

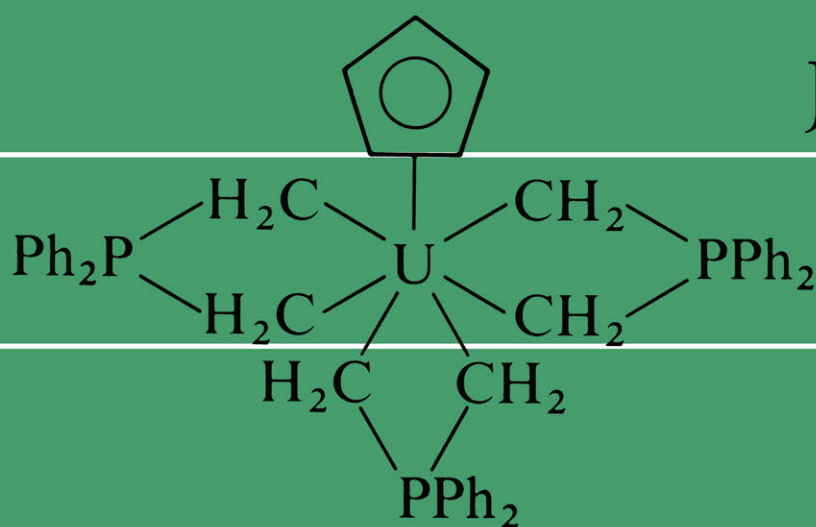
Organometallic Compounds of the

Lanthanides, Actinides and Early Transition Metals

Edited by D. J. Cardin, S.A. Cotton,

M. Green and

J. A. Labinger



SPRINGER-SCIENCE+BUSINESS MEDIA, B.V.

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Edited by

D. J. Cardin

Trinity College, Dublin

S. A. Cotton

Stanground School, Peterborough

M. Green

University of Bristol

J. A. Labinger

*Atlantic Richfield Company
Chatsworth, California*

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Contents

Preface	<i>page</i> vii
Introduction	ix
Am Americium	1
Bk Berkelium	3
Ce Cerium	5
Cf Californium	8
Cm Curium	10
Cr Chromium	12
Dy Dysprosium	40
Er Erbium	42
Eu Europium	46
Gd Gadolinium	48
Hf Hafnium	51
Ho Holmium	61
La Lanthanum	63
Lu Lutetium	65
Mn Manganese	70
Mo Molybdenum	93
Nb Niobium	118
Nd Neodymium	127
Np Neptunium	130
Pa Protactinium	132
Pm Promethium	134
Pr Praseodymium	136
Pu Plutonium	138
Re Rhenium	140
Sc Scandium	156

Contents

Sm	Samarium	159
Ta	Tantalum	163
Tb	Terbium	171
Tc	Technetium	173
Th	Thorium	176
Ti	Titanium	185
Tm	Thulium	211
U	Uranium	213
V	Vanadium	229
W	Tungsten	250
Y	Yttrium	275
Yb	Ytterbium	279
Zr	Zirconium	287
Name Index		309
Molecular Formula Index		337
CAS Registry Number Index		379

Preface

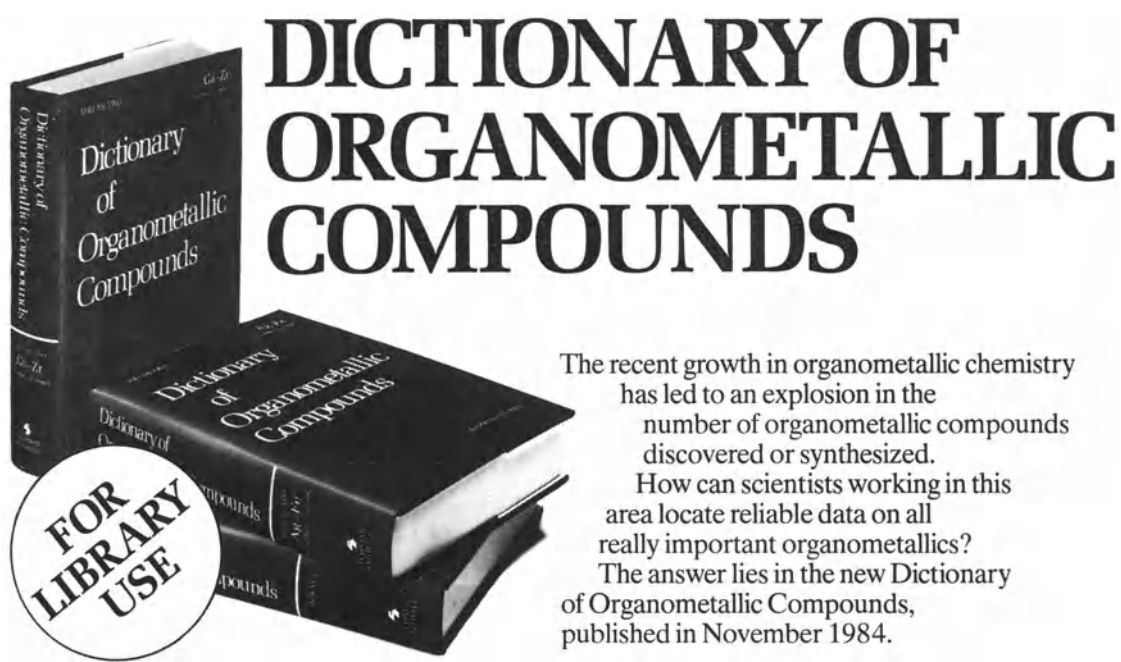
This is one of the first volumes to be published in the series of *Chapman and Hall Chemistry Sourcebooks* which provides carefully tailored information to workers in specialized areas of chemistry. The information contained in this book is derived from the *Dictionary of Organometallic Compounds*, published in November 1984.

The wide range of metals in this particular volume is of great interest to inorganic and organic chemists alike. Organic derivatives of several of the early transition elements are involved in commercial catalytic processes, particularly important examples being the use of titanium compounds in Ziegler-Natta polymerisation and molybdenum and tungsten intermediates in alkene metathesis. Reactions involving the organolanthanides and organoactinides have as yet been less well explored, but there is burgeoning interest in their synthesis. The large variety of compounds in this particular compendium will ensure its appeal to a wide readership.

The databank on the properties of organometallic compounds, which is represented in its current form by the *Dictionary of Organometallic Compounds* and its subset publications such as this volume, will be kept continuously up-to-date. Supplements to the main *Dictionary* will appear annually and revised editions of this *Sourcebook* will be published from time to time as demands permits.

D.J. Cardin
S.A. Cotton
M. Green
J.A. Labinger

This Sourcebook has been reproduced in part from the Dictionary of Organometallic Compounds. If you find it useful and you would like full coverage, then why not buy the Main Work for your library



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The recent growth in organometallic chemistry has led to an explosion in the number of organometallic compounds discovered or synthesized.

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Introduction

1. Using the Sourcebook

The *Sourcebook* is divided into element sections: within each section the arrangement of entries is in order of molecular formula according to the Hill convention (i.e. C, then H, then other elements in alphabetical sequence of element symbol; where no carbon is present, the elements including H are ordered strictly alphabetically).

Every entry is numbered to assist ready location and the entry number consists of a metal element symbol followed by a five-digit number.

Indexes

There are three printed indexes: a name index which lists every compound name or synonym in alphabetical order; a molecular formula index which lists all molecular formulae, including those of derivatives, in Hill convention order; and a CAS registry number index listing all CAS numbers included in the *Sourcebook* in serial order. All indexes refer to the entry number. In the name index an entry number which follows immediately upon an index term means that the term itself is used as the entry name but an entry number which is preceded by the word 'see' means that the term is a synonym to an entry name. In all three indexes an entry number which is preceded by the word 'in' refers the reader to a specified stereoisomer or derivative which is to be found embedded within the particular entry.

In addition to the three printed indexes, each element section (except where the section is very short) is preceded by a graphical structure index allowing the rapid visual location of compounds of interest. The structure index reproduces all structure diagrams present in that element section in reduced size and printed in entry number order.

The following paragraphs summarize important considerations in compiling the information in this *Sourcebook*. For more detailed information, see the Introduction to the *Dictionary of Organometallic Compounds* from which this *Sourcebook* derives.

2. Compound Selection

In compiling this *Sourcebook* the aim has been to include from the primary literature up to mid 1983:

(1) Compounds representative of all important structural types (typically, the parent member of each series, where known, together with a selection of its homologues).

(2) Any compound with an established use, such as in catalysis, as a synthetic reagent or starting material.

(3) Other compounds of particular chemical, structural, biological or historical interest, especially those thought to exhibit unusual bonding characteristics.

Some compounds which are not considered sufficiently important to justify separate entries of their own have been included as derivatives in the entries of other compounds. These may include for example:

(1) Organic derivatives in the classical sense.

(2) Donor-acceptor complexes.

(3) The various salts of an anion or cation. In nearly every case, the entry for an ionic substance refers to the naked anion or cation, and the molecular formula, molecular weight and CAS registry number given for the main entry are those of the ion, in agreement with current CAS practice. Salts of the ion with various counterions are then treated as derivatives and the molecular formulae of all of these are given.

(4) Oligomeric compounds. Where a compound is known in several states of molecular aggregation these are all included in the one entry, which usually refers to the monomer. Compounds which are known only in dimeric form are entered as such, but the hypothetical monomers are included as derivatives to ensure that the names and molecular formulae of the monomeric forms occur in the indexes.

All names and molecular formulae recorded for derivatives occur in the Name and Molecular Formula Indexes respectively.

3. Chemical Names and Synonyms

The naming of organometallic compounds is frequently problematic and so in selecting the range of alternative names to present for each compound or derivative, editorial policy has been to report names which are found in the literature, including *Chemical Abstracts*, and not to attempt to impose a system of nomenclature. The editorial generation of new names has therefore been kept to a minimum required by consistency. Most names given in the *Sourcebook* are those given in the original paper(s) and in *Chemical Abstracts*.

Names corresponding to those used by CAS during

the 8th, 9th, and 10th collective index periods (1967-71, 1972-6 and 1977-81 respectively) are labelled with the suffixes 8CI, 9CI and 10CI respectively.

4. Toxicity and Hazard Information

Toxicity and hazard information is highlighted by the sign ▷ which also appears in the indexes.

All organometallic compounds should be treated as if they have dangerous properties.

The information contained in the *Sourcebook* has been compiled from sources believed to be reliable. No warranty, guarantee or representation is made by the Publisher as to the correctness or sufficiency of any information herein, and the Publisher assumes no responsibility in connection therewith.

The specific information in this publication on the hazardous and toxic properties of certain compounds is intended to alert the reader to possible dangers associated with the use of those compounds. The absence of such information should not, however, be taken as an indication of safety in use or misuse.

5. Bibliographic References

The selection of references is made with the aim of facilitating entry into the literature for the user who wishes to locate more detailed information about a particular compound. Reference contents are frequently indicated using mnemonic suffixes. In general recent references are preferred to older ones, and the number of references quoted does not necessarily indicate the relative importance of a compound.

Journal abbreviations generally follow the practice of *Chemical Abstracts Service Source Index* (CASSI). In patent references, no distinction is made between patent applications and granted patents.

6. Sources of Further Information

The following books and review series provide more information about various aspects of organometallic chemistry. Lists of reviews specific to organic compounds of particular metals may be found in the introductory sections of the metals concerned.

General

Comprehensive Organometallic Chemistry, Wilkinson, G. *et al.* Eds, Pergamon, Oxford, 1982. This book represents the most complete and up to date review of the whole subject. In addition to sections

for each element there are chapters on the use of organometallics in organic synthesis and catalysis.

Comprehensive Inorganic Chemistry, Trotman-Dickenson, A.F. *et al.* Eds, Pergamon, Oxford, 1973. Contains information about organometallics as well as discussions of oxidation states, coordination chemistry and analysis of the metals.

Gmelins Handbuch der Anorganischen Chemie, 8th Edn, Springer-Verlag, Berlin. Some volumes of Gmelin covering organometallic compounds have been updated relatively recently and can therefore be consulted for comprehensive data on some types of organometallics. Some Gmelin element sections, however, are many years out of date.

Houben-Weyls Methoden der Organischen Chemie, 4th Edn, Band XIII, *Metallorganische Verbindungen*, Thieme-Verlag, Stuttgart.

The Chemistry of the Carbon-Metal Bond, Hartley, F.R. and Patai, S. Eds, Wiley, New York, 1982-. Contains sections on the synthesis, analysis and thermochemistry of various classes of organometallic compounds.

Transition-Metal Complexes of Phosphorus, Arsenic and Antimony Ligands, McAuliffe, C.A. Ed., Macmillan, London, 1973.

Methods of Elemento-Organic Chemistry, Kocheskov, K.A. Ed., North Holland, Amsterdam, 1967.

MTP International Review of Science: Inorganic Chemistry, Series 2, Emeléus, H.J. Ed., Butterworths, London; University Park Press, Baltimore, 1974-5.

Advances in Organometallic Chemistry, Academic Press, 1964-.

Annual Surveys of Organometallic Chemistry, Elsevier, 1964-7.

Organometallic Chemistry Reviews, Elsevier, 1966-7.

Organometallic Chemistry Reviews, Section A: Subject Reviews 1968-72.

Organometallic Chemistry Reviews, Section B: Annual Surveys 1968-74.

Journal of Organometallic Chemistry: This incorporates reviews and surveys after the discontinuation of the two series of *Organometallic Chemistry Reviews*.

Organometallic Chemistry, 1972-, (Specialist Periodical Reports), RSC.

Coordination Chemistry Reviews, Elsevier, 1966-.

Progress in Inorganic Chemistry, Interscience, 1959-.

Advances in Inorganic Chemistry and Radiochemistry, Academic Press, 1959-.

Analysis

Scott's Standard Methods of Chemical Analysis, Furman, N.H. Ed., 6th Edn, Van Nostrand, New York, 1962.

Crompton, T.R., *Chemical Analysis of Organometallic Compounds*, Academic Press, London, 1973.

Spectroscopy

Nuclear Magnetic Resonance Spectroscopy of Nuclei Other than the Proton, Axenrod, T. and Webb, G.A. Eds, Wiley, London, 1974.

NMR and the Periodic Table, Harris, R.K. and

Mann, B.E. Eds, Academic Press, London, 1978.

¹³C NMR Data for Organometallic Compounds, Mann, B.E. and Taylor, B.F. Eds, Academic Press, London, 1981.

Spectroscopic Properties of Inorganic and Organometallic Compounds, 1968-, (Specialist Periodical Reports), RSC.

Handling

Shriver, D.F., *The Manipulation of Air-Sensitive Compounds*, McGraw-Hill, 1969.

Organometallic Syntheses, Academic Press, New York, 1965, Vol. 1.

Am Americium

S. A. Cotton

Américium (Fr.), Americium (Ger.), Americio (Sp., Ital.), Америций (Amieritsii) (Russ.), アメリシウム (Japan.)

Atomic Number. 95

Atomic Weight. 243 (stablest isotope)

Electronic Configuration. [Rn] $5f^7 7s^2$

Oxidation State. +3

Coordination Number. See under Uranium

Colour. Reported Am(III) compounds are flesh-coloured.

Availability. Americium compounds are not generally available. The most suitable material for synthesis is AmCl_3 . The two most common isotopes are ^{241}Am ($t_{1/2} = 458\text{y}$) and the longer lived ^{243}Am ($t_{1/2} = 8.8 \times 10^3\text{y}$).

Handling. Extreme care is necessary in the handling of americium due to its acute toxicity.

Toxicity. Americium is an extremely toxic α - and γ -emitter.

Spectroscopy. Optical spectra have been used to study americium compounds.

Analysis. X-ray techniques are used to demonstrate that compounds are isomorphous with analogues of the stabler actinides.

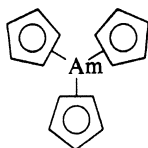
References. See under Uranium

C₁₅H₁₅Am

Am-00001

Tris(η^5 -2,4-cyclopentadien-1-yl)americium*Tricyclopentadienylamericium*

[1295-18-7]



M 438.284

Rose solid. Sol. C₆H₆, THF. Mp >330°. Subl. at 160-200° *in vacuo*. Glows in the dark. Slowly dec. in air.Baumgartner, F. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1966, **5**, 134 (*synth*)Kanellakopulos, B. *et al*, *Radiochim. Acta*, 1978, **25**, 89 (*synth, ir, uv*)

Bk Berkelium

S. A. Cotton

Berkélium (Fr.), Berkelium (Ger.), Berquelio or Berkelio (Sp.), Berchelio or Berkelio (Ital.), Берклий (Bierklii) (Russ.), パークリウム (Japan.)

Atomic Number. 97

Atomic Weight. 247 (stablest isotope, $t_{1/2} = 1.4 \times 10^3 \text{y}$)

Electronic Configuration. [Rn] $5f^7 7s^2$

Oxidation State. +3

Coordination Number. See under Uranium.

Colour. Amber.

Availability. Berkelium is not readily available. Anhydrous BkCl_3 formed by treatment of the oxide with HCl gas has been

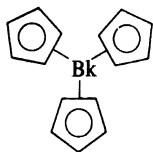
used as a starting material. See Laubereau, P. G. *et al.*, *Inorg. Chem.*, 1970, **9**, 109.

Handling. See under Plutonium.

Toxicity. See under Plutonium.

Analysis. See under Americium.

References. See under Uranium.

C₁₅H₁₅Bk**Bk-00001****Tris(η^5 -2,4-cyclopentadien-1-yl)berkelium***Tricyclopentadienylberkelium***M 442.284**Amber solid. Subl. at 135-65° *in vacuo*.Laubereau, P.G. *et al*, *Inorg. Chem.*, 1970, **9**, 1091 (*synth, uv*)

Ce Cerium

S. A. Cotton

Cérium (Fr.), Cer (Ger.), Cerio (Sp., Ital.), Церий (Tserii) (Russ.), セリウム (Japan.)

Atomic Number. 58

Atomic Weight. 140.12

Electronic Configuration. [Xe] $4f^1 5d^1 6s^2$

Oxidation States. +3 (+4 for certain incompletely characterised compounds).

Coordination Number. Usually 6 or greater.

Colour. The few reported complexes are generally yellow or green.

Availability. Common starting materials are CeO_2 and the more expensive anhydrous CeCl_3 .

Handling. See under Lanthanum.

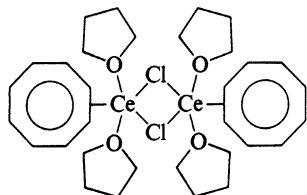
Toxicity. See under Lanthanum.

Isotopic Abundance. ^{138}Ce , 0.25%; ^{140}Ce , 88.48%; ^{142}Ce , 11.1%.

Spectroscopy. The Ce^{3+} ion has electronic configuration f^1 and its compounds would be expected to give ^1H nmr spectra with relatively small paramagnetic shifts, but no data have yet been reported for organometallics.

Analysis. See under Lanthanum.

References. See under Lanthanum.

C₈H₈CeCl**Ce-00001****Chloro(cyclooctatetraene)cerium***Di-μ-chlorobis(η⁸-1,3,5,7-cyclooctatetraene)dicerium, 9Cl*

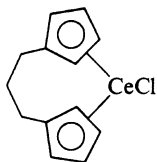
Bis-THF adduct

M 279.724

Bis-THF adduct is dimeric.

Bis-THF adduct: [12701-52-9].C₃₂H₄₈Ce₂Cl₂O₄ M 847.875Yellow-green cryst. Sol. dioxan, THF. Mp >345°. μ = 1.79μ_B. Extremely air- and moisture-sensitive.Hodgson, K.O. *et al*, *Inorg. Chem.*, 1972, **11**, 171 (*struct*)Hodgson, K.O. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 8650 (*synth, ir, uv, props*)**C₁₃H₁₄CeCl****Ce-00002****Chloro[1,3-propanediylbis(η⁵-2,4-cyclopentadien-1-ylidene)]-cerium**

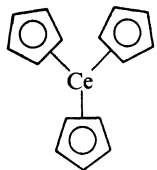
[75861-70-0]



M 345.827

Probably dimeric. Sol. THF. Mp >100°. Air- and moisture-sensitive. μ_{eff} = 2.00μ_B (306K).John, J.N. *et al*, *J. Coord. Chem.*, 1980, **10**, 177 (*synth*)**C₁₅H₁₅Ce****Ce-00003****Tris(η⁵-2,4-cyclopentadien-1-yl)cerium, 9Cl***Tri-π-cyclopentadienylcerium, 8Cl*

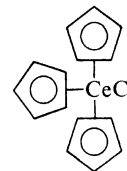
[1298-53-9]



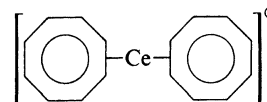
M 335.404

Orange cryst. Mp 435°. Subl. at 200-50° *in vacuo*, hydrol. by H₂O.*Cyclohexylisocyanide adduct:* [37298-97-8]. Sol. C₆H₆. Mp 134°.Wilkinson, G. *et al*, *J. Am. Chem. Soc.*, 1954, **76**, 6210 (*synth*)Reid, A.F. *et al*, *Inorg. Chem.*, 1966, **5**, 1213 (*synth*)Von Ammon, R. *et al*, *Ber. Bunsenges. Phys. Chem.*, 1972, **76**, 995 (*nmr, ir*)Devyatikh, G.G. *et al*, *Dokl. Akad. Nauk. SSSR*, 1973, **208**, 1094 (*ms*)**C₁₅H₁₅CeCl****Ce-00004****Chlorotris(η⁵-2,4-cyclopentadien-1-yl)cerium***Tricyclopentadienylcerium chloride*

[12636-79-2]



M 370.857

Dark-brown cryst. Insol. aromatic hydrocarbons, sol. most other org. solvs., e.g. pet. ether, THF, CHCl₃, MeOH. Mp 176° dec.Kalsotra, B.L. *et al*, *Isr. J. Chem.*, 1971, **9**, 569 (*synth, ir*)**C₁₆H₁₆Ce[⊖]****Ce-00005****Bis(η⁸-1,3-5,7-cyclooctatetraene)cerate(1-), 9Cl***Dicyclooctatetraenecerate(1-)*

M 348.422 (ion)

K salt: [51187-43-0].C₁₆H₁₆CeK M 387.521Pale-green solid. Mp >345°. Extremely air- and moisture-sensitive. μ = 1.88μ_B.*K salt, diglyme adduct:* [37328-32-8].C₂₂H₃₀CeKO₃ M 521.696

Bright-green plates. Air- and moisture-sensitive.

Mares, F. *et al*, *J. Organomet. Chem.*, 1970, **24**, C68 (*synth*)Hodgson, K.O. *et al*, *Inorg. Chem.*, 1972, **11**, 3030 (*struct*)Hodgson, K.O. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 8650 (*synth, ir, raman*)Clack, D.W. *et al*, *J. Organomet. Chem.*, 1976, **122**, C28.**C₁₈H₁₄CeCl₂****Ce-00006****Dichlorobis[(1,2,3,3a,7a-η)-1H-inden-1-yl]cerium, 9Cl**

[36354-35-5]

(C₉H₇)₂CeCl₂

M 441.335

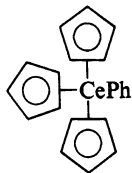
Red-brown cryst. Sol. THF, Me₂CO, C₆H₆, spar. sol. toluene, xylene. Mp 129-30° dec. Unaffected by water.Kalsotra, B.L. *et al*, *Isr. J. Chem.*, 1971, **9**, 569 (*synth, ir*)**C₂₀H₂₀Ce₂Cl₂****Ce-00007****Dichlorotetrakis(η⁵-2,4-cyclopentadien-1-yl)dicerium***Chlorobis(η⁵-2,4-cyclopentadien-1-yl)cerium dimer*[(C₅H₅)₂CeCl]₂

M 611.524

C₂₁H₂₀Ce

Ce-00008

Tris(η^5 -2,4-cyclopentadien-1-yl)phenylcerium, 9Cl
Tricyclopentadienylphenylcerium
 [39330-90-0]



M 412.509

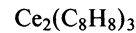
Red-brown cryst. Sol. pet. ether. Dec. by air.

Kalsotra, B.L. *et al*, *J. Inorg. Nucl. Chem.*, 1973, **35**, 311 (*synth*, *ir*)

C₂₄H₂₄Ce₂

Ce-00009

Tris(1,3,5,7-cyclooctatetraene)dicerium, 9Cl
 [60605-80-3]



M 592.694

Bright-green solid. Sol. THF. $\mu_{\text{eff}} = 1.86\mu_{\text{B}}$. Highly oxygen-sensitive. Stable to 250°.

Greco, A. *et al*, *J. Organomet. Chem.*, 1976, **113**, 321 (*synth*)

Ely, S.R. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 1624 (*synth*)

de Kock, C.W. *et al*, *Inorg. Chem.*, 1978, **17**, 625 (*synth*, *ir*)

Cf Californium

S. A. Cotton

Californium (Fr., Ger.), Californio (Sp., Ital.), Калифорний (Kalifornii) (Russ.), カリホルニウム or カリフォルニウム (Japan.)

Atomic Number. 98

Atomic Weight. 251 (stablest isotope, $t_{1/2} \sim 800\text{y}$)

Electronic Configuration. [Rn] $5f^{10} 7s^2$

Oxidation State. +3

Coordination Number. See under Uranium.

Colour. Red.

Availability. ^{249}Cf ($t_{1/2} = 360\text{y}$) is preferred over ^{252}Cf ($t_{1/2}$

= 2.65y) although the latter is produced in larger quantities.

Handling. See under Uranium and Plutonium.

Toxicity. See under Plutonium. ^{252}Cf is a particularly strong neutron emitter.

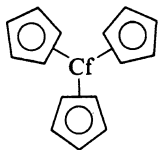
Analysis. See under Americium.

References. See under Uranium.

$C_{15}H_{15}Cf$

Cf-00001

Tris(η^5 -2,4-cyclopentadien-1-yl)californium
Tricyclopentadienylcalifornium



M 446.284

Ruby-red solid. Subl. at 135-320° *in vacuo*.Laubereau, P.G. *et al*, *Inorg. Chem.*, 1970, **9**, 1091 (*synth*)

Cm Curium

S. A. Cotton

Curium (Fr., Ger.), Curio (Sp., Ital.), Кюрий (Kiurii) (Russ.), キュリウム (Japan.)

Atomic Number. 96

Atomic Weight. 247 (stablest isotope, $t_{1/2} = 1.6 \times 10^7 \text{y}$)

Electronic Configuration. [Rn] $5f^7 6d^1 7s^2$

Oxidation State. +3

Coordination Number. See under Uranium.

Colour. Colourless.

Availability. ^{244}Cm ($t_{1/2} = 17.6 \text{y}$), formed by neutron bombardment of plutonium, is the most easily obtained isotope,

although like the other transuranium elements it is not generally available. CmCl_3 is probably the best starting material.

Handling. See under Uranium and Plutonium.

Toxicity. Like plutonium, curium is extremely toxic, and accumulates in the body.

Analysis. See under Americium.

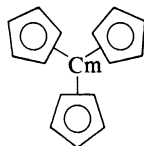
References. See under Uranium.

C₁₅H₁₅Cm

Cm-00001

Tris(η^5 -2,4-cyclopentadien-1-yl)curium*Tricyclopentadienylcurium*

[11077-58-0]



M 442.284

Colourless solid. Mp >300°. Subl. at 180° *in vacuo*.

Fluoresces red in uv light.

Baumgartner, F. *et al*, *J. Organomet. Chem.*, 1970, **22**, C17
(*synth, ms*)Laubereau, P.G. *et al*, *Inorg. Nucl. Chem. Lett.*, 1970, **6**, 59
(*synth*)

Cr Chromium

M. Green

Chrome (Fr.), Chrom (Ger.), Cromo (Sp., Ital.), Хром (Khrom) (Russ.), クロム (Japan.)

Atomic Number. 24

Atomic Weight. 51.996

Electronic Configuration. [Ar] $3d^5 4s^1$

Oxidation States. -4, -2, -1, 0, +1, +2, +3, +4.

Coordination Number. The most common coordination numbers with conventional ligands are 4, 5 and 6. Tetrahedral geometry is particularly common in oxidation states -1, 0, +1.

Colour. Variable including colourless, yellow, red, green and blue.

Availability. A range of starting materials are available including $\text{Cr}(\text{CO})_6$, anhydrous CrCl_3 , $\text{CrCl}_3 \cdot 3\text{THF}$ and $\text{Cr}(\text{C}_6\text{H}_6)_2$. The latter is moderately expensive. $\text{Cr}(\text{CO})_6$ is the starting material for almost all chromium-carbonyl chemistry and for many other Cr(0) species.

Handling. The group 6 and 7 carbonyls $[\text{M}(\text{CO})_6]$ ($\text{M} = \text{Cr}, \text{Mo}, \text{W}$) and $[\text{M}_2(\text{CO})_{10}]$ ($\text{M} = \text{Mn}, \text{Tc}, \text{Re}$) are air-stable materials and can be handled without special precautions. However, the simple anions $[\text{M}(\text{CO})_5]^{2-}$, $[\text{M}(\text{CO})_5]^-$, which are synthetically useful species are moisture-sensitive, and should normally be handled under a dry oxygen-free nitrogen atmosphere. The recently prepared group 6 anions $[\text{M}(\text{CO})_4]^{4-}$ are extremely pyrophoric. In contrast the halo-substituted anions $[\text{XM}(\text{CO})_5]^-$ ($\text{M} = \text{Cr}, \text{Mo}, \text{W}$) and the related group 7 species $[\text{XM}(\text{CO})_5]$ ($\text{M} = \text{Mn}, \text{Tc}, \text{Re}$) are air- and moisture-stable materials. Other important starting materials vary in stability, for example, simple η^5 -cyclopentadienyl

complexes such as $[\text{MoCl}(\text{CO})_3(\eta^5\text{-C}_5\text{H}_5)]$ and $[\text{Mn}(\text{CO})_3(\eta^5\text{-C}_5\text{H}_5)]$ can be handled without special precautions, whereas potentially important complexes such as $[\text{Mo}(\eta^6\text{-C}_6\text{H}_6)_2]$, $[\text{Cr}(\eta^5\text{-C}_5\text{H}_5)_2]$ and $[\text{Cr}(\eta^3\text{-C}_3\text{H}_5)_3]$ are air-sensitive and must be handled with care. Simple molecules such as WMe_6 containing carbon to metal σ -bonds are sensitive, whereas, $[\text{MeMn}(\text{CO})_5]$ or the rhenium analogue can be handled in air. Molecules containing metal to carbon multiple bonds such as carbene and carbyne complexes vary in stability and it is not possible to generalise. In all cases the original papers should be consulted, and in the case of air-sensitive materials suitable techniques such as those described in Shriver's book adopted.

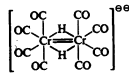
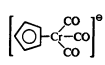
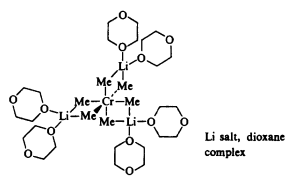
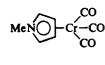
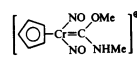
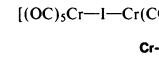
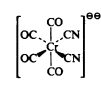
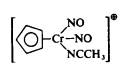
Toxicity. Chromium compounds are not regarded as highly toxic, but the carbonyl complexes should, as for other metals, be regarded as such.

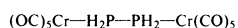
Isotopic Abundance. ^{50}Cr , 4.31%; ^{52}Cr , 83.76%; ^{53}Cr , 9.54%; ^{54}Cr , 2.38%. The radioisotope commonly used in tracer work is ^{51}Cr ($t_{1/2} \sim 27.7\text{d}$).

Spectroscopy. ^{53}Cr has $I = \frac{3}{2}$ and a low nmr detection sensitivity and there have been few reports of the use of this nucleus as an nmr probe.

Analysis. For standard methods of analysis, see *Scott's Standard Methods of Chemical Analysis*, Furman, N. H. Ed., 6th Edn, 1962.

References. General reviews are listed in the introduction to the *Sourcebook*.

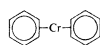
	Cr(CO) ₆ (O _h)	[Cr(CH ₂ Ph)(H ₂ O) ₅] ³⁺	
Cr-00001	Cr-00020	Cr-00036	Cr-00053
[Cr(CO) ₄] ³⁺	(OC) ₅ CrCNBH ₃ ⁺ (O _h)		
Cr-00002	Cr-00021	Cr-00037	Cr-00054
			(OC) ₅ Cr=C(CN)NMe ₂
Cr-00003	Cr-00022	Cr-00038	Cr-00055
(Me ₂ Tl) ₂ CrO ₄	As Cr-00022 with X = I	[(OC) ₅ Cr≡CNMe ₂] ⁺	
Cr-00004	Cr-00023	Cr-00039	Cr-00056
(OC) ₅ CrBr ⁺ (O _h)	[MeCr(CO) ₅] ⁺		
Cr-00005	Cr-00024	Cr-00040	Cr-00057
[(OC) ₅ CrCl] ⁺ (O _h)			
Cr-00006	Cr-00025	Cr-00041	Cr-00058
[(OC) ₅ CrI] ⁺ (O _h)		(OC) ₅ Cr=C(OMe)CH ₃	
Cr-00007	Cr-00026	Cr-00042	Cr-00059
Cr(CO) ₅ ²⁺			
Cr-00008	Cr-00027	Cr-00043	Cr-00060
[Cr(CO) ₅ OH] ⁺	(OC) ₅ CrAsH ₃ (O _h)	(OC) ₅ Cr=CHNMe ₂	
Cr-00009	Cr-00010	Cr-00044	
(OC) ₅ CrAsH ₃ (O _h)	(OC) ₅ CrNH ₃ (O _h)	(OC) ₅ Cr=C(CH ₃)NHMe	
Cr-00011	Cr-00012	Cr-00045	Cr-00061
Cr(CO) ₅ PH ₃	(OC) ₅ CrNCSMe		
Cr-00012	Cr-00028	Cr-00046	Cr-00062
(OC) ₅ CrSbH ₃ (O _h)	[(OC) ₅ CrCOCH ₃] ⁺ (O _h)	Cr(CO) ₅ PMe ₃	As Cr-00062 with X = Cl
Cr-00013	Cr-00029	Cr-00047	Cr-00063
(OC) ₅ CrNH ₂ NH ₂ (O _h)		(OC) ₅ CrS=PMe ₃ (O _h)	Cr-00064
Cr-00014	Cr-00030	Cr-00048	Cr-00065
	As Cr-00032 with X = NS		
Cr-00015	Cr-00031	Cr-00049	Cr-00066
[(OC) ₅ CrCN] ⁺ (O _h)		(Et ₂ Tl) ₂ CrO ₄	
Cr-00016	Cr-00032	Cr-00050	Cr-00067
	(OC) ₅ Cr=C(NH ₂)CH ₃		
Cr-00017	Cr-00033	Cr-00051	
(OC) ₅ CrCS (O _h)	(OC) ₅ CrSMe ₂ (O _h)		
Cr-00018	Cr-00034	Cr-00052	
(OC) ₅ CrCSe (O _h)			
Cr-00019	Cr-00035		



Cr-00068



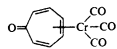
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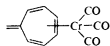
Cr-00101

As Cr-00072 with
R = CH₂SiMe₃

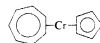
Cr-00116



Cr-00069



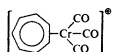
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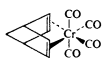
Cr-00102

As Cr-00072 with
R = CH₂SnMe₃

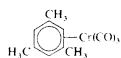
Cr-00117



Cr-00070



Cr-00087



Cr-00103

[MeCrCl₂(THF)₃]

Cr-00118



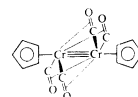
Cr-00071

As Cr-00072 with
R = COCH₃

Cr-00088



Cr-00104



Cr-00120



Cr-00072

As Cr-00072 with
R = COOMe

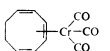
Cr-00089

As Cr-00072 with
R = SiMe₃

Cr-00105



Cr-00073



Cr-00090

As Cr-00072 with
R = SnMe₃

Cr-00106

As Cr-00097 with
X = CH₃

Cr-00121



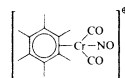
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Cr-00091



Cr-00107



Cr-00122



Cr-00075



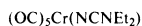
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Cr-00108



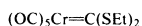
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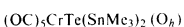
Cr-00076

M = Cr

Cr-00093



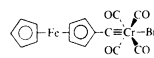
Cr-00077



Cr-00093



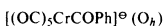
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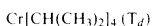
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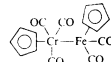
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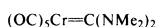
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Cr-00110



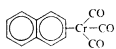
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Cr-00079



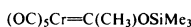
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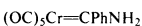
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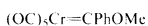
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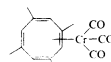
Cr-00080



Cr-00096



Cr-00112



Cr-00127

As Cr-00003 with
R = Me

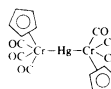
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Cr-00097



Cr-00113



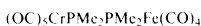
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Cr-00082

As Cr-00097 with
X = F

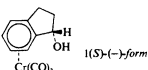
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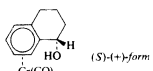
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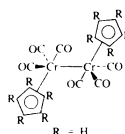
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Cr-00099



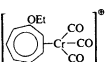
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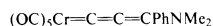
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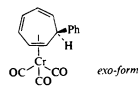
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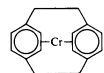
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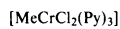
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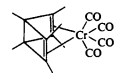
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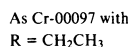
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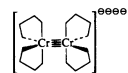
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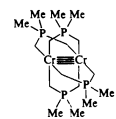
Cr-00134



Cr-00135



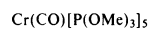
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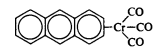
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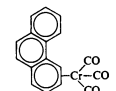
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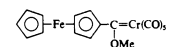
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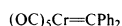
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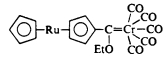
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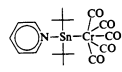
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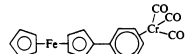
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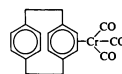
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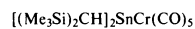
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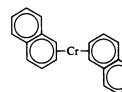
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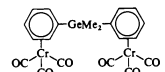
Cr-00147



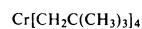
Cr-00148



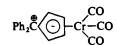
Cr-00149



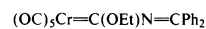
Cr-00150



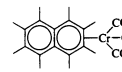
Cr-00151



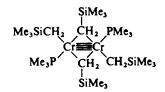
Cr-00152



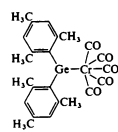
Cr-00153



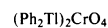
Cr-00154



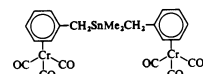
Cr-00155



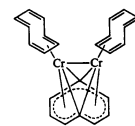
Cr-00156



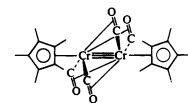
Cr-00157



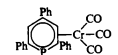
Cr-00158



Cr-00159



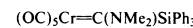
Cr-00160



Cr-00161



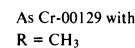
Cr-00162



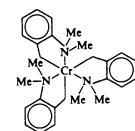
Cr-00163



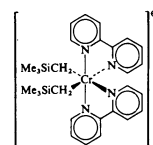
Cr-00164



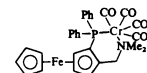
Cr-00165



Cr-00166



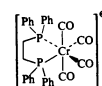
Cr-00167



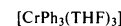
Cr-00168



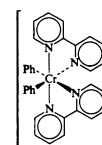
Cr-00169



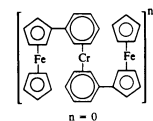
Cr-00170



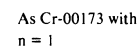
Cr-00171



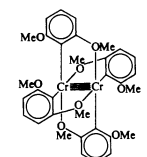
Cr-00172



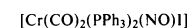
Cr-00173



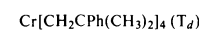
Cr-00174



Cr-00175



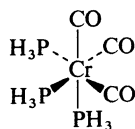
Cr-00177



Cr-00178

C₃H₉CrO₃P₃**Tricarbonyltris(phosphine)chromium, 9Cl**

[25885-03-4]

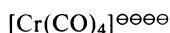


M 238.020

Mp 130° dec.

fac-form

Yellow cryst.

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1969, **18**, P26 (*synth*)Guggenberger, L.S. *et al*, *Inorg. Chem.*, 1973, **12**, 1143.Huttner, G. *et al*, *J. Organomet. Chem.*, 1973, **47**, 383 (*cryst struct*)**C₄CrO₄^{−−−−}****Tetracarbonylchromate(4−)**

M 164.038 (ion)

Tetra-Na salt: [67202-62-4].C₄CrNa₄O₄ M 255.997

▷Pyrophoric

Ellis, J.E. *et al*, *J. Am. Chem. Soc.*, 1983, **105**, 2296 (*synth*)**Cr-00001**C₉H₁₂BrCrNO₅

M 346.098

Orange cryst.

Abel, E.W. *et al*, *J. Chem. Soc.*, 1963, 2068 (*synth*)Knoll, L., *J. Organomet. Chem.*, 1979, **182**, 77 (*props*)Chatt, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 2032.Cotton, F.A. *et al*, *Inorg. Chem.*, 1981, **20**, 578 (*props*)Nixon, J.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 199 (*props*)**C₅CrClO₅[−]****Pentacarbonylchlorochromate(1−), 9Cl**

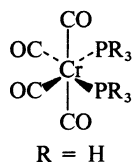
[14911-56-9]



M 227.501 (ion)

Tetraethylammonium salt: [14780-95-1].C₁₃H₂₀CrClNO₅ M 357.754Yellow cryst. Sol. CHCl₃, insol. Et₂O.*Bis(triphenylphosphine)iminium salt*: [65650-76-2].C₄₁H₃₀ClCrNO₅P₂ M 766.088Yellow cryst. ir ν_{CO} 2059, 1926, 1854 cm^{−1}.Abel, E.W. *et al*, *J. Chem. Soc.*, 1963, 2068 (*synth*)Grillone, M.D., *Transition Met. Chem.*, 1981, **6**, 93 (*synth*)Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 398 (*props*)**Cr-00006****C₄H₆CrO₄P₂****Tetracarbonylbis(phosphine)chromium, 9Cl**

[25885-01-2]



R = H

M 232.033

cis-form

Pale-yellow cryst.

Fischer, E.O. *et al*, *Chem. Ber.*, 1969, **102**, 2547 (*synth*)Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1969, **18**, P26.Guggenberger, L.S. *et al*, *Inorg. Chem.*, 1973, **12**, 1143 (*cryst struct*)**Cr-00003****C₅CrIO₅[−]****Pentacarbonyliodochromate(1−), 10Cl**

[14780-98-4]



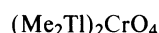
M 318.953 (ion)

Tetraethylammonium salt:C₁₃H₂₀CrINO₅ M 449.205

Orange cryst.

Methyltriphenylphosphonium salt: [76309-27-8].C₂₄H₁₈CrIO₅P M 596.277

Orange cryst.

Abel, E.W. *et al*, *J. Chem. Soc.*, 1963, 2068 (*synth*)*Organomet. Synth.*, 1965, **1**, 122 (*synth*)Angelici, R.J. *et al*, *Inorg. Chem.*, 1980, **19**, 3853 (*props*)Grim, S. *et al*, *Inorg. Chem.*, 1980, **19**, 2475 (*props*)Magomedov, G.K. *et al*, *Zh. Obshch. Khim.*, 1980, **50**, 2623 (*props*)**Cr-00007****C₄H₁₂CrO₄Tl₂****Tetramethyl[μ-[chromato(2−)-O:O′]]dithallium**
Dimethylthallium chromate

M 584.898

Yellow cryst. (Me₂CO aq.). Sol. H₂O, EtOH. Mp 255°.

▷Toxic

Goddard, A.E., *J. Chem. Soc.*, 1921, 672 (*synth*)**Cr-00004****C₅BrCrO₅[−]****Bromopentacarbonylchromate(1−), 9Cl**

[14911-72-9]



M 271.952 (ion)

Tetramethylammonium salt: [14780-93-9].**Cr-00005****C₅CrO₅^{−−}****Pentacarbonylchromate(2−), 9Cl**

M 192.048 (ion)

Trigonal bipyramidal struct.

Di-Na salt: [51233-19-3].C₅CrNa₂O₅ M 238.028

Reactive anion, readily oxidised.

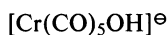
Di-Cs salt: [57127-95-4].C₅CrCs₂O₅ M 457.859

Reactive anion.

Behrens, H. *et al*, *Z. Anorg. Allg. Chem.*, 1960, **306**, 94 (*props*)Behrens, H. *et al*, *Chem. Ber.*, 1967, **96**, 2220 (*props*)Behrens, H. *et al*, *Z. Naturforsch., B*, 1973, **18**, 276 (*synth*)Ellis, J.E. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 7825 (*synth*)Ellis, J.E. *et al*, *J. Organomet. Chem.*, 1975, **97**, 79 (*props*)Ellis, J.E. *et al*, *Inorg. Chem.*, 1977, **16**, 1357 (*synth, props*)**Cr-00008****C₅HCrO₆[−]****Pentacarbonylhydroxychromate(1−)**

[55000-28-7]

Cr-00009



M 209.055 (ion)

K salt, Dibenzo-18-crown-6-complex: Yellow cryst.Cihonski, J.L. *et al*, *Inorg. Chem.*, 1975, **14**, 1717 (*synth, ir, raman*)**C₅H₃AsCrO₅****Cr-00010****(Arsine)pentacarbonylchromium, 8Cl***Pentacarbonylarsinechromium*

[29454-58-8]



M 269.993

Yellow cryst. Mp 69-70°.

Dobson, G.R. *et al*, *Inorg. Chim. Acta*, 1967, **1**, 287 (*synth*)Fischer, E.O. *et al*, *Chem. Ber.*, 1970, **103**, 1815.Fischer, E.O. *et al*, *Chem. Ber.*, 1971, **104**, 986 (*synth*)**C₅H₃CrNO₅****Cr-00011****Amminepentacarbonylchromium, 9Cl**

[15228-27-0]



M 209.078

Yellow cryst. Mp 150°.

Behrens, H. *et al*, *Chem. Ber.*, 1964, **97**, 433 (*synth*)Strohmeier, W. *et al*, *Chem. Ber.*, 1966, **99**, 3419 (*synth*)Lloyd, D.R. *et al*, *J. Chem. Soc., Faraday Trans. 2*, 1974, 1418 (*pe*)Sellmann, D. *et al*, *Angew. Chem.*, 1975, **87**, 772 (*props*)Sellmann, D. *et al*, *J. Organomet. Chem.*, 1976, **111**, 303 (*props*)**C₅H₃CrO₅P****Cr-00012****Pentacarbonyl(phosphine)chromium, 9Cl**

[18116-53-5]



M 226.045

Pale-yellow cryst. by subl. Mp 116°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1969, **102**, 2547 (*synth*)Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1969, **18**, P26.Guggenberger, L.S. *et al*, *Inorg. Chem.*, 1973, **12**, 1143.**C₅H₃CrO₅Sb****Cr-00013****Pentacarbonyl(stibine)chromium, 8Cl**

[32356-12-0]



M 316.822

Orange-yellow cryst. Mp 44°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1971, **104**, 986 (*synth, ir, nmr*)**C₅H₄CrN₂O₅****Cr-00014****Pentacarbonyl(hydrazine-*N*)chromium, 9Cl**

[30092-08-1]

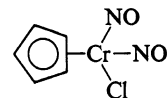


M 224.093

Yellow cryst. Mp 120-8°.

Sellman, D., *Z. Naturforsch., B*, 1970, **25**, 890 (*synth*)Sellman, D. *et al*, *J. Organomet. Chem.*, 1976, **111**, 303 (*synth, props, ir, nmr*)**C₅H₅ClCrN₂O₂****Cr-00015****Chloro(η⁵-2,4-cyclopentadien-1-yl)dinitrosylchromium, 9Cl**
Cyclopentadienyldinitrosylchlorochromium

[12071-51-1]



M 212.556

Golden needles by vac. subl. at ca. 70°. Dec. ca. 140° without melting.

Carter, O.L. *et al*, *J. Chem. Soc. (A)*, 1966, 1095 (*struct*)Legzdins, P. *et al*, *Inorg. Chem.*, 1975, **14**, 1875 (*synth, ms*)Herberhold, M. *et al*, *Isr. J. Chem.*, 1977, **15**, 206 (*synth*)*Inorg. Synth.*, 1978, **18**, 129 (*synth, pmr*)Müller, J. *et al*, *J. Organomet. Chem.*, 1979, **169**, 25 (*ms*)**C₆CrNO₅[⊖]****Cr-00016****Pentacarbonyl(cyano-*C*)chromate(1-), 9Cl**

[14971-28-9]



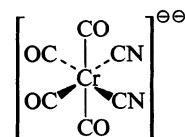
M 218.066 (ion)

Na salt: [14971-41-6].C₆CrNNaO₅ M 241.055

White cryst.

Bis(triphenylphosphine)iminium salt: [22043-86-3].C₄₂H₃₀CrN₂O₅P₂ M 756.653

White cryst.

(THF)₃Cr(3+) salt: [62997-61-9].C₃₀H₂₄Cr₄N₃O₁₈ M 922.513Red-brown cryst. Sol. C₆H₆.Behrens, H. *et al*, *Z. Anorg. Allg. Chem.*, 1960, **306**, 94 (*props*)Seyferth, D. *et al*, *J. Am. Chem. Soc.*, 1960, **82**, 1080 (*props*)King, R.B., *Inorg. Chem.*, 1967, **6**, 25 (*synth, props*)Behrens, U. *et al*, *J. Organomet. Chem.*, 1977, **131**, 65 (*synth, struct*)**C₆CrN₂O₄^{⊖⊖}****Cr-00017****Tetracarbonyldicyanochromate(2-)**

M 216.073 (ion)

*cis-form**Bis(triphenylphosphine)iminium salt*: [22142-87-6].C₄₂H₃₀CrN₂O₄P₂ M 754.660

White, air-stable cryst.

Behrens, H. *et al*, *Z. Anorg. Allg. Chem.*, 1960, **306**, 94.Behrens, H. *et al*, *Chem. Ber.*, 1964, **97**, 433 (*synth*)Ruff, J.K., *Inorg. Chem.*, 1969, **8**, 86 (*synth*)**C₆CrO₅S****Cr-00018****(Carbonothioyl)pentacarbonylchromium, 9Cl**

[50358-90-2]



M 236.119

Air- and moisture-stable yellow cryst. Sol. hexane.

Angelici, R.J. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 7516 (*synth*)
 Butler, I.S. *et al*, *Inorg. Chem.*, 1976, **15**, 2602 (*ir*)
 Poliakov, M. *et al*, *Inorg. Chem.*, 1976, **15**, 2022.
 Lichtenberger, D.L. *et al*, *Inorg. Chem.*, 1976, **15**, 2015 (*uv*)
 Butler, I.S. *et al*, *J. Organomet. Chem.*, 1977, **132**, C1 (*synth*)
 Saillard, J.Y. *et al*, *Acta Crystallogr., Sect. B*, 1978, **34**, 3318 (*cryst struct*)

C₆CrO₅Se**Cr-00019****(Carbonoselenoyl)pentacarbonylchromium, 10Cl**

[63356-87-6]



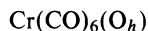
M 283.019

Highly volatile, air-stable deep-yellow cryst.

Butler, I.S. *et al*, *J. Organomet. Chem.*, 1977, **132**, C1 (*synth*)
 Butler, I.S. *et al*, *Z. Anorg. Allg. Chem.*, 1978, **446**, 17.
 Butler, I.S. *et al*, *Inorg. Chim. Acta*, 1979, **32**, 113 (*pe*)
 Wilkinson, J.R. *et al*, *J. Organomet. Chem.*, 1979, **179**, 159 (*nmr*)
 English, A.M. *et al*, *J. Organomet. Chem.*, 1981, **205**, 177 (*synth*)
 Plowman, K.R. *et al*, *Inorg. Chem.*, 1981, **20**, 2553 (*ir*)

C₆CrO₆**Cr-00020****Chromium carbonyl, 10Cl, 9Cl, 8Cl**

Hexacarbonylchromium. Chromium hexacarbonyl
 [13007-92-6]



M 220.058

Catalyst for hydrogenation, isomerisation, water gas shift reaction and alkylation of aromatic hydrocarbons.
 Colourless cryst. (methylcyclohexane or by subl.). Sl. sol. CCl₄, insol. H₂O, EtOH, Et₂O. Mp 152-5°.

▶ Explodes at 210°. GB5075000.

Podall, H.E. *et al*, *J. Am. Chem. Soc.*, 1961, **83**, 2057 (*synth*)
 Whitaker, A. *et al*, *Acta Crystallogr.*, 1967, **23**, 977 (*cryst struct*)
 Rieke, R. *et al*, *J. Org. Chem.*, 1974, **76**, C19 (*synth*)
 Bodner, G.M., *Inorg. Chem.*, 1975, **14**, 2694 (*cmr*)
 Jost, A. *et al*, *Acta Crystallogr., Sect. B*, 1975, **31**, 2649 (*nd*)
 Michels, G.D. *et al*, *Inorg. Chem.*, 1980, **19**, 479.
 Fieser, M. *et al*, *Reagents for Organic Synthesis*, Wiley, 1967-83, **8**, 110.
 Sax, N.I., *Dangerous Properties of Industrial Materials*, 5th Ed., Van Nostrand-Reinhold, 1979, .
 Hazards in the Chemical Laboratory, (Bretherick, L., Ed.), 3rd Ed., Royal Society of Chemistry, London, 1981, .

C₆H₃BCrNO₅[⊖]**Cr-00021****Pentacarbonyl[(cyano-C)trihydroborato(1-)-N]chromate(1-), 9Cl**

M 231.899 (ion)

Mp >170° dec.

Tetramethylammonium salt: [52138-78-0].

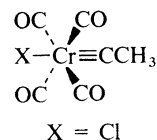
C₁₀H₁₅BCrN₂O₅ M 306.045

Yellow cryst.

King, R.B. *et al*, *J. Organomet. Chem.*, 1974, **65**, 71 (*synth, ir, nmr*)

C₆H₃ClCrO₄**Cr-00022****Tetracarbonylchloroethylidynchromium, 10Cl**

[62938-49-2]



M 226.536

Yellow cryst. Struct. by analogy with Tetracarbonyldoethylidynchromium, Cr-00023.

Fischer, E.O. *et al*, *Chem. Ber.*, 1976, **109**, 1673.
 Hans, J. *et al*, *J. Organomet. Chem.*, 1981, **216**, 235.

C₆H₃CrIO₄**Cr-00023****Tetracarbonyliodoethylidynchromium, 9Cl**

[50701-14-9]

As Tetracarbonylchloroethylidynchromium, Cr-00022 with



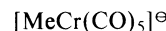
M 317.988

Cryst.

Fischer, E.O. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1973, **12**, 564 (*synth, nmr*)
 Huttner, G. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1974, **13**, 609 (*cryst struct*)

C₆H₃CrO₅[⊖]**Cr-00024**

Pentacarbonylmethylchromate(1-), 9Cl
Methylpentacarbonylchromium(-1)

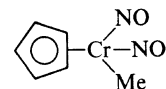


M 207.083 (ion)

(Ph₃P)₂N[⊖] salt: [62197-85-7]. (T-4)Triphenyl(P,P-P-triphenylphosphineimidato-N)phosphorus(1+) pentacarbonylmethylchromate(1-), 9Cl. Bis(triphenylphosphine)iminium methylpentacarbonylchromate.
 C₄₂H₃₃CrNO₅P₂ M 745.670
 Yellow cryst.

Ellis, J.E. *et al*, *Inorg. Chem.*, 1977, **16**, 1357.**C₆H₈CrN₂O₂****Cr-00025****(η⁵-2,4-Cyclopentadienyl)methyldinitrosylchromium**

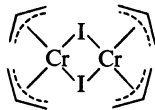
Methyldinitrosyl(η⁵-2,4-cyclopentadien-1-yl)chromium
 [53522-59-1]



M 192.137

Red cryst.

Piper, T.S. *et al*, *J. Inorg. Nucl. Chem.*, 1956, **3**, 104 (*synth*)
 Wojcicki, A. *et al*, *Inorg. Chem.*, 1980, **19**, 3803 (*synth, props*)

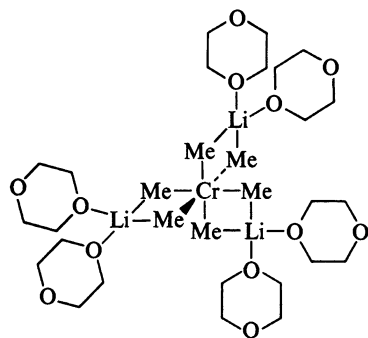
C₆H₁₀CrI**Cr-00026****Iodobis(η³-2-propenyl)chromium, 9Cl***Bis(allyl)chromium iodide. Diallyliodochromium*

M 261.046

Dimeric.

*Dimer: [12154-13-1]. Di-μ-iodotetrakis(η³-2-propenyl)dichromium, 9Cl. Tetraallyldiiododichromium.*C₁₂H₂₀Cr₂I₂ M 522.091

Air-sensitive red cryst.

Wilke, E. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1966, **5**, 151
(*synth, props*)**C₆H₁₈Cr⁺⁺⁺****Cr-00027****Hexamethylchromate(3-), 9Cl**Li salt, dioxane
complex

M 142.204 (ion)

*Tri-Li salt: [15335-69-0].*C₆H₁₈CrLi₃ M 163.027

Obt. as dioxane complex.

Krause, J. *et al*, *J. Organomet. Chem.*, 1974, **65**, 215 (*synth, cryst struct*)**C₇H₃CrNO₅S****Cr-00028****Pentacarbonyl(methyl thiocyanate-N)chromium, 10Cl**

[57196-01-7]

(OC)₅CrNCSMe

M 265.160

Yellow cryst. Mp 39-41° dec.

Quick, M.H. *et al*, *Inorg. Chem.*, 1976, **15**, 160 (*synth*)Goddard, R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 1255
(*synth, cryst struct*)**C₇H₃CrO₆[⊖]****Cr-00029****Acetylpentacarbonylchromate(1-), 9Cl**[(OC)₅CrCOCH₃][⊖] (O_h)

M 235.093 (ion)

*Li salt: [38883-45-3].*C₇H₃CrLiO₆ M 242.034

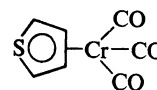
Reactive.

*Tetramethylammonium salt: [75112-13-9].*C₁₁H₁₅CrNO₆ M 309.239

Pale cryst. Mp 175° dec.

Fischer, E.O. *et al*, *Chem. Ber.*, 1967, **100**, 2445 (*synth*)Aumann, R. *et al*, *Chem. Ber.*, 1968, **101**, 954 (*props*)Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1972, **40**, 159 (*props*)*Inorg. Synth.*, 1977, **17**, 95 (*synth*)Klinger, R.J. *et al*, *Inorg. Chem.*, 1981, **20**, 34 (*synth*)**C₇H₄CrO₃S****Cr-00030****Tricarbonylthiophenechromium, 8Cl**

[12078-15-8]



M 220.163

Red cryst.

Bailey, M.F. *et al*, *Inorg. Chem.*, 1965, **4**, 1306 (*cryst struct*)Ofel, K. *et al*, *Chem. Ber.*, 1966, **99**, 1732.Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1967, **8**, P5 (*synth*)Ofel, K. *et al*, *J. Organomet. Chem.*, 1971, **30**, 211 (*cryst struct*)**C₇H₅CrNO₂S****Cr-00031****Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)thionitrosylchromium, 10Cl**

[66539-91-1]

As Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)nitrosylchromium, Cr-00032 with

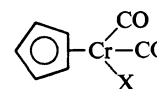
X = NS

M 219.178

Red cryst. Mp 68-9°.

Greenhough, T.J. *et al*, *Inorg. Chem.*, 1979, **18**, 3548 (*synth, cryst struct*)Hubbard, J.L. *et al*, *Inorg. Chem.*, 1980, **19**, 1388 (*pe*)**C₇H₅CrNO₃****Cr-00032****Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)nitrosylchromium, 10Cl***Cyclopentadienyldicarbonylnitrosylchromium*

[36312-04-6]



X = NO

M 203.117

Orange cryst. Mp 67-8°. Subl. at 60-80° *in vacuo*.Fischer, E.O. *et al*, *Chem. Ber.*, 1961, **94**, 93 (*synth*)Müller, J., *J. Organomet. Chem.*, 1970, **23**, C38 (*ms*)Ball, D.E. *et al*, *J. Organomet. Chem.*, 1973, **55**, C24 (*props*)Mintz, E.A. *et al*, *J. Organomet. Chem.*, 1977, **137**, 199 (*props*)*Inorg. Synth.*, 1978, **18**, 126 (*synth*)Atwood, J.L. *et al*, *J. Organomet. Chem.*, 1979, **165**, 65 (*props, cryst struct*)Herberhold, M. *et al*, *J. Organomet. Chem.*, 1980, **191**, 79
(*props*)**C₇H₅CrNO₅****Cr-00033****(1-Aminoethylidene)pentacarbonylchromium, 9Cl**

[22852-50-2]

(OC)₅Cr=C(NH₂)CH₃

M 235.116

Pale-yellow cryst. Sol. org. solvs. Mp 76-7°.

Klabunde, U. *et al*, *J. Am. Chem. Soc.*, 1967, **89**, 7141.

Moser, E. *et al*, *J. Organomet. Chem.*, 1968, **12**, P1 (*synth*)
 Fischer, E.O. *et al*, *Chem. Ber.*, 1971, **104**, 1339 (*synth*)
 Block, T.F. *et al*, *J. Organomet. Chem.*, 1977, **139**, 235.
 Doetz, K.H. *et al*, *Chem. Ber.*, 1980, **113**, 3597 (*props*)

C₇H₆CrO₅S**Cr-00034****Pentacarbonyl(dimethyl sulfide)chromium**

Pentacarbonyl[thiobis[methane]]chromium, 9Cl
 [31172-83-5]

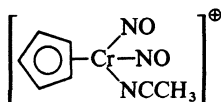


M 254.177

Yellow oil. Mp 9°.

Ehrl, W. *et al*, *Chem. Ber.*, 1970, **103**, 3563 (*synth*)Raubenheimer, H.G. *et al*, *J. Organomet. Chem.*, 1976, **112**, 145 (*synth, derivs*)Herberhöld, M. *et al*, *J. Chem. Res. (S)*, 1977, 246 (*synth*)**C₇H₈CrN₃O₂⁺****Cr-00035****Acetonitrile(η⁵-2,4-cyclopentadien-1-yl)dinitrosylchromium(1+)**

[74924-58-6]



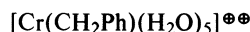
M 218.155 (ion)

Hexafluorophosphate: [74924-59-7].C₇H₈CrF₆N₃O₂P M 363.119

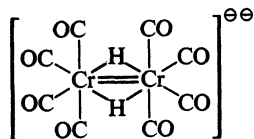
Useful starting material. Green cryst.

Wojcicki, A. *et al*, *Inorg. Chem.*, 1980, **19**, 3803 (*synth, props*)**C₇H₁₇CrO₅⁺⁺****Cr-00036****Pentaaquabenzylchromium(2+)***Pentaaqua(phenylmethyl)chromium(2+)*

[34788-74-4]



M 233.204 (ion)

Anet, F.A.L., *Can. J. Chem.*, 1959, **37**, 58.Kochi, J.K. *et al*, *J. Am. Chem. Soc.*, 1961, **83**, 2017.Sneeden, R.P.A. *et al*, *J. Organomet. Chem.*, 1966, **6**, 542.Taube, H. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 1117.**C₈H₂Cr₂O₈⁼⁼****Cr-00037****Octacarbonyl-μ-dihydrodichromate(2-)**

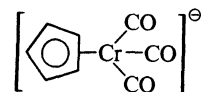
M 330.091 (ion)

Bis(tetraethylammonium) salt: [84850-72-6].C₂₄H₄₂Cr₂N₂O₈ M 590.596

Air-sensitive burgundy cryst.

Ellis, J.E. *et al*, *J. Am. Chem. Soc.*, 1983, **105**, 2296 (*synth*)**C₈H₅CrO₃⁻****Cr-00038****Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)chromate(1-)**

[48121-47-7]



M 201.122 (ion)

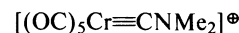
Has wide synthetic utility.

Na salt: [12203-12-2].C₈H₅CrO₃Na M 224.111

Air- and moisture-sensitive.

Inorg. Synth., 1963, **7**, 99 (*synth*)Burlitch, J.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 828 (*props*)Ellis, J.E. *et al*, *J. Organomet. Chem.*, 1975, **99**, 263 (*synth*)Hackett, P. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1606 (*props*)Pedersen, S.E. *et al*, *Inorg. Chem.*, 1975, **14**, 2365 (*props*)**C₈H₆CrNO₅⁺****Cr-00039****Pentacarbonyl[(dimethylamino)methylidyne]chromium(1+), 9Cl**

[61170-98-7]



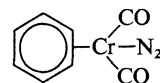
M 248.135 (ion)

Hexafluorophosphate: [61771-01-5].C₈H₆CrF₆NO₅P M 393.099

Red cryst.

Tetrachloroborate: [61770-99-8].C₈H₆BCl₄CrNO₅ M 400.757Fischer, E.O. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1976, **15**, 616 (*synth*)Hartshorn, A.J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1976, 761 (*synth, props*)Fischer, H. *et al*, *Angew. Chem.*, 1981, **93**, 483 (*props*)**C₈H₆CrN₂O₂****Cr-00040****(η⁶-Benzene)dicarbonyl(dinitrogen)chromium, 9Cl***Dicarbonyl(dinitrogen)(η⁶-benzene)chromium*

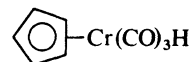
[38904-62-0]



M 214.144

Somewhat unstable, disproportionates to [(η⁶-C₆H₆)-(OC)₂CrN₂Cr(CO)₂(η⁶-C₆H₆)].Strohmeier, W. *et al*, *Chem. Ber.*, 1964, **97**, 1877 (*synth*)Sellmann, D. *et al*, *Z. Naturforsch., B*, 1972, **27**, 465, 718 (*synth*)**C₈H₆CrO₃****Cr-00041****Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)hydrochromium, 9Cl***Tricarbonyl-π-cyclopentadienylhydrochromium*, 8Cl.*Cyclopentadienyltricarbonylchromium hydride. Cyclopentadienylhydridotricarbonylchromium. Hydridotri-**carbonyl(π-cyclopentadienyl)chromium*

[36495-37-1]



M 202.130

Yellow cryst. Mp 57-8° dec. V. air-sensitive. Dec. slowly at r.t., rapidly at Mp, evolving H₂. Readily volatile.

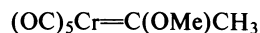
Acidic; dissolves in alkalis → solution of

[C₅H₅Cr(CO)₃]⁻.

Fischer, E.O. *et al*, *Z. Naturforsch., B*, 1955, **10**, 140 (*synth*)
 Piper, T.S. *et al*, *J. Inorg. Nucl. Chem.*, 1956, **3**, 104 (*pmr, ir*)
 Fischer, E.O. *et al*, *Chem. Ber.*, 1961, **94**, 2413 (*synth*)
Inorg. Synth., 1963, **7**, 136 (*synth*)
 Hart, W.P. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 1196 (*synth, props*)
 Nesmeyanov, A.N. *et al*, *J. Organomet. Chem.*, 1980, **184**, 63 (*props*)

C₈H₆CrO₆ Cr-00042

Pentacarbonyl(1-methoxyethylidene)chromium, 10Cl
 [20540-69-6]



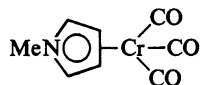
M 250.128

Yellow cryst. Mp 34°.

Aumann, R. *et al*, *Chem. Ber.*, 1968, **101**, 964 (*synth*)
 Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1971, **28**, 367 (*props*)
 Connor, J.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 2419 (*nmr*)
 Bodner, G.M. *et al*, *Inorg. Chem.*, 1973, **12**, 1071 (*nmr*)
Inorg. Synth., 1977, **17**, 99 (*synth*)
 Brown, F.J., *Prog. Inorg. Chem.*, 1980, **27**, 1 (*props*)

C₈H₇CrNO₃ Cr-00043

Tricarbonyl(1-methylpyrrole)chromium, 8Cl
 [33506-43-3]



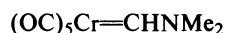
M 217.144

Yellow cryst. Dec. ca. 110°.

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1967, **8**, P5 (*synth*)
 Ofel, K. *et al*, *J. Organomet. Chem.*, 1971, **30**, 211 (*synth, props*)

C₈H₇CrNO₅ Cr-00044

Pentacarbonyl[(dimethylamino)methylene]chromium, 10Cl
 [38893-15-1]



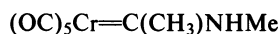
M 249.143

Yellow cryst. Mp 64-6°.

Hartshorn, A.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 348 (*synth*)
 Hill, J.E. *et al*, *Transition Met. Chem.*, 1978, **3**, 315 (*props*)

C₈H₇CrNO₅ Cr-00045

Pentacarbonyl[1-(methylamino)ethylidene]chromium, 9Cl
 [12387-00-7]



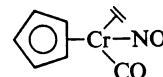
M 249.143

Red cryst.

Baikie, P.E. *et al*, *J. Chem. Soc., Chem. Commun.*, 1967, 1199.
 Connor, J.A. *et al*, *J. Chem. Soc. (A)*, 1969, 578 (*synth*)
 Fischer, E.O. *et al*, *Chem. Ber.*, 1973, **106**, 3893 (*props*)
 Lloyd, M.K. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1743.

C₈H₉CrNO₂ Cr-00046

Carbonyl(η⁵-2,4-cyclopentadien-1-yl)(η²-ethene)nitrosylchromium, 10Cl
Carbonylnitrosyl(η⁵-cyclopentadienyl)(η²-ethylene)chromium
 [38816-34-1]



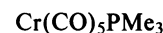
M 203.161

Orange-yellow cryst. (pentane at -80°). *ir* ν_{CO} 1971, ν_{NO} 1664 cm⁻¹ (CH₂Cl₂). Darkens in air at 47° and dec. to black oil at 86°.

Herberhold, M. *et al*, *J. Organomet. Chem.*, 1972, **42**, 407 (*synth, props*)
 Alt, H. *et al*, *J. Organomet. Chem.*, 1974, **77**, 353 (*nmr*)
 Kreiter, C.G. *et al*, *Chem. Ber.*, 1981, **114**, 1845 (*nmr*)

C₈H₉CrO₅P Cr-00047

Pentacarbonyl(trimethylphosphine)chromium, 8Cl
 [26555-09-9]



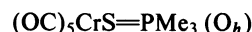
M 268.126

Yellow low-melting solid.

Jenkins, J.H. *et al*, *Inorg. Chem.*, 1967, **6**, 2250.
 Mathieu, R. *et al*, *Inorg. Chem.*, 1970, **9**, 2030.
 Connor, J.A. *et al*, *J. Organomet. Chem.*, 1972, **43**, 357.

C₈H₉CrO₅PS Cr-00048

Pentacarbonyl(trimethylphosphine sulfide-S)chromium, 9Cl
 [35244-74-7]



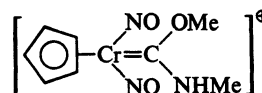
M 300.186

Yellow cryst. Sol. C₆H₆. Mp 87°.

Ainscough, E.W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 2360 (*synth, props*)
 Doorman, B.M. *et al*, *Inorg. Nucl. Chem. Lett.*, 1973, **9**, 941.
 Baker, E.N. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 2205 (*cryst struct*)
 Raubenheimer, H.G. *et al*, *J. Organomet. Chem.*, 1976, **112**, 145 (*ir*)

C₈H₁₂CrN₃O₃⁺ Cr-00049

(η⁵-2,4-Cyclopentadien-1-yl)[methoxy(methylamino)methylene]dinitrosylchromium(1+)
Bisnitrosyl[methoxy(methylamino)methylene](η⁵-2,4-cyclopentadien-1-yl)chromium(1+)
 [74924-70-2]



M 250.197 (ion)

Hexafluorophosphate: [74924-71-3].

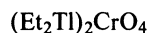
C₈H₁₂CrF₆N₃O₃P M 395.161

Green cryst. (Me₂CO/Et₂O).

Wojcicki, A. *et al*, *Inorg. Chem.*, 1980, **19**, 3803 (*synth*)

C₈H₂₀CrO₄Tl₂ Cr-00050

(Chromato-O)bis(diethylthallium)
Diethylthallium chromate. Bis(diethylthallium)chromate



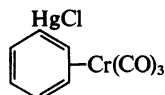
M 641.006

Yellow cryst. (EtOH). Sol. H₂O, EtOH. Mp 193° dec.

►Violently explosive; toxic

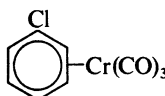
Goddard, A.E., *J. Chem. Soc.*, 1921, 672 (*synth*)**C₉H₅ClCrHgO₃****Cr-00051****Tricarbonyl(chloromercury)[μ-[(1-η:1,2,3,4,5,6-η)phenyl-]]chromium**

[41576-43-6]

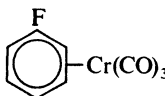


M 449.176

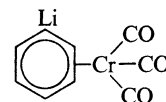
Light-yellow solid. Mp 139° dec.

Magomedov, G.K.I. *et al*, *J. Gen. Chem. USSR (Engl. Transl.)*, 1972, **42**, 2443 (*synth, ir*)**C₉H₅ClCrO₃****Cr-00052****Tricarbonyl(η⁶-chlorobenzene)chromium, 9Cl**
(η⁶-Chlorobenzene)tricarbonylchromium
[12082-03-0]

M 248.586

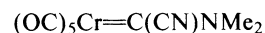
Yellow cryst. (Et₂O/pet. ether). Mp 102-3°. Sublimes *in vacuo*.Fischer, E.O. *et al*, *Z. Naturforsch., B*, 1958, **13**, 458 (*synth*)Nicholls, B. *et al*, *J. Chem. Soc.*, 1959, 551 (*synth*)Fischer, R.D., *Chem. Ber.*, 1960, **93**, 165 (*ir*)Gaivonski, P.E. *et al*, *Izv. Akad. Nauk. SSSR, Ser. Khim.*, 1973, **11**, 2618; *CA*, **80**, 59047 (*ms*)Bodner, G.M. *et al*, *Inorg. Chem.*, 1974, **13**, 360 (*cmr*)*Inorg. Synth.*, 1978, **19**, 154 (*synth, ir*)**C₉H₅CrFO₃****Cr-00053****(η⁶-Fluorobenzene)tricarbonylchromium**
Tricarbonyl(η⁶-fluorobenzene)chromium, 9Cl
[12082-05-2]

M 232.131

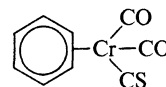
Yellow cryst. (heptane). Mp 123-4°. Sublimes *in vacuo*.Nicholls, B. *et al*, *J. Chem. Soc.*, 1959, 551 (*synth*)Fischer, R.D., *Chem. Ber.*, 1960, **93**, 165 (*ir*)Strohmeier, W., *Chem. Ber.*, 1961, **94**, 2490 (*synth*)Müller, J. *et al*, *Chem. Ber.*, 1969, **102**, 3314 (*ms*)Bodner, G.M. *et al*, *Inorg. Chem.*, 1974, **13**, 360 (*cmr*)*Inorg. Synth.*, 1979, **19**, 154 (*synth*)**C₉H₅CrLiO₃****Cr-00054****[μ(η⁶-Phenyl)](tricarbonylchromium)lithium, 10Cl**
[67421-16-3]

M 220.074

Formed as soln. in THF.

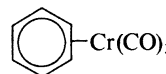
Rausch, M.D. *et al*, *J. Organomet. Chem.*, 1978, **153**, 59 (*synth*)Sammelhack, M.F. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 768 (*synth*)**C₉H₆CrN₂O₅****Cr-00055****Pentacarbonyl[cyano(dimethylamino)methylene]chromium, 10Cl**
[61771-03-7]

M 274.153

Hartshorn, A.J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1976, 761 (*synth, ir, nmr*)**C₉H₆CrO₂S****Cr-00056****(η⁶-Benzene)(carbonothioyl)dicarbonylchromium, 10Cl**
Carbonothioyl(dicarbonyl)(η⁶-benzene)chromium
[63356-86-5]

M 230.201

Yellow cryst. Mp 125° dec. Related complexes have been synthesised.

Butler, I.S. *et al*, *J. Organomet. Chem.*, 1977, **133**, 59 (*synth*)Herberhold, M. *et al*, *Chem. Ber.*, 1978, **111**, 2273 (*synth*)*Inorg. Synth.*, 1979, **19**, 197.**C₉H₆CrO₃****Cr-00057****(η⁶-Benzene)tricarbonylchromium, 9Cl**
Tricarbonylbenzenechromium. Benzenechromium tricarbonyl
[12082-08-5]

M 214.141

Yellow cryst. (Et₂O/pet. ether). Mp 161.5-163°.

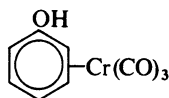
Sublimes at 130°/2 mm.

►GB4700000.

Gmelin Suppl., **3**, 183.Natta, G. *et al*, *Chem. Ind. (Milan)*, 1958, **40**, 287 (*synth*)Corradini, P. *et al*, *J. Am. Chem. Soc.*, 1959, **81**, 2271 (*struct*)Strohmeier, W. *et al*, *Chem. Ber.*, 1964, **97**, 1877 (*pmr*)*Inorg. Synth.*, 1978, **19**, 154 (*synth, ir*)Federov, L.A. *et al*, *J. Organomet. Chem.*, 1979, **182**, 499 (*cmr*)

C₉H₆CrO₄

Tricarbonyl(η⁶-phenol)chromium, 9Cl
(η⁶-Phenol)tricarbonylchromium
[32802-03-2]



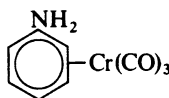
M 230.140

Yellow cryst. Mp 113-5°.

Natta, G. *et al*, *Chem. Ind. (Milan)*, 1958, 1003 (*synth*)
Fischer, R.D., *Chem. Ber.*, 1960, **93**, 165 (*ir*)
Jackson, W.R. *et al*, *J. Chem. Soc.*, 1960, 469 (*synth*)
Fischer, E.O. *et al*, *Chem. Ber.*, 1961, **94**, 93 (*synth*)
Lundquist, R.T. *et al*, *J. Org. Chem.*, 1962, **27**, 1167 (*uv*)
Müller, J. *et al*, *Chem. Ber.*, 1969, **102**, 3314 (*ms*)

C₉H₇CrNO₃

(η⁶-Aniline)tricarbonylchromium
(η⁶-Benzenamine)tricarbonylchromium, 9Cl.
Tricarbonyl(aniline)chromium
[12108-11-1]



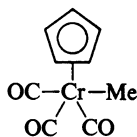
M 229.155

Yellow cryst. Mp 161-2°. Sublimes *in vacuo*.

Fischer, E.O. *et al*, *Chem. Ber.*, 1958, **91**, 2763 (*synth*)
Natta, G. *et al*, *Chem. Ind. (Milan)*, 1958, 1003 (*synth*)
Fischer, E.O. *et al*, *Chem. Ber.*, 1961, **94**, 93 (*synth*)
Brown, D. *et al*, *J. Chem. Soc.*, 1962, 3849 (*ir*)
Lundquist, R.T. *et al*, *J. Org. Chem.*, 1962, **27**, 1167 (*uv*)
Wu, A. *et al*, *J. Organomet. Chem.*, 1971, **33**, 53 (*pmr*)
Bodner, G.M. *et al*, *Inorg. Chem.*, 1974, **13**, 360 (*cmr*)

C₉H₈CrO₃

Cyclopentadienyltricarbonylmethylchromium
Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)methylchromium, 9Cl
[41311-89-1]



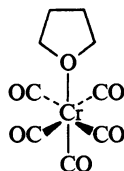
M 216.156

Yellow cryst. Thermally unstable.

Piper, T.S. *et al*, *J. Inorg. Nucl. Chem.*, 1956, **3**, 104 (*synth*, *ir*, *pmr*)
Alt, H.G., *J. Organomet. Chem.*, 1977, **124**, 167 (*synth*)
Samuel, E. *et al*, *J. Organomet. Chem.*, 1979, **172**, 309.

C₉H₈CrO₆

Pentacarbonyl(tetrahydrofuran)chromium, 10Cl
[15038-41-2]



M 264.155

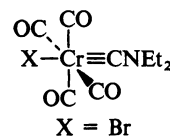
Yellow cryst.

Strohmeier, W. *et al*, *Chem. Ber.*, 1961, **94**, 398 (*synth*)**Cr-00058**

Schubert, U. *et al*, *J. Organomet. Chem.*, 1978, **144**, 175 (*cryst struct*)
Veith, M. *et al*, *J. Organomet. Chem.*, 1981, **216**, 377 (*props*)
Roesky, H.W. *et al*, *Inorg. Chem.*, 1981, **20**, 2910 (*props*)

C₉H₁₀BrCrNO₄

Bromotetracarbonyl[(diethylamino)methylidyne]chromium, 10Cl
[57091-06-2]



M 328.082

Orange cryst. Mp 47°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1978, **111**, 3542 (*synth*, *cryst struct*)**C₉H₁₀ClCrNO₄**

Tetracarbonylchloro[(diethylamino)methylidyne]chromium, 10Cl
[59218-84-7]

As Bromotetracarbonyl[(diethylamino)methylidyne]-chromium, Cr-00062 with

X = Cl

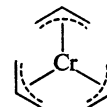
M 283.631

Yellow cryst. Mp 52° dec. Struct. by analogy with Bromotetracarbonyl[(diethylamino)methylidyne]chromium, Cr-00062.

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1976, **107**, C23 (*synth*)
Hartshorn, A.S. *et al*, *J. Chem. Soc., Chem. Commun.*, 1976, 761 (*synth*)
Fischer, H. *et al*, *Angew. Chem.*, 1981, **93**, 483 (*props*)

C₉H₁₅Cr

Tris(η³-2-propenyl)chromium, 9Cl
Tris(π-allyl)chromium. Triallylchromium. Chromium triallyl
[12082-46-1]



M 175.214

Monomeric in C₆H₆ and dioxan. Dark-red cryst. Mp 77-9° dec. Paramagnetic.

Wilke, G. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1966, **5**, 151 (*props*)
Inorg. Synth., 1972, **13**, 73 (*synth*, *props*)

C₁₀CrIO₁₀[⊖]

Decacarbonyl-μ-iododichromate(1-), 8Cl

[(OC)₅Cr—I—Cr(CO)₅][⊖]

M 459.005 (ion)

Bis(triphenylphosphine)iminium salt: [21637-80-9].

C₄₆H₃₀CrINO₁₀P₂ M 997.592

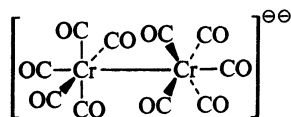
Red cryst. Mp 109-10°.

Ruff, J.K., *Inorg. Chem.*, 1968, **7**, 1821 (*synth*)
Dahl, L.F. *et al*, *J. Am. Chem. Soc.*, 1970, **92**, 7327 (*cryst struct*)

C₁₀Cr₂O₁₀²⁻

Decacarbonyldichromate(2-), 9Cl

[45264-01-5]



M 384.096 (ion)

Di-Na salt: [15616-67-8].

C₁₀Cr₂Na₂O₁₀ M 430.076

Yellow cryst.

Di-K salt: [57348-61-5].

C₁₀Cr₂K₂O₁₀ M 462.293

Yellow cryst.

Bis(tetraethylammonium) salt: [15682-68-5].

C₂₆H₄₀Cr₂N₂O₁₀ M 644.601

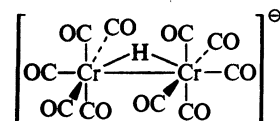
Yellow cryst.

Bis(bis(triphenylphosphine)iminium)salt: [49736-18-7].

C₈₂H₆₀Cr₂N₂O₁₀P₄ M 1461.270Dark-yellow cryst. Sol. in CH₂Cl₂. Mp 185-9° dec.Hayter, R.E., *J. Am. Chem. Soc.*, 1966, **88**, 4376 (props)Ruff, J.K., *Inorg. Chem.*, 1967, **6**, 2080 (props)Dahl, L.F. et al, *J. Am. Chem. Soc.*, 1970, **92**, 7312 (cryst struct)Ruff, J.K. et al, *J. Organomet. Chem.*, 1971, **33**, C64 (props)*Inorg. Synth.*, 1974, **15**, 89 (synth)Unguvenasu, C. et al, *J. Chem. Soc., Chem. Commun.*, 1975, 388 (synth)Behrens, H. et al, *Z. Naturforsch., B*, 1977, **32**, 1105 (props)C₁₀HCr₂O₁₀⁻

Decacarbonyl-μ-hydrodichromate(1-), 10Cl

[73740-63-3]



M 385.104 (ion)

Tetraethylammonium salt: [16924-36-0].

C₁₈H₂₁Cr₂NO₁₀ M 515.357

Yellow cryst., v. air-sensitive.

Bis(triphenylphosphine)iminium salt: [62341-83-7].

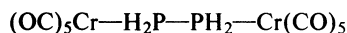
C₄₆H₃₁Cr₂NO₁₀P₂ M 871.695

Yellow cryst.

Hayter, R.J., *J. Am. Chem. Soc.*, 1966, **88**, 4376 (synth)Dahl, L.F. et al, *J. Am. Chem. Soc.*, 1970, **92**, 7312 (cryst struct)Dahl, L.F. et al, *J. Am. Chem. Soc.*, 1977, **99**, 4497.Cooper, C.B. et al, *Adv. Chem. Ser.*, 1978, **167**, 232 (ir, raman)C₁₀H₄Cr₂O₁₀P₂

Decacarbonyl[μ-(diphosphine-P:P')]dichromium

[52589-03-4]



M 450.075

Yellow powder. Sol. THF, Me₂CO, insol. nonpolar solvs.

THF adduct: Colourless needles.

Sellman, D., *Angew. Chem., Int. Ed. Engl.*, 1973, **12**, 1020 (synth)

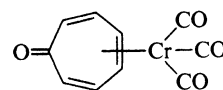
Cr-00066

C₁₀H₆CrO₄

Tricarbonyl[(2,3,4,5,6,7-η)-2,4,6-cycloheptatrien-1-one]chromium, 8Cl

Tricarbonyl(η⁶-tropone)chromium

[32648-85-4]



M 242.151

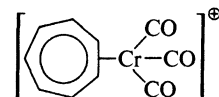
Orange-red cryst. Sol. Et₂O. Mp 120.5-121.5°.Pauson, P.L. et al, *J. Chem. Soc. (C)*, 1970, 2315 (synth, props)Barrow, M.J. et al, *J. Chem. Soc., Chem. Commun.*, 1971, 119 (cryst struct)

Cr-00069

C₁₀H₇CrO₃⁺Tricarbonyl(η⁷-cycloheptatrienylium)chromium(1+), 10Cl

Tricarbonyltropyliumchromium(1+)

[46238-43-1]



M 227.160 (ion)

Tetrafluoroborate: [12170-19-3].

C₁₀H₇BCrF₄O₃ M 313.963Red cryst. or orange solid. Sol. CH₂Cl₂. Mp >300°.

Triiodide:

C₁₀H₇CrI₃O₃ M 607.873

Brown solid. Mp >150° dec.

Perchlorate:

C₁₀H₇ClCrO₇ M 326.610

Red cryst.

▷Dec. explosively >170°

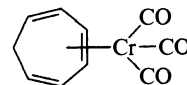
Monro, J.D. et al, *J. Chem. Soc.*, 1961, 3475 (props)Connor, J.A. et al, *J. Organomet. Chem.*, 1970, **24**, 441 (synth)Deganello, G. et al, *J. Organomet. Chem.*, 1975, **97**, C46 (props)Hackett, P. et al, *Inorg. Chim. Acta.*, 1975, **12**, L19 (props)John, G.R. et al, *J. Organomet. Chem.*, 1976, **120**, C45 (props)Olah, G. et al, *J. Org. Chem.*, 1976, **41**, 1694 (pmr, cmr)Alton, J.G. et al, *Inorg. Chim. Acta.*, 1980, **41**, 245 (props)

Cr-00071

C₁₀H₈CrO₃

Tricarbonyl[(1,2,3,4,5,6-η)-1,3,5-cycloheptatriene]chromium, 9Cl

[12125-72-3]



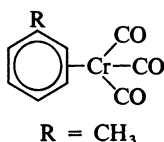
M 228.167

Orange-red cryst. (hexane). Mp 128-30°.

Abel, E.W. et al, *J. Chem. Soc.*, 1958, 4559 (synth)Fischer, R.D., *Chem. Ber.*, 1960, **93**, 165 (ir)Bennett, M.A. et al, *J. Chem. Soc.*, 1961, 2037 (pmr)Deckelmann, E. et al, *Helv. Chim. Acta.*, 1969, **52**, 892 (props)Müller, J. et al, *Chem. Ber.*, 1970, **103**, 3128 (ms)Mann, B.E., *J. Chem. Soc., Chem. Commun.*, 1971, 976 (cmr)Pauson, P.L. et al, *J. Chem. Soc., Perkin Trans. 2*, 1972, 1141.Adedeji, F.A. et al, *J. Organomet. Chem.*, 1975, **97**, 221.Kreiter, C.G. et al, *Chem. Ber.*, 1975, **108**, 1502 (nmr)Gower, M. et al, *Inorg. Chim. Acta.*, 1979, **37**, 79 (props)

C₁₀H₈CrO₃**Cr-00072**

Tricarbonyl[(1,2,3,4,5,6- η)methylbenzene]chromium, 9Cl
Tricarbonyl(η^6 -toluene)chromium. (η^6 -Toluene)-tricarbonylchromium
 [12083-24-8]

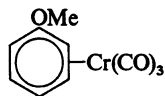


M 228.167

Mp 80-1°.

Nicholls, B. *et al*, *J. Chem. Soc.*, 1959, 551 (*synth*)Fischer, R.D., *Chem. Ber.*, 1960, **93**, 165 (*ir*)Jackson, W.R. *et al*, *J. Chem. Soc.*, 1960, 469 (*synth*)Lloyd, M.K. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1768 (*electrochem*)Jackson, W.R. *et al*, *Aust. J. Chem.*, 1975, **28**, 1535 (*cmr*)Koerner von Gustorf, E.A. *et al*, *Adv. Inorg. Chem. Radiochem.*, 1976, **19**, 65 (*props*)v. Meurs, F. *et al*, *J. Organomet. Chem.*, 1976, **113**, 341 (*pmr*)Bamford, C.H. *et al*, *J. Chem. Soc., Faraday Trans. 1*, 1977, **73**, 1406 (*props*)**C₁₀H₈CrO₄****Cr-00073**

Tricarbonyl-(1,2,3,4,5- η -methoxybenzene)chromium, 9Cl
Anisoletricarbonylchromium, 8Cl.
Tricarbonylanisolechromium
 [12116-44-8]

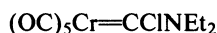


M 244.167

Catalyst for the selective hydrogenation of unsaturated fats. Yellow cryst. (C₆H₆/pet. ether or by subl.). Mp 84-5°. Air sensitive.

Mangini, A. *et al*, *Inorg. Chim. Acta*, 1968, **2**, 8 (*pmr*)Roques, B.P. *et al*, *J. Organomet. Chem.*, 1974, **73**, 327 (*cmr*)Sammelhack, M.F., *Ann. N.Y. Acad. Sci.*, 1977, **295**, 36 (*use*)*Inorg. Synth.*, 1979, **19**, 154 (*synth, props*)Sammelhack, M.F. *et al*, *J. Org. Chem.*, 1979, **44**, 3275.**C₁₀H₁₀ClCrNO₅****Cr-00074**

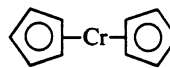
Pentacarbonyl[chloro(diethylamino)methylene]chromium, 10Cl
 [59218-83-6]



M 311.642

Yellow cryst. Dec. >30° to Cl(OC)₄Cr≡CNEt₂.Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1976, **107**, C23 (*synth*)Huttner, G. *et al*, *J. Organomet. Chem.*, 1977, **141**, C17 (*synth, cryst struct*)Fischer, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1978, **17**, 842 (*props*)Fischer, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1981, **20**, 463 (*props*)**C₁₀H₁₀Cr****Cr-00075**

Chromocene, 9Cl
Di- π -cyclopentadienylchromium, 8Cl.
Biscyclopentadienylchromium
 [1271-24-5]

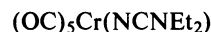


M 182.185

Red needles. Mp 173°. V. air-sensitive. Paramagnetic.

Cotton, F.A. *et al*, *Z. Naturforsch., B*, 1954, **9**, 417 (*synth*)Fischer, E.O. *et al*, *Z. Naturforsch., B*, 1954, **9**, 503 (*synth*)Friedman, L. *et al*, *J. Am. Chem. Soc.*, 1955, **77**, 3689 (*ms*)Fischer, E.O., *Recl. Trav. Chim. Pays-Bas*, 1956, **75**, 629 (*struct*)Fritz, H.P., *Chem. Ber.*, 1959, **92**, 780 (*ir*)Koehler, F.H., *J. Organomet. Chem.*, 1976, **110**, 235 (*synth, cmr, pmr*)**C₁₀H₁₀CrN₂O₅****Cr-00076**

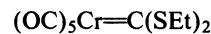
Pentacarbonyl(diethylcyanamide-*N'*)chromium, 10Cl
 [66915-54-6]



M 290.195

Air-sensitive, pale-yellow cryst. (Et₂O/pentane). Sol.Me₂CO, CH₂Cl₂. Mp 77°.Schubert, U. *et al*, *Acta Crystallogr., Sect. B*, 1978, **34**, 2293 (*cryst struct*)Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1978, **149**, C40 (*synth, ir, cmr, pmr, cryst struct*)**C₁₀H₁₀CrO₅S₂****Cr-00077**

[Bis(ethylthio)methylene]pentacarbonylchromium, 10Cl
 [67483-97-0]

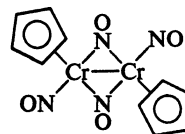


M 326.302

Air-stable, orange-red cryst. Mp 52°.

Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 146 (*synth*)**C₁₀H₁₀Cr₂N₄O₄****Cr-00078**

Bis(η^5 -2,4-cyclopentadien-1-yl)di- μ -nitrosyldinitrosyldichromium, 9Cl
Bis(η^5 -cyclopentadienyl)trinitrosyldichromium
 [36607-01-9]

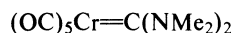


M 354.205

Purple solid. Mp 146.5-147°.

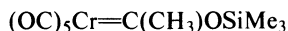
Kirchner, R.M. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 6602 (*synth, cryst struct*)Calderon, J.L. *et al*, *J. Organomet. Chem.*, 1974, **64**, C10.Kolthammer, B.W.S. *et al*, *Tetrahedron Lett.*, 1978, 323 (*props*)
Inorg. Synth., 1979, **19**, 208.**C₁₀H₁₂CrN₂O₅****Cr-00079**

[Bis(dimethylamino)methylene]pentacarbonylchromium, 10Cl
 [61771-06-0]



M 292.211

Yellow needles. Mp 102°.

Hartshorn, A.J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1976, 761 (*synth*, *ir*, *nmr*)Hartshorn, A.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 348 (*synth*, *props*)**C₁₀H₁₂CrO₆Si****Cr-00080****Pentacarbonyl[1-(trimethylsiloxy)ethylidene]chromium, 8Cl**
[12307-27-6]

M 308.283

Orange cryst.

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1968, **12**, P1 (*synth*, *ir*, *nmr*)**C₁₀H₁₈CrO₄P₂****Cr-00081****Tetracarbonylbis(trimethylphosphine)chromium, 9Cl**
[17548-29-7]

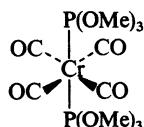
As Tetracarbonylbis(phosphine)chromium, Cr-00003 with



M 316.193

cis-form

Pale-yellow cryst. Mp 71°.

Jenkins, J.H. *et al*, *Inorg. Chem.*, 1967, **6**, 2250.Mathieu, R. *et al*, *Inorg. Chem.*, 1970, **9**, 2030.Connor, J.A. *et al*, *J. Organomet. Chem.*, 1972, **43**, 357.**C₁₀H₁₈CrO₁₀P₂****Cr-00082****Tetracarbonylbis(trimethyl phosphite-P)chromium, 8Cl**
[21370-42-3]

M 412.190

trans-form

Yellow air-stable cryst. Mp 76-8°.

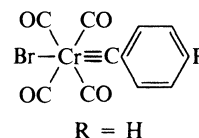
Poilblanc, R. *et al*, *Bull. Soc. Chim. Fr.*, 1962, 1301.Ogilvie, F.B. *et al*, *J. Am. Chem. Soc.*, 1970, **92**, 1916 (*nmr*)Braterman, P.S. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1027.Mann, B.E., *J. Chem. Soc., Dalton Trans.*, 1973, 2012.**C₁₁H₃Cr₂O₁₀S[⊖]****Cr-00083****Decarbonyl(μ-methanethiolato)dichromate(1-)**

M 431.191 (ion)

Yellow. Diamagnetic.

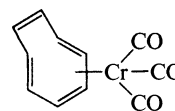
Tetraethylammonium salt: [24604-40-8].C₁₉H₂₃Cr₂NO₁₀S M 561.443Sl. air-sensitive orange-yellow cryst. (Me₂CO aq.).*Bis(triphenylphosphine)iminium salt*: [22017-07-8].C₄₇H₃₃Cr₂NO₁₀P₂S M 969.778

No phys. props. reported.

Behrens, H. *et al*, *Z. Anorg. Allg. Chem.*, 1969, **369**, 131 (*synth*, *ir*, *nmr*)**C₁₁H₅BrCrO₄****Cr-00084****Bromotetracarbonyl(phenylmethyldiene)chromium, 9Cl**
[50701-13-8]

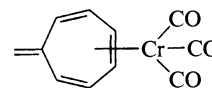
M 333.058

Yellow needles (pentane).

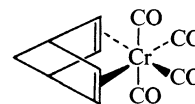
Fischer, E.O. *et al*, *Chem. Ber.*, 1976, **109**, 1673; 1977, **110**, 805 (*synth*, *ir*, *nmr*)Frank, A. *et al*, *J. Organomet. Chem.*, 1978, **161**, C27 (*cryst struct*)**C₁₁H₈CrO₃****Cr-00085****Tricarbonyl[(1,2,3,4,5,6-η)-1,3,5,7-cyclooctatetraene]chromium, 10Cl**
[12093-03-7]

M 240.178

Red-brown cryst. Sol. hydrocarbons.

Kreiter, C.G. *et al*, *J. Am. Chem. Soc.*, 1966, **88**, 3444 (*synth*)King, R.B., *J. Organomet. Chem.*, 1967, **8**, 139 (*synth*)Mann, B.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 1021 (*nmr*)**C₁₁H₈CrO₃****Cr-00086****Tricarbonyl[(1,2,3,4,5,6-η)-7-methylene-1,3,5-cycloheptatriene]chromium, 9Cl**
Tricarbonyl(η⁶-heptafulvene)chromium
[52472-03-4]

M 240.178

Unstable red oil, characterised by *ir* and *nmr*.Howell, J.A.S. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 293 (*synth*, *nmr*)**C₁₁H₈CrO₄****Cr-00087****[(2,3,5,6-η)-Bicyclo[2.2.1]hepta-2,5-diene]tetracarbonylchromium, 9Cl**
Tetracarbonyl(2,5-norbornadiene)chromium, 8Cl. Tetracarbonylnorbornadienechromium
[12146-36-0]

M 256.178

Orange-yellow or white cryst. Mp 92-3°.

Bennett, M.A. *et al*, *J. Chem. Soc.*, 1961, 2037 (*synth*, *ir*, *pmr*)

Dub, M. *Organometallic Compounds*, Springer-Verlag, Berlin, 2nd Ed., 1966, 1.
 Mann, B.E., *J. Chem. Soc., Dalton Trans.*, 1973, 2012 (*cmr*)
 Rietvelde, D. *et al*, *J. Organomet. Chem.*, 1976, **118**, 191 (*props*)
 Darensbourg, D.J. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 896 (*synth, props*)

C₁₁H₈CrO₄ Cr-00088

Tricarbonyl[(1-(η^6 -phenyl)ethanone)chromium, 9Cl
Tricarbonyl[(η^6 -acetophenone)chromium. (Acetylbenzene)tricarbonylchromium
 [12153-11-6]

As Tricarbonyl[(1,2,3,4,5,6- η)methylbenzene]chromium, Cr-00072 with



M 256.178
 Mp 91-2°.

Nicholls, B. *et al*, *J. Chem. Soc.*, 1959, 551 (*synth*)
 Ercoli, R. *et al*, *Chim. Ind. (Milan)*, 1959, **41**, 404 (*synth*)
 Jackson, W.R. *et al*, *J. Chem. Soc.*, 1960, 469 (*synth*)
 Dusaosoy, Y., *C.R. Hebd. Seances Acad. Sci.*, 1970, **270**, 1792 (*cryst struct*)
 Gubin, S.P. *et al*, *J. Organomet. Chem.*, 1970, **22**, 149 (*props*)
 Lumbroso, H. *et al*, *J. Organomet. Chem.*, 1973, **61**, 249.

C₁₁H₈CrO₅ Cr-00089

Tricarbonyl[(1,2,3,4,5,6- η)methyl benzoate]chromium, 9Cl
(Benzoic acid)tricarbonylchromium methyl ester, 8Cl. (Methyl benzoate)tricarbonylchromium
 [12125-87-0]

As Tricarbonyl[(1,2,3,4,5,6- η)methylbenzene]chromium, Cr-00072 with



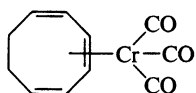
M 272.177

Catalyst for hydrogenation of unsatd. fats, esp. 1,3-dienes to *cis*-monoenes. Red cryst. (Et₂O/pet. ether or by subl.). Mp 95-6°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1958, **91**, 2763 (*synth*)
 Jackson, W.R. *et al*, *J. Chem. Soc.*, 1960, 469 (*synth*)
 Fischer, R.D., *Chem. Ber.*, 1960, **93**, 165 (*ir*)
 Sim, G.A. *et al*, *J. Chem. Soc. (A)*, 1967, 1619 (*cryst struct*)
 Frankel, E.N. *et al*, *J. Org. Chem.*, 1969, **34**, 3936, 3960 (*use*)
 Lloyd, M.K. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1768.
 van Meurs, F. *et al*, *J. Organomet. Chem.*, 1976, **113**, 341 (*synth*)
Inorg. Synth., 1979, **19**, 154 (*synth*)

C₁₁H₁₀CrO₃ Cr-00090

Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-cyclooctatriene]chromium, 9Cl
 [55928-13-7]

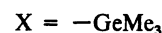
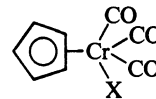


M 242.194
 Red cryst.

Fischer, E.O. *et al*, *Chem. Ber.*, 1959, **92**, 2645 (*synth*)
 Prout, C.K. *et al*, *J. Chem. Soc.*, 1962, 3770 (*cryst struct*)
 Aumann, R. *et al*, *Tetrahedron Lett.*, 1970, 903 (*synth*)
 Kreiter, C.G. *et al*, *Chem. Ber.*, 1975, **108**, 1502 (*nmr*)

C₁₁H₁₄CrGeO₃ Cr-00091

Tricarbonyl- π -cyclopentadienyl(trimethylgermyl)chromium, 8Cl
 [31884-35-2]



M 318.816
 Yellow cryst. Mp 86-8°. Bp_{0.001} 50° subl.

Cardin, D.J. *et al*, *J. Chem. Soc. (A)*, 1970, 2594 (*synth, props*)
 Keppie, S.A. *et al*, *J. Chem. Soc. (A)*, 1971, 3216 (*synth*)

C₁₁H₁₄CrO₃Sn Cr-00092

Tricarbonyl- π -cyclopentadienyl(trimethylstannyl)chromium, 8Cl
 [31854-87-2]

M 364.916
 Lemon-yellow cryst. Mp 109-10°. Bp_{0.001} 80° subl.

Patil, H.R.H. *et al*, *Inorg. Chem.*, 1966, **5**, 1401 (*synth*)
 Cardin, D.J. *et al*, *J. Chem. Soc. (A)*, 1970, 2594 (*synth, props*)
 Keppie, S.A. *et al*, *J. Chem. Soc. (A)*, 1971, 3216 (*synth, props*)

C₁₁H₁₈CrO₅Sn₂Te Cr-00093

Pentacarbonyl(hexamethyldistannatellurane)chromium, 9Cl
 [28480-04-8]



M 647.236
 Solid. Mp 85°.

Schumann, H. *et al*, *Chem. Ber.*, 1973, **106**, 2049 (*ir, raman, nmr*)

C₁₂H₅CrO₆[−] Cr-00094

Benzoylpentacarbonylchromate(1-), 9Cl
 [(OC)₅CrCOPh][−] (O_h)

M 297.164 (ion)

Li salt: [39912-34-0].

C₁₂H₅CrLiO₆ M 304.105

Reactive.

Tetramethylammonium salt: [54817-05-9].

C₁₆H₁₇CrNO₆ M 371.309

Pale-yellow cryst. Mp 92°.

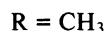
Fischer, E.O. *et al*, *Chem. Ber.*, 1967, **100**, 2445 (*synth*)
 Aumann, R. *et al*, *Chem. Ber.*, 1968, **101**, 954 (*props*)
 Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1972, **46**, C15 (*props*)

Fischer, E.O. *et al*, *Chem. Ber.*, 1974, **107**, 3554 (*props*)
 Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1975, **91**, C23 (*props*)

C₁₂H₇BrCrO₄ **Cr-00095**
Bromotetracarbonyl[(4-methylphenyl)methylidyne]chromium, 10Cl

[57987-16-3]

As Bromotetracarbonyl(phenylmethylidyne)chromium,
 Cr-00084 with

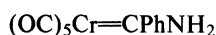


M 347.085

Yellow powder.

Fischer, E.O. *et al*, *Monatsh. Chem.*, 1977, **108**, 759 (*synth*)
 Kreissl, F.R. *et al*, *Chem. Ber.*, 1978, **111**, 3283 (*props*)

C₁₂H₇CrNO₅ **Cr-00096**
(Aminophenylmethylene)pentacarbonylchromium, 10Cl
 [32370-44-8]

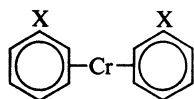


M 297.187

Yellow needles. Mp 79°.

Klabunde, U. *et al*, *J. Am. Chem. Soc.*, 1967, **89**, 7141.
 Moser, E. *et al*, *J. Organomet. Chem.*, 1968, **12**, P1 (*synth*)
 Fischer, E.O. *et al*, *Chem. Ber.*, 1971, **104**, 1339 (*synth*)
 Block, T.F. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 4321 (*pe*)
 Block, T.F. *et al*, *J. Organomet. Chem.*, 1977, **139**, 235.
 Doetz, K.H. *et al*, *Chem. Ber.*, 1980, **113**, 3597 (*props*)

C₁₂H₁₀Cl₂Cr **Cr-00097**
Bis(η⁶-chlorobenzene)chromium, 9Cl
 [42087-89-8]



X = Cl

M 277.113

Black cryst. Mp 135° dec.

Graves, V. *et al*, *Inorg. Chem.*, 1976, **15**, 577 (*synth, props*)

C₁₂H₁₀CrF₂ **Cr-00098**
Bis(η⁶-fluorobenzene)chromium, 9Cl
 [42087-90-1]

As Bis(η⁶-chlorobenzene)chromium, Cr-00097 with

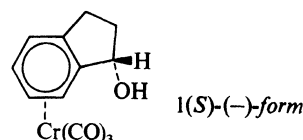


M 244.204

Black cryst. Mp 204° dec.

Skell, P.S. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 3337 (*synth, props*)
 Graves, V. *et al*, *Inorg. Chem.*, 1976, **15**, 577 (*synth, props*)

C₁₂H₁₀CrO₄ **Cr-00099**
Tricarbonyl[(3a,4,5,6,7,7a-η)-2,3-dihydro-1H-inden-1-ol]chromium, 9Cl
Tricarbonyl-η⁶-1-indanolchromium
 [12088-83-4]



M 270.205

(*R*)-*endo*-form

Yellow needles. $[\alpha]_D^{22} + 60.9^\circ$ (c, 2.07 in CHCl₃).

(*S*)-*endo*-form

Yellow prismatic cryst. Mp 110°. $[\alpha]_D^{22} - 60.7^\circ$ (c, 2.14 in CHCl₃).

(±)-*endo*-form

Yellow cryst. Sol. CCl₄. Mp 105°.

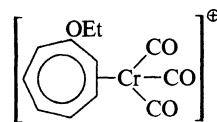
Monosuccinate:

C₁₆H₁₄CrO₇ M 370.278

Cryst. (Et₂O/pentane). Mp 123°.

Jaouen, G. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 4667 (*synth*)

C₁₂H₁₁CrO₄⁺ **Cr-00100**
Tricarbonyl(ethoxy-π-cycloheptatrienylium)chromium(1+), 8Cl



M 271.213 (ion)

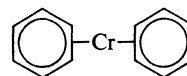
Tetrafluoroborate: [32825-28-8].

C₁₂H₁₁BCrF₄O₄ M 358.016

Orange cryst. Mp 110°.

Pauson, P.L. *et al*, *J. Chem. Soc. (C)*, 1970, 2315 (*synth*)

C₁₂H₁₂Cr **Cr-00101**
Bis(η⁶-benzene)chromium, 9Cl
Dibenzenechromium
 [1271-54-1]



M 208.223

Polymerisation catalyst. Brown-black air-sensitive cryst.
 Sol. C₆H₆, sl. sol. Et₂O. Mp 284-5° (280-1°). Adopts strict D_{6h} symmetry in the solid state. Subl. at 160° *in vacuo*. Dec. on pyrolysis to metallic Cr.

▷GB5850000.

Fischer, E.O. *et al*, *Z. Anorg. Allg. Chem.*, 1961, **312**, 244 (*synth, props*)

Keulen, E. *et al*, *J. Organomet. Chem.*, 1966, **5**, 490 (*cryst struct*)

Emanuel, R.V. *et al*, *J. Chem. Soc. (A)*, 1969, 3002 (*nmr*)

Timms, P.L., *J. Chem. Soc., Chem. Commun.*, 1969, 1033 (*synth*)

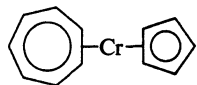
Timms, P.L., *J. Chem. Educ.*, 1972, **49**, 782 (*synth*)

Connor, J.A. *et al*, *J. Chem. Soc., Faraday Trans. 1*, 1973, **69**, 1218.

Graves, V. *et al*, *Inorg. Chem.*, 1976, **15**, 577 (*cmr*)

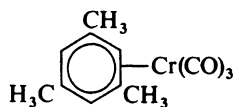
Graves, V. *et al*, *J. Organomet. Chem.*, 1976, **120**, 397 (*pmr*)

C₁₂H₁₂Cr **Cr-00102**
 (η⁷-Cycloheptatrienyl)(η⁵-2,4-cyclopentadien-1-yl)chromium, 9Cl
 π-Cycloheptatrienyl-π-cyclopentadienylchromium
 [12093-81-1]



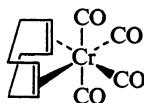
M 208.223
 Blue-black cryst. Mp ca. 230° dec. Sublimes at 80-100°/0.1 mm.
 King, R.B. *et al*, *Inorg. Chem.*, 1964, **3**, 785 (*synth*)
 Fischer, E.O. *et al*, *Chem. Ber.*, 1966, **99**, 2905 (*synth*)
 Elschenbroich, C. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 6956.
 Groenenboom, C.J. *et al*, *J. Organomet. Chem.*, 1974, **76**, C4, 229 (*cmr*, *pmr*)
 v. Oven, H.O. *et al*, *J. Organomet. Chem.*, 1974, **81**, 379 (*synth*)

C₁₂H₁₂CrO₃ **Cr-00103**
 Tricarbonyl[(1,2,3,4,5,6-η)-1,3,5-trimethylbenzene]chromium, 9Cl
 Tricarbonyl(mesitylene)chromium, 8Cl. (η⁶-1,3,5-Trimethylbenzene)tricarbonylchromium.
 Mesitylenetricarbonylchromium
 [12129-67-8]



M 256.221
 Yellow needles (diisopropyl ether). Mp 172-4°. Sublimes *in vacuo*.
 Fischer, E.O. *et al*, *Z. Naturforsch., B*, 1958, **13**, 458 (*synth*)
 Nicholls, B. *et al*, *J. Chem. Soc.*, 1959, 551; 1960, 469 (*synth*)
 Fischer, R.D., *Chem. Ber.*, 1960, **93**, 165 (*ir*)
 Strohmeier, W. *et al*, *Chem. Ber.*, 1964, **97**, 1877 (*pmr*)
 Jackson, W.R. *et al*, *Aust. J. Chem.*, 1975, **28**, 1535 (*cmr*)
Inorg. Synth., 1978, **19**, 154 (*synth*)

C₁₂H₁₂CrO₄ **Cr-00104**
 Tetracarbonyl[(1,2,5,6-η)-1,5-cyclooctadiene]chromium, 9Cl
 [12301-34-7]



M 272.220
 White cryst.
 Bennett, M.A., *Adv. Organomet. Chem.*, 1966, **4**, 353 (*synth*, *props*)
 Rietvelde, D. *et al*, *J. Organomet. Chem.*, 1976, **118**, 191 (*synth*, *props*)
 Darensbourg, D.J. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 896 (*synth*, *props*)

C₁₂H₁₄CrO₃Si **Cr-00105**
 [Trimethyl(η⁶-phenyl)silane]tricarbonylchromium, 9Cl
 Tricarbonyl(η⁶-trimethylsilylbenzene)chromium
 [33248-13-4]
 As Tricarbonyl[(1,2,3,4,5,6-η)methylbenzene]chromium, Cr-00072 with

R = SiMe₃

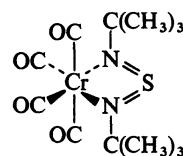
M 286.322
 Mp 72-3°.
 Seyferth, D. *et al*, *Inorg. Chem.*, 1963, **2**, 417 (*synth*)
 Hagen, A.P. *et al*, *Inorg. Chem.*, 1976, **15**, 1512 (*synth*)
 Van Meurs, F. *et al*, *J. Organomet. Chem.*, 1976, **113**, 353 (*props*)

C₁₂H₁₄CrO₃Sn **Cr-00106**
 Tricarbonyl(trimethylphenylstannane)chromium, 8Cl
 Tricarbonyl(trimethylstannylbenzene)chromium
 [31868-92-5]
 As Tricarbonyl[(1,2,3,4,5,6-η)methylbenzene]chromium, Cr-00072 with

R = SnMe₃

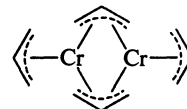
M 376.927
 Mp 78-9°.
 Seyferth, D. *et al*, *Inorg. Chem.*, 1963, **2**, 417 (*synth*)
 Poeth, T.P. *et al*, *Inorg. Chem.*, 1971, **10**, 522 (*synth*)

C₁₂H₁₈CrN₂O₄S **Cr-00107**
 (Di-*tert*-butylsulfurdiimide-*N,N'*)tetracarbonylchromium
 [Bis(1,1-dimethylethyl)sulfurdiimide-*N,N'*]tetracarbonylchromium, 9Cl
 [55257-39-1]



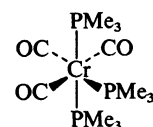
M 338.341
 Purple cryst. Mp 111° dec.
 Lindsell, W.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 40 (*synth*)
 Meij, R. *et al*, *J. Organomet. Chem.*, 1976, **110**, 219 (*synth*)

C₁₂H₂₀Cr₂ **Cr-00108**
 Tetra-2-propenyldichromium, 9Cl
 Tetra(π-allyl)dichromium
 [12295-17-9]



M 268.282
 Brown-red cryst. Mp 121-9° dec.
 Aoki, T. *et al*, *Bull. Chem. Soc. Jpn.*, 1969, **42**, 545 (*synth*, *props*)

C₁₂H₂₇CrO₃P₃ **Cr-00109**
 Tricarbonyltris(trimethylphosphine)chromium
 [30476-93-8]



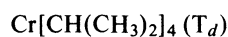
M 364.261

mer-form

Yellow low-melting solid.

Jenkins, J.H. *et al*, *Inorg. Chem.*, 1967, **6**, 2250.Mathieu, R. *et al*, *Inorg. Chem.*, 1970, **9**, 2030.Connor, J.A. *et al*, *J. Organomet. Chem.*, 1972, **43**, 357.**C₁₂H₂₈Cr****Cr-00110****Tetraisopropylchromium***Tetrakis(1-methylethyl)chromium*, 9Cl.*Tetrakis(isopropyl)chromium*

[38711-69-2]



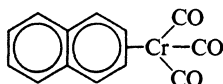
M 224.349

Dark brown-red cryst. Sol. pentane.

▷Pyrophoric

Kruse, W., *J. Organomet. Chem.*, 1972, **42**, C39 (*synth*)Müller, J. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1975, **14**, 760 (*synth*)**C₁₃H₈CrO₃****Cr-00111****Tricarbonyl[(1,2,3,4,4a,8a-η)naphthalene]chromium, 9Cl***Naphthalenetetracarboxylchromium*

[12110-37-1]

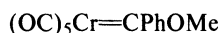


M 264.200

Red cryst.

Fischer, E.O. *et al*, *Chem. Ber.*, 1958, **91**, 2763 (*synth*)Natta, G. *et al*, *Chem. Ind. (Milan)*, 1958, **40**, 1003 (*synth*)Kunz, V. *et al*, *Helv. Chim. Acta*, 1967, **50**, 1052 (*cryst struct*)Nicholas, K.M. *et al*, *Inorg. Chem.*, 1971, **10**, 1519 (*pmr, ir*)Nazarova, E.B. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1979, **58**; *CA*, **90**, 151182 (*ir, raman*)**C₁₃H₈CrO₆****Cr-00112****Pentacarbonyl(methoxyphenylmethylene)chromium, 9Cl**

[27436-93-7]

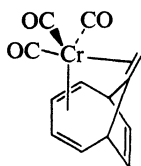


M 312.199

Orange-red cryst. Mp 46°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1967, **100**, 2445 (*synth*)Aumann, R. *et al*, *Chem. Ber.*, 1968, **101**, 964 (*synth*)Bodner, G.M. *et al*, *Inorg. Chem.*, 1973, **12**, 1071 (*nmr*)Fischer, E.O. *et al*, *Chem. Ber.*, 1976, **109**, 1868 (*props*)Doetz, K.H. *et al*, *Chem. Ber.*, 1976, **109**, 2033 (*props*)Brown, F.J., *Prog. Inorg. Chem.*, 1980, **27**, 1 (*props*)**C₁₃H₁₀CrO₃****Cr-00113****Tricarbonyl(2,3,4,5-η:9,10-η-9-methylenebicyclo[4.2.1]nona-2,4,7-triene)chromium**

[70585-10-3]



M 266.216

Red cryst. (hexane).

Jameson, E.B. *et al*, *Organometallics*, 1982, **1**, 689 (*synth, cryst struct*)**C₁₃H₁₂CrFeP₂O₉****Cr-00114****Tetracarbonyl[μ-(tetramethyldiphosphine)(pentacarbonylchromium)iron, 8Cl**

[34406-98-9]

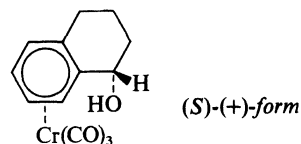


M 482.023

Yellow. Mp 96°.

Vahrenkamp, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1971, **10**, 513 (*synth*)**C₁₃H₁₂CrO₄****Cr-00115****Tricarbonyl[(4a,5,6,7,8,8a-η)-1,2,3,4-tetrahydro-1-naphthalenol]chromium, 9Cl***Tricarbonyl-η⁶-1-tetralolchromium*

[12126-74-8]



M 284.231

(R)-endo-formCryst. Mp 140°. [α]_D²² –20° (c, 2.245 in CHCl₃).**(S)-endo-form**Needles (Et₂O/pet. ether). Mp 138°. [α]_D²² +17° (c, 2.1 in CHCl₃), (85% optical purity).**(±)-endo-form**Cryst. (Et₂O/pet. ether). Mp 130°.*Monosuccinate*:C₁₇H₁₆CrO₇ M 384.305Cryst. (Et₂O/pet. ether). Mp 143°.Jaouen, G. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 4667 (*synth, ir, resoln, props*)**C₁₃H₁₆CrO₃Si****Cr-00116****Tricarbonyl(η⁶-benzyltrimethylsilyl)chromium***Tricarbonyl[trimethyl(η⁶-phenyl)methylsilane]chromium, 9Cl*

[53470-78-3]

As Tricarbonyl[(1,2,3,4,5,6-η)methylbenzene]chromium, Cr-00072 with



M 300.349

Mp 143-4°.

Bly, R.S. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 4221 (*synth*)Dossier, P.J. *et al*, *J. Organomet. Chem.*, 1974, **71**, 207 (*props*)**C₁₃H₁₆CrO₃Sn****Cr-00117****(Benzyltrimethylstannane)tricarbonylchromium, 8Cl***Tricarbonyl(η⁶-benzyltrimethylstannane)chromium*

[31724-95-5]

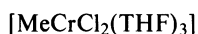
As Tricarbonyl[(1,2,3,4,5,6-η)methylbenzene]chromium, Cr-00072 with



M 390.954
Mp 146–8°.

Harrison, P.G. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 5398 (*nmr*)
Poeth, T.P. *et al*, *Inorg. Chem.*, 1971, **10**, 522 (*synth, ir, raman*)

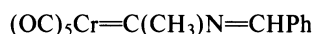
C₁₃H₂₇Cl₂CrO₃ **Cr-00118**
Dichloromethyltris(tetrahydrofuran)chromium, 9Cl
[36153-92-1]



M 354.257
Green cryst. $\mu_B = 3.85$ bm.

Nishimura, K. *et al*, *J. Organomet. Chem.*, 1972, **37**, 317 (*synth*)
Yamamoto, A. *et al*, *J. Organomet. Chem.*, 1975, **102**, 57 (*synth*)

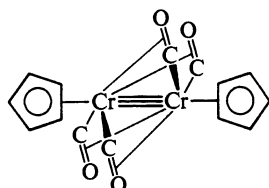
C₁₄H₉CrNO₅ **Cr-00119**
[1-(Benzylideneamino)ethylidene]pentacarbonylchromium, 8Cl
[31246-02-3]



M 323.225
Deep-yellow needles. Mp 93°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1970, **103**, 1262, 3744 (*synth, ir, nmr*)

C₁₄H₁₀Cr₂O₄ **Cr-00120**
Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)dichromium, 10Cl
[54667-87-7]

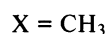


M 346.223
Four "semi-bridging" carbonyls in cryst. Cryst. (toluene/pet. ether). Mp 205–6° (sealed tube).

Hackett, P. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 1625 (*synth, ir*)
Curtis, M.D. *et al*, *J. Organomet. Chem.*, 1978, **155**, 131 (*cryst struct*)
Jemmis, E.D. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 2576 (*struct*)

C₁₄H₁₆Cr **Cr-00121**
Bis[(1,2,3,4,5,6- η)methylbenzene]chromium, 9Cl
Bis(toluene)chromium
[12087-58-0]

As Bis(η^6 -chlorobenzene)chromium, Cr-00097 with

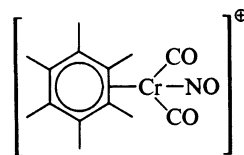


M 236.276
Green-black cryst. Mp 86–7°.

Fischer, E.O. *et al*, *Z. Anorg. Allg. Chem.*, 1956, **286**, 146 (*synth*)
Fischer, E.O. *et al*, *Z. Naturforsch., B*, 1956, **11**, 758 (*synth*)
Fischer, E.O. *et al*, *Chem. Ber.*, 1959, **92**, 938.
Skell, P.S. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 3337 (*synth, props*)

Graves, V. *et al*, *Inorg. Chem.*, 1976, **15**, 577 (*nmr*)
Graves, V. *et al*, *J. Organomet. Chem.*, 1976, **20**, 397 (*nmr*)

C₁₄H₁₈CrNO₃⁺ **Cr-00122**
Dicarbonyl[(1,2,3,4,5,6- η)hexamethylbenzene]nitrosylchromium(1+), 9Cl
Dicarbonylnitrosyl(η^6 -hexamethylbenzene)-chromium(1+)



M 300.297 (ion)
Mp >170° dec.

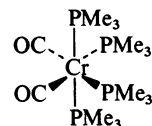
Hexafluorophosphate: [43105-73-3].

C₁₄H₁₈CrF₆NO₃P M 445.261

Yellow air-stable cryst.

Connelly, N.G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 2334; 1975, 2335 (*synth, ir, pmr*)

C₁₄H₃₆CrO₂P₄ **Cr-00123**
Dicarbonyltetrakis(trimethylphosphine)chromium, 8Cl
[30476-94-9]



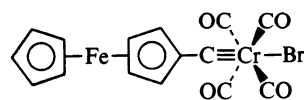
M 412.328

cis-form

Yellow cryst. Mp 150° dec.

Jenkins, J.H. *et al*, *Inorg. Chem.*, 1967, **6**, 2250 (*synth*)
Mathieu, R. *et al*, *Inorg. Chem.*, 1970, **9**, 2030 (*synth*)
Connor, J.A. *et al*, *J. Organomet. Chem.*, 1972, **43**, 357.

C₁₅H₉BrCrFeO₄ **Cr-00124**
Bromotetracarbonyl(ferrocenylmethylidyne)chromium, 10Cl



M 440.981

trans-form [68830-17-1]

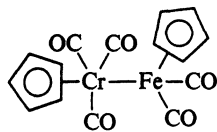
Red microcryst. (MeOH). Mp >70° dec. Cl and I analogues also known.

Fischer, E.O. *et al*, *Chem. Ber.*, 1978, **111**, 3530 (*synth, struct, ir, pmr, cmr*)
Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1980, **191**, 261 (*ir, pmr, cmr*)

C₁₅H₁₀CrFeO₅

Cr-00125

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)[dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)iron]chromium, 10Cl
Pentacarbonylbis(η⁵-2,4-cyclopentadien-1-yl)chromium-iron
[75339-31-0]



M 378.084

Green-black solid. Mp 107°.

Madach, T. *et al*, *Chem. Ber.*, 1980, **113**, 2675 (*synth*, *ir*, *pmr*, *uv*)C₁₅H₁₀CrO₆

Cr-00126

Pentacarbonyl(1-methoxy-3-phenyl-2-propenylidene)chromium, 9Cl
[54873-11-9]



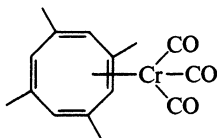
M 338.236

Deep-red cryst. Mp 73-6°.

Casey, C.P. *et al*, *J. Organomet. Chem.*, 1974, **77**, 345 (*synth*)Casey, C.P. *et al*, *Inorg. Chem.*, 1977, **16**, 391 (*synth*, *ir*, *nmr*)C₁₅H₁₆CrO₃

Cr-00127

Tricarbonyl[(1,2,3,4,5,6-η)-1,3,5,7-tetramethyl-1,3,5,7-cyclooctatetraene]chromium, 9Cl
[12302-33-9]



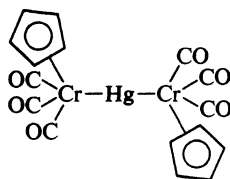
M 296.286

Red microcryst. Mp 65-9°.

Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1968, **90**, 1438 (*synth*)Bennett, M.J. *et al*, *J. Am. Chem. Soc.*, 1968, **90**, 903.Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 7926 (*synth*, *nmr*)C₁₆H₁₀Cr₂HgO₆

Cr-00128

Hexacarbonyldi-π-cyclopentadienyl-μ-mercuriodichromium, 8Cl
Bis[tricarbonyl(η⁵-cyclopentadienyl)chromium]mercury
[12194-11-5]



M 602.833

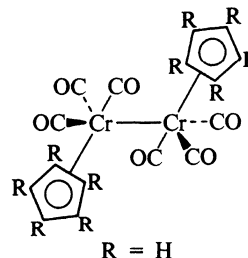
Yellow cryst. Mp 201-3°. Bp_{0.1} 130° subl.

▷GB6225000.

Inorg. Synth., 1963, **7**, 99 (*synth*)Dub, M., *Organometallic Compounds*, Springer-Verlag, Berlin, 2nd Ed., 1966, **1**.Burlitch, J.M. *et al*, *Inorg. Chem.*, 1970, **9**, 563 (*props*)Manning, A.R. *et al*, *J. Chem. Soc. (A)*, 1971, 637 (*synth*, *props*)C₁₆H₁₀Cr₂O₆

Cr-00129

Hexacarbonylbis(η⁵-2,4-cyclopentadien-1-yl)dichromium, 10Cl
Bis[tricarbonyl(π-cyclopentadienyl)chromium]
[12194-12-6]

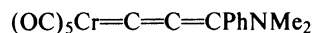


M 402.243

Deep-green cryst. Bp_{0.1} 100-20° subl.*Inorg. Synth.*, 1963, **7**, 104 (*synth*)Adams, R.D. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 749 (*cryst struct*)Hackett, P. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 1625 (*props*)Birdwhistell, R. *et al*, *J. Organomet. Chem.*, 1978, **157**, 239 (*synth*)Braunstein, P. *et al*, *Inorg. Chem.*, 1981, **20**, 3586 (*props*)Lindsell, W.L., *J. Chem. Soc., Chem. Commun.*, 1981, 531 (*props*)C₁₆H₁₁CrNO₅

Cr-00130

Pentacarbonyl[3-(dimethylamino)-3-phenyl-1,2-propadienylidene]chromium, 9Cl
[60349-51-1]



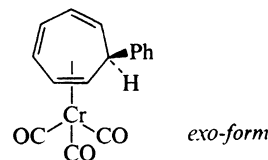
M 349.263

Red-violet cryst. (THF/pentane). Mp 125° dec.

Fischer, E.O. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1976, **15**, 623 (*synth*, *struct*)C₁₆H₁₂CrO₃

Cr-00131

Tricarbonyl[(1,2,3,4,5,6-η)-7-phenyl-1,3,5-cycloheptatriene]chromium, 8Cl
[12147-95-4]



M 304.265

exo-form

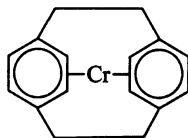
Red cryst. Mp 130-31°.

endo-form [12147-94-3]

Red needles. Mp 114-5°.

Pauson, P.L. *et al*, *J. Chem. Soc. (C)*, 1967, 1057, 1061; 1970, 2315 (*synth*)Foreman, M.I. *et al*, *J. Chem. Soc., Perkin Trans. 2*, 1972, 1141.Lloyd, M.K. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1768.

C₁₆H₁₆Cr
 ($\eta^{1,2}$ -[2,2]Paracyclophane)chromium, 10Cl
 [66901-71-1]



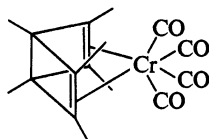
M 260.298
 Lemon-yellow solid.
 Elschenbroich, C. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1978, **17**, 531 (*synth, props*)

C₁₆H₁₈Cl₂CrN₃
 Dichloromethyltrispyridinechromium, 9Cl
 [36153-96-5]



M 375.240
 Green cryst.
 Nishimura, U. *et al*, *J. Organomet. Chem.*, 1972, **37**, 317 (*synth*)
 Yamamoto, A. *et al*, *J. Organomet. Chem.*, 1975, **102**, 57 (*synth*)

C₁₆H₁₈CrO₄
 Tetracarbonyl(1,2,3,4,5,6-hexamethylbicyclo[2.2.0]hexa-2,5-diene)chromium, 9Cl
 Tetracarbonyl(hexamethyldewarbenzene)chromium
 [12242-79-4]

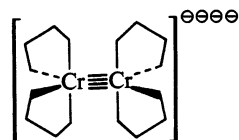


M 326.312
 Yellow-orange cryst. Mp 115°.
 Fischer, E.O. *et al*, *Chem. Ber.*, 1968, **101**, 824 (*synth*)
 Huttner, E. *et al*, *J. Organomet. Chem.*, 1971, **29**, 275 (*cryst struct*)

C₁₆H₂₀Cr
 Bis[(1,2,3,4,5,6- η)ethylbenzene]chromium, 9Cl
 [12212-68-9]
 As Bis(η^6 -chlorobenzene)chromium, Cr-00097 with
 R = CH₂CH₃

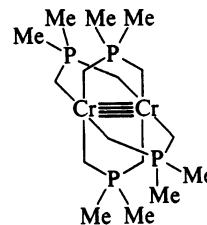
M 264.330
 Brown-black liq.
 Sorokin, A.Yu. *et al*, *J. Gen. Chem. USSR (Engl. Transl.)*, 1965, **35**, 2123 (*synth*)
 Suskina, I.A. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1971, 425 (*polarog*)
 Graves, V. *et al*, *Inorg. Chem.*, 1976, **15**, 577 (*synth, nmr*)
 Telnoi, V.I. *et al*, *Russ. Chem. Rev. (Engl. Transl.)*, 1977, **46**, 689

Cr-00132 **C₁₆H₃₂Cr₂⁺⁺⁺⁺**
 Tetrakis(μ -tetramethylene)dichromate(4-), 8Cl



M 328.421 (ion)
 Tetra-Li salt: [31424-66-5].
 C₁₆H₃₂Cr₂Li₄ M 356.185
 Yellow air-sensitive cryst.
 Krause, J. *et al*, *J. Organomet. Chem.*, 1971, **27**, 59 (*synth, cryst struct*)

Cr-00133 **C₁₆H₄₀Cr₂P₄**
 Tetrakis[(dimethylphosphonio)bis(methylene)]dichromium, 10Cl
 [53237-33-5]



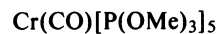
M 460.379
 Yellow cryst. Mp 163-5°.
 Kurras, E. *et al*, *Z. Chem.*, 1974, **14**, 160 (*synth*)
 Cotton, F.A. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1978, **17**, 953 (*synth*)
 Cotton, F.A. *et al*, *Inorg. Chem.*, 1979, **18**, 2713 (*synth, cryst struct*)

Cr-00138 **C₁₆H₄₄CrSi₄**
 Tetrakis[(trimethylsilyl)methyl]chromium, 9Cl
 [35394-18-4]



M 400.862
 Purple air-sensitive needles. Sol. hydrocarbons. Mp 40°.
 Yagupsky, G. *et al*, *J. Chem. Soc., Chem. Commun.*, 1970, 1369 (*synth*)
 Mowat, W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 533 (*synth*)

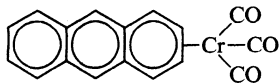
Cr-00139 **C₁₆H₄₅CrO₁₆P₅**
 Carbonylpentakis(trimethylphosphite-P)chromium, 8Cl
 [37478-32-3]



M 700.387
 Pale-yellow cryst. Mp 175°.
 Mathieu, R. *et al*, *Inorg. Chem.*, 1972, **11**, 1858 (*synth*)

C₁₇H₁₀CrO₃

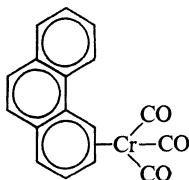
Anthracenetricarbonylchromium, 8Cl
Tricarbonyl-η⁶-anthracenechromium
 [12155-42-9]



M 314.260
 Dark-green cryst. Sol. C₆H₆, insol. hexane. Mp 189-92°.
 Fischer, E.O. *et al*, *Chem. Ber.*, 1967, **100**, 3084 (*nmr*)
 Mills, O.S. *et al*, *J. Organomet. Chem.*, 1968, **11**, 151 (*cryst struct*)
 Muir, K.W. *et al*, *J. Chem. Soc. (B)*, 1968, 467 (*cryst struct*)

C₁₇H₁₀CrO₃

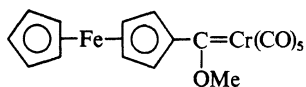
Tricarbonyl-η⁶-phenanthrenechromium
 [12094-55-2]



M 314.260
 Bright-orange cryst. Mp 158-60°.
 King, R.B. *et al*, *J. Am. Chem. Soc.*, 1960, **82**, 4557 (*synth*)
 Fischer, E.O. *et al*, *Chem. Ber.*, 1967, **100**, 3084 (*synth*)
 Muir, K.W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1968, 467 (*cryst struct*)
 Mills, O.S. *et al*, *J. Organomet. Chem.*, 1968, **11**, 151 (*cryst struct*)

C₁₇H₁₂CrFeO₆

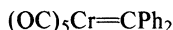
Pentacarbonyl(ferrocenylmethoxymethylene)chromium, 9Cl
(Methoxyferrocenylcarbene)pentacarbonylchromium
 [131725-05-0]



M 420.121
 Purple cryst. (C₆H₆/heptane). Mp 170° dec. (softens at 135°).
 Connor, J.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 1470 (*synth, pmr, ir, uv, ms*)
 Rausch, M.D. *et al*, *J. Organomet. Chem.*, 1973, **51**, 1 (*synth, pmr, ir*)

C₁₈H₁₀CrO₅

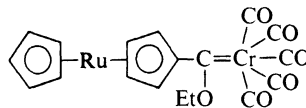
Pentacarbonyl(diphenylmethylene)chromium, 9Cl
 [62589-11-1]



M 358.270
 Air-sensitive black cryst.
 Fischer, E.O. *et al*, *Chem. Ber.*, 1977, **110**, 656 (*synth*)
 Doetz, K.H. *et al*, *Chem. Ber.*, 1977, **110**, 1555 (*props*)
 Doetz, K.H. *et al*, *J. Organomet. Chem.*, 1978, **157**, C55 (*props*)
 Cooper, N.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 238 (*synth, ir, nmr*)

Cr-00140**C₁₈H₁₄CrO₆Ru**

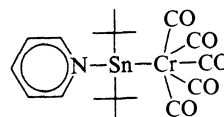
Pentacarbonyl(ethoxyruthenocenylmethylene)chromium, 10Cl
 [75280-69-2]



M 479.371
 Orange-yellow cryst. (CH₂Cl₂/pentane). Mp 113°.
 Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1980, **191**, 261 (*synth, ir, ms, pmr, cmr*)

C₁₈H₂₃CrNO₅Sn

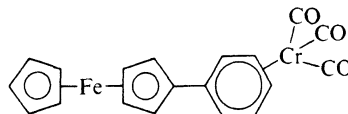
[Di-tert-butyl(pyridine)tin]pentacarbonylchromium
[Bis(1,1-dimethylethyl)(pyridine)tin]pentacarbonylchromium, 9Cl. [(Pyridine)di-tert-butylstannanediyl]-pentacarbonylchromium
 [50982-07-5]



M 504.069
 Pale yellow cryst. (hexane).
 Marks, T.J., *J. Am. Chem. Soc.*, 1971, **93**, 7090 (*synth, ir, pmr*)
 Brice, M.D. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 4529 (*struct*)
 Gryniewicz, G.W. *et al*, *Inorg. Chem.*, 1973, **12**, 2522 (*mössbauer, pe*)

C₁₉H₁₄CrFeO₃

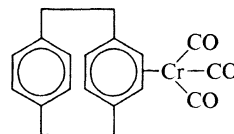
Tricarbonyl(phenylferrocene)chromium, 8Cl
Tricarbonyl[η⁶-(ferrocenylbenzene)]chromium



M 398.161
 Orange cryst. (heptane). Mp 147-50° dec.
 Gubin, S.P. *et al*, *J. Organomet. Chem.*, 1970, **22**, 449 (*synth, ir, pmr, polarog*)

C₁₉H₁₆CrO₃

Tricarbonyl(3-8-η-[2.2]paracyclophane)chromium
Tricarbonyl[(1,10,11,12,13,14-η)-tricyclo-[8.2.2.2^{4,7}]hexadeca-4,6,10,12,13,15-hexaene]chromium, 10Cl
 [41354-64-7]



M 344.330
 Air-stable cryst. (C₆H₆/pentane). Mp 253-5°.
 Cram, D.J. *et al*, *J. Am. Chem. Soc.*, 1960, **82**, 5721 (*synth*)
 Langer, E. *et al*, *Tetrahedron*, 1973, **29**, 375 (*props*)
 Cristiani, F. *et al*, *Inorg. Chim. Acta*, 1975, **12**, 119 (*props*)
 Kai, Y. *et al*, *Acta Crystallogr., Sect. B*, 1978, **34**, 2840 (*cryst struct*)
 Langer, E. *et al*, *J. Organomet. Chem.*, 1979, **173**, 47 (*props*)

C₁₉H₃₈CrO₅Si₄Sn**Cr-00148**

[Bis[bis(trimethylsilyl)methyl]tin]pentacarbonylchromium
Pentacarbonyl[[[(stannylenedimethylidyne)tetrakis(trimethylsilylato)](2-)-Sn]chromium, 9Cl
 [41772-92-3]



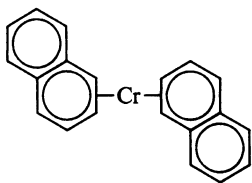
M 629.534

Orange cryst. (hexane). Mp 120°.

Cotton, J.D. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 2275
 (synth, struct)

C₂₀H₁₆Cr**Cr-00149**

Bis[(1,2,3,4,4a,8a-η)naphthalene]chromium, 10Cl
 [33085-81-3]



M 308.342

Black cryst.

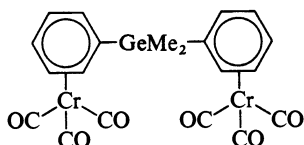
Elschenbroich, C. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1977, **16**, 870 (props)

Connor, J.A. *et al*, *J. Organomet. Chem.*, 1979, **179**, 331.

Kundig, E.P. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 991
 (synth, props)

C₂₀H₁₆Cr₂GeO₆**Cr-00150**

(Dimethyldiphenylgermane)bis[tricarbonylchromium]
 [75061-55-1]



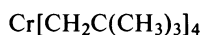
M 528.925

Yellow cryst. Mp 115-6°.

Nagelberg, S.B. *et al*, *Organometallics*, 1982, **1**, 851.

C₂₀H₄₄Cr**Cr-00151**

Tetrakis(2,2-dimethylpropyl)chromium, 9Cl
Tetrakis(neopentyl)chromium.
Tetraneopentylchromium
 [37007-84-4]



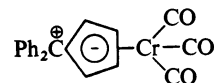
M 336.564

Maroon air-sensitive needles. Mp 110°.

Mowat, W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 770
 (synth)

C₂₁H₁₄CrO₃**Cr-00152**

Tricarbonyl(diphenylmethylenecyclopentadiene)chromium
Tricarbonyl[[[(2,3,4,5-η)-2,4-cyclopentadien-1-ylidene]phenylmethyl]benzene]chromium, 10Cl. *Tricarbonyl(η⁶-6,6-diphenylfulvene)chromium*
 [12248-79-2]



M 366.336

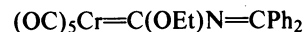
Brown needles. Mp 209°.

Andrianov, V.G. *et al*, *Zh. Strukt. Khim.*, 1977, **18**, 3118
 (struct)

Edelmann, F. *et al*, *J. Organomet. Chem.*, 1977, **134**, 31.

C₂₁H₁₅CrNO₆**Cr-00153**

Pentacarbonyl[(diphenylmethylene)amino]ethoxymethylene]chromium, 9Cl
 [54330-36-8]



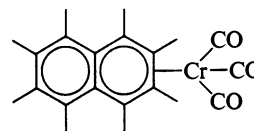
M 429.349

Bright-red cryst. Mp 88-90°.

Doyle, M.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 1494
 (synth, ir, nmr)

C₂₁H₂₄CrO₃**Cr-00154**

Tricarbonyl(η⁶-octamethylnaphthalene)chromium
 [79391-56-3]



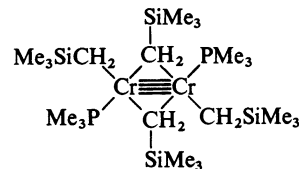
M 376.415

Dark-red cryst.

Hull, J.W. *et al*, *Organometallics*, 1982, **1**, 264 (synth, struct)

C₂₂H₆₂Cr₂P₂Si₄**Cr-00155**

Bis(trimethylphosphine)bis[μ-[(trimethylsilyl)methyl]]bis(trimethylsilyl)methyl]dichromium, 10Cl
 [64216-75-7]



M 605.013

Deep-red air-sensitive cryst. (Et₂O). Mp 80-100° dec.

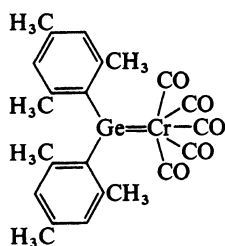
Anderson, R.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 446
 (synth)

Hursthouse, M.B. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 1314 (cryst struct)

C₂₃H₂₂CrGeO₅

Cr-00156

[Bis(2,4,6-trimethylphenyl)germylene]pentacarbonylchromium, 10Cl
(Dimesitylgermanediyl)pentacarbonylchromium
[63428-34-2]



M 503.010

Pale-yellow needles (pet. ether). Mp 114°.

Jutzi, P. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1977, **16**, 639.C₂₄H₂₀CrO₄Tl₂

Cr-00157

μ-(Chromato-O,O')tetraphenyldithallium
Bis(diphenylthallium)chromate
(Ph₂Tl)₂CrO₄

M 833.182

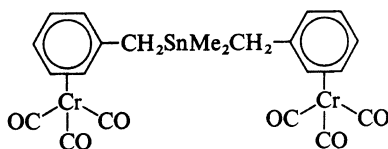
Yellow needles. Sol. Py, insol. H₂O. Mp 290° (explodes).

▷ Toxic, explodes on heating

Goddard, A.E., *J. Chem. Soc.*, 1922, 482 (*synth*)C₂₄H₂₀Cr₂O₆Sn

Cr-00158

(Dibenzyldimethylstannane)bis[tricarbonylchromium]
[81496-90-4]



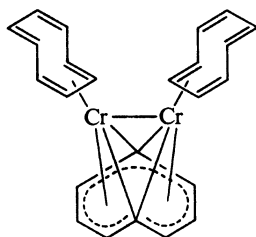
M 627.100

Yellow cryst. Mp 189-91°.

Nagelberg, S.B. *et al*, *Organometallics*, 1982, **1**, 851.C₂₄H₂₄Cr₂

Cr-00159

μ-[(1,2,3,4-η:5,6,7,8-η)-1,3,5,7-Cyclooctatetraene-
]bis(1,2,3,4-η)-1,3,5,7-cyclooctatetraene]dichromium, 9Cl
Tris(cyclooctatetraene)dichromium
[59982-80-8]



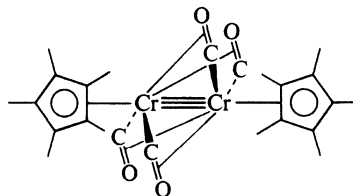
M 416.446

Air-sensitive black cryst.

Breil, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1966, **5**, 898 (*synth*)Brauer, D.J. *et al*, *Inorg. Chem.*, 1976, **15**, 2511 (*synth, cryst struct*)C₂₄H₃₀Cr₂O₄

Cr-00160

Tetracarbonylbis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dichromium, 10Cl
[37299-12-0]



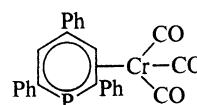
M 486.491

Four "semi-bridging" carbonyls in cryst. Deep-green cryst. (hexane). Dec. >200°.

King, R.B. *et al*, *J. Organomet. Chem.*, 1979, **171**, 53 (*synth, ir, props*)Robbins, J.L. *et al*, *Inorg. Chem.*, 1981, **20**, 1133 (*uv*)C₂₆H₁₇CrO₃P

Cr-00161

Tricarbonyl[(1,2,3,4,5,6-η)-2,4,6-triphenylphosphorin]chromium, 9Cl
Tricarbonyl(η⁶-2,4,6-triphenylphosphabenzene)chromium
[36153-02-3]



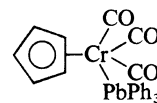
M 460.388

Ir, nmr and ms suggest π-bonded ring. Dark red-brown cryst. Mp 156-7°.

Deberitz, J. *et al*, *Chem. Ber.*, 1970, **103**, 2541 (*synth*)Varenkamp, H. *et al*, *Chem. Ber.*, 1972, **105**, 1148 (*struct*)Nöth, H. *et al*, *Chem. Ber.*, 1973, **106**, 2227 (*struct*)Lückoff, M. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1976, **15**, 503.C₂₆H₂₀CrO₃Pb

Cr-00162

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(triphenylplumbyl)-chromium
(Triphenylplumbyl)(cyclopentadienyl)tricarbonylchromium

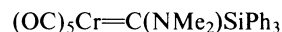


M 639.638

Yellow solid (CH₂Cl₂). Mp 195-7° dec.Patil, H.R.H. *et al*, *Inorg. Chem.*, 1966, **5**, 1401.C₂₆H₂₁CrNO₅Si

Cr-00163

Pentacarbonyl[(dimethylamino)(triphenylsilyl)methylene]chromium, 9Cl
[60674-48-8]



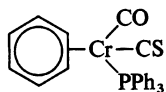
M 507.537

Yellow cryst.

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1976, **113**, C31 (*synth*)Fischer, E.O. *et al*, *Chem. Ber.*, 1977, **110**, 3467 (*synth*)Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1979, **168**, 53 (*nmr*)

C₂₆H₂₁CrOPS**Cr-00164****(η^6 -Benzene)(carbonothioyl)carbonyl(triphenylphosphine)chromium, 10Cl**

[63590-28-3]

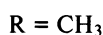


M 464.481

Orange-brown cryst. Mp 120-4° dec.

Jaoven, G., *Tetrahedron Lett.*, 1973, 5159.Jaoven, G. *et al.*, *J. Organomet. Chem.*, 1974, **72**, 377.Butler, I.S. *et al.*, *J. Organomet. Chem.*, 1977, **133**, 59.**C₂₆H₃₀Cr₂O₆****Cr-00165****Hexacarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dichromium, 10Cl**

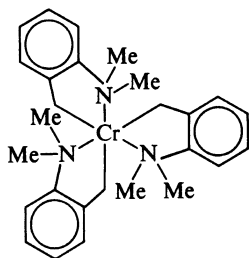
[70605-18-4]

As Hexacarbonylbis(η^5 -2,4-cyclopentadien-1-yl)dichromium, Cr-00129 with

M 542.511

Deep-purple, v. air-sensitive cryst. (C₆H₆).King, R.B., *Coord. Chem. Rev.*, 1976, **20**, 155 (*synth*)King, R.B. *et al.*, *J. Organomet. Chem.*, 1979, **171**, 53 (*synth*, *pmr*)**C₂₇H₃₆CrN₃****Cr-00166****Tris[[2-(dimethylamino)phenyl]methyl-C,N]chromium, 10Cl**

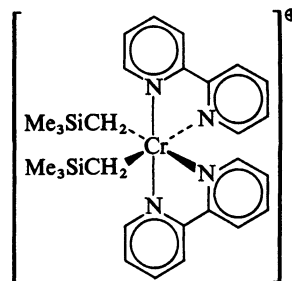
[64061-47-8]



M 454.598

Red cryst. (CH₂Cl₂). μ_{eff} = 3.6 BM.

▷Pyrophoric

Manzer, L.E., *J. Organomet. Chem.*, 1977, **135**, C6 (*synth*, *props*)Lukehart, C.M. *et al.*, *J. Organomet. Chem.*, 1979, **179**, C9 (*props*)**C₂₈H₃₈CrN₄Si₂[⊕]****Cr-00167****Bis(2,2'-bipyridine-*N,N'*)bis[(trimethylsilyl)methyl]chromium(1+), 9Cl**

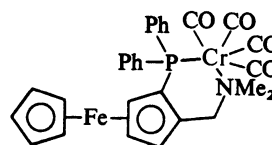
M 538.802 (ion)

 μ_B = 3.64 BM.*Iodide*: [41678-48-2].C₂₈H₃₈CrIN₄Si₂ M 665.707

Red cryst.

Daly, J.J. *et al.*, *Helv. Chim. Acta*, 1973, **56**, 503 (*synth*, *cryst struct*)Daly, J.J. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1973, 1497.**C₂₉H₂₆CrFeNO₄P****Cr-00168****Tetracarbonyl[1-[(dimethylamino)methyl]-2-(diphenylphosphino)ferrocene-*N,P*]chromium, 9Cl**

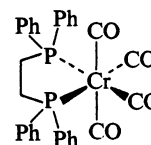
[55960-25-3]



M 591.345

Cryst. (Me₂CO/pet. ether). Mp 160-4°.Kotz, J.C. *et al.*, *J. Organomet. Chem.*, 1975, **84**, 255 (*synth*, *ir*, *pmr*)**C₃₀H₂₄CrO₄P₂****Cr-00169****Tetracarbonyl[1,2-ethanediylbis(diphenylphosphine)-*P,P'*]chromium, 10Cl****[1,2-Bis(diphenylphosphino)ethane]tetracarbonylchromium**

[29890-04-8]



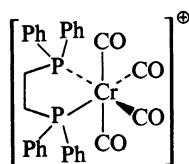
M 562.461

Yellow cryst. Mp 211°.

Chatt, J. *et al.*, *J. Chem. Soc.*, 1961, 4980 (*synth*)Grim, S.O. *et al.*, *Inorg. Chem.*, 1974, **13**, 1095 (*synth*, *nmr*)Cohen, M.A. *et al.*, *Inorg. Chem.*, 1976, **15**, 1417 (*synth*, *props*)Brisdon, B.J. *et al.*, *J. Mol. Struct.*, 1977, **41**, 99 (*ir*)Gaebelein, H. *et al.*, *J. Organomet. Chem.*, 1978, **156**, 389 (*ir*)Treichel, P.M. *et al.*, *Inorg. Chim. Acta*, 1979, **33**, 171 (*synth*)

C₃₀H₂₄CrO₄P₂[⊕]**Cr-00170**

Tetracarbonyl[1,2-ethanediylbis(diphenylphosphine)-P,P']-chromium(1+), 9Cl
Tetracarbonyl[1,2-bis(diphenylphosphino)ethane]chromium(1+)



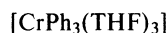
M 562.461 (ion)

Hexafluorophosphate: [37757-22-5].C₃₀H₂₄CrF₆O₄P₃ M 707.425

Deep-purple cryst.

Johnson, B.F.G. *et al*, *J. Organomet. Chem.*, 1972, **40**, C36 (*synth*)**C₃₀H₃₉CrO₃****Cr-00171**

Triphenyltris(tetrahydrofuran)chromium, 8Cl
 [13986-68-0]

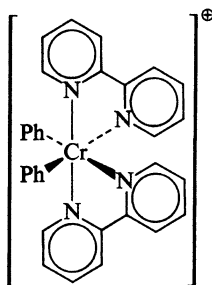


M 499.632

Red air-sensitive cryst.

Herwig, W. *et al*, *J. Am. Chem. Soc.*, 1957, **79**, 6561; 1959, **81**, 4798 (*synth*)Whitesides, G.M. *et al*, *J. Am. Chem. Soc.*, 1970, **92**, 5625 (*props*)Seidel, W. *et al*, *Z. Chem.*, 1971, **11**, 932 (*props*)**C₃₂H₂₆CrN₄[⊕]****Cr-00172**

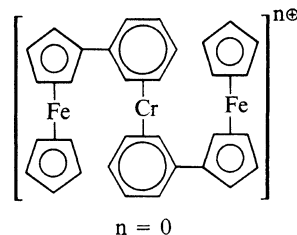
Bis(2,2'-bipyridine-N,N')diphenylchromium(1+), 9Cl



M 518.580 (ion)

Iodide: [25839-19-4].C₃₂H₂₆CrIN₄ M 645.485Red cryst. μ_B = 3.80 BM.Muller, H., *Z. Chem.*, 1969, **9**, 311 (*synth*)Sneeden, R.P.A. *et al*, *J. Organomet. Chem.*, 1973, **47**, 125 (*synth*)**C₃₂H₂₈CrFe₂****Cr-00173**

Bis[(η^6 -phenyl)ferrocene]chromium, 10Cl
(1,1'-Diferrocenyldi- π -benzene)chromium
 [67574-52-1]



n = 0

M 576.263

Isol. as the oxidation product 89776-1.

Sheveler, Yu.A. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1981, 1414 (*synth*)**C₃₂H₂₈CrFe₂[⊕]****Cr-00174**

Bis[(η^6 -phenyl)ferrocene]chromium(1+), 10Cl
(1,1'-Diferrocenyldi- π -benzene)chromium(1+)
 As Bis[(η^6 -phenyl)ferrocene]chromium, Cr-00173 with

n = 1

M 576.263 (ion)

Iodide: [75826-53-8].C₃₂H₂₈CrFe₂I M 703.168

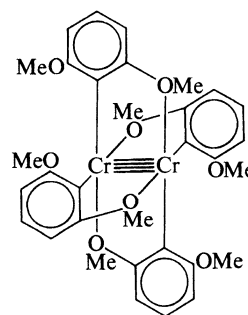
Red-brown lustrous cryst. (MeOH). Mp 132-4°.

Tetraphenylborate: [79102-83-3].C₅₆H₄₈BCrFe₂ M 895.495

No phys. props. reported.

Nesmeyanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1978, 1420 (*synth, esr, mössbauer*)Shevelev, Yu.A. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1980, 1414; 1981, 1414 (*synth, ir, uv, esr*)**C₃₂H₃₆Cr₂O₈****Cr-00175**

Tetrakis[μ -(2,6-dimethoxyphenyl-C:O)]dichromium, 10Cl
 [64836-05-1]



M 652.624

Orange air-sensitive cryst. (THF/hexane).

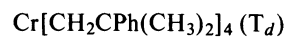
Cotton, F.A. *et al*, *Inorg. Chim. Acta*, 1977, **25**, L105.Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 7372.Cotton, F.A. *et al*, *Inorg. Chem.*, 1978, **17**, 2087 (*synth, cryst struct*)

Handle all chemicals with care

C₃₈H₃₀CrINO₃P₂**Cr-00177****Dicarbonylodonitrosylbis(triphenylphosphine)chromium, 9CI**
[60020-27-1]

M 789.508

Yellow solid. Mp >100° dec.

Connelly, N.G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 699
(*synth, props*)**C₄₀H₅₂Cr****Cr-00178****Tetrakis(2-methyl-2-phenylpropyl)chromium, 9CI**
[37007-87-7]

M 584.847

Purple air-sensitive prisms. Sol. hexane. Mp 120° dec.

Gramlich, V. *et al*, *J. Organomet. Chem.*, 1973, **61**, 247 (*cryst struct*)Mowat, W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 770
(*synth*)

Dy Dysprosium

S. A. Cotton

Dysprosium (Fr., Ger.), Disprozio (Sp., Ital.), Диспрозий (Disprozii) (Russ.), ジスプロシウム (Japan.)

Atomic Number. 66

Atomic Weight. 162.50

Electronic Configuration. [Xe] $4f^{10} 6s^2$

Oxidation State. +3

Coordination Number. 6 or greater.

Colour. Mainly yellow, but some are colourless.

Availability. Available starting materials are Dy_2O_3 and anhydrous $DyCl_3$. See also under Lanthanum.

Handling. See under Lanthanum.

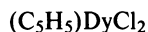
Toxicity. See under Lanthanum.

Isotopic Abundance. ^{160}Dy , 2.29%; ^{161}Dy , 18.88%; ^{162}Dy , 25.53%; ^{163}Dy , 24.97%; ^{164}Dy , 28.18%.

Spectroscopy. 1H nmr spectra of dysprosium compounds show very large paramagnetic shifts with very broad lines and as yet, no data on organodysprosium compounds are available. See also under Lanthanum.

Analysis. See under Lanthanum.

References. See under Lanthanum.

C₅H₅Cl₂Dy**Dichloro(η⁵-2,4-cyclopentadien-1-yl)dysprosium**
Cyclopentadienyldysprosium dichloride

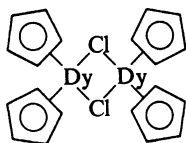
M 298.501

*Tris-THF adduct:*C₁₇H₁₉Cl₂DyO₃ M 504.741

Colourless cryst. Mp 85-90° dec.

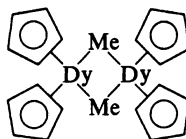
Extremely air-sensitive. μ = 11.81 μ_B. Struct. probably
Manastyrskyj, S. *et al*, *Inorg. Chem.*, 1963, **2**, 904 (*synth*)**Dy-00001**C₂₂H₂₆DyN M 466.954Sol. C₆H₆. Mp 163°.Birmingham, J.M. *et al*, *J. Am. Chem. Soc.*, 1956, **78**, 42
(*synth*)v. Ammon, R. *et al*, *Ber. Bunsenges. Phys. Chem.*, 1972, **76**, 995.
Aleksanyan, V.T. *et al*, *J. Raman. Spectrosc.*, 1974, **2**, 345
(*raman*)**C₂₀H₁₉DyO₃W****Dy-00005****[μ-(Carbonyl-C,O)]bis[(1,2,3,4,5-η)-1-methyl-2,4-cyclopentadien-1-yl][tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)tungsten]dysprosium, 9Cl**

M 653.718

Nitrosylated by *N*-methyl-*N*-nitroso-*p*-toluenesulfonamide to give (C₅H₅)W(CO)₂NO. Sol. THF, DMSO. Mp >220° dec. Air- and moisture-sensitive.Crease, A.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1501
(*synth, ir*)**C₁₀H₁₀ClDy****Chlorobis(η⁵-2,4-cyclopentadienyl)dysprosium****Dy-00002**

M 328.142

Dimeric.

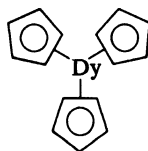
Dimer: [60482-74-8]. *Di-μ-chlorotetrakis(η⁵-2,4-cyclopentadien-1-yl)didysprosium, 9Cl.*C₂₀H₂₀Cl₂Dy₂ M 656.284Yellow cryst. Sol. THF. Mp 343-6°. Dec. in air. Subl. *in vacuo*. μ_{eff} = 10.6 μ_B.Maginn, R.E. *et al*, *J. Am. Chem. Soc.*, 1963, **85**, 672 (*synth, ir*)**C₁₁H₁₃Dy****Bis(η⁵-2,4-cyclopentadien-1-yl)methyldysprosium****Dy-00003**

M 307.724

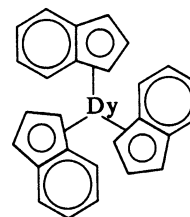
Dimeric.

Dimer: [60997-41-3]. *Tetrakis(η⁵-2,4-cyclopentadienyl)-di-μ-methyldidysprosium, 9Cl.*C₂₂H₂₆Dy₂ M 615.447Pale-yellow cryst. Sol. CH₂Cl₂, C₆H₆, toluene. Dec. >165°. Air-sensitive. μ_{eff} = 9.9 μ_B.Holton, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 54 (*synth, ir*)**C₁₅H₁₅Dy****Tris(η⁵-2,4-cyclopentadien-1-yl)dysprosium, 9Cl**
*Tricyclopentadienyldysprosium***Dy-00004**

[12088-04-9]



M 357.784

Yellow cryst. Sol. THF. Mp 302°. Hydrol. by H₂O. Subl. at 220° *in vacuo*. μ_{eff} = 10.0 μ_B.*Isocyanocyclohexane adduct*: [37298-98-9]. *Tris(2,4-cyclopentadien-1-yl)isocyanocyclohexanedysprosium.***C₂₇H₂₁Dy****Dy-00006****Triindenylidysprosium***Tris(1,2,3,3a,7a-η)-1H-inden-1-ylidysprosium*

M 507.963

May be a mono- or trihapto complex.

THF adduct: [22696-75-9].C₃₁H₂₉DyO M 580.070Pale-tan solid. Sol. THF. μ = 9.95 μ_B.Tsutsui, M. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 3175 (*synth*)

Er Erbium

S. A. Cotton

Erbium (Fr., Ger.), Erbio (Sp., Ital.), Эрбий Erbii) (Russ.), エルビウム (Japan.)

Atomic Number. 68

Atomic Weight. 167.26

Electronic Configuration. [Xe] $4f^{12} 6s^2$

Oxidation State. +3

Coordination Number. 6 or greater, but less in compounds with bulky ligands such as $-\text{CH}_2\text{SiMe}_3$, $-\text{C}(\text{CH}_3)_3$.

Colour. Pink.

Availability. Available starting materials are Er_2O_3 and anhydrous ErCl_3 . See also under Lanthanum.

Handling. See under Lanthanum.

Toxicity. See under Lanthanum.

Isotopic Abundance. ^{162}Er , 0.14%; ^{164}Er , 1.56%; ^{166}Er , 33.41%; ^{167}Er , 22.94%; ^{168}Er , 27.07%; ^{170}Er , 14.88%.

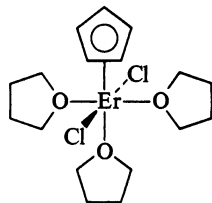
Spectroscopy. The resonances in ^1H nmr spectra of organoerbium compounds are very broad with large paramagnetic shifts.

Erbium compounds have electronic spectra with certain hypersensitive peaks, where the intensity in particular is affected by the environment. See for example Pappalardo, R., *J. Chem. Phys.*, 1968, **49**, 1545.

Analysis. See under Lanthanum.

References. See under Lanthanum for general references, and also, for ^1H nmr spectra, the following:

Schumann, H. *et al.*, *J. Organomet. Chem.*, 1978, **146**, C5.

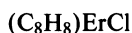
C₅H₅Cl₂Er**Dichloro(η⁵-2,4-cyclopentadien-1-yl)erbium**
*Cyclopentadienylerbium dichloride***Er-00001**

THF adduct

M 303.261

Tris-THF adduct: [81703-54-0].C₁₇H₂₉Cl₂ErO₃ M 519.580Pink cryst. Sol. THF, sl. sol. C₆H₆. Mp 91-4°. Dec. by air and moisture. $\mu = 9.68\mu_B$.Manastyrskij, S. *et al*, *Inorg. Chem.*, 1963, **2**, 904 (*synth, ir*)Day, C.S. *et al*, *Organometallics*, 1982, **1**, 998 (*struct*)**C₆H₁₈Er⁺⁺⁺****Hexamethylebate(3-)****Er-00002**

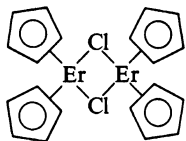
M 257.468 (ion)

Tris[(tetramethylethylenediamine)lithium] salt: [66862-11-1].C₂₄H₆₆ErLi₃N₆ M 626.909Pink cryst. Sl. sol. Et₂O. Mp 138-9° dec. Extremely air- and moisture-sensitive.Schumann, H. *et al*, *Angew. Chem.*, *Int. Ed. Engl.*, 1978, **17**, 276; 1981, **20**, 120 (*synth, struct*)**C₈H₈ClEr****(η⁸-1,3,5,7-Cyclooctatetraene)chloroerbium****Er-00003**

M 306.864

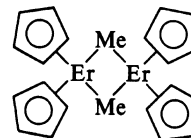
THF adduct: (η⁸-1,3,5,7-Cyclooctatetraene)-chloro(tetrahydrofuran)erbium.C₁₂H₁₆ClErO M 378.971

Pink powder. Sol. THF. Presumably dimeric by analogy with Chloro(cyclooctatetraene)cerium, Ce-00001.

Wayda, A.L., *Organometallics*, 1983, **2**, 565 (*synth, ir*)**C₁₀H₁₀ClEr****Chlorobis(η⁵-2,4-cyclopentadien-1-yl)erbium**
[53224-35-4]**Er-00004**

M 332.902

Dimeric.

Dimer: Dichlorotetrakis(η⁵-2,4-cyclopentadien-1-yl)-dierbium, 9Cl.C₂₀H₂₀Cl₂Er₂ M 665.804Pink cryst. Sol. THF. Mp >200° dec. Dec. in air. Subl. *in vacuo*. $\mu_{\text{eff}} = 9.79\mu_B$.Maginn, R.E. *et al*, *J. Am. Chem. Soc.*, 1963, **85**, 672 (*synth, ir*)Marks, T.J. *et al*, *Inorg. Chem.*, 1976, **15**, 1302 (*synth*)**C₁₁H₁₃Er****Bis(η⁵-2,4-cyclopentadien-1-yl)methylerbium**
[61127-35-3]**Er-00005**

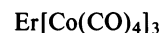
M 312.484

Dimeric.

Dimer: Tetrakis(η⁵-2,4-cyclopentadien-1-yl)-di-μ-methyldierbium.C₂₂H₂₆Er₂ M 624.967

Active catalyst for catalytic polymerisation of ethene.

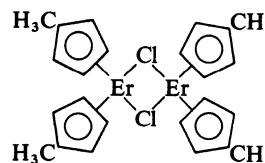
Convenient source for making alkynides. Pink cryst.

Sol. THF, toluene, C₆H₆, CH₂Cl₂. Mp >150° dec. $\mu_{\text{eff}} = 9.41\mu_B$ (295°K), oxygen- and moisture-sensitive.Ely, N.M. *et al*, *Inorg. Chem.*, 1975, **14**, 2680 (*synth, ir*)Ballard, D.G.H. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 994 (*use*)Holton, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 54 (*synth, uv, ir, ms*)Evans, W.J. *et al*, *J. Organomet. Chem.*, 1980, **202**, C6 (*use*)**C₁₂Co₃ErO₁₂****Tris(tetracarbonylcobalto)erbium, 8Cl****Er-00006**

M 680.184

Tetrakis-THF complex: [34216-63-2].C₂₈H₃₂Co₃ErO₁₆ M 968.611

Struct. not yet established. Dark-red solid. Mp 138-40° dec. Air- and water-sensitive.

Marianelli, R.S. *et al*, *J. Organomet. Chem.*, 1971, **32**, C41 (*synth, ir*)**C₁₂H₁₄ClEr****Chlorobis(η⁵-methylcyclopentadienyl)erbium****Er-00007**

M 360.956

Dimeric.

Dimer: Di-μ-chlorotetrakis[(1,2,3,4,5-η)-1-methyl-2,4-cyclopentadien-1-yl]dierbium.C₂₄H₂₈Cl₂Er₂ M 721.911Pink cryst. Sol. C₆H₆, THF. Mp 119-22°. Dec. in air.Subl. *in vacuo*.Maginn, R.E. *et al*, *J. Am. Chem. Soc.*, 1963, **85**, 672 (*synth*)**C₁₂H₃₃ErSi₃****Tris(trimethylsilyl)methyl]erbium****Er-00008**

M 428.909

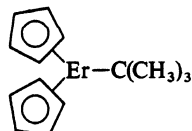
Bis-THF complex: [67483-83-4]. *Bis(tetrahydrofuran)-tris[(trimethylsilyl)methyl]erbium*.C₂₀H₄₉ErO₂Si₃ M 573.122

Pink cryst. Sol. hexane. Mp 49-51°.

Tris-THF(?) complex: [66228-53-3]. *Tris(tetrahydrofuran)tris[(trimethylsilyl)methyl]erbium*.

C₂₄H₅₇ErO₃Si₃ M 645.229Pink cryst. Sol. pentane, THF. Air-sensitive, unstable >30°. $\mu = 9.2\mu_B$. Possibly identical with the bis-complex above.Atwood, J.L. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 140 (*synth*, *ir*)Schumann, H. *et al*, *J. Organomet. Chem.*, 1978, **146**, C5 (*synth*, *ir*, *pmr*)C₁₄H₁₉Er

Er-00009

tert-Butylbis(η^5 -cyclopentadienyl)erbium*(Bis- η^5 -2,4-cyclopentadien-1-yl)(1,1-dimethylethyl)erbium*, 10Cl. *Bis(cyclopentadienyl)(tert-butyl)erbium*

M 354.564

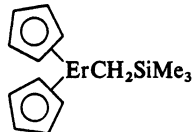
THF complex: [78683-33-7].C₁₈H₂₇ErO M 426.671

Pink cryst. Sol. THF, toluene. Mp >40° dec.

Extremely air- and moisture-sensitive.

Evans, W.J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 292 (*synth*, *ir*)Schumann, H. *et al*, *Organometallics*, 1982, **1**, 1194 (*synth*, *ir*)C₁₄H₂₁ErSi

Er-00010

Bis(η^5 -2,4-cyclopentadien-1-yl)((trimethylsilyl)methyl)erbium

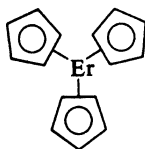
M 384.665

THF complex: [82311-89-5].C₁₈H₂₉ErOSi M 456.772Light-brown solid. Sol. THF, C₆H₆, toluene. Mp ~50° dec. Extremely sensitive to moisture and oxygen.Schumann, H. *et al*, *Organometallics*, 1982, **1**, 1194 (*synth*, *ir*)C₁₅H₁₅Er

Er-00011

Tris(η^5 -2,4-cyclopentadien-1-yl)erbium, 9Cl*Tricyclopentadienylerbium*

[39330-74-0]



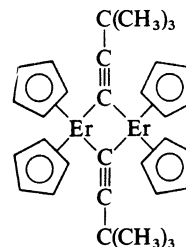
M 362.544

Pink cryst. Sol. THF. Mp 285°. Hydrol. by H₂O. Subl. at 200° *in vacuo*. $\mu_{eff} = 9.44\mu_B$.*Isocyanocyclohexane complex*: [37298-99-0]. *Tris(2,4-cyclopentadien-1-yl)isocyanocyclohexaneerbium*.C₂₂H₂₆ErN M 471.714Sol. C₆H₆. Mp 168°.Birmingham, J.M. *et al*, *J. Am. Chem. Soc.*, 1956, **78**, 42 (*synth*)Pappalardo, R., *J. Chem. Phys.*, 1968, **49**, 1545 (*uv*)v. Ammon, R. *et al*, *Ber. Bunsenges. Phys. Chem.*, 1972, **76**, 995.Aleksanyan, V.T. *et al*, *J. Organomet. Chem.*, 1977, **131**, 251 (*raman*)C₁₆H₁₉Er

Er-00012

Bis(2,4-cyclopentadien-1-yl)(3,3-dimethylbutynyl)erbium

[76747-86-9]



M 378.586

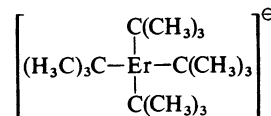
Dimeric.

Dimer: *Tetrakis(η⁵-2,4-cyclopentadien-1-yl)bis[μ-(3,3-dimethylbutynyl)]dierbium*.C₃₂H₃₈Er₂ M 757.172

Pink solid. Sol. THF. Extremely air- and moisture-sensitive.

Evans, W.J. *et al*, *J. Organomet. Chem.*, 1980, **202**, C6 (*synth*, *ir*)Atwood, J.L. *et al*, *Inorg. Chem.*, 1981, **20**, 4115 (*synth*, *struct*, *ir*, *uv*)C₁₆H₃₆Er⁺

Er-00013

Tetra-tert-butylerbate(1-)*Tetrakis(1,1-dimethylethyl)erbate(1-)*

M 395.720 (ion)

Li salt, tetra-THF complex: [68893-45-8].C₃₂H₆₈ErLiO₄ M 691.088Pink solid. Sol. Et₂O, THF. Mp 60° dec. (*in vacuo*). V. air- and moisture-sensitive. $\mu_{eff} = 9.7\mu_B$.Wayda, A.L. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7119 (*synth*, *ir*, *uv*)C₁₈H₁₅ErO₃W

Er-00014

[μ-(Carbonyl-C, O)]bis(η⁵-2,4-cyclopentadien-1-yl)[dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)tungsten]erbium

[39477-06-0]

(C₅H₅)₂ErW(C₅H₅)(CO)₃

M 630.425

Nitrosylated by *N*-methyl-*N*-nitroso-*p*-toluenesulfonamide to afford (C₅H₅)W(CO)₂NO. Sol. THF, DMSO. Air- and moisture-sensitive. Dec. >220°.Crease, A.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1501 (*synth*, *ir*)C₁₈H₃₀Er₂

Er-00015

Tris(3-hexyne)dierbium(H₃CCH₂CH₂CH₂C≡CH)₃Er₂

M 580.955

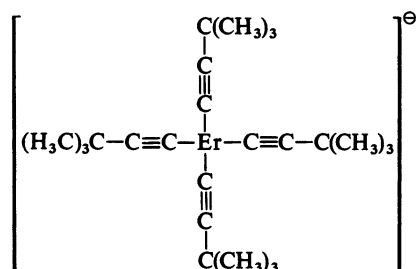
Catalyst for homogeneous hydrogenation of alkenes and alkynes. Dark-brown solid. Sol. C₆H₆. Yields hexane and hexene on thermolysis at 220°.

Evans, W.J. *et al.*, *J. Chem. Soc., Chem. Commun.*, 1979, 1007 (synth, ir, use)

C₂₄H₃₆Er⁺

Er-00016

Tetrakis(3,3-dimethyl-1-butynyl)erbate(1-)



M 491.808 (ion)

Li salt, THF complex: [76565-26-9].

C₂₈H₄₄ErLiO M 570.856

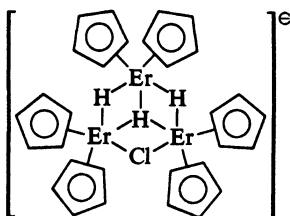
Pink solid. Sol. THF, pentane. μ_{eff} 9.79 μ_B .

Evans, W.J. *et al.*, *J. Organomet. Chem.*, 1980, **202**, C6 (synth, uv, ir)

C₃₀H₃₃ClEr₃⁺

Er-00017

μ -Chlorohexakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -hydro- μ_3 -hydrotrierbate(1-)



M 930.824 (ion)

Li salt, tetra-THF complex: [80795-37-5].

C₄₆H₆₅ClEr₃LiO₄ M 1226.191

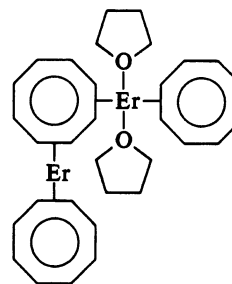
Pink prisms. Extremely air- and moisture-sensitive.

Evans, W.J. *et al.*, *J. Am. Chem. Soc.*, 1982, **104**, 2015 (synth, struct, ir)

C₃₂H₄₀Er₂O₂

Er-00018

Tris(1,3,5,7-cyclooctatetraene)bis(tetrahydrofuran)dierbium
[65101-97-5]



M 791.187

Struct. assigned by analogy with $[\mu - [(1,2-\eta:1,2,3,4,5,6,7,8-\eta)-1,3,5,7\text{-Cyclooctatetraene}]-[\text{bis}(\eta^8-1,3,5,7\text{-cyclooctatetraene})\text{bis}(\text{tetrahydrofuran})\text{dineodymium, Nd-00012. Reddish-brown cryst. Sol. THF. Extremely air- and moisture-sensitive, inflames in air. } \mu_{\text{eff}} = 9.31 \mu_B.$

Eu Europium

S. A. Cotton

Europium (Fr., Ger.), Europio (Sp., Ital.), Европий (Yevropii) (Russ.), ユーロピウム (Japan.)

Atomic Number. 63

Atomic Weight. 151.96

Electronic Configuration. [Xe] $4f^7 6s^2$

Oxidation States. +2, +3, the latter being more common.

Coordination Number. 6 or greater.

Colour. Usually brown or yellow.

Availability. Available starting materials are Eu_2O_3 and anhydrous EuCl_3 . See also under Lanthanum.

Handling. See under Lanthanum.

Toxicity. See under Lanthanum.

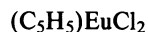
Isotopic Abundance. ^{151}Eu , 47.8%; ^{153}Eu , 52.18%.

Spectroscopy. The ^1H nmr spectra of Eu(III) ($4f^6$) compounds display large paramagnetic shifts. It is anticipated that lines in the ^1H nmr spectra of Eu(II) compounds would be too broad to give useful information, owing to the long relaxation times involved.

^{151}Eu , $I = \frac{5}{2}$, should be amenable to Mössbauer spectroscopy.

Analysis. See under Lanthanum.

References. See under Lanthanum.

C₅H₅Cl₂Eu**Eu-00001****Dichloro(η⁵-2,4-cyclopentadien-1-yl)europium**
Cyclopentadienyleuropium dichloride

M 287.961

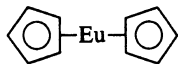
*Tris-THF adduct:*C₁₇H₂₉Cl₂EuO₃ M 504.280

Purple cryst. Darkens >50°. Extremely air-sensitive.

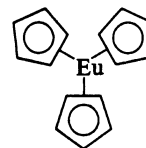
 $\mu_{\text{eff}} = 4.24\mu_{\text{B}}$. Struct. probably resembles Dichloro(η⁵-2,4-cyclopentadien-1-yl)erbium, Er-00001.Manastyrskyj, S. *et al*, *Inorg. Chem.*, 1963, **2**, 904 (*synth*)**C₈H₈Eu****Eu-00002****η⁸-1,3,5,7-Cyclooctatetraeneeuropium**

M 256.111

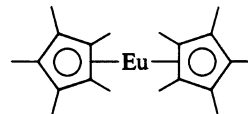
Orange solid. Sol. Py, DMF giving red solns. Extremely sensitive to air and water. Does not subl. Stable to 500°.

Hayes, R.G. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 6876 (*synth*, *epr*)**C₁₀H₁₀Eu****Eu-00003****Bis(η⁵-2,4-cyclopentadien-1-yl)europium***Dicyclopentadienyleuropium. Europocene*

M 282.149

Yellow. Sol. THF. Subl. at 400° *in vacuo*. $\mu_{\text{eff}} = 7.63\mu_{\text{B}}$.Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1965, **3**, 181 (*synth*, *ir*)Aleksanyan, V.T. *et al*, *J. Organomet. Chem.*, 1977, **131**, 113 (*ir*)**C₁₅H₁₅Eu****Eu-00004****Tris(η⁵-2,4-cyclopentadien-1-yl)europium, 9Cl**
Tricyclopentadienyleuropium

M 347.244

Brown cryst. Stable *in vacuo* up to 70°.*THF solvate:* Mahogany-brown cryst. (THF).*Cyclohexylisocyanide adduct:* [37299-00-6]. Sol. C₆H₆. Mp 150°.Manastyrskyj, S. *et al*, *Inorg. Chem.*, 1964, **3**, 1647.Tsutsui, M. *et al*, *Z. Naturforsch., B*, 1966, **21**, 1 (*synth*)von Ammon, R. *et al*, *Ber. Bunsenges Phys. Chem.*, 1972, **76**, 995 (*nmr*, *ir*)**C₂₀H₃₀Eu****Eu-00005****Bis(pentamethylcyclopentadienyl)europium***Decamethyleuropocene*

M 422.417

THF complex: [74282-45-4].C₂₄H₃₈EuO M 494.524

Red prisms. Sol. toluene. Mp 178-81°.

Complex with 2Et₂O + 1THF: [74282-44-3].C₃₂H₅₈EuO₃ M 642.768Red cryst. Sol. Et₂O, hydrocarbons. Mp 181-2°. $\mu_{\text{eff}} = 7.99\mu_{\text{B}}$.Tilley, T.D. *et al*, *Inorg. Chem.*, 1980, **19**, 2999 (*synth*, *ir*)

Gd Gadolinium

S. A. Cotton

Gadolinium (Fr., Ger.), Gadolinio (Sp., Ital.), Гадолиний (Gadolinii) (Russ.), ガドリニウム (Japan.)

Atomic Number. 64

Atomic Weight. 157.25

Electronic Configuration. [Xe] $4f^7 5d^1 6s^2$

Oxidation State. +3

Coordination Number. 6 or greater.

Colour. Colourless or yellow.

Availability. Available starting materials are Gd_2O_3 and anhydrous $GdCl_3$. See also under Lanthanum.

Handling. See under Lanthanum.

Toxicity. See under Lanthanum.

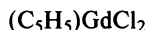
Isotopic Abundance. ^{154}Gd , 2.15%; ^{155}Gd , 14.73%; ^{156}Gd , 20.47%; ^{157}Gd , 15.68%; ^{158}Gd , 24.87%; ^{160}Gd , 21.90%.

Spectroscopy. See also under Lanthanum.

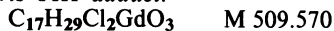
Owing to long relaxation times for $Gd(III)$ ($4f^7$), 1H nmr spectra are too broad to be observed. With the 8S ground state, esr spectra should be capable of giving useful information about the environment of $Gd(III)$ in organometallics.

Analysis. See under Lanthanum.

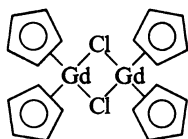
References. See under Lanthanum.

C₅H₅Cl₂Gd **Gd-00001****Dichloro(η⁵-2,4-cyclopentadien-1-yl)gadolinium**
Cyclopentadienylgadolinium dichloride

M 293.251

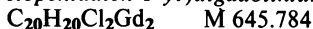
Tris-THF adduct:

Lavender cryst. Mp 82-6° dec. Extremely air-sensitive.

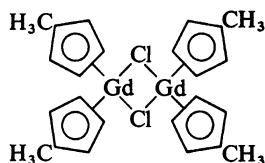
Struct. probably resembles Dichloro(η⁵-2,4-cyclopentadien-1-yl)erbium.Manastyrskij, S. *et al*, *Inorg. Chem.*, 1963, 2, 904 (*synth*)**C₁₀H₁₀ClGd** **Gd-00002****Chlorobis(η⁵-2,4-cyclopentadien-1-yl)gadolinium**
Chlorodicyclopentadienylgadolinium. Dicyclopentadienylgadolinium chloride

M 322.892

Dimeric.

Dimer: [11087-14-2]. *Di-μ-chlorotetrakis(η⁵-2,4-cyclopentadien-1-yl)digadolinium, 9Cl.*

Colourless cryst. Sol. THF. Dec. >140°. Dec. by air.

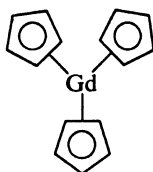
Subl. *in vacuo*. μ_{eff} = 8.86 μ_B.Maginn, R.E. *et al*, *J. Am. Chem. Soc.*, 1963, 85, 672 (*synth, ir*)Green, J.C. *et al*, *J. Organomet. Chem.*, 1981, 212, 329 (*pe*)**C₁₂H₁₄ClGd** **Gd-00003****Chlorobis(η⁵-methylcyclopentadienyl)gadolinium**

M 350.946

Dimeric.

Dimer: *Di-μ-chlorotetrakis(η⁵-1-methyl-2,4-cyclopentadien-1-yl)gadolinium, 9Cl.* Colourless cryst. Sol.C₆H₆, THF. Mp 188-97°. Subl. *in vacuo*, air-sensitive.Maginn, R.E. *et al*, *J. Am. Chem. Soc.*, 1963, 85, 672 (*synth*)**C₁₅H₁₅Gd** **Gd-00004****Tris(η⁵-2,4-cyclopentadien-1-yl)gadolinium, 9Cl***Tri-π-cyclopentadienylgadolinium, 8Cl*

[1272-21-5]



M 352.534

Pale-yellow cryst. Mp 350°. Subl. at 200-5° *in vacuo*, hydrol. by H₂O.*THF adduct:* [75038-98-1]. White cryst. Sol. THF. Air-sensitive.*Cyclohexylisocyanide adduct:* [37299-01-7]. Sol. C₆H₆. Mp 200°.Wilkinson, G. *et al*, *J. Am. Chem. Soc.*, 1954, 76, 6210 (*synth*)
Von Ammon, R. *et al*, *Ber. Bunsenges. Phys. Chem.*, 1972, 76, 995 (*ir*)Devyatikh, G.G. *et al*, *Dokl. Akad. Nauk. SSSR*, 1973, 208, 1094 (*ms*)Aleksanyan, V.T. *et al*, *J. Organomet. Chem.*, 1977, 131, 251 (*raman*)Rogers, R.D. *et al*, *J. Organomet. Chem.*, 1980, 192, 65 (*struct*)**C₁₆H₁₅Gd** **Gd-00005****Bis(η⁵-2,4-cyclopentadien-1-yl)phenylgadolinium**

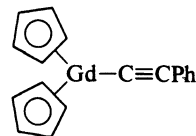
[55672-18-9]



M 364.545

Lavender solid. Sol. THF, C₆H₆. Air- and moisture-sensitive. μ_{eff} = 7.69 μ_B.Ely, N.M. *et al*, *Inorg. Chem.*, 1975, 14, 2680 (*synth, ir*)Tsutsui, M. *et al*, *J. Am. Chem. Soc.*, 1975, 97, 1280 (*synth, ir*)**C₁₈H₁₅Gd** **Gd-00006****Bis(η⁵-2,4-cyclopentadien-1-yl)(phenylethynyl)gadolinium**

[53224-33-2]



M 388.567

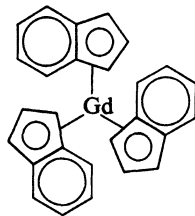
Pale-yellow solid. Sol. C₆H₆, THF. Mp 279-82° dec. Air- and moisture-sensitive. μ_{eff} = 7.98 μ_B.Ely, N.M. *et al*, *Inorg. Chem.*, 1975, 14, 2680 (*synth, ir*)

Suggestions for new Entries are welcomed. Please write to the Editor, Dictionary of Organometallic Compounds, Chapman and Hall Ltd, 11 New Fetter Lane, London EC4P 4EE

C₂₇H₂₁Gd

Gd-00008

Triindenylgadolinium, 8Cl

Tris(1,2,3,3a,7a-η)-1H-inden-1-ylgadolinium

M 502.713

May be a mono- or a trihapto-complex.

THF complex: [22696-74-8].C₃₁H₂₉GdO M 574.820Pale-green cryst. Sol. THF. $\mu = 7.89\mu_B$.Tsutsui, M. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 3175 (*synth*)

Hf Hafnium

D. J. Cardin

Hafnium (Fr., Ger.), Hafnio (Sp.), Afnio (Ital.), Гафний (Gafnii) (Russ.), ハフニウム (Japan.)

Atomic Number. 72

Atomic Weight. 178.49 (Most commercial hafnium samples are contaminated with zirconium and so this value may not be appropriate).

Electronic Configuration. [Xe] $4f^{14} 5d^2 6s^2$

Oxidation States. The remarks for zirconium are applicable here with the general exception that there are markedly fewer examples of any type.

Coordination Number. Because of the extreme closeness of size of hafnium and zirconium the coordination numbers encountered are the same for analogous compounds with very few exceptions. Thus for some bulky alkyls the tetra-alkyl may be accessible for the lighter metal only. There is also a structural difference between the tetrakis-cyclopentadienyls (q.v.). See under Zirconium.

Colour. See under Zirconium.

Availability. Common starting materials parallel those for zirconium, with fewer materials commercially available and at higher cost. Commercial Hf compounds are frequently contaminated with up to 9% of Zr.

Handling. Standard inert atmosphere techniques are required for air-sensitive compounds.

Toxicity. Hafnium compounds are not thought to be especially toxic but note that relatively little information is available and compounds should be treated appropriately.

Isotopic Abundance. ^{174}Hf , 0.18%; ^{176}Hf , 5.20%; ^{177}Hf , 18.50%; ^{178}Hf , 27.14%; ^{179}Hf , 13.75%; ^{180}Hf , 35.24%.

Spectroscopy. Neither of the two isotopes having nuclear spin (^{177}Hf , $I = \frac{7}{2}$ or ^{179}Hf , $I = \frac{9}{2}$), have been observed to date. The receptivities of these two isotopes relative to ^{13}C are 0.88 and 0.27 respectively.

Nmr of other nuclei is not generally useful for paramagnetic compounds of hafnium.

Esr is a valuable tool for d^1 compounds. Hyperfine couplings are not observed however.

Analysis. Because of the extreme similarity of the inorganic chemistry of these elements, methods used for zirconium are generally applicable. Difficulties may however arise for Zr/Hf ratios, for which chemical methods are not good (although available) especially when the hafnium content is low. In these cases emission spectroscopy, X-ray fluorescence or absorbance are preferred, and activation analysis is necessary for trace amounts.

References. General reviews are listed in the introduction to the *Sourcebook*.

Wailles, P. C. *et al.*, *Organometallic Chemistry of Titanium, Zirconium, and Hafnium*, Academic Press, London, 1974.

Larsen, E. M., *Adv. Inorg. Chem. Radiochem.*, 1970, **13**, 1.

Cardin, D. J. *et al.*, *The Organometallic Chemistry of Zirconium and Hafnium*, Ellis Horwood, in press (1984).



Hf-00001



Hf-00002

As Hf-00002 with
X = Cl

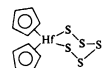
Hf-00003

As Hf-00002 with
X = F

Hf-00004

As Hf-00002 with
X = I

Hf-00005



Hf-00006



Hf-00007



Hf-00008



Hf-00009



Hf-00010

As Hf-00002 with
X = NCO

Hf-00011

As Hf-00002 with
X = CO

Hf-00012

As Hf-00002 with
X = Me

Hf-00013



Hf-00014



Hf-00015



Hf-00016



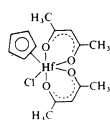
Hf-00017

As Hf-00002 with
X = NMe2

Hf-00018

Me2Hf[N(SiMe3)2]2

Hf-00019



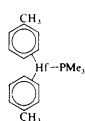
Hf-00020

Hf(CH2SiMe3)4

Hf-00021

Et2Hf[N(SiMe3)2]2

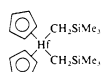
Hf-00022



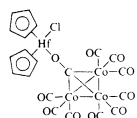
Hf-00023

As Hf-00002 with
R = NEt2

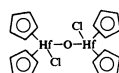
Hf-00024



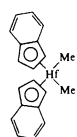
Hf-00025



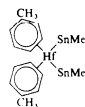
Hf-00026



Hf-00027



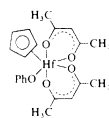
Hf-00028



Hf-00029

Hf[CH2C(CH3)3]4

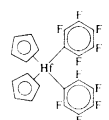
Hf-00030



Hf-00031

CHf[CH(SiMe3)2]3

Hf-00032



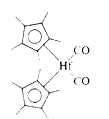
Hf-00033

As Hf-00002 with
X = Ph

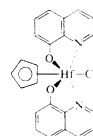
Hf-00034

As Hf-00002 with
X = SePh

Hf-00035



Hf-00036



Hf-00037



Hf-00038

As Hf-00002 with
X = -CH2Ph

Hf-00039



Hf-00040



Hf-00041



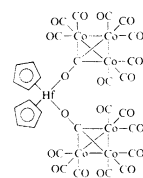
Hf-00042



Hf-00043

Hf(CH2Ph)4

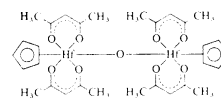
Hf-00044



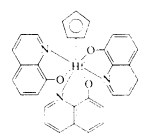
Hf-00045



Hf-00046



Hf-00047



Hf-00048

As Hf-00002 with
X = -N=CPh2

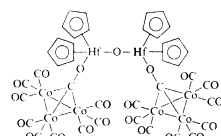
Hf-00049

As Hf-00002 with
X = -CHPh2

Hf-00050



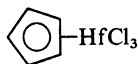
Hf-00051



Hf-00052

[(H3C)2C-CPh]4Hf

Hf-00053

C₅H₅Cl₃Hf**Hf-00001****Trichloro(η⁵-2,4-cyclopentadien-1-yl)hafnium, 9Cl**
[61906-04-5]

M 349.944

Mp 125° dec. Forms a bis-THF adduct.

Renaut, P. *et al*, *J. Organomet. Chem.*, 1978, **148**, 35 (*nmr*, *ms*)Samuel, E. *et al*, *Inorg. Chem.*, 1973, **12**, 881 (*ir*)Caletti, C. *et al*, *J. Electron Spectrosc. Relat. Phenom.*, 1980, **18**, 61 (*pe*)**C₁₀H₁₀HfI₂****Hf-00005****Bis(η⁵-2,4-cyclopentadien-1-yl)diiodohafnium, 9Cl**
Hafnocene diiodide

[37260-85-8]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)hafnium, Hf-00002 with

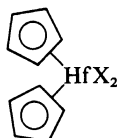
X = I

M 562.488

Yellow solid. Mp 303-5°.

Druce, P.M. *et al*, *J. Chem. Soc. (A)*, 1969, 2106, 2814 (*ir*, *ms*, *nmr*)Samuel, E. *et al*, *Inorg. Chem.*, 1973, **12**, 881 (*ir*)Caletti, C. *et al*, *J. Electron Spectrosc. Relat. Phenom.*, 1980, **18**, 61 (*pe*)**C₁₀H₁₀Br₂Hf****Hf-00002****Dibromobis(η⁵-2,4-cyclopentadien-1-yl)hafnium, 9Cl**
Hafnocene dibromide

[37260-83-6]



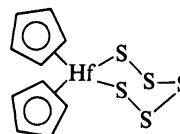
X = Br

M 468.487

Off-white solid. Mp 265-7°.

Druce, P.M. *et al*, *J. Chem. Soc. (A)*, 1969, 2106, 2814 (*ir*, *ms*, *nmr*)Samuel, E. *et al*, *Inorg. Chem.*, 1973, **12**, 881 (*ir*)Caletti, C. *et al*, *J. Electron Spectrosc. Relat. Phenom.*, 1980, **18**, 61 (*pe*)**C₁₀H₁₀HfS₅****Hf-00006****Bis(η⁵-2,4-cyclopentadien-1-yl)(pentathio)hafnium, 10Cl***Bis(η⁵-cyclopentadienyl)cyclo(pentasulfur-1,5-diyl)-hafnium*

[75213-10-4]



M 468.979

Air-stable yellow cryst. (CH₂Cl₂). Mp 150-5° dec. E_{act} (ring inversion) 58 kJ. mol.⁻¹ (CD₂Cl₂).McCall, J.M. *et al*, *J. Organomet. Chem.*, 1980, **193**, C37 (*synth*, *ir*, *nmr*)**C₁₀H₁₀Cl₂Hf****Hf-00003****Dichlorobis(η⁵-2,4-cyclopentadien-1-yl)hafnium, 9Cl**
Dichlorodi-π-cyclopentadienylhafnium, 8Cl. Bis(cyclopentadienyl)hafnium dichloride. Hafnocene dichloride
[12116-66-4]As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)hafnium, Hf-00002 with

X = Cl

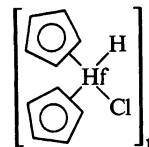
M 379.585

Colourless solid. Mp 234-5°, >300°. Bp_{0.01} 155°.

▷MG4815000.

Druce, P.M. *et al*, *J. Chem. Soc. (A)*, 1969, 2106, 2814 (*ir*, *ms*, *nmr*, *raman*)Burmeister, J.L. *et al*, *Inorg. Chem.*, 1970, **9**, 58 (*ir*, *uv*)Samuel, E. *et al*, *Inorg. Chem.*, 1973, **12**, 881 (*ir*)Caletti, C. *et al*, *J. Electron Spectrosc. Relat. Phenom.*, 1980, **18**, 61 (*pe*)**C₁₀H₁₁ClHf****Hf-00007****Chlorobis(η⁵-2,4-cyclopentadien-1-yl)hydrohafnium, 10Cl***Chlorobis(η-cyclopentadienyl)hydridohafnium. Hafnocene hydridochloride*

[72953-59-4]



M 345.140

'Hydrohafnation' reagent analogue to Chlorobis(η⁵-2,4-cyclopentadien-1-yl)hydrozirconium.Tolstikow, G.A. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1979, 2576 (*synth*, *ir*, *use*)**C₁₀H₁₀F₂Hf****Hf-00004****Bis(η⁵-2,4-cyclopentadien-1-yl)difluorohafnium, 9Cl**
Hafnocene difluoride

[37260-84-7]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)hafnium, Hf-00002 with

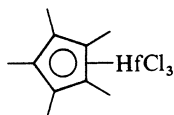
X = F

M 346.676

Colourless solid. Mp >200°.

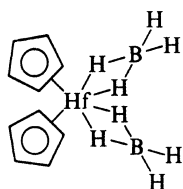
Druce, P.M. *et al*, *J. Chem. Soc. (A)*, 1969, 2106, 2814 (*ir*, *ms*, *nmr*)

C₁₀H₁₅Cl₃Hf **Hf-00008**
Trichloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]hafnium, 10Cl
 [75181-08-7]



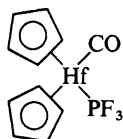
M 420.078
 Green-yellow solid. Bp_{0.001} 140° subl.
 Blenkins, J. *et al*, *J. Organomet. Chem.*, 1981, **218**, 383 (*nmr*)

C₁₀H₁₈B₂Hf **Hf-00009**
Bis(η⁵-2,4-cyclopentadien-1-yl)bis[tetrahydroborato(1-)-H,H']hafnium, 9Cl
Hafnocene bis(borohydride)
 [56420-26-9]



M 338.362
 Colourless solid. Sol. Et₂O, aromatic hydrocarbons. Bp 110° subl. *in vacuo*. Dec. slowly in air. Deutero analogue also prepd.
 Davies, N. *et al*, *J. Chem. Soc. (A)*, 1969, 2601 (*synth*, *ir*, *nmr*)
 Marks, T.J. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 3397 (*nmr*)

C₁₁H₁₀F₃HfOP **Hf-00010**
Carbonylbis(η⁵-2,4-cyclopentadien-1-yl)(phosphorous trifluoride)hafnium
Carbonylbis(cyclopentadienyl)trifluorophosphinehafnium
 [71763-65-0]



M 424.658
 Degree of association uncertain. Yellow solid.
 Sikora, D.J. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 5079 (*synth*, *nmr*, *ir*)

C₁₂H₁₀HfN₂O₂ **Hf-00011**
Bis(cyanato)di- π -cyclopentadienylhafnium, 8Cl
Bis(η-cyclopentadienyl)dicyanatohafnium. Hafnocene dicyanate
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)hafnium, Hf-00002 with

X = NCO

M 392.713
 Mp 185°.
 Burmeister, J.L. *et al*, *Inorg. Chem.*, 1970, **9**, 58 (*synth*, *ir*, *ms*, *uv*)

C₁₂H₁₀HfO₂ **Hf-00012**
Dicarbonylbis(η⁵-2,4-cyclopentadien-1-yl)hafnium, 10Cl
Hafnocene dicarbonyl
 [59487-86-4]
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)hafnium, Hf-00002 with

X = CO

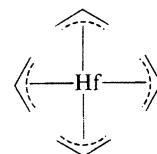
M 364.700
 Dark-red air-sensitive cryst. by subl. Sol. hydrocarbons.
 Demerseman, B. *et al*, *J. Organomet. Chem.*, 1976, **107**, C19 (*synth*, *ir*)
 Thomas, J.F. *et al*, *J. Organomet. Chem.*, 1976, **111**, 297 (*synth*, *ir*, *ms*)
 Sikora, D.J. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 5079 (*cryst struct*)

C₁₂H₁₆Hf **Hf-00013**
Bis(η⁵-2,4-cyclopentadien-1-yl)dimethylhafnium, 10Cl
Hafnocene dimethyl
 [37260-88-1]
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)hafnium, Hf-00002 with

X = Me

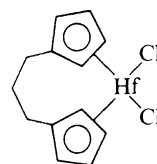
M 338.748
 White cryst. by subl. Bp 90° subl. *in vacuo*.
 Samuel, E. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 6263 (*synth*)
 Alt, H. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 5936.
 Alt, H.G. *et al*, *J. Organomet. Chem.*, 1976, **107**, 257.

C₁₂H₂₀Hf **Hf-00014**
Tetrakis(η³-2-propenyl)hafnium, 10Cl
Tetraallylhafnium
 [12241-95-1]



M 342.780
 Red cryst. (pentane). Bp_{0.0001} ~20° subl. Differs from Zr analogue Tetrakis(η³-2-propenyl)zirconium.
 Becconsall, J.K. *et al*, *J. Chem. Soc. (A)*, 1967, 423 (*synth*, *nmr*, *ms*)

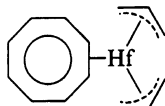
C₁₃H₁₄Cl₂Hf **Hf-00015**
Dichloro[1,3-propanediylbis[(1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]]hafnium, 9Cl
Dichloro(1,1'-trimethylenedicyclopentadienyl)hafnium
 [38117-94-1]



M 419.650

Bp_{0.001-0.0001} 200° subl.Hillman, M. *et al*, *J. Organomet. Chem.*, 1972, **42**, 123 (*synth, nmr*)Saldarriaga-Molina, C.H. *et al*, *Inorg. Chem.*, 1974, **13**, 2880 (*cryst struct*)

C₁₄H₁₈Hf **Hf-00016**
(η^8 -1,3,5,7-Cyclooctatetraene)bis(η^3 -2-propenyl)hafnium, 9Cl
Bis(η -allyl)[η -cyclooctatetraene(2-)]hafnium
 [41558-36-5]

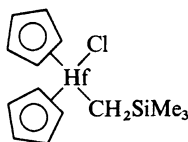


M 364.786

Yellow solid. In toluene shows dynamic allyl groups to low temp.

Kablitz, H.J. *et al*, *J. Organomet. Chem.*, 1972, **44**, C49 (*synth, nmr*)

C₁₄H₂₁ClHfSi **Hf-00017**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)((trimethylsilyl)methyl)-hafnium, 10Cl
 [78205-96-6]



M 431.348

White solid.

Jeffery, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 1593 (*synth, ir, nmr*)

C₁₄H₂₂HfN₂ **Hf-00018**
Bis(η^5 -cyclopentadienyl)bis(dimethylamido)hafnium
Di- π -cyclopentadienylbis(dimethylaminato)hafnium, 8Cl. Hafnocene bis(dimethylamide)
 As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00002 with



M 396.831

Catalyses acrylonitrile polymerisation. Yellow solid by subl. Bp_{0.02} 120-5° subl.Chandra, G. *et al*, *J. Chem. Soc. (A)*, 1968, 1940 (*synth, nmr, ms*)Jenkins, A.D. *et al*, *Polym. Lett.*, 1968, **6**, 865 (*use*)Druce, P.M. *et al*, *J. Chem. Soc. (A)*, 1969, 2106 (*props*)

C₁₄H₄₂HfN₂Si₄ **Hf-00019**
Dimethylbis[bis(trimethylsilyl)amido]hafnium
Dimethylbis[1,1,1-trimethyl-N-(trimethylsilyl)silanaminato]hafnium, 10Cl
 [71000-84-5]

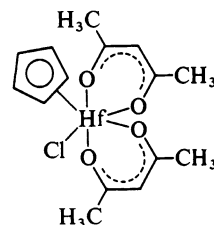


M 529.331

Colourless liq. at r.t.; cryst. (pentane). Mp ca. 20°.

Andersen, R.A., *Inorg. Chem.*, 1979, **18**, 2928 (*synth, ir, pmr, cmr*)

C₁₅H₁₉ClHfO₄ **Hf-00020**
Chloro- π -cyclopentadienylbis(2,4-pentanedionato)hafnium, 8Cl
Bis(1-acetyl-2-oxopropyl)chloro(η^5 -2,4-cyclopentadien-1-yl)hafnium, 10Cl. Bis(acetylacetonato)chloro(η -cyclopentadienyl)hafnium
 [12147-78-3]



M 477.256

Mp 181-2°.

Minacheva, M.K. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1969, 1104 (*nmr*)Sudarikov, V.S. *et al*, *Zh. Strukt. Khim.*, 1969, **10**, 558 (*cryst struct*)Kharlamova, E.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1970, 2621 (*props*)Pinnavaia, T.J. *et al*, *Inorg. Chem.*, 1971, **10**, 1388 (*synth, nmr*)

C₁₆H₄₄HfSi₄ **Hf-00021**
Tetrakis(trimethylsilylmethyl)hafnium, 9Cl
 [40334-04-1]



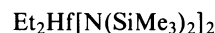
M 527.356

Polymerises olefins. Colourless liq. Mp 8-10°. Bp_{0.001} ca. 50°. Shows markedly enhanced thermal stability relative to straight-chain alkyls.

▷Pyrophoric

Collier, M.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 445 (*synth, nmr, ir*)Lappert, M.F. *et al*, *J. Organomet. Chem.*, 1974, **66**, 271 (*pe*)Ballard, D.G.H. *et al*, *J. Catal.*, 1976, **44**, 116 (*use*)

C₁₆H₄₆HfN₂Si₄ **Hf-00022**
Diethylbis[bis(trimethylsilyl)amido]hafnium
Diethylbis[1,1,1-trimethyl-N-(trimethylsilyl)silanaminato]hafnium, 10Cl
 [70969-31-2]

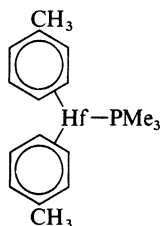


M 557.385

Colourless prisms (pentane). Mp 65-7°. Stable to β -H transfer, presumably for steric reasons.Andersen, R.A., *Inorg. Chem.*, 1979, **18**, 2928 (*synth, ir, pmr, cmr*)

C₁₇H₂₅HfP**Hf-00023**

Bis[(1,2,3,4,5,6- η)methylbenzene](trimethylphosphine)hafnium, 10Cl
Ditoluene(trimethylphosphine)hafnium
 [71361-39-2]



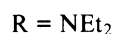
M 438.848

Dark-green cryst. Sol. aromatic solvs., less sol. aliphatic solvs. Solns. stable under Ar but not N₂.

Cloke, F.G.N. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 1938 (*synth, ms, nmr*)

C₁₈H₃₀HfN₂**Hf-00024**

Bis(η^5 -cyclopentadienyl)bis(diethylamido)hafnium
Di- π -cyclopentadienylbis(diethylaminato)hafnium, 8Cl.
Hafnocene bis(diethylamide)
 As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00002 with



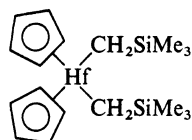
M 452.938

Yellow cryst. by subl. Bp_{0.03} 120-30° subl.

Chandra, G. *et al*, *J. Chem. Soc. (A)*, 1968, 1940 (*synth, ms*)

C₁₈H₃₂HfSi₂**Hf-00025**

Bis(η^5 -2,4-cyclopentadien-1-yl)bis[(trimethylsilyl)methyl]hafnium, 9Cl
 [11077-95-5]



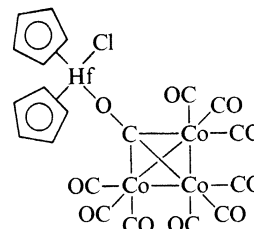
M 483.112

White needles. Mp 83°. More thermally stable than analogous alkyls. Air-sensitive, particularly in soln.

Collier, M.R. *et al*, *J. Organomet. Chem.*, 1970, **25**, C36 (*synth*)
 Collier, M.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 445 (*synth, ir, nmr*)

C₂₀H₁₀ClCo₃HfO₁₀**Hf-00026**

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)[μ_4 -[methanolato(4-)-C:C:C:O]](nonacarbonyltricobalt)hafnium, 10Cl
Chlorobis(η^5 -cyclopentadienyl)[μ_3 -(oxymethylidyne)-cyclotris(tricarbonylcobalt)hafnium
 [67422-56-4]



M 801.036

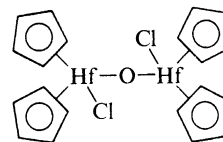
Dark-red cryst. (toluene). Spar. sol. aromatic, v. spar. sol. aliphatic solvs. Mp 139-42°.

Stutte, B. *et al*, *Chem. Ber.*, 1978, **111**, 1603 (*synth, ir, nmr, cryst struct*)

Ishii, M. *et al*, *Ber. Bunsenges Phys. Chem.*, 1979, **83**, 1026 (*synth, ir, nmr*)

C₂₀H₂₀Cl₂Hf₂O**Hf-00027**

Dichlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -oxodihafnium
Dichlorotetra- π -cyclopentadienyloxodihafnium, 8Cl.
 μ -Oxobis[bis(η -cyclopentadienyl)chlorohafnium]
 [12118-16-0]



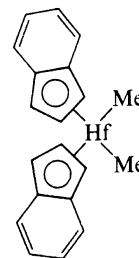
M 704.263

Cryst. Mp 265-9° dec.

Samuel, E., *Bull. Soc. Chim. Fr.*, 1966, 3548 (*synth, ir, uv, nmr*)
 Minacheva, M.K., *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1967, **173**, 581 (*synth*)

C₂₀H₂₀Hf**Hf-00028**

Bis[(1,2,3,3a,7a- η)-1H-inden-1-yl]dimethylhafnium, 9Cl
 [49596-06-7]



M 438.868

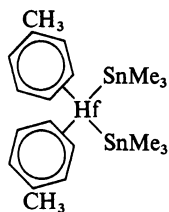
Straw-coloured solid by subl. Mp 120° dec. Bp ca. 120° subl. *in vacuo*.

Samuel, E. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 6263 (*synth, nmr*)

Atwood, J.L. *et al*, *Inorg. Chem.*, 1975, **14**, 1757 (*cryst struct*)

C₂₀H₂₄HfSn₂**Hf-00029**

Bis[(1,2,3,4,5,6- η)methylbenzene]bis(trimethylstannyl)hafnium, 10Cl
Ditoluenebis(trimethylstannyl)hafnium
 [78379-40-5]



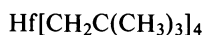
M 680.280

Black cryst. Solid only slowly dec. by air.

Cloke, F.G.N. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 117
 (synth, nmr, ms, cryst struct)

C₂₀H₄₄Hf**Hf-00030**

Tetrakis(2,2-dimethylpropyl)hafnium, 9Cl
Tetraneopentylhafnium
 [50654-35-8]



M 463.058

Colourless cryst. by subl. Mp 115-6°. Bp_{0.001} 50° subl.

Shows enhanced thermal stability over straight chain alkyls.

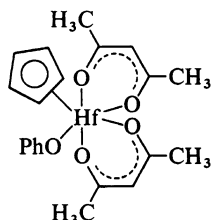
Davidson, P.J. *et al*, *J. Organomet. Chem.*, 1973, **57**, 269 (synth, ir, raman, nmr, ms)

Lappert, M.F. *et al*, *J. Organomet. Chem.*, 1974, **66**, 271 (pe)

Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1975, 830.

C₂₁H₂₄HfO₅**Hf-00031**

η^5 -2,4-Cyclopentadien-1-ylbis(2,4-pentanedionato-*O,O'*-phenoxyl)hafnium
Bis(acetylacetonato)(η -cyclopentadienyl)phenoxylhafnium



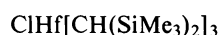
M 534.908

Mp 67.5-70°.

Brainina, E.M. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1971, **196**, 1085 (synth, nmr)

C₂₁H₅₇ClHfSi₆**Hf-00032**

Tris[bis(trimethylsilyl)methyl]chlorohafnium, 9Cl
Chlorotris[bis(trimethylsilyl)methyl]hafnium
 [53668-85-2]



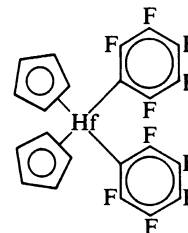
M 692.137

White cryst.

Barker, G.K. *et al*, *J. Organomet. Chem.*, 1974, **76**, C45 (synth, ir, nmr)

C₂₂H₁₀F₁₀Hf**Hf-00033**

Bis(η^5 -2,4-cyclopentadien-1-yl)bis(pentafluorophenyl)hafnium, 9Cl
 [12636-90-7]



M 642.795

White microcryst. by subl. Mp 221-3°.

Rausch, M.D. *et al*, *J. Coord. Chem.*, 1971, **1**, 141 (synth, ir, nmr, ms)

C₂₂H₂₀Hf**Hf-00034**

Bis(η^5 -2,4-cyclopentadien-1-yl)diphenylhafnium, 10Cl
Hafnocene diphenyl
 [51231-81-3]

As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00002 with

X = Ph

M 462.890

White cryst. Mp 145° dec.

Samuel, E. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 6263 (synth, ir, nmr)

C₂₂H₂₀HfSe₂**Hf-00035**

Bis(benzeneselenolato)bis(η^5 -2,4-cyclopentadien-1-yl)hafnium, 10Cl
Bis(η -cyclopentadienyl)bis(phenylselenato)hafnium
 [78789-95-4]

As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00002 with

X = SePh

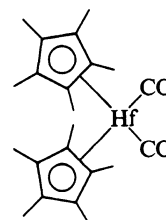
M 620.810

Golden-yellow air-stable cryst. (C₆H₆/pentane). Mp 160°. Deliquescent.

Gautheron, B. *et al*, *J. Organomet. Chem.*, 1981, **209**, C49 (synth, ms, nmr)

C₂₂H₃₀HfO₂**Hf-00036**

Dicarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]hafnium
 [76830-38-1]



M 504.968

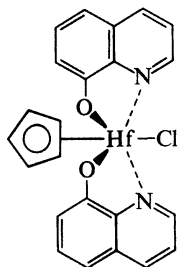
Purple needles (heptane).

Sikora, D.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 1265 (synth, cryst struct, ir, ms, nmr)

C₂₃H₁₇ClHfN₂O₂

Hf-00037

Chloro- π -cyclopentadienylbis(8-quinolinolato)hafnium, 8Cl
Chloro(cyclopentadienyl)hafnium bisoxinate

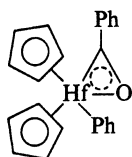


M 567.343

Yellow solid (Et₂O). Mp 248.5-251.5°.Brainina, E.M. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1968, 817 (*synth*, *ir*)Charalambous, J. *et al*, *J. Chem. Soc. (A)*, 1971, 2487 (*synth*, *ir*, *nmr*, *ms*)C₂₃H₂₀HfO

Hf-00038

(η^2 -Benzoyl)bis(η^5 -2,4-cyclopentadien-1-yl)phenylhafnium, 10Cl
 [66152-54-3]



M 490.900

Characterized spectroscopically. Yellow-orange cryst. (toluene/pentane). Mp 22°. Stable to loss of CO both in solid state and in soln.

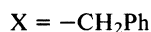
Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 1946 (*synth*, *ir*, *nmr*)C₂₄H₂₄Hf

Hf-00039

Bis(benzyl)bis(η^5 -cyclopentadienyl)hafnium

Bis(η^5 -2,4-cyclopentadien-1-yl)bis(phenylmethyl)hafnium, 10Cl. *Hafnocene dibenzyl*

[56770-59-3]

As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00002 with

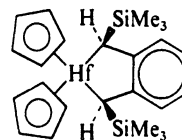
M 490.944

Yellow cryst. (toluene/heptane).

Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 1946 (*synth*, *nmr*)Brindley, P.B. *et al*, *J. Chem. Soc., Perkin Trans. 2*, 1981, 419 (*nmr*)C₂₄H₃₄HfSi₂

Hf-00040

Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-phenylenebis(trimethylsilyl)methylene]hafnium, 10Cl
 2,2-Bis(η^5 -cyclopentadienyl)-1,3-bis(trimethylsilyl)-2-hafnaindane
 [76933-96-5]



M 557.194

meso-form

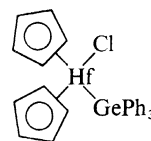
Orange cryst. (pentane). Sol. org. solvs. Mp 144-6°.

Limited air stability but thermally robust and sublimable.

Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1980, 1284 (*synth*, *ir*, *ms*, *nmr*)C₂₈H₂₅ClGeHf

Hf-00041

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylgermyl)hafnium, 9Cl
 [12636-97-4]



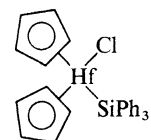
M 648.039

Yellow solid. Subl. at 200° *in vacuo*.Kingston, B.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 69 (*synth*, *nmr*, *ms*)C₂₈H₂₅ClHfSi

Hf-00042

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylsilyl)hafnium, 9Cl

[12636-99-6]



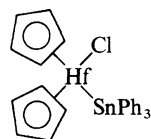
M 603.534

Yellow solid. Bp 180° subl. *in vacuo*.Kingston, B.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 69 (*synth*, *nmr*, *ms*)C₂₈H₂₅ClHfSn

Hf-00043

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylstannyl)hafnium, 9Cl

[12637-00-2]



M 694.139

Yellow solid.

Kingston, B.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 69 (*synth*, *nmr*)

C₂₈H₂₈Hf**Hf-00044****Tetrabenzylhafnium**

Tetrakis(phenylmethyl)hafnium, 9Cl. *Hafnium tetrabenzyl*
[31406-67-4]



M 543.019

Olefin polymerisation catalyst. Pale-yellow cryst. Mp 112-4°.

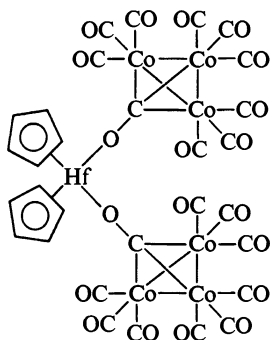
Davies, G.R. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 1511 (cryst struct)

Felton, J.J. *et al*, *J. Organomet. Chem.*, 1972, **36**, 87; 1974, **82**, 375 (synth, nmr)

B.P., 1 428 108, (1976); *CA*, **85**, 63667y (use)

C₃₀H₁₀Co₆HfO₂₀**Hf-00045**

Bis(η⁵-2,4-cyclopentadien-1-yl)bis[μ₄-(methanolato(4-)-C:C:O)]bis(nonacarbonyltricobalt)dihafnium, 10Cl
Bis(η⁵-cyclopentadienyl)di[μ₃-(oxymethyldyne)cyclo-tris(tricarbonylcobalt)]hafnium
[67422-55-3]



M 1222.486

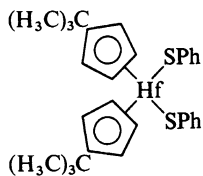
Red cryst. (toluene).

Ishii, M. *et al*, *Ber. Bunsenges. Phys. Chem.*, 1978, **83**, 1026 (cryst struct)

Stutte, B. *et al*, *Chem. Ber.*, 1978, **111**, 1603 (synth, ir, nmr, cryst struct)

C₃₀H₃₆HfS₂**Hf-00046**

Bis(η-*tert*-butylcyclopentadienyl)bis(phenylthiolato)hafnium
Bis(benzenethiolato)bis[(1,2,3,4,5-η)-1-(1,1-dimethylethyl)-2,4-cyclopentadien-1-yl]hafnium, 10Cl
[75673-89-1]



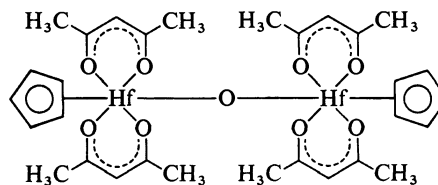
M 639.224

Yellow cryst. (hexane). Mp 460°.

Couturier, S. *et al*, *J. Organomet. Chem.*, 1980, **195**, 291 (synth, ms, nmr)

C₃₀H₃₈Hf₂O₉**Hf-00047**

Bis(η⁵-2,4-cyclopentadien-1-yl)-μ-oxotetrakis(2,4-pentanedionato-O,O')dihafnium, 10Cl
μ-Oxobis[bis(acetylacetonato)(η⁵-cyclopentadienyl)hafnium]
[76124-85-1]



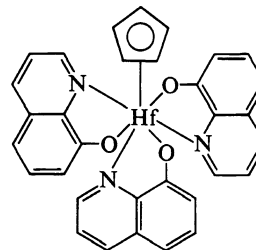
M 899.605

Mp 150-4°.

Brainina, E.M. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1968, 817 (synth, ir, props)

C₃₂H₂₃HfN₃O₃**Hf-00048**

π-Cyclopentadienyltris(8-quinolinolato)hafnium, 8Cl
Tris(8-quinolinolato)cyclopentadienylhafnium



M 676.042

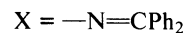
Solid. Mp 250° dec.

Minacheva, M.K. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1967, **173**, 581 (synth)

C₃₆H₃₀HfN₂**Hf-00049**

Bis(η⁵-cyclopentadienyl)bis(diphenylketimido)hafnium
Di-π-cyclopentadienylbis(1,1-diphenylmethyleneimino)hafnium, 8Cl. *Hafnocene bis(diphenylketimide)*
[11106-17-5]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)hafnium, Hf-00002 with



M 669.136

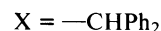
Red-orange powder. Bp_{0.001} ca. 150° subl.

Collier, M.R. *et al*, *Inorg. Nucl. Chem. Lett.*, 1971, **7**, 689 (synth, ir, nmr, ms)

C₃₆H₃₂Hf**Hf-00050**

Bis(η⁵-2,4-cyclopentadien-1-yl)bis(diphenylmethyl)hafnium, 10Cl
[60175-23-7]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)hafnium, Hf-00002 with



M 643.139

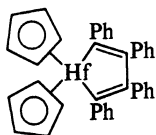
Orange cryst. (C₆H₆ or toluene). Mp 192-4°. Sl. sensitive to air in solid state, dec. rapidly in soln.

Atwood, J.L. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 6645 (*synth, ir, nmr, cryst struct*)

C₃₈H₃₀Hf**Hf-00051**

Bis(η⁵-2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)hafnium, 10Cl
1,1-Bis(η⁵-cyclopentadienyl)-2,3,4,5-tetraphenylhafnole

[53433-59-3]



M 665.145

Yellow cryst. (pentane/CH₂Cl₂). Stable in solid state but air-sensitive in soln.

Atwood, J.L. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 2454 (*cryst struct*)

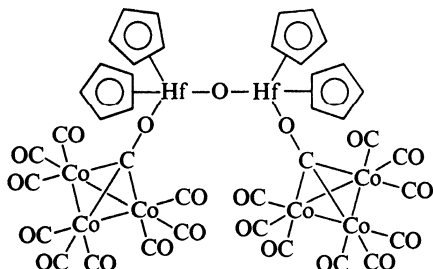
Sikora, D.J. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 5079 (*synth, ms, nmr*)

C₄₀H₂₀Co₆Hf₂O₂₁**Hf-00052**

Tetrakis(η⁵-2,4-cyclopentadien-1-yl)bis[μ₄-[methanolato(4-)-C:C:C:O]bis(nonacarbonyltricobalt)-μ-oxodihafnium, 10Cl

μ-Oxobis[bis(η⁵-cyclopentadienyl)[μ₃-(oxymethyldyne)cyclotris(tricarbonylcobalt)]hafnium]

[67422-50-8]



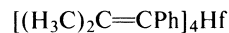
M 1547.165

Red cryst. (toluene). Mp 156-60°.

Stutte, B. *et al*, *Chem. Ber.*, 1978, **111**, 1603 (*synth, ir, nmr*)

C₄₀H₄₄Hf**Hf-00053**

Tetrakis(2-methyl-1-phenyl-1-propenyl)hafnium, 10Cl
Tetrakis(2,2-dimethyl-1-phenylethenyl)hafnium
 [63422-31-1]



M 703.278

Yellow cryst. Mp 70° dec.

Cardin, C.J. *et al*, *J. Organomet. Chem.*, 1977, **132**, C23 (*synth, nmr*)

Ho Holmium

S. A. Cotton

Holmium (Fr., Ger.), Holmio (Sp.), Olmio (Ital.), Гольмий (Gol'mii) (Russ.), ホルミウム (Japan.)

Atomic Number. 67

Atomic Weight. 164.9307

Electronic Configuration. [Xe] $4f^{11} 6s^2$

Oxidation State. +3

Coordination Number. 6 or greater.

Colour. Usually yellow.

Availability. Available starting materials are the expensive Ho_2O_3 and anhydrous HoCl_3 .

Handling. See under Lanthanum.

Toxicity. See under Lanthanum.

Isotopic Abundance. ^{165}Ho , 100%.

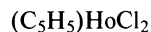
Spectroscopy. Organometallic compounds of the strongly paramagnetic Ho(III) show large paramagnetic shifts and very broad lines in their ^1H nmr spectra. For references see below. See also under Lanthanum.

Analysis. See under Lanthanum.

References. See under Lanthanum. For references to ^1H nmr spectroscopy, see also:

Von Ammon, R. *et al.*, *Inorg. Nucl. Chem. Lett.*, 1969, **5**, 315.

Schumann, H. *et al.*, *Z. Naturforsch., B*, 1981, **36**, 1244.

C₅H₅Cl₂Ho**Ho-00001****Dichloro(η⁵-2,4-cyclopentadien-1-yl)holmium**
Cyclopentadienylholmium dichloride

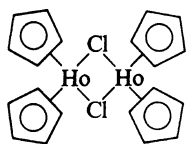
M 300.931

Tris-THF adduct: [52679-42-2].C₁₇H₂₉Cl₂HoO₃ M 517.251

Yellow cryst. Mp 84-92°. Extremely air-sensitive.

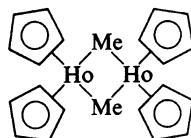
Struct. probably resembles Dichloro(η⁵-2,4-cyclopentadien-1-yl)erbium.Manastyrskij, S. *et al*, *Inorg. Chem.*, 1963, **2**, 904 (*synth*)**C₁₀H₁₀ClHo****Ho-00002****Chlorobis(η⁵-2,4-cyclopentadien-1-yl)holmium***Chlorodicyclopentadienylholmium. Dicyclopentadienylholmium chloride*

[56200-26-1]



M 330.572

Dimeric.

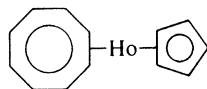
Dimer: Di-μ-chlorotetrakis(η⁵-2,4-cyclopentadien-1-yl)diholmium, 9Cl.C₂₀H₂₀Cl₂Ho₂ M 661.145Pale-yellow cryst. Sol. THF. Mp 340-3° dec. Subl. *in vacuo*. Air-sensitive. μ_{eff} = 10.3μ_B.Maginn, R.E. *et al*, *J. Am. Chem. Soc.*, 1963, **85**, 672 (*synth, ir*)**C₁₁H₁₃Ho****Ho-00003****Bis(η⁵-2,4-cyclopentadien-1-yl)methylholmium**

M 310.154

Dimeric.

Dimer: [60997-42-4]. Tetrakis(η⁵-2,4-cyclopentadien-1-yl)di-μ-methyldiholmium, 9Cl.C₂₂H₂₆Ho₂ M 620.308Straw cryst. Sol. CH₂Cl₂, C₆H₆, toluene. Dec. >160°.Air-sensitive. μ_{eff} = 10.0μ_B.Holton, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 54 (*synth, ir*)**C₁₃H₁₃Ho****Ho-00004****(η⁸-1,3,5,7-Cyclooctatetraenyl)(η⁵-2,4-cyclopentadien-1-yl)holmium, 9Cl**

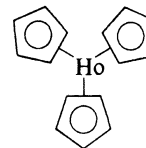
[52668-28-7]



M 334.176

Cryst. Sol. THF. Extremely air-sensitive. Forms adducts with THF, NH₃, C₆H₁₁NC, Py.Jamerson, J.D. *et al*, *J. Organomet. Chem.*, 1974, **65**, C33 (*synth, ms, ir*)**C₁₅H₁₅Ho****Ho-00005****Tris(η⁵-2,4-cyclopentadien-1-yl)holmium, 9Cl**
Tricyclopentadienylholmium

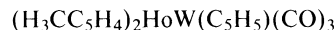
[1272-22-6]



M 360.214

Yellow cryst. Sol. THF. Mp 295°. Hydrol. by H₂O. Subl. at 230° *in vacuo*. μ_{eff} = 10.2μ_B.*Isocyanocyclohexane adduct*: [12098-32-7]. Tris(η⁵-2,4-cyclopentadien-1-yl)isocyanocyclohexaneholmium.C₂₂H₂₆HoN M 469.385Yellow cryst. Sol. C₆H₆. Mp 165°. Subl. at 150° *in vacuo*. μ_{eff} = 10.6μ_B.Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1965, **3**, 181 (*synth, ir*)Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1966, **6**, 141.v. Ammon, R. *et al*, *Inorg. Nucl. Chem. Lett.*, 1969, **5**, 315 (*nmr*)Aleksanyan, V.T. *et al*, *J. Organomet. Chem.*, 1977, **131**, 251 (*raman*)**C₂₀H₁₉HoO₃W****Ho-00006****[μ-(Carbonyl-C, O)]bis[(1,2,3,4,5-η)-1-methyl-2,4-cyclopentadien-1-yl][tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)tungsten]holmium, 9Cl**

[39477-08-2]



M 656.149

Nitrosylated by *N*-methyl-*N*-nitroso-*p*-toluenesulfonamide to give (C₅H₅)₂W(CO)₂NO. Sol. THF, DMSO.

Mp >220° dec. Air- and moisture-sensitive.

Crease, A.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1501 (*synth, ir*)

La Lanthanum

S. A. Cotton

Lanthane (Fr.), Lanthan (Ger.), Lantano (Sp.), Lantanio (Ital.), Лантан (Lantan) (Russ.), ランタン (Japan.)

Atomic Number. 57

Atomic Weight. 138.905

Electronic Configuration. [Xe] $5d^1 6s^2$

Oxidation State. +3

Coordination Number. Usually 6 or greater.

Colour. Colourless.

Availability. The most usual starting material for organolanthanum chemistry and for organolanthanides in general is the anhydrous chloride. Both this and the oxide are commercially available but the latter is invariably cheaper. LaCl_3 may be synthesized from La_2O_3 by treatment with NH_4Cl or by dissolving the oxide in hydrochloric acid, evaporating and treating the product with thionyl chloride. Commercial samples of anhydrous chlorides of the lanthanide may require refluxing with thionyl chloride. References to experimental procedures are given below.

Handling. Organolanthanides are extremely air- and moisture-sensitive and should be handled accordingly.

Toxicity. No special precautions are normally taken in handling lanthanum compounds. However, there have been few reports concerning their toxicity and they should be handled with caution.

Isotopic Abundance. ^{139}La , 99.91%.

Spectroscopy. ^{139}La , $I = \frac{7}{2}$, merits study as an nmr probe. Lanthanum compounds are diamagnetic and therefore give sharp, unshifted ^1H nmr spectra. There have to date been no studies reported of organolanthanum compounds. For references see below.

Mass spectra have been reported for relatively few organolanthanides—see *Gmelins Handbuch der Anorganischen Chemie*.

Lanthanum is amenable to Mössbauer spectroscopy and an account is given in *Organometallics of the f-Elements*—see below.

Analysis. Microanalytical results for organolanthanides are frequently lower than theoretical values, probably because of

incomplete combustion and concomitant carbide formation.

Analysis for lanthanum may be carried out gravimetrically or complexometrically. Gravimetric determination involves precipitation of lanthanum as the hydroxide or oxalate, followed by ignition to the oxide. For complexometric determination, the compound is decomposed by ignition or by hydrolysis, the residue dissolved in acid and then titrated directly with Na_2EDTA at pH 5–6 using xylenol orange indicator. For details, see references below.

References

General

- Marks, T. J., *Prog. Inorg. Chem.*, 1978, **24**, 51.
Cotton, S. A., *J. Organomet. Chem. Lib.*, 1977, **3**, 189.
Organometallics of the f-Elements, Marks, T. J. and Fischer, R. D. Eds, Reidel, Dordrecht, 1979.

Synthesis

- Braver, G., *Handbuch der Präparativen Anorganischen Chemie*, Thieme, Stuttgart, 1962, **2**, 1002.
Kiess, N. H., *J. Res. Natl. Bur. Stand.*, 1963, **67A**, 1343.
Schumann, H. *et al.*, *Organometallics*, 1982, **1**, 1194.
Laubereau, P. G. *et al.*, *Inorg. Chem.*, 1970, **9**, 1091.
Saran, M. S. *et al.*, *J. Organomet. Chem.*, 1970, **21**, 147.
Tilley, T. D. *et al.*, *Inorg. Chem.*, 1981, **20**, 3267.

Nmr

- Chemical Applications of Nmr in Paramagnetic Molecules*, La Mar, G. N., Horrocks, W. D. and Holm, R. H. Eds, Academic Press, 1973.
Forsburg, J. H. *et al.*, *Gmelins Handbuch der Anorganischen Chemie*, 8th Edn, Part D6, Springer-Verlag, 1983.
Webb, G. A., *Ann. Rev. Nmr Spectrosc.*, 1976, **6A**, 1.
Marks, T. J., *Prog. Inorg. Chem.*, 1978, **24**, 51.
Keller, H. J. *et al.*, *Angew. Chem., Int. Ed. Engl.*, 1969, **5**, 315.
Von Ammon, R. *et al.*, *Ber. Bunsenges Phys. Chem.*, 1972, **76**, 995.
Von Ammon, R. *et al.*, *Inorg. Nucl. Chem. Lett.*, 1969, **5**, 315.

C₈H₈ClLa **La-00001**
(η^8 -1,3,5,7-Cyclooctatetraene)chlorolanthanum
 (C₈H₈)LaCl

M 278.510

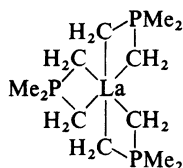
Bis-THF adduct: (η^8 -1,3,5,7-Cyclooctatetraene)-
bis(tetrahydrofuran)lanthanum.

C₁₆H₂₄ClLaO₂ M 422.723

Pale-yellow powder. Sol. THF. Presumably dimeric by
 analogy with Chloro(cyclooctatetraene)cerium.

Wayda, A.L., *Organometallics*, 1983, **2**, 565 (*synth*, *ir*, *nmr*)

C₁₂H₃₀LaP₃ **La-00002**
Tris[(dimethylphosphinidenio)bis(methylene)]lanthanum
 [61060-80-8]

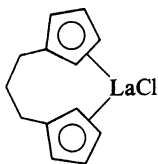


M 406.196

Colourless solid. Sol. C₆H₆. Mp 195-205° dec.

Schumann, H. *et al*, *Chem. Ztg.*, 1976, **100**, 336 (*synth*, *nmr*)

C₁₃H₁₄ClLa **La-00003**
Chloro[1,3-propanediylbis(η^5 -2,4-cyclopentadien-1-ylidene)]-
lanthanum
 [75857-12-4]

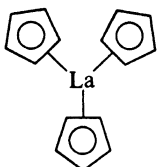


M 344.612

Probably dimeric. Sol. THF. Mp >100°. Air- and moisture-sensitive.

John, J.N. *et al*, *J. Coord. Chem.*, 1980, **10**, 177 (*synth*, *nmr*)

C₁₅H₁₅La **La-00004**
Tris(η^5 -2,4-cyclopentadien-1-yl)lanthanum, η Cl
Tri- π -cyclopentadienyllanthanum, η Cl
 [1272-23-7]



M 334.189

Cryst. Mp 395°. Subl. at 200-50° *in vacuo*, hydrol. by H₂O.

THF adduct: [79533-62-3]. White platelets. Sol. THF.
 Subl. *in vacuo* at 260°. Air-sensitive.

Cyclohexylisocyanide adduct: [37299-02-8]. Sol. C₆H₆.
 Mp 110°.

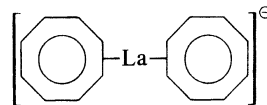
Wilkinson, G. *et al*, *J. Am. Chem. Soc.*, 1954, **76**, 6210 (*synth*)

Fritz, H.P., *Chem. Ber.*, 1959, **92**, 780 (*ir*)

Devatykh, G.G. *et al*, *Dokl. Akad. Nauk. SSSR*, 1970, **193**,
 1069 (*synth*, *ms*)

Von Ammon, R. *et al*, *Ber. Bunsenges. Phys. Chem.*, 1972, **76**,
 995 (*nmr*, *ir*)
 Aleksanyan, V.T. *et al*, *J. Raman Spec.*, 1974, **2**, 345 (*raman*)
 Rogers, R.D. *et al*, *J. Organomet. Chem.*, 1981, **216**, 383
 (*struct*)

C₁₆H₁₆La[⊖] **La-00005**
Bis(η^8 -1,3,5,7-cyclooctatetraene)lanthanate(1-), η Cl
Dicyclooctatetraenelanthanate(1-)



M 347.208 (ion)

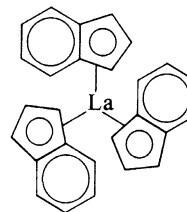
K salt: [51187-42-9].

C₁₆H₁₆KLa M 386.306

Green solid. Sol. dioxan, THF. Mp >345°. Extremely
 air- and moisture-sensitive.

Hodgson, K.O. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 8650 (*synth*,
ir)

C₂₇H₂₁La **La-00006**
Triindenyllanthanum
Tris(1,2,3,3a,7a- η)-1H-inden-1-yllanthanum



M 484.368

May be a monohapto- or a trihapto-complex.

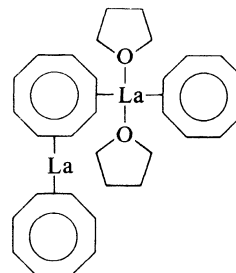
THF adduct: [22696-73-7].

C₃₁H₂₉LaO M 556.475

Pale-tan solid. Sol. THF. Diamagnetic.

Tsutsui, M. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 3175 (*synth*,
nmr)

C₃₂H₄₀La₂O₂ **La-00007**
Tris(1,3,5,7-cyclooctatetraene)bis(tetrahydrofuran)dilan-
thanum
 [65101-96-4]



M 734.478

Struct. assigned by analogy with [μ -[(1,2-
 η :1,2,3,4,5,6,7,8- η)-1,3,5,7-Cyclooctatetraene]-
 [bis(η^8 -1,3,5,7-cyclooctatetraene)bis(tetrahydro-
 furan)dineodymium, Nd-00012. Gold cryst. Sol. THF.
 Extremely air- and moisture-sensitive, inflames in air.

DeKock, C.W. *et al*, *Inorg. Chem.*, 1978, **17**, 625 (*synth*)

Lu Lutetium

S. A. Cotton

Lutétium (Fr.), Lutetium (Ger.), Lutecio (Sp.), Lutezio (Ital.), Лютеций (Liutetsii) (Russ.), ルテチウム (Japan.)

Atomic Number. 71

Atomic Weight. 174.97

Electronic Configuration. [Xe] $4f^{14} 5d^1 6s^2$

Oxidation State. +3

Coordination Number. 6 or more, but less when bulky ligands such as $-\text{CH}_2\text{SiMe}_3$ and $-\text{C}(\text{CH}_3)_3$ are present.

Colour. Colourless.

Availability. Starting materials are Lu_2O_3 and anhydrous LuCl_3 , which are expensive.

Handling. See under Lanthanum.

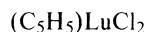
Toxicity. See under Lanthanum.

Isotopic Abundance. ^{175}Lu , 97.41%; ^{176}Lu , 2.59%.

Spectroscopy. Lu(III) compounds are diamagnetic ($4f^{14}$) and give sharp, unshifted ^1H nmr spectra of which a considerable number have now been reported. For these and for a discussion of ^{13}C nmr spectra see Forsburg, *loc cit.*

Analysis. See under Lanthanum

References. See under Lanthanum

C₅H₅Cl₂Lu**Lu-00001****Dichloro(η⁵-2,4-cyclopentadien-1-yl)lutetium**
Cyclopentadienyllutetium dichloride

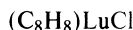
M 310.968

*Tris-THF adduct:*C₁₇H₂₉Cl₂LuO₃ M 527.287

Colourless cryst. Mp 76-8°. Extremely air-sensitive.

Struct. probably resembles Dichloro(η⁵-2,4-cyclopentadien-1-yl)erbium.Manastyrskyj, S. *et al*, *Inorg. Chem.*, 1963, **2**, 904 (*synth*)**C₆H₁₈Lu⁺⁺⁺****Lu-00002****Hexamethyllutetate(3-)**

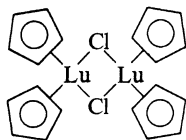
M 265.175 (ion)

Tris[(tetramethylethylenediamine)lithium] salt:
[66862-13-3].C₂₄H₆₆Li₃LuN₆ M 634.616White cryst. Sl. sol. Et₂O. Mp 141-2° dec. V. sensitive to air and moisture.Schumann, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1978, **17**, 276 (*synth*, *nmr*)**C₈H₈ClLu****Lu-00003****(η⁸-1,3,5,7-Cyclooctatetraene)chlorolutetium**

M 314.571

THF adduct: (η⁸-1,3,5,7-Cyclooctatetraene)-chloro(tetrahydrofuran)lutetium.C₁₂H₁₆ClLuO M 386.678

Off-white powder. Sol. THF. Probably dimeric by analogy with Chloro(cyclooctatetraene)cerium.

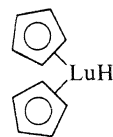
Wayda, A.L., *Organometallics*, 1983, **2**, 565 (*synth*, *ir*, *nmr*)**C₁₀H₁₀ClLu****Lu-00004****Chlorobis(η⁵-2,4-cyclopentadien-1-yl)lutetium, ⁹⁰Cl**
Chlorodicyclopentadienyllutetium. Dicyclopentadienyllutetium chloride

M 340.609

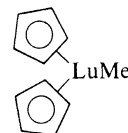
Dimeric.

Dimer: [76207-13-1]. *Di-μ-chlorotetrakis*(η⁵-2,4-cyclopentadien-1-yl)dilutetium.C₂₀H₂₀Cl₂Lu₂ M 681.218

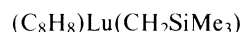
Pale-green-white cryst. Sol. THF. Mp 318-20°.

Diamagnetic. Air-sensitive. Subl. *in vacuo*.Maginn, R.E. *et al*, *J. Am. Chem. Soc.*, 1963, **85**, 672 (*synth*, *ir*)**C₁₀H₁₁Lu****Lu-00005****Bis(η⁵-2,4-cyclopentadien-1-yl)hydrolutetium**

M 306.164

THF adduct: [79292-30-1]. *Bis*(η⁵-2,4-cyclopentadien-1-yl)hydro(tetrahydrofuran)lutetium, 10Cl.C₁₄H₁₉LuO M 378.271Synthesized by reaction of (C₅H₅)₂LuR (R = Me₃SiCH₂ or C₆H₅CH₂) with H₂. Colourless cryst. Does not react with alkenes.Schumann, H. *et al*, *J. Organomet. Chem.*, 1981, **213**, C7 (*synth*, *nmr*, *ir*)**C₁₁H₁₃Lu****Lu-00006****Bis(η⁵-2,4-cyclopentadien-1-yl)methyllutetium**

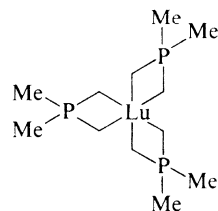
M 320.191

THF complex: [76207-05-1].C₁₅H₂₁LuO M 392.297White solid. Sol. THF, C₆H₆, toluene. Unstable at r.t. Extremely air- and moisture-sensitive.Schumann, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1981, **20**, 119 (*synth*, *nmr*)Schumann, H. *et al*, *Organometallics*, 1982, **1**, 1194 (*synth*, *ir*, *nmr*)**C₁₂H₁₉LuSi****Lu-00007****(η⁸-1,3,5,7-Cyclooctatetraene)(trimethylsilylmethyl)lutetium**

M 366.335

Bis-THF adduct: [84582-80-9]. (η⁸-1,3,5,7-Cyclooctatetraene)(trimethylsilylmethyl)bis(tetrahydrofuran)lutetium.C₂₀H₃₅LuO₂Si M 510.548

Off-white powder. Sol. toluene, THF. Marginally stable at r.t.

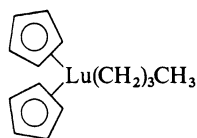
Wayda, A.L. *et al*, *Organometallics*, 1983, **2**, 565 (*synth*, *ir*, *nmr*)**C₁₂H₃₀LuP₃****Lu-00008****Tris[(dimethylphosphinidenio)bis(methylene)]lutetium**
[61060-87-5]

M 442.257

Colourless solid. Sol. C₆H₆. Mp 210° dec.Schumann, H. *et al*, *Chem.-Ztg.*, 1976, **100**, 336 (*synth*, *nmr*)

C₁₄H₁₉Lu
Butylbis(η⁵-2,4-cyclopentadien-1-yl)lutetium

Lu-00009



M 362.271

THF complex: [82293-70-7].

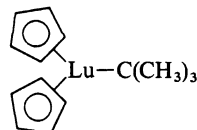
C₁₈H₂₇LuO M 434.378Colourless solid. Sol. THF, C₆H₆, toluene. Unstable at r.t., extremely sensitive to air and moisture.Schumann, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1981, **20**, 119 (*synth*, *nmr*)Schumann, H. *et al*, *Organometallics*, 1981, **1**, 1194 (*synth*, *ir*, *nmr*)

C₁₄H₁₉Lu
***tert*-Butylbis(η⁵-cyclopentadienyl)lutetium**

Lu-00010

Bis(η⁵-2,4-cyclopentadien-1-yl)(1,1-dimethylethyl)lutetium

[76207-08-4]



M 362.271

THF complex:

C₁₈H₂₇LuO M 434.378

LuH(C₄H₈O)]₂. Colourless cryst. + 1THF. Inserts CO at room temperature to form successively Bis(η⁵-2,4-cyclopentadien-1-yl)(2,2-dimethyl-1-oxopropyl-C,O)lutetium, Lu-00013 and Tetrakis(η⁵-2,4-cyclopentadien-1-yl)[μ-(2,2,7,7-tetramethyl-3,4,5,6-octanetetron-*O*³,*O*⁵:*O*⁴,*O*⁶)]dilutetium, Lu-00024

Reacts with H₂ to afford [(C₅H₅)₂ 70-80 dec.

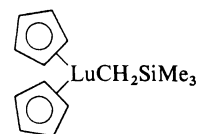
Extremely air- and moisture-sensitive.

LuH(C₄H₈O)]₂.Evans, W.J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 292, 706 (*struct*, *ir*, *nmr*, *synth*)Evans, W.J. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 2008 (*synth*, *nmr*, *cmr*, *ir*)Schumann, H. *et al*, *Organometallics*, 1982, **1**, 1194 (*synth*, *ir*, *nmr*, *cmr*)

C₁₄H₂₁LuSi
Bis(η⁵-2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]lutetium

Lu-00011

(Trimethylsilylmethyl)dicyclopentadienyllutetium



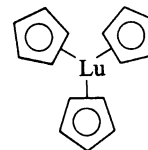
M 392.372

THF complex: [76207-10-8].

C₁₈H₂₉LuOSi M 464.479Yellow needles. Sol. THF, C₆H₆, toluene. Mp 100-10° dec.Schumann, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1981, **20**, 119 (*synth*, *struct*, *nmr*)Schumann, H. *et al*, *Organometallics*, 1982, **1**, 1194 (*synth*, *struct*, *ir*, *nmr*)

C₁₅H₁₅Lu
Tris(η⁵-2,4-cyclopentadien-1-yl)lutetium
Tricyclopentadienyllutetium
 [1272-24-8]

Lu-00012



M 370.251

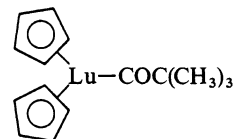
Colourless cryst. Mp 295°. Subl. at 260° *in vacuo*.

Isocyanocyclohexane adduct: [37299-03-9]. Tris(η⁵-2,4-cyclopentadien-1-yl)isocyanocyclohexanelutetium.

C₂₂H₂₆LuN M 479.421Sol. C₆H₆. Mp 170°.Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1965, **3**, 181 (*synth*, *ir*)v. Ammon, R. *et al*, *Ber. Bunsenges. Phys. Chem.*, 1972, **76**, 995.Aleksanyan, V.T. *et al*, *J. Organomet. Chem.*, 1977, **131**, 251 (*raman*)

C₁₅H₁₉LuO
Bis(η⁵-2,4-cyclopentadien-1-yl)(2,2-dimethyl-1-oxopropyl-C,O)lutetium
 [79503-47-2]

Lu-00013



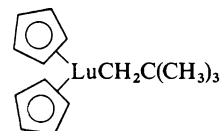
M 390.282

Formed by CO insertion reaction of *tert*-Butylbis(η⁵-cyclopentadienyl)lutetium, Lu-00010. Pale-yellow solid. Sol. THF, toluene. Air- and moisture-sensitive.

Evans, W.J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 706 (*synth*, *ir*, *pmr*, *cmr*)

C₁₅H₂₁Lu
Bis(η⁵-2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)lutetium
Dicyclopentadienylneopentyllutetium
 [76207-09-5]

Lu-00014



M 376.298

White cryst. + 1THF. Sol. C₆H₆, toluene. Mp 90-100° dec. Extremely air- and moisture-sensitive.

Schumann, H. *et al*, *Organometallics*, 1982, **1**, 1194 (*synth*, *ir*, *nmr*, *cmr*)

C₁₆H₄₄LuSi[⊖]
Tetrakis[(trimethylsilyl)methyl]luteate(1-)

Lu-00015

[Lu(CH₂SiMe₃)₄][⊖]

M 439.576 (ion)

Li salt, tetrakis(tetrahydrofuranate): [70388-23-7].

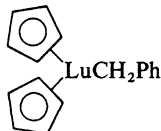
C₃₂H₈₄LiLuO₄Si M 743.007
Green-white solid. Sol. pentane. Mp 113-5° dec. Pyrophoric in air. Slowly dec. to Li[Lu(CH₂SiMe₃)₂(CHSiMe₃)].

Schumann, H. *et al*, *J. Organomet. Chem.*, 1979, **169**, C1 (*synth, nmr*)

C₁₇H₁₇Lu Lu-00016

Benzylbis(η⁵-2,4-cyclopentadienyl)lutetium

Bis(η⁵-2,4-cyclopentadien-1-yl)(phenylmethyl)lutetium, 9CI



M 396.288

THF complex: [76207-11-9].

C₂₁H₂₅LuO M 468.395

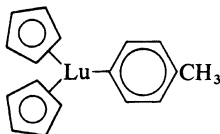
White cryst. Sol. THF, C₆H₆, toluene. Mp 100-10° dec. Extremely air- and moisture-sensitive.

Schumann, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1981, **20**, 119.

Schumann, H. *et al*, *Organometallics*, 1982, **1**, 1194 (*synth, ir, nmr*)

C₁₇H₁₇Lu Lu-00017

Bis(η⁵-2,4-cyclopentadien-1-yl)(4-methylphenyl)lutetium
p-Tolyldicyclopentadienyllutetium



M 396.288

THF complex: [76207-12-0].

C₂₁H₂₅LuO M 468.395

Colourless cryst. Sol. THF, C₆H₆, toluene. Mp 110-20° dec. V. sensitive to air and moisture.

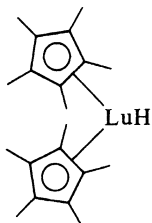
Schumann, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1981, **20**, 119 (*synth, nmr*)

Schumann, H. *et al*, *Organometallics*, 1982, **1**, 1194 (*synth, struct, nmr, ir*)

C₂₀H₃₁Lu Lu-00018

Hydridobis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]lutetium

[83463-59-6]



M 446.432

Reacts reversibly with C₆H₆ to form (C₅Me₅)₂LuPh + H₂. Undergoes rapid H/D exchange. Ether adduct extrudes ethane to form (C₅Me₅)₂LuOEt. Undergoes metallation reactions with SiMe₄, pyridine, and ylides. White solid. Sol. pentane, hexane, C₆H₆, toluene. Highly reactive.

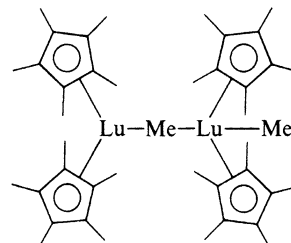
Watson, P.L. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 6471 (*synth, nmr*)

Watson, P.L., *J. Chem. Soc., Chem. Commun.*, 1983, 276 (*synth, nmr, ir*)

C₂₁H₃₃Lu Lu-00019

Methylbis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]lutetium

[85962-87-4]



M 460.459

Asymmetric dimer in solid state, dissociates in soln. Activates methane in soln. Metallated by SiMe₄.

Dimer:

C₄₂H₆₆Lu₂ M 920.917

White solid. Sol. toluene, cyclohexane.

Et₂O complex: [80145-92-2].

C₂₅H₄₃LuO M 534.581

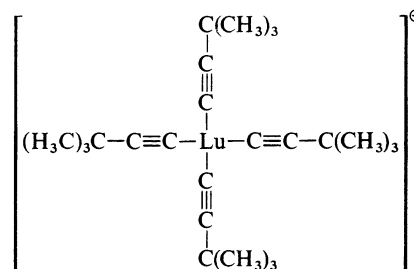
Sol. toluene, hexane, Et₂O.

Watson, P.L., *J. Chem. Soc., Chem. Commun.*, 1983, 276 (*props*)

Watson, P.L., *J. Am. Chem. Soc.*, 1982, **104**, 337, 6471; 1983, **105**, 6491 (*struct, nmr, cmr, props, synth*)

C₂₄H₃₆Lu[⊖] Lu-00020

Tetrakis(3,3-dimethyl-1-butyryl)lutetate(1-)



M 499.515 (ion)

Li salt, THF complex: [76565-30-5].

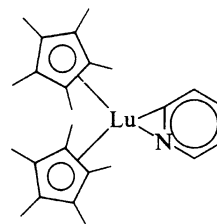
C₂₈H₄₄LiLuO M 578.563

White solid. Sol. THF, pentane. Diamagnetic.

Evans, W.J. *et al*, *J. Organomet. Chem.*, 1980, **202**, C6 (*synth, ir*)

C₂₅H₃₅LuN Lu-00021

[Bis(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-2-pyridinyl lutetium

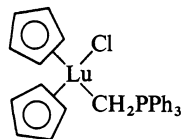


M 524.525

White cryst. Sol. cyclohexane. Formed by reaction of pyridine with Hydridobis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]lutetium, Lu-00018.

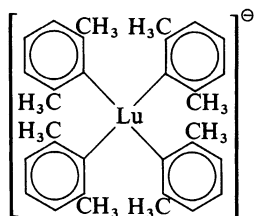
Watson, P.L., *J. Chem. Soc., Chem. Commun.*, 1983, 276
(*synth, struct, nmr, cmr*)

C₂₉H₂₇ClLuP **Lu-00022**
**Chlorobis(η⁵-2,4-cyclopentadien-1-yl)(triphenylphosphonium
η-methylide)lutetium, 10Cl**
[78577-75-0]



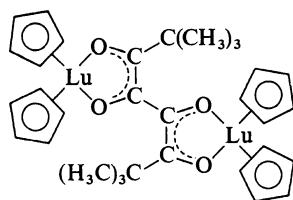
M 616.926
Colourless solid. Sol. C₆H₆, toluene, Et₂O, THF. Mp
172° dec. V. air- and moisture-sensitive.
Schumann, H. *et al*, *J. Organomet. Chem.*, 1981, **209**, C10
(*synth, nmr, ir*)

C₃₂H₃₆Lu[⊖] **Lu-00023**
Tetrakis(2,6-dimethylphenyl)lutetate(1-)



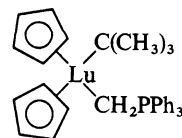
M 595.603 (ion)
Li salt, tetra-THF complex: [40844-50-6].
C₄₈H₆₈LiLuO₄ M 890.971
Colourless cryst. Sol. THF. Dec. by H₂O and air.
Cotton, S.A. *et al*, *J. Chem. Soc., Chem. Commun.*, 1972, 1225
(*synth, cryst struct*)

C₃₂H₃₈Lu₂O₄ **Lu-00024**
**Tetrakis(η⁵-2,4-cyclopentadien-1-yl)[μ-(2,2,7,7-tetramethyl-
3,4,5,6-octanetetron- O³, O⁵: O⁴, O⁶)]dilutetium**
[79716-32-8]



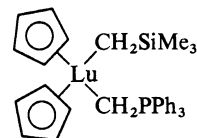
M 836.584
Formed by CO insertion reaction of *tert*-Butylbis(η⁵-cyclopentadienyl)lutetium, Lu-00010. Deep-purple
cryst. Sol. pentane, toluene.
Evans, W.J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 706
(*synth, struct, cmr, pmr, ir*)

C₃₃H₃₆LuP **Lu-00025**
**Bis(η⁵-2,4-cyclopentadien-1-yl)(*tert*-butyl)(triphenylphos-
phonium η-methylide)lutetium**
*Dicyclopentadienyl-*tert*-butyllutetium(methylenetri-
phenylphosphorane)*



M 638.588
Colourless cryst. Sol. C₆H₆, toluene, Et₂O, THF. Mp
122° dec. V. sensitive to oxygen and moisture.
Schumann, H. *et al*, *J. Organomet. Chem.*, 1983, **255**, 305
(*synth, ir, nmr*)

C₃₃H₃₈LuPSi **Lu-00026**
**Bis(η⁵-2,4-cyclopentadien-1-yl)((trimethylsilyl)methyl)(tri-
phenylphosphonium η-methylide)lutetium**
*Dicyclopentadienyl[(trimethylsilyl)methyl]lutetium-
(methylenetriphenylphosphorane)*



M 668.689
Colourless powder. Sol. C₆H₆, toluene, Et₂O, THF,
CH₂Cl₂. Mp 103° dec. V. sensitive to oxygen and
moisture.
Schumann, H. *et al*, *J. Organomet. Chem.*, 1983, **255**, 305
(*synth, ir, nmr*)

Mn Manganese

M. Green

Manganèse (Fr.), Mangan (Ger.), Manganeso (Sp.), Manganese (Ital.), Марганец (Manganets) (Russ.), マンガン (Japan.)

Atomic Number. 25

Atomic Weight. 54.9380

Electronic Configuration. [Ar] $3d^5 4s^2$

Oxidation States. -3, -1, 0, +1, +2

Coordination Number. Most commonly 4, 5 or 6 with conventional ligands. Examples include $\text{Mn}(\text{NO})_3\text{CO}$ (4), $[\text{Mn}(\text{CO})_5]^-$ and $[\text{Mn}(\text{CO})_4\text{PPh}_3]^-$ (5), $\text{MnCl}(\text{CO})_5$ (6).

Colour. Variable.

Availability. Anhydrous MnCl_2 and $\text{Mn}_2(\text{CO})_{10}$ are commonly available starting materials.

Handling. See under Chromium.

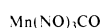
Toxicity. Mn compounds are not especially toxic except for the carbonyl complexes.

Isotopic Abundance. ^{55}Mn , 100%. Both ^{54}Mn ($t_{1/2} = 303\text{d}$) and ^{56}Mn ($t_{1/2} = 2.57\text{d}$) have been used in tracer studies.

Spectroscopy. ^{55}Mn has $I = \frac{5}{2}$ and is relatively easily observed by nmr although the quadrupole moment of $0.55 \times 10^{-28} \text{ cm}^2$ gives rise to relatively broad lines. A range of chemical shifts has been reported for diamagnetic $\text{Mn}(\text{I})$ and $\text{Mn}(-\text{I})$ carbonyl-containing complexes. See for example Calderazzo, F. *et al.*, *J. Chem. Soc.*, (A), 1967, 154.

Analysis. For standard methods, see *Scott's Standard Methods of Chemical Analysis*, Furman, N. H. Ed., 6th Edn, Van Nostrand, 1962.

References. General reviews are listed in the introduction to the *Sourcebook*.



Mn-00001



Mn-00002

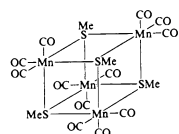


X = Br

Mn-00003

As Mn-00003 with
X = Cl

Mn-00004



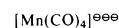
Mn-00005

As Mn-00003 with
X = I

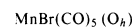
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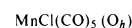
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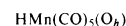
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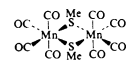
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Mn-00010



Mn-00011



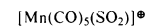
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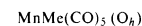
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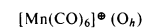
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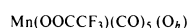
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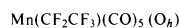
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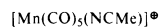
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Mn-00018



Mn-00019



Mn-00020



Mn-00021



Mn-00022



Mn-00023

L = N₂

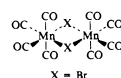
Mn-00024



Mn-00025

As Mn-00024 with
L = —NH₂NH₂

Mn-00026



X = Br

Mn-00027

As Mn-00027 with
X = Cl

Mn-00028



Mn-00029



Mn-00030

As Mn-00024 with
L = CS

Mn-00031

As Mn-00024 with
L = CSe

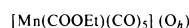
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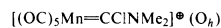
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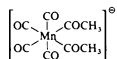
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Mn-00035



Mn-00036



Mn-00037



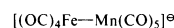
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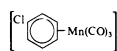
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As Mn-00027 with
X = I

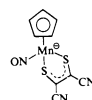
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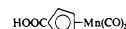
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Mn-00042



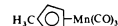
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Mn-00044



Mn-00045



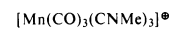
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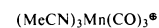
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R = CH₃

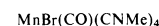
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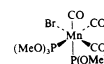
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Mn-00051



Mn-00052



Mn-00053



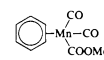
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Mn-00055



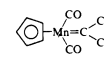
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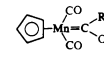
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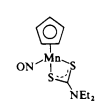
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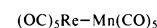
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R = CH₃

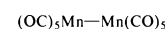
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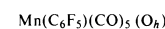
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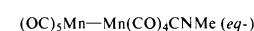
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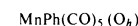
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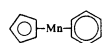
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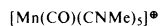
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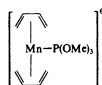
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Mn-00067



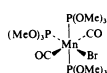
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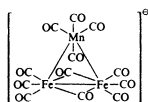
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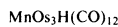
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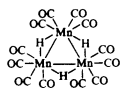
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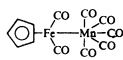
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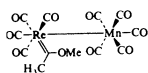
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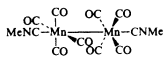
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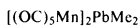
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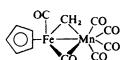
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Mn-00077



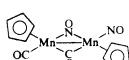
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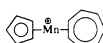
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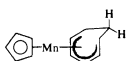
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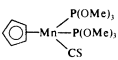
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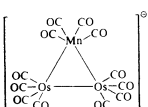
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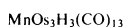
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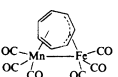
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Mn-00085



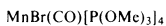
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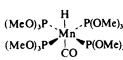
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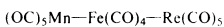
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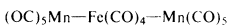
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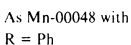
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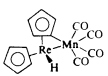
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Mn-00092



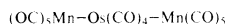
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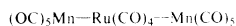
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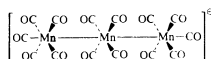
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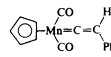
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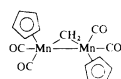
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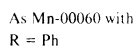
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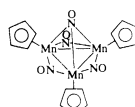
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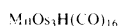
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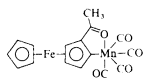
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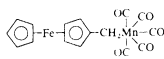
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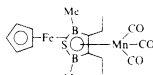
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Mn-00107



Mn-00108



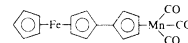
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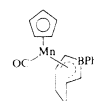
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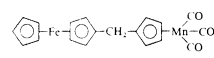
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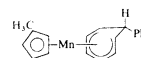
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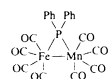
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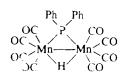
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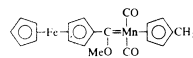
Mn-00115



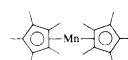
Mn-00116



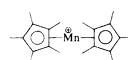
Mn-00117



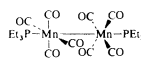
Mn-00118



Mn-00119



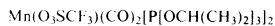
Mn-00120



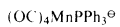
Mn-00121



Mn-00122



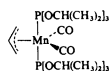
Mn-00123



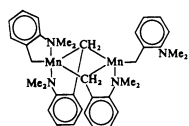
Mn-00124



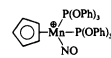
Mn-00125



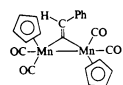
Mn-00131



Mn-00137



Mn-00142



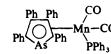
Mn-00126



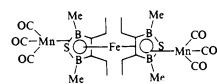
Mn-00132



Mn-00138



Mn-00143



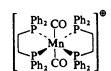
Mn-00127



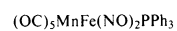
Mn-00133



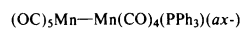
Mn-00139



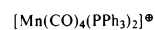
Mn-00144



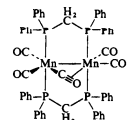
Mn-00128



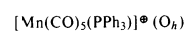
Mn-00134



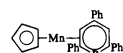
Mn-00140



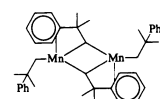
Mn-00145



Mn-00129



Mn-00135



Mn-00141



Mn-00130



Mn-00136

CMnN₃O₄**Mn-00001**Connor, J.A. *et al.*, *J. Organomet. Chem.*, 1974, **73**, 351 (*props*)**Carbonyltrinitrosylmanganese, 8Cl**

[14951-98-5]

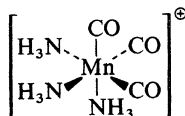


M 172.967

Green solid. Mp 27°.

Barraclough, C.G. *et al.*, *J. Chem. Soc.*, 1960, 4842 (*synth*)
Inorg. Synth., 1976, **16**, 4 (*synth*)**C₃H₉MnN₃O₃⁺****Mn-00002****Triamminetricarbonylmanganese(1+)**

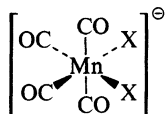
[14872-96-9]



M 190.060 (ion)

fac-form**Pentacarbonylmanganate(1-):****C₈H₉Mn₂N₃O₈** M 385.050Air-stable yellow cryst. Sol. Me₂CO, H₂O.**Tetraphenylborate:** [14872-95-8].**C₂₇H₂₉BMnN₃O₃** M 509.292Yellow cryst. (Me₂CO aq.). Sol. Me₂CO, insol. H₂O.Behrens, H. *et al.*, *Z. Anorg. Allg. Chem.*, 1967, **349**, 241 (*synth*)Behrens, H. *et al.*, *J. Organomet. Chem.*, 1972, **34**, 367 (*synth*)Herberhold, M. *et al.*, *J. Organomet. Chem.*, 1978, **152**, 329(pmr, cmr, ir, *cryst struct*, *props*)**C₄Br₂MnO₄[−]****Mn-00003****Dibromotetracarbonylmanganate(1-)**

[37176-07-1]



X = Br

M 326.788 (ion)

Tetraethylammonium salt: [43184-81-2].**C₁₂H₂₀Br₂MnNO₄** M 457.040

Cryst.

Abel, E.W. *et al.*, *J. Chem. Soc.*, 1964, 434 (*synth*, *ir*, *nmr*)Farona, M.F. *et al.*, *J. Inorg. Nucl. Chem.*, 1967, **29**, 1814

(props)

Connor, J.A. *et al.*, *J. Organomet. Chem.*, 1974, **73**, 351 (*props*)**C₄Cl₂MnO₄[−]****Mn-00004****Tetracarbonyldichloromanganate(1-)**

As Dibromotetracarbonylmanganate(1-), Mn-00003 with

X = Cl

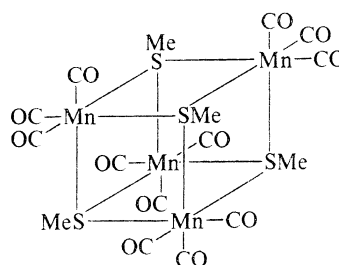
M 237.886 (ion)

Tetraethylammonium salt: [52901-72-1].**C₁₂H₂₀Cl₂MnNO₄** M 368.138

Cryst.

Abel, E.W. *et al.*, *J. Chem. Soc.*, 1964, 434 (*synth*, *ir*, *nmr*)Farona, M.F. *et al.*, *J. Inorg. Nucl. Chem.*, 1967, **29**, 1814

(props)

C₄H₃MnO₃S**Mn-00005****Tricarbonyl(methanethiolato)manganese**

M 186.064

Tetrameric, originally thought to be trimeric.

Tetramer: [24819-01-0]. **Dodecacarbonyltetrakis(μ₃-methanethiolato)tetramanganese, 8Cl.****C₁₆H₁₂Mn₄O₁₂S₄** M 744.256

Yellow-orange cryst. Dec. at 210°.

Abel, E.W. *et al.*, *J. Chem. Soc. (A)*, 1966, 1141 (*synth*)Jenkins, C.R., *J. Organomet. Chem.*, 1968, **15**, 441.Johnson, B.F.E. *et al.*, *Inorg. Chem.*, 1968, **7**, 831 (*ms*, *synth*)**C₄I₄MnO₄[−]****Mn-00006****Tetracarbonyldiiodomanganate(1-)**

[37176-05-9]

As Dibromotetracarbonylmanganate(1-), Mn-00003 with

X = I

M 674.598 (ion)

Tetramethylammonium salt: [53749-00-1].**C₈H₁₂I₂MnNO₄** M 494.934

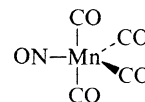
Cryst.

Abel, E.W. *et al.*, *J. Chem. Soc.*, 1964, 434 (*synth*, *ir*, *nmr*)Feron, M.F. *et al.*, *J. Inorg. Nucl. Chem.*, 1967, **29**, 1814

(props)

Connor, J.A. *et al.*, *J. Organomet. Chem.*, 1974, **73**, 351 (*props*)**C₄MnNO₅****Mn-00007****Tetracarbonylnitrosylmanganese, 8Cl**

[16104-17-9]



M 196.986

Red liq. Mp −1.5°.

Treichel, P.M. *et al.*, *J. Am. Chem. Soc.*, 1961, **83**, 2593 (*synth*)*Organomet. Synth.*, 1965, **1**, 164 (*synth*)Waersik, H. *et al.*, *Inorg. Chem.*, 1967, **6**, 1066.Keeton, D.P. *et al.*, *Inorg. Chim. Acta*, 1972, **6**, 33 (*props*)Herberhold, M. *et al.*, *J. Organomet. Chem.*, 1974, **67**, 81.Legzdins, P. *et al.*, *Inorg. Chem.*, 1975, **14**, 1875.**C₄MnO₄^{−−−}****Mn-00008****Tetracarbonylmanganate(3-), 10Cl**

[61769-24-2]



M 166.980 (ion)

Tri-Na salt: [59123-04-5].

C₄MnNa₃O₄ M 235.949

Characterised spectroscopically.

Ellis, J.E. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 1801 (*synth, props*)

C₅BrMnO₅

Mn-00009

Bromopentacarbonylmanganese, 10Cl, 9Cl, 8Cl

[14516-54-2]

MnBr(CO)₅ (O_h)

M 274.894

Orange-yellow cryst. Mod. sol. org. solvs. Bp_{0.05} 50° subl.

Dimerises slowly in soln. with loss of CO.

Abel, E.W. *et al*, *J. Chem. Soc.*, 1959, 1501 (*synth, props*)

Kaesz, H.D. *et al*, *J. Am. Chem. Soc.*, 1967, **89**, 2844 (*ir*)

Connor, J.A. *et al*, *J. Chem. Soc., Faraday Trans.*, 1972, **68**, 1754.

Aime, S. *et al*, *Transition Met. Chem.*, 1976, **1**, 177 (*cmr*)

Inorg. Synth., 1979, **19**, 160 (*synth*)

C₅ClMnO₅

Mn-00010

Pentacarbonylchloromanganese, 10Cl

Chloropentacarbonylmanganese, 9Cl, 8Cl

[14100-30-2]

MnCl(CO)₅ (O_h)

M 230.443

Pale-yellow light-sensitive cryst. Mod. sol. org. solvs.

Bp_{0.1} 40° subl. Light sensitive. Dimerises slowly in soln. with loss of CO.

Abel, E.W. *et al*, *J. Chem. Soc.*, 1959, 1501 (*synth, props*)

Kaesz, H.D. *et al*, *J. Am. Chem. Soc.*, 1967, **89**, 2844 (*ir*)

Greene, P.T. *et al*, *J. Chem. Soc. (A)*, 1971, 1559 (*cryst struct*)

Connor, J.A. *et al*, *J. Chem. Soc., Faraday Trans.*, 1972, **68**, 1754.

Inorg. Synth., 1979, **19**, 159 (*synth*)

C₅HMnO₅

Mn-00011

Pentacarbonylhydromanganese, 9Cl

Pentacarbonylmanganese hydride. Manganese hydrocarbonyl. Hydridopentacarbonylmanganese

[16972-33-1]

HMn(CO)₅ (O_h)

M 195.998

Liq. Mp –20°. Sublimes *in vacuo*. Stable to 50°.

▷Poisonous vapour

Inorg. Synth., 1963, **7**, 196 (*synth*)

Organomet. Synth., 1965, **1**, 158 (*synth*)

Edgell, W.F. *et al*, *J. Am. Chem. Soc.*, 1966, **88**, 5451 (*synth*)

Calderazzo, F. *et al*, *J. Chem. Soc. (A)*, 1967, 154 (*nmr*)

Edgell, W.F. *et al*, *Inorg. Chem.*, 1969, **8**, 1103 (*ir*)

La Placa, S. *et al*, *Inorg. Chem.*, 1969, **8**, 1928 (*cryst struct*)

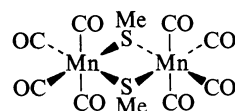
McNeill, E.A. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 6243 (*synth, struct*)

McKinney, R.J. *et al*, *Inorg. Chem.*, 1979, **18**, 3413.

C₅H₃MnO₄S

Mn-00012

Tetracarbonyl(methanethiolato)manganese



M 214.074

Dimeric.

Dimer: [21321-38-0]. Octacarbonylbis(μ-methanethiolato)dimanganese, 9Cl, 8Cl.

C₁₀H₆Mn₂O₈S₂ M 428.149

Golden-yellow cryst. (pentane).

Treichel, P.M. *et al*, *J. Chem. Soc.*, 1963, 720 (*synth, ir, pmr*)

C₅IMnO₅

Mn-00013

Pentacarbonyliodomanganese, 10Cl

Iodopentacarbonylmanganese, 9Cl, 8Cl

[14879-42-6]

MnI(CO)₅ (O_h)

M 321.895

Red-orange cryst. (hexane). Bp_{0.05} 50° subl. Iodine is liberated on prolonged standing at r.t., dimerises slowly in soln.

Abel, E.W. *et al*, *J. Chem. Soc.*, 1959, 1501 (*synth, props*)

Kaesz, H.D. *et al*, *J. Am. Chem. Soc.*, 1967, **89**, 2844 (*ir*)

Connor, J.A. *et al*, *J. Chem. Soc., Faraday Trans.*, 1972, **68**, 1754 (*props*)

Inorg. Synth., 1979, **19**, 160, 162 (*synth*)

C₅MnO₅[⊖]

Mn-00014

Pentacarbonylmanganate(1–), 10Cl

[14971-26-7]

Mn(CO)₅[⊖]

M 194.990 (ion)

Li salt: [15689-01-7].

C₅LiMnO₅ M 201.931

Moisture-sensitive.

Na salt: [13859-41-1].

C₅MnNaO₅ M 217.980

Moisture-sensitive.

K salt:

C₅KMnO₅ M 234.088

Moisture-sensitive.

Bis(triphenylphosphine)iminium salt: [52542-59-3].

C₄₁H₃₀MnNO₅P₂ M 733.577

Orange cryst.

Inorg. Synth., 1974, **15**, 84 (*synth*)

Duffy, D.N. *et al*, *J. Organomet. Chem.*, 1979, **164**, 227 (*props*)

Gladysz, J.A. *et al*, *Inorg. Chem.*, 1979, **18**, 553 (*synth*)

Pearson, R.G. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 1541 (*props*)

Braunstein, P. *et al*, *J. Organomet. Chem.*, 1981, **213**, 79 (*props*)

Uson, R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 316 (*props*)

C₅MnO₇S[⊕]

Mn-00015

Pentacarbonyl(sulfur dioxide-S)manganese(1+)

[Mn(CO)₅(SO₂)][⊕]

M 259.049 (ion)

Hexafluoroarsenate: [55853-06-0].

- C₅AsF₆MnO₇S M 447.961
Brownish-yellow solid.
Mews, R., *Angew. Chem., Int. Ed. Engl.*, 1975, **14**, 640; 1977, **16**, 56 (*synth*)
- C₆H₃MnO₅** **Mn-00016**
Pentacarbonylmethylmanganese, 10Cl
Methylpentacarbonylmanganese
[13601-24-6]

MnMe(CO)₅ (O_h)

M 210.025
Colourless cryst. (pet. ether).
Clossen, R.D. *et al.*, *J. Org. Chem.*, 1957, **22**, 598 (*synth, ir*)
Hsieh, A.T.T. *et al.*, *J. Organomet. Chem.*, 1970, **22**, 29 (*synth*)
Wojcicki, A., *Adv. Organomet. Chem.*, 1973, **11**, 87 (*synth, props*)
King, R.B. *et al.*, *J. Am. Chem. Soc.*, 1978, **100**, 1687 (*props*)
Butts, S.B. *et al.*, *J. Am. Chem. Soc.*, 1980, **102**, 5093 (*props*)
Butts, S.B. *et al.*, *Inorg. Chem.*, 1981, **20**, 278.
- C₆MnO₆[⊕]** **Mn-00017**
Hexacarbonylmanganese(1+), 9Cl
Manganesehexacarbonyl(1+)
[21331-06-6]

[Mn(CO)₆][⊕] (O_h)

M 223.000 (ion)
Tetrafluoroborate: [15557-71-8].
C₆BF₄MnO₆ M 309.804
White solid.
Fischer, E.O. *et al.*, *Chem. Ber.*, 1962, **95**, 249 (*synth, props*)
Kruck, T. *et al.*, *Chem. Ber.*, 1964, **97**, 1693 (*synth*)
Beach, N.A. *et al.*, *J. Am. Chem. Soc.*, 1968, **90**, 5713 (*synth, uv*)
DeKock, R.L. *et al.*, *Inorg. Chem.*, 1971, **10**, 38 (*struct*)
Darensbourg, D.J. *et al.*, *J. Am. Chem. Soc.*, 1977, **99**, 4726 (*props*)
Trogler, W.C., *J. Am. Chem. Soc.*, 1979, **101**, 6459 (*synth*)

- C₇F₃MnO₇** **Mn-00018**
Pentacarbonyl(trifluoroacetato-O)manganese, 8Cl
[15219-49-5]

Mn(OOCCF₃)(CO)₅ (O_h)

M 308.006
Bright-yellow volatile cryst.
Green, M.L.H. *et al.*, *J. Organomet. Chem.*, 1967, **8**, 511 (*synth*)
King, R.B. *et al.*, *J. Organomet. Chem.*, 1968, **15**, 457 (*synth*)
King, R.B. *et al.*, *J. Inorg. Nucl. Chem.*, 1969, **31**, 2169 (*props*)
Garner, C.L. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1974, 735 (*props*)

- C₇F₅MnO₅** **Mn-00019**
Pentacarbonyl(pentafluoroethyl)manganese, 8Cl
[20791-80-4]

Mn(CF₂CF₃)(CO)₅ (O_h)

M 314.004
Liq. Mp 15-7°.
Kaes, H.D. *et al.*, *Z. Naturforsch., B*, 1960, **15**, 763 (*synth, props*)

- C₇H₃MnNO₅[⊕]** **Mn-00020**
(Acetonitrile)pentacarbonylmanganese(1+), 9Cl
Pentacarbonylacetonitrilemanganese. Pentacarbonyl(cyanomethane)manganese
[27674-37-9]

[Mn(CO)₅(NCMe)][⊕]

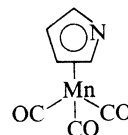
M 236.042 (ion)
Hexafluorophosphate: [37504-44-2].
C₇H₃F₆MnNO₅P M 381.007
Yellow cryst.
Drew, D. *et al.*, *Inorg. Chem.*, 1975, **14**, 1579 (*synth*)
Darensbourg, D.J. *et al.*, *J. Am. Chem. Soc.*, 1977, **99**, 4726, 5940 (*synth, props*)
Trogler, W.C., *J. Am. Chem. Soc.*, 1979, **101**, 6459 (*synth, props*)
Snow, M.R. *et al.*, *Inorg. Chim. Acta Lett.*, 1980, **44**, 189 (*synth*)

- C₇H₃MnNO₅[⊕]** **Mn-00021**
Pentacarbonyl(isocyanomethane)manganese(1+)
Pentacarbonyl(methylisocyanide)manganese(1+)
[45113-87-9]

[Mn(CO)₅(CNMe)][⊕] (O_h)

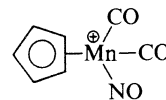
M 236.042 (ion)
Hexafluorophosphate: [38979-19-0].
C₇H₃F₆MnNO₅P M 381.007
Cryst. (Me₂CO/Et₂O). Mp 192-4°.
Treichel, P.M. *et al.*, *J. Organomet. Chem.*, 1972, **44**, 339 (*synth, props*)
Sarapu, A. *et al.*, *Inorg. Chem.*, 1975, **14**, 247 (*synth, props*)

- C₇H₄MnNO₃** **Mn-00022**
Tricarbonyl-π-pyrrolylmanganese, 8Cl
Pyrrolylmanganese tricarbonyl
[32761-36-7]



- M 205.052
Cryst. (pentane). Mp 41°. Cryst. struct. of related 2-Me deriv. has been detd.
Joshi, K.K. *et al.*, *J. Organomet. Chem.*, 1964, **1**, 471 (*synth, ir*)

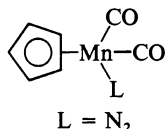
- C₇H₅MnNO₃[⊕]** **Mn-00023**
Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)nitrosylmanganese(1+), 9Cl
Dicarbonylnitrosyl(η⁵-cyclopentadienyl)manganese(1+)
[31921-90-1]



- M 206.059 (ion)
ir ν_{CO} 2125, 2075, ν_{NO} 1840 cm⁻¹. Dec. from 230°.
Hexafluorophosphate: [31921-90-1].
C₇H₅F₆MnNO₃P M 351.024
Yellow cryst. (Me₂CO/Et₂O).

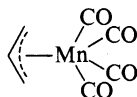
King, R.B. *et al*, *Inorg. Chem.*, 1964, **3**, 791 (*synth, ir, pmr*)
 Brunner, H. *et al*, *J. Organomet. Chem.*, 1969, **19**, 135 (*props*)
 King, R.B. *et al*, *Inorg. Chem.*, 1969, **8**, 2374 (*props*)
 James, T.A. *et al*, *J. Chem. Soc. (A)*, 1970, 850 (*props*)
 King, R.B. *et al*, *J. Organomet. Chem.*, 1973, **56**, 345 (*synth*)
 Busetto, L. *et al*, *J. Organomet. Chem.*, 1974, **66**, 453 (*props*)

C₇H₅MnN₂O₂ **Mn-00024**
Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(dinitrogen)manganese, 9Cl
 [38600-58-7]



M 204.067
 Air-stable red-brown cryst. by subl. Mp 60° dec. (gas evol.).
 Sellmann, D. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1971, **10**, 919;
 1972, **11**, 534 (*synth, ir, ms, pmr*)
 Sellmann, D., *J. Organomet. Chem.*, 1972, **44**, C46; 1978, **160**,
 183 (*synth, props*)
 Ziegler, M.L. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1976, **15**, 695.

C₇H₅MnO₄ **Mn-00025**
Tetracarbonyl(η³-2-propenyl)manganese, 9Cl
 (η³-Allyl)tetracarbonylmanganese. π-Allylmanganese
 tetracarbonyl
 [33307-28-7]

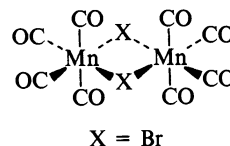


M 208.052
 Pale-yellow solid or cryst. Mp 38-41°, 53°. Bp₉ 60-2°
 subl.
 Kaesz, H.D. *et al*, *Z. Naturforsch., B*, 1960, **18**, 763 (*synth, props*)
 Davidson, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 126 (*ir, raman*)
 Abel, E.W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1706 (*synth*)
 Gibson, D.H. *et al*, *J. Organomet. Chem.*, 1979, **172**, C7 (*synth*)

C₇H₉MnN₂O₂ **Mn-00026**
Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(hydrazine-N)manganese, 10Cl
 [31921-91-2]
 As Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(dinitrogen)manganese, Mn-00024 with
 L = —NH₂NH₂

M 208.098
 Red-brown cryst.
 Sellmann, D., *Z. Naturforsch., B*, 1970, **25**, 890 (*synth*)
 Sellmann, D., *J. Organomet. Chem.*, 1972, **44**, C46.
 Sellmann, D. *et al*, *J. Organomet. Chem.*, 1978, **160**, 183; 1979, **178**, 433.

C₈Br₂Mn₂O₈ **Mn-00027**
Di(μ-bromo)octacarbonyldimanganese, 9Cl, 8Cl
 Octacarbonyldi(μ-bromo)dimanganese
 [18535-44-9]



M 493.767
 Brown cryst. (C₆H₆ or CCl₄). Subl. at 150°. Converted by CO into BrMn(CO)₅, Mn-00009.
 Monomer: Bromotetracarbonylmanganese.
 C₄BrMnO₄ M 246.884
 Abel, E.W. *et al*, *J. Chem. Soc.*, 1959, 1501 (*synth, props*)
 Dahl, L.F. *et al*, *Acta Crystallogr., Sect. B*, 1963, **16**, 611 (*cryst struct*)
 Abel, E.W. *et al*, *Trans. Faraday Soc.*, 1967, **63**, 45 (*ir*)
 Farona, M.F. *et al*, *J. Inorg. Nucl. Chem.*, 1967, **29**, 1814 (*synth*)
 Bamford, C.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 1846 (*synth, uv*)

C₈Cl₂Mn₂O₈ **Mn-00028**
Di(μ-chloro)octacarbonyldimanganese, 9Cl, 8Cl
 Octacarbonyldi(μ-chloro)dimanganese
 [18535-43-8]
 As Di(μ-bromo)octacarbonyldimanganese, Mn-00027 with

X = Cl

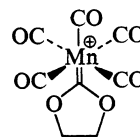
M 404.865
 Monomer: Tetracarbonylchloromanganese.
 Chlorotetracarbonylmanganese.
 C₄ClMnO₄ M 202.433
 Abel, E.W. *et al*, *J. Chem. Soc.*, 1959, 1501 (*synth, props*)
 El Sayed, M.A. *et al*, *Inorg. Chem.*, 1963, **2**, 158 (*ir*)
 Farona, M.F. *et al*, *J. Inorg. Nucl. Chem.*, 1967, **29**, 1814 (*synth*)
 Zingalas, F. *et al*, *Inorg. Chem.*, 1967, **6**, 1243 (*props*)
 Bamford, C.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 1846 (*synth*)

C₈H₃MnO₇ **Mn-00029**
Pentacarbonyl(1,2-dioxopropyl)manganese, 9Cl
 [33678-85-2]

Mn(COCOCH₃)(CO)₅

M 266.046
 Red cryst.
 Casey, C.P. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 1166 (*synth, props, cryst struct*)

C₈H₄MnO₇[⊕] **Mn-00030**
Pentacarbonyl-1,3-dioxalan-2-ylidenemanganese(1+)
 [40901-26-6]



M 267.053 (ion)

Hexafluorophosphate:

C₅H₄F₆MnO₇P M 375.985
Yellow cryst.

Bowen, D.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 1189
(*synth*, *ir*, *nmr*, *props*)

C₈H₅MnO₂S Mn-00031
(Carbonothioyl)dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)manganese, 9Cl

[31741-76-1]

As Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(dinitrogen)-manganese, Mn-00024 with

L = CS

M 220.124

Bright-yellow cryst. (pentane). Mp 56°. Bp_{0.001} 28° subl.

Fenster, A.E. *et al*, *Inorg. Chem.*, 1974, **13**, 915 (*synth*, *ir*, *nmr*)
Inorg. Synth., 1976, **16**, 53 (*synth*)

Butler, I.S. *et al*, *Inorg. Chem.*, 1977, **16**, 1779 (*synth*)

Butler, I.S. *et al*, *J. Organomet. Chem.*, 1977, **133**, 59 (*synth*, *ir*, *nmr*)

C₈H₅MnO₂Se Mn-00032
(Carbonoselenoyl)dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)-manganese, 10Cl

[55987-17-2]

As Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(dinitrogen)-manganese, Mn-00024 with

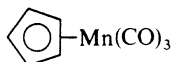
L = CSe

M 267.024

Golden cryst. Mp 64-5°. Bp_{0.005} 25° (subl.).

Butler, I.S. *et al*, *Inorg. Chem.*, 1977, **16**, 1779 (*synth*, *nmr*, *ir*)

C₈H₅MnO₃ Mn-00033
Cyclopentadienyltricarbonylmanganese
Tricarbonylcyclopentadienylmanganese. Cymantrene
[12079-65-1]



M 204.064

Pale-yellow cryst. with camphoraceous odour. Mp 76.8-

77.1°. Solns. in org. solvs. slowly oxidised by air.

Undergoes electrophilic substitution reactions.

Sublimes at 60°.

► Highly toxic, TLV (skin) 0.1. OO9720000.

Piper, T.S. *et al*, *J. Inorg. Nucl. Chem.*, 1955, **1**, 165 (*synth*, *ir*)

Kozikowski, J. *et al*, *J. Am. Chem. Soc.*, 1959, **81**, 2995.

Organomet. Synth., 1965, **1**, 111.

Müller, J. *et al*, *J. Organomet. Chem.*, 1967, **10**, 313 (*ms*)

Abel, E.W. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1971, **10**, 339 (*synth*)

Lokshin, B.V. *et al*, *J. Organomet. Chem.*, 1974, **77**, 69 (*ir*, *raman*)

Sax, N.I., *Dangerous Properties of Industrial Materials*, 5th Ed., Van Nostrand-Reinhold, 1979, 787.

Hazards in the Chemical Laboratory, (Bretherick, L., Ed.), 3rd Ed., Royal Society of Chemistry, London, 1981, 264.

C₈H₅MnO₅ Mn-00034
Pentacarbonyl-2-propenylmanganese, 9Cl
Allylpentacarbonylmanganese
[14057-83-1]



M 236.063

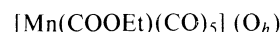
Lemon-yellow liq. Bp₁₅ 45°. Air sensitive. Dec. at 80° → CO + η³-C₃H₅Mn(CO)₄.

Kaes, H.D. *et al*, *Z. Naturforsch., B*, 1960, **15**, 682 (*synth*)

McClellan, W.R. *et al*, *J. Am. Chem. Soc.*, 1961, **83**, 1601 (*synth*)

Clarke, H.L. *et al*, *J. Organomet. Chem.*, 1972, **40**, 379 (*ir*, *raman*)

C₈H₅MnO₇ Mn-00035
Pentacarbonyl(ethoxycarbonyl)manganese, 9Cl
[28300-66-5]



M 268.061

Cryst. Mp 59.5°.

Kruck, T. *et al*, *Chem. Ber.*, 1964, **97**, 1693 (*synth*)

Beach, N.A. *et al*, *J. Am. Chem. Soc.*, 1968, **90**, 5713 (*props*)

Drew, D. *et al*, *Inorg. Chem.*, 1975, **14**, 1579 (*synth*)

C₈H₆ClMnNO₅[⊕] Mn-00036
Pentacarbonyl[chloro(dimethylamino)methylene]manganese(1+)
[58938-56-0]



M 286.530 (ion)

Mp 121-2° dec.

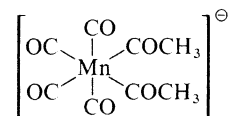
Perchlorate: [58938-57-1].

C₈H₆Cl₂MnNO₉ M 385.981

Pale-yellow solid. Mp 121-2° dec.

Hartshorn, A.J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1975, 929 (*synth*, *props*)

C₈H₆MnO₆[⊖] Mn-00037
Diacetyltetracarbonylmanganate(1-), 10Cl



M 253.070 (ion)

cis-Diacetyl moiety is electronically equiv. to the acetoacetate anion.

Li salt: [57891-59-5].

C₈H₆LiMnO₆ M 260.011

Not. isol., deep-yellow soln. in Et₂O.

Bis(triphenylphosphine)iminium salt: [66964-10-1]. No phys. props. reported.

Al salt: [58034-11-0]. *Hexakis*[μ-(acetyl-C-O)](*aluminum*)dodecacarbonyltrimanganese, 9Cl.

C₂₄H₁₈AlMn₃O₁₈ M 786.191

Pale-yellow hexagonal needles. Sol. CH₂Cl₂, CHCl₃, mod. sol. toluene. Dec. from 140°.

Lukehart, C.M. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 6903 (*synth*, *ir*, *pmr*, *cryst. struct*)

C₈H₉MnO₅Pb Mn-00038
Pentacarbonyl(trimethylplumbyl)manganese, 10Cl
(Trimethylplumbyl)pentacarbonylmanganese
[36527-71-6]



M 447.294

Yellow. Disproportionates in THF soln. to Me₄Pb and Bis(pentacarbonylmanganese)dimethyllead, Mn-00078

Haupt, H.J. *et al*, *J. Organomet. Chem.*, 1973, **54**, 231 (*synth*)
Kodel, W. *et al*, *Inorg. Chim. Acta*, 1981, **49**, 209.

C₈H₉MnO₅Si **Mn-00039**

Pentacarbonyl(trimethylsilyl)manganese, 9Cl, 8Cl
Trimethylsilylmanganese pentacarbonyl
[26500-16-3]



M 268.180

Mp 26.5°.

Malisch, W. *et al*, *Chem. Ber.*, 1974, **107**, 979 (*synth, ir*)
McLean, R.A.N., *J. Chem. Soc., Dalton Trans.*, 1974, 1568 (*uv*)

Spalding, T.R., *J. Organomet. Chem.*, 1978, **149**, 371 (*ms*)
Gladysz, J.A. *et al*, *Inorg. Chem.*, 1979, **18**, 553 (*synth*)
Li, S. *et al*, *J. Organomet. Chem.*, 1979, **166**, 317 (*nmr*)

C₈I₂Mn₂O₈ **Mn-00040**

Di(μ-iodo)octacarbonyldimanganese, 9Cl, 8Cl
Octacarbonyldi(μ-iodo)dimanganese

As Di(μ-bromo)octacarbonyldimanganese, Mn-00027
with



M 587.768

Monomer: Tetracarbonyliodomanganese.

Iodotetracarbonylmanganese.

C₄I₂Mn₂O₄ M 293.884

Abel, E.W. *et al*, *J. Chem. Soc.*, 1959, 1501 (*synth, props*)
El Sayad, M.A. *et al*, *Inorg. Chem.*, 1963, **2**, 158 (*ir*)
Farona, M.F. *et al*, *J. Inorg. Nucl. Chem.*, 1967, **29**, 1814 (*synth*)
Zingales, F. *et al*, *Inorg. Chem.*, 1967, **6**, 1243 (*props*)
Bamford, C.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 1846 (*synth*)

C₉FeMnO₉[⊖] **Mn-00041**

Nonacarbonylferratemanganate(1-), 8Cl



M 362.879 (ion)

Bis(triphenylphosphine)iminium salt:

C₄₅H₃₀FeMnNO₉P₂ M 901.466

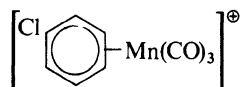
Dark-red cryst. (pentane/Et₂O). Mp 134-5°.

Ruff, J.K., *Inorg. Chem.*, 1968, **7**, 1818 (*synth, ir*)

C₉H₅ClMnO₃[⊕] **Mn-00042**

(Chlorobenzene)tricarbonylmanganese(1+)

Tricarbonyl(η⁶-chlorobenzene)manganese(1+), 9Cl
[57812-91-6]



M 251.528 (ion)

Hexafluorophosphate:

C₉H₅ClF₆MnPO₃ M 396.492

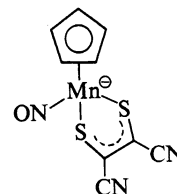
Pale-yellow cryst. (Me₂CO/EtOH).

Pauson, P.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1677.

C₉H₅MnN₃OS₂[⊖] **Mn-00043**

π-Cyclopentadienyl[dimercaptomaleonitrilato(2-)]nitrosylmanganate(1-)

[32629-44-0]



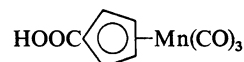
M 290.216 (ion)

McCleverty, J.A. *et al*, *Inorg. Chem.*, 1969, **8**, 1340 (*synth, props*)

McCleverty, J.A. *et al*, *J. Chem. Soc. (A)*, 1970, 3315 (*synth, props*)

C₉H₅MnO₅ **Mn-00044**

Tricarbonyl(carboxy-π-cyclopentadienyl)manganese, 8Cl
(Carboxycyclopentadienyl)tricarbonylmanganese
[12082-07-4]



M 248.074

Yellow cryst. (ClCH₂CH₂Cl). Mp 190-9° (195-7°).

Me ester:

C₁₀H₇MnO₅ M 262.100

Yellow oil. Bp_{2.5} 127-8°.

Amide:

C₉H₆MnNO₄ M 247.089

Mp 152-4°.

Cais, M. *et al*, *J. Am. Chem. Soc.*, 1960, **82**, 5667 (*synth*)

Riemschneider, R. *et al*, *Z. Naturforsch., B*, 1960, **15**, 627 (*synth*)

Tirosh, N. *et al*, *J. Organomet. Chem.*, 1966, **5**, 357.

Shew, L.M.C. *et al*, *J. Organomet. Chem.*, 1966, **5**, 362 (*deriv*)

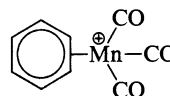
Nesmeyanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1969, 1945 (*deriv*)

Brill, T.B. *et al*, *Inorg. Chem.*, 1971, **10**, 74 (*nqr*)

C₉H₆MnO₃[⊕] **Mn-00045**

(η⁶-Benzene)tricarbonylmanganese(1+), 9Cl

Tricarbonyl(η⁶-benzene)manganese(1+)



M 217.083 (ion)

Hexafluorophosphate: [38834-51-4].

C₉H₆F₆MnO₃P M 362.047

Pale-yellow cryst.

Jones, D. *et al*, *J. Chem. Soc.*, 1962, 4458 (*props*)

Walker, P.J.C. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 662 (*props*)

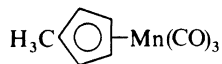
Pauson, P.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1677 (*synth, ir, nmr*)

Bachmann, P. *et al*, *Z. Naturforsch., B*, 1977, **32**, 471 (*synth*)

Kane-Maguire, L.A.P. *et al*, *Inorg. Chem.*, 1979, **18**, 700.

C₉H₇MnO₃**Mn-00046****(Methylcyclopentadienyl)tricarbonylmanganese***Tricarbonyl(methylcyclopentadienyl)manganese.**Methylcymantrene*

[12108-13-3]



M 218.091.

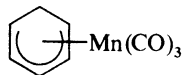
Antiknock additive for petrol. Yellow liq. Almost insol.

H₂O, misc. nonpolar solvs. d₄²⁰ 1.388. Mp 1.5°. Bp 233°, Bp₁₀ 102°.

► Highly toxic, TLV (skin) 0.2. Highly inflammable, flash p. 111°. OP1450000.

Piper, T.S. *et al*, *J. Inorg. Nucl. Chem.*, 1955, **1**, 165 (*synth*)Gibson, H.J. *et al*, *Angew. Chem.*, 1959, **71**, 629 (*synth*)Schlögl, K. *et al*, *Monatsh. Chem.*, 1967, **98**, 82 (*pmr*)Gansow, O.A. *et al*, *J. Chem. Soc., Chem. Commun.*, 1972, 456 (*cmr*)Parker, D.J., *Spectrochim. Acta, Part A*, 1975, **31**, 1789 (*ir, raman*)Sax, N.I., *Dangerous Properties of Industrial Materials*, 5th Ed., Van Nostrand-Reinhold, 1979, 816.*Hazards in the Chemical Laboratory*, (Bretherick, L., Ed.), 3rd Ed., Royal Society of Chemistry, London, 1981, 395.**C₉H₇MnO₃****Mn-00047****Tricarbonyl[(1,2,3,4,5-η)-2,4-cyclohexadien-1-yl]manganese, 9Cl***Cyclohexadienyltricarbonylmanganese*

[12108-14-4]

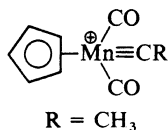


M 218.091

Yellow plates (pet. ether at –78°). Mp 79°.

Winkhaus, G. *et al*, *J. Chem. Soc.*, 1961, 3807 (*synth, ir, pmr*)King, R.B. *et al*, *Org. Mass. Spectrom.*, 1974, **9**, 195 (*ms*)Munro, G.A.M. *et al*, *Isr. J. Chem.*, 1976/77, **15**, 258 (*synth*)**C₉H₈MnO₂[⊕]****Mn-00048****Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)ethylidinemanganese(1+), 10Cl**

[59831-15-1]

R = CH₃

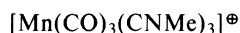
M 203.099 (ion)

Tetrachloroborate: [59831-16-2].C₉H₈BCl₄MnO₂ M 355.721

Characterised spectroscopically.

Fischer, E.O. *et al*, *Chem. Ber.*, 1977, **110**, 1140 (*synth*)Kreissl, F.R. *et al*, *Chem. Ber.*, 1977, **110**, 3040 (*props*)Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1979, **169**, C27 (*props*)Fischer, E.O. *et al*, *Z. Naturforsch., B*, 1979, **34**, 1168.**C₉H₉MnN₃O₃[⊕]****Mn-00049****Tricarbonyltris(isocyanomethane)manganese(1+)***Tricarbonyltris(methylisocyanide)manganese(1+)*

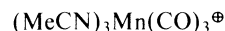
[45167-07-5]



M 262.126 (ion)

Hexafluorophosphate: [38833-22-6].C₉H₉F₆MnN₃O₃P M 407.091White cryst. (Me₂CO/Et₂O). Mp 175-7°.Treichel, P.M. *et al*, *J. Organomet. Chem.*, 1972, **44**, 339 (*synth, ir, nmr*)Sawai, T. *et al*, *J. Organomet. Chem.*, 1974, **80**, 91 (*synth*)Sarapu, A. *et al*, *Inorg. Chem.*, 1975, **14**, 247 (*synth*)Treichel, P.M. *et al*, *Isr. J. Chem.*, 1977, **15**, 253.**C₉H₉MnN₃O₃[⊕]****Mn-00050****Tris(acetonitrile)tricarbonylmanganese(1+)***Tricarbonyltris(cyanomethane)manganese(1+)*

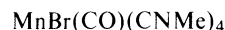
[55029-83-9]



M 262.126 (ion)

Hexafluorophosphate: [54039-60-0].C₉H₉F₆MnN₃O₃P M 407.091Pale-yellow plate-like cryst. (CH₂Cl₂/EtOH). Mp 131-3° dec.Reimann, R.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 808 (*synth, ir, nmr*)Edwards, D.A. *et al*, *J. Organomet. Chem.*, 1977, **131**, 73 (*synth, props*)Kane-Maguire, L.A.P. *et al*, *Inorg. Chem.*, 1979, **18**, 700 (*synth*)**C₉H₁₂BrMnN₄O****Mn-00051****Bromocarbonyltetrakis(isocyanomethane)manganese, 8Cl***Bromocarbonyltetrakis(methyl isocyanide)manganese*

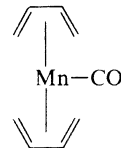
[38833-19-1]



M 327.062

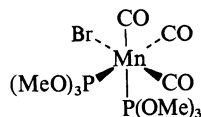
Bright-yellow cryst. (CH₂Cl₂/hexane). Mp 176-8°.Treichel, P.M. *et al*, *J. Organomet. Chem.*, 1972, **44**, 339 (*synth, ir, nmr*)Adams, R.D. *et al*, *J. Organomet. Chem.*, 1975, **87**, C48 (*synth*)Treichel, P.M. *et al*, *J. Organomet. Chem.*, 1976, **122**, 229 (*synth*)**C₉H₁₂MnO****Mn-00052****Bis(η⁴-1,3-butadiene)carbonylmanganese, 9Cl**

[54688-87-8]



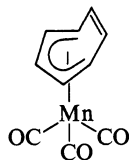
M 191.131

Long blue-green needles (pentane). Paramagnetic with 1 unpaired electron. Dec. at 150°, *ir* ν_{CO} 1968 cm⁻¹ (pentane).Herberhold, M. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1975, **14**, 351 (*synth, ir, ms, esr*)Huttner, G. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1975, **87**, 352 (*cryst struct*)Harlow, R.L. *et al*, *Organometallics*, 1982, **1**, 1506 (*synth*)

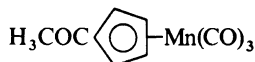
C₉H₁₈BrMnO₉P₂**Mn-00053****Bromotricarbonylbis(trimethylphosphite-*P*)manganese, 8Cl**
[52841-89-1]

M 467.025

Orange cryst. Mp 110°.

Treichel, P.M. *et al*, *J. Organomet. Chem.*, 1969, **17**, P37
(*synth*)Reimann, R.H., *J. Chem. Soc., Dalton Trans.*, 1973, 841
(*synth*)**C₁₀H₇MnO₃****Mn-00054****Tricarbonyl[(1,2,3,4,5- η)-2,4,6-cycloheptatrien-1-yl]manganese, 9Cl**
[53011-14-6]

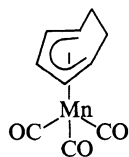
M 230.102

Bright-orange solid. Mp 64°. Bp_{0.04} 35° subl.Whitesides, T.H. *et al*, *Inorg. Chem.*, 1976, **15**, 874 (*synth*, *ir*, *nmr*)**C₁₀H₇MnO₄****Mn-00055****(Acetylcyclopentadienyl)tricarbonylmanganese [(1,2,3,4,5- η)-1-Acetyl-2,4-cyclopentadien-1-yl]tricarbonylmanganese, 9Cl. Tricarbonyl(acetyl- π -cyclopentadienyl)manganese, 8Cl. Acetylcymentrene**
[12116-28-8]

M 246.101

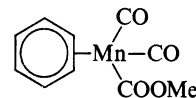
Yellow cryst. (pet. ether). Mp 41.5-42.5°.

2,4-Dinitrophenylhydrazones: Mp 223-4°.

Cotton, F.A. *et al*, *Chem. Ind. (London)*, 1958, 1368 (*synth*, *ir*)Fischer, E.O. *et al*, *Chem. Ber.*, 1958, **91**, 2719 (*synth*, *ir*)Kozikowski, J. *et al*, *J. Am. Chem. Soc.*, 1959, **81**, 2995 (*synth*, *ir*)Khotsyanova, J.L. *et al*, *J. Organomet. Chem.*, 1975, **88**, 351
(*struct*)**C₁₀H₉MnO₃****Mn-00056****Tricarbonyl[(1,2,3,4,5- η)-2,4-cycloheptadien-1-yl]manganese, 9Cl**
[32798-86-0]

M 232.117

Yellow cryst. (hexane). Mp 66-8°.

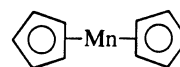
King, R.B. *et al*, *Inorg. Chem.*, 1974, **13**, 637 (*synth*, *ir*, *nmr*)**C₁₀H₉MnO₄****Mn-00057****(η^6 -Benzene)dicarbonyl(methoxycarbonyl)manganese, 8Cl**
[53127-56-3]

M 248.117

Unstable yellow cryst.

Walker, P.J.C. *et al*, *Inorg. Chim. Acta*, 1973, **7**, 621 (*synth*, *ir*, *nmr*)**C₁₀H₁₀Mn****Mn-00058****Mangancene, 9Cl***Di- π -Cyclopentadienylmanganese, 8Cl.**Biscyclopentadienylmanganese*

[1271-27-8]

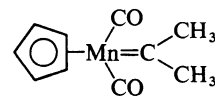


M 185.127

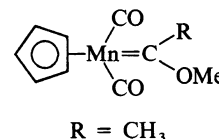
Polymeric in solid state. Amber-brown cryst. becoming pinkish white at 159-60°. Sol. Py, THF, mod. sol.

C₆H₆. Mp 173°. Sublimes *in vacuo* at 100-30°. Stable to 350°.

►Inflames explosively in air when finely divided

Wilkinson, G. *et al*, *J. Inorg. Nucl. Chem.*, 1956, **2**, 95 (*synth*)Reid, A.F. *et al*, *Aust. J. Chem.*, 1966, **19**, 309 (*synth*)Parker, D.J. *et al*, *J. Chem. Soc. (A)*, 1970, 480 (*ir*)Ammeter, J.H. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 7833.Switzer, M.E. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 7669.U.S.P., 3 880 743, (1975); CA, **83**, 97557 (*synth*)Binder, W. *et al*, *Z. Naturforsch., B*, 1978, **33**, 1235 (*cryst struct*)Haaland, A., *Acc. Chem. Res.*, 1979, **12**, 415 (*struct*)Haaland, A., *Inorg. Nucl. Chem. Lett.*, 1979, **15**, 267 (*ed*)Chipperfield, J.R. *et al*, *J. Organomet. Chem.*, 1979, **178**, 177.**C₁₀H₁₁MnO₂****Mn-00059****Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(1-methylethylidene)manganese, 9Cl**
[59831-13-9]

M 218.134

Herrmann, W.A., *Chem. Ber.*, 1975, **108**, 486 (*synth*)Friedrich, P. *et al*, *J. Organomet. Chem.*, 1977, **139**, C68 (*cryst struct*)**C₁₀H₁₁MnO₃****Mn-00060****Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(1-methoxyethylidene)manganese, 9Cl**
[12244-94-9]R = CH₃

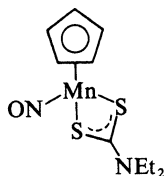
M 234.133

Red-brown liq.

Fischer, E.O. *et al*, *Chem. Ber.*, 1967, **100**, 2445 (*synth*, *props*)

C₁₀H₁₅MnN₂OS₂**Mn-00061**

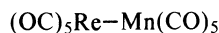
π-Cyclopentadienyl(diethylthiocarbamate)nitrosylmanganese, 8Cl
[32680-07-2]



M 298.299

McCleverty, J.A. *et al*, *Inorg. Chem.*, 1969, **8**, 1340 (*synth, props*)McCleverty, J.A. *et al*, *J. Chem. Soc.*, 1970, 3315 (*synth, props*)**C₁₀MnO₁₀Re****Mn-00062**

Pentacarbonyl(pentacarbonylmanganese)rhenium, 8Cl
Manganese rhenium decacarbonyl.
Decacarbonylmanganeserhenium
[14693-30-2]

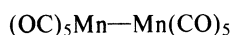


M 521.249

White, air-stable cryst.

Nesmeyanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1963, 194 (*synth*)Struchkov, Y.T. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1967, **172**, 107 (*cryst struct*)Junk, G.A. *et al*, *J. Chem. Soc. (A)*, 1970, 2102.Spiro, T.G., *Prog. Inorg. Chem.*, 1970, **11**, 1 (*spectra*)Abel, E.W. *et al*, *Inorg. Nucl. Chem. Lett.*, 1971, **7**, 587 (*synth*)Knox, S.A.R. *et al*, *Inorg. Chem.*, 1971, **10**, 2636 (*synth, struct*)**C₁₀Mn₂O₁₀****Mn-00063**

Decacarbonyldimanganese, 8Cl
Manganese carbonyl. Dimanganese decacarbonyl
[10170-69-1]

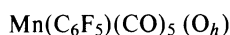


M 389.980

Starting material for manganese carbonyl chemistry.
Yellow cryst. Sol. org. solvs. Mp 152-4°. Bp_{0.1} 80° subl.

Podall, H.E. *et al*, *J. Am. Chem. Soc.*, 1960, **82**, 1325 (*synth*)Calderazzo, F. *et al*, *Inorg. Chem.*, 1965, **4**, 293 (*synth*)Lewis, J. *et al*, *J. Chem. Soc. (A)*, 1966, 1663 (*ms*)Haas, H. *et al*, *J. Chem. Phys.*, 1967, **47**, 2996 (*ir*)King, R.B., *J. Organomet. Chem.*, 1968, **11**, 641 (*synth*)Almenningen, A. *et al*, *Acta Chem. Scand.*, 1969, **23**, 865 (*cryst struct*)Brill, T.B. *et al*, *Inorg. Chem.*, 1974, **13**, 470 (*synth*)Ireland, P.S. *et al*, *J. Magn. Reson.*, 1976, **23**, 485 (*nmr*)**C₁₁F₅MnO₅****Mn-00064**

Pentacarbonyl(pentafluorophenyl)manganese, 8Cl
Pentafluorophenylpentacarbonylmanganese
[14122-94-2]

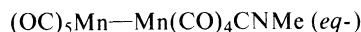


M 362.048

White cryst. Mp 123-4°.

Jolly, P.W. *et al*, *J. Chem. Soc.*, 1965, 5830 (*synth, nmr*)Booth, B.L. *et al*, *J. Chem. Soc. (A)*, 1970, 1974 (*synth*)Oliver, A.J. *et al*, *Inorg. Chem.*, 1970, **99**, 2578 (*props*)**C₁₁H₃Mn₂NO₉****Mn-00065**

Nonacarbonyl(isocyanomethane)dimanganese, 9Cl
Nonacarbonyl(methyl isocyanide)dimanganese
[57956-59-9]



M 403.022

Yellow cryst. (Et₂O/pentane). Mp 95°.Ziegler, M.L. *et al*, *Chem. Ber.*, 1965, **98**, 2454 (*synth*)Fischer, E.O. *et al*, *Chem. Ber.*, 1969, **102**, 2449 (*synth, props*)Koelle, U., *J. Organomet. Chem.*, 1978, **155**, 53 (*synth*)**C₁₁H₅MnO₅****Mn-00066**

Pentacarbonylphenylmanganese, 9Cl
Phenylpentacarbonylmanganese
[13985-77-8]

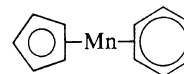


M 272.096

White cryst. Mp 52°.

Booth, B.L. *et al*, *J. Chem. Soc. (A)*, 1969, 920 (*props*)Wojcicki, A., *Adv. Organomet. Chem.*, 1973, **11**, 87 (*synth, props*)Blumer, D.J. *et al*, *J. Organomet. Chem.*, 1979, **173**, 71 (*props*)Stewart, R.P., *Inorg. Chem.*, 1979, **18**, 2083 (*props*)**C₁₁H₁₁Mn****Mn-00067**

(η⁶-Benzene)(η⁵-2,4-cyclopentadien-1-yl)manganese, 9Cl
[1271-43-8]

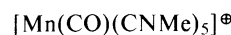


M 198.146

Deep-red cryst.

Denning, R.G. *et al*, *J. Am. Chem. Soc.*, 1966, **88**, 4619 (*synth*)Fischer, E.O. *et al*, *Chem. Ber.*, 1966, **99**, 2213 (*synth, props*)**C₁₁H₁₅MnN₅O[⊕]****Mn-00068**

Carbonylpentakis(isocyanomethane)manganese(1+)
Carbonylpentakis(methyl isocyanide)manganese(1+)
[45211-82-3]



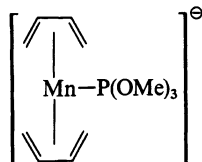
M 288.210 (ion)

Hexafluorophosphate: [39044-46-7].

C₁₁H₁₅F₆MnN₅OP M 433.175Cryst. (CH₂Cl₂/Et₂O). Mp 215°.Treichel, P.M. *et al*, *J. Organomet. Chem.*, 1972, **44**, 339 (*synth, ir, nmr*)Sarapu, A. *et al*, *Inorg. Chem.*, 1975, **14**, 247.Treichel, P.M. *et al*, *Isr. J. Chem.*, 1977, **15**, 253.

C₁₁H₂₁MnO₃P[⊖]

Mn-00069

Bis(η⁴-1,3-butadiene)(trimethyl phosphite)manganate(1-)

M 287.197 (ion)

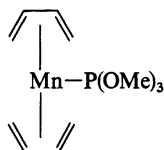
Tetrabutylammonium salt: [82963-81-3].

C₂₇H₅₇MnNO₃P M 529.664Red needles (THF/Et₂O).Harlow, R.L. *et al*, *Organometallics*, 1982, **1**, 1506 (*synth*, *props*)C₁₁H₂₁MnO₃P

Mn-00070

Bis(η⁴-1,3-butadiene)(trimethyl phosphite)manganese

[82963-77-7]



M 287.197

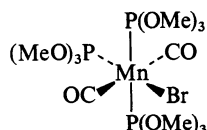
Green paramagnetic cryst.

Harlow, R.L. *et al*, *Organometallics*, 1982, **1**, 1506 (*synth*, *cryst struct*)C₁₁H₂₇BrMnO₁₁P₃

Mn-00071

Bromodicarbonyltris(trimethylphosphite-*P*)manganese, 8Cl

[39604-51-8]



M 563.091

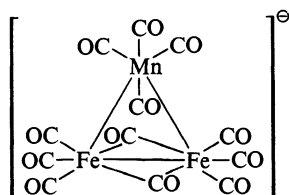
Orange needles. Mp 125° dec., 161°.

Treichel, P.M. *et al*, *J. Organomet. Chem.*, 1969, **17**, P37 (*synth*)Reimann, R.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 841, 2658 (*synth*, *ir*, *nmr*)C₁₂Fe₂MnO₁₂[⊖]

Mn-00072

Tetracarbonyl(di-μ-carbonylhexacarbonyldiferrate)manganate(1-), 10Cl

Dodecacarbonyldiferratemanganate(1-), 9Cl



M 502.757 (ion)

Tetraethylammonium salt: [53433-49-1].

C₂₀H₂₀Fe₂MnNO₁₂ M 633.010

Intensely blue-black cryst. (EtOH).

Bis(triphenylphosphine)iminium salt: [68520-37-6].

C₄₈H₃₀Fe₂MnNO₁₂P₂ M 1041.344Dark-blue cryst. (CH₂Cl₂/Et₂O). Mp 171-3°.Anders, U. *et al*, *J. Chem. Soc., Chem. Commun.*, 1966, 291 (*synth*, *ir*, *uv*)Ruff, J.K., *Inorg. Chem.*, 1968, **7**, 1818 (*synth*, *ir*)Knight, J.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1970, 1006 (*ir*)Lindauer, M.W. *et al*, *Inorg. Chem.*, 1970, **9**, 1694 (*mössbauer*)Tyler, D.R. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7888 (*uv*)C₁₂HMnO₁₂Os₃

Mn-00073

Dodecacarbonylhydromanganesediosmium, 8Cl

[12560-43-9]

MnOs₃H(CO)₁₂

M 962.671

No phys. props. reported.

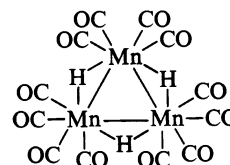
Knight, J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 62 (*synth*, *ir*)C₁₂H₃Mn₃O₁₂

Mn-00074

Dodecacarbonyltrihydrotrimanganese

Tris(hydridomanganese tetracarbonyl)

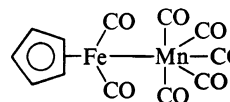
[18444-56-9]



M 503.963

Orange-red cryst., stable to air. Bp₁ 60° subl. Dec. at 123-5°.Johnson, B.F.G. *et al*, *J. Organomet. Chem.*, 1967, **10**, 105 (*synth*, *ir*, *nmr*)*Inorg. Synth.*, 1968, **12**, 43 (*synth*)Kirtley, S.W. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 4532 (*cryst struct*)C₁₂H₅FeMnO₇

Mn-00075

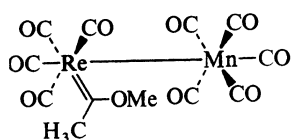
Pentacarbonyl[dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)iron]-manganese, 9ClDicarbonyl(η⁵-2,4-cyclopentadien-1-yl)pentacarbonylmanganioiron. Pentacarbonyl(dicarbonyl-π-cyclopentadienylferrio)manganese, 8Cl. Cyclopentadienyliron dicarbonylpentacarbonylmanganese. (η⁵-Cyclopentadienyl)-dicarbonylironpentacarbonylmanganese. Heptacarbonyl(η⁵-cyclopentadienyl)ironmanganese [12088-73-2]

M 371.952

Dark-red plates. Mp 76°. Bp 40° *in vacuo* subl.King, R.B. *et al*, *Chem. Ind. (London)*, 1961, 747 (*synth*)Herber, R.H. *et al*, *Inorg. Chem.*, 1964, **3**, 101 (*mössbauer*)Dessy, R.E. *et al*, *J. Am. Chem. Soc.*, 1966, **88**, 5117, 5124.Hansen, P.J. *et al*, *J. Organomet. Chem.*, 1966, **6**, 389 (*cryst struct*)Madach, T. *et al*, *Chem. Ber.*, 1980, **113**, 2675 (*synth*, *pmr*, *ir*, *uv*)Busetto, L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1982, 1631 (*ir*)

C₁₂H₆MnO₁₀Re**Mn-00076**

**Pentacarbonyl[tetracarbonyl(1-methoxyethylidene)]mangan-
eserhenium, ⁹Cl**
Nonacarbonyl(1-methoxyethylidene)manganeserhenium
 [49547-64-0]

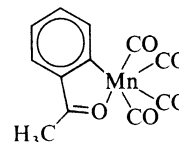


M 551.318

Red-orange cryst. Mp 107-8°.

Casey, C.P. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 3053 (*synth, struct*)**C₁₂H₇MnO₅****Mn-00080**

(2-Acetylphenyl-C,O)tetracarbonylmanganese, ⁹Cl
Acetophenonetetracarbonylmanganese
 [50831-23-7]

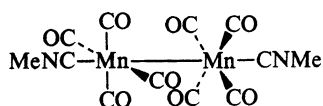


M 286.122

Yellow cryst.

Knobler, C.B. *et al*, *Inorg. Chem.*, 1975, **14**, 2062 (*struct*)McKinney, R.J. *et al*, *Inorg. Chem.*, 1975, **14**, 2057 (*synth, ir, ms, nmr*)**C₁₂H₆Mn₂N₂O₈****Mn-00077**

Octacarbonylbis(isocyanomethane)dimanganese, ⁹Cl
Octacarbonylbis(methyl isocyanide)dimanganese
 [58034-14-3]

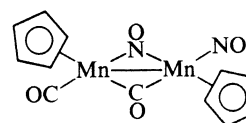


M 416.064

Fluxional. Characterised spectroscopically.

Grant, S. *et al*, *J. Organomet. Chem.*, 1975, **96**, C11 (*synth*)**C₁₂H₁₀Mn₂N₂O₄****Mn-00081**

**μ -Carbonylcarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(nitro-
syl-N:N)]nitrosyldimanganese, ⁹Cl**
Dicarbonyldicyclopentadienyldinitrosyldimanganese
 [38999-59-6]



M 356.098

Purple-brown cryst. (CH₂Cl₂/hexane). Dec. at ca. 200°.King, R.B. *et al*, *Inorg. Chem.*, 1964, **3**, 791 (*synth, ir*)Adam, R.D. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 6589 (*nmr*)Kirchner, R.M. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 6602 (*cryst struct*)**C₁₂H₆Mn₂O₁₀Pb****Mn-00078**

Bis(pentacarbonylmanganese)dimethyllead
Decacarbonyl[μ -(dimethylplumbylene)]dimanganese, ¹⁰Cl
 [42167-74-8]

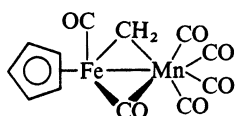


M 627.249

Yellow solid.

Haupt, H.J. *et al*, *J. Organomet. Chem.*, 1973, **54**, 231.Kodel, W. *et al*, *Inorg. Chim. Acta*, 1981, **49**, 209.**C₁₂H₇FeMnO₆****Mn-00079**

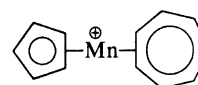
**μ -Carbonylpentacarbonyl(η^5 -2,4-cyclopentadienyl)iron- μ -m-
ethylenemanganese**
*(μ -Carbonyl)(μ -methylene)[(cyclopentadienylcarbonyliron)tetracarbonylmanganese]. Hexacarbonyl(η^5 -
cyclopentadienyl)iron- μ -methylene manganese*
 [83350-15-6]



M 357.969

Cryst. (pentane or by subl. *in vacuo*) (dimorph.). Bp_{0.05} 55° subl.Gadol, S.M. *et al*, *Organometallics*, 1982, **1**, 1607 (*struct*)**C₁₂H₁₂Mn⁺****Mn-00082**

**(η^7 -Cycloheptatrienylum)(η^5 -2,4-cyclopentadien-1-yl)m-
anganese(1⁺), ⁹Cl**

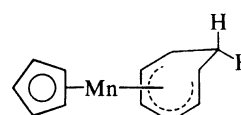


M 211.165 (ion)

Hexafluorophosphate: [52308-73-3].

C₁₂H₁₂F₆MnP M 356.129Cryst. (Me₂CO/EtOH).Pauson, P.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 2387 (*synth, props*)**C₁₂H₁₃Mn****Mn-00083**

**[(1,2,3,4,5,6- η)-1,3,5-Cycloheptatriene](η^5 -2,4-cyclopenta-
dien-1-yl)manganese, ⁹Cl**
 [52308-70-0]

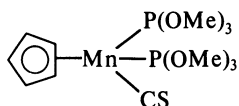


M 212.173

Red-black needle-shaped cryst. Bp_{0.01} 60° subl.Pauson, P.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 2387 (*synth, props*)

C₁₂H₂₃MnO₆P₂S**Mn-00084****Carbonylthioyl(η⁵-2,4-cyclopentadien-1-yl)bis(trimethylphosphite-*P*)manganese, 9Cl**

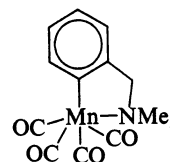
[51831-93-7]



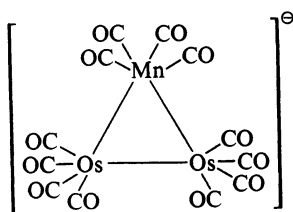
M 412.256

Yellow cryst. (CH₂Cl₂/hexane). Dec. at ca. 180°.Coville, N.J. *et al*, *J. Organomet. Chem.*, 1974, **64**, 101 (*synth*)Butler, I.S. *et al*, *J. Organomet. Chem.*, 1974, **80**, 235.Fenster, A.E. *et al*, *Inorg. Chem.*, 1974, **13**, 915 (*synth*, *ir*, *nmr*)Bennett, M.J. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 4810 (*synth*, *pmr*, *cmr*, *ms*, *ir*)**C₁₃H₁₂MnNO₄****Mn-00088****Tetracarbonyl[2-[(dimethylamino)methyl]phenyl-C,*N*]manganese, 9Cl**

[38162-89-9]



M 301.180

Bright-yellow needles (pet. ether). Mp 73°. Bp_{0.01} 100° subl.Little, R.G. *et al*, *Inorg. Chem.*, 1973, **12**, 844 (*cryst struct*)Bennett, R.L. *et al*, *Aust. J. Chem.*, 1975, **28**, 1265 (*synth*, *ir*, *nmr*)**C₁₂MnO₁₂Os₂[⊖]****Mn-00085****Dodecacarbonylmanganatediosmate(1-), 8Cl**

M 771.463 (ion)

Tetramethylammonium salt: [12563-65-4].C₁₆H₁₂MnNO₁₂Os₂ M 845.608

Characterised spectroscopically.

Knight, J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 62 (*synth*, *ir*)**C₁₃H₃₆BrMnO₁₃P₄****Mn-00089****Bromocarbonyltetrakis(trimethylphosphite-*P*)manganese, 8Cl**
[52646-26-1]MnBr(CO)[P(OMe)₃]₄

M 659.157

Orange cryst. Mp 131°.

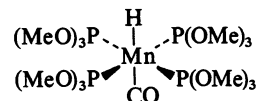
Treichel, P.M. *et al*, *J. Organomet. Chem.*, 1969, **17**, P37 (*synth*)Reimann, R.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 841.**C₁₃H₃MnO₁₃Os₃****Mn-00086****Tridecacarbonyltrihydromanganesetriosmium, 8Cl**

[12563-75-6]

MnOs₃H₃(CO)₁₃

M 992.697

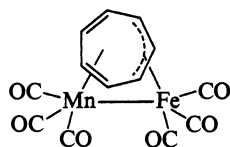
No phys. props. reported.

Knight, J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 62 (*synth*, *ir*)**C₁₃H₃₇MnO₁₃P₄****Mn-00090****Carbonylhydrotetrakis(trimethylphosphite-*P*)manganese, 9Cl**
Hydridocarbonyltetrakis(trimethylphosphite)manganese

M 580.261

trans-form [66562-91-2]Pale-brown-pink cryst. (hexane). Sol. C₆H₆, polar solvs.Stuhl, L.S. *et al*, *Inorg. Chem.*, 1978, **17**, 2148 (*synth*, *ir*, *nmr*)**C₁₃H₇FeMnO₆****Mn-00087****Tricarbonyl[μ-[(1,2,3-η:4,5,6,7-η)-2,4,6-cycloheptatrien-1-yl]](tricarbonyliron)manganese, 9Cl**
μ-[(1,2,3-η:4,5,6,7-η)-Cycloheptatrienyl]tricarbonylirontricarbonylmanganese

[60767-46-6]



M 369.980

Fluxional molecule. Orange cryst. (pentane). Mp 141-2°.

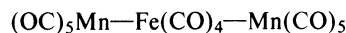
C₁₄FeMnO₁₄Re**Mn-00091****Pentacarbonyl(pentacarbonylmanganese)(tetracarbonyliron)-rhenium, 9Cl***Tetradecacarbonylmanganeserheniumiron*, 8Cl

[33958-72-4]

(OC)₅Mn—Fe(CO)₄—Re(CO)₅

M 689.138

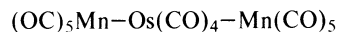
Orange needles (Me₂CO).Evans, G.O. *et al*, *J. Inorg. Nucl. Chem.*, 1968, **30**, 2862 (*synth*, *ir*, *ms*)Evans, G.O. *et al*, *Inorg. Chem.*, 1970, **9**, 979 (*ir*)Tyler, D.R. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7888 (*struct*)

C₁₄FeMn₂O₁₄**Mn-00092****Tetracarbonylbis(pentacarbonylmanganio)iron, 8Cl***Decacarbonyl(tetracarbonyliron)dimanganese, 10Cl*
[15668-57-2]

M 557.869

Air-stable red needles (Me₂CO). Sol. org. solvs. Mp 112°. Bp 75° subl. *in vacuo*.Schubert, E.H. *et al*, *Z. Naturforsch., B*, 1965, **20**, 1306 (*synth, ir*)Agron, P.A. *et al*, *Acta Crystallogr.*, 1967, **23**, 1079 (*cryst struct*)Evans, G.O. *et al*, *Inorg. Chem.*, 1970, **9**, 979 (*ir*)Tyler, D.R. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7888 (*uv*)

Red paramagnetic cryst.

Wilkinson, G. *et al*, *J. Am. Chem. Soc.*, 1983, **105**, 6752 (*synth, struct*)**C₁₄Mn₂O₁₄Os****Mn-00096****Tetracarbonylbis(pentacarbonylmanganio)osmium, 8Cl***Tetradecacarbonyldimanganeseosmium. Dimanganese osmium tetradecacarbonyl*
[33292-90-9]

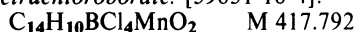
M 692.222

No phys. props. reported. *ir* ν_{CO} 2068, 2020, 1987 cm⁻¹.Abel, E.W. *et al*, *Inorg. Nucl. Chem. Lett.*, 1971, **7**, 587 (*synth, ir*)**C₁₄H₁₀MnO₂[⊖]****Mn-00093****Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(phenylmethyldiynemanganese(1+), 9Cl**

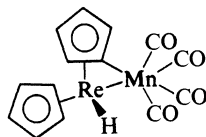
[59831-17-3]

As Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)ethyldiynemanganese(1+), Mn-00048 with

M 265.170 (ion)

Tetrachloroborate: [59831-18-4].

Yellow cryst.

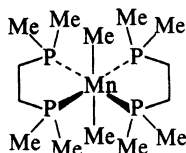
Fischer, E.O. *et al*, *Chem. Ber.*, 1977, **110**, 1140 (*synth*)Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1977, **129**, 197 (*props*)Kreissl, F.R. *et al*, *Chem. Ber.*, 1977, **110**, 3040 (*props*)Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1979, **169**, C27 (*props*)Fischer, E.O. *et al*, *Z. Naturforsch., B*, 1979, **34**, 1168 (*synth*)**C₁₄H₁₀MnO₄Re****Mn-00094****(η⁵-2,4-Cyclopentadien-1-yl)[μ-(η⁵-2,4-cyclopentadien-1-ylidene)]hydrotetracarbonylmanganeserhenium, 10Cl**
[71486-19-6]

M 483.376

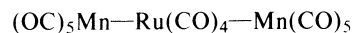
Air-stable red cryst. Air-sensitive in soln.

Hoxmeier, R.J. *et al*, *Inorg. Chem.*, 1979, **18**, 3453 (*synth, nmr, props*)**C₁₄H₃₈MnP₄****Mn-00095****Bis[1,2-ethanediylbis(dimethylphosphine)]-P,P']dimethylmanganese***Bis[(1,2-dimethylphosphino)ethane]dimethylmanganese*

[87450-50-8]

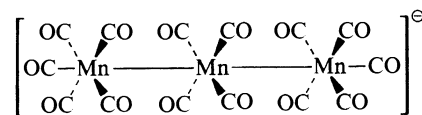


M 385.287

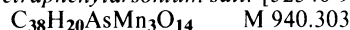
C₁₄Mn₂O₁₄Ru**Mn-00097****Tetracarbonylbis(pentacarbonylmanganio)ruthenium, 8Cl***Tetradecacarbonyldimanganeseruthenium*
[33152-40-8]

M 603.092

Yellow.

Abel, E.W. *et al*, *Inorg. Nucl. Chem. Lett.*, 1971, **7**, 587 (*synth, ir*)**C₁₄Mn₃O₁₄[⊖]****Mn-00098****Tetradecacarbonyltrimanganate(1-)***Trimanganesetetradecacarbonyl(1-)*

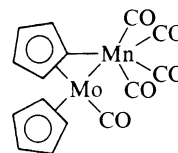
M 556.960 (ion)

Tetraphenylarsonium salt: [52340-90-6].

Red cryst.

Curtis, M.D., *Inorg. Chem.*, 1972, **11**, 802 (*synth, ir*)Bau, R. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 988 (*synth, cryst struct*)**C₁₅H₉MnMoO₅****Mn-00099****Molybdenumcarbonyl(η⁵-2,4-cyclopentadien-1-yl)[μ-(η⁵-2,4-cyclopentadien-1-ylidene)]tetracarbonylmanganese, 10Cl**

[71411-08-0]

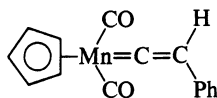


M 420.111

Red cryst.

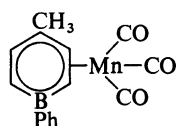
Hoxmeier, R.J., *J. Am. Chem. Soc.*, 1971, **93**, 536 (*synth*)Hoxmeier, R.J., *Inorg. Chem.*, 1979, **18**, 3453, 3462 (*synth, struct*)

C₁₅H₁₁MnO₂ **Mn-00100**
 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(2-phenylethenylidene)manganese, 9Cl
 [60039-69-2]



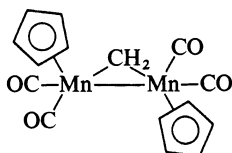
M 278.189
 Dark-red cryst. Mp 64°.
 Nesmeyanov, A.N. *et al*, *J. Organomet. Chem.*, 1976, **110**, C36 (synth)
 Antonova, A.B. *et al*, *J. Organomet. Chem.*, 1977, **137**, 55.

C₁₅H₁₂BMnO₃ **Mn-00101**
 Tricarbonyl[(1,2,3,4,5,6- η)-4-methyl-1-phenylboratabenzene]manganese, 10Cl
 [62980-54-5]



M 306.006
 Yellow cryst. Mp 73-5°.
 Herberich, G.E. *et al*, *Chem. Ber.*, 1977, **110**, 1167 (synth, nmr)

C₁₅H₁₂Mn₂O₄ **Mn-00102**
 Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)- μ -methylenedimanganese, 10Cl
 [57603-41-5]



M 366.133
 Cryst. Mp 135-6°.
 Herrmann, W.A. *et al*, *J. Organomet. Chem.*, 1975, **97**, 245 (synth)
 Creswick, M. *et al*, *J. Organomet. Chem.*, 1979, **172**, C39 (cryst struct)

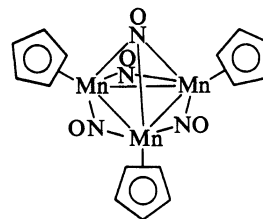
C₁₅H₁₃MnO₃ **Mn-00103**
 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(2-methoxy-1-phenylethylidene)manganese, 9Cl
 [12245-61-3]

As Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(1-methoxyethylidene)manganese, Mn-00060 with

R = Ph

M 296.204
 Red-brown liq.
 Fischer, E.O. *et al*, *Chem. Ber.*, 1967, **100**, 2445 (synth, props)
 Hadicke, E. *et al*, *Acta Crystallogr., Sect. B*, 1971, **27**, 270.

C₁₅H₁₅Mn₃N₄O₄ **Mn-00104**
 Tris(η^5 -2,4-cyclopentadien-1-yl)- μ_3 -nitrosyltri- μ -nitrosyltrimanganese, 9Cl
 [12312-71-9]



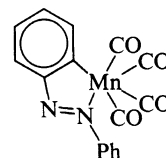
M 480.122
 Needle-shaped cryst.
 King, R.B. *et al*, *Inorg. Chem.*, 1964, **3**, 791 (synth)
 Elder, R.C., *Inorg. Chem.*, 1974, **13**, 1037 (cryst struct)

C₁₆H₁₆MnO₁₆Os₃ **Mn-00105**
 Hexadecacarbonylhydromanganesetriosmium, 8Cl
 [12566-57-3]



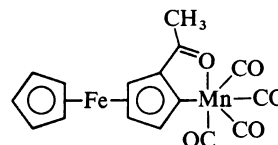
M 1074.712
 No phys. props. reported.
 Knight, J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 62 (synth, ir)

C₁₆H₉MnN₂O₄ **Mn-00106**
 Tetracarbonyl[2-(phenylazo)phenyl]manganese, 9Cl
 (Azobenzene)tetracarbonylmanganese
 [19528-32-6]

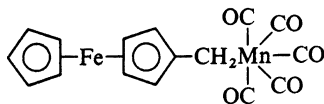


M 348.196
 Red needle-shaped cryst. Bp_{0.01} 90-100° subl.
 Bruce, M.I. *et al*, *J. Chem. Soc. (A)*, 1970, 3204 (synth)
 Bennett, R.L. *et al*, *Aust. J. Chem.*, 1974, **27**, 2131 (synth)

C₁₆H₁₁FeMnO₅ **Mn-00107**
 (2-Acetylferrocenyl-C,O)tetracarbonylmanganese, 9Cl
 [56708-99-7]

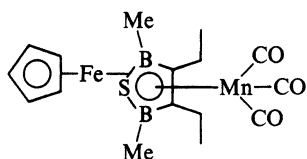


M 394.045
 Red cryst. (hexane), dec. after some days in air. Soln. dec. overnight in air. Mp 126-127.5°.
 Crawford, S.S. *et al*, *Inorg. Chem.*, 1977, **16**, 3193 (synth, ms)

C₁₆H₁₁FeMnO₅**Mn-00108****Pentacarbonyl(ferrocenylmethyl)manganese, 9Cl**
[60349-59-9]

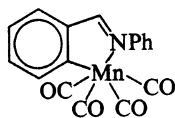
M 394.045

Mp 74-6°.

Pannell, K.H. *et al*, *Inorg. Chem.*, 1976, **15**, 2671 (*synth*, *pmr*, *ir*)**C₁₆H₂₁B₂FeMnO₃S****Mn-00109****Tricarbonyl[(η⁵-2,4-cyclopentadien-1-yl)iron[μ-(1,2,3,4,5-η:1,2,3,4,5-η)-3,4-diethyl-2,5-dihydro-2,5-dimethyl-1,2,5-thiadiborole]]manganese, 10Cl**
[66921-71-9]

M 425.805

Green air-stable cryst. Mp 194°.

Siebert, W. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1978, **17**, 527 (*synth*, *pmr*, *nmr*, *ir*, *ms*)**C₁₇H₁₀MnNO₄****Mn-00110****Tetracarbonyl[2-[(phenylimino)methyl]phenyl-C,N]manganese, 9Cl**
Tetracarbonyl-2-(N-phenylformimidoyl)phenylmanganese
[36594-09-9]

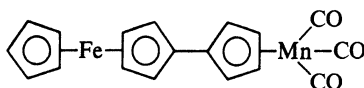
M 347.208

Yellow cryst.

Bruce, M.I. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 1595 (*synth*, *pmr*, *struct*)Little, R.G. *et al*, *Inorg. Chem.*, 1973, **12**, 840 (*cryst struct*)**C₁₇H₁₀MnO₅TI****Mn-00111****Pentacarbonyl(diphenylthallium)manganese, 9Cl**
[41654-98-2]

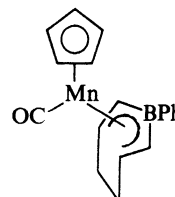
M 553.584

▷Toxic

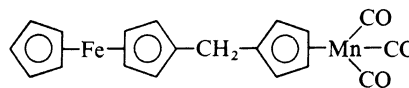
Haupt, H.J. *et al*, *J. Organomet. Chem.*, 1973, **50**, 63 (*synth*, *ir*, *nmr*)**C₁₈H₁₃FeMnO₃****Mn-00112****Tricarbonyl[(1,2,3,4,5-η)-ferrocenyl-2,4-cyclopentadien-1-yl]manganese, 9Cl**
Cymantrenylferrocene
[37048-11-6]

M 388.084

Orange cryst. (EtOH aq.). Mp 108-109.5°.

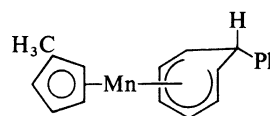
Nesmeyanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1972, 735; 1980, 1171 (*synth*)Nesmeyanov, A.N. *et al*, *Zh. Strukt. Khim.*, 1973, **14**, 49 (*cmr*)**C₁₈H₁₈BMnO****Mn-00113****Carbonyl[(η⁵-2,4-cyclopentadien-1-yl)((1,2,3,6,7-η)-4,5-dihydro-1-phenyl-1H-borepin)manganese**
[67158-14-9]

M 316.088

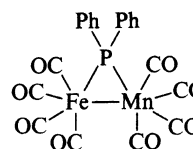
Violet oil, characterised by *ir* and *nmr*.Koelle, U. *et al*, *J. Organomet. Chem.*, 1978, **152**, 7 (*synth*, *ir*, *nmr*)**C₁₉H₁₅FeMnO₃****Mn-00114****Tricarbonyl[(1,2,3,4,5-η)-1-(ferrocenylmethyl)-2,4-cyclopentadien-1-yl]manganese**
(Ferrocenylmethyl)cymantrene. (Ferrocenylmethyl)cyclopentadienylmanganese tricarbonyl

M 402.111

Orange cryst. Mp 121.5-122°.

Cais, M. *et al*, *Tetrahedron Lett.*, 1961, 440 (*synth*)Maoz, N. *et al*, *Tetrahedron Lett.*, 1965, 2087, 2095 (*ms*)**C₁₉H₁₉Mn****Mn-00115****[(1,2,3,4,5-η)-1-methyl-2,4-cyclopentadien-1-yl][(1,2,3,4,5,6-η)-7-phenyl-1,3,5-cycloheptatriene]manganese**
[58355-39-8]

M 302.297

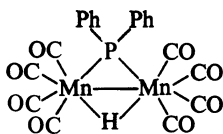
Cryst. Bp_{0.0001} 80° subl.Pauson, P.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 2387 (*synth*, *ir*, *nmr*, *props*)Jeffreys, J.A.D. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 144 (*cryst struct*)**C₂₀H₁₀FeMnO₈P****Mn-00116****Tetracarbonyl[μ-(diphenylphosphino)](tetracarbonylmanganio)iron, 8Cl**
[32649-18-6]

M 520.053

Orange cryst. Mp 164-5°.

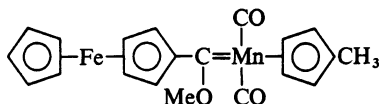
Benson, B.C. *et al*, *J. Chem. Soc., Chem. Commun.*, 1968, 1506 (synth)
 Yasufuku, K. *et al*, *J. Organomet. Chem.*, 1971, **28**, 415 (synth, ir)

C₂₀H₁₁Mn₂O₈P **Mn-00117**
Octacarbonyl-μ-(diphenylphosphino)-μ-hydrodimanganese,
 8Cl
 [19663-11-7]



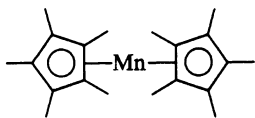
M 520.152
 Mod. air-sensitive yellow cryst. (pet. ether). Mp 154-5° dec. Diamagnetic.
 Green, M.L.H. *et al*, *Z. Naturforsch. B*, 1962, **17**, 783 (synth, ir, pmr)
 Hayter, R.E., *Z. Naturforsch. B*, 1963, **18**, 581 (synth)
 Doedens, R.J. *et al*, *J. Am. Chem. Soc.*, 1967, **89**, 4323 (cryst struct)

C₂₀H₁₉FeMnO₃ **Mn-00118**
Dicarbonyl[(1,2,3,4,5-η)-1-methyl-2,4-cyclopentadien-1-yl-ferrocenylmethoxymethylene)manganese, 9Cl
[Ferrocenyl(methoxy)carbene]methylcyclopentadienyl-dicarbonylmanganese
 [35226-88-1]



M 418.153
 Red-brown cryst. (pentane). Mp 53-4°.
 Connor, J.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 1470 (synth, pmr, ir, uv, ms)

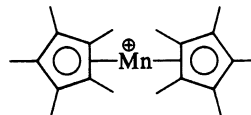
C₂₀H₃₀Mn **Mn-00119**
Decamethylmanganocene, 10Cl
Bis(η⁵-pentamethylcyclopentadienyl)manganese
 [67506-86-9]



M 325.395
 Red-orange cryst. (hexane); air-sensitive. Mp 292°.
 Robbins, J.L. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 3853 (synth, esr)
 Freyberg, D.P. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 892 (cryst struct)

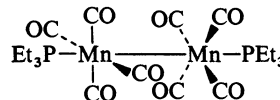
Handle all chemicals with care

C₂₀H₃₀Mn⁺ **Mn-00120**
Decamethylmanganocenium
Bis(pentamethylcyclopentadienyl)manganese(1+)
 [71163-80-9]



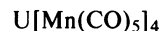
M 325.395 (ion)
 Hexafluorophosphate: [71163-81-0].
 C₂₀H₃₀F₆MnP M 470.359
 Red cryst.
 Robbins, J.L. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 3853 (synth, props)

C₂₀H₃₀Mn₂O₈P₂ **Mn-00121**
Octacarbonylbis(triethylphosphine)dimanganese, 8Cl
 [15529-60-9]



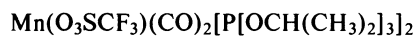
M 570.276
 Yellow cryst. Mp 153-4°.
 Lewis, T. *et al*, *Chem. Ind. (London)*, 1963, 1398 (synth)
 Osborne, A.G. *et al*, *J. Chem. Soc.*, 1964, 634 (synth)
 Lewis, J. *et al*, *J. Chem. Soc. (A)*, 1966, 845.
 Bennett, M.J. *et al*, *J. Chem. Soc. (A)*, 1968, 75 (cryst struct)

C₂₀Mn₄O₂₀U **Mn-00122**
Tetrakis(pentacarbonylmanganio)uranium, 8Cl
 [31135-22-5]



M 1017.989
 Struct. not yet established. Bright-orange solid. Sol. Me₂CO, THF. Mp 180° dec. Extremely air-sensitive; air oxidn. affords Mn₂(CO)₁₀, reaction with bromine yields UBr₄ + Mn(CO)₅Br. Reacts quickly with cold chloroform forming Mn(CO)₅Cl.
 Bennett, R.L. *et al*, *J. Organomet. Chem.*, 1971, **26**, 355 (synth, ir, ms)

C₂₁H₄₂F₃MnO₁₁P₂S **Mn-00123**
Dicarbonyl(trifluoromethanesulfonate-O,O')bis(triisopropylphosphite-P)manganese
Dicarbonyl(trifluoromethanesulfonate-O,O')bis[tris(1-methylethyl)phosphite-P]manganese, 10Cl
 [66562-90-1]



M 676.497
 Orange-red cryst. (hexane at low temp.). Sol. hexane. Mp ~91° dec. Struct. not fully elucidated.
 Stuhl, L.J. *et al*, *Inorg. Chem.*, 1978, **17**, 2148 (synth, ir, nmr, props)

C₂₂H₁₅MnO₄P[⊖]**Mn-00124****Tetracarbonyl(triphenylphosphine)manganate(1-), 10Cl**
[53418-18-1]

M 429.270 (ion)

Na salt: [19457-74-0].

C₂₂H₁₅MnNaO₄P M 452.260

Moisture-sensitive.

K salt: [67204-49-3].

C₂₂H₁₅KMnO₄P M 468.368

No phys. props. reported.

Tetramethylammonium salt: [74365-56-3].

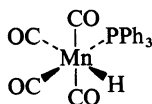
C₂₆H₂₇MnNO₄P M 503.415

Moisture-sensitive orange cryst.

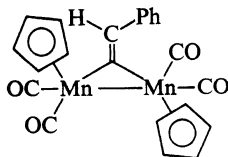
Bis(triphenylphosphine)iminium salt: [67047-38-5].

C₅₈H₄₅MnNO₄P₃ M 967.857

Orange cryst.

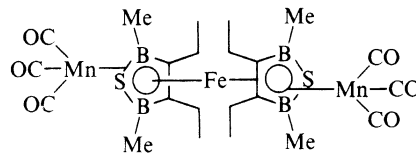
Müller, R. *et al.*, *J. Organomet. Chem.*, 1978, **150**, C11 (*props*)Wrighton, M.S. *et al.*, *J. Am. Chem. Soc.*, 1978, **100**, 2701(*synth*)Darensbourg, M.Y. *et al.*, *Inorg. Chem.*, 1979, **18**, 3286 (*props*)Casey, C.P. *et al.*, *J. Am. Chem. Soc.*, 1980, **102**, 2728 (*synth*)**C₂₂H₁₆MnO₄P****Mn-00125****Tetracarbonylhydro(triphenylphosphine)manganese, 9Cl**
Hydridotetracarbonyltriphenylphosphinemanganese
[16925-29-4]

M 430.278

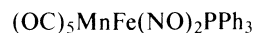
Cryst. (Et₂O/pet. ether). Mp 137-8°.Hieber, W. *et al.*, *Z. Anorg. Allg. Chem.*, 1962, **314**, 125 (*synth*, *ir*, *nmr*)Hieber, W. *et al.*, *Chem. Ber.*, 1965, **98**, 2933 (*synth*)Booth, B.L. *et al.*, *J. Chem. Soc. (A)*, 1966, 157 (*synth*, *props*)Froelich, J.A. *et al.*, *Inorg. Chem.*, 1977, **16**, 960 (*props*)**C₂₂H₁₆Mn₂O₄****Mn-00126****Tetracarbonylbis(η⁵-2,4-cyclopentadien-1-yl)[μ-(phenyleth-
enylidene)]dimanganese, 10Cl**
[60429-52-9]

M 454.242

Violet cryst. Mp 144°.

Nesmeyanov, A.N. *et al.*, *J. Organomet. Chem.*, 1976, **110**, C36 (*synth*)Antonova, A.B. *et al.*, *J. Organomet. Chem.*, 1977, **137**, 55 (*cryst struct*)**C₂₂H₃₂B₄FeMn₂O₆S₂****Mn-00127****Hexacarbonylbis[μ-[(1,2,3,4,5-η:1,2,3,4,5-η)-3,4-di-
ethyl-2,5-dihydro-2,5-dimethyl-1,2,5-thiadiborole]](iron)-
dimanganese, 10Cl**
[66921-70-8]

M 665.574

Orange-red cryst. (CS₂). Bp_{0.1} 140-60° subl. Darkens
>155°, dec. at 210°.Siebert, W. *et al.*, *Angew. Chem., Int. Ed. Engl.*, 1978, **17**, 527
(*synth*, *ir*, *ms*, *struct*)**C₂₃H₁₅FeMnN₂O₇P****Mn-00128****Dinitrosyl(pentacarbonylmanganio)(triphenylphosphine)iron,
8Cl**
[28939-17-5]

M 573.139

Characterised spectroscopically.

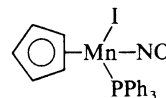
Hieber, W. *et al.*, *Z. Naturforsch., B*, 1970, **25**, 663 (*synth*, *ir*)**C₂₃H₁₅MnO₅P[⊖]****Mn-00129****Pentacarbonyl(triphenylphosphine)manganese(1+)**
[Mn(CO)₅(PPh₃)][⊕] (O_h)

M 457.280 (ion)

Hexafluorophosphate: [54039-57-5].

C₂₃H₁₅F₆MnO₅P₂ M 602.244

Yellow cryst.

Kruck, T. *et al.*, *Chem. Ber.*, 1963, **96**, 3035 (*synth*, *props*)Darensbourg, D.J. *et al.*, *J. Organomet. Chem.*, 1975, **85**, 73
(*synth*)Darensbourg, D.T. *et al.*, *J. Am. Chem. Soc.*, 1977, **99**, 5940
(*synth*)Froelich, J.A. *et al.*, *Inorg. Chem.*, 1977, **16**, 960.Behrens, H. *et al.*, *J. Organomet. Chem.*, 1978, **159**, 201.Usón, R. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1979, 996.**C₂₃H₂₀IMnNOP****Mn-00130****(η⁵-2,4-Cyclopentadien-1-yl)iodonitrosyl(triphenylphos-
phine)manganese, 10Cl**
*Iodonitrosyltriphenylphosphine(η⁵-cyclopentadienyl)-
manganese*
[69120-57-6]

M 539.233

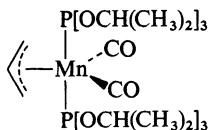
James, T.A. *et al.*, *J. Chem. Soc. (A)*, 1970, 850 (*synth*)Haines, B.W. *et al.*, *Inorg. Chem.*, 1981, **20**, 650 (*props*)

C₂₃H₄₇MnO₈P₂

Mn-00131

Dicarbonyl(η^3 -2-propenyl)bis(triisopropylphosphite-*P*)manganese

Dicarbonyl(η^3 -2-propenyl)bis[tris(1-methylethyl)phosphite-*P*]manganese, 10Cl. Dicarbonyl(η^3 -allyl)bis(triisopropylphosphite)manganese
[66562-85-4]



M 568.505

Catalyst for hydrogenation of alkenes. Air-sensitive yellow cryst. (hexane at -40°). Mp 104.6 – 106° .

Stuhl, L.S. *et al*, *Inorg. Chem.*, 1978, **17**, 2148 (*synth, ir, nmr, props*)

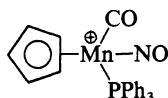
C₂₄H₂₀MnNO₂P⁺

Mn-00132

Carbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosyl(triphenylphosphine)manganese(I+), 9Cl

Carbonylnitrosyl(triphenylphosphine)(η^5 -cyclopentadienyl)manganese(I+)

[34691-61-7]



M 440.339 (ion)

Hexafluorophosphate: [32880-58-3].

C₂₄H₂₀F₆MnNO₂P₂ M 585.303

Characterised spectroscopically.

Brunner, H., *Z. Anorg. Allg. Chem.*, 1969, **368**, 120 (*props*)

Brunner, H. *et al*, *J. Organomet. Chem.*, 1970, **24**, C7 (*props*)

James, T.A. *et al*, *J. Chem. Soc. (A)*, 1970, 850 (*synth, props*)

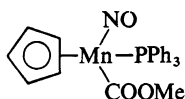
Brunner, H. *et al*, *J. Organomet. Chem.*, 1973, **54**, 221; 1975, **87**, 223; 1976, **104**, 347 (*props*)

C₂₅H₂₃MnNO₃P

Mn-00133

 η^5 -2,4-Cyclopentadien-1-yl(methoxycarbonyl)nitrosyl(triphenylphosphine)manganese, 9Cl

[35886-41-0]



M 471.373

Known in opt. active forms.

(+)-form[α]_D²⁵₅₇₉ +630°.**(-)-form**[α]_D²⁵₅₇₉ –645°.**(±)-form**

Red cryst., air-sensitive in soln. Mod. sol. C₆H₆, CH₂Cl₂, spar. sol. hexane, MeOH. Dec. at 125° .

Brunner, H., *Z. Anorg. Allg. Chem.*, 1969, **368**, 120 (*synth*)

Brunner, H. *et al*, *Z. Naturforsch., B*, 1971, **26**, 1220.

Brunner, H., *Adv. Organomet. Chem.*, 1980, **18**, 151 (*rev*)

C₂₇H₁₅Mn₂O₉P

Mn-00134

Nonacarbonyl(triphenylphosphine)dimanganese, 8Cl

[14592-26-8]

(OC)₅Mn—Mn(CO)₄(PPh₃)(*ax*-)

M 624.260

Orange cryst. (hexane). Mp 145° dec.

Ziegler, M.L. *et al*, *Chem. Ber.*, 1965, **98**, 2454 (*synth*)

Wawersik, H. *et al*, *J. Chem. Soc., Chem. Commun.*, 1966, 366 (*synth*)

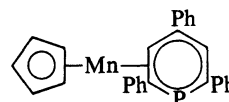
Fischer, E.O. *et al*, *Chem. Ber.*, 1969, **102**, 2449 (*synth, props*)

C₂₈H₂₂MnP

Mn-00135

(η^5 -2,4-Cyclopentadien-1-yl)[(1,2,3,4,5,6- η)-2,4,6-triphenylphosphorin]manganese, 10Cl

[73752-27-9]



M 444.394

Cryst. (pentane). Mp 145 – 50° dec.

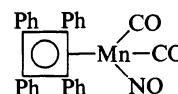
Nief, F. *et al*, *J. Organomet. Chem.*, 1980, **187**, 277 (*synth, props*)

C₃₀H₂₀MnNO₃

Mn-00136

Dicarbonylnitrosyl(η^4 -tetraphenylcyclobutadiene)manganese

[83378-77-2]



M 497.431

Orange cryst. (CH₂Cl₂/hexane). Mp 192° dec.

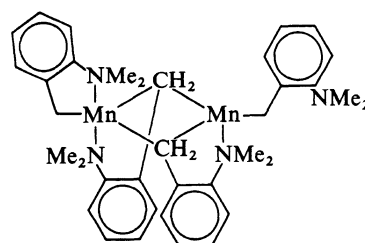
Rausch, M.D. *et al*, *Organometallics*, 1982, **1**, 1567 (*synth, struct*)

C₃₆H₄₈Mn₂N₄

Mn-00137

Bis[μ -[[2-(dimethylamino)phenyl]methyl-C:*C*,*N*]][[2-(dimethylamino)phenyl]methyl][[2-(dimethylamino)phenyl]methyl-C:*N*]dimanganese, 10Cl

[65186-91-6]



M 646.678

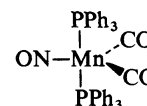
Manzer, L.E. *et al*, *J. Organomet. Chem.*, 1977, **139**, C34 (*synth, cryst struct*)

C₃₈H₃₀MnNO₃P₂

Mn-00138

Dicarbonylnitrosylbis(triphenylphosphine)manganese, 8Cl

[14653-43-1]



M 665.545

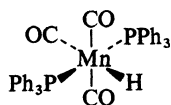
Orange cryst.

Hieber, W. *et al*, *Z. Anorg. Allg. Chem.*, 1962, **318**, 136 (*synth*)

Enemark, J.H. *et al*, *Inorg. Chem.*, 1967, **6**, 1575 (*struct*)
Keeton, D.P. *et al*, *Inorg. Chim. Acta*, 1972, **6**, 33 (*synth*)

C₃₉H₃₁MnO₃P₂**Mn-00139**

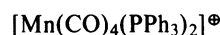
Tricarbonylhydrobis(triphenylphosphine)manganese, 10Cl
Hydrotetricarbonylbis(triphenylphosphine)manganese
[17030-38-5]



M 664.558
Cream-white cryst. (C₆H₆/pet. ether). Mp 237-9° dec.
Ugo, R. *et al*, *J. Organomet. Chem.*, 1967, **8**, 189 (*synth, ir, nmr*)
Hayakawa, H. *et al*, *Bull. Chem. Soc. Jpn.*, 1978, **51**, 2041 (*cryst struct*)

C₄₀H₃₀MnO₄P₂[⊕]**Mn-00140**

Tetracarbonylbis(triphenylphosphine)manganese(1+)

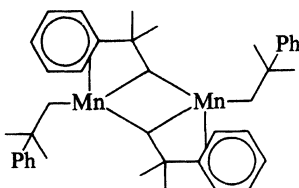


M 691.560 (ion)
Hexafluorophosphate: [70083-76-0].
C₄₀H₃₀F₆MnO₄P₃ M 836.524
No phys. props. reported.

Kruck, T. *et al*, *Chem. Ber.*, 1963, **96**, 3035 (*synth, props*)
Green, M.L.H. *et al*, *J. Organomet. Chem.*, 1967, **8**, 511 (*synth*)
Behrens, H. *et al*, *J. Organomet. Chem.*, 1972, **34**, 367 (*props*)
Brink, R.W. *et al*, *Inorg. Chem.*, 1973, **12**, 1067 (*synth, ir*)
Behrens, H. *et al*, *J. Organomet. Chem.*, 1978, **159**, 201 (*props*)

C₄₀H₅₂Mn₂**Mn-00141**

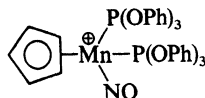
Bis[μ-(2-methyl-2-phenylpropyl)]bis(2-methyl-2-phenylpropyl)dimanganese, 9Cl
Tetrakis(2-methyl-2-phenylpropyl)dimanganese
[62450-90-2]



M 642.727
Anderson, R.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 2204.

C₄₁H₃₅MnNO₇P₂[⊕]**Mn-00142**

(η⁵-2,4-Cyclopentadien-1-yl)nitrosylbis(triphenyl phosphite-P)manganese(1+)
Nitrosylbis(triphenyl phosphite)(η⁵-cyclopentadienyl)-manganese(1+)



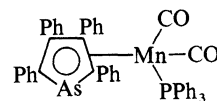
M 770.616 (ion)

Hexafluorophosphate: [36223-58-2].
C₄₁H₃₅F₆MnNO₇P₃ M 915.580
Pale-yellow cryst. Mp 134-7°.

James, T.A. *et al*, *J. Chem. Soc. (A)*, 1970, 850 (*synth. props*)

C₄₈H₃₅AsMnO₂P**Mn-00143**

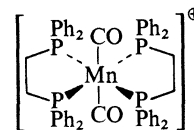
Dicarbonyl[(1,2,3,4,5-η)-2,3,4,5-tetraphenyl-1H-arsol-1-yl-](triphenylphosphine)manganese, 10Cl
[72415-82-8]



M 804.637
Yellow cryst. (hexane/CHCl₃). Mp 244-50°.
Abel, E.W. *et al*, *J. Chem. Soc., Chem. Commun.*, 1973, 258 (*synth, cryst struct*)
Abel, E.W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 814.
Abel, E.W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 1552 (*synth, props*)

C₅₄H₄₈MnO₂P₄[⊕]**Mn-00144**

Dicarbonylbis[1,2-ethanediy]bis[diphenylphosphine]-P,P'-manganese(1+)



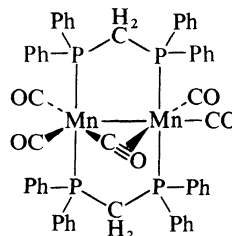
M 907.805 (ion)
Air-stable.

trans-form

Perchlorate: [14836-77-2].
C₅₄H₄₈ClMnO₆P₄ M 1007.256
Yellow cryst. (MeOH). Sol. org. solvs. except Et₂O, pet. ether.
Chloride:
C₅₄H₄₈ClMnO₂P₄ M 943.258
Yellow cryst. + 2MeOH (MeOH) or + 2CHCl₃ (CHCl₃). Sol. org. solvs., except pet. ether, Et₂O.
Saeco, A., *Gazz. Chim. Ital.*, 1963, **93**, 698 (*synth*)
Osborne, A.G. *et al*, *J. Chem. Soc.*, 1965, 700 (*synth*)
Wimmer, F.L. *et al*, *Inorg. Chem.*, 1974, **13**, 1617 (*props*)

C₅₅H₄₄Mn₂O₅P₄**Mn-00145**

μ-Carbonyltetracarbonylbis[μ-[methylenebis(diphenylphosphine)-P,P']]dimanganese, 10Cl
[56665-73-7]



M 1018.721
Red diamagnetic cryst.
Colton, R. *et al*, *Aust. J. Chem.*, 1975, **28**, 1673 (*synth, ir*)
Commons, C.J. *et al*, *Aust. J. Chem.*, 1975, **28**, 1663 (*struct*)
Caulton, K.G. *et al*, *J. Organomet. Chem.*, 1976, **114**, C11.
Caulton, K.G. *et al*, *Organometallics*, 1982, **1**, 274 (*nmr*)

Mo Molybdenum

M. Green

Molybdène (Fr.), Molybdän (Ger.), Molibdeno (Sp., Ital.), Молибден (Molibden) (Russ.), モリブデン (Japan.)

Atomic Number. 42

Atomic Weight. 95.94

Electronic Configuration. [Kr] $4d^5 5s^1$

Oxidation States. -4, -2, 0, +2, +4

Coordination Number. This ranges from 4 in $[\text{Mo}(\text{CO})_4]^{4-}$ upwards.

Colour. Variable including colourless, yellow, red, green and blue.

Availability. Readily available starting materials include $\text{Mo}(\text{CO})_6$ and anhydrous MoCl_5 .

Handling. See under Chromium.

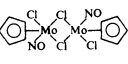
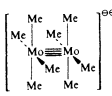
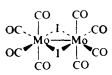
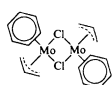
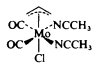
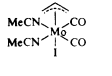
Toxicity. Molybdenum compounds, except for the carbonyl complexes, are generally not regarded as highly toxic.

Isotopic Abundance. ^{92}Mo , 15.86%; ^{94}Mo , 9.12%; ^{95}Mo , 15.78%; ^{96}Mo , 16.50%; ^{97}Mo , 9.45%; ^{98}Mo , 23.75%; ^{100}Mo , 9.62%. Thirteen radioisotopes are also known. ^{99}Mo ($t_{1/2} \sim 66\text{h}$) is commonly used in tracer work.

Spectroscopy. Both ^{95}Mo and ^{97}Mo have $I = \frac{5}{2}$ and although fundamental studies have been carried out, few chemical shift data are available.

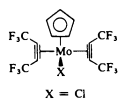
Analysis. For standard methods see *Scott's Standard Methods of Chemical Analysis*, Furman, N. H. Ed., 6th Edn, Van Nostrand, 1962.

References. General reviews are listed in the introduction to the *Sourcebook*.

$[\text{Mo}(\text{CO})_4]^{\text{e}^{\text{e}^{\text{e}^{\text{e}}}}$	$(\text{OC})_5\text{Mo}=\text{C}(\text{OMe})\text{CH}_3$		$[(\text{OC})_5\text{Mo}-\text{Mo}(\text{CO})_5]^{\text{e}^{\text{e}}}$
Mo-00001	Mo-00017	Mo-00031	Mo-00045
	$\left[\left(\text{C}_5\text{H}_5 \right) \text{Mo} \left(\begin{array}{c} \text{CO} \\ \text{CO} \\ \text{CO} \\ \text{NH}_2\text{NH}_2 \end{array} \right) \right]^{\oplus}$	$\left[\left(\text{C}_6\text{H}_5 \right) \text{Mo} \left(\begin{array}{c} \text{CO} \\ \text{CO} \\ \text{CO} \end{array} \right) \right]^{\oplus}$	
Mo-00002	Mo-00018	Mo-00032	Mo-00046
			
Mo-00003	Mo-00019	Mo-00033	Mo-00047
$(\text{OC})_5\text{MoI}^{\oplus}$	$\left[\begin{array}{c} \text{Me} \quad \text{Me} \\ \text{Me} \quad \text{Me} \\ \text{Mo} \quad \text{Mo} \\ \text{Me} \quad \text{Me} \end{array} \right]^{\text{e}^{\text{e}^{\text{e}^{\text{e}}}}$		
Mo-00004	Mo-00020	Mo-00034	Mo-00048
		$\left[\begin{array}{c} \text{H}_3\text{C} \quad \text{CH}_3 \\ \text{Mo} \quad \text{Mo} \\ \text{OC} \quad \text{CO} \end{array} \right]^{\oplus}$	
Mo-00005	Mo-00021	Mo-00035	Mo-00049
$[\text{MoCN}(\text{CO})_5]^{\oplus}$			
Mo-00006	Mo-00022	Mo-00036	Mo-00050
$\text{Mo}(\text{CO})_6(\text{O}_h)$	$\left[\left(\text{C}_5\text{H}_5 \right) \text{Mo} \left(\begin{array}{c} \text{CO} \\ \text{CO} \\ \text{CO} \end{array} \right) \right]^{\oplus}$		
Mo-00007	Mo-00023	Mo-00037	Mo-00051
			
Mo-00008	Mo-00024	Mo-00038	Mo-00052
$\left[\begin{array}{c} \text{OC} \quad \text{H} \quad \text{CO} \\ \text{OC} \quad \text{Mo} \quad \text{CO} \\ \text{OC} \quad \text{H} \quad \text{CO} \end{array} \right]^{\text{e}^{\text{e}}}$			
Mo-00009	Mo-00025	Mo-00039	Mo-00053
			
Mo-00010	Mo-00026	Mo-00040	Mo-00054
	$(\text{H}_3\text{CCN})_3\text{Mo}(\text{CO})_3$	$(\text{C}_5\text{H}_5)_2\text{Mo}(\text{H})\text{Li}$	$\left[\left(\text{C}_5\text{H}_5 \right) \text{Mo} \left(\begin{array}{c} \text{CO} \\ \text{CO} \\ \text{NCCH}_3 \\ \text{NCCH}_3 \end{array} \right) \right]^{\oplus}$
Mo-00011	Mo-00027	Mo-00041	Mo-00055
As Mo-00011 with L = Cl	$\left[\left(\text{C}_5\text{H}_5 \right) \text{Mo} \left(\begin{array}{c} \text{NO} \\ \text{CO} \end{array} \right) \right]^{\oplus}$		$\left[\left(\text{C}_5\text{H}_5 \right) \text{Mo} \left(\begin{array}{c} \text{CO} \\ \text{CO} \end{array} \right) \right]^{\oplus}$
Mo-00012	Mo-00028	Mo-00042	Mo-00056
As Mo-00011 with L = I			As Mo-00011 with L = GeMe ₃
Mo-00013	Mo-00029	Mo-00043	Mo-00057
			As Mo-00011 with L = SiMe ₃
Mo-00014	Mo-00030	Mo-00044	Mo-00058
As Mo-00011 with L = Tl			
Mo-00015			
As Mo-00011 with L = H			
Mo-00016			

As Mo-00011 with
L = SnMe₃

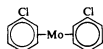
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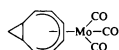
Mo-00073

As Mo-00073 with
X = I

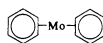
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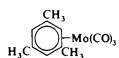
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Mo-00062



Mo-00063



Mo-00064



Mo-00065



Mo-00066



Mo-00067



Mo-00068



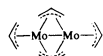
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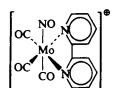
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Mo(S₂CNEt₂)₂(CO)₂

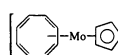
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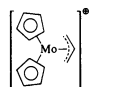
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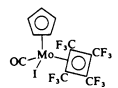
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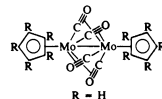
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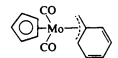
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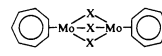
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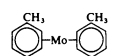
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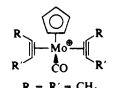
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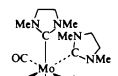
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Mo-00081



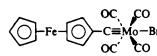
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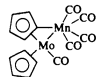
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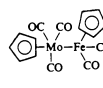
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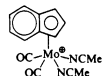
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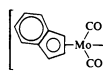
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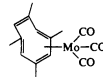
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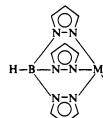
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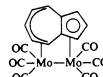
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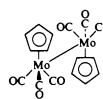
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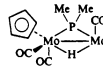
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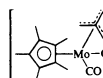
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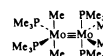
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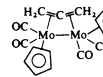
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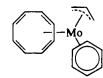
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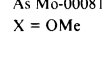
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Mo-00098



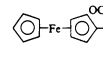
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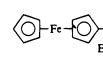
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Ph₂C=Mo(CO)₅

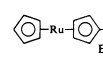
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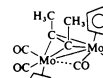
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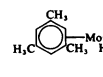
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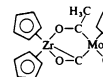
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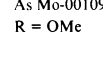
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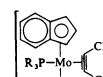
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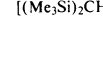
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Mo-00108

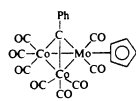


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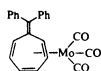


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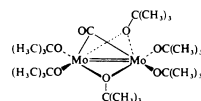




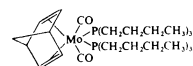
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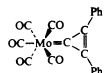
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Mo-00130



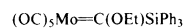
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Mo-00112

As Mo-00083 with
R = Ph, R' = CH₃

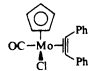
Mo-00121



Mo-00131

As Mo-00083 with
R = R' = Ph

Mo-00140



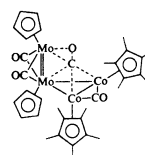
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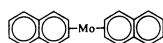
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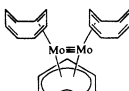
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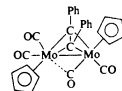
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Mo-00114



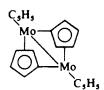
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Mo-00133



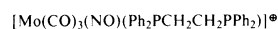
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Mo-00115

As Mo-00079 with
R = CH₃

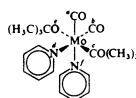
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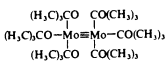
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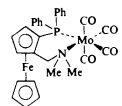
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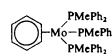
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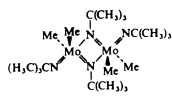
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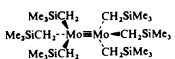
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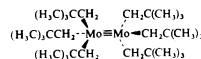
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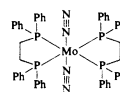
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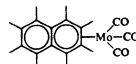
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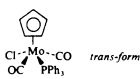
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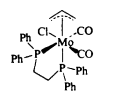
Mo-00145



Mo-00118



Mo-00127



Mo-00137



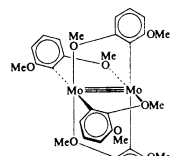
Mo-00146



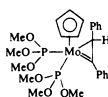
Mo-00119



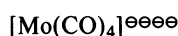
Mo-00128



Mo-00138



Mo-00129

C₄MoO₄⁴⁻**Mo-00001****Tetracarbonylmolybdate(4-)**

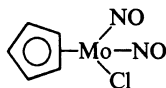
M 207.982 (ion)

Tetra-Na salt: [67202-63-5].C₄MoNa₄O₄ M 299.941Pale-orange solid. Insol. THF, HMPA, liq. NH₃.

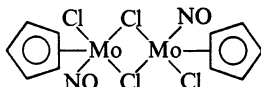
▷Extremely pyrophoric, reacting explosively with fluorolube, water or air. Deflagrates on percussion

Lin, J.T. *et al*, *J. Am. Chem. Soc.*, 1983, **105**, 2296 (*synth*)**C₅H₅ClMoN₂O₂****Mo-00002****Chloro(η⁵-2,4-cyclopentadien-1-yl)dinitrosylmolybdenum, 10Cl**

[12305-00-9]

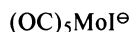


M 256.500

Green cryst. Mp 116°. Bp_{0.005} 40-50° subl.Hoyano, J.K. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1022.*Inorg. Synth.*, 1978, **18**, 126 (*synth*)Botto, R.E. *et al*, *Inorg. Chem.*, 1979, **18**, 2049 (*nmr*)Legzdins, P. *et al*, *Inorg. Chem.*, 1979, **18**, 1250.**C₅H₅Cl₂MoNO****Mo-00003****Dichloro(η⁵-2,4-cyclopentadien-1-yl)nitrosylmolybdenum**

M 261.947

Dimeric.

Dimer: [41395-41-9]. Di-μ-chlorodichlorobis(η⁵-2,4-cyclopentadien-1-yl)dinitrosyldimolybdenum, 10Cl. Tetrachlorobis(cyclopentadienyl)-dinitrosyldimolybdenum.C₁₀H₁₀Cl₄Mo₂N₂O₂ M 523.893*Inorg. Synth.*, 1976, **16**, 24 (*synth*)*Inorg. Synth.*, 1978, **18**, 126 (*synth*)**C₅IMoO₅⁺****Mo-00004****Pentacarbonyliodomolybdate(1-), 9Cl**

M 362.897 (ion)

Tetraethylammonium salt: [14781-00-1].C₁₃H₂₀IMoNO₅ M 493.149

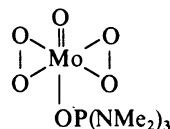
Yellow cryst.

Bis(triphenylphosphine)iminium salt: [39004-14-3].C₄₁H₃₀IMoNO₅P₂ M 901.484

Yellow cryst.

Abel, E.W. *et al*, *J. Chem. Soc.*, 1963, 2068 (*synth*)Ruff, J.K. *et al*, *Synth. React. Inorg. Metal-Org. Chem.*, 1972, **1**, 215 (*synth*)Bond, A.M. *et al*, *Inorg. Chem.*, 1974, **13**, 602 (*props*)**C₆H₁₈MoO₆P****Mo-00005****Diperoxooxohexamethylphosphoramidomolybdenum***(Hexamethylphosphoric triamide-O)oxodiperoxymolybdenum*

[25377-12-2]



M 313.118

Reagent for efficient stereospecific epoxidn. of olefins, also for enolate hydroxylation and for oxidn. of alkyl bromides and nitriles. Yellow-orange needles. Mp 101-2° dec.

Himoun, H. *et al*, *Tetrahedron*, 1970, **26**, 37 (*synth*)Sharpless, K.B. *et al*, *J. Am. Chem. Soc.*, 1972, **94**, 295 (*use*)Schmitt, G. *et al*, *J. Organomet. Chem.*, 1978, **152**, 271 (*use*)Vedjs, E. *et al*, *J. Org. Chem.*, 1978, **43**, 188 (*use*)Matlin, S.A. *et al*, *J. Chem. Soc., Perkin Trans. 1*, 1979, 2481 (*synth, use*)Fieser, M. *et al*, *Reagents for Organic Synthesis*, Wiley, 1967-83, **8**, 206 (*use*)**C₆MoNO₅⁺****Mo-00006****Pentacarbonyl(cyano-C)molybdate(1-), 8Cl**

M 262.010 (ion)

Bis(triphenylphosphine)iminium salt: [39048-39-0].C₄₂H₃₀MoN₂P₂O₅ M 800.597

White cryst.

King, R.B., *Inorg. Chem.*, 1967, **6**, 25 (*synth, props*)Ruff, J.K. *et al*, *Synth. React. Inorg. Metal-Org. Chem.*, 1971, **1**, 215.**C₆MoO₆****Mo-00007****Molybdenum carbonyl, 10Cl***Molybdenum hexacarbonyl. Hexacarbonylmolybdenum*

[13939-06-5]

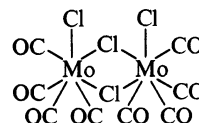


M 264.002

Important starting material. Colourless, odourless, air-stable, diamagnetic solid. Sol. org. solvs.

Junk, G.A. *et al*, *Z. Naturforsch., B*, 1968, **23**, 1 (*ms*)Jones, L.H. *et al*, *Inorg. Chem.*, 1969, **11**, 2349 (*ir*)Lloyd, D.R. *et al*, *J. Chem. Soc., Faraday Trans. 2*, 1973, **69**, 1659 (*pe*)Mann, B.E., *J. Chem. Soc., Dalton Trans.*, 1973, 2012 (*nmr*)Hagan, A.P. *et al*, *Inorg. Chem.*, 1978, **17**, 1369 (*synth*)Michels, G.D. *et al*, *Inorg. Chem.*, 1980, **19**, 479.**C₈Cl₄Mo₂O₈****Mo-00008****Octacarbonyltetrachlorodimolybdenum, 9Cl***Octacarbonyldi-μ-chlorodichlorodimolybdenum*

[12655-17-3]



M 557.775

Yellow powder. Sol. CH₂Cl₂, CHCl₃ (part. dec.).Thermally unstable. *ir* ν_{CO} 2100w, 2050m, 1980s, 1956w cm⁻¹ (nujol).

Monomer: Tetracarbonyldichloromolybdenum.

C₄Cl₂MoO₄ M 278.888

Unknown.

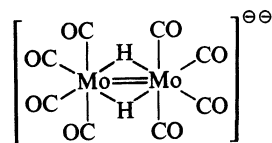
Colton, R. *et al*, *Aust. J. Chem.*, 1966, **19**, 1143 (*synth*, *ir*)

Davis, R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 508 (*props*)

C₈H₂Mo₂O₈^{⊖⊖}

Mo-00009

Octacarbonyl-μ-dihydrodimolybdate(2-)



M 417.979 (ion)

Tetraethylammonium salt: [84850-68-0].

C₂₄H₄₂Mo₂N₂O₈ M 678.484

Orange air-sensitive cryst.

Ellis, J.E. *et al*, *J. Am. Chem. Soc.*, 1983, **105**, 2296 (*synth*)

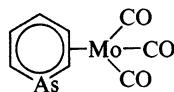
C₈H₅AsMoO₃

Mo-00010

(η⁶-Arsenin)tricarbonylmolybdenum, 10Cl

Tricarbonyl-η⁶-arsabenzene molybdenum. Arsabenzene-tricarbonylmolybdenum

[65198-26-7]



M 319.987

Air-stable red cryst.

Ashe, A.J. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 8099 (*synth*, *props*)

C₈H₅BrMoO₃

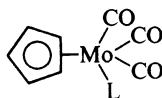
Mo-00011

Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)molybdenum,

9Cl

Cyclopentadienyltricarbonylmolybdenum bromide

[12079-79-7]



L = Br

M 324.970

Red cryst. (CH₂Cl₂). Mp 150-1°.

Piper, T.S. *et al*, *J. Inorg. Nucl. Chem.*, 1956, **3**, 104 (*synth*)

Burkett, A.R. *et al*, *J. Organomet. Chem.*, 1974, **67**, 67 (*synth*, *uv*, *pmr*, *ir*)

King, R.B., *Coord. Chem. Rev.*, 1976, **20**, 155.

C₈H₅ClMoO₃

Mo-00012

Tricarbonylchloro(η⁵-2,4-cyclopentadien-1-yl)molybdenum,

9Cl

Chlorotricarbonyl(η⁵-cyclopentadienyl)molybdenum

[12128-23-3]

As Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-molybdenum, Mo-00011 with

L = Cl

M 280.519

Orange-red cryst. Dec. at 145° without melting.

Piper, T.S. *et al*, *J. Inorg. Nucl. Chem.*, 1956, **3**, 104 (*synth*)

Parker, D.J. *et al*, *J. Chem. Soc. (A)*, 1970, 480, 1382 (*ir*)

Wrighton, M.S. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 4246 (*synth*)

King, R.B., *Coord. Chem. Rev.*, 1976, **20**, 155 (*rev*)

Todd, L.J. *et al*, *J. Organomet. Chem.*, 1978, **154**, 151 (*cmr*)

C₈H₅IMoO₃

Mo-00013

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)iodomolybdenum, 9Cl

Iodotricarbonyl(η⁵-cyclopentadienyl)molybdenum

[12287-61-5]

As Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-molybdenum, Mo-00011 with

L = I

M 371.970

Red cryst. (CH₂Cl₂/pet. ether). Mp 134-134.5°.

Piper, T.S. *et al*, *J. Inorg. Nucl. Chem.*, 1956, **3**, 104 (*synth*)

White, C. *et al*, *J. Chem. Soc. (A)*, 1971, 940.

King, R.B., *Coord. Chem. Rev.*, 1976, **20**, 155.

St. Laurent, J.C.T.R.B. *et al*, *J. Organomet. Chem.*, 1978, **153**, C19.

Todd, L.J. *et al*, *J. Organomet. Chem.*, 1978, **154**, 151 (*struct*)

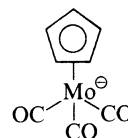
Colville, N.J., *J. Organomet. Chem.*, 1980, **190**, C84.

C₈H₅MoO₃[⊖]

Mo-00014

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)molybdate(1-), 9Cl

[12126-18-0]



M 245.066 (ion)

Li salt: [68550-41-4].

C₈H₅LiMoO₃ M 252.007

Characterised spectroscopically.

Tetrabutylammonium salt:

C₂₄H₄₁MoNO₃ M 487.533

Cryst. Characterised crystallographically.

King, R.B. *et al*, *Inorg. Chem.*, 1965, **4**, 475.

Ellis, J.E. *et al*, *J. Organomet. Chem.*, 1975, **99**, 263.

King, R.B., *Coord. Chem. Rev.*, 1976, **20**, 155.

Crotty, D.E. *et al*, *Inorg. Chem.*, 1977, **16**, 920 (*cryst struct*)

Gladysz, J.A. *et al*, *Inorg. Chem.*, 1979, **18**, 553 (*synth*)

C₈H₅MoO₃Tl

Mo-00015

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)thalliummolybdenum, 10Cl

Thalliumtricarbonyl(η⁵-cyclopentadienyl)molybdenum

[52720-93-1]

As Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-molybdenum, Mo-00011 with

L = Tl

M 449.449

Light-yellow cryst. Mp 230° dec.

Burlitch, J.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 828 (*synth*, *ir*)

C₈H₆MoO₃ **Mo-00016**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydromolybdenum,
¹⁰Cl
Hydriotricarbonyl(η^5 -cyclopentadienyl)molybdenum
 [12176-06-6]

As Bromotricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-
 molybdenum, Mo-00011 with

L = H

M 246.074

Yellow cryst.; air-sensitive, darkens immediately on
 exposure to air. Bp_{0.1} 50° subl.

Inorg. Synth., 1963, **7**, 99 (*synth*)

Dub, M., *Organometallic Compounds*, Springer-Verlag, Berlin,
 2nd Ed., 1966, Vol. 1.

Treichel, P.M. *et al.*, *Inorg. Chem.*, 1967, **6**, 1328 (*synth*)

Keppie, S.A. *et al.*, *J. Organomet. Chem.*, 1969, **19**, P5 (*synth*)

Faller, J.W. *et al.*, *J. Am. Chem. Soc.*, 1970, **92**, 5852.

Kalck, P. *et al.*, *J. Organomet. Chem.*, 1970, **24**, 445.

C₈H₆MoO₆ **Mo-00017**
Pentacarbonyl(1-methoxyethylidene)molybdenum, ¹⁰Cl
Pentacarbonyl(methoxymethylcarbene)molybdenum.
Pentacarbonyl[methoxy(methyl)methylene]molybdenum
 m
 [12365-46-7]

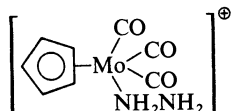
(OC)₅Mo=C(OMe)CH₃

M 294.072

Unstable.

Fischer, E.O. *et al.*, *Chem. Ber.*, 1967, **100**, 2445 (*synth, props*)

C₈H₉MoN₂O₃[⊕] **Mo-00018**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(hydrazine-*N*)mo-
lybdenum(1+), ¹⁰Cl



M 277.111 (ion)

Chloride: [68643-99-2].

C₈H₉ClMoN₂O₃ M 312.564

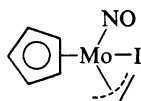
Unstable.

Fischer, E.O. *et al.*, *J. Organomet. Chem.*, 1964, **2**, 230 (*synth*)

Nolte, M.J. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1978, 932

(*synth, props*)

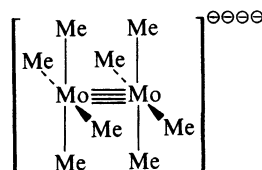
C₈H₁₀IMoNO **Mo-00019**
(η^5 -2,4-Cyclopentadien-1-yl)iodonitrosyl(η^3 -2-propenyl)-
molybdenum, ¹⁰Cl
 η^3 -Allyliodonitrosyl(η^5 -cyclopentadienyl)molybdenum
 [66979-94-0]



M 359.018

Faller, J.W. *et al.*, *J. Organomet. Chem.*, 1980, **187**, 227 (*struct, synth*)

C₈H₂₄Mo₂^{⊕⊕⊕⊕} **Mo-00020**
Octamethyldimolybdenum(4-), ⁹Cl



M 312.158 (ion)

Tetra-Li salt, tetrakis-THF complex: [53307-60-1].

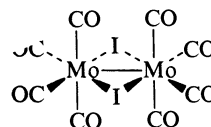
C₂₄H₅₆Li₄Mo₂O₄ M 628.348

Mo—Mo 2.147(3) Å. Diamagnetic.

Heyn, B. *et al.*, *Z. Chem.*, 1972, **12**, 338 (*synth*)

Cotton, F.A. *et al.*, *J. Am. Chem. Soc.*, 1974, **96**, 3824 (*synth, cryst struct*)

C₈I₂Mo₂O₈ **Mo-00021**
Octacarbonyldi- μ -iododimolybdenum, ⁹Cl
 [55463-48-4]



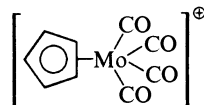
M 669.772

Black cryst. (hexane). Mo—Mo bond 3.16 Å.

Schmid, C. *et al.*, *Chem. Ber.*, 1975, **108**, 260 (*synth*)

Boese, R. *et al.*, *Acta Crystallogr., Sect. B*, 1976, **32**, 582 (*cryst struct*)

C₉H₅MoO₄[⊕] **Mo-00022**
Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+),
¹⁰Cl



M 273.076 (ion)

Air-stable.

Hexafluorophosphate: [41618-11-5].

C₉H₅F₆MoO₄P M 418.040

Yellow cryst.

Tetrafluoroborate: [67251-59-6].

C₉H₅BF₄MoO₄ M 359.880

Yellow cryst.

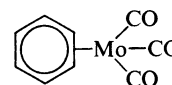
Treichel, P.M. *et al.*, *Inorg. Chem.*, 1967, **6**, 1328; 1971, **10**, 1183 (*props*)

Abel, E.W. *et al.*, *Adv. Organomet. Chem.*, 1970, **8**, 117 (*synth, props*)

Behrens, H. *et al.*, *Z. Anorg. Allg. Chem.*, 1977, **438**, 61 (*props*)

Pfister, A. *et al.*, *Z. Anorg. Allg. Chem.*, 1977, **438**, 53 (*props*)

C₉H₆MoO₃ **Mo-00023**
 η^6 -Benzenetricarbonylmolybdenum, ¹⁰Cl
Tricarbonyl(η^6 -benzene)molybdenum
 [12287-81-9]



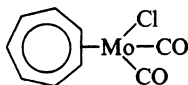
M 258.085

Yellow cryst., air-stable in solid state. Mp 120-5°.

Fischer, E.O. *et al.*, *Chem. Ber.*, 1958, **91**, 2763 (*synth*)

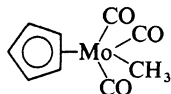
Mann, B.E., *J. Chem. Soc., Dalton Trans.*, 1973, 2012 (*nmr*)
 Kane-Maguire, L.A.P. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 428.
 Nesmeyanov, A.N. *et al*, *J. Organomet. Chem.*, 1975, **102**, 185 (*synth*)
 Barbeau, C. *et al*, *Can. J. Chem.*, 1976, **54**, 1612 (*ir*)
 Muetterties, E.L. *et al*, *J. Organomet. Chem.*, 1979, **178**, 197.

C₉H₇ClMoO₂ **Mo-00024**
Dicarbonylchloro(η⁷-cycloheptatrienyl)molybdenum
Dicarbonylchlorotropyliummolybdenum
 [55411-20-6]



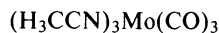
M 278.546
 Dark-green solid. Mp ca. 185°.
 King, R.B. *et al*, *Inorg. Chem.*, 1964, **3**, 785 (*synth*)
 Beall, T.W. *et al*, *Inorg. Chem.*, 1972, **11**, 915 (*props*)
 Isaacs, E.E. *et al*, *Can. J. Chem.*, 1975, **53**, 975 (*props*)
 Ziegler, M.L. *et al*, *Z. Naturforsch., B*, 1975, **30**, 26 (*cryst struct*)
 Bochmann, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 714 (*synth*)
 Bowerbank, R. *et al*, *J. Chem. Soc., Chem. Commun.*, 1977, 245 (*props*)

C₉H₈MoO₃ **Mo-00025**
Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)methylmolybdenum, 9Cl
Cyclopentadienyl(methyl)tricarbonylmolybdenum
 [12082-25-6]



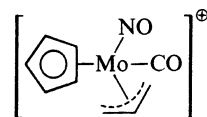
M 260.100
 Yellow cryst. by subl. *in vacuo*.
 Piper, T.S. *et al*, *J. Inorg. Nucl. Chem.*, 1956, **3**, 104.
 King, R.B. *et al*, *Can. J. Chem.*, 1969, **47**, 2959 (*ir*)
 Samuel, E. *et al*, *J. Organomet. Chem.*, 1979, **172**, 309 (*uv*)

C₉H₉MoN₃O₃ **Mo-00026**
Tris(acetonitrile)tricarbonylmolybdenum, 9Cl, 8Cl
Tricarbonyltris(acetonitrile)molybdenum
 [15038-48-9]



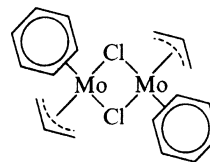
M 303.128
 Bright-yellow cryst. (MeCN/hexane). Mp 140° dec.
 Tate, D.P. *et al*, *Inorg. Chem.*, 1962, **1**, 433 (*synth*)
 Werner, H. *et al*, *Helv. Chim. Acta*, 1970, **53**, 2002 (*synth, props, ir*)
 Graham, J.M., *J. Organomet. Chem.*, 1974, **77**, 247.

C₉H₁₀MoNO₂⁺ **Mo-00027**
Carbonyl(η⁵-2,4-cyclopentadien-1-yl)nitrosyl(η³-2-propenyl)-molybdenum(1+), 10Cl
η³-Allylcarbonylcyclopentadienylmolybdenum(1+)



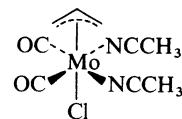
M 260.124 (ion)
 Hexafluorophosphate: [54438-52-7].
 C₉H₁₀F₆MoNO₂P M 405.088
 Yellow cryst.
 Faller, J.W. *et al*, *Ann. N.Y. Acad. Sci.*, 1977, **295**, 186 (*synth, props*)
 Adams, R.D. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 2570 (*props*)
 McCleverty, J.A. *et al*, *Transition Met. Chem.*, 1979, **4**, 273 (*synth, nmr*)

C₉H₁₁ClMo **Mo-00028**
(η⁶-Benzene)chloro(η³-2-propenyl)molybdenum
Allylbenzenechloromolybdenum



M 250.579
 Dimeric.
 Dimer: [12701-35-8]. *Bis(η⁶-benzene)di-μ-chloro-bis(η³-2-propenyl)dimalybdendium*, 9Cl. *Bis(allyl)-bis(η⁶-benzene)di-μ-chlorodimalybdendium*. *Diallyl-bis-η⁶-benzenedichloromolybdendium*.
 C₁₈H₂₂Cl₂Mo₂ M 501.158
 Purple cryst., sensitive to oxygen.
 Green, M.L.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 311;
 1976, 213 (*synth*)
Inorg. Synth., 1977, **17**, 57 (*synth*)

C₉H₁₁ClMoN₂O₂ **Mo-00029**
Bis(acetonitrile)dicarbonylchloro(η³-2-propenyl)molybdenum, 9Cl
Bis(acetonitrile)η³-allyldicarbonylchloromolybdenum
 [33221-75-9]

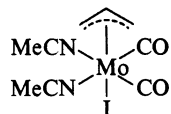


M 310.591
 Yellow cryst.
 Hayter, R.G., *J. Organomet. Chem.*, 1968, **13**, P1 (*synth*)
 Tom Dieck, H. *et al*, *J. Organomet. Chem.*, 1968, **14**, 375 (*synth, ir, nmr*)
 Brisdon, B.J., *J. Organomet. Chem.*, 1977, **125**, 225.

C₉H₁₁IMoN₂O₂

Mo-00030

Bis(acetonitrile)dicarbonyliodo(η³-2-propenyl)molybdenum,
10Cl
Bis(acetonitrile)(η³-allyl)dicarbonyliodomolybdenum
[33221-77-1]



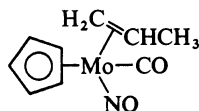
M 402.043
Orange cryst.

Hayter, R.E., *J. Organomet. Chem.*, 1968, **13**, P1.
Dieck, H.T. *et al.*, *J. Organomet. Chem.*, 1968, **14**, 375 (*synth*)
Brisdon, B.J. *et al.*, *Inorg. Chim. Acta*, 1979, **35**, L381; **36**, 127.
Clark, D.A. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1980, 565 (*react*)

C₉H₁₁MoNO₂

Mo-00031

Carbonyl(η⁵-2,4-cyclopentadien-1-yl)nitrosyl(1,2-η-1-propene)molybdenum, 10Cl
[54438-48-1]



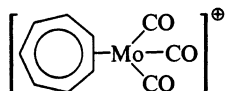
M 261.131
Yellow cryst.

Bailey, N.A. *et al.*, *J. Chem. Soc., Chem. Commun.*, 1974, 592.
Faller, J.W. *et al.*, *Ann. N.Y. Acad. Sci.*, 1977, **295**, 186.
Adams, R.D. *et al.*, *J. Am. Chem. Soc.*, 1979, **101**, 2570 (*props*)
Faller, J.W. *et al.*, *J. Organomet. Chem.*, 1980, **187**, 227 (*props*)

C₁₀H₇MoO₃[⊕]

Mo-00032

Tricarbonyl(η⁷-cycloheptatrienylium)molybdenum(1+), 9Cl
Tricarbonyl(η⁷-tropylium)molybdenum(1+)
[46238-45-3]



M 271.104 (ion)

Tetrafluoroborate: [12170-21-7].

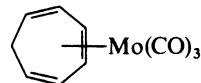
C₁₀H₇BF₄MoO₃ M 357.907
Orange air-stable cryst. Mp >270°.

Dauben, H.J. *et al.*, *J. Am. Chem. Soc.*, 1958, **80**, 5570 (*synth*)
Clark, G.R. *et al.*, *J. Organomet. Chem.*, 1973, **50**, 185 (*struct*)
Isaacs, E.E. *et al.*, *Can. J. Chem.*, 1975, **53**, 975 (*props*)
Isaacs, E.E. *et al.*, *J. Organomet. Chem.*, 1975, **90**, 319 (*props*)
Salzer, A. *et al.*, *J. Organomet. Chem.*, 1975, **87**, 101 (*synth*)
Tremmel, P.O. *et al.*, *Z. Naturforsch., B*, 1975, **30**, 699 (*props*)
Olah, G. *et al.*, *J. Org. Chem.*, 1976, **41**, 1694 (*cmr*)
Green, M. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1977, 1755 (*props*)

C₁₀H₈MoO₃

Mo-00033

Tricarbonyl[(1,2,3,4,5,6η)-1,3,5-cycloheptatriene]molybdenum, 9Cl
(η⁶-1,3,5-Cycloheptatriene)tricarbonylmolybdenum
[12125-77-8]



M 272.111

Red hexagonal prisms (hexane), air-stable in solid state.
Mp 100.5-101.5°, 95° dec. Sensitive to light, dec. by CCl₄. Sublimes *in vacuo* at 85°.

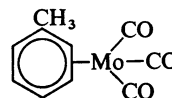
▷QA4700000.

Abel, E.W. *et al.*, *J. Chem. Soc.*, 1958, 4559 (*synth, ir*)
Dunitz, J.D. *et al.*, *Helv. Chim. Acta*, 1960, **43**, 2188 (*cryst struct*)
Inorg. Synth., 1967, **9**, 121.
Guenther, H. *et al.*, *Z. Naturforsch., B*, 1967, **22**, 389 (*pmr*)
Olah, G.A. *et al.*, *J. Org. Chem.*, 1976, **41**, 1694 (*cmr*)
Gower, M. *et al.*, *Inorg. Chim. Acta*, 1979, **37**, 79.

C₁₀H₈MoO₃

Mo-00034

Tricarbonyl[(1,2,3,4,5,6-η)methylbenzene]molybdenum, 9Cl
Tricarbonyl(η⁶-toluene)molybdenum
[12083-34-0]



M 272.111

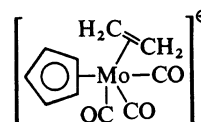
Mp 118-20° dec.

Strohmeier, W., *Chem. Ber.*, 1961, **94**, 3337 (*synth, props*)
Zingales, F. *et al.*, *J. Am. Chem. Soc.*, 1966, **88**, 2707.
Nesmeyanov, A.N. *et al.*, *J. Organomet. Chem.*, 1975, **102**, 185 (*synth, props*)
Holtzapfel, G.M. *et al.*, *Inorg. Nucl. Chem. Lett.*, 1976, **12**, 623.
Muetterties, E.L. *et al.*, *J. Organomet. Chem.*, 1979, **178**, 197.

C₁₀H₉MoO₃[⊕]

Mo-00035

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(η²-ethene)molybdenum(1+)
[46238-41-9]

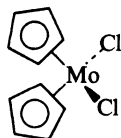


M 273.119 (ion)

Tetrafluoroborate: [62866-16-4].

C₁₀H₉BF₄MoO₃ M 359.923
Yellow cryst.

Dub, M., *Organometallic Compounds*, Springer-Verlag, Berlin, 2nd. Ed., 1966, **1**.
Beck, W. *et al.*, *Z. Naturforsch., B*, 1978, **33**, 1214.
Beck, W. *et al.*, *Chem. Ber.*, 1981, **114**, 867 (*synth*)

C₁₀H₁₀Cl₂Mo**Mo-00036****Dichlorobis(η⁵-2,4-cyclopentadien-1-yl)molybdenum, 9Cl**
[12184-22-4]

M 297.035

Green cryst. Dec. at 270°.

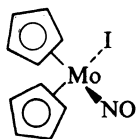
Dub, M., *Organometallic Compounds*, Springer-Verlag, Berlin, 2nd Ed., 1966, Vol. 1 (*synth*)Cooper, R.L. *et al*, *J. Chem. Soc. (A)*, 1967, 1155 (*synth, ir, nmr, uv, esr*)Prout, K. *et al*, *Acta Crystallogr., Sect. B*, 1974, **30**, 2290 (*struct*)Lindsell, W.E., *J. Chem. Soc., Dalton Trans.*, 1975, 2508.Thomas, J.L., *Inorg. Chem.*, 1978, **17**, 1507.Aviles, T. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 1367.Faller, J.W. *et al*, *J. Organomet. Chem.*, 1971, **31**, C75 (*nmr*)Abel, E.W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1706 (*synth*)Gibson, D.H. *et al*, *J. Organomet. Chem.*, 1979, **172**, C7 (*synth*)**C₁₀H₁₁LiMo****Mo-00040****Bis(η⁵-2,4-cyclopentadien-1-yl)hydromolybdenumlithium**(C₅H₅)₂Mo(H)Li

M 234.078

Tetrameric.

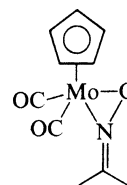
Tetramer: [51837-59-3]. *Tetrakis*[bis(η⁵-2,4-cyclopentadien-1-yl)hydromolybdenum]tetralithium, 9Cl.C₄₀H₄₄Li₄Mo₄ M 936.312

Yellow-orange cryst.

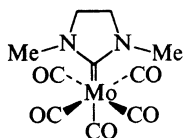
Francis, B.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1339 (*synth, props*)Meunier, B. *et al*, *Acta Crystallogr., Sect. B*, 1979, **35**, 2558.Berry, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 29 (*props*)**C₁₀H₁₀IMoNO****Mo-00037****Bis(η⁵-2,4-cyclopentadien-1-yl)iodonitrosylmolybdenum, 9Cl**
[12300-89-9]

M 383.040

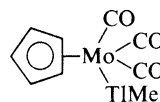
Green-black cryst. Mp 157-9°.

King, R.B., *Inorg. Chem.*, 1968, **7**, 90 (*synth*)Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1972, **94**, 402 (*props*)**C₁₀H₁₁MoNO₃****Mo-00041****Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(2-propanoneoximate-*N,O*)molybdenum, 10Cl**
[61491-36-9]

M 289.142

Purple cryst. (CH₂Cl₂/hexane). Mp 100-1° dec.Doedens, R.J. *et al*, *Inorg. Chem.*, 1977, **16**, 907 (*cryst struct*)King, R.B. *et al*, *Inorg. Chem.*, 1977, **16**, 1164 (*synth, nmr*)**C₁₀H₁₀MoN₂O₅****Mo-00038****Pentacarbonyl(1,3-dimethyl-2-imidazolidinylidene)molybdenum, 10Cl**
[57560-35-7]

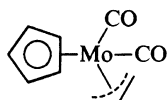
M 334.139

Air-stable white cryst. (Et₂O/hexane). Mp 108-9°.Lappert, M.F. *et al*, *J. Less-Common Met.*, 1977, **54**, 191 (*synth, ir, cmr*)**C₁₀H₁₁MoO₃Tl****Mo-00042****Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(dimethylthallium)molybdenum, 10Cl**

M 479.518

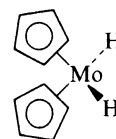
Mp 68-9°.

▷ Toxic

Walther, B. *et al*, *J. Organomet. Chem.*, 1978, **145**, 285 (*pmr, ir, synth*)**C₁₀H₁₀MoO₂****Mo-00039****Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(η³-2-propenyl)molybdenum, 10Cl**
*η*³-Allyldicarbonyl(η⁵-cyclopentadienyl)molybdenum
[12128-87-9]

M 258.128

Yellow cryst. Mp 175-6°.

Davison, A. *et al*, *Inorg. Chem.*, 1967, **6**, 2124 (*ir*)Faller, J.W. *et al*, *Inorg. Chem.*, 1968, **7**, 840 (*nmr*)**C₁₀H₁₂Mo****Mo-00043****Bis(η⁵-2,4-cyclopentadien-1-yl)dihydromolybdenum, 10Cl**
Dihydridobis(η⁵-cyclopentadienyl)molybdenum. Bis(cyclopentadienyl)molybdenum dihydride
[1291-40-3]

M 228.145

Yellow cryst. Mp 183-5° (163-5°, 174°). Subl. *in vacuo* at 50°.

Green, M.L.H. *et al*, *J. Chem. Soc.*, 1961, 4854 (*synth, ir, nmr*)
Dub, H., *Organometallic Compounds*, Springer-Verlag, Berlin, 2nd Ed., 1966, Vol. 1 (*synth*)

Macosek, F. *et al*, *Collect. Czech. Chem. Commun.*, 1970, **35**, 993 (*ms*)

Van Dam, E.M. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 465 (*synth*)

Schultz, A.J. *et al*, *Inorg. Chem.*, 1977, **16**, 3303 (*struct*)

Calado, J.C.E. *et al*, *J. Organomet. Chem.*, 1979, **174**, 77.

Hoxmeier, R.J. *et al*, *Inorg. Chem.*, 1979, **18**, 3462.

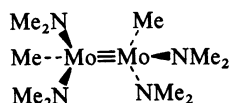
C₁₀H₃₀Mo₂N₄

Mo-00044

Dimethyltetrakis(N-dimethylamino)dimolybdenum

Dimethyltetrakis(N-methylmethaneaminato)dimolybdenum, 9Cl

[67030-82-4]



M 398.254

Thermally stable yellow cryst. Bp_{0.01} 100° subl.

Chisholm, M.H. *et al*, *Inorg. Chem.*, 1976, **15**, 2244; 1977, **16**, 320.

Chisholm, M.H. *et al*, *Inorg. Chem.*, 1978, **17**, 2338 (*cryst struct, synth, ir, nmr*)

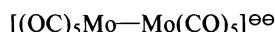
Chisholm, M.H. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 6784.

C₁₀Mo₂O₁₀²⁻

Mo-00045

Decarbonyldimolybdate(2-), 9Cl

[57348-62-6]



M 471.984 (ion)

Staggered conformation. Mo—Mo distance 3.123(7) Å.

Di-K salt: [57348-62-6].

C₁₀K₂Mo₂O₁₀ M 550.181

Yellow cryst.

Bis[bis(triphenylphosphine)iminium]salt: [49736-19-8].

C₈₂H₆₀Mo₂N₂O₁₀P₄ M 1549.158

Yellow cryst.

Hayter, R.G., *J. Am. Chem. Soc.*, 1966, **88**, 4376 (*synth*)

Dahl, L.F. *et al*, *J. Am. Chem. Soc.*, 1970, **92**, 7312 (*cryst struct*)

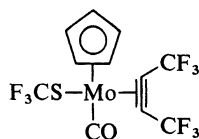
Ungurenasu, C. *et al*, *J. Chem. Soc., Chem. Commun.*, 1975, 388 (*synth*)

C₁₁H₅F₉MoOS

Mo-00046

Carbonyl(η⁵-2,4-cyclopentadien-1-yl)((2,3-η)-1,1,1,4,4,4-hexafluoro-2-butyne)(trifluoromethanethiolato)molybdenum, 9Cl

[*Bis(trifluoromethyl)acetylene*]carbonyl(η⁵-cyclopentadienyl)(trifluoromethanethiolato)molybdenum
[59464-63-0]



M 452.146

Blue cryst. Mp 111-2°.

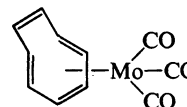
Braterman, P.S. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 241 (*synth*)

C₁₁H₈MoO₃

Mo-00047

Tricarbonyl[(1,2,3,4,5,6-η)-1,3,5,7-cyclooctatetraene]molybdenum, 9Cl

[12108-93-9]



M 284.122

Red or yellow cryst.

Winstein, S. *et al*, *J. Am. Chem. Soc.*, 1965, **87**, 3267 (*synth*)

Kaes, H.D. *et al*, *J. Am. Chem. Soc.*, 1966, **88**, 1319 (*props*)

Paul, I.C. *et al*, *J. Am. Chem. Soc.*, 1966, **88**, 5927 (*cryst struct*)

King, R.B., *Inorg. Chem.*, 1967, **8**, 139 (*synth*)

Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 4723, 7926 (*synth, nmr*)

Mann, B.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 1021 (*nmr*)

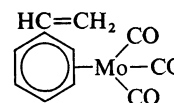
C₁₁H₈MoO₃

Mo-00048

Tricarbonyl[(1,2,3,4,5,6-η)ethenylbenzene]molybdenum, 9Cl

Tricarbonyl(η⁶-styrene)molybdenum

[53041-79-5]



M 284.122

Mp 80-2°.

Nesmeyanov, A.N. *et al*, *J. Organomet. Chem.*, 1975, **102**, 185 (*synth*)

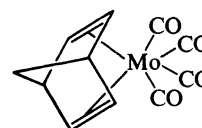
C₁₁H₈MoO₄

Mo-00049

[(2,3,5,6-η)-Bicyclo[2.2.1]hepta-2,5-diene]tetracarbonylmolybdenum, 9Cl

Tetracarbonylnorbornadienemolybdenum

[12146-37-1]



M 300.122

Pale-yellow cryst. Mp 77-8°. Bp_{0.1} 100° subl.

Bennett, M.A. *et al*, *J. Chem. Soc.*, 1961, 2037 (*synth, pmr*)

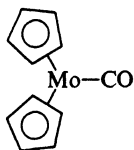
Lauterbur, P.C., *J. Am. Chem. Soc.*, 1965, **87**, 3266 (*cmr*)

Werner, H. *et al*, *J. Organomet. Chem.*, 1966, **5**, 79 (*props*)

Mann, B.E., *J. Chem. Soc., Dalton Trans.*, 1973, 2012 (*cmr, ir*)

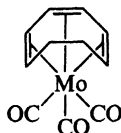
Skinner, H.A. *et al*, *J. Organomet. Chem.*, 1977, **142**, 321 (*props*)

C₁₁H₁₀MoO **Mo-00050**
Carbonylbis(η⁵-2,4-cyclopentadien-1-yl)molybdenum, 10Cl
 [12701-85-8]



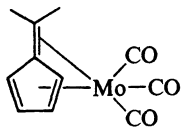
M 254.139
 Bright-green cryst. Bp_{0.001} 35° subl.
 Thomas, J.L., *J. Am. Chem. Soc.*, 1973, **95**, 1838 (*synth*)
 Geoffrey, G.L. *et al*, *Inorg. Chem.*, 1978, **17**, 2410.
 Grebenik, P. *et al*, *J. Chem. Soc., Chem. Commun.*, 1979, 742.

C₁₁H₁₀MoO₃ **Mo-00051**
Tricarbonyl[(1,2,3,4,5,6-η)-1,3,5-cyclooctatriene]molybdenum, 9Cl
 [12093-14-0]



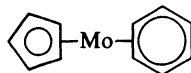
M 286.138
 Orange-red cryst.
 Fischer, E.O. *et al*, *Chem. Ber.*, 1959, **92**, 2645 (*synth*)
 Aumann, R. *et al*, *Tetrahedron Lett.*, 1970, 903 (*synth, props*)
 Kreiter, C.E. *et al*, *Chem. Ber.*, 1975, **108**, 1502 (*nmr*)
 Kesz, H.D. *et al*, *J. Am. Chem. Soc.*, 1966, **88**, 1319 (*props*)

C₁₁H₁₀MoO₃ **Mo-00052**
Tricarbonyl[η⁶-5-(1-methylethylidene)-1,3-cyclopentadiene]molybdenum, 10Cl
Tricarbonyl-η⁶-6,6-dimethylfulvenemolybdenum
 [63835-71-2]



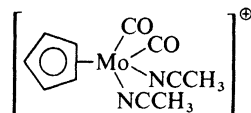
M 286.138
 Dark-red cryst. (hexane). Dec. ca. 130°.
 Edelman, F. *et al*, *J. Organomet. Chem.*, 1977, **134**, 31 (*synth, props*)

C₁₁H₁₁Mo **Mo-00053**
(η⁶-Benzene)(η⁵-2,4-cyclopentadien-1-yl)molybdenum, 9Cl
 [12153-25-2]



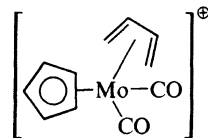
M 239.148
 Red cryst., paramagnetic, air-sensitive. Sol. polar solvs.,
 spar. sol. C₆H₆. Bp_{0.01} 85°.
 Wehner, W.H. *et al*, *Chem. Ber.*, 1970, **103**, 2258.
 Green, M.L.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 311;
 1976, 213.
Inorg. Synth., 1980, **20**, 196 (*synth*)

C₁₁H₁₁MoN₂O₂[⊕] **Mo-00054**
Bis(acetonitrile)dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)molybdenum(1+), 9Cl
 [12109-14-7]



M 299.160 (ion)
Hexafluorophosphate:
 C₁₁H₁₁F₆MoN₂O₂P M 444.124
 Orange-red cryst. Sol. CH₂Cl₂.
Tetraphenylborate: [68868-08-6].
 C₃₅H₃₁BMoN₂O₂ M 618.392
 Orange-red cryst.
 Treichel, P.M. *et al*, *J. Organomet. Chem.*, 1967, **7**, 449 (*synth*)
 Nolte, M.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 932
 (*synth*)

C₁₁H₁₁MoO₂[⊕] **Mo-00055**
(η⁴-1,3-Butadiene)dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)molybdenum(1+), 9Cl
Dicarbonyl(η⁴-1,3-butadiene)(η⁵-cyclopentadienyl)molybdenum(1+)

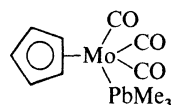


M 271.147 (ion)
Tetrafluoroborate: [63947-89-7].
 C₁₁H₁₁BF₄MoO₂ M 357.950
 Yellow cryst. Reacts with nucleophiles.
 Faller, J.W. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 4858 (*synth*)
 Faller, J.W. *et al*, *Ann. N.Y. Acad. Sci.*, 1977, **295**, 186.

C₁₁H₁₄GeMoO₃ **Mo-00056**
Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(trimethylgermyl)molybdenum, 9Cl
Trimethylgermyltricarbonyl(η⁵-cyclopentadienyl)molybdenum
 [33306-91-1]
 As Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)molybdenum, Mo-00011 with
 L = GeMe₃

M 362.760
 Pale-yellow cryst. Mp 84°. Bp_{0.001} 70° subl.
 Carrick, A. *et al*, *J. Chem. Soc. (A)*, 1968, 913 (*synth*)
 Cardin, D.J. *et al*, *J. Chem. Soc. (A)*, 1970, 2594 (*synth, ir, nmr, uv*)
 Dean, W.K. *et al*, *Inorg. Chem.*, 1977, **16**, 1061 (*synth, props*)

C₁₁H₁₄MoO₃Pb **Mo-00057**
Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(trimethylplumbyl)molybdenum
(Trimethylplumbyl)(cyclopentadienyl)tricarbonylmolybdenum



M 497.370

Pale-orange solid (CH₂Cl₂/pentane). Mp 93-5°.
Patil, H.R.H. *et al*, *Inorg. Chem.*, 1966, **5**, 1401.

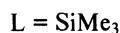
C₁₁H₁₄MoO₃Si **Mo-00058**

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(trimethylsilyl)molybdenum, 9Cl

Trimethylsilyltricarbonyl(η⁵-cyclopentadienyl)molybdenum

[12282-32-5]

As Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-molybdenum, Mo-00011 with



M 318.255

Orange-yellow solid, air- and light-sensitive. Bp_{0.001} 100° subl.

Cardin, D.J. *et al*, *J. Chem. Soc. (A)*, 1970, 2594 (*synth*)

Hagen, A.P. *et al*, *Inorg. Chem.*, 1971, **10**, 1657 (*synth*)

Malisch, W. *et al*, *Chem. Ber.*, 1974, **107**, 979 (*synth*)

C₁₁H₁₄MoO₃Sn **Mo-00059**

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(trimethylstannyl)molybdenum, 9Cl

Trimethylstannyltricarbonyl(η⁵-cyclopentadienyl)molybdenum

[12214-92-5]

As Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-molybdenum, Mo-00011 with



M 408.860

Pale-yellow cryst. (hexane). Mp 99-100°. Bp_{0.001} 80° subl.

Abel, E.W. *et al*, *J. Organomet. Chem.*, 1970, **22**, C31.

Inorg. Synth., 1970, **12**, 60 (*synth*, *ir*, *nmr*)

Cardin, D.J. *et al*, *J. Chem. Soc. (A)*, 1970, 2594.

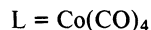
Abel, E.W. *et al*, *J. Organomet. Chem.*, 1973, **49**, 435 (*synth*)

C₁₂H₅CoMoO₇ **Mo-00060**

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(tetracarbonylcobalt)molybdenum, 10Cl

[62015-65-0]

As Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)molybdenum, Mo-00011 with



M 416.041

Cryst. (pentane). Mp 63-5° (sealed under Ar).

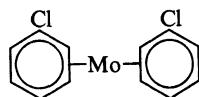
Schmid, E. *et al*, *Z. Naturforsch., B*, 1977, **32**, 1277 (*synth*, *props*)

Abrahamson, H.B. *et al*, *Inorg. Chem.*, 1978, **17**, 1003 (*synth*, *props*)

C₁₂H₁₀Cl₂Mo **Mo-00061**

Bis(η⁶-chlorobenzene)molybdenum, 9Cl

[52346-34-6]



M 321.057

Light green, air-sensitive powder. Dec. at 92° (under N₂ sealed tube).

▷Pyrophoric

Inorg. Synth., 1979, **19**, 80 (*synth*)

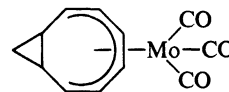
Green, M.L.H., *J. Organomet. Chem.*, 1980, **200**, 119 (*props*)

C₁₂H₁₀MoO₃ **Mo-00062**

[(2,3,4,5,6,7-η)-Bicyclo[6.1.0]nona-2,4,6-triene]tricarbonylmolybdenum, 9Cl

Tricarbonyl-η⁶-bicyclo[6.1.0]nona-2,4,6-trienemolybdenum

[41354-56-7]



M 298.149

Orange cryst.

Grimme, W., *Chem. Ber.*, 1967, **100**, 113 (*synth*, *props*)

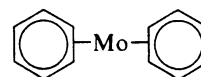
Brookhart, M. *et al*, *Inorg. Chem.*, 1974, **13**, 1540 (*props*)

Darensbourg, D.J. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 4119 (*props*)

C₁₂H₁₂Mo **Mo-00063**

Bis(η⁶-benzene)molybdenum, 9Cl

[12129-68-9]



M 252.167

Green cryst. Mp 115° dec. Air-sensitive. Sublimes (high vac.) at 110-5°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1956, **89**, 1805; 1960, **93**, 2065 (*synth*)

Fritz, H.P. *et al*, *Spectrochim. Acta*, 1961, **17**, 1068 (*ir*)

Schneider, R. *et al*, *Naturwissenschaften*, 1962, **48**, 452 (*cryst struct*)

Benfield, F.W.S. *et al*, *J. Chem. Soc., Chem. Commun.*, 1973, 866 (*synth*)

Silvon, M.P. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 1945 (*synth*)

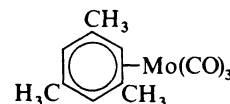
Green, M.L.H., *J. Organomet. Chem.*, 1980, **200**, 119 (*synth*, *props*)

C₁₂H₁₂MoO₃ **Mo-00064**

(η⁶-1,3,5-Trimethylbenzene)tricarbonylmolybdenum

Mesitylenetricarbonylmolybdenum. Tricarbonyl-1,3,5-trimethylbenzenemolybdenum

[12089-15-5]



M 300.165

Yellow cryst. Mp 140° dec.

Price, J.T. *et al*, *Can. J. Chem.*, 1968, **46**, 515 (*pmr*)

U.S.P., 3 382 263, (1968); *CA*, **69**, 59376 (*synth*)

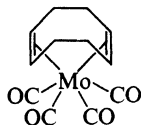
Lokshin, B.V. *et al*, *Zh. Strukt. Khim.*, 1975, **16**, 592; *CA*, **84**, 51628 (*ir*, *raman*)

Nesmeyanov, A.N. *et al*, *J. Organomet. Chem.*, 1975, **102**, 185 (*synth*)

Koskland, D.E. *et al*, *Acta Crystallogr., Sect. B*, 1977, **53**, 2013 (*struct*)

C₁₂H₁₂MoO₄**Mo-00065**

Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]molybdenum, 9Cl
[12109-74-9]

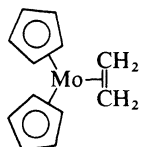


M 316.164

Yellow-brown solid. Mp 125-9° dec.

Leigh, G.J. *et al*, *J. Organomet. Chem.*, 1965, **4**, 461 (*synth*)Zingales, F. *et al*, *J. Organomet. Chem.*, 1967, **7**, 461 (*props*)King, R.B., *J. Organomet. Chem.*, 1967, **8**, 139 (*synth*)Zingales, F. *et al*, *J. Am. Chem. Soc.*, 1967, **89**, 256 (*props*)Tayim, H.A. *et al*, *Inorg. Nucl. Chem. Lett.*, 1972, **8**, 231.**C₁₂H₁₄Mo****Mo-00066**

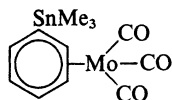
Bis(η^5 -cyclopentadienyl)(η^2 -ethylene)molybdenum
Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)molybdenum, 9Cl
[37343-05-8]



M 254.183

Bright-red needles. Bp_{0.0001} 50° subl.Thomas, J.L., *J. Am. Chem. Soc.*, 1973, **95**, 1838 (*synth, nmr, ms*)**C₁₂H₁₄MoO₃Sn****Mo-00067**

Tricarbonyl(η^6 -trimethylstannylbenzene)molybdenum
Tricarbonyl(trimethylphenylstannane)molybdenum, 8Cl
[31870-76-5]

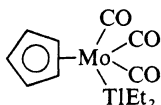


M 420.871

Shiny-yellow needles (pet. ether). Mp 103-5°.

Poeth, T.P. *et al*, *Inorg. Chem.*, 1971, **10**, 522 (*synth, ir, nmr, ms, uv*)**C₁₂H₁₅MoO₃Tl****Mo-00068**

Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(diethylthallium)-molybdenum
[66125-44-8]



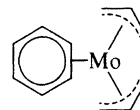
M 507.572

Mp 86-7°.

▷Toxic

Walther, B. *et al*, *J. Organomet. Chem.*, 1978, **145**, 285 (*synth, ir, nmr*)**C₁₂H₁₆Mo****Mo-00069**

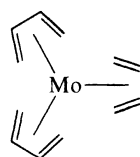
(η^6 -Benzene)bis(η^3 -2-propenyl)molybdenum, 9Cl
Bis(η^3 -allyl)(η^6 -benzene)molybdenum. *Diallyl*- η^6 -benzenemolybdenum
[35625-70-8]



M 256.198

Green, M.L.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 311; 1976, 213.**C₁₂H₁₈Mo****Mo-00070**

Tris(η^4 -1,3-butadiene)molybdenum, 9Cl
[51733-17-6]



M 258.214

Yellow cryst. (heptane). Bp_{0.001} 50-60° subl.Skell, P.S. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 626 (*synth, ir, nmr, ms*)Skell, P.S. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1975, **14**, 195 (*synth, struct*)**C₁₂H₂₀MoN₂O₂S₄****Mo-00071**

Dicarbonylbis(diethylcarbamoedithioato-S,S')molybdenum, 10Cl
[18947-43-8]

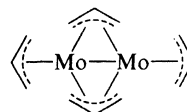


M 448.482

16-Electron complex.

Colton, R. *et al*, *Aust. J. Chem.*, 1968, **21**, 15 (*synth*)McDonald, J.W. *et al*, *J. Organomet. Chem.*, 1975, **92**, C25.*Inorg. Synth.*, 1976, **16**, 235 (*synth*)**C₁₂H₂₀Mo₂****Mo-00072**

Bis[μ -(1- η :2,3- η)-2-propenyl]bis(η^3 -2-propenyl)dimolybdenum, 9Cl
Tetraallyldimolybdenum
[79739-15-4]



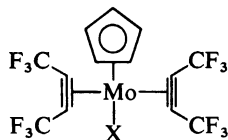
M 356.170

Dark-green cryst., air- and moisture-sensitive.

Oberkirch, W., *Diss. Techn. Hochschule, Aachen*, 1963 (*synth*)Wilke, E. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1966, **5**, 151 (*synth*)Ramey, K.C. *et al*, *J. Am. Chem. Soc.*, 1968, **90**, 4275 (*nmr*)Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 5441 (*synth, struct*)Benn, R. *et al*, *J. Organomet. Chem.*, 1979, **174**, C38 (*props*)

C₁₃H₅ClF₁₂Mo**Mo-00073**

Chloro(η^5 -2,4-cyclopentadien-1-yl)bis[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne]molybdenum, 10Cl
[54721-00-5]



X = Cl

M 520.556
Yellow cryst.

Davidson, J.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 2531;
1977, 287 (*props, synth*)
Davidson, J.L., *J. Organomet. Chem.*, 1980, **186**, C19 (*props*)

C₁₃H₅F₁₂IMo**Mo-00074**

(η^5 -2,4-Cyclopentadien-1-yl)bis[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne]iodomolybdenum, 10Cl
[59172-20-2]

As Chloro(η^5 -2,4-cyclopentadien-1-yl)bis[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne]molybdenum, Mo-00073 with

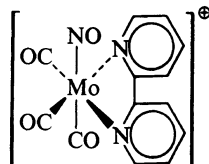
X = I

M 612.008
Red-brown cryst.

Davidson, J.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 2531.
Davidson, J.L. *et al*, *J. Chem. Soc., Chem. Commun.*, 1980, 113
(*synth, nmr*)

C₁₃H₈MoN₃O₄⁺**Mo-00075**

(2,2'-Bipyridine-*N,N'*)tricarbonylnitrosylmolybdenum(1+)
[63890-69-7]



M 366.164 (ion)

fac-form

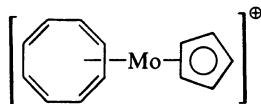
Tetrafluoroborate: [63890-70-0].

C₁₃H₈BF₄MoN₃O₄ M 452.968
Red-brown solid. Sol. CH₂Cl₂.

Condon, D. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 925
(*synth, props*)

C₁₃H₁₃Mo⁺**Mo-00076**

(η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)-molybdenum(1+), 10Cl



M 265.186 (ion)

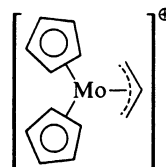
Hexafluorophosphate: [61930-16-3].

C₁₃H₁₃F₆PMo M 410.150
No phys. props. reported.

Segel, J.A. *et al*, *J. Chem. Soc., Chem. Commun.*, 1976, 766
(*synth, props*)

C₁₃H₁₅Mo⁺**Mo-00077**

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)molybdenum(1+), 10Cl
[53449-94-8]



M 267.202 (ion)

Hexafluorophosphate: [53449-95-9].

C₁₃H₁₅F₆MoP M 412.166
Red cryst.

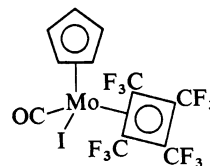
Green, M.L.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1993
(*synth*)

Ephritikhine, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 1131
(*props*)

Davies, S. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 1510
(*synth*)

C₁₄H₅F₁₂IMoO**Mo-00078**

Carbonyl(η^5 -2,4-cyclopentadien-1-yl)iodo[(1,2,3,4- η)-1,2,3,4-tetrakis(trifluoromethyl)cyclobutadiene]molybdenum, 10Cl
[74890-12-3]



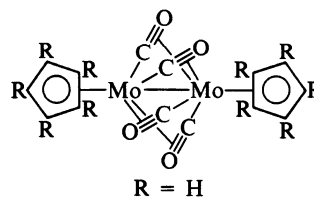
M 640.018

Dynamic nmr reported.

Davidson, J.L. *et al*, *J. Chem. Soc., Chem. Commun.*, 1980, 113
(*synth, nmr*)

C₁₄H₁₀Mo₂O₄**Mo-00079**

Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)dimolybdenum, 10Cl
Dicyclopentadienyltetracarbonyldimolybdenum
[56200-27-2]



R = H

M 434.111

Dark-brown cryst.

Ginley, D.S. *et al*, *Inorg. Chim. Acta*, 1977, **23**, 85 (*synth*)

Bailey, W.I. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 5764.

Chisholm, M.H. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 807.

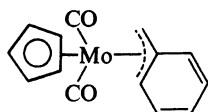
Klinger, R.J. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 5034 (*synth*)

King, R.B. *et al*, *J. Organomet. Chem.*, 1979, **171**, 53.

Jemmis, E.D. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 2576.

C₁₄H₁₂MoO₂**Mo-00080**

Benzylidencarbonyl- π -cyclopentadienylmolybdenum, 8Cl
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(phenylmethyl)-molybdenum
 [12126-95-3]

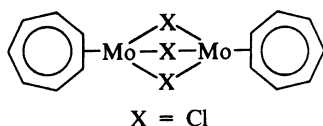


M 308.188

Dark-red cryst., blackens on storage at r.t. in closed vials.

Mp 83-5°. Bp_{0.1} 80° subl.King, R.B. *et al*, *J. Am. Chem. Soc.*, 1966, **88**, 709 (*synth*, *ir*, *nmr*)Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1968, **90**, 5418 (*struct*)Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 1339.**C₁₄H₁₄Cl₃Mo₂****Mo-00081**

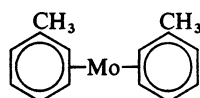
Trichlorobis(η^7 -2,4,6-cycloheptatrien-1-yl)dimolybdenum, 9Cl
Bis(η^7 -2,4,6-cycloheptatrien-1-yl)tri- μ -chlorodimolybdenum
 [51809-70-2]



M 480.504

Allen, G.C. *et al*, *J. Chem. Soc., Chem. Commun.*, 1976, 794 (*pe*)Bochmann, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 714 (*synth*)Ashworth, E.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 1693 (*synth*, *props*)**C₁₄H₁₆Mo****Mo-00082**

Bis[(1,2,3,4,5,6- η)methylbenzene]molybdenum, 9Cl
Bis(η^6 -toluene)molybdenum
 [12131-22-5]

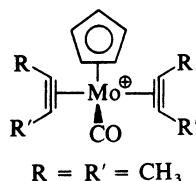


M 280.220

Green air-sensitive cryst.

Green, M.L.H. *et al*, *J. Chem. Soc. (A)*, 1971, 2929.Green, M.L.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 301.Green, M.L.H., *J. Organomet. Chem.*, 1980, **200**, 119 (*synth*, *props*)**C₁₄H₁₇MoO⁺****Mo-00083**

Bis[(2,3- η)-2-butyne]carbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+), 10Cl
 [66615-14-3]



M 297.228 (ion)

Tetrafluoroborate: [66615-15-4].

C₁₄H₁₇BF₄MoO M 384.031Yellow cryst. (CH₂Cl₂/Et₂O).

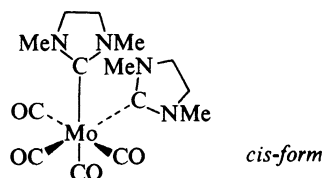
Hexafluorophosphate: [74380-92-0].

C₁₄H₁₇F₆MoOP M 442.192

Yellow cryst.

Bottrill, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 2365 (*synth*)Bergmann, R.E. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 2698 (*synth*)Allen, J.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 873 (*props*)**C₁₄H₂₀MoN₄O₄****Mo-00084**

Tetracarbonylbis(1,3-dimethyl-2-imidazolidinylidene)molybdenum, 10Cl
 [64161-94-0]

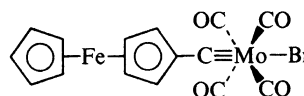


M 404.276

Dicarbene complex.

cis-formPale-yellow microcryst. Sol. Me₂CO, CHCl₃. Mp 274°.***trans-form***By irradiation of *cis-form* in Me₂CO. Deep-orange microcryst. Spar. sol. Me₂CO. Readily reverts to *cis-form* on heating to 140-60° or on dissolution in CHCl₃ (30°).Lappert, M.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 1272 (*ir*, *pmr*, *cmr*, *cryst struct*, *synth*, *props*)**C₁₅H₉BrFeMoO₄****Mo-00085**

Bromotetracarbonyl(ferrocenylmethylidyne)molybdenum, 10Cl



M 484.925

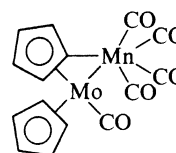
trans-form [68830-12-6]

Red microcryst. Mp >40° dec.

Fischer, E.O. *et al*, *Chem. Ber.*, 1978, **111**, 3530 (*synth*, *pmr*, *cmr*, *ir*, *polarog*)**C₁₅H₉MnMoO₅****Mo-00086**

Molybdenumcarbonyl(η^5 -2,4-cyclopentadien-1-yl)[μ -(η^5 -2,4-cyclopentadien-1-ylidene)]tetracarbonylmanganese, 10Cl

[71411-08-0]



M 420.111

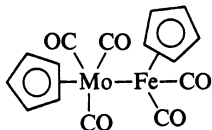
Red cryst.

Hoxmeier, R.J., *J. Am. Chem. Soc.*, 1971, **93**, 536 (*synth*)Hoxmeier, R.J., *Inorg. Chem.*, 1979, **18**, 3453, 3462 (*synth*, *struct*)

C₁₅H₁₀FeMoO₅

Mo-00087

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)iron)molybdenum, 10Cl
 Tricarbonyl-π-cyclopentadienyl(dicarbonyl-π-cyclopentadienylferrio)molybdenum, 8Cl. Pentacarbonyl-bis(η⁵-2,4-cyclopentadien-1-yl)ironmolybdenum
 [12130-13-1]

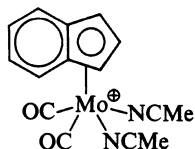


M 422.028

Red-violet cryst. (pentane or C₆H₆). Mp 209° (205°).King, R.B. *et al*, *Chem. Ind. (London)*, 1961, 747 (*synth, ir*)Abrahamson, H.B. *et al*, *Inorg. Chem.*, 1978, 17, 1003 (*uv, ir, synth, pmr*)Madach, T. *et al*, *Chem. Ber.*, 1980, 113, 2675 (*pmr, ir*)C₁₅H₁₃MoN₂O₂⁺

Mo-00088

Bis(acetonitrile)dicarbonyl[(1,2,3,3a,7a-η)-1H-inden-1-yl]molybdenum(1+), 9Cl
 [66615-32-5]



M 349.220 (ion)

Tetrafluoroborate: [66615-33-6].

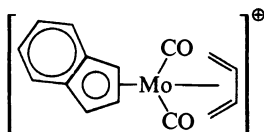
C₁₅H₁₃BF₄MoN₂O₂ M 436.024

Orange cryst. Characterised spectroscopically.

Bottrill, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 2365 (*synth, ir, nmr*)C₁₅H₁₃MoO₂⁺

Mo-00089

(η⁴-1,3-Butadiene)dicarbonyl[(1,2,3,3a,7a-η)-1H-inden-1-yl]molybdenum(1+)
 [66615-20-1]



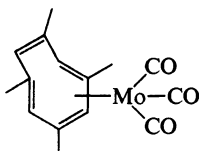
M 321.207 (ion)

Tetrafluoroborate: [66615-21-2].

C₁₅H₁₃BF₄MoO₂ M 408.010Yellow cryst. (CH₂Cl₂/Et₂O).Bottrill, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 2365 (*synth, props*)C₁₅H₁₆MoO₃

Mo-00090

Tricarbonyl(η⁶-1,3,5,7-tetramethyl-1,3,5,7-cyclooctatetraene)molybdenum, 8Cl
 [12111-76-1]

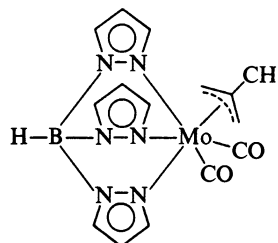


M 340.230

Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1968, 90, 1438 (*synth, nmr*)C₁₅H₁₇BMoN₆O₂

Mo-00091

Dicarbonyl[hydrotris(1H-pyrazolato-N¹)borato(1-)-N²,N²,N²[(1,2,3-η)-2-methyl-2-propenyl]molybdenum, 9Cl
 [38834-21-8]



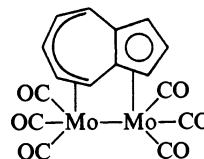
M 420.088

Yellow cryst.

Trofimenko, S. *et al*, *J. Am. Chem. Soc.*, 1969, 91, 588, 3183 (*synth, nmr*)Meekin, P. *et al*, *J. Am. Chem. Soc.*, 1972, 94, 5677 (*nmr*)Holt, E.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 2444 (*cryst struct*)C₁₆H₈Mo₂O₆

Mo-00092

[μ-[(1,2,3,3a,8a-η:4,5,6,7,8-η)azulene]]hexacarbonyldimolybdenum, 10Cl
 Hexacarbonylazulenedimolybdenum. Azulenedimolybdenum hexacarbonyl
 [60295-03-6]



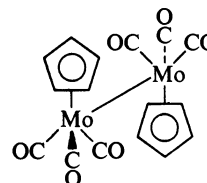
M 488.116

Blackish-red cryst.; dec. >150°. Diamagnetic. Fluxional with CO scrambling.

Burton, R. *et al*, *J. Chem. Soc.*, 1960, 4290 (*synth, nmr*)King, R.B. *et al*, *Inorg. Chem.*, 1965, 4, 475 (*synth, ir, nmr*)Churchill, M.R. *et al*, *Inorg. Chem.*, 1968, 7, 1545 (*cryst struct*)Cotton, F.A. *et al*, *Inorg. Chem.*, 1976, 15, 1866 (*cryst struct*)Cotton, F.A. *et al*, *Inorg. Chem.*, 1976, 15, 2806 (*cmr*)C₁₆H₁₀Mo₂O₆

Mo-00093

Hexacarbonylbis(η⁵-2,4-cyclopentadien-1-yl)dimolybdenum, 10Cl
 Bis(tricarbonyl-π-cyclopentadienylmolybdenum)
 [12091-64-4]



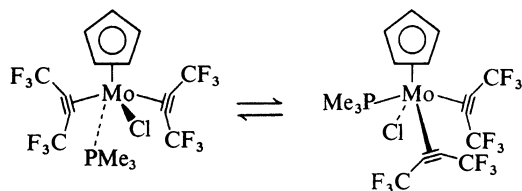
M 490.131

Red-violet cryst. (pentane/CH₂Cl₂). Bp_{0.1} 150° subl.*Inorg. Synth.*, 1963, 7, 99 (*synth*)Dub, M., *Organometallic Compounds*, Springer-Verlag, Berlin, 2nd Ed., 1966, Vol. 1 (*props*)

Curtis, M.D., *Inorg. Nucl. Chem. Lett.*, 1970, 859.
 Haines, R.J. *et al*, *J. Organomet. Chem.*, 1971, **28**, 97.
 Birdwhistell, R. *et al*, *J. Organomet. Chem.*, 1978, **157**, 239
 (*synth*)

C₁₆H₁₄ClF₁₂MoP **Mo-00094**

Chloro(η^5 -2,4-cyclopentadien-1-yl)bis[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butene](trimethylphosphine)molybdenum, 10Cl
 [66118-38-5]



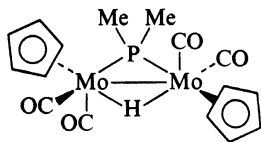
M 596.634

Mixt. of isomers in soln., with suggested structs. as shown. Pale-yellow cryst. (CH₂Cl₂/hexane). Mp 175° dec.

Davidson, J.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 2246
 (*synth*, *ir*, *pmr*, *nmr*)

C₁₆H₁₇Mo₂O₄P **Mo-00095**

Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(dimethylphosphino)]- μ -hydridimolybdenum, 10Cl
 [12092-01-2]



M 496.162

Orange-red rod-like cryst. (C₆H₆/hexane). Mp 215°.

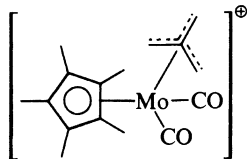
Hayter, R.G., *Inorg. Chem.*, 1962, **2**, 1031 (*synth*, *ir*, *nmr*)
 Petersen, J.L. *et al*, *Inorg. Chem.*, 1978, **17**, 1308 (*struct*)
 Petersen, J.L. *Inorg. Chem.*, 1980, **19**, 186 (*struct*)

C₁₆H₂₁MoO₂⁺ **Mo-00096**

Dicarbonyl(η^4 -2-methylene-1,3-propanediyl)(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl)molybdenum(1+), 10Cl

Dicarbonyl(η^4 -trimethylenemethane)(η^5 -cyclopentadienyl)molybdenum(1+)

[75593-05-4]



M 341.281 (ion)

Tetrafluoroborate: [75593-06-5].

C₁₆H₂₁BF₄MoO₂ M 428.084

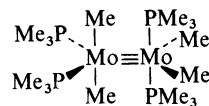
Yellow cryst.

Barnes, S.G. *et al*, *J. Chem. Soc., Chem. Commun.*, 1980, 267
 (*synth*, *props*)

C₁₆H₄₈Mo₂P₄

Mo-00097

Tetramethyltetakis(trimethylphosphine)dimolybdenum, 9Cl
 [64376-69-8]



M 556.330

Blue cryst. Mp 220° dec. (sealed tube).

Anderson, R.A. *et al*, *J. Chem. Soc., Chem. Commun.*, 1977, 283 (*synth*)

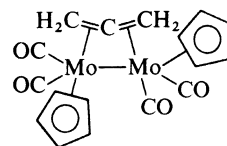
Anderson, R.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 446
 (*synth*, *nmr*, *struct*)

Anderson, R.A. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 3953 (*cryst struct*)

C₁₇H₁₄MoO₄

Mo-00098

Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(1,2- η :2,3- η)-1,2-propadiene]]dimolybdenum, 10Cl
 Allenetetracarbonylbiscyclopentadienyldimolybdenum
 [62573-31-3]



M 378.235

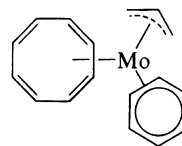
Red cryst. (toluene/pentane), mod. air stable in solid state. Sol. aromatic solvs. Sol. CH₂Cl₂, CHCl₃ but dec. after several hrs. V-shaped allene moiety.

Bailey, W.L., *J. Am. Chem. Soc.*, 1978, **100**, 802 (*ir*, *nmr*, *ms*, *synth*, *cryst struct*)

C₁₇H₁₉Mo⁺

Mo-00099

(η^6 -Benzene)(1,2,3,4- η)-1,3,5,7-cyclooctatetraene(η^3 -2-propenyl)molybdenum(1+)
 η^3 -Allyl- η^6 -benzene- η^4 -cyclooctatetraenemolybdenum-
 (1+)



M 319.277 (ion)

Hexafluorophosphate: [59464-56-1].

C₁₇H₁₉F₆PMo M 464.241

Dark-red cryst. (CH₂Cl₂, THF).

Green, M.L.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 311;
 1976, 213 (*synth*, *nmr*)

C₁₇H₂₃Mo₂O₃

Mo-00100

Bis(η^7 -2,4,6-cycloheptatrien-1-yl)tri- μ -methoxydimolybdenum, 10Cl
 [53321-77-0]

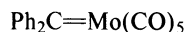
As Trichlorobis(η^7 -2,4,6-cycloheptatrien-1-yl)dimolybdenum, Mo-00081 with

X = OMe

M 467.247

Ashworth, E.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 1693
 (*synth*)

C₁₈H₁₀MoO₅ **Mo-00101**
Pentacarbonyl(diphenylmethylene)molybdenum, 10Cl
 [76346-28-6]

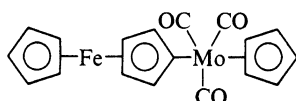


M 402.214

Dark-red cryst.

Beatty, R.P. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 238 (*synth, props*)

C₁₈H₁₄FeMoO₃ **Mo-00102**
Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)ferrocenylmolybdenum, 9Cl
 [60349-56-6]

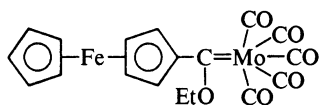


M 430.094

Mp 140° dec.

Pannell, K.H. *et al*, *Inorg. Chem.*, 1976, **15**, 2671 (*synth, ir, pmr*)

C₁₈H₁₄FeMoO₆ **Mo-00103**
Pentacarbonyl(ethoxyferrocenylmethylene)molybdenum, 10Cl
 [68830-11-5]



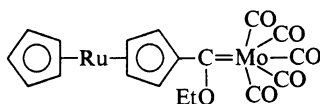
M 478.092

Black-red cryst. (pentane). Mp >85° dec.

Fischer, E.O. *et al*, *Chem. Ber.*, 1978, **111**, 3530 (*synth, ir, pmr, cmr*)

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1980, **191**, 261 (*ir, pmr, cmr*)

C₁₈H₁₄MoO₆Ru **Mo-00104**
Pentacarbonyl(ethoxyruthenocenylmethylene)molybdenum, 10Cl
 [75280-68-1]

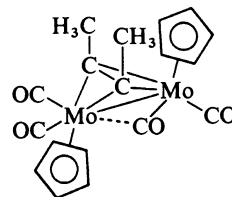


M 523.315

Orange-yellow cryst. (CH₂Cl₂/pentane). Mp 108°.

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1980, **191**, 261 (*synth, ir, ms, pmr, cmr*)

C₁₈H₁₆Mo₂O₄ **Mo-00105**
[η-(2,3-η:2,3-η)-2-Butyne]tetracarbonylbis(η⁵-2,4-cyclopentadien-1-yl)dimolybdenum, 10Cl
μ-Dimethylacetylenebis(cyclopentadienyldicarbonylmolybdenum)
 [68079-61-8]



M 488.202

Dark-red cryst. Sol. C₆H₆, CH₂Cl₂.

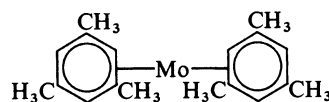
Ginley, D.S. *et al*, *Inorg. Chim. Acta*, 1977, **23**, 85 (*synth*)

Curtis, M.D. *et al*, *J. Organomet. Chem.*, 1978, **161**, 23 (*synth*)

Bailey, W.I. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 5764 (*synth, cryst struct*)

Knox, S.A.R. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 221; 1979, 934 (*props*)

C₁₈H₂₄Mo **Mo-00106**
Bis[(1,2,3,4,5,6-η)-1,3,5-trimethylbenzene]molybdenum, 9Cl
Bis(η⁶-mesitylene)molybdenum
 [12131-50-9]



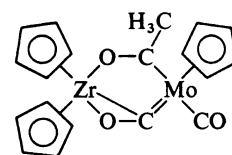
M 336.328

Green air-sensitive cryst.

Benfield, F.W.S. *et al*, *J. Chem. Soc., Chem. Commun.*, 1973, 866 (*synth*)

Green, M.L.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 301 (*synth*)

C₁₉H₁₈MoO₃Zr **Mo-00107**
[μ-(Acetyl-C:O)]μ-(η²-carbonyl)[carbonyl(η⁵-2,4-cyclopentadien-1-yl)molybdenum]bis(η⁵-2,4-cyclopentadien-1-yl)zirconium
μ-[Acetyl-C(Mo):O(Zr)]μ-[carbonyl-C-(Mo):O(Zr)]bis-η-cyclopentadienylyl zirconium(carbonyl)η-cyclopentadienylmolybdenum
 [76671-79-9]



M 481.509

Air-stable solid. Yellow cryst. Unreactive to most donor ligands.

Longato, B. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 209 (*synth, ir, nmr, cryst struct*)

C₁₉H₃₁MoO₆P₂[⊕] **Mo-00108**
[(2,3-η)-2-Butyne][(1,2,3,3a,7a-η)-1H-inden-1-yl]bis(trimethylphosphite)molybdenum(1+), 10Cl
 [64347-67-7]

As [(2,3-η)-2-Butyne][(1,2,3,3a,7a-η)-1H-inden-1-yl]bis(trimethylphosphine)molybdenum(1+), Mo-00109 with

R = OMe

M 513.338 (ion)

Tetrafluoroborate: [64347-68-8].C₁₉H₃₁BF₄MoO₆P₂ M 600.141

Yellow cryst.

Bottrill, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 2365

(synth)

Allen, S.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1983, 927

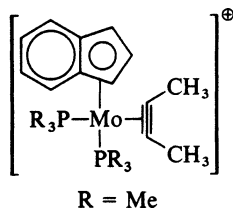
(props)

C₁₉H₃₁MoP₂⁺

Mo-00109

[(2,3-η)-2-Butyne]((1,2,3,3a,7a-η)-1H-inden-1-yl)bis(trimethylphosphine)molybdenum(1+), 10Cl

[78091-05-1]



M 417.341 (ion)

Tetrafluoroborate: [78091-06-2].C₁₉H₃₁BF₄MoP₂ M 504.145

Blue air-sensitive cryst.

Allen, S.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 873

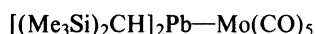
(synth)

C₁₉H₃₈MoO₅PbSi₄

Mo-00110

[Bis[bis(trimethylsilyl)methyl]plumbylene]pentacarbonylmolybdenum, 10Cl

[62789-86-0]



M 761.988

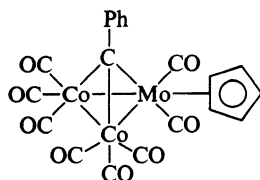
Yellow complex.

Cotton, J.D. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 2275.C₂₀H₁₀Co₂MoO₈

Mo-00111

Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(hexacarbonyldicobalt)[μ₃-(phenylmethylidyne)]molybdenum, 10Cl

[68185-45-5]



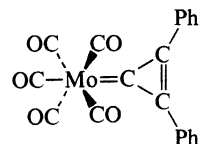
M 592.101

Black cryst. Mp 165° dec. pmr δ 5.22 (s, C₅H₅) 7.21 (m, C₆H₅-)ppm (CCl₄).Beurich, H., *Angew. Chem., Int. Ed. Engl.*, 1978, 17, 863 (synth, ir, pmr)C₂₀H₁₀MoO₅

Mo-00112

Pentacarbonyl(2,3-diphenyl-2-cyclopropen-1-ylidene)molybdenum, 9Cl

[37766-71-5]



M 426.236

Yellow cryst. Mp 180° dec.

Rees, C.W. *et al*, *J. Chem. Soc., Chem. Commun.*, 1972, 428

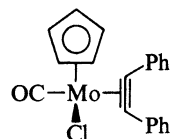
(synth, props)

C₂₀H₁₅ClMoO

Mo-00113

Carbonylchloro(η⁵-2,4-cyclopentadien-1-yl)(diphenylacetylene)molybdenumCarbonylchloro(η⁵-2,4-cyclopentadien-1-yl)[1,1'-(η²-1,2-ethynediyl)bis(benzene)]molybdenum, 10Cl

[54720-88-6]



M 402.731

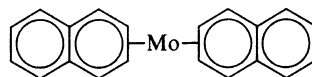
Green cryst.

Davidson, J.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 287, 2246 (props)C₂₀H₁₆Mo

Mo-00114

Bis[(1,2,3,4,4a,8a-η)naphthalene]molybdenum, 10Cl

[67422-84-8]



M 352.286

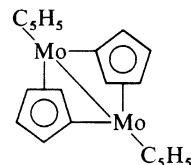
V. air-sensitive deep-red solid.

Kündig, E.P. *et al*, *J. Chem. Soc., Chem. Commun.*, 1977, 912 (synth, props)C₂₀H₁₈Mo₂

Mo-00115

Bis(η⁵-2,4-cyclopentadien-1-yl)bis[μ-(η⁵-2,4-cyclopentadien-1-ylidene)]dimolybdenum, 10Cl*Dehydromolybdenocene*

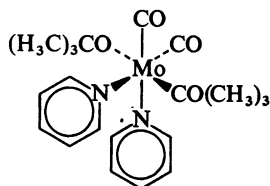
[66705-66-6]



M 450.242

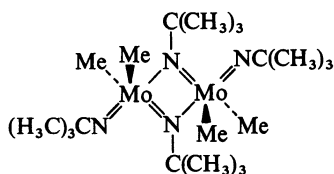
Starting material for (C₅H₅)₂Mo chemistry. Dark-red cryst.Smart, J.C. *et al*, *Inorg. Chem.*, 1978, 17, 3290.Meunier, B. *et al*, *Acta Crystallogr., Sect. B*, 1979, 35, 2558 (cryst struct)Berry, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 29 (synth, nmr)

C₂₀H₂₈MoON₂O₄ **Mo-00116**
Dicarbonylbis(2-methyl-2-propanolato)bis(pyridine)molybdenum, 10Cl
Bis(tert-butoxy)dicarbonylbis(pyridine)molybdenum
 [72202-89-2]



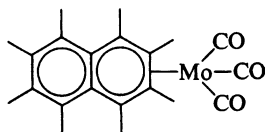
M 472.392
 Green, air-sensitive cryst. Sol. toluene with dec., insol. hexane. ν_{CO} 1908, 1768 cm⁻¹ (nujol).
 Chisholm, M.H. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 7615 (synth, ir, cryst struct, ms)

C₂₀H₄₈Mo₂N₄ **Mo-00117**
Bis[μ-[2-methyl-2-propanaminato(2-)]][bis[2-methyl-2-propanaminato(2-)]tetramethyldimolybdenum, 10Cl
Tetrakis(tert-butylaminato)tetramethyldimolybdenum
 [73448-06-3]



M 536.506
 Air-sensitive, violet cryst. Sol. hexane.
 Nugent, W.A. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 1759 (synth)
 Thorn, D.L. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 357 (struct)

C₂₁H₂₄MoO₃ **Mo-00118**
Tricarbonyl(η⁶-octamethylnaphthalene)molybdenum
 [79391-57-4]



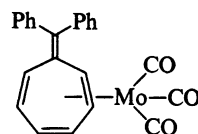
M 420.359
 Bright-orange cryst.
 Hull, J.W. *et al*, *Organometallics*, 1982, **1**, 264 (synth, struct)

C₂₃H₁₅MoO₅P **Mo-00119**
Pentacarbonyl(triphenylphosphine)molybdenum, 10Cl
 [14971-42-7]



M 498.282
 Pale-yellow cryst. Mp 127-8°.
 Magee, T.A. *et al*, *J. Am. Chem. Soc.*, 1961, **83**, 3200 (synth)
 Cotton, F.A. *et al*, *Inorg. Chem.*, 1981, **20**, 580 (synth, cryst struct)

C₂₃H₁₆MoO₃ **Mo-00120**
Tricarbonyl[(1,2,3,4,5,6-η)-7-(diphenylmethylene)-1,3,5-cycloheptatriene]molybdenum, 9Cl
Tricarbonyl η⁶-8,8-diphenylheptafulvenemolybdenum
 [52445-38-2]



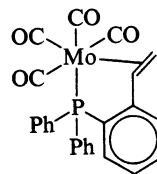
M 436.318
 Red cryst.
 Howell, J.A.S., *J. Chem. Soc., Dalton Trans.*, 1974, 293 (synth, props)

C₂₃H₂₁ClMo **Mo-00121**
Chlorobis(1-phenyl-1-propyne)(η⁵-cyclopentadienyl)molybdenum
Chloro(η⁵-2,4-cyclopentadien-1-yl)bis[[(1,2-η)-1-propynyl]benzene]molybdenum, 10Cl
 [60109-61-7]
 As Bis[(2,3-η)-2-butyne]carbonyl(η⁵-2,4-cyclopentadien-1-yl)molybdenum(1+), Mo-00083 with



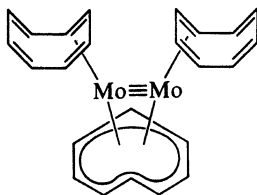
M 428.812
 Yellow cryst. (CH₂Cl₂/hexane). Mp 160-2°.
 Davidson, J.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 738 (synth)
 Faller, J.W. *et al*, *J. Organomet. Chem.*, 1979, **172**, 171 (pmr, isom)

C₂₄H₁₇MoO₄P **Mo-00122**
Tetracarbonyl[[2-(η²-ethenyl)phenyl]diphenylphosphine-P]-molybdenum, 9Cl
Tetracarbonyl(o-styryldiphenylphosphine)molybdenum
 [12290-82-3]



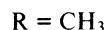
M 496.310
 Air-stable yellow cryst. Mp 155-65° dec. Rotational isomers thought to be present in soln.
 Bennett, M.A. *et al*, *J. Organomet. Chem.*, 1967, **10**, 301 (synth, props, nmr, ir)
 Bennett, M.A. *et al*, *J. Organomet. Chem.*, 1973, **51**, 289 (ir, synth, props)

C₂₄H₂₄Mo₂ **Mo-00123**
 $[\mu-(1,2,3,4-\eta:5,6,7,8-\eta)-1,3,5,7\text{-cyclooctatetraene-}]$
 $[\text{bis}[(1,2,3,4-\eta)-1,3,5,7\text{-cyclooctatetraene}]\text{dimolybdenum, 10Cl}$
Tris(cyclooctatetraene)dimolybdenum
 [66719-22-0]



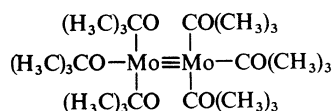
M 504.334
 Black cryst. (toluene).
 Cotton, F.A. *et al*, *Inorg. Chem.*, 1978, **17**, 2093 (*synth, struct*)

C₂₄H₃₀Mo₂O₄ **Mo-00124**
Tetracarbonylbis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dimolybdenum, 10Cl
 [12132-04-6]
 As Tetracarbonylbis(η⁵-2,4-cyclopentadien-1-yl)dimolybdenum, Mo-00079 with



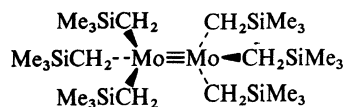
M 574.379
 Deep-red cryst. Mp 219° dec. *ir* ν_{CO} 1867, 1842 cm⁻¹.
Monomer: Dicarbonyl(pentamethylcyclopentadienyl)-molybdenum.
 C₁₂H₁₅MoO₂ M 287.189
 Unknown.
 King, R.B., *Coord. Chem. Rev.*, 1976, **20**, 155 (*rev*)
 Curtis, M.D. *et al*, *J. Organomet. Chem.*, 1978, **161**, 23 (*synth*)
 King, R.B. *et al*, *J. Organomet. Chem.*, 1979, **171**, 53 (*synth*)

C₂₄H₅₄Mo₂O₆ **Mo-00125**
Hexakis(2-methyl-2-propanolato)dimolybdenum, 10Cl
Hexa-tert-butoxydimolybdenum
 [60764-63-8]



M 630.567
 Has no bridging ligands. Red-orange volatile cryst. (pentane). Sol. hydrocarbons, THF. Bp_{0.001} 100-20° subl. O₂- and moisture-sensitive.
 Chisholm, M.H. *et al*, *Inorg. Chem.*, 1977, **16**, 1801 (*synth, ms, ir, pmr, cmr*)
 Chisholm, M.H. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 1305 (*props*)

C₂₄H₆₆Mo₂Si₆ **Mo-00126**
Hexakis(trimethylsilyl)methyl]dimolybdenum, 9Cl
 [34439-17-3]

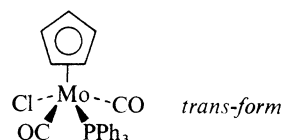


M 715.178

Air-stable yellow plate-like cryst. Mp 99°. Bp 120° subl.
 Mo-Mo distance 2.167 Å.

Huq, F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 1079 (*cryst struct*)
 Mowat, W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 533 (*synth*)
 Wilkinson, G. *et al*, *Pure Appl. Chem.*, 1972, **30**, 627 (*synth, props*)

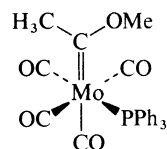
C₂₅H₂₀ClMoO₂P **Mo-00127**
Dicarbonylchloro(η⁵-2,4-cyclopentadien-1-yl)(triphenylphosphine)molybdenum, 10Cl
Chlorodicarbonyl(triphenylphosphine)(η⁵-cyclopentadienyl)molybdenum
 [12115-01-4]



M 514.799
 Exists as mixt. of *cis*- and *trans*-forms, not separated.
 Orange cryst. (C₆H₆/2,2,4-trimethylpentane). Sol. CHCl₃. Mp 170° dec. Equilibrium ratio of *cis/trans* in CHCl₃ ~50:1.

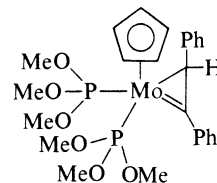
Haines, R.J. *et al*, *J. Chem. Soc. (A)*, 1967, 94 (*synth, ir, pmr, uv, props*)
 Faller, J.W. *et al*, *J. Am. Chem. Soc.*, 1970, **92**, 5852 (*pmr*)
 Blumer, D.J. *et al*, *J. Organomet. Chem.*, 1979, **173**, 71 (*synth*)

C₂₅H₂₁MoO₅P **Mo-00128**
Tetracarbonyl(1-methoxyethylidene)(triphenylphosphine)-molybdenum



M 528.352
cis-form [23606-69-1]
 Stable yellow-orange cryst. Mp 104-6°.
 Fischer, E.O. *et al*, *Chem. Ber.*, 1969, **102**, 1495 (*synth, pmr, ir*)

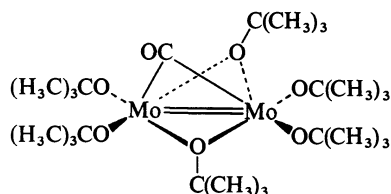
C₂₅H₃₄MoO₆P₂ **Mo-00129**
(η⁵-2,4-Cyclopentadien-1-yl)((1,2-η)-1,2-diphenylethenyl)bis(trimethylphosphite-P)molybdenum, 10Cl
 [76791-31-6]



M 588.428
 Green cryst.
 Green, M. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 1267 (*synth, cryst struct*)

C₂₅H₅₄Mo₂O₇**Mo-00130****Hexa-*tert*-butoxy- μ -carbonyldimolybdenum**

[67063-52-9]



M 658.577

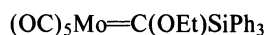
Example of a complex with an Mo-Mo double bond. Purple cryst. (hexane at -15°). Sol. alkanes. Dec. on warming with loss of CO.

Chisholm, M.H. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 7645 (*synth*, *cmr*, *pmr*, *ir*, *cryst struct*)

Chisholm, M.H. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 3451.

C₂₆H₂₀MoO₆Si**Mo-00131****Pentacarbonyl[ethoxy(triphenylsilyl)methylene]molybdenum,**¹⁰Cl**Pentacarbonyl[ethoxy(triphenylsilyl)carbene]molybdenum**

[65573-54-8]



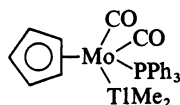
M 552.466

Orange cryst. Mp 77-9°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1977, **110**, 3467 (*synth*, *props*)

C₂₇H₂₆MoO₂PTl**Mo-00132****Dicarbonyl[(η^5 -2,4-cyclopentadien-1-yl)(dimethylthallium)-(triphenylphosphine)molybdenum**

[66125-47-1]



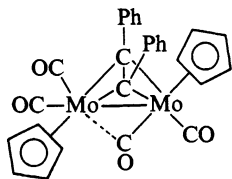
M 713.798

Mp 146-8°.

Walther, B. *et al*, *J. Organomet. Chem.*, 1978, **145**, 285.

C₂₈H₂₀Mo₂O₄**Mo-00133** **μ -Carbonyltricarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(1,1'-(η^2 : η^2 -1,2-ethynediylbisbenzene)]dimolybdenum, ¹⁰Cl**

[67507-24-8]



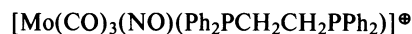
M 612.344

Ginley, D.S. *et al*, *Inorg. Chim. Acta*, 1977, **23**, 85 (*synth*)

Bailey, W.I. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 5764 (*synth*, *cryst struct*)

Curtis, M.D. *et al*, *J. Organomet. Chem.*, 1978, **161**, 23 (*synth*, *ir*, *nmr*)

Knox, S.A.R. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 221; 1979, 934 (*props*)

C₂₉H₂₄MoNO₄P₂[⊕]**Mo-00134****Tricarbonyl[1,2-ethanediylbis(diphenylphosphine)-*P,P'*]nitrosylmolybdenum(1+), ⁹Cl**

M 608.400 (ion)

Stereochemistry not reported.

Hexafluorophosphate: [37757-20-3].

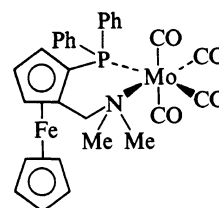
C₂₉H₂₄F₆MoNO₄P₃ M 753.365Yellow cryst. (CH₂Cl₂/hexane). Sol. polar org. solvs.

Mp 160° dec. Solns. slowly dec. in air.

Johnson, B.F.G. *et al*, *J. Organomet. Chem.*, 1972, **40**, C36

(*synth*)

Connelly, N.G., *J. Chem. Soc., Dalton Trans.*, 1973, 2183

(*synth*)**C₂₉H₂₆FeMoNO₄P****Mo-00135****Tetracarbonyl[1-[(dimethylamino)methyl]-2-(diphenylphosphino)ferrocene-*N,P*]molybdenum, ⁹Cl**

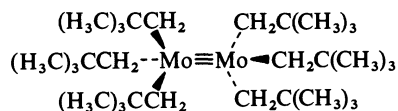
M 635.289

Cryst. (Me₂CO/pet. ether). Mp 175-8° dec.

Kotz, J.C. *et al*, *J. Organomet. Chem.*, 1975, **84**, 255 (*synth*, *ir*, *pmr*)

C₃₀H₆₆Mo₂**Mo-00136****Hexakis(2,2-dimethylpropyl)dimolybdenum, ⁹Cl****Hexakisneopentylidimolybdenum**

[42077-05-4]



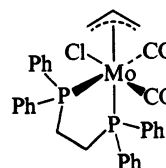
M 618.731

Yellow plate-like cryst. Mp 135-8°. Subl. *in vacuo* at 130° with dec.

Mowat, W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1120 (*synth*, *props*)

C₃₁H₂₉ClMoO₂P₂**Mo-00137****Dicarbonylchloro[1,2-ethanediylbis(diphenylphosphine)-*P,P'*](η^3 -2-propenyl)molybdenum, ¹⁰Cl****Bis(η^3 -allyl)dicarbonylchloro[1,2-bis(diphenylphosphino)ethane]molybdenum**

[33135-95-4]



M 626.909

Orange cryst. (CHCl₃/pet. ether).

Hayter, R.G., *J. Organomet. Chem.*, 1968, **13**, P1.

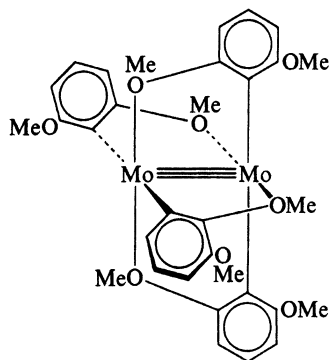
Tom Dieck, H. *et al*, *J. Organomet. Chem.*, 1968, **14**, 375

(*synth*)

Graham, A.J. *et al*, *Cryst. Struct. Commun.*, 1976, **5**, 891 (*cryst struct*)

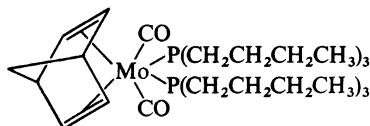
Brisdon, B.J., *J. Organomet. Chem.*, 1977, **125**, 225 (*synth*, *ir*, *nmr*)
 Faller, J.W. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 865 (*nmr*)

C₃₂H₃₆Mo₂O₈ **Mo-00138**
Tetrakis[μ-(2,6-dimethoxyphenyl)-C:O]dimolybdenum, 10Cl
 [64836-04-0]



M 740.512
 Extremely air-sensitive dark-red cryst. (THF/hexane).
 Mo-Mo 2.065(1) Å.
 Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 7372 (*synth*)
 Cotton, F.A. *et al*, *Inorg. Chem.*, 1978, **17**, 2087 (*cryst struct*)

C₃₃H₆₂MoO₂P₂ **Mo-00139**
[(2,3,5,6-η)-Bicyclo[2.2.1]hepta-2,5-diene]dicarbonylbis(tri-butylphosphine)molybdenum, 10Cl
 [64146-27-6]



M 648.739
 Yellow cryst.
 Tom Dieck, H. *et al*, *J. Organomet. Chem.*, 1977, **132**, 255
 (*synth*, *ir*, *nmr*)

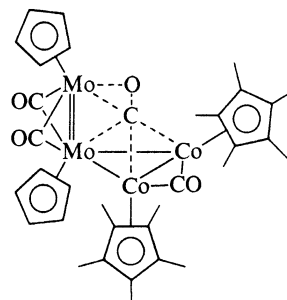
C₃₄H₂₅MoO⁺ **Mo-00140**
Carbonyl(η⁵-cyclopentadienyl)bis(diphenylacetylene)molybdenum(1+)
Carbonyl(η⁵-2,4-cyclopentadien-1-yl)bis[1,1'-(η²-1,2-ethynediyl)bis[benzene]]molybdenum(1+), 10Cl
 [66615-16-5]

As Bis[(2,3-η)-2-butyne]carbonyl(η⁵-2,4-cyclopentadien-1-yl)molybdenum(1+), Mo-00083 with

R = R' = Ph

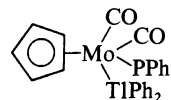
M 545.511 (ion)
Tetrafluoroborate: [66615-17-6].
 C₃₄H₂₅BF₄MoO M 632.315
 Yellow cryst. (CH₂Cl₂/Et₂O).
 Bottrill, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 2365
 (*synth*)
 Allen, J.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 873
 (*props*)

C₃₄H₄₀Co₂Mo₂O₄ **Mo-00141**
Di-μ-carbonyl[μ₄-(η²-carbonyl-C:C:C)[μ-carbonyl-bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dicobalt]bis(η⁵-2,4-cyclopentadien-1-yl)dimolybdenum
 [84474-41-9]



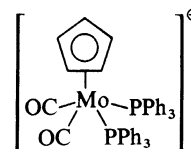
M 822.434
 Model for CO activation on a stepped metal surface. Isol. from toluene. *ir* ν_{CO} 1750 s, 1711 vs, 1696 vs, 1633 vw cm⁻¹ (THF). Bond length of μ₄-CO group 1.283(3) Å.
 Brun, P. *et al*, *J. Chem. Soc., Chem. Commun.*, 1982, 926
 (*synth*, *cryst struct*, *nmr*, *ir*)

C₃₇H₃₀MoO₂PTI **Mo-00142**
Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(diphenylthallium)-(triphenylphosphine)molybdenum
 [66125-48-2]



M 837.940
 Mp 173-5°.
 Walther, B. *et al*, *J. Organomet. Chem.*, 1978, **145**, 285 (*synth*, *ir*, *nmr*)

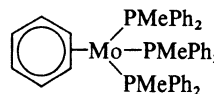
C₄₃H₃₅MoO₂P₂⁺ **Mo-00143**
Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)bis(triphenylphosphine)molybdenum(1+)



M 741.636 (ion)
Tetrafluoroborate: [78833-68-8].
 C₄₃H₃₅BF₄MoO₂P₂ M 828.439
 Cryst.

Suenkel, K. *et al*, *Z. Naturforsch., B*, 1981, **36**, 474 (*synth*, *ir*, *nmr*)

C₄₅H₄₅MoP₃ **Mo-00144**
(η⁶-Benzene)tris(methyldiphenylphosphine)molybdenum, 9Cl
 [35004-32-1]



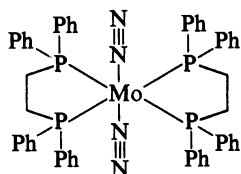
M 774.712
 Orange cryst. (C₆H₆).

Green, M.L.H. *et al*, *J. Chem. Soc. (A)*, 1971, 2929 (*synth*)
 Green, M.L.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 1361.
Inorg. Synth., 1977, **17**, 59 (*synth*)

C₅₂H₄₈MoN₄P₄**Mo-00145**

Bis(dinitrogen)bis[1,2-bis(diphenylphosphino)ethane]molybdenum

Bis(dinitrogen)bis[1,2-ethanediylbis(diphenylphosphine)-P,P']molybdenum, 9Cl. Bis(dinitrogen)bis[ethylenebis(diphenylphosphine)]molybdenum, 8Cl
 [41700-58-7]



M 948.813

Orange cryst. (C₆H₆/MeOH). Mp 165° dec.

Atkinson, L.K. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 157 (*synth*)

Chatt, J. *et al*, *J. Organomet. Chem.*, 1971, **27**, C15 (*synth*)

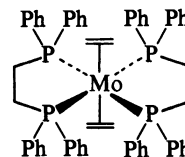
George, T.A. *et al*, *J. Organomet. Chem.*, 1971, **30**, C13 (*synth, ir*)

Uchida, T. *et al*, *Bull. Chem. Soc. Jpn.*, 1971, **44**, 2883 (*struct*)
Inorg. Synth., 1980, **20**, 119 (*synth*)

C₅₆H₅₆MoP₄**Mo-00146**

Bis[1,2-ethanediylbis(diphenylphosphine)-P,P']bis(η²-ethene)molybdenum, 10Cl
[Bis(1,2-diphenylphosphino)ethane]bis(ethylene)molybdenum

[56307-56-3]



M 948.893

Orange cryst.

Bryne, J.W. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 3871 (*synth*)

Bryne, J.W. *et al*, *J. Chem. Soc., Chem. Commun.*, 1977, 662 (*ir, nmr*)

Nb Niobium

J. A. Labinger

Niobium (Fr.), Niob or Niobium (Ger.), Niobio (Sp., Ital.), Ниобий (Niobii) (Russ.), ニオブ (Japan.)

Atomic Number. 41

Atomic Weight. 92.9064 (1)

Electronic Configuration. [Kr] $4d^4 5s^1$

Oxidation States. These range from -3 (for $\text{Nb}(\text{CO})_5^{3-}$) to $+5$, the more common values being -1 , $+1$, $+3$, $+4$ and $+5$.

Coordination Number. $3 - 8$ for conventional ligands.

Colour. Organoniobium compounds of oxidation state $+4(d^1)$ are highly coloured, often black. Those of even-electron oxidation states range from colourless (rare) through yellow to red and brown.

Availability. The commonest starting material is NbCl_5 .

Handling. All organoniobium compounds require standard techniques for handling air-sensitive materials.

Toxicity. Niobium compounds are not considered to be especially toxic except for the carbonyls.

Isotopic Abundance. ^{93}Nb , 100%.

Spectroscopy. ^{93}Nb ($I = \frac{9}{2}$) has a relatively high sensitivity but Nb(V) is the only oxidation state for which data are available.

Mass spectrometry of niobium compounds is relatively straightforward since there is only one naturally occurring isotope.

Esr is a useful technique for compounds of oxidation state $+4(d^1)$.

Analysis. Niobium is usually determined gravimetrically. Tantalum interferes with the determination but this is not a problem when assaying organometallic compounds.

References. General reviews are listed in the introduction to the *Sourcebook*.

MeNbCl₄

Nb-00001

Me₂NbCl₃

Nb-00002

Me₂NbCl₄[⊖]

Nb-00003

Me₃NbCl₂

Nb-00004

Me₃NbCl₃[⊖]

Nb-00005

Nb(CO)₆[⊖]

Nb-00007



Nb-00008



Nb-00009



Nb-00010



Nb-00011



Nb-00012



Nb-00013

As Nb-00010 with
X = H

Nb-00014

Nb-00015



Nb-00016

As Nb-00013 with
X = Cl, Y = CO

Nb-00017

As Nb-00013 with
X = CO, Y = H

Nb-00018

As Nb-00013 with
X = Cl, Y = Me

Nb-00019

As Nb-00011 with
X = Me

Nb-00020



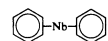
Nb-00021

As Nb-00013 with
X = Y = CN

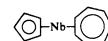
Nb-00022



Nb-00023



Nb-00024



Nb-00025

As Nb-00013 with
X = CO, Y = Me

Nb-00026



Nb-00027

As Nb-00013 with
X = Y = Me

Nb-00028



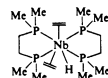
Nb-00029

As Nb-00016 with
X = CO

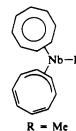
Nb-00030

As Nb-00027 with
R = Et

Nb-00031



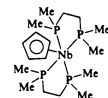
Nb-00032



Nb-00033

As Nb-00013 with
X = Me, Y = PEt₃

Nb-00034



Nb-00035

As Nb-00013 with
X = Br, Y = PMe₂Ph

Nb-00036

As Nb-00013 with
X = -PMe₂Ph, Y = H

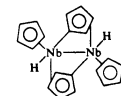
Nb-00037



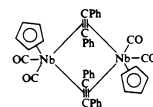
Nb-00038

MeNbCl₄(PPh₃)

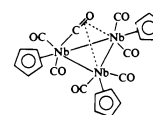
Nb-00039



Nb-00040



Nb-00041



Nb-00042

As Nb-00013 with
X = Y = SPh

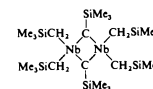
Nb-00043

As Nb-00033 with
R = Ph

Nb-00044

Ph₃SnNb(CO)₆

Nb-00045



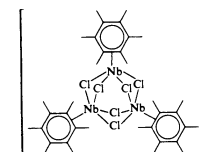
Nb-00046



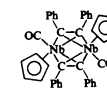
Nb-00047



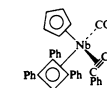
Nb-00048



Nb-00049



Nb-00050



Nb-00051

CH₃Cl₄Nb**Nb-00001**

Tetrachloromethylniobium, 9Cl
Methyltetrachloroniobium
 [41453-01-4]



M 249.753

Orange cryst. (CH₂Cl₂/pentane). Sol. CH₂Cl₂, toluene.
 Mp 65° dec.

Fowles, G.W.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 2313
 (pmr)

Santini-Scampucci, C. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973,
 2436 (*synth*, pmr, ir)

C₂H₆Cl₃Nb**Nb-00002**

Trichlorodimethylniobium, 9Cl
Dimethyltrichloroniobium
 [41453-02-5]



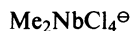
M 229.335

Yellow-orange solid (pentane).

Fowles, G.W.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 2313
 (pmr)

C₂H₆Cl₄Nb[⊖]**Nb-00003**

Tetrachlorodimethylniobate(1-), 9Cl
Dimethyltetrachloroniobate(1-)



M 264.788 (ion)

Tetraethylammonium salt: [38856-62-1].

C₁₀H₂₆Cl₄NNb M 395.041Violet solid (MeCN/C₆H₆).

Fowles, G.W.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 2313
 (pmr, ir)

C₃H₉Cl₂Nb**Nb-00004**

Dichlorotrimethylniobium, 9Cl
Trimethyldichloroniobium
 [2948-60-9]



M 208.917

Yellow cryst. (pentane), thermally unstable. Sol.
 aliphatic hydrocarbons. Subl. at 20° *in vacuo*.

Juinall, G.L., *J. Am. Chem. Soc.*, 1964, **86**, 4202 (*synth*)

Fowles, G.W.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 961
 (pmr)

C₃H₉Cl₃Nb[⊖]**Nb-00005**

Trichlorotrimethylniobate(1-), 9Cl
Trimethyltrichloroniobate(1-)



M 244.370 (ion)

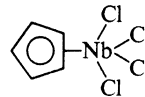
Tetraethylammonium salt: [53470-46-5].

C₁₁H₂₉Cl₃NNb M 374.622Cryst. (CH₂Cl₂/pentane).

Fowles, G.W.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 1080
 (*synth*, ir, pmr)

C₅H₅Cl₄Nb**Nb-00006**

Tetrachloro(η⁵-2,4-cyclopentadien-1-yl)niobium, 9Cl
Cyclopentadienyltetrachloroniobium
 [33114-15-7]



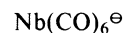
M 299.813

Red cryst. (CH₂Cl₂). Sl. sol. org. solvs. Mp 180° dec.

Forms adducts with nitriles.

Cardoso, A.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 1156
 (*synth*)

Bunker, M.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 2155
 (*synth*)

C₆NbO₆[⊖]**Nb-00007****Hexacarbonylniobate(1-), 9Cl**

M 260.969 (ion)

Tetraphenylarsonium salt: [60119-18-8].

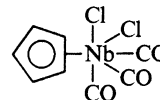
C₃₀H₂₀AsNbO₆ M 644.312

Yellow cryst. (diglyme aq.). Sol. polar org. solvs. Dec.
 >160°.

Inorg. Synth., 1976, **16**, 68 (*synth*, ir)

C₈H₅Cl₂NbO₃**Nb-00008**

Tricarbonyldichloro(η⁵-2,4-cyclopentadien-1-yl)niobium, 9Cl
Cyclopentadienyltricarbonyldichloroniobium
 [73394-64-6]



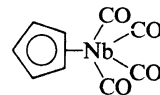
M 312.938

Orange-red cryst. (THF). Mp 150° dec.

Cardoso, A.M. *et al*, *J. Organomet. Chem.*, 1980, **186**, 237 (ir,
 pmr)

C₉H₅NbO₄**Nb-00009**

Tetracarbonyl(η⁵-2,4-cyclopentadien-1-yl)niobium, 9Cl
Cyclopentadienyltetracarbonylniobium
 [12108-03-1]



M 270.043

Orange-red cryst. by subl. *in vacuo*. Mp 144-6°. Dec.
 >120°. Sublimes at 60-80°/0.1 mm.

Dem'yanchuk, V.V. *et al*, *Zh. Obshch. Khim.*, 1970, **40**, 961;
CA, **73**, 70470 (*synth*)

Nesmeyanov, A.N. *et al*, *Zh. Strukt. Khim.*, 1972, **13**, 1033;
CA, **78**, 90759 (*cmr*)

Lokshin, B.V. *et al*, *J. Organomet. Chem.*, 1973, **55**, 315 (*ir*)

Fredericks, S. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 350 (*synth*)

Herrmann, W.A. *et al*, *Chem. Ber.*, 1979, **112**, 3942; *J.*

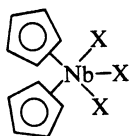
Organomet. Chem., 1980, **191**, 397 (*synth*)

Herrmann, W.A. *et al*, *Chem. Ber.*, 1981, **114**, 3558 (*struct*)

C₁₀H₁₀Br₃Nb

Nb-00010

Tribromobis(η⁵-2,4-cyclopentadien-1-yl)niobium, 9Cl
Bis(cyclopentadienyl)tribromoniobium
 [53522-49-9]



X = Br

M 462.807

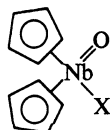
Sensitizer for electrophotography. Red-brown cryst.
 (CHCl₃), stable to dry air. Sol. polar org. solvs., H₂O
 with partial hydrolysis. Mp 260° dec.

Wilkinson, G. *et al*, *J. Am. Chem. Soc.*, 1954, **76**, 4281 (*synth*, *ir*)

C₁₀H₁₀ClNbO

Nb-00011

Chlorobis(η⁵-2,4-cyclopentadien-1-yl)oxoniobium, 9Cl
Bis(cyclopentadienyl)oxochloroniobium
 [59412-84-9]



X = Cl

M 274.548

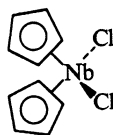
Yellow cryst. (THF).

Limonovskii, D.A. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1976, **226**, 65 (*synth*, *nmr*, *ir*)

C₁₀H₁₀Cl₂Nb

Nb-00012

Dichlorobis(η⁵-2,4-cyclopentadien-1-yl)niobium, 9Cl
Bis(cyclopentadienyl)dichloroniobium
 [12793-14-5]



M 294.001

Black cryst. Sl. sol. toluene, CH₂Cl₂. Bp_{0.25} 270° subl.
 Paramagnetic, μ = 1.63 BM.

▷QU0400000.

Green, M.L.H. *et al*, *J. Organomet. Chem.*, 1974, **74**, 245 (*synth*)

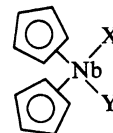
Prout, K. *et al*, *Acta Crystallogr., Sect. B*, 1974, **30**, 2290 (*struct*)

Inorg. Synth., 1976, **16**, 107 (*synth*, *ir*)

C₁₀H₁₀I₂Nb

Nb-00013

Bis(η⁵-2,4-cyclopentadien-1-yl)diiodoniobium
 [56028-53-6]



X = Y = I

M 476.904

Black cryst. (C₆H₆). Mp 155° dec. Paramagnetic, μ = 1.8 BM.

Treichel, P.M. *et al*, *J. Organomet. Chem.*, 1968, **12**, 479.

C₁₀H₁₃Nb

Nb-00014

Bis(η⁵-2,4-cyclopentadien-1-yl)trihydroniobium, 9Cl
Dicyclopentadienyltrihydroniobium
 [11105-67-2]

As Tribromobis(η⁵-2,4-cyclopentadien-1-yl)niobium, Nb-00010 with

X = H

M 226.119

Yellow cryst. (toluene). Sol. aromatic hydrocarbons. Dec. at 80° in soln.

Tebbe, F.N. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 3793 (*synth*, *pmr*)

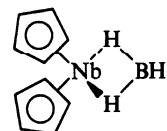
Wilson, R.D. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 1775 (*struct*)

Labinger, J.A. *et al*, *J. Organomet. Chem.*, 1979, **170**, 373 (*synth*)

C₁₀H₁₄BNb

Nb-00015

Bis(η⁵-2,4-cyclopentadien-1-yl)tetrahydroborato(1-)-H, H'-niobium, 9Cl
Bis(cyclopentadienyl)niobium borohydride
 [37298-41-2]



M 237.937

Dark-green solid (toluene), highly air-sensitive. Sol. Et₂O, aromatic hydrocarbons. Bp 80° subl. (part. dec.).

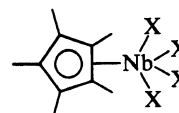
▷Pyrophoric in air

Kirillova, N.I. *et al*, *Zh. Strukt. Khim.*, 1974, **15**, 718 (*struct*)
Inorg. Synth., 1976, **16**, 107 (*synth*, *ir*)

C₁₀H₁₅Cl₄Nb

Nb-00016

Tetrachloro[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]niobium
Pentamethylcyclopentadienyltetrachloroniobium
 [80432-35-5]



X = Cl

M 369.947

Deep-brown waxy solid (C₆H₆). Sol. aromatic hydrocarbons; insol. aliphatic hydrocarbons.

Herrmann, W.A. *et al*, *Chem. Ber.*, 1981, **114**, 3558 (*synth*)

Middleton, A.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 1888 (*synth, ir, pmr*)

C₁₁H₁₀ClNbO Nb-00017

Carbonylchlorobis(η⁵-2,4-cyclopentadien-1-yl)niobium
Bis(cyclopentadienyl)chlorocarbonylniobium
 [63782-46-7]

As Bis(η⁵-2,4-cyclopentadien-1-yl)diiodoniobium, Nb-00013 with

X = Cl, Y = CO

M 286.559

Grey cryst. (THF). Sol. C₆H₆, THF, Me₂CO; insol. Et₂O, alcohols, pentane. Dec. >180°.

Limonovski, D.A. *et al*, *J. Organomet. Chem.*, 1977, **132**, C14 (*ir, pmr, synth*)

Fredericks, S. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 350 (*synth, pmr, ir*)

Otto, E.E.H. *et al*, *J. Organomet. Chem.*, 1978, **148**, 29 (*synth, pmr, ir*)

C₁₁H₁₁NbO Nb-00018

Carbonylbis(η⁵-2,4-cyclopentadien-1-yl)hydroniobium, 9Cl
Bis(cyclopentadienyl)hydro(carbonyl)niobium
 [11105-68-3]

As Bis(η⁵-2,4-cyclopentadien-1-yl)diiodoniobium, Nb-00013 with

X = CO, Y = H

M 252.114

Pale-violet cryst. by subl. Sol. aromatic hydrocarbons.

Tebbe, F.N. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 3793 (*synth, pmr, ir*)

Kirillova, N.I. *et al*, *Zh. Strukt. Khim.*, 1972, **13**, 473 (*struct*)

Otto, E.E.H. *et al*, *J. Organomet. Chem.*, 1978, **148**, 29 (*synth*)

C₁₁H₁₃ClNb Nb-00019

Chlorobis(η⁵-2,4-cyclopentadien-1-yl)methylniobium, 9Cl
Bis(cyclopentadienyl)methylchloroniobium
 [70616-56-7]

As Bis(η⁵-2,4-cyclopentadien-1-yl)diiodoniobium, Nb-00013 with

X = Cl, Y = Me

M 273.583

Brown cryst. (toluene). Sol. toluene.

Otto, E.E.H. *et al*, *J. Organomet. Chem.*, 1979, **170**, 209 (*synth*)

C₁₁H₁₃NbO Nb-00020

Bis(cyclopentadienyl)methyloxoniobium
 [67552-61-8]

As Chlorobis(η⁵-2,4-cyclopentadien-1-yl)oxoniobium, Nb-00011 with

X = Me

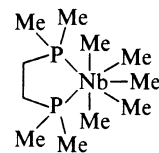
M 254.130

White cryst. (toluene).

Otto, E.E.H. *et al*, *J. Organomet. Chem.*, 1979, **170**, 209 (*ms, pmr*)

C₁₁H₃₁NbP₂ Nb-00021

[1,2-Ethanedilylbis(dimethylphosphine)-P, P']pentamethylniobium, 9Cl
Pentamethyl[bis(dimethylphosphino)ethane]niobium
 [53437-03-9]



M 318.220

Yellow cryst. (Et₂O).

Schrock, R.R. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 5288 (*nmr*)

C₁₂H₁₀N₂Nb Nb-00022

Bis(cyano-C)bis(η⁵-2,4-cyclopentadien-1-yl)niobium, 9Cl
Bis(cyclopentadienyl)dicyanoniobium
 [39333-45-4]

As Bis(η⁵-2,4-cyclopentadien-1-yl)diiodoniobium, Nb-00013 with

X = Y = CN

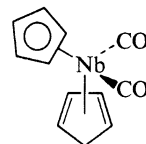
M 275.131

No phys. props. reported.

Stewart, C.P. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 722 (*synth, esr*)

C₁₂H₁₁NbO₂ Nb-00023

Dicarbonyl(cyclopentadiene)-π-cyclopentadienylniobium, 8Cl
 [31869-16-6]



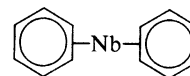
M 280.124

Yellow needles (pentane).

Nesmeyanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1970, 727 (*synth, ir, pmr*)

C₁₂H₁₂Nb Nb-00024

Bis(η⁶-benzene)niobium
 [68088-94-8]



M 249.133

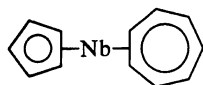
Obt. by metal-vapour synth. Red-purple cryst. (pet. ether). Bp 80° subl. (part. dec.).

Cloke, F.G.N. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 431 (*synth, pe*)

C₁₂H₁₂Nb

Nb-00025

(η^7 -Cycloheptatrienyl)(η^5 -2,4-cyclopentadien-1-yl)niobium, η Cl
(Cycloheptatrienyl)(cyclopentadienyl)niobium
[54360-38-2]



M 249.133

Solid by subl. Bp_{0.1} 120° subl.van Oven, H.O. *et al*, *J. Organomet. Chem.*, 1974, **81**, 379
(*synth*, *ir*, *ms*, *esr*)Groenenboom, C.J. *et al*, *J. Organomet. Chem.*, 1975, **97**, 73
(*pe*)C₁₂H₁₃NbO

Nb-00026

Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)methylniobium, η Cl
Bis(cyclopentadienyl)methyl(carbonyl)niobium
[65652-98-4]

As Bis(η^5 -2,4-cyclopentadien-1-yl)diiodoniobium, Nb-00013 with

X = CO, Y = Me

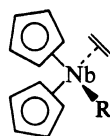
M 266.141

Green solid. Sol. toluene. Bp 50-60° subl.

Otto, E.E.H. *et al*, *J. Organomet. Chem.*, 1979, **170**, 209 (*synth*, *ir*)Foust, D.F. *et al*, *J. Organomet. Chem.*, 1980, **193**, 209 (*synth*, *pmr*)Threlkel, R.S. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 2560 (*synth*)C₁₂H₁₅Nb

Nb-00027

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)hydroniobium, η Cl
Bis(cyclopentadienyl)hydro(ethylene)niobium
[11105-70-7]



R = H

M 252.157

Sol. aromatic hydrocarbons.

Tebbe, F.N. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 3793 (*synth*)Guggenberger, L.J. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 5420
(*nmr*, *struct*)C₁₂H₁₆Nb

Nb-00028

Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylniobium, η Cl
[54373-66-9]

As Bis(η^5 -2,4-cyclopentadien-1-yl)diiodoniobium, Nb-00013 with

X = Y = Me

M 253.165

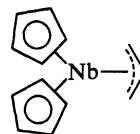
Red-brown cryst. (pentane). Sol. Et₂O, pentane. Bp_{0.0001} 80° subl. Paramagnetic, $\mu = 1.5$ BM.

►Explodes at 128°

Elson, I.H. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 7374 (*esr*)Manzer, L.E., *Inorg. Chem.*, 1977, **16**, 525 (*synth*)C₁₃H₁₅Nb

Nb-00029

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)niobium, η Cl
Allylbis(cyclopentadienyl)niobium
[39413-65-5]



M 264.168

Green-black cryst. (pentane). Sol. pentane. Dec. at 118°.

van Baalen, A. *et al*, *J. Organomet. Chem.*, 1974, **74**, 245 (*synth*, *ir*, *pmr*, *ms*)Green, J.C. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 403
(*synth*, *pe*)C₁₄H₁₅NbO₄

Nb-00030

Tetracarbonyl[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]niobium
Pentamethylcyclopentadienyltetracarbonylniobium
[80432-28-6]

As Tetrachloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]niobium, Nb-00016 with

X = CO

M 340.177

Orange-red cryst. (pentane). Sol. pentane, C₆H₆. Mp 128-30°.Herrmann, W.A. *et al*, *Chem. Ber.*, 1981, **114**, 3558 (*synth*, *ir*, *pmr*)C₁₄H₁₉Nb

Nb-00031

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)ethylniobium, η Cl
Bis(cyclopentadiene)ethyl(ethylene)niobium
[54244-99-4]

As Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)-hydroniobium, Nb-00027 with

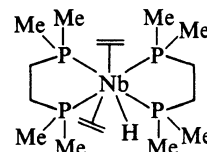
R = Et

M 280.211

Tebbe, F.N. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 3793 (*synth*)Guggenberger, L.J. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 5420
(*nmr*, *struct*)C₁₆H₄₁NbP₄

Nb-00032

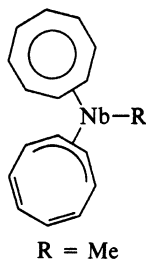
Bis[1,2-ethanediylbis(dimethylphosphine)-P, P']bis(η^2 -ethene)hydroniobium, η Cl
Hydrobis(ethylene)bis[bis(dimethylphosphino)ethane]-niobium
[62651-63-2]



M 450.301

Yellow cryst. (pentane). Sol. aliphatic hydrocarbons.

Schrock, R.R., *J. Organomet. Chem.*, 1976, **121**, 373 (*synth*, *nmr*)

C₁₇H₁₉Nb**Nb-00033****Bis(1,3,5,7-cyclooctatetraene)methylniobium, 9Cl**
[59296-78-5]

M 316.244

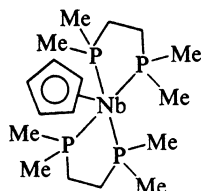
Proposed struct. shown. Red-brown cryst. (THF). Sol. THF, CH₂Cl₂. V. air- and moisture-sensitive.Schrock, R.R. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 903 (*synth*, *pmr*)**C₁₇H₂₈NbP****Nb-00034****Bis(cyclopentadienyl)methyl(triethylphosphine)niobium**
[70616-59-0]As Bis(η⁵-2,4-cyclopentadien-1-yl)diiodoniobium, Nb-00013 withX = Me, Y = PEt₃

M 356.288

Sol. aliphatic hydrocarbons.

Otto, E.E.H. *et al*, *J. Organomet. Chem.*, 1979, **170**, 209 (*synth*, *pmr*, *ms*)**C₁₇H₃₇NbP₄****Nb-00035****(η⁵-2,4-Cyclopentadien-1-yl)bis[1,2-ethanediylbis(dimethylphosphine)-P,P']niobium, 9Cl**
Cyclopentadienylbis[bis(dimethylphosphino)ethane]-niobium

[77299-51-5]



M 458.281

Yellow needles (THF).

Bunker, M.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 85 (*synth*, *pmr*)**C₁₈H₂₁BrNbP****Nb-00036****Bromobis(η⁵-2,4-cyclopentadien-1-yl)(dimethylphenylphosphine)niobium**
Bis(cyclopentadienyl)bromo(dimethylphenylphosphine)-niobium

[37298-77-4]

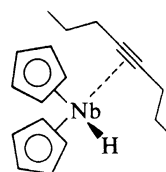
As Bis(η⁵-2,4-cyclopentadien-1-yl)diiodoniobium, Nb-00013 withX = Br, Y = PMe₂Ph

M 441.148

Green cryst. (THF). Sol. aromatic solvs. THF, Me₂CO.*Inorg. Synth.*, 1976, **16**, 107 (*synth*, *ir*, *pmr*)**C₁₈H₂₂NbP****Nb-00037****Bis(η⁵-2,4-cyclopentadien-1-yl)hydro(dimethylphenylphosphine)niobium, 9Cl**As Bis(η⁵-2,4-cyclopentadien-1-yl)diiodoniobium, Nb-00013 withX = —PMe₂Ph, Y = H

M 362.252

Red cryst. (pet. ether). Sol. org. solvs. Reacts with halogenated solvs. Solns. dec. >40°.

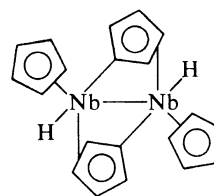
Inorg. Synth., 1976, **16**, 107 (*synth*, *ir*, *pmr*)**C₁₈H₂₅Nb****Nb-00038****Bis(cyclopentadienyl)hydro(η²-4-octyne)niobium**
[55534-71-9]

M 334.302

Sol. org. solvs.

Labinger, J.A. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 1596 (*synth*, *ir*, *pmr*)**C₁₉H₁₈Cl₄NbP****Nb-00039****Tetrachloromethyl(triphenylphosphine)niobium, 9Cl**
[51877-88-4]MeNbCl₄(PPh₃)

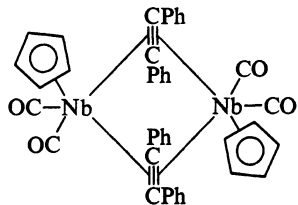
M 512.043

Purple powder (CH₂Cl₂/pet. ether). Mp 85° dec.Santini-Scampucci, C. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 2436 (*synth*, *nmr*, *ir*)**C₂₀H₂₀Nb₂****Nb-00040****Bis(η⁵-2,4-cyclopentadien-1-yl)bis[μ-[(1,η:1,2,3,4,5-η)-2,4-cyclopentadien-1-ylidene]]dihydrodiniobium, 9Cl**
Niobocene dimer
[11105-93-4]

M 446.191

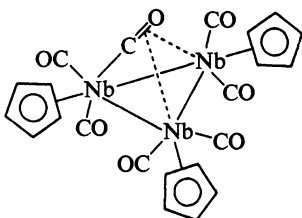
Yellow cryst. (toluene). Sol. aromatic hydrocarbons.

Tebbe, F.N. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 3793 (*synth*, *pmr*)Guggenberger, L.J., *Inorg. Chem.*, 1973, **12**, 294 (*struct*)

C₂₁H₁₅NbO₂**Nb-00041****Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(diphenylacetylene)-niobium**

M 392.255

Dimeric in solid state, monomeric in soln.

*Dimer: Tetracarbonylbis(cyclopentadienyl)bis(diphenylacetylene)diniobium.*C₄₂H₃₀Nb₂O₄ M 784.509Air-stable violet cryst. (Et₂O). Sol. org. solvs. Loses CO to form [(C₅H₅)Nb(CO)(PhC≡CPh)]₂ at 145°.Nesmeyanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1969, 100; *Bull. Acad. Sci. USSR, Div. Chem. Sci.*, 87 (*synth, ir*)**C₂₂H₁₅Nb₃O₇****Nb-00042****Heptacarbonyltris(cyclopentadienyl)triniobium**
[72228-91-2]

M 670.076

Has a doubly semibridging CO group. Black needles (hexane). Sol. CH₂Cl₂, THF, Et₂O. Dissolves to give brown, air-sensitive solns. Dec. >100°.Herrmann, W.A. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1979, 18, 960 (*synth, ir, nmr, struct*)Lewis, L.N. *et al*, *Inorg. Chem.*, 1980, 19, 3201 (*nmr*)**C₂₂H₂₀NbS₂****Nb-00043****Bis(benzenethiolato)bis(η⁵-2,4-cyclopentadien-1-yl)niobium, 9Cl***Bis(cyclopentadienyl)bis(benzenethiolato)niobium*
[37328-40-8]As Bis(η⁵-2,4-cyclopentadien-1-yl)diodoniobium, Nb-00013 with

X = Y = SPh

M 441.426

Green cryst. (CH₂Cl₂/pet. ether). Mp 135-40°.Douglas, W.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 1796 (*synth, esr*)**C₂₂H₂₁Nb****Nb-00044****Bis(1,3,5,7-cyclooctatetraene)phenylniobium, 9Cl**
[59296-77-4]

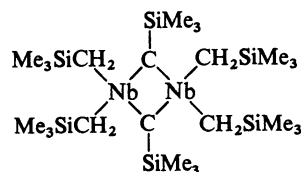
As Bis(1,3,5,7-cyclooctatetraene)methylniobium, Nb-00033 with

R = Ph

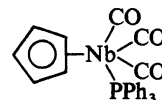
M 378.314

Ethylene dimerisation catalyst. Red-brown plates (THF). Sol. THF, CH₂Cl₂. V. air- and moisture-sensitive. Dec. at ca 100°.Schrock, R.P. *et al*, *J. Am. Chem. Soc.*, 1976, 98, 903 (*synth, pmr*)
U.S.P., 3 932 477; *CA*, 85, 33190 (*use*)**C₂₄H₁₅NbO₆Sn****Nb-00045****Hexacarbonyl(triphenylstannyl)niobium**
[36669-56-4]Ph₃SnNb(CO)₆

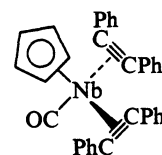
M 610.975

Red plates (CH₂Cl₂). Sol. CH₂Cl₂, Et₂O, aromatic solvs. Dec. in polar solvs., thermally labile.Davison, A. *et al*, *J. Organomet. Chem.*, 1972, 36, 113 (*synth, ir*)
Ellis, J.E. *et al*, *Inorg. Chem.*, 1976, 15, 3168.**C₂₄H₆₂Nb₂Si₆****Nb-00046****Tetrakis[(trimethylsilyl)methyl]bis[μ-(trimethylsilyl)methyldyne]diniobium, 9Cl**
[34844-61-6]

M 705.080

Red-brown prisms (pet. ether), highly air- and moisture-sensitive. Sol. Et₂O, hydrocarbons. Mp 152° dec.Huq, F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 1477 (*struct*)Mowat, W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1120 (*synth, pmr*)**C₂₆H₂₀NbO₃P****Nb-00047****Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(triphenylphosphine)niobium, 9Cl**
Cyclopentadienyltricarbonyl(triphenylphosphine)niobium

M 504.322

Red needles. Sol. C₆H₆, CH₂Cl₂. Mp 186° dec.Herrmann, W.A. *et al*, *J. Organomet. Chem.*, 1980, 191, 397 (*synth, pmr, ir*)**C₃₄H₂₅NbO****Nb-00048****Carbonyl-η⁵-2,4-cyclopentadien-1-ylbis(diphenylacetylene)niobium**

M 542.477

Air-stable yellow prisms (Et_2O). Sol. org. solvs. Mp 135-6°. Bp 200° subl. *in vacuo* (part. dec.).

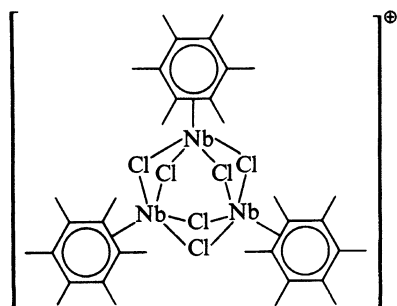
Nesmeyanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1969, 100 (*synth*, *pmr*)

Nesmeyanov, A.N. *et al*, *J. Chem. Soc., Chem. Commun.*, 1969, 277 (*struct*)

$C_{36}H_{54}Cl_6Nb_3^{\oplus}$

Nb-00049

Hexa- μ -chlorotris(hexamethylbenzene)triniobium(1+), κCl



M 978.260 (ion)

Chloride: [12103-45-6].

$C_{36}H_{54}Cl_7Nb_3$ M 1013.713

Dark-green needles ($CHCl_3$ /pentane). Mp 80° dec.

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1966, 6, 53 (*synth*, *ir*, *pmr*)

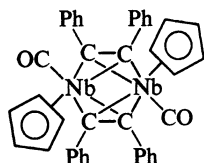
Churchill, M.R. *et al*, *J. Chem. Soc., Chem. Commun.*, 1974, 248 (*struct*)

$C_{40}H_{30}Nb_2O_2$

Nb-00050

Dicarbonylbis(η^5 -cyclopentadien-1-yl)bis[1,1'-(1,2-ethynediyl)bis(benzene)]diniobium, κCl

Dicarbonylbis(cyclopentadienyl)bis(diphenylacetylene)-diniobium



M 728.489

Air-stable, dark-lilac cryst. (toluene). Sol. aromatic solvs., Et_2O , $CHCl_3$. Mp 248-50° dec.

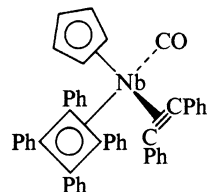
Nesmeyanov, A.N. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1968, 181, 736 (*synth*, *ir*, *pmr*)

Nesmeyanov, A.N. *et al*, *J. Chem. Soc., Chem. Commun.*, 1968, 1365 (*struct*)

$C_{48}H_{35}NbO$

Nb-00051

Cyclopentadienylcarbonyl(diphenylacetylene)(tetraphenylcyclobutadiene)niobium



M 720.710

Red cryst. (C_6H_6). Sol. org. solvs. Mp 120° dec. Dec. thermally to C_6Ph_6 .

Nesmeyanov, A.N. *et al*, *J. Chem. Soc., Chem. Commun.*, 1969, 739 (*synth*, *ir*, *pmr*, *struct*)

Nd Neodymium

S. A. Cotton

Néodyme (Fr.), Neodym (Ger.), Neodimio (Sp., Ital.), Неодим (Nieodim) (Russ.), ネオジム (Japan.)

Atomic Number. 60

Atomic Weight. 144.24

Electronic Configuration. [Xe] $4f^4 6s^2$

Oxidation State. +3

Coordination Number. Usually 6 or greater.

Colour. Generally blue.

Availability. Common starting materials are Nd_2O_3 and anhydrous NdCl_3 . For general remarks, see under Lanthanum.

Handling. See under Lanthanum.

Toxicity. See under Lanthanum.

Isotopic Abundance. ^{142}Nd , 27.11%; ^{143}Nd , 12.17%; ^{144}Nd , 23.85%; ^{145}Nd , 8.30%; ^{146}Nd , 17.62%; ^{148}Nd , 5.73%; ^{150}Nd , 5.62%.

Spectroscopy. See the Lanthanum section for general references. The limited ^1H nmr data published for Nd(III) ($4f^3$) compounds show relatively small shifts and broadened lines.

Electronic spectra of $\text{Nd}(\text{C}_5\text{H}_5)_3$ show hypersensitive transitions (at 588 and 594 nm) with greater extinction coefficients than usual.

Analysis. See under Lanthanum.

References. See under Lanthanum.

C₆H₁₈Nd⁺⁺⁺

Nd-00001

Hexamethylneodymate(3-)

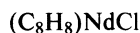


M 234.448 (ion)

Tris[(tetramethylethylenediamine)lithium] salt:
[76206-88-7].C₂₄H₆₆Li₃N₆Nd M 603.889Blue solid. Sol. Et₂O. Mp 78-83° dec.Schumann, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1981, **20**,
120 (*synth*)Aleksanyan, V.T. *et al*, *J. Raman Spectrosc.*, 1974, **2**, 345 (*ir*,
raman)Von Ammon, R. *et al*, *Inorg. Nucl. Chem. Lett.*, 1969, **5**, 315
(*nmr*)Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1966, **6**, 141 (*synth*)Von Ammon, R. *et al*, *Ber. Bunsenges. Phys. Chem.*, 1972, **76**,
995 (*ir*, *nmr*)C₈H₈ClNd

Nd-00002

Chloro(cyclooctatetraene)neodymium

Di-μ-chlorobis(η⁸-1,3,5,7-cyclooctatetraene)dineodym-
ium, 9Cl

M 283.844

THF adduct is dimeric, struct. may resemble
Chloro(cyclooctatetraene)cerium.

Bis-THF adduct: [51177-49-2].

C₃₂H₄₈Cl₂Nd₂O₄ M 856.115

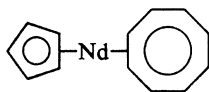
Bright-green cryst. Sol. dioxan, THF. Mp >345°.

Extremely air- and moisture-sensitive. μ = 3.37 μ_B.Hodgson, K.O. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 8650 (*synth*,
ir uv)C₁₃H₁₃Nd

Nd-00003

(η⁸-1,3,5,7-Cyclooctatetraene)(η⁵-2,4-cyclopentadien-1-yl)-
neodymium, 9Cl

[52668-26-5]



M 313.486

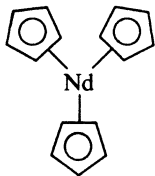
Cryst. Sol. THF. Extremely air-sensitive. Forms THF ad-
duct.Jamerson, J.D. *et al*, *J. Organomet. Chem.*, 1974, **65**, C33
(*synth*)C₁₅H₁₅Nd

Nd-00004

Tris(η⁵-2,4-cyclopentadien-1-yl)neodymium, 9Cl

Tri-π-cyclopentadienylneodymium, 8Cl

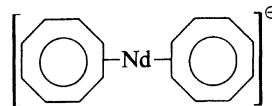
[1273-98-9]



M 339.524

Pale-blue cryst. Sol. THF. Mp 380°. Subl. at 200-50° *in*
vacuo, hydrol. by H₂O.Cyclohexylisocyanide adduct: [12098-33-8]. Violet
cryst. Sol. C₆H₆. Mp 147°. μ = 3.4 μ_B; Subl. *in vacuo*
at 150°.Wilkinson, G. *et al*, *J. Am. Chem. Soc.*, 1954, **76**, 6210 (*synth*)Reid, A.F. *et al*, *Inorg. Chem.*, 1966, **5**, 1213 (*synth*)Devatykh, G.G. *et al*, *Dokl. Akad. Nauk. SSSR*, 1970, **193**,
1069 (*synth*, *ms*)Thomas, J.L. *et al*, *J. Organomet. Chem.*, 1970, **23**, 487 (*ms*)C₁₆H₁₆Nd⁺

Nd-00005

Bis(η⁸-1,3,5,7-cyclooctatetraene)neodymate(1-), 9Cl
Dicyclooctatetraene neodymate(1-)

M 352.542 (ion)

K salt: [51177-54-9].

C₁₆H₁₆KNd M 391.641

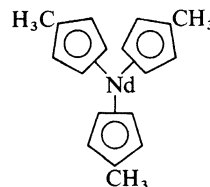
Pale-green solid. Sol. dioxan, THF. Mp >345°.

Extremely air- and moisture-sensitive. μ = 2.98 μ_B.Mares, F. *et al*, *J. Organomet. Chem.*, 1970, **24**, C68 (*synth*)Hodgson, K.O. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 8650 (*synth*,
ir, *nmr*, *uv*)C₁₈H₂₁Nd

Nd-00006

Tris[(1,2,3,4,5-η)-1-methyl-2,4-cyclopentadien-1-yl]neodym-
ium, 9Cl

[39470-13-8]

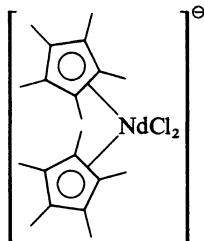


M 381.604

Blue-violet cryst. Sol. THF. Mp 165°. Air- and moisture-
sensitive. Subl. *in vacuo* at 200°.Reynolds, L.T. *et al*, *J. Inorg. Nucl. Chem.*, 1959, **9**, 86 (*synth*)Burns, J.H. *et al*, *Inorg. Chem.*, 1974, **13**, 1916 (*struct*)

C₂₀H₃₀Cl₂Nd⁺

Nd-00008

Dichlorobis[(1,2,3,4,5- η)-pentamethyl-2,4-cyclopentadien-1-yl]neodymate(1-)

M 485.603 (ion)

Li salt, THF complex: [73597-12-3].C₂₈H₄₆Cl₂LiNdO₂ M 636.757

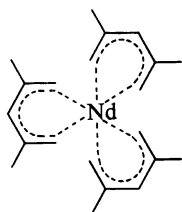
Blue-violet cryst. Sol. toluene, pentane. Mp 270° dec.

Extremely air- and moisture-sensitive. $\mu_{\text{eff}} = 3.50\mu_{\text{B}}$.Wayda, A.L. *et al*, *Inorg. Chem.*, 1980, **19**, 2190 (*synth, ir, nmr, uv*)C₂₁H₃₃Nd

Nd-00009

Tris[(1,2,3,4,5- η)-2,4-dimethyl-2,4-pentadienyl]neodymium, 10CI

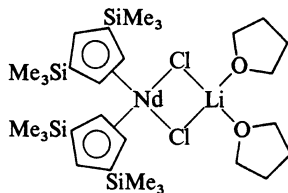
[80502-52-9]



M 429.732

Bright-green cryst. (red by transmittance). Sol. THF, Et₂O. Extremely air- and water-sensitive. $\mu_{\text{eff}} = 3.58\mu_{\text{B}}$.Ernst, R.D. *et al*, *Organometallics*, 1982, **1**, 708 (*synth, struct, uv, ir, nmr*)C₂₂H₄₂Cl₂NdSi₄⁺

Nd-00010

Dichlorobis[(1,2,3,4,5- η)-1,3-bis(trimethylsilyl)-2,4-cyclopentadien-1-yl]neodymate(1-)

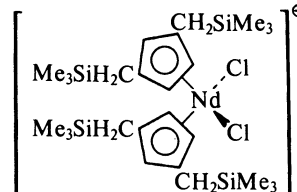
M 634.062 (ion)

Li salt, Bis-THF complex: [81507-33-7].C₃₀H₅₈Cl₂LiNdO₂Si₄ M 785.216

Blue-green or blue-pink cryst. Sol. pentane.

Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 1191 (*synth, struct*)C₂₆H₅₀Cl₂Nd⁺

Nd-00011

Bis[(1,2,3,4,5- η)-1,3-bis(trimethylsilylmethyl)-2,4-cyclopentadien-1-yl]dichloroneodymium(1-)

M 577.827 (ion)

*Tetraphenylarsonium salt:*C₅₀H₇₀AsCl₂NdSi₄ M 1073.513Relatively air-stable violet cryst. Sol. Et₂O, CH₂Cl₂.

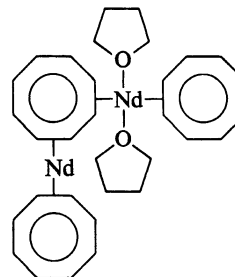
Mp ~165-75°.

*Benzyltriphenylphosphonium salt:*C₅₁H₇₂Cl₂NdP M 931.250Relatively air-stable violet cryst. Sol. Et₂O, CH₂Cl₂.Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1983, 69 (*synth, struct*)C₃₂H₄₀Nd₂O₂

Nd-00012

 $[\mu\text{-}[(1,2\text{-}\eta\text{-}1,2,3,4,5,6,7,8\text{-}\eta)\text{-}1,3,5,7\text{-Cyclooctatetraene-bis}(\eta^8\text{-}1,3,5,7\text{-cyclooctatetraene})\text{bis}(\text{tetrahydrofuran})\text{di-neodymium}]$ *Cyclooctatetraenylbis(tetrahydrofuran)neodymiumbis-(cyclooctatetraenyl)neodymate*

[59458-55-8]



M 745.147

Bright-green cryst. Sol. THF. Air-sensitive. $\mu_{\text{eff}} = 3.20\mu_{\text{B}}$.Ely, S.R. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 1624 (*synth, struct*)deKock, C.W. *et al*, *Inorg. Chem.*, 1978, **17**, 625 (*synth, struct, ir, raman*)

Np Neptunium

S. A. Cotton

Neptunium (Fr., Ger.), Neptunio (Sp.), Nettunio (Ital.), Нептуний (Nieptunii) (Russ.), ネプツニウム (Japan.)

Atomic Number. 93

Atomic Weight. 237.0482

Electronic Configuration. [Rn] $5f^5 7s^2$

Oxidation States. +3, +4

Coordination Number. See under Uranium.

Colour. Variable, including yellow, brown, red and green.

Availability. ^{237}Np is the most stable isotope ($t_{1/2} = 2.20 \times 10^6\text{y}$). Neptunium compounds are not generally available. NpCl_4 is the most useful starting material, prepared by the reaction of NpO_2 with CCl_4 . See under Uranium for references.

Handling. Neptunium is a highly radioactive α -emitter and is highly toxic. Neptunium compounds require scrupulously careful handling in glove boxes at slightly below atmospheric pressure.

Toxicity. See above.

Spectroscopy. Np(IV) compounds, despite being paramagnetic, give useful information in their ^1H nmr spectra. ^{239}Np Mössbauer spectra have been analysed giving valuable information on covalency. See references under Uranium and also Karraker, D. G. *et al.*, *Inorg. Chem.*, 1979, **18**, 2205.

Analysis. Following destruction of the original compound and redissolution in acid, neptunium content may be analysed by α -counting the solution. Isomorphism with corresponding uranium compounds may also be used as proof of identity.

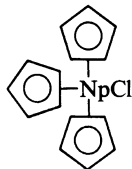
References. See under Uranium and also:

Karraker, D. G. *et al.*, *Inorg. Chem.*, 1979, **18**, 2205
(*Mössbauer, analysis*)

Alvey, P. J. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1973,
2308 (*analysis*)

C₁₅H₁₅ClNp**Np-00001**

Chlorotris(η⁵-2,4-cyclopentadien-1-yl)neptunium
Tricyclopentadienylneptunium chloride
 [1317-00-6]



M 467.785

Brown solid. Sol. C₆H₆. Mp >330° dec. Subl. at 100° in vacuo. μ_{eff} = 2.20μ_B.

Baumgartner, F. *et al*, *Naturwissenschaften*, 1965, **52**, 560 (synth)

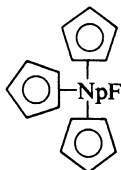
Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1966, **5**, 583 (synth)

Fischer, R.D. *et al*, *Z. Naturforsch., A*, 1969, **24**, 616.

Karraker, D.G. *et al*, *Inorg. Chem.*, 1972, **11**, 1742 (synth, mössbauer)

C₁₅H₁₅FNp**Np-00002**

Fluorotris(η⁵-2,4-cyclopentadien-1-yl)neptunium
Tricyclopentadienylneptunium fluoride
 [70445-59-9]



M 451.330

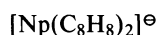
Green solid. Sol. THF. Subl. at 170° in vacuo.

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1966, **5**, 583 (synth)

Stollenwerk, A.H., *J. Phys. Colloq.*, 1979, 179 (synth)

C₁₆H₁₆Np[⊖]**Np-00003**

Bis(η⁸-1,3,5,7-cyclooctatetraene)neptunate(1-), 9Cl



M 445.351 (ion)

K salt, bis-THF complex: [54326-81-7].

C₂₄H₃₂KO₂Np M 628.662

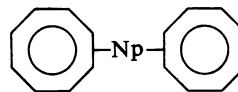
Burgundy cryst. Extremely air- and water-sensitive.

Easily oxid. to Bis(η⁸-1,3,5,7-cyclooctatetraene)neptunium, Np-00004.

Karraker, D.G. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 6685 (synth, mössbauer)

C₁₆H₁₆Np**Np-00004**

Bis(η⁸-1,3,5,7-cyclooctatetraene)neptunium, 9Cl
Neptunocene
 [37281-22-4]



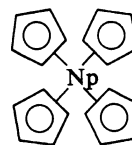
M 445.351

Orange solid. Sol. THF, toluene, C₆H₆, CCl₄. Air-sensitive. μ_{eff} = 1.81μ_B.

Karraker, D.G. *et al*, *J. Am. Chem. Soc.*, 1970, **92**, 4841 (synth, mössbauer, ir, uv)

C₂₀H₂₀Np**Np-00005**

Tetrakis(η⁵-2,4-cyclopentadien-1-yl)neptunium, 9Cl
 [37216-56-1]



M 497.426

Brown-red solid. Sol. C₆H₆, THF. Subl. with dec. at 200-20° in vacuo. μ_{eff} = 2.43μ_B.

Baumgartner, F. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1968, **7**, 634 (synth, ir)

Fischer, R.D. *et al*, *Z. Naturforsch., A*, 1969, **24**, 616 (synth)

Karraker, D.G. *et al*, *Inorg. Chem.*, 1972, **11**, 1742 (mössbauer)

Kanellakopulos, B. *et al*, *J. Chem. Phys.*, 1980, **72**, 6311 (nmr)

Pa Protactinium

S. A. Cotton

Protactinium (Fr.), Protaktinium (Ger.), Protactinio (Sp.), Protattinio (Ital.), Протактиний (Protactinii) (Russ.), プロトアクチニウム (Japan.)

Atomic Number. 91

Atomic Weight. 231.0359

Electronic Configuration. [Rn] $5f^2 6d^1 7s^2$ or [Rn] $5f^1 6d^2 7s^2$

Oxidation State. +4

Coordination Number. See under Uranium.

Colour. Orange-yellow.

Availability. Not commercially available. The commonest isotope, ^{231}Pa is an α -emitter ($t_{1/2} = 3.25 \times 10^4\text{y}$) obtained from uranium extraction. The most useful starting material is PaCl_4 obtained by the reduction of PaCl_5 with Al powder. PaCl_5 is in turn obtained from Pa_2O_5 by reaction with thionyl chloride. See Brown, D. *et al.*, *J. Chem. Soc. (A)*, 1966, 874; 1967, 719.

Handling. See under Uranium.

Toxicity. Protactinium is extremely toxic, requiring handling procedures similar to those used for plutonium.

Isotopic Abundance. ^{231}Pa , 100%.

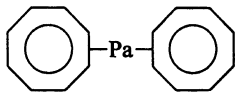
Spectroscopy. There are as yet no ^1H nmr data on the paramagnetic Pa(IV) ($5f^1$) organometallics.

Analysis. The identity of protactinium organometallics has largely been established by showing them to be isomorphous with corresponding compounds of other actinides.

References. See under Uranium.

C₁₆H₁₆Pa

Bis(η⁸-1,3,5,7-cyclooctatetraene)protactinium
[51056-18-9]



M 439.338

Golden-yellow cryst. Sol. C₆H₆, THF. Subl. at 155° *in vacuo*. V. air-sensitive.

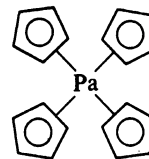
Goffart, J. *et al*, *Inorg. Nucl. Chem. Lett.*, 1974, **10**, 413 (*synth*, *ir*)

Starks, D.F. *et al*, *Inorg. Chem.*, 1974, **13**, 1307 (*synth*)

Pa-00001

C₂₀H₂₀Pa

Tetrakis(η⁵-2,4-cyclopentadien-1-yl)protactinium, 9Cl
Tetra-π-cyclopentadienylprotactinium, 8Cl
[79063-52-8]



M 491.414

Orange-yellow cryst. Subl. with dec. at 220° *in vacuo*.

Baumgärtner, F. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1969, **8**, 202 (*synth*, *ir*, *ms*)

Pa-00002

Pm Promethium

S. A. Cotton

Promethium (Fr., Ger.), Prometio (Sp.), Promezio (Ital.), Прометий (Prometii) (Russ.), プロメチウム (Japan.)

Atomic Number. 61

Atomic Weight. All isotopes are radioactive, not naturally occurring.

Electronic Configuration. [Xe] $4f^5 6s^2$

Oxidation State. +3

Coordination Number. Expected to be 6 or greater.

Colour. The one organopromethium compound so far reported is orange.

Availability. Extremely limited owing to the radioactivity and short half-life of the element. The stablest isotope, ^{147}Pm has $t_{1/2} = 17.7$ y. The most useful isotope, ^{145}Pm , which has $t_{1/2} = 2.5$ y, is a soft β -emitter.

Handling. See under Lanthanum.

Toxicity. Because of their radioactivity, promethium compounds should be handled with great care.

Spectroscopy. See the section under Lanthanum. The ^1H nmr spectra would be expected to display shifted and broadened lines compared with diamagnetic analogues. The optical spectra exhibit a range of sharp transitions. See Laubereau, P. G. *et al.*, *Inorg. Chem.*, 1970, **9**, 1091.

Analysis. The identity of the only known complex was established by comparison of powder photographs with those of analogous compounds.

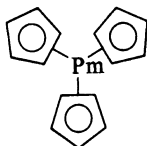
References. See under Lanthanum.

C₁₅H₁₅Pm

Pm-00001

Tris(η^5 -2,4-cyclopentadien-1-yl)promethium*Tricyclopentadienylpromethium*

[12277-27-9]



M 340.284

Yellow-orange cryst. Sol. THF. Subl. at 140-260° *in vacuo*. Hydrol. by H₂O.Baumgärtner, F. *et al*, *Radiochim. Acta.*, 1967, 7, 188 (*synth*)Kopune, C.R. *et al*, *Radiochim. Radioanal. Letters*, 1969, 1, 117 (*synth*)Laubereau, P.G. *et al*, *Inorg. Chem.*, 1970, 9, 1091 (*synth*)

Pr Praseodymium

S. A. Cotton

Praséodyme (Fr.), Praseodym (Ger.), Praseodimio (Sp., Ital.), Празеодимий (Prazeodimii) (Russ.), プラセオジム (Japan.)

Atomic Number. 59

Atomic Weight. 140.9077

Electronic Configuration. [Xe] $4f^3 6s^2$

Oxidation State. +3

Coordination Number. Usually 6 or greater.

Colour. With few exceptions (violet, yellow), organoprasedymium compounds are pale green.

Availability. Usual starting materials are Pr_6O_{11} and anhydrous PrCl_3 . See also the section under Lanthanum.

Handling. See under Lanthanum.

Toxicity. See under Lanthanum.

Isotopic Abundance. ^{141}Pr , 100%.

Spectroscopy. ^{141}Pr has $I = \frac{5}{2}$ and has been little studied as an nmr probe.

The ^1H nmr spectra of Pr(III) compounds are reasonably sharp in spite of the fact that Pr(III) is paramagnetic ($4f^2$). See Von Ammon, R. *et al.*, *Chem. Ber.*, 1971, **104**, 1072, and also under Lanthanum.

Analysis. See under Lanthanum.

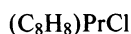
References. See under Lanthanum.

C₆H₁₈Pr⁺⁺⁺**Pr-00001****Hexamethylpraesodymate(3–)**

M 231.116 (ion)

Tris[(tetramethylethylenediamine)lithium] salt:

[76206-86-5].

C₂₄H₆₆Li₃N₆Pr M 600.556Green solid. Sol. Et₂O. Mp 59-62° dec. Extremely air- and moisture-sensitive.Schumann, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1981, **20**, 120 (*synth*)**C₈H₈ClPr****Pr-00002****Chloro(cyclooctatetraene)praesodymium**Di-μ-chlorobis(η⁸-1,3,5,7-cyclooctatetraene)dipraesodymium, 9Cl

M 280.512

Bis-THF complex probably dimeric; see

Chloro(cyclooctatetraene)cerium.

Bis-THF complex: [51177-48-1].

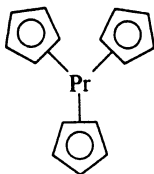
C₃₂H₄₈Cl₂O₄Pr₂ M 849.450

Pale-green cryst. Sol. dioxan, THF. Mp >345°.

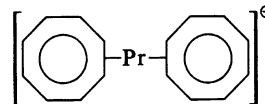
Extremely air- and moisture-sensitive. μ = 3.39μ_B.Hodgson, K.O. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 8650 (*synth*, *ir*, *uv*)**C₁₅H₁₅Pr****Pr-00003****Tris(η⁵-2,4-cyclopentadien-1-yl)praseodymium, 9Cl**

Tri-π-cyclopentadienylpraseodymium, 8Cl

[11077-59-1]



M 336.191

Pale-green cryst. Sol. THF. Mp 420°. Subl. at 200-50° *in vacuo*, hydrol. by H₂O.Cyclohexylisocyanide adduct: [11057-26-4]. Green needles. Sol. C₆H₆, sl sol. pentane. Air- and moisture-sensitive.Wilkinson, G. *et al*, *J. Am. Chem. Soc.*, 1954, **76**, 6210 (*synth*)Mueller, J., *Chem. Ber.*, 1969, **102**, 152 (*ms*)Von Ammon, R. *et al*, *Inorg. Nucl. Chem. Lett.*, 1969, **5**, 315 (*nmr*)Devyatykh, G.G. *et al*, *Dokl. Akad. Nauk. SSSR*, 1970, **193**, 1069 (*synth*, *ms*)Krasnova, S.G. *et al*, *Zh. Neorg. Khim.*, 1971, **16**, 1733 (*synth*)Von Ammon, R. *et al*, *Ber. Bunsenges. Phys. Chem.*, 1972, **76**, 995 (*nmr*, *ir*)Burns, J.H. *et al*, *J. Organomet. Chem.*, 1976, **120**, 361 (*struct*)Aleksanyan, V.T. *et al*, *J. Organomet. Chem.*, 1977, **131**, 251 (*raman*)**C₁₆H₁₆Pr⁺****Pr-00004****Bis(η⁸-1,3,5,7-cyclooctatetraene)praesodymate(1–), 9Cl**
Dicyclooctatetraenepraesodymate(1–)

M 349.210 (ion)

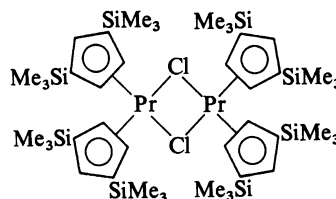
K salt: [51177-53-8].

C₁₆H₁₆KPr M 388.308

Yellow-gold solid. Sol. dioxan, THF. Mp >345°.

Extremely air- and moisture-sensitive. μ = 2.84μ_B.Mares, F. *et al*, *J. Organomet. Chem.*, 1970, **24**, C68 (*synth*)Hodgson, K.O. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 8650 (*synth*, *ir*, *uv*)**C₂₂H₄₂ClPrSi₄****Pr-00006****Bis[1,3-bis(trimethylsilyl)cyclopentadienyl]chloropraesodymium**

[81507-56-4]



M 595.277

Dimeric.

Dimer: Tetrakis[(1,2,3,4,5-η)-1,3-bis(trimethylsilyl)-2,4-cyclopentadien-1-yl]di-μ-chlorodipraesodymium.

C₄₄H₈₄Cl₂Pr₂Si₈ M 1190.553

Yellow cryst. Sol. toluene, THF.

Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 1190 (*synth*, *struct*)

Pu Plutonium

S. A. Cotton

Plutonium (Fr., Ger.), Plutonio (Sp., Ital.), Плутоний (Plutonii) (Russ.), プルトニウム (Japan.)

Atomic Number. 94

Atomic Weight. 244 (stablest isotope, $t_{1/2} = 8 \times 10^7$ y)

Electronic Configuration. [Rn] $5f^6 7s^2$

Oxidation States. +3, +4

Coordination Number. See under Uranium.

Colour. Pu(IV) compounds are usually red, and Pu(III) compounds are green.

Availability. Plutonium compounds are not generally available. The most useful starting material is Cs_2PuCl_6 (see for example Bibler, J. P. *et al.*, *Inorg. Chem.*, 1968, **7**, 982. For the use of the trihalides see Karraker, D. G. *et al.*, *J. Am. Chem. Soc.*, 1974, **96**, 6885).

Handling. Extreme care is required in the handling of plutonium, due to its acute toxicity. Remote control techniques are preferably used.

Toxicity. Plutonium is both highly radioactive and a potent carcinogen. Microgram quantities are potentially lethal and accumulate in the body.

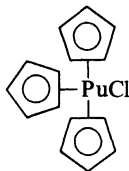
Spectroscopy. Nmr data on organoplutonium complexes are sparse. Spectra reported for $\text{Pu}(\text{Cp})_3$ show lines which are an order of magnitude broader than for U(IV) compounds.

Analysis. See under Neptunium.

References. See under Uranium.

C₁₅H₁₅ClPu**Pu-00001**

Chlorotris(η⁵-2,4-cyclopentadien-1-yl)plutonium
Tricyclopentadienylplutonium chloride
 [81033-04-7]



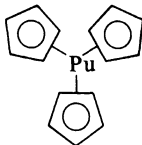
M 474.737

Dark-brown powder. Sol. MeCN, THF, v. sl. sol. pentane. Mp >230°. V. sensitive to hydrolysis, particularly in soln. Does not subl. *in vacuo* up to 230°.

Bagnall, K.W. *et al*, *J. Organomet. Chem.*, 1982, **224**, 263
 (synth, ir, uv)

C₁₅H₁₅Pu**Pu-00002**

Tris(η⁵-2,4-cyclopentadien-1-yl)plutonium
Tricyclopentadienylplutonium
 [12216-08-9]



M 439.284

Moss-green solid. Sol. THF. Mp >195° dec. Subl. at 140-65° *in vacuo*. Extremely sensitive to air.

THF complex: Tris(η⁵-2,4-cyclopentadienyl)-tetrahydrofuranplutonium.

C₁₉H₂₃OPu M 511.390

Green cryst.

Nicotine complex: Tris(η⁵-2,4-cyclopentadien-1-yl)-(nicotine)plutonium.

C₂₅H₂₉N₂Pu M 601.518

Green cryst.

Baumgartner, F. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1965, **4**, 878 (synth, ir)

Crisler, L.R. *et al*, *J. Inorg. Nucl. Chem.*, 1974, **36**, 1424 (synth, uv, ms)

C₁₆H₁₆Pu[⊖]**Pu-00003**

Bis(η⁸-1,3,5,7-cyclooctatetraene)plutonate(1-), 9Cl
 [Pu(C₈H₈)₂][⊖]

M 452.302 (ion)

K salt, bis-THF complex: [54326-82-8].

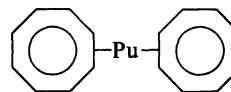
C₂₄H₃₂KO₂Pu M 635.614

Turquoise-green cryst. Extremely air- and water-sensitive. Easily oxid. to Bis(η⁸-1,3,5,7-cyclooctatetraene)-plutonium, Pu-00004 μ_{eff} = 1.25μ_B.

Karraker, D.G. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 6885 (synth)

C₁₆H₁₆Pu**Pu-00004**

Bis(η⁸-1,3,5,7-cyclooctatetraene)plutonium, 9Cl
Plutonocene
 [37281-23-5]



M 452.302

Cherry-red solid. Sol. THF, toluene, C₆H₆, CCl₄. Air-sensitive. Diamagnetic.

Karraker, D.G. *et al*, *J. Am. Chem. Soc.*, 1970, **92**, 4841 (synth, ir, uv)

Re Rhenium

M. Green

Rhénium (Fr.), Rhenium (Ger.), Renio (Sp., Ital.), Рений (Renii) (Russ.), レニウム (Japan.)

Atomic Number. 75

Atomic Weight. 186.207

Electronic Configuration. [Xe] $4f^{14} 5d^5 6s^2$

Oxidation States. -1, +1, +2, +3

Coordination Number. Commonly 6.

Colour. Variable.

Availability. Starting materials include $\text{Re}_2(\text{CO})_{10}$, KReO_4 , ReCl_3 and ReO_3 . Rhenium is an expensive metal.

Handling. See under Chromium.

Toxicity. Rhenium compounds, with the exception of the carbonyl complexes, are not regarded as highly toxic.

Isotopic Abundance. ^{185}Re , 37.07%; ^{187}Re , 62.93%.

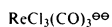
Spectroscopy. Both ^{185}Re and ^{187}Re have $I = \frac{5}{2}$ and only fundamental nmr studies have been carried out on these nuclei.

Analysis. For standard methods see *Scott's Standard methods of Chemical Analysis*, Furman, N. H. Ed., 6th Edn, Van Nostrand, 1962.

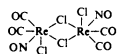
References. General reviews are listed in the introduction to the *Sourcebook*.



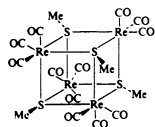
Re-00001



Re-00002



Re-00003



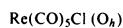
Re-00004



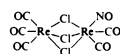
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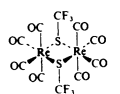
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Re-00007



Re-00008



Re-00009



Re-00010



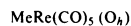
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Re-00012



Re-00013



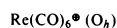
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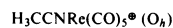
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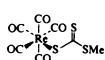
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Re-00017



Re-00018



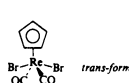
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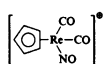
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Re-00021



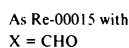
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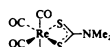
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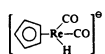
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Re-00025



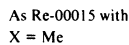
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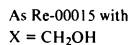
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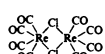
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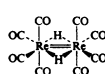
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Re-00030



Re-00031



Re-00032



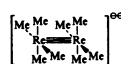
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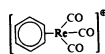
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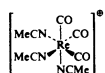
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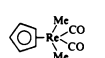
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Re-00037



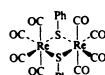
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Re-00039



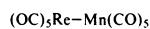
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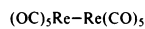
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Re-00042



Re-00043



Re-00044



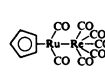
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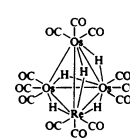
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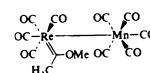
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Re-00048



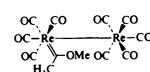
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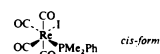
Re-00050



Re-00051



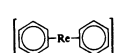
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Re-00053



Re-00054



Re-00055



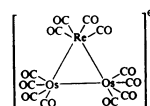
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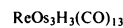
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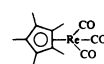
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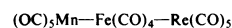
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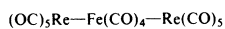
Re-00060



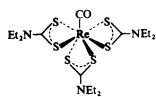
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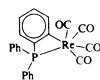
Re-00062



Re-00063



Re-00072



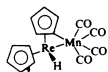
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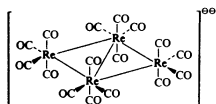
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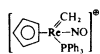
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Re-00065



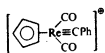
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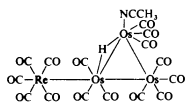
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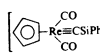
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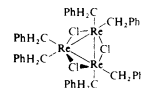
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Re-00074



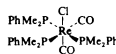
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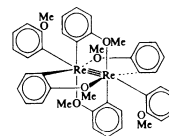
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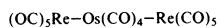
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Re-00082



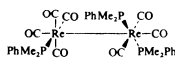
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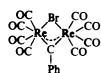
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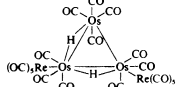
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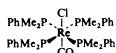
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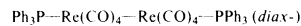
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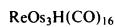
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Re-00084



Re-00091



Re-00070



Re-00085



Re-00092



Re-00071



Re-00077



Re-00086



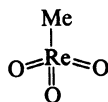
Re-00093



Re-00078

CH₃O₃Re**Methyltrioxorhenium, 9Cl**

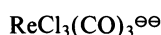
[70197-13-6]



M 249.240

Colourless cryst. Sol. CHCl₃, C₆H₆, Et₂O.Mertis, K. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1488.Beattie, I.R. *et al*, *Inorg. Chem.*, 1979, **18**, 2318 (*synth, spectra*)**Re-00001**

Yellow cryst.

Abel, E.W. *et al*, *J. Chem. Soc. (A)*, 1966, 1141 (*synth, ir, nmr*)Osborne, A.G. *et al*, *J. Chem. Soc. (A)*, 1966, 1143.Harrison, W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 1009 (*cryst struct*)**C₃Cl₃O₃Re³⁻****Tricarbonyltrichlororhenate(2-), 9Cl**

M 376.597 (ion)

Di-Cs salt: [35084-05-0].C₃CsCl₃O₃Re M 509.503

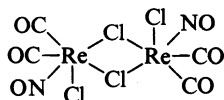
White cryst.

Bistetraethylammonium salt: [25908-19-4].C₁₉H₄₀Cl₃N₂O₃Re M 637.103

No phys. props. reported.

Ginsberg, A.P. *et al*, *Inorg. Chem.*, 1969, **8**, 2189 (*synth*)Colton, R. *et al*, *Aust. J. Chem.*, 1972, **25**, 9 (*synth*)**Re-00002****C₄Cl₄N₂O₆Re₂****Tetracarbonyldi-μ-chlorodichlorodinitrosyldirhenium, 9Cl**

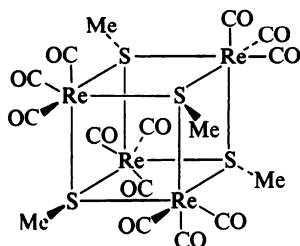
[25360-92-3]



M 686.280

Starting material for rhenium nitrosyl chemistry. Stable yellow cryst. (CH₂Cl₂/hexane). Sol. Me₂CO, C₆H₆, PhNO₂, chlorinated hydrocarbons, insol. aliphatic hydrocarbons.*Monomer: Dicarbonyldichloronitrosyldirhenium.*C₂Cl₂NO₃Re M 343.140

Unknown.

Zingales, F. *et al*, *Inorg. Chem.*, 1971, **10**, 507 (*synth*)Zingales, F. *et al*, *Inorg. Chem.*, 1971, **10**, 510 (*props*)Trovati, A. *et al*, *Inorg. Chem.*, 1971, **10**, 851 (*props*)Norton, J.R. *et al*, *Inorg. Chem.*, 1973, **12**, 485 (*synth, props*)*Inorg. Synth.*, 1976, **16**, 35 (*synth, ir, ms*)**Re-00003****C₄H₃O₃ReS****Tricarbonyl(methanethiolato)rhenium**

M 317.333

Tetrameric.

Tetramer: [23591-73-3]. Dodecacarbonyltetrakis(μ₃-methanethiolato)tetrarhenium, 8Cl.C₁₆H₁₂O₁₂Re₄S₄ M 1269.332**Re-00004****C₄H₁₂ORe****Tetramethyloxorhenium**

[53022-70-1]



M 262.345

Red-purple cryst. by subl. Mp ca. 45°.

Mertis, K. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 607 (*synth*)Gibson, J.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1073 (*synth*)Mertis, K. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1488 (*synth*)**Re-00005****C₅BrO₅Re****Bromopentacarbonylrhenium, 9Cl, 8Cl***Rhenium pentacarbonyl bromide*

[14220-21-4]

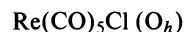


M 406.163

Yellow cryst. by subl.

Kirkham, W.J. *et al*, *J. Chem. Soc.*, 1965, 550 (*synth*)Junk, G.A. *et al*, *J. Am. Chem. Soc.*, 1968, **90**, 5758 (*ms*)Keeling, G. *et al*, *J. Chem. Soc. (A)*, 1971, 3143 (*ir*)Colton, R. *et al*, *Aust. J. Chem.*, 1972, **25**, 9 (*synth*)Hall, M.B., *J. Am. Chem. Soc.*, 1975, **97**, 2057 (*uv*)Webb, M.J. *et al*, *J. Organomet. Chem.*, 1975, **93**, 119 (*cmr*)**Re-00006****C₅ClO₅Re****Pentacarbonylchlororhenium, 9Cl, 8Cl***Chloropentacarbonylrhenium. Rhenium pentacarbonyl chloride*

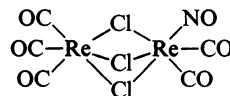
[14099-01-5]



M 361.712

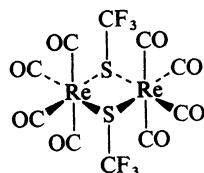
Cryst. (C₆H₆). Sublimes at 140°.Kirkham, W.J. *et al*, *J. Chem. Soc.*, 1965, 550 (*synth*)Junk, G.A. *et al*, *J. Am. Chem. Soc.*, 1968, **90**, 5758 (*ms*)Colton, R. *et al*, *Aust. J. Chem.*, 1972, **25**, 9 (*synth*)Higginson, B.R. *et al*, *J. Chem. Soc., Faraday Trans. 2*, 1975, **71**, 1913.Wrighton, M.S. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 1111 (*uv*)**Re-00007****C₅Cl₃NO₆Re₂****Pentacarbonyltri-μ-chloronitrosyldirhenium, 9Cl**

[37402-69-0]



M 648.831

Mod. air-stable light-orange cryst. (CH₂Cl₂/hexane).Sol. CH₂Cl₂, CCl₄, C₆H₆, reacts with EtOH.Zingales, F. *et al*, *Inorg. Chem.*, 1971, **10**, 507 (*props*)Norton, J.R. *et al*, *Inorg. Chem.*, 1973, **12**, 485 (*synth, ir*)*Inorg. Synth.*, 1976, **15**, 35 (*synth, ir*)**Re-00008**

C₅F₃O₄ReS**Re-00009****Tetracarbonyl(trifluoromethanethiolato)rhenium**

M 399.315

Dimeric.

Dimer: [25031-36-1]. Octacarbonylbis[μ-(trifluoromethanethiolato)]dirhenium, 8Cl.C₁₀F₆O₈Re₂S₂ M 798.630White cryst. by fractional subl. Mp 129°. Bp_{0.1} 70° subl.King, R.B. *et al*, *Inorg. Chem.*, 1969, **8**, 2540 (*synth*, *ir*, *nmr*)Grobe, J. *et al*, *J. Fluorine Chem.*, 1976, **8**, 145 (*synth*, *ir*, *nmr*)**C₅HO₅Re****Re-00010****Pentacarbonylhydorrhenium, 9Cl, 8Cl***Hydriodopentacarbonylrhenium. Pentacarbonylrhenium(I) hydride. Hydrogen pentacarbonyl rhenate(-1)* [16457-30-0]

M 327.267

Liq. Bp ca. 100° (extrapolated). With radical initiators gives •Re(CO)₅ useful in synth. of substituted complexes. Dec. at ca. 100° to H₂ + Re₂(CO)₁₀. Air and moisture sensitive.Hieber, W. *et al*, *Z. Naturforsch.*, **B**, 1959, **14**, 132 (*synth*, *props*)Hileman, J.C. *et al*, *Inorg. Chem.*, 1962, **1**, 933 (*synth*, *ir*, *nmr*)Braterman, P.S. *et al*, *J. Am. Chem. Soc.*, 1967, **89**, 2851 (*ir*)Byers, B.H. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 2527.Miles, W.J. *et al*, *J. Organomet. Chem.*, 1977, **131**, 93 (*synth*)**C₅IO₅Re****Re-00011****Pentacarbonyliodorhenium, 9Cl***Iodopentacarbonylrhenium* [13821-00-6]

M 453.164

Yellow cryst.

Abel, E.W. *et al*, *J. Chem. Soc.*, 1958, 3149 (*props*)Higginson, B.R. *et al*, *J. Chem. Soc., Faraday Trans. 2*, 1975, 1912 (*pe*)Dunn, J.G. *et al*, *J. Organomet. Chem.*, 1974, **102**, 199 (*props*)Burgess, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1158(*props*)Lindner, E. *et al*, *J. Organomet. Chem.*, 1976, **114**, C23 (*props*)Wrighton, M.S. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 1111.**C₅O₅Re[⊖]****Re-00012****Pentacarbonylrhenate(1-), 10Cl**

[14971-38-1]



M 326.259 (ion)

Salts generally prepd. and used *in situ* due to extreme sensitivity to air and moisture.*Na salt*: [33634-75-2].C₅NaO₅Re M 349.249

Yellow-green soln. in THF.

K salt: [63139-42-4].C₅KO₅Re M 365.357

Moisture-sensitive.

Inorg. Synth., 1964, **7**, 196 (*synth*)Dessy, R.E. *et al*, *J. Am. Chem. Soc.*, 1966, **88**, 5121 (*props*)Boerner, M. *et al*, *J. Chem. Res. (S)*, 1977, 74 (*props*)Benson, I.B. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 1240 (*props*)Curtis, M.D. *et al*, *J. Organomet. Chem.*, 1979, **172**, 177 (*props*)Beck, W. *et al*, *J. Organomet. Chem.*, 1981, **214**, 81 (*props*)**C₅O₇ReS[⊖]****Re-00013****Pentacarbonyl(sulfur dioxide-S)rhenium(1+)**

M 390.318 (ion)

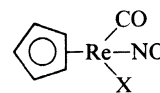
Hexafluoroarsenate: [55853-08-2].C₅AsF₆O₇ReS M 579.230Pale-yellow solid. Dec. at 40-50° *in vacuo* with loss of SO₂ reversibly forming Re(CO)₅F. AsF₅.Mews, R., *Angew. Chem., Int. Ed. Engl.*, 1975, **14**, 640 (*synth*, *ir*)**C₆H₃O₅Re****Re-00014****Pentacarbonylmethylrhenium, 9Cl***Methylpentacarbonylrhenium*

[14524-92-6]



M 341.294

Colourless cryst. Mp 120°.

Hieber, W. *et al*, *Z. Naturforsch.*, **B**, 1959, **14**, 132 (*synth*)Beck, W. *et al*, *Chem. Ber.*, 1961, **94**, 862 (*synth*)Tattershall, B.W. *et al*, *J. Chem. Soc. (A)*, 1968, 899 (*props*)Bruce, M.I. *et al*, *J. Chem. Soc. (C)*, 1970, 3204 (*props*)Bennett, R.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 1787 (*props*)King, R.B. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 1687 (*props*)**C₆H₆NO₂Re****Re-00015****Carbonyl(η⁵-2,4-cyclopentadien-1-yl)hydronitrosylrhenium, 9Cl***Carbonyl(η⁵-cyclopentadienyl)hydridonitrosylrhenium* [38814-46-9]

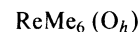
X = H

M 310.326

Orange thermally stable liq.

Stewart, R.P. *et al*, *J. Organomet. Chem.*, 1972, **42**, C32 (*synth*, *nmr*)Casey, C.P. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 1927 (*synth*)**C₆H₁₈Re****Re-00016****Hexamethylrhenium, 9Cl***Rhenium hexamethyl*

[56090-02-9]



M 276.415

Green cryst. Sol. hexane. Mp 10-2° dec.

► Explosion hazard

Mertis, K., *J. Chem. Soc., Dalton Trans.*, 1975, 607 (*synth, props*)
 Gibson, J.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1073 (*props*)
 Gibson, J.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1492 (*esr*)
 Green, J.C. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 1403 (*pe*)

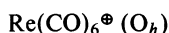
C₆O₆Re⁺

Re-00017

Hexacarbonylrhenium(1+)

Rhenium hexacarbonyl(1+)

[41944-00-7]



M 354.269 (ion)

Hexafluorophosphate: [38656-75-6].

C₆F₆O₆Pre M 499.234

White air-stable cryst.

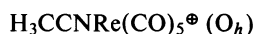
Hieber, W. *et al*, *Angew. Chem.*, 1961, 73, 586 (*synth*)
 Hieber, W. *et al*, *Z. Naturforsch., B*, 1961, 16, 709 (*synth*)
 Kruck, T. *et al*, *Chem. Ber.*, 1963, 96, 3028 (*synth*)
 Kruck, T. *et al*, *Chem. Ber.*, 1966, 99, 1153 (*synth*)
 Abel, E.W. *et al*, *J. Mol. Spectrosc.*, 1969, 30, 29 (*ir*)
 Bruce, D.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 1627 (*cryst struct*)

C₇H₃NO₅Re⁺

Re-00018

(Acetonitrile)pentacarbonylrhenium(1+)

[29421-17-8]



M 367.311 (ion)

Hexafluorophosphate: [55057-83-5].

C₇H₃F₆NO₅Pre M 512.276

Off-white powder. Sol. polar solvs. Mp 163-70°. Air-stable as solid, but air-sensitive in soln.

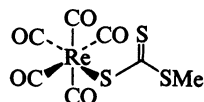
Connolly, N.G. *et al*, *J. Chem. Soc., Chem. Commun.*, 1970, 880 (*synth, ir*)
 Drew, D. *et al*, *Inorg. Chem.*, 1975, 14, 1579 (*synth, ir, nmr*)

C₇H₃O₅ReS₃

Re-00019

Pentacarbonyl(monomethylcarbonotrithioato-S)rhenium, 10Cl

[55190-76-6]



M 449.485

Yellow cryst. Mp 83°. Readily decarbonylates on warming.

Benson, I.B. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 1240 (*synth, ir, nmr*)

C₇H₃O₆Re

Re-00020

Acetylpentacarbonylrhenium, 10Cl

Pentacarbonylacetylrrhenium

[23319-44-0]



M 369.304

Sl. volatile, pale-yellow air-stable solid. Mp 79.5-80.5°.

Nesmeyanov, A.N. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci.*

Khim., 1967, 175, 1293 (*props*)

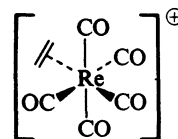
Inorg. Synth., 1980, 20, 201 (*synth*)

C₇H₄O₅Re

Re-00021

Pentacarbonyl(ethene)rhenium(1+)

Pentacarbonyl(ethylene)rhenium(1+), 8Cl



M 354.313

Hexafluorophosphate: [31922-27-7].

C₇H₄F₆O₅ReP M 499.277

White cryst. (Me₂CO/Et₂O).

Fischer, E.O. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1962, 1, 52 (*synth, nmr*)

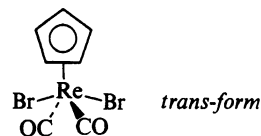
Brodie, A.M. *et al*, *J. Organomet. Chem.*, 1970, 24, 201 (*synth*)

C₇H₅Br₂O₂Re

Re-00022

Dibromodicarbonyl(η⁵-2,4-cyclopentadien-1-yl)rhenium, 9Cl

[32966-00-0]



M 467.130

Exists as *cis/trans* isomers in solid state, in soln. converts to the *trans* isomer shown.

cis-form

lateral-form

Dark-brown microcryst. Mp 217-20°. *ir* ν_{CO} 2055, 1987 cm⁻¹ (CHCl₃).

trans-form

diagonal-form

Maroon plates. Mp 221-3°. *ir* ν_{CO} 2070, 2008 cm⁻¹ (CHCl₃).

Nesmeyanov, A.N. *et al*, *Bull. Akad. Sci. USSR, Div. Chem. Sci.*, 1969, 1687 (*synth*)

King, R.B. *et al*, *J. Organomet. Chem.*, 1975, 93, C23 (*synth*)

Sizoi, V.F. *et al*, *J. Organomet. Chem.*, 1975, 94, 425 (*props*)

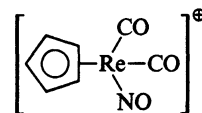
C₇H₅NO₃Re⁺

Re-00023

Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)nitrosylrhenium(1+), 10Cl

10Cl

[45978-17-4]



M 337.328 (ion)

Tetrafluoroborate: [31960-40-4].

C₇H₅BF₄NO₃Re M 424.132

Characterised spectroscopically.

Stewart, R.P. *et al*, *J. Organomet. Chem.*, 1972, 42, C32 (*synth, props*)

Casey, C.P. *et al*, *J. Am. Chem. Soc.*, 1979, 101, 741 (*props*)

Sweet, J.R. *et al*, *J. Organomet. Chem.*, 1979, 173, C9.

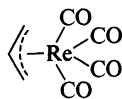
Tam, W. *et al*, *J. Am. Chem. Soc.*, 1979, 101, 1589 (*props*)

Wong, W.K. *et al*, *J. Am. Chem. Soc.*, 1979, 101, 5440 (*props*)

Casey, C.P. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 1927 (*props*)

C₇H₅O₄Re**Re-00024**

Tetracarbonyl(η³-2-propenyl)rhenium, 9Cl
(η³-Allyl)tetracarbonylrhenium
[33307-29-8]



M 339.321

Yellow cryst. (hydrocarbons). Mp 32-5°.

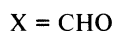
Abel, E.W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1706
(*synth*, *nmr*)

C₇H₆NO₃Re**Re-00025**

Carbonyl(η⁵-2,4-cyclopentadien-1-yl)formyl(nitrosyl)rhenium, 10Cl

[69621-06-3]

As Carbonyl(η⁵-2,4-cyclopentadien-1-yl)hydronitrosylrhenium, Re-00015 with



M 338.336

Orange oil.

Casey, C.P. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 741, 3371
(*synth*, *nmr*)

Tam, W. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 1589; 1982, **104**, 141 (*synth*, *props*)

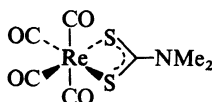
Sweet, J.R. *et al*, *J. Organomet. Chem.*, 1979, **173**, C9 (*synth*, *nmr*)

Casey, C.P. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 1927 (*synth*, *props*)

Casey, C.P. *et al*, *Pure Appl. Chem.*, 1980, **52**, 625 (*props*)

C₇H₆NO₄ReS₂**Re-00026**

Tetracarbonyl(dimethylcarbamodithioato-S,S')rhenium, 9Cl
[68795-84-6]



M 418.456

White cryst. Sol. CH₂Cl₂, toluene. Mp 120° dec.

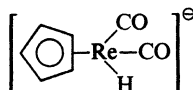
Rowbottom, J.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 684
(*synth*)

Calderazzo, F. *et al*, *J. Organomet. Chem.*, 1978, **160**, 207
(*synth*, *ir*, *nmr*, *cryst struct*)

Nakamoto, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 87
(*synth*)

C₇H₆O₂Re[⊖]**Re-00027**

Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)hydrorhenate(1-)



M 308.330 (ion)

K salt: [87145-51-5].

C₇H₆KO₂Re M 347.429

Slightly yellow cryst.

Tetraethylammonium salt: [87145-52-6].

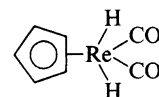
C₁₅H₂₆NO₂Re M 438.583

Yellow cryst.

Bergmann, R.G. *et al*, *J. Am. Chem. Soc.*, 1983, **105**, 6500
(*synth*, *props*)

C₇H₇O₂Re**Re-00028**

Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)dihydorrhenium
[80952-45-0]



M 309.338

Useful starting material.

Hoyano, J.K. *et al*, *Organometallics*, 1982, **1**, 783 (*synth*)

Bergmann, R.G. *et al*, *J. Am. Chem. Soc.*, 1983, **105**, 6500
(*synth*, *props*)

C₇H₈NO₂Re**Re-00029**

Carbonyl(η⁵-2,4-cyclopentadien-1-yl)methylnitrosylrhenium, 9Cl

[38814-45-8]

As Carbonyl(η⁵-2,4-cyclopentadien-1-yl)hydronitrosylrhenium, Re-00015 with



M 324.353

Red air-stable cryst. Mp 75°.

Stewart, R.P. *et al*, *J. Organomet. Chem.*, 1972, **42**, C32 (*synth*, *ir*, *nmr*)

C₇H₈NO₃Re**Re-00030**

Carbonyl(η⁵-2,4-cyclopentadien-1-yl)(hydroxymethyl)nitrosylrhenium, 10Cl

[31960-41-5]

As Carbonyl(η⁵-2,4-cyclopentadien-1-yl)hydronitrosylrhenium, Re-00015 with



M 340.352

Air-stable orange powder. Mp 105°.

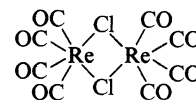
Sweet, J.R. *et al*, *J. Organomet. Chem.*, 1979, **173**, C9 (*synth*, *props*, *nmr*)

Tam, W. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 1589 (*synth*, *props*, *nmr*)

Casey, C.P. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 1927.

C₈Cl₂O₈Re₂**Re-00031**

Octacarbonyldi-μ-chlorodirhenium, 10Cl
[15189-52-3]



M 667.403

Bridged dimer. Off-white cryst.

Monomer: Tetracarbonylchlororhenium. Tetracarbonylrhenium chloride.

C₄ClO₄Re M 333.702

Unknown.

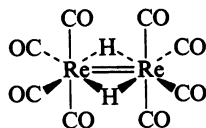
Rowbottom, J.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 684
(*props*)

Swanson, B.I. *et al*, *Inorg. Chem.*, 1975, **14**, 1737 (*raman*)

Inorg. Synth., 1976, **16**, 35 (*synth*)
 McCleverty, J.A. *et al*, *J. Organomet. Chem.*, 1979, **169**, 289 (*props*)
 Lausarot, P.M. *et al*, *J. Organomet. Chem.*, 1980, **201**, 459 (*props*)

C₈H₂O₈Re₂**Re-00032**

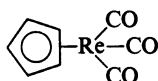
Octacarbonyldi-μ-hydrodirhenium, 10Cl
 [38887-05-7]



M 598.513
 Yellow cryst., mod. air-stable.
 Bennett, M.J. *et al*, *J. Am. Chem. Soc.*, 1972, **94**, 6232 (*synth*, *ir*, *nmr*, *cryst struct*)
 Andrews, M.A. *et al*, *Inorg. Chem.*, 1977, **16**, 1556 (*synth*, *ir*, *nmr*)
 Epstein, R.A. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 3847 (*synth*)

C₈H₅O₃Re**Re-00033**

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)rhenium, 9Cl
Cyclopentadienyltricarbonylrhenium
 [12079-73-1]



M 335.333
 Cryst. (hexane or by subl. *in vacuo*). Mp 112°.
 Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1963, **1**, 191 (*synth*)
 Nesmeyanov, A.N. *et al*, *Izv. Akad. Nauk SSSR*, 1963, 193; *CA*, **58**, 12588 (*synth*)
 Lokshin, B.V. *et al*, *Spectrochim. Acta, Part A*, 1972, **28**, 2209; *Izv. Akad. Nauk SSSR*, 1974, 710; *CA*, **81**, 18816 (*ir*)
 Ignatov, B.G. *et al*, *Izv. Akad. Nauk SSSR, Ser. Fiz.*, 1975, **39**, 2630; *CA*, **84**, 128662 (*nqr*)
 Cozak, D. *et al*, *Spectrosc. Lett.*, 1976, **9**, 673 (*cmr*)
 Lichtenberger, D.L. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 50.

C₈H₅O₇Re**Re-00034**

Pentacarbonyl(ethoxycarbonyl)rhenium
Pentacarbonyl(hydroformatoethyl ester)rhenium, 8Cl
 [15692-05-4]



M 399.330
 White cryst. Mp 69-70°.
 Kruck, T. *et al*, *Chem. Ber.*, 1966, **99**, 1153 (*synth*)
 Brodie, A.M. *et al*, *J. Organomet. Chem.*, 1970, **24**, 201 (*synth*, *props*)
 Angelic, R.J., *Acc. Chem. Res.*, 1972, **5**, 335 (*props*)

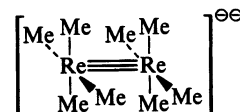
C₈H₉O₅PbRe**Re-00035**

Pentacarbonyl(trimethylplumbyl)rhenium, 10Cl
(Trimethylplumbyl)pentacarbonylrhenium
 [55318-19-9]



M 578.563
 Orange solid. Mp 48-50°. Disproportionates in Me₂CO to Me₂Pb[Re(CO)₅]₂ and Me₄Pb.

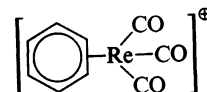
Schubert, W. *et al*, *Z. Naturforsch., B*, 1974, **29**, 694 (*synth*)
 Kodel, W. *et al*, *Inorg. Chim. Acta*, 1981, **49**, 209.

C₈H₂₄Re₂^{⊖⊖}**Re-00036****Octamethyl-dirhenate(2-), 9Cl**

M 492.692 (ion)
Bis[tetrakis(tetrahydrofuran)lithium(1+)]salt: [62171-36-2].
 C₄₀H₈₈Li₂O₈Re₂ M 1083.426
 Red cryst., air- and water-sensitive, but thermally stable.
 Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 6922 (*synth*, *cryst struct*)

C₉H₆O₃Re[⊕]**Re-00037**

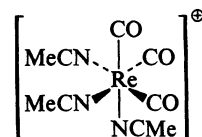
(η⁶-Benzene)tricarbonylrhenium(1+)
 [68927-89-9]



M 348.352 (ion)
Hexafluorophosphate: [68927-90-2].
 C₉H₆F₆O₃PRe M 493.316
 Yellow cryst.
 Kane-Maguire, L.A.P. *et al*, *Inorg. Chem.*, 1979, **18**, 700 (*synth*, *nmr*, *props*)

C₉H₉N₃O₃Re[⊕]**Re-00038**

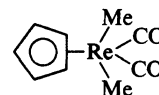
Tris(acetonitrile)tricarbonylrhenium(1+), 9Cl
 [66610-17-1]



M 393.395 (ion)
Hexafluorophosphate: [66610-18-2].
 C₉H₉F₆N₃O₃PRe M 538.360
 Yellow air-stable cryst.
 Reimann, R.H. *et al*, *J. Organomet. Chem.*, 1973, **59**, C24 (*synth*)
 Chan, L.Y.Y. *et al*, *Can. J. Chem.*, 1977, **55**, 111 (*synth*, *cryst struct*)
 Zolanovitch, V.I. *et al*, *J. Organomet. Chem.*, 1978, **146**, 63 (*synth*)
 Kane-Maguire, L.A.P. *et al*, *Inorg. Chem.*, 1979, **18**, 700 (*synth*, *ir*, *nmr*)

C₉H₁₁O₂Re**Re-00039**

Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)dimethylrhenium
 [80952-46-1]



M 337.392
 Pale-yellow cryst. Sol. C₆H₆. Mp 150-5°.

Hoyano, J.K. *et al*, *Organometallics*, 1982, **1**, 783 (*synth, props*)

C₉O₉Re₂²⁺

Re-00040

μ-Carbonyloctacarbonyldirhenium(2-), 10Cl
Nonacarbonyldirhenium(2-)



M 624.508 (ion)

Di-K salt: [66940-26-9].

C₉H₉K₂Re₂ M 567.781

Orange powder. Dec. at 120-40°.

Beck, W. *et al*, *Z. Anorg. Allg. Chem.*, 1961, **308**, 23 (*synth*)

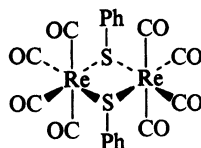
Ellis, J.E. *et al*, *J. Organomet. Chem.*, 1975, **99**, 263.

Gladysz, J.A. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 2545 (*synth, ir*)

C₁₀H₅O₄ReS

Re-00041

(Benzenethiolato)tetracarbonylrhenium



M 407.414

Dimeric.

Dimer: [15680-94-1]. Bis(μ-benzenethiolato)octacarbonyldirhenium, 8Cl.

C₂₀H₁₀O₈Re₂S₂ M 814.828

Pale-yellow cryst. (C₆H₆/pentane). Mp 270° dec. ir ν_{CO} 2105m, 2030s, 2000m, 1967s cm⁻¹ (cyclohexane).

Osborne, A.G. *et al*, *J. Chem. Soc. (A)*, 1966, 1143.

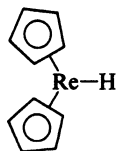
C₁₀H₁₁Re

Re-00042

Bis(η⁵-2,4-cyclopentadien-1-yl)hydridorhenium, 9Cl

Bis(cyclopentadienyl)hydridorhenium. Bis(cyclopentadienyl)rhenium hydride. Dicyclopentadienylhydridorhenium

[1271-32-5]



M 317.404

Yellow air-sensitive cryst. by subl. Sol. org. solvs., insol.

H₂O. Mp 161-2°. Bp_{0.01} ca. 80° subl.

Wilkinson, G. *et al*, *J. Am. Chem. Soc.*, 1955, **77**, 3421 (*nmr*)
Organomet. Synth., 1965, **1**, 80 (*synth*)

Cooper, R.L. *et al*, *J. Chem. Soc. (A)*, 1967, 1155 (*props*)

Shriver, D.F., *Acc. Chem. Res.*, 1970, **3**, 231 (*props*)

Hoxmeier, R.J., *Inorg. Chem.*, 1979, **18**, 3453 (*props*)

Casey, C.P. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 1927 (*props*)

C₁₀MnO₁₀Re

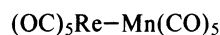
Re-00043

Pentacarbonyl(pentacarbonylmanganese)rhenium, 8Cl

Manganese rhenium decacarbonyl.

Decacarbonylmanganeserhenium

[14693-30-2]



M 521.249

White, air-stable cryst.

Nesmeyanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1963, 194 (*synth*)

Struchkov, Y.T. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1967, **172**, 107 (*cryst struct*)

Junk, G.A. *et al*, *J. Chem. Soc. (A)*, 1970, 2102.

Spiro, T.G., *Prog. Inorg. Chem.*, 1970, **11**, 1 (*spectra*)

Abel, E.W. *et al*, *Inorg. Nucl. Chem. Lett.*, 1971, **7**, 587 (*synth*)

Knox, S.A.R. *et al*, *Inorg. Chem.*, 1971, **10**, 2636 (*synth, struct*)

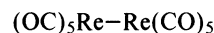
C₁₀O₁₀Re₂

Re-00044

Decacarbonyldirhenium, 10Cl

Dirhenium decacarbonyl

[14285-68-8]



M 652.518

White air-stable cryst. by subl. Spar. sol. org. solvs., insol. H₂O. Mp 177°.

Organomet. Synth., 1965, **1**, 92 (*synth*)

Quicksall, C.O. *et al*, *Inorg. Chem.*, 1969, **8**, 2363 (*ir, raman*)

Swenson, B.I. *et al*, *Prog. Inorg. Chem.*, 1970, **11**, 1 (*ir*)

Bor, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 440 (*electron diff*)

Jackson, R.A. *et al*, *Inorg. Chem.*, 1978, **17**, 997.

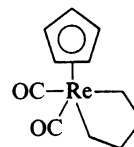
Churchill, M.R. *et al*, *Inorg. Chem.*, 1981, **20**, 1609 (*cryst struct*)

C₁₁H₁₃O₂Re

Re-00045

Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)tetramethylenrhenium

[87145-50-4]



M 363.430

Yellow air-stable cryst.

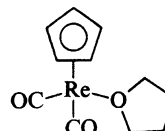
Bergmann, R.G. *et al*, *J. Am. Chem. Soc.*, 1983, **105**, 6500 (*synth, props*)

C₁₁H₁₃O₃Re

Re-00046

Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(tetrahydrofuran)rhenium, 9Cl

[59423-86-8]

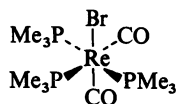


M 379.429

Stable yellow cryst. (THF). Mp 75-8° dec.

Sellmann, D. *et al*, *Z. Naturforsch., B*, 1977, **32**, 795 (*synth, nmr*)

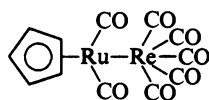
Caulton, K.G., *Coord. Chem. Rev.*, 1981, **38**, 1 (*rev*)

C₁₁H₂₇BrO₂P₃Re**Re-00047****Bromodicarbonyltris(trimethylphosphine)rhenium, 9Cl**
[49742-48-5]

M 550.365

mer, cis-form

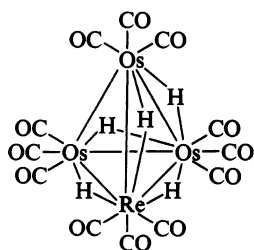
White cryst. Mp 175-8°.

Reimann, R.H. *et al*, *J. Organomet. Chem.*, 1973, **59**, 309
(*synth*, *ir*, *nmr*, *props*)**C₁₂H₅O₇ReRu****Re-00048****Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(pentacarbonylrhenio)ruthenium***Cyclopentadienylrutheniumdicarbonylpentacarbonylrhenium. (η⁵-Cyclopentadienyl)dicarbonylruthenium-pentacarbonylrhenium. Heptacarbonyl(η⁵-cyclopentadienyl)rheniumruthenium*

M 548.444

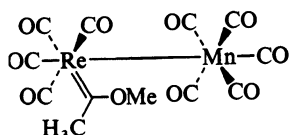
Yellow solid. Bp_{0.1} 60° subl.Blackmore, T. *et al*, *J. Chem. Soc. (A)*, 1968, 2931 (*synth*, *ir*)
Bruce, M.I., *Int. J. Mass Spectrom. Ion Phys.*, 1968, **1**, 141 (*ms*)**C₁₂H₅O₁₂Os₃Re****Re-00049****Tricarbonyltri-μ-hydro(nonacarbonyldi-μ-hydrotriosmium)rhenium, 10Cl***Dodecacarbonylpenta-μ-hydrotriosmiumrhenium*

[77424-05-6]



M 1097.971

Yellow cryst.

Churchill, M.R. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 2430
(*synth*, *struct*, *ir*, *pmr*, *ms*)**C₁₂H₆MnO₁₀Re****Re-00050****Pentacarbonyl[tetracarbonyl(1-methoxyethylidene)]manganeserhenium, 9Cl***Nonacarbonyl(1-methoxyethylidene)manganeserhenium*
[49547-64-0]

M 551.318

Red-orange cryst. Mp 107-8°.

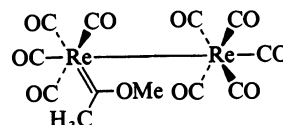
Casey, C.P. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 3053 (*synth*, *struct*)**C₁₂H₆O₁₀PbRe₂****Re-00051****Bis(pentacarbonylrhenium)dimethyllead***Decacarbonyl[μ-(dimethylplumbylene)]dirhenium, 10Cl*
[55318-17-7]

M 889.787

Yellow solid. Mp 124-6°.

Schubert, W. *et al*, *Z. Naturforsch., B*, 1974, **29**, 694.**C₁₂H₆O₁₀Re₂****Re-00052****Nonacarbonyl(1-methoxyethylidene)dirhenium, 8Cl**

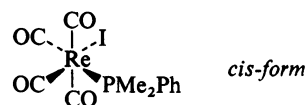
[49547-63-9]



M 682.587

Colourless cryst. Mp 110°. Subl. *in vacuo*.Fischer, E.O. *et al*, *Chem. Ber.*, 1972, **105**, 3027 (*synth*, *nmr*)**C₁₂H₁₁IO₄PRe****Re-00053****Tetracarbonyl(dimethylphenylphosphine)iodorhenium, 8Cl**

[26901-29-1]

*cis-form*

M 563.302

cis-form

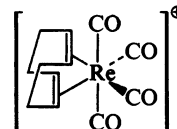
Pale-yellow cryst. Mp 90°.

trans-form [26901-38-2]

Pale-yellow cryst. Mp 122°.

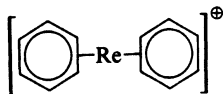
Singleton, E. *et al*, *J. Organomet. Chem.*, 1970, **21**, 449 (*synth*, *ir*, *nmr*)**C₁₂H₁₂O₄Re[⊕]****Re-00054****Tetracarbonyl[(1,2,5,6-η)-1,5-cyclooctadiene]rhenium(1+), 10Cl**

[66531-51-9]



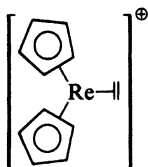
M 406.431 (ion)

Tetrafluoroborate: [66531-52-0].C₁₂H₁₂BF₄O₄Re M 493.235Magnolia cryst. (Me₂CO/Et₂O).Harris, P.J. *et al*, *J. Organomet. Chem.*, 1978, **148**, 327 (*synth*, *ir*, *nmr*)

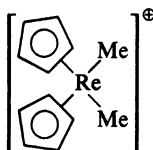
C₁₂H₁₂Re⁺**Bis(η⁶-benzene)rhenium(1+), 8Cl**
[11077-50-2]

M 342.434 (ion)

Dec. at 300°.

*Hexafluorophosphate:*C₁₂H₁₂F₆PRe M 487.398Yellow cryst. (Me₂CO/Et₂O).Fischer, E.O. *et al*, *Chem. Ber.*, 1966, **99**, 2206 (*synth*, *nmr*)**C₁₂H₁₄Re⁺****Re-00056****Bis(η⁵-2,4-cyclopentadien-1-yl)(η²-ethene)rhenium(1+), 10Cl**
Bis(η⁵-cyclopentadienyl)(ethylene)rhenium(1+)
[72316-87-1]

M 344.450 (ion)

Tetrafluoroborate: [72316-87-1].C₁₂H₁₄BF₄Re M 431.253Deep-maroon cryst. (Me₂CO/Et₂O).Mink, R.I. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 6928 (*synth*, *nmr*)**C₁₂H₁₆Re⁺****Re-00057****Bis(η⁵-2,4-cyclopentadien-1-yl)dimethylrhenium(1+), 10Cl**
Dimethylbis(η⁵-cyclopentadienyl)rhenium(1+)
[73449-72-6]

M 346.465 (ion)

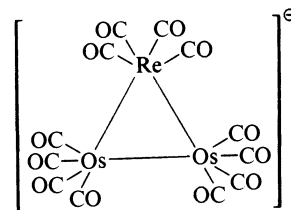
Hexafluorophosphate: [73449-73-7].C₁₂H₁₆F₆PRe M 491.430

Characterised spectroscopically.

Baudry, D. *et al*, *J. Chem. Soc., Chem. Commun.*, 1979, 895; 1980, 249 (*synth*, *props*)**C₁₂H₂₀Re₂****Re-00058****Tetrakis(η³-2-propenyl)dirhenium, 10Cl**
Tetrakis(η³-allyl)dirhenium
[67178-24-9]

M 536.704

Orange cryst. (pentane). Mp 120° dec.

Masters, A.F. *et al*, *Nouv. J. Chem.*, 1977, **1**, 389 (*synth*, *ir*, *nmr*)Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 3788 (*cryst struct*)**C₁₂O₁₂Os₂Re⁺****Re-00055****Dodecacarbonylrhenatediosmate(1-), 8Cl****Re-00059**

M 902.732 (ion)

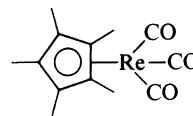
Tetramethylammonium salt: [12563-67-6].C₁₆H₁₂NO₁₂Os₂Re M 976.877

Characterised spectroscopically.

Knight, J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 62 (*synth*, *ir*)**C₁₃H₃O₁₃Os₃Re****Re-00060****Tridecacarbonyltrihydorrheniumtriosmium, 8Cl**
[12563-76-7]ReOs₃H₃(CO)₁₃

M 1123.966

No phys. props. reported.

Knight, J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 62 (*synth*, *ir*)**C₁₃H₁₅O₃Re****Re-00061****Tricarbonyl[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]rhenium, 9Cl**
[12130-88-0]

M 405.467

White cryst. (hexane). Mp 151°.

King, R.B. *et al*, *J. Organomet. Chem.*, 1967, **8**, 287 (*synth*, *nmr*)King, R.B. *et al*, *J. Organomet. Chem.*, 1979, **171**, 53 (*synth*, *props*)**C₁₄FeMnO₁₄Re****Re-00062****Pentacarbonyl(pentacarbonylmanganese)(tetracarbonyliron)-rhenium, 9Cl**
Tetradecacarbonylmanganeserheniumiron, 8Cl
[33958-72-4](OC)₅Mn—Fe(CO)₄—Re(CO)₅

M 689.138

Orange needles (Me₂CO).Evans, G.O. *et al*, *J. Inorg. Nucl. Chem.*, 1968, **30**, 2862 (*synth*, *ir*, *ms*)Evans, G.O. *et al*, *Inorg. Chem.*, 1970, **9**, 979 (*ir*)Tyler, D.R. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7888 (*struct*)**C₁₄FeO₁₄Re₂****Re-00063****Tetracarbonylbis(pentacarbonylrhenio)iron, 8Cl**
Decacarbonyl(tetracarbonyliron)dirhenium, 10Cl
[16040-31-6](OC)₅Re—Fe(CO)₄—Re(CO)₅

M 820.407

Stable yellow solid. Mp 163° dec.

Evans, G.O. *et al*, *J. Chem. Soc., Chem. Commun.*, 1967, 186 (synth, ir)

Evans, G.O. *et al*, *Inorg. Chem.*, 1971, **10**, 1598 (ir, raman)

Tyler, D.R. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7888 (uv)

C₁₄HO₁₄Re₃**Re-00064****Tetradecacarbonylhydrotrirhenium, 9Cl**

[12086-80-5]



M 951.775

Yellow cryst.

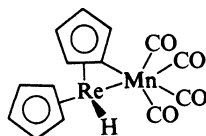
Fellmann, W. *et al*, *Inorg. Nucl. Chem. Lett.*, 1966, **2**, 63 (synth, ir, nmr)

Curtis, M.D., *Inorg. Nucl. Chem. Lett.*, 1970, **6**, 859 (synth)

Curtis, M.D., *Inorg. Chem.*, 1972, **11**, 802 (synth, ir)

C₁₄H₁₀MnO₄Re**Re-00065****(η^5 -2,4-Cyclopentadien-1-yl)[μ -(η^5 -2,4-cyclopentadien-1-ylidene)]hydrotetracarbonylmanganeserhenium, 10Cl**

[71486-19-6]



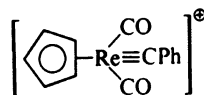
M 483.376

Air-stable red cryst. Air-sensitive in soln.

Hoxmeier, R.J. *et al*, *Inorg. Chem.*, 1979, **18**, 3453 (synth, nmr, props)

C₁₄H₁₀O₂Re⁺**Re-00066****Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(phenylmethyldyne)-rhenium(1+)**

[61993-63-3]



M 396.439 (ion)

Tetrachloroborate: [61993-64-4].

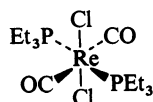
C₁₄H₁₀BCl₄O₂Re M 549.061

Yellow cryst. Mp 78° dec.

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1976, **120**, C6 (synth, nmr)

C₁₄H₃₀Cl₂O₂P₂Re**Re-00067****Dicarbonyldichlorobis(triethylphosphine)rhenium, 10Cl**

[61818-15-3]



M 549.450

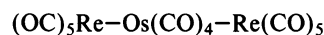
trans-form

Green cryst.

Hertzner, C.A. *et al*, *Inorg. Chem.*, 1978, **17**, 2383 (synth, ir, nmr, props)

C₁₄O₁₄OsRe₂**Re-00068****Tetracarbonylbis(pentacarbonylrhenio)osmium, 8Cl****Tetradecacarbonylosmiumdirhenium. Osmium dirhenium tetradecacarbonyl**

[33153-70-7]



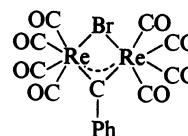
M 954.760

No phys. props. reported. ir ν_{CO} 2094, 2021, 1982 cm⁻¹.

Abel, E.W. *et al*, *Inorg. Nucl. Chem. Lett.*, 1971, **7**, 587 (synth, ir)

C₁₅H₅BrO₈Re₂**Re-00069** **μ -Bromooctacarbonyl[μ -(phenylmethyldyne)dirhenium**

[58384-14-8]



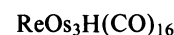
M 765.518

Black cryst. (CH₂Cl₂/Et₂O). Mp 108° dec.

Fischer, E.O. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1976, **15**, 231 (synth, nmr, cryst struct)

C₁₆HO₁₆Os₃Re**Re-00070****Hexadecacarbonylhydrorheniumtriosmium, 8Cl**

[12566-58-4]



M 1205.981

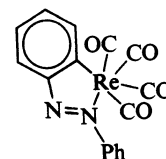
Yellow solid, not obt. pure.

Knight, J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 62 (synth)

Shapley, J.R. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 8064 (synth, ms, pmr)

C₁₆H₉N₂O₄Re**Re-00071****Tetracarbonyl[2-(phenylazo)phenyl]rhenium, 8Cl**

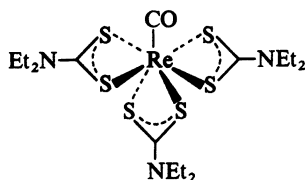
[19529-33-0]



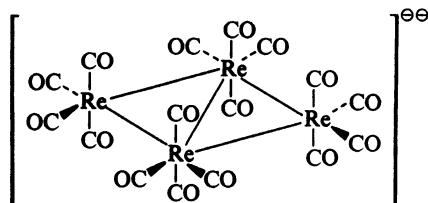
M 479.465

Red needles by subl. Mp 121-2°. Bp_{0.01} 100° subl.

Bruce, M.I. *et al*, *J. Chem. Soc. (A)*, 1970, 3204 (synth, nmr)

C₁₆H₃₀N₃OReS₆**Re-00072****Carbonyltris(diethylcarbamodithioato-*S,S'*)rhenium, 9Cl**
[52193-18-7]

M 659.000

Distorted pentagonal bipyramidal geometry. Wine-red plates (Me₂CO).Fletcher, S.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 486 (*cryst struct*)Rowbottom, J.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 684 (*synth, ir, nmr*)**C₁₆O₁₆Re₄⁴⁻****Re-00073****Hexadecacarbonyltetrarhenate(2-)**

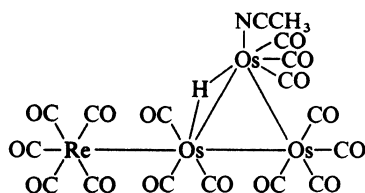
M 1192.994 (ion)

Di-Na salt: [19497-41-7].C₁₆Na₂O₁₆Re₄ M 1238.974

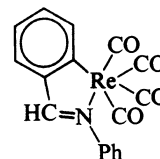
No phys. props. reported.

Bis(tetraethylammonium) salt:C₃₂H₄₀N₂O₁₆Re₄ M 1453.500Dark-red cryst. (Me₂CO/EtOH).Bau, R. *et al*, *J. Am. Chem. Soc.*, 1967, **89**, 6374 (*synth*)Churchill, M.R. *et al*, *Inorg. Chem.*, 1968, **7**, 2606 (*cryst struct*)Ciani, G. *et al*, *J. Organomet. Chem.*, 1978, **157**, 199 (*synth, cryst struct*)**C₁₇H₄NO₁₅Os₃Re****Re-00074****[(Acetonitrile)decacarbonyl-μ-hydrotriosmium]pentacarbonylrhenium, 10Cl**
(Acetonitrile)pentadecacarbonyl-μ-hydrotriosmiumrhenium

[79255-11-1]



M 1219.023

Previously reported as HReOs₃(CO)₁₅. Yellow cryst. (MeCN).Shapley, J.R. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 8064 (*synth, ir, ms*)Churchill, M.R. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 2430 (*struct*)**C₁₇H₁₀NO₄Re****Re-00075****Tetracarbonyl[2-[(phenylimino)methyl]phenyl-*C,N*]rhenium, 9Cl**
[38883-46-4]

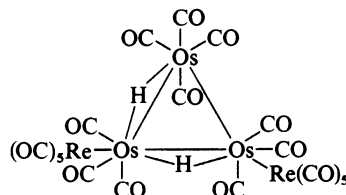
M 478.477

Yellow needles (pet. ether). Sol. cyclohexane, Me₂CO.

Mp 115.5-116°.

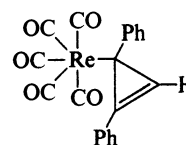
Bennett, R.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 1787 (*synth, ir, nmr*)**C₂₀H₂O₂₀Os₃Re₂****Re-00076****Decacarbonyl(decacarbonyldi-μ-hydrotriosmium)diruthenium, 10Cl***Icosacarbonyldi-μ-hydrotriosmiumdiruthenium. Eicosacarbonyldi-μ-hydrotriosmiumdiruthenium*

[64885-82-1]



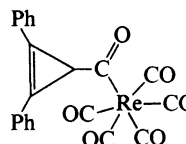
M 1505.238

Clear-yellow plates.

Churchill, M.R. *et al*, *Inorg. Chem.*, 1978, **17**, 3546 (*struct*)Churchill, M.R. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 2430 (*synth, ir, pmr, ms*)**C₂₀H₁₁O₅Re****Re-00077****Pentacarbonyl(1,2-diphenyl-2-cyclopropen-1-yl)rhenium, 10Cl**
[79643-33-7]

M 517.511

Pale-yellow cryst. Mp 100-3°.

Desrosiers, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 5593 (*synth, nmr*)**C₂₁H₁₁O₆Re****Re-00078****Pentacarbonyl[(2,3-diphenyl-2-cyclopropen-1-yl)]carbonylrhenium, 10Cl**
[79643-31-5]

M 545.521

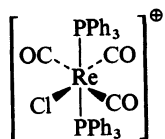
Pale-yellow cryst. Mp 92-4°.

Desrosiers, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 5593 (*synth, nmr*)

C₃₉H₃₀ClO₃P₂Re⁺

Re-00087

Tricarbonylchlorobis(triphenylphosphine)rhenium(1+), 9Cl



M 830.272 (ion)

mer,trans-form

Tetrafluoroborate: [42584-07-6].

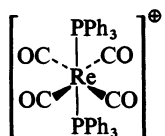
C₃₉H₃₀BClF₄O₃P₂Re M 917.075

White solid. Mp 173-8°.

Eaborn, C. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 58 (*synth, ir, nmr*)C₄₀H₃₀O₄P₂Re⁺

Re-00088

Tetracarbonylbis(triphenylphosphine)rhenium(1+)



M 822.829 (ion)

trans-form

Hexafluorophosphate: [38496-54-7].

C₄₀H₃₀F₆O₄P₂Re M 967.793

Characterised spectroscopically.

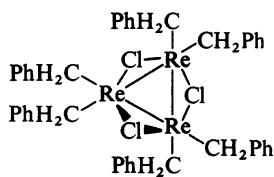
Angelici, R.J. *et al*, *Inorg. Chem.*, 1973, **12**, 1067 (*synth, ir*)Behrens, H. *et al*, *J. Organomet. Chem.*, 1978, **159**, 201 (*synth, ir, nmr*)C₄₂H₄₂Cl₃Re₃

Re-00089

Hexabenzyltri-μ-chlorotrirrhenium

Tri-μ-chlorohexakis(phenylmethyl)trirrhenum, 10Cl

[73682-46-9]



M 1211.774

Brown-black cryst. Sol. hydrocarbons. Mp 110° dec.

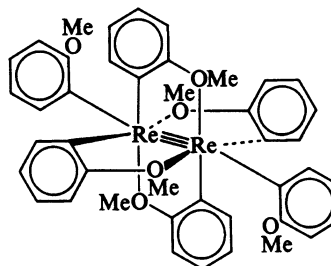
Edwards, P. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 334 (*synth, props*)C₄₂H₄₂O₆Re₂

Re-00090

Tetrakis[μ-(2-methoxyphenyl-C:O)]bis(2-methoxyphenyl-C,O)dirrhenum, 10Cl

Hexakis(2-methoxyphenyl)dirrhenum

[71110-90-2]



M 1015.204

Dark-green cryst. (CH₂Cl₂). Mod. sol. Me₂CO, chlorinated solvs., spar. sol. hydrocarbons. Mp 180-200° dec. Fluxional in soln. with exchange between end and bridging ligand positions.Jones, R.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 472 (*synth, pmr, cmr*)C₄₄H₃₀O₈P₂Re₂

Re-00091

Octacarbonylbis(triphenylphosphine)dirrhenum, 10Cl

[14172-94-2]

Ph₃P—Re(CO)₄—Re(CO)₄—PPh₃ (*di-ax-*)

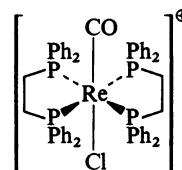
M 1121.078

White plates (C₆H₆/hexane). Mp 239-41°.Dewit, D.G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 528 (*synth*)Cox, D.J. *et al*, *J. Organomet. Chem.*, 1980, **186**, 339, 347 (*synth, ir, nmr*)C₅₃H₄₈ClOP₄Re⁺

Re-00092

Carbonylchlorobis[1,2-ethanediy]bis(diphenylphosphine-P,P')rhenium(1+)

Bis[1,2-bis(diphenylphosphino)ethane]carbonylchlororhenium



M 1046.517 (ion)

trans-form

Tribromide:

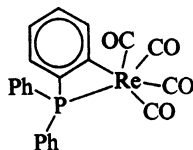
C₅₃H₄₈Br₃ClOP₄Re M 1286.229By oxidn. of Re(CO)Cl(PPh₂CH₂CH₂PPh₂)₂ with Br₂. Green needles (CHCl₃/Et₂O).

Hexafluorophosphate: [51886-84-1].

C₅₃H₄₈ClF₆OP₄Re M 1191.481By metathesis of the tribromide complex. Green needles (CHCl₃/Et₂O).Chatt, J. *et al*, *J. Organomet. Chem.*, 1974, **64**, 245 (*synth, ir, nmr*)

C₂₂H₁₄O₄Pre**Re-00079**

Tetracarbonyl[2-(diphenylphosphinophenyl-C,P)]rhenium, 9Cl
[56483-30-8]

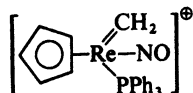


M 559.531

Red cryst.

McKinney, R.J. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 3066 (*synth*, *nmr*)Huie, B.T. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 7852 (*props*)**C₂₄H₂₂NOPRe⁺****Re-00080**

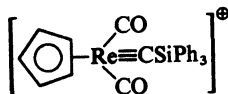
(η^5 -2,4-Cyclopentadien-1-yl)methylenenitrosyl(triphenylphosphine)rhenium(1+), 10Cl
Methylenenitrosyl(triphenylphosphine)(η^5 -cyclopentadienyl)rhenium(1+)
[71763-23-0]



M 557.625 (ion)

Tetrafluoroborate: [71763-22-9].C₂₄H₂₂BF₄NOPRe M 644.428Unstable, characterised by *nmr*.Wong, W.K. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 5441 (*synth*)Kiel, W.A. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 3299 (*props*)**C₂₆H₂₀O₂ReSi⁺****Re-00081**

Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)((triphenylsilyl)methyldiynyl)rhenium(1+)
[76096-93-0]



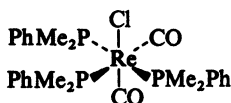
M 578.735 (ion)

Tetrafluoroborate: [76096-94-1].C₂₆H₂₀BF₄O₂ReSi M 665.539

Bright-yellow cryst. Mp 140° dec.

Fischer, E.O. *et al*, *Z. Naturforsch., B*, 1980, **35**, 1083 (*synth*, *nmr*)**C₂₆H₃₃ClO₂P₃Re****Re-00082**

Dicarbonylchlorotris(dimethylphenylphosphine)rhenium, 9Cl
[26566-78-9]

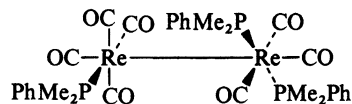


M 692.127

Yellow prisms.

Douglas, P.G. *et al*, *J. Chem. Soc. (A)*, 1969, 1491.Chatt, J. *et al*, *J. Organomet. Chem.*, 1974, **64**, 245 (*synth*, *ir*, *nmr*)**C₃₁H₃₃O₇P₃Re₂****Re-00083**

Heptacarbonyltris(dimethylphenylphosphine)dirhenium, 10Cl
[26901-33-7]

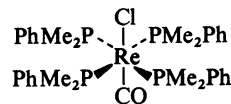


M 982.933

White prisms (EtOAc/hexane). Mp 148°.

Singleton, E. *et al*, *J. Organomet. Chem.*, 1971, **21**, 449 (*synth*)Moelwyn-Hughes, J.T. *et al*, *J. Organomet. Chem.*, 1971, **26**, 373 (*synth*)Cox, D.J. *et al*, *J. Organomet. Chem.*, 1980, **186**, 347 (*synth*, *ir*)**C₃₃H₄₄ClOP₄Re****Re-00084**

Carbonylchlorotetrakis(dimethylphenylphosphine)rhenium, 9Cl
[25259-88-5]

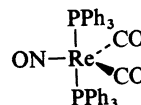


M 802.265

White cryst. Mp 166-79° dec.

Douglas, P.G. *et al*, *J. Chem. Soc. (A)*, 1969, 1491 (*synth*, *ir*, *nmr*)Chatt, J. *et al*, *J. Organomet. Chem.*, 1974, **64**, 245 (*synth*, *ir*, *nmr*)**C₃₈H₃₀NO₃P₂Re****Re-00085**

Dicarbonylnitrosylbis(triphenylphosphine)rhenium, 9Cl
[53183-18-9]

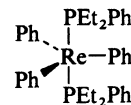


M 796.814

Brick-red cryst. Mp 180° dec.

La Monica, G. *et al*, *J. Organomet. Chem.*, 1974, **71**, 57 (*synth*)Giusto, D. *et al*, *J. Organomet. Chem.*, 1976, **105**, 91 (*synth*, *ir*, *nmr*, *props*)**C₃₈H₄₅P₂Re****Re-00086**

Bis(diethylphenylphosphine)triphenylrhenium, 9Cl
[15390-66-6]



M 749.928

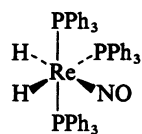
Deep-blue cryst. (hexane).

Chatt, J. *et al*, *J. Chem. Soc. (A)*, 1966, 1834 (*synth*)Gibson, J.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1073 (*esr*)Carroll, W.E. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 825 (*struct*)Green, J.C. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 1403 (*pe*)

C₅₄H₄₇NOP₃Re

Re-00093

Dihydronitrosyltris(triphenylphosphine)rhenium, 9Cl



M 1005.100

mer, cis-form [58694-74-9]Yellow cryst. (C₆H₆/EtOH).Adams, R.W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 1075
(*synth, ir, nmr*)Ciani, E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1943 (*cryst struct*)Giusto, D. *et al*, *J. Organomet. Chem.*, 1976, **105**, 91 (*synth*)

Sc Scandium

S. A. Cotton

Scandium (Fr., Ger.), Escandio (Sp.), Scandio (Ital.), Скандий (Scandii) (Russ.), スカンジウム (Japan.)

Atomic Number. 21

Atomic Weight. 44.9559

Electronic Configuration. [Ar] $3d^1 4s^2$

Oxidation State. +3

Coordination Number. Usually 6 but may be lower in compounds containing bulky ligands such as $-\text{CH}_2\text{SiMe}_3$.

Colour. Generally colourless but may be yellow or brown.

Availability. Usual starting materials are Sc_2O_3 and anhydrous ScCl_3 . For the synthesis of the latter, see Saran, M. S. *et al.*, *J. Organomet. Chem.*, 1970, **21**, 147. See also under Lanthanum.

Handling. See under Lanthanum.

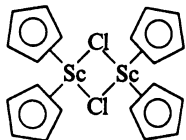
Toxicity. Little is known about the toxicity of scandium and its compounds.

Isotopic Abundance. ^{45}Sc , 100%.

Spectroscopy. ^{45}Sc has $I = \frac{7}{2}$ and has been little studied. Sc(III) compounds are diamagnetic and their ^1H nmr spectra are sharp. Coupling has not been resolved between ^1H and ^{45}Sc .

Analysis. See the corresponding Lanthanum section. Gravimetric analysis is known to the Editor to have given good results.

References. See under Lanthanum.

C₁₀H₁₀ClSc**Sc-00001****Chlorobis(η⁵-2,4-cyclopentadien-1-yl)scandium***Chlorodicyclopentadienylscandium. Dicyclopentadienylscandium chloride*

M 210.598

Dimeric.

Dimer: [37205-32-6]. *Di-μ-chlorotetrakis(η⁵-2,4-cyclopentadien-1-yl)dis scandium, 9Cl.*C₂₀H₂₀Cl₂Sc₂ M 421.196Yellow-green cryst. Sol. C₆H₆, THF. Mp 313-5°. V. sensitive to moisture.Coutts, R.S.P. *et al*, *J. Organomet. Chem.*, 1970, **25**, 117 (*synth*, *nmr*)Atwood, J.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 2487 (*struct*)**C₁₁H₁₃Sc****Sc-00002****Bis(η⁵-2,4-cyclopentadien-1-yl)methylscandium, 9Cl**

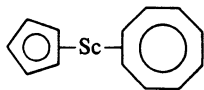
M 190.180

Py complex: [60936-88-1].C₁₆H₁₈NSc M 269.281Pale-yellow solid. Sol. toluene. Py removable *in vacuo*;

Py-free product not fully characterised.

Holton, J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1976, 480 (*synth*, *ir*)Holton, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 54 (*synth*, *ir*, *nmr*)**C₁₃H₁₃Sc****Sc-00003****(η⁸-1,3,5,7-Cyclooctatetraene)(η⁵-2,4-cyclopentadien-1-yl)scandium, 9Cl**

[60830-03-7]



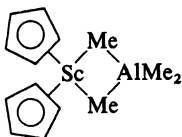
M 214.202

Yellowish-white cryst. Sol. Et₂O, THF. Bp_{0.1} 120° subl.

Rather air-sensitive.

Westerhof, A. *et al*, *J. Organomet. Chem.*, 1976, **116**, 319 (*synth*, *ir*, *ms*)**C₁₄H₂₂AlSc****Sc-00004****Bis(2,4-cyclopentadien-1-yl)(dimethylaluminum)di-μ-methylscandium**

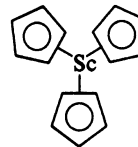
[60475-11-8]



M 262.265

Pale-yellow cryst. Sol. C₆H₆, toluene, CH₂Cl₂. Mp 110-8°. Air-sensitive.Holton, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 45 (*synth*, *ir*, *nmr*, *cmr*)**C₁₅H₁₅Sc****Sc-00005****Tris(η⁵-2,4-cyclopentadien-1-yl)scandium***Tricyclopentadienylscandium*

[1298-54-0]



M 240.239

Straw cryst. Sol. Py, THF, dioxan. Mp 240°. Dec. by water. Subl. at 200-50° *in vacuo*.Birmingham, J.M. *et al*, *J. Am. Chem. Soc.*, 1956, **78**, 42 (*synth*)Reid, A.F. *et al*, *Inorg. Chem.*, 1966, **5**, 1213 (*synth*)Atwood, J.L. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 1488 (*struct*)**C₁₈H₁₅Sc****Sc-00006****Triphenylscandium, 8Cl***Scandium triphenyl*

[21500-33-4]

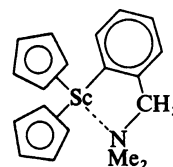
Ph₃Sc

M 276.272

Yellow-brown powder. Sol. THF. Mp >140°. Pyrophoric in air.

Hart, F.A. *et al*, *J. Organomet. Chem.*, 1970, **21**, 147 (*synth*, *ir*)**C₁₉H₂₂NSc****Sc-00007****Bis(η⁵-2,4-cyclopentadien-1-yl)[2-[(dimethylamino)methyl]phenyl-C,N]scandium**

[68878-72-8]



M 309.345

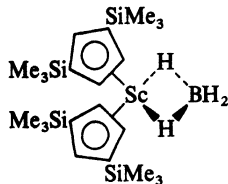
White cryst. Sol. Et₂O. Mp 150°. Very air-sensitive.Manzer, L.E., *J. Am. Chem. Soc.*, 1978, **100**, 8068 (*synth*, *nmr*)**C₂₁H₅₇ScSi₆****Sc-00008****Tris[bis(trimethylsilyl)methyl]scandium**Sc[CH(SiMe₃)₂]₃

M 523.150

Bis-THF complex: [53659-74-8].C₂₉H₇₃O₂ScSi₆ M 667.363

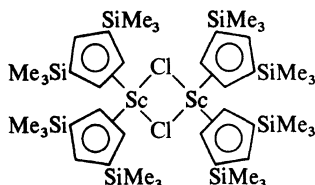
White cryst. Air-sensitive.

Barker, G.K. *et al*, *J. Organomet. Chem.*, 1974, **76**, C45 (*synth*, *pmr*)

C₂₂H₂₆BScSi₄**Sc-00009****Bis[(1,2,3,4,5- η)-1,3-bis(trimethylsilyl)-2,4-cyclopentadien-1-yl]tetrahydroboratoscandium**

M 458.555

White cryst. Sol. pentane, THF. Mp 82-4°.

Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1983, 206
(*synth, cryst struct, cmr, nmr, ir*)**C₂₂H₄₂ClScSi₄****Sc-00010****Bis[1,3-bis(trimethylsilyl)cyclopentadienyl]chloroscandium**

M 499.325

Bridged dimer.

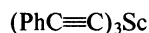
Dimer: [81507-53-1].

C₄₄H₈₄Cl₂Sc₂Si₈ M 998.649

Colourless cryst. Sol. toluene, THF.

Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981,
1190 (*synth, struct*)**C₂₄H₁₅Sc****Sc-00011****Tris(phenylethynyl)scandium, 8Cl**

[21500-34-5]

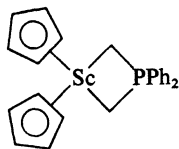


M 348.338

Dark-brown solid. Sol. THF. Mp >250°. Pyrophoric in air.

Hart, F.A. *et al*, *J. Organomet. Chem.*, 1970, **21**, 147 (*synth, ir*)**C₂₄H₂₄PSc****Sc-00012****Bis(η⁵-2,4-cyclopentadien-1-yl)(diphenylphosphinidenio)bis-(methylene)scandium, 9Cl**

[59982-77-3]

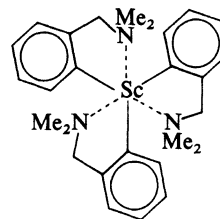


M 388.383

Reacts with cyclohexanone to give methylenecyclohexane quantitatively (more reactive than Ti, V analogues).

Pale-yellow cryst. Sol. Et₂O. Very air-sensitive.Manzer, L.E., *Inorg. Chem.*, 1976, **15**, 2567 (*synth, nmr*)**C₂₇H₃₆N₃Sc****Sc-00013****Tris[2-[(dimethylamino)methyl]phenyl-C,N]scandium**

[65521-47-3]

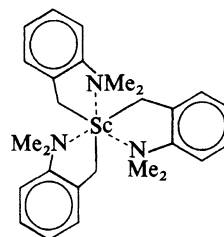


M 447.557

White solid. Sol. hot THF. Mp 180-2°. Pyrophoric in air.
Dec. by MeOH and CH₂Cl₂.Manzer, L.E., *J. Am. Chem. Soc.*, 1978, **100**, 8068 (*synth, nmr*)**C₂₇H₃₆N₃Sc****Sc-00014****[Tris(2-(dimethylamino)phenyl)methyl-C,N]scandium**

Tris(2-dimethylaminobenzyl)scandium

[64061-48-9]



M 447.557

Ethylene polymerisation catalyst. Pale-yellow cryst. Sol.
THF, toluene. Mp 115-8°. Extremely air-sensitive.U.S.P., 597 981, (1977); *CA*, **88**, 62468 (*use*)Manzer, L.E., *J. Am. Chem. Soc.*, 1978, **100**, 8068 (*synth, nmr*)

Sm Samarium

S. A. Cotton

Samarium (Fr., Ger.), Samario (Sp., Ital.), Самарий (Samarii) (Russ.), サマリウム (Japan.)

Atomic Number. 62

Atomic Weight. 150.4

Electronic Configuration. [Xe] $4f^6 6s^2$

Oxidation States. +2 (unusual), +3 (common).

Coordination Number. 6 or greater.

Colour. Sm(III) organometallics are yellow or orange whilst those of Sm(II) are purple.

Availability. Commonly available materials are Sm_2O_3 and anhydrous SmCl_3 . See also under Lanthanum.

Handling. See under Lanthanum.

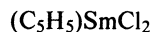
Toxicity. As for Lanthanum.

Isotopic Abundance. ^{144}Sm , 3.1%; ^{150}Sm , 7.4%; ^{152}Sm , 26.7%; ^{154}Sm , 22.7%.

Spectroscopy. ^1H nmr spectra of Sm(III) compounds ($4f^5$) show lines with paramagnetic shifts. Mössbauer spectroscopy is potentially a tool for studying compounds of ^{149}Sm ($t_{1/2} \sim 4 \times 10^{14}$ y).

Analysis. See under Lanthanum.

References. See under Lanthanum.

C₅H₅Cl₂Sm Sm-00001**Dichloro(η⁵-2,4-cyclopentadien-1-yl)samarium, 9Cl**
Cyclopentadienylsamarium dichloride

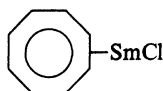
M 286.361

Tris-THF adduct: [52679-41-1].C₁₇H₂₉Cl₂O₃Sm M 502.680

Beige cryst. Darkens >50°. Extremely air-sensitive.

Struct. probably resembles Dichloro(η⁵-2,4-cyclopentadien-1-yl)erbium.Manastyrskyj, S. *et al*, *Inorg. Chem.*, 1963, **2**, 904 (*synth*)**C₆H₁₈Sm⁺⁺⁺ Sm-00002****Hexamethylsamarate(3-)**

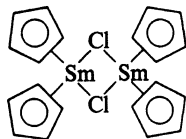
M 240.568 (ion)

Tris[(tetramethylethylenediamine)lithium] salt: [76206-90-1].C₂₄H₆₆Li₃N₆Sm M 610.009Yellow solid. Sol. Et₂O. Mp 85-8° dec. Extremely air- and moisture-sensitive.Schumann, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1981, **20**, 120 (*synth*)**C₈H₈ClSm Sm-00003****Chloro(cyclooctatetraene)samarium***Di-μ-chlorobis(η⁸-1,3,5,7-cyclooctatetraene)disamarium*

M 289.964

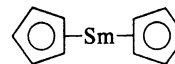
THF complex: [52679-44-4].C₃₂H₄₈Cl₂O₄Sm₂ M 868.355

Purple cryst. Sol. dioxan, THF. Mp >345°. Dimeric; struct. may resemble Chloro(cyclooctatetraene)-cerium.

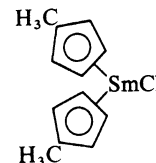
Hodgson, K.O. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 8650 (*synth*, *ir*, *uv*, *props*)**C₁₀H₁₀ClSm Sm-00004****Chlorobis(η⁵-2,4-cyclopentadien-1-yl)samarium, 9Cl***Chlorodicyclopentadienylsamarium. Dicyclopentadienylsamarium chloride*

M 316.002

Dimeric.

Dimer: [56200-25-0]. *Di-μ-chlorotetrakis(η⁵-2,4-cyclopentadien-1-yl)disamarium*.C₂₀H₂₀Cl₂Sm₂ M 632.004Yellow solid. Sol. THF. Mp >200° dec. Subl. *in vacuo*. Air-sensitive. μ_{eff} = 1.62 μ_B.Maginn, R.E. *et al*, *J. Am. Chem. Soc.*, 1963, **85**, 672 (*synth*, *ir*)Marks, T.J. *et al*, *Inorg. Chem.*, 1976, **15**, 1302 (*synth*)**C₁₀H₁₀Sm Sm-00005****Bis(η⁵-2,4-cyclopentadien-1-yl)samarium***Dicyclopentadienylsamarium*

M 280.549

THF complex:C₁₄H₁₈O₂Sm M 352.656Purple solid. Pyrophoric in air. μ_{eff} = 3.6 μ_B.Watt, G.W. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 775 (*synth*, *ir*)**C₁₂H₁₄ClSm Sm-00006****Chlorobis[(1,2,3,4,5-η)-1-methyl-2,4-cyclopentadien-1-yl]samarium**

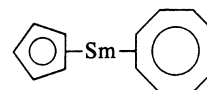
M 344.056

THF adduct: [84623-27-8].C₁₆H₂₂ClO₂Sm M 416.162

Orange cryst. Sol. toluene, THF. Extremely air- and moisture-sensitive.

Evans, W.J. *et al*, *Organometallics*, 1983, **2**, 709 (*synth*, *nmr*, *cmr*, *ir*)**C₁₃H₁₃Sm Sm-00007****(η⁸-1,3,5,7-Cyclooctatetraene)(η⁵-2,4-cyclopentadien-1-yl)samarium, 9Cl**

[52668-27-6]

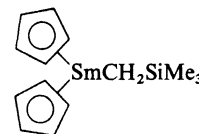


M 319.606

Cryst. Sol. THF. Extremely air-sensitive. Forms THF adducts.

Jamerson, J.D. *et al*, *J. Organomet. Chem.*, 1974, **65**, C33 (*synth*)**C₁₄H₂₁SiSm Sm-00008****Bis(η⁵-2,4-cyclopentadien-1-yl)((trimethylsilyl)methyl)samarium**

[82293-73-0]

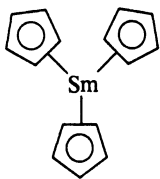


M 367.765

Colourless cryst. Sol. THF, toluene, C₆H₆. Mp <50° dec. Extremely sensitive to moisture and oxygen.Schumann, H. *et al*, *Organometallics*, 1982, **1**, 1194 (*synth*, *ir*)

C₁₅H₁₅Sm**Sm-00009**

Tris(η⁵-2,4-cyclopentadien-1-yl)samarium, 9Cl
Tri-π-cyclopentadienylsamarium, 8Cl
 [1298-55-1]



M 345.644

Orange cryst. Sol. THF. Mp 365°. Subl. at 200-50° *in vacuo*, hydrol. by H₂O.

Cyclohexylisocyanide adduct: [37299-04-0]. Sol. C₆H₆. Mp 148°.

Wilkinson, G. *et al*, *J. Am. Chem. Soc.*, 1954, **76**, 6210 (*synth*)

Reid, A.F. *et al*, *Inorg. Chem.*, 1966, **5**, 1213 (*synth*)

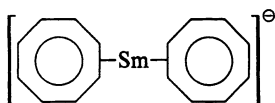
Wong, C.-H. *et al*, *Acta. Crystallogr., Sect. B*, 1969, **25**, 2580 (*struct*)

Thomas, J.L. *et al*, *J. Organomet. Chem.*, 1970, **23**, 487 (*ms*)

Von Ammon, R. *et al*, *Ber. Bunsenges. Phys. Chem.*, 1972, **76**, 995 (*ir*)

C₁₆H₁₆Sm[⊖]**Sm-00010**

Bis(η⁸-1,3,5,7-cyclooctatetraene)samarate(1-), 9Cl
Dicyclooctatetraenesamarate(1-)



M 358.662 (ion)

K salt: [51177-55-0].

C₁₆H₁₆KSm M 397.761

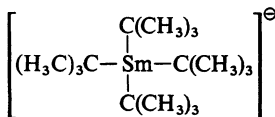
Brown solid. Sol. dioxan, THF. Mp >345°. Extremely air- and moisture-sensitive. μ = 1.42μ_B.

Mares, F. *et al*, *J. Organomet. Chem.*, 1970, **24**, C68 (*synth*)

Hodgson, K.O. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 8650 (*synth, ir, nmr, uv*)

C₁₆H₃₆Sm[⊖]**Sm-00011**

Tetra-*tert*-butylsamarate(1-)
Tetrakis(1,1-dimethylethyl)samarate(1-)



M 378.820 (ion)

Li salt, Tetra-THF complex: [68868-92-8].

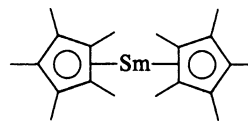
C₃₂H₆₈LiO₄Sm M 674.188

Dark-gold solid. Sol. THF, Et₂O. V. air- and moisture-sensitive. μ_{eff} = 2.1μ_B.

Wayda, A.L. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7119 (*synth, ir, pmr*)

C₂₀H₃₀Sm**Sm-00012**

Bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]samarium



M 420.817

Bis-THF complex: [79372-14-8].

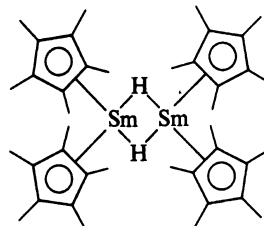
C₂₈H₄₆O₂Sm M 565.030

Polymerises ethylene. Catalyses hydrogenation of 3-hexyne → (*Z*)-3-hexene (>99%). Reacts with CO, NO. Purple cryst. μ_{eff} = 3.6μ_B.

Evans, W.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 6507 (*synth, ir, uv, nmr, cmr, struct*)

C₂₀H₃₁Sm**Sm-00013**

Hydrobis(pentamethylcyclopentadienyl)samarium



M 421.825

Dimeric.

Dimer: Di-μ-hydrotetrakis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]disamarium.

C₄₀H₆₂Sm₂ M 843.650

Red-orange prisms. Sol. toluene. μ_{eff} = 1.4μ_B. Dec. after a few days in solid state.

Evans, W.J. *et al*, *J. Am. Chem. Soc.*, 1983, **105**, 1401 (*synth, struct, ir, nmr*)

C₂₂H₂₁CoO₄Sm**Sm-00014**

[μ-(Carbonyl-C,O)]tris[(1,2,3,4,5-η)-1-methyl-2,4-cyclopentadien-1-yl](tricarbonylcobalt)samarium

Co(CO)₄[H₃CC₅H₄]₃Sm

M 558.699

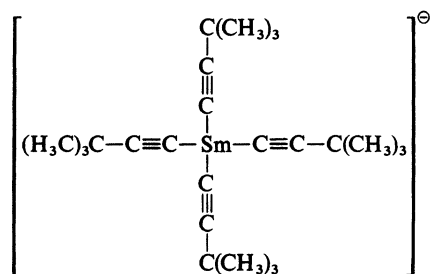
Dimeric. Bright-yellow solid. Sol. Et₂O, THF, insol. non-polar solvs. Extremely sensitive to air and moisture.

Crease, A.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1501 (*synth, ir*)

C₂₄H₃₆Sm[⊖]

Sm-00015

Tetrakis(3,3-dimethyl-1-butynyl)samarate(1-)

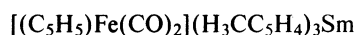


M 474.908 (ion)

Li salt, THF complex: [76565-28-1].

C₂₈H₄₄LiOSm M 553.956Off-white solid. Sol. THF, pentane. $\mu_{\text{eff}} = 1.66\mu_{\text{B}}$.Evans, W.J. *et al*, *J. Organomet. Chem.*, 1980, **202**, C6 (*synth*, *ir*, *cmr*)C₂₅H₂₆FeO₂Sm

Sm-00016

[μ -(Carbonyl-C,O)]Tris[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl][carbonyl(η^5 -2,4-cyclopentadien-1-yl)iron]-samarium

M 564.686

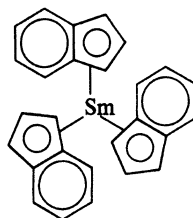
Red solid. Sol. CH₂Cl₂, THF. Destroyed by air and moisture. Unstable above 120° at 10⁻¹mm. Cannot be subl.Crease, A.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1501 (*synth*, *ir*)C₂₇H₂₁Sm

Sm-00017

Triindenylsamarium

Tris(1,2,3,3a,7a- η)-1H-inden-1-ylsamarium, 9Cl

[39358-33-3]



M 495.823

Deep-red cryst. Sol. C₆H₆. Air-sensitive.

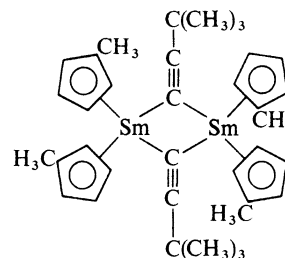
THF adduct: [22533-62-6].

C₃₁H₂₉OSm M 567.930Deep-red cryst. Sol. THF. Mp 185-200°. $\mu = 1.55\mu_{\text{B}}$.Tsutsui, M. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 3175 (*nmr*)Atwood, J.L. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 1830 (*synth*, *struct*)C₃₆H₄₆Sm₂

Sm-00018

Bis[μ -(3,3-dimethyl-1-butyn-1-yl)]tetrakis(1,2,3,4,5- η -1-methyl-2,4-cyclopentadien-1-yl)disamarium

[84642-15-9]



M 779.479

Reacts with HPPH₂ to form (MeC₅H₄)₂SmPPh₂. Yellow rectangular prisms (toluene). Sol. toluene, THF. V. air- and moisture-sensitive.Evans, W.J. *et al*, *Organometallics*, 1983, **2**, 709 (*synth*, *ir*, *nmr*, *cmr*, *uv*, *cryst struct*)

Ta Tantalum

J. A. Labinger

Tantale (Fr.), Tantal (Ger.), Tántalo (Sp.), Tantalio (Ital.), Тантал (Tantal) (Russ.), タンタル (Japan.)

Atomic Number. 73

Atomic Weight. 180.7479(3)

Electronic Configuration. [Xe] $5d^3 6s^2$

Oxidation States. These range from -3 (for $\text{Ta}(\text{CO})_5^{3-}$) to $+5$, the more common values being -1 , $+1$, $+3$, $+4$ and $+5$.

Coordination Number. 3–8 for conventional ligands.

Colour. Organotantalum compounds of oxidation state $+4$ (d^1) are highly coloured, often black. Those of even-electron oxidation states range from colourless (rare) through yellow to red and brown.

Availability. The commonest starting material is TaCl_5 .

Handling. All organotantalum compounds require standard techniques for handling air-sensitive materials.

Toxicity. Tantalum compounds in general are not especially toxic although the carbonyls must be considered highly toxic as are those of other metals.

Isotopic Abundance. ^{181}Ta , 99.988%.

Spectroscopy. ^{181}Ta ($I = \frac{7}{2}$) has relative receptivity 0.036. The nucleus has been studied with little success since the quadrupole moment is so high at $3 \times 10^{-24} \text{ cm}^2$.

Mass spectrometry of Ta compounds is straightforward as there is essentially only one naturally occurring isotope.

Esr is a useful technique for the $+4$ (d^1) oxidation state.

Analysis. Tantalum may be determined gravimetrically. Niobium interferes but this is not a problem when assaying organometallic compounds.

References. General reviews are listed in the introduction to the *Sourcebook*.

MeTaCl ₄	Ta-00001		As Ta-00011 with R = Me	$[(H_3C)_3CO]_3Ta[CHC(CH_3)_3]$	Ta-00032		
Me ₂ TaCl ₃	Ta-00002		Ta-00012	PhCH=TaCl ₃ (PMe ₃) ₂		Ta-00033	
Me ₃ TaCl ₂	Ta-00003		Ta-00013	As Ta-00012 with X = CO	Ta-00024	Ta-00034	
	Ta-00004		Ta-00014	As Ta-00012 with X = Me	Ta-00025	Ta-00035	
TaMe ₅	Ta-00005		Ta-00015		Ta-00026	$(H_3C)_3CCH=Ta[CH_2C(CH_3)_3]_3$	Ta-00036
Ta(CO) ₆ ⁺	Ta-00006		Ta-00016		Ta-00027		Ta-00037
As Ta-00004 with X = Me	Ta-00007		Ta-00017		Ta-00028		Ta-00038
	Ta-00008		Ta-00018	As Ta-00026 with R = Me	Ta-00029		Ta-00039
	Ta-00009		Ta-00019		Ta-00030	$(PhCH_2)_4TaCl$	Ta-00040
	Ta-00010		Ta-00020		Ta-00031	Ta(CH ₂ Ph) ₅	Ta-00041
	Ta-00011		Ta-00021				

CH₃Cl₄Ta**Ta-00001**TaMe₅**Tetrachloromethyltantalum***Methyltetrachlorotantalum*

[41453-04-7]

MeTaCl₄

M 337.795

Yellow cryst. by subl. Sol. CH₂Cl₂. Mp 50° dec. Bp_{0.1} 20° subl. Disproportionates in soln. to Me₂TaCl₃ and TaCl₅.Fowles, G.W.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 961 (*synth*, *pmr*)Santini-Scampucci, C. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 2436 (*synth*, *ir*, *pmr*)

M 256.121

Yellow cryst. (Et₂O), dec. at r.t. Mp 0°.

► May dec. violently

Galyer, L. *et al*, *J. Chem. Soc., Chem. Commun.*, 1975, 497 (*pe*)
Schrock, R.R., *J. Organomet. Chem.*, 1976, **122**, 209 (*synth*, *pmr*, *ms*, *haz*)**C₂H₆Cl₃Ta****Ta-00002****Trichlorodimethyltantalum***Dimethyltrichlorotantalum*

[41453-05-8]

Me₂TaCl₃

M 317.376

Yellow soln. in pentane. Sol. aliphatic hydrocarbons. Disproportionates in soln. to MeTaCl₄ and Me₃TaCl₂.Fowles, G.W.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 961 (*synth*, *pmr*)**C₃H₉Cl₂Ta****Ta-00003****Dichlorotrimethyltantalum, 9Cl***Trimethyldichlorotantalum*

[3020-02-8]

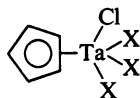
Me₃TaCl₂

M 296.958

Air- and moisture-sensitive volatile yellow solid. V. sol. org. solvs.

Schrock, R.R. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 2389 (*synth*, *pmr*)**C₅H₅Cl₄Ta****Ta-00004****Tetrachloro(η⁵-2,4-cyclopentadien-1-yl)tantalum, 9Cl***Cyclopentadienyltetrachlorotantalum*

[62927-98-4]



X = Cl

M 387.854

Yellow solid (CH₂Cl₂). Sl. sol. org. solvs., HMPA with some dec. Mp 190° dec. Bp_{0.05} 230° subl.Burt, R.J. *et al*, *J. Organomet. Chem.*, 1977, **129**, C33 (*synth*, *ir*, *ms*)Cardoso, A.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 1156 (*synth*)Bunker, M.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 2155 (*synth*)**C₅H₁₅Ta****Ta-00005****Pentamethyltantalum**

[53378-72-6]

C₆O₆Ta[⊖]**Ta-00006****Hexacarbonyltantalate(1-)**Ta(CO)₆[⊖]

M 349.010 (ion)

Tetraphenylarsonium salt: [57288-89-8].C₃₀H₂₀AsO₆Ta M 732.354

Yellow cryst. (diglyme aq.). Sol. polar org. solvs. Mp 193-4° dec.

Wrighton, M.S. *et al*, *Inorg. Chem.*, 1976, **15**, 434 (*uv*)*Inorg. Synth.*, 1976, **16**, 68 (*synth*, *ir*)**C₈H₁₄ClTa****Ta-00007****Chloro(η⁵-2,4-cyclopentadien-1-yl)trimethyltantalum, 9Cl***Cyclopentadienyltrimethylchlorotantalum*

[49598-13-2]

As Tetrachloro(η⁵-2,4-cyclopentadien-1-yl)tantalum, Ta-00004 with

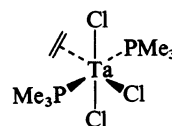
X = Me

M 326.600

Orange needles (toluene). Sol. aromatic hydrocarbons. Sl. dec. at 25°.

Schrock, R.R. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 2389 (*synth*, *pmr*)**C₈H₂₂Cl₃P₂Ta****Ta-00008****Trichloro(η²-ethene)bis(trimethylphosphine)tantalum, 9Cl***(Ethylene)trichlorobis(trimethylphosphine)tantalum*

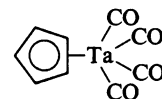
[71860-94-1]



M 467.516

Royal-blue solid (Et₂O). Sol. aromatic hydrocarbons, Et₂O.Sattelberger, A.P. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 7111 (*synth*, *nmr*)Rocklage, S.M. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 1440 (*synth*, *nmr*, *uv*)**C₉H₅O₄Ta****Ta-00009****Tetracarbonyl(η⁵-2,4-cyclopentadien-1-yl)tantalum, 9Cl***Cyclopentadienyltetracarbonyltantalum*

[32628-95-8]



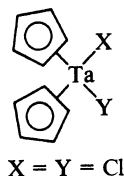
M 358.084

Ruby-red cryst. by subl. Mp 171-3°. Sublimes at 30-40°/0.0001 mm.

Werner, R.P.M. *et al*, *Inorg. Chem.*, 1964, **3**, 298 (*synth*, *ir*)
Nesmeyanov, A.N. *et al*, *Zh. Strukt. Khim.*, 1972, **13**, 1033;
CA, **78**, 90759 (*cmr*)

C₁₀H₁₀Cl₂Ta**Ta-00010**

Dichlorobis(η⁵-2,4-cyclopentadien-1-yl)tantalum, 9Cl
Bis(cyclopentadienyl)dichlorotantalum
[54039-37-1]



M 382.043

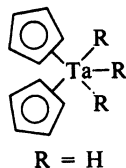
Brown cryst., mod. air-stable. Sol. toluene, CH₂Cl₂,
Me₂CO. Bp_{0.001} 222° subl.

Green, M.L.H. *et al*, *J. Organomet. Chem.*, 1978, **161**, C25
(*synth*)

Bunker, M.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 2155
(*esr*)

C₁₀H₁₃Ta**Ta-00011**

Bis(cyclopentadienyl)trihydro-tantalum
Dicyclopentadienyltrihydro-tantalum
[12117-02-1]



M 314.161

White cryst. Sol. C₆H₆. Mp 187-9° dec. Bp_{0.01} 120° subl.

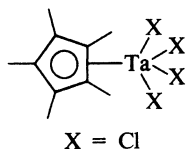
Green, M.L.H. *et al*, *J. Chem. Soc. (A)*, 1961, 4854 (*synth*,
pmr, *ir*)

Wilson, R.D. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 1775 (*struct*)

Green, M.L.H. *et al*, *J. Organomet. Chem.*, 1978, **161**, C25
(*synth*)

C₁₀H₁₅Cl₄Ta**Ta-00012**

Tetrachloro[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum
Pentamethylcyclopentadienyltetrachlorotantalum
[71414-47-6]



M 457.988

Yellow needles (C₆H₆). Sol. aromatic hydrocarbons,
insol. aliphatic hydrocarbons. Dec. >250°.

McClain, S.J. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 4558 (*synth*,
pmr, *ir*)

Herrmann, W.A. *et al*, *Chem. Ber.*, 1981, **114**, 3558 (*synth*)

C₁₁H₁₀ClOTa**Ta-00013**

Carbonylchlorobis(η⁵-2,4-cyclopentadien-1-yl)tantalum
Bis(cyclopentadienyl)chlorocarbonyltantalum
[69593-26-6]

As Dichlorobis(η⁵-2,4-cyclopentadien-1-yl)tantalum, Ta-00010 with

X = CO, Y = Cl

M 374.600

Grey-green solid (toluene). Sol. toluene, THF. Mp 221°.

Klazinga, A.H. *et al*, *J. Organomet. Chem.*, 1979, **165**, 31
(*synth*)

C₁₁H₁₁OTa**Ta-00014**

Carbonylbis(η⁵-2,4-cyclopentadien-1-yl)hydro-tantalum, 9Cl
Bis(cyclopentadienyl)hydro(carbonyl)tantalum
[11105-69-4]

As Dichlorobis(η⁵-2,4-cyclopentadien-1-yl)tantalum, Ta-00010 with

X = CO, Y = H

M 340.155

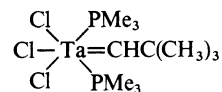
Green cryst. (toluene). Sol. toluene, THF. Mp 157°. Dec.
at 219°.

Klazinga, A.H. *et al*, *J. Organomet. Chem.*, 1979, **165**, 31
(*synth*, *ir*, *pmr*)

Klazinga, A.H. *et al*, *J. Organomet. Chem.*, 1980, **194**, 309.

C₁₁H₂₈Cl₃P₂Ta**Ta-00015**

Trichloro(2,2-dimethylpropylidene)bis(trimethylphosphine)-tantalum, 10Cl
Bis(trimethylphosphine)neopentylidenetrichlorotantalum
[70083-62-4]



M 509.597

Mixt. of isomers. Purple-pink fibres (Et₂O). Sl. sol.
pentane, Et₂O.

Rupprecht, G.A. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 6236
(*synth*, *nmr*, *ir*)

C₁₂H₅HgO₆Ta**Ta-00016**

Hexacarbonyl(phenylmercury)tantalum
(OC)₆TaHgPh

M 626.706

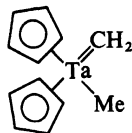
Orange-red plates. Sol. CH₂Cl₂. Mp 65-8° dec.

Kebly, K.A. *et al*, *Inorg. Chem.*, 1964, **3**, 1646 (*synth*)

Davison, A. *et al*, *J. Organomet. Chem.*, 1972, **36**, 113 (*ir*)

C₁₂H₁₅Ta**Ta-00017****Bis(η⁵-2,4-cyclopentadien-1-yl)methyl(methylidene)tantalum, 9Cl**

[57913-16-3]

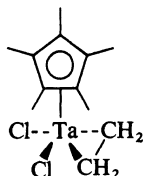


M 340.198

First isol. methylidene complex. Greenish-white cryst. (toluene), dec. slowly at r.t. Sol. aromatic hydrocarbons.

Guggenberger, L.J. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 6578 (*struct*)Schrock, R.R. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 2389 (*synth*, *ir*, *pmr*)**C₁₂H₁₉Cl₂Ta****Ta-00018****Dichloro(η⁵-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl)tantalum, 9Cl****(Pentamethylcyclopentadienyl)dichloro(ethylene)tantalum**

[71414-49-8]

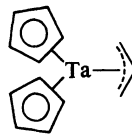


M 415.136

Olefin dimerisation catalyst. Purple cryst. (toluene). Sol. aromatic hydrocarbons.

McLain, S.J. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 4558 (*synth*, *nmr*, *struct*)McLain, S.J. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 5610 (*use*)**C₁₃H₁₅Ta****Ta-00019****Bis(η⁵-2,4-cyclopentadien-1-yl)(η³-2-propenyl)tantalum, 9Cl****Allylbis(cyclopentadienyl)tantalum**

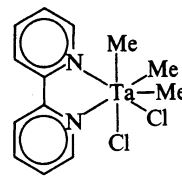
[54039-40-6]



M 352.209

Green cryst. by subl. Sol. pentane. Bp_{0.1} 130° subl.van Baalen, A. *et al*, *J. Organomet. Chem.*, 1974, **74**, 245 (*synth*, *ir*, *pmr*, *ms*)**C₁₃H₁₇Cl₂N₂Ta****Ta-00020****(2,2'-Bipyridine-*N,N'*)dichlorotrimethyltantalum, 9Cl****Trimethyldichloro(2,2'-bipyridyl)tantalum**

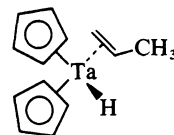
[50589-81-6]



M 453.145

Yellow cryst. (CH₂Cl₂).Drew, M.G.B. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1830 (*struct*)Fowles, G.W.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 1080 (*synth*, *ir*, *pmr*)**C₁₃H₁₇Ta****Ta-00021****Bis(cyclopentadienyl)hydropropenetantalum**

[68586-68-5]



M 354.225

Yellow cryst. (pentane). Mp 109°. Dec. >125°.

Klazinga, A.H. *et al*, *J. Organomet. Chem.*, 1978, **157**, 413 (*synth*, *nmr*)Klazinga, A.H. *et al*, *J. Organomet. Chem.*, 1979, **165**, 31.**C₁₃H₁₉Ta****Ta-00022****Bis(η⁵-2,4-cyclopentadien-1-yl)trimethyltantalum, 9Cl**

[61649-18-1]

As Bis(cyclopentadienyl)trihydrotantalum, Ta-00011 with

R = Me

M 356.241

White cryst. (toluene), thermally unstable. Sol. aromatic hydrocarbons.

Schrock, R.R. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 2389 (*synth*, *pmr*)**C₁₃H₂₄Cl₃P₂Ta****Ta-00023****Benzylidenetrichlorobis(trimethylphosphine)tantalum****Trichloro(phenylmethylidene)bis(trimethylphosphine)-tantalum**

[77026-98-3]

PhCH=TaCl₃(PMe₃)₂

M 529.587

Exists as mixt. of isomers. Green cryst. (C₆H₆). Sol. polar org. solvs.Rupprecht, G.A. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 6236 (*synth*, *nmr*, *ir*)**C₁₄H₁₅O₄Ta****Ta-00024****Tetracarbonyl[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum****Pentamethylcyclopentadienyltetracarbonyltantalum**

As Tetrachloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00012 with



M 428.218

Orange-yellow needles (C₆H₆). Sol. aromatic hydrocarbons. Mp 136-9°.

Herrmann, W.A. *et al*, *Chem. Ber.*, 1981, **114**, 3558 (*synth*, *ir*, *pmr*)

C₁₄H₂₇Ta Ta-00025

[(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]tetramethyltantalum, ⁹Cl

[71763-35-4]

As Tetrachloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00012 with



M 376.315

Yellow cryst. (pentane). Sol. pentane, Et₂O.

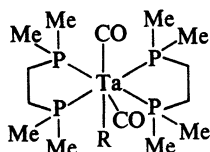
Wood, C.D. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 5421 (*synth*)

C₁₄H₃₃TaO₂P₄ Ta-00026

Dicarbonylbis[1,2-ethanediylbis(dimethylphosphine)-P,P']-hydrotantalum, ⁹Cl

Dicarbonylhydrobis[bis(dimethylphosphino)ethane]tantalum

[62050-78-6]



M 538.256

Orange cryst. (hexane). Mp 140-41°.

Tebbe, F.N., *J. Am. Chem. Soc.*, 1973, **95**, 5823 (*synth*, *ir*)

Meakin, P. *et al*, *Inorg. Chem.*, 1974, **13**, 1025 (*nmr*, *struct*)

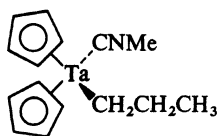
Bond, A.M. *et al*, *Inorg. Chem.*, 1980, **19**, 1760.

C₁₅H₂₀NTa Ta-00027

Bis(η^5 -2,4-cyclopentadien-1-yl)(isocyanomethane)propyltantalum

Bis(cyclopentadienyl)propyl(methyl isocyanide)-tantalum

[74909-91-4]



M 395.278

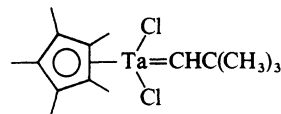
Red-brown cryst. (pentane). Mp 104°. Dec. at 111°.

Klazinga, A.H. *et al*, *J. Organomet. Chem.*, 1980, **192**, 75 (*synth*, *ir*, *nmr*)

C₁₅H₂₅Cl₂Ta Ta-00028

Dichloro(2,2-dimethylpropylidene)(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, ⁹Cl
(Pentamethylcyclopentadienyl)dichloro(neopentylidene)-tantalum

[71414-58-9]



M 457.216

Red oil (pentane).

Wood, C.D. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 3210 (*synth*, *nmr*)

C₁₅H₃₅TaO₂P₄ Ta-00029

Dicarbonylbis[1,2-ethanediylbis(dimethylphosphine)-P,P']-methyltantalum, ⁹Cl

Methyldicarbonylbis[bis(dimethylphosphino)ethane]-tantalum

[61916-37-8]

As Dicarbonylbis[1,2-ethanediylbis(dimethylphosphine)-P,P']hydrotantalum, Ta-00026 with



M 552.283

Yellow cryst. (toluene).

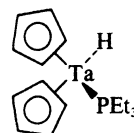
Datta, S. *et al*, *Inorg. Chem.*, 1977, **16**, 1134 (*synth*, *nmr*, *ir*)

Bond, A.M. *et al*, *Inorg. Chem.*, 1980, **19**, 1760.

C₁₆H₂₆PTa Ta-00030

Bis(η^5 -2,4-cyclopentadien-1-yl)hydro(triethylphosphine)tantalum, ¹⁰Cl

[11105-81-0]



M 430.303

Red cryst. (pentane). Sol. aromatic hydrocarbons.

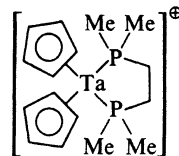
Barefield, E.K. *et al*, *J. Am. Chem. Soc.*, 1970, **92**, 5234 (*synth*, *pmr*)

Klazinga, A.H. *et al*, *J. Organomet. Chem.*, 1978, **157**, 413 (*synth*)

C₁₆H₂₆P₂Ta[⊕] Ta-00031

Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethanediylbis(dimethylphosphine)-P,P']tantalum(1+), ⁹Cl

Bis(cyclopentadienyl)[bis(dimethylphosphino)ethane]-tantalum(1+)



M 461.277 (ion)

Chloride: [66632-54-0].

C₁₆H₂₆ClP₂Ta M 496.730

Red cryst. (CH₂Cl₂/heptane).Foxman, B.M. *et al*, *Inorg. Chem.*, 1978, **17**, 2311 (*nmr*, *struct*)

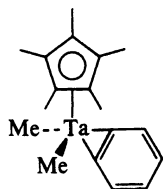
C₁₇H₃₇O₃Ta **Ta-00032**
 (2,2-Dimethylpropylidene)tris(2-methyl-2-propanolato)tantalum, 9Cl
Tris(tert-butoxy)(2,2-dimethylpropylidene)tantalum
 [76992-41-1]



M 470.425

Olefin metathesis catalyst. Orange oil (Et₂O).Rocklage, S.M. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 1440
(*synth*, *cmr*, *use*)

C₁₈H₂₅Ta **Ta-00033**
 (η²-Benzyne)dimethyl[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, 9Cl
 (Pentamethylcyclopentadienyl)dimethyl(η²-benzyne)-tantalum
 [69302-77-8]

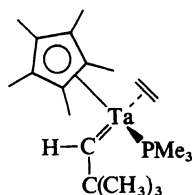


M 422.343

Yellow cryst. (pentane), mod. air-stable.

McLain, S.J. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 263 (*synth*, *nmr*)Churchill, M.R. *et al*, *Inorg. Chem.*, 1979, **18**, 1697 (*struct*)

C₂₀H₃₈PTa **Ta-00034**
 (2,2-Dimethylpropylidene)-η²-ethene(η⁵-pentamethyl-2,4-cyclopentadien-1-yl)(trimethylphosphine)tantalum
 (Pentamethylcyclopentadienyl)(neopentylidene)(ethylene)(trimethylphosphine)tantalum

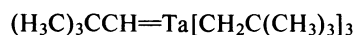


M 490.442

No phys. details recorded.

Schultz, A.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 169 (*nd*, *struct*)

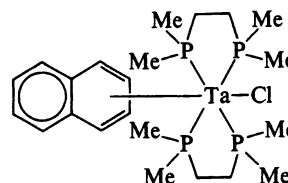
C₂₀H₄₃Ta **Ta-00035**
 Tris(2,2-dimethylpropyl)(2,2-dimethylpropylidene)tantalum, 9Cl
Tris(neopentyl)neopentylidenetantalum
 [54294-45-0]



M 464.508

First non-heteroatom stabilised alkylidene complex isol.
Orange cryst. (Et₂O); highly air-sensitive. Sol.
nonpolar org. solvs. Mp 71°.Schrock, R.R. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 3359 (*synth*, *nmr*)

C₂₂H₄₀ClP₄Ta **Ta-00036**
 Chlorobis[1,2-ethanediylbis(dimethylphosphine)-P,P'](η⁴-naphthalene)tantalum, 9Cl
 (η⁴-Naphthalene)chlorobis[bis(dimethylphosphino)ethane]tantalum
 [64367-79-9]

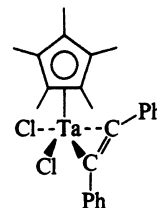


M 644.854

Red cryst. (toluene). Sol. toluene, sl. sol. pentane.

Albright, J.O. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 611 (*synth*, *nmr*, *struct*)Bond, A.M. *et al*, *Inorg. Chem.*, 1980, **19**, 1760 (*props*)

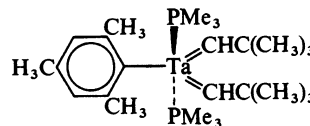
C₂₄H₂₅Cl₂Ta **Ta-00037**
 Dichloro(diphenylacetylene)(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum
 (Pentamethylcyclopentadienyl)dichloro(diphenylacetylene)tantalum
 [75522-28-0]



M 565.315

Orange cryst. (toluene). Sol. toluene, CH₂Cl₂, insol. pentane.Smith, G. *et al*, *Inorg. Chem.*, 1981, **20**, 387 (*synth*, *nmr*, *struct*)

C₂₅H₄₉P₂Ta **Ta-00038**
 Bis(2,2-dimethylpropylidene)(2,4,6-trimethylphenyl)bis(trimethylphosphine)tantalum, 9Cl
 Mesitylbis(neopentylidene)bis(trimethylphosphine)tantalum
 [69552-43-8]



M 592.558

Yellow cryst. (Et₂O). Sol. pentane, Et₂O.Churchill, M.R. *et al*, *Inorg. Chem.*, 1979, **18**, 1930 (*struct*)Fellmann, J.D. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 5752 (*synth*, *nmr*)

C ₂₈ H ₂₈ ClTa	Ta-00039	C ₃₅ H ₃₅ Ta	Ta-00040
Tetrabenzylchlorotantalum		Pentabenzyltantalum	
<i>Chlorotetrakis(phenylmethyl)tantalum</i>		<i>Pentakis(phenylmethyl)tantalum</i>	
[74920-40-4]		[62044-68-2]	
	(PhCH ₂) ₄ TaCl		Ta(CH ₂ Ph) ₅
M 580.930		M 636.609	
Red cryst. (C ₆ H ₆), thermally unstable. Sol. aromatic hydrocarbons.		Red cryst. (toluene). Sol. aromatic hydrocarbons. Dec. at 80° in soln., subl. with dec.	
Messierle, L.W. <i>et al</i> , <i>J. Am. Chem. Soc.</i> , 1980, 102 , 6744 (<i>synth, nmr</i>)		Schrock, R.R., <i>J. Organomet. Chem.</i> , 1976, 122 , 209 (<i>synth, pmr, ms</i>)	

Tb Terbium

S. A. Cotton

Terbium (Fr., Ger.), Terbio (Sp., Ital.), Тербий (Terbii) (Russ.), テルビウム (Japan.)

Atomic Number. 65

Atomic Weight. 158.9254

Electronic Configuration. [Xe] $4f^9 6s^2$

Oxidation State. +3

Coordination Number. 6 or greater.

Colour. Colourless or yellow.

Availability. The available starting materials are Tb_4O_7 and anhydrous $TbCl_3$ and are expensive. See also the section under Lanthanum.

Handling. See under Lanthanum.

Toxicity. See under Lanthanum.

Isotopic Abundance. ^{159}Tb , 100%.

Spectroscopy. Very few data are available for 1H nmr spectra, but compounds of the paramagnetic $Tb(III)$ species give large paramagnetic shifts with considerable line-broadening. See also under Lanthanum.

Analysis. See under Lanthanum.

References. See under Lanthanum. Also, for 1H nmr spectra:

Schumann, H. *et al.*, *Z. Anorg. Allg. Chem.*, 1976, **426**, 127.

Schumann, H. *et al.*, *Z. Naturforsch., B*, 1981, **366**, 1244.

C₁₂H₃₃Tb

Tb-00001

Tris[(trimethylsilyl)methyl]terbium



M 336.318

Bis-THF complex: [67483-82-3]. *Bis(tetrahydrofuran)-tris[(trimethylsilyl)methyl]terbium.*

C₂₀H₄₉O₂Si₃Tb M 564.788

Colourless cryst. Sol. hexane. Mp 50-4°. Air-sensitive in soln. but stable as large cryst. μ_{eff} 9.12 μ_{B} .

Atwood, J.L. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 141 (*synth, ir*)

C₁₆H₁₆Tb[⊖]

Tb-00003

Bis(η^8 -1,3,5,7-cyclooctatetraene)terbate(1-), 9Cl
Dicyclooctatetraeneterbate(1-)



M 367.228 (ion)

K salt: [51177-57-2].

C₁₆H₁₆KTb M 406.326

Yellow-brown solid. Sol. THF. Mp >345°. Extremely air- and moisture-sensitive. $\mu = 9.86\mu_{\text{B}}$.

Mares, F. *et al*, *J. Organomet. Chem.*, 1970, **24**, C68 (*synth*)
Hodgson, K.O. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 8650 (*synth, ir, nmr, uv*)

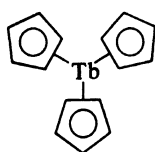
C₁₅H₁₅Tb

Tb-00002

Tris(η^5 -2,4-cyclopentadien-1-yl)terbium, 9Cl

Tricyclopentadienylterbium

[1272-25-9]



M 354.209

Colourless cryst. Sol. THF. Mp 316°. Subl. at 230° *in vacuo*. Hydrol. by H₂O. $\mu_{\text{eff}} = 8.9\mu_{\text{B}}$.

Isocyanocyclohexane adduct: [12098-34-9]. *Tris(η^5 -2,4-cyclopentadien-1-yl)isocyanocyclohexaneterbium.*

C₂₂H₂₆NTb M 463.380

Colourless cryst. Sol. C₆H₆. Mp 162°. $\mu_{\text{eff}} = 10.1\mu_{\text{B}}$.

Subl. *in vacuo* at 150°.

Fischer, E.O. *et al*, *Angew. Chem.*, 1964, **76**, 52 (*synth*)

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1965, **3**, 181; 1966, **6**, 141 (*synth*)

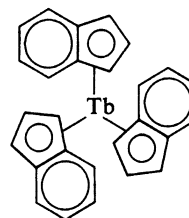
Laubereau, P.G. *et al*, *Inorg. Chem.*, 1970, **9**, 1091 (*synth*)

Aleksanyan, V.T. *et al*, *J. Organomet. Chem.*, 1977, **131**, 251 (*raman*)

C₂₇H₂₁Tb

Tb-00005

Triindenylterbium, 8Cl

Tris(1,2,3,3a,7a- η)-1H-inden-1-ylterbium

M 504.388

May be a mono- or a trihapto complex.

THF adduct: [22877-87-8].

C₃₁H₂₉OTb M 576.495

Pale yellow. $\mu = 9.43\mu_{\text{B}}$.

Tsutsui, M. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 3175 (*synth*)

Tc Technetium

M. Green

Technétium (Fr.), Technetium (Ger.), Technecio (Sp.), Tecnezio (Ital.), Технеций (Technietsii) (Russ.), テクネチウム (Japan.)

Atomic Number. 43

Atomic Weight. 99 (most common isotope)

Electronic Configuration. [Kr] $4d^6 5s^1$

Oxidation States. -1, +1

Coordination Number. Most often 6.

Colour. Physical appearance and reactivity of technetium complexes are similar to those of manganese and rhenium.

Availability. Technetium is not naturally occurring and all isotopes are radioactive. Of the long-lived isotopes only ^{99}Tc ($t_{1/2} = 2.12 \times 10^5 \text{ y}$) is readily available. The short-lived isotopes of greatest practical importance are ^{95}Tc ($t_{1/2} = 60 \text{ d}$), ^{97}Tc ($t_{1/2} = 90.5 \text{ d}$) and ^{99m}Tc ($t_{1/2} = 6.02 \text{ h}$).

Handling. The handling of ^{99}Tc on a small scale ($<0.05 \text{ g}$) does not present a serious health hazard provided elementary precautions are taken. Intending workers should first consult the current *Code of Practice for the Protection of Persons Exposed to Ionizing Radiation* (HMSO).

Toxicity. See above.

Analysis. ^{99}Tc compounds may be determined by conventional chemical and spectroscopic methods. The percentage of ^{99}Tc in a compound is determined by direct counting of the β -decay.

References. General reviews are listed in the introduction to the *Sourcebook*.

C₅BrO₅Tc**Tc-00001****Bromopentacarbonyltechnetium, 10Cl**

[15841-97-1]



M 317.956

Yellow cryst. by subl. Sublimes *in vacuo*.Bor, G. *et al*, *Inorg. Nucl. Chem. Lett.*, 1973, **9**, 1073 (*props*)Behrens, R.G. *et al*, *J. Less-Common Met.*, 1978, **61**, 321(*props*)Kruglov, A.A. *et al*, *Zh. Neorg. Khim.*, 1981, **26**, 960 (*cryst struct*)Michels, E.D. *et al*, *Inorg. Chem.*, 1981, **20**, 3445 (*synth*)**C₅ClO₅Tc****Tc-00002****Pentacarbonylchlorotechnetium, 10Cl***Chloropentacarbonyltechnetium*

[15841-98-2]

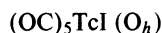


M 273.505

Colourless cryst.

Hileman, J.C. *et al*, *J. Am. Chem. Soc.*, 1961, **83**, 2453 (*synth*)Behrens, R.G., *J. Less-Common Met.*, 1978, **61**, 321 (*props*)Kruglov, A.A. *et al*, *Zh. Neorg. Khim.*, 1981, **26**, 960 (*cryst struct*)**C₅IO₅Tc****Tc-00003****Pentacarbonyliodotechnetium, 10Cl**

[15841-96-0]

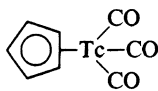


M 364.957

No phys. props. recorded.

Hileman, J.C. *et al*, *J. Am. Chem. Soc.*, 1961, **83**, 2953 (*synth*)DeJong, I.G. *et al*, *Inorg. Chem.*, 1973, **12**, 2519 (*synth*)Behrens, R.G., *J. Less-Common Met.*, 1978, 321.**C₈H₅O₃Tc****Tc-00004****Cyclopentadienyltricarbonyltechnetium***Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)technetium, 9Cl*

[60184-30-7]

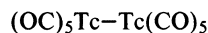


M 247.126

Cryst. by subl. in high vac. Mp 87.5°.

Palm, C. *et al*, *Naturwissenschaften*, 1962, **49**, 279 (*synth, uv, ir, pmr*)Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1963, **1**, 191.de Jong, I.G. *et al*, *Inorg. Chem.*, 1976, **15**, 2588 (*synth*)**C₁₀H₁₀Tc₂****Tc-00005****Decacarbonylditechnetium, 10Cl***Ditechnetium decacarbonyl*

[14837-15-1]

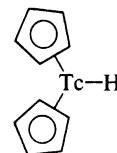


M 326.189

White cryst.

Hileman, J.C., *Prep. Inorg. React.*, Jolly, W.J., Ed., Interscience, New York, 1964, **1**, 102 (*synth*)Bailey, M.F. *et al*, *Inorg. Chem.*, 1965, **4**, 1140 (*cryst struct*)Junk, G.A. *et al*, *J. Chem. Soc. (A)*, 1970, 2102 (*ms*)Spiro, T.G., *Prog. Inorg. Chem.*, 1970, **11**, 1 (*ir, raman*)Jackson, R.A. *et al*, *Inorg. Chem.*, 1978, **17**, 997.Kidd, D.R. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 4095 (*props*)**C₁₀H₁₁Tc****Tc-00006****Bis(η⁵-2,4-cyclopentadien-1-yl)hydrotechnetium, 9Cl***Bis(cyclopentadienyl)hydridotechnetium. Bis(cyclopentadienyl)technetium hydride. Dicyclopentadienylhydridotechnetium*

[12116-92-6]

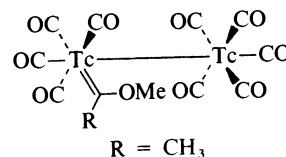


M 229.197

Yellow cryst. (toluene).

Fischer, E.O. *et al*, *Chem. Ber.*, 1969, **102**, 1954 (*synth, nmr*)**C₁₂H₆O₁₀Tc₂****Tc-00007****Nonacarbonyl(1-methoxyethylidene)ditechnetium, 8Cl**

[38855-80-0]

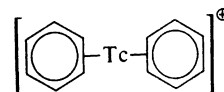


M 506.173

Yellow cryst. Mp 103°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1972, **105**, 3027 (*synth, nmr*)**C₁₂H₁₂Tc[⊕]****Tc-00008****Bis(η⁶-benzene)technetium(1+)**

[11077-51-3]



M 254.227 (ion)

*Hexafluorophosphate:*C₁₂H₁₂F₆PTe M 428.791

Yellow-green cryst.

Palm, C. *et al*, *Tetrahedron Lett.*, 1962, 253 (*synth, nmr*)**C₁₇H₈O₁₀Tc₂****Tc-00009****Nonacarbonyl(methoxyphenylmethylene)ditechnetium, 8Cl**

[38855-79-7]

As Nonacarbonyl(1-methoxyethylidene)ditechnetium, Tc-00007 with

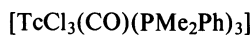
R = Ph

M 568.244

Yellow-orange cryst. by subl. Mp 88° dec.

Fischer, E.O. *et al*, *Chem. Ber.*, 1972, **105**, 3027 (*synth, nmr*)**C₂₅H₃₃Cl₃OP₃Tc****Tc-00010****Carbonyltrichlorotris(dimethylphenylphosphine)technetium, 10Cl**

[64347-45-1]



M 646.815

Pale-yellow cryst.

Bandoli, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 373
(*synth, ir, nmr*)

Tc-00011

Bis(acetonitrile)carbonylchlorotris(dimethylphenylphosphine)technetium(2+)

[74847-93-1]



M 658.014 (ion)

Diperchlorate: [74847-94-2].C₂₉H₃₉Cl₃N₂O₉P₃Tc M 856.915

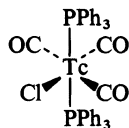
Yellow cryst.

Mazzi, U. *et al*, *Inorg. Chim. Acta*, 1980, **41**, 95 (*synth, ir, nmr, props*)

Tc-00012

Tricarbonylchlorobis(triphenylphosphine)technetium, 10Cl

[64396-16-3]



M 742.065

mer,trans-form

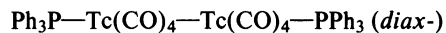
White cryst.

Mazzi, U. *et al*, *J. Organomet. Chem.*, 1977, **135**, 177 (*synth, ir, nmr*)

Tc-00013

Octacarbonylbis(triphenylphosphine)ditechnetium, 10Cl

[61663-90-9]



M 944.664

Characterised spectroscopically in soln.

Fawcett, J.P. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 2039
(*synth, ir*)Jackson, R.A. *et al*, *Inorg. Chem.*, 1979, **18**, 3331 (*synth, ir*)

Th Thorium

S. A. Cotton

Thorium (Fr.), Thor (Ger.), Torio (Sp., Ital.), Торий (Torii) (Russ.), トリウム (Japan.)

Atomic Number. 90

Atomic Weight. 232.0382 (one natural isotope)

Electronic Configuration. [Rn] $6d^2 7s^2$

Oxidation State. +3 (very rare), +4

Coordination Number. See under Uranium.

Colour. Colourless or yellow.

Availability. Materials available (at medium cost) include ThO_2 , anhydrous ThCl_4 and thorium metal. The most convenient starting material is the anhydrous chloride, prepared either by direct reaction of the elements or by the reaction of ThO_2 with CCl_4 at 450° . References to experimental procedures are given under Uranium.

Handling. See under Uranium.

Toxicity. ^{232}Th is an α -emitter with a long half-life (1.41×10^{10} y) and its decay generates gaseous ^{220}Rn .

Isotopic Abundance. ^{232}Th , 100%.

Spectroscopy. Th(IV) compounds are diamagnetic and give sharp unshifted ^1H nmr spectra.

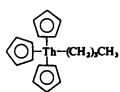
Analysis. The compound is first destroyed with acid and then titrated against EDTA using xylenol orange indicator at pH 2.5–3.5. Alternatively, thorium may be precipitated either as the hydroxide or oxalate followed by ignition to the oxide which is determined gravimetrically.

Lower than predicted values for C and H microanalysis may be obtained and this is probably due to carbide formation and incomplete combustion.

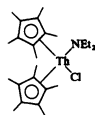
References. See under Uranium.



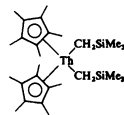
Th-00001



Th-00012



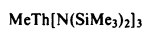
Th-00022



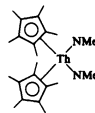
Th-00031



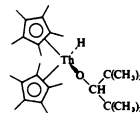
Th-00002



Th-00013



Th-00023



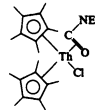
Th-00032



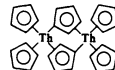
Th-00003



Th-00014



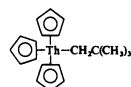
Th-00024



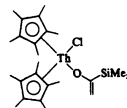
Th-00033



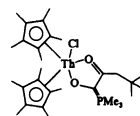
Th-00004



Th-00015



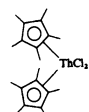
Th-00025



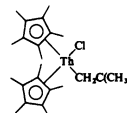
Th-00034



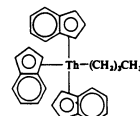
Th-00005



Th-00016



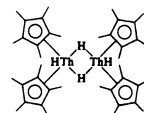
Th-00026



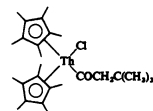
Th-00035



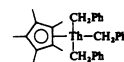
Th-00006



Th-00017



Th-00027



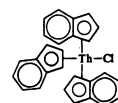
Th-00036



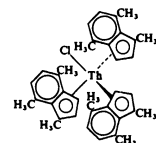
Th-00007



Th-00018



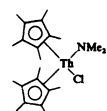
Th-00028



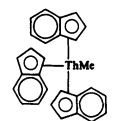
Th-00037



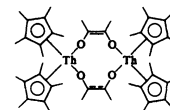
Th-00008



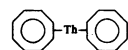
Th-00019



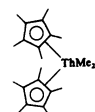
Th-00029



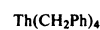
Th-00038



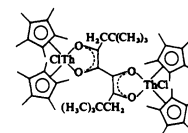
Th-00009



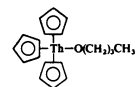
Th-00020



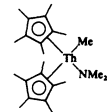
Th-00030



Th-00039



Th-00011



Th-00021

C₈H₈Cl₂Th
 Dichloro(η⁸-1,3,5,7-cyclooctatetraene)thorium

Th-00001



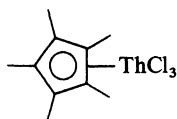
M 407.095

Di-THF complex: [73652-04-7].C₁₆H₂₄Cl₂O₂Th M 551.309

White cryst. Very air-sensitive.

LeVanda, C. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 2128 (*synth*, *cmr*, *pmr*, *ir*)Zalkin, A. *et al*, *Inorg. Chem.*, 1980, **19**, 2560 (*struct*)
C₁₀H₁₅Cl₃Th
 [(1,2,3,4,5-η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]trichlorothorium

Th-00002



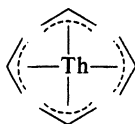
M 473.626

Bis-THF complex: [82511-71-5].C₁₈H₃₁Cl₃O₂Th M 617.839

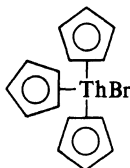
Colourless cryst. Sol. THF, dioxan.

Mintz, E.A. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 4692 (*synth*, *nmr*, *ir*)
C₁₂H₂₀Th
 Tetrakis(η³-2-propenyl)thorium
Tetraallylthorium

Th-00003



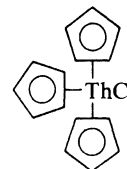
M 396.328

Dark-yellow solid. Sol. C₆H₆. Mp 0° dec.Wilke, G. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1966, **5**, 151 (*synth*, *ir*, *nmr*)
C₁₅H₁₅BrTh**Th-00004**
 Bromotris(η⁵-2,4-cyclopentadien-1-yl)thorium


M 507.226

Pale-yellow solid. Subl. at 180° *in vacuo*.Kanellakopulos, B., *MTP International Review of Science, Inorg. Chem.*, Series One, 1972, **7**, 302.
C₁₅H₁₅ClTh
 Chlorotris(η⁵-2,4-cyclopentadien-1-yl)thorium, 9Cl
 [1284-82-8]

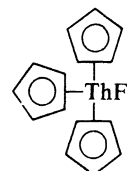
Th-00005



M 462.775

Colourless solid. Sol. THF, CHCl₃, toluene, CH₂Cl₂.Subl. at 200° *in vacuo*. Air-sensitive.Ter Haan, G.L. *et al*, *Inorg. Chem.*, 1964, **3**, 1648 (*synth*, *nmr*, *ir*)Marks, T.J. *et al*, *Inorg. Synth.*, 1976, **16**, 147 (*synth*, *nmr*, *ir*)
C₁₅H₁₅FTh
 Fluorotris(η⁵-2,4-cyclopentadien-1-yl)thorium
Tricyclopentadienylthorium fluoride

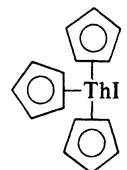
Th-00006



M 446.320

Pale-yellow solid. Subl. at 200° *in vacuo*.Mueller, J., *Chem. Ber.*, 1969, **102**, 152 (*ms*)Kanellakopulos, B., *MTP International Review of Science, Inorg. Chem.*, Series one, 1972, **7**, 302.
C₁₅H₁₅ITh
 Iodotris(η⁵-2,4-cyclopentadien-1-yl)thorium
Tricyclopentadienylthorium iodide
 [80410-12-4]

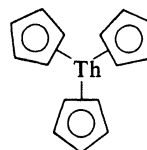
Th-00007



M 554.226

Pale-yellow solid. Sol. toluene. Subl. at 190° *in vacuo*.Mueller, J., *Chem. Ber.*, 1969, **102**, 152 (*ms*)Bruno, J.W. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 1860 (*synth*, *nmr*, *ms*)
C₁₅H₁₅Th
 Tris(η⁵-2,4-cyclopentadien-1-yl)thorium
Tricyclopentadienylthorium
 [52550-20-6]

Th-00008



M 427.322

Purple-form

Purple solid. Sol. THF, insol. C₆H₆, pentane. Dec. >170°. Forms adduct with C₆H₁₁NC. μ_{eff} 0.40 μ_{B} . Possibly dimeric.

Green-form

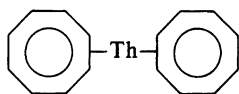
Prod. by thermolysis and photolysis of (C₅H₅)₃ThC₃H₇. Dark-green cryst. Generally insol. (Dec. by MeOH). Highly air-sensitive. μ_{eff} = 2.10 μ_{B} .

Kanellakopulos, B. *et al*, *Inorg. Nucl. Chem. Lett.*, 1974, **10**, 155 (*synth*, *ir*, *ms*)

Kalina, D.G. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 3877 (*synth*, *ir*, *ms*, *raman*, *uv*)

C₁₆H₁₆Th**Th-00009****Bis(η^8 -1,3,5,7-cyclooctatetraene)thorium**
Thoracene

[12702-09-9]



M 440.341

Bright-yellow solid. Sol. DMSO. Bp_{0.03} 160° subl. Dec. >190°. Air-sensitive.

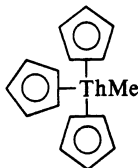
▷Explodes when red-hot.

Streitwieser, A. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 7528 (*synth*, *nmr*, *ms*)

Ardeef, A. *et al*, *Inorg. Chem.*, 1972, **11**, 1083 (*struct*)

C₁₆H₁₈Th**Th-00010****Tris(η^5 -2,4-cyclopentadien-1-yl)methylthorium**

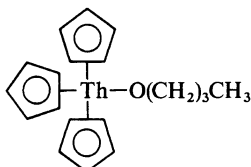
[80410-05-5]



M 442.356

White microcrystalline solid. Sol. toluene, C₆H₆.

Bruno, J.W. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 1860 (*synth*, *nmr*, *ir*)

C₁₉H₂₄OTh**Th-00011****Butoxytris(η^5 -2,4-cyclopentadien-1-yl)thorium**

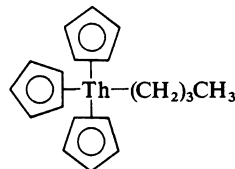
M 500.436

White cryst. Sol. dimethoxyethane, THF, CH₂Cl₂, CHCl₃. Mp 148-50°. Diamagnetic. Subl. at 135° *in vacuo*. Oxidized and hydrolysed in air.

Ter Haar, G.L. *et al*, *Inorg. Chem.*, 1964, **3**, 1648 (*synth*, *ir*, *nmr*)

C₁₉H₂₄Th**Th-00012****Butyltris(η^5 -2,4-cyclopentadien-1-yl)thorium, 9CI**
Tricyclopentadienylbutylthorium

[54067-92-4]



M 484.437

White cryst. Sol. toluene. Mp 210° dec. Dec. by air.

Marks, T.J. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 703 (*synth*, *ir*, *nmr*, *raman*)

C₁₉H₅₇N₃Si₆Th**Th-00013****Methyltris(hexamethyldisilyl)amino]thorium***Methyltris[1,1,1-trimethyl-N-(trimethylsilyl)silylaminato]thorium*

[69517-43-7]



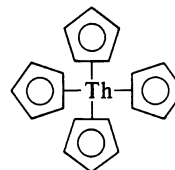
M 728.231

White needles (pentane). Sol. Et₂O, pentane. Mp 133-5°. Air- and moisture-sensitive.

Turner, H.W. *et al*, *Inorg. Chem.*, 1979, **18**, 1221 (*synth*, *ir*, *nmr*)

C₂₀H₂₀Th**Th-00014****Tetrakis(η^5 -2,4-cyclopentadien-1-yl)thorium**

[1298-75-5]



M 492.416

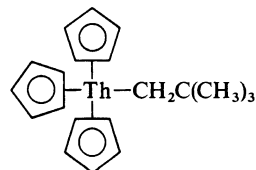
Colourless solid. Sol. Et₂O. Mp >170° dec. Subl. at 250-90° *in vacuo*.

Fischer, E.O. *et al*, *Z. Naturforsch., B*, 1962, **17**, 276 (*synth*, *ir*, *nmr*)

Green, J.C. *et al*, *J. Organomet. Chem.*, 1981, **212**, 329 (*pe*)

C₂₀H₂₆Th**Th-00015****Tris(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)thorium, 9CI***Tricyclopentadienylneopentylthorium*

[58920-14-2]



M 498.464

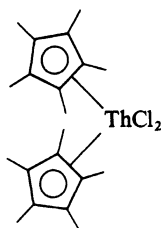
White microcryst. solid. Sol. toluene. Mp 200° dec. Smokes on exposure to air.

Marks, T.J. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 703 (*synth*, *ir*, *nmr*)

C₂₀H₃₀Cl₂Th

Th-00016

Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium
Bis(pentamethylcyclopentadienyl)thorium dichloride
 [67506-88-1]



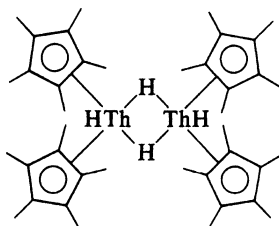
M 573.401

White cryst. Sol. toluene, THF. Air-sensitive.

Manriquez, J.M. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 3939 (*synth*, *ir*, *pmr*)Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 6650 (*synth*, *ir*, *pmr*)C₂₀H₃₂Th

Th-00017

Dihydrobis(pentamethylcyclopentadienyl)thorium
Bis(pentamethylcyclopentadienyl)thorium dihydride



M 504.511

Dimeric.

Dimer: [67506-92-7]. *Di- μ -hydrodihydrotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dithorium*, 9Cl.

C₄₀H₆₄Th₂ M 1009.022

Inserts ethylene to form diethyl complex; reacts rapidly with MeCl, acetone; catalyses hydrogenation of hex-1-ene; inserts CO; catalyses hydrogenation of coordinated CO in Chloro(3,3-dimethyl-1-oxobutyl-C,O)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00027 and (Benzoyl-C,O)chlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium. Pale-yellow cryst. Sol. toluene, almost insol. pentane. Mp >80°. Air-sensitive.

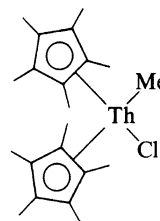
Broach, R.W. *et al*, *Science*, 1979, **203**, 172 (*cryst struct*)Maata, E.A. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 3578 (*use*)Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 6650, 6959 (*synth*, *ir*, *nmr*, *use*)

The first digit of the Entry number defines the Supplement in which the Entry is found. 0 indicates the Main Work

C₂₁H₃₃ClTh

Th-00018

Chloro(methyl)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium
 [79301-20-5]



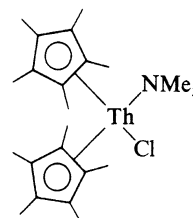
M 552.983

Reacts additively with alcohols and carbonyl compounds.

White cryst. Sol. toluene, C₆H₆. Air- and moisture-sensitive.Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 6650 (*synth*, *nmr*, *props*)C₂₂H₃₆ClNTh

Th-00019

Chloro(dimethylamino)bis(pentamethylcyclopentadienyl)thorium
Chloro(N-methylmethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium
 [77260-84-5]



M 582.024

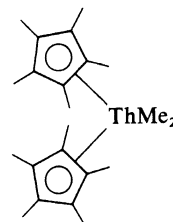
Inserts CO into Th-N bond. White cryst. Sol. toluene.

Air- and moisture-sensitive.

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 2206 (*synth*, *ir*, *nmr*)C₂₂H₃₆Th

Th-00020

Dimethylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium
 [67506-90-5]



M 532.565

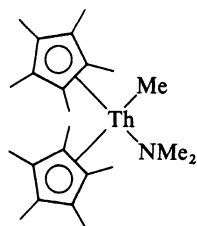
When supported on alumina, very active catalyst for hydrogenation of propene and polymerisation of ethylene. Inserts CO. Reacts with H₂ to give Dihydrobis(pentamethylcyclopentadienyl)thorium, Th-00017. White cryst. Sol. toluene, pentane. V. air-sensitive.

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 3939 (*synth*)Manriquez, J.M. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7112.Bowman, R.G. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 257.Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 6050 (*synth*, *ir*, *pmr*)

C₂₃H₃₉NTh

Th-00021

Methyl(*N*-methylmethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, 10Cl
[77260-87-8]



M 561.606

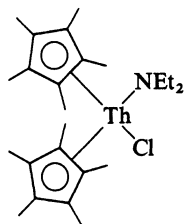
Inserts CO preferentially at Th—C bond to give (C₅Me₅)₂Th(η^2 -COMe)(NMe₂). White cryst. Sol. pentane, Et₂O. Air- and moisture-sensitive.

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 2206 (*synth*, *ir*, *nmr*)

C₂₄H₄₀ClNTh

Th-00022

Chloro(diethylamino)bis(pentamethylcyclopentadienyl)thorium
Chloro(*N*-ethylethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium
[77260-81-2]



M 610.078

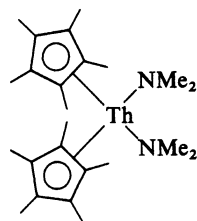
Inserts CO into Th-N bond. Colourless cryst. Sol. toluene. Air- and moisture-sensitive.

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 2206 (*synth*, *ir*, *nmr*)

C₂₄H₄₂N₂Th

Th-00023

Bis(dimethylamino)bis(pentamethylcyclopentadienyl)thorium
Bis(*N*-methylmethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium
[77431-02-8]



M 590.647

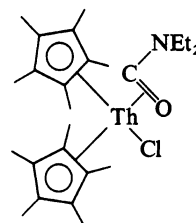
Inserts CO into one Th-N bond (into both at 60°). Colourless cryst. Sol. Et₂O, sl. sol. pentane. Air- and moisture-sensitive.

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 2206 (*synth*, *ir*, *nmr*)

C₂₅H₄₀ClNOTh

Th-00024

Chloro[(diethylamino)carbonyl-*C,O*]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium
[77260-90-3]



M 638.088

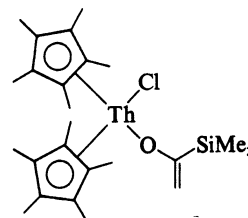
Formed by CO insertion reaction of Chloro(diethylamino)bis(pentamethylcyclopentadienyl)thorium, Th-00022. Colourless cryst. Sol. toluene, pentane. Air- and moisture-sensitive.

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 2206 (*synth*, *ir*, *nmr*, *cryst struct*)

C₂₅H₄₁ClOSiTh

Th-00025

Chloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl][1-(trimethylsilyl)ethenolato]thorium
[68963-89-3]



M 653.175

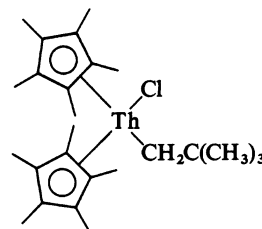
Formed by migratory CO insertion reactions of (C₅Me₅)₂ThCl(CH₂SiMe₃). Colourless needles. Sol. C₆H₆, toluene.

Manriquez, J.M. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7112 (*synth*, *ir*, *nmr*)

C₂₅H₄₁ClTh

Th-00026

Chloro(2,2-dimethylpropyl)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium
[74587-39-6]



M 609.090

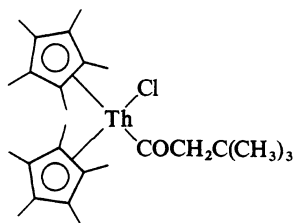
Th-C bond undergoes CO insertion reactions. White solid. Sol. toluene.

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 5393 (*synth*, *props*)

C₂₆H₄₁ClOTh

Th-00027

Chloro(3,3-dimethyl-1-oxobutyl-C,O)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium
[74587-36-3]



M 637.100

Formed by CO insertion of Chloro(2,2-dimethylpropyl)-bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00026. Coordinated CO-reduced to -CH₂O- by H₂ with catalyst of Dihydrobis(pentamethylcyclopentadienyl)thorium, Th-00017. Rearranges by H migration at 100°, reacts with excess CO to give Dichlorotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl][μ -(2,2,9,9-tetramethyl-4,5,6,7-decanetetraene-O⁴,O⁵,O⁶,O⁷)]dithorium, Th-00039. Pale-yellow plates. Sol. toluene.

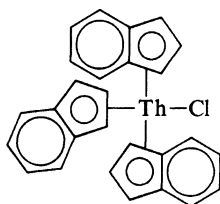
Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 5393 (*synth, ir, struct, cmr*)

Matta, E.A. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 3576.

C₂₇H₂₁ClTh

Th-00028

Chlorotris[(1,2,3,3a,7a- η)-1H-inden-1-yl]thorium, 9Cl
Triindenylthorium chloride
[11133-05-4]



M 612.954

Sol. THF, sl. sol. pentane. Mp 181°. Air- and moisture-sensitive. Subl. *in vacuo* at 160°.

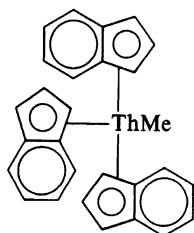
Laubereau, P.G. *et al*, *Inorg. Chem.*, 1971, **10**, 2274 (*synth, ir, ms, nmr*)

Fragala, I.E. *et al*, *Inorg. Chem.*, 1983, **22**, 216 (*pe*)

C₂₈H₂₄Th

Th-00029

Tris[(1,2,3,3a,7a- η)-1H-indenyl]methylthorium
[63643-54-9]



M 592.536

Yellow solid. Sol. C₆H₆, THF, sl. sol. pentane. Mp 213-5°. Subl. at 190-5° *in vacuo*.

Goffart, J. *et al*, *Inorg. Nucl. Chem. Lett.*, 1977, **13**, 189 (*synth, ir, raman, ms*)

C₂₈H₂₈Th

Th-00030

Tetrabenzylthorium

Tetrakis(phenylmethyl)thorium, 9Cl. Thorium tetrabenzyl
[54008-63-8]



M 596.567

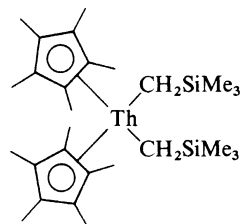
Yellow cryst. Sol. C₆H₆, toluene. Air- and light-sensitive.

Köhler, E. *et al*, *J. Organomet. Chem.*, 1974, **76**, 235 (*synth, ir, pmr*)

C₂₈H₅₂Si₂Th

Th-00031

Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis[(trimethylsilyl)methyl]thorium
[69040-88-6]



M 676.928

Inserts two CO groups into Th-C bonds at 25°. Undergoes intermolecular cyclometallation on heating to 80°, eliminating SiMe₄. White cryst. Sol. heptane, pentane. Air- and moisture-sensitive.

Manriquez, J.M. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7112 (*props*)

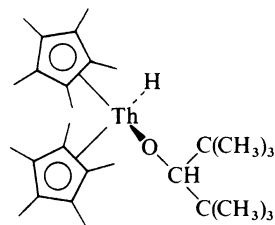
Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 6650 (*synth, ir, nmr*)

Bruno, J.W. *et al*, *J. Organomet. Chem.*, 1983, **250**, 237 (*synth, struct*)

C₂₉H₅₀OTh

Th-00032

Hydrobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](2,2,4,4-tetramethyl-3-pentanolato)thorium, 10Cl
[79932-08-4]



M 646.752

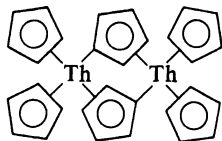
Carbonylated to yield enediolate, or in presence of H₂, methoxide Th(C₅Me₅)₂(OMe)[OCH(CMe₃)₂]. Colourless cryst. Sol. toluene.

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 6959 (*synth*)
Katahira, D.A. *et al*, *Organometallics*, 1982, **1**, 1723.

C₃₀H₂₈Th₂

Th-00033

Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -(1- η : 1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]dithorium, 9Cl
[54067-93-5]



M 852.627

Formed by thermal decomposition of Butyltris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00012. Colourless cryst. Sol. toluene. Air- and moisture-sensitive.

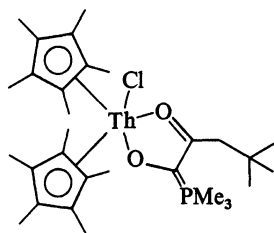
Baker, E.C. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 7586 (*synth, struct*)

Marks, T.J. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 703 (*synth, ms*)

C₃₀H₅₀ClOPTH

Th-00034

Chloro[1-hydroxy-4,4-dimethyl-1-(trimethylphosphoranylidene)-2-pentanonato-O, O']bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium
[86543-76-2]



M 725.189

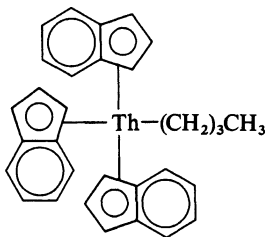
Prepd. by reaction of Chloro(3,3-dimethyl-1-oxobutyl-C, O)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00027 and PMe₃ with CO. Cryst. (toluene). Sol. toluene.

Moloy, K.G. *et al*, *J. Am. Chem. Soc.*, 1983, **105**, 5696 (*synth, struct, nmr*)

C₃₁H₃₀Th

Th-00035

Butyltris[(1,2,3,3a,7a- η)-1H-inden-1-yl]thorium
Tris(η^5 -indenyl)butylthorium
[63643-43-6]



M 634.616

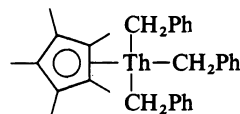
Yellow solid. Sol. THF, pentane. Mp 125-6°. Subl. at 185-90° *in vacuo*.

Goffart, J. *et al*, *Inorg. Nucl. Chem. Lett.*, 1977, **13**, 189 (*synth, ir, raman, ms*)

C₃₁H₃₆Th

Th-00036

Tribenzyl(pentamethylcyclopentadienyl)thorium
[(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]tris(phenylmethyl)thorium. (*Pentamethylcyclopentadienyl*)tribenzylthorium
[82511-73-7]



M 640.664

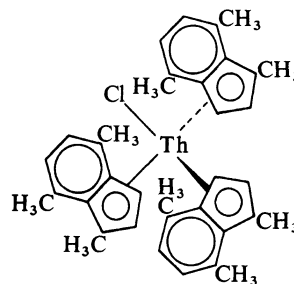
Reacts with H₂ to form toluene, inserts formaldehyde to yield alkoxide. Yellow cryst. Sol. toluene.

Mintz, E.A. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 4692 (*synth, struct, nmr, cmr, ir*)

C₃₆H₃₉ClTh

Th-00037

Chlorotris[(1,2,3,3a,7a- η)-1,4,7-trimethyl-1H-inden-1-yl]thorium
Tris(1,4,7-trimethylindenyl)thorium chloride
[78599-84-5]



M 739.195

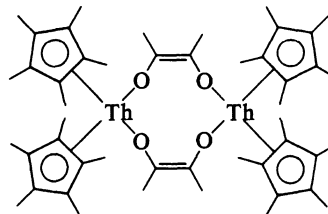
Yellow cryst. Sol. THF, sl. sol. pentane. Air- and moisture-sensitive. Struct. by analogy with the corresponding U complex.

Goffart, J. *et al*, *J. Organomet. Chem.*, 1981, **209**, 281 (*synth, ir, ms, raman, nmr*)

C₄₈H₇₂Th₂O₄

Th-00038

Bis[μ -(2-butene-2,3-diolato(2-)-O, O')]tetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dithorium
[69021-32-5]



M 1177.171

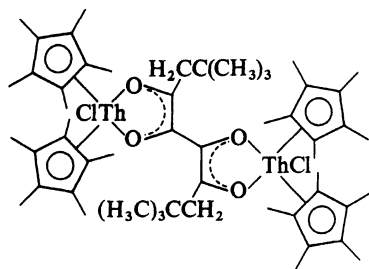
Formed by CO insertion of (C₅Me₅)₂ThMe₂. Colourless cryst. Sol. toluene.

Manriquez, J.M. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7112 (*synth, ir, nmr*)

C₅₄H₈₂Cl₂O₄Th₂

Th-00039

Dichlorotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl][μ -(2,2,9,9-tetramethyl-4,5,6,7-decane-tetrone-*O*⁴,*O*⁵,*O*⁶,*O*⁷)]dithorium
[74587-38-5]



M 1330.222

Dark-purple cryst. Sol. toluene.

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 5393 (*synth, struct*)

Ti Titanium

D. J. Cardin

Titane (Fr.), Titan (Ger.), Titanio (Sp., Ital.), Титан (Teetan) (Russ.), チタン (Japan.)

Atomic Number. 22

Atomic Weight. 47.90

Electronic Configuration. [Ar] $3d^2 4s^2$

Oxidation States. By far the largest number of organotitanium compounds prepared so far are derivatives of Ti(IV). There is also a fairly substantial organometallic chemistry of Ti(III). Ti(II) is a much smaller class, represented for example by bis(cyclopentadienyl) derivatives with neutral donors, and some arene complexes. Arene and butadiene compounds of Ti(0) are known.

Coordination Number. (Note, all ligands in this section are treated as monohapto, including cyclic hydrocarbons, which may or, more frequently, may not be). For Ti(IV), and especially the bis(cyclopentadienyl) derivatives, tetrahedral geometry predominates. However, with chelating ligands higher coordination numbers are known, eg. 7 in $\text{Ti}(\text{S}_2\text{CNMe}_2)_3(\eta^5\text{-C}_5\text{H}_5)$. In lower oxidation states, coordination numbers vary from 2 in bis(arene)metal(0) compounds to 5 in the Ti(II) complex $[\text{Ti}_3(\text{C}_6\text{Me}_6)_3\text{Cl}_6]^+\text{Cl}^-$, and in the $\text{Ti}(\eta^5\text{-C}_5\text{H}_5)(\text{S}_2\text{CNR}_2)_2$ species of Ti(III). For metals in oxidation states (II) and (III) four coordination is still common.

Colour. Despite the d^0 configuration of titanium (IV) the vast majority of organic derivatives are coloured, presumably owing to charge transfer transitions. Derivatives with electron withdrawing substituents and a single cyclopentadienyl ligand are frequently yellow or pale in colour. Bis(cyclopentadienyl) compounds are generally deeply coloured, often red or orange. Compounds of the lower oxidation states are generally intensely coloured. Red (and similar coloured) compounds are common, but colours are highly ligand-dependent.

Availability. The prime (low cost) starting material is TiCl_4 ; the element is unreactive with regard to organylation except in the vapour phase. TiCl_4 is readily converted to $\text{TiCl}_2(\eta^5\text{-C}_5\text{H}_5)_2$, an important departure point for the huge range of cyclopentadienyl derivatives. Other halogens are usually incorporated metathetically from the chlorides. In some cases, (eg. alkyls) alkoxides have been recommended over the tetrachloride. TiCl_3 has been employed for metal(III) alkyls, but for cyclopentadienyl Ti(III) compounds reduction from

$\text{TiX}_3(\eta^5\text{-C}_5\text{H}_5)$ (X = halide) has been widely employed. Apart from these, the compounds $\text{TiCl}_3(\eta^5\text{-C}_5\text{H}_5)$, $\text{TiCl}_2(\text{C}_9\text{H}_7)_2$, (C_9H_7 = indenyl), $\text{TiCl}_2(\eta^5\text{-C}_5\text{H}_5)_2$, $\text{Ti}(\text{OMe})_4$, $\text{Ti}(\text{OEt})_4$, $\text{Ti}(\text{NMe}_2)_4$, $\text{Ti}(\text{acac})_2\text{Cl}_2$, and TiX_4 (X = F, Br, I) are readily obtainable commercially.

Handling. Standard inert atmosphere techniques are required for those compound of titanium which are air-sensitive.

Toxicity. Organotitanium compounds are not associated with any known specific toxicity.

Isotopic Abundance. ^{46}Ti , 7.93%; ^{47}Ti , 7.28%; ^{48}Ti , 73.94%; ^{49}Ti , 5.51%; ^{50}Ti , 5.34%.

Spectroscopy. ^{47}Ti and ^{49}Ti have nuclear spins $I = \frac{5}{2}$ and $\frac{7}{2}$ and receptivities relative to ^{13}C of 0.864 and 1.18 respectively. In their nmr spectra the two resonances always occur 270 ppm apart as the frequencies lie extremely close, eg. at 5.6390 and 5.6375 MHz referred to ^1H TMS at 100 MHz.

Nmr is not generally useful for paramagnetic compounds.

Esr data are reported for many titanium(III) compounds but hyperfine splitting is not always observed.

Analysis. For precise analysis the organic compounds are generally decomposed by oxidation, alkaline fusion, or hydrolysis, after which the aqueous solution can be estimated titrimetrically, colorimetrically, or gravimetrically. Experimental details are given in standard analytical works. X-ray fluorescence and polarographic methods have also been employed.

For detection of the element, after conversion to an aqueous medium, the orange colour produced by hydrogen peroxide in the presence of sulfuric acid has been the most widely used. This colour is bleached by fluoride ions (distinction from vanadium). Other reagents for aqueous media include pyrocatechol, morphine, and chromotropic acid.

References. In addition to references given in the introduction to the *Sourcebook*, the following provide further reading:

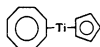
Wailles, P. C. *et al.*, *Organometallic Chemistry of Titanium, Zirconium and Hafnium*, Academic Press, London, 1974.

Clark, R. J. H. *et al.*, *J. Organomet. Chem. Lib.*, 1977, 3, 223.

Chemical Structure	Chemical Name	Chemical Name	Chemical Name
	MeTiBr ₃		
	Ti-00001		
	MeTiCl ₃		
	Ti-00002		
	EtTiCl ₃		
	Ti-00003		
	Me ₃ SiCH ₂ TiCl ₃		
	Ti-00004		
	Ti(OMe) ₄		
	Ti-00005		
	TiMe ₄		
	Ti-00006		
	Ti-X X = Br		
	Ti-00007		
	Ti-Cl ₂		
	Ti-00008		
	As Ti-00007 with X = Cl		
	Ti-00009		
	As Ti-00007 with X = F		
	Ti-00010		
	As Ti-00007 with X = I		
	Ti-00011		
	(C ₆ F ₅)TiCl ₃		
	Ti-00012		
	Me ₂ Ti(NMe ₂) ₂		
	Ti-00013		
	MeTi(NMe ₂) ₃		
	Ti-00014		
	As Ti-00007 with X = NCS		
	Ti-00015		
	As Ti-00007 with R = OMe		
	Ti-00016		
	As Ti-00007 with X = Me		
	Ti-00017		
	Ti(NMe ₂) ₄		
	Ti-00018		
	As Ti-00024 with X = N ₃		
	Ti-00032		
	Ti-00033		
	As Ti-00033 with X = Se		
	Ti-00034		
	Ti-00035		
	(H ₃ C) ₂ C=CPhTiCl ₃		
	Ti-00036		
	As Ti-00023 with X = H		
	Ti-00037		
	Ti-00038		
	Ti-00039		
	Ti-00040		
	Ti-00041		
	MeTi[OCH(CH ₃) ₂] ₃		
	Ti-00042		
	Me ₃ SiCH ₂ Ti(NMe ₂) ₃		
	Ti-00043		
	Ti-00044		
	Ti-00045		
	Ti-00046		
	As Ti-00007 with X = OAc		
	Ti-00047		

As Ti-00045 with
 $X = -N=C(CF_3)_2$

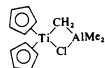
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Ti-00064



Ti-00065



Ti-00066



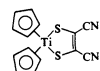
Ti-00067



Ti-00068

As Ti-00024 with
 $X = -OOC(CF_3)_3$

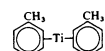
Ti-00069



Ti-00070

As Ti-00024 with
 $X = OAc$

Ti-00071



Ti-00072



Ti-00073



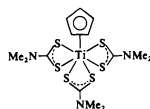
Ti-00074



Ti-00075

As Ti-00024 with
 $X = NMe_2$

Ti-00076



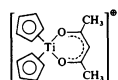
Ti-00077



Ti-00078



Ti-00079



Ti-00080



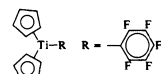
Ti-00081

As Ti-00045 with
 $X = -CH_2C(CH_3)_3$

Ti-00082



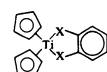
Ti-00083



Ti-00084

As Ti-00024 with
 $X = -C\equiv CCF_3$

Ti-00085



Ti-00086

As Ti-00086 with
 $X = S$

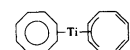
Ti-00087

As Ti-00045 with
 $X = Ph$

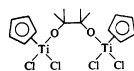
Ti-00088

As Ti-00084 with
 $R = Ph$

Ti-00089



Ti-00090



Ti-00091

As Ti-00024 with
 $X = P(OMe)_3$

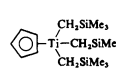
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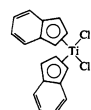
Ti-00093

As Ti-00084 with
 $R = CH_2Ph$

Ti-00094



Ti-00095



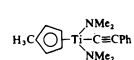
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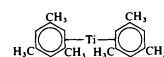
Ti-00097

As Ti-00084 with
 $R = 2,6\text{-Dimethylphenyl}$

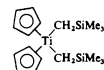
Ti-00098



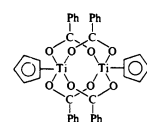
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Ti-00100



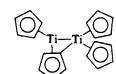
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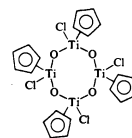
Ti-00102

As Ti-00045 with
 $X = -N=C(C(CH_3)_3)_2$

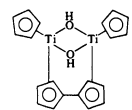
Ti-00103



Ti-00104



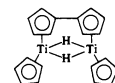
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Ti-00106



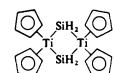
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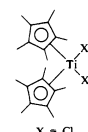
Ti-00108

As Ti-00045 with
 $X = -CPh=C(CH_3)_2$

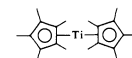
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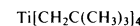
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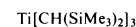
Ti-00111



Ti-00112



Ti-00113



Ti-00114

As Ti-00024 with
 $X = C_6F_5$

Ti-00115

As Ti-00024 with
 $X = OPh$

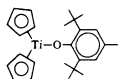
Ti-00116

As Ti-00024 with
 $X = -SPh$

Ti-00117

As Ti-00024 with
X = Ph

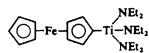
Ti-00118



Ti-00128

As Ti-00111 with
X = Me

Ti-00119



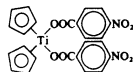
Ti-00120

As Ti-00045 with
X = -N=CPh₂

Ti-00121

As Ti-00007 with
R = OPh

Ti-00122



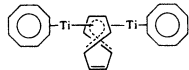
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TiPh₄

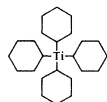
Ti-00124

As Ti-00024 with
X = CH₂Ph

Ti-00125



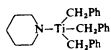
Ti-00126



Ti-00127

As Ti-00024 with
X = -C≡CPh

Ti-00129



Ti-00130



Ti-00131



Ti-00132



Ti-00133



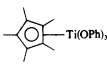
Ti-00134



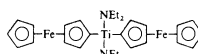
Ti-00135

Ti(CH₂Ph)₄

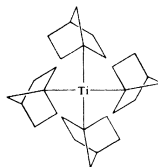
Ti-00136



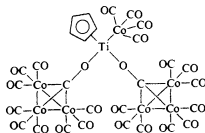
Ti-00137



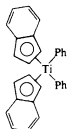
Ti-00138



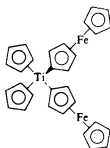
Ti-00139



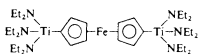
Ti-00140



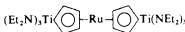
Ti-00141



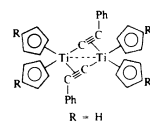
Ti-00142



Ti-00143



Ti-00144



Ti-00145



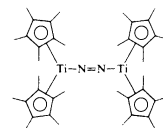
Ti-00146

As Ti-00145 with
R = CH₃

Ti-00147

[(H₃C)₂C=C(Ph)₄Ti]

Ti-00148



Ti-00149



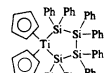
Ti-00150



Ti-00151



Ti-00152



Ti-00153

CH₃Br₃Ti**Ti-00001****Tribromomethyltitanium, 9Cl**

[30043-33-5]



M 302.627

Dark-violet cryst. melting to yellow liq., dec. slowly at r.t., extremely air-sensitive. Sol. hydrocarbons, Et₂O, THF. Mp 2-3°. Forms a complex with bipyridine.Thiele, K.H. *et al*, *Z. Anorg. Allg. Chem.*, 1968, **356**, 195; 1970, **378**, 62 (*synth*)Clark, R.J.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 2454 (*nmr*)**CH₃Cl₃Ti****Ti-00002****Trichloromethyltitanium, 9Cl**

[2747-38-8]



M 169.274

Monomeric in soln. Violet cryst. Mp 28.5°.

Beerman, C. *et al*, *Angew. Chem.*, 1959, **71**, 618 (*synth*)Karavinka, G.L. *et al*, *J. Polym. Sci.*, 1961, **50**, 143 (*synth, ir*)Dijkgraaf, C. *et al*, *Spectrochim. Acta, Part A*, 1969, **25**, 1455 (*uv*)Hawlan, J.F. *et al*, *Can. J. Chem.*, 1972, **50**, 747 (*nmr*)*Inorg. Synth.*, 1976, **16**, 120 (*synth*)Basso-Bert, M. *et al*, *J. Organomet. Chem.*, 1977, **136**, 201 (*uv*)**C₂H₅Cl₃Ti****Ti-00003****Trichloroethyltitanium, 9Cl**

[4984-20-7]



M 183.301

Violet solid.

Thiele, K.H. *et al*, *Z. Anorg. Allg. Chem.*, 1968, **356**, 195 (*synth*)Hanlaw, J.F. *et al*, *Can. J. Chem.*, 1972, **50**, 747 (*synth, nmr*)**C₄H₁₁Cl₃SiTi****Ti-00004****Trichloro(trimethylsilylmethyl)titanium, 9Cl**

[54943-97-4]



M 241.455

Red-orange liq.

Beilin, S.I. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim. (Engl. Transl.)*, 1974, **218**, 718 (*synth, ir, nmr*)Nametkin, N.S. *et al*, *Bull. Acad. Sci. USSR, Div. Chem. Sci.*, 1974, 2767 (*ms*)Sonnek, G. *et al*, *Z. Anorg. Allg. Chem.*, 1976, **426**, 232 (*synth*)**C₄H₁₂O₄Ti****Ti-00005****Tetramethyl titanate***Titanium(IV) methoxide. Methyl titanate(IV). Methyl orthotitanate*

M 172.016

Cocatalyst with organo-Al compds. for polymerisations.

Cryst. or liq. Mp 209-10° (tetramer).

B.P., 512 452, (1941); *CA*, **35**, 463 (*synth*)Kriegsmann, H. *et al*, *Z. Elektrochem.*, 1958, **62**, 1163 (*ir, raman*)Deluzarche, A., *Ann. Chim. (Paris)*, 1961, **6**, 661; *CA*, **56**, 12531 (*synth*)Adams, R.W. *et al*, *Aust. J. Chem.*, 1966, **19**, 207 (*struct*)Wright, D.A. *et al*, *Acta Crystallogr., Sect. B*, 1968, **24**, 1108 (*cryst struct*)**C₄H₁₂Ti****Ti-00006****Tetramethyltitanium, 10Cl***Titanium tetramethyl*

[2371-70-2]



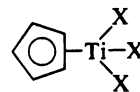
M 108.019

Yellow cryst. (<-78°) (hexane). Sol. pet. ether. Dec. autocatalytically above -78°, more stable in Et₂O. Adducts substantially more stable.

▷Dioxan adduct explodes at 0°

Clauss, K. *et al*, *Angew. Chem.*, 1959, **71**, 627 (*synth, props*)Berthold, H.J. *et al*, *Z. Anorg. Allg. Chem.*, 1963, **319**, 230 (*synth*)Eysel, H.H. *et al*, *Spectrochim. Acta, Part A*, 1970, **26**, 1595 (*ir*)Tabacchi, R. *et al*, *Helv. Chim. Acta*, 1970, **53**, 1977 (*nmr*)**C₅H₅Br₃Ti****Ti-00007****Tribromo(η⁵-2,4-cyclopentadien-1-yl)titanium, 10Cl***Cyclopentadienyltitanium tribromide*

[12240-42-5]



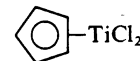
X = Br

M 352.687

Orange solid. Mp 197-9°. Readily hydrol.

Sloan, C.L. *et al*, *J. Am. Chem. Soc.*, 1959, **81**, 1364 (*synth, ir*)Ronova, I.A. *et al*, *Dokl. Chem. (Engl. Transl.)*, 1969, **185**, 334 (*ed*)Semin, G.K. *et al*, *Dokl. Chem. (Engl. Transl.)*, 1970, **194**, 635 (*nqr*)Nesmayanov, A.N. *et al*, *Dokl. Chem. (Engl. Transl.)*, 1972, **205**, 632 (*cmr*)Samuel, E. *et al*, *Inorg. Chem.*, 1973, **12**, 881 (*ir*)Cardoso, A.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 1156 (*synth*)**C₅H₅Cl₂Ti****Ti-00008****Dichloro(η⁵-2,4-cyclopentadien-1-yl)titanium, 10Cl***Cyclopentadienyltitanium dichloride*

[31781-62-1]



M 183.881

Degree of association of unsolvated material uncertain.

THF complex shown to be monomeric in soln.

Cocatalyst for ethylene polymerisation. Purple solid.

Sol. polar org. solvs., insol. C₆H₆, Ph₂O, heptane.*THF complex:*C₉H₁₃Cl₂OTi M 255.987

Blue.

Bartlett, P.D. *et al*, *J. Am. Chem. Soc.*, 1961, **83**, 581 (*synth, uv, esr, nmr, use*)Coutts, R.S.P. *et al*, *Aust. J. Chem.*, 1971, **24**, 1079, 2533 (*synth, nmr, ir, uv*)Floriani, C. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1954 (*synth*)

C₅H₅Cl₃Ti**Ti-00009****Trichloro(η⁵-2,4-cyclopentadien-1-yl)titanium, 10Cl***Cyclopentadienyltitanium trichloride*

[1270-98-0]

As Tribromo(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00007 with

X = Cl

M 219.334

Orange-yellow cryst. Mp 208-11°. Sensitive to hydrol.

Gorsich, R.D., *J. Am. Chem. Soc.*, 1958, **80**, 4744 (*synth, ir*)
Ganis, P. *et al*, *Atti. Accad. Nazl. Lincei Rend. Classe Sci. Fis. Mat. Nat.*, 1962, **33**, 303 (*cryst struct*)Reid, A.F. *et al*, *Spectrochim. Acta*, 1964, **20**, 1257 (*ir*)Nesmayanov, A.N. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim. (Engl. Transl.)*, 1972, **205**, 632 (*cmr*)Glivicky, A. *et al*, *Can. J. Chem.*, 1973, **51**, 2609 (*pmr*)*Inorg. Synth.*, 1976, **16**, 237 (*synth, ir*)Cardoso, A.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 1156 (*synth, ms, nmr*)Chandra, K. *et al*, *Chem. Ind. (London)*, 1980, 288 (*synth, nmr*)

M 321.297

Yellow solid. Sol. polar solvs. including H₂O, dioxan, THF. Mp 114-8°. Bp_{0.0001} 100° subl. Forms a bispyridine adduct. Ti—C bond stable to hydrolysis by acid or alkali.Lahuerta Pena, P. *et al*, *Rev. Acad. Cieac. Exactas, Fis. Quim. Natur. Zaragoza*, 1972, **27**, 75; *CA*, **77**, 164813 (*synth*)
Razuvaev, G.A. *et al*, *Dokl. Chem.*, 1972, **203**, 220 (*synth*)**C₆H₁₈N₂Ti****Ti-00013****Bis(dimethylamido)dimethyltitanium***Dimethylbis(N-methylmethanaminato)titanium, 9Cl*

[59512-77-5]

Me₂Ti(NMe₂)₂

M 166.102

Yellow solid. Dec. at -35°.

Bürger, H. *et al*, *J. Organomet. Chem.*, 1976, **108**, 69 (*synth, ir, nmr*)**C₇H₂₁N₃Ti****Ti-00014****Tris(dimethylaminato)methyltitanium, 8Cl***Tris(dimethylamido)methyltitanium*

[25483-53-8]

MeTi(NMe₂)₃

M 195.143

Yellow liq. Mp 8-9°. Bp_{0.001} 20° subl. Dec. at 80°.TiCD₃ analogue also prepd. (Mp reported 9-10°).Bürger, H. *et al*, *J. Organomet. Chem.*, 1969, **20**, 129 (*synth, ir, nmr, raman*)Bürger, H. *et al*, *J. Organomet. Chem.*, 1970, **21**, 381 (*uv*)**C₅H₅F₃Ti****Ti-00010****(η⁵-2,4-Cyclopentadien-1-yl)trifluorotitanium, 10Cl***Cyclopentadienyltitanium trifluoride*

[63166-76-7]

As Tribromo(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00007 with

X = F

M 169.970

Yellow cryst. Spar. sol. org. solvs. (less sol. than other C₅H₅TiX₃ halides). Mp 140° dec. Readily hydrol.Nesmayanov, A.N. *et al*, *Dokl. Chem. (Engl. Transl.)*, 1968, **182**, 874 (*ir*)Nesmayanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1968, 514 (*synth, ir*)**C₅H₅I₃Ti****Ti-00011****(η⁵-Cyclopentadien-1-yl)triiodotitanium, 10Cl***Cyclopentadienyltitanium triiodide*

[12240-43-6]

As Tribromo(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00007 with

X = I

M 493.688

Dark-red cryst. Mp 148-50°. Hydrolytically sensitive.

Sloan, C.L. *et al*, *J. Am. Chem. Soc.*, 1959, **81**, 1364 (*synth, ir*)
Nesmayanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1968, 514 (*synth, ir*)Bryukhova, E.V. *et al*, *J. Organomet. Chem.*, 1974, **81**, 195(*nqr*)Cardoso, A.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 1156 (*synth*)

M 287.208

Red solid. Mp 162-5°. Bp_{0.001} 150° subl.Köpf, H. *et al*, *Z. Naturforsch., B*, 1968, **23**, 1534 (*synth, ir*)**C₈H₁₄O₃Ti****Ti-00016****(η⁵-Cyclopentadienyl)trimethoxytitanium, 8Cl**

[12145-64-1]

As Tribromo(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00007 with

R = OMe

M 206.077

Monomeric in C₆H₆. White solid. Mp 50-2°. Bp_{1.5} 88°.Nesmayanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1967, 808 (*synth, props*)**C₆Cl₃F₅Ti****Ti-00012****Trichloro(pentafluorophenyl)titanium, 9Cl**

[37759-22-1]

(C₆F₅)TiCl₃**C₈H₁₄Ti****Ti-00017****(η⁵-2,4-Cyclopentadien-1-yl)trimethyltitanium, 9Cl**

[38386-55-9]

As Tribromo(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00007 with

X = Me

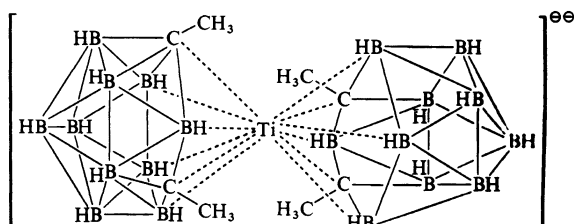
M 158.079

Yellow cryst. Mp ca. 20° dec.

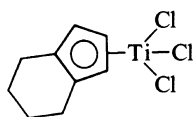
Giannini, U. *et al*, *Tetrahedron Lett.*, 1960, 19 (*synth*)Clauss, K. *et al*, *Justus Liebigs Ann. Chem.*, 1962, **654**, 8 (*synth*)Samuel, E. *et al*, *Inorg. Chem.*, 1973, **12**, 881 (*raman*, *nmr*)Green, M.L.H. *et al*, *J. Organomet. Chem.*, 1974, **73**, 259 (*ir*, *nmr*)**C₈H₂₄N₄Ti****Ti-00018****Tetrakis(dimethylamino)titanium**

M 224.184

Reagent for conversion of hindered ketones to enamines.

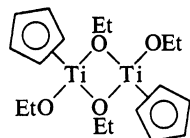
Yellow liq. Bp_{0.05} 50°.Bradley, D.C. *et al*, *J. Chem. Soc.*, 1960, 3857 (*synth*)Buerger, H. *et al*, *Inorg. Nucl. Chem. Lett.*, 1966, **3**, 209 (*ir*)Fieser, M. *et al*, *Reagents for Organic Synthesis*, Wiley, 1967-83, **2**, 399.**C₈H₃₂B₂₀Ti^{ee}****Ti-00019****Bis[η⁶-decahydro-C, C'-dimethyldicarbadoecaborato(2-)]-titanate(2-), 9Cl****4,4'-Bis(decahydro-1,6-dimethyl-1,6-dicarba-4-titanocloso-tridecaborate)(2-)**

M 392.421 (ion)

Bis(tetramethylammonium) salt: [55266-92-7].C₁₆H₅₆B₂₀N₂Ti M 540.712Red cryst. + 2Me₂CO (Me₂CO/EtOH), air-stable in solid state.Salentine, C.G. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 426 (*synth*, *pmr*, *nmr*, *props*)Yo, F.Y. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 428 (*cryst struct*)**C₉H₁₁Cl₃Ti****Ti-00020****Trichloro(η⁵-tetrahydroindenyl)titanium****(η⁵-Tetrahydroindenyl)titanium trichloride**

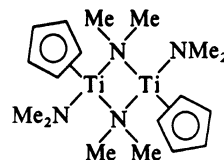
M 273.425

Characterised by hydrol. prods.

Samuel, E., *J. Organomet. Chem.*, 1969, **19**, 87 (*synth*, *ir*, *nmr*)**C₉H₁₅O₂Ti****Ti-00021****Cyclopentadienyldiethoxytitanium**

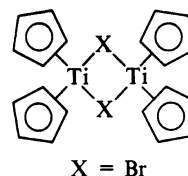
M 203.096

Dimeric.

Dimer: Bis(η⁵-2,4-cyclopentadien-1-yl)diethoxy-di-μ-ethoxydititanium. Dicyclopentadienyldi-μ-ethoxydiethoxydititanium. Bis[(η-cyclopentadienyl)ethoxy(μ-ethoxy)titanium]. Red-brown liq.Lappert, M.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1971, 1314 (*synth*, *nmr*)**C₉H₁₇N₂Ti****Ti-00022****Cyclopentadienylbis(dimethylamido)titanium**

M 201.127

Dimeric.

Dimer: [11067-83-7]. Di-π-cyclopentadienylbis[μ(di-methylamino)]bis(dimethylamino)dititanium, 8Cl. Dicyclopentadienyltetrakis(dimethylamino)dititanium. Bis[(η-cyclopentadienyl)(dimethylamido)(μ-dimethylamido)titanium]. Red-brown oil. Not fully characterised but related compds. were characterised analytically and spectroscopically.Aleya, E.C. *et al*, *J. Chem. Soc., Chem. Commun.*, 1969, 1064 (*synth*, *nmr*)Lappert, M.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1971, 874, 1314 (*synth*, *props*)**C₁₀H₁₀BrTi****Ti-00023****Bromobis(cyclopentadienyl)titanium****Dicyclopentadienyltitanium bromide**

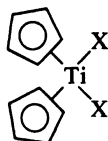
X = Br

M 257.973

Dimeric in C₆H₆.**Dimer:** [39333-86-3]. Di-μ-bromotetrakis(η⁵-2,4-cyclopentadien-1-yl)dititanium, 9Cl. Bis[μ-bromobis(η⁵-cyclopentadienyl)titanium].C₂₀H₂₀Br₂Ti₂ M 515.946Red-brown solid. Sol. H₂O, org. solvs. Subl. *in vacuo*.Gubin, S.P. *et al*, *J. Organomet. Chem.*, 1969, **20**, 229.Coutts, R.S.P. *et al*, *Aust. J. Chem.*, 1973, **26**, 2101.Coutts, R.S.P. *et al*, *J. Organomet. Chem.*, 1973, **47**, 375 (*synth*, *uv*, *ir*)

C₁₀H₁₀Br₂Ti**Ti-00024**

Dibromobis(η⁵-2,4-cyclopentadien-1-yl)titanium, 10Cl
Dicyclopentadienylyltitanium dibromide. Titanocene dibromide
 [1293-73-8]



X = Br

M 337.877

Dark-red cryst. Mp 290-313° dec.

Wilkinson, G. *et al*, *J. Am. Chem. Soc.*, 1953, **75**, 1011 (*synth*)Druce, P.M. *et al*, *J. Chem. Soc. (A)*, 1969, 2106 (*synth*, *ir*, *ms*, *nmr*)Druce, P.M. *et al*, *J. Chem. Soc. (A)*, 1969, 2814 (*ir*)Bryukhova, E.V. *et al*, *J. Organomet. Chem.*, 1974, **81**, 195 (*nqr*)Nesmayanov, A.N. *et al*, *J. Struct. Chem. (Engl. Transl.)*, 1975, **16**, 705 (*cmr*)McDermott, J.X. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 6529 (*nmr*)**C₁₀H₁₀ClTi****Ti-00025**

Chlorobis(cyclopentadienyl)titanium
Dicyclopentadienylyltitanium chloride

As Bromobis(cyclopentadienyl)titanium, Ti-00023 with

X = Cl

M 213.522

Dimeric.

Dimer: [1271-18-7]. *Di-μ-chlorotetrakis(η⁵-2,4-cyclopentadien-1-yl)dittitanium. Bis[bis(η-cyclopentadienyl)-μ-chlorotitanium]*.

C₂₀H₂₀Cl₂Ti₂ M 427.044

Starting material for Ti(III) cyclopentadienyl complexes. Green cryst. Sol. H₂O, org. solvs. Mp 285-8°. Subl. *in vacuo*. One ref. reports as moisture-sensitive.

Green, M.L.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 1000 (*synth*)Chivers, T. *et al*, *Can. J. Chem.*, 1973, **51**, 815.Coutts, R.S.P. *et al*, *J. Organomet. Chem.*, 1973, **47**, 375 (*synth*, *ir*, *uv*)

Wailles, P.C. *et al*, unpublished results cited in *Organic Chemistry of Titanium, Zirconium, and Hafnium*, Academic Press, London, 1974, 207 (*synth*)

Manzer, L.E., *J. Organomet. Chem.*, 1976, **110**, 291 (*synth*)Jungst, R. *et al*, *Inorg. Chem.*, 1977, **16**, 1645 (*cryst struct*)**C₁₀H₁₀Cl₂Ti****Ti-00026**

Dichlorobis(η⁵-2,4-cyclopentadien-1-yl)titanium, 9Cl
Bis(cyclopentadienyl)titanium dichloride. Titanocene dichloride

[1271-19-8]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00024 with

X = Cl

M 248.975

Cocatalyst for polymerisation. Bright-red acicular cryst. (toluene). Mp 289°.

▷XR2050000.

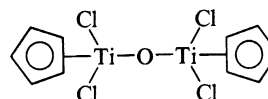
Wilkinson, G. *et al*, *J. Am. Chem. Soc.*, 1954, **76**, 4281 (*synth*)
 Coutts, R.S.P. *et al*, *Adv. Organomet. Chem.*, 1970, **9**, 136 (*rev*)
 Siebert, F.W. *et al*, *J. Organomet. Chem.*, 1970, **23**, 177 (*synth*, *pmr*, *ms*)
 Balutina, O.A. *et al*, *Tr. Khim. Khim. Tekhnol.*, 1974, 119; *CA*, **83**, 170279 (*ir*)
 Clearfield, A. *et al*, *Can. J. Chem.*, 1975, **53**, 1622 (*cryst struct*)
 Martin, M.L. *et al*, *J. Organomet. Chem.*, 1975, **97**, 261 (*pmr*, *cmr*)
 Fieser, M. *et al*, *Reagents for Organic Synthesis*, Wiley, 1967-83, **6**, 48.

C₁₀H₁₀Cl₄O₂Ti₂**Ti-00027**

Tetrachlorobis(η⁵-2,4-cyclopentadien-1-yl)-μ-oxodititanium, 9Cl

Bis[dichloro(η⁵-cyclopentadienyl)titanium]oxide. Oxybis[dichlorocyclopentadienylyltitanium]

[12146-06-4]



M 383.760

Obt. by hydrol., but is itself hydrol. to monochloro oligomers. Orange cryst. (CCl₄). Spar. sol. org. solvs. Mp 149-51°.

Corradini, P. *et al*, *J. Am. Chem. Soc.*, 1959, **81**, 5510 (*cryst struct*)Gorsich, R.D., *J. Am. Chem. Soc.*, 1960, **82**, 4211 (*synth*)Thewalt, U. *et al*, *J. Organomet. Chem.*, 1977, **127**, 169 (*cryst struct*)**C₁₀H₁₀FTi****Ti-00028**

Bis(cyclopentadienyl)fluorotitanium

Dicyclopentadienylyltitanium fluoride

As Bromobis(cyclopentadienyl)titanium, Ti-00023 with

X = F

M 197.067

Dimeric in C₆H₆.

Dimer: [39333-87-4]. *Tetrakis(η⁵-2,4-cyclopentadien-1-yl)di-μ-fluorodititanium, 9Cl. Bis[bis(η⁵-cyclopentadienyl)-μ-fluorotitanium]*.

C₂₀H₂₀F₂Ti₂ M 394.135Green cryst. by subl. Sol. org. solvs., spar. sol. H₂O.Gubin, S.P. *et al*, *J. Organomet. Chem.*, 1969, **20**, 229.Coutts, R.S.P. *et al*, *Aust. J. Chem.*, 1973, **26**, 2101.Coutts, R.S.P. *et al*, *J. Organomet. Chem.*, 1973, **47**, 375 (*synth*, *ir*, *uv*)**C₁₀H₁₀F₂Ti****Ti-00029**

Bis(η⁵-2,4-cyclopentadien-1-yl)difluorotitanium, 10Cl
Dicyclopentadienylyltitanium difluoride. Titanocene difluoride

[309-89-7]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00024 with

X = F

M 216.066

Tumour inhibitor. Yellow cryst. Mp 238-80° dec.

Samuel, E., *Bull. Soc. Chim. Fr.*, 1966, 3548 (*synth*)Druce, P.M. *et al*, *J. Chem. Soc. (A)*, 1969, 2106 (*synth*, *ir*, *ms*, *nmr*)Dias, A.D., *Rev. Port. Quim.*, 1971, **13**, 222; *CA*, **77**, 120222 (*uv*)

White, D.A., *J. Inorg. Nucl. Chem.*, 1971, **33**, 691 (*pmr*)
Ger. Pat., 2 923 334, (1979); *CA*, **94**, 150572 (*use*)

C₁₀H₁₀ITi

Ti-00030

Bis(cyclopentadienyl)iodotitanium

Dicyclopentadienyliodotitanium iodide

As Dibromobis(cyclopentadienyl)titanium, Ti-00023 with



M 304.974

Dimeric in C₆H₆.

Dimer: [39333-90-9]. *Tetrakis*(η^5 -2,4-cyclopentadien-1-yl)di- μ -iododititanium, 9Cl. *Bis*[bis(η^5 -cyclopentadienyl)- μ -iododititanium].

C₂₀H₂₀I₂Ti₂ M 609.947

Red-brown solid. Sol. H₂O, org. solvs. Shows anomalous magnetic behaviour.

Gubin, S.P. *et al*, *J. Organomet. Chem.*, 1969, **20**, 229.Coutts, R.S.P. *et al*, *Aust. J. Chem.*, 1973, **26**, 2101.

Coutts, R.S.P. *et al*, *J. Organomet. Chem.*, 1973, **47**, 375 (*synth*, *uv*, *ir*)

C₁₀H₁₀I₂Ti

Ti-00031

Bis(η^5 -2,4-cyclopentadien-1-yl)diiodotitanium, 10Cl

Dicyclopentadienyliodotitanium diiodide. Titanocene diiodide

[12152-92-0]

As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00024 with



M 431.878

Black cryst. Mp 315-7°.

Chien, J.C.W., *J. Phys. Chem.*, 1963, **67**, 2477 (*uv*)

Druce, P.M. *et al*, *J. Chem. Soc. (A)*, 1969, 2106, 2814 (*synth*, *ir*, *ms*, *nmr*)

Gubin, S.P. *et al*, *J. Organomet. Chem.*, 1969, **20**, 229.

Bryukhova, E.V. *et al*, *J. Organomet. Chem.*, 1974, **81**, 195 (*nqr*)

Nesmayanov, A.N. *et al*, *J. Struct. Chem. (Engl. Transl.)*, 1975, **16**, 705 (*pmr*, *cmr*)

C₁₀H₁₀N₆Ti

Ti-00032

Diazidobis(η^5 -2,4-cyclopentadien-1-yl)titanium, 10Cl

Titanocene diazide

[1298-37-9]

As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00024 with



M 262.109

Orange cryst. Mp 145-6°. Bp_{0.001} 200° subl.

Langford, C.H. *et al*, *J. Organomet. Chem.*, 1965, **4**, 271 (*synth*, *uv*)

Coutts, R.S.P. *et al*, *Aust. J. Chem.*, 1971, **24**, 1075 (*synth*, *ir*, *ms*, *nmr*)

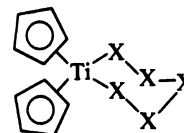
de Gil, E.R. *et al*, *Acta Crystallogr., Sect. B*, 1976, **32**, 909 (*cryst struct*)

C₁₀H₁₀S₅Ti

Ti-00033

Bis(η^5 -2,4-cyclopentadien-1-yl)(pentathio)titanium, 9ClBis(η^5 -cyclopentadienyl)cyclo(pentasulfur-1,5-diyl)titanium

[12116-82-4]



M 338.369

Intermed. in synth. of S_n (n = 7, 9, 20, etc.) and other ring-systems. Dark purple cryst. Mp 194-8°. Below 120°, C₅H₅ rings nonequivalent owing to S₅ ring conformation. E_{act} (ring inversion) 69.1 kJ mol.⁻¹.

Köpf, H. *et al*, *Chem. Ber.*, 1969, **102**, 1504 (*synth*)

Epstein, E.F. *et al*, *J. Organomet. Chem.*, 1971, **26**, 229 (*cryst struct*)

Muller, E.G. *et al*, *J. Organomet. Chem.*, 1976, **111**, 91 (*ir*, *nmr*, *cryst struct*)

Abel, E.W. *et al*, *J. Organomet. Chem.*, 1978, **160**, 75 (*nmr*)

C₁₀H₁₀Se₅Ti

Ti-00034

Bis(η^5 -2,4-cyclopentadien-1-yl)(pentaselenidato(2-))titanium, 9ClBis(η^5 -cyclopentadienyl)cyclo-1,5-pentaseelenium-1,5-diyl)titanium

[12307-22-1]

As Bis(η^5 -2,4-cyclopentadien-1-yl)(pentathio)titanium, Ti-00033 with



M 572.869

Monomeric in C₆H₆. Air-stable violet leaflets (C₆H₆).Insol. H₂O, sol. Et₂O, C₆H₆, sl. sol. CS₂. Mp 211°.

C₅H₅ rings nonequivalent magnetically (Se₅ ring conformation).

Köpf, H. *et al*, *Chem. Ber.*, 1968, **101**, 272 (*synth*, *ir*, *uv*, *nmr*)C₁₀H₁₀Ti

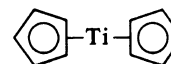
Ti-00035

Titanocene

Bis(η^5 -2,4-cyclopentadien-1-yl)titanium, 9Cl.

Dicyclopentadienyliodotitanium

[1271-29-0]



M 178.069

Identity doubtful, except possibly as a reactive intermediate. Black solid. Struct. not established.

▷ XR2075000.

Rausch, M.D. *et al*, *J. Organomet. Chem.*, 1978, **160**, 81.

Pez, G.P. *et al*, *Adv. Organomet. Chem.*, 1981, **21**, 1 (*rev*)

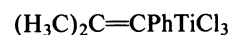
C₁₀H₁₁Cl₃Ti

Ti-00036

Trichloro(2-methyl-1-phenyl-1-propenyl)titanium, 10Cl

Trichloro(1-phenyl-2,2-dimethylethenyl)titanium

[72348-00-6]



M 285.436

Material characterized spectroscopically.

Cardin, D.J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1979, 513
(*synth*, *nmr*)**C₁₀H₁₁Ti****Ti-00037****Bis(η⁵-cyclopentadienyl)hydrotitanium**

As Bromobis(cyclopentadienyl)titanium, Ti-00023 with

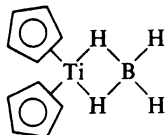
X = H

M 179.077

Dimeric.

Dimer: [11078-10-7]. *Tetra-π-cyclopentadienyldi-μ-hydroditiitanium*, 8Cl. *Di-π-cyclopentadienyldi-2,4-cyclopentadien-1-yldi-μ-hydroditiitanium*, 8Cl. *Bis[bis(η⁵-cyclopentadienyl)-μ-hydroditiitanium]*.C₂₀H₂₂Ti₂ M 358.154Violet solid. On standing isomerises to polymer. With H₂ gives a fulvalene hydrido dimer.Bercaw, J.E. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 7301 (*synth*, *ir*, *esr*)**C₁₀H₁₄BTi****Ti-00038****Bis(η⁵-2,4-cyclopentadien-1-yl)(tetrahydroborato(1-))H,H'-titanium**, 10Cl*Bis(η⁵-cyclopentadienyl)titanium tetrahydridoborate. Titanocene borohydride*

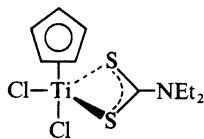
[12772-20-2]



M 192.911

Purple needles. Subl. *in vacuo*.Nöth, H. *et al*, *Naturwissenschaften*, 1960, **47**, 57 (*esr*)Davies, N. *et al*, *J. Chem. Soc. (A)*, 1969, 2601 (*ir*)Marks, T.J. *et al*, *Inorg. Chem.*, 1972, **11**, 2540 (*synth*, *ir*)Melmed, K.M. *et al*, *Inorg. Chem.*, 1973, **12**, 232 (*cryst struct*)*Inorg. Synth.*, 1977, **17**, 91 (*synth*)**C₁₀H₁₅Cl₂NS₂Ti****Ti-00039****Dichloro(η⁵-2,4-cyclopentadien-1-yl)(diethylcarbamodithioato-S,S')titanium**, 9Cl*Dichloro(η-cyclopentadienyl)N,N-diethyldithiocarbamateotitanium*

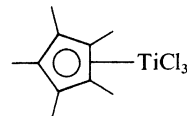
[53079-53-1]



M 332.141

Red solid. Mp 181-4°. Stable to hydrolysis unlike most (C₅H₅)Ti(IV) dihalides.Coutts, R.S.P. *et al*, *J. Organomet. Chem.*, 1975, **84**, 47 (*synth*, *ir*, *nmr*)**C₁₀H₁₅Cl₃Ti****Ti-00040****Trichloro[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium**, 10Cl*(Pentamethylcyclopentadienyl)titanium trichloride*

[70756-51-3]

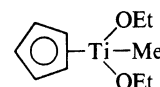


M 289.468

Red solid. Mp 225-7°.

King, R.B. *et al*, *J. Organomet. Chem.*, 1967, **8**, 287 (*synth*, *ir*, *pmr*)Nesmeyanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1968, 514 (*ir*)Gubin, S.P. *et al*, *J. Organomet. Chem.*, 1969, **20**, 229 (*polarog*)Nesmayanov, A.N. *et al*, *Dokl. Chem. (Engl. Transl.)*, 1972, **205**, 632 (*cmr*)**C₁₀H₁₈O₂Ti****Ti-00041****(η⁵-2,4-Cyclopentadien-1-yl)diethoxymethyltitanium**, 10Cl

[53695-79-7]



M 218.131

Yellow liq. d₄²⁰ 1.059. Bp_{0.05} 32°. Forms complex with Me₂AlOEt.Blandy, C. *et al*, *J. Organomet. Chem.*, 1977, **128**, 415 (*synth*, *ir*, *pmr*, *cmr*, *props*)**C₁₀H₂₄O₃Ti****Ti-00042****Methyltris(2-propanolato)titanium**, 10Cl*Methyltriisopropoxytitanium. Methyltris(isopropoxy)-titanium*

[18006-13-8]

MeTi[OCH(CH₃)₂]₃

M 240.178

Yellow liq. Mp 10°. Bp_{0.018} 50°.Clauss, K., *Justus Liebigs Ann. Chem.*, 1968, **711**, 19 (*synth*)Dijkgraaf, C. *et al*, *Spectrochem. Acta, Part A*, 1969, **25**, 1455 (*synth*)Blandy, C. *et al*, *C.R. Hebd. Seances Acad. Sci.*, 1974, **278**, 1323 (*nmr*)Rausch, M.D. *et al*, *J. Organomet. Chem.*, 1974, **74**, 85 (*synth*, *nmr*)Blandy, C. *et al*, *Synth. React. Inorg. Metal-Org. Chem.*, 1978, **8**, 331 (*nmr*)**C₁₀H₂₉N₃SiTi****Ti-00043****Tris(dimethylamido)(trimethylsilylmethyl)titanium***Tris(N-methylmethanaminato)[(trimethylsilyl)methyl]-titanium*, 9Cl

[59512-75-3]

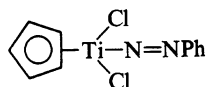
Me₃SiCH₂Ti(NMe₂)₃

M 267.325

Liq. Mp <0°. Bp_{0.001} 50°.Bürger, H. *et al*, *J. Organomet. Chem.*, 1976, **108**, 69 (*synth*, *ir*, *nmr*)

C₁₁H₁₀Cl₂N₂Ti

Ti-00044

Dichloro(η⁵-2,4-cyclopentadien-1-yl)(phenylazo)titanium, 10Cl*Dichloro(η-cyclopentadienyl)phenyldiazenidotitanium*
[68182-14-9]

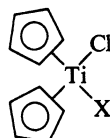
M 288.999

Orange cryst. (Et₂O).Dilworth, J.R. *et al*, *J. Organomet. Chem.*, 1978, **159**, 47 (*synth*, *ir*, *nmr*)C₁₁H₁₃ClTi

Ti-00045

Chlorobis(η⁵-2,4-cyclopentadien-1-yl)methyltitanium, 10Cl*Chloro(methyl)titanocene*

[1278-83-7]



X = Me

M 228.557

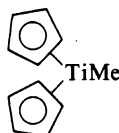
Orange-yellow solid. Mp 168-70°. Cryst. phase transition at 91.6°.

Beachell, H.C. *et al*, *Inorg. Chem.*, 1965, **4**, 1133 (*synth*, *mr*)
Gubin, S.P. *et al*, *J. Organomet. Chem.*, 1969, **20**, 241 (*polarog*)
Waters, J.A. *et al*, *J. Organomet. Chem.*, 1970, **22**, 417 (*synth*, *ir*, *uv*, *nmr*)
Waters, J.A. *et al*, *J. Organomet. Chem.*, 1971, **33**, 41.C₁₁H₁₃Ti

Ti-00046

Bis(η⁵-2,4-cyclopentadien-1-yl)methyltitanium

[12288-70-9]



M 193.104

Complex prepd. *in situ*. Effects cyclometalation of pyridines and quinolines.Klei, B. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 659 (*synth*, *use*)
Klei, B. *et al*, *J. Organomet. Chem.*, 1980, **188**, 97 (*use*)
Fieser, M. *et al*, *Reagents for Organic Synthesis*, Wiley, 1967-83, **8**, 40 (*use*)C₁₁H₁₄O₆Ti

Ti-00047

Tris(acetato-O)(η⁵-2,4-cyclopentadien-1-yl)titanium, 9Cl
Triacetato(η⁵-cyclopentadienyl)titanium. (η⁵-Cyclopentadienyl)titanium triacetate

[1282-42-4]

As Tribromo(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00007 with

X = OAc

M 290.108

Mp 115-7°.

Dvoryantseva, G.G. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1965, **161**, 603 (*synth*, *ir*)
Nesmeyanov, A.N. *et al*, *Tetrahedron Suppl.*, 1966, **8**, pt. 2, 389 (*synth*, *nmr*)
Nesmayanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1967, 808 (*synth*)
Nesmayanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1971, 2729 (*nmr*)
Nesmayanov, A.N. *et al*, *J. Struct. Chem. (Engl. Transl.)*, 1975, 705 (*cmr*)C₁₁H₂₀O₃Ti

Ti-00048

(π-Cyclopentadienyl)triethoxytitanium, 8Cl

[1282-41-3]

As Tribromo(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00007 with

X = OEt

M 248.157

Monomeric in C₆H₆. Colourless liq. Bp₃ 106-7°.Nesmayanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1961, 743 (*synth*)
Nesmayanov, A.N. *et al*, *Dokl. Chem. (Engl. Transl.)*, 1968, **182**, 874 (*ir*)
Nesmayanov, A.N. *et al*, *J. Struct. Chem. (Engl. Transl.)*, 1972, **13**, 964 (*nmr*)C₁₁H₂₃N₃Ti

Ti-00049

(η⁵-Cyclopentadienyl)tris(dimethylamido)titanium
(η⁵-Cyclopentadien-1-yl)tris(N-methylmethanaminato)-titanium, 9Cl

[58057-99-1]

As Tribromo(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00007 withX = NMe₂

M 245.203

Red oil or orange cryst. Mp 100°. Bp_{0.01} 95°, Bp_{0.001} 50°. Dec. ~140°.Chandra, G. *et al*, *Inorg. Nucl. Chem. Lett.*, 1965, **1**, 83 (*synth*)
Chandra, G. *et al*, *J. Chem. Soc. (A)*, 1968, 1940 (*synth*)
Bürger, H. *et al*, *J. Organomet. Chem.*, 1969, **20**, 129 (*synth*, *nmr*)
Bürger, H. *et al*, *J. Organomet. Chem.*, 1975, **101**, 295 (*ir*, *raman*)C₁₂H₁₀N₂O₂Ti

Ti-00050

Dicyanatobis(η⁵-cyclopentadienyl)titanium*Bis(cyanato-N)bis(η⁵-cyclopentadien-1-yl)titanium, 9Cl. Biscyclopentadienyldicyanatotitanium*
[12109-61-4]As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00024 with

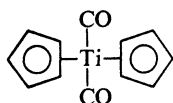
X = NCO

M 262.103

The ligating atom of the NCO group is uncertain (cf. 9Cl name). Orange-red solid. Mp 275-7°. Bp_{0.001} 160° subl.Coutts, R.S.P. *et al*, *Aust. J. Chem.*, 1966, **19**, 2069 (*synth*, *nmr*)
Samuel, E., *Bull. Soc. Chim. Fr.*, 1966, 3548 (*synth*, *ir*)
Burmeister, J.L. *et al*, *Inorg. Chem.*, 1969, **8**, 170; 1970, **9**, 58 (*synth*, *ir*, *uv*, *ms*)
Anderson, S.J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1974, 996 (*cryst struct*)

C₁₂H₁₀O₂Ti**Ti-00051****Dicarbonylbis(η⁵-2,4-cyclopentadien-1-yl)titanium, 10Cl**

Dicarbonyldi-π-cyclopentadienyltitanium, 8Cl. Titanocene dicarbonyl
[12129-51-0]



M 234.090

Monomeric in C₆H₆. Dark-red cryst. (toluene or by subl.). Sol. org. solvs. Reacts with CH₂Cl₂ and CHCl₃.
Mp 90° dec. Bp_{0.001} 40-80° subl. Readily oxidized.

Calderazzo, F. *et al*, *Inorg. Chim. Acta*, 1967, **1**, 65 (*ir*)Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1967, **9**, P15 (*uv*)Alt, H. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 5936 (*synth*)Demerseman, B. *et al*, *J. Organomet. Chem.*, 1975, **101**, C24 (*synth*)Fachinetti, G. *et al*, *J. Chem. Soc., Chem. Commun.*, 1976, 230 (*synth, pmr, ir*)Atwood, J.L. *et al*, *J. Organomet. Chem.*, 1977, **132**, 367 (*cryst struct*)**C₁₂H₁₀Ti****Ti-00052****Diphenyltitanium, 10Cl***Titanium diphenyl*

[14724-88-0]

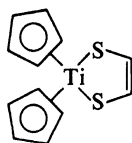


M 202.091

Not well characterised. Polymeric. Black solid. Sol. C₆H₆. Forms adducts with THF and NH₃. μ_B = 0.59 BM. Dec. slowly at 200-50°.

▷PyrophoricLatyaeva, V.N. *et al*, *J. Organomet. Chem.*, 1964, **2**, 388; 1969, **16**, 103 (*synth*)Thiele, K.H. *et al*, *Z. Anorg. Chem.*, 1978, **441**, 13 (*synth*)**C₁₂H₁₂S₂Ti****Ti-00053****Bis(η⁵-2,4-cyclopentadien-1-yl)[1,2-ethenedithiolato(2-)-S,S']titanium, 9Cl**

[12307-60-7]

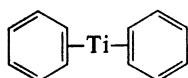


M 268.227

Green-black cryst. (CH₂Cl₂/hexane or by subl.). Mp 177-9°, 202-4°. Bp_{0.1} 110-20° subl.

King, R.B. *et al*, *Inorg. Chem.*, 1968, **7**, 340 (*synth, ir, nmr*)Köpf, H. *et al*, *Z. Naturforsch., B*, 1968, **23**, 1531 (*synth, ir, nmr*)Kutoglu, A., *Acta Crystallogr., Sect. B*, 1973, **29**, 2891 (*cryst struct*)**C₁₂H₁₂Ti****Ti-00054****Bis(η⁶-benzene)titanium, 9Cl**

[52462-43-8]

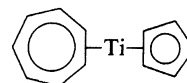


M 204.107

Reducing agent in org. synth. Cocatalyst for diene oligomerisations. Burgundy-red cryst.

Akhmedov, V.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1412 (*use*)Anthony, M.T. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1419 (*synth, spectra*)Hawker, P.N. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 730 (*synth*)**C₁₂H₁₂Ti****Ti-00055****(η⁷-Cycloheptatrienylium)(η⁵-2,4-cyclopentadien-1-yl)titanium***π-Cycloheptatrienyl-π-cyclopentadienyltitanium*

[51203-49-7]

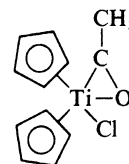


M 204.107

Sky-blue cryst. Sublimes at 125°/1 mm. Diamagnetic.

v. Oven, H.O. *et al*, *J. Organomet. Chem.*, 1970, **23**, 159 (*synth, ir*)Zeinstra, J.D. *et al*, *J. Organomet. Chem.*, 1973, **54**, 207 (*struct*)Verkouw, H.T. *et al*, *J. Organomet. Chem.*, 1973, **59**, 259 (*ms, ir, pmr*)Evans, S. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 304.Groenenboom, C.J. *et al*, *J. Organomet. Chem.*, 1974, **80**, 229(*cmr, pmr*)Demerseman, B. *et al*, *J. Organomet. Chem.*, 1975, **101**, C24 (*synth*)**C₁₂H₁₃ClOTi****Ti-00056****[(C,O-η)-Acetyl]chlorobis(η⁵-2,4-cyclopentadien-1-yl)titanium, 10Cl***Acetylchlorotitanocene*

[66320-88-5]



M 256.567

Orange air-stable cryst. (toluene). Sol. CHCl₃, polar solvs., insol. hydrocarbons.

Floriani, C. *et al*, *J. Chem. Soc., Chem. Commun.*, 1972, 790 (*synth, ir, ms*)Fachinetti, G. *et al*, *J. Organomet. Chem.*, 1974, **71**, C5 (*synth, ir, nmr*)Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 2297 (*synth, cryst struct*)**C₁₂H₁₃ClTi****Ti-00057****Chlorobis(η⁵-2,4-cyclopentadien-1-yl)ethenyltitanium***Chloro-π-cyclopentadienylvinyltitanium, 8Cl.**Chloro(vinyl)titanocene*

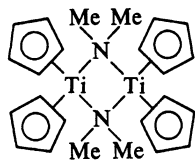
As Chlorobis(η⁵-2,4-cyclopentadien-1-yl)methyltitanium, Ti-00045 with



M 240.568

Red-brown solid. Mp 153° dec.

Waters, J.A. *et al*, *J. Organomet. Chem.*, 1970, **22**, 417 (*synth, ir, nmr*)

C₁₂H₁₆NTi[Bis(η⁵-cyclopentadienyl)dimethylamidotitanium]

M 222.145

Dimeric.

Dimer: [11057-67-3]. *Tetra-π-cyclopentadienyl-bis[μ-(dimethylamino)]dititanium, 8Cl*. *Bis[bis(η⁵-cyclopentadienyl)dimethylamidotitanium]*.

C₂₄H₃₂N₂Ti₂ M 444.290

Useful starting material for Ti(III) complexes. Brown solid. Highly sensitive to air and moisture.

Lappert, M.F. *et al*, *J. Chem. Soc. (A)*, 1971, 874 (*synth, ir*)Lappert, M.F. *et al*, *J. Chem. Soc. (A)*, 1971, 1314 (*props*)C₁₂H₁₆S₂TiBis(η⁵-2,4-cyclopentadien-1-yl)bis(methanethiolato)titanium, 10Cl*Bis(η-cyclopentadienyl)bis(thiomethoxy)titanium.**Bis(thiomethoxy)titanocene*

[12089-78-0]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00024 with

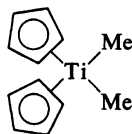
X = SMe

M 272.258

Red-violet solid or purple cryst. Mp 184-5°.

Coutts, R.S.P. *et al*, *Aust. J. Chem.*, 1966, **19**, 1377 (*synth, nmr*)Giddings, S.A., *Inorg. Chem.*, 1967, **6**, 849 (*synth*)Abel, E.W. *et al*, *J. Organomet. Chem.*, 1968, **14**, 285 (*synth, nmr*)Köpf, H. *et al*, *Z. Naturforsch., B*, 1968, **23**, 1536 (*synth, ir*)C₁₂H₁₆TiBis(η⁵-2,4-cyclopentadien-1-yl)dimethyltitanium, 9Cl

[1271-66-5]



M 208.138

Orange-yellow needles (pentane). Mp 97° dec.

Piper, T.S. *et al*, *J. Inorg. Nucl. Chem.*, 1956, **3**, 104 (*synth*)*Ger. Pat.*, 1 037 446, (1958); *CA*, **54**, 18546 (*synth*)Clauss, K. *et al*, *Justus Liebig's Ann. Chem.*, 1962, **654**, 8 (*synth*)Hanlan, J.F. *et al*, *Can. J. Chem.*, 1972, **50**, 747 (*pmr, ir*)Erskine, G.J. *et al*, *J. Organomet. Chem.*, 1976, **114**, 119 (*synth, props*)Cardoso, A.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 1156 (*synth*)

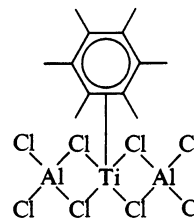
Ti-00058

C₁₂H₁₈Al₂Cl₈Ti

Tetra-μ-chlorobis(dichloroaluminium)(1,2,3,4,5,6-η)hexamethylbenzene)titanium, 10Cl

Hexamethylbenzenebis(di-μ-dichlorodichloroaluminum)titanium

[39450-72-1]



M 547.741

Catalyst for trimerization of butadiene. Violet cryst.

(C₆H₆). Sol. aromatic hydrocarbons, insol. aliphatic hydrocarbons. Br and I analogues also known.Pasynkiewicz, S. *et al*, *J. Organomet. Chem.*, 1973, **54**, 203 (*synth*)Dzierzgowski, S. *et al*, *J. Mol. Catal.*, 1977, **2**, 253 (*use*)Thewalt, U. *et al*, *J. Organomet. Chem.*, 1979, **172**, 317 (*cryst struct*)

Ti-00061

C₁₂H₃₄N₂Si₂Ti

Bis(dimethylamido)bis(trimethylsilylmethyl)titanium

Bis(N-methylmethanaminato)bis[(trimethylsilyl)methyl]titanium, 9Cl

[59512-73-1]

(Me₃SiCH₂)₂Ti(NMe₂)₂

M 310.465

Yellow solid (below 0°).

Bürger, H. *et al*, *J. Organomet. Chem.*, 1976, **108**, 69 (*synth, nmr*)

Ti-00062

C₁₃H₁₀ClF₆NTi

Chlorodi-π-cyclopentadienyl[2,2,2-trifluoro-1-(trifluoromethyl)ethylideniminato]titanium

Chloro[bis(trifluoromethyl)ketimido]titanocene. Chlorobis(η-cyclopentadienyl)[bis(trifluoromethyl)ketimido]titanium

[11077-55-7]

As Chlorobis(η⁵-2,4-cyclopentadien-1-yl)methyltitanium, Ti-00045 withX = —N=C(CF₃)₂

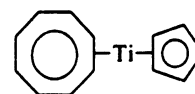
M 377.552

Yellow solid. Mp 194-5° dec. Bp_{0.001} <84° subl.Cetinkaya, B. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 215 (*synth, ir, nmr, ms*)

Ti-00063

C₁₃H₁₃Ti(η⁸-1,3,5,7-Cyclooctatetraene)(η⁵-2,4-cyclopentadien-1-yl)titanium, 10Cl

[11065-40-0]



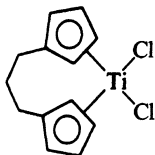
M 217.126

Green cryst. Bp_{0.1} 120° subl. Dec. at ~160° without melting (under Ar). Thermally stable but v. sensitive to oxygen. Paramagnetic (1 unpaired electron).

Ti-00064

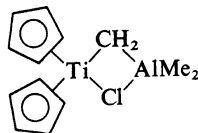
- Van Oven, H.O. *et al*, *J. Organomet. Chem.*, 1969, **19**, 373 (*synth, ir, ms*)
 Lehmkuhl, H. *et al*, *J. Organomet. Chem.*, 1970, **25**, C44 (*synth*)
 Kroon, P.A. *et al*, *J. Organomet. Chem.*, 1970, **25**, 451 (*cryst struct*)
 Thomas, J.L. *et al*, *Inorg. Chem.*, 1972, **11**, 348 (*esr*)
 Veldman, M.E.E. *et al*, *J. Organomet. Chem.*, 1975, **84**, 247 (*synth, ms, ir, props*)

C₁₃H₁₄Cl₂Ti **Ti-00065**
Dichloro[1,3-propanediylbis[(1,2,3,4,5-η)-2,4-cyclopentadien-1-ylidene]]titanium, 9Cl
Dichloro(1,1'-trimethylenedicyclopentadienyl)titanium
 [38117-97-4]



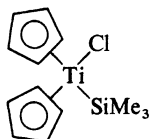
- M 289.040
 Deep red-brown cryst.
Japan. Pat., 63 5 991, (1963) (*synth, ir, uv, nmr*)
 Davis, B.R. *et al*, *J. Organomet. Chem.*, 1971, **30**, 75 (*cryst struct*)
 Hillman, M. *et al*, *J. Organomet. Chem.*, 1972, **42**, 123 (*synth, props*)
 Epstein, E.F. *et al*, *Inorg. Chim. Acta*, 1973, **7**, 211 (*neutron diffraction*)
 Smith, J.A. *et al*, *J. Organomet. Chem.*, 1979, **173**, 175 (*nmr*)

C₁₃H₁₈AlClTi **Ti-00066**
μ-Chlorobis(η⁵-cyclopentadienyl)(dimethylaluminum)-μ-methylenetitanium
 [67719-69-1]



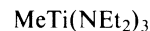
- M 284.600
 Reagent for olefin homologation and redn. of certain ketones to alkenes and esters to enol ethers. Red-orange cryst. Air and moisture sensitive.
 Tebbe, F.N. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 3611 (*synth, use*)
 Pine, S.H. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 3270 (*use*)
 Fieser, M. *et al*, *Reagents for Organic Synthesis*, Wiley, 1967-83, **8**, 83 (*use*)

C₁₃H₁₉ClSiTi **Ti-00067**
Chlorobis(η⁵-2,4-cyclopentadien-1-yl)(trimethylsilyl)titanium
Chloro(trimethylsilyl)titanocene
 [75799-47-2]



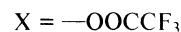
- M 286.712
 Dark-green cryst. Mp 119-21°.
 Rösch, L. *et al*, *J. Organomet. Chem.*, 1980, **197**, 51 (*synth, ir, cryst struct*)

C₁₃H₃₃N₃Ti **Ti-00068**
Tris(diethylaminato)methyltitanium, 8Cl
Tris(diethylamido)methyltitanium
 [25483-56-1]



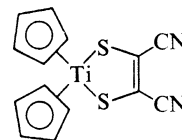
- M 279.304
 Yellow liq. Mp 4-5°. Dec. at 120-30°. TiCD₃ analogue also prepd.
 Bürger, H. *et al*, *J. Organomet. Chem.*, 1969, **20**, 129 (*synth, ir, raman, pmr*)
 Bürger, H. *et al*, *J. Organomet. Chem.*, 1970, **21**, 381 (*uv*)

C₁₄H₁₀F₆O₄Ti **Ti-00069**
Bis(η⁵-2,4-cyclopentadien-1-yl)bis(trifluoroacetato-O)titanium, 10Cl
Titanocene bis(trifluoroacetate)
 [1282-45-7]
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00024 with



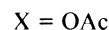
- M 404.101
 Orange cryst. (toluene). Mp 175-9°.
 Drozdov, G.V. *et al*, *Zh. Obshch. Khim.*, 1962, **32**, 2360 (*synth, uv*)
 Beachell, H.C. *et al*, *Inorg. Chem.*, 1965, **4**, 1133 (*synth, nmr*)
 Saunders, L. *et al*, *Polymer*, 1965, **6**, 635 (*synth, ir*)
 Nesmayanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1971, 2729 (*nmr*)

C₁₄H₁₀N₂S₂Ti **Ti-00070**
Bis(η⁵-2,4-cyclopentadien-1-yl)[2,3-dimercapto-2-butenedinitrilato(2-)-S,S']titanium, 9Cl
Bis(η⁵-cyclopentadienyl)(1,2-dicyanoethylenedithiolato)titanium
 [12087-16-0]



- M 318.246
 Dark-green cryst. Mp 260°.
 Köpf, H. *et al*, *J. Organomet. Chem.*, 1965, **4**, 426 (*synth*)
 Chauduri, M.A. *et al*, *J. Chem. Soc. (A)*, 1966, 838 (*synth, ir*)
 Locke, J. *et al*, *Inorg. Chem.*, 1966, **5**, 1187 (*synth, ir, nmr*)
 McCleverty, J.A. *et al*, *Inorg. Chem.*, 1969, **8**, 1340.
 Chiesi-Villa, A. *et al*, *Acta Crystallogr., Sect. B*, 1976, **33**, 909 (*cryst struct*)

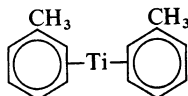
C₁₄H₁₆O₄Ti **Ti-00071**
Bis(acetato-O)bis(η⁵-2,4-cyclopentadien-1-yl)titanium, 10Cl
Dicyclopentadienyltitanium diacetate. Titanocene diacetate. Diacetatobis(η⁵-cyclopentadienyl)titanium
 [1282-51-5]
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00024 with



- M 296.158
 Orange cryst. Mp 126-30°. Hydrolytically sensitive and thermally labile.

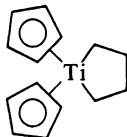
Nesmayanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1961, 2146 (*synth*)
 Razuvaev, G.A. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1961, **138**, 1126 (*synth*)
 Nesmayanov, A.N. *et al*, *Tetrahedron Suppl.*, 1966, **8**, pt. 2, 382 (*nmr*)

C₁₄H₁₆Ti **Ti-00072**
Bis[(1,2,3,4,5,6-η)-methylbenzene]titanium, 10Cl
Ditoluenetitanium
 [55527-82-7]



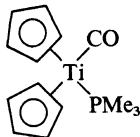
M 232.160
 Obt. by metal vapour synth. technique. Burgandy-red
 cryst.
 Anthony, M.T. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1419 (*synth, ir, ms, nmr, pe*)
 Hawker, P.N. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 730 (*synth*)

C₁₄H₁₈Ti **Ti-00073**
(1,4-Butanediyl)bis(η⁵-2,4-cyclopentadien-1-yl)titanium, 9Cl
1,4-Tetramethylenebis(η⁵-cyclopentadienyl)titanium.
1,1-Bis(η⁵-cyclopentadienyl)titanacyclopentane
 [52124-67-1]



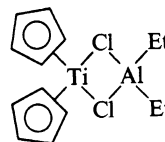
M 234.176
 Orange needles. Dec. > -30°. Relatively stable compared
 with acyclic relatives.
 McDermott, J.X. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 947; 1976, **98**, 6529 (*synth, nmr*)

C₁₄H₁₉OPTi **Ti-00074**
Carbonylbis(η⁵-2,4-cyclopentadien-1-yl)(trimethylphosphine)-
titanium, 10Cl
 [56770-61-7]



M 282.157
 Maroon cryst. (hexane).
 Demerseman, B. *et al*, *J. Organomet. Chem.*, 1975, **93**, 199 (*synth, ir*)

C₁₄H₂₀AlCl₂Ti **Ti-00075**
Di-μ-chlorobis(η⁵-cyclopentadien-1-yl)(diethylaluminum)ti-
tanium, 10Cl
 [39459-00-2]



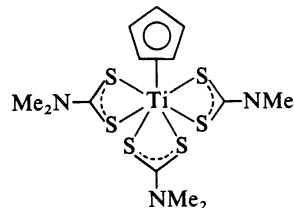
M 334.080
 Catalyses olefin polymerization. Blue cryst. (heptane).
 Mp 80-90°. V. sensitive to O₂.
 Natta, G. *et al*, *J. Am. Chem. Soc.*, 1958, **80**, 755 (*cryst struct*)
 Breslow, D.S. *et al*, *J. Am. Chem. Soc.*, 1959, **81**, 81 (*synth, use*)
 Maki, A.H. *et al*, *J. Am. Chem. Soc.*, 1960, **82**, 4109 (*esr*)
 Henrici-Olivé, G. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1967, **6**, 790 (*esr, synth, rev*)
 Henrici-Olivé, G. *et al*, *J. Organomet. Chem.*, 1969, **17**, 83 (*esr*)
 Bulychov, B.M. *et al*, *Transition Met. Chem.*, 1981, **6**, 32 (*esr, props*)

C₁₄H₂₂N₂Ti **Ti-00076**
Bis(η⁵-cyclopentadienyl)bis(dimethylamido)titanium
Bis(η⁵-2,4-cyclopentadien-1-yl)bis(N-methylmethana-
minato)titanium, 9Cl. Bis(dimethylamido)titanocene
 [12086-52-1]
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-
 00024 with

X = NMe₂

M 266.221
 Air-sensitive brown oil. Bp_{0.2} 120-8°.
 Chandra, G. *et al*, *J. Chem. Soc. (A)*, 1968, 1940 (*synth, ms*)

C₁₄H₂₃N₃S₆Ti **Ti-00077**
(η⁵-2,4-Cyclopentadien-1-yl)tris(dimethylcarbomodithioato-
S,S')titanium, 10Cl
(η-Cyclopentadienyl)tris(N,N-dimethyldithiocarbam-
ato)titanium
 [67891-23-0]

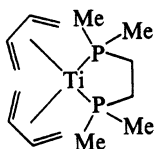


M 473.596
 Orange-yellow cryst. + C₆H₆ (CH₂Cl₂/C₆H₆).
 Steffen, W.L. *et al*, *Inorg. Chem.*, 1978, **17**, 3498 (*cryst struct*)

C₁₄H₂₈P₂Ti

Ti-00078

Bis(η⁴-1,3-butadiene)[1,2-ethanediylbis(dimethylphosphine)-P,P']titanium, 10Cl
[1,2-Bis(dimethylphosphino)ethane]bis(η⁴-1,3-butadiene)titanium
 [75061-57-3]



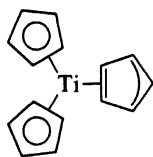
M 306.203

Catalytically dimerizes alkenes. Blue cryst. (hexane).

Datta, S. *et al*, *J. Organomet. Chem.*, 1980, **188**, 353 (*synth*, *ms*, *cmr*, *nmr*)Wreford, S.S. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 458 (*props*)C₁₅H₁₅Ti

Ti-00079

[(1,2-η)-2,4-cyclopentadien-1-yl]bis(η⁵-2,4-cyclopentadien-1-yl)titanium, 9Cl
Tris(η-cyclopentadienyl)titanium
 [52700-41-1]

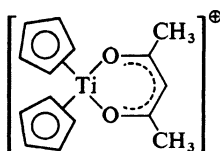


M 243.164

Green cryst. Mp 138-40°. Bp_{0.001} 125° subl. μ_{eff} close to spin-only value.Canty, A.J. *et al*, *Aust. J. Chem.*, 1968, **21**, 807 (*synth*)Siegert, F.W. *et al*, *J. Organomet. Chem.*, 1969, **20**, 141 (*synth*, *ir*, *nmr*)Lucas, C.R. *et al*, *J. Chem. Soc., Chem. Commun.*, 1973, 97 (*cryst struct*)C₁₅H₁₇O₂Ti⁺

Ti-00080

Di-π-cyclopentadienyl(2,4-pentanedionato)titanium(1+)
Acetylacetonatotitanocene



M 277.178 (ion)

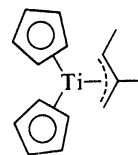
Perchlorate: [12267-13-9].C₁₅H₁₇ClO₆Ti M 376.629

Violet cryst. (MeOH). Other salts also prepd.

Doyle, G. *et al*, *Inorg. Chem.*, 1967, **6**, 1111 (*synth*, *ir*, *nmr*)Doyle, G. *et al*, *Inorg. Chem.*, 1968, **7**, 2484.C₁₅H₁₉Ti

Ti-00081

Bis(η⁵-2,4-cyclopentadien-1-yl)(1,2,3-η)-2-methyl-2-buten-yl)titanium, 10Cl
Bis(cyclopentadienyl)(1,2-dimethylallyl)titanium
 [12111-85-2]

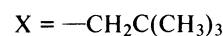


M 247.195

Monomeric in C₆H₆. Sol. org. solvs. Mp 70.5-71° dec. V. sensitive to O₂ and H₂O even as cryst.Helmholdt, R.B. *et al*, *Recl. Trav. Chim. Pays-Bas*, 1967, **86**, 1263 (*ir*, *cryst struct*)Martin, H.A. *et al*, *J. Organomet. Chem.*, 1967, **12**, 149 (*synth*, *uv*)C₁₅H₂₁ClTi

Ti-00082

Chlorobis(η⁵-2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)-titanium
Chlorobis(η-cyclopentadienyl)neopentyltitanium, 8Cl.
Chloro(neopentyl)titanocene
 [11082-41-0]

As Chlorobis(η⁵-2,4-cyclopentadien-1-yl)methyltitanium, Ti-00045 with

M 284.664

Red-brown solid. Mp 95°.

Waters, J.A. *et al*, *J. Organomet. Chem.*, 1970, **22**, 417 (*synth*, *ir*, *nmr*, *uv*)C₁₅H₂₆O₃Ti

Ti-00083

Phenyltris(2-propanolato)titanium, 9Cl
Triisopropoxyphenyltitanium. Phenyltris(isopropoxy)-titanium
 [16635-23-7]



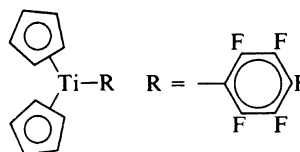
M 302.249

White or pale-yellow cryst. Mp 88-90°.

Herman, D.F. *et al*, *J. Am. Chem. Soc.*, 1952, **74**, 2693; 1953, **75**, 3877 (*synth*)Herman, D.F., *Adv. Chem. Ser.*, 1959, **23**, 265 (*ir*)Holloway, H., *Chem. Ind. (London)*, 1962, 214 (*synth*)Rausch, M.D. *et al*, *J. Organomet. Chem.*, 1974, **74**, 85 (*nmr*)C₁₆H₁₀F₅Ti

Ti-00084

Bis(η⁵-2,4-cyclopentadien-1-yl)pentafluorophenyltitanium, 10Cl
 [39333-59-0]



M 345.127

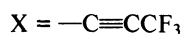
Monomeric. Brown-purple leaflets (pentane). μ_{eff} 1.92 BM (20°). Dec. at 106°.Teuben, J.H. *et al*, *J. Organomet. Chem.*, 1972, **46**, 313 (*synth*, *ir*, *props*)

De Boer, E.J.M. *et al*, *J. Organomet. Chem.*, 1978, **153**, 53; 1979, **166**, 193; **181**, 61 (*props*)

C₁₆H₁₀F₆Ti **Ti-00085**
Bis- π -cyclopentadienylbis(3,3,3-trifluoro-1-propynyl)titanium, 8Cl

Bis(trifluoromethylethynyl)titanocene

As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00024 with



M 364.125

Orange solid. Mp ca. 125° dec. Bp_{0.001} 100° subl.

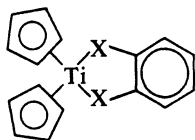
► Explosion hazard on heating

Bruce, M.I. *et al*, *J. Chem. Soc. (A)*, 1968, 356 (*synth, ir, pmr, nmr*)

C₁₆H₁₄O₂Ti **Ti-00086**
[1,2-Benzenediolato(2-)-O,O']bis(η^5 -2,4-cyclopentadien-1-yl)titanium

Di- π -cyclopentadienyl[pyrocatecholato(2-)]titanium, 8Cl

[12308-48-4]



X = O

M 286.165

Monomeric in C₆H₆. Uses claimed in paints, varnishes and related materials. Brown-red cryst. Sol. C₆H₆, toluene, ethers, spar. sol. hexane, MeOH, EtOH. Mp 100-3°.

Andrä, K., *J. Organomet. Chem.*, 1968, **11**, 567 (*synth, ir*)

C₁₆H₁₄S₂Ti **Ti-00087**
[1,2-Benzenedithiolato(2-)-S,S']bis(η^5 -2,4-cyclopentadien-1-yl)titanium, 9Cl

[12155-21-4]

As [1,2-Benzenediolato(2-)-O,O']bis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00086 with

X = S

M 318.287

Monomeric in C₆H₆. Blue-black needles (C₆H₆/propanol). Sol. nonpolar solvs., spar. sol. Et₂O, alcohols. Mp 222-4°.

Köpf, H. *et al*, *J. Organomet. Chem.*, 1965, **4**, 426 (*synth*)
 Kutoglu, A., *Z. Anorg. Allg. Chem.*, 1972, **390**, 195 (*cryst struct*)

C₁₆H₁₅ClTi **Ti-00088**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)phenyltitanium, 9Cl
Chloro(phenyl)titanocene

[12663-63-7]

As Chlorobis(η^5 -2,4-cyclopentadien-1-yl)methyltitanium, Ti-00045 with

X = Ph

M 290.628

Orange platelets (pentane). Mp 121° dec. Can be handled briefly in air, even in soln.

Waters, J.A. *et al*, *J. Organomet. Chem.*, 1970, **21**, 417 (*synth, nmr, uv*)

Waters, J.A. *et al*, *J. Organomet. Chem.*, 1971, **33**, 41.

Rausch, M.D. *et al*, *J. Organomet. Chem.*, 1974, **74**, 85 (*synth, nmr*)

C₁₆H₁₅Ti **Ti-00089**
Bis(η^5 -2,4-cyclopentadien-1-yl)phenyltitanium, 10Cl

[11136-26-8]

As Bis(η^5 -2,4-cyclopentadien-1-yl)pentafluorophenyltitanium, Ti-00084 with

R = Ph

M 255.175

Thermally unstable monomer. Green cryst. (pentane). η_{eff} 1.58 BM (20°). Dec. at 29°.

Teuben, J.H. *et al*, *Recl. Trav. Chim. Pays-Bas*, 1971, **90**, 360 (*synth*)

Teuben, J.H. *et al*, *J. Organomet. Chem.*, 1972, **46**, 313 (*synth, ir, props*)

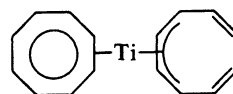
De Boer, E.J.M. *et al*, *J. Organomet. Chem.*, 1978, **15**, 53; 1979, **166**, 193 (*props*)

Middleton, A.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1980, 1888 (*props*)

C₁₆H₁₆Ti **Ti-00090**
Bis(1,3,5,7-cyclooctatetraene)titanium, 9Cl

[η -Cyclooctatetraene(2-)](η^4 -cyclooctatetraene)titanium

[12112-27-5]



M 256.182

Structurally has η^8 - and η^4 -COT ligands but fluxional in soln. Violet-red cryst. (toluene). Spar. sol. aromatic hydrocarbons.

Breil, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1966, **5**, 898 (*synth*)

Dietrich, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1969, **8**, 765 (*cryst struct*)

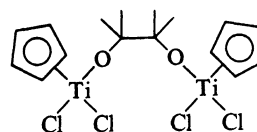
Lehmkuhl, H. *et al*, *J. Organomet. Chem.*, 1970, **25**, C44 (*synth*)

Schwartz, J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1973, 172 (*nmr*)

C₁₆H₂₂Cl₄O₂Ti₂ **Ti-00091**
Tetrachlorobis(η^5 -2,4-cyclopentadien-1-yl)[μ -[2,3-dimethyl-2,3-butanediolato(2-)-O,O']dititanium, 10Cl

1,1,2,2-Tetramethylethanediatobis[dichloro(η -cyclopentadienyl)titanium]

[42178-05-2]



M 483.921

Struct. data indicate some Ti-O multiple bonding. Yellow cryst. (THF/Et₂O). V. spar. sol. C₆H₆.

Coutts, R.S.P. *et al*, *J. Organomet. Chem.*, 1973, **50**, 145 (*synth, ir, uv*)

Huffman, J.C. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 3009 (*cryst struct*)

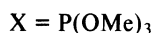
Marsella, J.A. *et al*, *J. Organomet. Chem.*, 1980, **201**, 389
(*synth, ir, nmr*)

C₁₆H₂₈O₆P₂Ti **Ti-00092**

Bis(η⁵-2,4-cyclopentadien-1-yl)bis(trimethylphosphite)titanium, 10Cl

[76083-35-7]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00024 with



M 426.221

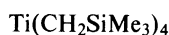
V. air-sensitive and less stable than Zr analogue. Red-brown cryst. (pentane).

Chang, M. *et al*, *J. Organomet. Chem.*, 1980, **199**, C3 (*synth, nmr, ms, props*)

C₁₆H₄₄Si₄Ti **Ti-00093**

Tetrakis(trimethylsilylmethyl)titanium, 9Cl

[33948-28-6]



M 396.746

Olefin polymerisation catalyst. Pale-yellow-green liq. Mp 0-1°. Bp_{0.001} 25°. Thermally robust compared with simple Ti alkyls.

Ballard, D.G.H., *Proc. 23rd IUPAC Congress*, Boston, 1971, **6**, 213 (*use*)

Collier, M.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 445 (*synth, ir, nmr*)

Lappert, M.F. *et al*, *J. Organomet. Chem.*, 1974, **66**, 271 (*pe*)

Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1975, 830.

C₁₇H₁₇Ti **Ti-00094**

Benzylbis(η⁵-cyclopentadienyl)titanium

Bis(η⁵-2,4-cyclopentadien-1-yl)(phenylmethyl)titanium, 10Cl

[39333-72-7]

As Bis(η⁵-2,4-cyclopentadien-1-yl)-pentafluorophenyltitanium, Ti-00084 with



M 269.201

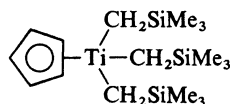
Brown cryst. (Et₂O/dioxan). Dec. >43°.

Teuben, J.H. *et al*, *J. Organomet. Chem.*, 1972, **46**, 313 (*synth, esr, ir*)

C₁₇H₃₈Si₃Ti **Ti-00095**

(η⁵-2,4-Cyclopentadien-1-yl)tris[(trimethylsilyl)methyl]titanium, 9Cl

[54056-33-6]



M 374.624

Yellow cryst. Mp 60-2°.

Chivers, T. *et al*, *J. Organomet. Chem.*, 1974, **77**, 241 (*synth, ir, nmr*)

Green, M.L.H. *et al*, *J. Organomet. Chem.*, 1974, **73**, 259 (*synth, nmr*)

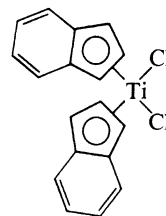
C₁₈H₁₄Cl₂Ti **Ti-00096**

Dichlorobis[(1,2,3,3a,7a-η)-1H-inden-1-yl]titanium, 9Cl

Bisindenyltitanium dichloride.

Dichlorodiindenyltitanium

[12113-02-9]



M 349.095

Dark-brown cryst. Mp 210°.

▷XR2056000.

Marconi, W. *et al*, *Chem. Ind. (London)*, 1962, **44**, 229 (*synth*)

Samuel, E. *et al*, *J. Organomet. Chem.*, 1965, **4**, 156 (*synth, ir*)

Samuel, E., *Bull. Soc. Chim. Fr.*, 1966, 3548 (*ir*)

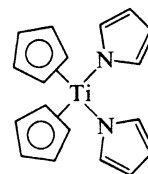
Joseph, P.T. *et al*, *Indian J. Chem.*, 1971, **9**, 175 (*synth*)

C₁₈H₁₈N₂Ti **Ti-00097**

Bis(η⁵-2,4-cyclopentadien-1-yl)di-1H-pyrrol-1-yltitanium, 10Cl

Di(η¹-pyrrolyl)titanocene

[11077-90-0]



M 310.234

Red-brown cryst. Mp 175-7° dec. Cryst. struct. shows pyrrolyl rings to be essentially σ-bonded.

Issleib, K. *et al*, *Z. Anorg. Allg. Chem.*, 1969, **369**, 83 (*synth*)

Tille, D., *Z. Naturforsch., B*, 1970, **25**, 1538 (*ir, nmr*)

Van Bynum, R. *et al*, *Inorg. Chem.*, 1980, **19**, 2368 (*cryst struct*)

C₁₈H₁₉Ti **Ti-00098**

Bis(η⁵-2,4-cyclopentadien-1-yl)(2,6-dimethylphenyl)titanium, 10Cl

[39333-76-1]

As Bis(η⁵-2,4-cyclopentadien-1-yl)pentafluorophenyltitanium, Ti-00084 with



M 283.228

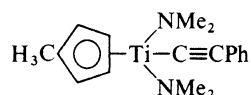
Green cryst. (pentane/Et₂O). Mp 180°. Bp_{0.1} 160° subl. η_{eff} 1.66 BM. V. air-sensitive.

Teuben, J.H. *et al*, *J. Organomet. Chem.*, 1972, **46**, 313 (*synth, ir, props*)

Olthof, G.J. *et al*, *J. Organomet. Chem.*, 1976, **122**, 47 (*cryst struct*)

C₁₈H₂₄N₂Ti **Ti-00099**

Bis(dimethylamido)(η⁵-methylcyclopentadienyl)phenylethynyltitanium



M 316.281

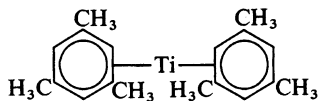
Dark viscous oil.

Jenkins, A.D. *et al*, *J. Organomet. Chem.*, 1970, **23**, 165 (*synth*, *ir*, *ms*, *nmr*)

C₁₈H₂₄Ti

Ti-00100

Bis[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]titanium, 10Cl
Dimesitylenetitanium
 [57347-27-0]



M 288.268

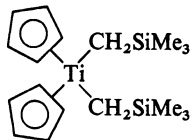
Burgundy-red solid.

Anthony, M.T. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1419 (*synth*, *ir*, *nmr*)

C₁₈H₃₂Si₂Ti

Ti-00101

Bis(η^5 -2,4-cyclopentadien-1-yl)bis[(trimethylsilyl)methyl]titanium, 10Cl
Bis(trimethylsilylmethyl)titanocene
 [11077-96-6]



M 352.502

Orange cryst. Mp 185°. Bp 60-80° subl. *in vacuo*. Also said to dec. without melting.

Yagupsky, G. *et al*, *J. Chem. Soc., Chem. Commun.*, 1970, 1369 (*synth*, *ms*)

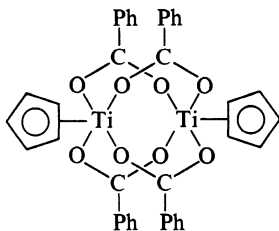
Wozniak, B. *et al*, *J. Chem. Soc. (A)*, 1971, 3116 (*synth*, *nmr*, *ir*)

Collier, M.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 445 (*synth*, *ir*, *ms*, *nmr*)

C₁₉H₁₅O₄Ti

Ti-00102

Bis(μ -benzoato)(η^5 -cyclopentadienyl)titanium



M 355.205

Dimeric.

Dimer: [11088-05-4]. *Tetrakis*[μ -benzoato-O:O']-bis(η^5 -2,4-cyclopentadien-1-yl)dittitanium, 10Cl.

C₃₈H₃₀O₈Ti₂ M 710.410

Diamagnetic but no Ti-Ti bonding (*l* = 363 pm).

Brown cryst. Spar. sol. hexane, THF.

Razuvaev, G.A. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1969, **187**, 340 (*synth*)

Coutts, R.S.P. *et al*, *Aust. J. Chem.*, 1973, **26**, 941 (*synth*, *esr*, *uv*, *ir*)

Tarkhova, T.N. *et al*, *Zh. Strukt. Khim.*, 1976, **17**, 1052 (*cryst struct*)

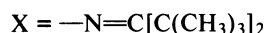
C₁₉H₂₈ClNTi

Ti-00103

(1-*tert*-Butyl-2,2-dimethylpropylideniminato)chlorodi- π -cyclopentadienyltitanium, 8Cl
Chlorobis(η^5 -cyclopentadienyl)di-*tert*-butylketimidotitanium

[11105-88-7]

As Chlorobis(η^5 -2,4-cyclopentadien-1-yl)methyltitanium, Ti-00045 with



M 353.770

Yellow-orange solid.

Collier, M.R. *et al*, *Inorg. Nucl. Chem. Lett.*, 1971, **7**, 689 (*synth*, *ir*, *nmr*, *ms*)

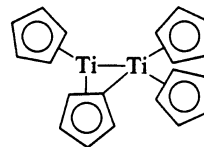
C₂₀H₁₉Ti₂

Ti-00104

μ (η^1 : η^5 -Cyclopentadienyl)tris(η -cyclopentadienyl)dittitanium-(Ti-Ti)

Tris(η^5 -2,4-cyclopentadien-1-yl)[μ -(1- η :1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene)]dittitanium(Ti-Ti), 9Cl

[61529-60-0]



M 355.130

Grey-black solid. Forms cryst. adduct with two moles THF possibly identical with "black titanocene".

▷Pyrophoric

Pez, G.P., *J. Am. Chem. Soc.*, 1976, **98**, 8072 (*synth*, *struct*)

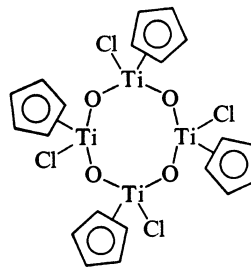
Pez, G.P. *et al*, *Adv. Organomet. Chem.*, 1981, **191** (*rev*)

C₂₀H₂₀Cl₄O₄Ti₄

Ti-00105

Tetrachlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)tetra- μ -oxotitanium, 10Cl

Cyclotetra[μ -oxochloro- η -cyclopentadienyltitanium]
 [12171-57-2]



M 657.708

Yellow cryst. V. spar. sol. org. solvs. Mp 260°. Ring nonplanar. Tetrahydroindenyl and other analogues known.

Monomer:

C₅H₅ClOTi M 164.427

Unknown.

Gorsich, R.D. *et al*, *J. Am. Chem. Soc.*, 1960, **82**, 4211 (*synth*)

Saunders, L. *et al*, *Polymer*, 1965, **6**, 635 (*synth*, *ir*, *struct*)

Skapski, A.C. *et al*, *Acta Crystallogr., Sect. B*, 1970, **26**, 716 (*cryst struct*)

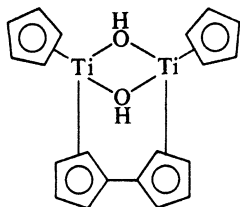
Coutts, R.S.P. *et al*, *Inorg. Nucl. Chem. Lett.*, 1973, **9**, 49 (*ir*, *synth*)

Marsella, J.A. *et al*, *J. Organomet. Chem.*, 1980, **201**, 389 (*nmr*)

C₂₀H₂₀O₂Ti₂

Ti-00106

[μ -(1,2,3,4,5- η :1',2',3',4',5'- η)(Bi-2,4-cyclopentadien-1-yl)-1,1'-diyl]bis(η^5 -2,4-cyclopentadien-1-yl)di- μ -hydroxodititanium, 9Cl
 $\mu(\eta^5:\eta^5$ -Fulvalene)di- μ -hydroxobis(η^5 -cyclopentadienyl)titanium)



M 388.137

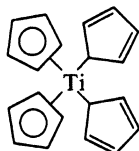
Reddish-purple cryst. (THF). V. oxygen sensitive, stable under inert atm. at r.t.

Guggenberger, L.J. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 4137 (synth, ir, ms, cryst struct)

C₂₀H₂₀Ti

Ti-00107

Di-2,4-cyclopentadien-1-ylbis(η^5 -2,4-cyclopentadien-1-yl)-titanium, 10Cl
 Tetra(cyclopentadienyl)titanium. Bis(η^1 -cyclopentadienyl)bis(η -cyclopentadienyl)titanium
 [63726-15-8]



M 308.258

Fluxional. Shows both ring rotation and $\eta^1:\eta^5$ interchange. Violet-black solid or green-black cryst. Mp 128°. Oxygen-sensitive.

Siebert, F.W. *et al*, *J. Organomet. Chem.*, 1969, **20**, 141 (synth, ir, nmr)

Calderon, J.L. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 3587 (synth, nmr)

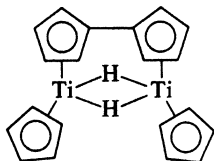
Calderon, J.L. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 3592 (cryst struct)

Lee, J.G. *et al*, *J. Organomet. Chem.*, 1977, **135**, 115 (synth, derivs)

C₂₀H₂₀Ti₂

Ti-00108

$\mu(\eta^5:\eta^5$ -Fulvalene)di- μ -hydridobis(cyclopentadienyl)titanium
 [μ -(1,2,3,4,5- η :1',2',3',4',5'- η)(Bis-2,4-cyclopentadien-1-yl)-1,1'-diyl]bis(η^5 -2,4-cyclopentadien-1-yl)di- μ -hydridodititanium, 9Cl
 [52676-23-0]



M 356.138

Green solid.

Watt, G.W. *et al*, *J. Am. Chem. Soc.*, 1966, **88**, 1138 (synth)

Salzmann, J.J. *et al*, *Helv. Chim. Acta*, 1967, **50**, 1831 (synth)

Brintzinger, H.H. *et al*, *J. Am. Chem. Soc.*, 1970, **92**, 6182 (spectra, struct)

Bercaw, J.E. *et al*, *J. Am. Chem. Soc.*, 1972, **94**, 1219.

Davison, A. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 3017 (cmr, struct)

Guggenberger, L.J. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 4137.

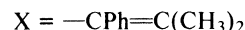
Pez, G.P. *et al*, *Adv. Organomet. Chem.*, 1981, **19**, 1 (rev)

C₂₀H₂₁CITi

Ti-00109

Chlorobis(η^5 -cyclopentadienyl)(2,2-dimethyl-1-phenylethenyl)titanium

As Chlorobis(η^5 -2,4-cyclopentadien-1-yl)methyltitanium, Ti-00045 with



M 344.719

Characterised by full x-ray analysis and spectroscopically. Dark-red cryst.

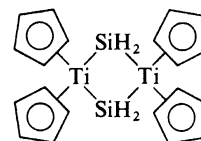
Cardin, D.J. *et al*, unpublished (synth, nmr, ir, cryst struct)

C₂₀H₂₄Si₂Ti₂

Ti-00110

Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -silylenedititanium, 9Cl

Bis[bis(η -cyclopentadienyl)(μ -silylene)titanium]
 [50923-29-0]



M 416.341

Olive-green cryst. Sol. C₆H₆.

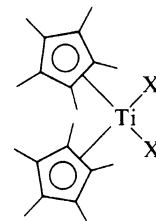
Hencken, G. *et al*, *Chem. Ber.*, 1973, **106**, 1747 (synth, cryst struct)

C₂₀H₃₀Cl₂Ti

Ti-00111

Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, 10Cl

Bis(pentamethylcyclopentadienyl)titanium dichloride. Decamethyltitanocene dichloride
 [11136-36-0]



X = Cl

M 389.243

Red-brown cryst. Mp 273° dec.

Bercaw, J.E. *et al*, *J. Am. Chem. Soc.*, 1972, **94**, 1219 (synth, nmr)

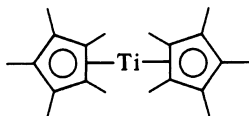
Bercaw, J.E., *J. Am. Chem. Soc.*, 1974, **96**, 5087 (synth, ir)

Harrigan, R.W. *et al*, *J. Organomet. Chem.*, 1974, **81**, 79 (uv)

McKenzie, T.C. *et al*, *J. Organomet. Chem.*, 1975, **102**, 457 (cryst struct)

C₂₀H₃₀Ti**Ti-00112****Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, 10Cl***Decamethyltitanocene. Permethyltitanocene*

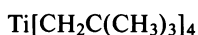
[11136-37-1]



M 318.337

Exists as tautomeric mixt. with H transfer CH₃ → Ti.Monomeric in soln. Orange cryst. Sol. Et₂O, hydrocarbons. μ_{eff} 2.6 BM.Bercaw, J.E. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 2046; 1972, **94**, 1219; 1974, **96**, 5087 (*synth*, *nmr*, *ir*, *props*)**C₂₀H₄₄Ti****Ti-00113****Tetrakis[2,2-dimethylpropyl]titanium***Tetraneopentyltitanium*

[13356-21-3]



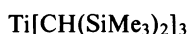
M 332.448

Yellow cryst. Mp ~105° dec. Bp ~50° subl. *in vacuo*.

Photosensitive in soln. Thermally unstable at r.t. over long periods.

Davidson, P.J. *et al*, *J. Organomet. Chem.*, 1973, **57**, 269 (*synth*, *nmr*, *ir*, *raman*)Mowat, W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1120 (*synth*, *nmr*, *ir*)Lappert, M.F. *et al*, *J. Organomet. Chem.*, 1974, **66**, 271 (*pe*)**C₂₁H₅₇Si₆Ti****Ti-00114****Tris[bis(trimethylsilyl)methyl]titanium, 10Cl**

[53668-82-9]

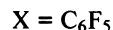


M 526.074

Blue-green cryst. Sol. hydrocarbons. Extremely air- and water-sensitive.

Barker, G.K. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 734 (*synth*, *esr*)**C₂₂H₁₀F₁₀Ti****Ti-00115****Bis(η^5 -2,4-cyclopentadien-1-yl)bis(pentafluorophenyl)titanium, 10Cl***Bis(pentafluorophenyl)titanocene*

[12155-89-4]

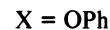
As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00024 with

M 512.185

Orange solid. Mp 228-30°.

Bourn, A.J.R. *et al*, *Proc. Chem. Soc., London*, 1963, 200 (*nmr*)Chaudari, M.A. *et al*, *J. Organomet. Chem.*, 1964, **2**, 206 (*synth*, *ir*, *nmr*)Tamborski, C. *et al*, *J. Organomet. Chem.*, 1965, **4**, 446 (*synth*)Bruce, M.I. *et al*, *Org. Mass Spectrom.*, 1968, **1**, 835 (*ms*)**C₂₂H₂₀O₂Ti****Ti-00116****Bis(η^5 -2,4-cyclopentadien-1-yl)bis(phenolato-*O*)titanium***Bis(η^5 -cyclopentadienyl)diphenoxytitanium*

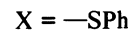
[12246-19-4]

As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00024 with

M 364.279

Monomeric in C₆H₆. Deep-yellow cryst. (C₆H₆). Mp 142°. $E_{1/2} = -1174$ mV.Andr , K., *Z. Chem.*, 1967, **7**, 318 (*synth*)Andr , K., *J. Organomet. Chem.*, 1968, **11**, 567 (*synth*, *ir*, *props*)**C₂₂H₂₀S₂Ti****Ti-00117****Bis(benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)titanium, 10Cl***Bis(η -cyclopentadienyl)bis(thiophenoxy)titanium.**Bis(thiophenoxy)titanocene*

[1292-47-3]

As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00024 with

M 396.400

Deep-red cryst. Mp 199-206°.

K pf, H. *et al*, *Z. Anorg. Allg. Chem.*, 1965, **340**, 139 (*synth*, *ir*, *nmr*)Coutts, R.S.P. *et al*, *Aust. J. Chem.*, 1966, **19**, 1377 (*synth*, *nmr*)Dessy, R.E. *et al*, *J. Am. Chem. Soc.*, 1966, **88**, 5112 (*polarog*)Abel, E.W. *et al*, *J. Organomet. Chem.*, 1968, **14**, 285 (*synth*)Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 2433 (*synth*)Muller, E.G. *et al*, *J. Organomet. Chem.*, 1976, **111**, 73 (*cryst struct*)**C₂₂H₂₀Ti****Ti-00118****Bis(η^5 -cyclopentadien-1-yl)diphenyltitanium, 10Cl***Diphenyltitanocene*

[1273-09-2]

As Ti-00024 with



M 332.280

Orange-yellow cryst. Mp 142-8°.

Summers, L. *et al*, *J. Am. Chem. Soc.*, 1954, **76**, 2278 (*synth*)Beachell, H.C. *et al*, *Inorg. Chem.*, 1965, **4**, 1133 (*synth*, *nmr*)Tel'noi, V.I. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1967, **174**, 1374.Kocman, V. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 1340 (*cryst struct*)Boekel, C.P. *et al*, *J. Organomet. Chem.*, 1974, **81**, 371 (*synth*)Boekel, C.P. *et al*, *J. Organomet. Chem.*, 1975, **102**, 161.**C₂₂H₃₆Ti****Ti-00119****Dimethylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, 9Cl**

[11136-41-7]

As Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, Ti-00111 with

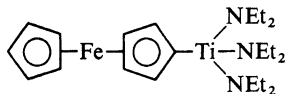
M 348.406

Yellow solid. Thermal stability greatly enhanced over C₅H₅ analogue.

Bercaw, J.E. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 2045 (*synth*, *nmr*)
 Bercaw, J.E. *et al*, *J. Am. Chem. Soc.*, 1972, **94**, 1219 (*synth*, *ms*)
 Pez, G.I. *et al*, *Adv. Organomet. Chem.*, 1981, **19**, 1 (*rev*)

C₂₂H₃₉FeN₃Ti**Ti-00120****Tris(diethylamino)ferrocenyltitanium**

Tris(N-ethylethanaminato)ferrocenyltitanium, ⁹Cl.
 [*Tris*(diethylamino)titanium]ferrocene
 [42993-54-4]

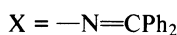


M 449.297
 Dark-red cryst. (Et₂O/pet. ether). Mp 31.5-32.5°.
 Bürger, H. *et al*, *J. Organomet. Chem.*, 1973, **56**, 269 (*synth*, *pmr*, *cmr*, *ir*)

C₂₃H₂₀ClNTi**Ti-00121****Chlorodi- π -cyclopentadienyl(1,1-diphenylmethyleniminato)titanium, ⁸Cl**

Chlorobis(η^5 -cyclopentadienyl)(diphenylketimido)titanium. *Chloro*(diphenylketimido)titanocene
 [11106-00-6]

As *Chlorobis*(η^5 -2,4-cyclopentadien-1-yl)methyltitanium, Ti-00045 with

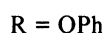


M 393.751
 Yellow-orange solid.
 Collier, M.R. *et al*, *Inorg. Nucl. Chem. Lett.*, 1971, **7**, 689 (*synth*, *ir*, *nmr*, *ms*)

C₂₃H₂₀O₃Ti**Ti-00122****(η^5 -2,4-Cyclopentadien-1-yl)triphenoxytitanium, ⁹Cl**

[12149-47-2]

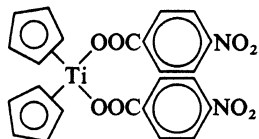
As Tribromo(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00007 with



M 392.289
 Yellow solid. Mp 102-4°.
 Nesmayanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1971, 2354, 2588 (*synth*, *ir*, *pmr*)
 Nesmayanov, A.N. *et al*, *J. Struct. Chem. (Engl. Transl.)*, 1975, **16**, 705 (*cmr*)

C₂₄H₁₈N₂O₈Ti**Ti-00123****Bis(η^5 -2,4-cyclopentadien-1-yl)bis(4-nitrobenzoato-*O'*)titanium, ⁹Cl**

Bis(4-nitrobenzoato)titanocene
 [11082-60-3]



M 510.295
 Orange cryst. Mp 180° dec.
 Razuvaev, G.A. *et al*, *J. Gen. Chem. USSR (Engl. Transl.)*, 1971, **41**, 1560 (*synth*, *ir*)

Kuntsevich, T.S. *et al*, *Kristallografiya*, 1976, **21**, 80 (*cryst struct*)

C₂₄H₂₀Ti**Ti-00124****Tetraphenyltitanium, ⁹Cl**

Titanium tetraphenyl
 [2371-72-4]



M 356.302
 Monomeric in C₆H₆. Yellow cryst. Mp ca. 45° dec.
 Stable when pure in soln., but deteriorates in the solid state. Forms adducts in soln. with *N*-donors.

Boustany, K.S. *et al*, *Helv. Chim. Acta*, 1967, **50**, 1305 (*synth*)
 Jacot-Guillarmod, A. *et al*, *Chimia*, 1969, **23**, 188 (*synth*)
 Tabacchi, R. *et al*, *Chimia*, 1970, **24**, 271 (*derivs*)
 Tabacchi, R. *et al*, *Helv. Chim. Acta*, 1970, **53**, 1971; 1977 (*synth*, *nmr*)

C₂₄H₂₄Ti**Ti-00125****Dibenzylbis(η^5 -2,4-cyclopentadien-1-yl)titanium**

Bis(η^5 -2,4-cyclopentadien-1-yl)*bis*(phenylmethyl)titanium, ¹⁰Cl. *Dibenzyltitanocene*
 [37299-11-9]

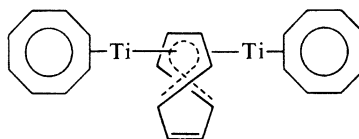
As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00024 with



M 360.334
 Orange-yellow solid. Mp ca. 100° dec.
 Fachinetti, G. *et al*, *J. Chem. Soc., Chem. Commun.*, 1972, 654 (*nmr*)
 Boekel, C.P. *et al*, *J. Organomet. Chem.*, 1975, **102**, 317 (*synth*)
 Clark, R.J.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 120 (*synth*)

C₂₄H₂₄Ti₂**Ti-00126****Tris(1,3,5,7-cyclooctatetraene)dittitanium, ¹⁰Cl**

Bis[η -cyclooctatetraene(2-)]titanium](μ - η^4 , η^4 -cyclooctatetraene)
 [12149-66-5]

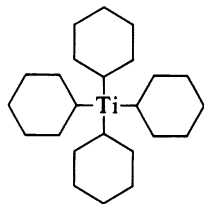


M 408.214
 Extremely air-sensitive yellow cryst. Sl. sol. aromatic solvs. Gives a chain ion with K in THF. Paramagnetic, $\mu = 2.56$ BM.

Breil, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1966, **5**, 898 (*synth*)
 Dietrich, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1966, **5**, 899 (*cryst struct*)
 Kolesnikov, S.P. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 999 (*esr*, *props*, *nmr*)

C₂₄H₄₄Ti**Tetracyclohexyltitanium, 10Cl**

[30169-70-1]



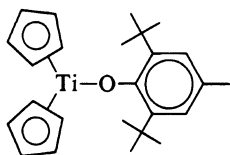
M 380.492

Yellow cryst. (pentane). Stable at –80° for weeks and for days at –50°. Dec. at low temp.

► Inflames in air

Weber, J.B. *et al*, *Helv. Chim. Acta*, 1978, **61**, 2949 (*synth, props*)**C₂₅H₃₃OTi****Ti-00128****Bis(η⁵-cyclopentadienyl)(2,6-di-*tert*-butyl-4-methylphenoxy)-titanium**[2,6-Bis(1,1-dimethylethyl)-4-methylphenolato]bis(η⁵-2,4-cyclopentadien-1-yl)titanium, 10Cl

[74481-90-6]



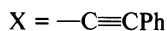
M 397.415

Monomeric, unlike analogues with less bulky groups.

Deep-purple cryst. Mp 167-9°.

Cetinkaya, B. *et al*, *J. Organomet. Chem.*, 1980, **188**, C31 (*synth, cryst struct, ir*)**C₂₆H₂₀Ti****Ti-00129****Bis(η⁵-2,4-cyclopentadien-1-yl)bis(phenylethynyl)titanium, 10Cl***Di(phenylethynyl)titanocene*

[12303-93-4]

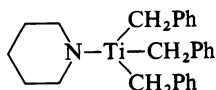
As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00024 with

M 380.324

Orange cryst.

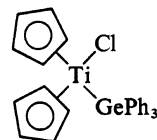
Köpf, H. *et al*, *J. Organomet. Chem.*, 1967, **10**, 383 (*synth, ir, nmr, uv*)Teuben, J.H. *et al*, *J. Organomet. Chem.*, 1969, **17**, 87 (*synth, ir, ms, uv*)Jenkins, A.D. *et al*, *J. Organomet. Chem.*, 1970, **23**, 165 (*ir*)**C₂₆H₃₁NTi****Ti-00130****Tribenzyl(piperidinyl)titanium***Tris(phenylmethyl)-1-piperidinyltitanium, 9Cl*

[59512-63-9]



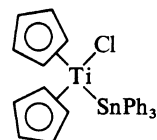
M 405.418

Red solid below 5°. Mp 5°. Dec. at 30°.

Bürger, H., *J. Organomet. Chem.*, 1976, **108**, 69 (*synth, ir, nmr*)**C₂₈H₂₅ClGeTi****Ti-00131****Chlorobis(η⁵-cyclopentadienyl)(triphenylgermyl)titanium, 8Cl***Chloro(triphenylgermyl)titanocene*

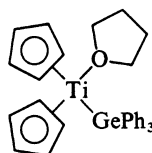
M 517.429

Green solid. Mp 193-6° dec. Unusual colour for Ti(IV) complex.

Coutts, R.S.P. *et al*, *J. Chem. Soc., Chem. Commun.*, 1968, 260 (*synth, nmr*)**C₂₈H₂₅ClSnTi****Ti-00132****Chlorobis(η⁵-cyclopentadienyl)(triphenylstannyl)titanium, 8Cl***Chloro(triphenylstannyl)titanocene*

M 563.529

Green solid. Mp 177-80° dec. Unusual colour for Ti(IV) complex.

Coutts, R.S.P. *et al*, *J. Chem. Soc., Chem. Commun.*, 1968, 260 (*synth, mr*)**C₂₈H₂₅GeTi****Ti-00133****Bis(η⁵-cyclopentadienyl)triphenylgermyltitanium***Di-π-cyclopentadienyl(triphenylgermyl)titanium, 8Cl*

THF complex

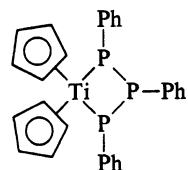
M 481.976

*THF complex:*C₃₂H₃₃GeOTi M 554.082

Green solid. Paramagnetic with 1 unpaired electron.

Coutts, R.S.P. *et al*, *J. Chem. Soc., Chem. Commun.*, 1968, 260 (*synth, ir, nmr*)**C₂₈H₂₅P₃Ti****Ti-00134****Bis(η⁵-2,4-cyclopentadien-1-yl)[1,2,3-triphenyltriphosphinato(2-)-P¹,P³]titanium, 10Cl**

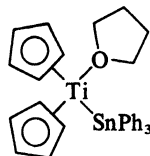
[37299-20-0]



M 502.307

Monomeric in dioxan. Mod. air-stable, dark-violet solid. Mp 243-5°.

Issleib, K. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1972, **11**, 527 (*synth, ms, nmr*)

C₂₈H₂₅SnTi**Ti-00135****Bis(η⁵-cyclopentadienyl)triphenylstannyltitanium***Di-π-cyclopentadienyl(triphenylstannyl)titanium, 8Cl*

THF complex

M 528.076

THF complex:

C₃₂H₃₃SnOTi M 600.182

Green solid. Mp 177-8°. Paramagnetic with 1 unpaired electron.

Coutts, R.S.P. *et al*, *J. Chem. Soc., Chem. Commun.*, 1968, 260 (*synth, ir, nmr*)**C₂₈H₂₈Ti****Ti-00136****Tetrabenzyltitanium***Tetrakis(phenylmethyl)titanium, 9Cl*

[17520-19-3]



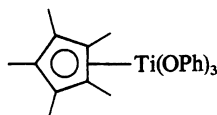
M 412.409

Olefin polymerisation catalyst. Red cryst. (pentane).

Spar. sol. aliphatic hydrocarbons, sol. aromatic hydrocarbons. Mp ca. 70°. Dec. after several hours at 100° in heptane. Nonequiv. Ti—C—Ph angles in solid state.

Giannini, U. *et al*, *J. Chem. Soc., Chem. Commun.*, 1968, 940 (*synth, use, nmr, ir*)Tabacchi, R., *et al*, *Chimia*, 1970, **24**, 221 (*props*)Bassi, I.W. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 3788 (*cryst struct*)Bröser, W. *et al*, *J. Organomet. Chem.*, 1971, **32**, 385 (*ir*)Davies, G.R. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 1511 (*cryst struct*)Jacot-Guillarmod, A. *et al*, *Chimia*, 1974, **28**, 15 (*props*)**C₂₈H₃₀O₃Ti****Ti-00137****[(1,2,3,4,5-η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]triphenoxytitanium, 9Cl**

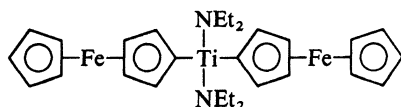
[36523-12-3]



M 462.423

Liq. Bp₁ 214-6°.Nesmayanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1971, 2354, 2588 (*synth, ir, pmr*)Nesmayanov, A.N. *et al*, *J. Struct. Chem. (Engl. Transl.)*, 1975, **16**, 705 (*cmr*)**C₂₈H₃₈Fe₂N₂Ti****Ti-00138****Diferrocenylbis(diethylaminato)titanium***Bis(N-ethylethanaminato)diferrocenyltitanium, 9Cl*

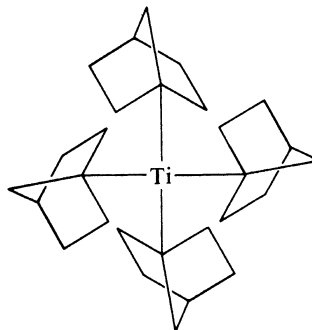
[39470-19-4]



M 562.196

Cherry-red cryst. (Et₂O/pet. ether). Mp 72° dec.Bürger, H. *et al*, *J. Organomet. Chem.*, 1973, **56**, 269 (*synth, pmr, cmr, ir*)**C₂₈H₄₄Ti****Ti-00139****Tetrakis(bicyclo[2.2.1]-hept-1-yl)titanium, 9Cl***Tetrakis(1-norbornyl)titanium*

[36333-76-3]

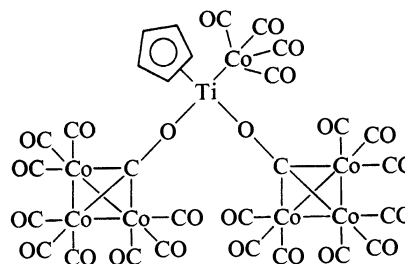


M 428.536

Yellow cryst. Air stable in isooctane soln. No pyridine adducts detected.

Bower, B.K. *et al*, *J. Am. Chem. Soc.*, 1972, **94**, 2512 (*synth, props, ms*)**C₂₉H₅Co₇O₂₄Ti****Ti-00140****(η⁵-2,4-Cyclopentadien-1-yl)[μ₄-[methanolato(4-)-C:C:C:O]](nonacarbonyltricobalt)(tetracarbonylcobalt)titanium, 10Cl***(η-Cyclopentadienyl)bis[μ₃-(oxymethyldiene)cyclotris-(tricarbonylcobalt)](tetracarbonylcobaltio)titanium*

[67421-95-8]



M 1197.757

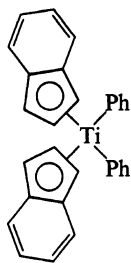
Air-sensitive cryst. Black cryst. (toluene). Spar. sol. aromatic solvs., almost insol. aliphatic hydrocarbons. Mp 125° dec.

Schmid, G. *et al*, *Chem. Ber.*, 1978, **111**, 1239 (*synth, ir, nmr, cryst struct*)

C₃₀H₂₄Ti

Ti-00141

Bis[(1,2,3,3a,7a-η)-1H-inden-1-yl]diphenyltitanium, 9Cl
[49596-07-8]



M 432.400

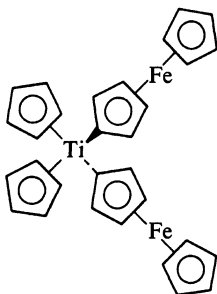
Orange-red air-stable cryst. Mp 105° dec.

Rausch, M.D., *Pure Appl. Chem.*, 1970, **30**, 523 (*synth*, *nmr*)
Samuel, E. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 6263 (*synth*, *nmr*)

C₃₀H₂₈Fe₂Ti

Ti-00142

Bis(η⁵-2,4-cyclopentadien-1-yl)diferrocenyltitanium
Diferrocenyldicyclopentadienyldititanium. Di-π-cyclopentadienyl-di-σ-ferrocenyltitanium
[65274-19-3]



M 548.125

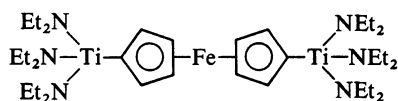
Deep-green cryst. Solns. are air-sensitive.

Razuvaev, G.A. *et al*, *J. Organomet. Chem.*, 1977, **141**, 313 (*synth*)
Osborne, A.G. *et al*, *J. Organomet. Chem.*, 1979, **181**, 425.
Kotz, J.C. *et al*, *Organometallics*, 1983, **2**, 68 (*props*)

C₃₄H₆₈FeN₆Ti₂

Ti-00143

Hexakis(diethylaminato)-μ-1,1'-ferrocenediylidititanium
Hexakis(N-ethylethanaminato)-μ-1,1'-ferrocenediylidititanium, 9Cl. 1,1'-Bis[tris(diethylamino)titanium]-ferrocene
[42920-73-0]



M 712.558

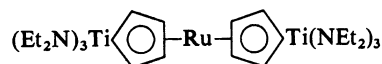
Red-brown, water-sensitive cryst. (Et₂O/pet. ether). Mp 40-50° dec.

Bürger, H. *et al*, *J. Organomet. Chem.*, 1973, **56**, 269 (*synth*, *pmr*, *cmr*, *ir*)
Thewalt, U. *et al*, *Z. Naturforsch. B*, 1975, **30**, 636 (*struct*)
Bürger, H. *et al*, *Z. Anorg. Allg. Chem.*, 1976, **423**, 112 (*pmr*, *cmr*)

C₃₄H₆₈N₆RuTi₂

Ti-00144

Hexakis(diethylaminato)-μ-1,1'-ruthenocenediylidititanium
Hexakis(N-ethylethanaminato)-μ-1,1'-ruthenocenediylidititanium, 9Cl. 1,1'-Bis[tris(diethylamino)titanium]-ruthenocene
[60898-12-6]



M 757.781

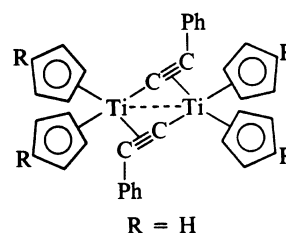
Yellow cryst. (Et₂O). Mp 90° dec.

Bürger, H. *et al*, *Z. Anorg. Allg. Chem.*, 1976, **423**, 112 (*synth*, *pmr*, *cmr*)

C₃₆H₃₀Ti₂

Ti-00145

Tetra-π-cyclopentadienylbis(phenylethynyl)ditanium, 8Cl



M 558.393

Dark-green cryst. Mp >200°.

Monomer: Bis(η⁵-2,4-cyclopentadien-1-yl)-(phenylethynyl)titanium.

C₁₈H₁₅Ti M 279.197

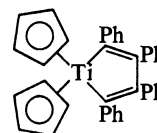
Unknown.

Teuben, J.H. *et al*, *J. Organomet. Chem.*, 1969, **17**, 87 (*synth*, *ir*, *uv*, *ms*)

C₃₈H₃₀Ti

Ti-00146

Bis(η⁵-2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)titanium, 10Cl
Bis(η⁵-cyclopentadienyl)-2,3,4,5-tetraphenyltitanole. Bis(η⁵-cyclopentadienyl)-2,3,4,5-tetraphenyltitanacyclopentadiene
[1317-21-1]



M 534.535

Accessible by a variety of routes. Green cryst., air-stable as solid. Mp 157-9° (150°).

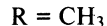
Vol'pin, M.E. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1963, **151**, 1100 (*synth*)
Sonogashira, K. *et al*, *Bull. Chem. Soc. Jpn.*, 1966, **39**, 1178 (*synth*, *ir*, *nmr*, *uv*)
Siegert, F.W. *et al*, *Recl. Trav. Chim. Pays-Bas*, 1970, **89**, 764 (*synth*, *ir*, *nmr*, *uv*)
Watt, G.W. *et al*, *J. Am. Chem. Soc.*, 1970, **92**, 826 (*synth*)
Atwood, J.L. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 2454 (*cryst struct*)

C₄₀H₃₈Ti₂

Ti-00147

[μ-(1,4-Diphenyl-1,3-butadiene-1,2,3,4-tetrayl-C¹, C³: C², C⁴)]tetrakis[(1,2,3,4,5-η)-1-methyl-2,4-cyclopentadien-1-yl]ditanium, 10Cl
Bis[bis(η⁵-methylcyclopentadienyl)titanium](μ-η²:η²-1,4-diphenyl-1,3-butadiene)

[59645-02-2]

As Tetra- π -cyclopentadienylbis(phenylethynyl)ditanium, Ti-00145 with

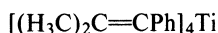
M 614.500

Green cryst. Sol. toluene, spar. sol. other common solvs.

Sekutowski, D.G. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 1376
(*synth*, *cryst struct*, *ir*, *ms*)C₄₀H₄₄Ti

Ti-00148

Tetrakis(2-methyl-1-phenyl-1-propenyl)titanium, 10Cl

Tetrakis(2,2-dimethyl-1-phenylethenyl)titanium
[63422-29-7]

M 572.668

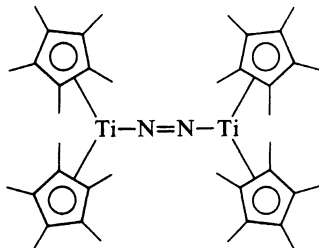
Yellow solid. Mp > -20° dec. Unstable above -20°.

Cardin, C.J. *et al*, *J. Organomet. Chem.*, 1977, **132**, C23 (*synth*, *nmr*)C₄₀H₆₀N₂Ti₂

Ti-00149

[η -(Dinitrogen-*N,N'*)]tetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dititanium, 10ClBis[bis(η^5 -pentamethylcyclopentadienyl)titanium]- μ - $\eta^1, \eta^{1'}$ -dinitrogen

[11136-46-2]



M 664.687

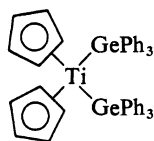
Blue-black cryst. Below -42° coordinates 2 further moles of N₂ end-on, one on each Ti atom.Sanner, R.D. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 8358 (*synth*, *cryst struct*, *props*)Bercaw, J., *Kinet. Katal*, 1977, **18**, 549 (*synth*, *cryst struct*, *props*)C₄₆H₄₀Ge₂Ti

Ti-00150

Bis(η^5 -2,4-cyclopentadien-1-yl)bis(triphenylgermyl)titanium, 9Cl

Bis(triphenylgermyl)titanocene

[39330-96-6]

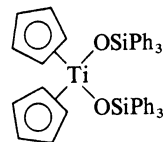


M 785.882

Burgundy solid. Mp 171-3°.

Coutts, R.S.P. *et al*, *J. Chem. Soc., Chem. Commun.*, 1968, 260
(*synth*, *nmr*)Razuvaev, G.A. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1972, 1605 (*synth*)C₄₆H₄₀O₂Si₂Ti

Ti-00151

Bis(η^5 -2,4-cyclopentadien-1-yl)bis(triphenylsilyloxy)titanium
Di- π -cyclopentadienylbis(triphenylsilanolato)titanium, 8Cl

M 728.872

Bright-yellow cryst. (ligroin). Sol. most org. solvs., insol.

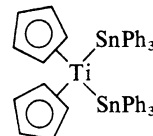
MeOH. Mp 199-200°, 210°. Air-stable but dec. by acid or alkali.

Noltes, J.G. *et al*, *Recl. Trav. Chim. Pays-Bas*, 1962, **81**, 39
(*synth*, *ir*)U.S.P., 3 030 394, (1962); *CA*, **57**, 3589 (*synth*)Takiguchi, T. *et al*, *Bull. Chem. Soc. Jpn.*, 1968, **41**, 2810
(*synth*, *struct*)C₄₆H₄₀Sn₂Ti

Ti-00152

Bis(η -cyclopentadienyl)bis(triphenylstannyl)titanium, 8Cl

Bis(triphenylstannyl)titanocene



M 878.082

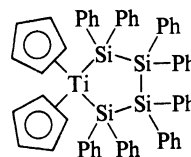
Green solid. Mp 80° dec.

Coutts, R.S.P. *et al*, *J. Chem. Soc., Chem. Commun.*, 1968, 260
(*synth*, *nmr*)C₅₈H₅₀Si₄Ti

Ti-00153

Bis(η^5 -2,4-cyclopentadien-1-yl)(1,1,2,2,3,3,4,4-octaphenyl-1,4-tetrasilanediy)l)titanium, 10ClBis(η^5 -cyclopentadienyl)cyclo(1,1,2,2,3,3,4,4-octaphenyltetrasilicon-1,4-diyl)titanium

[71776-21-1]



M 907.255

Monomeric in C₆H₆. Small green cryst. (Me₂CO/pet. ether). Sol. aromatics, ethers, hydrocarbons, dec. in CHCl₃. Mp 140° dec. Air-stable solid. Cryst. give powder *in vacuo*.Holtman, M.S. *et al*, *J. Organomet. Chem.*, 1980, **187**, 147
(*synth*, *ir*, *nmr*, *uv*)

Suggestions for new Entries are welcomed. Please write to the Editor, Dictionary of Organometallic Compounds, Chapman and Hall Ltd, 11 New Fetter Lane, London EC4P 4EE

Tm Thulium

S. A. Cotton

Thulium (Fr., Ger.), Tulio (Sp.), Tullio (Ital.), Тулий (Tuulii) (Russ.), ツリウム (Japan.)

Atomic Number. 69

Atomic Weight. 168.9342

Electronic Configuration. [Xe] $4f^{13} 6s^2$

Oxidation State. +3

Coordination Number. 6 or greater.

Colour. Green or yellow-green.

Availability. Starting materials are Tm_2O_3 and anhydrous TmCl_3 which are expensive. See also under Lanthanum.

Handling. See under Lanthanum.

Toxicity. See under Lanthanum.

Isotopic Abundance. ^{169}Tm , 100%.

Spectroscopy. ^1H nmr spectra of paramagnetic thulium compounds show large paramagnetic shifts with broad lines. See also under Lanthanum.

Analysis. See under Lanthanum.

References. See under Lanthanum.

C₆H₁₈Tm⁺⁺⁺

Hexamethylthuliate(3–)



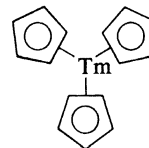
M 259.142 (ion)

Tris[(tetramethylethylenediamine)lithium] salt: [76206-92-3].C₂₄H₆₆Li₃N₆Tm M 628.583White cryst. Sol. Et₂O. Mp 109-14°. Extremely air- and moisture-sensitive.Schumann, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1981, **20**, 120 (*synth*)

Tm-00001

C₁₅H₁₅Tm*Tris*(η⁵-2,4-cyclopentadien-1-yl)thulium*Tricyclopentadienylthulium*

[1272-26-0]

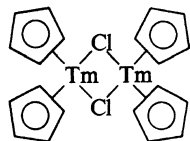


M 364.218

Yellow-green cryst. Sol. THF. Mp 278°. Hydrol. by

H₂O. Subl. at 220° *in vacuo*. μ_{eff} = 7.1 μ_B.*Isocyanocyclohexane complex*: [37299-05-1]. *Tris*(2,4-cyclopentadien-1-yl)isocyanocyclohexanethulium.C₂₂H₂₆NTm M 473.388Sol. C₆H₆. Mp 162°.Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1965, **3**, 181 (*synth*)Pappalardo, R., *J. Mol. Spectrosc.*, 1969, **29**, 13 (*uv*)v. Ammon, R. *et al*, *Inorg. Nucl. Chem. Lett.*, 1969, **5**, 315 (*nmr*)v. Ammon, R. *et al*, *Ber. Bunsenges. Phys. Chem.*, 1972, **76**, 995.Aleksanyan, V.T. *et al*, *J. Raman Spectrosc.*, 1974, **2**, 345 (*raman*)

Tm-00004

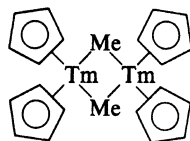
C₁₀H₁₀ClTm*Chlorobis*(η⁵-2,4-cyclopentadien-1-yl)thulium*Chlorodicyclopentadienylthulium. Dicyclopentadienylthulium chloride*

M 334.576

Dimeric.

Dimer: [60482-72-6]. *Di-μ-chlorotetrakis*(η⁵-2,4-cyclopentadien-1-yl)dithulium, 9Cl.C₂₀H₂₀Cl₂Tm M 500.218Yellow-green cryst. Sol. THF. Subl. at 200° *in vacuo*.Holton, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 45 (*synth*)

Tm-00002

C₁₁H₁₃Tm*Bis*(η⁵-2,4-cyclopentadien-1-yl)methylthulium

M 314.158

Dimeric.

Dimer: [70844-68-7]. *Tetrakis*(η⁵-2,4-cyclopentadien-1-yl)di-μ-methyldithulium, 9Cl.C₂₂H₂₆Tm₂ M 628.316Pale-green cryst. Sol. CH₂Cl₂, C₆H₆, toluene. Dec.>160°. Air-sensitive. μ_{eff} = 7.5 μ_B.Holton, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 54 (*synth, ir*)

Tm-00003

U Uranium

S. A. Cotton

Uranium (Fr.), Uran (Ger.), Uranio (Sp., Ital.), Уран (Uran) (Russ.), ウラン (Japan.)

Atomic Number. 92

Atomic Weight. 238.029. Individual samples may vary in atomic weight since commercial materials are always depleted in the fissionable isotope (see below).

Electronic Configuration. [Rn] $5f^3 6d^1 7s^2$

Oxidation States. +3, +4 are the most common.

Coordination Number. Generally 6 or higher with conventional ligands.

Colour. Complexes of U(IV) are usually green or red-brown. The small number of U(III) complexes are brown, green or blue-black.

Availability. The most common starting material is anhydrous UCl_4 which is commercially available and relatively expensive but which may be synthesized from the reaction between U_3O_8 and hexachloropropene. See *Inorg. Synth.*, 1957, **5**, 143; 1974, **15**, 243 and Karraker, D. G. *et al.*, *J. Am. Chem. Soc.*, 1974, **96**, 6885.

Handling. All organouranium compounds and those of other actinides should be assumed to be destroyed by traces of air and/or water, unless specifically stated otherwise and should therefore be handled in an inert atmosphere. In general they are soluble in organic solvents such as THF and may also be soluble in less polar solvents such as toluene. Some compounds are pyrophoric.

Toxicity. Although not as toxic as other actinides, the radioactivity of α -emitting uranium compounds means that they should be treated with respect. The main hazard is oral ingestion.

Isotopic Abundance. Natural uranium consists of ^{235}U , 0.72% ($t_{1/2} = 7 \times 10^8$ y) and ^{238}U , 99.2% ($t_{1/2} = 4.51 \times 10^9$ y) but commercial materials are always depleted in the fissionable ^{235}U .

Spectroscopy. Uranium itself is not commonly used as an nmr probe although nmr parameters have been obtained for UF_6 in solution. Compounds of U(IV) are paramagnetic ($5f^2$) but their ^1H nmr spectra display reasonably sharp resonances with large isotropic shifts. The linewidths in ^1H nmr spectra of U(III) ($5f^3$) are broader than those of U(IV).

Analysis. Microanalytical results for carbon content of or-

ganometallic compounds of uranium and other actinides are frequently low owing to carbide formation.

Analysis for uranium can be carried out by gravimetric or volumetric methods, both first requiring destruction of the compound (eg. by combustion in a furnace) and destruction of any remaining organic material with acid. The hydroxide can be precipitated from solution, ignited, and weighed as U_3O_8 ; alternatively the 8-hydroxyquinoline complex has been used.

Titrimetric methods involve reduction in solution to U^{4+} and titration with Ce^{4+} or $\text{Cr}_2\text{O}_7^{2-}$.

References. In addition to reviews listed in the introduction to the *Sourcebook*, the following provide further reading:

General

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Cotton, S. A., *J. Organomet. Chem. Lib.*, 1977, **3**, 189.

Marks, T. J., *Acc. Chem. Res.*, 1976, **9**, 223.

Bagnall, K. W., *The Actinide Elements*, Elsevier, 1972.

Kannellakopulos, B. and Bagnall, K. W., *MTP*

International Review of Science, Inorganic Chemistry

Series I, Emeléus, H. J. and Bagnall, K. W. Eds,

University Book Press, 1971, **7**, 229.

Organometallics of the f-Elements, Marks, T. J. and Fischer, R. D. Eds, Reidel, Dordrecht, 1979.

Nmr

Von Ammon, R. *et al.*, *Inorg. Nucl. Chem. Lett.*, 1969, **5**, 219.

Marks, T. J. *et al.*, *J. Am. Chem. Soc.*, 1973, **95**, 5529; 1976, **98**, 703.

Fagan, P. J. *et al.*, *J. Am. Chem. Soc.*, 1981, **103**, 6650.

Fagan, P. J. *et al.*, *Organometallics*, 1981, **1**, 170.

Mass spectra

Müller, J., *Chem. Ber.*, 1969, **102**, 52.

Analysis

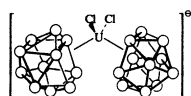
Halstead, G. W. *et al.*, *J. Am. Chem. Soc.*, 1975, **97**, 3050.

Brown, D., *Halides of the Lanthanides and Actinides*, Wiley, 1968.

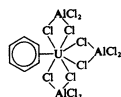
Reynolds, L. T. *et al.*, *J. Inorg. Nucl. Chem.*, 1956, **2**, 246.

Bagnall, K. W. *et al.*, *J. Chem. Soc.*, 1961, 1611.

Bibler, J. P. *et al.*, *Inorg. Chem.*, 1968, **7**, 982.



U-00001



U-00002



U-00003



U-00004



U-00005



U-00006



U-00007



U-00008



U-00009



U-00010



U-00012



U-00013



U-00014



U-00015



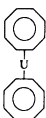
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U-00017



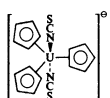
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U-00020



U-00021



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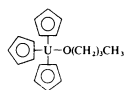
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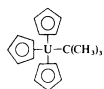
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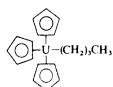
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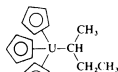
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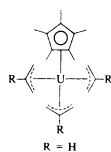
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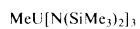
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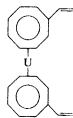
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U-00031



U-00032



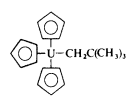
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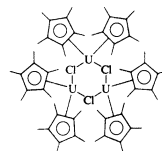
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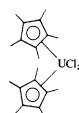
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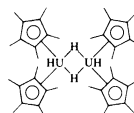
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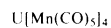
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U-00038



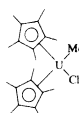
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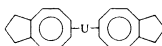
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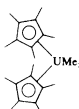
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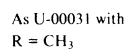
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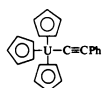
U-00044



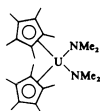
U-00045



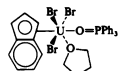
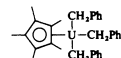
U-00046



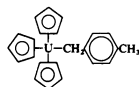
U-00047



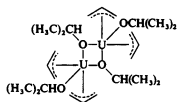
U-00055

THF adduct
U-00063

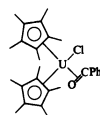
U-00072



U-00048



U-00056



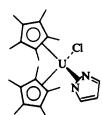
U-00064



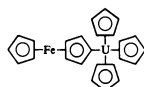
U-00073



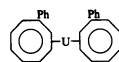
U-00074



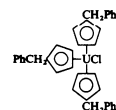
U-00049



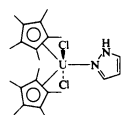
U-00057



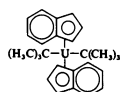
U-00065



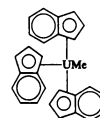
U-00075



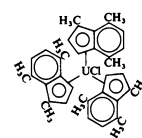
U-00050



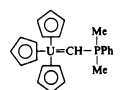
U-00058



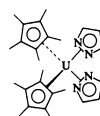
U-00066



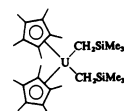
U-00076



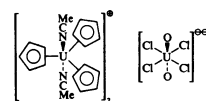
U-00051



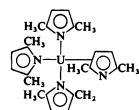
U-00059



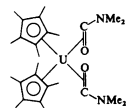
U-00068



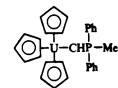
U-00077



U-00052



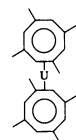
U-00060



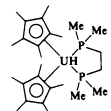
U-00069



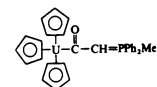
U-00078



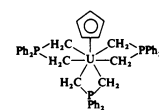
U-00053



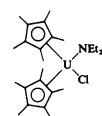
U-00061



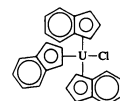
U-00070



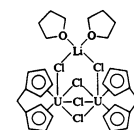
U-00079



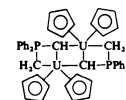
U-00054



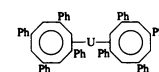
U-00062



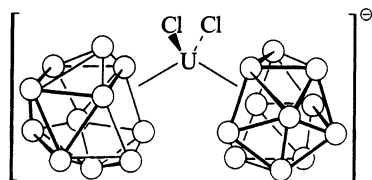
U-00071



U-00080



U-00081

C₄H₂₂B₁₈Cl₂U^{⊖⊖}**U-00001****Dichlorobis[(7,8,9,10,11-η)undecahydro-7,8-dicarbaundecaborato]uranate(2-)**

○ = BH or CH (position of CH's not rigorously established)

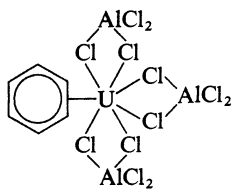
M 573.733 (ion)

Di-Li salt, octa-THF complex: [62559-95-9].C₃₆H₈₆B₁₈Cl₂Li₂O₈U M 1164.468

Yellow-orange cryst. Dec. by air and water.

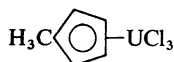
Fronczek, F.R. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 1769 (*synth, uv, cryst struct*)**C₆H₆Al₃Cl₁₂U****U-00002****(Benzene)hexa-μ-chlorohexachlorotrialuminumuranium, 8Cl**
(Benzene)dodecachlorotrialuminumuranium

[34738-51-7]



M 822.523

Black cryst. Insol. common solvs. Immediately dec. by air. Dec. by polar. solvs., e.g. THF. Stable to 110°.

Cesari, M. *et al*, *Inorg. Chim. Acta.*, 1971, **5**, 439 (*synth, struct, ir*)**C₆H₇Cl₃U****U-00003****Trichloro[(1,2,3,4,5-η)-1-methyl-2,4-cyclopentadien-1-yl]uranium**

M 423.509

Bis-THF complex: [67507-18-0].C₁₄H₂₃Cl₃O₂U M 567.722

Bright-green cryst. Air-sensitive.

Ernst, R.D. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 2656 (*synth, struct, ir, nmr*)**C₆H₁₈U^{⊖⊖⊖}****U-00004****Hexamethyluranate(3-)**UMe₆^{⊖⊖⊖}

M 328.237 (ion)

Tri-Li salt: [63816-93-3].C₆H₁₈Li₃U M 349.060

Pale-green solid + 3 dioxan. Sol. THF. Mp 265-8° dec. Air- and moisture-sensitive.

Sigurdson, E.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 812 (*synth, nmr, ir*)**C₉H₁₅BrU****U-00005****Bromotris(η³-2-propenyl)uranium, 9Cl***Tris(π-allyl)uranium bromide. Triallyluranium bromide*

[42801-93-4]



M 441.150

Catalyses stereospecific polymerisation of butadiene.

Lugli, G. *et al*, *Makromol. Chem.*, 1974, **175**, 2021 (*synth*)**C₉H₁₅ClU****U-00006****Chlorotris(η³-2-propenyl)uranium, 9Cl***Tris(π-allyl)uranium chloride. Triallyluranium chloride*

[41556-44-9]



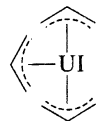
M 396.699

Catalyses stereospecific polymerisation of butadiene.

Dark-violet cryst.

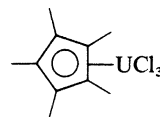
Lugli, G. *et al*, *Makromol. Chem.*, 1974, **175**, 2021 (*synth*)**C₉H₁₅IU****U-00007****Iodotris(η³-2-propenyl)uranium, 9Cl***Triallyliodouranium. Triallyluranium iodide*

[42801-92-3]



M 488.151

Catalyses stereospecific polymerisation of butadiene.

Lugli, G. *et al*, *Makromol. Chem.*, 1974, **175**, 2021.**C₁₀H₁₅Cl₃U****U-00008****[(1,2,3,4,5-η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadienyl]trichlorouranium***Pentamethylcyclopentadienyluranium trichloride*

M 479.616

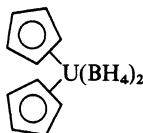
Bis-THF complex: [82511-72-6].C₁₈H₃₁Cl₃O₂U M 623.830

Dark-red needles. Sol. THF, dioxan.

Mintz, E.A. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 4692 (*synth, nmr, ir*)

C₁₀H₁₈B₂U**U-00009**

Bis(η⁵-2,4-cyclopentadien-1-yl)bis[tetrahydroborato(1-)-H,H']uranium, 10Cl
Bis(cyclopentadienyl)uranium bis(tetrahydroborate)
 [65888-45-1]



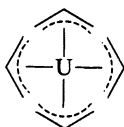
M 397.901

Red-brown solid. Sol. THF, dimethoxyethane. Subl. at 60° *in vacuo*. V. oxygen- and moisture-sensitive.

Zanella, P. *et al*, *J. Organomet. Chem.*, 1977, **142**, C21 (*synth, struct, ir, nmr*)

C₁₂H₂₀U**U-00010**

Tetrakis(η³-2-propenyl)uranium
Tetraallyluranium
 [12701-96-1]



M 402.319

Reacts with alcohols to yield mixed complexes

U(C₃H₅)₂(OR)₂. Reacts with HX to form U(C₃H₅)-

X (X = Cl, Br, I). Dark-red solid. Sol. pentane. Mp -20° dec. Burns spontaneously in air. μ_{eff} = 2.6 μ_B.

Lugli, G. *et al*, *Inorg. Chim. Acta*, 1969, **3**, 253 (*synth, ir*)

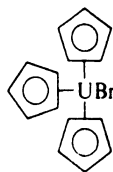
Brunelli, M. *et al*, *J. Magn. Reson.*, 1973, **9**, 247 (*nmr*)

Ger. Pat., 2 257 787, (1973); CA, **79**, 53579

Brunelli, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 861 (*props*)

C₁₅H₁₅BrU**U-00012**

Bromotris(η⁵-2,4-cyclopentadien-1-yl)uranium
Tricyclopentadienyluranium bromide
 [67507-08-8]



M 513.216

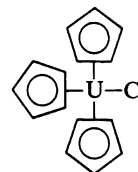
Dark-brown cryst. Sl. sol. pentane, sol. C₆H₆. Subl. at 160° *in vacuo*.

Fischer, R.D. *et al*, *J. Organomet. Chem.*, 1970, **25**, 123 (*synth, uv, ir, nmr*)

Sung-Yu, N.K. *et al*, *Inorg. Chem.*, 1981, **20**, 2727 (*synth, ir, ms, nmr*)

C₁₅H₁₅ClU**U-00013**

Chlorotris(η⁵-2,4-cyclopentadien-1-yl)uranium, 9Cl
Chlorotri-π-cyclopentadienyluranium, 8Cl. Tris(cyclopentadienyl)uranium chloride
 [1284-81-7]



M 468.765

Air-sensitive red-black cryst. Mp 260-5°. Gives green aq. solns.

Reynolds, L.T. *et al*, *J. Inorg. Nucl. Chem.*, 1956, **2**, 246 (*synth*)

Wong, C.-H. *et al*, *Acta Crystallogr.*, 1965, **18**, 340 (*cryst struct*)

Anderson, M.L. *et al*, *J. Organomet. Chem.*, 1969, **17**, 345 (*ir, uv, ms*)

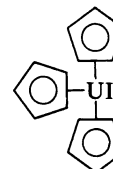
Fischer, R.D. *et al*, *J. Organomet. Chem.*, 1970, **25**, 123 (*pmr*)

Fukushima, E. *et al*, *Chem. Phys. Lett.*, 1976, **44**, 285 (*cmr*)

Inorg. Synth., 1976, **16**, 147 (*synth*)

C₁₅H₁₅IU**U-00014**

Iodotris(η⁵-2,4-cyclopentadien-1-yl)uranium
Tricyclopentadienyluranium iodide
 [69030-40-6]



M 560.217

Brown solid. Sol. C₆H₆. Subl. at 170° *in vacuo*.

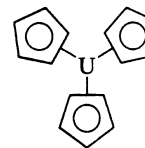
Fischer, R.D. *et al*, *J. Organomet. Chem.*, 1970, **25**, 123.

Aderhold, C. *et al*, *Z. Naturforsch., A*, 1978, **33**, 1268.

Sung-Yu, N.K. *et al*, *Inorg. Chem.*, 1981, **20**, 2727 (*synth, nmr, ms*)

C₁₅H₁₅U**U-00015**

Tris(η⁵-2,4-cyclopentadien-1-yl)uranium, 9Cl
Tricyclopentadienyluranium
 [54007-00-0]



M 433.312

Forms adducts with Lewis bases e.g. THF. Bronze solid.

Sol. THF, Et₂O, sl. sol. C₆H₆. Mp >200°. μ_{eff} = 2.33 μ_B. Subl. at 120-50° *in vacuo*.

Nicotine complex: Tris(η⁵-2,4-cyclopentadienyl)-(nicotine)uranium.

C₂₅H₂₉N₂U M 595.546

Brown. Sl. sol. pentane.

Isocyanocyclohexane complex: Tris(η⁵-2,4-cyclopentadien-1-yl)isocyanocyclohexaneuranium.

C₂₂H₂₆NU M 542.483

Pale-brown solid. Sol. pentane, C₆H₆. μ_{eff} = 2.33 μ_B.

THF complex:

C₁₉H₂₃OU M 505.419

Brown solid (THF/C₆H₆).

Kanellakopulos, B. *et al*, *J. Organomet. Chem.*, 1970, **24**, 507 (synth, ir, uv)

Karraker, D.G. *et al*, *Inorg. Chem.*, 1972, **11**, 1742 (synth)

Zanella, P. *et al*, *Inorg. Chim. Acta.*, 1980, **44**, L155 (synth)

Wasserman, H.J. *et al*, *J. Organomet. Chem.*, 1983, **254**, 305 (cryst struct)

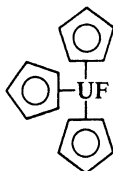
C₁₅H₁₅UF

U-00016

Tris(η⁵-2,4-cyclopentadien-1-yl)fluorouranium, 9Cl

Tricyclopentadienyluranium fluoride

[12715-68-3]



M 452.311

Green cryst. Sol. C₆H₆. Air- and moisture-sensitive. Subl. at 170° in vacuo. μ_{eff} 3.35μ_B.

Fischer, R.D. *et al*, *J. Organomet. Chem.*, 1970, **25**, 123 (synth, ir)

Kanellakopulos, B. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1970, **9**, 957 (ir)

Ryan, R.R. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 4258 (cryst struct)

Aderhold, C. *et al*, *Z. Naturforsch., A*, 1978, **33**, 1268.

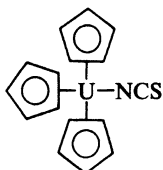
C₁₆H₁₅NSU

U-00017

Tris(η⁵-2,4-cyclopentadien-1-yl)(thiocyanato-*N*)uranium

Tricyclopentadienyluranium thiocyanate

[69526-48-3]



M 491.390

Brown cryst. Sol. most org. solvs. Mp 200° dec.

MeCN adduct: [69377-30-6].

C₁₈H₁₈N₂SU M 532.443

Green cryst. Dec. >90°.

Fischer, R.D. *et al*, *Z. Naturforsch., B*, 1978, **33**, 1393 (synth, ir, uv, struct)

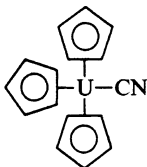
C₁₆H₁₅NU

U-00018

(Cyano-*C*)tris(η⁵-2,4-cyclopentadien-1-yl)uranium

Tris(cyclopentadienyl)cyanouranium

[54006-99-4]



M 459.330

Green solid. Insol. all common org. solvs. Mp >200°.

Involatile, ms. obt. >150°. Dec. above 200° leaving black pyrophoric residue.

Kanellakopulos, B. *et al*, *J. Organomet. Chem.*, 1974, **76**, C42 (synth, ir)

Bagnall, K.W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1982, 1999 (synth, ir, uv, ms)

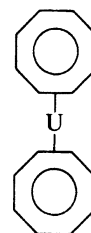
C₁₆H₁₆U

U-00019

Uranocene

Bis(η⁸-1,3,5,7-cyclooctatetraene)uranium, 9Cl. Di-π-cyclooctatrienyleneuranium, 8Cl

[11079-26-8]



M 446.331

Green plates. Flammable in air but stable to H₂O. Subl. at 180°/0.03mm.

Streitwieser, A. *et al*, *J. Am. Chem. Soc.*, 1968, **90**, 7364 (synth)

Zalkin, A. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 5667 (struct)

Hocks, L. *et al*, *Spectrochim. Acta, Part. A*, 1974, **30**, 904 (ir)

Inorg. Synth., 1978, **19**, 149 (synth)

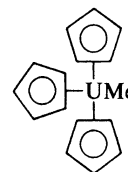
C₁₆H₁₈U

U-00020

Tris(η⁵-2,4-cyclopentadien-1-yl)methyluranium, 9Cl

Tricyclopentadienylmethyluranium

[37205-28-0]



M 448.347

Pale-yellow powder. Sol. C₆H₆, THF, Et₂O. Pyrophoric in air.

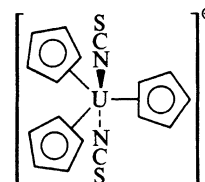
Brandi, G. *et al*, *Inorg. Chem. Acta.*, 1973, **7**, 319 (synth, ir, nmr)

Marks, T.J. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 5529 (synth, ir, nmr)

C₁₇H₁₅N₂S₂U[⊖]

U-00021

Tris(η⁵-cyclopentadienyl)diisothiocyanatouranate(IV)



M 549.468 (ion)

Tetraphenylarsonium salt:

C₄₁H₃₅AsN₂S₂U M 932.811

Bright-green cryst. (MeCN). Sol. MeCN, THF.

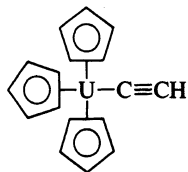
Bagnall, K.W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1982, 1999 (synth, ir, uv, nmr)

Borubieri, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1983, 45 (cryst struct)

C₁₇H₁₆U

U-00022

Tris(η⁵-2,4-cyclopentadien-1-yl)ethynyluranium, 9Cl
 Tricyclopentadienyluranium acetylide
 [52827-35-7]



M 458.342

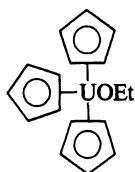
Yellow-green solid. Sol. THF, toluene. Sensitive to oxygen and moisture.

Tsutsui, M. *et al*, *Inorg. Chem.*, 1975, **14**, 78 (*synth, ir, nmr*)
 Atwood, J.L. *et al*, *J. Coord. Chem.*, 1976, **5**, 209 (*struct*)

C₁₇H₂₀OU

U-00023

Ethoxytris(η⁵-2,4-cyclopentadien-1-yl)uranium
 [63415-86-1]



M 478.373

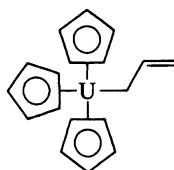
Can be synthesized by reaction of (C₅H₅)₃UCl with Li-BHET₃. Exchanges alkyl groups with AlR₃. Green cryst. Sol. THF, C₆H₆, sl. sol. pentane. Mp 210-3°.

v. Ammon, R. *et al*, *Radiochim. Acta.*, 1969, **11**, 162 (*synth, nmr, uv*)
 Marques-Ellis, H. *et al*, *J. Organomet. Chem.*, 1977, **131**, 257 (*synth, nmr*)
 Vasil'ev, V.K., *J. Organomet. Chem.*, 1977, **142**, C7.

C₁₈H₂₀U

U-00024

Tris(η⁵-2,4-cyclopentadien-1-yl)-2-propenyluranium, 9Cl
 Tricyclopentadienylallyluranium. Allyltricyclopentadienyluranium
 [37298-76-3]



M 474.385

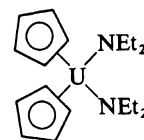
Dark-brown cryst. Sol. toluene. Mp 155° dec. Inflames in air.

Marks, T.J. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 5529 (*synth, ir, nmr*)

C₁₈H₃₀N₂U

U-00025

Bis(η⁵-2,4-cyclopentadien-1-yl)bis(N-ethylethanaminato)-uranium
 Dicyclopentadienylbis(diethylamino)uranium
 [54068-37-0]



M 512.477

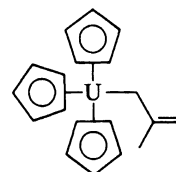
Inserts CO₂, CS₂, COS. Reacts with carboxylic and thiocarboxylic acids. Gold flakes. Sol. hexane. Air- and moisture-sensitive.

Arduini, A.L. *et al*, *Inorg. Chem.*, 1981, **20**, 2470, 2474, 2480 (*synth, nmr, ir, ms, props*)

C₁₉H₂₂U

U-00026

Tris(η⁵-2,4-cyclopentadien-1-yl)(2-methyl-1-propenyl)uranium, 9Cl
 Tricyclopentadienyl-η¹-2-methylallyluranium(I^V)
 [50643-51-1]



M 488.412

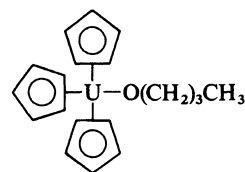
Deep reddish-brown cryst. Sol. toluene. Air-sensitive.

Halstead, G.W. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 3049 (*synth, struct, ir, ms*)

C₁₉H₂₄OU

U-00027

Butoxytris(η⁵-2,4-cyclopentadien-1-yl)uranium
 [1284-95-3]



M 506.427

Green cryst. Sol. dimethoxymethane, cyclohexane, THF, sl. sol. pentane. Mp 149-51°. Extremely air-sensitive. Subl. at 120° *in vacuo*. Liberates butanol quantitatively with HCl. Can be prepared by redox reaction from UCl₃ and C₅H₅Na in THF.

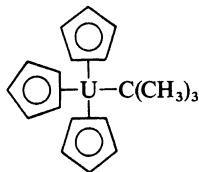
Ter Haar, G.L., *Inorg. Chem.*, 1964, **3**, 1648 (*synth, ir*)
 v. Ammon, R. *et al*, *Radiochim. Acta.*, 1969, **11**, 162 (*synth, nmr, uv*)
 McLaren, A.B., *Inorg. Nucl. Chem. Lett.*, 1980, **16**, 223 (*synth, ms*)

C₁₉H₂₄U

U-00028

tert-Butyltricyclopentadienyluranium

Tris(η⁵-2,4-cyclopentadien-1-yl)(1,1-dimethylethyl)-uranium, 9Cl. Tricyclopentadienyl-tert-butyluranium(IV)
[50647-46-6]



M 490.428

Red solid. Sol. C₆H₆, Et₂O. Pyrophoric in air.

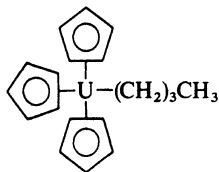
Marks, T.J. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 5529 (*synth*, *ir*, *nmr*)

C₁₉H₂₄U

U-00029

Butyltris(η⁵-2,4-cyclopentadien-1-yl)uranium

Tricyclopentadienyl(butyl)uranium(IV)
[37298-84-3]



M 490.428

Dark-red cryst. Sol. C₆H₆, toluene, Et₂O, hot hexane.

Mp 130° dec. Smokes on exposure to air. μ_{eff} = 3.36μ_B.

Brandi, G. *et al*, *Inorg. Chim. Acta.*, 1973, **7**, 319 (*synth*, *ir*, *nmr*)

Marks, T.J. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 5529 (*synth*, *ir*, *nmr*)

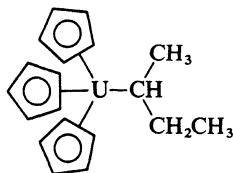
Perego, G. *et al*, *Acta Crystallogr., Sect. B*, 1976, **32**, 3034 (*struct*)

C₁₉H₂₄U

U-00030

Tris(η⁵-2,4-cyclopentadien-1-yl)(1-methylpropyl)uranium

Tricyclopentadienyl(sec-butyl)uranium. sec-Butyltricyclopentadienyluranium
[80410-09-9]



M 490.428

Yields chiefly butane and (C₅H₅)₃U on photolysis. Dark black-green microcryst. Sol. toluene, C₆H₆.

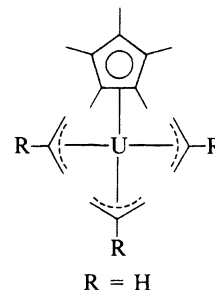
Bruno, J.W. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 1860 (*synth*, *ir*, *nmr*)

C₁₉H₃₀U

U-00031

[(1,2,3,4,5-η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]tris(2-propenyl)uranium

(Pentamethylcyclopentadienyl)tris(allyl)uranium. Tri-allyl(pentamethylcyclopentadienyl)uranium
[84895-69-2]



M 496.475

Dark cryst. Sol. THF, pentane. Slowly dec. at r.t. V. air-sensitive.

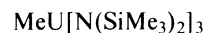
Cymbaluk, T.H. *et al*, *Organometallics*, 1983, **2**, 963 (*synth*, *ir*, *nmr*)

C₁₉H₅₇N₃Si₆U

U-00032

Methyltris[hexamethyldisilyl]amido]uranium

Methyltris[1,1,1-trimethyl-N-(trimethylsilyl)silanamido]uranium
[69517-44-8]



M 734.221

Light-brown needles (pentane). Sol. Et₂O, pentane. Mp 130-2°. Air- and moisture-sensitive.

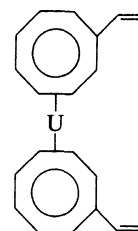
Turner, H.W. *et al*, *Inorg. Chem.*, 1979, **18**, 1221 (*synth*, *ir*, *nmr*)

C₂₀H₂₀U

U-00033

Bis[(1,2,3,4,5,6,7,8-η)-1-ethenyl-1,3,5,7-cyclooctatetraene]uranium, 9Cl

1,1'-Divinyluranocene
[37274-09-2]



M 498.407

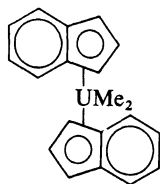
Yields 1,1'-diethyluranocene (94%) on hydrogenation using Pd/C catalyst. Green solid. Sol. cyclohexane. Oxygen- and moisture-sensitive.

Streitwieser, A. *et al*, *Inorg. Chem.*, 1973, **12**, 1102 (*synth*, *uv*, *ms*, *ir*, *nmr*)

C₂₀H₂₀U

U-00034

Bis[(1,2,3,3a,7a-η)-1H-inden-1-yl]dimethyluranium
[63720-03-6]



M 498.407

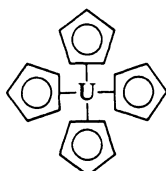
Yellow-brown solid. Sol. THF, toluene. Extremely air- and moisture-sensitive. Pyrophoric in air.

Seyam, A.M. *et al*, *Inorg. Nucl. Chem. Lett.*, 1977, **13**, 115 (synth, ir)

C₂₀H₂₀U

U-00035

Tetrakis(η⁵-2,4-cyclopentadien-1-yl)uranium, 9Cl
[1298-76-6]



M 498.407

Air-sensitive red cryst. (pentane). Dec. at 250° under N₂.

Fischer, E.O. *et al*, *Z. Naturforsch., B*, 1962, **17**, 275 (synth, ir)

Anderson, M.L. *et al*, *J. Organomet. Chem.*, 1969, **17**, 345 (ir, uv, ms)

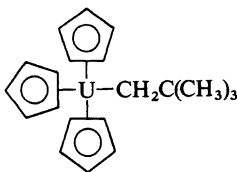
v. Ammon, R. *et al*, *Chem. Phys. Lett.*, 1970, **4**, 553 (pmr)

Burns, J.H. *et al*, *J. Organomet. Chem.*, 1974, **69**, 225 (cryst struct)

C₂₀H₂₆U

U-00036

Tris(η⁵-2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)uranium, 9Cl
Tricyclopentadienylneopentyluranium(IV)
[37298-90-1]



M 504.454

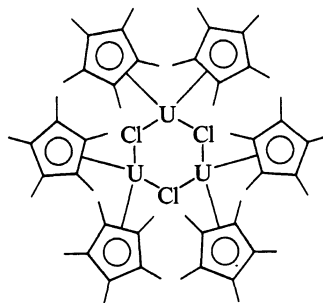
Dark-red cryst. Sol. toluene, Et₂O. Mp 148° dec. Smokes in air.

Marks, T.J. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 5529 (synth, ir, nmr)

C₂₀H₃₀ClU

U-00037

Chlorobis(pentamethylcyclopentadienyl)uranium
[71794-95-1]



M 543.939

Trimeric.

Trimer: Tri-μ-chlorohexakis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]triuranium, 9Cl.

C₆₀H₉₀Cl₃U₃ M 1631.817

Forms adducts with Lewis bases Py, PMe₃, Et₂O, THF. Unusual reactions with unsaturated organic molecules. Forms alkyls, amides, and hydrides. Green cryst. Sol. THF. Air- and moisture-sensitive.

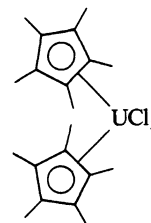
Finke, R.G. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 232 (props)

Fagan, P.J. *et al*, *Organometallics*, 1982, **1**, 170 (synth, struct, ir, nmr)

C₂₀H₃₀Cl₂U

U-00038

Dichlorobis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium
Bis(pentamethylcyclopentadienyl)uranium dichloride
[67506-89-2]



M 579.392

Starting material for a wide range of organouranium compounds. Maroon cryst. Sol. toluene, Et₂O, THF. Air-sensitive.

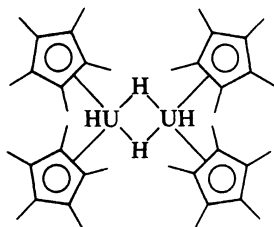
Manriquez, J.M. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 3939 (synth, ir)

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 6650 (synth, ir, pmr)

C₂₀H₃₂U

U-00039

Dihydrobis(pentamethylcyclopentadienyl)uranium
Bis(pentamethylcyclopentadienyl)uranium dihydride



M 510.502

Dimeric, struct. by analogy with
 Dihydrobis(pentamethylcyclopentadienyl)thorium.

Dimer: [67588-76-5]. *Di-μ-hydrodihydrotetrakis*[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]diuranium.

C₄₀H₆₄U₂ M 1021.003

Catalyst for homogeneous hydrogenation of hexene.

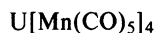
Black-green cryst. Sol. toluene. Sensitive to N₂ and air,
 must be kept under Ar at –20°.

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 6650 (*synth*, *ir*, *nmr*, *use*)

C₂₀Mn₄O₂₀U

U-00040

Tetrakis(pentacarbonylmanganio)uranium, 8Cl
 [31135-22-5]



M 1017.989

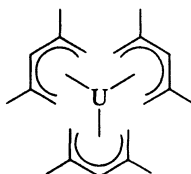
Struct. not yet established. Bright-orange solid. Sol.
 Me₂CO, THF. Mp 180° dec. Extremely air-sensitive;
 air oxidn. affords Mn₂(CO)₁₀, reaction with bromine
 yields UBr₄ + Mn(CO)₅Br. Reacts quickly with cold
 chloroform forming Mn(CO)₅Cl.

Bennett, R.L. *et al*, *J. Organomet. Chem.*, 1971, **26**, 355 (*synth*, *ir*, *ms*)

C₂₁H₂₇U

U-00041

Tris(2,4-dimethylpentadienyl)uranium



M 517.473

Dark cryst. giving red-brown soln. Sol. pentane, THF,
 toluene. μ_{eff} = 2.4 μ_B. Dec. at once by halogenated
 solvs.

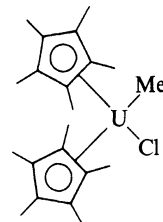
▷Pyrophoric in air

Cymbaluk, T.H. *et al*, *J. Organomet. Chem.*, 1983, **255**, 311
 (*synth*, *ir*, *nmr*)

C₂₁H₃₃ClU

U-00042

**Chloro(methyl)bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-
 2,4-cyclopentadien-1-yl]uranium**
 [67506-91-6]



M 558.974

Yields Chlorobis(pentamethylcyclopentadienyl)uranium,
 U-00037 on hydrogenolysis. Reacts additively with
 carbonyl compds., alcohol. Maroon cryst. Sol. C₆H₆,
 toluene. Air- and moisture-sensitive.

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 6650 (*synth*, *nmr*)

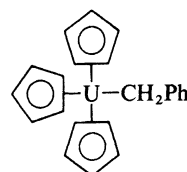
Fagan, P.J. *et al*, *Organometallics*, 1982, **1**, 170.

C₂₂H₂₂U

U-00043

Benzyltricyclopentadienyluranium

Tris(η⁵-2,4-cyclopentadien-1-yl)(phenylmethyl)uranium, 9Cl. *Tricyclopentadienylbenzyluranium*
 [37206-36-3]



M 524.445

Dark-violet needles. Sol. C₆H₆, THF. Mp 200° dec. Air-
 sensitive.

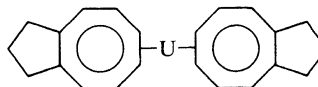
Brandi, G. *et al*, *Inorg. Chim. Acta.*, 1973, **7**, 319 (*synth*, *ir*, *nmr*)

C₂₂H₂₄U

U-00044

Dicyclopentenouranocene

Bis(η⁸-bicyclo[6.3.0]undeca-2,4,6-triene-1,8-diide)uranium
 [80287-59-8]



M 526.461

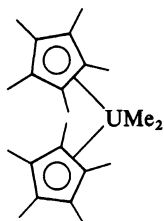
Green cryst. Sol. THF, toluene, dioxan. μ_{eff} = 2.4 μ_B.
 Air-sensitive.

Zalkin, A. *et al*, *Organometallics*, 1982, **1**, 619 (*synth*, *struct*, *ir*, *nmr*, *cmr*)

C₂₂H₃₆U

U-00045

Dimethylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium
[67605-92-9]



M 538.555

When supported on alumina, very active catalyst for hydrogenation of propene and polymerization of ethylene. Inserts CO. U-C bond undergoes hydrogenolysis to form Dihydrobis(pentamethylcyclopentadienyl)uranium, U-00039. Orange needles. Sol. toluene, pentane. V. air-sensitive.

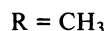
Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 3939 (*synth*)Manriquez, J.M. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7112.Bowman, R.G. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 257.Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 6650 (*synth*, *ir*, *pmr*)C₂₂H₃₆U

U-00046

Tris(2-methyl-1-propenyl)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium
(Pentamethylcyclopentadienyl)tris(2-methylallyl)uranium

[84895-68-1]

As [(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]tris(2-propenyl)uranium, U-00031 with



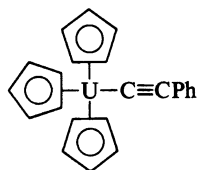
M 538.555

Dark cryst. Sol. THF, pentane, Et₂O. Slowly dec. at r.t. V. air-sensitive.

Cymbaluk, T.H. *et al*, *Organometallics*, 1983, **2**, 963 (*synth*, *ir*, *struct*, *nmr*)C₂₃H₂₀U

U-00047

Tris(η^5 -2,4-cyclopentadien-1-yl)(phenylethynyl)uranium
Tricyclopentadienylphenylethynyluranium(IV)
[39311-60-9]



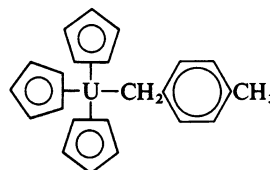
M 534.440

Yellow-green cryst. Sol. hexane, C₆H₆, THF. Mp 183-5° dec. Water- and oxygen-sensitive. $\mu_{\text{eff}} = 2.88\mu_B$.

Gebala, A.E. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 91 (*synth*, *ir*, *nmr*)Atwood, J.L. *et al*, *J. Chem. Soc., Chem. Commun.*, 1973, 453 (*struct*)C₂₃H₂₄U

U-00048

[Tris(η^5 -2,4-cyclopentadien-1-yl)](4-methylphenyl)methyl]uranium, 9Cl
Tricyclopentadienyl-4-methylbenzyluranium
[39448-14-1]

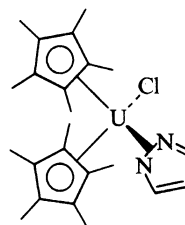


M 538.472

Dark-violet cryst. Sol. C₆H₆, toluene. Air-sensitive.Brandi, G. *et al*, *Inorg. Chim. Acta.*, 1973, **7**, 319 (*synth*, *ir*, *nmr*)Perego, G. *et al*, *Acta Crystallogr., Sect. B*, 1976, **32**, 3034 (*struct*)C₂₃H₃₃ClN₂U

U-00049

Chlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](1H-pyrazolato-*N*¹,*N*²)uranium
[81277-18-1]

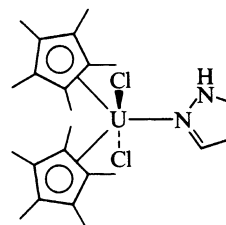


M 611.009

Red-brown cryst. Sol. hexane, toluene, THF. $\mu_{\text{eff}} = 2.42\mu_B$.Eigenbrot, C.W. *et al*, *Inorg. Chem.*, 1982, **21**, 2653 (*synth*, *struct*)C₂₃H₃₄Cl₂N₂U

U-00050

Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](1H-pyrazole-*N*²)uranium
[81277-17-0]

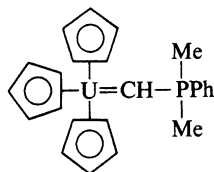


M 647.470

Red-brown cryst. Sol. toluene, THF. $\mu_{\text{eff}} = 3.42\mu_B$.Eigenbrot, C.W. *et al*, *Inorg. Chem.*, 1982, **21**, 2653 (*synth*, *cryst struct*, *ir*, *ms*, *nmr*)

C₂₄H₂₇PU**U-00051****Tris(η^5 -2,4-cyclopentadien-1-yl)(dimethylphenylphosphoranylidenemethyl)uranium**

[77357-85-8]

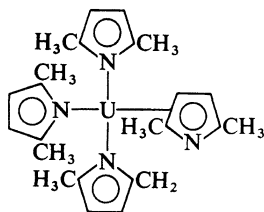


M 584.480

Dark-green cryst. Sol. THF, toluene. Pyrophoric in air.

Cramer, R.E. *et al*, *Inorg. Chem.*, 1981, **20**, 2466 (*synth, struct, ir, uv, nmr*)Cramer, R.E. *et al*, *Organometallics*, 1983, **2**, 1336.**C₂₄H₃₂N₄U****U-00052****[(1,2,3,4,5- η)-2,5-Dimethyl-1H-pyrrol-1-yl]tris(2,5-dimethyl-1H-pyrrol-1-yl)uranium, 9Cl***Tetrakis(2,5-dimethylpyrrolyl)uranium (IV)*

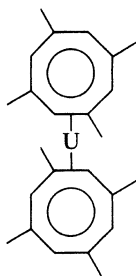
[55224-20-9]



M 614.573

nmr shows nonequivalent dimethylpyrrole moieties. Red-brown microcryst. solid. Sol. THF, Et₂O. Mp 98-102° dec. $\mu_{\text{eff}} = 2.20\mu_{\text{B}}$.Marks, T.J. *et al*, *J. Organomet. Chem.*, 1974, **82**, C35 (*synth, ms, ir, nmr*)**C₂₄H₃₂U****U-00053****Bis[(1,2,3,4,5,6,7,8- η)-1,3,5,7-tetramethyl-1,3,5,7-cyclooctatetraene]uranium, 9Cl***1,1',3,3',5,5',7,7'-Octamethyluranocene*

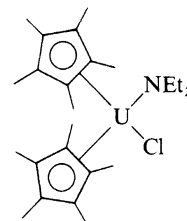
[12715-87-6]



M 558.546

Burgundy-red cryst. Sol. THF. Air- and moisture-sensitive. $\mu_{\text{eff}} = 2.2\mu_{\text{B}}$.Streitwieser, A. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 7343 (*synth, nmr*)Hodgson, K.O. *et al*, *Inorg. Chem.*, 1973, **12**, 458 (*struct*)Streitwieser, A., *Inorg. Chem.*, 1973, **12**, 1102 (*synth, ir, uv, ms, nmr*)Edelstein, N. *et al*, *Inorg. Chem.*, 1976, **15**, 1397.**C₂₄H₄₀CINU****U-00054****Chloro(diethylamino)bis(pentamethylcyclopentadienyl)uranium***Chloro(N-ethylethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium*

[77260-83-4]



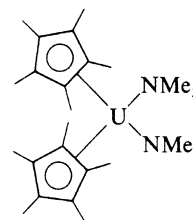
M 616.069

Inserts CO into U-N bond. Dark-red cryst. Sol. toluene.

Air- and moisture-sensitive.

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 2206 (*synth, ir, nmr*)**C₂₄H₄₂N₂U****U-00055****Bis(dimethylamino)bis(pentamethylcyclopentadienyl)uranium***Bis(N-methylmethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium*

[77260-85-6]

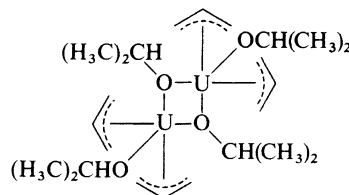


M 596.638

Inserts CO into both U-N bonds at 60° to form

Bis[(dimethylamino)carbonyl-C,O]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U-00060. Orange cryst. Sol. pentane, Et₂O. Air-sensitive.Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 2206 (*synth, ir, nmr*)**C₂₄H₄₈O₄U₂****U-00056****Bis[μ -(2-propanolato)]bis(2-propanolato)tetrakis(η^3 -2-propenyl)diuranium***Di- μ -isopropoxobis[di(η -allyl)isopropoxouranium(IV-)]*

[71427-99-1]



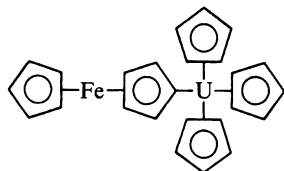
M 876.699

Light-brown cryst. Sol. pentane, Et₂O. Air-sensitive, dec. by moisture. Dec. in a few days at r.t.Brunelli, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 861 (*synth, ir, pmr, struct*)

C₂₅H₂₄FeU

U-00057

Tris(η^5 -2,4-cyclopentadien-1-yl)ferrocenyluranium, 9Cl
[52827-36-8]



M 618.341

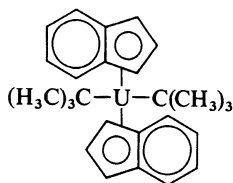
Brown solid (hexane); stable under Ar, but sensitive to O₂ and H₂O. Sl. sol. hydrocarbons. Mp >190° dec. Bp 180° *in vacuo* subl.

Tsutsui, M. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 3650.Tsutsui, M. *et al*, *Inorg. Chem.*, 1975, **14**, 78 (*synth, pmr, ir*)C₂₆H₃₂U

U-00058

Di-*tert*-butyldiindenyluranium

Bis(1,1-dimethylethyl)bis[(1,2,3,3a,7a- η)-1H-inden-1-yl]uranium, 9Cl
[63720-04-7]



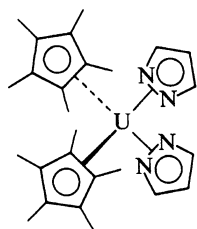
M 582.568

Brown powder. Sol. THF, toluene. Extremely oxygen- and moisture-sensitive. Pyrophoric in air.

Seyam, A.M. *et al*, *Inorg. Nucl. Chem. Lett.*, 1977, **13**, 115 (*synth, ir*)C₂₆H₃₆N₄U

U-00059

Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis(1H-pyrazolato-*N*¹,*N*²)uranium
[81293-74-5]



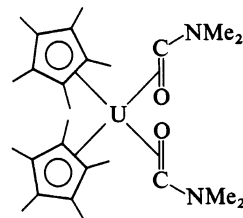
M 642.626

Red-brown cryst. Sol. hexane, THF, toluene.

Eigenbrot, C.W. *et al*, *Inorg. Chem.*, 1982, **21**, 2653 (*synth, cryst struct, ir, ms, pmr*)C₂₆H₄₂N₂O₂U

U-00060

Bis(dimethylamino)carbonyl-*C, O*]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium
[77260-96-9]



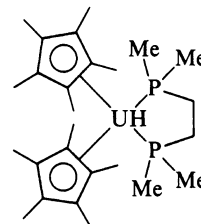
M 652.659

Prepd. by CO insertion of Bis(dimethylamino)bis(pentamethylcyclopentadienyl)uranium, U-00055. Emerald-green prisms. Sol. pentane, toluene. Air-sensitive. Partially decarboxylates at 110°.

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 2206 (*synth, ir, nmr, cryst struct*)C₂₆H₄₇P₂U

U-00061

[1,2-Ethandiylbis(dimethylphosphine)-*P, P'*]hydro-bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium
[80602-96-6]



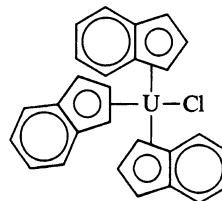
M 659.634

Formed by reaction of Dimethylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U-00045 with H₂ in presence of excess bis(1,2-dimethylphosphino)ethane. Reacts with N₂, THF and CO to yield complex mixt. of prods. Black microcryst. Sol. C₆H₆, toluene. $\mu_{\text{eff}} = 3.47 \mu_B$.

Duttera, M.R. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 865 (*synth, struct, nmr, ir*)C₂₇H₂₁ClU

U-00062

Chlorotris[(1,2,3,3a,7a- η)-1H-inden-1-yl]uranium
Chlorotri- π -indenyluranium, 8Cl. Triindenyluranium chloride
[11082-70-5]



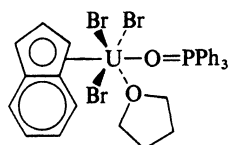
M 618.945

Red-brown cryst. Sol. THF, sl. sol. pentane. Mp 203° dec., >300°. V. reactive to moisture and air. Subl. *in vacuo* at 160°.

Laubereau, P.G. *et al*, *Inorg. Chem.*, 1971, **10**, 2274 (*synth, ir, ms, nmr, uv*)

Burns, J.H. *et al*, *Inorg. Chem.*, 1971, **10**, 2789 (*struct*)
 Fragala, I.L. *et al*, *Inorg. Chem.*, 1983, **22**, 216 (*pe*)

C₂₇H₂₂Br₃OPU **U-00063**
Tribromo[(1,2,3,3*a*,7*a*- η -1*H*-inden-1-yl)(triphenylphosphine oxide-*O*)uranium



THF adduct

M 871.185

THF adduct: [74191-17-6].

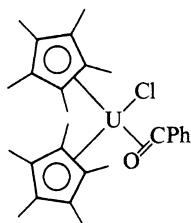
C₃₁H₃₀Br₃O₂PU M 943.291

Red solid. Oxygen- and moisture-sensitive.

Meunier-Piret, J. *et al*, *Bull. Soc. Chim. Belg.*, 1980, **89**, 241 (*struct*)

Goffart, J. *et al*, *Inorg. Nucl. Chem. Lett.*, 1980, **16**, 233 (*synth*, *ms*, *ir*)

C₂₇H₃₅ClOU **U-00064**
(Benzoyl-*C*,*O*)chlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium
 [77841-33-9]

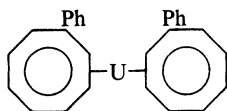


M 649.055

Coordinated PhCO reduced to PhCH₂O by H₂ at 25° using catalyst of Dihydrobis(pentamethylcyclopentadienyl)thorium. Sol. C₆H₆. Air-sensitive.

Maatta, E.A. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 3576.

C₂₈H₂₄U **U-00065**
Bis[(1,2,3,4,5,6,7,8- η)-1-phenyl-1,3,5,7-cyclooctatetraene]uranium
1,1'-Diphenyluranocene
 [37274-13-8]

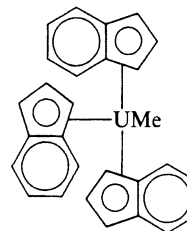


M 598.527

Green solid. Sol. hexane. Stable to air for several minutes.

Streitwieser, A., *et al*, *Inorg. Chem.*, 1973, **12**, 1102 (*synth*, *uv*, *ms*, *ir*, *nmr*)

C₂₈H₂₄U **U-00066**
Tris[(1,2,3,3*a*,7*a*- η -1*H*-inden-1-yl)methyl]uranium, 9Cl
 [63643-55-0]



M 598.527

Red-brown solid. Sol. THF, C₆H₆, sl. sol. pentane. Mp 211-3°. Subl. at 185-90° *in vacuo*. Dec. rapidly in air. Undergoes methanolysis nearly quantitatively to afford (C₉H₇)₃UOMe.

Goffart, J. *et al*, *Inorg. Nucl. Chem. Lett.*, 1977, **13**, 189 (*synth*, *ir*, *ms*, *uv*)

C₂₈H₄₄I₄N₄U **U-00067**
Tetrakis(cyclohexylisocyanide)tetraiodouranium
Tetraiodotetrakis(isocyanocyclohexane)uranium
 [32518-07-3]

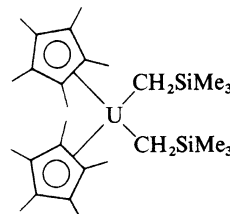
UI₄(CNC₆H₁₁)₄

M 1182.329

Off-white cryst. Sol. C₆H₆, CHCl₃, Me₂CO, MeOH. Extremely sensitive to moisture, gradually dec. at 0°.

Lux, F. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1971, **10**, 274 (*synth*, *ir*)

C₂₈H₅₂Si₂U **U-00068**
Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis[(trimethylsilyl)methyl]uranium
 [68963-85-9]



M 682.919

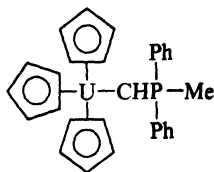
Inserts two CO groups into U-C bonds at 25°. Orange needles. Sol. pentane. Air- and moisture-sensitive.

Manriquez, J.M. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7112 (*props*)

Fagan, P.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 6650 (*synth*, *ir*, *nmr*)

C₂₉H₂₉PU**U-00069**

Tris(η⁵-2,4-cyclopentadien-1-yl)(methyldiphenylphosphoranylidene)methyl)uranium
[77357-86-9]



M 646.551

Dark-green microcryst. Sol. toluene, THF. Inserts CO to give Tris(η⁵-2,4-cyclopentadien-1-yl)[(methyldiphenylphosphoranylidene)acetyl]uranium, U-00070 V. reactive to traces of O₂/H₂O.

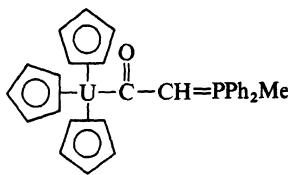
►Inflames in air

Cramer, R.E. *et al*, *Inorg. Chem.*, 1981, **20**, 2466 (*synth, struct, ir, uv*)

Cramer, R.E. *et al*, *Organometallics*, 1982, **1**, 869 (*props*)

C₃₀H₂₉OPU**U-00070**

Tris(η⁵-2,4-cyclopentadien-1-yl)(methyldiphenylphosphoranylidene)acetyl)uranium
[81388-97-8]



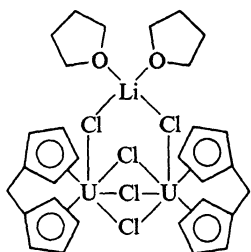
M 674.561

Formed by CO insertion into (C₅H₅)₃U=CHPMePh₂.
Red cryst. Sol. toluene.

Cramer, R.E. *et al*, *Organometallics*, 1982, **1**, 869 (*synth, struct, nmr*)

C₃₀H₃₆Cl₅LiO₂U₂**U-00071**

Di-μ-chlorodi-μ₃-chloro(μ-chlorobis[methylene-bis(η⁵-2,4-cyclopentadien-1-ylidene)])diuraniumbis-(tetrahydrofuran)lithium
[60109-96-8]



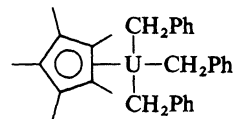
M 1088.877

Dimer cleaved by various reagents including Lewis bases. Readily alkylated. Dark-red cryst. Sol. toluene, hot pentane. Air-sensitive.

Secaur, C.A. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 3713 (*synth, struct, ms, nmr*)

C₃₁H₃₆U**U-00072**

Tribenzyl(pentamethylcyclopentadienyl)uranium
[(1,2,3,4,5-η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]tris(phenylmethyl)uranium. Pentamethylcyclopentadienyltribenzyluranium
[82511-74-8]



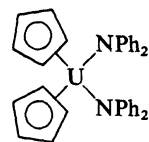
M 646.654

Black cryst. Sol. toluene.

Mintz, E.A. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 4692 (*synth, nmr, cmr*)

C₃₄H₃₀N₂U**U-00073**

Bis(η⁵-2,4-cyclopentadien-1-yl)bis(N-phenylbenzenaminato)-uranium
Dicyclopentadienylbis(diphenylamino)uranium
[77507-88-1]



M 704.653

Dark-red solid. Sol. THF. Air- and moisture-sensitive.

Arduini, A.L. *et al*, *Inorg. Chem.*, 1981, **20**, 2470 (*synth, nmr, ms*)

C₃₆H₃₀U^{⊖⊖}**U-00074****Hexaphenyluranate(2-)**UPh₆^{⊖⊖}

M 700.662 (ion)

Di-Li salt: [63816-92-2].

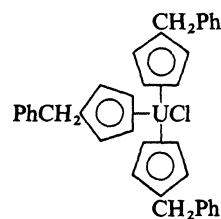
C₃₆H₃₀Li₂U M 714.544

Red solid + 8Et₂O (Et₂O). Dec. >5° in solid state, rapidly in soln. Inflames in air.

Sigurdson, E.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 812 (*synth, nmr, ir*)

C₃₆H₃₃ClU**U-00075**

Chlorotris(benzylcyclopentadienyl)uranium
Chlorotris[(1,2,3,4,5-η)-1-phenylmethyl-2,4-cyclopentadien-1-yl]uranium. Tris(benzylcyclopentadienyl)uranium(IV) chloride
[37325-10-3]



M 739.139

Dark-red cryst. Sol. dimethoxyethane, cyclohexane. Oxygen-stable but water-sensitive.

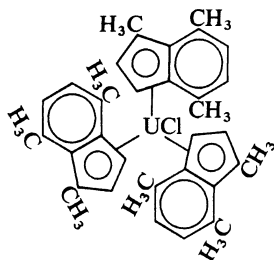
Leong, J. *et al*, *Inorg. Chem.*, 1973, **12**, 1329 (*synth, struct*)

C₃₆H₃₉ClU

U-00076

Chlorotris[(1,2,3,3a,7a-η)-1,4,7-trimethyl-1H-inden-1-yl]uranium*Tris(1,4,7-trimethylindenyl)uranium chloride*

[78599-85-6]

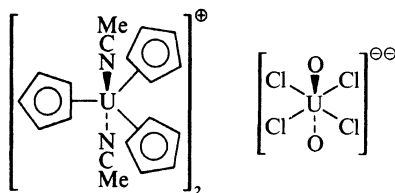


M 745.186

Dark-brown cryst. Sol. THF, sl. sol. pentane. Air- and moisture-sensitive.

Goffart, J. *et al*, *J. Organomet. Chem.*, 1981, **209**, 281 (*synth, struct, ir, ms, uv*)C₃₈H₄₂Cl₄N₄O₂U₃

U-00077

Bis[bis(acetonitrile)tris(η⁵-cyclopentadienyl)uranium(1+)]tetrachlorodioxouranate(2-)

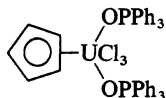
M 1442.674

*Bis(1,3-butadiene) adduct:*C₄₆H₅₄Cl₄N₄O₂U₃ M 1550.857Prepd. by reaction of butadiene with (C₅H₅)₃UCl in MeCN. Dark-green needles.*Cyclopentadiene adduct:*C₄₃H₄₈Cl₄N₄O₂U₃ M 1508.777Formed by reaction of (C₅H₅)₃UCl with lab. grade MeCN over 3-4 months. Green-brown amorph. solid.Bombieri, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1983, 1115 (*synth, cryst struct, ir, nmr*)C₄₁H₃₅Cl₃O₂P₂U

U-00078

Trichloro(η⁵-2,4-cyclopentadien-1-yl)bis(triphenylphosphine oxide-*O*)uranium

[67507-20-4]



M 966.062

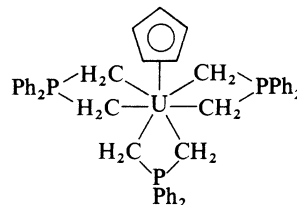
Green cryst. Sol. THF. Air-stable.

Bagnall, K.W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 295 (*synth, ir*)Bombieri, G. *et al*, *Inorg. Nucl. Chem. Lett.*, 1978, **14**, 359 (*struct*)C₄₇H₄₇P₃U

U-00079

(η⁵-2,4-Cyclopentadien-1-yl)tris[(diphenylphosphinidenio)-bis(methylene)]uranium

[77357-87-0]



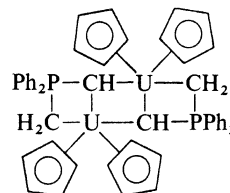
M 942.838

Gold rod-shaped cryst. Sol. Et₂O. Air- and moisture-sensitive.Cramer, R.E. *et al*, *Inorg. Chem.*, 1981, **20**, 2466 (*synth, struct, ir, uv, pmr*)C₄₈H₄₆P₂U₂

U-00080

Tetrakis(η⁵-2,4-cyclopentadien-1-yl)bis[μ-[methylene(diphenylphosphinidenio)methylidene]]diuranium

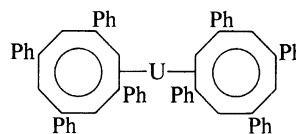
[67771-71-5]



M 1160.897

Deep-red cryst. + 0.5Et₂O. Sol. Et₂O, C₆H₆. Also exists as pentane solvate.Cramer, R.E. *et al*, *Inorg. Chem.*, 1980, **19**, 2565 (*synth, ms, struct*)C₆₄H₄₈U

U-00081

Bis[(1,2,3,4,5,6,7,8-η)-1,3,5,7-tetraphenyl-1,3,5,7-cyclooctatetraene]uranium, 9Cl*1,1',3,3',5,5',7,7'-Octaphenyluranocene*

M 1055.112

Dark-brown cryst. Sl. sol. THF, insol. most solvs.

Bp_{0.00001} 400° subl.Streitwieser, A. *et al*, *J. Organomet. Chem.*, 1975, **97**, C41 (*synth, ms, uv*)Templeton, L.K. *et al*, *Inorg. Chem.*, 1976, **15**, 3000 (*struct*)

V Vanadium

J. A. Labinger

Vanadium (Fr., Ger.), Vanadio (Sp., Ital.), Ванадий (Vanadii) (Russ.), バナジウム (Japan.)

Atomic Number. 23

Atomic Weight. 50.9414(3)

Electronic Configuration. [Ar] $3d^3 4s^2$

Oxidation States. These range from -3 (for $\text{V}(\text{CO})_5^{3-}$) to $+5$. The more common values are -1 to $+4$; relatively few penta-valent organovanadium compounds are known.

Coordination Number. 3–8 for conventional ligands.

Colour. Organovanadium($+IV$) compounds tend to be strongly coloured, from dark brown to blue or black. This is also the case for the other odd-electron states. Colours of compounds of the remaining oxidation states typically range from colourless (fairly rare) through yellow to red or brown.

Availability. Convenient starting materials include VCl_4 (a liquid), VCl_3 and $\text{V}(\text{acac})_3$. Cp_2VCl_2 is commercially available but expensive.

Handling. Vanadium complexes are air-sensitive and require standard inert atmosphere techniques for their manipulation.

Toxicity. Vanadium compounds are not especially toxic although the carbonyls should be considered highly toxic as are those of other metals.

Isotopic Abundance. ^{51}V , 99.76%.

Spectroscopy. ^{51}V ($I = \frac{7}{2}$) has relative sensitivity 0.381, a relatively low quadrupole moment and has therefore been used extensively as an nmr probe, primarily in work by Rehder *et al.* on carbonyl derivatives. Whilst many vanadium compounds are paramagnetic, nmr has still proven useful for these. A large amount of ^1H and ^{13}C nmr spectroscopy has been carried out on substituted vanadocenes and related compounds by Kohler and others.

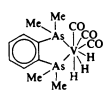
Mass spectroscopy is straightforward since vanadium has essentially only one naturally occurring isotope.

Esr is a very powerful tool, especially for the $+4$ oxidation state which has electronic configuration d^1 and hence is highly suitable. A vast amount of work has been done on compounds of the type Cp_2VX_2 . Esr has also been used to some extent for vanadium compounds of oxidation states 0 and $+2$.

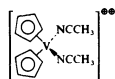
Analysis. Vanadium may be determined volumetrically by conversion to standard oxidation state ($+2$ or $+4$) and redox titration, or colorimetrically as a peroxo complex or heteropoly acid.

References. General reviews are listed in the introduction to the *Sourcebook*.

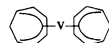
$\text{NH}_3\text{V}(\text{CO})_5^{\ominus}$			As V-00027 with $\text{X} = \text{Me}, \text{Y} = \text{Cl}$
V-00001	V-00018	V-00032	V-00046
			As V-00026 with $\text{X} = \text{Me}$
V-00002	V-00019	V-00033	V-00047
V-00003	V-00020	V-00034	V-00048
	As V-00017 with $\text{R} = \text{Me}$		As V-00027 with $\text{X} = \text{Y} = \text{CN}$
V-00004	V-00021	V-00035	V-00049
As V-00003 with $\text{X} = \text{Cl}$		$[(\text{H}_3\text{C})_3\text{CO}]_2\text{VMe}_2$	
V-00005	V-00022	V-00036	V-00050
V-00006	V-00023	V-00037	V-00051
V-00007	V-00024	V-00038	V-00052
$\text{V}(\text{CO})_5^{\ominus\ominus\ominus}$	V-00025	As V-00027 with $\text{X} = \text{CO}, \text{Y} = \text{I}$	
V-00008	V-00026	V-00039	V-00053
$\text{PhV}(\text{O})\text{Cl}_2$		As V-00026 with $\text{X} = \text{CO}$	
V-00009	V-00027	V-00040	V-00054
			As V-00026 with $\text{X} = \text{Et}$
V-00010	V-00028	V-00041	V-00055
$\text{V}(\text{CO})_2\text{CN}^{\ominus\ominus}$			As V-00027 with $\text{X} = \text{Y} = \text{Me}$
V-00011	V-00029	V-00042	V-00056
$\text{V}(\text{CO})_6^{\ominus}$	As V-00026 with $\text{X} = \text{Cl}$		$\text{OV}(\text{CH}_2\text{SiMe}_3)_3$
V-00012	V-00030	V-00043	V-00057
$\text{V}(\text{CO})_6$	As V-00027 with $\text{X} = \text{Y} = \text{Cl}$		As V-00027 with $\text{X} = \text{Ac}, \text{Y} = \text{CO}$
V-00013	V-00031	V-00044	V-00058
$\text{EtHgV}(\text{CO})_6$	As V-00026 with $\text{X} = \text{I}$		As V-00026 with $\text{X} = -\text{CH}_2\text{CH}=\text{CH}_2$
V-00014	V-00032	V-00045	V-00059
	V-00033		
V-00015	V-00034	V-00060	
	V-00035		
V-00016	V-00036		
	V-00037		
V-00017	V-00038		



V-00061



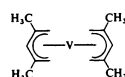
V-00062



V-00063

As V-00027 with
X = Y = Et

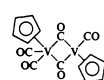
V-00064



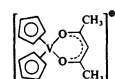
V-00065

EtV(NEt₂)₃

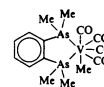
V-00066



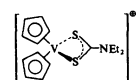
V-00067



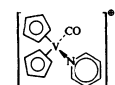
V-00068



V-00069



V-00070



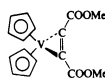
V-00071

As V-00026 with
X = SPh

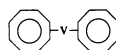
V-00072

As V-00026 with
X = Ph

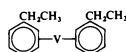
V-00073



V-00074



V-00075



V-00076

V(CH₂SiMe₃)₄

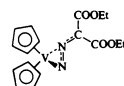
V-00077



V-00078

As V-00026 with
X = CH₂Ph

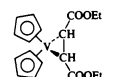
V-00079



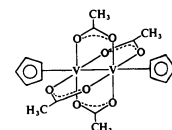
V-00080



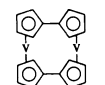
V-00081



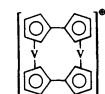
V-00082



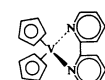
V-00083



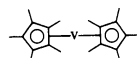
V-00084



V-00085



V-00086



V-00087



V-00088

V[CH(SiMe₃)₂]₃

V-00089



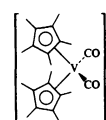
V-00090



V-00091

As V-00027 with
X = Y = SPh

V-00092



V-00093

Ph₃PV(CO)₅⁺

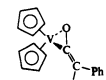
V-00094

(OC)₅VPPPh₃

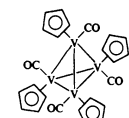
V-00095

Ph₃SnV(CO)₆

V-00096



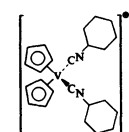
V-00097



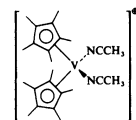
V-00098

As V-00027 with
X = Y = CH₂Ph

V-00099



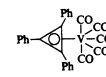
V-00100



V-00101



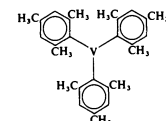
V-00102



V-00103

As V-00019 with
L = PPh₃

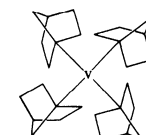
V-00104



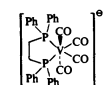
V-00105

V(CH₂Ph)₄

V-00106



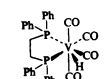
V-00107



V-00108



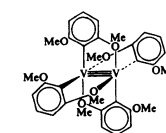
V-00109



V-00110

[Ph₂PCH₂CH₂PPh₂V(CO)₅]⁺

V-00111



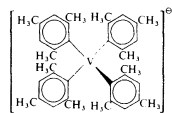
V-00112



V-00113



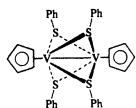
V-00115



V-00117



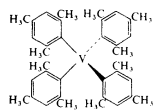
V-00119



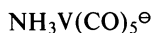
V-00114



V-00116



V-00118

C₅H₃NO₅V[⊖]**V-00001****Amminopentacarbonylvanadate(1-), 9Cl**

M 208.024 (ion)

Na salt: [81831-31-4].

C₅H₃NNaO₅V M 231.014Red-purple soln. in liq. NH₃.

Tetraphenylphosphonium salt: [36580-51-5].

C₂₉H₂₃NO₅PV M 547.420Dark-purple cryst. Insol. Et₂O, alkanes, EtOH, sl. sol. liq. NH₃, v. sol. MeCN, THF when dec. is rapid. Turns black in air after several hrs. Dec. >130°.

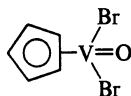
Tetraphenylarsonium salt: [78937-16-3].

C₂₉H₂₃AsNO₅V M 591.368Magenta solid (liq. NH₃). Dec. in solvs. in which it is sol. Air-stable. Dec. >110°.

Bis(triphenylphosphine)iminium salt: [81831-32-5].

C₄₁H₃₃N₂O₅P₂V M 746.611

Dark-purple cryst., unstable at r.t.

Rehder, D., *J. Organomet. Chem.*, 1972, **37**, 303 (*synth, ir, nmr, uv*)Ellis, J.E. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 6100 (*synth*)Ellis, J.E. *et al*, *Organometallics*, 1982, **1**, 898 (*synth*)**C₅H₅Br₂OV****V-00002****Dibromo(η⁵-2,4-cyclopentadien-1-yl)oxovanadium***Cyclopentadienyloxodibromovanadium*

M 291.843

Green-black cryst. Sol. aromatic hydrocarbons, CHCl₃, CCl₄. Air-stable, diamagnetic.Fischer, E.O. *et al*, *Chem. Ber.*, 1960, **93**, 701 (*synth*)B.P., 857 138, (1960); *CA*, **55**, 17538Skachillova, S.Ya. *et al*, *J. Gen. Chem. USSR (Engl. Transl.)*, 1966, **36**, 1073**C₅H₅Br₃V****V-00003****Tribromo(η⁵-2,4-cyclopentadien-1-yl)vanadium, 9Cl***Cyclopentadienyltribromovanadium. Cyclopentadienylvanadium tribromide*

[60530-27-0]

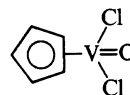


X = Br

M 355.748

Green cryst. (toluene). Sol. aromatic hydrocarbons, CHCl₃, CCl₄. Paramagnetic.Fischer, E.O. *et al*, *Chem. Ber.*, 1960, **93**, 701 (*synth*)**C₅H₅Cl₂OV****V-00004****Dichloro(η⁵-2,4-cyclopentadien-1-yl)oxovanadium, 9Cl***Cyclopentadienyloxodichlorovanadium. Cyclopentadienylvanadium oxydichloride*

[1293-64-7]



M 202.941

Blue-black cryst. (toluene). Sol. aromatic hydrocarbons, CHCl₃, CCl₄. Bp_{0.1} 100° subl. Diamagnetic.Fischer, E.O. *et al*, *Chem. Ber.*, 1960, **93**, 701 (*synth*)de Liefde Meijer, H.J. *et al*, *Recl. Trav. Chim. Pays-Bas*, 1965, **84**, 1418 (*synth, ir*)**C₅H₅Cl₃V****V-00005****Trichloro(η⁵-2,4-cyclopentadien-1-yl)vanadium, 9Cl***Cyclopentadienyltrichlorovanadium. Cyclopentadienylvanadium trichloride*

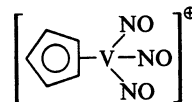
[34767-30-1]

As Tribromo(η⁵-2,4-cyclopentadien-1-yl)vanadium, V-00003 with

X = Cl

M 222.395

Alkene polymerisation catalyst. Violet cryst. (toluene).

Sol. aromatic hydrocarbons, CHCl₃, CCl₄. Bp 130-60° subl. *in vacuo*. Paramagnetic.Fischer, E.O. *et al*, *Chem. Ber.*, 1960, **93**, 701 (*synth*)U.S.P., 3 080 305, (1963); *CA*, **59**, 3957 (*use*)Ger. Pat., 1 959 322, (1971); *CA*, **75**, 88768 (*use*)Thiele, K.-H. *et al*, *Z. Anorg. Allg. Chem.*, 1976, **423**, 231 (*synth*)**C₅H₅N₃O₃V[⊕]****V-00006****Cyclopentadienyltrinitrosylvanadium(1+)**

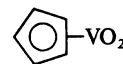
M 206.054 (ion)

Diamagnetic.

Hexafluorophosphate: [69439-84-5].

C₅H₅F₆N₃O₃PV M 351.018Green cryst. (MeNO₂). Sol. MeNO₂. Dec. at 160°.Herberhold, M. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1979, **18**, 220 (*synth, ir, pmr, ms*)**C₅H₅O₂V****V-00007****(η⁵-2,4-Cyclopentadien-1-yl)dioxovanadium, 9Cl**

[57088-86-5]



M 148.035

Latyaeva, V.N. *et al*, *CA*, 1975, **83**, 179261t.**C₅O₅V^{⊖⊖⊖}****V-00008****Pentacarbonylvanadate(3-)**

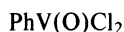
M 190.994 (ion)

Tri-K salt: [78937-14-1].C₅K₃O₅V M 308.288Dark red-brown powder (NH₃). Insol. most solvs., sl. sol. liq. NH₃. Dec. >60°.

▷Pyrophoric. Shock-sensitive, solid deflagrates on scratching

Ellis, J.E. *et al.*, *J. Am. Chem. Soc.*, 1976, **98**, 8264 (*synth*)Ellis, J.E. *et al.*, *J. Am. Chem. Soc.*, 1981, **103**, 6100 (*synth*, *haz*)**C₆H₅Cl₂OV****V-00009****Dichlorooxophenylvanadium***Phenylvanadium oxydichloride*

[28597-01-5]



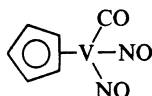
M 214.952

Ethylene polymerisation catalyst. Deep-red cryst. (pentane). Diamagnetic, highly unstable.

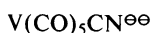
▷Dec. explosively above 10°

Carrick, W.L. *et al.*, *J. Am. Chem. Soc.*, 1960, **82**, 3887 (*use*)Reichle, W.T. *et al.*, *J. Organomet. Chem.*, 1970, **24**, 419 (*synth*)Thiele, K.-H. *et al.*, *Z. Anorg. Allg. Chem.*, 1972, **390**, 280(*synth*, *uv*, *ir*, *haz*)**C₆H₅N₂O₃V****V-00010****Carbonyl(η⁵-2,4-cyclopentadien-1-yl)dinitrosylvanadium***Cyclopentadienylcarbonyldinitrosylvanadium*

[31811-51-5]



M 204.059

Dark-brown powder by subl. Sol. aromatic, aliphatic hydrocarbons, Et₂O. Mp 50°. Bp 40° subl. *in vacuo*. Diamagnetic, light-sensitive.Fischer, E.O. *et al.*, *J. Organomet. Chem.*, 1968, **14**, P4 (*synth*, *ir*, *pmr*, *ms*)Herberhold, M. *et al.*, *Angew. Chem., Int. Ed. Engl.*, 1979, **18**, 220.**C₆NO₅V^{⊖⊖}****V-00011****Pentacarbonyl(cyano-C)vanadate(2-), 9Cl**

M 217.011 (ion)

Bis(tetraphenylphosphonium) salt: [36580-53-7].C₅₄H₄₀NO₅P₂V M 895.803Black cryst. (NH₃). Sol. MeCN, DMF, NH₃.

▷Pyrophoric

Rehder, D., *J. Organomet. Chem.*, 1972, **37**, 303 (*synth*, *ir*, *nmr*, *uv*)**C₆O₆V[⊖]****V-00012****Hexacarbonylvanadate(1-)**

M 219.004 (ion)

Na salt, bis(diglyme) complex: [15531-13-2].C₁₈H₂₈NaO₁₂V M 510.343Yellow solid. Sol. H₂O. Mp 173-6° dec. (under N₂).Werner, R.P.M. *et al.*, *Chem. Ind. (London)*, 1961, 144 (*synth*, *ir*)**C₆O₆V****V-00013****Vanadium hexacarbonyl***Vanadium carbonyl*, 9Cl. *Hexacarbonylvanadium*

[14024-00-1]



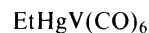
M 219.004

Dark-blue cryst. by vac. subl. Dec. at 60-70°; air-sensitive, paramagnetic with one unpaired electron.

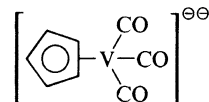
▷Toxic

Ercoli, R. *et al.*, *J. Am. Chem. Soc.*, 1960, **82**, 2966 (*synth*)Werner, R.P.M. *et al.*, *Chem. Ind. (London)*, 1961, 144 (*synth*)Silvestri, G. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1972, 2558(*synth*)Rietz, R.R. *et al.*, *Inorg. Chem.*, 1975, **14**, 2818.Schmidling, D.G., *J. Mol. Struct.*, 1975, **24**, 1 (*struct*)Rubinson, K.A., *J. Am. Chem. Soc.*, 1976, **98**, 5188 (*epr*, *uv*)Sax, N.I., *Dangerous Properties of Industrial Materials*, 5th Ed., Van Nostrand-Reinhold, 1979, 1082.**C₈H₅HgO₆V****V-00014****Hexacarbonyl(ethylmercury)vanadium, 9Cl**

[36571-13-8]



M 448.655

Orange platelets (pentane). Sol. CH₂Cl₂, mod. sol. aliphatic hydrocarbons. Mp 47-8° dec. Subl. at r.t. *in vacuo*, with part. dec.Davison, A. *et al.*, *J. Organomet. Chem.*, 1972, **36**, 113 (*synth*, *ir*)**C₈H₅O₃V^{⊖⊖}****V-00015****Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)vanadate(2-)**

M 200.067 (ion)

Di-Na salt: [68688-11-9].C₈H₅Na₂O₃V M 246.047

Yellow powder + 1 THF (THF). Sol. THF, HMPA.

Fischer, E.O. *et al.*, *Chem. Ber.*, 1970, **103**, 3684 (*synth*)Ellis, J.E. *et al.*, *J. Organomet. Chem.*, 1976, **120**, 389 (*ir*)Kinney, R.J. *et al.*, *J. Am. Chem. Soc.*, 1978, **100**, 7902 (*synth*, *ir*, *pmr*)**C₈H₅O₅V****V-00016****Pentacarbonyl(η³-2-propenyl)vanadium, 9Cl***π-Allylpentacarbonylvanadium*

[53593-70-7]



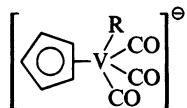
M 232.066

Dark-red needles (Et₂O at -78°). Mp 93° dec. Unstable.Schneider, M. *et al.*, *J. Organomet. Chem.*, 1976, **121**, 345 (*synth*, *spectra*)

C₈H₆O₃V[⊖]

V-00017

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)hydrovanadate(1-)
Cyclopentadienyltricarbonylhydrovanadate(1-)



R = H

M 201.075 (ion)

Diamagnetic.

Tetraethylammonium salt:

C₁₆H₂₆NO₃V M 331.328

Relatively air-stable orange-yellow microcryst. Sl. sol.
THF. Dec. in MeCN over 2 days.

Bis(triphenylphosphine)iminium salt: [68738-02-3].

C₄₄H₃₆NO₃P₂V M 739.662

Yellow solid (THF). Sol. THF, HMPA, insol.
aliphatic hydrocarbons. Mp 201° dec.

Kinney, R.J. *et al*, *J. Am. Chem. Soc.*, 1973, **100**, 635, 7902

(synth, ir, pmr)

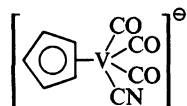
Puttfarcken, U. *et al*, *J. Organomet. Chem.*, 1980, **185**, 219

(synth, ir, nmr, pmr)

C₉H₅NO₃V[⊖]

V-00018

Tricarbonyl(cyano-C(η⁵-2,4-cyclopentadien-1-yl)vana-
date(1-), 9Cl
Cyclopentadienyltricarbonylcyanovanadate(1-)



M 226.085 (ion)

Na salt: [46238-54-4].

C₉H₅NNaO₃V M 249.075Orange-red cryst. (H₂O). Sol. H₂O.

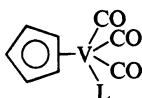
Tetramethylammonium salt:

C₁₃H₁₇N₂O₃V M 300.230Orange-red needles (H₂O). Dec. at 130°.Fischer, E.O. *et al*, *Chem. Ber.*, 1970, **103**, 3684 (synth, ir, pmr)Rehder, D., *Z. Naturforsch., B*, 1976, **31**, 273 (ir, nmr)C₉H₅O₃SV

V-00019

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(thiocarbonyl)vana-
dium

[65892-02-6]



L = CS

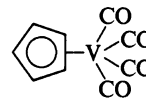
M 244.138

Yellow solid (hexane). Mp 69-72°.

Rajan, S., *Indian J. Chem., Sect. A*, 1977, **15**, 920 (synth, ir)C₉H₅O₄V

V-00020

Tetracarbonyl(η⁵-2,4-cyclopentadien-1-yl)vanadium, 9Cl
Cyclopentadienyltetracarbonylvanadium
[12108-04-2]



M 228.078

Orange cryst. by subl. Mp 139°. Sublimes at 80-100°/
0.5 mm.

Fischer, E.O. *et al*, *Chem. Ber.*, 1960, **93**, 1006 (props)Werner, R.P.M. *et al*, *Inorg. Chem.*, 1964, **3**, 298 (synth, ir)Wilford, J.B. *et al*, *J. Organomet. Chem.*, 1967, **8**, 495 (struct)Durig, J.R. *et al*, *J. Organomet. Chem.*, 1969, **16**, 425 (ir, raman)Rietz, R.R. *et al*, *Inorg. Chem.*, 1975, **14**, 2818.Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1046 (synth)C₉H₈O₃V[⊖]

V-00021

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)methylvanadate(1-)
Cyclopentadienyltricarbonylmethylvanadate(1-)
As Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-
hydrovanadate(1-), V-00017 with

R = Me

M 215.102 (ion)

Diamagnetic.

Bis(triphenylphosphine)iminium salt: [68688-15-3].

C₄₅H₃₈NO₃P₂V M 753.689

Brick-red cryst. (THF). Sol. THF, insol. aliphatic
hydrocarbons, Et₂O. Air-sensitive.

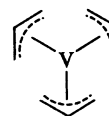
Kinney, R.J. *et al*, *J. Am. Chem. Soc.*, 1973, **100**, 635, 7902

(synth, ir, pmr)

C₉H₁₅V

V-00022

Tris(η³-2-propenyl)vanadium, 9Cl
Triallylvanadium
[12170-02-4]



M 174.159

Highly unstable. Ethylene polymerisation catalyst.

Brown cryst.

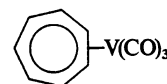
▷ Deflagrates above -30°

Wilke, G. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1966, **5**, 151
(synth)

Ballard, D.G.H. *et al*, *Makromol. Chem.*, 1971, **148**, 175 (use)C₁₀H₇O₃V

V-00023

Tricarbonyl(η⁷-cycloheptatrienyl)vanadium, 9Cl
Tricarbonyl(tropylium)vanadium. Cycloheptatrienyltri-
carbonylvanadium
[12083-16-8]



M 226.105

Dark-green cryst. (hexane). Mp 134-7° dec.

Werner, R.P.M. *et al*, *J. Am. Chem. Soc.*, 1961, **83**, 2023

(*synth*)

Fritz, H.P. *et al*, *Chem. Ber.*, 1964, **97**, 1398 (*ir*, *pmr*)

Whitesides, G.M. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 2245 (*pmr*)

Mueller, J. *et al*, *J. Organomet. Chem.*, 1972, **34**, 165 (*synth*, *ms*)

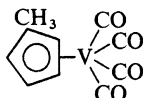
Burkert, P.K. *et al*, *CA*, 1974, **80**, 139152 (*nqr*)

Rietz, R.R. *et al*, *Inorg. Chem.*, 1975, **14**, 2818.

C₁₀H₇O₄V

V-00024

Tetracarbonyl(η^5 -methyl-2,4-cyclopentadien-1-yl)vanadium
[63339-27-5]



M 242.104

Yellow solid by subl. Sol. aliphatic hydrocarbons, THF.
Bp_{0.01} 50° subl.

Jones, W.D. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 4415 (*synth*, *ms*, *pmr*)

C₁₀H₉NO₅V[⊖]

V-00025

Pentacarbonyl(2-isocyano-2-methylpropane)vanadate(1-)
Pentacarbonyl(tert-butyl isocyanide)vanadate(1-)



M 274.126 (ion)

Tetraethylammonium salt: [78954-02-6].

C₁₈H₂₉N₂O₅V M 404.379

Orange cryst. (THF), dec. over several minutes in air.

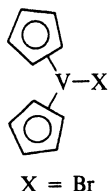
Sol. THF, insol. Et₂O. Mp 102-5° dec.

Ellis, J.E. *et al*, *Organometallics*, 1982, **1**, 898 (*synth*, *ir*, *pmr*)

C₁₀H₁₀BrV

V-00026

Bromobis(η^5 -2,4-cyclopentadien-1-yl)vanadium
Bis(cyclopentadienyl)bromovanadium
[64815-29-8]



M 261.035

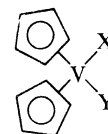
Deep-blue cryst. by subl. Sl. sol. Et₂O, hydrocarbons. Mp 221-2°. Bp_{0.2} 165° subl. Air-sensitive.

de Liefde Meijer, H.J. *et al*, *Recl. Trav. Chim. Pays-Bas*, 1961, **80**, 831 (*synth*)

C₁₀H₁₀Br₂V

V-00027

Dibromobis(η^5 -2,4-cyclopentadien-1-yl)vanadium
Bis(cyclopentadienyl)dibromovanadium
[69109-78-0]



X = Y = Br

M 340.939

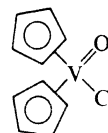
Dark-green solid, unstable in solid state. Solns. in CHCl₃, CCl₄ are stable. Sol. CCl₄, CHCl₃. Paramagnetic.

Wilkinson, G. *et al*, *J. Am. Chem. Soc.*, 1954, **76**, 4281 (*synth*, *ir*)

C₁₀H₁₀ClOV

V-00028

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)oxovanadium
Vanadocene oxychloride
[71191-42-9]



M 232.583

Blue cryst. by subl. Bp 170-90° subl. *in vacuo*.

Holliday, A.K. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 228 (*synth*, *pmr*)

C₁₀H₁₀ClV

V-00029

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, 9Cl
Bis(cyclopentadienyl)chlorovanadium. Vanadocene chloride

[12701-79-0]

As Bromobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V-00026 with

X = Cl

M 216.584

Indigo cryst. (CH₂Cl₂). Sol. CH₂Cl₂, THF. Mp 194-8°, 206-7°. Bp_{0.0001} 100° subl. Paramagnetic.

de Liefde Meijer, H.J. *et al*, *Inorg. Chem. Acta*, 1970, **4**, 651 (*synth*)

Manzer, L.E., *J. Organomet. Chem.*, 1976, **110**, 291 (*synth*)

Fieselman, B.F. *et al*, *J. Organomet. Chem.*, 1977, **137**, 43 (*cryst struct*, *synth*, *props*)

C₁₀H₁₀Cl₂V

V-00030

Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, 9Cl
Bis(cyclopentadienyl)dichlorovanadium. Vanadocene dichloride

[12083-48-6]

As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V-00027 with

X = Y = Cl

M 252.037

Dark-green cryst. (CHCl₃). Sol. CHCl₃, H₂O, alcohols. Paramagnetic. Dec. at 250°.

Wilkinson, G. *et al*, *J. Am. Chem. Soc.*, 1954, **76**, 4281 (*synth, ir*)
Organomet. Synth., 1965, **1**, 75 (*synth*)
 Holloway, J.D.L. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 2038.

C₁₀H₁₀IV V-00031

Bis(η⁵-2,4-cyclopentadien-1-yl)iodovanadium, 9Cl
Vanadocene iodide. Bis(cyclopentadienyl)vanadium iodide

[53291-02-4]

As Bromobis(η⁵-2,4-cyclopentadien-1-yl)vanadium, V-00026 with



M 308.035

Dark-green cryst. by subl. Insol. Et₂O, aliphatic hydrocarbons. Mp 214-5°. Bp_{0.2} 165° subl.

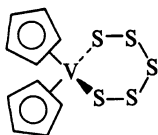
de Liefde Meijer, H.J. *et al*, *Recl. Trav. Chim. Pays-Bas*, 1961, **80**, 831 (*synth*)

Köhler, F.H. *et al*, *Chem. Ber.*, 1978, **111**, 3464 (*synth*)

C₁₀H₁₀S₅V V-00032

Bis(η⁵-2,4-cyclopentadienyl)pentathiovanadium, 9Cl
Bis(cyclopentadienyl)vanadium pentasulfide. Vanadocene pentasulfide

[11077-28-4]



M 341.431

Air-stable dark-red cryst. (THF aq.). Sol. THF. Dec. >150°.

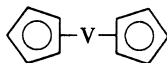
Köpf, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1971, **10**, 137 (*synth*)

Müller, E.G., *J. Organomet. Chem.*, 1976, **111**, 91 (*synth, esr, ir, cryst struct, props*)

C₁₀H₁₀V V-00033

Bis(η⁵-2,4-cyclopentadien-1-yl)vanadium
Vanadocene, 9Cl

[1277-47-0]



M 181.131

Polymerisation catalyst for acetylenes. Air-sensitive violet cryst. by subl. Sol. C₆H₆, THF. Mp 167-8°. Paramagnetic.

Fischer, E.O. *et al*, *Chem. Ber.*, 1958, **91**, 2205 (*synth, ir*)
 de Liefde Meijer, H.J. *et al*, *Recl. Trav. Chim. Pays-Bas*, 1966, **85**, 1007 (*synth*)

Müller, J. *et al*, *J. Organomet. Chem.*, 1967, **10**, 313 (*ms*)

Köhler, F.H. *et al*, *J. Organomet. Chem.*, 1976, **110**, 235 (*cmr, pmr*)

Aleksanyan, V.T. *et al*, *J. Organomet. Chem.*, 1977, **124**, 293 (*ir, raman*)

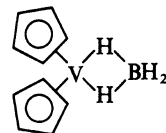
Handlir, K. *et al*, *Z. Chem.*, 1979, **19**, 265 (*synth*)

C₁₀H₁₄BV V-00034

Bis(η⁵-2,4-cyclopentadien-1-yl)[tetrahydroborato(1-)-H, H'-]vanadium, 9Cl

Bis(cyclopentadienyl)vanadium borohydride

[55744-43-9]



M 195.972

Deep-violet cryst. by subl. Sol. aromatic hydrocarbons. Bp_{0.001} 55° subl. Dec. slowly at r.t. under N₂. Dec. >80°. Diamagnetic.

▷Pyrophoric

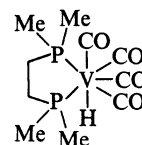
Marks, T.J. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 1439 (*synth, ir, pmr*)

C₁₀H₁₇O₄P₂V V-00035

Tetracarbonyl[1,2-ethanediylbis(dimethylphosphine)-P, P']-hydrovanadium, 9Cl

Hydrotetracarbonyl[bis(dimethylphosphino)ethane]-vanadium

[56408-47-0]



M 314.131

Yellow cryst. (CH₂Cl₂/heptane). Sol. CH₂Cl₂. Mp 123° dec.

Ellis, J.E. *et al*, *J. Organomet. Chem.*, 1975, **93**, 205 (*synth, ir, pmr*)

C₁₀H₂₄O₂V V-00036

Di-tert-butoxydimethylvanadium

Dimethylbis(2-methyl-2-propanolato-O)vanadium.

Dimethyldi-tert-butoxyvanadium

[63243-40-3]



M 227.240

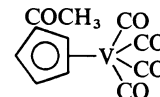
Ethylene polymerisation catalyst. Blue-violet liq. Sol. hydrocarbons, ethers. Bp₁ 35-40°. Paramagnetic. Dec. >77°.

Razuvaev, G.A. *et al*, *J. Organomet. Chem.*, 1977, **131**, 43 (*synth, esr*)

Razuvaev, G.A., *CA*, 1978, **89**, 180433 (*use*)

C₁₁H₇O₅V V-00037

(η⁵-1-Acetyl-2,4-cyclopentadien-1-yl)tetracarbonylvanadium



M 270.115

Red cryst. by subl. at 80-90° *in vacuo*. Sol. CH₂Cl₂. Mp 98°.

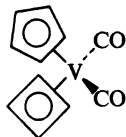
Fischer, E.O. *et al*, *Chem. Ber.*, 1960, **93**, 1006 (*synth, ir*)

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1967, **7**, 113 (*synth, pmr*)

Palyi, G. *et al*, *Inorg. Chim. Acta*, 1975, **15**, L23 (*synth*)

C₁₁H₉O₂V**V-00038**

Dicarbonyl(η^4 -1,3-cyclobutadiene)(η^5 -2,4-cyclopentadien-1-yl)vanadium
[68033-40-9]



M 224.132

Bright-orange cryst. by subl. Sol. common org. solvs.
Subl. at r.t. *in vacuo*.

Rausch, M.D. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 401
(*synth, ms, nmr, ir*)

C₁₁H₁₀IOV**V-00039**

Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)iodovanadium, η^1 Cl
Bis(cyclopentadienyl)iodocarbonylvanadium
[53291-19-3]

As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)vanadium,
V-00027 with



M 336.045

Dec. *in vacuo* to Bis(η^5 -2,4-cyclopentadien-1-yl)-
iodovanadium, V-00031 Diamagnetic.

Calderazzo, F. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 3695 (*synth, ir*)

C₁₁H₁₀OV**V-00040**

Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)vanadium, η^1 Cl
Bis(cyclopentadienyl)carbonylvanadium. Vanadocene carbonyl. Bis(cyclopentadienyl)vanadium carbonyl
[53339-41-6]

As Bromobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V-
00026 with



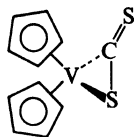
M 209.141

Dark-brown solid (heptane). Sol. hydrocarbons.
Paramagnetic.

Calderazzo, F. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 3695 (*synth, ir*)

C₁₁H₁₀S₂V**V-00041**

**[(C,S- η)-Carbon disulfide]bis(η^5 -2,4-cyclopentadien-1-yl)-
vanadium, η^1 Cl**
Bis(cyclopentadienyl)vanadium(carbon disulfide)
[60674-62-6]



M 257.262

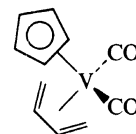
Maroon cryst. (toluene). Sol. toluene, THF.
Paramagnetic.

Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1046
(*synth, ir*)

Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 1612
(*cryst struct*)

C₁₁H₁₁O₂V**V-00042**

**(η^4 -1,3-Butadiene)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-
vanadium**
Cyclopentadienyldicarbonyl(η^4 -1,3-butadiene)vanadium



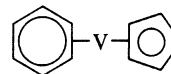
M 226.148

Dark-red needles by subl. Mp 135-40° dec. Bp 60-80°
subl. *in vacuo*.

Fischer, E.O. *et al*, *Chem. Ber.*, 1960, **93**, 3006 (*synth, ir*)

C₁₁H₁₁V**V-00043**

(η^6 -Benzene)(η^5 -2,4-cyclopentadien-1-yl)vanadium, η^1 Cl
Cyclopentadienyl(benzene)vanadium
[39358-56-0]



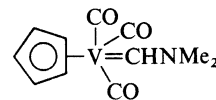
M 194.149

Not well characterised.

Müller, J. *et al*, *J. Organomet. Chem.*, 1974, **71**, 257.

C₁₁H₁₂NO₃V**V-00044**

**Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(dimethylami-
nomethylene)vanadium**
[67407-28-7]



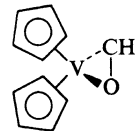
M 257.162

Yellow needles (hexane). Sol. THF, hydrocarbons. Mp
120°. Diamagnetic.

Hartshorn, A.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 348
(*synth, ir, pmr*)

C₁₁H₁₂OV**V-00045**

**Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -C,O-formaldehyde)vana-
dium**
[80737-39-9]



M 211.157

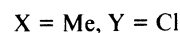
Deep-green cryst. (toluene), thermally labile. Sol. tol-
uene.

Gambarotta, S. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 2019
(*synth, ir, cryst struct*)

C₁₁H₁₃ClV**V-00046**

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)methylvanadium
Bis(cyclopentadienyl)chloro(methyl)vanadium
[66908-84-7]

As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)vanadium,
V-00027 with



M 231.618
Brown cryst. (toluene). Sol. THF, toluene. Paramagnetic.
Razuvaev, G.A. *et al*, *Bull. Acad. Sci. USSR, Div. Chem. Sci.*,
1978, **27**, 605.
Razuvaev, G.A. *et al*, *Inorg. Chim. Acta*, 1980, **44**, L103 (*synth*,
esr)

C₁₁H₁₃V **V-00047**

Bis(η⁵-2,4-cyclopentadien-1-yl)methylvanadium, 9Cl

[54111-39-6]

As Bromobis(η⁵-2,4-cyclopentadien-1-yl)vanadium, V-00026 with

X = Me

M 196.165
Green-black cryst. (pentane). Sol. aromatic, aliphatic hydrocarbons, Et₂O. Mp 52°. Bp_{0.001} 40-60° subl. Paramagnetic. Dec. >138°.

Razuvaev, G.A. *et al*, *Dokl. Chem. (Engl. Transl.)*, 1976, **231**, 690

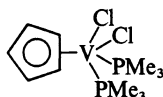
Bourman, H. *et al*, *J. Organomet. Chem.*, 1976, **110**, 327 (*synth*, *ir*, *uv*)

Foust, D.F. *et al*, *J. Organomet. Chem.*, 1980, **193**, 209 (*synth*, *ms*, *props*)

C₁₁H₂₃Cl₂P₂V **V-00048**

Dichloro(η⁵-2,4-cyclopentadien-1-yl)bis(trimethylphosphine)-vanadium

Cyclopentadienyldichlorobis(trimethylphosphine)vanadium



M 339.098
Dark-blue needles (pentane). Sol. aromatic, aliphatic hydrocarbons. Air-sensitive, paramagnetic.

Nieman, J. *et al*, *J. Organomet. Chem.*, 1980, **186**, C12 (*synth*, *ir*, *uv*, *props*)

C₁₂H₁₀N₂V **V-00049**

Bis(cyano-C)bis(η⁵-2,4-cyclopentadien-1-yl)vanadium, 9Cl

Bis(cyclopentadienyl)dicyanovanadium. Bis(cyclopentadienyl)vanadium dicyanide. Vanadocene dicyanide
[39333-50-1]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)vanadium, V-00027 with

X = Y = CN

M 233.166
Green cryst. (CHCl₃). Sl. sol. polar org. solvs. Air-stable, paramagnetic.

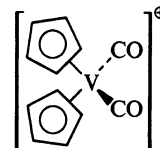
Doyle, G. *et al*, *Inorg. Chem.*, 1968, **7**, 2479, 2484 (*synth*, *ir*, *esr*)

C₁₂H₁₀O₂V[⊕]

V-00050

Dicarbonylbis(2,4-cyclopentadien-1-yl)vanadium(1+)

Bis(cyclopentadienyl)dicarbonylvandium(1+)



M 237.151 (ion)

Diamagnetic.

Triiodide:

C₁₂H₁₀I₃O₂V M 617.865

Orange ppt.

Hexacarbonylvandate:

C₁₈H₁₀O₈V₂ M 456.155

Orange solid (Me₂CO/pentane). Insol. H₂O, hydrocarbons, spar. sol. CS₂. Dec. at 140° (sealed tube under N₂) without melting. Mod. air-stable as solid, air-sensitive in soln. *ir* ν_{CO} 2050, 2010, 1860 cm⁻¹.

Trichlorostannate:

C₁₂H₁₀Cl₃O₂SnV M 462.200

Yellow-orange. Sol. Me₂CO.

Tetraphenylborate: [57088-91-2].

C₃₆H₃₀BO₂V M 556.383

Air-stable, yellow-orange solid (Me₂CO). Sol. Me₂CO, THF, v. sl. sol. MeOH, insol. hydrocarbons.

Calderazzo, F. *et al*, *Inorg. Chem.*, 1963, **2**, 721 (*synth*, *ir*, *pmr*)

Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 203, 1046 (*synth*, *pmr*)

Atwood, J.L. *et al*, *Inorg. Chem.*, 1980, **19**, 3812 (*cryst struct*)

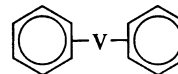
C₁₂H₁₂V

V-00051

Bis(η⁶-benzene)vanadium, 9Cl

Dibenzenevanadium

[12129-72-5]



M 207.168

Butadiene polymerisation catalyst. Red-black cryst. by subl. Sol. most org. solvs., insol. CCl₄, MeOH. Mp 277-8°. Bp 120-50° subl. *in vacuo*. Paramagnetic. Dec. >300°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1957, **90**, 250 (*synth*)

Brauer, G., *Handbook of Preparative Inorg. Chem.*, Academic Press, N.Y., 1965, **2**, 1289.

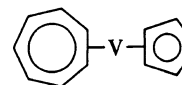
Akhmadev, V.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1412 (*use*)

C₁₂H₁₂V

V-00052

(η⁷-Cycloheptatrienyl)(η⁵-2,4-cyclopentadien-1-yl)vanadium, 9Cl

[12636-68-9]



M 207.168

Purple cryst. by subl. Sol. aliphatic hydrocarbons. Bp_{0.1} 100° subl. Paramagnetic.

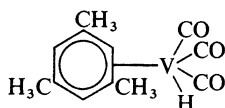
Engelbreton, G. *et al*, *J. Am. Chem. Soc.*, 1963, **85**, 481 (*cryst struct*)

Organomet. Synth., 1965, **1**, 140 (*synth*)
 Gulick, W.M. *et al*, *Inorg. Chem.*, 1967, **6**, 1320 (*uv. props*)
 Rettig, M.S. *et al*, *J. Am. Chem. Soc.*, 1970, **92**, 5100 (*pmr, ms, esr*)
 Evans, S. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 304 (*pe*)
 Müller, J. *et al*, *J. Organomet. Chem.*, 1974, **71**, 257 (*synth, ms*)

C₁₂H₁₃O₃V

V-00053

Tricarbonylhydro(η⁶-1,3,5-trimethylbenzene)vanadium
Tricarbonylhydro(η⁶-mesitylene)vanadium
 [31868-99-2]

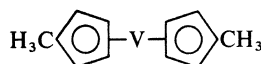


M 256.174
 Orange-yellow cryst. (pentane). Sol. aliphatic hydrocarbons. Dec. at 69-72°.
 Davison, A. *et al*, *J. Organomet. Chem.*, 1970, **23**, 491 (*synth, ir, pmr, ms*)

C₁₂H₁₄V

V-00054

Bis(η⁵-1-methyl-2,4-cyclopentadien-1-yl)vanadium
1,1'-Dimethylvanadocene
 [12146-93-9]



M 209.184
 Deep-violet liq. or deep-violet cryst. Sol. aromatic, aliphatic hydrocarbons, THF. Mp 26-8°.
 Eberl, K. *et al*, *Angew. Chem.*, 1976, **88**, 575.
 Köhler, F.H., *J. Organomet. Chem.*, 1976, **110**, 235 (*synth, nmr*)
 Köhler, F.H. *et al*, *Z. Naturforsch., B*, 1977, **32**, 1026 (*synth, nmr*)

C₁₂H₁₅V

V-00055

Bis(η⁵-2,4-cyclopentadien-1-yl)ethylvanadium, 9Cl
 [59424-00-9]
 As Bromobis(η⁵-2,4-cyclopentadien-1-yl)vanadium, V-00026 with

X = Et

M 210.192
 Green-black cryst. (pentane). Sol. aliphatic hydrocarbons, Et₂O. Mp 27°. Paramagnetic. Dec. >94°.
 Bouman, H. *et al*, *J. Organomet. Chem.*, 1976, **110**, 327 (*synth, ir, uv*)
 Razuvaev, G.A. *et al*, *J. Organomet. Chem.*, 1977, **129**, 169 (*synth*)

C₁₂H₁₆V

V-00056

Bis(2,4-cyclopentadien-1-yl)dimethylvanadium
 [62363-03-5]
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)vanadium, V-00027 with

X = Y = Me

M 211.200

Black cryst. (toluene/hexane). Sol. aromatic hydrocarbons. Mp 130-2° dec. Bp_{0.001} 65-100° subl. Paramagnetic.

Razuvaev, G.A. *et al*, *J. Organomet. Chem.*, 1977, **129**, 169 (*synth, esr*)
 Faust, D.F. *et al*, *J. Organomet. Chem.*, 1980, **193**, 209 (*synth, ms*)

C₁₂H₃₃OSi₃V

V-00057

Oxotris(trimethylsilylmethyl)vanadium
 [31011-82-2]

OV(CH₂SiMe₃)₃

M 328.590
 Pale-yellow cryst. (pet. ether). Sol. hydrocarbons, ethers. Mp 75°. Diamagnetic, light-sensitive, mod. air-stable.
 Mowat, W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 533 (*synth, ir, pmr, uv*)

C₁₃H₁₃O₂V

V-00058

Acetylcarbonylbis(η⁵-2,4-cyclopentadien-1-yl)vanadium
 [54111-41-0]
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)vanadium, V-00027 with

X = Ac, Y = CO

M 252.186
 Green-maroon cryst. (toluene). Sol. aromatic hydrocarbons. Diamagnetic.
 Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 203 (*synth, ir*)

C₁₃H₁₅V

V-00059

Bis(2,4-cyclopentadien-1-yl)(η¹-2-propenyl)vanadium
(η¹-Allyl)bis(cyclopentadienyl)vanadium
 As Bromobis(η⁵-2,4-cyclopentadien-1-yl)vanadium, V-00026 with

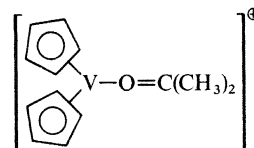
X = -CH₂CH=CH₂

M 222.203
 σ-bonded allyl. Black cryst. (THF/pentane), solns. unstable >0°. Mp 49°. Air-sensitive, paramagnetic.
 Martin, H.A. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1964, **3**, 311.
 Siegfert, F.W. *et al*, *J. Organomet. Chem.*, 1968, **15**, 131 (*synth, pmr, ir*)
 de Liefde Meijer, H.J. *et al*, *Inorg. Chim. Acta*, 1970, **4**, 651.

C₁₃H₁₆OV[⊕]

V-00060

Bis(η⁵-2,4-cyclopentadien-1-yl)(2-propanone)vanadium(1+), 9Cl
Acetonebis(cyclopentadienyl)vanadium(1+)



M 239.210 (ion)
Tetraphenylborate: [60686-18-2].

C₃₇H₃₆BOV M 558.442Deep-blue cryst. (Me₂CO). Sol. THF, Me₂CO, insol. H₂O. Paramagnetic.Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1046

(synth, ir)

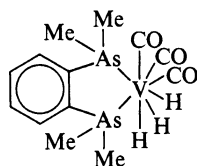
Gambarotta, S. *et al*, *Inorg. Chem.*, 1981, **20**, 1173 (cryst struct)C₁₃H₁₉As₂O₃V

V-00061

Tricarbonyltrihydro[1,2-phenylenebis(dimethylarsine)-As,As']vanadium

[1,2-Bis(dimethylarsino)benzene]tricarbonyltrihydrovanadium

[61917-87-1]



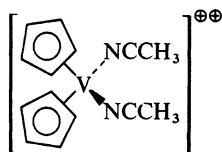
M 424.076

Red cryst. (CH₂Cl₂). Sol. CH₂Cl₂, THF. Air-stable, diamagnetic. Dec. >130°.Ellis, J.E. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 626 (synth, pmr, ir)C₁₄H₁₆N₂V^{⊕⊕}

V-00062

Bis(acetonitrile)bis(η⁵-2,4-cyclopentadien-1-yl)vanadium(2+)

Bis(cyclopentadienyl)bis(acetonitrile)vanadium(2+)



M 263.235 (ion)

Bis(hexafluorophosphate): [37205-22-4].

C₁₄H₁₆F₁₂N₂P₂V M 553.164

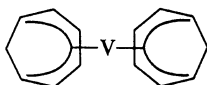
Dark-green needles (MeCN). Dec. slowly at r.t. Sol. polar org. solvs.

Connelly, N.G. *et al*, *J. Organomet. Chem.*, 1972, **38**, 385 (synth, ir)C₁₄H₁₆V

V-00063

Bis[(1,2,3,4,5,6-η)-1,3,5-cycloheptatriene]vanadium, 9Cl

[12671-05-5]



M 235.222

Green-brown solid (hexane). Sol. common org. solvs. Mp 132° dec. Paramagnetic.

Müller, J. *et al*, *Chem. Ber.*, 1972, **105**, 3346 (synth, esr, ms)C₁₄H₂₀V

V-00064

Bis(η⁵-2,4-cyclopentadien-1-yl)diethylvanadium

[63118-93-4]

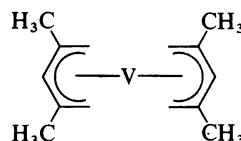
As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)vanadium, V-00027 with

X = Y = Et

M 239.254

Thermally unstable black soln. in toluene. Dec. in soln. >0° to Bis(η⁵-2,4-cyclopentadien-1-yl)ethylvanadium, V-00055.Razuvaev, G.A. *et al*, *J. Organomet. Chem.*, 1977, **129**, 169 (synth, esr)Evans, A.G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 57.C₁₄H₂₂V

V-00065

Bis(η⁵-2,4-dimethyl-2,4-pentadien-1-yl)vanadium

M 241.269

Sandwich struct. Deep-green cryst. (pentane). V. sol. aliphatic hydrocarbons. Subl. *in vacuo*. Paramagnetic.Wilson, D.R. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 1120 (synth, struct)C₁₄H₃₅N₃V

V-00066

Tris(diethylamido)ethylvanadium

Ethyltris(N-ethylethanaminato-N)vanadium. Ethyltris(diethylamino)vanadium

[56765-58-3]

EtV(NEt₂)₃

M 296.392

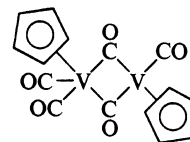
Ethylene polymerisation catalyst. Deep-green liq. Stable to 115°. Sol. hydrocarbons. Bp_{0.001} 71-3°. Paramagnetic.Fröhlich, H.-O. *et al*, *Z. Chem.*, 1975, **15**, 233 (synth)U.S.P., 4 042 610, (1977); CA, **87**, 184686 (use)Fröhlich, H.-O. *et al*, *Z. Anorg. Allg. Chem.*, 1979, **458**, 89 (synth, props)C₁₅H₁₀O₅V₂

V-00067

Di-μ-carbonyltricarbonylbis(η⁵-2,4-cyclopentadien-1-yl)divanadium, 9Cl

Pentacarbonylbis(cyclopentadienyl)divanadium. Bis(cyclopentadienyl)divanadium pentacarbonyl

[41699-43-8]



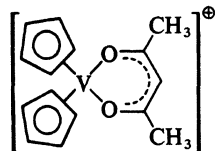
M 372.124

Contains two semibridging CO groups. Dark-green cryst. (C₆H₆). Sol. hydrocarbons. THF. Mp 99° dec. Thermally unstable >40°.Cotton, F.A. *et al*, *J. Organomet. Chem.*, 1978, **160**, 93 (ir, cryst struct)Herrmann, W.A. *et al*, *Chem. Ber.*, 1979, **112**, 392 (synth, ms)Lewis, L.N. *et al*, *Inorg. Chem.*, 1980, **19**, 1840 (synth, ir, pmr)Huffman, J.C. *et al*, *Inorg. Chem.*, 1980, **19**, 2755 (cryst struct)

C₁₅H₁₇O₂V[⊕]

V-00068

Bis(η⁵-2,4-cyclopentadien-1-yl)(pentanedionato)vanadium(1+), 8Cl
 (Acetylacetonato)bis(cyclopentadienyl)vanadium(1+)



M 280.240 (ion)

Styrene polym. catalyst. Paramagnetic.

Perchlorate:

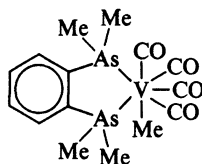
C₁₅H₁₇ClO₆V M 379.690Olive-green cryst. (H₂O). Sl. sol. polar org. solvs.

▷ Explosive

Doyle, G. *et al*, *Inorg. Chem.*, 1968, **7**, 2479, 2484 (*synth*, *ir*, *esr*)U.S.P., 3 577 448, (1971); *CA*, **75**, 37306 (*use*)C₁₅H₁₉As₂O₄V

V-00069

Tetracarbonylmethyl[1,2-phenylenebis(dimethylarsine)-As,As']vanadium, 9Cl
 Tetracarbonyl[bis(dimethylarsino)benzene]methylvanadium
 [56408-48-1]

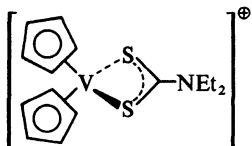


M 464.097

Violet cryst. (CH₂Cl₂/heptane). Sol. CH₂Cl₂, insol. aliphatic hydrocarbons. Mp 112° dec. Mod. air-stable, diamagnetic.Ellis, J.E. *et al*, *J. Organomet. Chem.*, 1975, **93**, 205 (*synth*, *ir*, *pmr*)C₁₅H₂₀NS₂V[⊕]

V-00070

Bis(η⁵-2,4-cyclopentadien-1-yl)(diethylcarbamoedithioato-S,S')vanadium(1+), 9Cl



M 329.391 (ion)

Paramagnetic.

Triiodide:

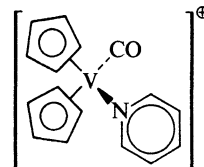
C₁₅H₂₀I₃NS₂V M 710.105Air-stable, violet-maroon cryst. (THF/C₆H₆). Sol. Me₂CO.

Tetrafluoroborate: [37215-22-8].

C₁₅H₂₀BF₄NS₂V M 416.195Styrene polymerisation catalyst. Green cryst. (H₂O). Sl. sol. common org. solvs.U.S.P., 3 577 448, (1971); *CA*, **75**, 37306 (*use*)Bond, A.M. *et al*, *Inorg. Chem.*, 1973, **12**, 887 (*props*)Casey, A.T. *et al*, *Aust. J. Chem.*, 1974, **27**, 757 (*synth*, *ir*, *esr*, *uv*)Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 203 (*synth*)C₁₆H₁₅NOV[⊕]

V-00071

Carbonylbis(η⁵-2,4-cyclopentadien-1-yl)(pyridine)vanadium(1+), 9Cl
 Bis(cyclopentadienyl)carbonyl(pyridine)vanadium(1+)



M 288.242 (ion)

Diamagnetic.

Tetraphenylborate: [57088-95-6].

C₄₀H₃₅BNOV M 607.474

Red-violet cryst. (THF). Sol. THF.

Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1046 (*synth*, *ir*)C₁₆H₁₅SV

V-00072

(Benzenethiolato)bis(η⁵-2,4-cyclopentadien-1-yl)vanadium, 9Cl
 Bis(cyclopentadienyl)vanadium phenylsulfide
 [55500-02-2]
 As Bromobis(η⁵-2,4-cyclopentadien-1-yl)vanadium, V-00026 with

X = SPh

M 290.296

Olefin polymerisation catalyst. Green-black cryst. (toluene). Sol. aromatic hydrocarbons. Paramagnetic.

Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 2433 (*synth*)Ger. Pat., 2 521 973, (1975); *CA*, **84**, 744356 (*use*)Razuvaev, G.A. *et al*, *Inorg. Chim. Acta*, 1978, **31**, L357.C₁₆H₁₅V

V-00073

Bis(η⁵-2,4-cyclopentadien-1-yl)phenylvanadium, 9Cl
 [12212-56-5]
 As Bromobis(η⁵-2,4-cyclopentadien-1-yl)vanadium, V-00026 with

X = Ph

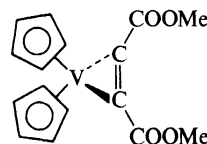
M 258.236

Green-black cryst. (toluene). Sol. aromatic hydrocarbons. Mp 90-2°. Paramagnetic.

de Liefde Meijer, H.J. *et al*, *Chem. Ind. (London)*, 1960, **79**, 119 (*synth*)Razuvaev, G.A. *et al*, *J. Organomet. Chem.*, 1977, **129**, 169 (*synth*, *esr*)C₁₆H₁₆O₄V

V-00074

Bis(η⁵-2,4-cyclopentadien-1-yl)((2,3-η)-dimethyl 2-butyne-dioate)vanadium, 9Cl
 Bis(cyclopentadienyl)(dimethylacetylenedicarboxylate)-vanadium
 [12155-24-7]



M 323.242

Dark-green cryst. (toluene). Mp 146-7° dec.

Tsumura, R. *et al*, *Bull. Chem. Soc. Jpn.*, 1965, **38**, 861 (*synth*, *esr*)

Fachinetti, G. *et al*, *Inorg. Chem.*, 1979, **18**, 2282 (*synth*, *ir*, *cryst struct*)

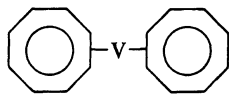
Peterson, J.L. *et al*, *Inorg. Chem.*, 1980, **19**, 1852 (*synth*, *esr*, *cryst struct*)

C₁₆H₁₆V

V-00075

Bis(η⁸-1,3,5,7-cyclooctatetraene)vanadium, 9Cl

[35796-61-3]



M 259.244

Purple solid. Paramagnetic.

Breil, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1966, **5**, 898 (*synth*)

Thomas, J.L. *et al*, *Inorg. Chem.*, 1972, **11**, 348 (*esr*)

Hocks, L. *et al*, *Spectrochim Acta, Part A*, 1974, **30**, 907 (*ir*)

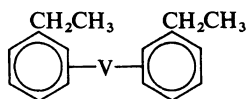
Hocks, L. *et al*, *J. Organomet. Chem.*, 1976, **104**, 199 (*esr*, *uv*)

C₁₆H₂₀V

V-00076

Bis[(1,2,3,4,5,6-η)ethylbenzene]vanadium, 9Cl

[36955-48-3]



M 263.276

Metal deposition reagent. Red liq. Mp 130-40°. Stable to gas chromatography.

Petukhov, G.G. *et al*, *J. Gen. Chem. USSR, (Engl. Transl.)*, 1974, **44**, 2184 (*use*)

Zborovskaya, L.S. *et al*, *CA*, 1975, **83**, 179260 (*synth*)

Dozorov, V.A. *et al*, *CA*, 1979, **91**, 159914 (*purifn*)

C₁₆H₄₄Si₄V

V-00077

Tetrakis(trimethylsilyl)methyl]vanadium, 9Cl

[41572-08-1]



M 399.807

Deep-green cryst. (pet. ether). V. sol. hydrocarbons. Mp 43°. Subl. at r.t. *in vacuo*, stable indef. below -30°.

▷Pyrophoric

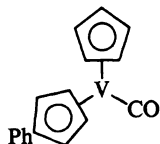
Mowat, W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 533 (*synth*, *ir*, *uv*)

C₁₇H₁₄OV

V-00078

Carbonyl(η⁵-2,4-cyclopentadien-1-yl)(η⁵-1-phenyl-2,4-cyclopentadien-1-yl)vanadium

[54111-38-5]



M 285.239

Green cryst. Mp 46°. Paramagnetic.

Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 203 (*synth*, *ir*)

C₁₇H₁₇V

V-00079

Benzylbis(cyclopentadienyl)vanadium

Bis(η⁵-2,4-cyclopentadien-1-yl)(phenylmethyl)vanadium, 9Cl

[54111-40-9]

As Bromobis(η⁵-2,4-cyclopentadien-1-yl)vanadium, V-00026 with

X = CH₂Ph

M 272.263

Black cryst. (hexane/toluene). Sol. aromatic hydrocarbons. Mp 107-9°. Paramagnetic.

de Liefde Meijer, H.J. *et al*, *Recl. Trav. Chim. Pays-Bas*, 1961, **80**, 831 (*synth*)

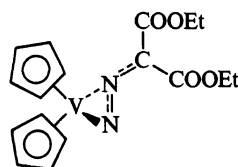
Razuvaev, G.A. *et al*, *J. Organomet. Chem.*, 1977, **129**, 169 (*synth*, *esr*)

C₁₇H₂₀N₂O₄V

V-00080

Bis(η⁵-2,4-cyclopentadien-1-yl)(η²-diethyldiazomalonate-N,N')vanadium

[80679-14-7]



M 367.298

Black cryst. (toluene), v. air-sensitive. Sol. aromatic hydrocarbons, insol. aliphatic hydrocarbons. μ_{eff} = 1.77 BM (293K).

Gambarotta, S. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 1918 (*synth*, *ir*)

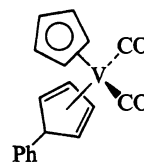
C₁₈H₁₅O₂V

V-00081

Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(phenylcyclopentadiene)vanadium

Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)[(2,3,4,5-η)-2,4-cyclopentadien-1-yl]benzene]vanadium, 9Cl. (Cyclopentadienyl)(phenylcyclopentadiene)dicarbonylvandium

[54162-08-2]



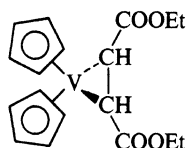
M 314.257

Red cryst. Mp 46°. Diamagnetic. Thermally dec. to green (C₅H₅)V(C₅H₄Ph)(CO).

Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 203 (*synth*, *ir*)

C₁₈H₂₂O₄V

V-00082

Bis(η⁵-2,4-cyclopentadien-1-yl)((2,3-η)-diethyl 2-butenedioate)vanadium, 10Cl*Bis(cyclopentadienyl)(η²-diethyl fumarate)vanadium*
[60674-63-7]

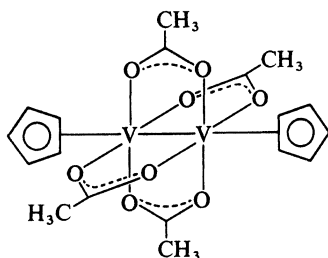
M 353.311

Green-maroon cryst. (C₆H₆). Sol. aromatic hydrocarbons. Paramagnetic.Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1046 (synth)Fachinetti, G. *et al*, *Inorg. Chem.*, 1979, **18**, 2282 (cryst struct)C₁₈H₂₂O₈V₂

V-00083

Tetrakis[μ-(acetato-O, O')]bis(η⁵-2,4-cyclopentadien-1-yl)-divanadium, 9Cl

[33221-79-3]



M 468.250

Mediator in Pd catalysed carbonylation of aromatic nitro compds. Violet cryst. by subl. Spar. sol. common org. solvs. Mp 239-40° dec. Bp_{0.1} 125° subl. Antiferromagnetic.*Monomer: Bis(acetato)cyclopentadienylvanadium. Diaacetoxycyclopentadienylvanadium. Cyclopentadienylvanadium diacetate.*C₉H₁₁O₄V M 234.125

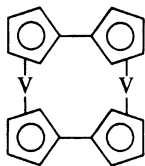
Unknown.

King, R.B., *Inorg. Chem.*, 1966, **5**, 2231 (synth, ms, ir)Razuvaev, G.A., *Dokl. Chem. (Engl. Transl.)*, 1974, **216**, 355McGregor, K.T. *et al*, *J. Organomet. Chem.*, 1975, **101**, 321 (esr, props)C₂₀H₁₆V₂

V-00084

1,1'';1,1'''-Bivanadocene*Bis[μ-(1,2,3,4,5-η-1',2',3',4',5'-η)[bi-2,4-cyclopentadien-1-yl]-1,1'-diyl]divanadium, 10Cl. Bis(fulvalene)-divanadium*

[71743-66-3]



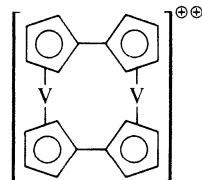
M 358.229

Dark-purple cryst. by subl., stable to >300° under N₂. Spar. sol. common org. solvs. Bp_{0.1} 230° subl. Diamagnetic.

▷ Pyrophoric

Smart, J.C. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 4371; 1980, **102**, 1009 (synth, ir, ms)C₂₀H₁₆V₂^{⊕⊕}

V-00085

1,1'';1,1'''-Bivanadocenium(2+), 10Cl*Bis(fulvalene)divanadium(2+)*

M 358.229 (ion)

Bis(hexafluorophosphate): [73153-05-6].C₂₀H₁₆F₁₂P₂V₂ M 648.158

Brown air-sensitive cryst. (MeCN). Sol. MeCN.

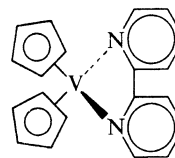
Paramagnetic, hygroscopic.

Smart, J.C. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 4371; 1980, **102**, 1009 (synth, ir, uv, props, struct)C₂₀H₁₈N₂V

V-00086

(2,2'-Bipyridine-N, N')bis(η⁵-2,4-cyclopentadien-1-yl)vanadium, 9Cl*Bis(cyclopentadienyl)(bipyridyl)vanadium*

[60818-71-5]



M 337.317

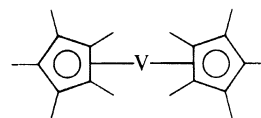
Black cryst. (heptane). Sol. hydrocarbons. Paramagnetic.

Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1046 (synth)C₂₀H₃₀V

V-00087

Bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]vanadium*Decamethylvanodocene*

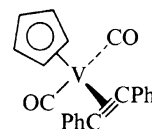
[74507-60-1]



M 321.399

Dark-red prisms (pentane). Sol. THF, pentane, Et₂O, CH₂Cl₂, aromatic hydrocarbons, sl. sol. MeCN, Me₂CO. Mp 299-300°. Bp_{0.00001} 100° subl. Paramagnetic.Robbins, J.L. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 1882 (synth, ir, ms, esr, uv)C₂₁H₁₅O₂V

V-00088

Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(diphenylacetylene)-vanadium

M 350.290

Green cryst. (C₆H₆). Sol. common org. solvs. Mp 58-60°. Bp₁ 90° subl. dec. Dec. at 122-5°.

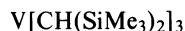
▷ Pyrophoric

Nesmeyanov, A.N. *et al*, *Dokl. Chem. (Engl. Transl.)*, 1968, **182**, 789 (*synth*, *ir*, *pmr*)

C₂₁H₅₇Si₆V

V-00089

Tris[bis(trimethylsilyl)methyl]vanadium, 9Cl
[53726-77-5]



M 529.136

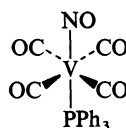
Air-sensitive blue-green cryst. (hexane). Sol. hexane, Et₂O. Paramagnetic.

Barker, G.K. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 734 (*synth*)

C₂₂H₁₅NO₅PV

V-00090

Tetracarbonylnitrosyl(triphenylphosphine)vanadium



M 455.279

trans-form

Orange cryst. Mp 88-90° dec.

Werner, R.P.M., *Z. Naturforsch., B*, 1961, **16**, 478.

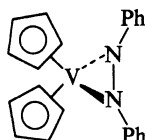
C₂₂H₂₀N₂V

V-00091

(Azobenzene)bis(cyclopentadienyl)vanadium

Bis(η⁵-2,4-cyclopentadien-1-yl)(diphenyldiazene-N,N')vanadium, 9Cl

[51159-66-1]



M 363.355

Dark-maroon cryst. (toluene). Sol. aromatic hydrocarbons. Paramagnetic.

Fachinetti, G., *J. Organomet. Chem.*, 1973, **57**, C51 (*synth*)

Peterson, J.L. *et al*, *Inorg. Chem.*, 1980, **19**, 1852 (*synth*, *esr*)

C₂₂H₂₀S₂V

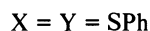
V-00092

Bis(benzenethiolato)bis(η⁵-2,4-cyclopentadien-1-yl)vanadium, 9Cl

Bis(cyclopentadienyl)vanadium bis(phenylsulfide)

[56009-67-7]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)vanadium, V-00027 with



M 399.462

Dark-violet cryst. (C₆H₆), green-black cryst. (toluene/hexane). Sol. aromatic hydrocarbons, THF. Mp 140° dec. Paramagnetic. Dec. at ca 100° liberating Ph₂S₂.

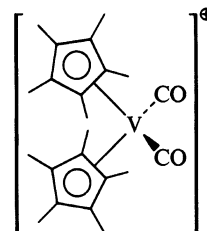
Fachinetti, G. *et al*, *J. Chem. Soc.*, 1974, 2433 (*synth*)

Muller, E.G. *et al*, *J. Organomet. Chem.*, 1976, **111**, 73 (*synth*, *ir*, *props*, *esr*, *cryst struct*)

C₂₂H₃₀O₂V[⊕]

V-00093

Dicarbonylbis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]vanadium(1+)



M 377.419 (ion)

Diamagnetic.

Hexafluorophosphate: [80679-49-8].

C₂₂H₃₀F₆O₂PV M 522.383

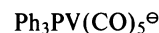
Bright-yellow prisms (Me₂CO). Sol. Me₂CO, insol. aliphatic hydrocarbons.

Robbins, J.L. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 1882 (*synth*, *cmr*, *pmr*, *ir*)

C₂₃H₁₅O₅PV[⊖]

V-00094

Pentacarbonyl(triphenylphosphine)vanadate(1-), 9Cl



M 453.284 (ion)

Tetraethylammonium salt: [56328-27-9].

C₃₁H₃₅NO₅PV M 583.536

Bright yellow-orange cryst. (Me₂CO). Sol. Me₂CO.

Mp 191-3°.

Tetraphenylphosphonium salt:

C₄₇H₃₅O₅P₂V M 792.680

Bright-orange cryst. (Me₂CO/Et₂O). Sol. THF. Dec. >150°.

Rehder, D., *J. Organomet. Chem.*, 1972, **37**, 303 (*ir*, *uv*, *nmr*)

Darensbourg, M.Y. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 6100 (*synth*, *ir*)

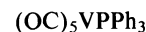
Fjare, K.L. *et al*, *Organometallics*, 1982, **1**, 1373 (*synth*)

C₂₃H₁₅O₅PV

V-00095

Pentacarbonyl(triphenylphosphine)vanadium

[72622-82-3]



M 453.284

Olive-green solid, unstable at r.t. Sol. CH₂Cl₂, toluene, alkanes. Mp 104° dec. Paramagnetic. Dec. in polar org. solvs.

Ellis, J.E. *et al*, *Inorg. Chem.*, 1980, **19**, 1082 (*synth*, *ir*, *props*)

C₂₄H₁₅O₆SnV

V-00096

Hexacarbonyl(triphenylstannyl)vanadium, 9Cl

Triphenylstannylvanadium hexacarbonyl

[27323-98-4]



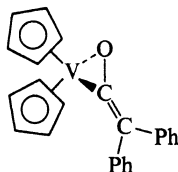
M 569.010

Bright orange-yellow cryst. (CH₂Cl₂). Sol. CH₂Cl₂, Et₂O, hydrocarbons. Mp 81-2° dec.

Davison, A. *et al*, *J. Organomet. Chem.*, 1972, **36**, 113 (*synth*, *ir*)

C₂₄H₂₀OV**V-00097****Bis(2,4-cyclopentadien-1-yl)(η^2 -C,O-diphenylketene)vanadium**

[76173-79-0]



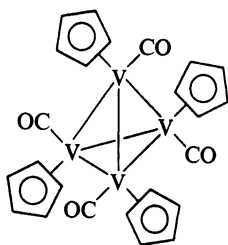
M 375.363

Deep-green cryst. (toluene). Sol. toluene, insol. THF.

Paramagnetic.

Gambarotta, S. *et al*, *Inorg. Chem.*, 1981, **20**, 1173 (*cryst struct, synth, ir*)**C₂₄H₂₀O₄V₄****V-00098****Tetracarbonyltetrakis(cyclopentadienyl)tetravanadium**

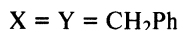
[69276-81-9]



M 576.186

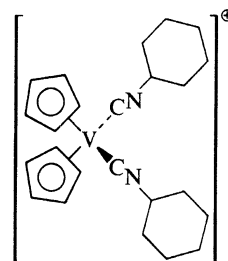
Proposed struct. shown. Black cryst. with metallic lustre (CH₂Cl₂/Et₂O). Sol. CH₂Cl₂, Et₂O, C₆H₆. Air-sensitive, paramagnetic.Herrmann, W.A. *et al*, *J. Organomet. Chem.*, 1979, **164**, C25 (*synth, ir, ms*)**C₂₄H₂₄V****V-00099****Dibenzylbis(cyclopentadienyl)vanadium***Bis*(η^5 -2,4-cyclopentadien-1-yl)*bis*(phenylmethyl)vanadium, 9Cl

[63118-94-5]

As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V-00027 with

M 363.395

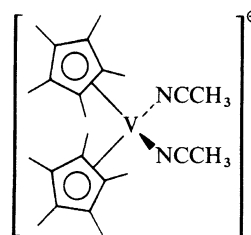
Not isol. in pure form. Soln. half-life ~30 min. at r.t.

Razuvaev, G.A. *et al*, *J. Organomet. Chem.*, 1977, **129**, 169 (*synth, esr*)**C₂₄H₃₂N₂V⁺****V-00100****Bis(η^5 -2,4-cyclopentadien-1-yl)bis(isocyanocyclohexane)vanadium(1+), 9Cl***Bis*(cyclopentadienyl)*bis*(cyclohexyl isocyanide)-vanadium(1+)

M 399.472 (ion)

Diamagnetic.

Chloride: [60686-15-9].

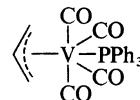
C₂₄H₃₂ClN₂V M 434.925Maroon cryst. (THF). Sol. Me₂CO, insol. aromatic hydrocarbons.Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1046 (*synth, ir*)**C₂₄H₃₆N₂V⁺****V-00101****Bis(acetonitrile)bis(η^5 -pentamethyl-2,4-cyclopentadien-1-yl)vanadium(1+)**

M 403.503 (ion)

Hexafluorophosphate: [80679-48-7].

C₂₄H₃₆F₆PV M 520.454Olive-green needles (MeCN/toluene). Sol. MeCN, Me₂CO.Robbins, J.L. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 1882 (*synth, ir*)**C₂₅H₂₀O₄V****V-00102****Tetracarbonyl(η^3 -propenyl)(triphenylphosphine)vanadium***Allyltetracarbonyl*(triphenylphosphine)vanadium

[61443-37-6]



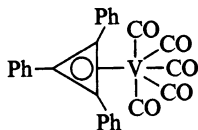
M 435.372

Red-brown needles (C₆H₆/hexane). Sol. aromatic hydrocarbons, Et₂O, THF, spar. sol. aliphatic hydrocarbons.Schneider, M. *et al*, *J. Organomet. Chem.*, 1974, **73**, C7; 1976, **121**, 345 (*synth*)Schneider, M. *et al*, *J. Organomet. Chem.*, 1976, **121**, 189 (*cryst struct*)

Having problems with locating a compound? Have you checked the indexes?

C₂₆H₁₅O₅V**V-00103**

Pentacarbonyl[(1,2,3-η)-1,2,3-triphenyl-2-cyclopropen-1-yl]-vanadium, 9Cl
[62050-66-2]

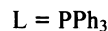


M 458.343

Red needles (Et₂O). Sol. org. solvs. Mp 230° dec.Schneider, M. *et al*, *J. Organomet. Chem.*, 1976, **121**, 345
(*synth*, *ir*, *nmr*, *ms*)**C₂₆H₂₀O₃PV****V-00104**

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(triphenylphosphine)-vanadium, 9Cl
Cyclopentadienyltricarbonyl(triphenylphosphine)vanadium

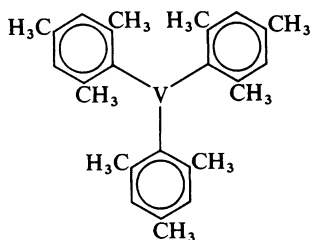
[12213-09-1]

As Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-(thiocarbonyl)vanadium, V-00019 with

M 462.357

Orange cryst. (CHCl₃). Sol. CH₂Cl₂, CHCl₃, toluene, EtOH. Mp 158-62°. Air-stable as solid.Connelly, N.G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 2165
(*ir*, *synth*)Rehder, D., *J. Magn. Reson.*, 1977, **25**, 177 (*nmr*)Alway, D.G. *et al*, *Inorg. Chem.*, 1980, **19**, 779 (*synth*, *ir*, *pmr*, *uv*)**C₂₇H₃₃V****V-00105**

Tris(2,4,6-trimethylphenyl)vanadium
Trimesitylvanadium
[59774-49-1]

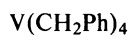


M 408.499

*THF complex:*C₃₁H₄₁O₂V M 480.606Butadiene polymerisation catalyst. Deep-blue cryst. + 1THF (THF). Sol. THF, poorly sol. Et₂O. Paramagnetic. Dec. at 142°.Seidel, W. *et al*, *Z. Chem.*, 1974, **14**, 25; 1977, **17**, 73 (*synth*)Seidel, W. *et al*, *Z. Anorg. Allg. Chem.*, 1977, **435**, 146 (*synth*, *uv*, *ir*)*East Ger. Pat.*, 126 998, (1977); *CA*, **88**, 106023 (*use*)**C₂₈H₂₈V****V-00106****Tetrabenzylvanadium**

Tetrakis(phenylmethyl)vanadium, 9Cl. Vanadium tetrabenzyl

[41328-40-9]

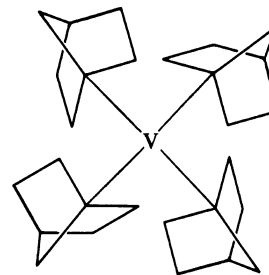


M 415.471

Green-black cryst. (toluene). Sol. hydrocarbons. Light-sensitive, paramagnetic. Solns. stable to 60°.

Ibekwe, S.D. *et al*, *J. Organomet. Chem.*, 1971, **31**, C65 (*synth*, *esr*)Razuvaev, G.A. *et al*, *J. Organomet. Chem.*, 1975, **93**, 113
(*synth*, *esr*)Köhler, E. *et al*, *Z. Anorg. Allg. Chem.*, 1976, **421**, 129 (*esr*, *nmr*)**C₂₈H₄₄V****V-00107****Tetrakis(bicyclo[2.2.1]hept-1-yl)vanadium, 9Cl**

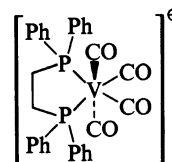
Tetrakis(norbornyl)vanadium. Tetranorbornylvanadium
[36333-77-4]



M 431.597

Alkene oligomerisation catalyst. Purple cryst. (toluene). Sol. hydrocarbons. Dec. >100°, solns. mod. stable to 0.1M H₂SO₄. Paramagnetic.Bower, B.K. *et al*, *J. Am. Chem. Soc.*, 1972, **94**, 2512 (*synth*)*Ger. Pat.*, 2 204 885, (1972); *CA*, **77**, 165313 (*use*)*Ger. Pat.*, 2 204 920, (1972); *CA*, **77**, 165307 (*use*)Bower, B.K. *et al*, *Inorg. Chem.*, 1974, **13**, 759 (*esr*)**C₃₀H₂₄O₄P₂V[⊖]****V-00108**

Tetracarbonyl[1,2-ethanediylbis(diphenylphosphine)-P,P']-vanadate(1-)
[1,2-Bis(diphenylphosphino)ethane]tetracarbonylvandate(1-)

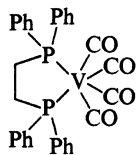


M 561.406 (ion)

Tetraethylammonium salt: [67204-23-3].C₃₈H₄₄NO₄P₂V M 691.659Orange-red cryst. (THF/C₆H₆). Sol. THF, C₆H₆, insol. aliphatic hydrocarbons. Mp 256-60° dec.Davison, A. *et al*, *J. Organomet. Chem.*, 1971, **31**, 239 (*synth*, *ir*)Rehder, D. *et al*, *J. Organomet. Chem.*, 1976, **122**, 53 (*synth*, *ir*, *nmr*)

C₃₀H₂₄O₄P₂V**V-00109**

Tetracarbonyl[1,2-ethanediylbis(diphenylphosphine)-P,P']-vanadium
[Bis(diphenylphosphino)ethane]tetracarbonylvanadium
 [18347-09-6]



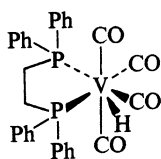
M 561.406

Green cryst. (pentane). Sl. sol. aliphatic hydrocarbons.

Paramagnetic. Dec. in polar solvs.

Behrens, H. *et al*, *Z. Anorg. Allg. Chem.*, 1968, **356**, 225 (*synth, ir, props*)**C₃₀H₂₅O₄P₂V****V-00110**

Tetracarbonyl[1,2-ethanediylbis(diphenylphosphine)-P,P']-hydrovanadium, 10Cl
Hydrotetracarbonyl[bis(diphenylphosphino)ethane]vanadium
 [36681-92-2]



M 562.414

Yellow-brown cryst. (CH₂Cl₂/heptane). Sol. CH₂Cl₂,C₆H₆. Dec. to V(CO)₄(Ph₂PCH₂CH₂PPh₂) above 50°.Davison, A. *et al*, *J. Organomet. Chem.*, 1972, **36**, 131 (*ir, synth*)Greiser, T. *et al*, *Transition Met. Chem.*, 1979, **4**, 168 (*cryst struct*)**C₃₁H₂₄O₅P₂V[⊖]****V-00111**

Pentacarbonyl[η¹-1,2-ethanediylbis(diphenylphosphine)-P]-vanadate(1-)
Pentacarbonyl[bis(diphenylphosphino)ethane]-vanadate(1-)

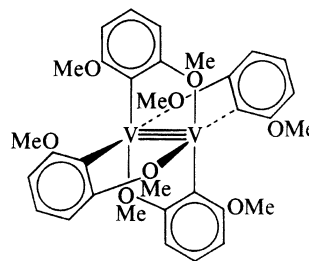


M 589.417 (ion)

One P not coordinated.

Tetraethylammonium salt: [34089-19-5].C₃₉H₄₄NO₅P₂V M 719.669Yellow platelets (Me₂CO). Solns. are light-sensitive.Sol. Me₂CO, THF, MeCN, sl. sol. toluene, insol. Et₂O, EtOH, aliphatic hydrocarbons. Mp 123°.Fjare, K.L. *et al*, *Organometallics*, 1982, **1**, 1373 (*synth, ir, pmr, nmr*)**C₃₂H₃₆O₈V₂****V-00112**

Tetrakis[μ-(2,6-dimethoxyphenyl-C:O)]divanadium, 10Cl
 [62613-18-7]

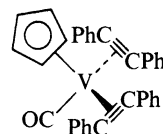


M 650.515

V—V triple bond proposed. Black cryst. (THF). Diamagnetic.

Seidel, W. *et al*, *Z. Chem.*, 1976, **16**, 492 (*synth*)Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 7886 (*struct*)**C₃₄H₂₅OV****V-00113**

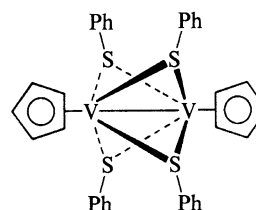
Carbonyl-η⁵-2,4-cyclopentadien-1-ylbis(diphenylacetylene)-vanadium



M 500.512

Orange cryst. (C₆H₆). Sol. common org. solvs. Mp 105–10° dec. Light-sensitive, dec. in air yielding tetraphenylcyclopentadienone.Nesmeyanov, A.N. *et al*, *Dokl. Chem. (Engl. Transl.)*, 1968, **182**, 789 (*synth, ir, pmr*)**C₃₄H₃₀S₄V₂****V-00114**

Tetrakis[μ-(benzenethiolato)]bis(η⁵-2,4-cyclopentadien-1-yl)divanadium, 9Cl
 [59487-44-4]



M 668.734

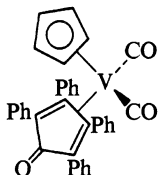
Brown cryst. Insol. common org. solvs. Paramagnetic.

Volatile under high vacuum. Dec. at 300°.

Muller, E.G. *et al*, *J. Organomet. Chem.*, 1976, **111**, 73 (*synth, props*)Pasynskii, A.A. *et al*, *Inorg. Chim. Acta*, 1980, **39**, 91 (*synth, ir, ms*)

C₃₆H₂₅O₃V

V-00115

Dicarbonyl- η^5 -2,4-cyclopentadien-1-yl(η^4 -tetraphenylcyclopentadienone)vanadium*Dicarbonylcyclopentadienyltetracyclonevanadium*

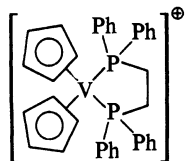
M 556.533

Red-orange cryst. (C₆H₆). Sol. aromatic hydrocarbons, Et₂O. Mp 123-6° dec. Dec. in air yielding tetraphenylcyclopentadienone.

Pasynskii, A.A. *et al*, *Dokl. Chem. (Engl. Transl.)*, 1969, **185**, 253 (*synth, ir*)

C₃₆H₃₄P₂V[⊕]

V-00116

Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethanediylbis(diphenylphosphine)-*P, P'*]vanadium(1+), η Cl*[Bis(diphenylphosphino)ethane]bis(cyclopentadienyl)vanadium(1+)*

M 579.554 (ion)

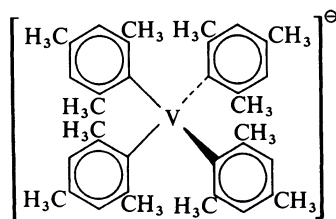
Tetraphenylborate: [57088-89-8].C₆₀H₅₄BP₂V M 898.786

Green solid (THF). Sol. THF. Diamagnetic.

Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1046.

C₃₆H₄₄V[⊖]

V-00117

Tetrakis(2,4,6-trimethylphenyl)vanadate(1-)*Tetramesitylvanadate(1-)*

M 527.685 (ion)

Paramagnetic.

Li salt, tetrakis(THF) complex: [59834-80-9].C₅₂H₇₆LiO₄V M 823.053Deep-violet cryst. (THF/Et₂O). Sol. THF, spar. sol.Et₂O, C₆H₆. Dec. at 161°.

Seidel, W. *et al*, *Z. Anorg. Allg. Chem.*, 1976, **426**, 150 (*synth*)

Seidel, W. *et al*, *Z. Chem.*, 1977, **17**, 73 (*synth, props*)

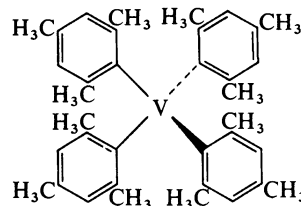
Kreisel, G. *et al*, *Z. Anorg. Allg. Chem.*, 1980, **460**, 51 (*uv*)

C₃₆H₄₄V

V-00118

Tetrakis(2,4,6-trimethylphenyl)vanadium*Tetramesitylvanadium*

[59774-48-0]



M 527.685

Air-stable red cryst. (C₆H₆). Sol. aromatic hydrocarbons. Paramagnetic.

Seidel, W. *et al*, *Z. Chem.*, 1976, **16**, 115 (*synth*)

Glowiak, T. *et al*, *J. Organomet. Chem.*, 1978, **155**, 39 (*struct, uv, props*)

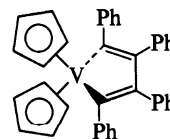
Kirmse, R. *et al*, *Z. Chem.*, 1980, **20**, 385 (*esr*)

C₃₈H₃₀V

V-00119

Bis(η^5 -2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)vanadium, η Cl

[59547-67-0]



M 537.597

Green cryst. (Et₂O).

Vogelaar-Van der Huizen, T.M. *et al*, *J. Organomet. Chem.*, 1976, **105**, 321 (*synth, ir, esr*)

W Tungsten

M. Green

Tungstène (Fr.), Wolfram (Ger.), Tungsteno (Sp., Ital.), Вольфрам (Vol'fram) (Russ.), タングステン (Japan.)

Atomic Number. 74

Atomic Weight. 183.85

Electronic Configuration. [Xe] $5d^4 6s^2$

Oxidation States. -4, -2, -1, 0, +2, +4, +6

Coordination Number. The most common coordination number with conventional ligands is 6, eg. $[\text{W}_2(\text{CO})_{10}]^{2-}$, $[\text{W}(\text{CS})(\text{CO})_5]$, WMe_6 but 4, 5 and 7 are also known.

Colour. Variable, including colourless, yellow, red, green and blue.

Availability. Readily available starting materials are $\text{W}(\text{CO})_6$ and anhydrous WCl_6 which are moderately expensive.

Handling. See under Chromium.

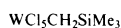
Toxicity. Tungsten compounds, with the exception of the carbonyl complexes, are not regarded as highly toxic.

Isotopic Abundance. ^{180}W , 0.135%; ^{182}W , 26.4%; ^{183}W , 14.4%; ^{184}W , 30.6%; ^{186}W , 28.4%. Fifteen radioisotopes of tungsten have been detected. ^{185}W (β -emitter, $t_{1/2} = 75\text{d}$) and ^{187}W (β -emitter, $t_{1/2} \sim 23.8\text{h}$) are most often used for tracer work.

Spectroscopy. ^{183}W , $I = \frac{1}{2}$, has a low relative receptivity, but even so, a range of ^{183}W nmr chemical shift data is available for organometallics. See for example McFarlane, H. C. E. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1976, 1616.

Analysis. For standard methods see *Scott's Standard methods of Chemical Analysis*, Furman, N. H. Ed., 6th Edn, Van Nostrand, 1962.

References. General reviews are listed in the introduction to the *Sourcebook*.



W-00001



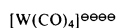
W-00018



W-00033



W-00049



W-00002

As W-00018 with
L = ClAs W-00018 with
L = Me

W-00034



W-00003



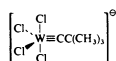
W-00020

As W-00018 with
L = SO₂Me

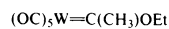
W-00035



W-00050



W-00004

As W-00018 with
L = I

W-00036

As W-00018 with
L = AsMe₂

W-00051



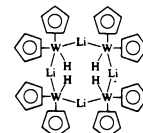
W-00005



W-00021



W-00037



W-00052

As W-00005 with
X = Cl

W-00006



W-00022



W-00038

As W-00018 with
L = SbMe₂

W-00053



W-00007

As W-00018 with
L = H

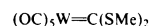
W-00039



W-00054

As W-00005 with
X = I

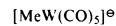
W-00008



W-00025



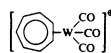
W-00040



W-00009



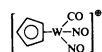
W-00026



W-00041



W-00055



W-00010



W-00027



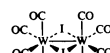
W-00042



W-00056



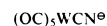
W-00011



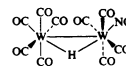
W-00028

As W-00031 with
R = CH₃

W-00043



W-00012



W-00029



W-00044

As W-00057 with
X = Cl

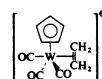
W-00058



W-00013



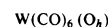
W-00030



W-00045

As W-00057 with
X = I

W-00059



W-00014



W-00031



W-00046



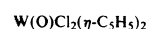
W-00060



W-00015



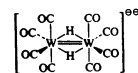
W-00032



W-00047



W-00061



W-00017

As W-00046 with
X = Cl

W-00048



W-00062

As W-00018 with
L = GeMe₃

W-00063

As W-00018 with
L = SiMe₃

W-00064

As W-00018 with
L = SnMe₃

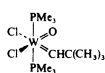
W-00065



W-00066

$W \equiv C(CH_3)_3(O=P(Et)_3)Cl_3$

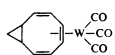
W-00067



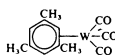
W-00068



W-00069



W-00070



W-00071



W-00072



W-00073



W-00074



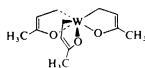
W-00075



W-00076



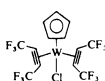
W-00077



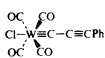
W-00078



W-00079



W-00080



W-00081



W-00082

$(OC)_5W=CPhOMe$

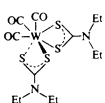
W-00083



W-00084



W-00085



W-00086

$(OC)_4WP[CH(CH_3)_2]_3^{3-}$

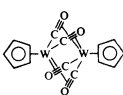
W-00087



W-00088

$[WCl(CO)_2(C_5H_5)]_2$

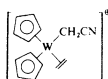
W-00089



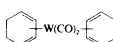
W-00090



W-00091



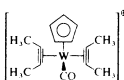
W-00092



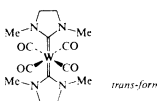
W-00093



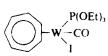
W-00094



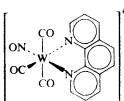
W-00095



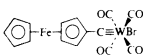
W-00096



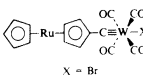
W-00097



W-00098



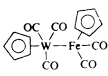
W-00099



W-00100

As W-00100 with
X = Cl

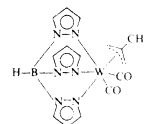
W-00101



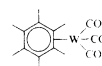
W-00102



W-00103



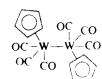
W-00104



W-00105

$W_2(\mu-SCF_3)_2(CO)_4(\eta-C_5H_5)_2$

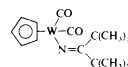
W-00106



W-00107



W-00108



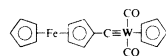
W-00109

$[(H_3C)_3CO]_4WO$

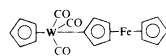
W-00110

$(OC)_5W=CPh_2$

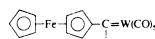
W-00111



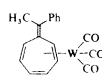
W-00112



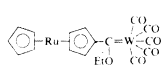
W-00113



W-00114



W-00115



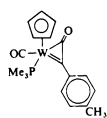
W-00116

$(C_5H_5)_2ErW(C_5H_5)(CO)_3$

W-00117

$(C_5H_5)_2YbW(C_5H_5)(CO)_3$

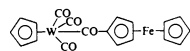
W-00118



W-00119



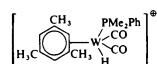
W-00120



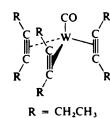
W-00121



W-00122



W-00123



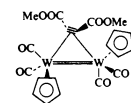
W-00124



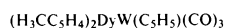
W-00125



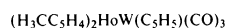
W-00126



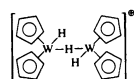
W-00127



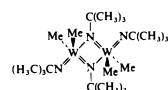
W-00128



W-00129



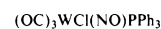
W-00130



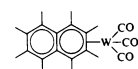
W-00131



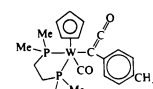
W-00132



W-00133



W-00134



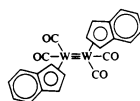
W-00135



W-00136



W-00137



W-00138



W-00139



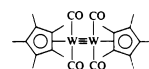
W-00140



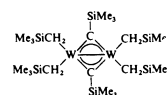
W-00141



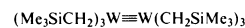
W-00142



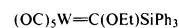
W-00143



W-00144



W-00145



W-00146



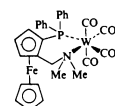
W-00147



W-00148



W-00149



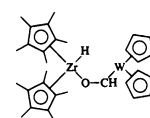
W-00150



W-00151



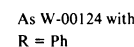
W-00152



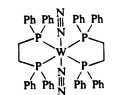
W-00153



W-00154



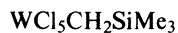
W-00155



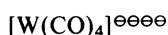
W-00156

C₄H₁₁Cl₅SiW**W-00001****Pentachloro[(trimethylsilyl)methyl]tungsten**

[57595-19-4]



M 448.331

Dolgoplosk, B.A. *et al*, *Dokl. Chem. (Engl. Transl.)*, 1975, **223**, 501 (*synth*)Neugebauer, D. *et al*, *J. Organomet. Chem.*, 1978, **153**, C41 (*cryst struct*)**C₄O₄W^{⊖⊖⊖⊖}****W-00002****Tetracarbonyltungstate(4-)**

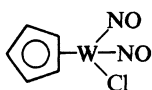
M 295.892 (ion)

Tetra-Na salt: [67202-46-4].C₄Na₄O₄W M 387.851

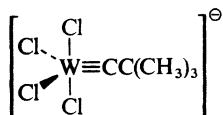
▷Pyrophoric

Ellis, J.E. *et al*, *J. Am. Chem. Soc.*, 1983, **105**, 2296 (*synth, props*)**C₅H₅ClN₂O₂W****W-00003****Chloro(η⁵-cyclopentadien-1-yl)dinitrosyltungsten, 10Cl**

[53419-14-0]



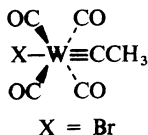
M 344.410

Green cryst. Bp_{0.005} 40-50° subl.Hoyano, J.K. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1022.*Inorg. Synth.*, 1978, **18**, 126 (*synth*)Botto, R.E. *et al*, *Inorg. Chem.*, 1979, **18**, 2049 (*synth, nmr, props*)Legzdins, P. *et al*, *Inorg. Chem.*, 1979, **18**, 1250.**C₅H₉Cl₄W[⊖]****W-00004****Tetrachloro(1,1-dimethylpropylidyne)tungsten(1-), 10Cl**

M 394.788 (ion)

Tetraethylammonium salt: [78251-20-4].C₁₃H₂₉Cl₄NW M 525.041Wengrovius, J.H. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 3932 (*synth, cmr, props*)**C₆H₃BrO₄W****W-00005****Bromotetracarbonyl ethylidynetungsten, 10Cl**

[50726-31-3]



X = Br

M 402.841

Colourless cryst.

Fischer, E.O. *et al*, *Chem. Ber.*, 1976, **109**, 1673 (*synth*)Fischer, E.O. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1977, **16**, 465 (*props*)**C₆H₃ClO₄W****W-00006****Tetracarbonylchloroethylidynetungsten, 9Cl**

[60872-91-5]

As Bromotetracarbonyl ethylidynetungsten, W-00005 with

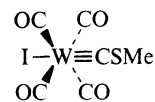
X = Cl

M 358.390

Brown cryst. (pentane).

Fischer, E.O. *et al*, *Chem. Ber.*, 1976, **109**, 1673 (*synth, ir, nmr, mr*)**C₆H₃IO₄SW****W-00007****Tetracarbonyliodo(methylthiomethylidyne) tungsten, 9Cl**

[59831-50-4]



M 481.902

Mod. air-sensitive yellow cryst.

Angelici, R.J. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 7516; 1974, **96**, 7586; 1975, **97**, 1261 (*synth, nmr*)**C₆H₃IO₄W****W-00008****Tetracarbonyl ethylidynetungsten, 10Cl**

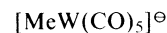
[50726-32-4]

As Bromotetracarbonyl ethylidynetungsten, W-00005 with

X = I

M 449.842

Yellow cryst. stable below 30°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1976, **109**, 1673 (*synth, ir, nmr*)
Neugebauer, D. *et al*, *J. Organomet. Chem.*, 1978, **153**, C41 (*cryst struct*)**C₆H₃O₅W[⊖]****W-00009****Pentacarbonylmethyltungstate(1-), 9Cl***Methylpentacarbonyltungsten(1-)*

M 338.937 (ion)

(Ph₃P)₂N[⊕] salt: [62197-79-9]. (T-4)Triphenyl(P,P,P-triphenylphosphineimidato-N)phosphorus(1+) pentacarbonylmethyltungstate(1-), 9Cl. Bis(triphenylphosphine)iminium methylpentacarbonyltungstate.C₄₂H₃₃NO₅P₂W M 877.524

Yellow cryst.

Me₄N[⊕] salt: [68866-90-0]. N,N,N-Trimethylmethanaminium(1+) pentacarbonylmethyltungstate(1-), 9Cl. Tetramethylammonium methylpentacarbonyltungstate.C₁₀H₁₅NO₅W M 413.082Yellow cryst. (CH₂Cl₂/Et₂O).Et₄N[⊕] salt: [57574-51-3]. N,N,N-Triethylethanaminium(1+) pentacarbonylmethyltungstate(1-), 9Cl.

Tetraethylammonium methylpentacarbonyltungstate.

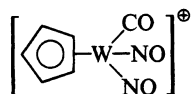
C₁₄H₂₃NO₅W M 469.189

Yellow cryst. (CH₂Cl₂/hexane).

Ellis, J.E. *et al*, *Inorg. Chem.*, 1977, **16**, 1357 (*synth*)
Casey, C.P. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7565 (*synth*,
nmr)

C₆H₅N₂O₃W[⊕]**W-00010****Carbonyl(η⁵-2,4-cyclopentadien-1-yl)dinitrosyltungsten(1+),**
9Cl

[53419-02-6]



M 336.967 (ion)

Hexafluorophosphate: [53419-03-7].

C₆H₅F₆N₂O₃PW M 481.931

Green powder.

Stewart, R.P. *et al*, *Inorg. Chem.*, 1975, **14**, 2699 (*synth*)**C₆H₁₈W****W-00011****Hexamethyltungsten, 9Cl**

Tungsten hexamethyl

[36133-73-0]

WMe₆ (O_h)

M 274.058

Dark-red cryst.; stable when stored at –40°. Sol.
hydrocarbons. Dec. at r.t.▷ Reacts explosively with atmos. oxygen and may also
detonate *in vacuo* or under N₂ or ArShortland, A.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 872
(*ir*)Smith, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 1742.Gayler, A.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 2235
(*synth*, *nmr*, *ms*)Chiu, K.W. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 7978.**C₆NO₅W[⊖]****W-00012****Pentacarbonyl(cyano-C)tungstate(1–), 10Cl**

[68927-82-2]

(OC)₅WCN[⊖]

M 349.920 (ion)

Tetraethylammonium salt: [77827-07-7].

C₁₄H₂₀N₂O₅W M 480.172White cryst. Sol. H₂O.

Bis(triphenylphosphine)iminium salt: [22043-88-5].

C₄₂H₃₀N₂O₅P₂W M 888.507

White cryst.

King, R.B., *Inorg. Chem.*, 1967, **6**, 25.Ruff, J.K. *et al*, *Synth. React. Inorg. Metal-Org. Chem.*, 1971,
1, 215 (*synth*)Fehlhammer, W.P. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1979,
18, 75 (*props*)Angelici, R.J. *et al*, *Inorg. Chem.*, 1981, **20**, 2977 (*synth*)**C₆O₅SW****W-00013****(Carbonothioyl)pentacarbonyltungsten, 9Cl**

Thiocarbonylpentacarbonyltungsten

[50358-92-4]

(OC)₅WCS

M 367.973

Yellow cryst. (hexane).

Angelici, R.J. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 7516 (*props*)Angelici, R.J. *et al*, *Inorg. Chem.*, 1976, **15**, 1089 (*synth*)Fenske, R.F. *et al*, *Inorg. Chem.*, 1976, **15**, 2015 (*struct*)Angelici, R.J. *et al*, *Inorg. Chem.*, 1976, **15**, 2403 (*props*)Poliakoff, M., *Inorg. Chem.*, 1976, **15**, 2892 (*ir*)Butler, I.S., *Acc. Chem. Res.*, 1977, **10**, 359 (*synth*, *props*)**C₆O₆W****W-00014****Tungsten carbonyl, 9Cl**

Hexacarbonyltungsten. Tungsten hexacarbonyl

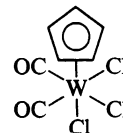
[14040-11-0]

W(CO)₆ (O_h)

M 351.912

Important starting material. Air-stable, colourless,
odourless cryst. Sl. sol. hexane. Mp 150° dec.Arnesen, S.P. *et al*, *Acta Chem. Scand.*, 1966, **20**, 2711 (*ed*)Jones, L.H. *et al*, *Inorg. Chem.*, 1969, **11**, 2349 (*ir*)Beneze, L., *J. Organomet. Chem.*, 1972, **37**, C37 (*struct*)Brateman, P.S. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1027
(*nmr*)Dellien, I. *et al*, *Chem. Rev.*, 1976, **76**, 283.Hagen, A.P. *et al*, *Inorg. Chem.*, 1978, **17**, 1369 (*synth*, *bibl*)**C₇H₅Cl₃O₂W****W-00015****Dicarbonyltrichloro(η⁵-2,4-cyclopentadien-1-yl)tungsten, 8Cl**

[12107-08-3]

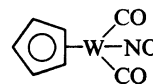


M 411.324

Yellow cryst. Dec. at 150°.

Green, M.L.H. *et al*, *J. Chem. Soc. (A)*, 1967, 686 (*synth*, *nmr*,
ir)King, R.B. *et al*, *J. Organomet. Chem.*, 1973, **60**, 125 (*synth*)**C₇H₅NO₃W****W-00016****Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)nitrosyltungsten, 10Cl**

[12128-14-2]

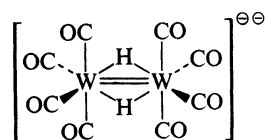


M 334.971

Orange-red solid. Bp_{0.005} 50-60° subl.Crease, A.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1501.Rosan, A.M. *et al*, *Synth. React. Inorg. Metal-Org. Chem.*,
1976, **6**, 357 (*synth*)*Inorg. Synth.*, 1978, **18**, 126 (*synth*)Botto, R.E. *et al*, *Inorg. Chem.*, 1979, **18**, 2049 (*struct*)Ginzberg, A.E. *et al*, *J. Organomet. Chem.*, 1979, **182**, C1.

C₈H₂O₈W₂²⁻

Octacarbonyldi-μ-hydroditungstate(2-), 9Cl



M 593.799 (ion)

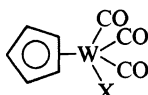
Bis(tetraethylammonium) salt:

C₂₄H₄₂N₂O₈W₂ M 854.304

Red cryst.

Davison, A. *et al.*, *J. Chem. Soc., Chem. Commun.*, 1973, 691 (synth)Churchill, M.R. *et al.*, *Inorg. Chem.*, 1974, **13**, 2413 (cryst struct)C₈H₅BrO₃WBromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)tungsten, 9Cl

[37131-50-3]



L = Br

M 412.880

Red cryst. (CHCl₃/pentane).Sloan, T.E. *et al.*, *Inorg. Chem.*, 1968, **7**, 1268 (synth, ir, nmr)C₈H₅ClO₃WTricarbonylchloro(η⁵-2,4-cyclopentadien-1-yl)tungsten, 9ClChlorotricarbonyl(η⁵-cyclopentadienyl)tungsten

[12128-24-4]

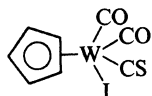
As Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-tungsten, W-00018 with

L = Cl

M 368.429

Deep-red cryst. (CCl₄). Mp 160° dec.Coffey, C.E., *J. Inorg. Nucl. Chem.*, 1963, **25**, 179 (synth, ir)Green, M.L.H. *et al.*, *J. Chem. Soc. (A)*, 1967, 687 (pmr)King, R.B., *Org. Mass Spectrom.*, 1969, **2**, 401 (ms)Laine, R.M. *et al.*, *Inorg. Chem.*, 1977, **16**, 388 (synth, nmr)C₈H₅IO₂SW(Carbonothioyl)dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)iodotungsten, 10ClThiocarbonyldicarbonyl(η⁵-cyclopentadienyl)iodotungsten

[72303-50-5]



M 475.941

Air-stable purple cryst. (CH₂Cl₂/hexane at -20°).Greaves, W.W. *et al.*, *J. Organomet. Chem.*, 1980, **191**, 49 (synth, ir, nmr)C₈H₅IO₃WTricarbonyl(η⁵-2,4-cyclopentadien-1-yl)iodotungsten, 10ClIodotricarbonyl(η⁵-cyclopentadienyl)tungsten

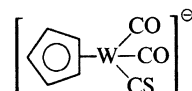
W-00017

[31870-69-6]

As Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-tungsten, W-00018 with

X = I

M 459.880

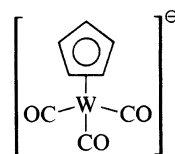
Red cryst. (CHCl₃/pentane).Sloan, T.E. *et al.*, *Inorg. Chem.*, 1968, **7**, 1268 (synth, ir, nmr)C₈H₅O₂SW⁻(Carbonothioyl)dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)tungstate(1-), 10ClThiocarbonyldicarbonyl(η⁵-cyclopentadienyl)-tungsten(1-)

M 349.036 (ion)

Tetrabutylammonium salt: [74989-73-4].

C₂₄H₄₁O₂NSW M 591.503Characterised spectroscopically, not isol. ir ν_{CO} 1890, 1804 cm⁻¹ (CH₂Cl₂).Greaves, W.W. *et al.*, *J. Organomet. Chem.*, 1980, **191**, 49 (synth, ir, nmr)C₈H₅O₃W⁻Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)tungstate(1-), 10Cl

[12126-17-9]



M 332.976 (ion)

Na salt: [12107-36-7].

C₈H₅NaO₃W M 355.965

Reactive, air-sensitive.

K salt: [62866-03-9].

C₈H₅KO₃W M 372.074

Reactive, air-sensitive.

Brunner, H. *et al.*, *J. Organomet. Chem.*, 1976, **107**, 307 (props)Tsutsui, M. *et al.*, *J. Organomet. Chem.*, 1976, **116**, 91 (props)*Inorg. Synth.*, 1977, **17**, 104 (synth)Nesmeyanov, A.N. *et al.*, *J. Organomet. Chem.*, 1979, **166**, 217 (props)Malisch, W. *et al.*, *Chem. Ber.*, 1980, **113**, 3318 (props)Olgemüller, B. *et al.*, *Chem. Ber.*, 1981, **114**, 867 (props)C₈H₆O₃WTricarbonyl(η⁵-2,4-cyclopentadien-1-yl)hydrotungsten, 9ClHydridotricarbonyl(η⁵-cyclopentadienyl)tungsten. Cyclopentadienyltungsten tricarbonyl hydride

[12128-26-6]

As Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-tungsten, W-00018 with

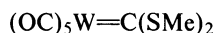
L = H

M 333.984

Yellow cryst. by subl. *in vacuo*. Mp 68.5-69.5°.*Inorg. Synth.*, 1963, **7**, 136 (synth)King, R.B. *et al.*, *Inorg. Chem.*, 1966, **5**, 1837 (synth)

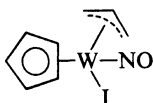
Faller, J.W. *et al*, *J. Chem. Soc., Chem. Commun.*, 1969, 719 (*nmr*)
 Johnson, B.F.G. *et al*, *J. Chem. Soc. (A)*, 1970, 1684 (*ms*)
 Kalck, P. *et al*, *J. Organomet. Chem.*, 1970, **24**, 445.
 Keppie, S.A. *et al*, *J. Chem. Soc. (A)*, 1971, 3216 (*synth, nmr*)
 Davidson, G. *et al*, *J. Organomet. Chem.*, 1976, **120**, 229 (*ir, raman*)
 McFarlane, H.C. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1616 (*nmr*)

C₈H₆O₅S₂W **W-00025**
[Bis(methylthio)methylene]pentacarbonyltungsten, 10Cl
 [76262-42-5]



M 430.102
 Red cryst. (pentane at –20°). Mp 63–5°.
 Angelici, R.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 817 (*synth, props*)

C₈H₁₀INOW **W-00026**
(η^5 -2,4-Cyclopentadien-1-yl)iodonitrosyl(η^3 -2-propenyl)tungsten, 10Cl
 η^3 -Allylcyclopentadienyliodonitrosyltungsten
 [71341-42-9]

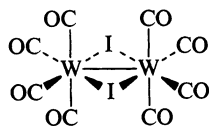


M 446.928
 Orange-brown cryst. Mp 165° dec.
 Legzdins, P. *et al*, *Inorg. Chem.*, 1979, **18**, 3268 (*synth, cryst struct, nmr*)

C₈H₂₄W^{⊖⊖} **W-00027**
Octamethyltungstate(2–), 9Cl
 $[WMe_8]^{2-}$

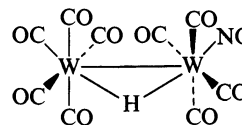
M 304.128 (ion)
Di-Li salt: [62337-31-9].
 C₈H₂₄Li₂W M 318.010
 Yellow powder.
 Gayler, A.L. *et al*, *J. Organomet. Chem.*, 1975, **85**, C37.
 Gayler, A.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 2235 (*synth, props*)

C₈I₂O₈W₂ **W-00028**
Octacarbonyldi- μ -iododitungsten, 9Cl
 [55405-97-5]



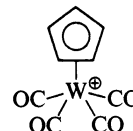
M 845.592
 W—W bond length 2.155 Å.
 Schmid, G. *et al*, *Chem. Ber.*, 1975, **108**, 260 (*synth*)
 Schmid, G. *et al*, *Chem. Ber.*, 1976, **109**, 2148 (*props, cryst struct*)

C₉HNO₁₀W₂
Nonacarbonyl- μ -hydronitrosylditungsten, 9Cl
 [40270-21-1]



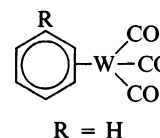
M 650.808
 NO group axial, bent staggered struct. Orange cryst. (CH₂Cl₂). Sol. common org. solvs. Mp 128–129.5°.
 Air-stable as solid but mod. air-sensitive in soln.
 Bau, R. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 6621 (*synth, cryst struct*)
 King, R.B. *et al*, *Inorg. Chem.*, 1974, **13**, 3038 (*props*)
 Angelici, R.J. *et al*, *Inorg. Chem.*, 1976, **15**, 2397 (*synth*)

C₉H₅O₄W[⊕] **W-00030**
Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten(1+)



M 360.986 (ion)
Hexafluorophosphate: [37668-41-0].
 C₉H₅F₆O₄PW M 505.950
 Yellow powder (Me₂CO/Et₂O).
 Fischer, E.O. *et al*, *Chem. Ber.*, 1962, **95**, 249 (*synth*)
 Dub, M. *Organometallic Compounds*, Springer-Verlag, Berlin, 2nd Ed., 1966, Vol. 1 (*synth*)
 Treichel, P.M. *et al*, *Inorg. Chem.*, 1967, **6**, 1328.
 Treichel, P.M. *et al*, *J. Organomet. Chem.*, 1967, **7**, 449 (*synth*)
 Nolte, M.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1978, 932.

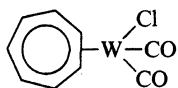
C₉H₆O₃W **W-00031**
(η^6 -Benzene)tricarbonyltungsten, 9Cl
Tricarbonylbenzenetungsten
 [12128-53-9]



M 345.995
 Yellow air-stable cryst. Sol. org. solvs. Mp 140–5°.
 King, R.B. *et al*, *Inorg. Chem.*, 1966, **5**, 1837 (*synth*)
 Brown, D.A. *et al*, *J. Chem. Soc. (A)*, 1969, 1534 (*struct*)
 Pidcock, A. *et al*, *J. Chem. Soc. (A)*, 1969, 1604 (*props*)
 Pettit, R. *et al*, *J. Am. Chem. Soc.*, 1971, **93**, 7087 (*props*)
 Mann, B.E., *J. Chem. Soc., Dalton Trans.*, 1973, 2012 (*nmr*)
 Lokshin, B.V. *et al*, *J. Organomet. Chem.*, 1975, **102**, 535 (*props*)

C₉H₇ClO₂W**W-00032**

Dicarbonylchloro(η⁷-cycloheptatrienyl)tungsten, 9Cl
Dicarbonylchlorotropyliumtungsten
 [59589-12-7]

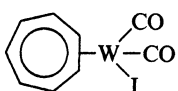


M 366.456

King, R.B. *et al*, *Inorg. Chem.*, 1966, **5**, 1837 (*synth*)
 Hoch, G. *et al*, *Z. Naturforsch., B*, 1976, **31**, 294 (*props*)
 Powell, P. *et al*, *J. Organomet. Chem.*, 1978, **149**, C1 (*props*)

C₉H₇IO₂W**W-00033**

Dicarbonyl(η⁷-cycloheptatrienyl)iodotungsten, 9Cl
Dicarbonyliodotropyliumtungsten
 [12082-10-9]



M 457.908

Greenish-black cryst. Mp 185-91° dec.

King, R.B. *et al*, *Inorg. Chem.*, 1966, **5**, 1837 (*synth*, *ir*, *nmr*)
 Powell, P. *et al*, *J. Organomet. Chem.*, 1978, **149**, C1 (*props*)

C₉H₈O₃W**W-00034**

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)methyltungsten, 10Cl
Methyltricarbonyl(η⁵-cyclopentadienyl)tungsten
 [12082-27-8]

As Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-
 tungsten, W-00018 with

L = Me

M 348.010

Lemon-yellow cryst. Mp 144.7-145.3°.

Piper, T.S. *et al*, *J. Inorg. Nucl. Chem.*, 1956, **3**, 104 (*synth*, *ir*, *pmr*)
 Davidson, G. *et al*, *J. Organomet. Chem.*, 1976, **120**, 229 (*ir*, *raman*)
 McFarlane, H.C. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1616 (*nmr*)
 Alt, H.G., *J. Organomet. Chem.*, 1977, **124**, 167 (*synth*)
 Severson, R.G. *et al*, *J. Organomet. Chem.*, 1978, **157**, 173 (*synth*, *uv*)

C₉H₈O₅SW**W-00035**

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)methanesulfonyltungsten, 10Cl
Methanesulfonyl tricarbonyl(η⁵-cyclopentadienyl)tungsten

[52409-63-9]

As Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-
 tungsten, W-00018 with

L = SO₂Me

M 412.069

Yellow cryst. Mp 176-9° dec.

Kroll, J.O. *et al*, *J. Organomet. Chem.*, 1974, **66**, 95 (*synth*, *nmr*, *ir*)
 Lorenz, I.P. *et al*, *Z. Naturforsch., B*, 1976, **31**, 888 (*synth*)
 Severson, R.G. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 877 (*synth*, *nmr*)

C₉H₈O₆W**W-00036**

Pentacarbonyl(1-ethoxyethylidene)tungsten, 8Cl
 [25879-47-4]

(OC)₅W=C(CH₃)OEt

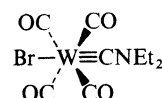
M 396.009

Yellow cryst. (pentane).

Aumann, R. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1967, **6**, 878 (*synth*)
 Darensbourg, M.Y. *et al*, *Inorg. Chem.*, 1970, **9**, 32 (*synth*)

C₉H₁₀BrNO₄W**W-00037**

Bromotetracarbonyl[(diethylamino)methylidyne]tungsten
 [60872-94-8]



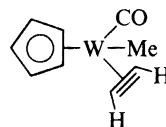
M 459.936

Yellow cryst. Mp 47°.

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1974, **65**, C53 (*synth*, *ir*, *nmr*)

C₉H₁₀OW**W-00038**

Carbonyl(η⁵-2,4-cyclopentadien-1-yl)(η²-ethyne)methyltungsten, 10Cl
(Acetylene)carbonyl(η⁵-cyclopentadienyl)methyltungsten
 [62798-73-6]



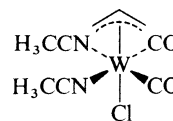
M 318.027

Cryst. Mp 91°.

Alt, H.G., *J. Organomet. Chem.*, 1977, **127**, 349 (*synth*, *ir*, *nmr*)
 Alt, H.G. *et al*, *Z. Naturforsch., B*, 1977, **32**, 144 (*synth*)

C₉H₁₁ClN₂O₂W**W-00039**

Bis(acetonitrile)dicarbonylchloro(η³-2-propenyl)tungsten, 10Cl
Bis(acetonitrile)(η³-allyl)dicarbonylchlorotungsten
 [62680-77-7]



M 398.501

Yellow cryst.

Hayter, R.E., *J. Organomet. Chem.*, 1968, **13**, P1 (*synth*)
 Hohmann, F., *J. Organomet. Chem.*, 1977, **137**, 315 (*synth*)
 Doyle, G., *J. Organomet. Chem.*, 1978, **150**, 67 (*props*)
 Brisdon, B.J. *et al*, *Inorg. Chim. Acta*, 1980, **40**, 191 (*props*)
 Brisdon, B.J. *et al*, *Transition Met. Chem.*, 1981, **6**, 83 (*props*)

C₁₀HO₁₀W₂[⊖]**W-00040**

Decacarbonyl-μ-hydroditungstate(1-)
 [19773-10-5]

[W₂H(CO)₁₀][⊖]

M 648.812 (ion)

Et₄N[⊕] salt adopts linear eclipsed struct. PPN[⊕] salt adopts bent staggered struct.

Tetraethylammonium salt: [12083-01-1].

C₁₈H₂₁NO₁₀W₂ M 779.065

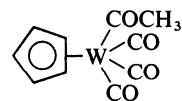
Yellow cryst.

Bis(triphenylphosphine)iminium salt: [56172-01-1].

C₄₆H₃₁NO₁₀P₂W₂ M 1187.399Yellow prisms (CH₂Cl₂/Et₂O).Hayter, R.G., *J. Am. Chem. Soc.*, 1966, **88**, 4376 (*synth*)Gray, H.B. *et al.*, *J. Am. Chem. Soc.*, 1975, **97**, 3073 (*synth*, *ir*)Wilson, R.D. *et al.*, *J. Organomet. Chem.*, 1975, **91**, C49 (*cryst struct*)Bau, R. *et al.*, *Acc. Chem. Res.*, 1979, **12**, 176 (*cryst struct*)Yellow cryst. Mp 139-42° dec. Bp_{0.2} 120° subl.King, R.B. *et al.*, *Inorg. Chem.*, 1966, **5**, 1837 (*synth*)Kobayashi, H. *et al.*, *Bull. Chem. Soc. Jpn.*, 1975, **48**, 1222 (*ir*)**C₁₀H₈O₄W****W-00044**Acetyltricarbonyl(η⁵-2,4-cyclopentadien-1-yl)tungsten, 10ClTricarbonyl(η⁵-2,4-cyclopentadien-1-yl)acetyltungsten.

Cyclopentadienyltricarbonylacetyltungsten

[64666-36-0]

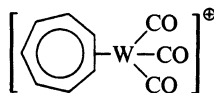


M 376.021

Yellow cryst.

Adams, R.D. *et al.*, *Inorg. Chem.*, 1978, **17**, 266 (*synth*, *props*)**C₁₀H₇O₃W[⊕]****W-00041**Tricarbonyl(η⁷-cycloheptatrienylum)tungsten(1+), 9ClTricarbonyl(η⁷-tropylium)tungsten(1+)

[46238-46-4]

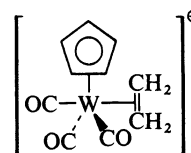


M 359.014 (ion)

Tetrafluoroborate: [12083-17-9].

C₁₀H₇BF₄O₃W M 445.817

Orange cryst.

King, R.B. *et al.*, *Inorg. Chem.*, 1966, **5**, 1837 (*synth*, *props*)Kane-Maguire, L.A.P. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1973, 1683 (*props*)Kane-Maguire, L.A.P. *et al.*, *J. Organomet. Chem.*, 1975, **102**, C4 (*props*)John, G.R. *et al.*, *J. Organomet. Chem.*, 1976, **120**, C47 (*props*)Ziegler, M.L. *et al.*, *Z. Naturforsch., B*, 1976, **31**, 294 (*props*)**C₁₀H₉O₃W[⊕]****W-00045**Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(η²-ethene)tungsten(1+), 10ClTricarbonyl(η⁵-cyclopentadienyl)(ethylene)-tungsten(1+)

M 361.029 (ion)

Tetrafluoroborate: [63079-59-4].

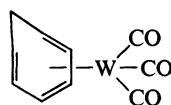
C₁₀H₉BF₄O₃W M 447.833

Green cryst.

Fischer, E.O. *et al.*, *Chem. Ber.*, 1961, **94**, 1200 (*synth*)Knoth, W.H., *Inorg. Chem.*, 1975, **14**, 1566 (*synth*, *props*)**C₁₀H₈O₃W****W-00042**

Tricarbonyl[(1,2,3,4,5,6-η)-1,3,5-cycloheptatriene]tungsten, 9Cl

[12128-81-3]

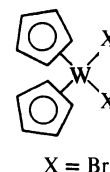


M 360.021

Air-stable red cryst. Sol. hydrocarbons. Sublimes.

King, R.B. *et al.*, *Inorg. Chem.*, 1966, **5**, 1837 (*synth*)King, R.B. *et al.*, *Inorg. Chem.*, 1971, **10**, 1841 (*props*)Kreiter, C.G. *et al.*, *Chem. Ber.*, 1975, **108**, 1502 (*nmr*)Brown, D.L.S. *et al.*, *J. Organomet. Chem.*, 1977, **142**, 321 (*props*)Fragala, I. *et al.*, *J. Organomet. Chem.*, 1979, **182**, 511 (*pe*)Gower, M. *et al.*, *Inorg. Chim. Acta*, 1979, **37**, 79 (*props*)**C₁₀H₁₀Br₂W****W-00046**Dibromobis(η⁵-2,4-cyclopentadien-1-yl)tungsten, 10Cl

[12184-19-9]



X = Br

M 473.847

Green cryst. Dec. at 250°.

Cooper, R.L. *et al.*, *J. Chem. Soc. (A)*, 1967, 1155 (*synth*)**C₁₀H₁₀Cl₂OW****W-00047**Dichlorobis(η⁵-2,4-cyclopentadien-1-yl)oxotungsten, 10Cl

[53504-76-0]

W(O)Cl₂(η-C₅H₅)₂

M 400.944

Green cryst. (pet. ether).

Anand, S.P. *et al.*, *J. Organomet. Chem.*, 1969, **17**, 423 (*synth*)Anand, S.P. *et al.*, *J. Organomet. Chem.*, 1969, **19**, 387; 1971, **28**, 265.**C₁₀H₈O₃W****W-00043**

Tricarbonyl[(1,2,3,4,5,6-η)-methylbenzene]tungsten, 9Cl

Tricarbonyltoluenetungsten

[12128-82-4]

As (η⁶-Benzene)tricarbonyltungsten, W-00031 withR = CH₃

M 360.021

C₁₀H₁₀Cl₂W**W-00048****Dichlorobis(η⁵-2,4-cyclopentadien-1-yl)tungsten, 10Cl**

[12184-26-8]

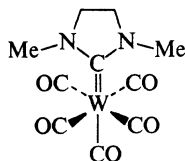
As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)tungsten, W-00046 with

M 384.945

Green cryst. Dec. at 250°.

Cooper, R.L. *et al.*, *J. Chem. Soc. (A)*, 1967, 1155 (*synth*)Crabtree, R.H. *et al.*, *J. Chem. Soc. (A)*, 1971, 1350.Green, M.L.H. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1972, 1445.Lindsell, W.E., *J. Chem. Soc., Dalton Trans.*, 1975, 2548.Bell, L.G. *et al.*, *J. Organomet. Chem.*, 1977, **135**, 173.Dias, A.R. *et al.*, *J. Organomet. Chem.*, 1979, **175**, 193.**C₁₀H₁₀N₂O₅W****W-00049****Pentacarbonyl(1,3-dimethyl-2-imidazolidinylidene)tungsten, 10Cl**

[64515-01-1]



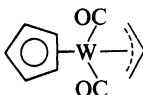
M 422.049

White cryst. Mp 118°.

Lappert, M.F. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1977, 1283 (*synth, props, ir, nmr*)**C₁₀H₁₀O₂W****W-00050****Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(η³-2-propenyl)tungsten**

π-Allyldicarbonyl-π-cyclopentadienyltungsten, 8Cl

[31811-41-3]



M 346.038

Yellow air-stable cryst.

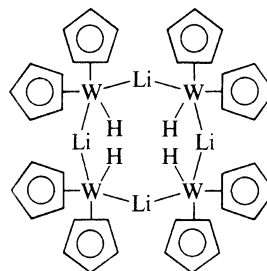
Dub, M., *Organometallic Compounds*, Springer-Verlag, Berlin, 2nd Ed., 1966, **1**.Davison, A. *et al.*, *Inorg. Chem.*, 1967, **6**, 2124 (*synth, nmr, ir*)**C₁₀H₁₁AsO₃W****W-00051****Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(dimethylarsino)tungsten, 10Cl**

[52456-36-7]

As Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)tungsten, W-00018 with

M 437.967

Light-orange needles. Mp 69-70° (sealed tube).

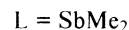
Malisch, W. *et al.*, *Angew. Chem., Int. Ed. Engl.*, 1974, **13**, 84 (*synth, ir, nmr*)Panster, P. *et al.*, *J. Organomet. Chem.*, 1977, **134**, C32 (*synth, props*)Müller, R. *et al.*, *Chem. Ber.*, 1977, **110**, 3910 (*synth*)**C₁₀H₁₁LiW****W-00052****Bis(η⁵-2,4-cyclopentadien-1-yl)hydro(tungsten)lithium**

M 321.988

Tetrameric. Important synthetic intermediate.

Tetramer: [53322-18-2].C₄₀H₄₄Li₄W₄ M 1287.952Yellow-brown cryst. Insol. aliphatic and aromatic hydrocarbons. Reacts with other solvs. inc. THF. Dec. in air or H₂O.Prout, K. *et al.*, *Acta Crystallogr., Sect. B*, 1974, **30**, 2318 (*cryst struct*)Francis, B.R. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1976, 1339 (*synth, props*)**C₁₀H₁₁O₃SbW****W-00053****Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(dimethylstilbino)tungsten, 10Cl**

[52571-36-5]

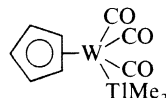
As Bromotricarbonyl(η⁵-2,4-cyclopentadien-1-yl)tungsten, W-00018 with

M 484.795

Cryst. Mp 64-6°.

Malisch, W. *et al.*, *J. Organomet. Chem.*, 1975, **99**, 421 (*synth, ir, nmr, ms*)**C₁₀H₁₁O₃TlW****W-00054****Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(dimethylthallium)tungsten, 10Cl**

[66125-45-9]



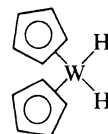
M 567.428

Mp 76-8°.

▷ Toxic

Walther, B. *et al.*, *J. Organomet. Chem.*, 1978, **145**, 285 (*synth, ir, pmr*)**C₁₀H₁₂W****W-00055****Bis(η⁵-2,4-cyclopentadien-1-yl)dihydrotungsten, 10Cl***Bis(η⁵-cyclopentadienyl)dihydridotungsten*

[1271-33-6]



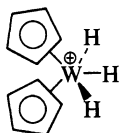
M 316.055

Yellow cryst. Mp 163-5°.

Green, M.L.H. *et al*, *J. Chem. Soc.*, 1961, 4854.
Johnson, M.P. *et al*, *J. Am. Chem. Soc.*, 1966, **88**, 301.
Otsuka, S. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 5091.
Barefield, E.U. *et al*, *J. Organomet. Chem.*, 1974, **76**, C50.
Hoxmeier, R.J. *et al*, *Inorg. Chem.*, 1979, **18**, 3453.
Kochi, J.K. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 208.

C₁₀H₁₃W⁺**W-00056**

Bis(η⁵-2,4-cyclopentadien-1-yl)trihydrotungsten(1+), 10Cl
Bis(η⁵-cyclopentadienyl)trihydridotungsten(1+)
[11108-17-1]



M 317.063 (ion)

Hexafluorophosphate: [11108-17-1].

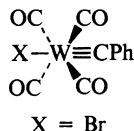
C₁₀H₁₃F₆PW M 462.027

Characterised spectroscopically.

Green, M.L.H. *et al*, *J. Chem. Soc.*, 1961, 4854 (*synth*)
Bau, R. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 1775 (*struct*)

C₁₁H₅BrO₄W**W-00057**

Bromotetracarbonyl(phenylmethylidyne)tungsten, 9Cl
Bromotetracarbonylphenylcarbonynetungsten
[60872-93-7]



M 464.912

Cryst. (CH₂Cl₂/pentane).

Fischer, E.O. *et al*, *Chem. Ber.*, 1976, **109**, 1673 (*synth*)
Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1977, **134**, C37 (*synth*)

C₁₁H₅ClO₄W**W-00058**

Tetracarbonylchloro(phenylmethylidyne)tungsten, 9Cl
Chlorotetracarbonylphenylcarbonynetungsten
[60873-00-9]
As Bromotetracarbonyl(phenylmethylidyne)tungsten,
W-00057 with

X = Cl

M 420.461

Light-yellow needle-like cryst.

Huttner, G. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1974, **13**, 609 (*struct*)
Fischer, E.O. *et al*, *Chem. Ber.*, 1976, **109**, 1673 (*synth*, *nmr*, *ir*, *ms*)

C₁₁H₅IO₄W**W-00059**

Tetracarbonyliodo(phenylmethylidyne)tungsten, 9Cl
Iodotetracarbonylphenylcarbonynetungsten
[60872-92-6]
As Bromotetracarbonyl(phenylmethylidyne)tungsten,
W-00057 with

X = I

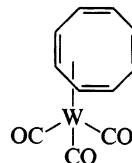
M 511.913

Cryst. (pentane).

Huttner, G. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1974, **13**, 609 (*struct*)
Fischer, E.O. *et al*, *Chem. Ber.*, 1976, **109**, 1673 (*synth*)
Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1977, **134**, C37 (*synth*)

C₁₁H₈O₃W**W-00060**

Tricarbonyl[(1,2,3,4,5,6-η)-1,3,5,7-cyclooctatetraene]tungsten, 10Cl
[12108-95-1]



M 372.032

Red cryst.

King, R.B. *et al*, *Inorg. Chem.*, 1966, **5**, 1837 (*synth*)
Holloway, C.E. *et al*, *J. Chem. Soc. (A)*, 1969, 931 (*nmr*)
Mann, B.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 1021 (*nmr*)
Laine, R.M., *Transition Met. Chem.*, 1980, **5**, 158 (*synth*)

C₁₁H₈O₄W**W-00061**

[(2,3,5,6-η)-Bicyclo[2.2.1]hepta-2,5-diene]tetracarbonyltungsten, 9Cl
Tetracarbonyl(2,5-norbornadiene)tungsten, 8Cl. Norbornadienetetracarbonyltungsten
[12129-25-8]



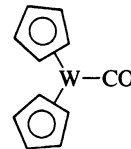
M 388.032

Yellow cryst. Mp 90-2°. Sublimes at 80°/0.1 mm.

Bennett, M.A. *et al*, *J. Chem. Soc.*, 1961, 2037 (*synth*, *ir*)
Fronzaglia, A. *et al*, *Inorg. Chem.*, 1966, **5**, 1837 (*synth*, *pmr*, *ir*)
Dobson, G.R., *Inorg. Chem.*, 1969, **8**, 90 (*synth*, *ir*)
Mann, B.E., *J. Chem. Soc., Dalton Trans.*, 1973, 2012 (*cmr*, *ir*)

C₁₁H₁₀OW**W-00062**

Carbonylbis(η⁵-2,4-cyclopentadien-1-yl)tungsten, 10Cl
[39333-44-3]



M 342.049

Green solid. Bp_{0.001} 60° subl.

Thomas, J.L. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 1838 (*synth*)
Brintzinger, H.H. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 3694.
Perutz, R.N. *et al*, *J. Chem. Soc., Chem. Commun.*, 1979, 742.

C₁₁H₁₄GeO₃W**W-00063**

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(trimethylgermyl)tungsten, 9Cl
[33306-93-3]

As Bromotricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten, W-00018 with



M 450.670

Yellow cryst. Mp 113-4°. Bp_{0.001} 90° subl.

Carrick, A. *et al*, *J. Chem. Soc. (A)*, 1968, 913.

Cardin, D.J. *et al*, *J. Chem. Soc. (A)*, 1970, 2594 (*synth*)

Keppie, S.A. *et al*, *J. Chem. Soc. (A)*, 1971, 3216 (*synth*)

C₁₁H₁₄O₃SiW

W-00064

Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(trimethylsilyl)tungsten, 9Cl

[12282-35-8]

As Bromotricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten, W-00018 with



M 406.165

Yellow-orange needles, air- and light-sensitive. Bp_{0.001} 100° subl.

Cardin, D.J. *et al*, *J. Chem. Soc. (A)*, 1970, 2594 (*synth*)

Hagen, A.P. *et al*, *Inorg. Chem.*, 1971, **10**, 1657 (*synth*)

Malisch, W. *et al*, *Chem. Ber.*, 1974, **107**, 979 (*synth*)

C₁₁H₁₄O₃SnW

W-00065

Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(trimethylstannyl)tungsten, 9Cl

[12093-29-7]

As Bromotricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten, W-00018 with



M 496.770

Pale-yellow cryst. Mp 120°.

Patil, H.R.H. *et al*, *Inorg. Chem.*, 1966, **5**, 1401 (*synth*)

Carrick, A. *et al*, *J. Chem. Soc. (A)*, 1968, 913 (*synth*)

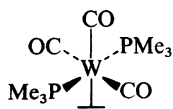
Cardin, D.J. *et al*, *J. Chem. Soc. (A)*, 1970, 2594 (*synth*)

Keppie, S.A. *et al*, *J. Chem. Soc. (A)*, 1971, 3216 (*synth*)

C₁₁H₂₂O₃P₂W

W-00066

Tricarbonyl(η^2 -ethene)bis(trimethylphosphine)tungsten, 10Cl
[66496-24-0]



M 448.091

mer-trans-form

Yellow cryst.

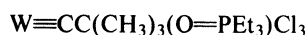
Koemm, U. *et al*, *J. Organomet. Chem.*, 1978, **148**, 179 (*synth*, *nmr*)

C₁₁H₂₄Cl₃OPW

W-00067

Trichloro(1,1-dimethylpropylidyne)(triethylphosphine oxide)tungsten, 10Cl

[78251-21-5]



M 493.493

Blue cryst.

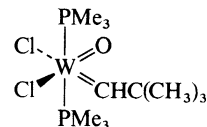
Wengrovius, J.H. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 3932 (*synth*, *cmr*, *nmr*)

C₁₁H₂₈Cl₂OP₂W

W-00068

Dichloro(2,2-dimethylpropylidene)oxobis(trimethylphosphine)tungsten, 10Cl

[76603-92-4]



M 493.045

Olefin metathesis catalyst.

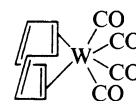
Wengrovius, J.H. *et al*, *Organometallics*, 1982, **1**, 148 (*synth*)

C₁₂H₈O₄W

W-00069

Tetracarbonyl[(1,2,5,6- η)-1,3,5,7-cyclooctatetraene]tungsten, 10Cl

[74468-66-9]



M 400.043

Red-orange cryst. Sol. hydrocarbons.

Winstein, S., *Chem. Soc., Spec. Publ.*, 1967, **21**, 5.

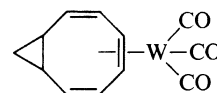
Laine, R.M., *Transition Met. Chem.*, 1980, **5**, 158 (*synth*)

C₁₂H₁₀O₃W

W-00070

[(2,3,4,5,6,7- η)Bicyclo[6.1.0]nona-2,4,6-triene]tricarbonyltungsten, 9Cl

[59714-56-6]



M 386.059

Salzer, A., *J. Organomet. Chem.*, 1976, **117**, 245 (*synth*, *props*)

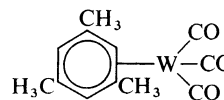
C₁₂H₁₂O₃W

W-00071

Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]tungsten, 9Cl

Tricarbonylmesitylenetungsten

[12129-69-0]



M 388.075

Yellow cryst. Bp₁ 140° subl. Dec. >180°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1958, **91**, 2763 (*synth*)

King, R.B. *et al*, *Inorg. Chem.*, 1966, **5**, 1837.

Kobayashi, H. *et al*, *Bull. Chem. Soc. Jpn.*, 1975, **48**, 1222 (*ir*)

Brown, D.L.S. *et al*, *J. Organomet. Chem.*, 1977, **142**, 321

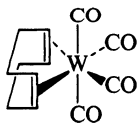
(*props*)

Sennikov, P.E. *et al*, *J. Organomet. Chem.*, 1980, **190**, 167.

C₁₂H₁₂O₄W

W-00072

Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]tungsten, 9Cl
[12129-70-3]

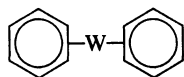


M 404.074

Fischer, E.O. *et al*, *Chem. Ber.*, 1959, **92**, 2995 (*synth*)Leigh, G.J. *et al*, *J. Organomet. Chem.*, 1965, **4**, 461 (*synth*)King, R.B. *et al*, *Inorg. Chem.*, 1966, **5**, 1837 (*synth*)C₁₂H₁₂W

W-00073

Bis(η^6 -benzene)tungsten, 9Cl
[12089-23-5]



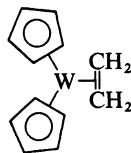
M 340.077

Green cryst.

Fischer, E.O. *et al*, *Chem. Ber.*, 1960, **93**, 2065 (*synth*)Skell, P.S. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 1945 (*synth*)Clove, F.G.W. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 72 (*synth*)Green, M.L.H., *J. Organomet. Chem.*, 1980, **200**, 119 (*synth*)C₁₂H₁₄W

W-00074

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)tungsten, 9Cl
Dicyclopentadienyl(ethylene)tungsten
[37343-06-9]



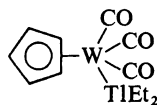
M 342.093

Orange cryst. Mp 176° dec.

Thomas, J.L., *J. Am. Chem. Soc.*, 1973, **95**, 1838 (*synth*)Green, M.L.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 1324 (*synth*)Green, M.L.H. *et al*, *J. Organomet. Chem.*, 1974, **76**, 49 (*props*)Green, J.C. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 403 (*pe*)C₁₂H₁₅O₃TiW

W-00075

Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(diethylthallium)tungsten
[66125-46-0]



M 595.482

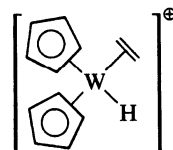
Used in the synth. of tungsten carbonyls. Mp 119-21°.

▷ Toxic

Walther, B. *et al*, *J. Organomet. Chem.*, 1978, **145**, 285 (*synth*, *ir*, *nmr*)C₁₂H₁₅W[⊕]

W-00076

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)hydrotungsten(1+)
[37343-09-2]



M 343.101 (ion)

Hexafluorophosphate: [53770-66-4].

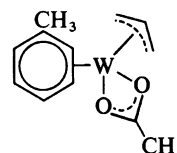
C₁₂H₁₅F₆PW M 488.065

White cryst.

Benfield, F.W.S., *J. Chem. Soc., Dalton Trans.*, 1974, 1324 (*synth*)C₁₂H₁₆O₂W

W-00077

(Acetato-O)(1,2,3,4,5- η -methylbenzene)(η^3 -2-propen-yl)tungsten, 10Cl
 η^3 -Allyl(acetato)- η^6 -toluenetungsten
[78607-84-8]

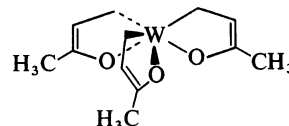


M 376.107

Green, M.L.H., *J. Organomet. Chem.*, 1980, **200**, 119 (*synth*)C₁₂H₁₈O₃W

W-00078

Tris(3,4- η -3-buten-2-one-O)tungsten, 8Cl
Tris(methyl vinyl ketone)tungsten
[12178-34-6]

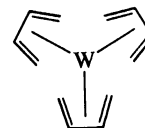


M 394.122

Yellow cryst. (EtOAc); air-stable. Mp 137-40°. Bp_{0.1} 90° subl.King, R.B. *et al*, *Inorg. Chem.*, 1966, **5**, 1837 (*synth*, *ir*, *ms*, *nmr*)Moriarty, R.E. *et al*, *J. Chem. Soc., Chem. Commun.*, 1972, 1242 (*cryst struct*)C₁₂H₁₈W

W-00079

Tris(η^4 -1,3-butadiene)tungsten
[51733-16-5]



M 346.124

Catalyses polym. of ethylene and butadiene. Yellow cryst.

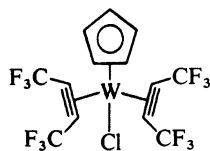
Darkens after 1 week in air. Sol. common org. solvs.

Dec. at 130°. Trigonal prismatic struct. by analogy with corresponding Me deriv.

Skell, P.S. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 626 (*synth*, *nmr*, *ms*)

Gansing, W. *et al*, *Angew. Chem.*, 1981, **93**, 201.**C₁₃H₅ClF₁₂W** **W-00080****Chloro(η⁵-2,4-cyclopentadien-1-yl)bis[(2,3-η)-1,1,1,4,4,4-hexafluoro-2-butyne]tungsten, 10Cl***Bis[bis(trifluoromethyl)acetylene]chloro(cyclopentadienyl)tungsten*

[54720-97-7]

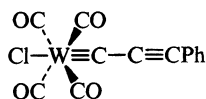


M 608.466

Pale-yellow cryst. Mp 147°.

Davidson, J.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 738 (*synth, cryst struct*)Davidson, J.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 287, 2246 (*props*)Davidson, J.L., *J. Organomet. Chem.*, 1980, **186**, C19 (*props*)**C₁₃H₅ClO₄W** **W-00081****Tetracarbonylchloro(3-phenyl-2-propynylidene)tungsten, 9Cl**

[55336-79-3]

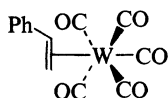


M 444.483

Cryst.

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1974, **81**, C23 (*synth, ir, nmr*)**C₁₃H₈O₅W** **W-00082****Pentacarbonyl[(η²-ethenyl)benzene]tungsten, 9Cl***Pentacarbonyl(η²-styrene)tungsten*

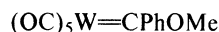
[60635-81-6]



M 428.053

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1976, **112**, C59 (*synth*)**C₁₃H₈O₆W** **W-00083****Pentacarbonyl(methoxyphenylmethylene)tungsten, 10Cl**

[37823-96-4]

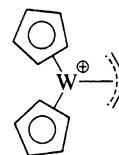


M 444.053

Orange-red cryst. Mp 59°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1967, **100**, 2445 (*synth*)Casey, C.P. *et al*, *J. Organomet. Chem.*, 1974, **77**, 345 (*props*)Fischer, E.O. *et al*, *Chem. Ber.*, 1976, **109**, 1673 (*props*)Casey, C.P. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 1651 (*props*)Fischer, E.O. *et al*, *Chem. Ber.*, 1977, **110**, 1651 (*props*)**C₁₃H₁₅W[⊕]****W-00084****Bis(η⁵-2,4-cyclopentadien-1-yl)(η³-2-propenyl)tungsten(1+),**^{9Cl}*(η³-Allyl)bis(η⁵-cyclopentadienyl)tungsten(1+)*

[55650-02-7]



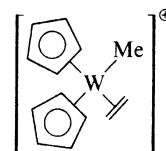
M 355.112 (ion)

*Hexafluorophosphate:*C₁₃H₁₅F₆PW M 500.076

Orange cryst.

Ephritikhine, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 1131 (*synth*)**C₁₃H₁₇W[⊕]****W-00085****Bis(η⁵-2,4-cyclopentadien-1-yl)(η²-ethene)methyltungsten(1+), 10Cl**

[53504-75-9]



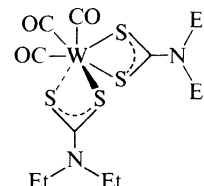
M 357.127 (ion)

Hexafluorophosphate: [53504-75-9].C₁₃H₁₇F₆PW M 502.091

Pale-yellow cryst.

Benfield, F.W.S. *et al*, *J. Organomet. Chem.*, 1974, **76**, 49 (*props*)Benfield, F.W.S. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 1324 (*synth*)Green, M.L.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 262 (*props*)Cooper, N.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 1121 (*props*)**C₁₃H₂₀N₂O₃S₄W****W-00086****Tricarbonylbis(diethylcarbamoedithioato-S,S')tungsten, 10Cl**

[72827-54-4]



M 564.403

7-Coordinate tungsten. Orange-red cryst. turning green on exp. to air for several days. Loses CO reversibly *in vacuo*.Templeton, J.L. *et al*, *Inorg. Chem.*, 1980, **9**, 1753 (*synth, ir, pmr, cmr, cryst struct*)**C₁₃H₂₁O₄PW^{⊖⊖}****W-00087****Tetracarbonyl(triisopropylphosphine)tungstate(2-)***Tetracarbonyl[tris(1-methylethyl)phosphine]-tungsten(2-)*

[79135-08-3]



M 456.130 (ion)

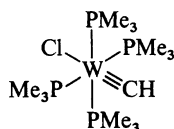
Di-Na salt:



Thermally unstable orange soln. in THF.

Cooper, N.J. *et al*, *Organometallics*, 1982, **1**, 215 (*synth*)**C₁₃H₃₇ClP₄W****W-00088****Chloromethylidynetetrakis(trimethylphosphine)tungsten, 10Cl**

[76642-46-1]

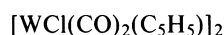


M 536.633

Orange-yellow cryst.

Sharp, P.R. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 965 (*synth*, *nmr*, *props*)**C₁₄H₁₀Cl₂O₄W₂****W-00089****Tetracarbonyldichlorobis(η⁵-2,4-cyclopentadien-1-yl)ditungsten, 8Cl**

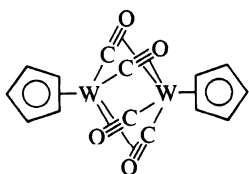
[51185-44-5]



M 680.837

Obt. by photochemical dec. of (C₅H₅)W(CO)₃Cl. Not isol.; identified spectroscopically in soln.Ali, L.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1475 (*synth*, *props*, *uv*)Allen, D.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1899.Allen, D.M. *et al*, *Inorg. Chim. Acta*, 1977, **21**, 191 (*ir*)**C₁₄H₁₀O₄W₂****W-00090****Tetracarbonylbis(η⁵-2,4-cyclopentadien-1-yl)ditungsten, 10Cl**

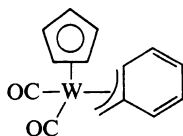
[62853-03-6]



M 609.931

Sol. hydrocarbons, CHCl₃. Not obt. pure. *ir* ν_{CO} 1885, 1830 cm⁻¹ (isooctane).Ginley, D.S. *et al*, *Inorg. Chim. Acta*, 1977, **23**, 85 (*synth*, *pmr*, *ir*)**C₁₄H₁₂O₂W****W-00091****Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(η³-6-methylene-2,4-cyclohexadien-1-yl)tungsten, 10Cl**

[68349-04-2]

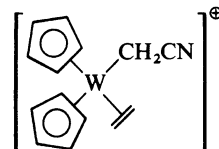


M 396.098

Orange-brown cryst. Mp 103-5°.

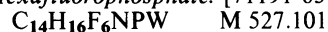
Cotton, F.A. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 1339 (*synth*, *nmr*)Severson, R.G. *et al*, *J. Organomet. Chem.*, 1978, **157**, 173.**C₁₄H₁₆NW[⊕]****W-00092****(Cyanomethyl)bis(η⁵-2,4-cyclopentadien-1-yl)(η²-ethene)tungsten(1+)**

[71191-62-3]



M 382.137 (ion)

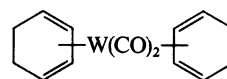
Hexafluorophosphate: [71191-63-4].



Yellow-brown cryst.

Benfield, F.W.S. *et al*, *J. Organomet. Chem.*, 1974, **76**, 49 (*props*)Green, M.L.H. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 262 (*synth*)**C₁₄H₁₆O₂W****W-00093****Dicarbonylbis[(1,2,3,4-η)-1,3-cyclohexadiene]tungsten, 9Cl**

[12131-26-9]

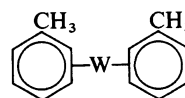


M 400.129

Red cryst.

King, R.B. *et al*, *Inorg. Chem.*, 1966, **5**, 1837 (*synth*)King, R.B. *et al*, *Inorg. Chem.*, 1974, **13**, 74 (*props*)**C₁₄H₁₆W****W-00094****Bis[(1,2,3,4,5,6-η)methylbenzene]tungsten, 10Cl***Bis*(η⁶-toluene)tungsten

[52346-44-8]

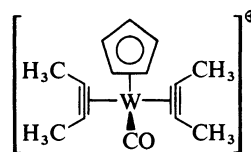


M 368.130

Green cryst.

Clope, F.G.W. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 72 (*synth*)Green, M.L.H., *J. Organomet. Chem.*, 1980, **200**, 119 (*synth*)**C₁₄H₁₇OW[⊕]****W-00095****Bis[(2,3-η)-2-butyne]carbonyl(η⁵-2,4-cyclopentadien-1-yl)tungsten(1+), 10Cl***Carbonyl*(η⁵-cyclopentadienyl)(dimethylacetylene)tungsten

[74380-93-1]



M 385.138 (ion)

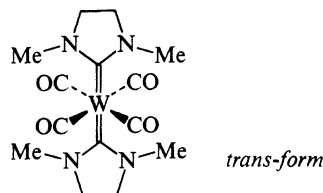
Hexafluorophosphate: [74380-94-2].

C₁₄H₁₇F₆OPW M 530.102Yellow cryst. (CH₂Cl₂/Et₂O).Beck, W. *et al*, *Z. Naturforsch., B*, 1978, **33**, 1214 (*synth*)Watson, P.L. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 2698 (*synth*)C₁₄H₂₀N₄O₄W

W-00096

Tetracarbonylbis(1,3-dimethyl-2-imidazolidinylidene)tungsten, 10Cl

[64514-96-1]



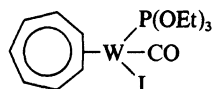
M 492.186

cis-formYellow cryst. Sol. CHCl₃, Me₂CO. Mp 278° dec.***trans-form***Orange-red cryst. Sol. CHCl₃. Isom. to *cis-form* at 160-80°.Lappert, M.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 1283 (*synth*, *pmr*)C₁₄H₂₂IO₄PW

W-00097

Carbonyl(η⁷-cycloheptatrienylum)iido(triethyl phosphite)-tungsten, 9Cl*Carbonyliido(triethyl phosphite)(tropylium)tungsten*

[36580-33-3]



M 596.054

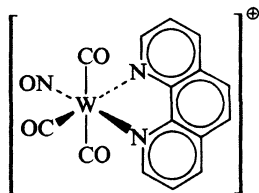
Light-green cryst. Mp 78-80°.

Beall, T.W. *et al*, *Inorg. Chem.*, 1972, **11**, 915 (*synth*, *ir*, *nmr*)C₁₅H₈N₃O₄W[⊕]

W-00098

Tricarbonylnitrosyl(1,10-phenanthroline-N¹,N¹⁰)tungsten(1+), 10Cl

[63890-73-3]



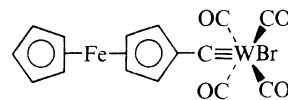
M 478.096 (ion)

mer-form*Hexafluorophosphate*: [63890-74-4].C₁₅H₈F₆N₃PO₄W M 623.060Air-stable orange solid. Sol. Me₂CO, CH₂Cl₂.Connelly, N.G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 925 (*synth*, *props*)C₁₅H₉BrFeO₄W

W-00099

Bromotetracarbonyl(ferroceniumylmethylidyne)tungsten, 9Cl*Bromotetracarbonyl(ferrocenylmethylidyne)tungsten*

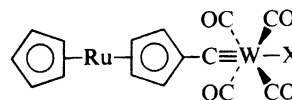
[68830-04-6]



M 572.835

trans-form [65230-41-3]Raspberry-red cryst. Stable at r.t. in the solid state for several hours even on exp. to air. In soln. dec. slowly >-10°. Spar. sol. hexane, sol. CH₂Cl₂, Me₂CO, other polar solvs. Mp >70° dec. Diamagnetic.Fischer, E.O. *et al*, *Chem. Ber.*, 1977, **110**, 3397; 1978, **111**, 3530 (*synth*, *ir*, *pmr*)C₁₅H₉BrO₄RuW

W-00100

Bromotetracarbonyl(ruthenocenylmethylidyne)tungsten, 10Cl

X = Br

M 618.058

trans-form [75293-20-8]

Bright-yellow powder. Mp >-5° dec.

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1980, **191**, 261 (*synth*, *ir*, *ms*, *cmr*, *pmr*)C₁₅H₉ClO₄RuW

W-00101

Tetracarbonylchloro(ruthenocenomethylidyne)tungsten, 10Cl

As Bromotetracarbonyl(ruthenocenylmethylidyne)tungsten, W-00100 with

X = Cl

M 573.607

trans-form

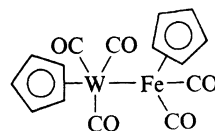
Bright-yellow.

Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1980, **191**, 261.C₁₅H₁₀FeO₅W

W-00102

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)[dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)iron]tungsten, 10Cl*Pentacarbonylbis(η⁵-2,4-cyclopentadien-1-yl)iron*tungsten

[64041-01-6]

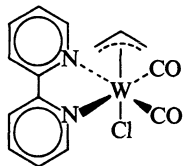


M 509.938

Red cryst. (CH₂Cl₂/hexane). Mp 220° dec. (softens ca. 150°).Pandey, V.N., *Inorg. Chim. Acta*, 1977, **23**, L26 (*synth*, *ir*)Abrahamson, H.B. *et al*, *Inorg. Chem.*, 1978, **17**, 1003 (*synth*, *ir*, *pmr*, *uv*)Madach, T. *et al*, *Chem. Ber.*, 1980, **113**, 2675 (*ir*, *pmr*)

C₁₅H₁₃ClN₂O₂W

W-00103

(2,2'-Bipyridine-*N,N'*)dicarbonylchloro(η^3 -2-propenyl)tungsten π -Allyl(2,2'-bipyridine)dicarbonylchlorotungsten, 8Cl
[12245-58-8]

M 472.583

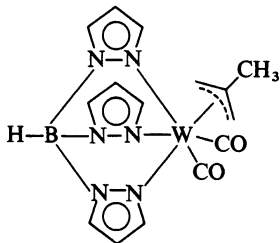
Air-stable maroon cryst. Sl. sol. polar solvs., insol. nonpolar solvs.

Hull, C.G. *et al*, *J. Organomet. Chem.*, 1967, **9**, 519 (*synth*, *pmr*, *ir*)Brisdon, B.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1975, 1999 (*synth*)C₁₅H₁₇BN₆O₂W

W-00104

Dicarbonyl[hydrotris(pyrazolato)borato(1-)](η^3 -2-methylpropenyl)tungstenDicarbonyl[hydrotris(pyrazolato)borato(1-)](2-methyl- π -allyl)tungsten, 8Cl

[12242-63-6]



M 507.998

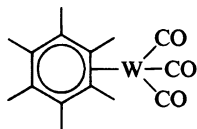
Yellow air-stable cryst.

Trofimenko, S., *J. Am. Chem. Soc.*, 1967, **89**, 3904; 1969, **91**, 558 (*synth*, *props*)C₁₅H₁₈O₃W

W-00105

Tricarbonyl[(1,2,3,4,5,6- η)-hexamethylbenzene]tungsten, 9Cl

[33505-53-2]



M 430.155

Pale-yellow cryst.

Manuel, T.A. *et al*, *Chem. Ind. (London)*, 1960, 231Stiddard, M.H.B. *et al*, *J. Chem. Soc. (A)*, 1969, 2355 (*synth*)Muettterties, E.L. *et al*, *J. Organomet. Chem.*, 1979, **178**, 197 (*synth*)C₁₆H₁₀F₆O₄S₂W₂

W-00106

Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -(trifluoromethanethiolato)]ditungsten, 8Cl

[12771-97-0]

W₂(μ -SCF₃)₂(CO)₄(η -C₅H₅)₂

M 812.063

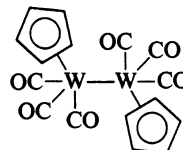
Apparently not well characterised.

Havlin, R. *et al*, *Z. Naturforsch., B*, 1966, **21**, 1108 (*synth*)Davidson, J.L. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 107 (*synth*)Watkins, D.D. *et al*, *J. Organomet. Chem.*, 1975, **102**, 71.C₁₆H₁₀O₆W₂

W-00107

Hexacarbonylbis(η^5 -2,4-cyclopentadien-1-yl)ditungsten, 9ClHexacarbonylbis(η^5 -2,4-cyclopentadien-1-yl)ditungsten, 9Cl. Bis(cyclopentadienyltricarboxyltungsten). Bis(cyclopentadienyl)hexacarbonylditungsten

[12566-66-4]



M 665.951

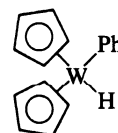
Purple-red cryst. Mp 240-2° dec.

Wilkinson, G., *J. Am. Chem. Soc.*, 1954, **76**, 209 (*synth*)Davison, A. *et al*, *J. Chem. Soc.*, 1962, 3653 (*ir*, *pmr*)Parker, D.J., *J. Chem. Soc. (A)*, 1970, 1382 (*ir*)Barnett, R.W. *et al*, *J. Organomet. Chem.*, 1972, **44**, 1 (*rev*)Adams, R.D. *et al*, *Inorg. Chem.*, 1974, **13**, 1086 (*cryst struct*, *pmr*)Wrighton, M.S. *et al*, *Pure Appl. Chem.*, 1975, **41**, 671 (*uv*)Ginley, D.S. *et al*, *Inorg. Chim. Acta*, 1977, **23**, 85 (*synth*, *props*)Birdwhistell, R. *et al*, *J. Organomet. Chem.*, 1978, **157**, 239 (*synth*)C₁₆H₁₆W

W-00108

Bis(η^5 -2,4-cyclopentadien-1-yl)hydrophenyltungsten, 10ClBis(η^5 -cyclopentadienyl)hydrido(phenyl)tungsten

[11077-71-7]



M 392.152

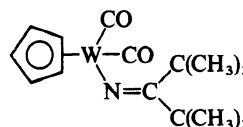
Orange needles.

Green, M.L.H. *Pure Appl. Chem.*, 1978, **50**, 27 (*synth*)Berry, M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 1950 (*synth*)Cooper, N.J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 1557 (*synth*)C₁₆H₂₃NO₂W

W-00109

Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(2,2,4,4-tetramethyl-3-pentaniminato)tungsten, 9Cl

[32610-90-5]



M 445.213

Deep-blue cryst. Mp 120-1° dec. Bp_{0.001} 100° subl.Kilner, M. *et al*, *J. Chem. Soc. (A)*, 1971, 292 (*synth*, *ir*, *ms*)

Inglis, T. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 562.**C₁₆H₃₆O₅W****W-00110****Tetrakis(2-methyl-2-propanolato)oxotungsten, 10Cl***Tetra-tert-butoxyoxotungsten*

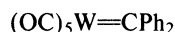
[58832-09-0]



M 492.307

Wengrovius, J.H. *et al*, *Organometallics*, 1982, **1**, 148 (*synth, props*)**C₁₈H₁₀O₅W****W-00111****Pentacarbonyl(diphenylmethylene)tungsten, 9Cl**

[50276-12-5]

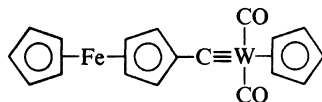


M 490.124

Black cryst. (pentane). Mp 65-6°.

Casey, C.P. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 5833; 1974, **96**, 7808; 1977, **99**, 2127, 2533 (*synth, props, cryst struct*)Fischer, E.O. *et al*, *Chem. Ber.*, 1977, **110**, 3842 (*props*)**C₁₈H₁₄FeO₂W****W-00112****Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(ferrocenylmethylene)tungsten, 10Cl**

[65230-44-6]

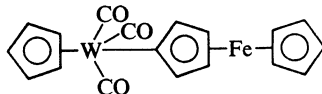


M 502.004

Bright-red cryst. (pentane). Spar. sol. nonpolar solvs. Mp 112°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1977, **110**, 3397; 1978, **111**, 3530 (*synth, ir, pmr, cmr, ms*)**C₁₈H₁₄FeO₃W****W-00113****Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)ferrocenyltungsten, 9Cl***π-Cyclopentadienyl-σ-ferrocenyltungsten tricarbonyl*

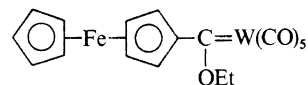
[52472-04-5]



M 518.004

Bright-orange air stable cryst. (CH₂Cl₂/heptane). Mp 173-5° (170-3°).Nesmeyanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1973, 2796 (*synth, ir, pmr*)Pannell, K.H. *et al*, *Inorg. Chem.*, 1976, **15**, 2671 (*synth, ir*)**C₁₈H₁₄FeO₆W****W-00114****Pentacarbonyl(ethoxyferrocenylmethylene)tungsten, 9Cl***[Ethoxyferrocenylcarbene]pentacarbonyltungsten*

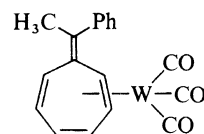
[34691-66-2]



M 566.002

Dark-brown needles (Et₂O/hexane). Mp 155-6°.Connor, J.A. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 1470 (*synth, pmr, ir, uv, ms*)**C₁₈H₁₄O₃W****W-00115****Tricarbonyl[(1,2,3,4,5,6-η)-7-(1-phenylethylidene)-1,3,5-cycloheptatriene]tungsten, 9Cl***Tricarbonyl(8-phenylheptafulvene)tungsten*

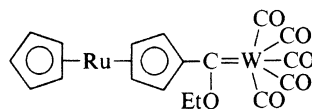
[52471-95-1]



M 462.157

Not isol.; observed spectroscopically *in situ*.Howell, J.A.S. *et al*, *J. Chem. Soc., Dalton Trans.*, 1974, 293 (*synth*)**C₁₈H₁₄O₆RuW****W-00116****Pentacarbonyl(ethoxyruthenocenylmethylene)tungsten, 10Cl**

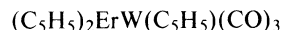
[75280-67-0]



M 611.225

Orange-red cryst. (CH₂Cl₂/hexane). Mp 142°.Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1980, **191**, 261 (*synth, ir, ms, pmr, cmr, struct*)**C₁₈H₁₅ErO₃W****W-00117****[μ-(Carbonyl-C, O)]bis(η⁵-2,4-cyclopentadien-1-yl)dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)tungsten]erbium**

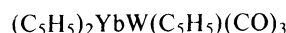
[39477-06-0]



M 630.425

Nitrosylated by *N*-methyl-*N*-nitroso-*p*-toluenesulfonamide to afford (C₅H₅)W(CO)₂NO. Sol. THF, DMSO. Air- and moisture-sensitive. Dec. >220°.Crease, A.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1501 (*synth, ir*)**C₁₈H₁₅O₃WYb****W-00118****[μ-(Carbonyl-C, O)]bis(η⁵-2,4-cyclopentadien-1-yl)dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)tungsten]ytterbium**

[39477-07-1]



M 636.205

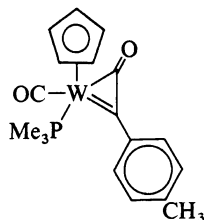
Nitrosylated by *N*-methyl-*N*-nitroso-*p*-toluenesulfonamide to afford (C₅H₅)W(CO)₂NO. Golden cryst. Sol. THF, DMSO. Mp >220° dec. Air- and moisture-sensitive.

Crease, A.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1501 (*synth*, *ir*)

C₁₈H₂₁O₂PW

W-00119

Carbonyl(η⁵-2,4-cyclopentadien-1-yl)((1,2-η)(4-methylphenyl)oxoethenyl)(trimethylphosphine)tungsten, 10Cl
[61202-59-3]



M 484.186

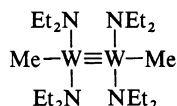
η²-Ketenyl complex. Brick-red cryst.

Kreissl, F.R. *et al*, *Chem. Ber.*, 1977, **110**, 3782; 1979, **112**, 3376 (*synth*, *ir*, *nmr*)

C₁₈H₄₆N₄W₂

W-00120

Dimethyltetraakis(*N*-dimethylamino)ditungsten
Bis(methyl)tetrakis(N-methylmethanaminato)ditungsten, 10Cl
[72286-69-2]



M 686.288

Red cryst.

Chisholm, M.H. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 6393 (*synth*)

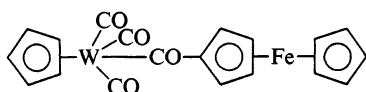
Chisholm, M.H. *et al*, *Inorg. Chem.*, 1977, **16**, 320, 603 (*ms*, *cryst struct*, *props*)

Chisholm, M.H. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 6784.

C₁₉H₁₄FeO₄W

W-00121

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)(ferrocenylcarbonyl)tungsten, 9Cl
π-Cyclopentadienyl-σ-ferrocenoyltungsten tricarbonyl
[52680-31-6]



M 546.014

Bright-orange air-stable cryst. (heptane or CH₂Cl₂/hexane). Mp 147° dec. Decarbonylates at 130° to Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)ferrocenyltungsten, W-00113.

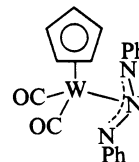
Nesmeyanov, A.N. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1973, 2796 (*synth*, *ir*, *pmr*)

Pannell, K.H. *et al*, *Inorg. Chem.*, 1976, **15**, 2671 (*synth*, *ms*, *ir*, *pmr*)

C₁₉H₁₅N₃O₂W

W-00122

Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(1,3-diphenyltriazenato-N¹,N³)tungsten, 10Cl
Dicarbonyl(1,3-diphenyl-1-triazenato-N¹,N³)(η⁵-cyclopentadienyl)tungsten
[63641-12-3]



M 501.196

Red-orange cryst. (CH₂Cl₂/hexane). Mp 107-9° dec.

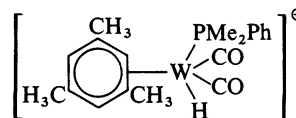
Pfeiffer, E. *et al*, *J. Organomet. Chem.*, 1976, **105**, 371 (*synth*)

King, R.B. *et al*, *Inorg. Chem.*, 1977, **16**, 1164, 2648 (*synth*, *props*)

C₁₉H₂₄O₂PW⁺

W-00123

Dicarbonyl(dimethylphenylphosphine)hydro[(1,2,3,4,5,6-η)-1,3,5-trimethylbenzene]tungsten(1+), 10Cl
Dicarbonyl(dimethylphenylphosphine)hydrido(mesitylene)tungsten(1+)
[64426-76-2]



M 499.221 (ion)

Trifluoromethanesulfonate: [64426-77-3].

C₂₀H₂₄F₃O₅PSW M 648.286

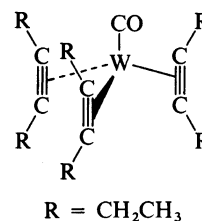
Observed in soln. by *nmr*.

Flood, T.C. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 4334 (*synth*, *nmr*)

C₁₉H₃₀OW

W-00124

Carbonyltris(3-hexyne)tungsten, 8Cl
[12131-66-7]



R = CH₂CH₃

M 458.295

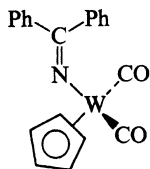
Pale-yellow cryst. Mp 55-6°.

Tate, D.P. *et al*, *J. Am. Chem. Soc.*, 1963, **85**, 2174; 1964, **86**, 3261 (*synth*, *ir*, *nmr*)

King, R.B., *Inorg. Chem.*, 1968, **7**, 1044 (*struct*)

C₂₀H₁₅NO₂W**W-00125**

Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(α -phenylbenzenemethaniminato)tungsten, 9Cl
[31833-59-7]



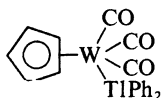
M 485.194

Green-black dichroic cryst. (toluene/hexane). Mp 110-2°.

Farmery, K. *et al*, *J. Chem. Soc. (A)*, 1970, 2279 (*synth*, *ir*, *ms*)
Keable, H.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 153;
1974, 639 (*synth*, *props*)

C₂₀H₁₅O₃TiW**W-00126**

Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(diphenylthallium)-tungsten
[66125-42-6]



M 691.570

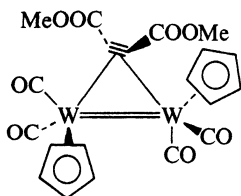
Mp 38-40°.

▷Toxic

Walther, B. *et al*, *J. Organomet. Chem.*, 1978, **145**, 285 (*synth*, *ir*)

C₂₀H₁₆O₈W₂**W-00127**

Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -[(2,3- η :2,3- η)-dimethyl-2-butynedioate]]ditungsten, 10Cl
[62303-78-0]



M 752.042

Air-stable red solid. Mp 188-90° dec. (under N₂). Struct. by analogy with unsubst. acetylene analogue.

Maine, R.M. *et al*, *J. Organomet. Chem.*, 1977, **124**, 29 (*synth*, *ir*, *cmr*, *pmr*, *uv*, *ms*)

Finnimore, S.R. *et al*, *J. Chem. Soc., Chem. Commun.*, 1980, 411 (*synth*)

C₂₀H₁₉DyO₃W**W-00128**

[μ -(Carbonyl-C,O)]bis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl][dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten]dysprosium



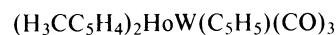
M 653.718

Nitrosylated by *N*-methyl-*N*-nitroso-*p*-toluenesulfonamide to give (C₅H₅)W(CO)₂NO. Sol. THF, DMSO. Mp >220° dec. Air- and moisture-sensitive.

Crease, A.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1501 (*synth*, *ir*)

C₂₀H₁₉HoO₃W**W-00129**

[μ -(Carbonyl-C,O)]bis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl][dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten]holmium
[39477-08-2]



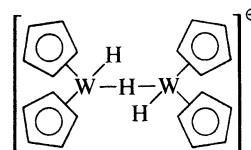
M 656.149

Nitrosylated by *N*-methyl-*N*-nitroso-*p*-toluenesulfonamide to give (C₅H₅)₂W(CO)₂NO. Sol. THF, DMSO. Mp >220° dec. Air- and moisture-sensitive.

Crease, A.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1501 (*synth*, *ir*)

C₂₀H₂₃W₂[⊕]**W-00130**

Tetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -hydridodihydroditungsten(1+), 10Cl
Tetrakis(η^5 -cyclopentadienyl)- μ -hydridodihydroditungsten(1+)
[72932-64-0]



M 631.102 (ion)

Perchlorate: [72932-65-1].

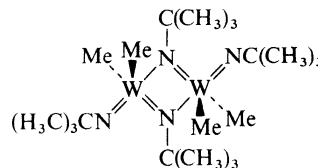
C₂₀H₂₃ClO₄W₂ M 730.552

Dark-purple cryst.

Klinger, R.J. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 208 (*synth*, *cryst struct*)

C₂₀H₄₈N₄W₂**W-00131**

Bis[μ -[2-methyl-2-propanaminato(2-)]][bis[2-methyl-2-propanaminato(2-)]tetramethylditungsten, 10Cl
Tetrakis(tert-butylaminato)tetramethylditungsten
[73448-07-4]



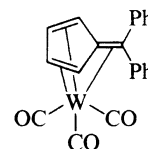
M 712.326

Air-sensitive, red-orange cryst. Sol. hexane.

Nugent, W.A. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 1759 (*synth*)
Thorn, D.L. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 357 (*struct*)

C₂₁H₁₄O₃W**W-00132**

Tricarbonyl(diphenylmethylidencyclopentadiene)tungsten
Tricarbonyl[(η^6 -2,4-cyclopentadien-1-ylidenephénylmethyl)benzene]tungsten, 10Cl. Tricarbonyldiphenylfulvenetungsten
[63882-22-4]



M 498.190

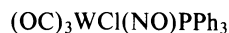
Violet needles. Mp 215°.

Edelmann, F. *et al*, *J. Organomet. Chem.*, 1977, **134**, 31 (*synth*)

C₂₁H₁₅ClNO₄PW

W-00133

Tricarbonylchloronitrosyl(triphenylphosphine)tungsten, 9Cl
[42536-19-6]



M 595.631

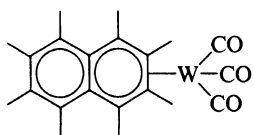
Meridional, but complete stereochemistry not known. Yellow solid. Sol. common org. solvs.

Colton, R. *et al*, *Aust. J. Chem.*, 1973, **26**, 1087 (*synth*, *ir*, *pmr*)

C₂₁H₂₄O₃W

W-00134

Tricarbonyl(η⁶-octamethylnaphthalene)tungsten
[79391-58-5]



M 508.269

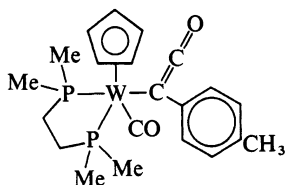
Bright-orange cryst. (CH₂Cl₂/hexane).

Hull, J.W. *et al*, *Organometallics*, 1982, **1**, 264 (*synth*, *struct*)

C₂₁H₂₈O₂P₂W

W-00135

Carbonyl(η⁵-2,4-cyclopentadien-1-yl)[1,2-ethanediylbis(dimethylphosphine)]-P, P'[(4-methylphenyl)oxoethenyl]tungsten, 10Cl
[75899-98-8]



M 558.249

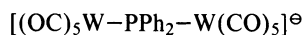
η⁵-Ketenyl complex. Yellow cryst.

Kreissl, F.R. *et al*, *Chem. Ber.*, 1980, **113**, 3377 (*synth*)

C₂₂H₁₀O₁₀PW[⊖]

W-00136

Decacarbonyl(μ-diphenylphosphido)ditungstate(1-)
[80049-78-1]



M 649.139 (ion)

K salt:

C₂₂H₁₀KO₁₀PW M 688.237

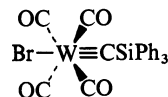
No phys. props. reported.

Keiter, R.L., *Organometallics*, 1982, **1**, 409 (*synth*)

C₂₃H₁₅BrO₄SiW

W-00137

Bromotetracarbonyl[(triphenylsilyl)methylidyne]tungsten, 10Cl
Bromotetracarbonyltriphenylsilylcarbonynetungsten
[62319-82-8]



M 647.209

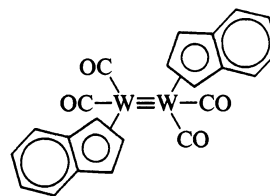
Ivory cryst. (CH₂Cl₂/pentane at -78°). Dec. >ca. 65°.

Fischer, E.O. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1977, **16**, 401 (*synth*, *ir*, *nmr*)

C₂₄H₁₄O₆W₂

W-00138

Hexacarbonylbis[(1,2,3,3a,7a-η)-1H-inden-1-yl]ditungsten, 10Cl
Hexacarbonylbis(η⁵-indenyl)tungsten.
[68586-58-3]



M 766.071

Cryst. (CH₂Cl₂/heptane). Mp 204-5° dec.

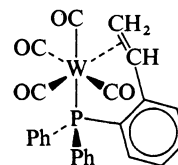
Birdwhistell, R. *et al*, *J. Organomet. Chem.*, 1978, **157**, 239 (*synth*, *props*)

Nesmeyanov, A.N. *et al*, *J. Organomet. Chem.*, 1978, **159**, 189 (*synth*, *props*)

C₂₄H₁₇PO₄W

W-00139

Tetracarbonyl[2-(η²-ethenyl)phenyldiphenylphosphine-P]-tungsten, 9Cl
[12290-83-4]



M 584.220

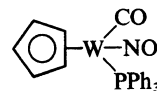
Yellow cryst. Mp 160-75° dec.

Bennett, M.A. *et al*, *J. Organomet. Chem.*, 1967, **10**, 301; 1973, **51**, 289 (*synth*)

C₂₄H₂₀NO₂PW

W-00140

Carbonyl(η⁵-2,4-cyclopentadien-1-yl)nitrosyl(triphenylphosphine)tungsten, 8Cl
[33113-68-7]

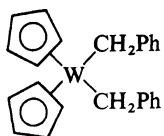


M 569.251

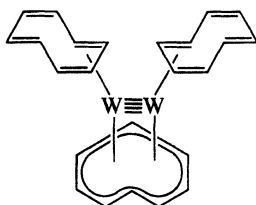
Solid. Mp 222-4°.

Brunner, H., *Chem. Ber.*, 1969, **102**, 305 (*synth*, *props*)

Brunner, H., *J. Organomet. Chem.*, 1969, **16**, 119 (*synth*, *nmr*, *ir*)

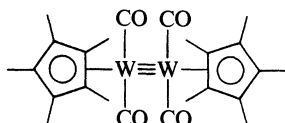
C₂₄H₂₄W**W-00141****Dibenzylbis(η⁵-2,4-cyclopentadien-1-yl)tungsten***Bis(η⁵-2,4-cyclopentadien-1-yl)bis(phenylmethyl)tungsten. Bis(benzyl)bis(η⁵-cyclopentadienyl)tungsten*

M 496.304

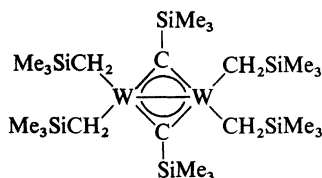
Orange needles (C₆H₆/pet. ether). Mp 200° dec.Francis, B.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1339
(*synth*, *pmr*, *ms*)**C₂₄H₂₄W₂****W-00142****[μ-[(1,2,3,4-η:5,6,7,8-η)-1,3,5,7-cyclooctatetraene-]]bis[(1,2,3,4-η)-1,3,5,7-cyclooctatetraene]ditungsten, 10Cl**
[66719-23-1]

M 680.154

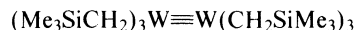
Green-black cryst. (toluene). Mp >360°.

Cotton, F.A. *et al*, *Inorg. Chem.*, 1978, 17, 2093 (*synth*, *cryst struct*)**C₂₄H₃₀O₄W₂****W-00143****Tetracarbonylbis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ditungsten, 10Cl**
[70634-77-4]

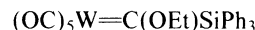
M 750.199

Deep-red cryst. (Et₂O at low temp.). Mp 237° dec. Adds 2 mol. CO reversibly across the W-W triple bond.King, R.B. *et al*, *J. Organomet. Chem.*, 1979, 171, 53 (*synth*, *nmr*, *ir*, *props*)**C₂₄H₆₂Si₆W₂****W-00144****Bis[μ-[(trimethylsilyl)methylidyne]tetrakis[(trimethylsilyl)methyl]ditungsten, 10Cl**
[59654-41-0]

M 886.967

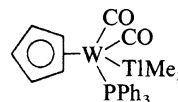
Brown-red polycrystalline, glassy solid. Bp_{0.001} 140-50° subl.Andersen, R.A. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1976, 15, 609 (*synth*, *nmr*)Chisholm, M.H. *et al*, *Inorg. Chem.*, 1976, 15, 2250; 1978, 17, 696 (*cryst struct*)**C₂₄H₆₆Si₆W₂****W-00145****Hexakis[(trimethylsilyl)methyl]ditungsten, 9Cl**
[36643-37-5]

M 890.998

D_{3d} ethane-like struct. Yellow plates. Mp 99°.Huq, F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 1079 (*cryst struct*)Mowat, W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 533 (*synth*)Chisholm, M.H. *et al*, *J. Am. Chem. Soc.*, 1976, 98, 4683 (*struct*)Chisholm, M.H. *et al*, *Inorg. Chem.*, 1976, 15, 2252 (*struct*)**C₂₆H₂₀O₆SiW****W-00146****Pentacarbonyl[ethoxy(triphenylsilyl)methylene]tungsten, 10Cl**
[65573-55-9]

M 640.376

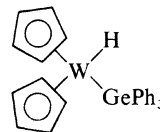
Dark-red cryst. (pentane). Mp 93°.

Fischer, E.O. *et al*, *Chem. Ber.*, 1977, 110, 3467 (*synth*, *cryst struct*)**C₂₇H₂₆O₂PTiW****W-00147****Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(dimethylthallium)-(triphenylphosphine)tungsten**
[66125-49-3]

M 801.708

Mp 160-2°.

▷ Toxic

Walther, B. *et al*, *J. Organomet. Chem.*, 1978, 145, 285.**C₂₈H₂₆GeW****W-00148****Bis(η⁵-2,4-cyclopentadien-1-yl)hydro(triphenylgermyl)tungsten, 10Cl**
Bis(η⁵-cyclopentadienyl)hydrido(triphenylgermyl)tungsten
[70675-84-2]

M 618.953

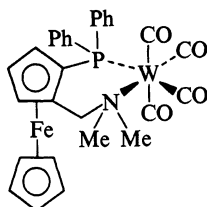
Francis, B.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1976, 1339 (*synth*, *props*)Perevozchikova, N.V. *et al*, *Zh. Obshch. Khim.*, 1979, 49, 945; *CA*, 91, 39621 (*synth*)**C₂₈H₂₈W****W-00149****Tetrabenzyltungsten***Tetrakis(phenylmethyl)tungsten, 9Cl. Tetrakis(benzyl)-tungsten. Tungsten tetrabenzyl*

[53235-29-3]



M 548.379

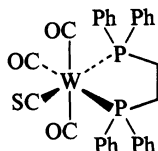
Solid, stable at r.t.

Thiele, K.H. *et al*, *Z. Anorg. Allg. Chem.*, 1975, **412**, 11 (*synth*, *ir*, *nmr*)**C₂₉H₂₆FeNO₄PW****W-00150****Tetracarbonyl[1-[(dimethylamino)methyl]-2-(diphenylphosphino)ferrocene-*N,P*]tungsten, 9Cl**

M 723.199

Cryst. (Me₂CO/pet. ether). Mp 203-6° dec.Kotz, J.C. *et al*, *J. Organomet. Chem.*, 1975, **84**, 255 (*synth*, *ir*, *pmr*)**C₃₀H₂₄O₃P₂SW****W-00151****(Carbonothioyl)tricarbonyl[1,2-ethanediylbis(diphenylphosphine)-*P,P'*]tungsten, 10Cl****[1,2-Bis(diphenylphosphino)ethane](carbonothioyl)tricarbonyltungsten**

[54204-88-5]

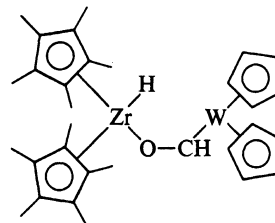


M 710.375

Yellow cryst. (CH₂Cl₂/hexane).Angelici, R.J. *et al*, *Inorg. Chem.*, 1976, **15**, 1089 (*synth*, *ir*, *nmr*)Jaouen, G. *et al*, *J. Organomet. Chem.*, 1974, **72**, 377 (*synth*)**C₃₁H₃₆O₄PSnW[⊖]****W-00152****Tetracarbonyl(triphenylstannane)(triisopropylphosphine)-tungstate(1-)**

M 806.137 (ion)

Stereochemistry not reported.

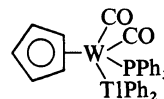
Li salt: [79135-09-4].C₃₁H₃₆LiO₄PSnW M 813.078Off-white cryst. + 2THF (Et₂O).*Tetraethylammonium salt*: [79135-11-8].C₃₉H₅₆NO₄PSnW M 936.389Off-white needles + ½CH₂Cl₂ (CH₂Cl₂).Maher, J.M. *et al*, *Organometallics*, 1982, **1**, 215 (*synth*, *ir*, *pmr*)**C₃₁H₄₂OWZr****W-00153****[Bis(η⁵-2,4-cyclopentadien-1-yl)hydro[μ-[methanolato(3-)-C:O]]bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, 10Cl****Bis(η⁵-cyclopentadienyl)hydrido[bis(η-pentamethylcyclopentadienyl)hydrido]zirconoxymethylene]tungsten**
[69289-49-2]

M 705.742

Red-brown cryst. (toluene).

Wolczanski, P.T. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 218 (*synth*, *ir*, *nmr*, *cryst struct*)**C₃₇H₃₀O₂PTIW****W-00154****Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(diphenylthallium)-(triphenylphosphine)tungsten**

[66125-50-6]



M 925.850

Mp 188-90°.

Walther, B. *et al*, *J. Organomet. Chem.*, 1978, **145**, 285 (*synth*, *nmr*, *ir*)**C₄₃H₃₀OW****W-00155****Carbonyltris(diphenylacetylene)tungsten**

As Carbonyltris(3-hexyne)tungsten, W-00124 with

R = Ph

M 746.559

Yellow prismatic cryst.

Tate, D.P. *et al*, *J. Am. Chem. Soc.*, 1964, **86**, 3261 (*synth*)Bau, R. *et al*, *J. Am. Chem. Soc.*, 1972, **94**, 1402 (*cryst struct*)

Handle all chemicals with care

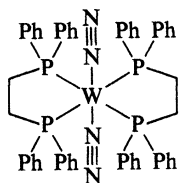
C₅₂H₄₈N₄P₄W

W-00156

Bis(dinitrogen)bis[1,2-bis(diphenylphosphino)ethane]tungsten

Bis(dinitrogen)bis[1,2-ethanediylbis(diphenylphosphine)-P,P']tungsten, 9Cl. Bis(dinitrogen)bis[ethylene-bis(diphenylphosphine)]tungsten, 8Cl

[55954-53-5]



M 1036.723

Orange cryst.

Bell, B. *et al*, *J. Chem. Soc., Chem. Commun.*, 1970, 842 (*synth. ir*)

Y Yttrium

S. A. Cotton

Yttrium (Fr., Ger.), Ytrio or Itrio (Sp.), Ittrio (Ital.), Иттрий (Ittrii) (Russ.), イットリウム (Japan.)

Atomic Number. 39

Atomic Weight. 88.9059

Electronic Configuration. [Kr] $4d^1 5s^2$

Oxidation State. +3

Coordination Number. Usually 6 or greater, unless bulky ligands are present.

Colour. Generally colourless but may be yellow or brown.

Availability. Usual starting materials are Y_2O_3 and anhydrous YCl_3 . See also under Lanthanum.

Handling. See under Lanthanum.

Toxicity. Yttrium is not generally regarded as toxic but little is known about this element.

Isotopic Abundance. ^{89}Y , 100%.

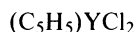
Spectroscopy. ^{89}Y has $I = \frac{1}{2}$, but has not been studied as an nmr probe.

Analysis. See under Lanthanum.

References. See under Lanthanum.

C₅H₅Cl₂Y

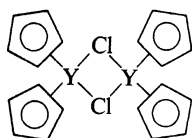
Y-00001

Dichloro(η⁵-2,4-cyclopentadien-1-yl)yttrium, 9Cl
Cyclopentadienylyttrium dichloride

M 224.906

Tris-THF adduct: [52810-84-1].C₁₇H₂₉Cl₂O₃Y M 441.226Dec. by air and moisture. Struct. probably resembles
Dichloro(η⁵-2,4-cyclopentadien-1-yl)erbium.Jamerson, J.D. *et al.*, *J. Organomet. Chem.*, 1974, **65**, C33
(*synth*)**C₁₀H₁₀ClY**

Y-00002

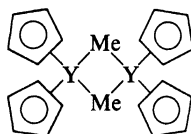
Chlorobis(η⁵-2,4-cyclopentadien-1-yl)yttrium*Chlorodicyclopentadienylyttrium. Dicyclopentadienylyttrium chloride*

M 254.548

Dimeric.

Dimer: Dichlorotetrakis(η⁵-2,4-cyclopentadien-1-yl)-
diyttrium, 9Cl. Colourless cryst. Sol. THF. Subl. *in vacuo* at 250°.Okamoto, J. *et al.*, *CA*, 1966, **64**, 9762a (*synth*)Holton, J. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1979, 45 (*synth*)Green, J.C. *et al.*, *J. Organomet. Chem.*, 1981, **212**, 329 (*pe*)**C₁₁H₁₃Y**

Y-00003

Bis(η⁵-2,4-cyclopentadien-1-yl)methylttrium

M 234.130

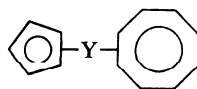
Dimeric.

Dimer: [60997-40-2]. Tetrakis(η⁵-2,4-cyclopentadien-
1-yl)di-μ-methylttrium.C₂₂H₂₆Y₂ M 468.259Colourless cryst. Sol. C₆H₆, toluene, CH₂Cl₂. Air-
sensitive solid. Dec. >158°.Holton, J. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1979, 54 (*synth*,
struct, *ir*, *nmr*)**C₁₃H₁₃Y**

Y-00004

**(η⁸-1,3,5,7-Cyclooctatetraene)(η⁵-2,4-cyclopentadien-1-yl)-
yttrium, 9Cl**

[52668-25-4]



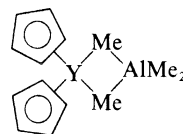
M 258.152

Cryst. Sol. THF. Extremely air-sensitive. Forms labile
THF adduct.Jamerson, J.D. *et al.*, *J. Organomet. Chem.*, 1974, **65**, C33
(*synth*, *nmr*)**C₁₄H₂₂AlY**

Y-00005

**Bis(η⁵-2,4-cyclopentadien-1-yl)(dimethylaluminum)di-μ-met-
hylyttrium**

[57398-65-9]



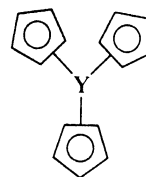
M 306.215

Homogeneous ethylene polymerization catalyst. Colour-
less cryst. Sol. toluene, CH₂Cl₂, C₆H₆. Mp 143°. Air-
sensitive.Ballard, D.G.H. *et al.*, *J. Chem. Soc., Chem. Commun.*, 1978,
994 (*use*)Scollary, G.R., *Aust. J. Chem.*, 1978, **31**, 411 (*struct*)Holton, J. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1979, 45 (*synth*,
nmr, *ir*, *cmr*)**C₁₅H₁₅Y**

Y-00006

Tris(η⁵-2,4-cyclopentadien-1-yl)yttrium, 9Cl*Tri-π-cyclopentadienylyttrium, 8Cl*

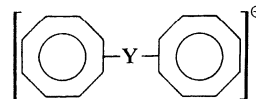
[1294-07-1]



M 284.189

Pale-yellow cryst. Sol. THF. Mp 295°. Subl. at 200-50°
in vacuo, hydrol. by H₂O.*Cyclohexylisocyanide adduct:* [12098-35-0]. Colourless
solid. Sol. C₆H₆. Mp 165°.*THF adduct:* White cryst. Sol. THF. Air-sensitive. Subl.
at 160-80° *in vacuo*.Wilkinson, G. *et al.*, *J. Am. Chem. Soc.*, 1954, **76**, 6210 (*synth*)Fischer, E.O. *et al.*, *J. Organomet. Chem.*, 1966, **6**, 141 (*synth*)Okamoto, Y. *et al.*, *CA*, 1966, **64**, 9762a (*synth*, *rev*)Von Ammon, R. *et al.*, *Ber. Bunsenges. Phys. Chem.*, 1972, **76**,
995 (*ir*, *nmr*)Devyatykh, G.G. *et al.*, *Dokl. Akad. Nauk. SSSR*, 1973, **208**,
1094 (*synth*, *ms*)Aleksanyan, V.T. *et al.*, *J. Organomet. Chem.*, 1977, **131**, 251
(*raman*)Rogers, R.D. *et al.*, *J. Organomet. Chem.*, 1981, **216**, 383
(*struct*)**C₁₆H₁₆Y[⊖]**

Y-00007

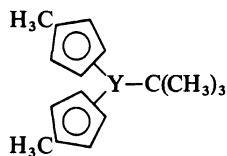
Bis(η⁸-1,3,5,7-cyclooctatetraene)yttrate(1-), 9Cl*Dicyclooctatetraeneyttrate(1-)*

M 297.208 (ion)

K salt: [51187-41-8].C₁₆H₁₆KY M 336.307Yellow solid. Sol. dioxan, THF. Mp >345°. Extremely
air- and moisture-sensitive.Hodgson, K.O. *et al.*, *J. Am. Chem. Soc.*, 1973, **95**, 8650 (*synth*,
ir)

C₁₆H₂₃Y

Y-00008

tert-Butylbis(methylcyclopentadienyl)yttriumBis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl-]
[(1,1-dimethylethyl)yttrium, 9Cl

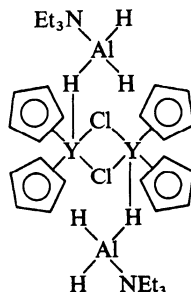
M 304.264

THF complex: [80642-67-7].

C₂₀H₃₁OY M 376.370Light-yellow powder. Reacts with H₂ to give
[(C₅H₄CH₃)₂YH(C₄H₈O)]₂. Extremely air- and
moisture-sensitive.Evans, W.J. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 2008 (*synth*,
ir, *nmr*)C₁₆H₂₈AlClNY

Y-00009

Chlorobis(cyclopentadienyl)[trihydro(triethylamino)aluminum]yttrium



M 385.744

Dimeric.

Dimer: Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl-)
bis[trihydro(triethylaluminum)aluminum]diyttrium.C₃₂H₅₆Al₂Cl₂N₂Y₂ M 771.489Colourless cryst. Sol. C₆H₆. Air- and moisture-
sensitive.Lobkovsky, E.B. *et al*, *J. Organomet. Chem.*, 1983, **254**, 167
(*synth*, *struct*)C₁₆H₄₄Si₄Y⁺

Y-00010

Tetrakis[(trimethylsilyl)methyl]yttrate(1-)

[Y(CH₂SiMe₃)₄]⁺

M 437.772 (ion)

Li salt, tetrakis-THF complex: [67483-85-6].C₃₂H₇₆LiO₄Si₄Y M 733.139Colourless cryst. Sol. Et₂O, THF. Mp 85-9°.Atwood, J.L. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 140
(*synth*, *cmr*, *nmr*, *ir*)C₁₈H₁₅Y

Y-00011

Triphenylttrium, 8Cl

Yttrium triphenyl

[25292-08-4]



M 320.222

Brown solid. Sol. THF. Stable to 210° *in vacuo*.

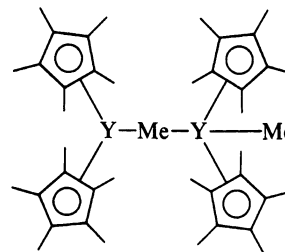
Pyrophoric in air.

Hart, F.A. *et al*, *J. Organomet. Chem.*, 1970, **21**, 147 (*synth*, *ir*)C₂₁H₃₃Y

Y-00012

Methylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]yttrium

[87136-56-9]



M 374.398

Asymmetric dimeric struct. in solid state, dissociates in
soln. (by analogy with Lu analogue, Methyl-
bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopent-
adien-1-yl]lutetium. Activates methane in soln.*Dimer*:C₄₂H₆₆Y₂ M 748.795

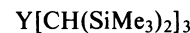
White solid. Sol. toluene, cyclohexane.

Watson, P.L., *J. Am. Chem. Soc.*, 1983, **105**, 6491 (*nmr*, *cmr*,
props)C₂₁H₅₇Si₆Y

Y-00013

Tris[bis(trimethylsilyl)methyl]yttrium

[53668-81-8]



M 567.100

White cryst. Sol. Et₂O.*Bis-THF complex*: [53659-75-9].C₂₉H₇₃O₂Si₆Y M 711.313

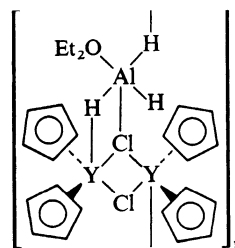
White cryst. Sol. THF. Air-sensitive.

Barker, G.K. *et al*, *J. Organomet. Chem.*, 1974, **76**, C45 (*synth*,
pmr)C₂₄H₃₃AlCl₂OY₂

Y-00014

 μ -Chloro- μ_3 -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl-)
trihydro[1,1'-oxybis[ethane]]aluminumdiyttrium, 10Cl

[83243-22-5]



M 613.223

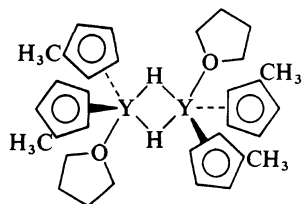
Polymeric chain-struct. with Y—H—Al chain linkages.

Formed by reaction of AlH₃ with (C₅H₅)₂YCl. Col-
ourless cryst. Sol. Et₂O. Sensitive to air and moisture.Lobkovskii, E.B. *et al*, *J. Organomet. Chem.*, 1982, **235**, 151
(*synth*, *cryst struct*)

C₃₂H₄₆O₂Y₂

Y-00015

Di- μ -hydrotetrakis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]bis(tetrahydrofuran)diyttrium
[80658-44-2]



M 640.526

Formed by hydrogenolysis of (MeC₅H₄)₂Y(C₄H₉)-(OC₄H₈). Colourless prisms. Sol. hot THF. Extremely air- and moisture-sensitive.

Evans, W.J. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 2008 (*synth, cryst struct, ir*)

Yb Ytterbium

S. A. Cotton

Ytterbium (Fr., Ger.), Yterbio or Iterbio (Sp.), Itterbio (Ital.), Иттербий (Itterbii) (Russ.), イッテルビウム (Japan.)

Atomic Number. 70

Atomic Weight. 173.04

Electronic Configuration. [Xe] $4f^{14} 6s^2$

Oxidation States. +2, +3, the latter being more common.

Coordination Number. 6 or greater, but less with bulky ligands such as $-\text{CH}_2\text{SiMe}_3$, $-\text{C}(\text{CH}_3)_3$.

Colour. Yb(II) complexes are usually red or green. Those of Yb(III) are variable in colour.

Availability. Starting materials are Yb_2O_3 and anhydrous YbCl_3 , which are relatively expensive. See also under Lanthanum.

Handling. See under Lanthanum.

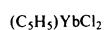
Toxicity See under Lanthanum.

Isotopic Abundance. ^{170}Yb , 3.03%; ^{171}Yb , 14.31%; ^{172}Yb , 21.82%; ^{173}Yb , 16.13%; ^{174}Yb , 31.84%; ^{176}Yb , 12.73%.

Spectroscopy. Yb(III) compounds give ^1H nmr spectra with very broad, shifted lines but a considerable amount of data is becoming available. Yb(II) compounds are diamagnetic.

Analysis. See under Lanthanum.

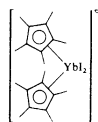
References. See under Lanthanum.



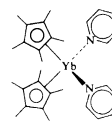
Yb-00001



Yb-00013



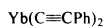
Yb-00023



Yb-00031



Yb-00002



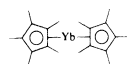
Yb-00014



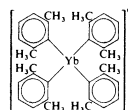
Yb-00003



Yb-00015



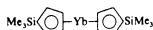
Yb-00024



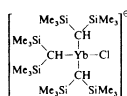
Yb-00032



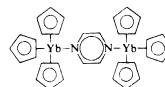
Yb-00004



Yb-00016



Yb-00025



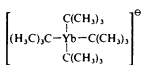
Yb-00033



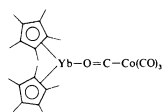
Yb-00005



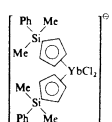
Yb-00007



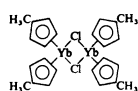
Yb-00017



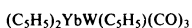
Yb-00026



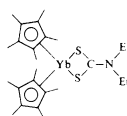
Yb-00034



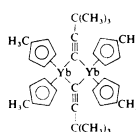
Yb-00008



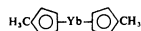
Yb-00018



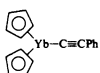
Yb-00027



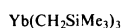
Yb-00035



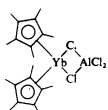
Yb-00009



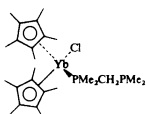
Yb-00019



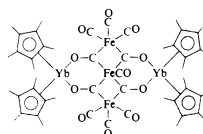
Yb-00010



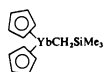
Yb-00020



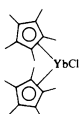
Yb-00028



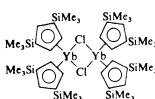
Yb-00036



Yb-00011



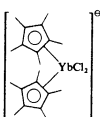
Yb-00021



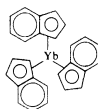
Yb-00029



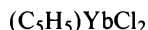
Yb-00012



Yb-00022



Yb-00030

C₅H₅Cl₂Yb**Yb-00001****Dichloro(η⁵-2,4-cyclopentadien-1-yl)ytterbium**
Cyclopentadienylytterbium dichloride

M 309.041

*Tris-THF adduct:*C₁₇H₂₉Cl₂O₃Yb M 525.360Orange cryst. Mp 78–81°. Extremely air-sensitive. μ = 4.33 μ_B. Struct. probably resembles Dichloro(η⁵-2,4-cyclopentadien-1-yl)erbium.Manastyrskij, S. *et al*, *Inorg. Chem.*, 1963, **2**, 904 (*synth*)**C₆H₁₈Yb^{eee}****Yb-00002****Hexamethylytterbate(3–)**

M 263.248 (ion)

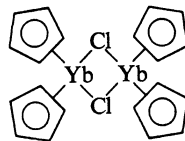
Tris[(tetramethylethylenediamine)lithium] salt:
[76206-94-5].C₂₄H₆₆Li₃N₆Yb M 632.689White cryst. Sol. Et₂O. Mp 141–2°. Extremely air- and moisture-sensitive.Schumann, H. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1981, **20**, 120 (*synth*)**C₈H₈Yb****Yb-00003****(η⁸-1,3,5,7-Cyclooctatetraene)ytterbium**

[65036-19-3]



M 277.191

Pink solid. Sol. Py, DMF. Mp >500°. Extremely oxygen-sensitive. Dec. by water.

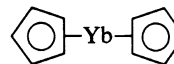
Hayes, R.G. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 6876 (*synth*)
de Kock, C.W. *et al*, *Inorg. Chem.*, 1978, **17**, 625 (*synth*, *ir*)**C₁₀H₁₀ClYb****Yb-00004****Chlorobis(η⁵-2,4-cyclopentadien-1-yl)ytterbium***Chlorodicyclopentadienylytterbium. Dicyclopentadienylytterbium chloride*

M 338.682

Dimeric.

Dimer: [42612-73-7]. *Di-μ-chlorotetrakis(η⁵-2,4-cyclopentadien-1-yl)diytterbium, 9Cl.*C₂₀H₂₀Cl₂Yb₂ M 677.364Orange-red cryst. Sol. THF. Mp >200° dec. Dec. in air. Subl. *in vacuo*. μ_{eff} = 4.81 μ_B.Maginn, R.E. *et al*, *J. Am. Chem. Soc.*, 1963, **85**, 672 (*synth*, *ir*)Marks, T.J. *et al*, *Inorg. Chem.*, 1976, **15**, 1302 (*synth*)**C₁₀H₁₀Yb****Yb-00005****Bis(η⁵-2,4-cyclopentadien-1-yl)ytterbium***Dicyclopentadienylytterbium. Ytterbocene*

[1271-31-4]



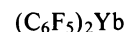
M 303.229

Red solid. Sol. THF. Subl. at 400° *in vacuo*.Fischer, E.O. *et al*, *J. Organomet. Chem.*, 1965, **3**, 181 (*synth*, *ir*)Aleksanyan, V.T. *et al*, *J. Organomet. Chem.*, 1977, **131**, 113 (*ir*)Evans, W.J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 292 (*synth*)**C₁₁H₁₃Yb****Yb-00006****Bis(η⁵-2,4-cyclopentadien-1-yl)methylytterbium**

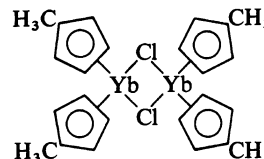
[55672-19-0]

M 318.264

Dimeric.

Dimer: [60997-43-5]. *Tetrakis(η⁵-2,4-cyclopentadien-1-yl)di-μ-methyldiytterbium, 9Cl.*C₂₂H₂₆Yb₂ M 636.527Orange cryst. Sol. C₆H₆, toluene, CH₂Cl₂. Air- and moisture-sensitive. μ_{eff} = 4.0 μ_B (295K). Dec. >165°.Ely, N. *et al*, *Inorg. Chem.*, 1975, **14**, 2680 (*synth*, *ir*, *uv*)Holton, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 54 (*synth*, *ir*, *uv*, *ms*, *struct*)**C₁₂F₁₀Yb****Yb-00007****Bis(pentafluorophenyl)ytterbium**

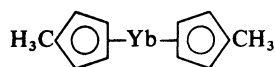
M 507.156

Tetrakis-THF complex: [59975-65-4].C₂₈H₃₂F₁₀O₄Yb M 795.582Orange-red cryst. Mp 78° dec. (under N₂).Deacon, G.B. *et al*, *J. Organomet. Chem.*, 1977, **135**, 103 (*synth*, *ir*, *nmr*, *uv*)**C₁₂H₁₄ClYb****Yb-00008****Chlorobis(η⁵-methylcyclopentadienyl)ytterbium***Di(methylcyclopentadienyl)ytterbium chloride*

M 366.736

Dimeric.

Dimer: [54365-60-5]. *Di-μ-chlorotetrakis[(1,2,3,4,5-η)-1-methyl-2,4-cyclopentadien-1-yl]diytterbium, 9Cl.*C₂₄H₂₈Cl₂Yb₂ M 733.471Red cryst. Sol. C₆H₆, THF. Mp 115–20°. Subl. *in vacuo*. Air-sensitive.Maginn, R.E. *et al*, *J. Am. Chem. Soc.*, 1963, **85**, 672 (*synth*)Baker, G.C. *et al*, *Inorg. Chem.*, 1975, **14**, 1376 (*cryst struct*)

C₁₂H₁₄Yb**Yb-00009****Bis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]ytterbium**

M 331.283

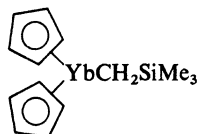
THF complex: [76137-73-0].

C₁₆H₂₂OYb M 403.389

Yellow cryst. V. air- and moisture-sensitive.

Zinnen, H.A. *et al*, *J. Chem. Soc., Chem. Commun.*, 1980, 810
(*synth*, *ir*, *uv*, *pmr*, *cmr*, *struct*)**C₁₂H₃₃Yb****Yb-00010****Tris[(trimethylsilyl)methyl]ytterbium**

M 350.433

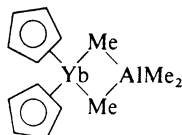
Bis-THF complex: [67624-22-0]. *Bis(tetrahydrofuran)-tris[(trimethylsilyl)methyl]ytterbium*.C₂₀H₄₉O₂Si₃Yb M 578.902Red cryst. Mp 53-4°. Air-sensitive in soln., stable as large cryst. μ_{eff} = 4.64 μ_B .Atwood, J.L. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 140
(*synth*, *ir*)**C₁₄H₂₁SiYb****Yb-00011****Bis(η^5 -2,4-cyclopentadien-1-yl)((trimethylsilyl)methyl)ytterbium**

M 390.445

THF complex: [82293-72-9].

C₁₈H₂₉OSiYb M 462.552Red-brown solid. Sol. THF, C₆H₆, toluene. Mp 40-50° dec. Extremely sensitive to moisture and oxygen.Schumann, H. *et al*, *Organometallics*, 1982, **1**, 1194 (*synth*, *ir*, *nmr*)**C₁₄H₂₂AlYb****Yb-00012****Bis(η^5 -2,4-cyclopentadien-1-yl)(dimethylaluminum)di- μ -methylytterbium**

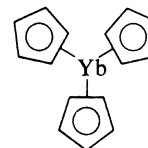
[60475-14-1]



M 390.349

Orange-red cryst. Sol. C₆H₆, toluene, CH₂Cl₂. Mp 133-5°. Air-sensitive.Holton, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1979, 45 (*synth*, *struct*, *ir*)**C₁₅H₁₅Yb****Yb-00013****Tris(η^5 -2,4-cyclopentadien-1-yl)ytterbium, 9Cl***Tricyclopentadienylytterbium*

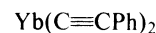
[1295-20-1]



M 368.324

Dark-green cryst. Sol. THF. Mp 273° dec. Hydrol. by H₂O. Subl. at 150° *in vacuo*. μ_{eff} = 4.0 μ_B .*Isocyanocyclohexane adduct*: [12098-36-1]. *Tris(η^5 -2,4-cyclopentadien-1-yl)isocyanocyclohexaneytterbium*.C₂₂H₂₆NYb M 477.494Dark-green cryst. Sol. C₆H₆. Mp 167°. μ_{eff} = 4.4 μ_B . Subl. at 150° *in vacuo*.*THF complex*: *Tris(η^5 -2,4-cyclopentadien-1-yl)-tetrahydrofuranytterbium*.C₁₉H₂₃OYb M 440.430Dark-green cryst. Sol. THF. Mp 223-6°. Subl. *in vacuo* at 100-20°.*Triphenylphosphine adduct*: *Tris(η^5 -2,4-cyclopentadien-1-yl)triphenylphosphineytterbium*.C₃₃H₃₀PYb M 630.614V. dark-green cryst. Sol. C₆H₆, sl. sol. pentane. Mp 185°.*NH₃ adduct*: *Tris(2,4-cyclopentadien-1-yl)-ammineytterbium*.C₁₅H₁₈NYb M 385.354Green cryst. Sol. C₆H₆. Forms (C₅H₅)₂YbNH₂ at 200°. Subl. at 150° *in high vacuum*.Birmingham, J.M. *et al*, *J. Am. Chem. Soc.*, 1956, **78**, 42
(*synth*)Fischer, R.D. *et al*, *J. Organomet. Chem.*, 1967, **6**, 141; **8**, 155
(*uv*)Pappalardo, R. *et al*, *J. Chem. Phys.*, 1967, **46**, 632 (*uv*)Thomas, J.L. *et al*, *J. Organomet. Chem.*, 1967, **23**, 486 (*ms*)v. Ammon, R. *et al*, *Inorg. Nucl. Chem. Lett.*, 1969, **5**, 315
(*nmr*)v. Ammon, R. *et al*, *Ber. Bunsenges. Phys. Chem.*, 1972, **76**, 995
(*ir*, *nmr*)**C₁₆H₁₀Yb****Yb-00014****Bis(phenylethynyl)ytterbium**

[66080-21-5]

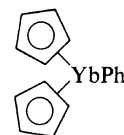


M 375.295

Purple-black cryst. Sol. THF. Mp 200° dec. V. air- and water-sensitive.

Deacon, G.B. *et al*, *J. Organomet. Chem.*, 1978, **146**, C43
(*synth*, *ir*, *pmr*)**C₁₆H₁₅Yb****Yb-00015****Bis(η^5 -2,4-cyclopentadien-1-yl)phenylytterbium, 9Cl**

[55672-22-5]

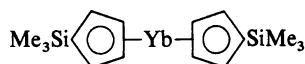


M 380.335

Orange cryst. Sol. C₆H₆, THF. Air- and moisture-sensitive. μ_{eff} = 3.86 μ_B (295K).

Ely, N.M. *et al*, *Inorg. Chem.*, 1975, **14**, 2680 (*synth, ir*)

C₁₆H₂₆Si₂Yb **Yb-00016**
Bis[(1,2,3,4,5-η)-1-(trimethylsilyl)-2,4-cyclopentadien-1-yl]ytterbium



M 447.592

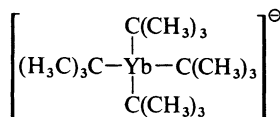
Bis-THF complex:

C₂₄H₄₂O₂Si₂Yb M 591.806

Purple cryst. Mp 120°. Loses THF *in vacuo* at 30°.

Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1980, 987 (*synth, ms*)

C₁₆H₃₆Yb[⊖] **Yb-00017**
Tetra-*tert*-butylytterbate(1-)
Tetrakis(1,1-dimethylethyl)ytterbate(1-)



M 401.500 (ion)

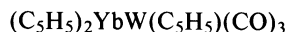
Li salt, tri-THF complex: [68868-91-7].

C₂₈H₆₀LiO₃Yb M 624.761

Red-purple solid. Sol. Et₂O, THF. V. air- and moisture-sensitive. μ_{eff} = 4.6 μ_B.

Wayda, A.L. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 7119 (*synth, ir*)

C₁₈H₁₅O₃WYb **Yb-00018**
[μ-(Carbonyl-C, O)]bis(η⁵-2,4-cyclopentadien-1-yl)(dicarbonyl)(η⁵-2,4-cyclopentadien-1-yl)tungstenytterbium
 [39477-07-1]

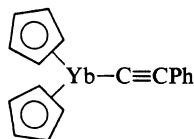


M 636.205

Nitrosylated by *N*-methyl-*N*-nitroso-*p*-toluenesulfonamide to afford (C₅H₅)W(CO)₂NO. Golden cryst. Sol. THF, DMSO. Mp >220° dec. Air- and moisture-sensitive.

Crease, A.E. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1501 (*synth, ir*)

C₁₈H₁₅Yb **Yb-00019**
Bis(η⁵-2,4-cyclopentadien-1-yl)(phenylethynyl)ytterbium
 [53224-34-3]

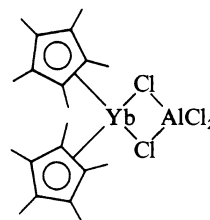


M 404.357

Orange cryst. Sol. C₆H₆, THF. Air- and moisture-sensitive. μ_{eff} = 4.31 μ_B.

Ely, N.M. *et al*, *Inorg. Chem.*, 1975, **14**, 2680 (*synth, ir*)

C₂₀H₃₀AlCl₄Yb **Yb-00020**
Di-μ-chloro(dichloroaluminum-)bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadienyl]ytterbium
 [78064-54-7]



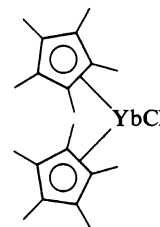
M 612.291

Deep-blue cryst. Sol. pentane. Mp 175° (part. melts).

Air- and moisture-sensitive.

Watson, P.L. *et al*, *Inorg. Chem.*, 1981, **20**, 3271 (*synth, struct, ir, uv, nmr*)

C₂₀H₃₀ClYb **Yb-00021**
Chlorobis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbium



M 478.950

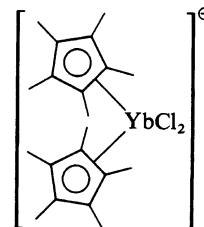
THF complex: [78064-47-8].

C₂₄H₃₈ClOYb M 551.057

Violet cryst. Sol. toluene, THF. Mp 221-3°. μ_{eff} 4.20 μ_B.

Tilley, T.D. *et al*, *Inorg. Chem.*, 1981, **20**, 3267 (*synth, ir, ms, nmr*)

C₂₀H₃₀Cl₂Yb[⊖] **Yb-00022**
Dichlorobis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbate(1-)



M 514.403 (ion)

Li salt, tetramethylethylenediamine complex: [78128-20-8].

C₂₆H₄₆Cl₂LiN₂Yb M 637.550

Violet needles. Sol. Et₂O. Mp 255° dec.

Li salt, bis (Et₂O) complex: [78128-04-8].

C₂₈H₅₀Cl₂LiO₂Yb M 669.589

Dark-purple cryst. Sol. Et₂O. Mp >250°. Loses Et₂O *in vacuo* or on stirring with pentane or toluene.

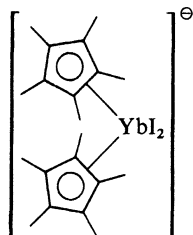
Tilley, T.D. *et al*, *Inorg. Chem.*, 1981, **20**, 3267 (*synth, struct, ir*)

Watson, P.L. *et al*, *Inorg. Chem.*, 1981, **20**, 3271 (*synth, struct, ir, uv, nmr*)

C₂₀H₃₀I₂Yb[⊖]

Yb-00023

Diiodobis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbate(1-)



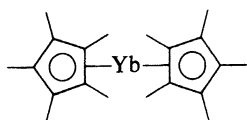
M 697.306 (ion)

Li salt: [78128-00-4].

C₂₈H₅₀I₂LiO₂Yb M 852.492Purple cryst. Sol. toluene, Et₂O. Mp >250°. Air- and moisture-sensitive.Watson, P.L., *J. Chem. Soc., Chem. Commun.*, 1980, 652 (synth)Watson, P.L. *et al.*, *Inorg. Chem.*, 1981, **20**, 3271 (synth, struct, ir, uv, nmr)C₂₀H₃₀Yb

Yb-00024

Bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbium



M 443.497

THF complex: [74282-46-5].

C₂₄H₃₈OYb M 515.604

Red prisms. Sol. hydrocarbons, ethers. Mp 206-9°.

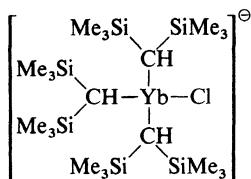
Diamagnetic.

Complex + 1 THF + ½ toluene: [74282-48-7]. Brown-red prisms. Mp 204-6°. V. air- and moisture-sensitive.

Tilley, T.D. *et al.*, *Inorg. Chem.*, 1980, **19**, 2999 (synth, struct, ir, nmr, cmr)C₂₁H₅₇ClSi₆Yb[⊖]

Yb-00025

Tris[bis(triethylsilyl)methyl]chloroytterbate(1-)



M 686.687 (ion)

Li salt, tetrakis-THF complex: [67483-92-5].

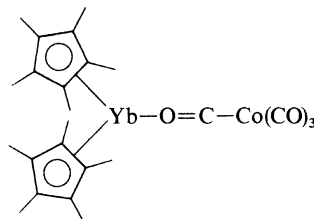
C₃₇H₈₉ClLiO₄Si₆Yb M 982.055

Red cryst. Sol. hexane, THF. Mp 123-4° dec.

Atwood, J.L. *et al.*, *J. Chem. Soc., Chem. Commun.*, 1978, 140 (synth, struct)C₂₄H₃₀CoO₄Yb

Yb-00026

[μ-(Carbonyl-C, O)]bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](tricarbonylcobalt)ytterbium



M 614.472

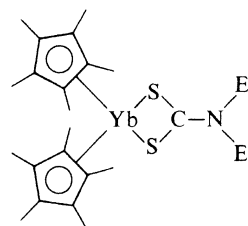
Blue ppt.

THF adduct: [80758-23-2].

C₂₈H₃₈CoO₅Yb M 686.578Blue prisms. μ_{eff} = 4.1 μ_B.Tilley, T.D. *et al.*, *J. Chem. Soc., Chem. Commun.*, 1981, 985 (synth, struct, ir, nmr)C₂₅H₄₀NS₂Yb

Yb-00027

Bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]diethylcarbamodithioato-S,S'-ytterbium, 10Cl [81276-69-9]

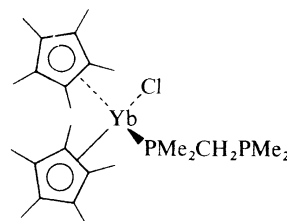


M 591.758

Purple prisms. Sol. pentane, Et₂O. Mp 226-7°. Air-sensitive. μ_{eff} = 3.39 μ_B.Tilley, T.D. *et al.*, *Inorg. Chem.*, 1982, **21**, 2644 (synth, ir, pmr, ms, struct)C₂₅H₄₄ClP₂Yb

Yb-00028

[Bis(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl][bis(dimethylphosphino)methane]chloroytterbium [84254-54-6]



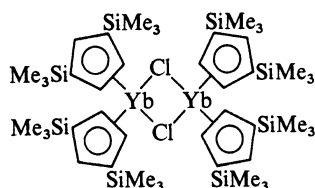
M 615.063

Purple prisms. Sol. C₆H₆, toluene. Mp 208° dec. μ_{eff} = 4.4 μ_B. The diphosphine is monodentate in this complex.Tilley, T.D. *et al.*, *Inorg. Chem.*, 1983, **22**, 856 (synth, cryst struct, ir)

C₂₆H₅₀ClSi₄Yb

Yb-00029

Bis[1,3-bis(trimethylsilylmethyl)cyclopentadienyl]chloroytterbium



M 683.516

Bridged dimer.

Dimer: [81536-99-4]. *Tetrakis*[(1,2,3,4,5- η)-1,3-bis-(trimethylsilylmethyl)-2,4-cyclopentadien-1-yl]di- μ -chlorodiytterbium.

C₅₂H₁₀₀Cl₂Si₈Yb₂ M 1367.032

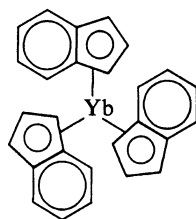
Red cryst. Sol. toluene, THF.

Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 1190 (*synth, struct*)

C₂₇H₂₁Yb

Yb-00030

Triindenylytterbium, 8Cl

Tris(1,2,3,3a,7a- η)-1H-inden-1-ylytterbium

M 518.503

THF complex: [22696-76-0].

C₃₁H₂₉OYb M 590.610Dark green. $\mu = 4.10\mu_B$.

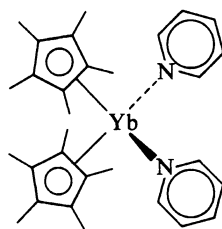
Tsutsui, M. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 3175 (*synth*)

C₃₀H₄₀N₂Yb

Yb-00031

Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadienyl]bis(pyridine)ytterbium

[81276-72-4]



M 601.699

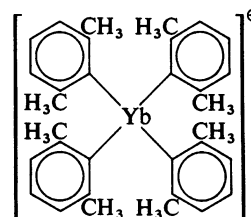
Dark-green prisms. Sol. pentane, toluene. Mp 208-10° (darkens at 190°).

Tilley, T.D. *et al*, *Inorg. Chem.*, 1982, **21**, 2647 (*synth, struct, pmr, ir*)

C₃₂H₃₆Yb[⊖]

Yb-00032

Tetrakis(2,6-dimethylphenyl)ytterbate(1-)



M 593.676 (ion)

*Li salt, tetra-THF complex:*C₄₈H₆₈LiO₄Yb M 889.044Yellow cryst. Sol. THF. Dec. by H₂O and air.

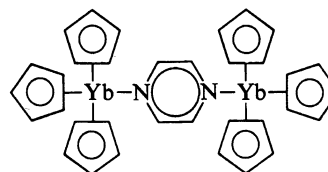
Cotton, S.A. *et al*, *J. Chem. Soc., Chem. Commun.*, 1972, 1225 (*synth, struct*)

C₃₄H₃₄N₂Yb₂

Yb-00033

Hexakis(η^5 -2,4-cyclopentadien-1-yl)[μ -(pyrazine-*N*¹:*N*⁴)]-diytterbium

[63950-86-7]



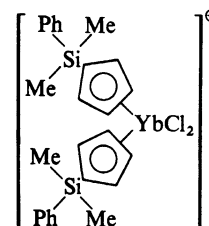
M 816.736

Green-brown cryst. Sol. dimethoxyethane, sl. sol. toluene.

Baker, E.C. *et al*, *Inorg. Chem.*, 1977, **16**, 2710 (*synth, struct, ms, ir*)

C₃₆H₃₄Cl₂Si₂Yb

Yb-00034

Dichlorobis[(1,2,3,4,5- η)-1-(methyldiphenylsilyl)-2,4-cyclopentadien-1-yl]ytterbate(1-)

M 766.782

Li salt, bis(diethyl ether) complex: [78128-08-2].C₄₄H₅₄Cl₂O₂Si₂Yb M 915.026

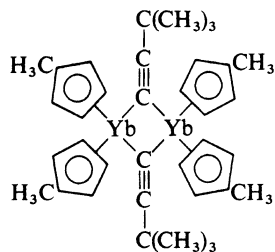
Orange cryst. Air- and moisture-sensitive.

Watson, P.L. *et al*, *Inorg. Chem.*, 1981, **20**, 3271 (*synth, struct, ir, uv*)

C₃₆H₄₂Yb₂

Yb-00035

Tetrakis(1,2,3,4,5- η -1-methyl-2,4-cyclopentadien-1-yl-
)bis[μ -3,3-dimethyl-1-butyne-1-yl]diytterbium
[76565-31-6]



M 820.808

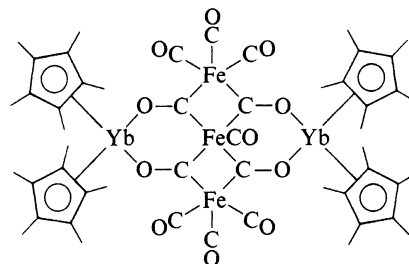
Struct. by analogy with Bis(2,4-cyclopentadien-1-yl)-
(3,3-dimethylbutynyl)erbium. Bright-orange cryst.
Sol. THF. Extremely air- and moisture-sensitive.

Atwood, J.L. *et al*, *Inorg. Chem.*, 1981, **20**, 4115 (*synth, ir, uv*)

C₅₁H₆₀Fe₃Yb₂

Yb-00036

Tetrakis[μ_3 -(carbonyl-C, C, O)](heptacarbonyltriiron)tetra-
kis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentad-
ien-1-yl]diytterbium
[80878-91-7]



M 1186.656

Violet prisms. Sol. toluene. Mp 307-10°. $\mu_{\text{eff}} = 3.91\mu_{\text{B}}$.

Tilley, T.D. *et al*, *J. Am. Chem. Soc.*, 1982, **104**, 1772 (*synth, struct, ir, nmr*)

Zr Zirconium

D. J. Cardin

Zirconium (Fr.), Zirkon (Ger.), Zirconio (Sp., Ital.), Цирконий (Tsirkonii) (Russ.), ジルコニウム (Japan.)

Atomic Number. 40

Atomic Weight. 91.22

Electronic Configuration. [Kr] $4d^2 5s^2$

Oxidation States. The oxidation state (IV) predominates for the organic derivatives of zirconium, and to a significantly greater extent than for its congener titanium. Such Zr(III) derivatives as are known include the species $ZrR_2(\eta^5-C_5H_5)$ ($R = \text{alkyl}$), which are kinetically labile, and some bridged bimetallic compounds, eg. $[Zr(\mu-PR_2)(\eta^5-C_5H_5)]_2$ which are diamagnetic. Monomeric compounds of the type $ZrX(\eta^5-C_5H_5)_2$ ($X = \text{halide}$) have not yet been obtained. The best characterised Zr(II) compounds are the metallocene adducts of neutral donors (eg. CO, PR_3) and compounds having the ligand pentamethylcyclopentadienyl. The diene metallocene adducts can be formulated as Zr(IV) species, having a metallocyclic structure. Zr(0) is represented by arene and conjugated diene adducts, generally together with phosphine, eg. $Zr(PMe_3)(\eta^6-C_6H_6)_2$, $Zr(PMe_2CH_2CH_2PMe_2)(\eta^4-C_4H_6)_2$.

Coordination Number. (Note: all ligands in this section are treated as monohapto, including cyclic hydrocarbons, which may, or more frequently, may not be). For Zr(IV), and particularly the metallocene derivatives, tetrahedral four coordinate geometry predominates. Chelating ligands may however confer higher coordination numbers, eg. 7 in $Zr(\text{diket})_3(\eta^5-C_5H_5)$ (diket = β -diketonate) or 5 in $ZrR(\eta^2-RCO)(\eta^5-C_5H_5)_2$ ($R = \text{alkyl}$). The coordination numbers of Zr(III) compounds are frequently not known, structural information being unavailable. Metal(II) complexes are four coordinate for the type $ZrL_2(\eta^5-C_5H_5)_2$, while the zero-valent $Zr(P-P)$ -(diene) $_2$ type are believed to be pseudo-octahedral.

Colour. The remarks concerning colour for titanium generally apply here, with the difference that the intense charge transfer bands present for the lighter metal are frequently absent from, or of reduced intensity, in the visible spectrum of analogous compounds of the heavier element, Titanocene dichloride, for example, is deep red, whereas zirconocene dichloride is colourless.

Availability. Analogous starting materials to those for titanium are generally employed with $ZrCl_2$ and $ZrCl_2(\eta^5-C_5H_5)_2$ being

the most important. The range of organometallic derivatives commercially available is smaller than for titanium.

Handling. Standard inert atmosphere techniques are required for those compounds of zirconium which are air-sensitive.

Toxicity. Organozirconium compounds are not associated with any known specific toxicity.

Isotopic Abundance. ^{90}Zr , 51.46%; ^{91}Zr , 11.23%; ^{92}Zr , 17.11%; ^{94}Zr , 17.40%; ^{96}Zr , 2.8%.

Spectroscopy. ^{91}Zr , $I = \frac{5}{2}$, is the only isotope with nuclear spin and has receptivity relative to ^{13}C of 6.04. There is only one report of nmr of zirconium to date. Nmr of other nuclei is not generally useful for paramagnetic materials.

Esr is a valuable tool for d^1 compounds where ^{91}Zr hyperfine couplings are generally observed.

Analysis. For precise analysis compounds are generally decomposed by ashing followed by fusion, or by wet oxidation, eg. with $\text{HClO}_4/\text{HNO}_3$. Aqueous solutions can be estimated titrimetrically, colorimetrically, or gravimetrically. Detailed procedures for particular uses are given in standard analytical works. X-ray fluorescence and polarographic methods have also been recommended.

Spot tests for elemental detection are available with a range of organic reagents. *p*-Dimethylaminophenylarsonic acid gives a red-brown precipitate, and pyrocatechol violet a blue colouration. Several ions (including organic ions) interfere. Recommended procedures are given in standard works.

References. General reviews are listed in the introduction to the *Sourcebook*.

Wailes, P. C. *et al.*, *Organometallic Chemistry of Titanium, Zirconium, and Hafnium*, Academic Press, London, 1974.

Larsen, E. M., *Adv. Inorg. Chem. Radiochem.*, 1970, **13**, 1.
Schwartz, J., *Organic Synthesis-Today-Tomorrow*, Trost, B. M. and Hutchinson, C. R. Eds, Pergamon, Oxford, 1981 (*hydrozirconation*)

Schwartz, J. and Labinger, J. A., *Angew. Chem., Int. Ed. Engl.*, 1976, **15**, 333 (*hydrozirconation*)

Cardin, D. J. *et al.*, *The Organometallic Chemistry of Zirconium and Hafnium*, Ellis Horwood, in press (1984)



Zr-00001

As Zr-00001 with
 $\text{X} = \text{Cl}$

Zr-00002

As Zr-00001 with
 $\text{X} = \text{I}$

Zr-00003



Zr-00004



Zr-00005



Zr-00006

As Zr-00006 with
 $\text{X} = \text{Y} = \text{Cl}$

Zr-00007

As Zr-00006 with
 $\text{X} = \text{Y} = \text{F}$

Zr-00008

As Zr-00006 with
 $\text{X} = \text{Y} = \text{I}$

Zr-00009



Zr-00010



Zr-00011



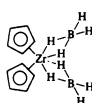
Zr-00012



Zr-00013



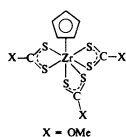
Zr-00014



Zr-00015

As Zr-00006 with
 $\text{X} = \text{OMe}$, $\text{Y} = \text{Cl}$

Zr-00016



Zr-00017

As Zr-00001 with
 $\text{X} = \text{OAc}$

Zr-00018

As Zr-00006 with
 $\text{X} = \text{Y} = \text{NCO}$ or CNO

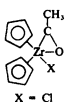
Zr-00019

As Zr-00006 with
 $\text{X} = \text{Y} = \text{NCS}$

Zr-00020

As Zr-00006 with
 $\text{X} = \text{Y} = \text{CO}$

Zr-00021



Zr-00022

As Zr-00006 with
 $\text{X} = \text{Cl}$, $\text{Y} = \text{OAc}$

Zr-00023

As Zr-00006 with
 $\text{X} = \text{Y} = \text{OMe}$

Zr-00024

As Zr-00006 with
 $\text{X} = \text{Y} = \text{Me}$

Zr-00025



Zr-00026



Zr-00027



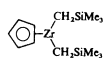
Zr-00028

As Zr-00022 with
 $\text{X} = \text{Me}$

Zr-00029

As Zr-00006 with
 $\text{X} = \text{Cl}$, $\text{Y} = \text{SiMe}_3$

Zr-00030



Zr-00031

As Zr-00006 with
 $\text{X} = \text{Y} = -\text{OOCCH}_3$

Zr-00032



Zr-00033



Zr-00034



Zr-00035

As Zr-00006 with
 $\text{X} = \text{Y} = \text{NMe}_2$

Zr-00036

As Zr-00017 with
 $\text{X} = \text{NMe}_2$

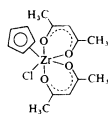
Zr-00037

$\text{Me}_2\text{Zr}[\text{N}(\text{SiMe}_3)_2]_2$

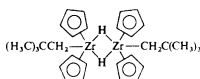
Zr-00038



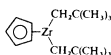
Zr-00039



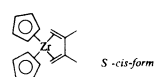
Zr-00040



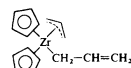
Zr-00041



Zr-00042



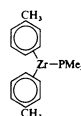
Zr-00043



Zr-00044

$\text{Zr}(\text{CH}_2\text{SiMe}_3)_4$

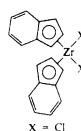
Zr-00045



Zr-00046



Zr-00047



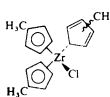
Zr-00048



Zr-00049



Zr-00050



Zr-00051



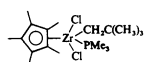
Zr-00052

As Zr-00006 with
 $\text{X} = \text{Y} = \text{NEt}_2$

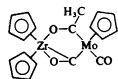
Zr-00053



Zr-00054



Zr-00055



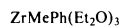
Zr-00056



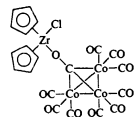
Zr-00057



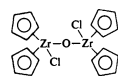
Zr-00058



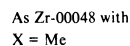
Zr-00059



Zr-00060



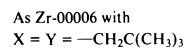
Zr-00061



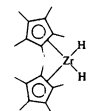
Zr-00062



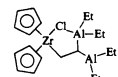
Zr-00063



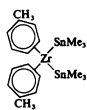
Zr-00064



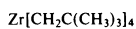
Zr-00065



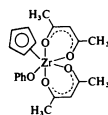
Zr-00066



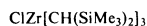
Zr-00067



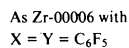
Zr-00068



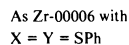
Zr-00069



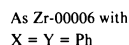
Zr-00070



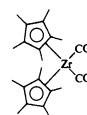
Zr-00071



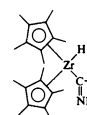
Zr-00072



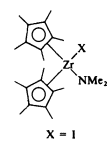
Zr-00073



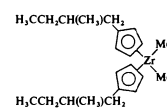
Zr-00074



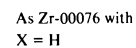
Zr-00075



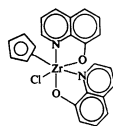
Zr-00076



Zr-00077



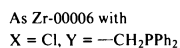
Zr-00078



Zr-00079



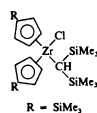
Zr-00080



Zr-00081



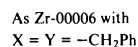
Zr-00082



Zr-00083



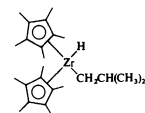
Zr-00084



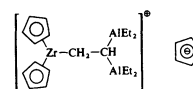
Zr-00085



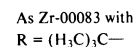
Zr-00086



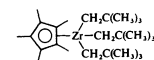
Zr-00087



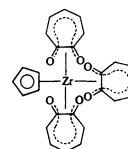
Zr-00088



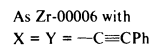
Zr-00089



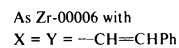
Zr-00090



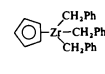
Zr-00091



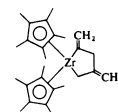
Zr-00092



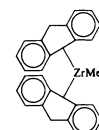
Zr-00093



Zr-00094



Zr-00095



Zr-00096



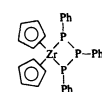
Zr-00097



Zr-00098



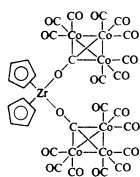
Zr-00099



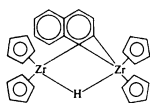
Zr-00100



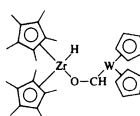
Zr-00101



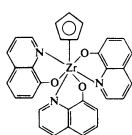
Zr-00102



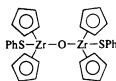
Zr-00103



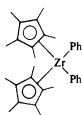
Zr-00104



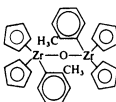
Zr-00105



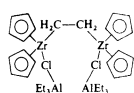
Zr-00106



Zr-00107



Zr-00108



Zr-00109

As Zr-00006 with
 $X = Y = -N=CPh_2$

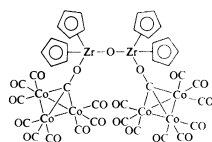
Zr-00110

As Zr-00006 with
 $X = Y = -CHPh_2$

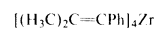
Zr-00111



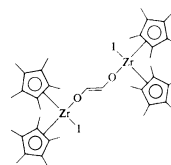
Zr-00112



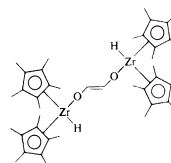
Zr-00113



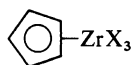
Zr-00114



Zr-00115



Zr-00116

C₅H₅Br₃Zr**Zr-00001****Tribromo(η⁵-2,4-cyclopentadien-1-yl)zirconium**

X = Br

M 396.027

Pale-yellow cryst. Mp 197-8°.

Reid, A.F. *et al*, *J. Organomet. Chem.*, 1964, **2**, 329 (*ir*, *nmr*, *uv*)**C₅H₅Cl₃Zr****Zr-00002****Trichloro(η⁵-2,4-cyclopentadien-1-yl)zirconium, 9Cl**

[34767-44-7]

As Tribromo(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00001 with

X = Cl

M 262.674

Cream solid. Mp 237° dec. Forms adducts with dimethoxyethane and TMEDA.

Reid, A.F. *et al*, *J. Organomet. Chem.*, 1964, **2**, 329 (*ir*, *uv*, *nmr*)Wells, N.J. *et al*, *J. Organomet. Chem.*, 1981, **213**, C17 (*synth*)**C₅H₅I₃Zr****Zr-00003****(η⁵-2,4-Cyclopentadien-1-yl)triiodozirconium**As Tribromo(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00001 with

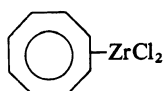
X = I

M 537.028

Red solid. Mp 133-133.5°.

Reid, A.F. *et al*, *J. Organomet. Chem.*, 1964, **2**, 329 (*ir*, *nmr*, *uv*)**C₈H₈Cl₂Zr****Zr-00004****Dichloro(η⁸-1,3,5,7-cyclooctatetraene)zirconium**

[42423-66-5]



M 266.277

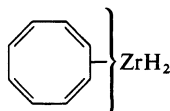
THF complex:

C₁₂H₁₆Cl₂OZr M 338.384

Orange-yellow cryst. (THF). Spar. sol. Loses THF in vacuo.

Lehmkuhl, H. *et al*, *J. Organomet. Chem.*, 1972, **46**, C1 (*synth*)Kablit, H.J. *et al*, *J. Organomet. Chem.*, 1973, **51**, 241 (*synth*, *ir*, *ms*)Brauer, D.J. *et al*, *Inorg. Chem.*, 1975, **14**, 3052 (*cryst struct*)**C₈H₁₀Zr****Zr-00005****(η⁸-1,3,5,7-cyclooctatetraene)dihydrozirconium, 9Cl**
(η-Cyclooctatetraene(2-))dihydrido zirconium

[42077-14-5]

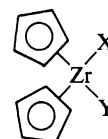


M 197.387

Detailed struct. unknown. Green-black cryst. (toluene).

Kablit, H.J. *et al*, *J. Organomet. Chem.*, 1973, **51**, 241 (*synth*, *ir*)**C₁₀H₁₀Br₂Zr****Zr-00006****Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, 9Cl***Zirconocene dibromide*

[1294-67-3]



X = Y = Br

M 381.217

Colourless solid. Mp 259-60°.

Druce, P.M. *et al*, *J. Chem. Soc. (A)*, 1969, 2106, 2814 (*ir*, *ms*, *nmr*)Samuel, E. *et al*, *Inorg. Chem.*, 1973, **12**, 881 (*ir*)Sayer, B.G. *et al*, *Inorg. Chim. Acta*, 1981, **48**, 53 (*nmr*)**C₁₀H₁₀Cl₂Zr****Zr-00007****Dichlorobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, 9Cl***Zirconocene dichloride. Bis(cyclopentadienyl)zirconium chloride*

[1291-32-3]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with

X = Y = Cl

M 292.315

Colourless cryst. Mp 248° (242-5°).

▷ ZH7525000.

Samuel, E. *et al*, *C.R. Hebd. Seances Acad. Sci.*, 1962, **254**, 308 (*synth*)Reid, A.F. *et al*, *J. Organomet. Chem.*, 1964, **2**, 329 (*ir*, *nmr*, *uv*)Dillard, J.G. *et al*, *J. Organomet. Chem.*, 1969, **16**, 265 (*ms*)Druce, P.M. *et al*, *J. Chem. Soc. (A)*, 1969, 2106 (*ir*, *ms*, *nmr*)Samuel, E. *et al*, *Inorg. Chem.*, 1973, **12**, 881 (*ir*)Prout, K. *et al*, *Acta Crystallogr., Sect. B*, 1974, **30**, 2290 (*cryst struct*)Caulletti, C. *et al*, *J. Electron Spectrosc. Relat. Phenom.*, 1980, **18**, 61 (*pe*)**C₁₀H₁₀F₂Zr****Zr-00008****Bis(η⁵-2,4-cyclopentadien-1-yl)difluorozirconium, 9Cl***Zirconocene difluoride*

[11090-85-0]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with

X = Y = F

M 259.406

Colourless solid. Mp >250°.

Druce, P.M. *et al*, *J. Chem. Soc. (A)*, 1969, 2106, 2814 (*ir*, *ms*, *nmr*)Bush, M.A. *et al*, *J. Chem. Soc. (A)*, 1971, 2225 (*cryst struct*)Samuel, E. *et al*, *Inorg. Chem.*, 1973, **12**, 881 (*ir*)

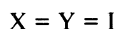
Cauletti, C. *et al*, *J. Electron Spectrosc. Relat. Phenom.*, 1980, **18**, 61 (*pe*)

C₁₀H₁₀I₂Zr **Zr-00009**

Bis(η⁵-2,4-cyclopentadien-1-yl)diiodozirconium, 9Cl
Zirconocene diiodide

[1298-41-5]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium,
Zr-00006 with



M 475.218

Yellow cryst. (C₆H₆). Mp 299-300°.

Druce, P.M. *et al*, *J. Chem. Soc. (A)*, 1969, 2106, 2814 (*ir, ms, nmr*)

Bush, M.A. *et al*, *J. Chem. Soc. (A)*, 1971, 2225 (*cryst struct*)

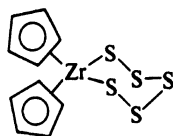
Samuel, E. *et al*, *Inorg. Chem.*, 1973, **12**, 881 (*ir*)

Sayer, B.G. *et al*, *Inorg. Chim. Acta*, 1981, **48**, 53 (*nmr*)

C₁₀H₁₀S₅Zr **Zr-00010**

Bis(η⁵-2,4-cyclopentadien-1-yl)(pentathio)zirconium, 10Cl
Bis(η⁵-cyclopentadienyl)cyclo(pentasulfur-1,5-diyl)zirconium

[75213-09-1]



M 381.709

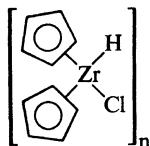
Air-stable orange cryst. (CH₂Cl₂). Mp 160-70° dec. E_{act}
(ring inversion) 48.6 kJ mol.⁻¹ (CD₂Cl₂) chain
conformation at r.t.

McCall, J.M. *et al*, *J. Organomet. Chem.*, 1980, **193**, C37
(*synth, ir, nmr, cryst struct*)

C₁₀H₁₁ClZr **Zr-00011**

Chlorobis(η⁵-2,4-cyclopentadien-1-yl)hydrozirconium, 10Cl
Chlorobis(η-cyclopentadienyl)hydrido-zirconium. Zirconocene hydridochloride. Schwartz's reagent

[37342-97-5]



M 257.870

Polymeric. Reagent for hydrozirconation in org. synth.,
crosscoupling of alkynes etc. White solid. Insol. Light-
sensitive, involatile.

Kautzner, B. *et al*, *J. Chem. Soc., Chem. Commun.*, 1969, 1105
(*synth, ir*)

Wailles, P.C. *et al*, *J. Organomet. Chem.*, 1970, **24**, 405 (*synth, ir*)

Schwartz, J. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1976, **15**, 333
(*use*)

Sorrell, T.N., *Tetrahedron Lett.*, 1978, 4985 (*use*)

Laycock, D.E. *et al*, *J. Org. Chem.*, 1981, **46**, 289 (*use*)

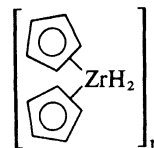
Fieser, M. *et al*, *Reagents for Organic Synthesis*, Wiley, 1967-
83, **8**, 84 (*use*)

C₁₀H₁₂Zr

Zr-00012

Bis(η⁵-2,4-cyclopentadien-1-yl)dihydrozirconium, 10Cl
Zirconocene dihydride

[37342-98-6]



M 223.425

Polymeric. Hydrogenation catalyst for alkenes and
alkynes. White solid. Insol. common solvs.

Couturier, S. *et al*, *J. Organomet. Chem.*, 1978, **157**, C61
(*synth, ms, use*)

Kautzner, B. *et al*, *J. Chem. Soc., Chem. Commun.*, 1969, 1105
(*synth, ir*)

Wailles, P.C. *et al*, *J. Organomet. Chem.*, 1972, **43**, C29 (*ir*)

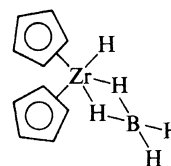
Labinger, J.A. *et al*, *J. Organomet. Chem.*, 1978, **155**, C25.
Inorg. Synth., 1979, **19**, 223.

C₁₀H₁₅BZr

Zr-00013

Bis(η⁵-2,4-cyclopentadien-1-yl)hydro[tetrahydroborato(1-)-H, H']zirconium
Bis(η-cyclopentadienyl)hydrido(tetrahydridoborato)-zirconium

[12116-93-7]



M 237.259

White solid. Subl. *in vacuo*.

James, B.D. *et al*, *Inorg. Chem.*, 1967, **6**, 1979 (*synth, ir, ms, nmr*)

Marks, T.J. *et al*, *Inorg. Chem.*, 1972, **11**, 2540 (*ir, raman*)

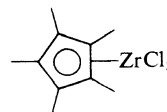
Marks, T.J. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 3397 (*nmr*)

C₁₀H₁₅Cl₃Zr

Zr-00014

Trichloro[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, 10Cl

[75181-07-6]



M 332.808

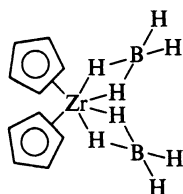
Yellow or white solid. Bp_{0.001} 160° subl.

Wengrovius, J.H. *et al*, *J. Organomet. Chem.*, 1981, **205**, 319
(*synth, nmr*)

Blenkers, J. *et al*, *J. Organomet. Chem.*, 1981, **218**, 383 (*nmr, synth*)

C₁₀H₁₈B₂Zr**Zr-00015**

Bis(η⁵-2,4-cyclopentadien-1-yl)bis[tetrahydroborato(1-)-H,H']zirconium, 10Cl
Zirconocene bis(borohydride)
 [12083-77-1]



M 251.092

Pale-yellow solid by subl. Mp 155° dec. Bp 110-5° subl. *in vacuo*. Hydrolysed only slowly by water. BD₄ analogue also made.

Nanda, R.K. *et al*, *Inorg. Chem.*, 1964, **3**, 1798 (*synth, ir*)
 Davies, N. *et al*, *J. Chem. Soc. (A)*, 1969, 2601 (*ir, nmr*)
 Marks, T.J. *et al*, *J. Am. Chem. Soc.*, 1975, **97**, 3397 (*ir, nmr*)
 Smith, B.E. *et al*, *J. Inorg. Nucl. Chem.*, 1976, **38**, 1973 (*synth, ir, raman*)

C₁₁H₁₃ClOZr**Zr-00016**

Chlorobis(η-cyclopentadienyl)methoxyzirconium
Chlorodi-π-cyclopentadienylmethoxyzirconium, 8Cl
 [11087-26-6]
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with

X = OMe, Y = Cl

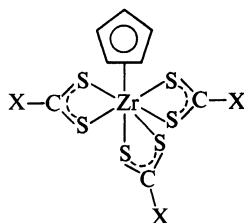
M 287.896

White cryst. by subl. Mp 111-114.5°.

Gray, D.R. *et al*, *Inorg. Chem.*, 1971, **10**, 2143 (*synth, ir, nmr*)
 Fachinetti, G. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 269 (*synth*)

C₁₁H₁₄O₃S₆Zr**Zr-00017**

(η⁵-2,4-Cyclopentadien-1-yl)tris(O-methylcarbonodithioato-S,S')zirconium, 10Cl
(η-Cyclopentadienyl)tris(methylxanthato)zirconium
 [66199-99-3]



X = OMe

M 477.810

Colourless cryst. (CH₂Cl₂/pet. ether). Mp 116-21° dec.

Jain, V.K. *et al*, *Inorg. Chim. Acta*, 1978, **26**, 51 (*synth, ir, nmr*)

C₁₁H₁₄O₆Zr**Zr-00018**

Tris(acetato)(η-cyclopentadienyl)zirconium
Triacetoxycyclopentadienylzirconium
 [31760-74-4]

As Tribromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00001 with

X = OAc

M 333.448

White cryst. (C₆H₆/pet. ether). Mp ~170°, 178° dec.

Brainina, E.M. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1963, 835 (*synth*)

Wales, P.C. *et al*, *J. Organomet. Chem.*, 1970, **24**, 413 (*synth, nmr*)

C₁₂H₁₀N₂O₂Zr**Zr-00019**

Bis(cyanato-N)bis(η⁵-2,4-cyclopentadien-1-yl)zirconium, 9Cl
Bis(cyanato-O)bis(η⁵-2,4-cyclopentadien-1-yl)zirconium, 9Cl. Bis(η-cyclopentadienyl)dicyanatozirconium. Zirconocene dicyanate
 [12109-63-6]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with

X = Y = NCO or CNO

M 305.443

Bonding of NCO group (cyanate or isocyanate) uncertain. Colourless solid. Mp 218°. Readily hydrol. to μ-oxo compd.

Coutts, R.S.P. *et al*, *Aust. J. Chem.*, 1966, **19**, 2069 (*synth, ir, nmr*)

Burmeister, J.L. *et al*, *Inorg. Chem.*, 1970, **9**, 58 (*ir, ms, uv*)

Jensen, A. *et al*, *Acta Chem. Scand.*, 1972, **26**, 2898 (*ir, props*)

C₁₂H₁₀N₂S₂Zr**Zr-00020**

Bis(η⁵-2,4-cyclopentadien-1-yl)bis(thiocyanato-N)zirconium, 9Cl
Bis(η-cyclopentadienyl)dithiocyanatozirconium. Zirconocene dithiocyanate
 [12109-67-0]
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with

X = Y = NCS

M 337.564

Yellow solid. Mp 279-81°. Bp_{0.0004} 200° subl.

Coutts, R.S.P. *et al*, *Aust. J. Chem.*, 1966, **19**, 2069 (*synth, ir, nmr*)

Samuel, E., *Bull. Soc. Chim. Fr.*, 1966, 3548 (*synth, ir, uv*)

Burmeister, J.L. *et al*, *Inorg. Chem.*, 1970, **9**, 58 (*ir, uv*)

Jensen, A. *et al*, *Acta Chem. Scand.*, 1972, **26**, 2898 (*ir*)

C₁₂H₁₀O₂Zr**Zr-00021**

Dicarbonylbis(η⁵-2,4-cyclopentadien-1-yl)zirconium, 10Cl
Zirconocene dicarbonyl
 [59487-85-3]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with

X = Y = CO

M 277.430

Violet or black cryst. (heptane). Bp_{0.01} 70° subl.

Demerseman, B. *et al*, *J. Organomet. Chem.*, 1976, **107**, C19 (*synth, ir*)

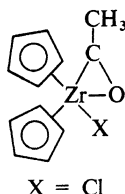
Fachinetti, G. *et al*, *J. Chem. Soc., Chem. Commun.*, 1976, 230 (*synth, ms, nmr*)

Thomas, J.L. *et al*, *J. Organomet. Chem.*, 1976, **111**, 297 (*synth, ir*)

Atwood, J.L. *et al*, *Inorg. Chem.*, 1980, **19**, 3812 (*cryst struct*)

Gell, K.I. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 2687 (*synth, ir, nmr*)

C₁₂H₁₃ClOZr **Zr-00022**
(Acetyl-C,O)chlorobis(η⁵-2,4-cyclopentadien-1-yl)zirconium
 [77001-15-1]



M 299.907
 Characterized spectroscopically.
 Marsella, J.A. *et al*, *J. Organomet. Chem.*, 1980, **201**, 389
 (*synth, ir, nmr*)

C₁₂H₁₃ClO₂Zr **Zr-00023**
(Acetato-O)chlorobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, 9Cl
(Acetato)chlorodi-π-cyclopentadienylzirconium, 8Cl.
Zirconocene acetate chloride
 [60876-22-4]
 As Zr-00006 with

X = Cl, Y = OAc

M 315.907
 Solid. Mp 137-9°.
 Brainina, E.M. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1969, 2492 (*synth, ir, nmr*)
 Brainina, E.M. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1976, 1611 (*synth*)
 Suzuki, H. *et al*, *Bull. Chem. Soc. Jpn.*, 1978, **51**, 1764 (*synth, ir, nmr, ms*)

C₁₂H₁₆O₂Zr **Zr-00024**
Bis(η⁵-2,4-cyclopentadien-1-yl)dimethoxyzirconium
Di-π-cyclopentadienyldimethoxyzirconium, 8Cl. Zirconocene dimethoxide
 [11087-29-9]
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with

X = Y = OMe

M 283.477
 Pale-yellow cryst. by subl. Mp 63-8°. Bp_{0.1} 85° subl.
 Gray, D.R. *et al*, *Inorg. Chem.*, 1971, **10**, 2143 (*synth, ir, nmr*)
 Etievant, P. *et al*, *Bull. Soc. Chim. Fr.*, 1978, 292 (*synth, nmr*)

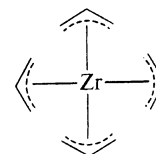
C₁₂H₁₆Zr **Zr-00025**
Bis(η⁵-2,4-cyclopentadien-1-yl)dimethylzirconium, 10Cl
Zirconocene dimethyl
 [12636-72-5]
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with

X = Y = Me

M 251.478
 Cocatalyst in metathesis reactions and α-olefin polymerisations. White cryst. by subl. Bp_{0.0001} 60-80° subl.

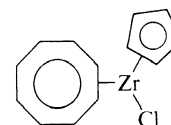
Samuel, E. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 6263 (*synth, nmr*)
 Alt, H. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 5936.
 Jordan, R.F. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 4853 (*cmr*)
Ger. Pat., 3 007 725, (1981); *CA*, **95**, 187927j (*use*)
 Van Leeuwen, P.W.N.M. *et al*, *J. Organomet. Chem.*, 1981, **209**, 169 (*cidnp*)

C₁₂H₂₀Zr **Zr-00026**
Tetrakis(η³-2-propenyl)zirconium, 10Cl
Tetraallylzirconium
 [12090-34-5]



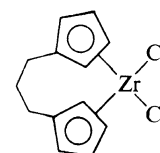
M 255.510
 Dynamic tetra-π-allyl struct. in soln. Used in the catalytic polymerisation of vinyl monomers. Red cryst. (pentane). Bp_{0.0005} ~20° subl. Dec. from 0°.
 Wilke, G. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1966, **5**, 151 (*synth*)
 Becconsall, J.K. *et al*, *J. Chem. Soc. (A)*, 1967, 423 (*synth, nmr, ms*)
 Ballard, D.G.H. *et al*, *J. Chem. Soc. (B)*, 1968, 1168 (*use*)

C₁₃H₁₃ClZr **Zr-00027**
Chloro[η⁸-1,3,5,7-cyclooctatetraene](η⁵-2,4-cyclopentadien-1-yl)zirconium, 9Cl
 [39413-64-4]



M 295.919
 Red cryst. (toluene).
 Kablitz, H.J. *et al*, *J. Organomet. Chem.*, 1973, **51**, 241 (*synth, nmr, ms*)

C₁₃H₁₄Cl₂Zr **Zr-00028**
Dichloro[1,3-propanediylbis[(1,2,3,4,5-η)-2,4-cyclopentadien-1-ylidene]]zirconium, 9Cl
Dichloro(1,1'-trimethylenedicyclopentadienyl)zirconium
 [38117-95-2]



M 332.380
 Cryst. by subl. Bp_{0.0001} 170° subl.
 Hillman, M. *et al*, *J. Organomet. Chem.*, 1972, **42**, 123 (*synth, ir, nmr, uv*)
 Saldarriaga-Molina, C.H. *et al*, *J. Organomet. Chem.*, 1974, **80**, 79 (*cryst struct*)

C₁₃H₁₆OZr **Zr-00029**
 (η²-Acetyl)bis(η⁵-2,4-cyclopentadien-1-yl)methylzirconium,
 10Cl
 [60970-97-0]

As (Acetyl-C,O)chlorobis(η⁵-2,4-cyclopentadien-1-yl)-
 zirconium, Zr-00022 with



M 279.489

Yellow cryst. In soln. loses CO under vacuum.

Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 1946

(*synth*, *ir*, *nmr*, *cryst struct*)

Marsella, J.A. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 5596 (*props*)

C₁₃H₁₉ClSiZr **Zr-00030**
 Chlorobis(η⁵-2,4-cyclopentadien-1-yl)(trimethylsilyl)zirconium,
 10Cl
 [76772-61-7]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium,
 Zr-00006 with



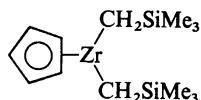
M 330.052

White solid by subl. Mp 98-100°. Bp_{0.0002} 60-70° subl.

Blakeney, A.J. *et al*, *J. Organomet. Chem.*, 1980, **202**, 263

(*synth*, *nmr*)

C₁₃H₂₇Si₂Zr **Zr-00031**
 (η⁵-Cyclopentadienyl)bis(trimethylsilylmethyl)zirconium



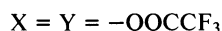
M 330.747

Unstable, not isol. from chemical or electrochemical re-
 duction. Characterised spectroscopically.

Lappert, M.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 805

(*esr*)

C₁₄H₁₀F₆O₄Zr **Zr-00032**
 Bis(η⁵-2,4-cyclopentadien-1-yl)bis(trifluoroacetato-O)zir-
 conium, 9Cl
Di-π-cyclopentadienylbis(trifluoroacetato)zirconium,
 8Cl. *Zirconocene bis(trifluoroacetate)*
 [37205-20-2]
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium,
 Zr-00006 with



M 447.441

Colourless cryst. Mp 117°. Bp_{0.003} 150° subl.

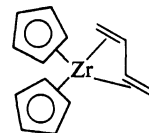
Brainina, E.M. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1963,
 835 (*synth*)

King, R.B. *et al*, *J. Organomet. Chem.*, 1968, **15**, 457 (*ir*, *synth*)

Wakes, P.C. *et al*, *J. Organomet. Chem.*, 1970, **24**, 413 (*synth*,
ir)

Minacheva, M.K. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*,
 1972, 139 (*synth*)

C₁₄H₁₆Zr **Zr-00033**
 (η⁴-1,3-Butadiene)bis(η⁵-2,4-cyclopentadien-1-yl)zirconium,
 10Cl
Bis(η⁵-cyclopentadienyl)(η⁴-1,3-butadiene)zirconium



M 275.500

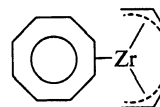
(*s-trans*)-*form* [75374-50-4]

Red cryst. Formed as mixt. with *s-cis*-isomer but
 photochemical isom. to *s-trans*-form occurs.

Erker, G. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 6344 (*synth*, *cryst*
struct, *ir*, *nmr*)

Yasuda, H. *et al*, *Chem. Lett.*, 1981, 519 (*synth*)

C₁₄H₁₈Zr **Zr-00034**
 (η⁸-1,3,5,7-Cyclooctatetraene)bis(η³-2-propenyl)zirconium,
 9Cl
*Bis(η-allyl)[η-cyclooctatetraene(2-)]zirconium. Dial-
 lylcyclooctatetraenezirconium*
 [39413-75-7]



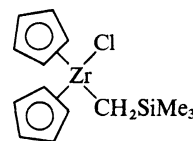
M 277.516

Catalytically oligomerises butadiene. Red-brown cryst.
 (toluene/Et₂O).

Kablitz, H.J. *et al*, *J. Organomet. Chem.*, 1973, **51**, 241 (*synth*,
nmr, *ir*, *ms*)

Hoffmann, E.G. *et al*, *J. Organomet. Chem.*, 1975, **97**, 183 (*ir*,
nmr)

C₁₄H₂₁ClSiZr **Zr-00035**
 Chlorobis(η⁵-2,4-cyclopentadien-1-yl)((trimethylsilyl)methyl)-
 zirconium, 10Cl
 [11082-39-6]

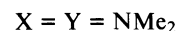


M 344.078

Pale-yellow cryst. (hexane/toluene). Mp 118-21°.

Collier, M.R., *J. Chem. Soc., Dalton Trans.*, 1973, 445 (*synth*,
ir, *ms*, *nmr*)

C₁₄H₂₂N₂Zr **Zr-00036**
 Bis(η-cyclopentadienyl)bis(dimethylamido)zirconium
Di-π-cyclopentadienylbis(dimethylaminato)zirconium,
 8Cl. *Zirconocene bis(dimethylamide)*
 [11108-30-8]
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium,
 Zr-00006 with



M 309.561

Polymerisation catalyst for acrylonitrile. Yellow cryst.

Bp_{0.05} 110-20° subl.

Chandra, G. *et al*, *J. Chem. Soc. (A)*, 1968, 1940 (*synth*)
 Jenkins, A.D. *et al*, *J. Polym. Sci., Polym. Lett., Part B*, 1968, 6,
 865 (*use*)

C₁₄H₂₃N₃S₆Zr **Zr-00037**
(η^5 -2,4-Cyclopentadien-1-yl)tris(dimethylcarbamodithioato-
S,S')zirconium, 9Cl

(η -Cyclopentadienyl)tris(N,N-dimethyldithiocarbamato)zirconium
 [61113-31-3]

As (η^5 -2,4-Cyclopentadien-1-yl)tris(O-methylcarbonodithioato-S,S')zirconium, Zr-00017
 with

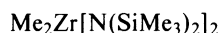


M 516.936
 Colourless cryst. + CH₂Cl₂ (CH₂Cl₂/hexane). Mp 270-
 5° dec.

Bruder, A.H. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 6932 (*synth*,
cryst struct, ir, nmr)

C₁₄H₄₂N₂Si₄Zr **Zr-00038**

Dimethylbis[bis(trimethylsilyl)amido]zirconium
 Dimethylbis[1,1,1-trimethyl-N-(trimethylsilyl)sila-
 naminato]zirconium, 10Cl
 [70969-30-1]



M 442.061
 Colourless liq. at r.t.; cryst. (pentane). Mp ca. 20°.

Andersen, R.A., *Inorg. Chem.*, 1979, **18**, 2928 (*synth, ir, pmr*,
cmr, ms)

C₁₅H₁₅ClZr **Zr-00039**

Chlorotris(η -cyclopentadienyl)zirconium
 Chloro-2,4-cyclopentadien-1-ylbis(η^5 -2,4-cyclopenta-
 dien-1-yl)zirconium, 10Cl
 [69005-93-2]

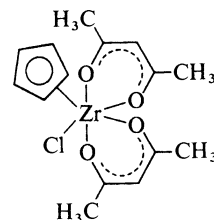


M 321.957
 Struct. postulated to be different from Chlorotris(η -
 methylcyclopentadienyl)zirconium, Zr-00051 (3
 η^5 -rings). Pale-yellow cryst. Mp 234°.

Etievant, P. *et al*, *Bull. Soc. Chim. Fr., Part II*, 1978, 292
 (*synth, ms, nmr*)

C₁₅H₁₉ClO₄Zr **Zr-00040**

**Chloro(η^5 -2,4-cyclopentadien-1-yl)bis(2,4-pentanedionato-
 O,O')zirconium, 9Cl**
 Bis(acetylacetonato)chloro(η -cyclopentadienyl)zirconium
 [12216-18-1]



M 389.986
 Colourless cryst. Mp 189-90°.

Brainina, E.M. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1964,
 1421 (*synth*)

Pinnavaia, T.I. *et al*, *J. Am. Chem. Soc.*, 1968, **90**, 5288 (*nmr*)

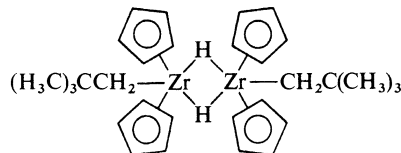
Stezowski, J.J. *et al*, *J. Am. Chem. Soc.*, 1969, **91**, 2890 (*cryst*
struct)

Fedorov, L.A. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1971,
 1844 (*nmr*)

Frazer, M.J. *et al*, *Inorg. Chem.*, 1971, **10**, 2137 (*synth, ir, nmr*)
 Minacheva, M.K., *Koord. Khim.*, 1975, **1**, 831 (*cmr*)

C₁₅H₂₂Zr **Zr-00041**

Bis(η^5 -cyclopentadienyl)(2,2-dimethylpropyl)hydrozirconium
 Bis(η -cyclopentadienyl)hydridoneopentylzirconium. Di-
 cyclopentadienylhydridoneopentylzirconium



M 293.559
 Dimeric.

Dimer: [67063-43-8]. *Tetrakis*(η^5 -2,4-cyclopentadien-
 1-yl)bis(2,2-dimethylpropyl)di- μ -hydrodizirconium,
 10Cl. *Bis*[bis(cyclopentadienyl)-
 hydridoneopentylzirconium].

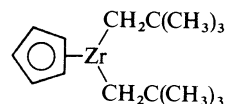
C₃₀H₄₄Zr₂ M 587.118

Not isol., characterised spectroscopically. Several
 related dimeric hydrides also reported.

Gell, K.I. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 3246 (*synth*,
nmr)

C₁₅H₂₇Zr **Zr-00042**

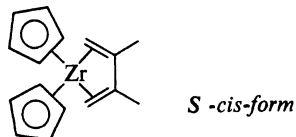
**(η^5 -2,4-Cyclopentadien-1-yl)bis(2,2-dimethylpropyl)zir-
 conium**
 (η -Cyclopentadienyl)dineopentylzirconium



M 298.598
 Unstable, not isol. from chemical or electrochemical
 reduction. Characterized spectroscopically.

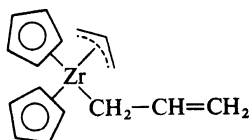
Lappert, M.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 805
 (*esr*)

C₁₆H₂₀Zr **Zr-00043**
Bis(η⁵-2,4-cyclopentadien-1-yl)((1,2,3,4-η)-2,3-dimethyl-1,3-butadiene)zirconium, 10Cl
 [75361-74-9]



M 303.554
s-cis and *s-trans* isomers known. Red cryst. solid. *s-trans* obt. from *s-cis* by photochem. isom.
 Erker, G. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 6344 (*synth, nmr, cryst struct*)

C₁₆H₂₀Zr **Zr-00044**
Bis(η⁵-2,4-cyclopentadien-1-yl)-η¹-2-propenyl-η³-2-propenylzirconium
Allyl-π-allyl-π-cyclopentadienylzirconium, 8Cl. Diallyl-bis(η-cyclopentadienyl)zirconium. Zirconocene diallyl



M 303.554
 Cream cryst. (pentane). Mp > -18° dec. Dec. at r.t. under N₂.
 Martin, H.A. *et al*, *J. Organomet. Chem.*, 1968, **14**, 149 (*synth, ir, nmr*)

C₁₆H₄₄Si₄Zr **Zr-00045**
Tetrakis(trimethylsilylmethyl)zirconium, 9Cl
 [32665-18-2]

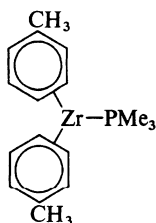


M 440.086
 Polymerizes 1-alkenes. Colourless cryst. (pentane, <10°); colourless liq. Mp 10-1°. Bp_{0.001} ca. 25°. Shows enhanced thermal stability over sample alkyls.

▷Pyrophoric

Collier, M.R. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 445 (*synth, ir, nmr*)
 Lappert, M.F. *et al*, *J. Organomet. Chem.*, 1974, **66**, 271 (*pe*)
 Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1975, 830.
 Ballard, D.G.H. *et al*, *J. Catal.*, 1976, **44**, 116 (*use*)

C₁₇H₂₅PZr **Zr-00046**
Bis[(1,2,3,4,5,6-η)methylbenzene](trimethylphosphine)zirconium, 10Cl
Ditoluene(trimethylphosphine)zirconium
 [71361-41-6]

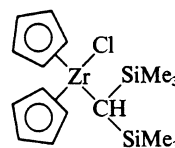


M 351.578

Believed to have (bent) sandwich struct. Dark-green cryst. Sol. aromatic hydrocarbons, spar. sol. pet. ether. Solns. stable under Ar but dec. under N₂.

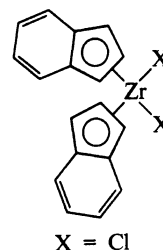
Cloke, F.G.N. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 1938 (*synth, ms, nmr*)

C₁₇H₂₉ClSi₂Zr **Zr-00047**
[Bis(trimethylsilyl)methyl]chlorobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, 10Cl
 [64815-30-1]



M 416.260
 Gives first 'sideways on' N₂ complex on reduction under N₂. Yellow air-stable cryst. (toluene). Mp 221-3°.
 Atwood, J.L. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 6645 (*synth, nmr*)
 Gynane, M.J.S. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 34.
 Jeffery, J. *et al*, *J. Organomet. Chem.*, 1979, **181**, 25.
 Lappert, M.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 814 (*nmr*)

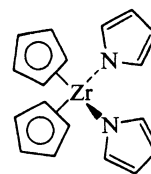
C₁₈H₁₄Cl₂Zr **Zr-00048**
Dichlorobis[(1,2,3,3a,7a-η)-1H-inden-1-yl]zirconium, 9Cl
 [12148-49-1]



M 392.435
 6-membered ring not coordinated. Yellow cryst. Mp 264°. Reported to dec. in org. solvs. 6 membered ring catalytically hydrogenated over Pt. Sensitive to air in soln.

Samuel, E. *et al*, *J. Organomet. Chem.*, 1965, **4**, 156 (*synth, ir*)
 Samuel, E., *Bull. Soc. Chim. Fr.*, 1966, 3548 (*synth, nmr*)

C₁₈H₁₈N₂Zr **Zr-00049**
Bis(η⁵-cyclopentadien-1-yl)di-1H-pyrrol-1-ylzirconium, 10Cl
Di-π-cyclopentadienyldipyrrol-1-ylzirconium, 8Cl.
Bis(η-cyclopentadienyl)bis(pyrrolyl)zirconium
 [73587-39-0]

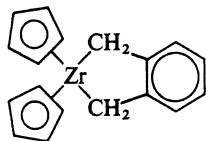


M 353.574

Yellow cryst. Mp 195°. Cyclopentadienyl ligands removed by pyridine-sodium at reflux temp. in THF to give the ZrPy₆[⊖] anion.

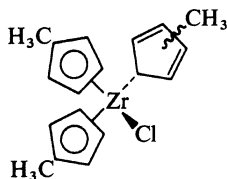
Issleib, K. *et al.*, *Z. Anorg. Chem.*, 1969, **369**, 83 (*synth, ir*)
Vann Bynum, R. *et al.*, *Inorg. Chem.*, 1980, **19**, 2360 (*synth, cryst struct, ms*)

C₁₈H₁₈Zr **Zr-00050**
Bis(η⁵-2,4-cyclopentadien-1-yl)[1,2-phenylenebis(methylene)]-zirconium, 10Cl
2,2-Bis(η⁵-cyclopentadienyl)-2-zirconaindane
[75070-70-1]



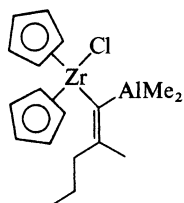
M 325.560
Cryst. Mp 177°.
Lappert, M.F. *et al.*, *J. Chem. Soc., Chem. Commun.*, 1980, 476 (*synth, nmr, cryst struct*)
Lappert, M.F. *et al.*, *J. Organomet. Chem.*, 1980, **192**, C35 (*props*)

C₁₈H₂₁ClZr **Zr-00051**
Chlorotris(η-methylcyclopentadienyl)zirconium
Chloro(1-methyl-2,4-cyclopentadien-1-yl)-bis[(1,2,3,4,5-η)-1-methyl-2,4-cyclopentadien-1-yl]zirconium, 10Cl
[69005-92-1]



M 364.037
Fluxional η¹-(η⁵)₂ struct. proposed, different from Chlorotris(η-cyclopentadienyl)zirconium, Zr-00039.
Pale-yellow cryst. (toluene). Mp 155°, 166-7°.
Brainina, E.H. *et al.*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1966, **169**, 335 (*synth*)
Etievant, P. *et al.*, *Bull. Soc. Chim. Fr., Part II*, 1978, 292 (*synth, ms, nmr*)

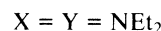
C₁₈H₂₆AlClZr **Zr-00052**
Chlorobis(η⁵-2,4-cyclopentadien-1-yl)[1-(dimethylalumino)-2-methyl-1-pentenyl]zirconium, 10Cl
Chlorobis(η-cyclopentadienyl)(1-dimethylalumino-2-methyl-2-propylethenyl)zirconium
[77089-97-5]



M 396.058
Prod. as a single stereochemically rigid stereoisomer.
Synthetic intermed. Spectroscopically and analytically characterised.

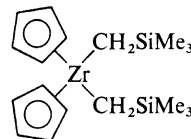
Yoshida, T. *et al.*, *J. Am. Chem. Soc.*, 1981, **103**, 1276 (*synth, ir, nmr, use*)

C₁₈H₃₀N₂Zr **Zr-00053**
Bis(η⁵-cyclopentadienyl)bis(diethylamido)zirconium
Di-π-cyclopentadienylbis(diethylaminato)zirconium, 8Cl. Zirconocene bis(diethylamide)
As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with



M 365.668
Orange-yellow solid. Bp_{0.03} 120-30° subl.
Chandra, G. *et al.*, *J. Chem. Soc. (A)*, 1968, 1940 (*synth, ms*)

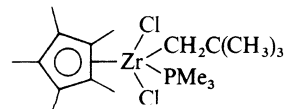
C₁₈H₃₂Si₂Zr **Zr-00054**
Bis(η⁵-2,4-cyclopentadien-1-yl)bis[(trimethylsilyl)methyl]zirconium, 10Cl
[11077-97-7]



M 395.842
White needles. Mp 96-7°. Sensitive to air but thermally more stable than the analogous alkyls.

Collier, M.R. *et al.*, *J. Organomet. Chem.*, 1970, **25**, C36 (*synth*)
Collier, M.R. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1973, 445 (*synth, ir, nmr*)
Jeffery, J. *et al.*, *J. Chem. Soc., Chem. Commun.*, 1978, 1081 (*nmr*)
Jeffery, J. *et al.*, *J. Chem. Soc., Dalton Trans.*, 1981, 1593 (*cryst struct*)

C₁₈H₃₅Cl₂PZr **Zr-00055**
Dichloro(2,2-dimethylpropyl)((1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl)(trimethylphosphine)zirconium, 10Cl
Dichloro(neopentyl)(trimethylphosphine)(η-pentamethylcyclopentadienyl)zirconium
[78067-94-4]



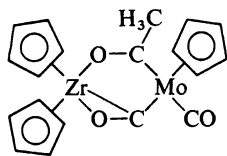
M 444.574
Orange cryst. at -30°. Mp >-30°.
Wengrovius, J.H. *et al.*, *J. Organomet. Chem.*, 1981, **205**, 319 (*nmr*)

The first digit of the Entry number defines the Supplement in which the Entry is found. 0 indicates the Main Work

C₁₉H₁₈MoO₃Zr**Zr-00056**

[μ-(Acetyl-C:O)]{μ-(η²-carbonyl)}[carbonyl(η⁵-2,4-cyclopentadien-1-yl)molybdenum]bis(η⁵-2,4-cyclopentadien-1-yl)zirconium

μ-[Acetyl-C(Mo):O(Zr)]μ-[carbonyl-C-(Mo):O(Zr)]bis-η-cyclopentadienylzirconium(carbonyl)η-cyclopentadienylmolybdenum
[76671-79-9]



M 481.509

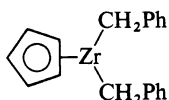
Air-stable solid. Yellow cryst. Unreactive to most donor ligands.

Longato, B. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 209 (*synth, ir, nmr, cryst struct*)

C₁₉H₁₉Zr**Zr-00057**

Bis(benzyl)(η-cyclopentadienyl)zirconium

(η⁵-2,4-Cyclopentadien-1-yl)bis(phenylmethyl)zirconium. Dibenzyl(cyclopentadienyl)zirconium



M 338.579

Unstable, not isol.

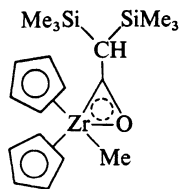
Lappert, M.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 805 (*esr*)

C₁₉H₃₂OSi₂Zr**Zr-00058**

Bis(trimethylsilyl)acetyl-C,O)bis(η⁵-2,4-cyclopentadien-1-yl)methylzirconium, 10Cl

Methyl[η²-bis(trimethylsilyl)acetyl-C,O]bis(η-cyclopentadienyl)zirconium

[71520-96-2]



M 423.852

Pale-yellow cryst. (CH₂Cl₂/Et₂O). Mp 123-5°. Stable to CO loss in soln. at 25°.

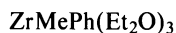
Lappert, M.F. *et al*, *J. Organomet. Chem.*, 1979, **174**, C35 (*synth, ir*)

Jeffery, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 1593 (*synth, ir, pmr*)

C₁₉H₃₈O₃Zr**Zr-00059**

Tris(diethyl ether)methylphenylzirconium

Methyltris[(1,1'-oxybis[ethane])]phenylzirconium, 10Cl
[69593-37-9]



M 405.727

Associated. Brown cryst. (Et₂O). Spar. sol. org. solvs. Mp ca. 90° dec.

Razuvaev, G.A. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1978, **243**, 1212 (*synth, props*)

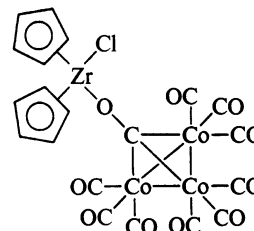
Razuvaev, G.A. *et al*, *Inorg. Chim. Acta*, 1980, **44**, L285 (*synth, ir*)

C₂₀H₁₀ClCo₃O₁₀Zr**Zr-00060**

Chlorobis(η⁵-2,4-cyclopentadien-1-yl)[μ₄-(methanolato(4-)-C:C:C:O)](nonacarbonyltricobalt)zirconium, 10Cl

Chlorobis(η⁵-cyclopentadienyl)[μ₃-(oxymethylidyne)-cyclotris(tricarbonylcobalt)]zirconium

[67422-57-5]



M 713.766

Dark-red cryst. (toluene). Spar. sol. aromatic, v. spar. sol. aliphatic solvs. Mp 138-41°.

Stutte, B. *et al*, *Chem. Ber.*, 1978, **111**, 1603 (*synth, ir, nmr, cryst struct*)

Ishii, M. *et al*, *Ber. Bunsenges. Phys. Chem.*, 1979, **83**, 1026 (*synth, ir, nmr*)

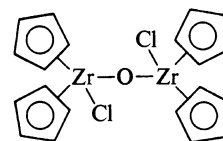
C₂₀H₂₀Cl₂OZr₂**Zr-00061**

Dichlorotetrakis(η⁵-2,4-cyclopentadien-1-yl)-μ-oxodizirconium, 10Cl

Dichlorotetra-π-cyclopentadienyloxodizirconium.

μ-Oxobis[chlorobis(η-cyclopentadienyl)zirconium]

[12097-04-0]



M 529.723

Colourless cryst. Mp 300-9°. Bp 200° subl. *in vacuo*.

Reid, A.F. *et al*, *Aust. J. Chem.*, 1965, **18**, 173 (*synth, ir, nmr, ms*)

Samuel, E., *Bull. Soc. Chim. Fr.*, 1966, 3548 (*synth, ir, uv, nmr*)

Etievant, P. *et al*, *Bull. Soc. Chim. Fr.*, 1978, 292 (*synth*)

Inorg. Synth., 1979, **19**, 223 (*synth*)

C₂₀H₂₀Zr**Zr-00062**

Bis[(1,2,3,3a,7a-η)-1H-inden-1-yl]dimethylzirconium, 9Cl

[49596-04-5]

As Dichlorobis[(1,2,3,3a,7a-η)-1H-inden-1-yl]zirconium, Zr-00048 with

X = Me

M 351.598

Straw-coloured solid by subl. Mp 107° dec. Subl. *in vacuo*.

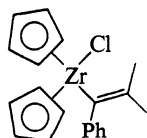
Samuel, E. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 6263 (*synth, nmr*)

Alt, H.G. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 5936.

Atwood, J.L. *et al*, *Inorg. Chem.*, 1975, **14**, 1757 (*cryst struct*)

C₂₀H₂₁ClZr **Zr-00063****Chlorobis(η⁵-2,4-cyclopentadien-1-yl)(2-methyl-1-phenyl-1-propenyl)zirconium, 10Cl***Chlorobis(η-cyclopentadienyl)(2,2-dimethyl-1-phenylethenyl)zirconium*

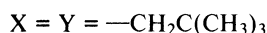
[63422-41-3]



M 388.059

Yellow cryst. (Et₂O). Mp 170° dec. Also characterized by cryst. struct. and elemental analysis.Cardin, C.J. *et al*, *J. Organomet. Chem.*, 1977, **132**, C23 (*synth*, *ir*, *nmr*)**C₂₀H₃₂Zr** **Zr-00064****Bis(η⁵-2,4-cyclopentadien-1-yl)bis(2,2-dimethylpropyl)zirconium, 10Cl***Bis(η⁵-cyclopentadienyl)bis(neopentyl)zirconium. Zirconocene dineopentyl*

[69793-83-5]

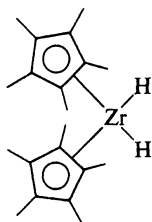
As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with

M 363.693

Pale-yellow.

Jeffery, J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 1081 (*nmr*)Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1979, 305 (*props*)Jeffery, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 1593 (*cryst struct*, *synth*, *nmr*)**C₂₀H₃₂Zr** **Zr-00065****Dihydrobis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, 10Cl***Dihydridobis(η-pentamethylcyclopentadienyl)zirconium*

[61396-34-7]

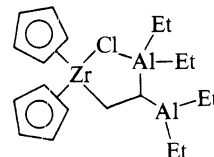


M 363.693

Monomeric. Pale-yellow cryst. (pet. ether). Freely sol. hydrocarbons and ethers. Deuterium analogue also prepd.

Manriquez, J.M. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 6733 (*synth*, *mw*, *ir*, *nmr*)Manriquez, J.M. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 2716 (*synth*, *nmr*, *ir*)Threlkel, R.S. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 2650 (*use*)**C₂₀H₃₃Al₂ClZr** **Zr-00066****μ-Chlorobis(η⁵-2,4-cyclopentadien-1-yl)bis(diethylaluminum)-μ-1-ethanyl-2-ylidenezirconium, 10Cl***μ-Chloro-1-[bis(η-cyclopentadienylzirconio)]-2,2-bis-(diethylaluminum)ethane*

[55466-98-3]

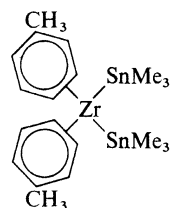


M 454.117

Cryst. (heptane). Mp 128° dec.

Heins, E. *et al*, *Makromol. Chem.*, 1970, **134**, 1 (*synth*)Kaminsky, W. *et al*, *Justus Liebigs Ann. Chem.*, 1975, 438 (*synth*, *nmr*, *bibl*)Kaminsky, W. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1976, **15**, 629 (*synth*, *cryst struct*)Kopf, J. *et al*, *Cryst. Struct. Commun.*, 1980, **9**, 197 (*cryst struct*)**C₂₀H₃₄Sn₂Zr** **Zr-00067****Bis[(1,2,3,4,5,6-η)-methylbenzene]bis(trimethylstannyl)zirconium, 10Cl***Ditoluenebis(trimethylstannyl)zirconium*

[78379-41-6]

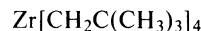


M 603.089

Black cryst. Solid only slowly dec. by air.

Cloke, F.G.N. *et al*, *J. Chem. Soc., Chem. Commun.*, 1981, 117 (*synth*, *nmr*)**C₂₀H₄₄Zr** **Zr-00068****Tetrakis(2,2-dimethylpropyl)zirconium, 9Cl***Tetraneopentylzirconium*

[38010-72-9]



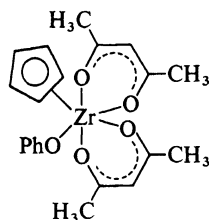
M 375.788

Polymerizes olefins. Colourless cryst. by subl. M_p 111° dec. Bp_{0.01} 50° subl. Shows enhanced thermal stability over straight chain alkyls.Davidson, P.J. *et al*, *J. Organomet. Chem.*, 1973, **57**, 269 (*synth*, *nmr*, *ms*, *ir*, *raman*)Mowat, W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1973, 1120 (*synth*, *nmr*, *ir*)Lappert, M.F. *et al*, *J. Organomet. Chem.*, 1974, **66**, 271 (*pe*)Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1975, 830.Chiu, K.W. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 2088.Wengrovius, J.H. *et al*, *J. Organomet. Chem.*, 1981, **205**, 319 (*synth*)

C₂₁H₂₄O₅Zr

Zr-00069

π -Cyclopentadienylbis(2,4-pentanedionato)phenoxyzirconium, 8Cl
Bis(acetylacetonato)(η -cyclopentadienyl)phenoxyzirconium



M 447.638
 Mp 62-63.5°.

Brainina, E.M. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1971, **196**, 1085 (*synth, nmr*)

C₂₁H₅₇ClSi₆Zr

Zr-00070

Tris[bis(trimethylsilyl)methyl]chlorozirconium, 10Cl
Chlorotris[bis(trimethylsilyl)methyl]zirconium
 [53668-84-1]



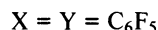
M 604.867
 White cryst.

Barker, G.K. *et al*, *J. Organomet. Chem.*, 1974, **76**, C45 (*synth, nmr, ir*)

C₂₂H₁₀F₁₀Zr

Zr-00071

Bis(η^5 -cyclopentadienyl)bis(pentafluorophenyl)zirconium
Dicyclopentadienylbis(pentafluorophenyl)zirconium
 As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with



M 555.525
 White cryst. by subl. Mp 218-9°. Bp_{0.01} 120° subl.

►Explodes in air above Mp

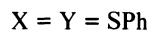
Chaudari, M. *et al*, *J. Chem. Soc. (A)*, 1966, 838 (*synth, ir*)
 Samuel, E. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 6263 (*nmr*)

C₂₂H₂₀S₂Zr

Zr-00072

Bis(benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)zirconium, 10Cl
Bis(η -cyclopentadienyl)bis(phenylthiolato)zirconium
 [37206-34-1]

As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with



M 439.740
 Yellow cryst. Mp 147-54° dec.

Köpf, H., *J. Organomet. Chem.*, 1968, **14**, 353 (*synth, ir, nmr*)
 Minacheva, M.K. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1972, 139 (*synth*)
 Petersen, J.L., *J. Organomet. Chem.*, 1979, **166**, 179 (*synth*)
 Brindley, P.B. *et al*, *J. Organomet. Chem.*, 1981, **222**, 89 (*synth, ir, nmr*)

C₂₂H₂₀Zr

Zr-00073

Bis(η^5 -2,4-cyclopentadien-1-yl)diphenylzirconium, 10Cl
Zirconocene diphenyl
 [51177-89-0]

As Dibromobis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with



M 375.620

White cryst. (Et₂O). Mp 140° dec.

Samuel, E. *et al*, *J. Am. Chem. Soc.*, 1973, **95**, 6263 (*synth, ir, nmr*)

Razuvaev, G.A. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1978, **243**, 1212 (*props*)

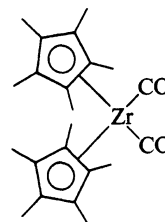
Razuvaev, G.A. *et al*, *J. Organomet. Chem.*, 1979, **174**, 67 (*props*)

Erker, G. *et al*, *J. Organomet. Chem.*, 1980, **188**, C1 (*props*)
 Hsueh-Sung Tung, *et al*, *Inorg. Chim. Acta*, 1981, **52**, 197.

C₂₂H₃₀O₂Zr

Zr-00074

Dicarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, 10Cl
 [61396-31-4]



M 417.698

Purple-brown or black cryst. (toluene).

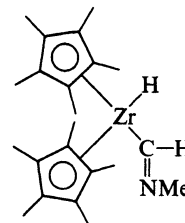
Manriquez, J.M. *et al*, *J. Am. Chem. Soc.*, 1976, **98**, 6733 (*synth, ir, nmr*)

Sikora, D.J. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 1265 (*cryst struct, synth, ir, ms*)

C₂₂H₃₅NZr

Zr-00075

Hydro[(methylimino)methyl]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, 10Cl
(N-Methylformimidoyl)hydridobis(η^5 -pentamethylcyclopentadienyl)zirconium
 [72108-52-2]



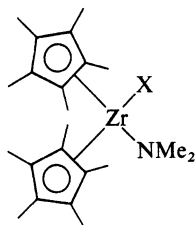
M 404.745

Unstable; characterized spectroscopically.

Wolczanski, P.T. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 6450 (*synth, ir, nmr*)

C₂₂H₃₆INZr Zr-00076**Dimethylamidoiodobis(η⁵-pentamethylcyclopentadienyl)zirconium**

Iodo(N-methylmethanaminato)bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, 10Cl. Bis(η-pentamethylcyclopentadienyl)-dimethylamido(iodo)zirconium
[72125-82-7]



X = I

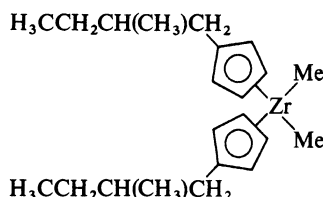
M 532.658

Characterization includes elemental analyses.

Wolczanski, P.T. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 6450
(*synth*, *nmr*)

C₂₂H₃₆Zr Zr-00077**Dimethylbis[(1,2,3,4,5-η)-1-(2-methylbutyl)-2,4-cyclopentadien-1-yl]zirconium, 10Cl**

[75663-08-0]



M 391.746

(S,S)-form [75663-08-0]

Chiral hydrogenation catalyst. Oil. [α]_D +14° (c, 2.5 in C₆H₆).

Couturier, S. *et al*, *J. Organomet. Chem.*, 1980, **195**, 291 (*synth*, *nmr*)

C₂₂H₃₇NZr Zr-00078**Dimethylamidohydro(pentamethylcyclopentadienyl)zirconium**

Hydro(N-methylmethanaminato)bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, 10Cl. Bis(η-pentamethylcyclopentadienyl)dimethylamidohydrido-zirconium
[72108-53-3]

As Dimethylamidoiodobis(η⁵-pentamethylcyclopentadienyl)zirconium, Zr-00076 with

X = H

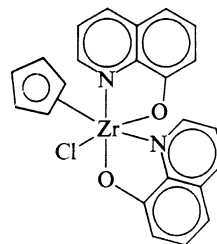
M 406.761

Solid by subl. Characterization includes elemental analysis.

Wolczanski, P.T. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 6450
(*synth*, *ir*, *nmr*)

C₂₃H₁₇ClN₂O₂Zr**Zr-00079****Chloro(η⁵-cyclopentadienyl)bis(8-quinolinolato)zirconium**

[12114-15-7]



M 480.073

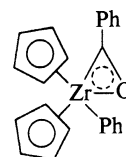
Yellow solid (Et₂O). Mp 260-3°.

Freidlina, R.K.H. *et al*, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 1966, 1396 (*synth*)

Charalambous, J. *et al*, *J. Chem. Soc. (A)*, 1971, 2487 (*synth*, *ir*, *nmr*, *ms*)

C₂₃H₂₀OZr**Zr-00080****(η²-Benzoyl)bis(η⁵-2,4-cyclopentadien-1-yl)phenylzirconium, 10Cl**

[66152-53-2]



M 403.630

Characterized spectroscopically. Yellow-orange solid (heptane/toluene). Mp 23°. Stable to loss of CO both in solid state and in soln.

Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 1946 (*synth*, *ir*, *nmr*)

Erker, G. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1978, **17**, 605 (*isom*)

Erker, G. *et al*, *J. Organomet. Chem.*, 1980, **188**, C1.

Marsella, J.A. *et al*, *J. Am. Chem. Soc.*, 1981, **103**, 5596.

C₂₃H₂₂ClPZr**Zr-00081****Chlorobis(η⁵-2,4-cyclopentadien-1-yl)((diphenylphosphino)methyl)zirconium, 10Cl**

[74380-49-7]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with

X = Cl, Y = —CH₂PPh₂

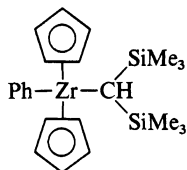
M 456.074

Pale-yellow cryst.

Schore, N.E. *et al*, *J. Am. Chem. Soc.*, 1980, **102**, 4251 (*synth*, *cryst struct*, *nmr*, *ir*)

C₂₃H₃₄Si₂Zr**Zr-00082****[Bis(trimethylsilyl)methyl]bis(η⁵-2,4-cyclopentadien-1-yl)-phenylzirconium, 10Cl***Bis(η-cyclopentadienyl)phenyl[bis(trimethylsilyl)methyl]zirconium*

[79194-27-7]

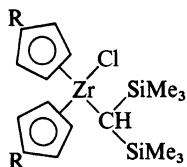


M 457.913

White cryst. Mp 116-8°. Shows unusually high barrier to rotation about Zr—C bonds.

Jeffery, J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1978, 1081 (*nmr*, *cryst struct*)Jeffery, J. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 1593 (*synth*, *ir*, *nmr*)**C₂₃H₄₅ClSi₄Zr****Zr-00083****[Bis(trimethylsilyl)methyl]chlorobis[(1,2,3,4,5-η)-1-(trimethylsilyl)-2,4-cyclopentadien-1-yl]zirconium, 10Cl***Chlorobis[η-(trimethylsilyl)cyclopentadienyl]bis(trimethylsilyl)methylzirconium*

[74042-81-2]

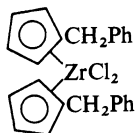
R = SiMe₃

M 560.624

Pale-yellow cryst. (hexane). Mp 154-6°.

Lappert, M.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 805, 814 (*synth*, *ir*, *nmr*, *cryst struct*)**C₂₄H₂₂Cl₂Zr****Zr-00084****Bis(η⁵-benzylcyclopentadienyl)dichlorozirconium***Dichlorobis[(1,2,3,4,5-η)-1-(phenylmethyl)-2,4-cyclopentadien-1-yl]zirconium, 10Cl*

[58689-69-3]



M 472.564

Mp 118°. Triboluminescent and highly piezoelectric.

Renaut, P. *et al*, *J. Organomet. Chem.*, 1978, **148**, 35 (*synth*)Dusausoy, Y. *et al*, *J. Organomet. Chem.*, 1978, **157**, 167 (*cryst struct*, *nmr*, *ir*, *uv*, *raman*)**C₂₄H₂₄Zr****Zr-00085****Bis(benzyl)bis(η⁵-cyclopentadienyl)zirconium***Bis(η⁵-2,4-cyclopentadien-1-yl)bis(phenylmethyl)zirconium, 10Cl. Zirconocene dibenzyl*

[37206-41-0]

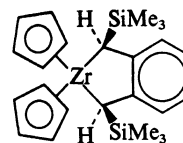
As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 withX = Y = -CH₂Ph

M 403.674

Yellow needles (toluene). Shows markedly higher thermal stability than Ti analogue.

Fachinetti, G. *et al*, *J. Chem. Soc., Chem. Commun.*, 1972, 654 (*synth*, *ir*, *nmr*)Fachinetti, G. *et al*, *J. Chem. Soc., Dalton Trans.*, 1977, 1946 (*ir*, *nmr*)Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1979, 305.Brindley, P.B. *et al*, *J. Chem. Soc., Perkin Trans. 2*, 1981, 419 (*nmr*)**C₂₄H₃₄Si₂Zr****Zr-00086****Bis(η⁵-2,4-cyclopentadien-1-yl)[1,2-phenylenebis[(trimethylsilyl)methylene]zirconium, 10Cl***2,2-Bis(η⁵-cyclopentadienyl)-1,3-bis(trimethylsilyl)-2-zirconaindane*

[76933-95-4]



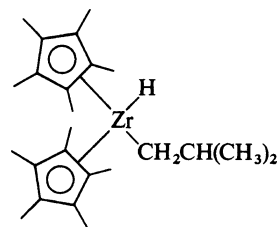
M 469.924

meso-form

Red cryst. (pentane). Sol. org. solvs. Mp 141-2°. Limited air stability but thermally robust and sublimable.

Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1980, 1284 (*synth*, *ir*, *ms*, *nmr*)**C₂₄H₄₀Zr****Zr-00087****Hydro(2-methylpropyl)bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, 10Cl***Isobutyl(hydrido)bis(η-pentamethylcyclopentadienyl)zirconium*

[67108-86-5]



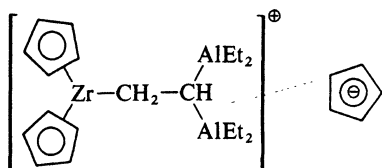
M 419.800

Yellow, microcryst. solid (pet. ether). Isotopomers also made.

Manriquez, J.M. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 2716 (*synth*, *nmr*)McAlister, D.R. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 5966 (*synth*, *nmr*)

C₂₅H₃₈Al₂Zr**Zr-00088**

[2,2-Bis(diethylalumino)ethyl]tris(η⁵-2,4-cyclopentadien-1-yl)zirconium, 10Cl
1,1-Bis(diethylalumino)-2-[bis(η-cyclopentadienyl)zirconio]ethane cyclopentadienide
 [64539-44-2]



M 483.758

Ionic material. Polymerises olefins. Cryst. Extremely air- and water-sensitive.

Kaminsky, W. *et al*, *Makromol. Chem.*, 1974, **175**, 443 (*synth, use*)

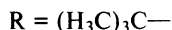
Kaminsky, W. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1976, **15**, 629 (*nmr, struct*)

Kopf, J. *et al*, *Cryst. Struct. Commun.*, 1980, **9**, 271 (*cryst struct*)

C₂₅H₄₅ClSi₂Zr**Zr-00089**

Bis(η⁵-*tert*-butylcyclopentadienyl)[bis(trimethylsilyl)methyl]-chlorozirconium
[Bis(trimethylsilyl)methyl]chlorobis[(1,2,3,4,5-η)-1-(1,1-dimethylethyl)-2,4-cyclopentadien-1-yl]zirconium, 10Cl
 [74042-79-8]

As [Bis(trimethylsilyl)methyl]chlorobis[(1,2,3,4,5-η)-1-(trimethylsilyl)-2,4-cyclopentadien-1-yl]zirconium, Zr-00083 with



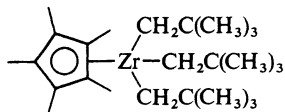
M 528.475

Pale-yellow cryst. (hexane). Mp 159-62°.

Lappert, M.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 805, 814 (*synth, ir, nmr, cryst struct*)

C₂₅H₄₈Zr**Zr-00090**

Tris(2,2-dimethylpropyl)(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, 10Cl
Trineopentyl(η-pentamethylcyclopentadienyl)zirconium
 [78067-96-6]



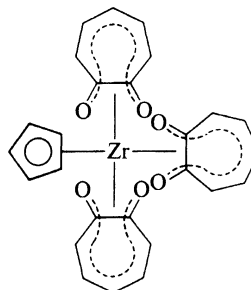
M 439.874

Off-white cryst. at -30°. Mp >-30°.

Wengrovius, J.H. *et al*, *J. Organomet. Chem.*, 1981, **205**, 319 (*nmr*)

C₂₆H₂₀O₆Zr**Zr-00091**

(η⁵-2,4-Cyclopentadien-1-yl)tris(2-hydroxy-2,4,6-cycloheptatrien-1-onato-*O, O'*)zirconium, 9Cl
(η-Cyclopentadienyl)tris(tropolonato)zirconium



M 519.660

Pale-yellow solid.

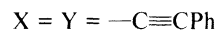
Frazer, M.J. *et al*, *Inorg. Chem.*, 1971, **10**, 2137 (*ir, nmr*)

McPartlin, M. *et al*, *J. Organomet. Chem.*, 1976, **104**, C20 (*cryst struct*)

C₂₆H₂₀Zr**Zr-00092**

Bis(η⁵-2,4-cyclopentadien-1-yl)bis(phenylethynyl)zirconium, 10Cl
Zirconocene bis(phenylacetylide)
 [72982-57-1]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with



M 423.664

Light-brown solid.

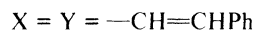
Jenkins, A.D. *et al*, *J. Organomet. Chem.*, 1970, **23**, 165 (*synth, ir, nmr, ms*)

Jimenez, R. *et al*, *J. Organomet. Chem.*, 1979, **182**, 353 (*synth, ir, nmr, uv*)

C₂₆H₂₄Zr**Zr-00093**

Bis(η-cyclopentadienyl)bis(2-phenylethenyl)zirconium
Di-π-cyclopentadienyldistyrylzirconium, 8Cl. Bis(η-cyclopentadienyl)bis(β-styryl)zirconium
 [11058-18-7]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with



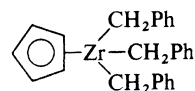
M 427.696

Black solid.

Wailes, P.C. *et al*, *J. Organomet. Chem.*, 1971, **27**, 373 (*synth, nmr*)

C₂₆H₂₆Zr**Zr-00094**

Tribenzyl(η-cyclopentadienyl)zirconium
(η⁵-2,4-Cyclopentadien-1-yl)tris(phenylmethyl)zirconium, 10Cl
 [78163-63-0]



M 429.711

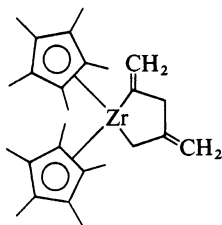
Yellow-orange cryst. (toluene/hexane).

Brindley, P.B. *et al*, *J. Chem. Soc., Perkin Trans. 2*, 1981, 419.

C₂₆H₃₈Zr

Zr-00095

[1,3-Bis(methylene)-1,4-butanediyl]bis(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, 10Cl
1,1-Bis(η^5 -pentamethylcyclopentadienyl)-2,4-dimethylene-1-zirconacyclopentane
[75125-14-3]



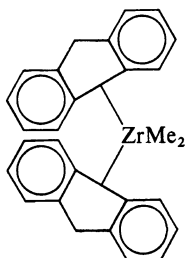
M 441.806
Orange cryst.

Schmidt, J.R. *et al*, *Inorg. Chem.*, 1981, **20**, 318 (*synth, cryst struct, ir, nmr*)

C₂₈H₂₄Zr

Zr-00096

Bis[(4a,4b,8a,9a- η)-9H-fluoren-9-yl]dimethylzirconium, 9Cl
[60373-20-8]



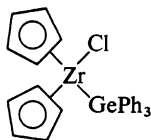
M 451.718
Light-yellow cryst. (pentane). Bp 200° subl. *in vacuo*.
Deuterated derivs. also obt.

Samuel, E. *et al*, *J. Organomet. Chem.*, 1976, **113**, 331 (*synth, nmr, ms, ir*)

C₂₈H₂₅ClGeZr

Zr-00097

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylgermyl)zirconium, 9Cl
[12636-98-5]



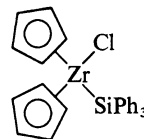
M 560.769
Orange solid. Bp_{0.001} 190° subl.

Coutts, R.S.P. *et al*, *J. Chem. Soc., Chem. Commun.*, 1968, 260 (*synth, nmr*)
Kingston, B.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 69 (*synth, ms, nmr*)

C₂₈H₂₅ClSiZr

Zr-00098

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylsilyl)zirconium, 9Cl
[12283-86-2]

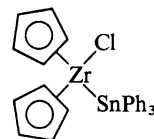


M 516.264
Orange cryst. (THF). Mp 175-8° dec. Bp 180° subl.
Cardin, D.J. *et al*, *J. Chem. Soc., Chem. Commun.*, 1967, 1035 (*synth, ms, nmr*)
Muir, K.W. *et al*, *J. Chem. Soc. (A)*, 1971, 2663 (*cryst struct*)
Kingston, B.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 69 (*synth, nmr, ms*)

C₂₈H₂₅ClSnZr

Zr-00099

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylstannyl)zirconium, 9Cl
[12637-01-3]

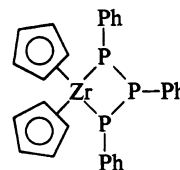


M 606.869
Orange solid. Dec. below 220°.
Coutts, R.S.P. *et al*, *J. Chem. Soc., Chem. Commun.*, 1968, 260 (*synth, nmr*)
Kingston, B.M. *et al*, *J. Chem. Soc., Dalton Trans.*, 1972, 69 (*synth, nmr*)

C₂₈H₂₅P₃Zr

Zr-00100

Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2,3-triphenyltriphospha-tol(2-)-P¹,P³]zirconium, 10Cl
[37299-22-2]



M 545.647
Monomeric. Orange solid. Sol. org. solvs. except aliphatic hydrocarbons and alcohols. Mp 233-5°. Solid stable in air, solns. air-sensitive.
Issleib, K. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1972, **11**, 527 (*synth, ms, nmr*)

C₂₈H₂₈Zr

Zr-00101

Tetrabenzylzirconium
Tetrakis(phenylmethyl)zirconium, 9Cl. Zirconium tetrabenzyl
[24356-01-2]

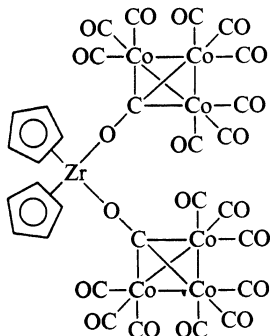


M 455.749
Olefin polymerisation catalyst and isomerization catalyst.
Yellow cryst. (hydrocarbons). Mp 133-4°. Sensitive to light.
Zucchini, U. *et al*, *J. Chem. Soc., Chem. Commun.*, 1969, 1174 (*synth, nmr, use*)

Davies, G.R. *et al*, *J. Chem. Soc., Chem. Commun.*, 1971, 677, 1511 (*cryst struct*)
 Zucchini, U. *et al*, *J. Organomet. Chem.*, 1971, **26**, 357 (*synth, nmr*)
 Felten, J.J. *et al*, *J. Organomet. Chem.*, 1972, **36**, 87 (*derivs*)
 Clarke, J.F. *et al*, *J. Organomet. Chem.*, 1974, **74**, 417 (*derivs*)
 Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1975, 830.

C₃₀H₁₀Co₆O₂₀Zr Zr-00102

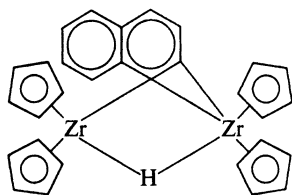
Bis(η⁵-2,4-cyclopentadien-1-yl)bis[μ₄-[methanolato(4-)-C:C:O]]bis(nonacarbonyltricobalt)zirconium
Bis(η-cyclopentadienyl)di[μ₃-(oxymethylidyne)cyclo-tris(tricarbonylcobalt)]zirconium
 [67422-53-1]



M 1135.216
 Red cryst. (toluene). Mp 145° dec.
 Ishii, M. *et al*, *Ber. Bunsenges. Phys. Chem.*, 1978, **83**, 1026 (*cryst struct*)
 Stutte, B. *et al*, *Chem. Ber.*, 1978, **111**, 1603 (*synth, ir, nmr, cryst struct*)

C₃₀H₂₈Zr₂ Zr-00103

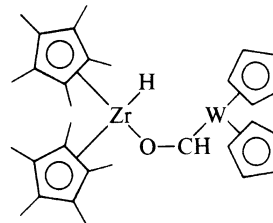
Tetrakis(η⁵-2,4-cyclopentadien-1-yl)-μ-hydro[μ-[(1,2-η:2-η)-2-naphthalenyl]]dizirconium, 10Cl
μ-Hydrido-μ-[2-η¹:1,2-η²-naphthyl]bis[bis(η-cyclopentadienyl)zirconium]
 [72894-62-3]



M 570.991
 Dark-green cryst. (THF). Sol. THF.
 Pez, G.P. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 6933 (*synth, ir, nmr, cryst struct*)

C₃₁H₄₂OWZr Zr-00104

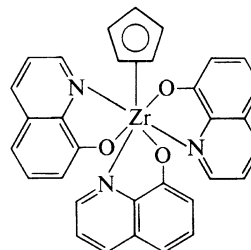
[Bis(η⁵-2,4-cyclopentadien-1-yl)tungsten]hydro[μ-[methanolato(3-)-C:O]]bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, 10Cl
Bis(η⁵-cyclopentadienyl)hydrido[bis(η-pentamethylcyclopentadienyl)hydrido-zirconoxymethylene]tungsten
 [69289-49-2]



M 705.742
 Red-brown cryst. (toluene).
 Wolczanski, P.T. *et al*, *J. Am. Chem. Soc.*, 1979, **101**, 218 (*synth, ir, nmr, cryst struct*)

C₃₂H₂₃N₃O₃Zr Zr-00105

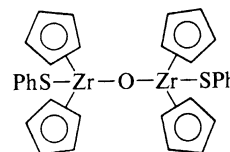
π-Cyclopentadienyltris(8-quinolinolato)zirconium
Tris(8-quinolinolato)cyclopentadienylzirconium



M 588.772
 Solid + CHCl₃. Mp 357-60° dec.
 Brainina, E.M. *et al*, *Dokl. Akad. Nauk SSSR, Ser. Sci. Khim.*, 1966, **169**, 335 (*synth*)

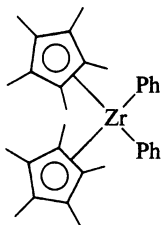
C₃₂H₃₀OS₂Zr₂ Zr-00106

Bis(benzenethiolato)tetrakis(η⁵-2,4-cyclopentadien-1-yl)-μ-oxodizirconium, 10Cl
μ-Oxobis[bis(η-cyclopentadienyl)phenylthiolatozirconium]
 [69662-01-7]



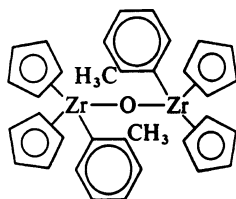
M 677.148
 Pale-yellow cryst. (C₆H₆).
 Petersen, J.L., *J. Organomet. Chem.*, 1979, **166**, 179 (*synth, ir, cryst struct*)

C₃₂H₄₀Zr **Zr-00107**
Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]diphenylzirconium, 10Cl
 [79847-76-0]



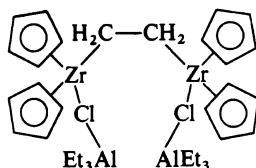
M 515.888
 Characterised spectroscopically and by photochemical decomposition. Pale-yellow cryst. (Et₂O).
 Tung, H.S. *et al*, *Inorg. Chim. Acta*, 1981, **52**, 197 (*synth*, *nmr*)

C₃₄H₃₄OZr₂ **Zr-00108**
Tetrakis(η⁵-2,4-cyclopentadien-1-yl)bis(2-methylphenyl)-μ-oxodizirconium
μ-Oxobis[bis(η-cyclopentadienyl)-o-tolylzirconium]
 [77674-18-1]



M 641.082
 Cryst. *m*-Isomer and other analogues also made.
 Chen, S.S. *et al*, *K'o Hsueh Tung Pao*, 1980, **25**, 270; *CA*, **94**, 208952k (*synth*, *cryst struct*)

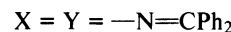
C₃₄H₅₄Al₂Cl₂Zr₂ **Zr-00109**
Di-μ-chlorotetrakis(η⁵-2,4-cyclopentadien-1-yl)-μ-1,2-ethanediylbis(triethylaluminum)dizirconium, 9Cl
1,2-Bis[Al,Zr-μ-chloro(triethylaluminum)(bis(η-cyclopentadienyl)zirconio)]ethane
 [56379-20-5]



M 770.110
 Catalyses olefin polymerisation. Cryst. Extremely air- and water-sensitive.
 Kaminsky, W. *et al*, *Makromol. Chem.*, 1974, **175**, 443 (*synth*, *use*)
 Kaminsky, W. *et al*, *Angew. Chem., Int. Ed. Engl.*, 1976, **15**, 629 (*synth*, *nmr*, *cryst struct*)

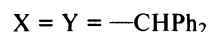
C₃₆H₃₀N₂Zr **Zr-00110**
Bis(η⁵-cyclopentadienyl)bis(diphenylketimido)zirconium
Di-π-cyclopentadienylbis(1,1-diphenylmethyleniminato)zirconium, 8Cl. Zirconocene bis(diphenylketimide)
 [11106-18-6]

As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with



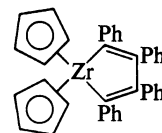
M 581.866
 Red cryst. Bp_{0.001} 150° subl.
 Collier, M.R. *et al*, *Inorg. Nucl. Chem Lett.*, 1971, **7**, 689 (*synth*, *ir*, *nmr*, *ms*)

C₃₆H₃₂Zr **Zr-00111**
Bis(η⁵-2,4-cyclopentadien-1-yl)bis(diphenylmethyl)zirconium, 10Cl
 [60175-22-6]
 As Dibromobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00006 with



M 555.869
 Orange-red cryst. (C₆H₆ or toluene). Mp >130° dec. Sl. air-sensitive in the solid state, dec. rapidly in soln.
 Atwood, J.L. *et al*, *J. Am. Chem. Soc.*, 1977, **99**, 6645 (*synth*, *ir*, *nmr*, *cryst struct*)
 Lappert, M.F. *et al*, *J. Chem. Soc., Chem. Commun.*, 1979, 305 (*props*)
 Lappert, M.F. *et al*, *J. Chem. Soc., Dalton Trans.*, 1981, 805 (*props*)

C₃₈H₃₀Zr **Zr-00112**
Bis(η⁵-2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)zirconium, 10Cl
1,1-Bis(η⁵-cyclopentadienyl)-2,3,4,5-tetraphenylzirconole
 [53433-58-2]

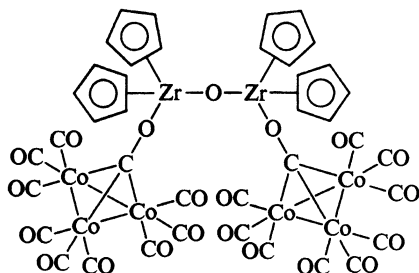


M 577.875
 Orange cryst. (CH₂Cl₂/pentane). Sol. CH₂Cl₂, insol. Et₂O, pet. ether. Mp 140°.
 Braye, E.H. *et al*, *J. Am. Chem. Soc.*, 1961, **83**, 4406 (*synth*)
 Watt, G.W. *et al*, *J. Am. Chem. Soc.*, 1970, **92**, 826 (*synth*)
 Alt, H.G. *et al*, *J. Am. Chem. Soc.*, 1974, **96**, 5936 (*synth*, *nmr*)
 Hunter, W.E. *et al*, *J. Organomet. Chem.*, 1981, **204**, 67 (*cryst struct*)

C₄₀H₂₀Co₆O₂₁Zr₂

Zr-00113

Tetrakis(η⁵-2,4-cyclopentadien-1-yl)bis[μ₄-{methanolato(4-)-C:C:C:O}bis(nonacarbonyltricobalt)-μ-oxodizirconium, 10Cl
μ-Oxobis[bis(η⁵-cyclopentadienyl)[μ₃-(oxymethyldyne)cyclotris(tricarbonylcobalt)]zirconium]
[67422-52-0]



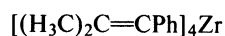
M 1372.625

Mp 160-4° dec.

Stutte, B. *et al*, *Chem. Ber.*, 1978, **111**, 1603 (*synth, ir, nmr*)C₄₀H₄₄Zr

Zr-00114

Tetrakis(2-methyl-1-phenyl-1-propenyl)zirconium, 10Cl
Tetrakis(2,2-dimethyl-1-phenylethenyl)zirconium
[63422-30-0]



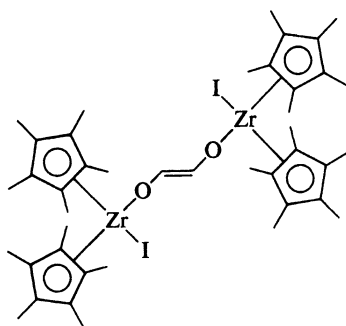
M 616.008

Yellow cryst. Mp 70° dec.

Cardin, C.J. *et al*, *J. Organomet. Chem.*, 1977, **132**, C23 (*synth, nmr*)C₄₂H₆₂I₂O₂Zr₂

Zr-00115

[μ-[1,2-Ethenediolato(2-)-O:O']diodotetrakis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dizirconium, 10Cl
μ-(1,2-Ethenediolato)bis[iodobis(η⁵-pentamethylcyclopentadienyl)zirconium]
[61396-38-1]



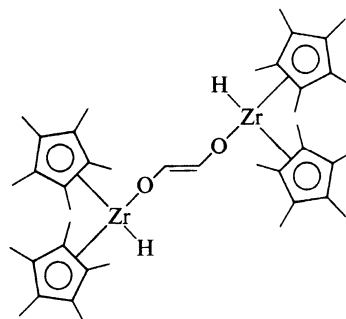
M 1035.200

Cryst.

Manriquez, J.M. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 2716 (*synth, ir, nmr, cryst struct*)C₄₂H₆₄O₂Zr₂

Zr-00116

[μ-[1,2-Ethenediolato(2-)-O:O']dihydrotetrakis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dizirconium, 10Cl
Ethenediolato-1,2-bis[hydridobis(η⁵-pentamethylcyclopentadienyl)zirconium]
[61396-37-0]



M 783.406

Cryst. Isotopomers also prepd.

Manriquez, J.M. *et al*, *J. Am. Chem. Soc.*, 1978, **100**, 2716 (*synth, ir, nmr, cryst struct*)

Name Index

- (Acetato-*O*)chlorobis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00023
- (Acetato)chlorodi- π -cyclopentadienylzirconium, *see* Zr-00023
- (Acetato-*O*)[(1,2,3,4,5- η)-methylbenzene](η^3 -2-propenyl)tungsten, W -00077
- Acetonebis(cyclopentadienyl)vanadium(1+), *see* V -00060
- Acetonitrile(η^5 -2,4-cyclopentadien-1-yl)dinitrosylchromium(1+), Cr-00035
- [(Acetonitrile)decacarbonyl- μ -hydrotriosmium]pentacarbonylrhenium, Re-00074
- (Acetonitrile)pentacarbonylmanganese(1+), Mn-00020
- (Acetonitrile)pentacarbonylrhenium(1+), Re-00018
- (Acetonitrile)pentadecacarbonyl- μ -hydrotriosmiumrhenium, *see* Re-00074
- Acetophenonetetracarbonylmanganese, *see* Mn-00080
- (Acetylacetonato)bis(cyclopentadienyl)vanadium(1+), *see* V -00068
- Acetylacetonatotitanocene, *see* Ti-00080
- (Acetylbenzene)tricarbonylchromium, *see* Cr-00088
- (η^2 -Acetyl)bis(η^5 -2,4-cyclopentadien-1-yl)methylzirconium, Zr-00029
- Acetylcarbonylbis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00058
- μ -[Acetyl-*C*(*Mo*):*O*(*Zr*)] μ -[carbonyl-*C*(*Mo*):*O*(*Zr*)]bis- η -cyclopentadienylzirconium(carbonyl) η -cyclopentadienylmolybdenum, *see* Mo-00107
- μ -(Acetyl-*C*:*O*)] μ -(η^2 -carbonyl)]carbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum]bis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Mo-00107
- [(*C*,*O*- η)-Acetyl]chlorobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00056
- (Acetyl-*C*,*O*)chlorobis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00022
- Acetylchlorotitanocene, *see* Ti-00056
- (η^5 -1-Acetyl-2,4-cyclopentadien-1-yl)tetracarbonylvanadium, V -00037
- (Acetylcyclopentadienyl)tricarbonylmanganese, Mn-00055
- [(1,2,3,4,5- η)-1-Acetyl-2,4-cyclopentadien-1-yl]tricarbonylmanganese, *see* Mn-00055
- Acetylcymantrene, *see* Mn-00055
- (Acetylene)carbonyl(η^5 -cyclopentadienyl)methyltungsten, *see* W -00038
- (2-Acetylferrocenyl-*C*,*O*)tetracarbonylmanganese, Mn-00107
- Acetylpentacarbonylchromate(1-), Cr-00029
- Acetylpentacarbonylrhenium, Re-00020
- (2-Acetylphenyl-*C*,*O*)tetracarbonylmanganese, Mn-00080
- Acetyltricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00044
- Allenetetracarbonylbiscyclopentadienylmolybdenum, *see* Mo-00098
- η^3 -Allyl(acetato)- η^6 -toluenetungsten, *see* W -00077
- Allyl- π -allyl- π -cyclopentadienylzirconium, *see* Zr-00044
- Allylbenzenechloromolybdenum, *see* Mo-00028
- η^3 -Allyl- η^6 -benzene- η^4 -cyclooctatetraenemolybdenum(1+), *see* Mo-00099
- π -Allyl(2,2'-bipyridine)dicarbonylchlorotungsten, *see* W -00103
- Allylbis(cyclopentadienyl)niobium, *see* Nb-00029
- Allylbis(cyclopentadienyl)tantalum, *see* Ta-00019
- (η^3 -Allyl)bis(η^5 -cyclopentadienyl)tungsten(1+), *see* W -00084
- (η^1 -Allyl)bis(cyclopentadienyl)vanadium, *see* V -00059
- η^3 -Allylcarbonylcyclopentadienylnitrosylmolybdenum(1+), *see* Mo-00027
- η^3 -Allylcyclopentadienylidionitrosyltungsten, *see* W -00026
- η^3 -Allyldicarbonyl(η^5 -cyclopentadienyl)molybdenum, *see* Mo-00039
- π -Allyldicarbonyl- π -cyclopentadienyltungsten, *see* W -00050
- η^3 -Allylodonitrosyl(η^5 -cyclopentadienyl)molybdenum, *see* Mo-00019
- π -Allylmanganese tetracarbonyl, *see* Mn-00025
- Allylpentacarbonylmanganese, *see* Mn-00034
- π -Allylpentacarbonylvanadium, *see* V -00016
- (η^3 -Allyl)tetracarbonylmanganese, *see* Mn-00025
- (η^3 -Allyl)tetracarbonylrhenium, *see* Re-00024
- Allyltetracarbonyl(triphenylphosphine)vanadium, *see* V -00102
- Allyltricyclopentadienyluranium, *see* U -00024
- (1-Aminoethylidene)pentacarbonylchromium, Cr-00033
- (Aminophenylmethylene)pentacarbonylchromium, Cr-00096
- Amminpentacarbonylchromium, Cr-00011
- Amminpentacarbonylvanadate(1-), V -00001
- (η^6 -Aniline)tricarbonylchromium, Cr-00059
- Anisoletricarbonylchromium, *see* Cr-00073
- Anthracenetetracarbonylchromium, Cr-00140
- Arsabenetetracarbonylmolybdenum, *see* Mo-00010
- (η^6 -Arsenin)tricarbonylmolybdenum, Mo-00010
- (Arsine)pentacarbonylchromium, Cr-00010
- (Azobenzene)bis(cyclopentadienyl)vanadium, V -00091
- (Azobenzene)tetracarbonylmanganese, *see* Mn-00106
- Azulenemolybdenum hexacarbonyl, *see* Mo-00092
- μ -[(1,2,3,3a,8a- η :4,5,6,7,8- η)azulene]]hexacarbonyldimolybdenum, Mo-00092
- (η^6 -Benzenamine)tricarbonylchromium, *see* Cr-00059
- (η^6 -Benzene)bis(η^3 -2-propenyl)molybdenum, Mo-00069
- (η^6 -Benzene)(carbonothioyl)carbonyl(triphenylphosphine)chromium, Cr-00164
- (η^6 -Benzene)(carbonothioyl)dicarbonylchromium, Cr-00056
- (η^6 -Benzene)chloro(η^3 -2-propenyl)molybdenum, Mo-00028
- Benzenechromium tricarbonyl, *see* Cr-00057
- (η^6 -Benzene)[(1,2,3,4- η)-1,3,5,7-cyclooctatetraene](η^3 -2-propenyl)molybdenum(1+), Mo-00099
- (η^6 -Benzene)(η^5 -2,4-cyclopentadien-1-yl)manganese, Mn-00067
- (η^6 -Benzene)(η^5 -2,4-cyclopentadien-1-yl)molybdenum, Mo-00053
- (η^6 -Benzene)(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00043
- (η^6 -Benzene)dicarbonyl(dinitrogen)chromium, Cr-00040
- (η^6 -Benzene)dicarbonyl(methoxycarbonyl)manganese, Mn-00057
- [1,2-Benzenediolato(2-)-*O*,*O'*]bis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00086
- [1,2-Benzenedithiolato(2-)-*S*,*S'*]bis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00087
- (Benzene)dodecachlorotrialluminuranium, *see* U -00002
- (Benzene)hexa- μ -chlorohexachlorotrialluminuranium, U -00002
- (Benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00072
- (Benzenethiolato)tetracarbonylrhenium, Re-00041
- (η^6 -Benzene)tricarbonylchromium, Cr-00057
- (η^6 -Benzene)tricarbonylmanganese(1+), Mn-00045
- η^6 -Benzenetetracarbonylmolybdenum, Mo-00023
- (η^6 -Benzene)tricarbonylrhenium(1+), Re-00037
- (η^6 -Benzene)tricarbonyltungsten, W -00031
- (η^6 -Benzene)tris(methyldiphenylphosphine)molybdenum, Mo-00144
- (Benzoic acid)tricarbonylchromium methyl ester, *see* Cr-00089
- (η^2 -Benzoyl)bis(η^5 -2,4-cyclopentadien-1-yl)phenylhafnium, Hf-00038
- (η^2 -Benzoyl)bis(η^5 -2,4-cyclopentadien-1-yl)phenylzirconium, Zr-00080
- (Benzoyl-*C*,*O*)chlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U -00064
- Benzoylpentacarbonylchromate(1-), Cr-00094
- Benzylbis(η^5 -2,4-cyclopentadienyl)lutetium, Lu-00016

- Benzylbis(η^5 -cyclopentadienyl)titanium, Ti-00094
 Benzylbis(cyclopentadienyl)vanadium, V -00079
 Benzylidicarbonyl- π -cyclopentadienylmolybdenum, Mo-00080
 [1-(Benzylideneamino)ethylidene]pentacarbonylchromium, Cr-00119
 Benzylidenetrichlorobis(trimethylphosphine)tantalum, Ta-00023
 Benzyltricyclopentadienyluranium, U -00043
 (Benzyltrimethylstannane)tricarbonylchromium, Cr-00117
 (η^2 -Benzene)dimethyl[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00033
 [(2,3,5,6- η)-Bicyclo[2.2.1]hepta-2,5-diene]-dicarbonylbis(tributylphosphine)molybdenum, Mo-00139
 [(2,3,5,6- η)-Bicyclo[2.2.1]hepta-2,5-diene]tetracarbonylchromium, Cr-00087
 [(2,3,5,6- η)-Bicyclo[2.2.1]hepta-2,5-diene]tetracarbonylmolybdenum, Mo-00049
 [(2,3,5,6- η)-Bicyclo[2.2.1]hepta-2,5-diene]tetracarbonyltungsten, W -00061
 [(2,3,4,5,6,7- η)-Bicyclo[6.1.0]nona-2,4,6-triene]tricarbonylmolybdenum, Mo-00062
 [(2,3,4,5,6,7- η)-Bicyclo[6.1.0]nona-2,4,6-triene]tricarbonyltungsten, W -00070
 [μ -[(1,2,3,4,5- η :1',2',3',4',5'- η)[Bi-2,4-cyclopentadien-1-yl]-1,1'-diyl]bis(η^5 -2,4-cyclopentadien-1-yl)]di- μ -hydroxodititanium, Ti-00106
 (2,2'-Bipyridine-*N,N'*)bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00086
 (2,2'-Bipyridine-*N,N'*)dicarbonylchloro(η^3 -2-propenyl)tungsten, W -00103
 (2,2'-Bipyridine-*N,N'*)dichlorotrimethyltantalum, Ta-00020
 (2,2'-Bipyridine-*N,N'*)tricarbonylnitrosylmolybdenum(1+), Mo-00075
 Bis(acetato-*O*)bis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00071
 Bis(acetato)cyclopentadienylvanadium, *in* V -00083
 Bis(acetonitrile) η^3 -allyldicarbonylchloromolybdenum, *see* Mo-00029
 Bis(acetonitrile)(η^3 -allyl)dicarbonylchlorotungsten, *see* W -00039
 Bis(acetonitrile)(η^3 -allyl)dicarbonyliodomolybdenum, *see* Mo-00030
 Bis(acetonitrile)bis(η^5 -2,4-cyclopentadien-1-yl)vanadium(2+), V -00062
 Bis(acetonitrile)bis(η^5 -pentamethyl-2,4-cyclopentadien-1-yl)vanadium(1+), V -00101
 Bis(acetonitrile)-carbonylchlorotris(dimethylphenylphosphine)technetium(2+), Tc-00011
 Bis(acetonitrile)dicarbonylchloro(η^3 -2-propenyl)molybdenum, Mo-00029
 Bis(acetonitrile)dicarbonylchloro(η^3 -2-propenyl)tungsten, W -00039
 Bis(acetonitrile)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+), Mo-00054
 Bis(acetonitrile)dicarbonyl[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]molybdenum(1+), Mo-00088
 Bis(acetonitrile)dicarbonyliodo(η^3 -2-propenyl)molybdenum, Mo-00030
 Bis(acetylacetonato)chloro(η -cyclopentadienyl)hafnium, *see* Hf-00020
 Bis(acetylacetonato)chloro(η -cyclopentadienyl)zirconium, *see* Zr-00040
 Bis(acetylacetonato)(η -cyclopentadienyl)phenoxyhafnium, *see* Hf-00031
 Bis(acetylacetonato)(η -cyclopentadienyl)phenoxyzirconium, *see* Zr-00069
 Bis(1-acetyl-2-oxopropyl)chloro(η^5 -2,4-cyclopentadien-1-yl)hafnium, *see* Hf-00020
 Bis(η^3 -allyl)(η^6 -benzene)molybdenum, *see* Mo-00069
 Bis(allyl)bis(η^6 -benzene)di- μ -chlorodimolybdenum, *in* Mo-00028
 Bis(allyl)chromium iodide, *see* Cr-00026
 Bis(η -allyl)[η -cyclooctatetraene(2-)]hafnium, *see* Hf-00016
 Bis(η -allyl)[η -cyclooctatetraene(2-)]zirconium, *see* Zr-00034
 Bis(η^3 -allyl)dicarbonylchloro[1,2-bis(diphenylphosphino)ethane]molybdenum, *see* Mo-00137
 1,2-Bis[Al,Zr- μ -chloro(triethylaluminum)]bis(η -cyclopentadienyl)zirconio]ethane, *see* Zr-00109
 ▸ Bis(η^6 -benzene)chromium, Cr-00101
 Bis(η^6 -benzene)di- μ -chlorobis(η^3 -2-propenyl)dimolybdenum, *in* Mo-00028
 Bis(η^6 -benzene)molybdenum, Mo-00063
 Bis(η^6 -benzene)niobium, Nb-00024
 Bis(η^6 -benzene)rhenium(1+), Re-00055
 Bis(benzeneselenolato)bis(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00035
 Bis(η^6 -benzene)technetium(1+), Tc-00008
 Bis(benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00043
 Bis(benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00117
 Bis(benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00092
 Bis(benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00072
 Bis(benzenethiolato)bis[(1,2,3,4,5- η)-1-(1,1-dimethylethyl)-2,4-cyclopentadien-1-yl]hafnium, *see* Hf-00046
 Bis(μ -benzenethiolato)octacarbonyldirhenium, *in* Re-00041
 Bis(benzenethiolato)tetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -oxodizirconium, Zr-00106
 Bis(η^6 -benzene)titanium, Ti-00054
 Bis(η^6 -benzene)tungsten, W -00073
 Bis(η^6 -benzene)vanadium, V -00051
 Bis(μ -benzoato)(η^5 -cyclopentadienyl)titanium, Ti-00102
 Bis(benzyl)bis(η^5 -cyclopentadienyl)hafnium, Hf-00039
 Bis(benzyl)bis(η^5 -cyclopentadienyl)tungsten, *see* W -00141
 Bis(benzyl)bis(η^5 -cyclopentadienyl)zirconium, Zr-00085
 Bis(η^5 -benzylcyclopentadienyl)dichlorozirconium, Zr-00084
 Bis(benzyl)(η -cyclopentadienyl)zirconium, Zr-00057
 ▸ Bis[μ -(1,2,3,4,5- η :1',2',3',4',5'- η)[bi-2,4-cyclopentadien-1-yl]-1,1'-diyl]divanadium, *see* V -00084
 Bis(η^8 -bicyclo[6.3.0]undeca-2,4,6-triene-1,8-diide)uranium, *see* U -00044
 Bis(2,2'-bipyridine-*N,N'*)bis[(trimethylsilyl)methyl]chromium(1+), Cr-00167
 Bis(2,2'-bipyridine-*N,N'*)diphenylchromium(1+), Cr-00172
 Bis[bis(acetonitrile)tris(η^5 -cyclopentadienyl)uranium(1+)]tetrachlorodioxouranate(2-), U -00077
 Bis[bis(η -cyclopentadienyl)- μ -chlorotitanium], *in* Ti-00025
 Bis[bis(η^5 -cyclopentadienyl)dimethylamidotitanium], *in* Ti-00058
 Bis[bis(η^5 -cyclopentadienyl)- μ -fluorotitanium], *in* Ti-00028
 Bis[bis(cyclopentadienyl)hydridoneopentylzirconium], *in* Zr-00041
 Bis[bis(η^5 -cyclopentadienyl)- μ -hydrotitanium], *in* Ti-00037
 Bis[bis(η^5 -cyclopentadienyl)- μ -iodotitanium], *in* Ti-00030
 Bis[bis(η -cyclopentadienyl)(μ -silylene)titanium], *see* Ti-00110
 Bis[1,2-bis(diphenylphosphino)ethane]carbonylchlororhenium, *see* Re-00092
 Bis[bis(η^5 -methylcyclopentadienyl)titanium](μ - η^2 : η^2 -1,4-diphenyl-1,3-butadiene), *see* Ti-00147
 Bis[bis(η^5 -pentamethylcyclopentadienyl)titanium] μ - η^1 , η^1 -dinitrogen, *see* Ti-00149
 Bis[bis(trifluoromethyl)acetylene]chloro(cyclopentadienyl)tungsten, *see* W -00080
 Bis[1,3-bis(trimethylsilyl)cyclopentadienyl]chloropraesodymium, Pr-00006
 Bis[1,3-bis(trimethylsilyl)cyclopentadienyl]chloroscandium, Sc-00010
 Bis[(1,2,3,4,5- η)-1,3-bis(trimethylsilyl)-2,4-cyclopentadien-1-yl]tetrahydroboratoscandium, Sc-00009
 Bis[1,3-bis(trimethylsilylmethyl)cyclopentadienyl]chloroytterbium, Yb-00029
 Bis[(1,2,3,4,5- η)-1,3-bis(trimethylsilylmethyl)-2,4-cyclopentadien-1-yl]dichloroneodymium(1-), Nd-00011
 [Bis[bis(trimethylsilyl)methyl]plumbylene]pentacarbonylmolybdenum, Mo-00110

- [Bis[bis(trimethylsilyl)methyl]tin]pentacarbonylchromium, Cr-00148
- Bis[μ -bromobis(η^5 -cyclopentadienyl)titanium], *in* Ti-00023
- Bis(η^4 -1,3-butadiene)carbonylmanganese, Mn-00052
- Bis(η^4 -1,3-butadiene)[1,2-ethanediy]bis(dimethylphosphine)-*P,P'*]titanium, Ti-00078
- Bis(η^4 -1,3-butadiene)(trimethyl phosphite)manganate(1-), Mn-00069
- Bis(η^4 -1,3-butadiene)(trimethyl phosphite)manganese, Mn-00070
- Bis[μ -(2-butene-2,3-diolato(2-)-*O,O'*)tetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dithorium, Th-00038
- Bis(*tert*-butoxy)dicarbonylbis(pyridine)molybdenum, *see* Mo-00116
- Bis(η -*tert*-butylcyclopentadienyl)bis(phenylthiolato)hafnium, Hf-00046
- Bis(η^5 -*tert*-butylcyclopentadienyl)[bis(trimethylsilyl)-methyl]chlorozirconium, Zr-00089
- Bis[(2,3- η)-2-butyne]carbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+), Mo-00083
- Bis[(2,3- η)-2-butyne]carbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten(1+), W-00095
- Bis(η^6 -chlorobenzene)chromium, Cr-00097
- Bis(η^6 -chlorobenzene)molybdenum, Mo-00061
- Bis(cyanato-*N*)bis(η^5 -cyclopentadien-1-yl)titanium, *see* Ti-00050
- Bis(cyanato-*N*)bis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00019
- Bis(cyanato-*O*)bis(η^5 -2,4-cyclopentadien-1-yl)zirconium, *see* Zr-00019
- Bis(cyanato)di- π -cyclopentadienylhafnium, Hf-00011
- Bis(cyano-*C*)bis(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00022
- Bis(cyano-*C*)bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V-00049
- Bis[(1,2,3,4,5,6- η)-1,3,5-cycloheptatriene]vanadium, V-00063
- Bis(η^7 -2,4,6-cycloheptatrien-1-yl)tri- μ -chlorodimolybdenum, *see* Mo-00081
- Bis(η^7 -2,4,6-cycloheptatrien-1-yl)tri- μ -methoxydimolybdenum, Mo-00100
- Bis(η^8 -1,3,5,7-cyclooctatetraene)cerate(1-), Ce-00005
- Bis(η^8 -1,3,5,7-cyclooctatetraene)lanthanate(1-), La-00005
- Bis(1,3,5,7-cyclooctatetraene)methylniobium, Nb-00033
- Bis(η^8 -1,3,5,7-cyclooctatetraene)neodymate(1-), Nd-00005
- Bis(η^8 -1,3,5,7-cyclooctatetraene)neptunate(1-), Np-00003
- Bis(η^8 -1,3,5,7-cyclooctatetraene)neptunium, Np-00004
- Bis(1,3,5,7-cyclooctatetraene)phenylniobium, Nb-00044
- Bis(η^8 -1,3,5,7-cyclooctatetraene)plutonate(1-), Pu-00003
- Bis(η^8 -1,3,5,7-cyclooctatetraene)plutonium, Pu-00004
- Bis(η^8 -1,3,5,7-cyclooctatetraene)praesodymate(1-), Pr-00004
- Bis(η^8 -1,3,5,7-cyclooctatetraene)protactinium, Pa-00001
- Bis(η^8 -1,3,5,7-cyclooctatetraene)samarate(1-), Sm-00010
- Bis(η^8 -1,3,5,7-cyclooctatetraene)terbate(1-), Tb-00003
- Bis(η^8 -1,3,5,7-cyclooctatetraene)thorium, Th-00009
- Bis(1,3,5,7-cyclooctatetraene)titanium, Ti-00090
- Bis[η -cyclooctatetraene(2-)]titanium[(μ - η^4 , η^4 -cyclooctatetraene)], *see* Ti-00126
- Bis(η^8 -1,3,5,7-cyclooctatetraene)uranium, *see* U-00019
- Bis(η^8 -1,3,5,7-cyclooctatetraene)vanadium, V-00075
- Bis(η^8 -1,3,5,7-cyclooctatetraene)yttrate(1-), Y-00007
- Bis(cyclopentadiene)ethyl(ethylene)niobium, *see* Nb-00031
- Bis(cyclopentadienyl)(bipyridyl)vanadium, *see* V-00086
- Bis(cyclopentadienyl)bis(acetonitrile)vanadium(2+), *see* V-00062
- Bis(cyclopentadienyl)bis(benzenethiolato)niobium, *see* Nb-00043
- Bis(cyclopentadienyl)bis(cyclohexyl isocyanide)vanadium(1+), *see* V-00100
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -[(1, η :1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]]dihydrodiniobium, Nb-00040
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -(η : η^5 -2,4-cyclopentadien-1-ylidene)]dimolybdenum, Mo-00115
- Bis(η^1 -cyclopentadienyl)bis(η -cyclopentadienyl)titanium, *see* Ti-00107
- Bis(η^5 -cyclopentadienyl)bis(diethylamido)hafnium, Hf-00024
- Bis(η^5 -cyclopentadienyl)bis(diethylamido)zirconium, Zr-00053
- Bis(η^5 -cyclopentadienyl)bis(dimethylamido)hafnium, Hf-00018
- Bis(η^5 -cyclopentadienyl)bis(dimethylamido)titanium, Ti-00076
- Bis(η -cyclopentadienyl)bis(dimethylamido)zirconium, Zr-00036
- Bis(cyclopentadienyl)[bis(dimethylphosphino)ethane]tantalum(1+), *see* Ta-00031
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(2,2-dimethylpropyl)zirconium, Zr-00064
- Bis(η^5 -cyclopentadienyl)bis(diphenylketimido)hafnium, Hf-00049
- Bis(η^5 -cyclopentadienyl)bis(diphenylketimido)zirconium, Zr-00110
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(diphenylmethyl)hafnium, Hf-00050
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(diphenylmethyl)zirconium, Zr-00111
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(*N*-ethylethanaminato)uranium, U-00025
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(isocyanocyclohexane)vanadium(1+), V-00100
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(methanethiolato)titanium, Ti-00059
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis[μ_4 -[methanolato(4-)-*C:C:C:O*]]bis(nonacarbonyltricalc)zirconium, Zr-00102
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis[μ_4 -[methanolato(4-)-*C:C:C:O*]]bis(nonacarbonyltricalc)dihafnium, Hf-00045
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(*N*-methylmethanaminato)titanium, *see* Ti-00076
- Bis(η^5 -cyclopentadienyl)bis(neopentyl)zirconium, *see* Zr-00064
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(4-nitrobenzoato-*O'*)titanium, Ti-00123
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(pentafluorophenyl)hafnium, Hf-00033
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(pentafluorophenyl)titanium, Ti-00115
- Bis(η^5 -cyclopentadienyl)bis(pentafluorophenyl)zirconium, Zr-00071
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(phenolato-*O*)titanium, Ti-00116
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(*N*-phenylbenzenaminato)uranium, U-00073
- Bis(η -cyclopentadienyl)bis(2-phenylethenyl)zirconium, Zr-00093
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(phenylethynyl)titanium, Ti-00129
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(phenylethynyl)zirconium, Zr-00092
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(phenylmethyl)hafnium, *see* Hf-00039
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(phenylmethyl)titanium, *see* Ti-00125
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(phenylmethyl)tungsten, *see* W-00141
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(phenylmethyl)vanadium, *see* V-00099
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(phenylmethyl)zirconium, *see* Zr-00085
- Bis(η -cyclopentadienyl)bis(phenylselenato)hafnium, *see* Hf-00035
- Bis(η -cyclopentadienyl)bis(phenylthiolato)zirconium, *see* Zr-00072
- Bis(η -cyclopentadienyl)bis(pyrrolyl)zirconium, *see* Zr-00049
- Bis(η -cyclopentadienyl)bis(β -styryl)zirconium, *see* Zr-00093
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis[tetrahydroborato(1-)-*H,H'*]hafnium, Hf-00009
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis[tetrahydroborato(1-)-*H,H'*]uranium, U-00009

- Bis(η^5 -2,4-cyclopentadien-1-yl)bis[tetrahydroborato(1-)-*H,H'*]zirconium, Zr-00015
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(thiocyanato-*N*)zirconium, Zr-00020
- Bis(η -cyclopentadienyl)bis(thiomethoxy)titanium, *see* Ti-00059
- Bis(η -cyclopentadienyl)bis(thiophenoxy)titanium, *see* Ti-00117
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(trifluoroacetato-*O*)titanium, Ti-00069
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(trifluoroacetato-*O*)zirconium, Zr-00032
- Bis- π -cyclopentadienylbis(3,3,3-trifluoro-1-propynyl)titanium, Ti-00085
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(trimethylphosphite)titanium, Ti-00092
- 2,2-Bis(η^5 -cyclopentadienyl)-1,3-bis(trimethylsilyl)-2-hafnaindane, *see* Hf-00040
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis[(trimethylsilyl)methyl]hafnium, Hf-00025
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis[(trimethylsilyl)methyl]titanium, Ti-00101
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis[(trimethylsilyl)methyl]zirconium, Zr-00054
- 2,2-Bis(η^5 -cyclopentadienyl)-1,3-bis(trimethylsilyl)-2-zirconaindane, *see* Zr-00086
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(triphenylgermyl)titanium, Ti-00150
- Bis(η^5 -2,4-cyclopentadien-1-yl)bis(triphenylsilyloxy)titanium, Ti-00151
- Bis(η -cyclopentadienyl)bis(triphenylstannyl)titanium, Ti-00152
- Bis(cyclopentadienyl)bromo(dimethylphenylphosphine)niobium, *see* Nb-00036
- Bis(cyclopentadienyl)bromovanadium, *see* V -00026
- Bis(η^5 -cyclopentadienyl)(η^4 -1,3-butadiene)zirconium, *see* Zr-00033
- Bis(cyclopentadienyl)(*tert*-butyl)erbium, *see* Er-00009
- Bis(η^5 -2,4-cyclopentadien-1-yl)(*tert*-butyl)-(triphenylphosphonium η -methylide)lutetium, Lu-00025
- Bis(cyclopentadienyl)carbonyl(pyridine)vanadium(1+), *see* V -00071
- Bis(cyclopentadienyl)carbonylvanadium, *see* V -00040
- Bis(cyclopentadienyl)chlorocarbonylniobium, *see* Nb-00017
- Bis(cyclopentadienyl)chlorocarbonyltantalum, *see* Ta-00013
- Bis(cyclopentadienyl)chloro(methyl)vanadium, *see* V -00046
- Bis(cyclopentadienyl)chlorovanadium, *see* V -00029
- Biscyclopentadienylchromium, *see* Cr-00075
- Bis(η^5 -cyclopentadienyl)cyclo(1,1,2,2,3,3,4,4-octaphenyltetrasilicon-1,4-diyl)titanium, *see* Ti-00153
- Bis(η^5 -cyclopentadienyl)cyclo-1,5-pentaseelenium-1,5-diyl)titanium, *see* Ti-00034
- Bis(η^5 -cyclopentadienyl)cyclo(pentasulfur-1,5-diyl)hafnium, *see* Hf-00006
- Bis(η^5 -cyclopentadienyl)cyclo(pentasulfur-1,5-diyl)titanium, *see* Ti-00033
- Bis(η^5 -cyclopentadienyl)cyclo(pentasulfur-1,5-diyl)zirconium, *see* Zr-00010
- Bis(cyclopentadienyl)dibromovanadium, *see* V -00027
- Bis(η^5 -cyclopentadienyl)(2,6-di-*tert*-butyl-4-methylphenoxy)titanium, Ti-00128
- Bis(cyclopentadienyl)dicarbonylvanadium(1+), *see* V -00050
- Bis(cyclopentadienyl)dichloroniobium, *see* Nb-00012
- Bis(cyclopentadienyl)dichlorotantalum, *see* Ta-00010
- Bis(cyclopentadienyl)dichlorovanadium, *see* V -00030
- Bis(η -cyclopentadienyl)dicyanatohafnium, *see* Hf-00011
- Biscyclopentadienyldicyanatotitanium, *see* Ti-00050
- Bis(η -cyclopentadienyl)dicyanatozirconium, *see* Zr-00019
- Bis(η^5 -cyclopentadienyl)(1,2-dicyanoethylenedithiolato)titanium, *see* Ti-00070
- Bis(cyclopentadienyl)dicyanoniobium, *see* Nb-00022
- Bis(cyclopentadienyl)dicyanovanadium, *see* V -00049
- Bis(η^5 -2,4-cyclopentadien-1-yl)diethoxy-di- μ -ethoxydititanium, *in* Ti-00021
- Bis(η^5 -2,4-cyclopentadien-1-yl)[(2,3- η)-diethyl-2-butenedioate]vanadium, V -00082
- Bis(η^5 -2,4-cyclopentadien-1-yl)(diethylcarbamodithioato-*S,S'*)vanadium(1+), V -00070
- Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -diethyldiazomalonate-*N,N'*)vanadium, V -00080
- Bis(cyclopentadienyl)(η^2 -diethyl fumarate)vanadium, *see* V -00082
- Bis(η^5 -2,4-cyclopentadien-1-yl)diethylvanadium, V -00064
- Bis(η^5 -2,4-cyclopentadien-1-yl)diferrocenylniobium, Ti-00142
- Bis(η^5 -2,4-cyclopentadien-1-yl)difluorohafnium, Hf-00004
- Bis(η^5 -2,4-cyclopentadien-1-yl)difluorotitanium, Ti-00029
- Bis(η^5 -2,4-cyclopentadien-1-yl)difluorozirconium, Zr-00008
- Bis(η^5 -cyclopentadienyl)dihydrotungsten, *see* W -00055
- Bis(η^5 -2,4-cyclopentadien-1-yl)dihydromolybdenum, Mo-00043
- Bis(η^5 -2,4-cyclopentadien-1-yl)dihydrotungsten, W -00055
- Bis(η^5 -2,4-cyclopentadien-1-yl)dihydrozirconium, Zr-00012
- Bis(η^5 -2,4-cyclopentadien-1-yl)diiodohafnium, Hf-00005
- Bis(η^5 -2,4-cyclopentadien-1-yl)diiodoniobium, Nb-00013
- Bis(η^5 -2,4-cyclopentadien-1-yl)diiodotitanium, Ti-00031
- Bis(η^5 -2,4-cyclopentadien-1-yl)diiodozirconium, Zr-00009
- Bis(η^5 -2,4-cyclopentadien-1-yl)[2,3-dimercapto-2-butenedinitrilato(2-)-*S,S'*]titanium, Ti-00070
- Bis(η^5 -2,4-cyclopentadien-1-yl)dimethoxyzirconium, Zr-00024
- Bis(cyclopentadienyl)(dimethylacetylenedicarboxylate)vanadium, *see* V -00074
- Bis(cyclopentadienyl)(1,2-dimethylallyl)titanium, *see* Ti-00081
- Bis(2,4-cyclopentadien-1-yl)(dimethylaluminum)di- μ -methylscandium, Sc-00004
- Bis(η^5 -2,4-cyclopentadien-1-yl)(dimethylaluminum)di- μ -methylt-erbium, Yb-00012
- Bis(η^5 -2,4-cyclopentadien-1-yl)(dimethylaluminum)di- μ -methylt-rium, Y -00005
- Bis[(η -cyclopentadienyl)(dimethylamido)(μ -dimethylamido)titanium], *in* Ti-00022
- [Bis(η^5 -cyclopentadienyl)dimethylamidotitanium, Ti-00058
- Bis(η^5 -2,4-cyclopentadien-1-yl)[2-[(dimethylamino)methyl]-phenyl-*C,N*]scandium, Sc-00007
- Bis(η^5 -2,4-cyclopentadien-1-yl)[(1,2,3,4- η)-2,3-dimethyl-1,3-butadiene]zirconium, Zr-00043
- Bis(η^5 -2,4-cyclopentadien-1-yl)[(2,3- η)-dimethyl-2-butyndioate]vanadium, V -00074
- Bis(2,4-cyclopentadien-1-yl)(3,3-dimethylbutynyl)erbium, Er-00012
- (Bis- η^5 -2,4-cyclopentadien-1-yl)(1,1-dimethylethyl)erbium, *see* Er-00009
- Bis(η^5 -2,4-cyclopentadien-1-yl)(1,1-dimethylethyl)lutetium, *see* Lu-00010
- Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylhafnium, Hf-00013
- Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylniobium, Nb-00028
- Bis(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethyl-1-oxopropyl-*C,O*)lutetium, Lu-00013
- Bis(η^5 -2,4-cyclopentadien-1-yl)(2,6-dimethylphenyl)titanium, Ti-00098
- Bis(η^5 -cyclopentadienyl)(2,2-dimethylpropyl)hydrozirconium, Zr-00041
- Bis(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)lutetium, Lu-00014
- Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylrhodium(1+), Re-00057
- Bis(η^5 -2,4-cyclopentadien-1-yl)dimethyltitanium, Ti-00060
- Bis(2,4-cyclopentadien-1-yl)dimethylvanadium, V -00056
- Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylzirconium, Zr-00025
- Bis(η^5 -2,4-cyclopentadien-1-yl)di- μ -nitrosyldinitrosyldichrom-ium, Cr-00078
- Bis(η -cyclopentadienyl)di[μ_3 -(oxymethylidyne)-cyclotris(tricarbonylcobalt)]zirconium, *see* Zr-00102
- Bis(η^5 -cyclopentadienyl)di[μ_3 -(oxymethylidyne)-cyclotris(tricarbonylcobalt)]hafnium, *see* Hf-00045
- Bis(η^5 -cyclopentadienyl)diphenoxytitanium, *see* Ti-00116
- Bis(η^5 -2,4-cyclopentadien-1-yl)(diphenyldiazene-*N,N'*)vanadi-um, *see* V -00091
- Bis(η^5 -2,4-cyclopentadien-1-yl)diphenylhafnium, Hf-00034
- Bis(2,4-cyclopentadien-1-yl)(η^2 -*C,O*-diphenylketene)vanadium, V -00097

- Bis(η^5 -2,4-cyclopentadien-1-yl)[(diphenylphosphinidenio)-bis(methylene)]scandium, Sc-00012
- Bis(η^5 -cyclopentadien-1-yl)diphenyltitanium, Ti-00118
- Bis(η^5 -2,4-cyclopentadien-1-yl)diphenylzirconium, Zr-00073
- Bis(η^5 -2,4-cyclopentadien-1-yl)di-1*H*-pyrrol-1-yltitanium, Ti-00097
- Bis(η^5 -cyclopentadien-1-yl)di-1*H*-pyrrol-1-ylzirconium, Zr-00049
- Bis(η -cyclopentadienyl)dithiocyanatozirconium, *see* Zr-00020
- Bis(cyclopentadienyl)divanadium pentacarbonyl, *see* V -00067
- [μ -(1,2,3,4,5- η :1',2',3',4',5'- η)]Bis-2,4-cyclopentadien-1-yl-1,1'-diyl]]bis(η^5 -2,4-cyclopentadien-1-yl)di- μ -hydrotitanium, *see* Ti-00108
- Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethanediy]bis(dimethylphosphine)-*P,P'*]tantalum(1+), Ta-00031
- Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethanediy]bis(diphenylphosphine)-*P,P'*]vanadium(1+), V -00116
- Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethenedithiolato(2-)-*S,S'*]titanium, Ti-00053
- Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)ethylniobium, Nb-00031
- Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)hydroniobium, Nb-00027
- Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)hydrotungsten(1+), W -00076
- Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)methyltungsten(1+), W -00085
- Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)molybdenum, *see* Mo-00066
- Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)rhenium(1+), Re-00056
- Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)tungsten, W -00074
- Bis[(η -cyclopentadienyl)ethoxy(μ -ethoxy)titanium], *in* Ti-00021
- Bis(η^5 -cyclopentadienyl)(η^2 -ethylene)molybdenum, Mo-00066
- Bis(η^5 -cyclopentadienyl)(ethylene)rhenium(1+), *see* Re-00056
- Bis(η^5 -2,4-cyclopentadien-1-yl)ethylvanadium, V -00055
- Bis(η^5 -2,4-cyclopentadien-1-yl)europium, Eu-00003
- Bis(cyclopentadienyl)fluorotitanium, Ti-00028
- Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -*C,O*-formaldehyde)vanadium, V -00045
- Bis(cyclopentadienyl)hafnium dichloride, *see* Hf-00003
- Bis(cyclopentadienyl)hexacarbonylditungsten, *see* W -00107
- Bis(η^5 -cyclopentadienyl)hydrido[bis(η -pentamethylcyclopentadienyl)hydrido]zirconoxymethylene]-tungsten, *see* W -00153
- Bis(η -cyclopentadienyl)hydridoneopentylzirconium, *see* Zr-00041
- Bis(η^5 -cyclopentadienyl)hydrido(phenyl)tungsten, *see* W -00108
- Bis(cyclopentadienyl)hydridorhenium, *see* Re-00042
- Bis(cyclopentadienyl)hydridotecnium, *see* Tc-00006
- Bis(η -cyclopentadienyl)hydrido(tetrahydridoborato)zirconium, *see* Zr-00013
- Bis(η^5 -cyclopentadienyl)hydrido(triphenylgermyl)tungsten, *see* W -00148
- Bis(cyclopentadienyl)hydro(carbonyl)niobium, *see* Nb-00018
- Bis(cyclopentadienyl)hydro(carbonyl)tantalum, *see* Ta-00014
- Bis(η^5 -2,4-cyclopentadien-1-yl)-hydro(dimethylphenylphosphine)niobium, Nb-00037
- Bis(cyclopentadienyl)hydro(ethylene)niobium, *see* Nb-00027
- Bis(η^5 -2,4-cyclopentadien-1-yl)hydrolutetium, Lu-00005
- [Bis(η^5 -2,4-cyclopentadien-1-yl)hydro[μ -(methanolato(3-)-*C,O*)]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, W -00153
- Bis(η^5 -2,4-cyclopentadien-1-yl)hydromolybdenumlithium, Mo-00040
- Bis(cyclopentadienyl)hydro(η^2 -4-octyne)niobium, Nb-00038
- Bis(η^5 -2,4-cyclopentadien-1-yl)hydrophenyltungsten, W -00108
- Bis(cyclopentadienyl)hydropropenetantalum, Ta-00021
- Bis(η^5 -2,4-cyclopentadien-1-yl)hydrorhenium, Re-00042
- Bis(η^5 -2,4-cyclopentadien-1-yl)hydrotechnetium, Tc-00006
- Bis(η^5 -2,4-cyclopentadien-1-yl)hydro[tetrahydroborato(1-)-*H,H'*]zirconium, Zr-00013
- Bis(η^5 -2,4-cyclopentadien-1-yl)hydro(tetrahydrofuran)lutetium, *in* Lu-00005
- Bis(η^5 -cyclopentadienyl)hydrotitanium, Ti-00037
- Bis(η^5 -2,4-cyclopentadien-1-yl)hydro(triethylphosphine)tantalum, Ta-00030
- Bis(η^5 -2,4-cyclopentadien-1-yl)hydro(triphenylgermyl)tungsten, W -00148
- Bis(η^5 -2,4-cyclopentadien-1-yl)hydro(tungsten)lithium, W -00052
- Bis(cyclopentadienyl)iodocarbonylvanadium, *see* V -00039
- Bis(η^5 -2,4-cyclopentadien-1-yl)iodonitrosylmolybdenum, Mo-00037
- Bis(cyclopentadienyl)iodotitanium, Ti-00030
- Bis(η^5 -2,4-cyclopentadien-1-yl)iodovanadium, V -00031
- Bis(η^5 -2,4-cyclopentadien-1-yl)(isocyanomethane)propyltantalum, Ta-00027
- Biscyclopentadienylmanganese, *see* Mn-00058
- Bis(η^5 -2,4-cyclopentadien-1-yl)[(1,2,3- η)-2-methyl-2-butenyl]titanium, Ti-00081
- Bis(cyclopentadienyl)methyl(carbonyl)niobium, *see* Nb-00026
- Bis(cyclopentadienyl)methylchloroniobium, *see* Nb-00019
- Bis(η^5 -2,4-cyclopentadien-1-yl)methyldysprosium, Dy-00003
- Bis(η^5 -2,4-cyclopentadien-1-yl)methylerbium, Er-00005
- Bis(η^5 -2,4-cyclopentadien-1-yl)methylholmium, Ho-00003
- Bis(η^5 -2,4-cyclopentadien-1-yl)methyllutetium, Lu-00006
- Bis(η^5 -2,4-cyclopentadien-1-yl)methyl(methylidene)tantalum, Ta-00017
- Bis(cyclopentadienyl)methyloxoniobium, Nb-00020
- Bis(η^5 -2,4-cyclopentadien-1-yl)(4-methylphenyl)lutetium, Lu-00017
- Bis(η^5 -2,4-cyclopentadien-1-yl)methylscandium, Sc-00002
- Bis(η^5 -2,4-cyclopentadien-1-yl)methylthulium, Tm-00003
- Bis(η^5 -2,4-cyclopentadien-1-yl)methyltitanium, Ti-00046
- Bis(cyclopentadienyl)methyl(triethylphosphine)niobium, Nb-00034
- Bis(η^5 -2,4-cyclopentadien-1-yl)methylvanadium, V -00047
- Bis(η^5 -2,4-cyclopentadien-1-yl)methylytterbium, Yb-00006
- Bis(η^5 -2,4-cyclopentadien-1-yl)methylyttrium, Y -00003
- Bis(cyclopentadienyl)molybdenum dihydride, *see* Mo-00043
- Bis(cyclopentadienyl)niobium borohydride, *see* Nb-00015
- Bis(η^5 -2,4-cyclopentadien-1-yl)(1,1,2,2,3,3,4,4-octaphenyl-1,4-tetrasilanediy)lithium, Ti-00153
- Bis(cyclopentadienyl)oxochloroniobium, *see* Nb-00011
- Bis(η^5 -2,4-cyclopentadien-1-yl)- μ -oxotetrakis(2,4-pentanedionato-*O,O'*)dihafnium, Hf-00047
- Bis(η^5 -2,4-cyclopentadien-1-yl)pentafluorophenyltitanium, Ti-00084
- Bis(η^5 -2,4-cyclopentadien-1-yl)(pentanedionato)vanadium(1+), V -00068
- Bis(η^5 -2,4-cyclopentadien-1-yl)[pentaselenidato(2-)]titanium, Ti-00034
- Bis(η^5 -2,4-cyclopentadien-1-yl)(pentathio)hafnium, Hf-00006
- Bis(η^5 -2,4-cyclopentadien-1-yl)(pentathio)titanium, Ti-00033
- Bis(η^5 -2,4-cyclopentadienyl)pentathiovanadium, V -00032
- Bis(η^5 -2,4-cyclopentadien-1-yl)(pentathio)zirconium, Zr-00010
- Bis(η -cyclopentadienyl)phenyl[bis(trimethylsilyl)methyl]zirconium, *see* Zr-00082
- Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-phenylenebis[methylene]]zirconium, Zr-00050
- Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-phenylenebis[(trimethylsilyl)methylene]]zirconium, Zr-00086
- Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-phenylenebis[(trimethylsilyl)methylene]]hafnium, Hf-00040
- Bis(η^5 -2,4-cyclopentadien-1-yl)(phenylethynyl)gadolinium, Gd-00006
- Bis(η^5 -2,4-cyclopentadien-1-yl)(phenylethynyl)titanium, *in* Ti-00145
- Bis(η^5 -2,4-cyclopentadien-1-yl)(phenylethynyl)ytterbium, Yb-00019

- Bis(η^5 -2,4-cyclopentadien-1-yl)phenylgadolinium, Gd-00005
 Bis(η^5 -2,4-cyclopentadien-1-yl)(phenylmethyl)lutetium, *see* Lu-00016
 Bis(η^5 -2,4-cyclopentadien-1-yl)(phenylmethyl)titanium, *see* Ti-00094
 Bis(η^5 -2,4-cyclopentadien-1-yl)(phenylmethyl)vanadium, *see* V-00079
 Bis(η^5 -2,4-cyclopentadien-1-yl)phenyltitanium, Ti-00089
 Bis(η^5 -2,4-cyclopentadien-1-yl)phenylvanadium, V-00073
 Bis(η^5 -2,4-cyclopentadien-1-yl)phenylytterbium, Yb-00015
 Bis(η^5 -2,4-cyclopentadien-1-yl)(2-propanone)vanadium(1+), V-00060
 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)molybdenum(1+), Mo-00077
 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)niobium, Nb-00029
 Bis(η^5 -2,4-cyclopentadien-1-yl)- η^1 -2-propenyl- η^3 -2-propenylzirconium, Zr-00044
 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)tantalum, Ta-00019
 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)tungsten(1+), W-00084
 Bis(2,4-cyclopentadien-1-yl)(η^1 -2-propenyl)vanadium, V-00059
 Bis(cyclopentadienyl)propyl(methyl isocyanide)tantalum, *see* Ta-00027
 Bis(cyclopentadienyl)rhenium hydride, *see* Re-00042
 Bis(η^5 -2,4-cyclopentadien-1-yl)samarium, Sm-00005
 Bis(cyclopentadienyl)technetium hydride, *see* Tc-00006
 ▶ Bis(η^5 -2,4-cyclopentadien-1-yl)[tetrahydroborato(1-)-H,H']niobium, Nb-00015
 Bis(η^5 -2,4-cyclopentadien-1-yl)[tetrahydroborato(1-)-H,H']titanium, Ti-00038
 ▶ Bis(η^5 -2,4-cyclopentadien-1-yl)[tetrahydroborato(1-)-H,H']vanadium, V-00034
 Bis(η^5 -2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)hafnium, Hf-00051
 Bis(η^5 -2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)titanium, Ti-00146
 Bis(η^5 -2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)vanadium, V-00119
 Bis(η^5 -2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)zirconium, Zr-00112
 1,1-Bis(η^5 -cyclopentadienyl)-2,3,4,5-tetraphenylhafnole, *see* Hf-00051
 Bis(η^5 -cyclopentadienyl)-2,3,4,5-tetraphenylitanacyclopentadiene, *see* Ti-00146
 Bis(η^5 -cyclopentadienyl)-2,3,4,5-tetraphenylitanole, *see* Ti-00146
 1,1-Bis(η^5 -cyclopentadienyl)-2,3,4,5-tetraphenylzirconole, *see* Zr-00112
 1,1-Bis(η^5 -cyclopentadienyl)titanacyclopentane, *see* Ti-00073
 ▶ Bis(η^5 -2,4-cyclopentadien-1-yl)titanium, *see* Ti-00035
 ▶ Bis(cyclopentadienyl)titanium dichloride, *see* Ti-00026
 Bis(η^5 -cyclopentadienyl)titanium tetrahydridoborate, *see* Ti-00038
 Bis(cyclopentadienyl)tribromoniobium, *see* Nb-00010
 Bis(cyclopentadienyl)tricarbyltungsten, *see* W-00107
 Bis(η^5 -cyclopentadienyl)trihydridotungsten(1+), *see* W-00056
 Bis(η^5 -2,4-cyclopentadien-1-yl)trihydroniobium, Nb-00014
 Bis(cyclopentadienyl)trihydrotantalum, Ta-00011
 Bis(η^5 -2,4-cyclopentadien-1-yl)trihydrotungsten(1+), W-00056
 Bis(η^5 -2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]erbium, Er-00010
 Bis(η^5 -2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]lutetium, Lu-00011
 Bis(η^5 -2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]samarium, Sm-00008
 Bis(η^5 -2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]-[triphenylphosphonium η -methylide]lutetium, Lu-00026
 Bis(η^5 -2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]ytterbium, Yb-00011
 Bis(η^5 -2,4-cyclopentadien-1-yl)trimethyltantalum, Ta-00022
 Bis(η^5 -cyclopentadienyl)trinitrosyldichromium, *see* Cr-00078
 Bis(η^5 -cyclopentadienyl)triphenylgermyltitanium, Ti-00133
 Bis(η^5 -cyclopentadienyl)triphenylstannyltitanium, Ti-00135
 Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2,3-triphenyltriphosphinato(2-)- P^1,P^3]titanium, Ti-00134
 Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2,3-triphenyltriphosphinato(2-)- P^1,P^3]zirconium, Zr-00100
 Bis(cyclopentadienyl)uranium bis(tetrahydroborate), *see* U-00009
 Bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V-00033
 Bis(cyclopentadienyl)vanadium bis(phenylsulfide), *see* V-00092
 ▶ Bis(cyclopentadienyl)vanadium borohydride, *see* V-00034
 Bis(cyclopentadienyl)vanadium(carbon disulfide), *see* V-00041
 Bis(cyclopentadienyl)vanadium carbonyl, *see* V-00040
 Bis(cyclopentadienyl)vanadium dicyanide, *see* V-00049
 Bis(cyclopentadienyl)vanadium iodide, *see* V-00031
 Bis(cyclopentadienyl)vanadium pentasulfide, *see* V-00032
 Bis(cyclopentadienyl)vanadium phenylsulfide, *see* V-00072
 Bis(η^5 -2,4-cyclopentadien-1-yl)ytterbium, Yb-00005
 2,2-Bis(η^5 -cyclopentadienyl)-2-zirconaindane, *see* Zr-00050
 ▶ Bis(cyclopentadienyl)zirconium chloride, *see* Zr-00007
 Bis(η^6 -decahydro-C,C'-dimethyldicarbododecaborato(2-))titanate(2-), Ti-00019
 4,4'-Bis(decahydro-1,6-dimethyl-1,6-dicarba-4-titanacloso-tridecaborate)(2-), *see* Ti-00019
 Bis[dichloro(η^5 -cyclopentadienyl)titanium]oxide, *see* Ti-00027
 1,1-Bis(diethylalumino)-2-[bis(η -cyclopentadienyl)-zirconio]ethane cyclopentadienide, *see* Zr-00088
 [2,2-Bis(diethylalumino)ethyl]tris(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00088
 Bis(diethylphenylphosphine)triphenylrhenium, Re-00086
 ▶ Bis(diethylthallium)chromate, *see* Cr-00050
 Bis(dimethylamido)bis(trimethylsilylmethyl)titanium, Ti-00062
 Bis(dimethylamido)dimethyltitanium, Ti-00013
 Bis(dimethylamido)(η^5 -methylcyclopentadienyl)phenylethynyltitanium, Ti-00099
 Bis(dimethylamido)titanocene, *see* Ti-00076
 Bis(dimethylamino)bis(pentamethylcyclopentadienyl)thorium, Th-00023
 Bis(dimethylamino)bis(pentamethylcyclopentadienyl)uranium, U-00055
 Bis[(dimethylamino)carbonyl-C,O]bis[(1,2,3,4,5- η -1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl)uranium, U-00060
 [Bis(dimethylamino)methylene]pentacarbonylchromium, Cr-00079
 Bis[μ -[[2-(dimethylamino)phenyl]methyl-C:C,N]] [[2-(dimethylamino)phenyl]methyl] [[2-(dimethylamino)phenyl]methyl-C,N]dimanganese, Mn-00137
 [1,2-Bis(dimethylarsino)benzene]tricarbyltrihydrovanadium, *see* V-00061
 Bis[μ -(3,3-dimethyl-1-butyn-1-yl)]tetrakis(1,2,3,4,5- η -1-methyl-2,4-cyclopentadien-1-yl)disamarium, Sm-00018
 Bis(1,1-dimethylethyl)bis[(1,2,3,3a,7a- η)-1H-inden-1-yl]uranium, *see* U-00058
 [2,6-Bis(1,1-dimethylethyl)-4-methylphenolato]bis(η^5 -2,4-cyclopentadien-1-yl)titanium, *see* Ti-00128
 [Bis(1,1-dimethylethyl)(pyridine)tin]pentacarbonylchromium, *see* Cr-00145
 [Bis(1,1-dimethylethyl)sulfurdiimide-N,N']tetracarbonylchromium, *see* Cr-00107
 Bis(η^5 -2,4-dimethyl-2,4-pentadien-1-yl)vanadium, V-00065
 [1,2-Bis(dimethylphosphino)ethane]bis(η^4 -1,3-butadiene)titanium, *see* Ti-00078
 Bis[(1,2-dimethylphosphino)ethane]dimethylmanganese, *see* Mn-00095
 Bis(2,2-dimethylpropylidene)(2,4,6-trimethylphenyl)-bis(trimethylphosphine)tantalum, Ta-00038
 Bis(dinitrogen)bis[1,2-bis(diphenylphosphino)ethane]molybdenum, Mo-00145
 Bis(dinitrogen)bis[1,2-bis(diphenylphosphino)ethane]tungsten, W-00156
 Bis(dinitrogen)bis[1,2-ethanediy]bis(diphenylphosphine)-P,P']molybdenum, *see* Mo-00145

- Bis(dinitrogen)bis[1,2-ethanediy]bis(diphenylphosphine)-*P,P'*]tungsten, *see* W -00156
- Bis(dinitrogen)bis[ethylenebis(diphenylphosphine)]molybdenum, *see* Mo-00145
- Bis(dinitrogen)bis[ethylenebis(diphenylphosphine)]tungsten, *see* W -00156
- [1,2-Bis(diphenylphosphine)ethane]tetracarbonylchromium, *see* Cr-00169
- [Bis(diphenylphosphino)ethane]bis(cyclopentadienyl)vanadium(1+), *see* V -00116
- [Bis(1,2-diphenylphosphino)ethane]bis(ethylene)molybdenum, *see* Mo-00146
- [1,2-Bis(diphenylphosphino)ethane](carbonothioyl)tricarbyltungsten, *see* W -00151
- [1,2-Bis(diphenylphosphino)ethane]tetracarbonylvanadate(1-), *see* V -00108
- [Bis(diphenylphosphino)ethane]tetracarbonylvanadium, *see* V -00109
- Bis(diphenylthallium)chromate, *see* Cr-00157
- Bis[1,2-ethanediy]bis[dimethylphosphine]-*P,P'*]bis(η^2 -ethene)hydroniobium, Nb-00032
- Bis[1,2-ethanediy]bis[dimethylphosphine]-*P,P'*]dimethylmanganese, Mn-00095
- Bis[1,2-ethanediy]bis[diethylphosphine]-*P,P'*]bis(η^2 -ethene)molybdenum, Mo-00146
- Bis[(1,2,3,4,5,6,7,8- η)-1-ethenyl-1,3,5,7-cyclooctatetraene]uranium, U -00033
- Bis[(1,2,3,4,5,6- η)ethylbenzene]chromium, Cr-00135
- Bis[(1,2,3,4,5,6- η)ethylbenzene]vanadium, V -00076
- Bis(*N*-ethylethanaminato)diferrocenyltitanium, *see* Ti-00138
- [Bis(ethylthio)methylene]pentacarbonylchromium, Cr-00077
- Bis[(4*a*,4*b*,8*a*,9*a*- η)-9*H*-fluoren-9-yl]dimethylzirconium, Zr-00096
- Bis(η^6 -fluorobenzene)chromium, Cr-00098
- Bis(fulvalene)divanadium, *see* V -00084
- Bis(fulvalene)divanadium(2+), *see* V -00085
- Bis[(1,2,3,3*a*,7*a*- η)-1*H*-inden-1-yl]dimethylhafnium, Hf-00028
- Bis[(1,2,3,3*a*,7*a*- η)-1*H*-inden-1-yl]dimethyluranium, U -00034
- Bis[(1,2,3,3*a*,7*a*- η)-1*H*-inden-1-yl]dimethylzirconium, Zr-00062
- Bis[(1,2,3,3*a*,7*a*- η)-1*H*-inden-1-yl]diphenyltitanium, Ti-00141
- Bisindenyltitanium dichloride, *see* Ti-00096
- Bis(η^6 -mesitylene)molybdenum, *see* Mo-00106
- Bis[(1,2,3,4,5,6- η)methylbenzene]bis(trimethylstannyl)hafnium, Hf-00029
- Bis[(1,2,3,4,5,6- η)methylbenzene]bis(trimethylstannyl)zirconium, Zr-00067
- Bis[(1,2,3,4,5,6- η)methylbenzene]chromium, Cr-00121
- Bis[(1,2,3,4,5,6- η)methylbenzene]molybdenum, Mo-00082
- Bis[(1,2,3,4,5,6- η)methylbenzene]titanium, Ti-00072
- Bis[(1,2,3,4,5,6- η)methylbenzene](trimethylphosphine)hafnium, Hf-00023
- Bis[(1,2,3,4,5,6- η)methylbenzene](trimethylphosphine)zirconium, Zr-00046
- Bis[(1,2,3,4,5,6- η)methylbenzene]tungsten, W -00094
- Bis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl](1,1-dimethylethyl)yttrium, *see* Y -00008
- Bis(η^5 -1-methyl-2,4-cyclopentadien-1-yl)vanadium, V -00054
- Bis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]ytterbium, Yb-00009
- [1,3-Bis(methylene)-1,4-butanediyl]bis(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00095
- Bis(*N*-methylmethanaminato)bis(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, *see* U -00055
- Bis(*N*-methylmethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, *see* Th-00023
- Bis(*N*-methylmethanaminato)bis[(trimethylsilyl)methyl]titanium, *see* Ti-00062
- Bis[μ -(2-methyl-2-phenylpropyl)]bis(2-methyl-2-phenylpropyl)dimanganese, Mn-00141
- Bis[μ -(2-methyl-2-propanaminato(2-))]bis[2-methyl-2-propanaminato(2-)]tetramethylditungsten, W -00131
- Bis[μ -(2-methyl-2-propanaminato(2-))]bis[2-methyl-2-propanaminato(2-)]tetramethyldimolybdenum, Mo-00117
- Bis(methyl)tetrakis(*N*-methylmethanaminato)ditungsten, *see* W -00120
- [Bis(methylthio)methylene]pentacarbonyltungsten, W -00025
- Bis[(1,2,3,4,4*a*,8*a*- η)naphthalene]chromium, Cr-00149
- Bis[(1,2,3,4,4*a*,8*a*- η)naphthalene]molybdenum, Mo-00114
- Bis(4-nitrobenzoato)titanocene, *see* Ti-00123
- Bisnitrosyl[methoxy(methylamino)methylene](η^5 -2,4-cyclopentadien-1-yl)chromium(1+), *see* Cr-00049
- Bis(pentacarbonylmanganese)dimethyllead, Mn-00078
- Bis(pentacarbonylrhenium)dimethyllead, Re-00051
- Bis(pentafluorophenyl)titanocene, *see* Ti-00115
- Bis(pentafluorophenyl)ytterbium, Yb-00007
- [Bis(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis(dimethylphosphino)methane]chloroytterbium, Yb-00028
- Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis(1*H*-pyrazolato-*N*¹,*N*²)uranium, U -00059
- Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadienyl]bis(pyridine)ytterbium, Yb-00031
- Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis[(trimethylsilyl)methyl]uranium, U -00068
- Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis[(trimethylsilyl)methyl]thorium, Th-00031
- Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]diethylcarbamodithioato-*S,S'*-ytterbium, Yb-00027
- Bis(η -pentamethylcyclopentadienyl)dimethylamidohydrozirconium, *see* Zr-00078
- Bis(η -pentamethylcyclopentadienyl)dimethylamido(iodo)zirconium, *see* Zr-00076
- 1,1-Bis(η^5 -pentamethylcyclopentadienyl)-2,4-dimethylene-1-zirconacyclopentane, *see* Zr-00095
- Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]diphenylzirconium, Zr-00107
- Bis(pentamethylcyclopentadienyl)europium, Eu-00005
- Bis(η^5 -pentamethylcyclopentadienyl)manganese, *see* Mn-00119
- Bis(pentamethylcyclopentadienyl)manganese(1+), *see* Mn-00120
- [Bis(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-2-pyridinyltitanium, Lu-00021
- Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]samarium, Sm-00012
- Bis(pentamethylcyclopentadienyl)thorium dichloride, *see* Th-00016
- Bis(pentamethylcyclopentadienyl)thorium dihydride, *see* Th-00017
- Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, Ti-00112
- Bis(pentamethylcyclopentadienyl)titanium dichloride, *see* Ti-00111
- Bis(pentamethylcyclopentadienyl)uranium dichloride, *see* U -00038
- Bis(pentamethylcyclopentadienyl)uranium dihydride, *see* U -00039
- Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]vanadium, V -00087
- Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbium, Yb-00024
- Bis[(1,2,3,4,5,6,7,8- η)-1-phenyl-1,3,5,7-cyclooctatetraene]uranium, U -00065
- Bis(phenylethynyl)ytterbium, Yb-00014
- Bis[(η^6 -phenyl)ferrocene]chromium, Cr-00173
- Bis[(η^6 -phenyl)ferrocene]chromium(1+), Cr-00174
- Bis[μ -(2-propanolato)]bis(2-propanolato)tetrakis(η^3 -2-propenyl)diuranium, U -00056
- Bis[μ -(1- η :2,3- η)-2-propenyl]bis(η^3 -2-propenyl)dimolybdenum, Mo-00072
- Bis(tetrahydrofuran)tris[(trimethylsilyl)methyl]erbium, *in* Er-00008
- Bis(tetrahydrofuran)tris[(trimethylsilyl)methyl]terbium, *in* Tb-00001
- Bis(tetrahydrofuran)tris[(trimethylsilyl)methyl]ytterbium, *in* Yb-00010
- Bis[(1,2,3,4,5,6,7,8- η)-1,3,5,7-tetramethyl-1,3,5,7-cyclooctatetraene]uranium, U -00053
- Bis[(1,2,3,4,5,6,7,8- η)-1,3,5,7-tetraphenyl-1,3,5,7-cyclooctatetraene]uranium, U -00081
- Bis(thiomethoxy)titanocene, *see* Ti-00059

- Bis(thiophenoxy)titanocene, *see* Ti-00117
 Bis(toluene)chromium, *see* Cr-00121
 Bis(η^6 -toluene)molybdenum, *see* Mo-00082
 Bis(η^6 -toluene)tungsten, *see* W -00094
 Bis(tricarbonyl(π -cyclopentadienyl)chromium], *see* Cr-00129
 ▶ Bis(tricarbonyl(η^5 -cyclopentadienyl)chromium]mercury, *see* Cr-00128
 Bis(tricarbonyl- π -cyclopentadienyl)molybdenum, *see* Mo-00093
 [Bis(trifluoromethyl)acetylene]carbonyl(η^5 -cyclopentadienyl)(trifluoromethanethiolato)molybdenum, *see* Mo-00046
 ▶ Bis(trifluoromethylethynyl)titanocene, *see* Ti-00085
 Bis[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]molybdenum, Mo-00106
 Bis[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]titanium, Ti-00100
 [Bis(2,4,6-trimethylphenyl)germylene]pentacarbonylchromium, Cr-00156
 Bis(trimethylphosphine)bis[μ -[(trimethylsilyl)methyl]]-bis[(trimethylsilyl)methyl]dichromium, Cr-00155
 Bis(trimethylphosphine)neopentylidenetrichlorotantalum, *see* Ta-00015
 Bis(trimethylsilyl)acetyl-*C, O*)bis(η^5 -2,4-cyclopentadien-1-yl)methylzirconium, Zr-00058
 Bis[(1,2,3,4,5- η)-1-(trimethylsilyl)-2,4-cyclopentadien-1-yl]ytterbium, Yb-00016
 [Bis(trimethylsilyl)methyl]bis(η^5 -2,4-cyclopentadien-1-yl)phenylzirconium, Zr-00082
 [Bis(trimethylsilyl)methyl]chlorobis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00047
 [Bis(trimethylsilyl)methyl]chlorobis[(1,2,3,4,5- η)-1-(1,1-dimethylethyl)-2,4-cyclopentadien-1-yl]zirconium, *see* Zr-00089
 [Bis(trimethylsilyl)methyl]chlorobis[(1,2,3,4,5- η)-1-(trimethylsilyl)-2,4-cyclopentadien-1-yl]zirconium, Zr-00083
 Bis[μ -[(trimethylsilyl)methylidyne]-tetrakis[(trimethylsilyl)methyl]ditungsten, W -00144
 Bis(trimethylsilylmethyl)titanocene, *see* Ti-00101
 Bis(triphenylgermyl)titanocene, *see* Ti-00150
 Bis(triphenylphosphine)iminium methylpentacarbonylchromate, *in* Cr-00024
 Bis(triphenylphosphine)iminium methylpentacarbonyltungstate, *in* W -00009
 Bis(triphenylstannyl)titanocene, *see* Ti-00152
 1,1'-Bis[tris(diethylamino)titanium]ferrocene, *see* Ti-00143
 1,1'-Bis[tris(diethylamino)titanium]ruthenocene, *see* Ti-00144
 ▶ 1,1";1,1"-Bivanadocene, V -00084
 1,1":1',1"-Bivanadocenium(2+), V -00085
 Bromobis(η^5 -2,4-cyclopentadien-1-yl)-(dimethylphenylphosphine)niobium, Nb-00036
 Bromobis(cyclopentadienyl)titanium, Ti-00023
 Bromobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00026
 Bromocarbonyltetrakis(isocyanomethane)manganese, Mn-00051
 Bromocarbonyltetrakis(methyl isocyanide)manganese, *see* Mn-00051
 Bromocarbonyltetrakis(trimethylphosphite-*P*)manganese, Mn-00089
 Bromodicarbonyltris(trimethylphosphine)rhenium, Re-00047
 Bromodicarbonyltris(trimethylphosphite-*P*)manganese, Mn-00071
 μ -Bromooctacarbonyl[μ -(phenylmethylidyne)dirhenium, Re-00069
 Bromopentacarbonylchromate(1-), Cr-00005
 Bromopentacarbonylmanganese, Mn-00009
 Bromopentacarbonylrhenium, Re-00006
 Bromopentacarbonyltechnetium, Tc-00001
 Bromotetracarbonyl[(diethylamino)methylidyne]chromium, Cr-00062
 Bromotetracarbonyl[(diethylamino)methylidyne]tungsten, W -00037
 Bromotetracarbonylhydridynetungsten, W -00005
 Bromotetracarbonyl(ferrocenylmethylidyne)tungsten, W -00099
 Bromotetracarbonyl(ferrocenylmethylidyne)chromium, Cr-00124
 Bromotetracarbonyl(ferrocenylmethylidyne)molybdenum, Mo-00085
 Bromotetracarbonyl(ferrocenylmethylidyne)tungsten, *see* W -00099
 Bromotetracarbonylmanganese, *in* Mn-00027
 Bromotetracarbonyl[(4-methylphenyl)methylidyne]chromium, Cr-00095
 Bromotetracarbonylphenylcarbynetungsten, *see* W -00057
 Bromotetracarbonyl(phenylmethylidyne)chromium, Cr-00084
 Bromotetracarbonyl(phenylmethylidyne)tungsten, W -00057
 Bromotetracarbonyl(ruthenocenylmethylidyne)tungsten, W -00100
 Bromotetracarbonyltriphenylsilylcarbynetungsten, *see* W -00137
 Bromotetracarbonyl[(triphenylsilyl)methylidyne]tungsten, W -00137
 Bromotricarbonylbis(trimethylphosphite-*P*)manganese, Mn-00053
 Bromotricarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum, Mo-00011
 Bromotricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00018
 Bromotris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00004
 Bromotris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00012
 Bromotris(η^3 -2-propenyl)uranium, U -00005
 (η^4 -1,3-Butadiene)bis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00033
 (η^4 -1,3-Butadiene)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+), Mo-00055
 (η^4 -1,3-Butadiene)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00042
 (η^4 -1,3-Butadiene)dicarbonyl[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]molybdenum(1+), Mo-00089
 (1,4-Butanediyl)bis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00073
 Butoxytris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00011
 Butoxytris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00027
tert-Butylbis(η^5 -cyclopentadienyl)erbium, Er-00009
 Butylbis(η^5 -2,4-cyclopentadien-1-yl)lutetium, Lu-00009
tert-Butylbis(η^5 -cyclopentadienyl)lutetium, Lu-00010
tert-Butylbis(methylcyclopentadienyl)yttrium, Y -00008
 (1-*tert*-Butyl-2,2-dimethylpropylideniminato)chlorodi- π -cyclopentadienyltitanium, Ti-00103
sec-Butyltricyclopentadienyluranium, *see* U -00030
tert-Butyltricyclopentadienyluranium, U -00028
 Butyltris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00012
 Butyltris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00029
 Butyltris[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]thorium, Th-00035
 [(2,3- η)-2-Butyne][(1,2,3,3a,7a- η)-1*H*-inden-1-yl]-bis(trimethylphosphine)molybdenum(1+), Mo-00109
 [(2,3- η)-2-Butyne][(1,2,3,3a,7a- η)-1*H*-inden-1-yl]-bis(trimethylphosphite)molybdenum(1+), Mo-00108
 [η -[(2,3- η)-2-Butyne]]tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)dimolybdenum, Mo-00105
 [(*C,S*- η)-Carbon disulfide]bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00041
 (Carbonoselenoyl)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)manganese, Mn-00032
 (Carbonoselenoyl)pentacarbonylchromium, Cr-00019
 Carbonothioyl(η^5 -2,4-cyclopentadien-1-yl)-bis(trimethylphosphite-*P*)manganese, Mn-00084
 Carbonothioyl(dicarbonyl)(η^6 -benzene)chromium, *see* Cr-00056
 (Carbonothioyl)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)iodotungsten, W -00020
 (Carbonothioyl)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)manganese, Mn-00031
 (Carbonothioyl)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungstate(1-), W -00022
 (Carbonothioyl)pentacarbonylchromium, Cr-00018
 (Carbonothioyl)pentacarbonyltungsten, W -00013
 (Carbonothioyl)tricarboyl[1,2-ethanediyl]bis[diphenylphosphine]-*P, P'*]tungsten, W -00151
 [μ -(Carbonyl-*C, O*)]bis(η^5 -2,4-cyclopentadien-1-yl)-[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)]tungsten]ytterbium, W -00118
 [μ -(Carbonyl-*C, O*)]bis(η^5 -2,4-cyclopentadien-1-yl)-[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)]tungsten]erbium, W -00117

- Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)hydroniobium, Nb-00018
 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)hydrotantalum, Ta-00014
 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)iodovanadium, V -00039
 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)methylniobium, Nb-00026
 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)molybdenum, Mo-00050
 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)(phosphorous trifluoride)hafnium, Hf-00010
 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)(pyridine)vanadium(1+), V -00071
 Carbonylbis(cyclopentadienyl)trifluorophosphinehafnium, *see* Hf-00010
 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)-(trimethylphosphine)titanium, Ti-00074
 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00062
 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00040
 [μ -(Carbonyl-C,O)]bis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl][tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten]holmium, W -00129
 [μ -(Carbonyl-C,O)]bis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl][tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten]dysprosium, W -00128
 [μ -(Carbonyl-C,O)]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](tricarbonylcobalt)ytterbium, Yb-00026
 μ -Carbonylcarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(nitrosyl-N:N)]nitrosyldimanganese, Mn-00081
 Carbonylchlorobis(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00017
 Carbonylchlorobis(η^5 -2,4-cyclopentadien-1-yl)tantalum, Ta-00013
 Carbonylchlorobis[1,2-ethanediy]bis(diphenylphosphine-P,P')rhenium(1+), Re-00092
 Carbonylchloro(η^5 -2,4-cyclopentadien-1-yl)-(diphenylacetylene)molybdenum, Mo-00113
 Carbonylchloro(η^5 -2,4-cyclopentadien-1-yl)[1,1'-(η^2 -1,2-ethynediyl)]bis[benzene]molybdenum, *see* Mo-00113
 Carbonylchlorotetrakis(dimethylphenylphosphine)rhenium, Re-00084
 Carbonyl(η^7 -cycloheptatrienyl)iodo(triethyl phosphite)tungsten, W -00097
 Carbonyl(η^5 -cyclopentadienyl)bis(diphenylacetylene)molybdenum(1+), Mo-00140
 Carbonyl- η^5 -2,4-cyclopentadien-1-ylbis(diphenylacetylene)niobium, Nb-00048
 Carbonyl- η^5 -2,4-cyclopentadien-1-ylbis(diphenylacetylene)vanadium, V -00113
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)bis[1,1'-(η^2 -1,2-ethynediyl)]bis[benzene]molybdenum(1+), *see* Mo-00140
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)[(1,2,3,6,7- η)-4,5-dihydro-1-phenyl-1*H*-borepin]manganese, Mn-00113
 Carbonyl(η^5 -cyclopentadienyl)(dimethylacetylene)tungsten, *see* W -00095
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)dinitrosyltungsten(1+), W -00010
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)dinitrosylvanadium, V -00010
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethanediy]bis(dimethylphosphine)-P,P'[(4-methylphenyl)-oxoethenyl]tungsten, W -00135
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)nitrosylchromium, Cr-00046
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethyne)methyltungsten, W -00038
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)formyl(nitrosyl)rhenium, Re-00025
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne](trifluoromethanethiolato)molybdenum, Mo-00046
 Carbonyl(η^5 -cyclopentadienyl)hydridonitrosylrhenium, *see* Re-00015
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)hydronitrosylrhenium, Re-00015
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)(hydroxymethyl)nitrosylrhenium, Re-00030
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)iodo[(1,2,3,4- η)-1,2,3,4-tetrakis(trifluoromethyl)cyclobutadiene]molybdenum, Mo-00078
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)methylnitrosylrhenium, Re-00029
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)[(1,2- η)(4-methylphenyl)oxoethenyl](trimethylphosphine)tungsten, W -00119
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosyl(1,2- η -1-propene)molybdenum, Mo-00031
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosyl(η^3 -2-propenyl)molybdenum(1+), Mo-00027
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-nitrosyl(triphenylphosphine)manganese, Mn-00132
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-nitrosyl(triphenylphosphine)tungsten, W -00140
 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^5 -1-phenyl-2,4-cyclopentadien-1-yl)vanadium, V -00078
 Carbonylhydrotetrakis(trimethylphosphite-P)manganese, Mn-00090
 Carbonylido(triethyl phosphite)(tropylium)tungsten, *see* W -00097
 (μ -Carbonyl)(μ -methylene)[(cyclopentadienylcarbonyliron)tetracarboxymanganese], *see* Mn-00079
 Carbonylnitrosyl(η^5 -cyclopentadienyl)(η^2 -ethylene)chromium, *see* Cr-00046
 Carbonylnitrosyl(triphenylphosphine)(η^5 -cyclopentadienyl)manganese(1+), *see* Mn-00132
 μ -Carbonyloctacarbonyldirhenium(2-), Re-00040
 μ -Carbonylpentacarbonyl(η^5 -2,4-cyclopentadienyl)iron- μ -methylene-manganese, Mn-00079
 Carbonylpentakis(isocyanomethane)manganese(1+), Mn-00068
 Carbonylpentakis(methyl isocyanide)manganese(1+), *see* Mn-00068
 Carbonylpentakis(trimethylphosphite-P)chromium, Cr-00139
 μ -Carbonyltetracarboxylbis[μ -methylenebis(diphenylphosphine)-P,P']dimanganese, Mn-00145
 μ -Carbonyltricarboxylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -[1,1'-(η^2 -1,2-ethynediyl)]bisbenzene]dimolybdenum, Mo-00133
 Carbonyltrichlorotris(dimethylphenylphosphine)technetium, Tc-00010
 Carbonyltrinitrosylmanganese, Mn-00001
 Carbonyltris(diethylcarbamo-dithioato-S,S')rhenium, Re-00072
 Carbonyltris(diphenylacetylene)tungsten, W -00155
 Carbonyltris(3-hexyne)tungsten, W -00124
 [μ -(Carbonyl-C,O)]tris[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl][dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)iron]samarium, Sm-00016
 [μ -(Carbonyl-C,O)]tris[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl](tetracarboxylcobalt)samarium, Sm-00014
 (Carboxycyclopentadienyl)tricarbonylmanganese, *see* Mn-00044
 (η^6 -Chlorobenzene)tricarbonylchromium, *see* Cr-00052
 (Chlorobenzene)tricarbonylmanganese(I), Mn-00042
 μ -Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-bis(diethylaluminum)- μ -1-ethanyl-2-ylideneczirconium, Zr-00066
 Chlorobis(η -cyclopentadienyl)[bis(trifluoromethyl)-ketimido]titanium, *see* Ti-00063
 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)cerium dimer, *see* Ce-00007
 Chlorobis(η^5 -cyclopentadienyl)di-*tert*-butylketimidotitanium, *see* Ti-00103
 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)[1-(dimethylaluminum)-2-methyl-1-pentenyl]zirconium, Zr-00052
 Chlorobis(η -cyclopentadienyl)(1-dimethylaluminum-2-methyl-2-propylethenyl)zirconium, *see* Zr-00052
 μ -Chlorobis(η^5 -cyclopentadienyl)(dimethylaluminum)- μ -methylene-titanium, Ti-00066
 Chlorobis(η^5 -cyclopentadienyl)(2,2-dimethyl-1-phenylethenyl)titanium, Ti-00109
 Chlorobis(η -cyclopentadienyl)(2,2-dimethyl-1-phenylethenyl)zirconium, *see* Zr-00063
 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)titanium, Ti-00082

- Chlorobis(η^5 -cyclopentadienyl)(diphenylketimido)titanium, *see* Ti-00121
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)[(diphenylphosphino)methyl]zirconium, Zr-00081
- Chlorobis(η^5 -2,4-cyclopentadienyl)dysprosium, Dy-00002
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)erbium, Er-00004
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)ethenyltitanium, Ti-00057
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)gadolinium, Gd-00002
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)holmium, Ho-00002
- Chlorobis(η -cyclopentadienyl)hydridohafnium, *see* Hf-00007
- Chlorobis(η -cyclopentadienyl)hydrido-zirconium, *see* Zr-00011
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)hydrohafnium, Hf-00007
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)hydrozirconium, Zr-00011
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)lutetium, Lu-00004
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)[μ_4 -[methanolato(4-)-C:C:C:O]](nonacarbonyltricalcobalt)dihafnium, Hf-00026
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)[μ_4 -[methanolato(4-)-C:C:C:O]](nonacarbonyltricalcobalt)zirconium, Zr-00060
- Chlorobis(η -cyclopentadienyl)methoxyzirconium, Zr-00016
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)methylniobium, Nb-00019
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(2-methyl-1-phenyl-1-propenyl)zirconium, Zr-00063
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)methyltitanium, Ti-00045
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)methylvanadium, V -00046
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)neodymium dimer, *see* Nd-00007
- Chlorobis(η^5 -cyclopentadienyl)neopentyltitanium, *see* Ti-00082
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)oxoniobium, Nb-00011
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)oxovanadium, V -00028
- Chlorobis(η^5 -cyclopentadienyl)[μ_3 -(oxymethylidyne)-cyclotris(tricarbonylcobalt)hafnium, *see* Hf-00026
- Chlorobis(η^5 -cyclopentadienyl)[μ_3 -(oxymethylidyne)-cyclotris(tricarbonylcobalt)]zirconium, *see* Zr-00060
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)phenyltitanium, Ti-00088
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)praesodymium dimer, *see* Pr-00005
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)samarium, Sm-00004
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)scandium, Sc-00001
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)thulium, Tm-00002
- Chlorobis(cyclopentadienyl)titanium, Ti-00025
- Chlorobis(cyclopentadienyl)[trihydro(triethylamino)-aluminum]yttrium, Y -00009
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]hafnium, Hf-00017
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]zirconium, Zr-00035
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(trimethylsilyl)titanium, Ti-00067
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(trimethylsilyl)zirconium, Zr-00030
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylgermyl)hafnium, Hf-00041
- Chlorobis(η^5 -cyclopentadienyl)(triphenylgermyl)titanium, Ti-00131
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylgermyl)zirconium, Zr-00097
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-(triphenylphosphonium η -methylide)lutetium, Lu-00022
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylsilyl)hafnium, Hf-00042
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylsilyl)zirconium, Zr-00098
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylstannyl)hafnium, Hf-00043
- Chlorobis(η^5 -cyclopentadienyl)(triphenylstannyl)titanium, Ti-00132
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylstannyl)zirconium, Zr-00099
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00029
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)ytterbium, Yb-00004
- Chlorobis(η^5 -2,4-cyclopentadien-1-yl)yttrium, Y -00002
- μ -Chloro-1-[bis(η -cyclopentadienylzirconio)]-2,2-bis(diethylalumino)ethane, *see* Zr-00066
- Chlorobis[1,2-ethanediybis(dimethylphosphine)-*P,P'*](η^4 -naphthalene)tantalum, Ta-00036
- Chlorobis(η^5 -methylcyclopentadienyl)erbium, Er-00007
- Chlorobis(η^5 -methylcyclopentadienyl)gadolinium, Gd-00003
- Chlorobis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]samarium, Sm-00006
- Chlorobis(η^5 -methylcyclopentadienyl)ytterbium, Yb-00008
- Chlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](1*H*-pyrazolato-*N*¹,*N*²)uranium, U -00049
- Chlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl][1-(trimethylsilyl)ethenolato]thorium, Th-00025
- Chlorobis(pentamethylcyclopentadienyl)uranium, U -00037
- Chlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbium, Yb-00021
- Chlorobis(1-phenyl-1-propyne)(η^5 -cyclopentadienyl)molybdenum, Mo-00121
- Chloro[bis(trifluoromethyl)ketimido]titanocene, *see* Ti-00063
- Chlorobis[η -(trimethylsilyl)cyclopentadienyl]-bis(trimethylsilyl)methylzirconium, *see* Zr-00083
- μ -Chloro- μ_3 -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)-trihydro[1,1'-oxybis(ethane)]aluminumdiyttrium, Y -00014
- Chloro(cyclooctatetraene)cerium, Ce-00001
- Chloro[η^8 -1,3,5,7-cyclooctatetraene](η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00027
- Chloro(cyclooctatetraene)neodymium, Nd-00002
- Chloro(cyclooctatetraene)praesodymium, Pr-00002
- Chloro(cyclooctatetraene)samarium, Sm-00003
- Chloro-2,4-cyclopentadien-1-ylbis(η^5 -2,4-cyclopentadien-1-yl)zirconium, *see* Zr-00039
- Chloro(η^5 -2,4-cyclopentadien-1-yl)bis[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne]molybdenum, Mo-00073
- Chloro(η^5 -2,4-cyclopentadien-1-yl)bis[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne](trimethylphosphine)molybdenum, Mo-00094
- Chloro(η^5 -2,4-cyclopentadien-1-yl)bis[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne]tungsten, W -00080
- Chloro- π -cyclopentadienylbis(2,4-pentanedionato)hafnium, Hf-00020
- Chloro(η^5 -2,4-cyclopentadien-1-yl)bis(2,4-pentanedionato-*O,O'*)zirconium, Zr-00040
- Chloro(η^5 -2,4-cyclopentadien-1-yl)bis[(1,2- η)-1-propynyl]-benzene]molybdenum, *see* Mo-00121
- Chloro- π -cyclopentadienylbis(8-quinolinolato)hafnium, Hf-00037
- Chloro(η^5 -cyclopentadienyl)bis(8-quinolinolato)zirconium, Zr-00079
- Chloro(η^5 -2,4-cyclopentadien-1-yl)dinitrosylchromium, Cr-00015
- Chloro(η^5 -2,4-cyclopentadien-1-yl)dinitrosylmolybdenum, Mo-00002
- Chloro(η^5 -cyclopentadien-1-yl)dinitrosyltungsten, W -00003
- Chloro(cyclopentadienyl)hafnium bisoxinate, *see* Hf-00037
- Chloro(η^5 -2,4-cyclopentadien-1-yl)trimethyltantalum, Ta-00007
- Chloro- π -cyclopentadienylvinyltitanium, *see* Ti-00057
- Chlorodicarbonyl(triphenylphosphine)(η^5 -cyclopentadienyl)molybdenum, *see* Mo-00127
- Chlorodi- π -cyclopentadienyl(1,1-diphenylmethyleniminato)titanium, Ti-00121
- Chlorodicyclopentadienylgadolinium, *see* Gd-00002
- Chlorodicyclopentadienylholmium, *see* Ho-00002
- Chlorodicyclopentadienyl lutetium, *see* Lu-00004
- Chlorodi- π -cyclopentadienylmethoxyzirconium, *see* Zr-00016
- Chlorodicyclopentadienylsamarium, *see* Sm-00004
- Chlorodicyclopentadienylscandium, *see* Sc-00001
- Chlorodicyclopentadienylthulium, *see* Tm-00002
- Chlorodi- π -cyclopentadienyl[2,2,2-trifluoro-1-(trifluoromethyl)ethylideniminato]titanium, Ti-00063
- Chlorodicyclopentadienylytterbium, *see* Yb-00004
- Chlorodicyclopentadienyl yttrium, *see* Y -00002
- Chloro(diethylamino)bis(pentamethylcyclopentadienyl)thorium, Th-00022

- Chloro(diethylamino)bis(pentamethylcyclopentadienyl)uranium, U -00054
- Chloro[(diethylamino)carbonyl-*C,O*]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00024
- Chloro(dimethylamino)bis(pentamethylcyclopentadienyl)thorium, Th-00019
- Chloro(3,3-dimethyl-1-oxobutyl-*C,O*)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00027
- Chloro(2,2-dimethylpropyl)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00026
- Chloro(diphenylketimido)titanocene, *see* Ti-00121
- Chloro(*N*-ethylethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, *see* Th-00022
- Chloro(*N*-ethylethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, *see* U -00054
- μ -Chlorohexakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -hydro- μ_3 -hydrotrierbate(1-), Er-00017
- Chloro[1-hydroxy-4,4-dimethyl-1-(trimethylphosphoranylidene)-2-pentanonato-*O,O'*]-bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00034
- Chloro(methyl)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00018
- Chloro(methyl)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U -00042
- Chloro(1-methyl-2,4-cyclopentadien-1-yl)bis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]zirconium, *see* Zr-00051
- Chloromethylidynetetrakis(trimethylphosphine)tungsten, W -00088
- Chloro(*N*-methylmethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, *see* Th-00019
- Chloro(methyl)titanocene, *see* Ti-00045
- Chloro(neopentyl)titanocene, *see* Ti-00082
- Chloropentacarbonylmanganese, *see* Mn-00010
- Chloropentacarbonylrhenium, *see* Re-00007
- Chloropentacarbonyltechnetium, *see* Tc-00002
- Chloro(phenyl)titanocene, *see* Ti-00088
- Chloro[1,3-propanediylbis(η^5 -2,4-cyclopentadien-1-ylidene)]-cerium, Ce-00002
- Chloro[1,3-propanediylbis(η^5 -2,4-cyclopentadien-1-ylidene)]-lanthanum, La-00003
- Chlorotetracarbonylmanganese, *in* Mn-00028
- Chlorotetracarbonylphenylcarbynetungsten, *see* W -00058
- Chlorotetrakis(phenylmethyl)tantalum, *see* Ta-00039
- Chlorotricarbonyl(η^5 -cyclopentadienyl)molybdenum, *see* Mo-00012
- Chlorotricarbonyl(η^5 -cyclopentadienyl)tungsten, *see* W -00019
- Chlorotri- π -cyclopentadienyluranium, *see* U -00013
- Chlorotri- π -indenyluranium, *see* U -00062
- Chloro(trimethylsilyl)titanocene, *see* Ti-00067
- Chloro(triphenylgermyl)titanocene, *see* Ti-00131
- Chloro(triphenylstannyl)titanocene, *see* Ti-00132
- Chlorotris(benzylcyclopentadienyl)uranium, U -00075
- Chlorotris[bis(trimethylsilyl)methyl]hafnium, *see* Hf-00032
- Chlorotris[bis(trimethylsilyl)methyl]zirconium, *see* Zr-00070
- Chlorotris(η^5 -2,4-cyclopentadien-1-yl)cerium, Ce-00004
- Chlorotris(η^5 -2,4-cyclopentadien-1-yl)neptunium, Np-00001
- Chlorotris(η^5 -2,4-cyclopentadien-1-yl)plutonium, Pu-00001
- Chlorotris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00005
- Chlorotris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00013
- Chlorotris(η -cyclopentadienyl)zirconium, Zr-00039
- Chlorotris[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]thorium, Th-00028
- Chlorotris[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]uranium, U -00062
- Chlorotris(η -methylcyclopentadienyl)zirconium, Zr-00051
- Chlorotris[(1,2,3,4,5- η)-1-phenylmethyl-2,4-cyclopentadien-1-yl]uranium, *see* U -00075
- Chlorotris(η^3 -2-propenyl)uranium, U -00006
- Chlorotris[(1,2,3,3a,7a- η)-1,4,7-trimethyl-1*H*-inden-1-yl]thorium, Th-00037
- Chlorotris[(1,2,3,3a,7a- η)-1,4,7-trimethyl-1*H*-inden-1-yl]uranium, U -00076
- Chloro(vinyl)titanocene, *see* Ti-00057
- (Chromato-*O*)bis(diethylthallium), Cr-00050
- μ -(Chromato-*O,O'*)tetraphenyldithallium, Cr-00157
- Chromium carbonyl, Cr-00020
- Chromium hexacarbonyl, *see* Cr-00020
- Chromium triallyl, *see* Cr-00064
- Chromocene, Cr-00075
- (Cyanomethyl)bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)tungsten(1+), W -00092
- (Cyano-*C*)tris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00018
- [(1,2,3,4,5,6- η)-1,3,5-Cycloheptatriene](η^5 -2,4-cyclopentadien-1-yl)manganese, Mn-00083
- (η^6 -1,3,5-Cycloheptatriene)tricarbonylmolybdenum, *see* Mo-00033
- π -Cycloheptatrienyl- π -cyclopentadienylchromium, *see* Cr-00102
- (Cycloheptatrienyl)(cyclopentadienyl)niobium, *see* Nb-00025
- π -Cycloheptatrienyl- π -cyclopentadienyltitanium, *see* Ti-00055
- (η^7 -Cycloheptatrienyl)(η^5 -2,4-cyclopentadien-1-yl)chromium, Cr-00102
- (η^7 -Cycloheptatrienyl)(η^5 -2,4-cyclopentadien-1-yl)manganese(1+), Mn-00082
- (η^7 -Cycloheptatrienyl)(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00025
- (η^7 -Cycloheptatrienyl)(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00055
- (η^7 -Cycloheptatrienyl)(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00052
- μ -[(1,2,3- η :4,5,6,7- η)-Cycloheptatrienyl]tricarbonylirontricarbonylmanganese, *see* Mn-00087
- Cycloheptatrienyltricarbonylvanadium, *see* V -00023
- Cyclohexadienyltricarbonylmanganese, *see* Mn-00047
- $[\mu$ -[(1,2- η :1,2,3,4,5,6,7,8- η)-1,3,5,7-Cyclooctatetraene]-bis(η^8 -1,3,5,7-cyclooctatetraene)]bis(tetrahydrofuran)dineodymium, Nd-00012
- $[\mu$ -[(1,2,3,4- η :5,6,7,8- η)-1,3,5,7-Cyclooctatetraene]-bis(1,2,3,4- η)-1,3,5,7-cyclooctatetraene]dichromium, Cr-00159
- $[\mu$ -[(1,2,3,4- η :5,6,7,8- η)-1,3,5,7-cyclooctatetraene]-bis[(1,2,3,4- η)-1,3,5,7-cyclooctatetraene]dimolybdenum, Mo-00123
- $[\mu$ -[(1,2,3,4- η :5,6,7,8- η)-1,3,5,7-cyclooctatetraene]-bis[(1,2,3,4- η)-1,3,5,7-cyclooctatetraene]ditungsten, W -00142
- (η^8 -1,3,5,7-Cyclooctatetraene)bis(η^3 -2-propenyl)hafnium, Hf-00016
- (η^8 -1,3,5,7-Cyclooctatetraene)bis(η^3 -2-propenyl)zirconium, Zr-00034
- (η^8 -1,3,5,7-Cyclooctatetraene)bis(tetrahydrofuran)lanthanum, *in* La-00001
- (η^8 -1,3,5,7-Cyclooctatetraene)chloroerbio, Er-00003
- (η^8 -1,3,5,7-Cyclooctatetraene)chlorolanthanum, La-00001
- (η^8 -1,3,5,7-Cyclooctatetraene)chlorolutetium, Lu-00003
- (η^8 -1,3,5,7-Cyclooctatetraene)chloro(tetrahydrofuran)erbium, *in* Er-00003
- (η^8 -1,3,5,7-Cyclooctatetraene)chloro(tetrahydrofuran)lutetium, *in* Lu-00003
- $[\eta$ -Cyclooctatetraene(2-)](η^4 -cyclooctatetraene)titanium, *see* Ti-00090
- (η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+), Mo-00076
- (η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)neodymium, Nd-00003
- (η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)samarium, Sm-00007
- (η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)scandium, Sc-00003
- (η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00064
- (η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)yttrium, Y -00004

- (η-Cyclooctatetraene(2-))dihydrozirconium, *see* Zr-00005
 (η⁸-1,3,5,7-cyclooctatetraene)dihydrozirconium, Zr-00005
 η⁸-1,3,5,7-Cyclooctatetraeneeuropium, Eu-00002
 (η⁸-1,3,5,7-Cyclooctatetraene)(trimethylsilylmethyl)-bis(tetrahydrofuran)lutetium, *in* Lu-00007
 (η⁸-1,3,5,7-Cyclooctatetraene)(trimethylsilylmethyl)lutetium, Lu-00007
 (η⁸-1,3,5,7-Cyclooctatetraene)ytterbium, Yb-00003
 Cyclooctatetraenylbis(tetrahydrofuran)-neodymiumbis(cyclooctatetraenyl)neodymate, *see* Nd-00012
 (η⁸-1,3,5,7-Cyclooctatetraenyl)(η⁵-2,4-cyclopentadien-1-yl)holmium, Ho-00004
 Cyclopentadienyl(benzene)vanadium, *see* V -00043
 Cyclopentadienylbis[bis(dimethylphosphino)ethane]niobium, *see* Nb-00035
 [(1,2-η)-2,4-cyclopentadien-1-yl]bis(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00079
 Cyclopentadienylbis(dimethylamido)titanium, Ti-00022
 (η⁵-2,4-Cyclopentadien-1-yl)bis(2,2-dimethylpropyl)zirconium, Zr-00042
 (η⁵-2,4-Cyclopentadien-1-yl)bis[1,2-ethanediylbis(dimethylphosphine)-P,P']niobium, Nb-00035
 (η⁵-2,4-Cyclopentadien-1-yl)bis[(2,3-η)-1,1,1,4,4,4-hexafluoro-2-butyl]iodomolybdenum, Mo-00074
 (η-Cyclopentadienyl)bis[μ₃-(oxymethyldiyl)-cyclotris(tricarbonylcobalt)](tetracarbonylcobaltio)titanium, *see* Ti-00140
 η⁵-2,4-Cyclopentadien-1-ylbis(2,4-pentanedionato-O,O')phenoxy-hafnium, Hf-00031
 π-Cyclopentadienylbis(2,4-pentanedionato)phenoxyzirconium, Zr-00069
 (η⁵-2,4-Cyclopentadien-1-yl)bis(phenylmethyl)zirconium, *see* Zr-00057
 (η⁵-Cyclopentadienyl)bis(trimethylsilylmethyl)zirconium, Zr-00031
 Cyclopentadienylcarbonyldinitrosylvanadium, *see* V -00010
 Cyclopentadienylcarbonyl(diphenylacetylene)-(tetraphenylcyclobutadiene)niobium, Nb-00051
 (η⁵-2,4-Cyclopentadien-1-yl)[μ-(η⁵-2,4-cyclopentadien-1-ylidene)]hydrotetracarbonylmanganeserhenium, Re-00065
 Cyclopentadienyldicarbonyl(η⁴-1,3-butadiene)vanadium, *see* V -00042
 (η⁵-Cyclopentadienyl)dicarbonylironpentacarbonylmanganese, *see* Mn-00075
 Cyclopentadienyldicarbonylnitrosylchromium, *see* Cr-00032
 (η⁵-Cyclopentadienyl)dicarbonylrutheniumpentacarbonylrhenium, *see* Re-00048
 Cyclopentadienyldichlorobis(trimethylphosphine)vanadium, *see* V -00048
 (η⁵-2,4-Cyclopentadien-1-yl)diethoxymethyltitanium, Ti-00041
 Cyclopentadienyldiethoxytitanium, Ti-00021
 π-Cyclopentadienyl(diethyldithiocarbamate)nitrosylmanganese, Mn-00061
 π-Cyclopentadienyl[dimercaptomaleonitrilato(2-)]nitrosylmanganate(1-), Mn-00043
 (η-Cyclopentadienyl)dineopentylzirconium, *see* Zr-00042
 Cyclopentadienyldinitrosylchlorochromium, *see* Cr-00015
 (η⁵-2,4-Cyclopentadien-1-yl)dioxovanadium, V -00007
 (η⁵-2,4-Cyclopentadien-1-yl)[(1,2-η)-1,2-diphenylethenyl]-bis(trimethylphosphite-P)molybdenum, Mo-00129
 Cyclopentadienyldysprosium dichloride, *see* Dy-00001
 Cyclopentadienylerbium dichloride, *see* Er-00001
 Cyclopentadienyleuropium dichloride, *see* Eu-00001
 π-Cyclopentadienyl-σ-ferrocenonyltungsten tricarbonyl, *see* W -00121
 π-Cyclopentadienyl-σ-ferrocenonyltungsten tricarbonyl, *see* W -00113
 Cyclopentadienylgadolinium dichloride, *see* Gd-00001
 Cyclopentadienylholmium dichloride, *see* Ho-00001
 Cyclopentadienylhydridotricarbonylchromium, *see* Cr-00041
 (η⁵-2,4-Cyclopentadien-1-yl)iodonitrosyl(η³-2-propenyl)molybdenum, Mo-00019
 (η⁵-2,4-Cyclopentadien-1-yl)iodonitrosyl(η³-2-propenyl)tungsten, W -00026
 (η⁵-2,4-Cyclopentadien-1-yl)-iodonitrosyl(triphenylphosphine)manganese, Mn-00130
 Cyclopentadienylirondicarbonylpentacarbonylmanganese, *see* Mn-00075
 Cyclopentadienyltitanium dichloride, *see* Lu-00001
 (η⁵-2,4-Cyclopentadien-1-yl)[μ₄-(methanolato(4-)-C:C:C:O)]-(nonacarbonyltricobalt)(tetracarbonylcobalt)titanium, Ti-00140
 η⁵-2,4-Cyclopentadien-1-yl(methoxycarbonyl)-nitrosyl(triphenylphosphine)manganese, Mn-00133
 (η⁵-2,4-Cyclopentadien-1-yl)[methoxy(methylamino)-methylene]dinitrosylchromium, Cr-00049
 (η⁵-2,4-Cyclopentadienyl)methyldinitrosylchromium, Cr-00025
 (η⁵-2,4-Cyclopentadien-1-yl)-methylenenitrosyl(triphenylphosphine)rhenium(1+), Re-00080
 Cyclopentadienyl(methyl)tricarbonylmolybdenum, *see* Mo-00025
 (η⁵-2,4-Cyclopentadien-1-yl)nitrosylbis(triphenyl phosphite-P)manganese(1+), Mn-00142
 Cyclopentadienyloxodibromovanadium, *see* V -00002
 Cyclopentadienyloxodichlorovanadium, *see* V -00004
 (Cyclopentadienyl)(phenylcyclopentadiene)dicarbonylvandium, *see* V -00081
 Cyclopentadienylrutheniumdicarbonylpentacarbonylrhenium, *see* Re-00048
 Cyclopentadienylsamarium dichloride, *see* Sm-00001
 Cyclopentadienyltetracarbonylniobium, *see* Nb-00009
 Cyclopentadienyltetracarbonyltantalum, *see* Ta-00009
 Cyclopentadienyltetracarbonylvandium, *see* V -00020
 Cyclopentadienyltetrachloroniobium, *see* Nb-00006
 Cyclopentadienyltetrachlorotantalum, *see* Ta-00004
 Cyclopentadienyltitanium dichloride, *see* Ti-00008
 (η⁵-Cyclopentadienyl)titanium triacetate, *see* Ti-00047
 Cyclopentadienyltitanium tribromide, *see* Ti-00007
 Cyclopentadienyltitanium trichloride, *see* Ti-00009
 Cyclopentadienyltitanium trifluoride, *see* Ti-00010
 Cyclopentadienyltitanium triiodide, *see* Ti-00011
 Cyclopentadienyltribromovanadium, *see* V -00003
 Cyclopentadienyltricarbonylacyltungsten, *see* W -00044
 Cyclopentadienyltricarbonylchromium hydride, *see* Cr-00041
 Cyclopentadienyltricarbonylcyanovanadate(1-), *see* V -00018
 Cyclopentadienyltricarbonyldichloroniobium, *see* Nb-00008
 Cyclopentadienyltricarbonylhydrovanadate(1-), *see* V -00017
 ▸ Cyclopentadienyltricarbonylmanganese, Mn-00033
 Cyclopentadienyltricarbonylmethylchromium, Cr-00060
 Cyclopentadienyltricarbonylmethylvanadate(1-), *see* V -00021
 Cyclopentadienyltricarbonylmolybdenum bromide, *see* Mo-00011
 Cyclopentadienyltricarbonylrhenium, *see* Re-00033
 Cyclopentadienyltricarbonyltechnetium, Tc-00004
 Cyclopentadienyltricarbonyl(triphenylphosphine)niobium, *see* Nb-00047
 Cyclopentadienyltricarbonyl(triphenylphosphine)vanadium, *see* V -00104
 Cyclopentadienyltrichlorovanadium, *see* V -00005
 (π-Cyclopentadienyl)triethoxytitanium, Ti-00048
 (η⁵-2,4-Cyclopentadien-1-yl)trifluorotitanium, Ti-00010
 (η⁵-Cyclopentadien-1-yl)triiodotitanium, Ti-00011
 (η⁵-2,4-Cyclopentadien-1-yl)triiodozirconium, Zr-00003
 (η⁵-Cyclopentadienyl)trimethoxytitanium, Ti-00016
 Cyclopentadienyltrimethylchlorotantalum, *see* Ta-00007
 (η⁵-2,4-Cyclopentadien-1-yl)trimethyltitanium, Ti-00017
 Cyclopentadienyltrinitrosylvanadium(1+), V -00006
 (η⁵-2,4-Cyclopentadien-1-yl)triphenoxytitanium, Ti-00122
 (η⁵-2,4-Cyclopentadien-1-yl)[(1,2,3,4,5,6-η)-2,4,6-triphenylphosphorin]manganese, Mn-00135
 ▸ μ(η¹:η⁵-Cyclopentadienyl)tris(η-cyclopentadienyl)-dititanium(Ti-Ti), Ti-00104
 (η⁵-Cyclopentadienyl)tris(dimethylamido)titanium, Ti-00049
 (η⁵-2,4-Cyclopentadien-1-yl)tris(dimethylcarbamodithioato-S,S')titanium, Ti-00077
 (η⁵-2,4-Cyclopentadien-1-yl)tris(dimethylcarbamodithioato-S,S')zirconium, Zr-00037
 (η-Cyclopentadienyl)tris(N,N-dimethyldithiocarbamate)titanium, *see* Ti-00077
 (η-Cyclopentadienyl)tris(N,N-dimethyldithiocarbamate)zirconium, *see* Zr-00037

- $(\eta^5\text{-}2,4\text{-Cyclopentadien-1-yl})\text{tris}[(\text{diphenylphosphinidenio})\text{-bis(methylene)uranium, U -00079}$
 $(\eta^5\text{-}2,4\text{-Cyclopentadien-1-yl})\text{tris}(2\text{-hydroxy-}2,4,6\text{-cycloheptatrien-1-onato-}O,O')\text{zirconium, Zr-00091}$
 $(\eta^5\text{-}2,4\text{-Cyclopentadien-1-yl})\text{tris}(O\text{-methylcarbonodithioato-}S,S')\text{zirconium, Zr-00017}$
 $(\eta^5\text{-Cyclopentadien-1-yl})\text{tris}(N\text{-methylmethanaminato})\text{titanium, see Ti-00049}$
 $(\eta\text{-Cyclopentadienyl})\text{tris}(\text{methylxanthato})\text{zirconium, see Zr-00017}$
 $(\eta^5\text{-}2,4\text{-Cyclopentadien-1-yl})\text{tris}(\text{phenylmethyl})\text{zirconium, see Zr-00094}$
 $\pi\text{-Cyclopentadienyltris}(8\text{-quinolinolato})\text{hafnium, Hf-00048}$
 $\pi\text{-Cyclopentadienyltris}(8\text{-quinolinolato})\text{zirconium, Zr-00105}$
 $(\eta^5\text{-}2,4\text{-Cyclopentadien-1-yl})\text{tris}[(\text{trimethylsilyl})\text{methyl}]\text{titanium, Ti-00095}$
 $(\eta\text{-Cyclopentadienyl})\text{tris}(\text{tropolonato})\text{zirconium, see Zr-00091}$
 $(\eta^5\text{-Cyclopentadienyl})\text{trithiocyanatotitanium, Ti-00015}$
Cyclopentadienyltungsten tricarbonyl hydride, *see* W -00024
Cyclopentadienylvanadium diacetate, *in* V -00083
Cyclopentadienylvanadium oxydichloride, *see* V -00004
Cyclopentadienylvanadium tribromide, *see* V -00003
Cyclopentadienylvanadium trichloride, *see* V -00005
Cyclopentadienylytterbium dichloride, *see* Yb-00001
Cyclopentadienylttrium dichloride, *see* Y -00001
Cyclotetra[μ -oxochloro- η -cyclopentadienyltitanium], *see* Ti-00105
► Cymantrene, *see* Mn-00033
Cymantrenylferrocene, *see* Mn-00112
Decacarbonyl(decacarbonyldi- μ -hydrotriosmium)diruthenium, Re-00076
Decacarbonyldichromate(2-), Cr-00066
Decacarbonyldimanganese, Mn-00063
Decacarbonyl[μ -(dimethylplumbylene)]dimanganese, *see* Mn-00078
Decacarbonyl[μ -(dimethylplumbylene)]dirhenium, *see* Re-00051
Decacarbonyl(μ -diphenylphosphido)ditungstate(1-), W -00136
Decacarbonyl[μ -(diphosphine-*P,P'*)]dichromium, Cr-00068
Decacarbonyldirhenium, Re-00044
Decacarbonylditechnetium, Tc-00005
Decacarbonyl- μ -hydrodichromate(1-), Cr-00067
Decacarbonyl- μ -hydroditungstate(1-), W -00040
Decacarbonyl- μ -iododichromate(1-), Cr-00065
Decacarbonylmanganeserhenium, *see* Re-00043
Decacarbonyl(tetracarbonyliron)dimanganese, *see* Mn-00092
Decacarbonyl(tetracarbonyliron)dirhenium, *see* Re-00063
Decamethyleuropocene, *see* Eu-00005
Decamethylmanganocene, Mn-00119
Decamethylmanganocenium, Mn-00120
Decamethyltitanocene, *see* Ti-00112
Decamethyltitanocene dichloride, *see* Ti-00111
Decamethylvanadocene, *see* V -00087
Decarbonyldimolybdate(2-), Mo-00045
Decarbonyl(μ -methanethiolato)dichromate(1-), Cr-00083
Dehydromolybdenocene, *see* Mo-00115
Diacetatobis($\eta^5\text{-cyclopentadienyl})\text{titanium, see Ti-00071}$
Diacetoxycyclopentadienylvanadium, *in* V -00083
Diacetyltetracarbonylmanganate(1-), Mn-00037
Diallyl- $\eta^6\text{-benzenemolybdenum, see Mo-00069}$
Diallylbis- $\eta^6\text{-benzenedichloromolybdenum, in Mo-00028}$
Diallylbis($\eta\text{-cyclopentadienyl})\text{zirconium, see Zr-00044}$
Diallylcyclooctatetraenezirconium, *see* Zr-00034
Diallyliodochromium, *see* Cr-00026
Diazaibis($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{titanium, Ti-00032}$
► Dibenzenechromium, *see* Cr-00101
Dibenzenevanadium, *see* V -00051
Dibenzylbis($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{titanium, Ti-00125}$
Dibenzylbis($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{tungsten, W -00141}$
Dibenzylbis(cyclopentadienyl)vanadium, V -00099
Dibenzyl(cyclopentadienyl)zirconium, *see* Zr-00057
(Dibenzyltrimethylstannane)bis[tricarbonylchromium], Cr-00158
Dibenzyltitanocene, *see* Ti-00125
Dibromobis($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{hafnium, Hf-00002}$
Dibromobis($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{titanium, Ti-00024}$
Dibromobis($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{tungsten, W -00046}$
Dibromobis($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{vanadium, V -00027}$
Dibromobis($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{zirconium, Zr-00006}$
Dibromo($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{oxovanadium, V -00002}$
Dibromodicarbonyl($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{rhenium, Re-00022}$
Di(μ -bromo)octacarbonyldimanganese, Mn-00027
Dibromotetracarbonylmanganate(1-), Mn-00003
Di- μ -bromotetrakis($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{dititanium, in Ti-00023}$
Di-*tert*-butoxydimethylvanadium, V -00036
Di-*tert*-butyldiindenyluranium, U -00058
[Di-*tert*-butyl(pyridine)tin]pentacarbonylchromium, Cr-00145
(Di-*tert*-butylsulfurdiimide-*N,N'*)tetracarbonylchromium, Cr-00107
Dicarbonyl($\eta^3\text{-allyl})\text{bis}(\text{triisopropylphosphite})\text{manganese, see Mn-00131}$
Dicarbonylbis[(1,2,3,4- η)-1,3-cyclohexadiene]tungsten, W -00093
Dicarbonylbis(cyclopentadienyl)bis(diphenylacetylene)diniobium, *see* Nb-00050
Dicarbonylbis($\eta^5\text{-cyclopentadien-1-yl})\text{bis}[1,1'-(1,2\text{-ethynediyl})\text{bis}(\text{benzene})]\text{diniobium, Nb-00050}$
Dicarbonylbis($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{hafnium, Hf-00012}$
Dicarbonylbis($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{titanium, Ti-00051}$
Dicarbonylbis(2,4-cyclopentadien-1-yl)vanadium(1+), V -00050
Dicarbonylbis($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{zirconium, Zr-00021}$
Dicarbonylbis(diethylcarbamodithioato-*S,S'*)molybdenum, Mo-00071
Dicarbonylbis[1,2-ethanediylbis(dimethylphosphine)-*P,P'*]hydro-tantalum, Ta-00026
Dicarbonylbis[1,2-ethanediylbis(dimethylphosphine)-*P,P'*]methyl-tantalum, Ta-00029
Dicarbonylbis[1,2-ethanediylbis(diphenylphosphine)-*P,P'*]manga-nese(1+), Mn-00144
Dicarbonylbis(2-methyl-2-propanolato)bis(pyridine)molybde-num, Mo-00116
Dicarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]hafnium, Hf-00036
Dicarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]vanadium(1+), V -00093
Dicarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00074
Dicarbonyl($\eta^4\text{-}1,3\text{-butadiene})\text{bis}(\eta^5\text{-cyclopentadienyl})\text{molybde-num}(1+), \text{see Mo-00055}$
Di- μ -carbonyl[$\mu_4\text{-(}\eta^2\text{-carbonyl-C:C:C)}]\text{[}\mu\text{-carbonylbis}[(1,2,3,4,5\text{-}\eta)\text{-}1,2,3,4,5\text{-pentamethyl-}2,4\text{-cyclopentadien-1-yl}]\text{dicobalt}]\text{bis}(\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{dimolybdenum, Mo-00141}$
Dicarbonylchloro($\eta^7\text{-cycloheptatrienyl})\text{molybdenum, Mo-00024}$
Dicarbonylchloro($\eta^7\text{-cycloheptatrienyl})\text{tungsten, W -00032}$
Dicarbonylchloro($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{-(triphenylphosphine)molybdenum, Mo-00127}$
Dicarbonylchloro[1,2-ethanediylbis(diphenylphosphine)-*P,P'*]($\eta^3\text{-}2\text{-propenyl})\text{molybdenum, Mo-00137}$
Dicarbonylchlorotris(dimethylphenylphosphine)rhenium, Re-00082
Dicarbonylchlorotropyliummolybdenum, *see* Mo-00024
Dicarbonylchlorotropyliumtungsten, *see* W -00032
Dicarbonyl($\eta^4\text{-}1,3\text{-cyclobutadiene})\text{bis}(\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{vanadium, V -00038}$
Dicarbonyl($\eta^7\text{-cycloheptatrienyl})\text{iodotungsten, W -00033}$
Dicarbonyl(cyclopentadiene)- π -cyclopentadienylniobium, Nb-00023
Dicarbonyl($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{bis}(\text{triphenylphosphine})\text{molybdenum}(1+), \text{Mo-00143}$
Dicarbonyl($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{[(1,2,3,4,5-}\eta\text{)-}2,4\text{-cyclopentadien-1-yl}]\text{benzene}]\text{vanadium, see V -00081}$
Dicarbonyl($\eta^5\text{-}2,4\text{-cyclopentadien-1-yl})\text{dihydrodirhenium, Re-00028}$

- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)dimethylrhenium, Re-00039
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(dimethylthallium)-(triphenylphosphine)molybdenum, Mo-00132
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(dimethylthallium)-(triphenylphosphine)tungsten, W -00147
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(dinitrogen)manganese, Mn-00024
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(diphenylacetylene)niobium, Nb-00041
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(diphenylacetylene)vanadium, V -00088
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(diphenylthallium)-(triphenylphosphine)tungsten, W -00154
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(diphenylthallium)-(triphenylphosphine)molybdenum, Mo-00142
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(1,3-diphenyltriazenato- N^1, N^3)tungsten, W -00122
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)ethylidynemanganese(1+), Mn-00048
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(ferrocenylmethylidyne)tungsten, W -00112
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(hexacarbonyldicobalt)[μ_3 -(phenylmethylidyne)]molybdenum, Mo-00111
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(hydrazine- N)manganese, Mn-00026
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydrorhenate(1-), Re-00027
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(1-methoxyethylidene)manganese, Mn-00060
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(2-methoxy-1-phenylethylidene)manganese, Mn-00103
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^3 -6-methylene-2,4-cyclohexadien-1-yl)tungsten, W -00091
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(1-methylethylidene)manganese, Mn-00059
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosylchromium, Cr-00032
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosylmanganese(1+), Mn-00023
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosylrhenium(1+), Re-00023
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosyltungsten, W -00016
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)pentacarbonylmanganioiron, *see* Mn-00075
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(pentacarbonylrhenio)ruthenium, Re-00048
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(α -phenylbenzenemethaniminato)tungsten, W -00125
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(phenylcyclopentadiene)vanadium, V -00081
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(2-phenylethenylidene)manganese, Mn-00100
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(phenylmethylidyne)manganese(1+), Mn-00093
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(phenylmethylidyne)rhenium(1+), Re-00066
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(phenylmethyl)molybdenum, *see* Mo-00080
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(2-propanoneoximato- N, O)molybdenum, Mo-00041
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)molybdenum, Mo-00039
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)tungsten, W -00050
- Dicarbonylcyclopentadienyltetracyclonevanadium, *see* V -00115
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(tetrahydrofuran)rhenium, Re-00046
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)tetramethylenerrhenium, Re-00045
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(2,2,4,4-tetramethyl-3-pentaniminato)tungsten, W -00109
- Dicarbonyl- η^5 -2,4-cyclopentadien-1-yl(η^4 -tetraphenylcyclopentadienone)vanadium, V -00115
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)thionitrosylchromium, Cr-00031
- Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)[(triphenylsilyl)-methylidyne]rhenium(1+), Re-00081
- Dicarbonyldichlorobis(triethylphosphine)rhenium, Re-00067
- Dicarbonyldichloronitrosylrhenium, *in* Re-00003
- Dicarbonyldicyclopentadienyldinitrosyldimanganese, *see* Mn-00081
- Dicarbonyldi- π -cyclopentadienyltitanium, *see* Ti-00051
- Dicarbonyl(dimethylphenylphosphine)hydrido(mesitylene)tungsten(1+), *see* W -00123
- Dicarbonyl(dimethylphenylphosphine)hydro[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]tungsten(1+), W -00123
- Dicarbonyl(dinitrogen)(η^6 -benzene)chromium, *see* Cr-00040
- Dicarbonyl(1,3-diphenyl-1-triazenato- N^1, N^3)(η^5 -cyclopentadienyl)tungsten, *see* W -00122
- Dicarbonyl[(1,2,3,4,5,6- η)hexamethylbenzene]nitrosylchromium(1+), Cr-00122
- Dicarbonylhydrobis[bis(dimethylphosphino)ethane]tantalum, *see* Ta-00026
- Dicarbonyl[hydrotris(pyrazolato)borato(1-)](2-methyl- π -allyl)tungsten, *see* W -00104
- Dicarbonyl[hydrotris(1*H*-pyrazolato- N^1)borato(1-)- N^2, N^2, N^2]-[(1,2,3- η -2-methyl-2-propenyl)molybdenum, Mo-00091
- Dicarbonyl[hydrotris(pyrazolato)borato(1-)](η^3 -2-methylpropenyl)tungsten, W -00104
- Dicarbonyliodonitrosylbis(triphenylphosphine)chromium, Cr-00177
- Dicarbonyliodotropyliumtungsten, *see* W -00033
- Dicarbonyl[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]-(ferrocenylmethoxymethylene)manganese, Mn-00118
- Dicarbonyl(η^4 -2-methylene-1,3-propanediyl)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]molybdenum(1+), Mo-00096
- Dicarbonylnitrosylbis(triphenylphosphine)manganese, Mn-00138
- Dicarbonylnitrosylbis(triphenylphosphine)rhenium, Re-00085
- Dicarbonylnitrosyl(η^5 -cyclopentadienyl)manganese(1+), *see* Mn-00023
- Dicarbonylnitrosyl(η^6 -hexamethylbenzene)chromium(1+), *see* Cr-00122
- Dicarbonylnitrosyl(η^4 -tetraphenylcyclobutadiene)manganese, Mn-00136
- Dicarbonyl(pentamethylcyclopentadienyl)molybdenum, *in* Mo-00124
- Dicarbonyl(η^3 -2-propenyl)bis(triisopropylphosphite- P)manganese, Mn-00131
- Dicarbonyl(η^3 -2-propenyl)bis[tris(1-methylethyl)phosphite- P]manganese, *see* Mn-00131
- Dicarbonyltetrakis(trimethylphosphine)chromium, Cr-00123
- Dicarbonyl[(1,2,3,4,5- η)-2,3,4,5-tetraphenyl-1*H*-arsol-1-yl](triphenylphosphine)manganese, Mn-00143
- Di- μ -carbonyltricarboxylbis(η^5 -2,4-cyclopentadien-1-yl)divanadium, V -00067
- Dicarbonyltrichloro(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00015
- Dicarbonyl(trifluoromethanesulfonate- O, O')-bis(triisopropylphosphite- P)manganese, Mn-00123
- Dicarbonyl(trifluoromethanesulfonate- O, O')bis[tris(1-methylethyl)phosphite- P]manganese, *see* Mn-00123
- Dicarbonyl(η^4 -trimethylenemethane)(η^5 -cyclopentadienyl)molybdenum(1+), *see* Mo-00096
- Dichlorobis[(1,2,3,4,5- η)-1,3-bis(trimethylsilyl)-2,4-cyclopentadien-1-yl]neodymium(1-), Nd-00010
- Di- μ -chlorobis(η^8 -1,3,5,7-cyclooctatetraene)dipraesodymium, *see* Pr-00002
- Di- μ -chlorobis(η^8 -1,3,5,7-cyclooctatetraene)dicerium, *see* Ce-00001
- Di- μ -chlorobis(η^8 -1,3,5,7-cyclooctatetraene)dineodymium, *see* Nd-00002
- Di- μ -chlorobis(η^8 -1,3,5,7-cyclooctatetraene)disamarium, *see* Sm-00003
- Di- μ -chlorobis(η^5 -cyclopentadien-1-yl)(diethylaluminum)titanium, Ti-00075
- Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00003
- Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)molybdenum, Mo-00036

- ▶ Dichlorobis(η^5 -2,4-cyclopentadienyl)niobium, Nb-00012
 Dichlorobis(η^5 -2,4-cyclopentadienyl)oxotungsten, W -00047
 Dichlorobis(η^5 -2,4-cyclopentadienyl)tantalum, Ta-00010
 ▶ Dichlorobis(η^5 -2,4-cyclopentadienyl)titanium, Ti-00026
 Dichlorobis(η^5 -2,4-cyclopentadienyl)tungsten, W -00048
 Dichlorobis(η^5 -2,4-cyclopentadienyl)vanadium, V -00030
 ▶ Dichlorobis(η^5 -2,4-cyclopentadienyl)zirconium, Zr-00007
 Dichlorobis[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]cerium, Ce-00006
 ▶ Dichlorobis[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]titanium, Ti-00096
 Dichlorobis[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]zirconium, Zr-00048
 Dichlorobis[(1,2,3,4,5- η)-1-(methyldiphenylsilyl)-2,4-cyclopentadien-1-yl]ytterbate(1-), Yb-00034
 Dichlorobis[(1,2,3,4,5- η)-pentamethyl-2,4-cyclopentadien-1-yl]neodymate(1-), Nd-00008
 Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](1*H*-pyrazole-*N*²)uranium, U -00050
 Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00016
 Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, Ti-00111
 Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U -00038
 Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbate(1-), Yb-00022
 Dichlorobis[(1,2,3,4,5- η)-1-(phenylmethyl)-2,4-cyclopentadien-1-yl]zirconium, *see* Zr-00084
 Dichlorobis[(7,8,9,10,11- η)undecahydro-7,8-dicarbaundecaborato]uranate(2-), U -00001
 Dichloro(η^8 -1,3,5,7-cyclooctatetraene)thorium, Th-00001
 Dichloro(η^8 -1,3,5,7-cyclooctatetraene)zirconium, Zr-00004
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)-bis(trimethylphosphine)vanadium, V -00048
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)-(diethylcarbamo-dithioato-*S,S'*)titanium, Ti-00039
 Dichloro(η -cyclopentadienyl)*N,N*-diethyldithiocarbamatotitanium, *see* Ti-00039
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)dysprosium, Dy-00001
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)erbium, Er-00001
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)europium, Eu-00001
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)gadolinium, Gd-00001
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)holmium, Ho-00001
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)lutetium, Lu-00001
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)nitrosylmolybdenum, Mo-00003
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)oxovanadium, V -00004
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)(phenylazo)titanium, Ti-00044
 Dichloro(η -cyclopentadienyl)phenyldiazidotitanium, *see* Ti-00044
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)samarium, Sm-00001
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00008
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)ytterbium, Yb-00001
 Dichloro(η^5 -2,4-cyclopentadien-1-yl)yttrium, Y -00001
 Di- μ -chloro(dichloroaluminum)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadienyl]ytterbium, Yb-00020
 Di- μ -chlorodichlorobis(η^5 -2,4-cyclopentadien-1-yl)dinitrosyldimolybdenum, *in* Mo-00003
 Di- μ -chlorodi- μ_3 -chloro(μ -chlorobis[methylenebis(η^5 -2,4-cyclopentadien-1-ylidene)])diuraniumbis(tetrahydrofuran)lithium, U -00071
 ▶ Dichlorodi- π -cyclopentadienylhafnium, *see* Hf-00003
 ▶ Dichlorodiindenyltitanium, *see* Ti-00096
 Dichloro(2,2-dimethylpropylidene)-oxobis(trimethylphosphine)tungsten, W -00068
 Dichloro(2,2-dimethylpropylidene)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00028
 Dichloro(2,2-dimethylpropyl)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](trimethylphosphine)zirconium, Zr-00055
 Dichloro(diphenylacetylene)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00037
 Dichloro(η^2 -ethene)(η^5 -1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl)tantalum, Ta-00018
 Dichloromethyltrispyridinechromium, Cr-00133
 Dichloromethyltris(tetrahydrofuran)chromium, Cr-00118
 Dichloro(neopentyl)(trimethylphosphine)(η -pentamethylcyclopentadienyl)zirconium, *see* Zr-00055
 Di(μ -chloro)octacarbonyldimanganese, Mn-00028
 ▶ Dichlorooxophenylvanadium, V -00009
 Dichloro[1,3-propanediylbis[(1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]]hafnium, Hf-00015
 Dichloro[1,3-propanediylbis[(1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]]titanium, Ti-00065
 Dichloro[1,3-propanediylbis[(1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]]zirconium, Zr-00028
 Dichlorotetra- π -cyclopentadienylloxodihafnium, *see* Hf-00027
 Dichlorotetra- π -cyclopentadienylloxodizirconium, *see* Zr-00061
 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)-bis[trihydro(triethylaluminum)aluminum]diyttrium, *in* Y -00009
 Dichlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)dicerium, Ce-00007
 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)didysprosium, *in* Dy-00002
 Dichlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)dierbium, *in* Er-00004
 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)diholmium, *in* Ho-00002
 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)dilutetium, *in* Lu-00004
 Dichlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)dipraesodymium, Pr-00005
 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)disamarium, *in* Sm-00004
 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)discandium, *in* Sc-00001
 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)dithulium, *in* Tm-00002
 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)ditanium, *in* Ti-00025
 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)diytterbium, *in* Yb-00004
 Dichlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)diyttrium, *in* Y -00002
 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -1,2-ethanediylbis(triethylaluminum)dizirconium, Zr-00109
 Dichlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -oxodihafnium, Hf-00027
 Dichlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -oxodizirconium, Zr-00061
 Di- μ -chlorotetrakis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]dierbium, *in* Er-00007
 Di- μ -chlorotetrakis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]diytterbium, *in* Yb-00008
 Di- μ -chlorotetrakis(η^5 -1-methyl-2,4-cyclopentadien-1-yl)gadolinium, *in* Gd-00003
 Dichlorotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl][μ -(2,2,9,9-tetramethyl-4,5,6,7-decanetetron-*O*⁴,*O*⁵,*O*⁶,*O*⁷)]dithorium, Th-00039
 Dichloro(1,1'-trimethylenedicyclopentadienyl)hafnium, *see* Hf-00015
 Dichloro(1,1'-trimethylenedicyclopentadienyl)titanium, *see* Ti-00065
 Dichloro(1,1'-trimethylenedicyclopentadienyl)zirconium, *see* Zr-00028
 Dichlorotrimethylniobium, Nb-00004
 Dichlorotrimethyltantalum, Ta-00003
 Dicyanatobis(η^5 -cyclopentadienyl)titanium, Ti-00050
 Dicyclooctatetraenecerate(1-), *see* Ce-00005
 Dicyclooctatetraenelanthanate(1-), *see* La-00005
 Dicyclooctatetraeneneodymate(1-), *see* Nd-00005
 Dicyclooctatetraenepraesodymate(1-), *see* Pr-00004
 Dicyclooctatetraenesamarate(1-), *see* Sm-00010
 Dicyclooctatetraeneterbate(1-), *see* Tb-00003

- Dicyclooctatetraeneyttrate(1−), *see* Y -00007
 Di- π -cyclooctatrienyleneuranium, *see* U -00019
 Di-2,4-cyclopentadien-1-ylbis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00107
 Di- π -cyclopentadienylbis(diethylamino)hafnium, *see* Hf-00024
 Di- π -cyclopentadienylbis(diethylamino)zirconium, *see* Zr-00053
 Dicyclopentadienylbis(diethylamino)uranium, *see* U -00025
 Di- π -cyclopentadienylbis(μ (dimethylamino))-bis(dimethylamino)ditanium, *in* Ti-00022
 Di- π -cyclopentadienylbis(dimethylamino)hafnium, *see* Hf-00018
 Di- π -cyclopentadienylbis(dimethylamino)zirconium, *see* Zr-00036
 Dicyclopentadienylbis(diphenylamino)uranium, *see* U -00073
 Di- π -cyclopentadienylbis(1,1-diphenylmethyleniminato)hafnium, *see* Hf-00049
 Di- π -cyclopentadienylbis(1,1-diphenylmethyleniminato)zirconium, *see* Zr-00110
 ▶ Dicyclopentadienylbis(pentafluorophenyl)zirconium, *see* Zr-00071
 Di- π -cyclopentadienylbis(trifluoroacetato)zirconium, *see* Zr-00032
 Di- π -cyclopentadienylbis(triphenylsilanolato)titanium, *see* Ti-00151
 Dicyclopentadienyl-*tert*-butyllutetium(methylenetriphenylphosphorane), *see* Lu-00025
 Di- π -cyclopentadienylchromium, *see* Cr-00075
 Di- π -cyclopentadienyldi-2,4-cyclopentadien-1-yl-di- μ -hydrotitanium, *in* Ti-00037
 Dicyclopentadienyldi- μ -ethoxydiethoxyditanium, *in* Ti-00021
 Di- π -cyclopentadienyldi- σ -ferrocenylditanium, *see* Ti-00142
 Di- π -cyclopentadienyldimethoxyzirconium, *see* Zr-00024
 Di- π -cyclopentadienyldipyrrol-1-ylzirconium, *see* Zr-00049
 Di- π -cyclopentadienyldistyrylzirconium, *see* Zr-00093
 Dicyclopentadienyl(ethylene)tungsten, *see* W -00074
 Dicyclopentadienyleuropium, *see* Eu-00003
 Dicyclopentadienylgadolinium chloride, *see* Gd-00002
 Dicyclopentadienylholmium chloride, *see* Ho-00002
 Dicyclopentadienylhydrideopentylzirconium, *see* Zr-00041
 Dicyclopentadienylhydridorhenium, *see* Re-00042
 Dicyclopentadienylhydride technetium, *see* Tc-00006
 Dicyclopentadienyllutetium chloride, *see* Lu-00004
 ▶ Di- π -Cyclopentadienylmanganese, *see* Mn-00058
 Dicyclopentadienylneopentylutetium, *see* Lu-00014
 Di- π -cyclopentadienyl(2,4-pentanedionato)titanium(1+), Ti-00080
 Di- π -cyclopentadienyl[pyrocatecholato(2−)]titanium, *see* Ti-00086
 Dicyclopentadienylsamarium, *see* Sm-00005
 Dicyclopentadienylsamarium chloride, *see* Sm-00004
 Dicyclopentadienylscandium chloride, *see* Sc-00001
 Dicyclopentadienyltetracarbonyldimolybdenum, *see* Mo-00079
 Dicyclopentadienyltetrakis(dimethylamino)ditanium, *in* Ti-00022
 Dicyclopentadienylthulium chloride, *see* Tm-00002
 ▶ Dicyclopentadienyltitanium, *see* Ti-00035
 Dicyclopentadienyltitanium bromide, *see* Ti-00023
 Dicyclopentadienyltitanium chloride, *see* Ti-00025
 Dicyclopentadienyltitanium diacetate, *see* Ti-00071
 Dicyclopentadienyltitanium dibromide, *see* Ti-00024
 Dicyclopentadienyltitanium difluoride, *see* Ti-00029
 Dicyclopentadienyltitanium diiodide, *see* Ti-00031
 Dicyclopentadienyltitanium fluoride, *see* Ti-00028
 Dicyclopentadienyltitanium iodide, *see* Ti-00030
 Dicyclopentadienyltrihydroniobium, *see* Nb-00014
 Dicyclopentadienyltrihydroxantalum, *see* Ta-00011
 Dicyclopentadienyl[(trimethylsilyl)methyl]lutetium(methylenetriphenylphosphorane), *see* Lu-00026
 Di- π -cyclopentadienyl(triphenylgermyl)titanium, *see* Ti-00133
 Di- π -cyclopentadienyl(triphenylstannyl)titanium, *see* Ti-00135
 Dicyclopentadienylterbium, *see* Yb-00005
 Dicyclopentadienylterbium chloride, *see* Yb-00004
 Dicyclopentadienylttrium chloride, *see* Y -00002
 Dicyclopentenouranocene, U -00044
 Diethylbis[bis(trimethylsilyl)amido]hafnium, Hf-00022
 Diethylbis[1,1,1-trimethyl-*N*-(trimethylsilyl)silanaminato]hafnium, *see* Hf-00022
 ▶ Diethylthallium chromate, *see* Cr-00050
 Diferrocenylbis(diethylamino)titanium, Ti-00138
 (1,1'-Diferrocenyldi- π -benzene)chromium, *see* Cr-00173
 (1,1'-Diferrocenyldi- π -benzene)chromium(1+), *see* Cr-00174
 Diferrocenyldicyclopentadienyltitanium, *see* Ti-00142
 Dihydridobis(η^5 -cyclopentadienyl)molybdenum, *see* Mo-00043
 Dihydridobis(η -pentamethylcyclopentadienyl)zirconium, *see* Zr-00065
 Dihydrobis(pentamethylcyclopentadienyl)thorium, Th-00017
 Dihydrobis(pentamethylcyclopentadienyl)uranium, U -00039
 Dihydrobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00065
 Di- μ -hydridihydrotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dithorium, *in* Th-00017
 Di- μ -hydridihydrotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]diuranium, *in* U -00039
 Dihydronitrosyltris(triphenylphosphine)rhenium, Re-00093
 Di- μ -hydrotetrakis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]bis(tetrahydrofuran)diyttrium, Y -00015
 Di- μ -hydrotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]disamarium, *in* Sm-00013
 Diiodobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbate(1−), Yb-00023
 Di(μ -iodo)octacarbonyldimanganese, Mn-00040
 Di- μ -iodotetrakis(η^3 -2-propenyl)dichromium, *in* Cr-00026
 Di- μ -isopropoxobis[di(η -allyl)isopropoxouranium(IV)], *see* U -00056
 Dimanganese decacarbonyl, *see* Mn-00063
 Dimanganese osmium tetradeccarbonyl, *see* Mn-00096
 Dimesitylenetitanium, *see* Ti-00100
 (Dimesitylgermanediyl)pentacarbonylchromium, *see* Cr-00156
 μ -Dimethylacetylenebis(cyclopentadienyldicarbonylmolybdenum), *see* Mo-00105
 Dimethylamidohydro(pentamethylcyclopentadienyl)zirconium, Zr-00078
 Dimethylamidoiodobis(η^5 -pentamethylcyclopentadienyl)zirconium, Zr-00076
 Dimethylbis[bis(trimethylsilyl)amido]hafnium, Hf-00019
 Dimethylbis[bis(trimethylsilyl)amido]zirconium, Zr-00038
 Dimethylbis(η^5 -cyclopentadienyl)rhenium(1+), *see* Re-00057
 Dimethylbis[(1,2,3,4,5- η)-1-(2-methylbutyl)-2,4-cyclopentadien-1-yl]zirconium, Zr-00077
 Dimethylbis(*N*-methylmethanaminato)titanium, *see* Ti-00013
 Dimethylbis(2-methyl-2-propanolato-*O*)vanadium, *see* V -00036
 Dimethylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00020
 Dimethylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, Ti-00119
 Dimethylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U -00045
 Dimethylbis[1,1,1-trimethyl-*N*-(trimethylsilyl)silanaminato]hafnium, *see* Hf-00019
 Dimethylbis[1,1,1-trimethyl-*N*-(trimethylsilyl)silanaminato]zirconium, *see* Zr-00038
 Di(methylcyclopentadienyl)ytterbium chloride, *see* Yb-00008
 Dimethyl-di-*tert*-butoxyvanadium, *see* V -00036
 (Dimethyldiphenylgermane)bis(tricarbonylchromium), Cr-00150
 (2,2-Dimethylpropylidene)- η^2 -ethene(η^5 -pentamethyl-2,4-cyclopentadien-1-yl)(trimethylphosphine)tantalum, Ta-00034
 (2,2-Dimethylpropylidene)tris(2-methyl-2-propanolato)tantalum, Ta-00032
 [(1,2,3,4,5- η)-2,5-Dimethyl-1*H*-pyrrol-1-yl]tris(2,5-dimethyl-1*H*-pyrrol-1-yl)uranium, U -00052
 Dimethyltetrachloroniobate(1−), *see* Nb-00003

- Dimethyltetrakis(*N*-dimethylamino)dimolybdenum, Mo-00044
 Dimethyltetrakis(*N*-dimethylamino)ditungsten, W -00120
 Dimethyltetrakis(*N*-methylmethanaminato)dimolybdenum, see Mo-00044
 ▶ Dimethylthallium chromate, see Cr-00004
 Dimethyltrichloroniobium, see Nb-00002
 Dimethyltrichlorotantalum, see Ta-00002
 1,1'-Dimethylvanadocene, see V -00054
 [η -(Dinitrogen-*N,N'*)]tetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dititanium, Ti-00149
 Dinitrosyl(pentacarbonylmanganio)(triphenylphosphine)iron, Mn-00128
 Diperoxoohexamethylphosphoramidomolybdenum, Mo-00005
 [μ -(1,4-Diphenyl-1,3-butadiene-1,2,3,4-tetrayl-*C*¹,*C*³:*C*²,*C*⁴)]tetrakis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]dititanium, Ti-00147
 Di(phenylethynyl)titanocene, see Ti-00129
 ▶ Diphenyltitanium, Ti-00052
 Diphenyltitanocene, see Ti-00118
 1,1'-Diphenyluranocene, see U -00065
 Di(η^1 -pyrrolyl)titanocene, see Ti-00097
 Dirhenium decacarbonyl, see Re-00044
 Ditechnetium decacarbonyl, see Tc-00005
 Ditluenebis(trimethylstannyl)hafnium, see Hf-00029
 Ditluenebis(trimethylstannyl)zirconium, see Zr-00067
 Ditluenetitanium, see Ti-00072
 Ditluene(trimethylphosphine)hafnium, see Hf-00023
 Ditluene(trimethylphosphine)zirconium, see Zr-00046
 1,1'-Divinyluranocene, see U -00033
 Dodecacarbonyldiferratemanganate(1-), see Mn-00072
 Dodecacarbonylhydromanganesediosmium, Mn-00073
 Dodecacarbonylmanganatediosmate(1-), Mn-00085
 Dodecacarbonylpenta- μ -hydrotriosmiumrhenium, see Re-00049
 Dodecacarbonylrhenatediosmate(1-), Re-00059
 Dodecacarbonyltetrakis(μ_3 -methanethiolato)tetramanganese, in Mn-00005
 Dodecacarbonyltetrakis(μ_3 -methanethiolato)tetrarhenium, in Re-00004
 Dodecacarbonyltrihydrotrimanganese, Mn-00074
 Eicosacarbonyldi- μ -hydrotriosmiumdiruthenium, see Re-00076
 [1,2-Ethanediybis(dimethylphosphine)-*P,P'*]-hydrobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U -00061
 [1,2-Ethanediybis(dimethylphosphine)-*P,P'*]pentamethylniobium, Nb-00021
 Ethenediolato-1,2-bis[hydridobis(η^5 -pentamethylcyclopentadienyl)zirconium], see Zr-00116
 μ -(1,2-Ethenediolato)bis[iodobis(η^5 -pentamethylcyclopentadienyl)zirconium], see Zr-00115
 [μ -(1,2-Ethenediolato(2-)-*O,O'*)]-dihydrotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dizirconium, Zr-00116
 [μ -(1,2-Ethenediolato(2-)-*O,O'*)]diodotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dizirconium, Zr-00115
 [Ethoxyferrocenylcarbene]pentacarbonyltungsten, see W -00114
 Ethoxytris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00023
 (Ethylene)trichlorobis(trimethylphosphine)tantalum, see Ta-00008
 Ethyltris(diethylamino)vanadium, see V -00066
 Ethyltris(*N*-ethylethanaminato-*N*)vanadium, see V -00066
 Europocene, see Eu-00003
 [Ferrocenyl(methoxy)carbene]methylcyclopentadienyldicarbonylmanganese, see Mn-00118
 (Ferrocenylmethyl)cyclopentadienylmanganese tricarbonyl, see Mn-00114
 (Ferrocenylmethyl)cymantrene, see Mn-00114
 (η^6 -Fluorobenzene)tricarbonylchromium, Cr-00053
 Fluorotris(η^5 -2,4-cyclopentadien-1-yl)neptunium, Np-00002
 Fluorotris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00006
 μ (η^5 : η^5 -Fulvalene)di- μ -hydridobis(cyclopentadienyldititanium), Ti-00108
 μ (η^5 : η^5 -Fulvalene)di- μ -hydroxobis(η^5 -cyclopentadienyldititanium), see Ti-00106
 Hafnium tetrabenzyl, see Hf-00044
 Hafnocene bis(borohydride), see Hf-00009
 Hafnocene bis(diethylamide), see Hf-00024
 Hafnocene bis(dimethylamide), see Hf-00018
 Hafnocene bis(diphenylketimide), see Hf-00049
 Hafnocene dibenzyl, see Hf-00039
 Hafnocene dibromide, see Hf-00002
 Hafnocene dicarbonyl, see Hf-00012
 ▶ Hafnocene dichloride, see Hf-00003
 Hafnocene dicyanate, see Hf-00011
 Hafnocene difluoride, see Hf-00004
 Hafnocene diiodide, see Hf-00005
 Hafnocene dimethyl, see Hf-00013
 Hafnocene diphenyl, see Hf-00034
 Hafnocene hydridochloride, see Hf-00007
 Heptacarbonyl(η^5 -cyclopentadienyl)ironmanganese, see Mn-00075
 Heptacarbonyl(η^5 -cyclopentadienyl)rheniumruthenium, see Re-00048
 Heptacarbonyltris(cyclopentadienyl)triniobium, Nb-00042
 Heptacarbonyltris(dimethylphenylphosphine)dirhenium, Re-00083
 Hexabenzyltri- μ -chlorotrirhenium, Re-00089
 Hexa-*tert*-butoxy- μ -carbonyldimolybdenum, Mo-00130
 Hexa-*tert*-butoxydimolybdenum, see Mo-00125
 Hexacarbonylazulenedimolybdenum, see Mo-00092
 Hexacarbonylbis(η^5 -2,4-cyclopentadien-1-yl)dichromium, Cr-00129
 Hexacarbonylbis(η^5 -2,4-cyclopentadien-1-yl)dimolybdenum, Mo-00093
 Hexacarbonylbis(η^5 -2,4-cyclopentadien-1-yl)ditungsten, W -00107
 Hexacarbonylbis(η^5 -2,4-cyclopentadien-1-yl)ditungsten, see W -00107
 Hexacarbonylbis[μ -(1,2,3,4,5- η :1,2,3,4,5- η)-3,4-diethyl-2,5-dihydro-2,5-dimethyl-1,2,5-thiadiborole]](iron)dimanganese, Mn-00127
 Hexacarbonylbis[(1,2,3,4a,7a- η)-1*H*-inden-1-yl]ditungsten, W -00138
 Hexacarbonylbis(η^5 -indenyl)tungsten, see W -00138
 Hexacarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dichromium, Cr-00165
 ▶ Hexacarbonylchromium, see Cr-00020
 Hexacarbonyl(η^5 -cyclopentadienyl)iron- μ -methylenemanganese, see Mn-00079
 ▶ Hexacarbonyldi- π -cyclopentadienyl- μ -mercuriodichromium, Cr-00128
 Hexacarbonyl(ethylmercury)vanadium, V -00014
 Hexacarbonylmanganese(1+), Mn-00017
 Hexacarbonylmolybdenum, see Mo-00007
 Hexacarbonylniobate(1-), Nb-00007
 Hexacarbonyl(phenylmercury)tantalum, Ta-00016
 Hexacarbonylrhenium(1+), Re-00017
 Hexacarbonyltantalate(1-), Ta-00006
 Hexacarbonyl(triphenylstannyl)niobium, Nb-00045
 Hexacarbonyl(triphenylstannyl)vanadium, V -00096
 Hexacarbonyltungsten, see W -00014
 Hexacarbonylvanadate(1-), V -00012
 ▶ Hexacarbonylvanadium, see V -00013
 Hexa- μ -chlorotris(hexamethylbenzene)triniobium(1+), Nb-00049
 Hexadecacarbonylhydromanganesetriosmium, Mn-00105
 Hexadecacarbonylhydrotriosmium, Re-00070
 Hexadecacarbonyltetrarhenate(2-), Re-00073
 Hexakis[μ -(acetyl-*C,O*)](aluminum)dodecacarbonyltrimanganese, in Mn-00037
 Hexakis(η^5 -2,4-cyclopentadien-1-yl)[μ -(pyrazine-*N*¹:*N*⁴)]diytterbium, Yb-00033
 Hexakis(diethylaminato)- μ -1,1'-ferrocenediyldititanium, Ti-00143
 Hexakis(diethylaminato)- μ -1,1'-ruthenocenediyldititanium, Ti-00144
 Hexakis(2,2-dimethylpropyl)dimolybdenum, Mo-00136
 Hexakis(*N*-ethylethanaminato)- μ -1,1'-ferrocenediyldititanium, see Ti-00143
 Hexakis(*N*-ethylethanaminato)- μ -1,1'-ruthenocenediyldititanium, see Ti-00144

- Hexakis(2-methoxyphenyl)dirhenium, *see* Re-00090
Hexakis(2-methyl-2-propanolato)dimolybdenum, Mo-00125
Hexakisneopentylidimolybdenum, *see* Mo-00136
Hexakis[(trimethylsilyl)methyl]dimolybdenum, Mo-00126
Hexakis[(trimethylsilyl)methyl]ditungsten, W -00145
Hexamethylbenzenebis(di- μ -dichlorodichloroaluminum)titanium, *see* Ti-00061
Hexamethylchromate(3-), Cr-00027
Hexamethylerbate(3-), Er-00002
Hexamethylutetate(3-), Lu-00002
Hexamethylneodymate(3-), Nd-00001
(Hexamethylphosphoric triamide-*O*)oxodiperoxymolybdenum, *see* Mo-00005
Hexamethylpraesodymate(3-), Pr-00001
▶ Hexamethylrhénium, Re-00016
Hexamethylsamarate(3-), Sm-00002
Hexamethylthulate(3-), Tm-00001
▶ Hexamethyltungsten, W -00011
Hexamethyluranate(3-), U -00004
Hexamethylytterbate(3-), Yb-00002
Hexaphenyluranate(2-), U -00074
Hydridobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]lutetium, Lu-00018
Hydridocarbonyltetrakis(trimethylphosphite)manganese, *see* Mn-00090
 μ -Hydrido- μ -[2- η :1,2- η^2 -naphthyl]bis[bis(η -cyclopentadienyl)zirconium], *see* Zr-00103
▶ Hydridopentacarbonylmanganese, *see* Mn-00011
Hydridopentacarbonylrhenium, *see* Re-00010
Hydridotetracarbonyltriphenylphosphinemanganese, *see* Mn-00125
Hydridotricarbonylbis(triphenylphosphine)manganese, *see* Mn-00139
Hydridotricarbonyl(π -cyclopentadienyl)chromium, *see* Cr-00041
Hydridotricarbonyl(η^5 -cyclopentadienyl)molybdenum, *see* Mo-00016
Hydridotricarbonyl(η^5 -cyclopentadienyl)tungsten, *see* W -00024
Hydrobis(ethylene)bis[bis(dimethylphosphino)ethane]niobium, *see* Nb-00032
Hydrobis(pentamethylcyclopentadienyl)samarium, Sm-00013
Hydrobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]([2,2,4,4-tetramethyl-3-pentanolato]thorium, Th-00032
Hydrogen pentacarbonyl rhenate(-1), *see* Re-00010
Hydro[(methylimino)methyl]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00075
Hydro(*N*-methylmethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, *see* Zr-00078
Hydro(2-methylpropyl)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00087
Hydrotetracarbonyl[bis(dimethylphosphino)ethane]vanadium, *see* V -00035
Hydrotetracarbonyl[bis(diphenylphosphino)ethane]vanadium, *see* V -00110
Icosacarbonyldi- μ -hydrotriosmiumdiruthenium, *see* Re-00076
Iodobis(η^3 -2-propenyl)chromium, Cr-00026
Iodo(*N*-methylmethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, *see* Zr-00076
Iodonitrosyltriphenylphosphine(η^5 -cyclopentadienyl)manganese, *see* Mn-00130
Iodopentacarbonylmanganese, *see* Mn-00013
Iodopentacarbonylrhenium, *see* Re-00011
Iodotetracarbonylmanganese, *in* Mn-00040
Iodotetracarbonylphenylcarbonyltungsten, *see* W -00059
Iodotricarbonyl(η^5 -cyclopentadienyl)molybdenum, *see* Mo-00013
Iodotricarbonyl(η^5 -cyclopentadienyl)tungsten, *see* W -00021
Iodotris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00007
Iodotris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00014
Iodotris(η^3 -2-propenyl)uranium, U -00007
Isobutyl(hydrido)bis(η -pentamethylcyclopentadienyl)zirconium, *see* Zr-00087
Manganese carbonyl, *see* Mn-00063
Manganesehexacarbonyl(1+), *see* Mn-00017
▶ Manganese hydrocarbonyl, *see* Mn-00011
Manganese rhenium decacarbonyl, *see* Re-00043
▶ Manganocene, Mn-00058
Mesitylbis(neopentylidene)bis(trimethylphosphine)tantalum, *see* Ta-00038
Mesitylenetricarbonylchromium, *see* Cr-00103
Mesitylenetricarbonylmolybdenum, *see* Mo-00064
Methanesulfonyltricarbonyl(η^5 -cyclopentadienyl)tungsten, *see* W -00035
(Methoxyferrocenylcarbene)pentacarbonylchromium, *see* Cr-00142
(Methyl benzoate)tricarbonylchromium, *see* Cr-00089
Methylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]lutetium, Lu-00019
Methylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]yttrium, Y -00012
Methyl[η^2 -bis(trimethylsilyl)acetyl-C,*O*]bis(η -cyclopentadienyl)zirconium, *see* Zr-00058
[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]-[(1,2,3,4,5,6- η)-7-phenyl-1,3,5-cycloheptatriene]manganese, Mn-00115
▶ (Methylcyclopentadienyl)tricarbonylmanganese, Mn-00046
▶ Methylcymantrene, *see* Mn-00046
Methyldicarbonylbis[bis(dimethylphosphino)ethane]tantalum, *see* Ta-00029
Methyldinitrosyl(η^5 -2,4-cyclopentadien-1-yl)chromium, *see* Cr-00025
Methylenenitrosyl(triphenylphosphine)(η^5 -cyclopentadienyl)rhenium(1+), *see* Re-00080
(*N*-Methylformimidoyl)hydridobis(η^5 -pentamethylcyclopentadienyl)zirconium, *see* Zr-00075
Methyl(*N*-methylmethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00021
Methyl orthotitanate, *see* Ti-00005
Methylpentacarbonylchromium(-1), *see* Cr-00024
Methylpentacarbonylmanganese, *see* Mn-00016
Methylpentacarbonylrhenium, *see* Re-00014
Methylpentacarbonyltungsten(1-), *see* W -00009
Methyltetrachloroniobium, *see* Nb-00001
Methyltetrachlorotantalum, *see* Ta-00001
Methyl titanate(IV), *see* Ti-00005
Methyltricarbonyl(η^5 -cyclopentadienyl)tungsten, *see* W -00034
Methyltrisopropoxytitanium, *see* Ti-00042
Methyltrioxorhenium, Re-00001
Methyltris[(hexamethyldisilyl)amido]uranium, U -00032
Methyltris[(hexamethyldisilyl)amino]thorium, Th-00013
Methyltris(isopropoxy)titanium, *see* Ti-00042
Methyltris[(1,1'-oxybis[ethane])phenyl]zirconium, *see* Zr-00059
Methyltris(2-propanolato)titanium, Ti-00042
Methyltris[1,1,1-trimethyl-*N*-(trimethylsilyl)silanaminato]uranium, *see* U -00032
Methyltris[1,1,1-trimethyl-*N*-(trimethylsilyl)silylanaminato]thorium, *see* Th-00013
Molybdenum carbonyl, Mo-00007
Molybdenumcarbonyl(η^5 -2,4-cyclopentadien-1-yl)[μ -(η^5 -2,4-cyclopentadien-1-ylidene)]tetracarbonylmanganese, Mn-00099
Molybdenum hexacarbonyl, *see* Mo-00007
(η^4 -Naphthalene)chlorobis[bis(dimethylphosphino)ethane]tantalum, *see* Ta-00036
Naphthalenetetracarbonylchromium, *see* Cr-00111
Neptunocene, *see* Np-00004
Niobocene dimer, *see* Nb-00040
Nitrosylbis(triphenyl phosphite)(η^5 -cyclopentadienyl)manganese(1+), *see* Mn-00142
Nonacarbonyldirhenium(2-), *see* Re-00040
Nonacarbonylferratemanganate(1-), Mn-00041
Nonacarbonyl- μ -hydronitrosylditungsten, W -00029
Nonacarbonyl(isocyanomethane)dimanganese, Mn-00065
Nonacarbonyl(1-methoxyethylidene)dirhenium, Re-00052
Nonacarbonyl(1-methoxyethylidene)ditechnetium, Tc-00007
Nonacarbonyl(1-methoxyethylidene)manganeserhenium, *see* Re-00050

- Nonacarbonyl(methoxyphenylmethylene)ditechnetium, Tc-00009
- Nonacarbonyl(methyl isocyanide)dimanganese, *see* Mn-00065
- Nonacarbonyl(triphenylphosphine)dimanganese, Mn-00134
- Norbornadienetetracarbonyltungsten, *see* W -00061
- Octacarbonylbis(isocyanomethane)dimanganese, Mn-00077
- Octacarbonylbis(μ -methanethiolato)dimanganese, *in* Mn-00012
- Octacarbonylbis(methyl isocyanide)dimanganese, *see* Mn-00077
- Octacarbonylbis(triethylphosphine)dimanganese, Mn-00121
- Octacarbonylbis(μ -(trifluoromethanethiolato))dirhenium, *in* Re-00009
- Octacarbonylbis(triphenylphosphine)dirhenium, Re-00091
- Octacarbonylbis(triphenylphosphine)ditechnetium, Tc-00013
- Octacarbonyldi(μ -bromo)dimanganese, *see* Mn-00027
- Octacarbonyldi(μ -chlorodichlorodimolybdenum, *see* Mo-00008
- Octacarbonyldi(μ -chloro)dimanganese, *see* Mn-00028
- Octacarbonyldi(μ -chlorodirhenium, Re-00031
- Octacarbonyl(μ -dihydrodichromate(2-), Cr-00037
- Octacarbonyl(μ -dihydrodimolybdate(2-), Mo-00009
- Octacarbonyldi(μ -hydroditungsten, Re-00032
- Octacarbonyldi(μ -hydroditungstate(2-), W -00017
- Octacarbonyldi(μ -iodo)dimanganese, *see* Mn-00040
- Octacarbonyldi(μ -iododimolybdenum, Mo-00021
- Octacarbonyldi(μ -iododitungsten, W -00028
- Octacarbonyl(μ -(diphenylphosphino)- μ -hydrodimanganese, Mn-00117
- Octacarbonyltetrachlorodimolybdenum, Mo-00008
- Octamethyldimolybdenum(4-), Mo-00020
- Octamethyldirhenate(2-), Re-00036
- Octamethyltungstate(2-), W -00027
- 1,1',3,3',5,5',7,7'-Octamethyluranocene, *see* U -00053
- 1,1',3,3',5,5',7,7'-Octaphenyluranocene, *see* U -00081
- Osmium dirhenium tetradeccarbonyl, *see* Re-00068
- μ -Oxobis[bis(acetylacetonato)(η^5 -cyclopentadienyl)hafnium], *see* Hf-00047
- μ -Oxobis[bis(η -cyclopentadienyl)chlorohafnium], *see* Hf-00027
- μ -Oxobis[bis(η^5 -cyclopentadienyl)[μ_3 -(oxymethylidyne)-cyclotris(tricarbonylcobalt)]hafnium], *see* Hf-00052
- μ -Oxobis[bis(η^5 -cyclopentadienyl)[μ_3 -(oxymethylidyne)-cyclotris(tricarbonylcobalt)]zirconium], *see* Zr-00113
- μ -Oxobis[bis(η -cyclopentadienyl)phenylthiolatozirconium], *see* Zr-00106
- μ -Oxobis[bis(η -cyclopentadienyl)-*o*-tolylzirconium], *see* Zr-00108
- μ -Oxobis[chlorobis(η -cyclopentadienyl)zirconium], *see* Zr-00061
- Oxotris(trimethylsilylmethyl)vanadium, V -00057
- Oxybis[dichlorocyclopentadienyltitanium], *see* Ti-00027
- ($\eta^{1,2}$ -[2,2]Paracyclophane)chromium, Cr-00132
- Pentaaquabenzylchromium(2+), Cr-00036
- Pentaaqua(phenylmethyl)chromium(2+), *see* Cr-00036
- Pentabenzyltantalum, Ta-00040
- Pentacarbonylacetoneitrilemanganese, *see* Mn-00020
- Pentacarbonylacylrhenium, *see* Re-00020
- Pentacarbonylarsinechromium, *see* Cr-00010
- Pentacarbonylbis(η^5 -2,4-cyclopentadien-1-yl)chromiumiron, *see* Cr-00125
- Pentacarbonylbis(cyclopentadienyl)divanadium, *see* V -00067
- Pentacarbonylbis(η^5 -2,4-cyclopentadien-1-yl)ironmolybdenum, *see* Mo-00087
- Pentacarbonylbis(η^5 -2,4-cyclopentadien-1-yl)irontungsten, *see* W -00102
- Pentacarbonyl[bis(diphenylphosphino)ethane]vanadate(1-), *see* V -00111
- Pentacarbonyl(*tert*-butyl isocyanide)vanadate(1-), *see* V -00025
- Pentacarbonylchlorochromate(1-), Cr-00006
- Pentacarbonyl[chloro(dimethylamino)methylene]chromium, Cr-00074
- Pentacarbonyl[chloro(dimethylamino)methylene]manganese(1+), Mn-00036
- Pentacarbonylchloromanganese, Mn-00010
- Pentacarbonylchlororhenium, Re-00007
- Pentacarbonylchloroditechnetium, Tc-00002
- Pentacarbonylchromate(2-), Cr-00008
- Pentacarbonyl(cyano-C)chromate(1-), Cr-00016
- Pentacarbonyl[cyano(dimethylamino)methylene]chromium, Cr-00055
- Pentacarbonyl(cyanomethane)manganese, *see* Mn-00020
- Pentacarbonyl(cyano-C)molybdate(1-), Mo-00006
- Pentacarbonyl[(cyano-C)trihydroborato(1-)-*N*]chromate(1-), Cr-00021
- Pentacarbonyl(cyano-C)tungstate(1-), W -00012
- Pentacarbonyl(cyano-C)vanadate(2-), V -00011
- Pentacarbonyl(dicarbonyl- π -cyclopentadienylferrio)manganese, *see* Mn-00075
- Pentacarbonyl[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)iron]manganese, Mn-00075
- Pentacarbonyl(diethylcyanamide-*N'*)chromium, Cr-00076
- Pentacarbonyl[(dimethylamino)methylene]chromium, Cr-00044
- Pentacarbonyl[(dimethylamino)methylidyne]chromium(1+), Cr-00039
- Pentacarbonyl[3-(dimethylamino)-3-phenyl-1,2-propadienylidene]chromium, Cr-00130
- Pentacarbonyl[(dimethylamino)(triphenylsilyl)methylene]chromium, Cr-00163
- Pentacarbonyl(1,3-dimethyl-2-imidazolidinylidene)molybdenum, Mo-00038
- Pentacarbonyl(1,3-dimethyl-2-imidazolidinylidene)tungsten, W -00049
- Pentacarbonyl(dimethyl sulfide)chromium, Cr-00034
- Pentacarbonyl-1,3-dioxalan-2-ylidenemanganese(1+), Mn-00030
- Pentacarbonyl(1,2-dioxopropyl)manganese, Mn-00029
- Pentacarbonyl[(2,3-diphenyl-2-cyclopropen-1-yl)]carbonylrhenium, Re-00078
- Pentacarbonyl(2,3-diphenyl-2-cyclopropen-1-ylidene)molybdenum, Mo-00112
- Pentacarbonyl(1,2-diphenyl-2-cyclopropen-1-yl)rhenium, Re-00077
- Pentacarbonyl[[(diphenylmethylene)amino]ethoxymethylene]chromium, Cr-00153
- Pentacarbonyl(diphenylmethylene)chromium, Cr-00143
- Pentacarbonyl(diphenylmethylene)molybdenum, Mo-00101
- Pentacarbonyl(diphenylmethylene)tungsten, W -00111
- ▶ Pentacarbonyl(diphenylthallium)manganese, Mn-00111
- Pentacarbonyl[η^1 -1,2-ethanediy]bis[diphenylphosphine]-*P*]vanadate(1-), V -00111
- Pentacarbonyl(ethene)rhenium(1+), Re-00021
- Pentacarbonyl[(η^2 -ethenyl)benzene]tungsten, W -00082
- Pentacarbonyl(ethoxycarbonyl)manganese, Mn-00035
- Pentacarbonyl(ethoxycarbonyl)rhenium, Re-00034
- Pentacarbonyl(1-ethoxyethylidene)tungsten, W -00036
- Pentacarbonyl(ethoxyferrocenylmethylene)molybdenum, Mo-00103
- Pentacarbonyl(ethoxyferrocenylmethylene)tungsten, W -00114
- Pentacarbonyl(ethoxyruthenocenylmethylene)chromium, Cr-00144
- Pentacarbonyl(ethoxyruthenocenylmethylene)molybdenum, Mo-00104
- Pentacarbonyl(ethoxyruthenocenylmethylene)tungsten, W -00116
- Pentacarbonyl[ethoxy(triphenylsilyl)carbene]molybdenum, *see* Mo-00131
- Pentacarbonyl[ethoxy(triphenylsilyl)methylene]molybdenum, Mo-00131
- Pentacarbonyl[ethoxy(triphenylsilyl)methylene]tungsten, W -00146
- Pentacarbonyl(ethylene)rhenium(1+), *see* Re-00021
- Pentacarbonyl(ferrocenylmethoxymethylene)chromium, Cr-00142
- Pentacarbonyl(ferrocenylmethyl)manganese, Mn-00108
- Pentacarbonyl(hexamethyldistannatellurane)chromium, Cr-00093
- Pentacarbonyl(hydrazine-*N*)chromium, Cr-00014
- Pentacarbonylhydridorhenium, Re-00010
- Pentacarbonyl(hydroformatoethyl ester)rhenium, *see* Re-00034
- ▶ Pentacarbonylhydromanganese, Mn-00011
- Pentacarbonylhydroxochromate(1-), Cr-00009
- Pentacarbonyliodochromate(1-), Cr-00007
- Pentacarbonyliodomanganese, Mn-00013
- Pentacarbonyliodomolybdate(1-), Mo-00004
- Pentacarbonyliodorhenium, Re-00011
- Pentacarbonyliododitechnetium, Tc-00003

- Pentacarbonyl(isocyanomethane)manganese(1+), Mn-00021
 Pentacarbonyl(2-isocyano-2-methylpropane)vanadate(1-), V -00025
 Pentacarbonylmanganate(1-), Mn-00014
 ▶ Pentacarbonylmanganese hydride, *see* Mn-00011
 Pentacarbonyl(1-methoxyethylidene)chromium, Cr-00042
 Pentacarbonyl(1-methoxyethylidene)molybdenum, Mo-00017
 Pentacarbonyl(methoxymethylcarbene)molybdenum, *see* Mo-00017
 Pentacarbonyl[methoxy(methyl)methylene]molybdenum, *see* Mo-00017
 Pentacarbonyl(methoxyphenylmethylene)chromium, Cr-00112
 Pentacarbonyl(methoxyphenylmethylene)tungsten, W -00083
 Pentacarbonyl(1-methoxy-3-phenyl-2-propenylidene)chromium, Cr-00126
 Pentacarbonyl[1-(methylamino)ethylidene]chromium, Cr-00045
 Pentacarbonylmethylchromate(1-), Cr-00024
 Pentacarbonyl(methylisocyanide)manganese(1+), *see* Mn-00021
 Pentacarbonylmethylmanganese, Mn-00016
 Pentacarbonylmethylrhenium, Re-00014
 Pentacarbonyl(methyl thiocyanate-*N*)chromium, Cr-00028
 Pentacarbonylmethyltungstate(1-), W -00009
 Pentacarbonyl(monomethylcarbonotrithioato-*S*)rhenium, Re-00019
 Pentacarbonyl(pentacarbonylmanganese)rhenium, Re-00043
 Pentacarbonyl(pentacarbonylmanganese)(tetracarbonyliron)rhenium, Re-00062
 Pentacarbonyl(pentafluoroethyl)manganese, Mn-00019
 Pentacarbonyl(pentafluorophenyl)manganese, Mn-00064
 Pentacarbonylphenylmanganese, Mn-00066
 Pentacarbonyl(phosphine)chromium, Cr-00012
 Pentacarbonyl-2-propenylmanganese, Mn-00034
 Pentacarbonyl(η^3 -2-propenyl)vanadium, V -00016
 Pentacarbonylrhenate(1-), Re-00012
 Pentacarbonylrhenium(I) hydride, *see* Re-00010
 Pentacarbonyl[[[(stannylenedimethylidene)-tetrakis(trimethylsilylato)](2-)-*Sn*]chromium, *see* Cr-00148
 Pentacarbonyl(stibine)chromium, Cr-00013
 Pentacarbonyl(η^2 -styrene)tungsten, *see* W -00082
 Pentacarbonyl(sulfur dioxide-*S*)manganese(1+), Mn-00015
 Pentacarbonyl(sulfur dioxide-*S*)rhenium(1+), Re-00013
 Pentacarbonyl[tetracarbonyl(1-methoxyethylidene)]manganese-rhenium, Re-00050
 Pentacarbonyl(tetrahydrofuran)chromium, Cr-00061
 Pentacarbonyl[thiobis[methane]]chromium, *see* Cr-00034
 Pentacarbonyltri- μ -chloronitrosyldirhenium, Re-00008
 Pentacarbonyl(trifluoroacetato-*O*)manganese, Mn-00018
 Pentacarbonyl(trimethylphosphine)chromium, Cr-00047
 Pentacarbonyl(trimethylphosphine sulfide-*S*)chromium, Cr-00048
 Pentacarbonyl(trimethylplumbyl)manganese, Mn-00038
 Pentacarbonyl[1-(trimethylsiloxy)ethylidene]chromium, Cr-00080
 Pentacarbonyl(trimethylsilyl)manganese, Mn-00039
 Pentacarbonyl[(1,2,3- η)-1,2,3-triphenyl-2-cyclopropen-1-yl]vanadium, V -00103
 Pentacarbonyl(triphenylphosphine)manganese(1+), Mn-00129
 Pentacarbonyl(triphenylphosphine)molybdenum, Mo-00119
 Pentacarbonyl(triphenylphosphine)vanadate(1-), V -00094
 Pentacarbonyl(triphenylphosphine)vanadium, V -00095
 Pentacarbonylvanadate(3-), V -00008
 Pentacarbonyl(trimethylplumbyl)rhenium, Re-00035
 Pentachloro[(trimethylsilyl)methyl]tungsten, W -00001
 Pentafluorophenylpentacarbonylmanganese, *see* Mn-00064
 Pentakis(phenylmethyl)tantalum, *see* Ta-00040
 Pentamethyl[bis(dimethylphosphino)ethane]niobium, *see* Nb-00021
 (Pentamethylcyclopentadienyl)dichloro(diphenylacetylene)tantalum, *see* Ta-00037
 (Pentamethylcyclopentadienyl)dichloro(ethylene)tantalum, *see* Ta-00018
 (Pentamethylcyclopentadienyl)dichloro(neopentylidene)tantalum, *see* Ta-00028
 (Pentamethylcyclopentadienyl)dimethyl(η^2 -benzyne)tantalum, *see* Ta-00033
 (Pentamethylcyclopentadienyl)(neopentylidene)(ethylene)-(trimethylphosphine)tantalum, *see* Ta-00034
 Pentamethylcyclopentadienyltetracarbonylniobium, *see* Nb-00030
 Pentamethylcyclopentadienyltetracarbonyltantalum, *see* Ta-00024
 Pentamethylcyclopentadienyltetrachloroniobium, *see* Nb-00016
 Pentamethylcyclopentadienyltetrachlorotantalum, *see* Ta-00012
 [(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]tetramethyltantalum, Ta-00025
 (Pentamethylcyclopentadienyl)titanium trichloride, *see* Ti-00040
 (Pentamethylcyclopentadienyl)tribenzylthorium, *see* Th-00036
 Pentamethylcyclopentadienyltribenzyluranium, *see* U -00072
 [(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]trichlorothorium, Th-00002
 [(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadienyl]trichlorouranium, U -00008
 [(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]triphenoxytitanium, Ti-00137
 (Pentamethylcyclopentadienyl)tris(allyl)uranium, *see* U -00031
 (Pentamethylcyclopentadienyl)tris(2-methylallyl)uranium, *see* U -00046
 [(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]tris(phenylmethyl)thorium, *see* Th-00036
 [(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]tris(phenylmethyl)uranium, *see* U -00072
 [(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]tris(2-propenyl)uranium, U -00031
 Pentamethylcyclopentadienyluranium trichloride, *see* U -00008
 ▶ Pentamethyltantalum, Ta-00005
 Permethyltitanocene, *see* Ti-00112
 (η^6 -Phenol)tricarbonylchromium, *see* Cr-00058
 Phenylpentacarbonylmanganese, *see* Mn-00066
 [μ (η^6 -Phenyl)](tricarbonylchromium)lithium, Cr-00054
 Phenyltris(isopropoxy)titanium, *see* Ti-00083
 Phenyltris(2-propanolato)titanium, Ti-00083
 ▶ Phenylvanadium oxydichloride, *see* V -00009
 Plutonocene, *see* Pu-00004
 [(Pyridine)di-*tert*-butylstannanedyl]pentacarbonylchromium, *see* Cr-00145
 Pyrrolylmanganese tricarbonyl, *see* Mn-00022
 Rhenium hexacarbonyl(1+), *see* Re-00017
 ▶ Rhenium hexamethyl, *see* Re-00016
 Rhenium pentacarbonyl bromide, *see* Re-00006
 Rhenium pentacarbonyl chloride, *see* Re-00007
 Scandium triphenyl, *see* Sc-00006
 Schwartz's reagent, *see* Zr-00011
 Tetra(π -allyl)dichromium, *see* Cr-00108
 Tetraallyldiiododichromium, *in* Cr-00026
 Tetraallyldimolybdenum, *see* Mo-00072
 Tetraallylhafnium, *see* Hf-00014
 Tetraallylthorium, *see* Th-00003
 Tetraallyluranium, *see* U -00010
 Tetraallylzirconium, *see* Zr-00026
 Tetrabenzylchlorotantalum, Ta-00039
 Tetrabenzylhafnium, Hf-00044
 Tetrabenzylthorium, Th-00030
 Tetrabenzyltitanium, Ti-00136
 Tetrabenzyltungsten, W -00149
 Tetrabenzylvanadium, V -00106
 Tetrabenzylzirconium, Zr-00101
 Tetra-*tert*-butoxyoxotungsten, *see* W -00110
 Tetra-*tert*-butylerbate(1-), Er-00013
 Tetra-*tert*-butylsamarate(1-), Sm-00011
 Tetra-*tert*-butylytterbate(1-), Yb-00017
 Tetracarbonylbis(cyclopentadienyl)bis(diphenylacetylene)dinobium, *in* Nb-00041
 Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -(trifluoromethanethiolato)]ditungsten, W -00106
 Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)dichromium, Cr-00120
 Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(2,3- η :2,3- η)-dimethyl-2-butyneedioate)]ditungsten, W -00127
 Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(dimethylphosphino)]- μ -hydrodimolybdenum, Mo-00095

- Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)dimolybdenum, Mo-00079
- Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)ditungsten, W -00090
- Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)- μ -methylenedimanganese, Mn-00102
- Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(phenylethylenylidene)dimanganese, Mn-00126
- Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(1,2- η^2 :3- η)-1,2-propadiene]dimolybdenum, Mo-00098
- Tetracarbonyl[bis(dimethylarsino)benzene]methylvanadium, *see* V -00069
- Tetracarbonylbis(1,3-dimethyl-2-imidazolidinylidene)molybdenum, Mo-00084
- Tetracarbonylbis(1,3-dimethyl-2-imidazolidinylidene)tungsten, W -00096
- Tetracarbonyl[1,2-bis(diphenylphosphino)ethane]chromium(1+), *see* Cr-00170
- Tetracarbonylbis(pentacarbonylmanganio)iron, Mn-00092
- Tetracarbonylbis(pentacarbonylmanganio)osmium, Mn-00096
- Tetracarbonylbis(pentacarbonylmanganio)ruthenium, Mn-00097
- Tetracarbonylbis(pentacarbonylrhenio)iron, Re-00063
- Tetracarbonylbis(pentacarbonylrhenio)osmium, Re-00068
- Tetracarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dichromium, Cr-00160
- Tetracarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dimolybdenum, Mo-00124
- Tetracarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ditungsten, W -00143
- Tetracarbonylbis(phosphine)chromium, Cr-00003
- Tetracarbonylbis(trimethylphosphine)chromium, Cr-00081
- Tetracarbonylbis(trimethyl phosphite-*P*)chromium, Cr-00082
- Tetracarbonylbis(triphenylphosphine)manganese(1+), Mn-00140
- Tetracarbonylbis(triphenylphosphine)rhenium(1+), Re-00088
- Tetracarbonylchloro[(diethylamino)methylidyne]chromium, Cr-00063
- Tetracarbonylchloroethylidynechromium, Cr-00022
- Tetracarbonylchloroethylidyne tungsten, W -00006
- Tetracarbonylchloromanganese, *in* Mn-00028
- Tetracarbonylchloro(phenylmethylidyne)tungsten, W -00058
- Tetracarbonylchloro(3-phenyl-2-propynylidyne)tungsten, W -00081
- Tetracarbonylchlororhenium, *in* Re-00031
- Tetracarbonylchloro(ruthenocenomethylidyne)tungsten, W -00101
- Tetracarbonylchromate(4-), Cr-00002
- Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]chromium, Cr-00104
- Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]molybdenum, Mo-00065
- Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]rhenium(1+), Re-00054
- Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]tungsten, W -00072
- Tetracarbonyl[(1,2,5,6- η)-1,3,5,7-cyclooctatetraene]tungsten, W -00069
- Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+), Mo-00022
- Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00009
- Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)tantalum, Ta-00009
- Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten(1+), W -00030
- Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00020
- Tetracarbonyl(di- μ -carbonylhexacarbonyldiferrate)manganate(1-), Mn-00072
- Tetracarbonyldichlorobis(η^5 -2,4-cyclopentadien-1-yl)ditungsten, W -00089
- Tetracarbonyldi- μ -chlorodichlorodinitrosydirhenium, Re-00003
- Tetracarbonyldichloromanganate(1-), Mn-00004
- Tetracarbonyldichloromolybdenum, *in* Mo-00008
- Tetracarbonyldicyanochromate(2-), Cr-00017
- Tetracarbonyldiiodomanganate(1-), Mn-00006
- Tetracarbonyl[1-[(dimethylamino)methyl]-2-(diphenylphosphino)ferrocene-*N,P*]tungsten, W -00150
- Tetracarbonyl[1-[(dimethylamino)methyl]-2-(diphenylphosphino)ferrocene-*N,P*]molybdenum, Mo-00135
- Tetracarbonyl[1-[(dimethylamino)methyl]-2-(diphenylphosphino)ferrocene-*N,P*]chromium, Cr-00168
- Tetracarbonyl[2-[(dimethylamino)methyl]phenyl-*C,N*]manganese, Mn-00088
- Tetracarbonyl(dimethylcarbomodithioato-*S,S'*)rhenium, Re-00026
- Tetracarbonyl(dimethylphenylphosphine)iodorhenium, Re-00053
- Tetracarbonyl[2-(diphenylphosphinophenyl-*C,P*)]rhenium, Re-00079
- Tetracarbonyl[μ -(diphenylphosphino)]-(tetracarbonylmanganio)iron, Mn-00116
- Tetracarbonyl[1,2-ethanediylbis[diphenylphosphine]-*P,P'*]hydrovanadium, V -00035
- Tetracarbonyl[1,2-ethanediylbis[diphenylphosphine]-*P,P'*]chromium, Cr-00169
- Tetracarbonyl[1,2-ethanediylbis[diphenylphosphine]-*P,P'*]chromium(1+), Cr-00170
- Tetracarbonyl[1,2-ethanediylbis[diphenylphosphine]-*P,P'*]hydrovanadium, V -00110
- Tetracarbonyl[1,2-ethanediylbis[diphenylphosphine]-*P,P'*]vanadate(1-), V -00108
- Tetracarbonyl[1,2-ethanediylbis[diphenylphosphine]-*P,P'*]vanadium, V -00109
- Tetracarbonyl[[2-(η^2 -ethenyl)phenyl]diphenylphosphine-*P*]molybdenum, Mo-00122
- Tetracarbonyl[2-(η^2 -ethenyl)phenyldiphenylphosphine-*P*]tungsten, W -00139
- Tetracarbonylethylidyneiodotungsten, W -00008
- Tetracarbonyl(1,2,3,4,5,6-hexamethylbicyclo[2.2.0]hexa-2,5-diene)chromium, Cr-00134
- Tetracarbonyl(hexamethyldewarbenzene)chromium, *see* Cr-00134
- Tetracarbonylhydro(triphenylphosphine)manganese, Mn-00125
- Tetracarbonyliodoethylidynechromium, Cr-00023
- Tetracarbonyliodomanganese, *in* Mn-00040
- Tetracarbonyliodo[(methylthiomethylidyne)]tungsten, W -00007
- Tetracarbonyliodo(phenylmethylidyne)tungsten, W -00059
- Tetracarbonylmanganate(3-), Mn-00008
- Tetracarbonyl(methanethiolato)manganese, Mn-00012
- Tetracarbonyl(1-methoxyethylidene)(triphenylphosphine)molybdenum, Mo-00128
- Tetracarbonyl(η^5 -methyl-2,4-cyclopentadien-1-yl)vanadium, V -00024
- Tetracarbonylmethyl[1,2-phenylenebis(dimethylarsine)-*As,As'*]vanadium, V -00069
- Tetracarbonylmolybdate(4-), Mo-00001
- Tetracarbonylnitrosylmanganese, Mn-00007
- Tetracarbonylnitrosyl(triphenylphosphine)vanadium, V -00090
- Tetracarbonylnorbornadienechromium, *see* Cr-00087
- Tetracarbonylnorbornadienechromium, *see* Cr-00087
- Tetracarbonylnorbornadienemolybdenum, *see* Mo-00049
- Tetracarbonyl(2,5-norbornadiene)tungsten, *see* W -00061
- Tetracarbonyl[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]niobium, Nb-00030
- Tetracarbonyl[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00024
- Tetracarbonyl[2-(phenylazo)phenyl]manganese, Mn-00106
- Tetracarbonyl[2-(phenylazo)phenyl]rhenium, Re-00071
- Tetracarbonyl-2-(*N*-phenylformimidoyl)phenylmanganese, *see* Mn-00110
- Tetracarbonyl[2-[(phenylimino)methyl]phenyl-*C,N*]manganese, Mn-00110
- Tetracarbonyl[2-[(phenylimino)methyl]phenyl-*C,N*]rhenium, Re-00075
- Tetracarbonyl(η^3 -2-propenyl)manganese, Mn-00025
- Tetracarbonyl(η^3 -2-propenyl)rhenium, Re-00024
- Tetracarbonyl(η^3 -propenyl)(triphenylphosphine)vanadium, V -00102
- Tetracarbonylrhenium chloride, *in* Re-00031
- Tetracarbonyl(*o*-styryldiphenylphosphine)molybdenum, *see* Mo-00122

- Tetracarbonyltetrakis(cyclopentadienyl)tetravanadium, V -00098
 Tetracarbonyl[μ -(tetramethyldiphosphine)]-(pentacarbonylchromium)iron, Cr-00114
 Tetracarbonyl(trifluoromethanethiolato)rhenium, Re-00009
 Tetracarbonyl(triisopropylphosphine)tungstate(2-), W -00087
 Tetracarbonyl(triphenylphosphine)manganate(1-), Mn-00124
 Tetracarbonyl(triphenylstannane)(triisopropylphosphine)tungstate(1-), W -00152
 Tetracarbonyl[tris(1-methylethyl)phosphine]tungsten(2-), *see* W -00087
 Tetracarbonyltungstate(4-), W -00002
 Tetrachlorobis(η^5 -2,4-cyclopentadien-1-yl)[μ -(2,3-dimethyl-2,3-butanediolato(2-)-*O,O'*)]ditanium, Ti-00091
 Tetrachlorobis(cyclopentadienyl)dinitrosyldimolybdenum, *in* Mo-00003
 Tetrachlorobis(η^5 -2,4-cyclopentadien-1-yl)- μ -oxodititanium, Ti-00027
 Tetra- μ -chlorobis(dichloroaluminium)[(1,2,3,4,5,6- η)-hexamethylbenzene]titanium, Ti-00061
 Tetrachloro(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00006
 Tetrachloro(η^5 -2,4-cyclopentadien-1-yl)tantalum, Ta-00004
 Tetrachlorodimethylniobate(1-), Nb-00003
 Tetrachloro(1,1-dimethylpropylidyne)tungsten(1-), W -00004
 Tetrachloromethylniobium, Nb-00001
 Tetrachloromethyltantalum, Ta-00001
 Tetrachloromethyl(triphenylphosphine)niobium, Nb-00039
 Tetrachloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]niobium, Nb-00016
 Tetrachloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00012
 Tetrachlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)tetra- μ -oxotetratitanium, Ti-00105
 ▶ Tetracyclohexyltitanium, Ti-00127
 Tetra- π -cyclopentadienylbis[μ -(dimethylamino)]ditanium, *in* Ti-00058
 Tetra- π -cyclopentadienylbis(phenylethynyl)ditanium, Ti-00145
 Tetra- π -cyclopentadienyl-di- μ -hydrodititanium, *in* Ti-00037
 Tetra- π -cyclopentadienylprotactinium, *see* Pa-00002
 Tetra(cyclopentadienyl)titanium, *see* Ti-00107
 Tetradecacarbonyldimanganesecosmium, *see* Mn-00096
 Tetradecacarbonyldimanganeseruthenium, *see* Mn-00097
 Tetradecacarbonylhydrotrirhenium, Re-00064
 Tetradecacarbonylmanganeserheniumiron, *see* Re-00062
 Tetradecacarbonylsmiumdirhenium, *see* Re-00068
 Tetradecacarbonyltrimanganate(1-), Mn-00098
 Tetraethylammonium methylpentacarbonyltungstate, *in* W -00009
 (η^5 -Tetrahydroindenyl)titanium trichloride, *see* Ti-00020
 Tetraiodotetrakis(isocyanocyclohexane)uranium, *see* U -00067
 ▶ Tetrakispropylchromium, Cr-00110
 Tetrakis[μ -(acetato-*O,O'*)]bis(η^5 -2,4-cyclopentadien-1-yl)divanadium, V -00083
 Tetrakis(η^3 -allyl)dirhenium, *see* Re-00058
 Tetrakis[μ -(benzenethiolato)]bis(η^5 -2,4-cyclopentadien-1-yl)divanadium, V -00114
 Tetrakis[μ -benzoato-*O,O'*)]bis(η^5 -2,4-cyclopentadien-1-yl)ditanium, *in* Ti-00102
 Tetrakis(benzyl)tungsten, *see* W -00149
 Tetrakis(bicyclo[2.2.1]-hept-1-yl)titanium, Ti-00139
 Tetrakis(bicyclo[2.2.1]hept-1-yl)vanadium, V -00107
 Tetrakis[bis(η^5 -2,4-cyclopentadien-1-yl)hydromolybdenum]tetralthium, *in* Mo-00040
 Tetrakis[(1,2,3,4,5- η)-1,3-bis(trimethylsilyl)-2,4-cyclopentadien-1-yl]di- μ -chlorodipraesodymium, *in* Pr-00006
 Tetrakis[(1,2,3,4,5- η)-1,3-bis(trimethylsilylmethyl)-2,4-cyclopentadien-1-yl]di- μ -chlorodiytterbium, *in* Yb-00029
 Tetrakis(*tert*-butylamino)tetramethyldimolybdenum, *see* Mo-00117
 Tetrakis(*tert*-butylamino)tetramethylditungsten, *see* W -00131
 Tetrakis[μ_3 -(carbonyl-*C,C,O*)](heptacarbonyltriiron)-tetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]diytterbium, Yb-00036
 Tetrakis(cyclohexylisocyanide)tetraiodouranium, U -00067
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -(1- η :1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]dithorium, Th-00033
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -(3,3-dimethylbutynyl)]dierbium, *in* Er-00012
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis(2,2-dimethylpropyl)di- μ -hydrodizirconium, *in* Zr-00041
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis[μ_4 -(methanolato(4-)-*C:C:C:O*)]bis(nonacarbonyltricobalt)- μ -oxodihafnium, Hf-00052
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis[μ_4 -(methanolato(4-)-*C:C:C:O*)]bis(nonacarbonyltricobalt)- μ -oxodizirconium, Zr-00113
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -(methylene(diphenylphosphinidenio)methylidyne)]diuranium, U -00080
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis(2-methylphenyl)- μ -oxodizirconium, Zr-00108
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -fluorodititanium, *in* Ti-00028
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -iododititanium, *in* Ti-00030
 Tetrakis(η^5 -2,4-cyclopentadienyl)-di- μ -methyldidysprosium, *in* Dy-00003
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -methyldierbium, *in* Er-00005
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -methyldiholmium, *in* Ho-00003
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -methyldithulium, *in* Tm-00003
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -methyldiytterbium, *in* Yb-00006
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -methyldiytrium, *in* Y -00003
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -silyleneditanium, Ti-00110
 Tetrakis(η^5 -cyclopentadienyl)- μ -hydridodihydridoditungsten(1+), *see* W -00130
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -hydrodihydroditungsten(1+), W -00130
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -hydro[μ -(1,2- η :2- η -2-naphthalenyl)]dizirconium, Zr-00103
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)neptunium, Np-00005
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)protactinium, Pa-00002
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)[μ -(2,2,7,7-tetramethyl-3,4,5,6-octanetetron-*O*³,*O*⁵:*O*⁴,*O*⁶)]dilutetium, Lu-00024
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00014
 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00035
 Tetrakis[μ -(2,6-dimethoxyphenyl-*C:O*)]dichromium, Cr-00175
 Tetrakis[μ -(2,6-dimethoxyphenyl)-*C:O*]]dimolybdenum, Mo-00138
 Tetrakis[μ -(2,6-dimethoxyphenyl-*C:O*)]divanadium, V -00112
 Tetrakis(dimethylamino)titanium, Ti-00018
 Tetrakis(3,3-dimethyl-1-butynyl)erbate(1-), Er-00016
 Tetrakis(3,3-dimethyl-1-butynyl)lutetate(1-), Lu-00020
 Tetrakis(3,3-dimethyl-1-butynyl)samarate(1-), Sm-00015
 Tetrakis(1,1-dimethylethyl)erbate(1-), *see* Er-00013
 Tetrakis(1,1-dimethylethyl)samarate(1-), *see* Sm-00011
 Tetrakis(1,1-dimethylethyl)ytterbate(1-), *see* Yb-00017
 Tetrakis(2,2-dimethyl-1-phenylethenyl)hafnium, *see* Hf-00053
 Tetrakis(2,2-dimethyl-1-phenylethenyl)titanium, *see* Ti-00148
 Tetrakis(2,2-dimethyl-1-phenylethenyl)zirconium, *see* Zr-00114
 Tetrakis(2,6-dimethylphenyl)lutetate(1-), Lu-00023
 Tetrakis(2,6-dimethylphenyl)ytterbate(1-), Yb-00032
 Tetrakis[(dimethylphosphonio)bis(methylene)]dichromium, Cr-00137
 Tetrakis(2,2-dimethylpropyl)chromium, Cr-00151

- Tetrakis(2,2-dimethylpropyl)hafnium, Hf-00030
 Tetrakis[2,2-dimethylpropyl]titanium, Ti-00113
 Tetrakis(2,2-dimethylpropyl)zirconium, Zr-00068
 Tetrakis(2,5-dimethylpyrrolyl)uranium (IV), *see* U -00052
 ▶ Tetrakis(isopropyl)chromium, *see* Cr-00110
 Tetrakis[μ -(2-methoxyphenyl-C:O)]bis(2-methoxyphenyl-C,O)di-rhenium, Re-00090
 Tetrakis(1,2,3,4,5- η -1-methyl-2,4-cyclopentadien-1-yl)-bis[μ -3,3-dimethyl-1-butyn-1-yl]diytterbium, Yb-00035
 ▶ Tetrakis(1-methylethyl)chromium, *see* Cr-00110
 Tetrakis(2-methyl-1-phenyl-1-propenyl)hafnium, Hf-00053
 Tetrakis(2-methyl-1-phenyl-1-propenyl)titanium, Ti-00148
 Tetrakis(2-methyl-1-phenyl-1-propenyl)zirconium, Zr-00114
 Tetrakis(2-methyl-2-phenylpropyl)chromium, Cr-00178
 Tetrakis(2-methyl-2-phenylpropyl)dimanganese, *see* Mn-00141
 Tetrakis(2-methyl-2-propanolato)oxotungsten, W -00110
 Tetrakis(neopentyl)chromium, *see* Cr-00151
 Tetrakis(1-norbornyl)titanium, *see* Ti-00139
 Tetrakis(norbornyl)vanadium, *see* V -00107
 Tetrakis(pentacarbonylmanganio)uranium, Mn-00122
 Tetrakis(phenylmethyl)hafnium, *see* Hf-00044
 Tetrakis(phenylmethyl)thorium, *see* Th-00030
 Tetrakis(phenylmethyl)titanium, *see* Ti-00136
 Tetrakis(phenylmethyl)tungsten, *see* W -00149
 Tetrakis(phenylmethyl)vanadium, *see* V -00106
 Tetrakis(phenylmethyl)zirconium, *see* Zr-00101
 Tetrakis(η^3 -2-propenyl)dirhenium, Re-00058
 Tetrakis(η^3 -2-propenyl)hafnium, Hf-00014
 Tetrakis(η^3 -2-propenyl)thorium, Th-00003
 Tetrakis(η^3 -2-propenyl)uranium, U -00010
 Tetrakis(η^3 -2-propenyl)zirconium, Zr-00026
 Tetrakis(μ -tetramethylene)dichromate(4-), Cr-00136
 Tetrakis(2,4,6-trimethylphenyl)vanadate(1-), V -00117
 Tetrakis(2,4,6-trimethylphenyl)vanadium, V -00118
 Tetrakis[(trimethylsilyl)methyl]bis[μ -(trimethylsilyl)-methylidyne]diniobium, Nb-00046
 Tetrakis[(trimethylsilyl)methyl]chromium, Cr-00138
 ▶ Tetrakis(trimethylsilylmethyl)hafnium, Hf-00021
 Tetrakis[(trimethylsilyl)methyl]luteate(1-), Lu-00015
 Tetrakis(trimethylsilylmethyl)titanium, Ti-00093
 ▶ Tetrakis[(trimethylsilyl)methyl]vanadium, V -00077
 Tetrakis[(trimethylsilyl)methyl]yttrate(1-), Y -00010
 ▶ Tetrakis(trimethylsilylmethyl)zirconium, Zr-00045
 Tetramesitylvanadate(1-), *see* V -00117
 Tetramesitylvanadium, *see* V -00118
 Tetramethylammonium methylpentacarbonyltungstate, *in* W -00009
 ▶ Tetrakis[μ -(chromato(2-)-O:O')]dithallium, Cr-00004
 1,4-Tetramethylenebis(η^5 -cyclopentadienyl)titanium, *see* Ti-00073
 1,1,2,2-Tetramethylethanediolatobis[dichloro(η -cyclopentadienyl)titanium], *see* Ti-00091
 Tetramethylorhenium, Re-00005
 Tetramethyltetrakis(trimethylphosphine)dimolybdenum, Mo-00097
 Tetramethyl titanate, Ti-00005
 ▶ Tetramethyltitanium, Ti-00006
 Tetraepentylchromium, *see* Cr-00151
 Tetraepentylhafnium, *see* Hf-00030
 Tetraepentyltitanium, *see* Ti-00113
 Tetraepentylzirconium, *see* Zr-00068
 Tetranorbornylvanadium, *see* V -00107
 Tetraphenyltitanium, Ti-00124
 Tetra-2-propenyldichromium, Cr-00108
 Thalliumtricarbonyl(η^5 -cyclopentadienyl)molybdenum, *see* Mo-00015
 Thiocarbonyldicarbonyl(η^5 -cyclopentadienyl)iodotungsten, *see* W -00020
 Thiocarbonyldicarbonyl(η^5 -cyclopentadienyl)tungsten(1-), *see* W -00022
 Thiocarbonylpentacarbonyltungsten, *see* W -00013
 ▶ Thoracene, *see* Th-00009
 Thorium tetrabenzyl, *see* Th-00030
 ▶ Titanium diphenyl, *see* Ti-00052
 Titanium(IV) methoxide, *see* Ti-00005
 ▶ Titanium tetramethyl, *see* Ti-00006
 Titanium tetraphenyl, *see* Ti-00124
 ▶ Titanocene, Ti-00035
 Titanocene bis(trifluoroacetate), *see* Ti-00069
 Titanocene borohydride, *see* Ti-00038
 Titanocene diacetate, *see* Ti-00071
 Titanocene diazide, *see* Ti-00032
 Titanocene dibromide, *see* Ti-00024
 Titanocene dicarbonyl, *see* Ti-00051
 ▶ Titanocene dichloride, *see* Ti-00026
 Titanocene difluoride, *see* Ti-00029
 Titanocene diiodide, *see* Ti-00031
 (η^6 -Toluene)tricarbonylchromium, *see* Cr-00072
p-Tolyldicyclopentadienyltitanium, *see* Lu-00017
 Triacetato(η^5 -cyclopentadienyl)titanium, *see* Ti-00047
 Triacetoxycyclopentadienylzirconium, *see* Zr-00018
 Triallylchromium, *see* Cr-00064
 Triallyliodouranium, *see* U -00007
 Triallyl(pentamethylcyclopentadienyl)uranium, *see* U -00031
 Triallyluranium bromide, *see* U -00005
 Triallyluranium chloride, *see* U -00006
 Triallyluranium iodide, *see* U -00007
 ▶ Triallylvanadium, *see* V -00022
 Triaminetricarbonylmanganese(1+), Mn-00002
 Tribenzyl(η -cyclopentadienyl)zirconium, Zr-00094
 Tribenzyl(pentamethylcyclopentadienyl)thorium, Th-00036
 Tribenzyl(pentamethylcyclopentadienyl)uranium, U -00072
 Tribenzyl(piperidinyl)titanium, Ti-00130
 Tribromobis(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00010
 Tribromo(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00007
 Tribromo(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00003
 Tribromo(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00001
 Tribromo[(1,2,3,3a,7a- η -1*H*-inden-1-yl)](triphenylphosphine oxide-*O*)uranium, U -00063
 Tribromomethyltitanium, Ti-00001
 Tricarbonyl(η^6 -acetophenone)chromium, *see* Cr-00088
 Tricarbonyl(acetyl- π -cyclopentadienyl)manganese, *see* Mn-00055
 Tricarbonyl(aniline)chromium, *see* Cr-00059
 Tricarbonylanisolechromium, *see* Cr-00073
 Tricarbonyl- η^6 -anthracenechromium, *see* Cr-00140
 Tricarbonyl- η^6 -arsabenzenechromium, *see* Mo-00010
 ▶ Tricarbonylbenzenechromium, *see* Cr-00057
 Tricarbonyl(η^6 -benzene)manganese(1+), *see* Mn-00045
 Tricarbonyl(η^6 -benzene)molybdenum, *see* Mo-00023
 Tricarbonylbenzenetungsten, *see* W -00031
 Tricarbonyl(η^6 -benzyltrimethylsilyl)chromium, Cr-00116
 Tricarbonyl(η^6 -benzyltrimethylstannane)chromium, *see* Cr-00117
 Tricarbonyl- η^6 -bicyclo[6.1.0]nona-2,4,6-trienemolybdenum, *see* Mo-00062
 Tricarbonylbis(diethylcarbomodithioato-S,S')tungsten, W -00086
 Tricarbonyl(carboxy- π -cyclopentadienyl)manganese, Mn-00044
 Tricarbonyl(η^6 -chlorobenzene)chromium, Cr-00052
 Tricarbonyl(η^6 -chlorobenzene)manganese(1+), *see* Mn-00042
 Tricarbonylchlorobis(triphenylphosphine)rhenium(1+), Re-00087
 Tricarbonylchlorobis(triphenylphosphine)technetium, Tc-00012
 Tricarbonylchloro(η^5 -2,4-cyclopentadien-1-yl)molybdenum, Mo-00012
 Tricarbonylchloro(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00019
 Tricarbonyl(chloromercury)[μ -[(1- η :1,2,3,4,5,6- η)phenyl]]chromium, Cr-00051
 Tricarbonylchloronitrosyl(triphenylphosphine)tungsten, W -00133
 Tricarbonyl(cyano-C)(η^5 -2,4-cyclopentadien-1-yl)vanadate(1-), V -00018
 Tricarbonyl[(1,2,3,4,5- η)-2,4-cycloheptadien-1-yl]manganese, Mn-00056
 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-cycloheptatriene]chromium, Cr-00071
 ▶ Tricarbonyl[(1,2,3,4,5,6 η)-1,3,5-cycloheptatriene]molybdenum, Mo-00033
 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-cycloheptatriene]tungsten, W -00042
 Tricarbonyl[(2,3,4,5,6,7- η)-2,4,6-cycloheptatrien-1-one]chromium, Cr-00069

Tricarbonyl(η^7 -cycloheptatrienyl)chromium(1+), Cr-00070
 Tricarbonyl(η^7 -cycloheptatrienyl)molybdenum(1+), Mo-00032
 Tricarbonyl(η^7 -cycloheptatrienyl)tungsten(1+), W -00041
 Tricarbonyl(η^7 -cycloheptatrienyl)vanadium, V -00023
 Tricarbonyl[(1,2,3,4,5- η)-2,4,6-cycloheptatrien-1-yl]manganese, Mn-00054
 Tricarbonyl[μ -[(1,2,3- η :4,5,6,7- η)-2,4,6-cycloheptatrien-1-yl]](tricarbonyliron)manganese, Mn-00087
 Tricarbonyl[(1,2,3,4,5- η)-2,4-cyclohexadien-1-yl]manganese, Mn-00047
 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5,7-cyclooctatetraene]chromium, Cr-00085
 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5,7-cyclooctatetraene]molybdenum, Mo-00047
 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5,7-cyclooctatetraene]tungsten, W -00060
 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-cyclooctatriene]chromium, Cr-00090
 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-cyclooctatriene]molybdenum, Mo-00051
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)acetyltungsten, *see* W -00044
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)chromate(1-), Cr-00038
 Tricarbonyl- π -cyclopentadienyl(dicarbonyl- π -cyclopentadienylferrio)molybdenum, *see* Mo-00087
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)iron]molybdenum, Mo-00087
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)iron]chromium, Cr-00125
 ▶ Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(diethylthallium)molybdenum, Mo-00068
 ▶ Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(diethylthallium)tungsten, W -00075
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(dimethylaminomethylene)vanadium, V -00044
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(dimethylarsino)tungsten, W -00051
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(dimethylstilbino)tungsten, W -00053
 ▶ Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(dimethylthallium)molybdenum, Mo-00042
 ▶ Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(dimethylthallium)tungsten, W -00054
 ▶ Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(diphenylthallium)tungsten, W -00126
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)molybdenum(1+), Mo-00035
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)tungsten(1+), W -00045
 Tricarbonyl(η^5 -cyclopentadienyl)(ethylene)tungsten(1+), *see* W -00045
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(ferrocenylcarbonyl)tungsten, W -00121
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)ferrocenylmolybdenum, Mo-00102
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)ferrocenyltungsten, W -00113
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(hydrazine-*N*)molybdenum(1+), Mo-00018
 Tricarbonyl- π -cyclopentadienylhydrochromium, *see* Cr-00041
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydrochromium, Cr-00041
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydromolybdenum, Mo-00016
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydrotungsten, W -00024
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydrovanadate(1-), V -00017
 Tricarbonyl[(η^6 -2,4-cyclopentadien-1-ylidene)phenylmethyl]benzene]tungsten, *see* W -00132
 Tricarbonyl[[[(2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]phenylmethyl]benzene]chromium, *see* Cr-00152
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)iodomolybdenum, Mo-00013

Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)iodotungsten, W -00021
 Tricarbonyl[(η^5 -2,4-cyclopentadien-1-yl)iron][μ -[(1,2,3,4,5- η :1,2,3,4,5- η)-3,4-diethyl-2,5-dihydro-2,5-dimethyl-1,2,5-thiadiborole]]manganese, Mn-00109
 ▶ Tricarbonylcyclopentadienylmanganese, *see* Mn-00033
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)methanesulfonyltungsten, W -00035
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)methylchromium, *see* Cr-00060
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)methylmolybdenum, Mo-00025
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)methyltungsten, W -00034
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)methylvanadate(1-), V -00021
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdate(1-), Mo-00014
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)rhenium, Re-00033
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)technetium, *see* Tc-00004
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(tetracarbonylcobalt)molybdenum, Mo-00060
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)thalliummolybdenum, Mo-00015
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(thiocarbonyl)vanadium, V -00019
 Tricarbonyl- π -cyclopentadienyl(trimethylgermyl)chromium, Cr-00091
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(trimethylgermyl)molybdenum, Mo-00056
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(trimethylgermyl)tungsten, W -00063
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(trimethylplumbyl)molybdenum, Mo-00057
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(trimethylsilyl)molybdenum, Mo-00058
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(trimethylsilyl)tungsten, W -00064
 Tricarbonyl- π -cyclopentadienyl(trimethylstannyl)chromium, Cr-00092
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(trimethylstannyl)molybdenum, Mo-00059
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(trimethylstannyl)tungsten, W -00065
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(triphenylphosphine)niobium, Nb-00047
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(triphenylphosphine)vanadium, V -00104
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(triphenylplumbyl)chromium, Cr-00162
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungstate(1-), W -00023
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)vanadate(2-), V -00015
 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)iron]tungsten, W -00102
 Tricarbonyldichloro(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00008
 Tricarbonyl[(3a,4,5,6,7,7a- η)-2,3-dihydro-1*H*-inden-1-ol]chromium, Cr-00099
 Tricarbonyl- η^6 -6,6-dimethylfulvenemolybdenum, *see* Mo-00052
 Tricarbonyl(η^6 -6,6-diphenylfulvene)chromium, *see* Cr-00152
 Tricarbonyldiphenylfulvenetungsten, *see* W -00132
 Tricarbonyl η^6 -8,8-diphenylheptafulvenemolybdenum, *see* Mo-00120
 Tricarbonyl[(1,2,3,4,5,6- η)-7-(diphenylmethylene)-1,3,5-cycloheptatriene]molybdenum, Mo-00120
 Tricarbonyl(diphenylmethylenecyclopentadiene)chromium, Cr-00152
 Tricarbonyl(diphenylmethylenecyclopentadiene)tungsten, W -00132
 Tricarbonyl[1,2-ethanediylbis[diphenylphosphine]-*P,P'*]nitrosylmolybdenum(1+), Mo-00134
 Tricarbonyl(η^2 -ethene)bis(trimethylphosphine)tungsten, W -00066
 Tricarbonyl[(1,2,3,4,5,6- η)ethenylbenzene]molybdenum, Mo-00048

- Tricarbonyl(ethoxy- π -cycloheptatrienyl)chromium(1+), Cr-00100
- Tricarbonyl(η^6 -(ferrocenylbenzene))chromium, *see* Cr-00146
- Tricarbonyl[(1,2,3,4,5- η)-ferrocenyl-2,4-cyclopentadien-1-yl]manganese, Mn-00112
- Tricarbonyl[(1,2,3,4,5- η)-1-(ferrocenylmethyl)-2,4-cyclopentadien-1-yl]manganese, Mn-00114
- Tricarbonyl(η^6 -fluorobenzene)chromium, *see* Cr-00053
- Tricarbonyl(η^6 -heptafulvene)chromium, *see* Cr-00086
- Tricarbonyl[(1,2,3,4,5,6- η)-hexamethylbenzene]tungsten, W -00105
- Tricarbonylhydrobis(triphenylphosphine)manganese, Mn-00139
- Tricarbonylhydro(η^6 -mesitylene)vanadium, *see* V -00053
- Tricarbonylhydro(η^6 -1,3,5-trimethylbenzene)vanadium, V -00053
- Tricarbonyl- η^6 -1-indanolchromium, *see* Cr-00099
- Tricarbonyl(mesitylene)chromium, *see* Cr-00103
- Tricarbonylmesitylenetungsten, *see* W -00071
- Tricarbonyl(methanethiolato)manganese, Mn-00005
- Tricarbonyl(methanethiolato)rhenium, Re-00004
- Tricarbonyl-(1,2,3,4,5- η -methoxybenzene)chromium, Cr-00073
- Tricarbonyl[(1,2,3,4,5,6- η)methylbenzene]chromium, Cr-00072
- Tricarbonyl[(1,2,3,4,5,6- η)methylbenzene]molybdenum, Mo-00034
- Tricarbonyl[(1,2,3,4,5,6- η)methylbenzene]tungsten, W -00043
- Tricarbonyl[(1,2,3,4,5,6- η)methyl benzoate]chromium, Cr-00089
- ▶ Tricarbonyl(methylcyclopentadienyl)manganese, *see* Mn-00046
- Tricarbonyl(2,3,4,5- η -9,10- η -methylenebicyclo[4.2.1]-nona-2,4,7-triene)chromium, Cr-00113
- Tricarbonyl[(1,2,3,4,5,6- η)-7-methylene-1,3,5-cycloheptatriene]chromium, Cr-00086
- Tricarbonyl[η^6 -5-(1-methylethylidene)-1,3-cyclopentadiene]molybdenum, Mo-00052
- Tricarbonyl[(1,2,3,4,5,6- η)-4-methyl-1-phenylboratabenzene]manganese, Mn-00101
- Tricarbonyl(1-methylpyrrole)chromium, Cr-00043
- Tricarbonyl[(1,2,3,4,4a,8a- η)naphthalene]chromium, Cr-00111
- Tricarbonylnitrosyl(1,10-phenanthroline- N^1, N^{10})tungsten(1+), W -00098
- Tricarbonyl(η^6 -octamethylnaphthalene)chromium, Cr-00154
- Tricarbonyl(η^6 -octamethylnaphthalene)molybdenum, Mo-00118
- Tricarbonyl(η^6 -octamethylnaphthalene)tungsten, W -00134
- Tricarbonyl(3-8- η -[2.2]paracyclophane)chromium, Cr-00147
- Tricarbonyl[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]rhenium, Re-00061
- Tricarbonyl- η^6 -phenanthrenechromium, Cr-00141
- Tricarbonyl(η^6 -phenol)chromium, Cr-00058
- Tricarbonyl[(1,2,3,4,5,6- η)-7-phenyl-1,3,5-cycloheptatriene]chromium, Cr-00131
- Tricarbonyl[1-(η^6 -phenyl)ethanone]chromium, Cr-00088
- Tricarbonyl[(1,2,3,4,5,6- η)-7-(1-phenylethylidene)-1,3,5-cycloheptatriene]tungsten, W -00115
- Tricarbonyl(phenylferrocene)chromium, Cr-00146
- Tricarbonyl(8-phenyl-8-methylheptafulvene)tungsten, *see* W -00115
- Tricarbonyl- π -pyrrolylmanganese, Mn-00022
- Tricarbonyl(η^6 -styrene)molybdenum, *see* Mo-00048
- Tricarbonyl[(4a,5,6,7,8,8a- η)-1,2,3,4-tetrahydro-1-naphthalenol]chromium, Cr-00115
- Tricarbonyl- η^6 -1-tetralolchromium, *see* Cr-00115
- Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5,7-tetramethyl-1,3,5,7-cyclooctatetraene]chromium, Cr-00127
- Tricarbonyl(η^6 -1,3,5,7-tetramethyl-1,3,5,7-cyclooctatetraene)molybdenum, Mo-00090
- Tricarbonylthiophenechromium, Cr-00030
- Tricarbonyl(η^6 -toluene)chromium, *see* Cr-00072
- Tricarbonyl(η^6 -toluene)molybdenum, *see* Mo-00034
- Tricarbonyltoluenetungsten, *see* W -00043
- Tricarbonyltrichlororhenate(2-), Re-00002
- Tricarbonyl[(1,10,11,12,13,14- η)-tricyclo[8.2.2.2^{4,7}]-hexadeca-4,6,10,12,13,15-hexaene]chromium, *see* Cr-00147
- Tricarbonyltri- μ -hydro(nonacarbonyltri- μ -hydrotriosmium)rhenium, Re-00049
- Tricarbonyltri- μ -hydro[1,2-phenylenebis(dimethylarsine)-As,As']vanadium, V -00061
- Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]chromium, Cr-00103
- Tricarbonyl-1,3,5-trimethylbenzenemolybdenum, *see* Mo-00064
- Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]tungsten, W -00071
- Tricarbonyl[trimethyl(η^6 -phenyl)methylsilane]chromium, *see* Cr-00116
- Tricarbonyl(trimethylphenylstannane)chromium, Cr-00106
- Tricarbonyl(trimethylphenylstannane)molybdenum, *see* Mo-00067
- Tricarbonyl(η^6 -trimethylsilylbenzene)chromium, *see* Cr-00105
- Tricarbonyl(trimethylstannylbenzene)chromium, *see* Cr-00106
- Tricarbonyl(η^6 -trimethylstannylbenzene)molybdenum, Mo-00067
- Tricarbonyl(η^6 -2,4,6-triphenylphosphabenzene)chromium, *see* Cr-00161
- Tricarbonyl[(1,2,3,4,5,6- η)-2,4,6-triphenylphosphorin]chromium, Cr-00161
- Tricarbonyltris(acetonitrile)molybdenum, *see* Mo-00026
- Tricarbonyltris(cyanomethane)manganese(1+), *see* Mn-00050
- Tricarbonyltris(isocyanomethane)manganese(1+), Mn-00049
- Tricarbonyltris(methylisocyanide)manganese(1+), *see* Mn-00049
- Tricarbonyltris(phosphine)chromium, Cr-00001
- Tricarbonyltris(trimethylphosphine)chromium, Cr-00109
- Tricarbonyl(η^6 -tropone)chromium, *see* Cr-00069
- Tricarbonyltropyliumchromium(1+), *see* Cr-00070
- Tricarbonyl(η^7 -tropylium)molybdenum(1+), *see* Mo-00032
- Tricarbonyl(η^7 -tropylium)tungsten(1+), *see* W -00041
- Tricarbonyl(tropylium)vanadium, *see* V -00023
- Trichlorobis(η^7 -2,4,6-cycloheptatrien-1-yl)dimolybdenum, Mo-00081
- Trichloro(η^5 -2,4-cyclopentadien-1-yl)-bis(triphenylphosphine oxide-*O*)uranium, U -00078
- Trichloro(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00001
- Trichloro(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00009
- Trichloro(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00005
- Trichloro(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00002
- Trichlorodimethylniobium, Nb-00002
- Trichloro(2,2-dimethylpropylidene)bis(trimethylphosphine)tantalum, Ta-00015
- Trichloro(1,1-dimethylpropylidene)(triethylphosphine oxide-*O*)tungsten, W -00067
- Trichlorodimethyltantalum, Ta-00002
- Trichloro(η^2 -ethene)bis(trimethylphosphine)tantalum, Ta-00008
- Trichloroethyltitanium, Ti-00003
- Tri- μ -chlorohexakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]triuranium, *in* U -00037
- Tri- μ -chlorohexakis(phenylmethyl)trirhenium, *see* Re-00089
- Trichloro[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]uranium, U -00003
- Trichloro(2-methyl-1-phenyl-1-propenyl)titanium, Ti-00036
- Trichloromethyltitanium, Ti-00002
- Trichloro(pentafluorophenyl)titanium, Ti-00012
- Trichloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]hafnium, Hf-00008
- Trichloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, Ti-00040
- Trichloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00014
- Trichloro(1-phenyl-2,2-dimethylethenyl)titanium, *see* Ti-00036
- Trichloro(phenylmethylidene)bis(trimethylphosphine)tantalum, *see* Ta-00023
- Trichloro(η^5 -tetrahydroindenyl)titanium, Ti-00020
- Trichlorotrimethylniobate(1-), Nb-00005
- Trichloro(trimethylsilylmethyl)titanium, Ti-00004
- Tricyclopentadienylallyluranium, *see* U -00024
- Tricyclopentadienylamericium, *see* Am-00001
- Tricyclopentadienylbenzyluranium, *see* U -00043
- Tricyclopentadienylberkelium, *see* Bk-00001
- Tricyclopentadienylbutylthorium, *see* Th-00012
- Tricyclopentadienyl(*sec*-butyl)uranium, *see* U -00030
- Tricyclopentadienyl(butyl)uranium(IV), *see* U -00029

Tricyclopentadienyl-*tert*-butyluranium(IV), *see* U -00028
 Tricyclopentadienylcalifornium, *see* Cf-00001
 Tri- π -cyclopentadienylcerium, *see* Ce-00003
 Tricyclopentadienylcerium chloride, *see* Ce-00004
 Tricyclopentadienylcurium, *see* Cm-00001
 Tricyclopentadienyl dysprosium, *see* Dy-00004
 Tricyclopentadienyl erbium, *see* Er-00011
 Tricyclopentadienyl europium, *see* Eu-00004
 Tri- π -cyclopentadienyl gadolinium, *see* Gd-00004
 Tricyclopentadienyl holmium, *see* Ho-00005
 Tri- π -cyclopentadienyl lanthanum, *see* La-00004
 Tricyclopentadienyl lutetium, *see* Lu-00012
 Tricyclopentadienyl- η^1 -2-methylallyluranium(IV), *see* U -00026
 Tricyclopentadienyl-4-methylbenzyluranium, *see* U -00048
 Tricyclopentadienyl methyluranium, *see* U -00020
 Tri- π -cyclopentadienyl neodymium, *see* Nd-00004
 Tricyclopentadienyl neopentylthorium, *see* Th-00015
 Tricyclopentadienyl neopentyluranium(IV), *see* U -00036
 Tricyclopentadienyl neptunium chloride, *see* Np-00001
 Tricyclopentadienyl neptunium fluoride, *see* Np-00002
 Tricyclopentadienyl phenylcerium, *see* Ce-00008
 Tricyclopentadienyl phenylethynyluranium(IV), *see* U -00047
 Tricyclopentadienyl plutonium, *see* Pu-00002
 Tricyclopentadienyl plutonium chloride, *see* Pu-00001
 Tri- π -cyclopentadienyl praseodymium, *see* Pr-00003
 Tricyclopentadienyl promethium, *see* Pm-00001
 Tri- π -cyclopentadienyl samarium, *see* Sm-00009
 Tricyclopentadienyl scandium, *see* Sc-00005
 Tricyclopentadienyl terbium, *see* Tb-00002
 Tricyclopentadienyl thorium, *see* Th-00008
 Tricyclopentadienyl thorium fluoride, *see* Th-00006
 Tricyclopentadienyl thorium iodide, *see* Th-00007
 Tricyclopentadienyl thulium, *see* Tm-00004
 Tricyclopentadienyl uranium, *see* U -00015
 Tricyclopentadienyl uranium acetylide, *see* U -00022
 Tricyclopentadienyl uranium bromide, *see* U -00012
 Tricyclopentadienyl uranium fluoride, *see* U -00016
 Tricyclopentadienyl uranium iodide, *see* U -00014
 Tricyclopentadienyl uranium thiocyanate, *see* U -00017
 Tricyclopentadienyl ytterbium, *see* Yb-00013
 Tri- π -cyclopentadienyl yttrium, *see* Y -00006
 Tridecacarbonyltrihydromanganesetriosmium, Mn-00086
 Tridecacarbonyltrihydrorheniumtriosmium, Re-00060
N,N,N-Triethylethanaminium(1+) pentacarbonylmethyltungstate(1-), *in* W -00009
 Triindenyl dysprosium, Dy-00006
 Triindenyl gadolinium, Gd-00008
 Triindenyl lanthanum, La-00006
 Triindenyl samarium, Sm-00017
 Triindenyl terbium, Tb-00005
 Triindenyl thorium chloride, *see* Th-00028
 Triindenyl uranium chloride, *see* U -00062
 Triindenyl ytterbium, Yb-00030
 Triisopropoxyphenyltitanium, *see* Ti-00083
 Trimanganesetetradecacarbonyl(1-), *see* Mn-00098
 Trimesitylvanadium, *see* V -00105
 (η^6 -1,3,5-Trimethylbenzene)tricarbonylchromium, *see* Cr-00103
 (η^6 -1,3,5-Trimethylbenzene)tricarbonylmolybdenum, Mo-00064
 Tri(methylcyclopentadienyl)neodymium, *see* Nd-00006
 Trimethyldichloro(2,2'-bipyridyl)tantalum, *see* Ta-00020
 Trimethyldichloroniobium, *see* Nb-00004
 Trimethyldichlorotantalum, *see* Ta-00003
 Trimethylgermyltricarbonyl(η^5 -cyclopentadienyl)molybdenum, *see* Mo-00056
N,N,N-Trimethylmethanaminium(1+) pentacarbonylmethyltungstate(1-), *in* W -00009
 [Trimethyl(η^6 -phenyl)silane]tricarbonylchromium, Cr-00105
 (Trimethylplumbyl)(cyclopentadienyl)tricarbonylmolybdenum, *see* Mo-00057
 (Trimethylplumbyl)pentacarbonylmanganese, *see* Mn-00038
 (Trimethylplumbyl)pentacarbonylrhenium, *see* Re-00035
 Trimethylsilylmanganese pentacarbonyl, *see* Mn-00039
 (Trimethylsilylmethyl)dicyclopentadienyl lutetium, *see* Lu-00011

Trimethylsilyltricarbonyl(η^5 -cyclopentadienyl)molybdenum, *see* Mo-00058
 Trimethylstannyltricarbonyl(η^5 -cyclopentadienyl)molybdenum, *see* Mo-00059
 Trimethyltrichloroniobate(1-), *see* Nb-00005
 Trineopentyl(η -pentamethylcyclopentadienyl)zirconium, *see* Zr-00090
 (Triphenylplumbyl)(cyclopentadienyl)tricarbonylchromium, *see* Cr-00162
 Triphenylscandium, Sc-00006
 Triphenylstannylvanadium hexacarbonyl, *see* V -00096
 (*T*-4)Triphenyl(*P,P,P*-triphenylphosphineimidato-*N*)-phosphorus(1+) pentacarbonylmethylchromate(1-), *in* Cr-00024
 Triphenyltris(tetrahydrofuran)chromium, Cr-00171
 Triphenyltitanium, Y -00011
 Tris(acetato-*O*)(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00047
 Tris(acetato)(η -cyclopentadienyl)zirconium, Zr-00018
 Tris(acetonitrile)tricarbonylmanganese(1+), Mn-00050
 Tris(acetonitrile)tricarbonylmolybdenum, Mo-00026
 Tris(acetonitrile)tricarbonylrhenium(1+), Re-00038
 Tris(π -allyl)chromium, *see* Cr-00064
 Tris(π -allyl)uranium bromide, *see* U -00005
 Tris(π -allyl)uranium chloride, *see* U -00006
 Tris(benzylcyclopentadienyl)uranium(IV) chloride, *see* U -00075
 Tris[bis(triethylsilyl)methyl]chloroytterbiate(1-), Yb-00025
 Tris[bis(trimethylsilyl)methyl]chlorohafnium, Hf-00032
 Tris[bis(trimethylsilyl)methyl]chlorozirconium, Zr-00070
 Tris[bis(trimethylsilyl)methyl]scandium, Sc-00008
 Tris[bis(trimethylsilyl)methyl]titanium, Ti-00114
 Tris[bis(trimethylsilyl)methyl]vanadium, V -00089
 Tris[bis(trimethylsilyl)methyl]yttrium, Y -00013
 Tris(η^4 -1,3-butadiene)molybdenum, Mo-00070
 Tris(η^4 -1,3-butadiene)tungsten, W -00079
 Tris[(3,4- η)-3-buten-2-one-*O*]tungsten, W -00078
 Tris(*tert*-butoxy)(2,2-dimethylpropylidene)tantalum, *see* Ta-00032
 Tris(1,3,5,7-cyclooctatetraene)bis(tetrahydrofuran)dierbium, Er-00018
 Tris(1,3,5,7-cyclooctatetraene)bis(tetrahydrofuran)dilanthanum, La-00007
 Tris(1,3,5,7-cyclooctatetraene)dicerium, Ce-00009
 Tris(cyclooctatetraene)dichromium, *see* Cr-00159
 Tris(cyclooctatetraene)dimolybdenum, *see* Mo-00123
 Tris(1,3,5,7-cyclooctatetraene)dititanium, Ti-00126
 Tris(η^5 -2,4-cyclopentadien-1-yl)americium, Am-00001
 Tris(2,4-cyclopentadien-1-yl)aminocyttterbium, *in* Yb-00013
 Tris(η^5 -2,4-cyclopentadien-1-yl)berkelium, Bk-00001
 Tris(η^5 -2,4-cyclopentadien-1-yl)californium, Cf-00001
 Tris(η^5 -2,4-cyclopentadien-1-yl)cerium, Ce-00003
 Tris(η^5 -2,4-cyclopentadien-1-yl)curium, Cm-00001
 Tris(cyclopentadienyl)cyanouranium, *see* U -00018
 ▸ Tris(η^5 -2,4-cyclopentadien-1-yl)[μ -[(1- η :1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]]dititanium(Ti-Ti), *see* Ti-00104
 Tris(η^5 -cyclopentadienyl)diisothiocyanatouranate(IV), U -00021
 Tris(η^5 -2,4-cyclopentadien-1-yl)(1,1-dimethylethyl)uranium, *see* U -00028
 Tris(η^5 -2,4-cyclopentadien-1-yl)-[(dimethylphenylphosphoranylidene)methyl]uranium, U -00051
 Tris(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)thorium, Th-00015
 Tris(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)uranium, U -00036
 Tris(η^5 -2,4-cyclopentadien-1-yl)dysprosium, Dy-00004
 Tris(η^5 -2,4-cyclopentadien-1-yl)erbium, Er-00011
 Tris(η^5 -2,4-cyclopentadien-1-yl)ethynyluranium, U -00022
 Tris(η^5 -2,4-cyclopentadien-1-yl)europium, Eu-00004
 Tris(η^5 -2,4-cyclopentadien-1-yl)ferrocenyluranium, U -00057
 Tris(η^5 -2,4-cyclopentadien-1-yl)fluorouranium, U -00016
 Tris(η^5 -2,4-cyclopentadien-1-yl)gadolinium, Gd-00004
 Tris(η^5 -2,4-cyclopentadien-1-yl)holmium, Ho-00005

- Tris(2,4-cyclopentadien-1-yl)isocyanocyclohexanedysprosium, *in* Dy-00004
- Tris(2,4-cyclopentadien-1-yl)isocyanocyclohexaneerbium, *in* Er-00011
- Tris(η^5 -2,4-cyclopentadien-1-yl)isocyanocyclohexaneholmium, *in* Ho-00005
- Tris(η^5 -2,4-cyclopentadien-1-yl)isocyanocyclohexanelutetium, *in* Lu-00012
- Tris(η^5 -2,4-cyclopentadien-1-yl)isocyanocyclohexaneterbium, *in* Tb-00002
- Tris(2,4-cyclopentadien-1-yl)isocyanocyclohexanethulium, *in* Tm-00004
- Tris(η^5 -2,4-cyclopentadien-1-yl)isocyanocyclohexaneuranium, *in* U-00015
- Tris(η^5 -2,4-cyclopentadien-1-yl)isocyanocyclohexaneytterbium, *in* Yb-00013
- Tris(η^5 -2,4-cyclopentadien-1-yl)lanthanum, La-00004
- Tris(η^5 -2,4-cyclopentadien-1-yl)lutetium, Lu-00012
- Tris(η^5 -2,4-cyclopentadien-1-yl)-[(methylphenylphosphoranyliden)acetyl]uranium, U-00070
- ▷ Tris(η^5 -2,4-cyclopentadien-1-yl)-(methylphenylphosphoranylidenemethyl)uranium, U-00069
- [Tris(η^5 -2,4-cyclopentadien-1-yl)][(4-methylphenyl)methyl]uranium, U-00048
- Tris(η^5 -2,4-cyclopentadien-1-yl)(2-methyl-1-propenyl)uranium, U-00026
- Tris(η^5 -2,4-cyclopentadien-1-yl)(1-methylpropyl)uranium, U-00030
- Tris(η^5 -2,4-cyclopentadien-1-yl)methylthorium, Th-00010
- Tris(η^5 -2,4-cyclopentadien-1-yl)methyluranium, U-00020
- Tris(η^5 -2,4-cyclopentadien-1-yl)neodymium, Nd-00004
- Tris(η^5 -2,4-cyclopentadien-1-yl)(nicotine)plutonium, *in* Pu-00002
- Tris(η^5 -2,4-cyclopentadienyl)(nicotine)uranium, *in* U-00015
- Tris(η^5 -2,4-cyclopentadien-1-yl)- μ_3 -nitrosyltri- μ -nitrosyltrimanganese, Mn-00104
- Tris(η^5 -2,4-cyclopentadien-1-yl)phenylcerium, Ce-00008
- Tris(η^5 -2,4-cyclopentadien-1-yl)(phenylethynyl)uranium, U-00047
- Tris(η^5 -2,4-cyclopentadien-1-yl)(phenylmethyl)uranium, *see* U-00043
- Tris(η^5 -2,4-cyclopentadien-1-yl)plutonium, Pu-00002
- Tris(η^5 -2,4-cyclopentadien-1-yl)praseodymium, Pr-00003
- Tris(η^5 -2,4-cyclopentadien-1-yl)promethium, Pm-00001
- Tris(η^5 -2,4-cyclopentadien-1-yl)-2-propenyluranium, U-00024
- Tris(η^5 -2,4-cyclopentadien-1-yl)samarium, Sm-00009
- Tris(η^5 -2,4-cyclopentadien-1-yl)scandium, Sc-00005
- Tris(η^5 -2,4-cyclopentadien-1-yl)terbium, Tb-00002
- Tris(η^5 -2,4-cyclopentadienyl)tetrahydrofuranplutonium, *in* Pu-00002
- Tris(η^5 -2,4-cyclopentadien-1-yl)tetrahydrofuranytterbium, *in* Yb-00013
- Tris(η^5 -2,4-cyclopentadien-1-yl)(thiocyanato-*N*)uranium, U-00017
- Tris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00008
- Tris(η^5 -2,4-cyclopentadien-1-yl)thulium, Tm-00004
- Tris(η -cyclopentadienyl)titanium, *see* Ti-00079
- Tris(η^5 -2,4-cyclopentadien-1-yl)triphenylphosphineytterbium, *in* Yb-00013
- Tris(η^5 -2,4-cyclopentadien-1-yl)uranium, U-00015
- Tris(cyclopentadienyl)uranium chloride, *see* U-00013
- Tris(η^5 -2,4-cyclopentadien-1-yl)ytterbium, Yb-00013
- Tris(η^5 -2,4-cyclopentadien-1-yl)yttrium, Y-00006
- Tris(diethylamido)ethylvanadium, V-00066
- Tris(diethylamido)methyltitanium, *see* Ti-00068
- Tris(diethylaminato)ferrocenyltitanium, Ti-00120
- Tris(diethylaminato)methyltitanium, Ti-00068
- [Tris(diethylamino)titanium]ferrocene, *see* Ti-00120
- Tris(diethyl ether)methylphenylzirconium, Zr-00059
- Tris(dimethylamido)methyltitanium, *see* Ti-00014
- Tris(dimethylamido)(trimethylsilylmethyl)titanium, Ti-00043
- Tris(dimethylaminato)methyltitanium, Ti-00014
- Tris(2-dimethylaminobenzyl)scandium, *see* Sc-00014
- Tris[2-[(dimethylamino)methyl]phenyl-*C,N*]scandium, Sc-00013
- ▷ Tris[[2-(dimethylamino)phenyl]methyl-*C,N*]chromium, Cr-00166
- [Tris(2-(dimethylamino)phenyl)methyl-*C,N*]scandium, Sc-00014
- Tris[(1,2,3,4,5- η)-2,4-dimethyl-2,4-pentadienyl]neodymium, Nd-00009
- ▷ Tris(2,4-dimethylpentadienyl)uranium, U-00041
- Tris[(dimethylphosphinidenio)bis(methylene)]lutetium, Lu-00008
- Tris[(dimethylphosphinidenio)bis(methylene)]lanthanum, La-00002
- Tris(2,2-dimethylpropyl)(2,2-dimethylpropylidene)tantalum, Ta-00035
- Tris(2,2-dimethylpropyl)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00090
- Tris(*N*-ethylethanaminato)ferrocenyltitanium, *see* Ti-00120
- Tris(3-hexyne)dierbium, Er-00015
- Tris(hydridomanganese tetracarbonyl), *see* Mn-00074
- Tris(η^5 -indenyl)butylthorium, *see* Th-00035
- Tris(1,2,3,3a,7a- η)-1*H*-inden-1-yl dysprosium, *see* Dy-00006
- Tris(1,2,3,3a,7a- η)-1*H*-inden-1-yl gadolinium, *see* Gd-00008
- Tris(1,2,3,3a,7a- η)-1*H*-inden-1-yl lanthanum, *see* La-00006
- Tris[(1,2,3,3a,7a- η)-1*H*-indenyl]methylthorium, Th-00029
- Tris[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]methyluranium, U-00066
- Tris(1,2,3,3a,7a- η)-1*H*-inden-1-yl samarium, *see* Sm-00017
- Tris(1,2,3,3a,7a- η)-1*H*-inden-1-yl terbium, *see* Tb-00005
- Tris(1,2,3,3a,7a- η)-1*H*-inden-1-yl ytterbium, *see* Yb-00030
- Tris[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]neodymium, Nd-00006
- Tris(*N*-methylmethanaminato)[(trimethylsilyl)methyl]titanium, *see* Ti-00043
- Tris(2-methyl-1-propenyl)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U-00046
- Tris(methyl vinyl ketone)tungsten, *see* W-00078
- Tris(neopentyl)neopentylidenetantalum, *see* Ta-00035
- Tris(phenylethynyl)scandium, Sc-00011
- Tris(phenylmethyl)-1-piperidinyltitanium, *see* Ti-00130
- Tris(η^3 -2-propenyl)chromium, Cr-00064
- ▷ Tris(η^3 -2-propenyl)vanadium, V-00022
- Tris(8-quinolinolato)cyclopentadienylhafnium, *see* Hf-00048
- Tris(8-quinolinolato)cyclopentadienylzirconium, *see* Zr-00105
- Tris(tetracarbonylcobalto)erbium, Er-00006
- Tris(tetrahydrofuran)tris[(trimethylsilyl)methyl]erbium, *in* Er-00008
- Tris(1,4,7-trimethylindenyl)thorium chloride, *see* Th-00037
- Tris(1,4,7-trimethylindenyl)uranium chloride, *see* U-00076
- Tris(2,4,6-trimethylphenyl)vanadium, V-00105
- Tris[(trimethylsilyl)methyl]erbium, Er-00008
- Tris[(trimethylsilyl)methyl]terbium, Tb-00001
- Tris[(trimethylsilyl)methyl]ytterbium, Yb-00010
- (*T*-4)Triphenyl(*P,P,P*-triphenylphosphineimidato-*N*)-phosphorus(1+) pentacarbonylmethyltungstate(1-), *in* W-00009
- Tungsten carbonyl, W-00014
- Tungsten hexacarbonyl, *see* W-00014
- ▷ Tungsten hexamethyl, *see* W-00011
- Tungsten tetrabenzyl, *see* W-00149
- Uranocene, U-00019
- ▷ Vanadium carbonyl, *see* V-00013
- ▷ Vanadium hexacarbonyl, V-00013
- Vanadium tetrabenzyl, *see* V-00106
- Vanadocene, *see* V-00033
- Vanadocene carbonyl, *see* V-00040
- Vanadocene chloride, *see* V-00029
- Vanadocene dichloride, *see* V-00030
- Vanadocene dicyanide, *see* V-00049
- Vanadocene iodide, *see* V-00031
- Vanadocene oxychloride, *see* V-00028
- Vanadocene pentasulfide, *see* V-00032
- Ytterbocene, *see* Yb-00005
- Yttrium triphenyl, *see* Y-00011
- Zirconium tetrabenzyl, *see* Zr-00101
- Zirconocene acetate chloride, *see* Zr-00023
- Zirconocene bis(borohydride), *see* Zr-00015

- Zirconocene bis(diethylamide), *see* Zr-00053
Zirconocene bis(dimethylamide), *see* Zr-00036
Zirconocene bis(diphenylketimide), *see* Zr-00110
Zirconocene bis(phenylacetyl­ide), *see* Zr-00092
Zirconocene bis(trifluoroacetate), *see* Zr-00032
Zirconocene diallyl, *see* Zr-00044
Zirconocene dibenzyl, *see* Zr-00085
Zirconocene dibromide, *see* Zr-00006
Zirconocene dicarbonyl, *see* Zr-00021
► Zirconocene dichloride, *see* Zr-00007
Zirconocene dicyanate, *see* Zr-00019
Zirconocene difluoride, *see* Zr-00008
Zirconocene dihydride, *see* Zr-00012
Zirconocene diiodide, *see* Zr-00009
Zirconocene dimethoxide, *see* Zr-00024
Zirconocene dimethyl, *see* Zr-00025
Zirconocene dineopentyl, *see* Zr-00064
Zirconocene diphenyl, *see* Zr-00073
Zirconocene dithiocyanate, *see* Zr-00020
Zirconocene hydrido­chloride, *see* Zr-00011

Molecular Formula Index

- CH₃Br₃Ti**
Tribromomethyltitanium, Ti-00001
- CH₃Cl₃Ti**
Trichloromethyltitanium, Ti-00002
- CH₃Cl₄Nb**
Tetrachloromethylniobium, Nb-00001
- CH₃Cl₄Ta**
Tetrachloromethyltantalum, Ta-00001
- CH₃O₃Re**
Methyltrioxorhenium, Re-00001
- CMnN₃O₄**
Carbonyltrinitrosylmanganese, Mn-00001
- C₂Cl₂NO₃Re**
Dicarbonyldichloronitrosylrhenium, *in* Re-00003
- C₂H₅Cl₃Ti**
Trichloroethyltitanium, Ti-00003
- C₂H₆Cl₃Nb**
Trichlorodimethylniobium, Nb-00002
- C₂H₆Cl₃Ta**
Trichlorodimethyltantalum, Ta-00002
- C₂H₆Cl₄Nb[⊖]**
Tetrachlorodimethylniobate(1−), Nb-00003
- C₃Cl₃O₃Re^{⊖⊖}**
Tricarbonyltrichlororhenate(2−), Re-00002
- C₃CsCl₃O₃Re**
Tricarbonyltrichlororhenate(2−); Di-Cs salt, *in* Re-00002
- C₃H₉Cl₂Nb**
Dichlorotrimethylniobium, Nb-00004
- C₃H₉Cl₂Ta**
Dichlorotrimethyltantalum, Ta-00003
- C₃H₉Cl₃Nb[⊖]**
Trichlorotrimethylniobate(1−), Nb-00005
- C₃H₉CrO₃P₃**
Tricarbonyltris(phosphine)chromium, Cr-00001
- C₃H₉MnN₃O₃[⊖]**
Triamminetricarbonylmanganese(1+), Mn-00002
- C₄BrMnO₄**
Bromotetracarboxylmanganese, *in* Mn-00027
- C₄Br₂MnO₄[⊖]**
Dibromotetracarboxylmanganate(1−), Mn-00003
- C₄ClMnO₄**
Tetracarboxylchloromanganese, *in* Mn-00028
- C₄ClO₄Re**
Tetracarboxylchlororhenium, *in* Re-00031
- C₄Cl₂MnO₄[⊖]**
Tetracarboxyldichloromanganate(1−), Mn-00004
- C₄Cl₂MoO₄**
Tetracarboxyldichloromolybdenum, *in* Mo-00008
- C₄Cl₄N₂O₆Re₂**
Tetracarboxyldi-μ-chlorodichlorodinitrosyldirhenium, Re-00003
- C₄CrNa₄O₄**
▷Tetracarboxylchromate(4−); Tetra-Na salt, *in* Cr-00002
- C₄CrO₄^{⊖⊖⊖⊖}**
Tetracarboxylchromate(4−), Cr-00002
- C₄H₃MnO₃S**
Tricarbonyl(methanethiolato)manganese, Mn-00005
- C₄H₃O₃ReS**
Tricarbonyl(methanethiolato)rhenium, Re-00004
- C₄H₆CrO₄P₂**
Tetracarboxylbis(phosphine)chromium, Cr-00003
- C₄H₁₁Cl₃SiTi**
Trichloro(trimethylsilylmethyl)titanium, Ti-00004
- C₄H₁₁Cl₅SiW**
Pentachloro[(trimethylsilyl)methyl]tungsten, W -00001
- C₄H₁₂CrO₄Tl₂**
▷Tetramethyl[μ-[chromato(2−)-O:O′]]dithallium, Cr-00004
- C₄H₁₂ORE**
Tetramethyloxorhenium, Re-00005
- C₄H₁₂O₄Ti**
Tetramethyl titanate, Ti-00005
- C₄H₁₂Ti**
▷Tetramethyltitanium, Ti-00006
- C₄H₂₂B₁₈Cl₂U^{⊖⊖}**
Dichlorobis[(7,8,9,10,11-η)undecahydro-7,8-dicarbaundecaborato]uranate(2−), U -00001
- C₄IMnO₄**
Tetracarboxyliodomanganese, *in* Mn-00040
- C₄I₄MnO₄[⊖]**
Tetracarboxyldiidomanganate(1−), Mn-00006
- C₄MnNO₅**
Tetracarboxylnitrosylmanganese, Mn-00007
- C₄MnNa₃O₄**
Tetracarboxylmanganate(3−); Tri-Na salt, *in* Mn-00008
- C₄MnO₄^{⊖⊖⊖⊖}**
Tetracarboxylmanganate(3−), Mn-00008
- C₄MoNa₄O₄**
▷Tetracarboxylmolybdate(4−); Tetra-Na salt, *in* Mo-00001
- C₄MoO₄^{⊖⊖⊖⊖}**
Tetracarboxylmolybdate(4−), Mo-00001
- C₄Na₄O₄W**
▷Tetracarboxyltungstate(4−); Tetra-Na salt, *in* W -00002
- C₄O₄W^{⊖⊖⊖⊖}**
Tetracarboxyltungstate(4−), W -00002
- C₅AsF₆MnO₇S**
Pentacarboxyl(sulfur dioxide-S)manganese(1+); Hexafluoroarsenate, *in* Mn-00015
- C₅AsF₆O₇ReS**
Pentacarboxyl(sulfur dioxide-S)rhenium(1+); Hexafluoroarsenate, *in* Re-00013
- C₅BrCrO₅[⊖]**
Bromopentacarboxylchromate(1−), Cr-00005
- C₅BrMnO₅**
Bromopentacarboxylmanganese, Mn-00009
- C₅BrO₅Re**
Bromopentacarboxylrhenium, Re-00006
- C₅BrO₅Tc**
Bromopentacarboxyltechnetium, Tc-00001
- C₅ClMnO₅**
Pentacarboxylchloromanganese, Mn-00010
- C₅ClO₅Re**
Pentacarboxylchlororhenium, Re-00007
- C₅ClO₅Tc**
Pentacarboxylchlorotechnetium, Tc-00002
- C₅Cl₃NO₆Re₂**
Pentacarboxyltri-μ-chloronitrosyldirhenium, Re-00008
- C₅CrClO₅[⊖]**
Pentacarboxylchlorochromate(1−), Cr-00006

C₅CrCs₂O₅Pentacarbonylchromate(2-); Di-Cs salt, *in* Cr-00008**C₅CrIO₅[⊖]**

Pentacarbonyliodochromate(1-), Cr-00007

C₅CrNa₂O₅Pentacarbonylchromate(2-); Di-Na salt, *in* Cr-00008**C₅CrO₅^{⊖⊖}**

Pentacarbonylchromate(2-), Cr-00008

C₅F₃O₄ReS

Tetracarbonyl(trifluoromethanethiolato)rhenium, Re-00009

C₅HCrO₆[⊖]

Pentacarbonylhydroxychromate(1-), Cr-00009

C₅HMnO₅

▷ Pentacarbonylhydromanganese, Mn-00011

C₅HO₅Re

Pentacarbonylhydridorhenium, Re-00010

C₅H₃AsCrO₅

(Arsine)pentacarbonylchromium, Cr-00010

C₅H₃CrNO₅

Amminepentacarbonylchromium, Cr-00011

C₅H₃CrO₅P

Pentacarbonyl(phosphine)chromium, Cr-00012

C₅H₃CrO₅Sb

Pentacarbonyl(stibine)chromium, Cr-00013

C₅H₃MnO₄S

Tetracarbonyl(methanethiolato)manganese, Mn-00012

C₅H₃NNaO₅VAmminepentacarbonylvanadate(1-); Na salt, *in* V -00001**C₅H₃NO₅V[⊖]**

Amminepentacarbonylvanadate(1-), V -00001

C₅H₄CrN₂O₅Pentacarbonyl(hydrazine-*N*)chromium, Cr-00014**C₅H₄F₆MnO₇P**Pentacarbonyl-1,3-dioxalan-2-ylidenemanganese(1+); Hexafluorophosphate, *in* Mn-00030**C₅H₅Br₂OV**Dibromo(η⁵-2,4-cyclopentadien-1-yl)oxovanadium, V -00002**C₅H₅Br₃Ti**Tribromo(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00007**C₅H₅Br₃V**Tribromo(η⁵-2,4-cyclopentadien-1-yl)vanadium, V -00003**C₅H₅Br₃Zr**Tribromo(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00001**C₅H₅ClCrN₂O₂**Chloro(η⁵-2,4-cyclopentadien-1-yl)dinitrosylchromium, Cr-00015**C₅H₅ClMoN₂O₂**Chloro(η⁵-2,4-cyclopentadien-1-yl)dinitrosylmolybdenum, Mo-00002**C₅H₅ClN₂O₂W**Chloro(η⁵-cyclopentadien-1-yl)dinitrosyltungsten, W -00003**C₅H₅ClOTi**Tetrachlorotetrakis(η⁵-2,4-cyclopentadien-1-yl)tetra-μ-oxotetratitanium; Monomer, *in* Ti-00105**C₅H₅Cl₂Dy**Dichloro(η⁵-2,4-cyclopentadien-1-yl)dysprosium, Dy-00001**C₅H₅Cl₂Er**Dichloro(η⁵-2,4-cyclopentadien-1-yl)erbium, Er-00001**C₅H₅Cl₂Eu**Dichloro(η⁵-2,4-cyclopentadien-1-yl)europium, Eu-00001**C₅H₅Cl₂Gd**Dichloro(η⁵-2,4-cyclopentadien-1-yl)gadolinium, Gd-00001**C₅H₅Cl₂Ho**Dichloro(η⁵-2,4-cyclopentadien-1-yl)holmium, Ho-00001**C₅H₅Cl₂Lu**Dichloro(η⁵-2,4-cyclopentadien-1-yl)lutetium, Lu-00001**C₅H₅Cl₂MoNO**Dichloro(η⁵-2,4-cyclopentadien-1-yl)nitrosylmolybdenum, Mo-00003**C₅H₅Cl₂OV**Dichloro(η⁵-2,4-cyclopentadien-1-yl)oxovanadium, V -00004**C₅H₅Cl₂Sm**Dichloro(η⁵-2,4-cyclopentadien-1-yl)samarium, Sm-00001**C₅H₅Cl₂Ti**Dichloro(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00008**C₅H₅Cl₂Y**Dichloro(η⁵-2,4-cyclopentadien-1-yl)yttrium, Y -00001**C₅H₅Cl₂Yb**Dichloro(η⁵-2,4-cyclopentadien-1-yl)ytterbium, Yb-00001**C₅H₅Cl₃Hf**Trichloro(η⁵-2,4-cyclopentadien-1-yl)hafnium, Hf-00001**C₅H₅Cl₃Ti**Trichloro(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00009**C₅H₅Cl₃V**Trichloro(η⁵-2,4-cyclopentadien-1-yl)vanadium, V -00005**C₅H₅Cl₃Zr**Trichloro(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00002**C₅H₅Cl₄Nb**Tetrachloro(η⁵-2,4-cyclopentadien-1-yl)niobium, Nb-00006**C₅H₅Cl₄Ta**Tetrachloro(η⁵-2,4-cyclopentadien-1-yl)tantalum, Ta-00004**C₅H₅F₃Ti**(η⁵-2,4-Cyclopentadien-1-yl)trifluorotitanium, Ti-00010**C₅H₅F₆N₃O₃PV**Cyclopentadienyltrinitrosylvanadium(1+); Hexafluorophosphate, *in* V -00006**C₅H₅I₃Ti**(η⁵-Cyclopentadien-1-yl)triiodotitanium, Ti-00011**C₅H₅I₃Zr**(η⁵-2,4-Cyclopentadien-1-yl)triiodozirconium, Zr-00003**C₅H₅N₃O₃V[⊖]**

Cyclopentadienyltrinitrosylvanadium(1+), V -00006

C₅H₅O₂V(η⁵-2,4-Cyclopentadien-1-yl)dioxovanadium, V -00007**C₅H₉Cl₄W[⊖]**

Tetrachloro(1,1-dimethylpropylidyne)tungsten(1-), W -00004

C₅H₁₅Ta

▷ Pentamethyltantalum, Ta-00005

C₅IMnO₅

Pentacarbonyliodomanganese, Mn-00013

C₅IMoO₅[⊖]

Pentacarbonyliodomolybdate(1-), Mo-00004

C₅IO₅Re

Pentacarbonyliodorhenium, Re-00011

C₅IO₅Tc

Pentacarbonyliodotechnetium, Tc-00003

C₅KMnO₅Pentacarbonylmanganate(1-); K salt, *in* Mn-00014**C₅KO₅Re**Pentacarbonylrhenate(1-); K salt, *in* Re-00012**C₅K₃O₅V**▷ Pentacarbonylvanadate(3-); Tri-K salt, *in* V -00008**C₅LiMnO₅**Pentacarbonylmanganate(1-); Li salt, *in* Mn-00014**C₅MnNaO₅**Pentacarbonylmanganate(1-); Na salt, *in* Mn-00014

- $C_5MnO_5^{\ominus}$**
Pentacarbonylmanganate(1-), Mn-00014
- $C_5MnO_7S^{\oplus}$**
Pentacarbonyl(sulfur dioxide-S)manganese(1+), Mn-00015
- C_5NaO_5Re**
Pentacarbonylrhenate(1-); Na salt, *in* Re-00012
- $C_5O_5Re^{\ominus}$**
Pentacarbonylrhenate(1-), Re-00012
- $C_5O_5V^{\ominus\ominus\ominus}$**
Pentacarbonylvanadate(3-), V -00008
- $C_5O_7ReS^{\oplus}$**
Pentacarbonyl(sulfur dioxide-S)rhenium(1+), Re-00013
- $C_6BF_4MnO_6$**
Hexacarbonylmanganese(1+); Tetrafluoroborate, *in* Mn-00017
- $C_6Cl_3F_5Ti$**
Trichloro(pentafluorophenyl)titanium, Ti-00012
- $C_6CrNNaO_5$**
Pentacarbonyl(cyano-C)chromate(1-); Na salt, *in* Cr-00016
- $C_6CrNO_5^{\ominus}$**
Pentacarbonyl(cyano-C)chromate(1-), Cr-00016
- $C_6CrN_2O_4^{\ominus\ominus}$**
Tetracarbonyldicyanochromate(2-), Cr-00017
- C_6CrO_5S**
(Carbonothioyl)pentacarbonylchromium, Cr-00018
- C_6CrO_5Se**
(Carbonoselenoyl)pentacarbonylchromium, Cr-00019
- C_6CrO_6**
▷Chromium carbonyl, Cr-00020
- $C_6F_6O_6PRe$**
Hexacarbonylrhenium(1+); Hexafluorophosphate, *in* Re-00017
- $C_6H_3BCrNO_5^{\ominus}$**
Pentacarbonyl[(cyano-C)trihydroborato(1-)-N]-chromate(1-), Cr-00021
- $C_6H_3BrO_4W$**
Bromotetracarbonylethylidynetungsten, W -00005
- $C_6H_3ClCrO_4$**
Tetracarbonylchloroethylidynecromium, Cr-00022
- $C_6H_3ClO_4W$**
Tetracarbonylchloroethylidynetungsten, W -00006
- $C_6H_3CrIO_4$**
Tetracarbonyliodoethylidynecromium, Cr-00023
- $C_6H_3CrO_5^{\ominus}$**
Pentacarbonylmethylchromate(1-), Cr-00024
- $C_6H_3IO_4SW$**
Tetracarbonyliodo[(methylthiomethylidyne)]tungsten, W -00007
- $C_6H_3IO_4W$**
Tetracarbonylethylidynieiodotungsten, W -00008
- $C_6H_3MnO_5$**
Pentacarbonylmethylmanganese, Mn-00016
- $C_6H_3O_5Re$**
Pentacarbonylmethylrhenium, Re-00014
- $C_6H_3O_5W^{\ominus}$**
Pentacarbonylmethyltungstate(1-), W -00009
- $C_6H_5Cl_2OV$**
▷Dichlorooxophenylvanadium, V -00009
- $C_6H_5F_6N_2O_3PW$**
Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-dinitrosyltungsten(1+); Hexafluorophosphate, *in* W -00010
- $C_6H_5N_2O_3V$**
Carbonyl(η^5 -2,4-cyclopentadien-1-yl)dinitrosylvanadium, V -00010
- $C_6H_5N_2O_3W^{\oplus}$**
Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-dinitrosyltungsten(1+), W -00010
- $C_6H_6Al_3Cl_{12}U$**
(Benzene)hexa- μ -chlorohexachlorotri-aluminumuranium, U -00002
- $C_6H_6NO_2Re$**
Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-hydronitrosylrhenium, Re-00015
- $C_6H_7Cl_3U$**
Trichloro[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]uranium, U -00003
- $C_6H_8CrN_2O_2$**
(η^5 -2,4-Cyclopentadienyl)methyldinitrosylchromium, Cr-00025
- $C_6H_{10}CrI$**
Iodobis(η^3 -2-propenyl)chromium, Cr-00026
- $C_6H_{18}Cr^{\ominus\ominus\ominus}$**
Hexamethylchromate(3-), Cr-00027
- $C_6H_{18}CrLi_3$**
Hexamethylchromate(3-); Tri-Li salt, *in* Cr-00027
- $C_6H_{18}Er^{\ominus\ominus\ominus}$**
Hexamethyleterbate(3-), Er-00002
- $C_6H_{18}Li_3U$**
Hexamethyluranate(3-); Tri-Li salt, *in* U -00004
- $C_6H_{18}Lu^{\ominus\ominus\ominus}$**
Hexamethyllutetate(3-), Lu-00002
- $C_6H_{18}MoO_6P$**
Diperoxoohexamethylphosphoramidomolybdenum, Mo-00005
- $C_6H_{18}N_2Ti$**
Bis(dimethylamido)dimethyltitanium, Ti-00013
- $C_6H_{18}Nd^{\ominus\ominus\ominus}$**
Hexamethylneodymate(3-), Nd-00001
- $C_6H_{18}Pr^{\ominus\ominus\ominus}$**
Hexamethylpraesodymate(3-), Pr-00001
- $C_6H_{18}Re$**
▷Hexamethylrhenium, Re-00016
- $C_6H_{18}Sm^{\ominus\ominus\ominus}$**
Hexamethylsamarate(3-), Sm-00002
- $C_6H_{18}Tm^{\ominus\ominus\ominus}$**
Hexamethylthuliate(3-), Tm-00001
- $C_6H_{18}U^{\ominus\ominus\ominus}$**
Hexamethyluranate(3-), U -00004
- $C_6H_{18}W$**
▷Hexamethyltungsten, W -00011
- $C_6H_{18}Yb^{\ominus\ominus\ominus}$**
Hexamethylytterbate(3-), Yb-00002
- $C_6MnO_6^{\oplus}$**
Hexacarbonylmanganese(1+), Mn-00017
- $C_6MoNO_5^{\ominus}$**
Pentacarbonyl(cyano-C)molybdate(1-), Mo-00006
- C_6MoO_6**
Molybdenum carbonyl, Mo-00007
- $C_6NO_5V^{\ominus\ominus}$**
Pentacarbonyl(cyano-C)vanadate(2-), V -00011
- $C_6NO_5W^{\ominus}$**
Pentacarbonyl(cyano-C)tungstate(1-), W -00012
- $C_6NbO_6^{\ominus}$**
Hexacarbonylniobate(1-), Nb-00007
- C_6O_5SW**
(Carbonothioyl)pentacarbonyltungsten, W -00013
- $C_6O_6Re^{\oplus}$**
Hexacarbonylrhenium(1+), Re-00017
- $C_6O_6Ta^{\ominus}$**
Hexacarbonyltantalate(1-), Ta-00006
- $C_6O_6V^{\ominus}$**
Hexacarbonylvanadate(1-), V -00012
▷Vanadium hexacarbonyl, V -00013

- C₆O₆W**
Tungsten carbonyl, W -00014
- C₇F₃MnO₇**
Pentacarbonyl(trifluoroacetato-*O*)manganese, Mn-00018
- C₇F₅MnO₅**
Pentacarbonyl(pentafluoroethyl)manganese, Mn-00019
- C₇H₃CrLiO₆**
Acetylpentacarbonylchromate(1-); Li salt, *in* Cr-00029
- C₇H₃CrNO₅S**
Pentacarbonyl(methyl thiocyanate-*N*)chromium, Cr-00028
- C₇H₃CrO₆[⊖]**
Acetylpentacarbonylchromate(1-), Cr-00029
- C₇H₃F₆MnNO₅P**
(Acetonitrile)pentacarbonylmanganese(1+); Hexafluorophosphate, *in* Mn-00020
Pentacarbonyl(isocyanomethane)manganese(1+); Hexafluorophosphate, *in* Mn-00021
- C₇H₃F₆NO₅PRe**
(Acetonitrile)pentacarbonylrhenium(1+); Hexafluorophosphate, *in* Re-00018
- C₇H₃MnNO₅[⊕]**
(Acetonitrile)pentacarbonylmanganese(1+), Mn-00020
Pentacarbonyl(isocyanomethane)manganese(1+), Mn-00021
- C₇H₃NO₅Re[⊕]**
(Acetonitrile)pentacarbonylrhenium(1+), Re-00018
- C₇H₃O₅ReS₃**
Pentacarbonyl(monomethylcarbonotrithioato-*S*)rhenium, Re-00019
- C₇H₃O₆Re**
Acetylpentacarbonylrhenium, Re-00020
- C₇H₄CrO₃S**
Tricarbonylthiophenechromium, Cr-00030
- C₇H₄F₆O₅ReP**
Pentacarbonyl(ethene)rhenium(1+); Hexafluorophosphate, *in* Re-00021
- C₇H₄MnNO₃**
Tricarbonyl- π -pyrrolylmanganese, Mn-00022
- C₇H₄O₅Re**
Pentacarbonyl(ethene)rhenium(1+), Re-00021
- C₇H₅BF₄NO₃Re**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-nitrosylrhenium(1+); Tetrafluoroborate, *in* Re-00023
- C₇H₅Br₂O₂Re**
Dibromodicarbonyl(η^5 -2,4-cyclopentadien-1-yl)rhenium, Re-00022
- C₇H₅Cl₃O₂W**
Dicarbonyltrichloro(η^5 -2,4-cyclopentadien-1-yl)-tungsten, W -00015
- C₇H₅CrNO₂S**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-thionitrosylchromium, Cr-00031
- C₇H₅CrNO₃**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosylchromium, Cr-00032
- C₇H₅CrNO₅**
(1-Aminoethylidene)pentacarbonylchromium, Cr-00033
- C₇H₅F₆MnNO₃P**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-nitrosylmanganese(1+); Hexafluorophosphate, *in* Mn-00023
- C₇H₅MnNO₃[⊕]**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-nitrosylmanganese(1+), Mn-00023
- C₇H₅MnN₂O₂**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(dinitrogen)-manganese, Mn-00024
- C₇H₅MnO₄**
Tetracarbonyl(η^3 -2-propenyl)manganese, Mn-00025
- C₇H₅NO₃Re[⊕]**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-nitrosylrhenium(1+), Re-00023
- C₇H₅NO₃W**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosyltungsten, W -00016
- C₇H₅O₄Re**
Tetracarbonyl(η^3 -2-propenyl)rhenium, Re-00024
- C₇H₆CrO₅S**
Pentacarbonyl(dimethyl sulfide)chromium, Cr-00034
- C₇H₆KO₂Re**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydrorhenate(1-); K salt, *in* Re-00027
- C₇H₆NO₃Re**
Carbonyl(η^5 -2,4-cyclopentadien-1-yl)formyl(nitrosyl)-rhenium, Re-00025
- C₇H₆NO₄ReS₂**
Tetracarbonyl(dimethylcarbamodithioato-*S,S'*)rhenium, Re-00026
- C₇H₆O₂Re[⊖]**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydrorhenate(1-), Re-00027
- C₇H₇O₂Re**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)dihydrorhenium, Re-00028
- C₇H₈CrF₆N₃O₂P**
Acetonitrile(η^5 -2,4-cyclopentadien-1-yl)-dinitrosylchromium(1+); Hexafluorophosphate, *in* Cr-00035
- C₇H₈CrN₃O₂[⊕]**
Acetonitrile(η^5 -2,4-cyclopentadien-1-yl)-dinitrosylchromium(1+), Cr-00035
- C₇H₈NO₂Re**
Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-methylnitrosylrhenium, Re-00029
- C₇H₈NO₃Re**
Carbonyl(η^5 -2,4-cyclopentadien-1-yl)(hydroxymethyl)-nitrosylrhenium, Re-00030
- C₇H₉MnN₂O₂**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(hydrazine-*N*)-manganese, Mn-00026
- C₇H₁₇CrO₅^{⊕⊖}**
Pentaaquabenzylchromium(2+), Cr-00036
- C₇H₂₁N₃Ti**
Tris(dimethylamino)methyltitanium, Ti-00014
- C₈Br₂Mn₂O₈**
Di(μ -bromo)octacarbonyldimanganese, Mn-00027
- C₈Cl₂Mn₂O₈**
Di(μ -chloro)octacarbonyldimanganese, Mn-00028
- C₈Cl₂O₈Re₂**
Octacarbonyldi- μ -chlorodirhenium, Re-00031
- C₈Cl₄Mo₂O₈**
Octacarbonyltetrachlorodimolybdenum, Mo-00008
- C₈H₂Cr₂O₈^{⊖⊖}**
Octacarbonyl- μ -dihydrodichromate(2-), Cr-00037
- C₈H₂Mo₂O₈^{⊖⊖}**
Octacarbonyl- μ -dihydrodimolybdate(2-), Mo-00009
- C₈H₂O₈Re₂**
Octacarbonyldi- μ -hydrodirhenium, Re-00032
- C₈H₂O₈W₂^{⊖⊖}**
Octacarbonyldi- μ -hydroditungstate(2-), W -00017
- C₈H₃MnO₇**
Pentacarbonyl(1,2-dioxopropyl)manganese, Mn-00029
- C₈H₄MnO₇[⊕]**
Pentacarbonyl-1,3-dioxalan-2-ylidenemanganese(1+), Mn-00030

- $C_8H_5AsMoO_3$**
(η^6 -Arsenin)tricarbonylmolybdenum, Mo-00010
- $C_8H_5BrMoO_3$**
Bromotricarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum, Mo-00011
- $C_8H_5BrO_3W$**
Bromotricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00018
- $C_8H_5ClMoO_3$**
Tricarbonylchloro(η^5 -2,4-cyclopentadien-1-yl)-molybdenum, Mo-00012
- $C_8H_5ClO_3W$**
Tricarbonylchloro(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00019
- $C_8H_5Cl_2NbO_3$**
Tricarbonyldichloro(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00008
- $C_8H_5CrO_3^\ominus$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)chromate(1-), Cr-00038
- $C_8H_5CrO_3Na$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)chromate(1-); Na salt, *in* Cr-00038
- $C_8H_5HgO_6V$**
Hexacarbonyl(ethylmercury)vanadium, V -00014
- $C_8H_5IMoO_3$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)iodomolybdenum, Mo-00013
- $C_8H_5IO_2SW$**
(Carbonothioyl)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-iodotungsten, W -00020
- $C_8H_5IO_3W$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)iodotungsten, W -00021
- $C_8H_5KO_3W$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungstate(1-); K salt, *in* W -00023
- $C_8H_5LiMoO_3$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdate(1-); Li salt, *in* Mo-00014
- $C_8H_5MnO_2S$**
(Carbonothioyl)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-manganese, Mn-00031
- $C_8H_5MnO_2Se$**
(Carbonoselenoyl)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-manganese, Mn-00032
- $C_8H_5MnO_3$**
▷Cyclopentadienyltricarbonylmanganese, Mn-00033
- $C_8H_5MnO_5$**
Pentacarbonyl-2-propenylmanganese, Mn-00034
- $C_8H_5MnO_7$**
Pentacarbonyl(ethoxycarbonyl)manganese, Mn-00035
- $C_8H_5MoO_3^\ominus$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdate(1-), Mo-00014
- $C_8H_5MoO_3Tl$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-thalliummolybdenum, Mo-00015
- $C_8H_5N_3S_3Ti$**
(η^5 -Cyclopentadienyl)triithiocyanatotitanium, Ti-00015
- $C_8H_5NaO_3W$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungstate(1-); Na salt, *in* W -00023
- $C_8H_5Na_2O_3V$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)vanadate(2-); Di-Na salt, *in* V -00015
- $C_8H_5O_2SW^\ominus$**
(Carbonothioyl)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-tungstate(1-), W -00022
- $C_8H_5O_3Re$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)rhenium, Re-00033
- $C_8H_5O_3Tc$**
Cyclopentadienyltricarbonyltechnetium, Tc-00004
- $C_8H_5O_3V^{ee}$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)vanadate(2-), V -00015
- $C_8H_5O_3W^\ominus$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungstate(1-), W -00023
- $C_8H_5O_5V$**
Pentacarbonyl(η^3 -2-propenyl)vanadium, V -00016
- $C_8H_5O_7Re$**
Pentacarbonyl(ethoxycarbonyl)rhenium, Re-00034
- $C_8H_6BCl_4CrNO_5$**
Pentacarbonyl[(dimethylamino)methylidyne]chromium(1+); Tetrachloroborate, *in* Cr-00039
- $C_8H_6ClMnNO_5^\ominus$**
Pentacarbonyl[chloro(dimethylamino)methylene]-manganese(1+), Mn-00036
- $C_8H_6Cl_2MnNO_9$**
Pentacarbonyl[chloro(dimethylamino)methylene]-manganese(1+); Perchlorate, *in* Mn-00036
- $C_8H_6CrF_6NO_5P$**
Pentacarbonyl[(dimethylamino)methylidyne]chromium(1+); Hexafluorophosphate, *in* Cr-00039
- $C_8H_6CrNO_5^\ominus$**
Pentacarbonyl[(dimethylamino)methylidyne]chromium(1+), Cr-00039
- $C_8H_6CrN_2O_2$**
(η^6 -Benzene)dicarbonyl(dinitrogen)chromium, Cr-00040
- $C_8H_6CrO_3$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydrochromium, Cr-00041
- $C_8H_6CrO_6$**
Pentacarbonyl(1-methoxyethylidene)chromium, Cr-00042
- $C_8H_6LiMnO_6$**
Diacyltetracarbonylmanganate(1-); Li salt, *in* Mn-00037
- $C_8H_6MnO_6^\ominus$**
Diacyltetracarbonylmanganate(1-), Mn-00037
- $C_8H_6MoO_3$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydromolybdenum, Mo-00016
- $C_8H_6MoO_6$**
Pentacarbonyl(1-methoxyethylidene)molybdenum, Mo-00017
- $C_8H_6O_3V^\ominus$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-hydrovanadate(1-), V -00017
- $C_8H_6O_3W$**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydrotungsten, W -00024
- $C_8H_6O_5S_2W$**
[Bis(methylthio)methylene]pentacarbonyltungsten, W -00025
- $C_8H_7CrNO_3$**
Tricarbonyl(1-methylpyrrole)chromium, Cr-00043
- $C_8H_7CrNO_5$**
Pentacarbonyl[(dimethylamino)methylene]chromium, Cr-00044
Pentacarbonyl[1-(methylamino)ethylidene]chromium, Cr-00045
- C_8H_8CeCl**
Chloro(cyclooctatetraene)cerium, Ce-00001
- C_8H_8ClEr**
(η^8 -1,3,5,7-Cyclooctatetraene)chloroerbiu, Er-00003

- C₈H₈ClLa**
(η^8 -1,3,5,7-Cyclooctatetraene)chlorolanthanum, La-00001
- C₈H₈ClLu**
(η^8 -1,3,5,7-Cyclooctatetraene)chlorolutetium, Lu-00003
- C₈H₈ClNd**
Chloro(cyclooctatetraene)neodymium, Nd-00002
- C₈H₈ClPr**
Chloro(cyclooctatetraene)praesodymium, Pr-00002
- C₈H₈ClSm**
Chloro(cyclooctatetraene)samarium, Sm-00003
- C₈H₈Cl₂Th**
Dichloro(η^8 -1,3,5,7-cyclooctatetraene)thorium, Th-00001
- C₈H₈Cl₂Zr**
Dichloro(η^8 -1,3,5,7-cyclooctatetraene)zirconium, Zr-00004
- C₈H₈Eu**
 η^8 -1,3,5,7-Cyclooctatetraeneeuropium, Eu-00002
- C₈H₈Yb**
(η^8 -1,3,5,7-Cyclooctatetraene)ytterbium, Yb-00003
- C₈H₉ClMoN₂O₃**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(hydrazine-*N*)-molybdenum(1+); Chloride, *in* Mo-00018
- C₈H₉CrNO₂**
Carbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)-nitrosylchromium, Cr-00046
- C₈H₉CrO₅P**
Pentacarbonyl(trimethylphosphine)chromium, Cr-00047
- C₈H₉CrO₅PS**
Pentacarbonyl(trimethylphosphine sulfide-*S*)chromium, Cr-00048
- C₈H₉MnO₅Pb**
Pentacarbonyl(trimethylplumbyl)manganese, Mn-00038
- C₈H₉MnO₅Si**
Pentacarbonyl(trimethylsilyl)manganese, Mn-00039
- C₈H₉Mn₂N₃O₈**
Triamminetricarbonylmanganese(1+); Pentacarbonylmanganate(1-), *in* Mn-00002
- C₈H₉MoN₂O₃[⊖]**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(hydrazine-*N*)-molybdenum(1+), Mo-00018
- C₈H₉O₅PbRe**
Pentacarbonyl(trimethylplumbyl)rhenium, Re-00035
- C₈H₁₀IMoNO**
(η^5 -2,4-Cyclopentadien-1-yl)iodonitrosyl(η^3 -2-propenyl)-molybdenum, Mo-00019
- C₈H₁₀INOW**
(η^5 -2,4-Cyclopentadien-1-yl)iodonitrosyl(η^3 -2-propenyl)-tungsten, W -00026
- C₈H₁₀Zr**
(η^8 -1,3,5,7-cyclooctatetraene)dihydrozirconium, Zr-00005
- C₈H₁₂CrF₆N₃O₃P**
(η^5 -2,4-Cyclopentadien-1-yl)[methoxy(methylamino)-methylene]dinitrosylchromium; Hexafluorophosphate, *in* Cr-00049
- C₈H₁₂CrN₃O₃[⊖]**
(η^5 -2,4-Cyclopentadien-1-yl)[methoxy(methylamino)-methylene]dinitrosylchromium, Cr-00049
- C₈H₁₂I₂MnNO₄**
Tetracarbonyldiiodomanganate(1-); Tetramethylammonium salt, *in* Mn-00006
- C₈H₁₄ClTa**
Chloro(η^5 -2,4-cyclopentadien-1-yl)trimethyltantalum, Ta-00007
- C₈H₁₄O₃Ti**
(η^5 -Cyclopentadienyl)trimethoxytitanium, Ti-00016
- C₈H₁₄Ti**
(η^5 -2,4-Cyclopentadien-1-yl)trimethyltitanium, Ti-00017
- C₈H₂₀CrO₄Tl₂**
▷(Chromato-*O*)bis(diethylthallium), Cr-00050
- C₈H₂₂Cl₃P₂Ta**
Trichloro(η^2 -ethene)bis(trimethylphosphine)tantalum, Ta-00008
- C₈H₂₄Li₂W**
Octamethyltungstate(2-); Di-Li salt, *in* W -00027
- C₈H₂₄Mo₂^{⊖⊖⊖⊖}**
Octamethyldimolybdenum(4-), Mo-00020
- C₈H₂₄N₄Ti**
Tetrakis(dimethylamino)titanium, Ti-00018
- C₈H₂₄Re₂^{⊖⊖}**
Octamethyldirhenate(2-), Re-00036
- C₈H₂₄W^{⊖⊖}**
Octamethyltungstate(2-), W -00027
- C₈H₃₂B₂₀Ti^{⊖⊖}**
Bis[η^6 -decahydro-*C,C'*-dimethyldicarbadodecaborato(2-)]-titanate(2-), Ti-00019
- C₈I₂Mn₂O₈**
Di(μ -iodo)octacarbonyldimanganese, Mn-00040
- C₈I₂Mo₂O₈**
Octacarbonyldi- μ -iododimolybdenum, Mo-00021
- C₈I₂O₈W₂**
Octacarbonyldi- μ -iododitungsten, W -00028
- C₉FeMnO₉[⊖]**
Nonacarbonylferratemanganate(1-), Mn-00041
- C₉HNO₁₀W₂**
Nonacarbonyl- μ -hydronitrosylditungsten, W -00029
- C₉H₅BF₄MoO₄**
Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+); Tetrafluoroborate, *in* Mo-00022
- C₉H₅ClCrHgO₃**
Tricarbonyl(chloromercury)[μ -[(1- η :1,2,3,4,5,6- η -phenyl)]chromium, Cr-00051
- C₉H₅ClCrO₃**
Tricarbonyl(η^6 -chlorobenzene)chromium, Cr-00052
- C₉H₅ClF₆MnPO₃**
(Chlorobenzene)tricarbonylmanganese(I); Hexafluorophosphate, *in* Mn-00042
- C₉H₅ClMnO₃[⊖]**
(Chlorobenzene)tricarbonylmanganese(I), Mn-00042
- C₉H₅CrFO₃**
(η^6 -Fluorobenzene)tricarbonylchromium, Cr-00053
- C₉H₅CrLiO₃**
[μ (η^6 -Phenyl)](tricarbonylchromium)lithium, Cr-00054
- C₉H₅F₆MoO₄P**
Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+); Hexafluorophosphate, *in* Mo-00022
- C₉H₅F₆O₄PW**
Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten(1+); Hexafluorophosphate, *in* W -00030
- C₉H₅MnN₃OS₂[⊖]**
 π -Cyclopentadienyl[dimercaptomaleonitrilato(2-)]-nitrosylmanganate(1-), Mn-00043
- C₉H₅MnO₅**
Tricarbonyl(carboxy- π -cyclopentadienyl)manganese, Mn-00044
- C₉H₅MoO₄[⊖]**
Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+), Mo-00022
- C₉H₅NNaO₃V**
Tricarbonyl(cyano-*C*)(η^5 -2,4-cyclopentadien-1-yl)-vanadate(1-); Na salt, *in* V -00018
- C₉H₅NO₃V[⊖]**
Tricarbonyl(cyano-*C*)(η^5 -2,4-cyclopentadien-1-yl)-vanadate(1-), V -00018

$C_9H_5NbO_4$ Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00009 **$C_9H_5O_3SV$** Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(thiocarbonyl)-vanadium, V -00019 **$C_9H_5O_4Ta$** Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)tantalum, Ta-00009 **$C_9H_5O_4V$** Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00020 **$C_9H_5O_4W^{\oplus}$** Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten(1+), W -00030 **$C_9H_6CrN_2O_5$**

Pentacarbonyl[cyano(dimethylamino)methylene]chromium, Cr-00055

 $C_9H_6CrO_2S$ (η^6 -Benzene)(carbonothioyl)dicarbonylchromium, Cr-00056 **$C_9H_6CrO_3$** ▷(η^6 -Benzene)tricarbonylchromium, Cr-00057 **$C_9H_6CrO_4$** Tricarbonyl(η^6 -phenol)chromium, Cr-00058 **$C_9H_6F_6MnO_3P$** (η^6 -Benzene)tricarbonylmanganese(1+); Hexafluorophosphate, *in* Mn-00045 **$C_9H_6F_6O_3PRe$** (η^6 -Benzene)tricarbonylrhenium(1+); Hexafluorophosphate, *in* Re-00037 **$C_9H_6MnNO_4$** Tricarbonyl(carboxy- π -cyclopentadienyl)manganese; Amide, *in* Mn-00044 **$C_9H_6MnO_3^{\oplus}$** (η^6 -Benzene)tricarbonylmanganese(1+), Mn-00045 **$C_9H_6MoO_3$** η^6 -Benzenetricarbonylmolybdenum, Mo-00023 **$C_9H_6O_3Re^{\oplus}$** (η^6 -Benzene)tricarbonylrhenium(1+), Re-00037 **$C_9H_6O_3W$** (η^6 -Benzene)tricarbonyltungsten, W -00031 **$C_9H_7ClMoO_2$** Dicarbonylchloro(η^7 -cycloheptatrienylium)molybdenum, Mo-00024 **$C_9H_7ClO_2W$** Dicarbonylchloro(η^7 -cycloheptatrienylium)tungsten, W -00032 **$C_9H_7CrNO_3$** (η^6 -Aniline)tricarbonylchromium, Cr-00059 **$C_9H_7IO_2W$** Dicarbonyl(η^7 -cycloheptatrienylium)iodotungsten, W -00033 **$C_9H_7MnO_3$** ▷(Methylcyclopentadienyl)tricarbonylmanganese, Mn-00046
Tricarbonyl[(1,2,3,4,5- η)-2,4-cyclohexadien-1-yl]-manganese, Mn-00047 **$C_9H_8BCl_4MnO_2$** Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-ethylidinemanganese(1+); Tetrachloroborate, *in* Mn-00048 **$C_9H_8CrO_3$**

Cyclopentadienyltricarbonylmethylchromium, Cr-00060

 $C_9H_8CrO_6$

Pentacarbonyl(tetrahydrofuran)chromium, Cr-00061

 $C_9H_8MnO_2^{\oplus}$ Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-ethylidinemanganese(1+), Mn-00048 **$C_9H_8MoO_3$** Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-methylmolybdenum, Mo-00025 **$C_9H_8O_3V^{\ominus}$** Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-methylvanadate(1-), V -00021 **$C_9H_8O_3W$** Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)methyltungsten, W -00034 **$C_9H_8O_5SW$** Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-methanesulfonyltungsten, W -00035 **$C_9H_8O_6W$**

Pentacarbonyl(1-ethoxyethylidene)tungsten, W -00036

 $C_9H_9F_6MnN_3O_3P$ Tricarbonyltris(isocyanomethane)manganese(1+); Hexafluorophosphate, *in* Mn-00049Tris(acetonitrile)tricarbonylmanganese(1+); Hexafluorophosphate, *in* Mn-00050 **$C_9H_9F_6N_3O_3PRe$** Tris(acetonitrile)tricarbonylrhenium(1+); Hexafluorophosphate, *in* Re-00038 **$C_9H_9K_2Re_2$** μ -Carbonyloctacarbonyldirhenium(2-); Di-K salt, *in* Re-00040 **$C_9H_9MnN_3O_3^{\oplus}$** Tricarbonyltris(isocyanomethane)manganese(1+), Mn-00049
Tris(acetonitrile)tricarbonylmanganese(1+), Mn-00050 **$C_9H_9MoN_3O_3$**

Tris(acetonitrile)tricarbonylmolybdenum, Mo-00026

 $C_9H_9N_3O_3Re^{\oplus}$

Tris(acetonitrile)tricarbonylrhenium(1+), Re-00038

 $C_9H_{10}BrCrNO_4$

Bromotetracarbonyl[(diethylamino)methylidyne]chromium, Cr-00062

 $C_9H_{10}BrNO_4W$

Bromotetracarbonyl[(diethylamino)methylidyne]tungsten, W -00037

 $C_9H_{10}ClCrNO_4$

Tetracarbonylchloro[(diethylamino)methylidyne]chromium, Cr-00063

 $C_9H_{10}F_6MoNO_2P$ Carbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosyl(η^3 -2-propenyl)molybdenum(1+); Hexafluorophosphate, *in* Mo-00027 **$C_9H_{10}MoNO_2^{\oplus}$** Carbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosyl(η^3 -2-propenyl)molybdenum(1+), Mo-00027 **$C_9H_{10}OW$** Carbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethyne)-methyltungsten, W -00038 **$C_9H_{11}ClMo$** (η^6 -Benzene)chloro(η^3 -2-propenyl)molybdenum, Mo-00028 **$C_9H_{11}ClMoN_2O_2$** Bis(acetonitrile)dicarbonylchloro(η^3 -2-propenyl)-molybdenum, Mo-00029 **$C_9H_{11}ClN_2O_2W$** Bis(acetonitrile)dicarbonylchloro(η^3 -2-propenyl)-tungsten, W -00039 **$C_9H_{11}Cl_3Ti$** Trichloro(η^5 -tetrahydroindenyl)titanium, Ti-00020 **$C_9H_{11}IMoN_2O_2$** Bis(acetonitrile)dicarbonyliodo(η^3 -2-propenyl)-molybdenum, Mo-00030 **$C_9H_{11}MoNO_2$** Carbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosyl(1,2- η -1-propene)molybdenum, Mo-00031

C₉H₁₁O₂ReDicarbonyl(η^5 -2,4-cyclopentadien-1-yl)dimethylrhenium, Re-00039**C₉H₁₁O₄V**Bis(acetato)cyclopentadienylvanadium, *in* V -00083**C₉H₁₂BrCrNO₅**Bromopentacarbonylchromate(1-); Tetramethylammonium salt, *in* Cr-00005**C₉H₁₂BrMnN₄O**

Bromocarbonyltetrakis(isocyanomethane)manganese, Mn-00051

C₉H₁₂MnOBis(η^4 -1,3-butadiene)carbonylmanganese, Mn-00052**C₉H₁₃Cl₂O₂Ti**Dichloro(η^5 -2,4-cyclopentadien-1-yl)titanium; THF complex, *in* Ti-00008**C₉H₁₅BrU**Bromotris(η^3 -2-propenyl)uranium, U -00005**C₉H₁₅ClU**Chlorotris(η^3 -2-propenyl)uranium, U -00006**C₉H₁₅Cr**Tris(η^3 -2-propenyl)chromium, Cr-00064**C₉H₁₅IU**Iodotris(η^3 -2-propenyl)uranium, U -00007**C₉H₁₅O₂Ti**

Cyclopentadienyldiethoxytitanium, Ti-00021

C₉H₁₅V▷ Tris(η^3 -2-propenyl)vanadium, V -00022**C₉H₁₇N₂Ti**

Cyclopentadienylbis(dimethylamido)titanium, Ti-00022

C₉H₁₈BrMnO₉P₂Bromotricarbonylbis(trimethylphosphite-*P*)manganese, Mn-00053**C₉O₉Re₂^{⊖⊖}** μ -Carbonyloctacarbonyldirhenium(2-), Re-00040**C₁₀CrIO₁₀[⊖]**Decacarbonyl- μ -iododichromate(1-), Cr-00065**C₁₀Cr₂K₂O₁₀**Decacarbonyldichromate(2-); Di-K salt, *in* Cr-00066**C₁₀Cr₂Na₂O₁₀**Decacarbonyldichromate(2-); Di-Na salt, *in* Cr-00066**C₁₀Cr₂O₁₀^{⊖⊖}**

Decacarbonyldichromate(2-), Cr-00066

C₁₀F₆O₈Re₂S₂Octacarbonylbis[μ -(trifluoromethanethiolato)]dirhenium, *in* Re-00009**C₁₀HCr₂O₁₀[⊖]**Decacarbonyl- μ -hydrodichromate(1-), Cr-00067**C₁₀HO₁₀W₂[⊖]**Decacarbonyl- μ -hydroditungstate(1-), W -00040**C₁₀H₄Cr₂O₁₀P₂**Decacarbonyl[μ -(diphosphine-*P:P'*)]dichromium, Cr-00068**C₁₀H₅O₄ReS**

(Benzenethiolato)tetracarbonylrhenium, Re-00041

C₁₀H₆CrO₄Tricarbonyl[(2,3,4,5,6,7- η)-2,4,6-cycloheptatrien-1-one]chromium, Cr-00069**C₁₀H₆Mn₂O₈S₂**Octacarbonylbis(μ -methanethiolato)dimanganese, *in* Mn-00012**C₁₀H₇BCrF₄O₃**Tricarbonyl(η^7 -cycloheptatrienylum)chromium(1+); Tetrafluoroborate, *in* Cr-00070**C₁₀H₇BF₄MoO₃**Tricarbonyl(η^7 -cycloheptatrienylum)molybdenum(1+); Tetrafluoroborate, *in* Mo-00032**C₁₀H₇BF₄O₃W**Tricarbonyl(η^7 -cycloheptatrienylum)tungsten(1+); Tetrafluoroborate, *in* W -00041**C₁₀H₇ClCrO₇**▷ Tricarbonyl(η^7 -cycloheptatrienylum)chromium(1+); Perchlorate, *in* Cr-00070**C₁₀H₇CrI₃O₃**Tricarbonyl(η^7 -cycloheptatrienylum)chromium(1+); Triiodide, *in* Cr-00070**C₁₀H₇CrO₃[⊖]**Tricarbonyl(η^7 -cycloheptatrienylum)chromium(1+), Cr-00070**C₁₀H₇MnO₃**Tricarbonyl[(1,2,3,4,5- η)-2,4,6-cycloheptatrien-1-yl]-manganese, Mn-00054**C₁₀H₇MnO₄**

(Acetylcyclopentadienyl)tricarbonylmanganese, Mn-00055

C₁₀H₇MnO₅Tricarbonyl(carboxy- π -cyclopentadienyl)manganese; Me ester, *in* Mn-00044**C₁₀H₇MoO₃[⊖]**Tricarbonyl(η^7 -cycloheptatrienylum)molybdenum(1+), Mo-00032**C₁₀H₇O₃V**Tricarbonyl(η^7 -cycloheptatrienylum)vanadium, V -00023**C₁₀H₇O₃W[⊖]**Tricarbonyl(η^7 -cycloheptatrienylum)tungsten(1+), W -00041**C₁₀H₇O₄V**Tetracarbonyl(η^5 -methyl-2,4-cyclopentadien-1-yl)-vanadium, V -00024**C₁₀H₈CrO₃**Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-cycloheptatriene]-chromium, Cr-00071Tricarbonyl[(1,2,3,4,5,6- η)-methylbenzene]chromium, Cr-00072**C₁₀H₈CrO₄**Tricarbonyl-(1,2,3,4,5- η -methoxybenzene)chromium, Cr-00073**C₁₀H₈MoO₃**▷ Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-cycloheptatriene]-molybdenum, Mo-00033Tricarbonyl[(1,2,3,4,5,6- η)-methylbenzene]molybdenum, Mo-00034**C₁₀H₈O₃W**Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-cycloheptatriene]-tungsten, W -00042Tricarbonyl[(1,2,3,4,5,6- η)-methylbenzene]tungsten, W -00043**C₁₀H₈O₄W**Acetyltricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00044**C₁₀H₉BF₄MoO₃**Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)-molybdenum(1+); Tetrafluoroborate, *in* Mo-00035**C₁₀H₉BF₄O₃W**Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)-tungsten(1+); Tetrafluoroborate, *in* W -00045**C₁₀H₉MnO₃**Tricarbonyl[(1,2,3,4,5- η)-2,4-cycloheptadien-1-yl]-manganese, Mn-00056**C₁₀H₉MnO₄**(η^6 -Benzene)dicarbonyl(methoxycarbonyl)manganese, Mn-00057**C₁₀H₉MoO₃[⊖]**Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)-molybdenum(1+), Mo-00035**C₁₀H₉NO₅V[⊖]**

Pentacarbonyl(2-isocyano-2-methylpropane)vanadate(1-), V -00025

$C_{10}H_9O_3W^{\oplus}$

Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)-tungsten(1+), W -00045

 $C_{10}H_{10}BrTi$

Bromobis(cyclopentadienyl)titanium, Ti-00023

 $C_{10}H_{10}BrV$

Bromobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00026

 $C_{10}H_{10}Br_2Hf$

Dibromobis(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00002

 $C_{10}H_{10}Br_2Ti$

Dibromobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00024

 $C_{10}H_{10}Br_2V$

Dibromobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00027

 $C_{10}H_{10}Br_2W$

Dibromobis(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00046

 $C_{10}H_{10}Br_2Zr$

Dibromobis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00006

 $C_{10}H_{10}Br_3Nb$

Tribromobis(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00010

 $C_{10}H_{10}ClCrNO_5$

Pentacarbonyl[chloro(diethylamino)methylene]chromium, Cr-00074

 $C_{10}H_{10}ClDy$

Chlorobis(η^5 -2,4-cyclopentadienyl)dysprosium, Dy-00002

 $C_{10}H_{10}ClEr$

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)erbium, Er-00004

 $C_{10}H_{10}ClGd$

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)gadolinium, Gd-00002

 $C_{10}H_{10}ClHo$

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)holmium, Ho-00002

 $C_{10}H_{10}ClLu$

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)lutetium, Lu-00004

 $C_{10}H_{10}ClNbO$

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)oxoniobium, Nb-00011

 $C_{10}H_{10}ClOV$

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)oxovanadium, V -00028

 $C_{10}H_{10}ClSc$

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)scandium, Sc-00001

 $C_{10}H_{10}ClSm$

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)samarium, Sm-00004

 $C_{10}H_{10}ClTi$

Chlorobis(cyclopentadienyl)titanium, Ti-00025

 $C_{10}H_{10}ClTm$

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)thulium, Tm-00002

 $C_{10}H_{10}ClV$

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00029

 $C_{10}H_{10}ClY$

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)yttrium, Y -00002

 $C_{10}H_{10}ClYb$

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)ytterbium, Yb-00004

 $C_{10}H_{10}Cl_2Hf$

▷Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00003

 $C_{10}H_{10}Cl_2Mo$

Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)molybdenum, Mo-00036

 $C_{10}H_{10}Cl_2Nb$

▷Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00012

 $C_{10}H_{10}Cl_2OW$

Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)oxotungsten, W -00047

 $C_{10}H_{10}Cl_2Ta$

Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)tantalum, Ta-00010

 $C_{10}H_{10}Cl_2Ti$

▷Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00026

 $C_{10}H_{10}Cl_2V$

Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00030

 $C_{10}H_{10}Cl_2W$

Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00048

 $C_{10}H_{10}Cl_2Zr$

▷Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00007

 $C_{10}H_{10}Cl_4Mo_2N_2O_2$

Di- μ -chlorodichlorobis(η^5 -2,4-cyclopentadien-1-yl)-dinitrosyldimolybdenum, *in* Mo-00003

 $C_{10}H_{10}Cl_4OTi_2$

Tetrachlorobis(η^5 -2,4-cyclopentadien-1-yl)- μ -oxodititanium, Ti-00027

 $C_{10}H_{10}Cr$

Chromocene, Cr-00075

 $C_{10}H_{10}CrN_2O_5$

Pentacarbonyl(diethylcyanamide-*N'*)chromium, Cr-00076

 $C_{10}H_{10}CrO_5S_2$

[Bis(ethylthio)methylene]pentacarbonylchromium, Cr-00077

 $C_{10}H_{10}Cr_2N_4O_4$

Bis(η^5 -2,4-cyclopentadien-1-yl)di- μ -nitrosyldinitrosyldichromium, Cr-00078

 $C_{10}H_{10}Eu$

Bis(η^5 -2,4-cyclopentadien-1-yl)europium, Eu-00003

 $C_{10}H_{10}FTi$

Bis(cyclopentadienyl)fluorotitanium, Ti-00028

 $C_{10}H_{10}F_2Hf$

Bis(η^5 -2,4-cyclopentadien-1-yl)difluorohafnium, Hf-00004

 $C_{10}H_{10}F_2Ti$

Bis(η^5 -2,4-cyclopentadien-1-yl)difluorotitanium, Ti-00029

 $C_{10}H_{10}F_2Zr$

Bis(η^5 -2,4-cyclopentadien-1-yl)difluorozirconium, Zr-00008

 $C_{10}H_{10}HfI_2$

Bis(η^5 -2,4-cyclopentadien-1-yl)diiodohafnium, Hf-00005

 $C_{10}H_{10}HfS_5$

Bis(η^5 -2,4-cyclopentadien-1-yl)(pentathio)hafnium, Hf-00006

 $C_{10}H_{10}IMoNO$

Bis(η^5 -2,4-cyclopentadien-1-yl)iodonitrosylmolybdenum, Mo-00037

 $C_{10}H_{10}ITi$

Bis(cyclopentadienyl)iodotitanium, Ti-00030

 $C_{10}H_{10}IV$

Bis(η^5 -2,4-cyclopentadien-1-yl)iodovanadium, V -00031

 $C_{10}H_{10}I_2Nb$

Bis(η^5 -2,4-cyclopentadien-1-yl)diiodoniobium, Nb-00013

 $C_{10}H_{10}I_2Ti$

Bis(η^5 -2,4-cyclopentadien-1-yl)diiodotitanium, Ti-00031

 $C_{10}H_{10}I_2Zr$

Bis(η^5 -2,4-cyclopentadien-1-yl)diiodozirconium, Zr-00009

 $C_{10}H_{10}Mn$

▷Manganocene, Mn-00058

 $C_{10}H_{10}MoN_2O_5$

Pentacarbonyl(1,3-dimethyl-2-imidazolidinylidene)-molybdenum, Mo-00038

 $C_{10}H_{10}MoO_2$

Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)-molybdenum, Mo-00039

 $C_{10}H_{10}N_2O_5W$

Pentacarbonyl(1,3-dimethyl-2-imidazolidinylidene)-tungsten, W -00049

 $C_{10}H_{10}N_6Ti$

Diazidobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00032

 $C_{10}H_{10}O_2W$

Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)-tungsten, W -00050

- C₁₀H₁₀S₅Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)(pentathio)titanium, Ti-00033
- C₁₀H₁₀S₅V**
Bis(η^5 -2,4-cyclopentadienyl)pentathiovanadium, V -00032
- C₁₀H₁₀S₅Zr**
Bis(η^5 -2,4-cyclopentadien-1-yl)(pentathio)zirconium, Zr-00010
- C₁₀H₁₀Se₅Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)[pentaselenidato(2-)]-titanium, Ti-00034
- C₁₀H₁₀Sm**
Bis(η^5 -2,4-cyclopentadien-1-yl)samarium, Sm-00005
- C₁₀H₁₀Tc₂**
Decacarbonylditechnetium, Tc-00005
- C₁₀H₁₀Ti**
▷Titanocene, Ti-00035
- C₁₀H₁₀V**
Bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00033
- C₁₀H₁₀Yb**
Bis(η^5 -2,4-cyclopentadien-1-yl)ytterbium, Yb-00005
- C₁₀H₁₁AsO₃W**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(dimethylarsino)-tungsten, W -00051
- C₁₀H₁₁ClHf**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)hydrohafnium, Hf-00007
- C₁₀H₁₁ClZr**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)hydrozirconium, Zr-00011
- C₁₀H₁₁Cl₃Ti**
Trichloro(2-methyl-1-phenyl-1-propenyl)titanium, Ti-00036
- C₁₀H₁₁LiMo**
Bis(η^5 -2,4-cyclopentadien-1-yl)hydromolybdenumlithium, Mo-00040
- C₁₀H₁₁LiW**
Bis(η^5 -2,4-cyclopentadien-1-yl)hydro(tungsten)lithium, W -00052
- C₁₀H₁₁Lu**
Bis(η^5 -2,4-cyclopentadien-1-yl)hydrolutetium, Lu-00005
- C₁₀H₁₁MnO₂**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(1-methylethylidene)manganese, Mn-00059
- C₁₀H₁₁MnO₃**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(1-methoxyethylidene)manganese, Mn-00060
- C₁₀H₁₁MoNO₃**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(2-propanoneoximato-*N,O*)molybdenum, Mo-00041
- C₁₀H₁₁MoO₃Ti**
▷Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(dimethylthallium)molybdenum, Mo-00042
- C₁₀H₁₁O₃SbW**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(dimethylstilbino)tungsten, W -00053
- C₁₀H₁₁O₃TIW**
▷Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(dimethylthallium)tungsten, W -00054
- C₁₀H₁₁Re**
Bis(η^5 -2,4-cyclopentadien-1-yl)hydrorhenium, Re-00042
- C₁₀H₁₁Tc**
Bis(η^5 -2,4-cyclopentadien-1-yl)hydrotechnetium, Tc-00006
- C₁₀H₁₁Ti**
Bis(η^5 -cyclopentadienyl)hydrotitanium, Ti-00037
- C₁₀H₁₂CrN₂O₅**
[Bis(dimethylamino)methylene]pentacarbonylchromium, Cr-00079
- C₁₀H₁₂CrO₆Si**
Pentacarbonyl[1-(trimethylsiloxy)ethylidene]chromium, Cr-00080
- C₁₀H₁₂Mo**
Bis(η^5 -2,4-cyclopentadien-1-yl)dihydromolybdenum, Mo-00043
- C₁₀H₁₂W**
Bis(η^5 -2,4-cyclopentadien-1-yl)dihydrotungsten, W -00055
- C₁₀H₁₂Zr**
Bis(η^5 -2,4-cyclopentadien-1-yl)dihydrozirconium, Zr-00012
- C₁₀H₁₃F₆PW**
Bis(η^5 -2,4-cyclopentadien-1-yl)trihydrotungsten(1+); Hexafluorophosphate, *in* W -00056
- C₁₀H₁₃Nb**
Bis(η^5 -2,4-cyclopentadien-1-yl)trihydroniobium, Nb-00014
- C₁₀H₁₃Ta**
Bis(cyclopentadienyl)trihydrantalum, Ta-00011
- C₁₀H₁₃W[⊕]**
Bis(η^5 -2,4-cyclopentadien-1-yl)trihydrotungsten(1+), W -00056
- C₁₀H₁₄BNb**
▷Bis(η^5 -2,4-cyclopentadien-1-yl)[tetrahydroborato(1-)-*H,H'*]niobium, Nb-00015
- C₁₀H₁₄BTi**
Bis(η^5 -2,4-cyclopentadien-1-yl)[tetrahydroborato(1-)-*H,H'*]titanium, Ti-00038
- C₁₀H₁₄BV**
▷Bis(η^5 -2,4-cyclopentadien-1-yl)[tetrahydroborato(1-)-*H,H'*]vanadium, V -00034
- C₁₀H₁₅BCrN₂O₅**
Pentacarbonyl[(cyano-*C*)trihydroborato(1-)-*N*]-chromate(1-); Tetramethylammonium salt, *in* Cr-00021
- C₁₀H₁₅BZr**
Bis(η^5 -2,4-cyclopentadien-1-yl)-hydro[tetrahydroborato(1-)-*H,H'*]zirconium, Zr-00013
- C₁₀H₁₅Cl₂NS₂Ti**
Dichloro(η^5 -2,4-cyclopentadien-1-yl)-(diethylcarbamidithioato-*S,S'*)titanium, Ti-00039
- C₁₀H₁₅Cl₃Hf**
Trichloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]hafnium, Hf-00008
- C₁₀H₁₅Cl₃Th**
[(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]trichlorothorium, Th-00002
- C₁₀H₁₅Cl₃Ti**
Trichloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, Ti-00040
- C₁₀H₁₅Cl₃U**
[(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadienyl]trichlorouranium, U -00008
- C₁₀H₁₅Cl₃Zr**
Trichloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00014
- C₁₀H₁₅Cl₄Nb**
Tetrachloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]niobium, Nb-00016
- C₁₀H₁₅Cl₄Ta**
Tetrachloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00012
- C₁₀H₁₅MnN₂OS₂**
 π -Cyclopentadienyl(diethyldithiocarbamato)-nitrosylmanganese, Mn-00061
- C₁₀H₁₅NO₅W**
N,N,N-Trimethylmethanaminium(1+) pentacarbonylmethyltungstate(1-), *in* W -00009
- C₁₀H₁₇O₄P₂V**
Tetracarbonyl[1,2-ethanediy]bis(dimethylphosphine)-*P,P'*]hydrovanadium, V -00035

$C_{10}H_{18}B_2Hf$ Bis(η^5 -2,4-cyclopentadien-1-yl)bis[tetrahydroborato(1-)-*H,H'*]hafnium, Hf-00009 **$C_{10}H_{18}B_2U$** Bis(η^5 -2,4-cyclopentadien-1-yl)bis[tetrahydroborato(1-)-*H,H'*]uranium, U -00009 **$C_{10}H_{18}B_2Zr$** Bis(η^5 -2,4-cyclopentadien-1-yl)bis[tetrahydroborato(1-)-*H,H'*]zirconium, Zr-00015 **$C_{10}H_{18}CrO_4P_2$**

Tetracarbonylbis(trimethylphosphine)chromium, Cr-00081

 $C_{10}H_{18}CrO_4P_2$ Tetracarbonylbis(trimethyl phosphite-*P*)chromium, Cr-00082 **$C_{10}H_{18}O_2Ti$** (η^5 -2,4-Cyclopentadien-1-yl)diethoxymethyltitanium, Ti-00041 **$C_{10}H_{24}O_2V$** Di-*tert*-butoxydimethylvanadium, V -00036 **$C_{10}H_{24}O_3Ti$**

Methyltris(2-propanolato)titanium, Ti-00042

 $C_{10}H_{26}Cl_4NNb$ Tetrachlorodimethylniobate(1-); Tetraethylammonium salt, *in* Nb-00003 **$C_{10}H_{29}N_3SiTi$**

Tris(dimethylamido)(trimethylsilylmethyl)titanium, Ti-00043

 $C_{10}H_{30}Mo_2N_4$ Dimethyltetrakis(*N*-dimethylamino)dimolybdenum, Mo-00044 **$C_{10}K_2Mo_2O_{10}$** Decarbonyldimolybdate(2-); Di-K salt, *in* Mo-00045 **$C_{10}MnO_{10}Re$**

Pentacarbonyl(pentacarbonylmanganese)rhenium, Re-00043

 $C_{10}Mn_2O_{10}$

Decacarbonyldimanganese, Mn-00063

 $C_{10}Mo_2O_{10}^{2-}$

Decarbonyldimolybdate(2-), Mo-00045

 $C_{10}O_{10}Re_2$

Decacarbonyldirhenium, Re-00044

 $C_{11}F_5MnO_5$

Pentacarbonyl(pentafluorophenyl)manganese, Mn-00064

 $C_{11}H_3Cr_2O_{16}S^{2-}$ Decarbonyl(μ -methanethiolato)dichromate(1-), Cr-00083 **$C_{11}H_3Mn_2NO_9$**

Nonacarbonyl(isocyanomethane)dimanganese, Mn-00065

 $C_{11}H_5BrCrO_4$

Bromotetracarbonyl(phenylmethylidyne)chromium, Cr-00084

 $C_{11}H_5BrO_4W$

Bromotetracarbonyl(phenylmethylidyne)tungsten, W -00057

 $C_{11}H_5ClO_4W$

Tetracarbonylchloro(phenylmethylidyne)tungsten, W -00058

 $C_{11}H_5F_9MoOS$ Carbonyl(η^5 -2,4-cyclopentadien-1-yl)[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne]-(trifluoromethanethiolato)molybdenum, Mo-00046 **$C_{11}H_5IO_4W$**

Tetracarbonyliodo(phenylmethylidyne)tungsten, W -00059

 $C_{11}H_5MnO_5$

Pentacarbonylphenylmanganese, Mn-00066

 $C_{11}H_7O_5V$ (η^5 -1-Acetyl-2,4-cyclopentadien-1-yl)-tetracarbonylvandium, V -00037 **$C_{11}H_8CrO_3$** Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5,7-cyclooctatetraene]-chromium, Cr-00085Tricarbonyl[(1,2,3,4,5,6- η)-7-methylene-1,3,5-cycloheptatriene]chromium, Cr-00086 **$C_{11}H_8CrO_4$** [(2,3,5,6- η)-Bicyclo[2.2.1]hepta-2,5-diene]-tetracarbonylchromium, Cr-00087Tricarbonyl[(1- η^6 -phenyl)ethanone]chromium, Cr-00088 **$C_{11}H_8CrO_5$** Tricarbonyl[(1,2,3,4,5,6- η)-methyl benzoate]chromium, Cr-00089 **$C_{11}H_8MoO_3$** Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5,7-cyclooctatetraene]-molybdenum, Mo-00047Tricarbonyl[(1,2,3,4,5,6- η)-ethenylbenzene]molybdenum, Mo-00048 **$C_{11}H_8MoO_4$** [(2,3,5,6- η)-Bicyclo[2.2.1]hepta-2,5-diene]-tetracarbonylmolybdenum, Mo-00049 **$C_{11}H_8O_3W$** Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5,7-cyclooctatetraene]-tungsten, W -00060 **$C_{11}H_8O_4W$** [(2,3,5,6- η)-Bicyclo[2.2.1]hepta-2,5-diene]-tetracarbonyltungsten, W -00061 **$C_{11}H_9O_2V$** Dicarbonyl(η^4 -1,3-cyclobutadiene)(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00038 **$C_{11}H_{10}ClNbO$** Carbonylchlorobis(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00017 **$C_{11}H_{10}ClOTa$** Carbonylchlorobis(η^5 -2,4-cyclopentadien-1-yl)tantalum, Ta-00013 **$C_{11}H_{10}Cl_2N_2Ti$** Dichloro(η^5 -2,4-cyclopentadien-1-yl)(phenylazo)-titanium, Ti-00044 **$C_{11}H_{10}CrO_3$** Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-cyclooctatriene]-chromium, Cr-00090 **$C_{11}H_{10}F_3HfOP$** Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)(phosphorous trifluoride)hafnium, Hf-00010 **$C_{11}H_{10}IOV$** Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)iodovanadium, V -00039 **$C_{11}H_{10}MoO$** Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)molybdenum, Mo-00050 **$C_{11}H_{10}MoO_3$** Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-cyclooctatriene]-molybdenum, Mo-00051Tricarbonyl[(η^6 -5-(1-methylethylidene)-1,3-cyclopentadiene)molybdenum, Mo-00052 **$C_{11}H_{10}OV$** Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00040 **$C_{11}H_{10}OW$** Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00062 **$C_{11}H_{10}S_2V$** [(*C,S*)-Carbon disulfide]bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00041 **$C_{11}H_{11}BF_4MoO_2$** (η^4 -1,3-Butadiene)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+); Tetrafluoroborate, *in* Mo-00055 **$C_{11}H_{11}F_6MoN_2O_2P$** Bis(acetonitrile)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-molybdenum(1+); Hexafluorophosphate, *in* Mo-00054 **$C_{11}H_{11}Mn$** (η^6 -Benzene)(η^5 -2,4-cyclopentadien-1-yl)manganese, Mn-00067 **$C_{11}H_{11}Mo$** (η^6 -Benzene)(η^5 -2,4-cyclopentadien-1-yl)molybdenum, Mo-00053

- C₁₁H₁₁MoN₂O₂[®]**
Bis(acetonitrile)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-molybdenum(1+), Mo-00054
- C₁₁H₁₁MoO₂[®]**
(η^4 -1,3-Butadiene)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+), Mo-00055
- C₁₁H₁₁NbO**
Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)hydroniobium, Nb-00018
- C₁₁H₁₁OTa**
Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)hydrotantalum, Ta-00014
- C₁₁H₁₁O₂V**
(η^4 -1,3-Butadiene)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00042
- C₁₁H₁₁V**
(η^6 -Benzene)(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00043
- C₁₁H₁₂NO₃V**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(dimethylaminomethylene)vanadium, V -00044
- C₁₁H₁₂OV**
Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -C,O-formaldehyde)-vanadium, V -00045
- C₁₁H₁₃CINb**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)methylniobium, Nb-00019
- C₁₁H₁₃ClOZr**
Chlorobis(η -cyclopentadienyl)methoxyzirconium, Zr-00016
- C₁₁H₁₃CiTl**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)methyltitanium, Ti-00045
- C₁₁H₁₃ClV**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)methylvanadium, V -00046
- C₁₁H₁₃Dy**
Bis(η^5 -2,4-cyclopentadien-1-yl)methyldysprosium, Dy-00003
- C₁₁H₁₃Er**
Bis(η^5 -2,4-cyclopentadien-1-yl)methylerbium, Er-00005
- C₁₁H₁₃Ho**
Bis(η^5 -2,4-cyclopentadien-1-yl)methylholmium, Ho-00003
- C₁₁H₁₃Lu**
Bis(η^5 -2,4-cyclopentadien-1-yl)methyllutetium, Lu-00006
- C₁₁H₁₃NbO**
Bis(cyclopentadienyl)methyloxoniobium, Nb-00020
- C₁₁H₁₃O₂Re**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-tetramethylenerrhenium, Re-00045
- C₁₁H₁₃O₃Re**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(tetrahydrofuran)-rhenium, Re-00046
- C₁₁H₁₃Sc**
Bis(η^5 -2,4-cyclopentadien-1-yl)methylscandium, Sc-00002
- C₁₁H₁₃Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)methyltitanium, Ti-00046
- C₁₁H₁₃Tm**
Bis(η^5 -2,4-cyclopentadien-1-yl)methylthulium, Tm-00003
- C₁₁H₁₃V**
Bis(η^5 -2,4-cyclopentadien-1-yl)methylvanadium, V -00047
- C₁₁H₁₃Y**
Bis(η^5 -2,4-cyclopentadien-1-yl)methylyttrium, Y -00003
- C₁₁H₁₃Yb**
Bis(η^5 -2,4-cyclopentadien-1-yl)methylytterbium, Yb-00006
- C₁₁H₁₄CrGeO₃**
Tricarbonyl- π -cyclopentadienyl(trimethylgermyl)-chromium, Cr-00091
- C₁₁H₁₄CrO₃Sn**
Tricarbonyl- π -cyclopentadienyl(trimethylstannyl)-chromium, Cr-00092
- C₁₁H₁₄GeMoO₃**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(trimethylgermyl)molybdenum, Mo-00056
- C₁₁H₁₄GeO₃W**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(trimethylgermyl)tungsten, W -00063
- C₁₁H₁₄MoO₃Pb**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(trimethylplumbyl)molybdenum, Mo-00057
- C₁₁H₁₄MoO₃Si**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(trimethylsilyl)-molybdenum, Mo-00058
- C₁₁H₁₄MoO₃Sn**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(trimethylstannyl)molybdenum, Mo-00059
- C₁₁H₁₄O₃S₆Zr**
(η^5 -2,4-Cyclopentadien-1-yl)tris(*O*-methylcarbonodithioato-*S,S'*)zirconium, Zr-00017
- C₁₁H₁₄O₃SiW**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(trimethylsilyl)-tungsten, W -00064
- C₁₁H₁₄O₃SnW**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(trimethylstannyl)tungsten, W -00065
- C₁₁H₁₄O₆Ti**
Tris(acetato-*O*)(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00047
- C₁₁H₁₄O₆Zr**
Tris(acetato)(η -cyclopentadienyl)zirconium, Zr-00018
- C₁₁H₁₅CrNO₆**
Acetylpentacarbonylchromate(1-); Tetramethylammonium salt, *in* Cr-00029
- C₁₁H₁₅F₆MnN₅OP**
Carbonylpentakis(isocyanomethane)manganese(1+); Hexafluorophosphate, *in* Mn-00068
- C₁₁H₁₅MnN₅O[®]**
Carbonylpentakis(isocyanomethane)manganese(1+), Mn-00068
- C₁₁H₁₈CrO₅Sn₂Te**
Pentacarbonyl(hexamethyldistannatellurane)chromium, Cr-00093
- C₁₁H₂₀O₃Ti**
(π -Cyclopentadienyl)triethoxytitanium, Ti-00048
- C₁₁H₂₁MnO₃P[®]**
Bis(η^4 -1,3-butadiene)(trimethyl phosphite)manganate(1-), Mn-00069
- Bis(η^4 -1,3-butadiene)(trimethyl phosphite)manganese, Mn-00070
- C₁₁H₂₂O₃P₂W**
Tricarbonyl(η^2 -ethene)bis(trimethylphosphine)tungsten, W -00066
- C₁₁H₂₃Cl₂P₂V**
Dichloro(η^5 -2,4-cyclopentadien-1-yl)-bis(trimethylphosphine)vanadium, V -00048
- C₁₁H₂₃N₃Ti**
(η^5 -Cyclopentadienyl)tris(dimethylamido)titanium, Ti-00049
- C₁₁H₂₄Cl₃OPW**
Trichloro(1,1-dimethylpropylidene)(triethylphosphine oxide-*O*)tungsten, W -00067
- C₁₁H₂₇BrMnO₁₁P₃**
Bromodicarbonyltris(trimethylphosphite-*P*)manganese, Mn-00071
- C₁₁H₂₇BrO₂P₃Re**
Bromodicarbonyltris(trimethylphosphine)rhenium, Re-00047

- C₁₁H₂₈Cl₂OP₂W**
Dichloro(2,2-dimethylpropylidene)-oxobis(trimethylphosphine)tungsten, W -00068
- C₁₁H₂₈Cl₃P₂Ta**
Trichloro(2,2-dimethylpropylidene)-bis(trimethylphosphine)tantalum, Ta-00015
- C₁₁H₂₉Cl₃NNb**
Trichlorotrimethylniobate(1-); Tetraethylammonium salt, *in* Nb-00005
- C₁₁H₃₁NbP₂**
[1,2-Ethanediy]bis(dimethylphosphine)-*P,P'*-pentamethylniobium, Nb-00021
- C₁₂Co₃ErO₁₂**
Tris(tetracarbonylcobalto)erbium, Er-00006
- C₁₂F₁₀Yb**
Bis(pentafluorophenyl)ytterbium, Yb-00007
- C₁₂Fe₂MnO₁₂^o**
Tetracarbonyl(di- μ -carbonylhexacarbonyldiferrate)-manganate(1-), Mn-00072
- C₁₂HMnO₁₂Os₃**
Dodecacarbonylhydromanganesediosmium, Mn-00073
- C₁₂H₃Mn₃O₁₂**
Dodecacarbonyltrihydrotrimanganese, Mn-00074
- C₁₂H₅CoMoO₇**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(tetracarbonylcobalt)molybdenum, Mo-00060
- C₁₂H₅CrLiO₆**
Benzoylpentacarbonylchromate(1-); Li salt, *in* Cr-00094
- C₁₂H₅CrO₆^o**
Benzoylpentacarbonylchromate(1-), Cr-00094
- C₁₂H₅FeMnO₇**
Pentacarbonyl[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-iron]manganese, Mn-00075
- C₁₂H₅HgO₆Ta**
Hexacarbonyl(phenylmercury)tantalum, Ta-00016
- C₁₂H₅O₇ReRu**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(pentacarbonylrhenio)ruthenium, Re-00048
- C₁₂H₅O₁₂Os₃Re**
Tricarbonyltri- μ -hydro(nonacarbonyldi- μ -hydrotriosmium)-rhenium, Re-00049
- C₁₂H₆MnO₁₀Re**
Pentacarbonyl[tetracarbonyl(1-methoxyethylidene)]-manganeserhenium, Re-00050
- C₁₂H₆Mn₂N₂O₈**
Octacarbonylbis(isocyanomethane)dimanganese, Mn-00077
- C₁₂H₆Mn₂O₁₀Pb**
Bis(pentacarbonylmanganese)dimethyllead, Mn-00078
- C₁₂H₆O₁₀PbRe₂**
Bis(pentacarbonylrhenium)dimethyllead, Re-00051
- C₁₂H₆O₁₀Re₂**
Nonacarbonyl(1-methoxyethylidene)dirhenium, Re-00052
- C₁₂H₆O₁₀Tc₂**
Nonacarbonyl(1-methoxyethylidene)ditechnetium, Tc-00007
- C₁₂H₇BrCrO₄**
Bromotetracarbonyl[(4-methylphenyl)methylidyne]-chromium, Cr-00095
- C₁₂H₇CrNO₅**
(Aminophenylmethylene)pentacarbonylchromium, Cr-00096
- C₁₂H₇FeMnO₆**
 μ -Carbonylpentacarbonyl(η^5 -2,4-cyclopentadienyl)iron- μ -methylenemanganese, Mn-00079
- C₁₂H₇MnO₅**
(2-Acetylphenyl-C,*O*)tetracarbonylmanganese, Mn-00080
- C₁₂H₈O₄W**
Tetracarbonyl[(1,2,5,6- η)-1,3,5,7-cyclooctatetraene]-tungsten, W -00069
- C₁₂H₁₀Cl₂Cr**
Bis(η^6 -chlorobenzene)chromium, Cr-00097
- C₁₂H₁₀Cl₂Mo**
▷Bis(η^6 -chlorobenzene)molybdenum, Mo-00061
- C₁₂H₁₀Cl₃O₂SnV**
Dicarbonylbis(2,4-cyclopentadien-1-yl)vanadium(1+); Trichlorostannate, *in* V -00050
- C₁₂H₁₀CrF₂**
Bis(η^6 -fluorobenzene)chromium, Cr-00098
- C₁₂H₁₀CrO₄**
Tricarbonyl[(3*a*,4,5,6,7,7*a*- η)-2,3-dihydro-1*H*-inden-1-ol]chromium, Cr-00099
- C₁₂H₁₀HfN₂O₂**
Bis(cyanato)di- π -cyclopentadienylniobium, Hf-00011
- C₁₂H₁₀HfO₂**
Dicarbonylbis(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00012
- C₁₂H₁₀I₃O₂V**
Dicarbonylbis(2,4-cyclopentadien-1-yl)vanadium(1+); Triiodide, *in* V -00050
- C₁₂H₁₀Mn₂N₂O₄**
 μ -Carbonylcarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(nitrosyl-*N:N'*)]nitrosyldimanganese, Mn-00081
- C₁₂H₁₀MoO₃**
[(2,3,4,5,6,7- η)-Bicyclo[6.1.0]nona-2,4,6-triene]-tricarbonylmolybdenum, Mo-00062
- C₁₂H₁₀N₂Nb**
Bis(cyano-C)bis(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00022
- C₁₂H₁₀N₂O₂Ti**
Dicyanatobis(η^5 -cyclopentadienyl)titanium, Ti-00050
- C₁₂H₁₀N₂O₂Zr**
Bis(cyanato-*N*)bis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00019
- C₁₂H₁₀N₂S₂Zr**
Bis(η^5 -2,4-cyclopentadien-1-yl)bis(thiocyanato-*N*)-zirconium, Zr-00020
- C₁₂H₁₀N₂V**
Bis(cyano-C)bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00049
- C₁₂H₁₀O₂Ti**
Dicarbonylbis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00051
- C₁₂H₁₀O₂V^o**
Dicarbonylbis(2,4-cyclopentadien-1-yl)vanadium(1+), V -00050
- C₁₂H₁₀O₂Zr**
Dicarbonylbis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00021
- C₁₂H₁₀O₃W**
[(2,3,4,5,6,7- η)-Bicyclo[6.1.0]nona-2,4,6-triene]-tricarbonyltungsten, W -00070
- C₁₂H₁₀Ti**
▷Diphenyltitanium, Ti-00052
- C₁₂H₁₁BCrF₄O₄**
Tricarbonyl(ethoxy- π -cycloheptatrienylium)chromium(1+); Tetrafluoroborate, *in* Cr-00100
- C₁₂H₁₁CrO₄^o**
Tricarbonyl(ethoxy- π -cycloheptatrienylium)chromium(1+), Cr-00100
- C₁₂H₁₁IO₄PRE**
Tetracarbonyl(dimethylphenylphosphine)iodorhenium, Re-00053
- C₁₂H₁₁NbO₂**
Dicarbonyl(cyclopentadiene)- π -cyclopentadienylniobium, Nb-00023

- C₁₂H₁₂BF₄O₄Re**
Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]-rhenium(1+); Tetrafluoroborate, *in* Re-00054
- C₁₂H₁₂Cr**
▷ Bis(η^6 -benzene)chromium, Cr-00101
(η^7 -Cycloheptatrienylium)(η^5 -2,4-cyclopentadien-1-yl)-chromium, Cr-00102
- C₁₂H₁₂CrO₃**
Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]-chromium, Cr-00103
- C₁₂H₁₂CrO₄**
Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]chromium, Cr-00104
- C₁₂H₁₂F₆MnP**
(η^7 -Cycloheptatrienylium)(η^5 -2,4-cyclopentadien-1-yl)-manganese(1+); Hexafluorophosphate, *in* Mn-00082
- C₁₂H₁₂F₆PRe**
Bis(η^6 -benzene)rhenium(1+); Hexafluorophosphate, *in* Re-00055
- C₁₂H₁₂F₆PTe**
Bis(η^6 -benzene)technetium(1+); Hexafluorophosphate, *in* Tc-00008
- C₁₂H₁₂Mn[®]**
(η^7 -Cycloheptatrienylium)(η^5 -2,4-cyclopentadien-1-yl)-manganese(1+), Mn-00082
- C₁₂H₁₂Mo**
Bis(η^6 -benzene)molybdenum, Mo-00063
- C₁₂H₁₂MoO₃**
(η^6 -1,3,5-Trimethylbenzene)tricarbonylmolybdenum, Mo-00064
- C₁₂H₁₂MoO₄**
Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]-molybdenum, Mo-00065
- C₁₂H₁₂Nb**
Bis(η^6 -benzene)niobium, Nb-00024
(η^7 -Cycloheptatrienylium)(η^5 -2,4-cyclopentadien-1-yl)-niobium, Nb-00025
- C₁₂H₁₂O₃W**
Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]-tungsten, W -00071
- C₁₂H₁₂O₄Re[®]**
Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]-rhenium(1+), Re-00054
- C₁₂H₁₂O₄W**
Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]tungsten, W -00072
- C₁₂H₁₂Re[®]**
Bis(η^6 -benzene)rhenium(1+), Re-00055
- C₁₂H₁₂S₂Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethenedithiolato(2-)-S,S']titanium, Ti-00053
- C₁₂H₁₂Tc[®]**
Bis(η^6 -benzene)technetium(1+), Tc-00008
- C₁₂H₁₂Ti**
Bis(η^6 -benzene)titanium, Ti-00054
(η^7 -Cycloheptatrienylium)(η^5 -2,4-cyclopentadien-1-yl)-titanium, Ti-00055
- C₁₂H₁₂V**
Bis(η^6 -benzene)vanadium, V -00051
(η^7 -Cycloheptatrienylium)(η^5 -2,4-cyclopentadien-1-yl)-vanadium, V -00052
- C₁₂H₁₂W**
Bis(η^6 -benzene)tungsten, W -00073
- C₁₂H₁₃ClOTi**
[(C,*O*- η)-Acetyl]chlorobis(η^5 -2,4-cyclopentadien-1-yl)-titanium, Ti-00056
- C₁₂H₁₃ClOZr**
(Acetyl-C,*O*)chlorobis(η^5 -2,4-cyclopentadien-1-yl)-zirconium, Zr-00022
- C₁₂H₁₃ClO₂Zr**
(Acetato-*O*)chlorobis(η^5 -2,4-cyclopentadien-1-yl)-zirconium, Zr-00023
- C₁₂H₁₃CITi**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)ethenyltitanium, Ti-00057
- C₁₂H₁₃Mn**
[(1,2,3,4,5,6- η)-1,3,5-Cycloheptatriene](η^5 -2,4-cyclopentadien-1-yl)manganese, Mn-00083
- C₁₂H₁₃NbO**
Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)methylniobium, Nb-00026
- C₁₂H₁₃O₃V**
Tricarbonylhydro(η^6 -1,3,5-trimethylbenzene)vanadium, V -00053
- C₁₂H₁₄BF₄Re**
Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)rhenium(1+); Tetrafluoroborate, *in* Re-00056
- C₁₂H₁₄ClEr**
Chlorobis(η^5 -methylcyclopentadienyl)erbium, Er-00007
- C₁₂H₁₄ClGd**
Chlorobis(η^5 -methylcyclopentadienyl)gadolinium, Gd-00003
- C₁₂H₁₄ClSm**
Chlorobis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]samarium, Sm-00006
- C₁₂H₁₄ClYb**
Chlorobis(η^5 -methylcyclopentadienyl)ytterbium, Yb-00008
- C₁₂H₁₄CrO₃Si**
[Trimethyl(η^6 -phenyl)silane]tricarbonylchromium, Cr-00105
- C₁₂H₁₄CrO₃Sn**
Tricarbonyl(trimethylphenylstannane)chromium, Cr-00106
- C₁₂H₁₄Mo**
Bis(η^5 -cyclopentadienyl)(η^2 -ethylene)molybdenum, Mo-00066
- C₁₂H₁₄MoO₃Sn**
Tricarbonyl(η^6 -trimethylstannylbenzene)molybdenum, Mo-00067
- C₁₂H₁₄Re[®]**
Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)rhenium(1+), Re-00056
- C₁₂H₁₄V**
Bis(η^5 -1-methyl-2,4-cyclopentadien-1-yl)vanadium, V -00054
- C₁₂H₁₄W**
Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)tungsten, W -00074
- C₁₂H₁₄Yb**
Bis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]-ytterbium, Yb-00009
- C₁₂H₁₅F₆PW**
Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)-hydrotungsten(1+); Hexafluorophosphate, *in* W -00076
- C₁₂H₁₅MoO₂**
Dicarbonyl(pentamethylcyclopentadienyl)molybdenum, *in* Mo-00124
- C₁₂H₁₅MoO₃Tl**
▷ Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(diethylthallium)molybdenum, Mo-00068
- C₁₂H₁₅Nb**
Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)hydroniobium, Nb-00027
- C₁₂H₁₅O₃TIW**
▷ Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(diethylthallium)tungsten, W -00075
- C₁₂H₁₅Ta**
Bis(η^5 -2,4-cyclopentadien-1-yl)methyl(methylidene)-tantalum, Ta-00017

- C₁₂H₁₅V**
Bis(η^5 -2,4-cyclopentadien-1-yl)ethylvanadium, V -00055
- C₁₂H₁₅W⁺**
Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)-hydrotungsten(1+), W -00076
- C₁₂H₁₆ClErO**
(η^8 -1,3,5,7-Cyclooctatetraene)chloro(tetrahydrofuran)-erbium, *in* Er-00003
- C₁₂H₁₆ClLuO**
(η^8 -1,3,5,7-Cyclooctatetraene)chloro(tetrahydrofuran)-lutetium, *in* Lu-00003
- C₁₂H₁₆Cl₂OZr**
Dichloro(η^8 -1,3,5,7-cyclooctatetraene)zirconium; THF complex, *in* Zr-00004
- C₁₂H₁₆F₆Pre**
Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylrhenium(1+); Hexafluorophosphate, *in* Re-00057
- C₁₂H₁₆Hf**
Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylhafnium, Hf-00013
- C₁₂H₁₆Mo**
(η^6 -Benzene)bis(η^3 -2-propenyl)molybdenum, Mo-00069
- C₁₂H₁₆NTi**
[Bis(η^5 -cyclopentadienyl)dimethylamidotitanium, Ti-00058]
- C₁₂H₁₆Nb**
▷ Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylniobium, Nb-00028
- C₁₂H₁₆O₂W**
(Acetato-*O*)[(1,2,3,4,5- η)-methylbenzene](η^3 -2-propenyl)-tungsten, W -00077
- C₁₂H₁₆O₂Zr**
Bis(η^5 -2,4-cyclopentadien-1-yl)dimethoxyzirconium, Zr-00024
- C₁₂H₁₆Re⁺**
Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylrhenium(1+), Re-00057
- C₁₂H₁₆S₂Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)bis(methanethiolato)-titanium, Ti-00059
- C₁₂H₁₆Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)dimethyltitanium, Ti-00060
- C₁₂H₁₆V**
Bis(2,4-cyclopentadien-1-yl)dimethylvanadium, V -00056
- C₁₂H₁₆Zr**
Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylzirconium, Zr-00025
- C₁₂H₁₈Al₂Cl₈Ti**
Tetra- μ -chlorobis(dichloroaluminium)[(1,2,3,4,5,6- η)-hexamethylbenzene]titanium, Ti-00061
- C₁₂H₁₈CrN₂O₄S**
(Di-*tert*-butylsulfurdiimide-*N,N'*)tetracarbonylchromium, Cr-00107
- C₁₂H₁₈Mo**
Tris(η^4 -1,3-butadiene)molybdenum, Mo-00070
- C₁₂H₁₈O₃W**
Tris[(3,4- η)-3-buten-2-one-*O*]tungsten, W -00078
- C₁₂H₁₈W**
Tris(η^4 -1,3-butadiene)tungsten, W -00079
- C₁₂H₁₉Cl₂Ta**
Dichloro(η^2 -ethene)(η^5 -1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl)tantalum, Ta-00018
- C₁₂H₁₉LuSi**
(η^8 -1,3,5,7-Cyclooctatetraene)(trimethylsilylmethyl)-lutetium, Lu-00007
- C₁₂H₂₀Br₂MnNO₄**
Dibromotetracarbonylmanganate(1-); Tetraethylammonium salt, *in* Mn-00003
- C₁₂H₂₀Cl₂MnNO₄**
Tetracarbonyldichloromanganate(1-); Tetraethylammonium salt, *in* Mn-00004
- C₁₂H₂₀Cr₂**
Tetra-2-propenyldichromium, Cr-00108
- C₁₂H₂₀Cr₂I₂**
Di- μ -iodotetrakis(η^3 -2-propenyl)dichromium, *in* Cr-00026
- C₁₂H₂₀Hf**
Tetrakis(η^3 -2-propenyl)hafnium, Hf-00014
- C₁₂H₂₀MoN₂O₂S₄**
Dicarbonylbis(diethylcarbamodithioato-*S,S'*)molybdenum, Mo-00071
- C₁₂H₂₀Mo₂**
Bis[μ -[(1- η :2,3- η)-2-propenyl]]bis(η^3 -2-propenyl)-dimolybdenum, Mo-00072
- C₁₂H₂₀Re₂**
Tetrakis(η^3 -2-propenyl)dirhenium, Re-00058
- C₁₂H₂₀Th**
Tetrakis(η^3 -2-propenyl)thorium, Th-00003
- C₁₂H₂₀U**
Tetrakis(η^3 -2-propenyl)uranium, U -00010
- C₁₂H₂₀Zr**
Tetrakis(η^3 -2-propenyl)zirconium, Zr-00026
- C₁₂H₂₃MnO₆P₂S**
Carbonothioyl(η^5 -2,4-cyclopentadien-1-yl)-bis(trimethylphosphite-*P*)manganese, Mn-00084
- C₁₂H₂₇CrO₃P₃**
Tricarbonyltris(trimethylphosphine)chromium, Cr-00109
- C₁₂H₂₈Cr**
▷ Tetraisopropylchromium, Cr-00110
- C₁₂H₃₀LaP₃**
Tris[(dimethylphosphinidenio)bis(methylene)]lanthanum, La-00002
- C₁₂H₃₀LuP₃**
Tris[(dimethylphosphinidenio)bis(methylene)]lutetium, Lu-00008
- C₁₂H₃₃ErSi₃**
Tris[(trimethylsilyl)methyl]erbium, Er-00008
- C₁₂H₃₃OSi₃V**
Oxotris(trimethylsilylmethyl)vanadium, V -00057
- C₁₂H₃₃Tb**
Tris[(trimethylsilyl)methyl]terbium, Tb-00001
- C₁₂H₃₃Yb**
Tris[(trimethylsilyl)methyl]ytterbium, Yb-00010
- C₁₂H₃₄N₂Si₂Ti**
Bis(dimethylamido)bis(trimethylsilylmethyl)titanium, Ti-00062
- C₁₂MnO₁₂Os₂⁺**
Dodecacarbonylmanganatediosmate(1-), Mn-00085
- C₁₂O₁₂Os₂Re⁺**
Dodecacarbonylrhenatediosmate(1-), Re-00059
- C₁₃H₃MnO₁₃Os₃**
Tridecacarbonyltrihydromanganesetriosmium, Mn-00086
- C₁₃H₃O₁₃Os₃Re**
Tridecacarbonyltrihydorrheniumtriosmium, Re-00060
- C₁₃H₅ClF₁₂Mo**
Chloro(η^5 -2,4-cyclopentadien-1-yl)bis[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne]molybdenum, Mo-00073
- C₁₃H₅ClF₁₂W**
Chloro(η^5 -2,4-cyclopentadien-1-yl)bis[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne]tungsten, W -00080
- C₁₃H₅ClO₄W**
Tetracarbonylchloro(3-phenyl-2-propynylidene)tungsten, W -00081
- C₁₃H₅F₁₂IMo**
(η^5 -2,4-Cyclopentadien-1-yl)bis[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne]iodomolybdenum, Mo-00074

C₁₃H₇FeMnO₆

Tricarbonyl[μ -[(1,2,3- η :4,5,6,7- η)-2,4,6-cycloheptatrien-1-yl]](tricarbonyliron)manganese, Mn-00087

C₁₃H₈BF₄MoN₃O₄

(2,2'-Bipyridine-*N,N'*)tricarbonylnitrosylmolybdenum(1+); Tetrafluoroborate, *in* Mo-00075

C₁₃H₈CrO₃

Tricarbonyl[(1,2,3,4,4a,8a- η)naphthalene]chromium, Cr-00111

C₁₃H₈CrO₆

Pentacarbonyl(methoxyphenylmethylene)chromium, Cr-00112

C₁₃H₈MoN₃O₄[⊕]

(2,2'-Bipyridine-*N,N'*)tricarbonylnitrosylmolybdenum(1+), Mo-00075

C₁₃H₈O₅W

Pentacarbonyl[(η^2 -ethenyl)benzene]tungsten, W -00082

C₁₃H₈O₆W

Pentacarbonyl(methoxyphenylmethylene)tungsten, W -00083

C₁₃H₁₀ClF₆NTi

Chlorodi- π -cyclopentadienyl[2,2,2-trifluoro-1-(trifluoromethyl)ethylideneiminato]titanium, Ti-00063

C₁₃H₁₀CrO₃

Tricarbonyl(2,3,4,5- η :9,10- η -9-methylenebicyclo[4.2.1]-nona-2,4,7-triene)chromium, Cr-00113

C₁₃H₁₂CrFeP₂O₉

Tetracarbonyl[μ -(tetramethyldiphosphine)]-(pentacarbonylchromium)iron, Cr-00114

C₁₃H₁₂CrO₄

Tricarbonyl[(4a,5,6,7,8,8a- η)-1,2,3,4-tetrahydro-1-naphthalenol]chromium, Cr-00115

C₁₃H₁₂MnNO₄

Tetracarbonyl[2-[(dimethylamino)methyl]phenyl-*C,N*]-manganese, Mn-00088

C₁₃H₁₃ClZr

Chloro[η^8 -1,3,5,7-cyclooctatetraene](η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00027

C₁₃H₁₃F₆PMo

(η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+); Hexafluorophosphate, *in* Mo-00076

C₁₃H₁₃Ho

(η^8 -1,3,5,7-Cyclooctatetraenyl)(η^5 -2,4-cyclopentadien-1-yl)holmium, Ho-00004

C₁₃H₁₃Mo[⊕]

(η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+), Mo-00076

C₁₃H₁₃Nd

(η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)neodymium, Nd-00003

C₁₃H₁₃O₂V

Acetylcarbonylbis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00058

C₁₃H₁₃Sc

(η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)scandium, Sc-00003

C₁₃H₁₃Sm

(η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)samarium, Sm-00007

C₁₃H₁₃Ti

(η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00064

C₁₃H₁₃Y

(η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)yttrium, Y -00004

C₁₃H₁₄CeCl

Chloro[1,3-propanediylbis(η^5 -2,4-cyclopentadien-1-ylidene)]cerium, Ce-00002

C₁₃H₁₄ClLa

Chloro[1,3-propanediylbis(η^5 -2,4-cyclopentadien-1-ylidene)]lanthanum, La-00003

C₁₃H₁₄Cl₂Hf

Dichloro[1,3-propanediylbis[(1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]]hafnium, Hf-00015

C₁₃H₁₄Cl₂Ti

Dichloro[1,3-propanediylbis[(1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]]titanium, Ti-00065

C₁₃H₁₄Cl₂Zr

Dichloro[1,3-propanediylbis[(1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]]zirconium, Zr-00028

C₁₃H₁₅F₆MoP

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)-molybdenum(1+); Hexafluorophosphate, *in* Mo-00077

C₁₃H₁₅F₆PW

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)-tungsten(1+); Hexafluorophosphate, *in* W -00084

C₁₃H₁₅Mo[⊕]

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)-molybdenum(1+), Mo-00077

C₁₃H₁₅Nb

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)niobium, Nb-00029

C₁₃H₁₅O₃Re

Tricarbonyl[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]rhenium, Re-00061

C₁₃H₁₅Ta

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)tantalum, Ta-00019

C₁₃H₁₅V

Bis(2,4-cyclopentadien-1-yl)(η^1 -2-propenyl)vanadium, V -00059

C₁₃H₁₅W[⊕]

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)-tungsten(1+), W -00084

C₁₃H₁₆CrO₃Si

Tricarbonyl(η^6 -benzyltrimethylsilyl)chromium, Cr-00116

C₁₃H₁₆CrO₃Sn

(Benzyltrimethylstannane)tricarbonylchromium, Cr-00117

C₁₃H₁₆OV[⊕]

Bis(η^5 -2,4-cyclopentadien-1-yl)(2-propanone)-vanadium(1+), V -00060

C₁₃H₁₆OZr

(η^2 -Acetyl)bis(η^5 -2,4-cyclopentadien-1-yl)-methylzirconium, Zr-00029

C₁₃H₁₇Cl₂N₂Ta

(2,2'-Bipyridine-*N,N'*)dichlorotrimethyltantalum, Ta-00020

C₁₃H₁₇F₆PW

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)-methyltungsten(1+); Hexafluorophosphate, *in* W -00085

C₁₃H₁₇N₂O₃V

Tricarbonyl(cyano-*C*)(η^5 -2,4-cyclopentadien-1-yl)-vanadate(1-); Tetramethylammonium salt, *in* V -00018

C₁₃H₁₇Ta

Bis(cyclopentadienyl)hydropropenetantalum, Ta-00021

C₁₃H₁₇W[⊕]

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)-methyltungsten(1+), W -00085

C₁₃H₁₈AlCITi

μ -Chlorobis(η^5 -cyclopentadienyl)(dimethylaluminum)- μ -methylenetitanium, Ti-00066

C₁₃H₁₉As₂O₃V

Tricarbonyltrihydro[1,2-phenylenebis(dimethylarsine)-*As,As'*]vanadium, V -00061

C₁₃H₁₉CiSiTi

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(trimethylsilyl)-titanium, Ti-00067

- C₁₃H₁₉ClSiZr**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(trimethylsilyl)-zirconium, Zr-00030
- C₁₃H₁₉Ta**
Bis(η^5 -2,4-cyclopentadien-1-yl)trimethyltantalum, Ta-00022
- C₁₃H₂₀CrClNO₅**
Pentacarbonylchlorochromate(1-); Tetraethylammonium salt, *in* Cr-00006
- C₁₃H₂₀CrINO₅**
Pentacarbonyliodochromate(1-); Tetraethylammonium salt, *in* Cr-00007
- C₁₃H₂₀IMoNO₅**
Pentacarbonyliodomolybdate(1-); Tetraethylammonium salt, *in* Mo-00004
- C₁₃H₂₀N₂O₃S₄W**
Tricarbonylbis(diethylcarbomodithioato-*S,S'*)tungsten, W -00086
- C₁₃H₂₁NaO₄PW**
Tetracarbonyl(triisopropylphosphine)tungstate(2-); Di-Na salt, *in* W -00087
- C₁₃H₂₁O₄PW[⊖]**
Tetracarbonyl(triisopropylphosphine)tungstate(2-), W -00087
- C₁₃H₂₄Cl₃P₂Ta**
Benzylidenetrichlorobis(trimethylphosphine)tantalum, Ta-00023
- C₁₃H₂₇Cl₂CrO₃**
Dichloromethyltris(tetrahydrofuran)chromium, Cr-00118
- C₁₃H₂₇Si₂Zr**
(η^5 -Cyclopentadienyl)bis(trimethylsilylmethyl)-zirconium, Zr-00031
- C₁₃H₂₉Cl₄NW**
Tetrachloro(1,1-dimethylpropylidyne)tungsten(1-); Tetraethylammonium salt, *in* W -00004
- C₁₃H₃₃N₃Ti**
Tris(diethylamino)methyltitanium, Ti-00068
- C₁₃H₃₆BrMnO₁₃P₄**
Bromocarbonyltetrakis(trimethylphosphite-*P*)manganese, Mn-00089
- C₁₃H₃₇ClP₄W**
Chloromethylidynetetrakis(trimethylphosphine)tungsten, W -00088
- C₁₃H₃₇MnO₁₃P₄**
Carbonylhydrotetrakis(trimethylphosphite-*P*)manganese, Mn-00090
- C₁₄FeMnO₁₄Re**
Pentacarbonyl(pentacarbonylmanganese)-(tetracarbonyliron)rhenium, Re-00062
- C₁₄FeMn₂O₁₄**
Tetracarbonylbis(pentacarbonylmanganio)iron, Mn-00092
- C₁₄FeO₁₄Re₂**
Tetracarbonylbis(pentacarbonylrhenio)iron, Re-00063
- C₁₄HO₁₄Re₃**
Tetradecacarbonylhydrotrirhenium, Re-00064
- C₁₄H₅F₁₂IMoO**
Carbonyl(η^5 -2,4-cyclopentadien-1-yl)iodo[(1,2,3,4- η)-1,2,3,4-tetrakis(trifluoromethyl)cyclobutadiene]-molybdenum, Mo-00078
- C₁₄H₉CrNO₅**
[1-(Benzylideneamino)ethylidene]pentacarbonylchromium, Cr-00119
- C₁₄H₁₀BCl₄MnO₂**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(phenylmethylidyne)manganese(1+); Tetrachloroborate, *in* Mn-00093
- C₁₄H₁₀BCl₄O₂Re**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(phenylmethylidyne)rhenium(1+); Tetrachloroborate, *in* Re-00066
- C₁₄H₁₀Cl₂O₄W₂**
Tetracarbonyldichlorobis(η^5 -2,4-cyclopentadien-1-yl)-ditungsten, W -00089
- C₁₄H₁₀Cr₂O₄**
Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)dichromium, Cr-00120
- C₁₄H₁₀F₆O₄Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)bis(trifluoroacetato-*O*)-titanium, Ti-00069
- C₁₄H₁₀F₆O₄Zr**
Bis(η^5 -2,4-cyclopentadien-1-yl)bis(trifluoroacetato-*O*)-zirconium, Zr-00032
- C₁₄H₁₀MnO₂[⊖]**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(phenylmethylidyne)manganese(1+), Mn-00093
- C₁₄H₁₀MnO₄Re**
(η^5 -2,4-Cyclopentadien-1-yl)[μ -(η : η^5 -2,4-cyclopentadien-1-ylidene)]-hydrotetracarbonylmanganeserhenium, Re-00065
- C₁₄H₁₀Mo₂O₄**
Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)-dimolybdenum, Mo-00079
- C₁₄H₁₀N₂S₂Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)[2,3-dimercapto-2-butenedinitrilato(2-)-*S,S'*]titanium, Ti-00070
- C₁₄H₁₀O₂Re[⊖]**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(phenylmethylidyne)rhenium(1+), Re-00066
- C₁₄H₁₀O₄W₂**
Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)ditungsten, W -00090
- C₁₄H₁₂MoO₂**
Benzylidicarbonyl- π -cyclopentadienylmolybdenum, Mo-00080
- C₁₄H₁₂O₂W**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^3 -6-methylene-2,4-cyclohexadien-1-yl)tungsten, W -00091
- C₁₄H₁₄Cl₃Mo₂**
Trichlorobis(η^7 -2,4,6-cycloheptatrien-1-yl)-dimolybdenum, Mo-00081
- C₁₄H₁₅NbO₄**
Tetracarbonyl[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]niobium, Nb-00030
- C₁₄H₁₅O₄Ta**
Tetracarbonyl[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00024
- C₁₄H₁₆Cr**
Bis[(1,2,3,4,5,6- η)methylbenzene]chromium, Cr-00121
- C₁₄H₁₆F₆NPW**
(Cyanomethyl)bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)-tungsten(1+); Hexafluorophosphate, *in* W -00092
- C₁₄H₁₆F₁₂N₂P₂V**
Bis(acetonitrile)bis(η^5 -2,4-cyclopentadien-1-yl)-vanadium(2+); Bis(hexafluorophosphate), *in* V -00062
- C₁₄H₁₆Mo**
Bis[(1,2,3,4,5,6- η)methylbenzene]molybdenum, Mo-00082
- C₁₄H₁₆NW[⊖]**
(Cyanomethyl)bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)-tungsten(1+), W -00092
- C₁₄H₁₆N₂V[⊖]**
Bis(acetonitrile)bis(η^5 -2,4-cyclopentadien-1-yl)-vanadium(2+), V -00062
- C₁₄H₁₆O₂W**
Dicarbonylbis[(1,2,3,4- η)-1,3-cyclohexadiene]tungsten, W -00093

C₁₄H₁₆O₄Ti

Bis(acetato-*O*)bis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00071

C₁₄H₁₆Ti

Bis[(1,2,3,4,5,6- η)-methylbenzene]titanium, Ti-00072

C₁₄H₁₆V

Bis[(1,2,3,4,5,6- η)-1,3,5-cycloheptatriene]vanadium, V -00063

C₁₄H₁₆W

Bis[(1,2,3,4,5,6- η)-methylbenzene]tungsten, W -00094

C₁₄H₁₆Zr

(η^4 -1,3-Butadiene)bis(η^5 -2,4-cyclopentadien-1-yl)-zirconium, Zr-00033

C₁₄H₁₇BF₄MoO

Bis[(2,3- η)-2-butyne]carbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+); Tetrafluoroborate, *in* Mo-00083

C₁₄H₁₇F₆MoOP

Bis[(2,3- η)-2-butyne]carbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+); Hexafluorophosphate, *in* Mo-00083

C₁₄H₁₇F₆OPW

Bis[(2,3- η)-2-butyne]carbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten(1+); Hexafluorophosphate, *in* W -00095

C₁₄H₁₇MoO⁺

Bis[(2,3- η)-2-butyne]carbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+), Mo-00083

C₁₄H₁₇OW⁺

Bis[(2,3- η)-2-butyne]carbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten(1+), W -00095

C₁₄H₁₈CrF₆NO₃P

Dicarbonyl[(1,2,3,4,5,6- η)-hexamethylbenzene]-nitrosylchromium(1+); Hexafluorophosphate, *in* Cr-00122

C₁₄H₁₈CrNO₃⁺

Dicarbonyl[(1,2,3,4,5,6- η)-hexamethylbenzene]-nitrosylchromium(1+), Cr-00122

C₁₄H₁₈Hf

(η^8 -1,3,5,7-Cyclooctatetraene)bis(η^3 -2-propenyl)-hafnium, Hf-00016

C₁₄H₁₈OSm

Bis(η^5 -2,4-cyclopentadien-1-yl)samarium; THF complex, *in* Sm-00005

C₁₄H₁₈Ti

(1,4-Butanediyl)bis(η^5 -2,4-cyclopentadien-1-yl)-titanium, Ti-00073

C₁₄H₁₈Zr

(η^8 -1,3,5,7-Cyclooctatetraene)bis(η^3 -2-propenyl)-zirconium, Zr-00034

C₁₄H₁₉Er

tert-Butylbis(η^5 -cyclopentadienyl)erbium, Er-00009

C₁₄H₁₉Lu

Butylbis(η^5 -2,4-cyclopentadien-1-yl)lutetium, Lu-00009
tert-Butylbis(η^5 -cyclopentadienyl)lutetium, Lu-00010

C₁₄H₁₉LuO

Bis(η^5 -2,4-cyclopentadien-1-yl)hydro(tetrahydrofuran)-lutetium, *in* Lu-00005

C₁₄H₁₉Nb

Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)ethylniobium, Nb-00031

C₁₄H₁₉OPTi

Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)-(trimethylphosphine)titanium, Ti-00074

C₁₄H₂₀AlCl₂Ti

Di- μ -chlorobis(η^5 -cyclopentadien-1-yl)(diethylaluminum)-titanium, Ti-00075

C₁₄H₂₀MoN₄O₄

Tetracarbonylbis(1,3-dimethyl-2-imidazolidinylidene)-molybdenum, Mo-00084

C₁₄H₂₀N₂O₅W

Pentacarbonyl(cyano-*C*)tungstate(1-); Tetraethylammonium salt, *in* W -00012

C₁₄H₂₀N₄O₄W

Tetracarbonylbis(1,3-dimethyl-2-imidazolidinylidene)-tungsten, W -00096

C₁₄H₂₀V

Bis(η^5 -2,4-cyclopentadien-1-yl)diethylvanadium, V -00064

C₁₄H₂₁ClHfSi

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]hafnium, Hf-00017

C₁₄H₂₁CiSiZr

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]zirconium, Zr-00035

C₁₄H₂₁ErSi

Bis(η^5 -2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]-erbium, Er-00010

C₁₄H₂₁LuSi

Bis(η^5 -2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]-lutetium, Lu-00011

C₁₄H₂₁SiSm

Bis(η^5 -2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]-samarium, Sm-00008

C₁₄H₂₁SiYb

Bis(η^5 -2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]-ytterbium, Yb-00011

C₁₄H₂₂AlSc

Bis(2,4-cyclopentadien-1-yl)(dimethylaluminum)di- μ -methylscandium, Sc-00004

C₁₄H₂₂AlY

Bis(η^5 -2,4-cyclopentadien-1-yl)(dimethylaluminum)di- μ -methylttrium, Y -00005

C₁₄H₂₂AlYb

Bis(η^5 -2,4-cyclopentadien-1-yl)(dimethylaluminum)di- μ -methylytterbium, Yb-00012

C₁₄H₂₂HfN₂

Bis(η^5 -cyclopentadienyl)bis(dimethylamido)hafnium, Hf-00018

C₁₄H₂₂IO₄PW

Carbonyl(η^7 -cycloheptatrienyl)iodo(triethylphosphite)tungsten, W -00097

C₁₄H₂₂N₂Ti

Bis(η^5 -cyclopentadienyl)bis(dimethylamido)titanium, Ti-00076

C₁₄H₂₂N₂Zr

Bis(η -cyclopentadienyl)bis(dimethylamido)zirconium, Zr-00036

C₁₄H₂₂V

Bis(η^5 -2,4-dimethyl-2,4-pentadien-1-yl)vanadium, V -00065

C₁₄H₂₃Cl₃O₂U

Trichloro[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]uranium; Bis-THF complex, *in* U -00003

C₁₄H₂₃NO₅W

N,N,N-Triethylethanaminium(1+)
pentacarbonylmethyltungstate(1-), *in* W -00009

C₁₄H₂₃N₃S₆Ti

(η^5 -2,4-Cyclopentadien-1-yl)-
tris(dimethylcarbomodithioato-*S,S'*)titanium, Ti-00077

C₁₄H₂₃N₃S₆Zr

(η^5 -2,4-Cyclopentadien-1-yl)-
tris(dimethylcarbomodithioato-*S,S'*)zirconium, Zr-00037

C₁₄H₂₇Ta

[(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]tetramethyltantalum, Ta-00025

C₁₄H₂₈P₂TiBis(η^4 -1,3-butadiene)[1,2-ethanediy]bis(dimethylphosphine)-*P,P'*]titanium, Ti-00078**C₁₄H₃₀Cl₂O₂P₂Re**

Dicarbonyldichlorobis(triethylphosphine)rhenium, Re-00067

C₁₄H₃₃TaO₂P₄Dicarbonylbis[1,2-ethanediy]bis(dimethylphosphine)-*P,P'*]hydrotantalum, Ta-00026**C₁₄H₃₅N₃V**

Tris(diethylamido)ethylvanadium, V -00066

C₁₄H₃₆CrO₂P₄

Dicarbonyltetrakis(trimethylphosphine)chromium, Cr-00123

C₁₄H₃₈MnP₄Bis[1,2-ethanediy]bis(dimethylphosphine)-*P,P'*]dimethylmanganese, Mn-00095**C₁₄H₄₂HfN₂Si₄**

Dimethylbis[bis(trimethylsilyl)amido]hafnium, Hf-00019

C₁₄H₄₂N₂Si₄Zr

Dimethylbis[bis(trimethylsilyl)amido]zirconium, Zr-00038

C₁₄Mn₂O₁₄Os

Tetracarbonylbis(pentacarbonylmanganio)osmium, Mn-00096

C₁₄Mn₂O₁₄Ru

Tetracarbonylbis(pentacarbonylmanganio)ruthenium, Mn-00097

C₁₄Mn₃O₁₄[⊖]

Tetradecacarbonyltrimanganate(1-), Mn-00098

C₁₄O₁₄OsRe₂

Tetracarbonylbis(pentacarbonylrhenio)osmium, Re-00068

C₁₅H₅BrO₈Re₂ μ -Bromooctacarbonyl[μ -(phenylmethylidyne)dirhenium, Re-00069**C₁₅H₈F₆N₃PO₄W**Tricarbonylnitrosyl(1,10-phenanthroline-*N*¹,*N*¹⁰)-tungsten(1+); Hexafluorophosphate, *in* W -00098**C₁₅H₈N₃O₄W[⊕]**Tricarbonylnitrosyl(1,10-phenanthroline-*N*¹,*N*¹⁰)-tungsten(1+), W -00098**C₁₅H₉BrCrFeO₄**

Bromotetracarbonyl(ferrocenylmethylidyne)chromium, Cr-00124

C₁₅H₉BrFeMoO₄

Bromotetracarbonyl(ferrocenylmethylidyne)molybdenum, Mo-00085

C₁₅H₉BrFeO₄W

Bromotetracarbonyl(ferroceniumylmethylidyne)tungsten, W -00099

C₁₅H₉BrO₄RuW

Bromotetracarbonyl(ruthenocenylmethylidyne)tungsten, W -00100

C₁₅H₉ClO₄RuW

Tetracarbonylchloro(ruthenocenomethylidyne)tungsten, W -00101

C₁₅H₉MnMoO₅Molybdenumcarbonyl(η^5 -2,4-cyclopentadien-1-yl)[μ -(η^5 -2,4-cyclopentadien-1-ylidene)]-tetracarbonylmanganese, Mn-00099**C₁₅H₁₀CrFeO₅**Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)iron]chromium, Cr-00125**C₁₅H₁₀CrO₆**

Pentacarbonyl(1-methoxy-3-phenyl-2-propenylidene)-chromium, Cr-00126

C₁₅H₁₀FeMoO₅Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)iron]molybdenum, Mo-00087**C₁₅H₁₀FeO₅W**Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)iron]tungsten, W -00102**C₁₅H₁₀O₅V₂**Di- μ -carbonyltricarbonylbis(η^5 -2,4-cyclopentadien-1-yl)-divanadium, V -00067**C₁₅H₁₁MnO₂**Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(2-phenylethenylidene)manganese, Mn-00100**C₁₅H₁₂BMnO₃**Tricarbonyl[(1,2,3,4,5,6- η)-4-methyl-1-phenylboratabenzene]manganese, Mn-00101**C₁₅H₁₂Mn₂O₄**Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)- μ -methylenedimanganese, Mn-00102**C₁₅H₁₃BF₄MoN₂O₂**Bis(acetonitrile)dicarbonyl[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]molybdenum(1+); Tetrafluoroborate, *in* Mo-00088**C₁₅H₁₃BF₄MoO₂**(η^4 -1,3-Butadiene)dicarbonyl[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]molybdenum(1+); Tetrafluoroborate, *in* Mo-00089**C₁₅H₁₃ClN₂O₂W**(2,2'-Bipyridine-*N,N'*)dicarbonylchloro(η^3 -2-propenyl)-tungsten, W -00103**C₁₅H₁₃MnO₃**Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(2-methoxy-1-phenylethylidene)manganese, Mn-00103**C₁₅H₁₃MoN₂O₂[⊕]**Bis(acetonitrile)dicarbonyl[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]molybdenum(1+), Mo-00088**C₁₅H₁₃MoO₂[⊕]**(η^4 -1,3-Butadiene)dicarbonyl[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]molybdenum(1+), Mo-00089**C₁₅H₁₅Am**Tris(η^5 -2,4-cyclopentadien-1-yl)americium, Am-00001**C₁₅H₁₅Bk**Tris(η^5 -2,4-cyclopentadien-1-yl)berkelium, Bk-00001**C₁₅H₁₅BrTh**Bromotris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00004**C₁₅H₁₅BrU**Bromotris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00012**C₁₅H₁₅Ce**Tris(η^5 -2,4-cyclopentadien-1-yl)cerium, Ce-00003**C₁₅H₁₅CeCl**Chlorotris(η^5 -2,4-cyclopentadien-1-yl)cerium, Ce-00004**C₁₅H₁₅Cf**Tris(η^5 -2,4-cyclopentadien-1-yl)californium, Cf-00001**C₁₅H₁₅ClNp**Chlorotris(η^5 -2,4-cyclopentadien-1-yl)neptunium, Np-00001**C₁₅H₁₅ClPu**Chlorotris(η^5 -2,4-cyclopentadien-1-yl)plutonium, Pu-00001**C₁₅H₁₅CITh**Chlorotris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00005**C₁₅H₁₅CIU**Chlorotris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00013**C₁₅H₁₅ClZr**Chlorotris(η -cyclopentadienyl)zirconium, Zr-00039**C₁₅H₁₅Cm**Tris(η^5 -2,4-cyclopentadien-1-yl)curium, Cm-00001**C₁₅H₁₅Dy**Tris(η^5 -2,4-cyclopentadien-1-yl)dysprosium, Dy-00004**C₁₅H₁₅Er**Tris(η^5 -2,4-cyclopentadien-1-yl)erbium, Er-00011**C₁₅H₁₅Eu**Tris(η^5 -2,4-cyclopentadien-1-yl)europium, Eu-00004

C₁₅H₁₅FNpFluorotris(η^5 -2,4-cyclopentadien-1-yl)neptunium, Np-00002**C₁₅H₁₅FTh**Fluorotris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00006**C₁₅H₁₅FU**Tris(η^5 -2,4-cyclopentadien-1-yl)fluorouranium, U-00016**C₁₅H₁₅Gd**Tris(η^5 -2,4-cyclopentadien-1-yl)gadolinium, Gd-00004**C₁₅H₁₅Ho**Tris(η^5 -2,4-cyclopentadien-1-yl)holmium, Ho-00005**C₁₅H₁₅ITh**Iodotris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00007**C₁₅H₁₅IU**Iodotris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00014**C₁₅H₁₅La**Tris(η^5 -2,4-cyclopentadien-1-yl)lanthanum, La-00004**C₁₅H₁₅Lu**Tris(η^5 -2,4-cyclopentadien-1-yl)lutetium, Lu-00012**C₁₅H₁₅Mn₃N₄O₄**Tris(η^5 -2,4-cyclopentadien-1-yl)- μ_3 -nitrosyltri- μ -nitrosyltrimanganese, Mn-00104**C₁₅H₁₅Nd**Tris(η^5 -2,4-cyclopentadien-1-yl)neodymium, Nd-00004**C₁₅H₁₅Pm**Tris(η^5 -2,4-cyclopentadien-1-yl)promethium, Pm-00001**C₁₅H₁₅Pr**Tris(η^5 -2,4-cyclopentadien-1-yl)praseodymium, Pr-00003**C₁₅H₁₅Pu**Tris(η^5 -2,4-cyclopentadien-1-yl)plutonium, Pu-00002**C₁₅H₁₅Sc**Tris(η^5 -2,4-cyclopentadien-1-yl)scandium, Sc-00005**C₁₅H₁₅Sm**Tris(η^5 -2,4-cyclopentadien-1-yl)samarium, Sm-00009**C₁₅H₁₅Tb**Tris(η^5 -2,4-cyclopentadien-1-yl)terbium, Tb-00002**C₁₅H₁₅Th**Tris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00008**C₁₅H₁₅Ti**[(1,2- η)-2,4-cyclopentadien-1-yl]bis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00079**C₁₅H₁₅Tm**Tris(η^5 -2,4-cyclopentadien-1-yl)thulium, Tm-00004**C₁₅H₁₅U**Tris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00015**C₁₅H₁₅Y**Tris(η^5 -2,4-cyclopentadien-1-yl)yttrium, Y -00006**C₁₅H₁₅Yb**Tris(η^5 -2,4-cyclopentadien-1-yl)ytterbium, Yb-00013**C₁₅H₁₆CrO₃**Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5,7-tetramethyl-1,3,5,7-cyclooctatetraene]chromium, Cr-00127**C₁₅H₁₆MoO₃**Tricarbonyl(η^6 -1,3,5,7-tetramethyl-1,3,5,7-cyclooctatetraene)molybdenum, Mo-00090**C₁₅H₁₇BMoN₆O₂**Dicarbonyl[hydrotris(1*H*-pyrazolato-*N*¹)borato(1-)-*N*²,*N*²,*N*²][(1,2,3- η -2-methyl-2-propenyl)-molybdenum, Mo-00091**C₁₅H₁₇BN₆O₂W**Dicarbonyl[hydrotris(pyrazolato)borato(1-)](η^3 -2-methylpropenyl)tungsten, W -00104**C₁₅H₁₇ClO₆Ti**Di- π -cyclopentadienyl(2,4-pentanedionato)titanium(1+); Perchlorate, *in* Ti-00080**C₁₅H₁₇ClO₆V**▷ Bis(η^5 -2,4-cyclopentadien-1-yl)(pentanedionato)-vanadium(1+); Perchlorate, *in* V -00068**C₁₅H₁₇O₂Ti[⊕]**Di- π -cyclopentadienyl(2,4-pentanedionato)titanium(1+), Ti-00080**C₁₅H₁₇O₂V[⊕]**Bis(η^5 -2,4-cyclopentadien-1-yl)(pentanedionato)-vanadium(1+), V -00068**C₁₅H₁₈NYb**Tris(2,4-cyclopentadien-1-yl)ammineytterbium, *in* Yb-00013**C₁₅H₁₈O₃W**Tricarbonyl[(1,2,3,4,5,6- η)-hexamethylbenzene]tungsten, W -00105**C₁₅H₁₉As₂O₄V**Tetracarbonylmethyl[1,2-phenylenebis(dimethylarsine)-*As,As'*]vanadium, V -00069**C₁₅H₁₉ClHfO₄**Chloro- π -cyclopentadienylbis(2,4-pentanedionato)-hafnium, Hf-00020**C₁₅H₁₉ClO₄Zr**Chloro(η^5 -2,4-cyclopentadien-1-yl)bis(2,4-pentanedionato-*O,O'*)zirconium, Zr-00040**C₁₅H₁₉LuO**Bis(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethyl-1-oxopropyl-*C,O*)lutetium, Lu-00013**C₁₅H₁₉Ti**Bis(η^5 -2,4-cyclopentadien-1-yl)[(1,2,3- η)-2-methyl-2-butenyl]titanium, Ti-00081**C₁₅H₂₀BF₄NS₂V**Bis(η^5 -2,4-cyclopentadien-1-yl)-(diethylcarbomodithioato-*S,S'*)vanadium(1+); Tetrafluoroborate, *in* V -00070**C₁₅H₂₀I₃NS₂V**Bis(η^5 -2,4-cyclopentadien-1-yl)-(diethylcarbomodithioato-*S,S'*)vanadium(1+); Triiodide, *in* V -00070**C₁₅H₂₀NS₂V[⊕]**Bis(η^5 -2,4-cyclopentadien-1-yl)-(diethylcarbomodithioato-*S,S'*)vanadium(1+), V -00070**C₁₅H₂₀NTa**Bis(η^5 -2,4-cyclopentadien-1-yl)(isocyanomethane)-propyltantalum, Ta-00027**C₁₅H₂₁CiT**Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)titanium, Ti-00082**C₁₅H₂₁Lu**Bis(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)-lutetium, Lu-00014**C₁₅H₂₁LuO**Bis(η^5 -2,4-cyclopentadien-1-yl)methyllutetium; THF complex, *in* Lu-00006**C₁₅H₂₂Zr**Bis(η^5 -cyclopentadienyl)(2,2-dimethylpropyl)-hydrozirconium, Zr-00041**C₁₅H₂₅Cl₂Ta**Dichloro(2,2-dimethylpropylidene)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-tantalum, Ta-00028**C₁₅H₂₆NO₂Re**Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydrorhenate(1-); Tetraethylammonium salt, *in* Re-00027**C₁₅H₂₆O₃Ti**

Phenyltris(2-propanolato)titanium, Ti-00083

C₁₅H₂₇Zr(η^5 -2,4-Cyclopentadien-1-yl)bis(2,2-dimethylpropyl)-zirconium, Zr-00042

C₁₅H₃₅TaO₂P₄Dicarbonylbis[1,2-ethanediylbis(dimethylphosphine)-*P,P'*]methyltantalum, Ta-00029**C₁₆H₁₆MnO₁₆Os₃**

Hexadecacarbonylhydromanganesetriosmium, Mn-00105

C₁₆H₁₆O₁₆Os₃Re

Hexadecacarbonylhydroseleniumtriosmium, Re-00070

C₁₆H₈Mo₂O₆[μ-[(1,2,3,3*a*,8*a*-η:4,5,6,7,8-η)azulene]]-hexacarbonyldimolybdenum, Mo-00092**C₁₆H₉MnN₂O₄**

Tetracarbonyl[2-(phenylazo)phenyl]manganese, Mn-00106

C₁₆H₉N₂O₄Re

Tetracarbonyl[2-(phenylazo)phenyl]rhenium, Re-00071

C₁₆H₁₀Cr₂HgO₆

▷Hexacarbonyldi-π-cyclopentadienyl-μ-mercuriodichromium, Cr-00128

C₁₆H₁₀Cr₂O₆Hexacarbonylbis(η⁵-2,4-cyclopentadien-1-yl)dichromium, Cr-00129**C₁₆H₁₀F₅Ti**Bis(η⁵-2,4-cyclopentadien-1-yl)-pentafluorophenyltitanium, Ti-00084**C₁₆H₁₀F₆O₄S₂W₂**Tetracarbonylbis(η⁵-2,4-cyclopentadien-1-yl)bis[μ-(trifluoromethanethiolato)]tungsten, W -00106**C₁₆H₁₀F₆Ti**

▷Bis-π-cyclopentadienylbis(3,3,3-trifluoro-1-propynyl)-titanium, Ti-00085

C₁₆H₁₀Mo₂O₆Hexacarbonylbis(η⁵-2,4-cyclopentadien-1-yl)-dimolybdenum, Mo-00093**C₁₆H₁₀O₆W₂**Hexacarbonylbis(η⁵-2,4-cyclopentadien-1-yl)ditungsten, W -00107**C₁₆H₁₀Yb**

Bis(phenylethynyl)ytterbium, Yb-00014

C₁₆H₁₁CrNO₅

Pentacarbonyl[3-(dimethylamino)-3-phenyl-1,2-propadienyldene]chromium, Cr-00130

C₁₆H₁₁FeMnO₅(2-Acetylferrocenyl-*C,O*)tetracarbonylmanganese, Mn-00107
Pentacarbonyl(ferrocenylmethyl)manganese, Mn-00108**C₁₆H₁₂CrO₃**

Tricarbonyl[(1,2,3,4,5,6-η)-7-phenyl-1,3,5-cycloheptatriene]chromium, Cr-00131

C₁₆H₁₂MnNO₁₂Os₂Dodecacarbonylmanganatediosmate(1-); Tetramethylammonium salt, *in* Mn-00085**C₁₆H₁₂Mn₄O₁₂S₄**Dodecacarbonyltetrakis(μ₃-methanethiolato)-tetramanganese, *in* Mn-00005**C₁₆H₁₂NO₁₂Os₂Re**Dodecacarbonylrhenatediosmate(1-); Tetramethylammonium salt, *in* Re-00059**C₁₆H₁₂O₁₂Re₄S₄**Dodecacarbonyltetrakis(μ₃-methanethiolato)tetrarhenium, *in* Re-00004**C₁₆H₁₄ClF₁₂MoP**Chloro(η⁵-2,4-cyclopentadien-1-yl)bis[(2,3-η)-1,1,1,4,4,4-hexafluoro-2-butyne]-(trimethylphosphine)molybdenum, Mo-00094**C₁₆H₁₄CrO₇**Tricarbonyl[(3*a*,4,5,6,7,7*a*-η)-2,3-dihydro-1*H*-inden-1-ol]chromium; Monosuccinate, *in* Cr-00099**C₁₆H₁₄O₂Ti**[1,2-Benzenediolato(2-)-*O,O'*]bis(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00086**C₁₆H₁₄S₂Ti**[1,2-Benzenedithiolato(2-)-*S,S'*]bis(η⁵-2,4-cyclopentadien-1-yl)titanium, Ti-00087**C₁₆H₁₅CITi**Chlorobis(η⁵-2,4-cyclopentadien-1-yl)phenyltitanium, Ti-00088**C₁₆H₁₅Gd**Bis(η⁵-2,4-cyclopentadien-1-yl)phenylgadolinium, Gd-00005**C₁₆H₁₅NOV⁺**Carbonylbis(η⁵-2,4-cyclopentadien-1-yl)(pyridine)-vanadium(1+), V -00071**C₁₆H₁₅NSU**Tris(η⁵-2,4-cyclopentadien-1-yl)(thiocyanato-*N*)uranium, U -00017**C₁₆H₁₅NU**(Cyano-*C*)tris(η⁵-2,4-cyclopentadien-1-yl)uranium, U -00018**C₁₆H₁₅SV**(Benzenethiolato)bis(η⁵-2,4-cyclopentadien-1-yl)-vanadium, V -00072**C₁₆H₁₅Ti**Bis(η⁵-2,4-cyclopentadien-1-yl)phenyltitanium, Ti-00089**C₁₆H₁₅V**Bis(η⁵-2,4-cyclopentadien-1-yl)phenylvanadium, V -00073**C₁₆H₁₅Yb**Bis(η⁵-2,4-cyclopentadien-1-yl)phenylytterbium, Yb-00015**C₁₆H₁₆Ce⁺**Bis(η⁸-1,3,5,7-cyclooctatetraene)cerate(1-), Ce-00005**C₁₆H₁₆CeK**Bis(η⁸-1,3,5,7-cyclooctatetraene)cerate(1-); K salt, *in* Ce-00005**C₁₆H₁₆Cr**(η^{1,2}-[2,2]Paracyclophane)chromium, Cr-00132**C₁₆H₁₆KL_a**Bis(η⁸-1,3,5,7-cyclooctatetraene)lanthanate(1-); K salt, *in* La-00005**C₁₆H₁₆KNd**Bis(η⁸-1,3,5,7-cyclooctatetraene)neodymate(1-); K salt, *in* Nd-00005**C₁₆H₁₆KPr**Bis(η⁸-1,3,5,7-cyclooctatetraene)praesodymate(1-); K salt, *in* Pr-00004**C₁₆H₁₆KSm**Bis(η⁸-1,3,5,7-cyclooctatetraene)samarate(1-); K salt, *in* Sm-00010**C₁₆H₁₆KTb**Bis(η⁸-1,3,5,7-cyclooctatetraene)terbate(1-); K salt, *in* Tb-00003**C₁₆H₁₆KY**Bis(η⁸-1,3,5,7-cyclooctatetraene)yttrate(1-); K salt, *in* Y -00007**C₁₆H₁₆La⁺**Bis(η⁸-1,3,5,7-cyclooctatetraene)lanthanate(1-), La-00005**C₁₆H₁₆Nd⁺**Bis(η⁸-1,3,5,7-cyclooctatetraene)neodymate(1-), Nd-00005**C₁₆H₁₆Np⁺**Bis(η⁸-1,3,5,7-cyclooctatetraene)neptunate(1-), Np-00003
Bis(η⁸-1,3,5,7-cyclooctatetraene)neptunium, Np-00004**C₁₆H₁₆O₄V**Bis(η⁵-2,4-cyclopentadien-1-yl)[(2,3-η)-dimethyl-2-butyndioate]vanadium, V -00074**C₁₆H₁₆Pa**Bis(η⁸-1,3,5,7-cyclooctatetraene)protactinium, Pa-00001**C₁₆H₁₆Pr⁺**Bis(η⁸-1,3,5,7-cyclooctatetraene)praesodymate(1-), Pr-00004**C₁₆H₁₆Pu⁺**Bis(η⁸-1,3,5,7-cyclooctatetraene)plutonate(1-), Pu-00003

- Bis(η^8 -1,3,5,7-cyclooctatetraene)plutonium, Pu-00004
- C₁₆H₁₆Sm⁺**
Bis(η^8 -1,3,5,7-cyclooctatetraene)samarate(1–), Sm-00010
- C₁₆H₁₆Tb⁺**
Bis(η^8 -1,3,5,7-cyclooctatetraene)terbate(1–), Tb-00003
- C₁₆H₁₆Th**
▷Bis(η^8 -1,3,5,7-cyclooctatetraene)thorium, Th-00009
- C₁₆H₁₆Ti**
Bis(1,3,5,7-cyclooctatetraene)titanium, Ti-00090
- C₁₆H₁₆U**
Uranocene, U -00019
- C₁₆H₁₆V**
Bis(η^8 -1,3,5,7-cyclooctatetraene)vanadium, V -00075
- C₁₆H₁₆W**
Bis(η^5 -2,4-cyclopentadien-1-yl)hydrophenyltungsten, W -00108
- C₁₆H₁₆Y⁺**
Bis(η^8 -1,3,5,7-cyclooctatetraene)yttrate(1–), Y -00007
- C₁₆H₁₇CrNO₆**
Benzoylpentacarbonylchromate(1–); Tetramethylammonium salt, *in* Cr-00094
- C₁₆H₁₇Mo₂O₄P**
Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(dimethylphosphino)]- μ -hydrodimolybdenum, Mo-00095
- C₁₆H₁₈Cl₂CrN₃**
Dichloromethyltrispyridinechromium, Cr-00133
- C₁₆H₁₈CrO₄**
Tetracarbonyl(1,2,3,4,5,6-hexamethylbicyclo[2.2.0]hexa-2,5-diene)chromium, Cr-00134
- C₁₆H₁₈NSc**
Bis(η^5 -2,4-cyclopentadien-1-yl)methylscandium; Py complex, *in* Sc-00002
- C₁₆H₁₈Th**
Tris(η^5 -2,4-cyclopentadien-1-yl)methylthorium, Th-00010
- C₁₆H₁₈U**
Tris(η^5 -2,4-cyclopentadien-1-yl)methyluranium, U -00020
- C₁₆H₁₉Er**
Bis(2,4-cyclopentadien-1-yl)(3,3-dimethylbutynyl)-erbium, Er-00012
- C₁₆H₂₀Cr**
Bis[(1,2,3,4,5,6- η)ethylbenzene]chromium, Cr-00135
- C₁₆H₂₀V**
Bis[(1,2,3,4,5,6- η)ethylbenzene]vanadium, V -00076
- C₁₆H₂₀Zr**
Bis(η^5 -2,4-cyclopentadien-1-yl)[(1,2,3,4- η)-2,3-dimethyl-1,3-butadiene]zirconium, Zr-00043
Bis(η^5 -2,4-cyclopentadien-1-yl)- η^1 -2-propenyl- η^3 -2-propenylzirconium, Zr-00044
- C₁₆H₂₁BF₄MoO₂**
Dicarbonyl(η^4 -2-methylene-1,3-propanediyl)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-molybdenum(1+); Tetrafluoroborate, *in* Mo-00096
- C₁₆H₂₁B₂FeMnO₃S**
Tricarbonyl[(η^5 -2,4-cyclopentadien-1-yl)iron][μ -[(1,2,3,4,5- η :1,2,3,4,5- η)-3,4-diethyl-2,5-dihydro-2,5-dimethyl-1,2,5-thiadiborole]]-manganese, Mn-00109
- C₁₆H₂₁MoO₂⁺**
Dicarbonyl(η^4 -2-methylene-1,3-propanediyl)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-molybdenum(1+), Mo-00096
- C₁₆H₂₂ClOSm**
Chlorobis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]samarium; THF adduct, *in* Sm-00006
- C₁₆H₂₂Cl₄O₂Ti₂**
Tetrachlorobis(η^5 -2,4-cyclopentadien-1-yl)[μ -[2,3-dimethyl-2,3-butanediolato(2–)-*O*:*O'*]]dititanium, Ti-00091
- C₁₆H₂₂OYb**
Bis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]-ytterbium; THF complex, *in* Yb-00009
- C₁₆H₂₃NO₂W**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(2,2,4,4-tetramethyl-3-pentaniminato)tungsten, W -00109
- C₁₆H₂₃Y**
tert-Butylbis(methylcyclopentadienyl)yttrium, Y -00008
- C₁₆H₂₄ClLaO₂**
(η^8 -1,3,5,7-Cyclooctatetraene)bis(tetrahydrofuran)-lanthanum, *in* La-00001
- C₁₆H₂₄Cl₂O₂Th**
Dichloro(η^8 -1,3,5,7-cyclooctatetraene)thorium; Di-THF complex, *in* Th-00001
- C₁₆H₂₆ClP₂Ta**
Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethanediybis(dimethylphosphine)]-*P,P'*-tantalum(1+); Chloride, *in* Ta-00031
- C₁₆H₂₆NO₃V**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-hydrovanadate(1–); Tetraethylammonium salt, *in* V -00017
- C₁₆H₂₆PTa**
Bis(η^5 -2,4-cyclopentadien-1-yl)hydro(triethylphosphine)-tantalum, Ta-00030
- C₁₆H₂₆P₂Ta⁺**
Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethanediybis(dimethylphosphine)]-*P,P'*-tantalum(1+), Ta-00031
- C₁₆H₂₆Si₂Yb**
Bis[(1,2,3,4,5- η)-1-(trimethylsilyl)-2,4-cyclopentadien-1-yl]ytterbium, Yb-00016
- C₁₆H₂₈AlCINy**
Chlorobis(cyclopentadienyl)[trihydro(triethylamino)-aluminum]yttrium, Y -00009
- C₁₆H₂₈O₆P₂Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)bis(trimethylphosphite)-titanium, Ti-00092
- C₁₆H₃₀N₃OReS₆**
Carbonyltris(diethylcarbamodithioato-*S,S'*)rhenium, Re-00072
- C₁₆H₃₂Cr₂⁺⁺**
Tetrakis(μ -tetramethylene)dichromate(4–), Cr-00136
- C₁₆H₃₂Cr₂Li₄**
Tetrakis(μ -tetramethylene)dichromate(4–); Tetra-Li salt, *in* Cr-00136
- C₁₆H₃₆Er⁺**
Tetra-*tert*-butylterbate(1–), Er-00013
- C₁₆H₃₆O₅W**
Tetrakis(2-methyl-2-propanolato)oxotungsten, W -00110
- C₁₆H₃₆Sm⁺**
Tetra-*tert*-butylsamarate(1–), Sm-00011
- C₁₆H₃₆Yb⁺**
Tetra-*tert*-butylytterbate(1–), Yb-00017
- C₁₆H₄₀Cr₂P₄**
Tetrakis[(dimethylphosphonio)bis(methylene)]dichromium, Cr-00137
- C₁₆H₄₁NbP₄**
Bis[1,2-ethanediybis(dimethylphosphine)]-*P,P'*]bis(η^2 -ethene)hydroniobium, Nb-00032
- C₁₆H₄₄CrSi₄**
Tetrakis[(trimethylsilyl)methyl]chromium, Cr-00138
- C₁₆H₄₄HfSi₄**
▷Tetrakis(trimethylsilylmethyl)hafnium, Hf-00021
- C₁₆H₄₄LuSi⁺**
Tetrakis[(trimethylsilyl)methyl]luteate(1–), Lu-00015
- C₁₆H₄₄Si₄Ti**
Tetrakis(trimethylsilylmethyl)titanium, Ti-00093

- C₁₆H₄₄Si₄V**
▷Tetrakis[(trimethylsilyl)methyl]vanadium, V -00077
- C₁₆H₄₄Si₄Y[⊖]**
Tetrakis[(trimethylsilyl)methyl]yttrate(1-), Y -00010
- C₁₆H₄₄Si₄Zr**
▷Tetrakis(trimethylsilylmethyl)zirconium, Zr-00045
- C₁₆H₄₅CrO₁₆P₅**
Carbonylpentakis(trimethylphosphite-*P*)chromium, Cr-00139
- C₁₆H₄₆HfN₂Si₄**
Diethylbis[bis(trimethylsilyl)amido]hafnium, Hf-00022
- C₁₆H₄₈Mo₂P₄**
Tetramethyltetrakis(trimethylphosphine)dimolybdenum, Mo-00097
- C₁₆H₅₆B₂₀N₂Ti**
Bis[η⁶-decahydro-*C,C'*-dimethyldicarbododecaborato(2-)]-titanate(2-); Bis(tetramethylammonium) salt, *in* Ti-00019
- C₁₆Na₂O₁₆Re₄**
Hexadecacarbonyltetrarhenate(2-); Di-Na salt, *in* Re-00073
- C₁₆O₁₆Re₄^{⊖⊖}**
Hexadecacarbonyltetrarhenate(2-), Re-00073
- C₁₇H₄NO₁₅Os₃Re**
[(Acetonitrile)decacarbonyl-μ-hydrotriosmium]-pentacarbonylrhenium, Re-00074
- C₁₇H₈O₁₀Tc₂**
Nonacarbonyl(methoxyphenylmethylene)ditechnetium, Tc-00009
- C₁₇H₁₀CrO₃**
Anthracenetricarbonylchromium, Cr-00140
Tricarbonyl-η⁶-phenanthrenechromium, Cr-00141
- C₁₇H₁₀MnNO₄**
Tetracarbonyl[2-[(phenylimino)methyl]phenyl-*C,N*]-manganese, Mn-00110
- C₁₇H₁₀MnO₅Ti**
▷Pentacarbonyl(diphenylthallium)manganese, Mn-00111
- C₁₇H₁₀NO₄Re**
Tetracarbonyl[2-[(phenylimino)methyl]phenyl-*C,N*]-rhenium, Re-00075
- C₁₇H₁₂CrFeO₆**
Pentacarbonyl(ferrocenylmethoxymethylene)chromium, Cr-00142
- C₁₇H₁₄MoO₄**
Tetracarbonylbis(η⁵-2,4-cyclopentadien-1-yl)[μ-[(1,2-η:2,3-η)-1,2-propadiene]]dimolybdenum, Mo-00098
- C₁₇H₁₄OV**
Carbonyl(η⁵-2,4-cyclopentadien-1-yl)(η⁵-1-phenyl-2,4-cyclopentadien-1-yl)vanadium, V -00078
- C₁₇H₁₅N₂S₂U[⊖]**
Tris(η⁵-cyclopentadienyl)diisothiocyanatouranate(IV), U -00021
- C₁₇H₁₆CrO₇**
Tricarbonyl[(4*a*,5,6,7,8,8*a*-η)-1,2,3,4-tetrahydro-1-naphthalenol]chromium; Monosuccinate, *in* Cr-00115
- C₁₇H₁₆U**
Tris(η⁵-2,4-cyclopentadien-1-yl)ethynyluranium, U -00022
- C₁₇H₁₇Lu**
Benzylbis(η⁵-2,4-cyclopentadienyl)lutetium, Lu-00016
Bis(η⁵-2,4-cyclopentadien-1-yl)(4-methylphenyl)-lutetium, Lu-00017
- C₁₇H₁₇Ti**
Benzylbis(η⁵-cyclopentadienyl)titanium, Ti-00094
- C₁₇H₁₇V**
Benzylbis(cyclopentadienyl)vanadium, V -00079
- C₁₇H₁₉Cl₂DyO₃**
▷Dichloro(η⁵-2,4-cyclopentadien-1-yl)dysprosium; Tris-THF adduct, *in* Dy-00001
- C₁₇H₁₉F₆PMo**
(η⁶-Benzene)[(1,2,3,4-η)-1,3,5,7-cyclooctatetraene](η³-2-propenyl)molybdenum(1+); Hexafluorophosphate, *in* Mo-00099
- C₁₇H₁₉Mo[⊖]**
(η⁶-Benzene)[(1,2,3,4-η)-1,3,5,7-cyclooctatetraene](η³-2-propenyl)molybdenum(1+), Mo-00099
- C₁₇H₁₉Nb**
Bis(1,3,5,7-cyclooctatetraene)methylniobium, Nb-00033
- C₁₇H₂₀N₂O₄V**
Bis(η⁵-2,4-cyclopentadien-1-yl)(η²-diethyldiazomalonate-*N,N'*)vanadium, V -00080
- C₁₇H₂₀OU**
Ethoxytris(η⁵-2,4-cyclopentadien-1-yl)uranium, U -00023
- C₁₇H₂₃Mo₂O₃**
Bis(η⁷-2,4,6-cycloheptatrien-1-yl)tri-μ-methoxydimolybdenum, Mo-00100
- C₁₇H₂₅HfP**
Bis[(1,2,3,4,5,6-η)methylbenzene](trimethylphosphine)-hafnium, Hf-00023
- C₁₇H₂₅PZr**
Bis[(1,2,3,4,5,6-η)methylbenzene](trimethylphosphine)-zirconium, Zr-00046
- C₁₇H₂₈NbP**
Bis(cyclopentadienyl)methyl(triethylphosphine)niobium, Nb-00034
- C₁₇H₂₉ClSi₂Zr**
[Bis(trimethylsilyl)methyl]chlorobis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00047
- C₁₇H₂₉Cl₂ErO₃**
Dichloro(η⁵-2,4-cyclopentadien-1-yl)erbium; Tris-THF adduct, *in* Er-00001
- C₁₇H₂₉Cl₂EuO₃**
Dichloro(η⁵-2,4-cyclopentadien-1-yl)europium; Tris-THF adduct, *in* Eu-00001
- C₁₇H₂₉Cl₂GdO₃**
Dichloro(η⁵-2,4-cyclopentadien-1-yl)gadolinium; Tris-THF adduct, *in* Gd-00001
- C₁₇H₂₉Cl₂HoO₃**
Dichloro(η⁵-2,4-cyclopentadien-1-yl)holmium; Tris-THF adduct, *in* Ho-00001
- C₁₇H₂₉Cl₂LuO₃**
Dichloro(η⁵-2,4-cyclopentadien-1-yl)lutetium; Tris-THF adduct, *in* Lu-00001
- C₁₇H₂₉Cl₂O₃Sm**
Dichloro(η⁵-2,4-cyclopentadien-1-yl)samarium; Tris-THF adduct, *in* Sm-00001
- C₁₇H₂₉Cl₂O₃Y**
Dichloro(η⁵-2,4-cyclopentadien-1-yl)yttrium; Tris-THF adduct, *in* Y -00001
- C₁₇H₂₉Cl₂O₃Yb**
Dichloro(η⁵-2,4-cyclopentadien-1-yl)ytterbium; Tris-THF adduct, *in* Yb-00001
- C₁₇H₃₇NbP₄**
(η⁵-2,4-Cyclopentadien-1-yl)bis[1,2-ethanediybis(dimethylphosphine)-*P,P'*]niobium, Nb-00035
- C₁₇H₃₇O₃Ta**
(2,2-Dimethylpropylidene)tris(2-methyl-2-propanolato)-tantalum, Ta-00032
- C₁₇H₃₈Si₃Ti**
(η⁵-2,4-Cyclopentadien-1-yl)tris[(trimethylsilyl)methyl]titanium, Ti-00095
- C₁₈H₁₀CrO₅**
Pentacarbonyl(diphenylmethylene)chromium, Cr-00143
- C₁₈H₁₀MoO₅**
Pentacarbonyl(diphenylmethylene)molybdenum, Mo-00101

- C₁₈H₁₀O₅W**
Pentacarbonyl(diphenylmethylene)tungsten, W -00111
- C₁₈H₁₀O₈V₂**
Dicarbonylbis(2,4-cyclopentadien-1-yl)vanadium(1+); Hexacarbonylvanadate, *in* V -00050
- C₁₈H₁₃FeMnO₃**
Tricarbonyl[(1,2,3,4,5- η)-ferrocenyl-2,4-cyclopentadien-1-yl]manganese, Mn-00112
- C₁₈H₁₄CeCl₂**
Dichlorobis[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]cerium, Ce-00006
- C₁₈H₁₄Cl₂Ti**
▷Dichlorobis[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]titanium, Ti-00096
- C₁₈H₁₄Cl₂Zr**
Dichlorobis[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]zirconium, Zr-00048
- C₁₈H₁₄CrO₆Ru**
Pentacarbonyl(ethoxyruthenocenylmethylene)chromium, Cr-00144
- C₁₈H₁₄FeMoO₃**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-ferrocenylmolybdenum, Mo-00102
- C₁₈H₁₄FeMoO₆**
Pentacarbonyl(ethoxyferrocenylmethylene)molybdenum, Mo-00103
- C₁₈H₁₄FeO₂W**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(ferrocenylmethylidene)tungsten, W -00112
- C₁₈H₁₄FeO₃W**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-ferrocenyltungsten, W -00113
- C₁₈H₁₄FeO₆W**
Pentacarbonyl(ethoxyferrocenylmethylene)tungsten, W -00114
- C₁₈H₁₄MoO₆Ru**
Pentacarbonyl(ethoxyruthenocenylmethylene)molybdenum, Mo-00104
- C₁₈H₁₄O₃W**
Tricarbonyl[(1,2,3,4,5,6- η)-7-(1-phenylethylidene)-1,3,5-cycloheptatriene]tungsten, W -00115
- C₁₈H₁₄O₆RuW**
Pentacarbonyl(ethoxyruthenocenylmethylene)tungsten, W -00116
- C₁₈H₁₅ErO₃W**
[μ -(Carbonyl-C,O)]bis(η^5 -2,4-cyclopentadien-1-yl)-[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten]-erbium, W -00117
- C₁₈H₁₅Gd**
Bis(η^5 -2,4-cyclopentadien-1-yl)(phenylethynyl)-gadolinium, Gd-00006
- C₁₈H₁₅O₂V**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(phenylcyclopentadiene)vanadium, V -00081
- C₁₈H₁₅O₃WYb**
[μ -(Carbonyl-C,O)]bis(η^5 -2,4-cyclopentadien-1-yl)-[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten]-ytterbium, W -00118
- C₁₈H₁₅Sc**
Triphenylscandium, Sc-00006
- C₁₈H₁₅Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)(phenylethynyl)titanium, *in* Ti-00145
- C₁₈H₁₅Y**
Triphenylttrium, Y -00011
- C₁₈H₁₅Yb**
Bis(η^5 -2,4-cyclopentadien-1-yl)(phenylethynyl)-ytterbium, Yb-00019
- C₁₈H₁₆Mo₂O₄**
[η -[(2,3- η :2,3- η)-2-Butyne]]tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)dimolybdenum, Mo-00105
- C₁₈H₁₈BMnO**
Carbonyl(η^5 -2,4-cyclopentadien-1-yl)[(1,2,3,6,7- η)-4,5-dihydro-1-phenyl-1*H*-borepin]manganese, Mn-00113
- C₁₈H₁₈N₂SU**
Tris(η^5 -2,4-cyclopentadien-1-yl)(thiocyanato-*N*)uranium; MeCN adduct, *in* U -00017
- C₁₈H₁₈N₂Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)di-1*H*-pyrrol-1-yltitanium, Ti-00097
- C₁₈H₁₈N₂Zr**
Bis(η^5 -cyclopentadien-1-yl)di-1*H*-pyrrol-1-ylzirconium, Zr-00049
- C₁₈H₁₈Zr**
Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-phenylenebis(methylene)]zirconium, Zr-00050
- C₁₈H₁₉Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)(2,6-dimethylphenyl)-titanium, Ti-00098
- C₁₈H₂₀U**
Tris(η^5 -2,4-cyclopentadien-1-yl)-2-propenyluranium, U -00024
- C₁₈H₂₁BrNbP**
Bromobis(η^5 -2,4-cyclopentadien-1-yl)-(dimethylphenylphosphine)niobium, Nb-00036
- C₁₈H₂₁ClZr**
Chlorotris(η -methylcyclopentadienyl)zirconium, Zr-00051
- C₁₈H₂₁Cr₂NO₁₀**
Decacarbonyl- μ -hydrodichromate(1-); Tetraethylammonium salt, *in* Cr-00067
- C₁₈H₂₁NO₁₀W₂**
Decacarbonyl- μ -hydroditungstate(1-); Tetraethylammonium salt, *in* W -00040
- C₁₈H₂₁Nd**
Tris[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]-neodymium, Nd-00006
- C₁₈H₂₁O₂PW**
Carbonyl(η^5 -2,4-cyclopentadien-1-yl)[(1,2- η)(4-methylphenyl)oxoethenyl](trimethylphosphine)-tungsten, W -00119
- C₁₈H₂₂Cl₂Mo₂**
Bis(η^6 -benzene)di- μ -chlorobis(η^3 -2-propenyl)-dimolybdenum, *in* Mo-00028
- C₁₈H₂₂NbP**
Bis(η^5 -2,4-cyclopentadien-1-yl)-hydro(dimethylphenylphosphine)niobium, Nb-00037
- C₁₈H₂₂O₄V**
Bis(η^5 -2,4-cyclopentadien-1-yl)[(2,3- η)-diethyl-2-butenedioate]vanadium, V -00082
- C₁₈H₂₂O₈V₂**
Tetrakis[μ -(acetato-*O,O'*)]bis(η^5 -2,4-cyclopentadien-1-yl)divanadium, V -00083
- C₁₈H₂₃CrNO₅Sn**
[Di-*tert*-butyl(pyridine)tin]pentacarbonylchromium, Cr-00145
- C₁₈H₂₄Mo**
Bis[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]molybdenum, Mo-00106
- C₁₈H₂₄N₂Ti**
Bis(dimethylamido)(η^5 -methylcyclopentadienyl)-phenylethynyltitanium, Ti-00099
- C₁₈H₂₄Ti**
Bis[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]titanium, Ti-00100
- C₁₈H₂₅Nb**
Bis(cyclopentadienyl)hydro(η^2 -4-octyne)niobium, Nb-00038
- C₁₈H₂₅Ta**
(η^2 -Benzene)dimethyl[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00033

C₁₈H₂₆AlClZr

Chlorobis(η⁵-2,4-cyclopentadien-1-yl)[1-(dimethylaluminio)-2-methyl-1-pentenyl]zirconium, Zr-00052

C₁₈H₂₇ErO

tert-Butylbis(η⁵-cyclopentadienyl)erbium; THF complex, *in* Er-00009

C₁₈H₂₇LuO

Butylbis(η⁵-2,4-cyclopentadien-1-yl)lutetium; THF complex, *in* Lu-00009

tert-Butylbis(η⁵-cyclopentadienyl)lutetium; THF complex, *in* Lu-00010

C₁₈H₂₈NaO₁₂V

Hexacarbonylvanadate(1-); Na salt, bis(diglyme) complex, *in* V -00012

C₁₈H₂₉ErOSi

Bis(η⁵-2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]erbium; THF complex, *in* Er-00010

C₁₈H₂₉LuOSi

Bis(η⁵-2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]lutetium; THF complex, *in* Lu-00011

C₁₈H₂₉N₂O₅V

Pentacarbonyl(2-isocyano-2-methylpropane)vanadate(1-); Tetraethylammonium salt, *in* V -00025

C₁₈H₂₉OSiYb

Bis(η⁵-2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]ytterbium; THF complex, *in* Yb-00011

C₁₈H₃₀Er₂

Tris(3-hexyne)dierbium, Er-00015

C₁₈H₃₀HfN₂

Bis(η⁵-cyclopentadienyl)bis(diethylamido)hafnium, Hf-00024

C₁₈H₃₀N₂U

Bis(η⁵-2,4-cyclopentadien-1-yl)bis(*N*-ethylethanaminato)uranium, U -00025

C₁₈H₃₀N₂Zr

Bis(η⁵-cyclopentadienyl)bis(diethylamido)zirconium, Zr-00053

C₁₈H₃₁Cl₃O₂Th

[(1,2,3,4,5-η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]trichlorothorium; Bis-THF complex, *in* Th-00002

C₁₈H₃₁Cl₃O₂U

[(1,2,3,4,5-η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadienyl]trichlorouranium; Bis-THF complex, *in* U -00008

C₁₈H₃₂HfSi₂

Bis(η⁵-2,4-cyclopentadien-1-yl)bis[(trimethylsilyl)methyl]hafnium, Hf-00025

C₁₈H₃₂Si₂Ti

Bis(η⁵-2,4-cyclopentadien-1-yl)bis[(trimethylsilyl)methyl]titanium, Ti-00101

C₁₈H₃₂Si₂Zr

Bis(η⁵-2,4-cyclopentadien-1-yl)bis[(trimethylsilyl)methyl]zirconium, Zr-00054

C₁₈H₃₅Cl₂PZr

Dichloro(2,2-dimethylpropyl)[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-(trimethylphosphine)zirconium, Zr-00055

C₁₈H₄₆N₄W₂

Dimethyltetraakis(*N*-dimethylamino)ditungsten, W -00120

C₁₉H₁₄CrFeO₃

Tricarbonyl(phenylferrocene)chromium, Cr-00146

C₁₉H₁₄FeO₄W

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-(ferrocenylcarbonyl)tungsten, W -00121

C₁₉H₁₅FeMnO₃

Tricarbonyl[(1,2,3,4,5-η)-1-(ferrocenylmethyl)-2,4-cyclopentadien-1-yl]manganese, Mn-00114

C₁₉H₁₅N₃O₂W

Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)(1,3-diphenyltriazenato-*N*¹,*N*³)tungsten, W -00122

C₁₉H₁₅O₄Ti

Bis(μ-benzoato)(η⁵-cyclopentadienyl)titanium, Ti-00102

C₁₉H₁₆CrO₃

Tricarbonyl(3-8-η-[2.2]paracyclophane)chromium, Cr-00147

C₁₉H₁₈Cl₄NbP

Tetrachloromethyl(triphenylphosphine)niobium, Nb-00039

C₁₉H₁₈MoO₃Zr

[μ-(Acetyl-C:O)][μ-(η²-carbonyl)][carbonyl(η⁵-2,4-cyclopentadien-1-yl)molybdenum]bis(η⁵-2,4-cyclopentadien-1-yl)zirconium, Mo-00107

C₁₉H₁₉Mn

[(1,2,3,4,5-η)-1-methyl-2,4-cyclopentadien-1-yl]-[(1,2,3,4,5,6-η)-7-phenyl-1,3,5-cycloheptatriene]-manganese, Mn-00115

C₁₉H₁₉Zr

Bis(benzyl)(η-cyclopentadienyl)zirconium, Zr-00057

C₁₉H₂₂NSc

Bis(η⁵-2,4-cyclopentadien-1-yl)[2-[(dimethylamino)methyl]phenyl-*C,N*]scandium, Sc-00007

C₁₉H₂₂U

Tris(η⁵-2,4-cyclopentadien-1-yl)(2-methyl-1-propenyl)uranium, U -00026

C₁₉H₂₃Cr₂NO₁₀S

Decarbonyl(μ-methanethiolato)dichromate(1-); Tetraethylammonium salt, *in* Cr-00083

C₁₉H₂₃OPu

Tris(η⁵-2,4-cyclopentadienyl)tetrahydrofuranplutonium, *in* Pu-00002

C₁₉H₂₃OU

Tris(η⁵-2,4-cyclopentadien-1-yl)uranium; THF complex, *in* U -00015

C₁₉H₂₃OYb

Tris(η⁵-2,4-cyclopentadien-1-yl)-tetrahydrofuranytterbium, *in* Yb-00013

C₁₉H₂₄OTh

Butoxytris(η⁵-2,4-cyclopentadien-1-yl)thorium, Th-00011

C₁₉H₂₄OU

Butoxytris(η⁵-2,4-cyclopentadien-1-yl)uranium, U -00027

C₁₉H₂₄O₂PW[®]

Dicarbonyl(dimethylphenylphosphine)hydro[(1,2,3,4,5,6-η)-1,3,5-trimethylbenzene]tungsten(1+), W -00123

C₁₉H₂₄Th

Butyltris(η⁵-2,4-cyclopentadien-1-yl)thorium, Th-00012

C₁₉H₂₄U

tert-Butyltricyclopentadienyluranium, U -00028
Butyltris(η⁵-2,4-cyclopentadien-1-yl)uranium, U -00029
Tris(η⁵-2,4-cyclopentadien-1-yl)(1-methylpropyl)uranium, U -00030

C₁₉H₂₈CINTi

(1-*tert*-Butyl-2,2-dimethylpropylideniminato)chlorodi-π-cyclopentadienyltitanium, Ti-00103

C₁₉H₃₀OW

Carbonyltris(3-hexyne)tungsten, W -00124

C₁₉H₃₀U

[(1,2,3,4,5-η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]tris(2-propenyl)uranium, U -00031

C₁₉H₃₁BF₄MoO₆P₂

[(2,3-η)-2-Butyne][(1,2,3,3*a*,7*a*-η)-1*H*-inden-1-yl]-bis(trimethylphosphite)molybdenum(1+); Tetrafluoroborate, *in* Mo-00108

C₁₉H₃₁BF₄MoP₂

[(2,3-η)-2-Butyne][(1,2,3,3*a*,7*a*-η)-1*H*-inden-1-yl]-bis(trimethylphosphine)molybdenum(1+); Tetrafluoroborate, *in* Mo-00109

- C₁₉H₃₁MoO₆P₂[⊕]**
[(2,3- η)-2-Butyne][(1,2,3,3a,7a- η)-1*H*-inden-1-yl]-bis(trimethylphosphite)molybdenum(1+), Mo-00108
- C₁₉H₃₁MoP₂[⊕]**
[(2,3- η)-2-Butyne][(1,2,3,3a,7a- η)-1*H*-inden-1-yl]-bis(trimethylphosphine)molybdenum(1+), Mo-00109
- C₁₉H₃₂OSi₂Zr**
Bis(trimethylsilyl)acetyl-*C,O*bis(η^5 -2,4-cyclopentadien-1-yl)methylzirconium, Zr-00058
- C₁₉H₃₈CrO₅Si₄Sn**
[Bis[bis(trimethylsilyl)methyl]tin]-pentacarbonylchromium, Cr-00148
- C₁₉H₃₈MoO₅PbSi₄**
[Bis[bis(trimethylsilyl)methyl]plumbylene]-pentacarbonylmolybdenum, Mo-00110
- C₁₉H₃₈O₃Zr**
Tris(diethyl ether)methylphenylzirconium, Zr-00059
- C₁₉H₄₀Cl₃N₂O₃Re**
Tricarbonyltrichlororhenate(2-); Bistetraethylammonium salt, *in* Re-00002
- C₁₉H₅₇N₃Si₆Th**
Methyltris[(hexamethyldisilyl)amino]thorium, Th-00013
- C₁₉H₅₇N₃Si₆U**
Methyltris[(hexamethyldisilyl)amido]uranium, U -00032
- C₂₀H₂O₂₀Os₃Re₂**
Decacarbonyl(decacarbonyldi- μ -hydrotriosmium)-diruthenium, Re-00076
- C₂₀H₁₀ClC₃HfO₁₀**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)[μ_4 -[methanolato(4-)-*C:C:C:O*]](nonacarbonyltricobalt)-dihafnium, Hf-00026
- C₂₀H₁₀ClC₃O₁₀Zr**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)[μ_4 -[methanolato(4-)-*C:C:C:O*]](nonacarbonyltricobalt)-zirconium, Zr-00060
- C₂₀H₁₀Co₂MoO₈**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(hexacarbonyldicobalt)[μ_3 -(phenylmethylidyne)]-molybdenum, Mo-00111
- C₂₀H₁₀FeMnO₈P**
Tetracarbonyl[μ -(diphenylphosphino)]-(tetracarbonylmanganio)iron, Mn-00116
- C₂₀H₁₀MoO₅**
Pentacarbonyl(2,3-diphenyl-2-cyclopropen-1-ylidene)-molybdenum, Mo-00112
- C₂₀H₁₀O₈Re₂S₂**
Bis(μ -benzenethiolato)octacarbonyldirhenium, *in* Re-00041
- C₂₀H₁₁Mn₂O₈P**
Octacarbonyl- μ -(diphenylphosphino)- μ -hydrodimanganese, Mn-00117
- C₂₀H₁₁O₅Re**
Pentacarbonyl(1,2-diphenyl-2-cyclopropen-1-yl)rhenium, Re-00077
- C₂₀H₁₅ClMoO**
Carbonylchloro(η^5 -2,4-cyclopentadien-1-yl)-(diphenylacetylene)molybdenum, Mo-00113
- C₂₀H₁₅NO₂W**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(α -phenylbenzenemethaniminato)tungsten, W -00125
- C₂₀H₁₅O₃TiW**
▷Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(diphenylthallium)tungsten, W -00126
- C₂₀H₁₆Cr**
Bis[(1,2,3,4,4a,8a- η)naphthalene]chromium, Cr-00149
- C₂₀H₁₆Cr₂GeO₆**
(Dimethyldiphenylgermane)bis[tricarbonylchromium], Cr-00150
- C₂₀H₁₆F₁₂P₂V₂**
1,1'':1',1'''-Bivanadocenium(2+); Bis(hexafluorophosphate), *in* V -00085
- C₂₀H₁₆Mo**
Bis[(1,2,3,4,4a,8a- η)naphthalene]molybdenum, Mo-00114
- C₂₀H₁₆O₈W₂**
Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -[(2,3- η :2,3- η)-dimethyl-2-butynedioate]]ditungsten, W -00127
- C₂₀H₁₆V₂**
▷1,1'':1',1'''-Bivanadocene, V -00084
1,1'':1',1'''-Bivanadocenium(2+), V -00085
- C₂₀H₁₈Mo₂**
Bis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -(η : η^5 -2,4-cyclopentadien-1-ylidene)]dimolybdenum, Mo-00115
- C₂₀H₁₈N₂V**
(2,2'-Bipyridine-*N,N'*)bis(η^5 -2,4-cyclopentadien-1-yl)-vanadium, V -00086
- C₂₀H₁₉DyO₃W**
[μ -(Carbonyl-*C,O*)]bis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl][tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten]dysprosium, W -00128
- C₂₀H₁₉FeMnO₃**
Dicarbonyl[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl](ferrocenylmethoxymethylene)manganese, Mn-00118
- C₂₀H₁₉HoO₃W**
[μ -(Carbonyl-*C,O*)]bis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl][tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten]holmium, W -00129
- C₂₀H₁₉Ti₂**
▷ μ (η^1 : η^5 -Cyclopentadienyl)tris(η -cyclopentadienyl)-dititanium(Ti-Ti), Ti-00104
- C₂₀H₂₀Br₂Ti₂**
Di- μ -bromotetrakis(η^5 -2,4-cyclopentadien-1-yl)-dititanium, *in* Ti-00023
- C₂₀H₂₀Ce₂Cl₂**
Dichlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)dicerium, Ce-00007
- C₂₀H₂₀Cl₂Dy₂**
Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)-didysprosium, *in* Dy-00002
- C₂₀H₂₀Cl₂Er₂**
Dichlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)dierbium, *in* Er-00004
- C₂₀H₂₀Cl₂Gd₂**
Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)-digadolinium, *in* Gd-00002
- C₂₀H₂₀Cl₂Hf₂O**
Dichlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -oxodihafnium, Hf-00027
- C₂₀H₂₀Cl₂Ho₂**
Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)-diholmium, *in* Ho-00002
- C₂₀H₂₀Cl₂Lu₂**
Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)-dilutetium, *in* Lu-00004
- C₂₀H₂₀Cl₂OZr₂**
Dichlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -oxodizirconium, Zr-00061
- C₂₀H₂₀Cl₂Sc₂**
Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)-discandium, *in* Sc-00001

- C₂₀H₂₀Cl₂Sm₂**
Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)-disamarium, *in* Sm-00004
- C₂₀H₂₀Cl₂Ti₂**
Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)-dititanium, *in* Ti-00025
- C₂₀H₂₀Cl₂Tm**
Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)-dithulium, *in* Tm-00002
- C₂₀H₂₀Cl₂Yb₂**
Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)-dytterbium, *in* Yb-00004
- C₂₀H₂₀Cl₄O₄Ti₄**
Tetrachlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)tetra- μ -oxotetratitanium, Ti-00105
- C₂₀H₂₀F₂Ti₂**
Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -fluorodititanium, *in* Ti-00028
- C₂₀H₂₀Fe₂MnNO₁₂**
Tetracarbonyl(di- μ -carbonylhexacarbonyldiferrate)-manganate(1-); Tetraethylammonium salt, *in* Mn-00072
- C₂₀H₂₀Hf**
Bis[(1,2,3,3*a*,7*a*)- η]-1*H*-inden-1-yl]dimethylhafnium, Hf-00028
- C₂₀H₂₀I₂Ti₂**
Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -iododititanium, *in* Ti-00030
- C₂₀H₂₀Nb₂**
Bis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -[(1, η :1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]]dihydrodiniobium, Nb-00040
- C₂₀H₂₀Np**
Tetrakis(η^5 -2,4-cyclopentadien-1-yl)neptunium, Np-00005
- C₂₀H₂₀O₂Ti₂**
[μ -[(1,2,3,4,5- η :1',2',3',4',5'- η)]Bi-2,4-cyclopentadien-1-yl]-1,1'-diyl]bis(η^5 -2,4-cyclopentadien-1-yl)di- μ -hydroxodititanium, Ti-00106
- C₂₀H₂₀Pa**
Tetrakis(η^5 -2,4-cyclopentadien-1-yl)protactinium, Pa-00002
- C₂₀H₂₀Th**
Tetrakis(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00014
- C₂₀H₂₀Ti**
Di-2,4-cyclopentadien-1-ylbis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00107
- C₂₀H₂₀Ti₂**
 μ (η^5 : η^5 -Fulvalene)di- μ -hydridobis(cyclopentadienyl)titanium, Ti-00108
- C₂₀H₂₀U**
Bis[(1,2,3,4,5,6,7,8- η)-1-ethenyl-1,3,5,7-cyclooctatetraene]uranium, U-00033
Bis[(1,2,3,3*a*,7*a*)- η]-1*H*-inden-1-yl]dimethyluranium, U-00034
Tetrakis(η^5 -2,4-cyclopentadien-1-yl)uranium, U-00035
- C₂₀H₂₀Zr**
Bis[(1,2,3,3*a*,7*a*)- η]-1*H*-inden-1-yl]dimethylzirconium, Zr-00062
- C₂₀H₂₁CITi**
Chlorobis(η^5 -cyclopentadienyl)(2,2-dimethyl-1-phenylethenyl)titanium, Ti-00109
- C₂₀H₂₁CIZr**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(2-methyl-1-phenyl-1-propenyl)zirconium, Zr-00063
- C₂₀H₂₂Ti₂**
Tetra- π -cyclopentadienyldi- μ -hydroditi-tanium, *in* Ti-00037
- C₂₀H₂₃ClO₄W₂**
Tetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -hydrodihydroditungsten(1+); Perchlorate, *in* W-00130
- C₂₀H₂₃W₂⁺**
Tetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -hydrodihydroditungsten(1+), W-00130
- C₂₀H₂₄F₃O₅PSW**
Dicarbonyl(dimethylphenylphosphine)hydro[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]tungsten(1+); Trifluoromethanesulfonate, *in* W-00123
- C₂₀H₂₄HfSn₂**
Bis[(1,2,3,4,5,6- η)-methylbenzene]bis(trimethylstannyl)-hafnium, Hf-00029
- C₂₀H₂₄Si₂Ti₂**
Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -silylenedititanium, Ti-00110
- C₂₀H₂₆Th**
Tris(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)-thorium, Th-00015
- C₂₀H₂₆U**
Tris(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)-uranium, U-00036
- C₂₀H₂₈MoON₂O₄**
Dicarbonylbis(2-methyl-2-propanolato)bis(pyridine)-molybdenum, Mo-00116
- C₂₀H₃₀AlCl₄Yb**
Di- μ -chloro(dichloroaluminum)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadienyl]-ytterbium, Yb-00020
- C₂₀H₃₀ClU**
Chlorobis(pentamethylcyclopentadienyl)uranium, U-00037
- C₂₀H₃₀ClYb**
Chlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbium, Yb-00021
- C₂₀H₃₀Cl₂Nd⁺**
Dichlorobis[(1,2,3,4,5- η)-pentamethyl-2,4-cyclopentadien-1-yl]neodymate(1-), Nd-00008
- C₂₀H₃₀Cl₂Th**
Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00016
- C₂₀H₃₀Cl₂Ti**
Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, Ti-00111
- C₂₀H₃₀Cl₂U**
Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U-00038
- C₂₀H₃₀Cl₂Yb⁺**
Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbate(1-), Yb-00022
- C₂₀H₃₀Eu**
Bis(pentamethylcyclopentadienyl)europium, Eu-00005
- C₂₀H₃₀F₆MnP**
Decamethylmanganocenium; Hexafluorophosphate, *in* Mn-00120
- C₂₀H₃₀I₂Yb⁺**
Diiodobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbate(1-), Yb-00023
- C₂₀H₃₀Mn**
Decamethylmanganocene, Mn-00119
Decamethylmanganocenium, Mn-00120
- C₂₀H₃₀Mn₂O₈P₂**
Octacarbonylbis(triethylphosphine)dimanganese, Mn-00121
- C₂₀H₃₀Sm**
Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]samarium, Sm-00012
- C₂₀H₃₀Ti**
Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, Ti-00112
- C₂₀H₃₀V**
Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]vanadium, V-00087

C₂₀H₃₀YbBis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbium, Yb-00024**C₂₀H₃₁Lu**Hydridobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]lutetium, Lu-00018**C₂₀H₃₁OY***tert*-Butylbis(methylcyclopentadienyl)yttrium; THF complex, *in* Y -00008**C₂₀H₃₁Sm**

Hydrobis(pentamethylcyclopentadienyl)samarium, Sm-00013

C₂₀H₃₂Th

Dihydrobis(pentamethylcyclopentadienyl)thorium, Th-00017

C₂₀H₃₂U

Dihydrobis(pentamethylcyclopentadienyl)uranium, U -00039

C₂₀H₃₂ZrBis(η^5 -2,4-cyclopentadien-1-yl)bis(2,2-dimethylpropyl)-zirconium, Zr-00064Dihydrobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00065**C₂₀H₃₃Al₂ClZr** μ -Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-bis(diethylaluminum)- μ -1-ethanyl-2-ylidenezirconium, Zr-00066**C₂₀H₃₄Sn₂Zr**Bis[(1,2,3,4,5,6- η)-methylbenzene]bis(trimethylstannyl)-zirconium, Zr-00067**C₂₀H₃₅LuO₂Si**(η^8 -1,3,5,7-Cyclooctatetraene)(trimethylsilylmethyl)-bis(tetrahydrofuran)lutetium, *in* Lu-00007**C₂₀H₃₈PTa**(2,2-Dimethylpropylidene)- η^2 -ethene(η^5 -pentamethyl-2,4-cyclopentadien-1-yl)(trimethylphosphine)tantalum, Ta-00034**C₂₀H₄₃Ta**

Tris(2,2-dimethylpropyl)(2,2-dimethylpropylidene)-tantalum, Ta-00035

C₂₀H₄₄Cr

Tetrakis(2,2-dimethylpropyl)chromium, Cr-00151

C₂₀H₄₄Hf

Tetrakis(2,2-dimethylpropyl)hafnium, Hf-00030

C₂₀H₄₄Ti

Tetrakis[2,2-dimethylpropyl)titanium, Ti-00113

C₂₀H₄₄Zr

Tetrakis(2,2-dimethylpropyl)zirconium, Zr-00068

C₂₀H₄₈Mo₂N₄Bis[μ -[2-methyl-2-propanaminato(2-)]bis[2-methyl-2-propanaminato(2-)]tetramethyldimolybdenum, Mo-00117**C₂₀H₄₈N₄W₂**Bis[μ -[2-methyl-2-propanaminato(2-)]bis[2-methyl-2-propanaminato(2-)]tetramethylditungsten, W -00131**C₂₀H₄₉ErO₂Si₃**Bis(tetrahydrofuran)tris[(trimethylsilyl)methyl]erbium, *in* Er-00008**C₂₀H₄₉O₂Si₃Tb**Bis(tetrahydrofuran)tris[(trimethylsilyl)methyl]-terbium, *in* Tb-00001**C₂₀H₄₉O₂Si₃Yb**Bis(tetrahydrofuran)tris[(trimethylsilyl)methyl]-ytterbium, *in* Yb-00010**C₂₀Mn₄O₂₀U**

Tetrakis(pentacarbonylmanganio)uranium, Mn-00122

C₂₁H₁₁O₆Re

Pentacarbonyl[(2,3-diphenyl-2-cyclopropen-1-yl)]-carbonylrhenium, Re-00078

C₂₁H₁₄CrO₃

Tricarbonyl(diphenylmethylenecyclopentadiene)chromium, Cr-00152

C₂₁H₁₄O₃W

Tricarbonyl(diphenylmethylenecyclopentadiene)-tungsten, W -00132

C₂₁H₁₅ClNO₄PW

Tricarbonylchloronitrosyl(triphenylphosphine)tungsten, W -00133

C₂₁H₁₅CrNO₆

Pentacarbonyl[[[(diphenylmethylene)amino]-ethoxymethylene]chromium, Cr-00153

C₂₁H₁₅NbO₂Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(diphenylacetylene)niobium, Nb-00041**C₂₁H₁₅O₂V**▷Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(diphenylacetylene)vanadium, V -00088**C₂₁H₂₀Ce**Tris(η^5 -2,4-cyclopentadien-1-yl)phenylcerium, Ce-00008**C₂₁H₂₄CrO₃**Tricarbonyl(η^6 -octamethylnaphthalene)chromium, Cr-00154**C₂₁H₂₄HfO₅** η^5 -2,4-Cyclopentadien-1-ylbis(2,4-pentanedionato-*O,O'*)-phenoxyhafnium, Hf-00031**C₂₁H₂₄MoO₃**Tricarbonyl(η^6 -octamethylnaphthalene)molybdenum, Mo-00118**C₂₁H₂₄O₃W**Tricarbonyl(η^6 -octamethylnaphthalene)tungsten, W -00134**C₂₁H₂₄O₅Zr** π -Cyclopentadienylbis(2,4-pentanedionato)-phenoxyzirconium, Zr-00069**C₂₁H₂₅LuO**Benzylbis(η^5 -2,4-cyclopentadienyl)lutetium; THF complex, *in* Lu-00016Bis(η^5 -2,4-cyclopentadien-1-yl)(4-methylphenyl)-lutetium; THF complex, *in* Lu-00017**C₂₁H₂₇U**

▷Tris(2,4-dimethylpentadienyl)uranium, U -00041

C₂₁H₂₈O₂P₂WCarbonyl(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethanedylbis(dimethylphosphine)]-*P,P'*[(4-methylphenyl)oxoethenyl]tungsten, W -00135**C₂₁H₃₃ClTh**Chloro(methyl)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00018**C₂₁H₃₃ClU**Chloro(methyl)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U -00042**C₂₁H₃₃Lu**Methylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]lutetium, Lu-00019**C₂₁H₃₃Nd**Tris[(1,2,3,4,5- η)-2,4-dimethyl-2,4-pentadienyl]-neodymium, Nd-00009**C₂₁H₃₃Y**Methylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]yttrium, Y -00012**C₂₁H₄₂F₃MnO₁₁P₂S**Dicarbonyl(trifluoromethanesulfonate-*O,O'*)-bis(triisopropylphosphite-*P*)manganese, Mn-00123**C₂₁H₅₇ClHfSi₆**

Tris[bis(trimethylsilyl)methyl]chlorohafnium, Hf-00032

C₂₁H₅₇ClSi₆Yb⁺

Tris[bis(trimethylsilyl)methyl]chloroytterbate(1-), Yb-00025

C₂₁H₅₇ClSi₆Zr

Tris[bis(trimethylsilyl)methyl]chlorozirconium, Zr-00070

C₂₁H₅₇ScSi₆

Tris[bis(trimethylsilyl)methyl]scandium, Sc-00008

C₂₁H₅₇Si₆Ti

Tris[bis(trimethylsilyl)methyl]titanium, Ti-00114

C₂₁H₅₇Si₆V

Tris[bis(trimethylsilyl)methyl]vanadium, V -00089

C₂₁H₅₇Si₆Y

Tris[bis(trimethylsilyl)methyl]yttrium, Y -00013

C₂₂H₁₀F₁₀HfBis(η^5 -2,4-cyclopentadien-1-yl)bis(pentafluorophenyl)-hafnium, Hf-00033**C₂₂H₁₀F₁₀Ti**Bis(η^5 -2,4-cyclopentadien-1-yl)bis(pentafluorophenyl)-titanium, Ti-00115**C₂₂H₁₀F₁₀Zr**▷ Bis(η^5 -cyclopentadienyl)bis(pentafluorophenyl)-zirconium, Zr-00071**C₂₂H₁₀KO₁₀PW**Decacarbonyl(μ -diphenylphosphido)ditungstate(1-); K salt, *in* W -00136**C₂₂H₁₀O₁₀PW^e**Decacarbonyl(μ -diphenylphosphido)ditungstate(1-), W -00136**C₂₂H₁₄O₄Pre**Tetracarbonyl[2-(diphenylphosphinophenyl-*C,P*)]rhenium, Re-00079**C₂₂H₁₅KMnO₄P**Tetracarbonyl(triphenylphosphine)manganate(1-); K salt, *in* Mn-00124**C₂₂H₁₅MnNaO₄P**Tetracarbonyl(triphenylphosphine)manganate(1-); Na salt, *in* Mn-00124**C₂₂H₁₅MnO₄P^e**

Tetracarbonyl(triphenylphosphine)manganate(1-), Mn-00124

C₂₂H₁₅NO₅PV

Tetracarbonylnitrosyl(triphenylphosphine)vanadium, V -00090

C₂₂H₁₅Nb₃O₇

Heptacarbonyltris(cyclopentadienyl)triniobium, Nb-00042

C₂₂H₁₆MnO₄P

Tetracarbonylhydro(triphenylphosphine)manganese, Mn-00125

C₂₂H₁₆Mn₂O₄Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(phenylethenylidene)]dimanganese, Mn-00126**C₂₂H₂₀Hf**Bis(η^5 -2,4-cyclopentadien-1-yl)diphenylhafnium, Hf-00034**C₂₂H₂₀HfSe₂**Bis(benzeneselenolato)bis(η^5 -2,4-cyclopentadien-1-yl)-hafnium, Hf-00035**C₂₂H₂₀N₂V**

(Azobenzene)bis(cyclopentadienyl)vanadium, V -00091

C₂₂H₂₀NbS₂Bis(benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)-niobium, Nb-00043**C₂₂H₂₀O₂Ti**Bis(η^5 -2,4-cyclopentadien-1-yl)bis(phenolato-*O*)-titanium, Ti-00116**C₂₂H₂₀S₂Ti**Bis(benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)-titanium, Ti-00117**C₂₂H₂₀S₂V**Bis(benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)-vanadium, V -00092**C₂₂H₂₀S₂Zr**Bis(benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)-zirconium, Zr-00072**C₂₂H₂₀Ti**Bis(η^5 -cyclopentadien-1-yl)diphenyltitanium, Ti-00118**C₂₂H₂₀Zr**Bis(η^5 -2,4-cyclopentadien-1-yl)diphenylzirconium, Zr-00073**C₂₂H₂₁CoO₄Sm**[μ -(Carbonyl-*C,O*)]tris[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl](tetracarbonylcobalt)-samarium, Sm-00014**C₂₂H₂₁Nb**

Bis(1,3,5,7-cyclooctatetraene)phenylniobium, Nb-00044

C₂₂H₂₂U

Benzyltricyclopentadienyluranium, U -00043

C₂₂H₂₄U

Dicyclopentenouranocene, U -00044

C₂₂H₂₆BScSi₄Bis[(1,2,3,4,5- η)-1,3-bis(trimethylsilyl)-2,4-cyclopentadien-1-yl]tetrahydroboratoscandium, Sc-00009**C₂₂H₂₆DyN**Tris(2,4-cyclopentadien-1-yl)-isocyanocyclohexanedysprosium, *in* Dy-00004**C₂₂H₂₆Dy₂**Tetrakis(η^5 -2,4-cyclopentadienyl)-di- μ -methylidysprosium, *in* Dy-00003**C₂₂H₂₆ErN**Tris(2,4-cyclopentadien-1-yl)isocyanocyclohexaneerbium, *in* Er-00011**C₂₂H₂₆Er₂**Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -methylidierbium, *in* Er-00005**C₂₂H₂₆HoN**Tris(η^5 -2,4-cyclopentadien-1-yl)-isocyanocyclohexaneholmium, *in* Ho-00005**C₂₂H₂₆Ho₂**Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -methylidholmium, *in* Ho-00003**C₂₂H₂₆LuN**Tris(η^5 -2,4-cyclopentadien-1-yl)-isocyanocyclohexanelutetium, *in* Lu-00012**C₂₂H₂₆NTb**Tris(η^5 -2,4-cyclopentadien-1-yl)-isocyanocyclohexaneterbium, *in* Tb-00002**C₂₂H₂₆NTm**Tris(2,4-cyclopentadien-1-yl)-isocyanocyclohexanethulium, *in* Tm-00004**C₂₂H₂₆NU**Tris(η^5 -2,4-cyclopentadien-1-yl)-isocyanocyclohexaneuranium, *in* U -00015**C₂₂H₂₆NYb**Tris(η^5 -2,4-cyclopentadien-1-yl)-isocyanocyclohexaneytterbium, *in* Yb-00013**C₂₂H₂₆Tm₂**Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -methylidithulium, *in* Tm-00003**C₂₂H₂₆Y₂**Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -methylidytrrium, *in* Y -00003**C₂₂H₂₆Yb₂**Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -methylidyterbium, *in* Yb-00006**C₂₂H₃₀CeKO₃**Bis(η^8 -1,3,5,7-cyclooctatetraene)cerate(1-); K salt, diglyme adduct, *in* Ce-00005**C₂₂H₃₀F₆O₂PV**Dicarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]vanadium(1+); Hexafluorophosphate, *in* V -00093

C₂₂H₃₀HfO₂Dicarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]hafnium, Hf-00036**C₂₂H₃₀O₂V[⊕]**Dicarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]vanadium(1+), V -00093**C₂₂H₃₀O₂Zr**Dicarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00074**C₂₂H₃₂B₄FeMn₂O₆S₂**Hexacarbonylbis[μ -[(1,2,3,4,5- η)-1,2,3,4,5- η]-3,4-diethyl-2,5-dihydro-2,5-dimethyl-1,2,5-thiadiborole]](iron)dimanganese, Mn-00127**C₂₂H₃₅NZr**Hydro[(methylimino)methyl]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00075**C₂₂H₃₆CINT_h**

Chloro(dimethylamino)bis(pentamethylcyclopentadienyl)-thorium, Th-00019

C₂₂H₃₆INZrDimethylamidiodobis(η^5 -pentamethylcyclopentadienyl)-zirconium, Zr-00076**C₂₂H₃₆Th**Dimethylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00020**C₂₂H₃₆Ti**Dimethylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, Ti-00119**C₂₂H₃₆U**Dimethylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U -00045
Tris(2-methyl-1-propenyl)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U -00046**C₂₂H₃₆Zr**Dimethylbis[(1,2,3,4,5- η)-1-(2-methylbutyl)-2,4-cyclopentadien-1-yl]zirconium, Zr-00077**C₂₂H₃₇NZr**

Dimethylamidohydro(pentamethylcyclopentadienyl)-zirconium, Zr-00078

C₂₂H₃₉FeN₃Ti

Tris(diethylamino)ferrocenyltitanium, Ti-00120

C₂₂H₄₀CIP₄TaChlorobis[1,2-ethanediy]bis(dimethylphosphine)-*P,P'*-(η^4 -naphthalene)tantalum, Ta-00036**C₂₂H₄₂CIPrSi₄**

Bis[1,3-bis(trimethylsilyl)cyclopentadienyl]-chloropraesodymium, Pr-00006

C₂₂H₄₂ClScSi₄

Bis[1,3-bis(trimethylsilyl)cyclopentadienyl]-chloroscandium, Sc-00010

C₂₂H₄₂Cl₂NdSi₄[⊖]Dichlorobis[(1,2,3,4,5- η)-1,3-bis(trimethylsilyl)-2,4-cyclopentadien-1-yl]neodymate(1-), Nd-00010**C₂₂H₆₂Cr₂P₂Si₄**Bis(trimethylphosphine)bis[μ -[(trimethylsilyl)methyl]]-bis[(trimethylsilyl)methyl]dichromium, Cr-00155**C₂₃H₁₅BrO₄SiW**

Bromotetracarbonyl[(triphenylsilyl)methylidene]-tungsten, W -00137

C₂₃H₁₅F₆MnO₅P₂Pentacarbonyl(triphenylphosphine)manganese(1+); Hexafluorophosphate, *in* Mn-00129**C₂₃H₁₅FeMnN₂O₇P**

Dinitrosyl(pentacarbonylmanganio)(triphenylphosphine)-iron, Mn-00128

C₂₃H₁₅MnO₅P[⊕]

Pentacarbonyl(triphenylphosphine)manganese(1+), Mn-00129

C₂₃H₁₅MoO₅P

Pentacarbonyl(triphenylphosphine)molybdenum, Mo-00119

C₂₃H₁₅O₅PV[⊖]Pentacarbonyl(triphenylphosphine)vanadate(1-), V -00094
Pentacarbonyl(triphenylphosphine)vanadium, V -00095**C₂₃H₁₆MoO₃**Tricarbonyl[(1,2,3,4,5,6- η)-7-(diphenylmethylene)-1,3,5-cycloheptatriene]molybdenum, Mo-00120**C₂₃H₁₇ClHfN₂O₂**Chloro- π -cyclopentadienylbis(8-quinolinolato)hafnium, Hf-00037**C₂₃H₁₇ClN₂O₂Zr**Chloro(η^5 -cyclopentadienyl)bis(8-quinolinolato)-zirconium, Zr-00079**C₂₃H₂₀CINTi**Chlorodi- π -cyclopentadienyl(1,1-diphenylmethyleniminato)titanium, Ti-00121**C₂₃H₂₀HfO**(η^2 -Benzoyl)bis(η^5 -2,4-cyclopentadien-1-yl)-phenylhafnium, Hf-00038**C₂₃H₂₀IMnNOP**(η^5 -2,4-Cyclopentadien-1-yl)-iodonitrosyl(triphenylphosphine)manganese, Mn-00130**C₂₃H₂₀OZr**(η^2 -Benzoyl)bis(η^5 -2,4-cyclopentadien-1-yl)-phenylzirconium, Zr-00080**C₂₃H₂₀O₃Ti**(η^5 -2,4-Cyclopentadien-1-yl)triphenoxytitanium, Ti-00122**C₂₃H₂₀U**Tris(η^5 -2,4-cyclopentadien-1-yl)(phenylethynyl)uranium, U -00047**C₂₃H₂₁ClMo**Chlorobis(1-phenyl-1-propyne)(η^5 -cyclopentadienyl)-molybdenum, Mo-00121**C₂₃H₂₂CIPZr**Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-[(diphenylphosphino)methyl]zirconium, Zr-00081**C₂₃H₂₂CrGeO₅**

[Bis(2,4,6-trimethylphenyl)germylene]-pentacarbonylchromium, Cr-00156

C₂₃H₂₄U[Tris(η^5 -2,4-cyclopentadien-1-yl)][(4-methylphenyl)-methyl]uranium, U -00048**C₂₃H₃₃ClN₂U**Chlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](1*H*-pyrazolato-*N*¹,*N*²)uranium, U -00049**C₂₃H₃₄Cl₂N₂U**Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](1*H*-pyrazole-*N*²)uranium, U -00050**C₂₃H₃₄Si₂Zr**[Bis(trimethylsilyl)methyl]bis(η^5 -2,4-cyclopentadien-1-yl)phenylzirconium, Zr-00082**C₂₃H₃₉NTh**Methyl(*N*-methylmethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-thorium, Th-00021**C₂₃H₄₅ClSi₄Zr**[Bis(trimethylsilyl)methyl]chlorobis[(1,2,3,4,5- η)-1-(trimethylsilyl)-2,4-cyclopentadien-1-yl]-zirconium, Zr-00083**C₂₃H₄₇MnO₈P₂**Dicarbonyl(η^3 -2-propenyl)bis(triisopropylphosphite)-manganese, Mn-00131**C₂₄H₁₄O₆W₂**Hexacarbonylbis[(1,2,3,3*a*,7*a*- η)-1*H*-inden-1-yl]-ditungsten, W -00138

C₂₄H₁₅NbO₆Sn

Hexacarbonyl(triphenylstannyl)niobium, Nb-00045

C₂₄H₁₅O₆SnV

Hexacarbonyl(triphenylstannyl)vanadium, V -00096

C₂₄H₁₅Sc

Tris(phenylethynyl)scandium, Sc-00011

C₂₄H₁₇MoO₄PTetracarbonyl[[2-(η^2 -ethenyl)phenyl]diphenylphosphine-*P*]molybdenum, Mo-00122**C₂₄H₁₇PO₄W**Tetracarbonyl[2-(η^2 -ethenyl)phenyl]diphenylphosphine-*P*]-tungsten, W -00139**C₂₄H₁₈AlMn₃O₁₈**Hexakis[μ -(acetyl-*C:O*)](aluminum)-dodecacarbonyltrimanganese, *in* Mn-00037**C₂₄H₁₈CrIO₅P**Pentacarbonyliodochromate(1-); Methyltriphenylphosphonium salt, *in* Cr-00007**C₂₄H₁₈N₂O₈Ti**Bis(η^5 -2,4-cyclopentadien-1-yl)bis(4-nitrobenzoato-*O'*)-titanium, Ti-00123**C₂₄H₂₀CrO₄Tl₂** μ -(Chromato-*O,O'*)tetraphenyldithallium, Cr-00157**C₂₄H₂₀Cr₂O₆Sn**

(Dibenzyl)dimethylstannane)bis[tricarbonylchromium], Cr-00158

C₂₄H₂₀F₆MnNO₂P₂Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-nitrosyl(triphenylphosphine)manganese; Hexafluorophosphate, *in* Mn-00132**C₂₄H₂₀MnNO₂P^o**Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-nitrosyl(triphenylphosphine)manganese, Mn-00132**C₂₄H₂₀NO₂PW**Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-nitrosyl(triphenylphosphine)tungsten, W -00140**C₂₄H₂₀OV**Bis(2,4-cyclopentadien-1-yl)(η^2 -*C,O*-diphenylketene)-vanadium, V -00097**C₂₄H₂₀O₄V₄**

Tetracarbonyltetrakis(cyclopentadienyl)tetravanadium, V -00098

C₂₄H₂₀Ti

Tetraphenyltitanium, Ti-00124

C₂₄H₂₂BF₄NOPRe(η^5 -2,4-Cyclopentadien-1-yl)-methylenenitrosyl(triphenylphosphine)rhenium(1+); Tetrafluoroborate, *in* Re-00080**C₂₄H₂₂Cl₂Zr**Bis(η^5 -benzylcyclopentadienyl)dichlorozirconium, Zr-00084**C₂₄H₂₂NOPRe^o**(η^5 -2,4-Cyclopentadien-1-yl)-methylenenitrosyl(triphenylphosphine)rhenium(1+), Re-00080**C₂₄H₂₄Ce₂**

Tris(1,3,5,7-cyclooctatetraene)dicerium, Ce-00009

C₂₄H₂₄Cr₂ μ -[(1,2,3,4- η :5,6,7,8- η)-1,3,5,7-Cyclooctatetraene]-bis[(1,2,3,4- η)-1,3,5,7-cyclooctatetraene]-dichromium, Cr-00159**C₂₄H₂₄Hf**Bis(benzyl)bis(η^5 -cyclopentadienyl)hafnium, Hf-00039**C₂₄H₂₄Mo₂** μ -[(1,2,3,4- η :5,6,7,8- η)-1,3,5,7-cyclooctatetraene]-bis[(1,2,3,4- η)-1,3,5,7-cyclooctatetraene]-dimolybdenum, Mo-00123**C₂₄H₂₄PSc**Bis(η^5 -2,4-cyclopentadien-1-yl)-[(diphenylphosphinidenio)bis(methylene)]scandium, Sc-00012**C₂₄H₂₄Ti**Dibenzylbis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00125**C₂₄H₂₄Ti₂**

Tris(1,3,5,7-cyclooctatetraene)ditanium, Ti-00126

C₂₄H₂₄V

Dibenzylbis(cyclopentadienyl)vanadium, V -00099

C₂₄H₂₄WDibenzylbis(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00141**C₂₄H₂₄W₂** μ -[(1,2,3,4- η :5,6,7,8- η)-1,3,5,7-cyclooctatetraene]-bis[(1,2,3,4- η)-1,3,5,7-cyclooctatetraene]-ditungsten, W -00142**C₂₄H₂₄Zr**Bis(benzyl)bis(η^5 -cyclopentadienyl)zirconium, Zr-00085**C₂₄H₂₅Cl₂Ta**Dichloro(diphenylacetylene)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00037**C₂₄H₂₇PU**Tris(η^5 -2,4-cyclopentadien-1-yl)-[(dimethylphenylphosphoranylidene)methyl]-uranium, U -00051**C₂₄H₂₈Cl₂Er₂**Di- μ -chlorotetrakis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]dierbium, *in* Er-00007**C₂₄H₂₈Cl₂Yb₂**Di- μ -chlorotetrakis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]dytterbium, *in* Yb-00008**C₂₄H₃₀CoO₄Yb** μ -(Carbonyl-*C,O*)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-tricarbonylcobalt]ytterbium, Yb-00026**C₂₄H₃₀Cr₂O₄**Tetracarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dichromium, Cr-00160**C₂₄H₃₀Mo₂O₄**Tetracarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dimolybdenum, Mo-00124**C₂₄H₃₀O₄W₂**Tetracarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ditungsten, W -00143**C₂₄H₃₂ClN₂V**Bis(η^5 -2,4-cyclopentadien-1-yl)bis(isocyanocyclohexane)-vanadium(1+); Chloride, *in* V -00100**C₂₄H₃₂KO₂Np**Bis(η^8 -1,3,5,7-cyclooctatetraene)neptunate(1-); K salt, bis-THF complex, *in* Np-00003**C₂₄H₃₂KO₂Pu**Bis(η^8 -1,3,5,7-cyclooctatetraene)plutonate(1-); K salt, bis-THF complex, *in* Pu-00003**C₂₄H₃₂N₂Ti₂**Tetra- π -cyclopentadienylbis[μ -(dimethylamino)]-ditanium, *in* Ti-00058**C₂₄H₃₂N₂V^o**Bis(η^5 -2,4-cyclopentadien-1-yl)bis(isocyanocyclohexane)-vanadium(1+), V -00100**C₂₄H₃₂N₄U**[(1,2,3,4,5- η)-2,5-Dimethyl-1*H*-pyrrol-1-yl]tris(2,5-dimethyl-1*H*-pyrrol-1-yl)uranium, U -00052**C₂₄H₃₂U**Bis[(1,2,3,4,5,6,7,8- η)-1,3,5,7-tetramethyl-1,3,5,7-cyclooctatetraene]uranium, U -00053**C₂₄H₃₃AlCl₂OY₂** μ -Chloro- μ_3 -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)-trihydro[1,1'-oxybis[ethane]]aluminumdiyttrium, Y -00014

- C₂₄H₃₄HfSi₂**
Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-phenylenebis[(trimethylsilyl)methylene]]hafnium, Hf-00040
- C₂₄H₃₄Si₂Zr**
Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-phenylenebis[(trimethylsilyl)methylene]]-zirconium, Zr-00086
- C₂₄H₃₆Er⁺**
Tetrakis(3,3-dimethyl-1-butynyl)erbate(1-), Er-00016
- C₂₄H₃₆F₆PV**
Bis(acetonitrile)bis(η^5 -pentamethyl-2,4-cyclopentadien-1-yl)vanadium(1+); Hexafluorophosphate, *in* V -00101
- C₂₄H₃₆Lu⁺**
Tetrakis(3,3-dimethyl-1-butynyl)lutetate(1-), Lu-00020
- C₂₄H₃₆N₂V⁺**
Bis(acetonitrile)bis(η^5 -pentamethyl-2,4-cyclopentadien-1-yl)vanadium(1+), V -00101
- C₂₄H₃₆Sm⁺**
Tetrakis(3,3-dimethyl-1-butynyl)samarate(1-), Sm-00015
- C₂₄H₃₈CfOYb**
Chlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbium; THF complex, *in* Yb-00021
- C₂₄H₃₈EuO**
Bis(pentamethylcyclopentadienyl)europium; THF complex, *in* Eu-00005
- C₂₄H₃₈OYb**
Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbium; THF complex, *in* Yb-00024
- C₂₄H₄₀CINth**
Chloro(diethylamino)bis(pentamethylcyclopentadienyl)-thorium, Th-00022
- C₂₄H₄₀CINU**
Chloro(diethylamino)bis(pentamethylcyclopentadienyl)-uranium, U -00054
- C₂₄H₄₀Zr**
Hydro(2-methylpropyl)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00087
- C₂₄H₄₁MoNO₃**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdate(1-); Tetra-butylammonium salt, *in* Mo-00014
- C₂₄H₄₁O₂NSW**
(Carbonothioyl)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-tungstate(1-); Tetra-butylammonium salt, *in* W -00022
- C₂₄H₄₂Cr₂N₂O₈**
Octacarbonyl- μ -dihydrodichromate(2-); Bis(tetraethylammonium) salt, *in* Cr-00037
- C₂₄H₄₂Mo₂N₂O₈**
Octacarbonyl- μ -dihydrodimolybdate(2-); Tetraethylammonium salt, *in* Mo-00009
- C₂₄H₄₂N₂O₈W₂**
Octacarbonyldi- μ -hydroditungstate(2-); Bis(tetraethylammonium) salt, *in* W -00017
- C₂₄H₄₂N₂Th**
Bis(dimethylamino)bis(pentamethylcyclopentadienyl)-thorium, Th-00023
- C₂₄H₄₂N₂U**
Bis(dimethylamino)bis(pentamethylcyclopentadienyl)-uranium, U -00055
- C₂₄H₄₂O₂Si₂Yb**
Bis[(1,2,3,4,5- η)-1-(trimethylsilyl)-2,4-cyclopentadien-1-yl]ytterbium; Bis-THF complex, *in* Yb-00016
- C₂₄H₄₄Ti**
►Tetracyclohexyltitanium, Ti-00127
- C₂₄H₄₈O₄U₂**
Bis[μ -(2-propanolato)]bis(2-propanolato)tetrakis(η^3 -2-propenyl)diuranium, U -00056
- C₂₄H₅₄Mo₂O₆**
Hexakis(2-methyl-2-propanolato)dimolybdenum, Mo-00125
- C₂₄H₅₆Li₄Mo₂O₄**
Octamethyldimolybdenum(4-); Tetra-Li salt, tetrakis-THF complex, *in* Mo-00020
- C₂₄H₅₇ErO₃Si₃**
Tris(tetrahydrofuran)tris[(trimethylsilyl)methyl]-erbium, *in* Er-00008
- C₂₄H₆₂Nb₂Si₆**
Tetrakis[(trimethylsilyl)methyl]bis[μ -(trimethylsilyl)-methylidyne]diniobium, Nb-00046
- C₂₄H₆₂Si₆W₂**
Bis[μ -[(trimethylsilyl)methylidyne]-tetrakis[(trimethylsilyl)methyl]ditungsten, W -00144
- C₂₄H₆₆ErLi₃N₆**
Hexamethyleterbate(3-); Tris[(tetramethylethylenediamine)lithium] salt, *in* Er-00002
- C₂₄H₆₆Li₃LuN₆**
Hexamethyllutetate(3-); Tris[(tetramethylethylenediamine)-lithium] salt, *in* Lu-00002
- C₂₄H₆₆Li₃N₆Nd**
Hexamethylneodymate(3-); Tris[(tetramethylethylenediamine)-lithium] salt, *in* Nd-00001
- C₂₄H₆₆Li₃N₆Pr**
Hexamethylpraesodymate(3-); Tris[(tetramethylethylenediamine)-lithium] salt, *in* Pr-00001
- C₂₄H₆₆Li₃N₆Sm**
Hexamethylsamarate(3-); Tris[(tetramethylethylenediamine)-lithium] salt, *in* Sm-00002
- C₂₄H₆₆Li₃N₆Tm**
Hexamethylthulate(3-); Tris[(tetramethylethylenediamine)lithium] salt, *in* Tm-00001
- C₂₄H₆₆Li₃N₆Yb**
Hexamethylytterbate(3-); Tris[(tetramethylethylenediamine)-lithium] salt, *in* Yb-00002
- C₂₄H₆₆Mo₂Si₆**
Hexakis[(trimethylsilyl)methyl]dimolybdenum, Mo-00126
- C₂₄H₆₆Si₆W₂**
Hexakis[(trimethylsilyl)methyl]ditungsten, W -00145
- C₂₅H₂₀ClMoO₂P**
Dicarbonylchloro(η^5 -2,4-cyclopentadien-1-yl)-(triphenylphosphine)molybdenum, Mo-00127
- C₂₅H₂₀O₄V**
Tetracarbonyl(η^3 -propenyl)(triphenylphosphine)vanadium, V -00102
- C₂₅H₂₁MoO₅P**
Tetracarbonyl(1-methoxyethylidene)(triphenylphosphine)-molybdenum, Mo-00128
- C₂₅H₂₃MnNO₃P**
 η^5 -2,4-Cyclopentadien-1-yl(methoxycarbonyl)-nitrosyl(triphenylphosphine)manganese, Mn-00133
- C₂₅H₂₄FeU**
Tris(η^5 -2,4-cyclopentadien-1-yl)ferrocenyluranium, U -00057
- C₂₅H₂₆FeO₂Sm**
[μ -(Carbonyl-C,O)]tris[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl][dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)iron]samarium, Sm-00016
- C₂₅H₂₉N₂Pu**
Tris(η^5 -2,4-cyclopentadien-1-yl)(nicotine)plutonium, *in* Pu-00002
- C₂₅H₂₉N₂U**
Tris(η^5 -2,4-cyclopentadienyl)(nicotine)uranium, *in* U -00015

C₂₅H₃₃Cl₃OP₃Tc

Carbonyltrichlorotris(dimethylphenylphosphine)-technetium, Tc-00010

C₂₅H₃₃OTi

Bis(η⁵-cyclopentadienyl)(2,6-di-*tert*-butyl-4-methylphenoxy)titanium, Ti-00128

C₂₅H₃₄MoO₆P₂

(η⁵-2,4-Cyclopentadien-1-yl)[(1,2-η)-1,2-diphenylethenyl]bis(trimethylphosphite-*P*)-molybdenum, Mo-00129

C₂₅H₃₅LuN

[Bis(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-2-pyridinyl lutetium, Lu-00021

C₂₅H₃₈Al₂Zr

[2,2-Bis(diethylalumino)ethyl]tris(η⁵-2,4-cyclopentadien-1-yl)zirconium, Zr-00088

C₂₅H₄₀CINOTh

Chloro[(diethylamino)carbonyl-*C,O*]bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-thorium, Th-00024

C₂₅H₄₀NS₂Yb

Bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]diethylcarbamodithioato-*S,S'*-ytterbium, Yb-00027

C₂₅H₄₁CIOSth

Chlorobis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl][1-(trimethylsilyl)-ethenolato]thorium, Th-00025

C₂₅H₄₁CITh

Chloro(2,2-dimethylpropyl)bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00026

C₂₅H₄₃LuO

Methylbis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]lutetium; Et₂O complex, *in* Lu-00019

C₂₅H₄₄CIP₂Yb

[Bis(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl][bis(dimethylphosphino)-methane]chloroytterbium, Yb-00028

C₂₅H₄₅ClSi₂Zr

Bis(η⁵-*tert*-butylcyclopentadienyl)[bis(trimethylsilyl)-methyl]chlorozirconium, Zr-00089

C₂₅H₄₈Zr

Tris(2,2-dimethylpropyl)[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00090

C₂₅H₄₉P₂Ta

Bis(2,2-dimethylpropylidene)(2,4,6-trimethylphenyl)-bis(trimethylphosphine)tantalum, Ta-00038

C₂₅H₅₄Mo₂O₇

Hexa-*tert*-butoxy-μ-carbonyldimolybdenum, Mo-00130

C₂₆H₁₅O₅V

Pentacarbonyl[(1,2,3-η)-1,2,3-triphenyl-2-cyclopropen-1-yl]vanadium, V -00103

C₂₆H₁₇CrO₃P

Tricarbonyl[(1,2,3,4,5,6-η)-2,4,6-triphenylphosphorin]-chromium, Cr-00161

C₂₆H₂₀BF₄O₂ReSi

Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)[(triphenylsilyl)-methylidyne]rhenium(1+); Tetrafluoroborate, *in* Re-00081

C₂₆H₂₀CrO₃Pb

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-(triphenylplumbyl)chromium, Cr-00162

C₂₆H₂₀MoO₆Si

Pentacarbonyl[ethoxy(triphenylsilyl)methylene]-molybdenum, Mo-00131

C₂₆H₂₀NbO₃P

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-(triphenylphosphine)niobium, Nb-00047

C₂₆H₂₀O₂ReSi⁺

Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)[(triphenylsilyl)-methylidyne]rhenium(1+), Re-00081

C₂₆H₂₀O₃PV

Tricarbonyl(η⁵-2,4-cyclopentadien-1-yl)-(triphenylphosphine)vanadium, V -00104

C₂₆H₂₀O₆SiW

Pentacarbonyl[ethoxy(triphenylsilyl)methylene]tungsten, W -00146

C₂₆H₂₀O₆Zr

(η⁵-2,4-Cyclopentadien-1-yl)tris(2-hydroxy-2,4,6-cycloheptatrien-1-onato-*O,O'*)zirconium, Zr-00091

C₂₆H₂₀Ti

Bis(η⁵-2,4-cyclopentadien-1-yl)bis(phenylethynyl)-titanium, Ti-00129

C₂₆H₂₀Zr

Bis(η⁵-2,4-cyclopentadien-1-yl)bis(phenylethynyl)-zirconium, Zr-00092

C₂₆H₂₁CrNO₅Si

Pentacarbonyl[(dimethylamino)(triphenylsilyl)methylene]-chromium, Cr-00163

C₂₆H₂₁CrOPS

(η⁶-Benzene)(carbonothioyl)carbonyl(triphenylphosphine)-chromium, Cr-00164

C₂₆H₂₄Zr

Bis(η-cyclopentadienyl)bis(2-phenylethenyl)zirconium, Zr-00093

C₂₆H₂₆Zr

Tribenzyl(η-cyclopentadienyl)zirconium, Zr-00094

C₂₆H₂₇MnNO₄P

Tetracarbonyl(triphenylphosphine)manganate(1-); Tetramethylammonium salt, *in* Mn-00124

C₂₆H₃₀Cr₂O₆

Hexacarbonylbis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dichromium, Cr-00165

C₂₆H₃₁NTi

Tribenzyl(piperidinyl)titanium, Ti-00130

C₂₆H₃₂U

Di-*tert*-butyldiindenyluranium, U -00058

C₂₆H₃₃ClO₂P₃Re

Dicarbonylchlorotris(dimethylphenylphosphine)rhenium, Re-00082

C₂₆H₃₆N₄U

Bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis(1*H*-pyrazolato-*N*¹,*N*²)-uranium, U -00059

C₂₆H₃₈Zr

[1,3-Bis(methylene)-1,4-butanediyl]bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-zirconium, Zr-00095

C₂₆H₄₀Cr₂N₂O₁₀

Decacarbonyldichromate(2-); Bis(tetraethylammonium) salt, *in* Cr-00066

C₂₆H₄₁ClOTh

Chloro(3,3-dimethyl-1-oxobutyl-*C,O*)bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-thorium, Th-00027

C₂₆H₄₂N₂O₂U

Bis[(dimethylamino)carbonyl-*C,O*]bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-uranium, U -00060

C₂₆H₄₆Cl₂LiN₂Yb

Dichlorobis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbate(1-); Li salt, tetramethylethylenediamine complex, *in* Yb-00022

- C₂₆H₄₇P₂U**
[1,2-Ethanedylbis(dimethylphosphine)-*P,P'*]-hydrobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U -00061
- C₂₆H₅₀ClSi₄Yb**
Bis[1,3-bis(trimethylsilylmethyl)cyclopentadienyl]-chloroytterbium, Yb-00029
- C₂₆H₅₀Cl₂Nd⁺**
Bis[(1,2,3,4,5- η)-1,3-bis(trimethylsilylmethyl)-2,4-cyclopentadien-1-yl]dichloroneodymium(1+), Nd-00011
- C₂₇H₁₅Mn₂O₉P**
Nonacarbonyl(triphenylphosphine)dimanganese, Mn-00134
- C₂₇H₂₁CITh**
Chlorotris[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]thorium, Th-00028
- C₂₇H₂₁CIU**
Chlorotris[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]uranium, U -00062
- C₂₇H₂₁Dy**
Triindenyl dysprosium, Dy-00006
- C₂₇H₂₁Gd**
Triindenyl gadolinium, Gd-00008
- C₂₇H₂₁La**
Triindenyl lanthanum, La-00006
- C₂₇H₂₁Sm**
Triindenyl samarium, Sm-00017
- C₂₇H₂₁Tb**
Triindenyl terbium, Tb-00005
- C₂₇H₂₁Yb**
Triindenyl ytterbium, Yb-00030
- C₂₇H₂₂Br₃OPU**
Tribromo[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]-(triphenylphosphine oxide-*O*)uranium, U -00063
- C₂₇H₂₆MoO₂PTI**
Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(dimethylthallium)(triphenylphosphine)molybdenum, Mo-00132
- C₂₇H₂₆O₂PTIW**
▷Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(dimethylthallium)(triphenylphosphine)tungsten, W -00147
- C₂₇H₂₉BMnN₃O₃**
Triamminetricarbonylmanganese(1+); Tetraphenylborate, *in* Mn-00002
- C₂₇H₃₃V**
Tris(2,4,6-trimethylphenyl)vanadium, V -00105
- C₂₇H₃₅ClOU**
(Benzoyl-*C,O*)chlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U -00064
- C₂₇H₃₆CrN₃**
▷Tris[[2-(dimethylamino)phenyl]methyl-*C,N*]chromium, Cr-00166
- C₂₇H₃₆N₃Sc**
Tris[2-[(dimethylamino)methyl]phenyl-*C,N*]scandium, Sc-00013
[Tris(2-(dimethylamino)phenyl)methyl-*C,N*]scandium, Sc-00014
- C₂₇H₅₇MnNO₃P**
Bis(η^4 -1,3-butadiene)(trimethyl phosphite)manganate(1+); Tetrabutylammonium salt, *in* Mn-00069
- C₂₈H₂₀Mo₂O₄**
 μ -Carbonyltricarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -[1,1'-(η^2 -1,2-ethynediylbisbenzene)]-dimolybdenum, Mo-00133
- C₂₈H₂₂MnP**
(η^5 -2,4-Cyclopentadien-1-yl)[(1,2,3,4,5,6- η)-2,4,6-triphenylphosphorin]manganese, Mn-00135
- C₂₈H₂₄Th**
Tris[(1,2,3,3a,7a- η)-1*H*-indenyl]methylthorium, Th-00029
- C₂₈H₂₄U**
Bis[(1,2,3,4,5,6,7,8- η)-1-phenyl-1,3,5,7-cyclooctatetraene]uranium, U -00065
Tris[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]methyluranium, U -00066
- C₂₈H₂₄Zr**
Bis[(4a,4b,8a,9a- η)-9*H*-fluoren-9-yl]dimethylzirconium, Zr-00096
- C₂₈H₂₅ClGeHf**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylgermyl)-hafnium, Hf-00041
- C₂₈H₂₅ClGeTi**
Chlorobis(η^5 -cyclopentadienyl)(triphenylgermyl)-titanium, Ti-00131
- C₂₈H₂₅ClGeZr**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylgermyl)-zirconium, Zr-00097
- C₂₈H₂₅ClHfSi**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylsilyl)-hafnium, Hf-00042
- C₂₈H₂₅ClHfSn**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylstannyl)-hafnium, Hf-00043
- C₂₈H₂₅ClSiZr**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylsilyl)-zirconium, Zr-00098
- C₂₈H₂₅ClSnTi**
Chlorobis(η^5 -cyclopentadienyl)(triphenylstannyl)-titanium, Ti-00132
- C₂₈H₂₅ClSnZr**
Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(triphenylstannyl)-zirconium, Zr-00099
- C₂₈H₂₅GeTi**
Bis(η^5 -cyclopentadienyl)triphenylgermyltitanium, Ti-00133
- C₂₈H₂₅P₃Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2,3-triphenyltriphosphinato(2-)-*P*¹,*P*³]titanium, Ti-00134
- C₂₈H₂₅P₃Zr**
Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2,3-triphenyltriphosphinato(2-)-*P*¹,*P*³]zirconium, Zr-00100
- C₂₈H₂₅SnTi**
Bis(η^5 -cyclopentadienyl)triphenylstannyltitanium, Ti-00135
- C₂₈H₂₆GeW**
Bis(η^5 -2,4-cyclopentadien-1-yl)hydro(triphenylgermyl)-tungsten, W -00148
- C₂₈H₂₈CITa**
Tetrabenzylchlorotantalum, Ta-00039
- C₂₈H₂₈Hf**
Tetrabenzylhafnium, Hf-00044
- C₂₈H₂₈Th**
Tetrabenzylthorium, Th-00030
- C₂₈H₂₈Ti**
Tetrabenzyltitanium, Ti-00136
- C₂₈H₂₈V**
Tetrabenzylvanadium, V -00106
- C₂₈H₂₈W**
Tetrabenzyltungsten, W -00149
- C₂₈H₂₈Zr**
Tetrabenzylzirconium, Zr-00101
- C₂₈H₃₀O₃Ti**
[(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]triphenoxytitanium, Ti-00137
- C₂₈H₃₂Co₃ErO₁₆**
Tris(tetracarbonylcobalto)erbium; Tetrakis-THF complex, *in* Er-00006
- C₂₈H₃₂F₁₀O₄Yb**
Bis(pentafluorophenyl)ytterbium; Tetrakis-THF complex, *in* Yb-00007

C₂₈H₃₈CoO₅Yb

[μ -(Carbonyl-*C,O*)]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-tricarboxylcobalt]ytterbium; THF adduct, *in* Yb-00026

C₂₈H₃₈CrIN₄Si₂

Bis(2,2'-bipyridine-*N,N'*)bis[(trimethylsilyl)methyl]-chromium(1+); Iodide, *in* Cr-00167

C₂₈H₃₈CrN₄Si₂[®]

Bis(2,2'-bipyridine-*N,N'*)bis[(trimethylsilyl)methyl]-chromium(1+), Cr-00167

C₂₈H₃₈Fe₂N₂Ti

Diferrocenylbis(diethylamino)titanium, Ti-00138

C₂₈H₄₄ErLiO

Tetrakis(3,3-dimethyl-1-butynyl)erbate(1-); Li salt, THF complex, *in* Er-00016

C₂₈H₄₄I₄N₄U

Tetrakis(cyclohexylisocyanide)tetraiodouranium, U -00067

C₂₈H₄₄LiLuO

Tetrakis(3,3-dimethyl-1-butynyl)lutetate(1-); Li salt, THF complex, *in* Lu-00020

C₂₈H₄₄LiOSm

Tetrakis(3,3-dimethyl-1-butynyl)samarate(1-); Li salt, THF complex, *in* Sm-00015

C₂₈H₄₄Ti

Tetrakis(bicyclo[2.2.1]-hept-1-yl)titanium, Ti-00139

C₂₈H₄₄V

Tetrakis(bicyclo[2.2.1]hept-1-yl)vanadium, V -00107

C₂₈H₄₆Cl₂LiNdO₂

Dichlorobis[(1,2,3,4,5- η)-pentamethyl-2,4-cyclopentadien-1-yl]neodymate(1-); Li salt, THF complex, *in* Nd-00008

C₂₈H₄₆O₂Sm

Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]samarium; Bis-THF complex, *in* Sm-00012

C₂₈H₅₀Cl₂LiO₂Yb

Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbate(1-); Li salt, bis (Et₂O) complex, *in* Yb-00022

C₂₈H₅₀I₂LiO₂Yb

Diiodobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbate(1-); Li salt, *in* Yb-00023

C₂₈H₅₂Si₂Th

Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis[(trimethylsilyl)methyl]-thorium, Th-00031

C₂₈H₅₂Si₂U

Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis[(trimethylsilyl)methyl]-uranium, U -00068

C₂₈H₆₀LiO₃Yb

Tetra-*tert*-butylytterbate(1-); Li salt, tri-THF complex, *in* Yb-00017

C₂₉H₅Co₇O₂₄Ti

(η^5 -2,4-Cyclopentadien-1-yl)[μ_4 -[methanolato(4-)-C:C:C:O]](nonacarbonyltricalcobalt)-tetracarboxylcobalt)titanium, Ti-00140

C₂₉H₂₃AsNO₅V

Amminepentacarbonylvanadate(1-); Tetraphenylarsonium salt, *in* V -00001

C₂₉H₂₃NO₅PV

Amminepentacarbonylvanadate(1-); Tetraphenylphosphonium salt, *in* V -00001

C₂₉H₂₄F₆MoNO₄P₃

Tricarboxyl[1,2-ethanedylbis[diphenylphosphine]-*P,P'*]-nitrosylmolybdenum(1+); Hexafluorophosphate, *in* Mo-00134

C₂₉H₂₄MoNO₄P₂[®]

Tricarboxyl[1,2-ethanedylbis[diphenylphosphine]-*P,P'*]-nitrosylmolybdenum(1+), Mo-00134

C₂₉H₂₆CrFeNO₄P

Tetracarboxyl[1-[(dimethylamino)methyl]-2-(diphenylphosphino)ferrocene-*N,P*]chromium, Cr-00168

C₂₉H₂₆FeMoNO₄P

Tetracarboxyl[1-[(dimethylamino)methyl]-2-(diphenylphosphino)ferrocene-*N,P*]molybdenum, Mo-00135

C₂₉H₂₆FeNO₄PW

Tetracarboxyl[1-[(dimethylamino)methyl]-2-(diphenylphosphino)ferrocene-*N,P*]tungsten, W -00150

C₂₉H₂₇ClLuP

Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-(triphenylphosphonium η -methylide)lutetium, Lu-00022

C₂₉H₂₉PU

► Tris(η^5 -2,4-cyclopentadien-1-yl)-(methylidiphenylphosphoranylidene)methyl)uranium, U -00069

C₂₉H₃₉ClN₂OP₃Tc^{®®}

Bis(acetonitrile)-carbonylchlorotris(dimethylphenylphosphine)-technetium(2+), Tc-00011

C₂₉H₃₉Cl₃N₂O₅P₃Tc

Bis(acetonitrile)-carbonylchlorotris(dimethylphenylphosphine)-technetium(2+); Dipercarbonate, *in* Tc-00011

C₂₉H₅₀OTh

Hydrobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](2,2,4,4-tetramethyl-3-pentanolato)thorium, Th-00032

C₂₉H₇₃O₂ScSi₆

Tris[bis(trimethylsilyl)methyl]scandium; Bis-THF complex, *in* Sc-00008

C₂₉H₇₃O₂Si₆Y

Tris[bis(trimethylsilyl)methyl]yttrium; Bis-THF complex, *in* Y -00013

C₃₀H₁₀Co₆HfO₂₀

Bis(η^5 -2,4-cyclopentadien-1-yl)bis[μ_4 -[methanolato(4-)-C:C:C:O]]bis(nonacarbonyltricalcobalt)dihafnium, Hf-00045

C₃₀H₁₀Co₆O₂₀Zr

Bis(η^5 -2,4-cyclopentadien-1-yl)bis[μ_4 -[methanolato(4-)-C:C:C:O]]bis(nonacarbonyltricalcobalt)dizirconium, Zr-00102

C₃₀H₂₀AsNbO₆

Hexacarbonylniobate(1-); Tetraphenylarsonium salt, *in* Nb-00007

C₃₀H₂₀AsO₆Ta

Hexacarbonyltantalate(1-); Tetraphenylarsonium salt, *in* Ta-00006

C₃₀H₂₀MnNO₃

Dicarbonylnitrosyl(η^4 -tetraphenylcyclobutadiene)-manganese, Mn-00136

C₃₀H₂₄CrF₆O₄P₃

Tetracarboxyl[1,2-ethanedylbis[diphenylphosphine]-*P,P'*]chromium(1+); Hexafluorophosphate, *in* Cr-00170

C₃₀H₂₄CrO₄P₂

Tetracarboxyl[1,2-ethanedylbis[diphenylphosphine]-*P,P'*]chromium, Cr-00169
Tetracarboxyl[1,2-ethanedylbis[diphenylphosphine]-*P,P'*]chromium(1+), Cr-00170

C₃₀H₂₄Cr₄N₃O₁₈

Pentacarbonyl(cyano-*C*)chromate(1-); (THF)₃Cr(3+) salt, *in* Cr-00016

C₃₀H₂₄O₃P₂SW

(Carbonylthio)tricarboxyl[1,2-ethanedylbis[diphenylphosphine]-*P,P'*]tungsten, W -00151

C₃₀H₂₄O₄P₂V[⊖]Tetracarbonyl[1,2-ethanediylbis[diphenylphosphine]-*P,P'*]vanadate(1−), V -00108Tetracarbonyl[1,2-ethanediylbis[diphenylphosphine]-*P,P'*]vanadium, V -00109**C₃₀H₂₄Ti**Bis[(1,2,3,3*a*,7*a*-η)-1*H*-inden-1-yl]diphenyltitanium, Ti-00141**C₃₀H₂₅O₄P₂V**Tetracarbonyl[1,2-ethanediylbis[diphenylphosphine]-*P,P'*]hydrovanadium, V -00110**C₃₀H₂₈Fe₂Ti**Bis(η⁵-2,4-cyclopentadien-1-yl)diferrocenyltitanium, Ti-00142**C₃₀H₂₈Th₂**Tetrakis(η⁵-2,4-cyclopentadien-1-yl)bis[μ-(1-η:1,2,3,4,5-η)-2,4-cyclopentadien-1-ylidene]-dithorium, Th-00033**C₃₀H₂₈Zr₂**Tetrakis(η⁵-2,4-cyclopentadien-1-yl)-μ-hydro[μ-[(1,2-η:2-η)-2-naphthalenyl]]dizirconium, Zr-00103**C₃₀H₂₉OPU**Tris(η⁵-2,4-cyclopentadien-1-yl)-[(methyl)diphenylphosphoranylidene]acetyl]uranium, U -00070**C₃₀H₃₃ClEr₃[⊖]**μ-Chlorohexakis(η⁵-2,4-cyclopentadien-1-yl)di-μ-hydro-μ₃-hydrotrierbate(1−), Er-00017**C₃₀H₃₆Cl₅LiO₂U₂**Di-μ-chlorodi-μ₃-chloro(μ-chlorobis[methylenebis(η⁵-2,4-cyclopentadien-1-ylidene)])-diuraniumbis(tetrahydrofuran)lithium, U -00071**C₃₀H₃₆HfS₂**Bis(η-*tert*-butylcyclopentadienyl)bis(phenylthiolato)-hafnium, Hf-00046**C₃₀H₃₈Hf₂O₉**Bis(η⁵-2,4-cyclopentadien-1-yl)-μ-oxotetrakis(2,4-pentanedionato-*O,O'*)dihafnium, Hf-00047**C₃₀H₃₉CrO₃**

Triphenyltris(tetrahydrofuran)chromium, Cr-00171

C₃₀H₄₀N₂Yb

Bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadienyl]bis(pyridine)ytterbium, Yb-00031

C₃₀H₄₄Zr₂Tetrakis(η⁵-2,4-cyclopentadien-1-yl)bis(2,2-dimethylpropyl)di-μ-hydrodizirconium, *in* Zr-00041**C₃₀H₅₀ClOPTh**Chloro[1-hydroxy-4,4-dimethyl-1-(trimethylphosphoranylidene)-2-pentanonato-*O,O'*]-bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00034**C₃₀H₅₈Cl₂LiNdO₂Si₄**Dichlorobis[(1,2,3,4,5-η)-1,3-bis(trimethylsilyl)-2,4-cyclopentadien-1-yl]neodymate(1−); Li salt, Bis-THF complex, *in* Nd-00010**C₃₀H₆₆Mo₂**

Hexakis(2,2-dimethylpropyl)dimolybdenum, Mo-00136

C₃₁H₂₄O₅P₂V[⊖]Pentacarbonyl[η¹-1,2-ethanediylbis[diphenylphosphine]-*P*]vanadate(1−), V -00111**C₃₁H₂₉ClMoO₂P₂**Dicarbonylchloro[1,2-ethanediylbis[diphenylphosphine]-*P,P'*](η³-2-propenyl)molybdenum, Mo-00137**C₃₁H₂₉DyO**Triindenyl dysprosium; THF adduct, *in* Dy-00006**C₃₁H₂₉GdO**Triindenyl gadolinium; THF complex, *in* Gd-00008**C₃₁H₂₉LaO**Triindenyl lanthanum; THF adduct, *in* La-00006**C₃₁H₂₉OSm**Triindenyl samarium; THF adduct, *in* Sm-00017**C₃₁H₂₉OTb**Triindenyl terbium; THF adduct, *in* Tb-00005**C₃₁H₂₉OYb**Triindenyl ytterbium; THF complex, *in* Yb-00030**C₃₁H₃₀Br₃O₂PU**Tribromo[(1,2,3,3*a*,7*a*-η-1*H*-inden-1-yl)-(triphenylphosphine oxide-*O*)]uranium; THF adduct, *in* U -00063**C₃₁H₃₀Th**Butyltris[(1,2,3,3*a*,7*a*-η)-1*H*-inden-1-yl]thorium, Th-00035**C₃₁H₃₃O₇P₃Re₂**

Heptacarbonyltris(dimethylphenylphosphine)dirhenium, Re-00083

C₃₁H₃₅NO₅PVPentacarbonyl(triphenylphosphine)vanadate(1−): Tetraethylammonium salt, *in* V -00094**C₃₁H₃₆LiO₄PSnW**Tetracarbonyl(triphenylstannane)-(triisopropylphosphine)tungstate(1−); Li salt, *in* W -00152**C₃₁H₃₆O₄PSnW[⊖]**

Tetracarbonyl(triphenylstannane)-(triisopropylphosphine)tungstate(1−), W -00152

C₃₁H₃₆Th

Tribenzyl(pentamethylcyclopentadienyl)thorium, Th-00036

C₃₁H₃₆U

Tribenzyl(pentamethylcyclopentadienyl)uranium, U -00072

C₃₁H₄₁OVTris(2,4,6-trimethylphenyl)vanadium; THF complex, *in* V -00105**C₃₁H₄₂OWZr**[Bis(η⁵-2,4-cyclopentadien-1-yl)hydro[μ-methanolato(3−)-*C:O*]]bis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-zirconium, W -00153**C₃₂H₂₃HfN₃O₃**

π-Cyclopentadienyltris(8-quinolinolato)hafnium, Hf-00048

C₃₂H₂₃N₃O₃Zr

π-Cyclopentadienyltris(8-quinolinolato)zirconium, Zr-00105

C₃₂H₂₆CrIN₄Bis(2,2'-bipyridine-*N,N'*)diphenylchromium(1+); Iodide, *in* Cr-00172**C₃₂H₂₆CrN₄[⊖]**Bis(2,2'-bipyridine-*N,N'*)diphenylchromium(1+), Cr-00172**C₃₂H₂₈CrFe₂**Bis[(η⁶-phenyl)ferrocene]chromium, Cr-00173Bis[(η⁶-phenyl)ferrocene]chromium(1+), Cr-00174**C₃₂H₂₈CrFe₂I**Bis[(η⁶-phenyl)ferrocene]chromium(1+); Iodide, *in* Cr-00174**C₃₂H₃₀OS₂Zr₂**Bis(benzenethiolato)tetrakis(η⁵-2,4-cyclopentadien-1-yl)-μ-oxodizirconium, Zr-00106**C₃₂H₃₃GeOTi**Bis(η⁵-cyclopentadienyl)triphenylgermyltitanium; THF complex, *in* Ti-00133**C₃₂H₃₃SnOTi**Bis(η⁵-cyclopentadienyl)triphenylstannyltitanium; THF complex, *in* Ti-00135**C₃₂H₃₆Cr₂O₈**Tetrakis[μ-(2,6-dimethoxyphenyl-*C:O*)]dichromium, Cr-00175**C₃₂H₃₆Lu[⊖]**

Tetrakis(2,6-dimethylphenyl)lutetate(1−), Lu-00023

C₃₂H₃₆Mo₂O₈Tetrakis[μ-(2,6-dimethoxyphenyl)-*C:O*]]dimolybdenum, Mo-00138

- C₃₂H₃₆O₈V₂**
Tetrakis[μ -(2,6-dimethoxyphenyl-C:O)]divanadium, V -00112
- C₃₂H₃₆Yb⁺**
Tetrakis(2,6-dimethylphenyl)ytterbate(1-), Yb-00032
- C₃₂H₃₈Er₂**
Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -(3,3-dimethylbutynyl)]dierbium, *in* Er-00012
- C₃₂H₃₈Lu₂O₄**
Tetrakis(η^5 -2,4-cyclopentadien-1-yl)[μ -(2,2,7,7-tetramethyl-3,4,5,6-octanetetron-*O*³,*O*⁵:*O*⁴,*O*⁶)]-dilutetium, Lu-00024
- C₃₂H₄₀Er₂O₂**
Tris(1,3,5,7-cyclooctatetraene)bis(tetrahydrofuran)-dierbium, Er-00018
- C₃₂H₄₀La₂O₂**
Tris(1,3,5,7-cyclooctatetraene)bis(tetrahydrofuran)-dilanthanum, La-00007
- C₃₂H₄₀N₂O₁₆Re₄**
Hexadecacarbonyltetrarhenate(2-); Bis(tetraethylammonium) salt, *in* Re-00073
- C₃₂H₄₀Nd₂O₂**
[μ -(1,2- η :1,2,3,4,5,6,7,8- η)-1,3,5,7-Cyclooctatetraene][bis(η^8 -1,3,5,7-cyclooctatetraene)bis(tetrahydrofuran)-dineodymium, Nd-00012
- C₃₂H₄₀Zr**
Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]diphenylzirconium, Zr-00107
- C₃₂H₄₆O₂Y₂**
Di- μ -hydrotetrakis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]bis(tetrahydrofuran)-diyttrium, Y -00015
- C₃₂H₄₈Ce₂Cl₂O₄**
Chloro(cyclooctatetraene)cerium; Bis-THF adduct, *in* Ce-00001
- C₃₂H₄₈Cl₂Nd₂O₄**
Chloro(cyclooctatetraene)neodymium; Bis-THF adduct, *in* Nd-00002
- C₃₂H₄₈Cl₂O₄Pr₂**
Chloro(cyclooctatetraene)praesodymium; Bis-THF complex, *in* Pr-00002
- C₃₂H₄₈Cl₂O₄Sm₂**
Chloro(cyclooctatetraene)samarium; THF complex, *in* Sm-00003
- C₃₂H₅₆Al₂Cl₂N₂Y₂**
Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)-bis[trihydro(triethylaluminum)aluminum]diyttrium, *in* Y -00009
- C₃₂H₅₈EuO₃**
Bis(pentamethylcyclopentadienyl)europium; Complex with 2Et₂O + 1 THF, *in* Eu-00005
- C₃₂H₆₈ErLiO₄**
Tetra-*tert*-butylerbate(1-); Li salt, tetra-THF complex, *in* Er-00013
- C₃₂H₆₈LiO₄Sm**
Tetra-*tert*-butylsamarate(1-); Li salt, Tetra-THF complex, *in* Sm-00011
- C₃₂H₇₆LiO₄Si₄Y**
Tetrakis[(trimethylsilyl)methyl]yttrate(1-); Li salt, tetrakis-THF complex, *in* Y -00010
- C₃₂H₈₄LiLuO₄Si**
Tetrakis[(trimethylsilyl)methyl]luteate(1-); Li salt, tetrakis(tetrahydrofuranate), *in* Lu-00015
- C₃₃H₃₀PYb**
Tris(η^5 -2,4-cyclopentadien-1-yl)-triphenylphosphineytterbium, *in* Yb-00013
- C₃₃H₃₆LuP**
Bis(η^5 -2,4-cyclopentadien-1-yl)(*tert*-butyl)-(triphenylphosphonium η -methylide)lutetium, Lu-00025
- C₃₃H₃₈LuPSi**
Bis(η^5 -2,4-cyclopentadien-1-yl)[(trimethylsilyl)methyl]-(triphenylphosphonium η -methylide)lutetium, Lu-00026
- C₃₃H₄₄ClO₄Re**
Carbonylchlorotetrakis(dimethylphenylphosphine)rhenium, Re-00084
- C₃₃H₆₂MoO₂P₂**
[(2,3,5,6- η)-Bicyclo[2.2.1]hepta-2,5-diene]-dicarbonylbis(tributylphosphine)molybdenum, Mo-00139
- C₃₄H₂₅BF₄MoO**
Carbonyl(η^5 -cyclopentadienyl)bis(diphenylacetylene)-molybdenum(1+); Tetrafluoroborate, *in* Mo-00140
- C₃₄H₂₅MoO⁺**
Carbonyl(η^5 -cyclopentadienyl)bis(diphenylacetylene)-molybdenum(1+), Mo-00140
- C₃₄H₂₅NbO**
Carbonyl- η^5 -2,4-cyclopentadien-1-ylbis(diphenylacetylene)niobium, Nb-00048
- C₃₄H₂₅OV**
Carbonyl- η^5 -2,4-cyclopentadien-1-ylbis(diphenylacetylene)vanadium, V -00113
- C₃₄H₃₀N₂U**
Bis(η^5 -2,4-cyclopentadien-1-yl)bis(*N*-phenylbenzenaminato)uranium, U -00073
- C₃₄H₃₀S₄V₂**
Tetrakis[μ -(benzenethiolato)]bis(η^5 -2,4-cyclopentadien-1-yl)divanadium, V -00114
- C₃₄H₃₄N₂Yb₂**
Hexakis(η^5 -2,4-cyclopentadien-1-yl)[μ -(pyrazine-*N*¹:*N*⁴)]-diytterbium, Yb-00033
- C₃₄H₃₄OZr₂**
Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis(2-methylphenyl)- μ -oxodizirconium, Zr-00108
- C₃₄H₄₀Co₂Mo₂O₄**
Di- μ -carbonyl[μ_4 -(η^2 -carbonyl-C:C:C)] [μ -carbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dicobalt]bis(η^5 -2,4-cyclopentadien-1-yl)dimolybdenum, Mo-00141
- C₃₄H₅₄Al₂Cl₂Zr₂**
Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -1,2-ethanediylbis(triethylaluminum)dizirconium, Zr-00109
- C₃₄H₆₈FeN₆Ti₂**
Hexakis(diethylaminato)- μ -1,1'-ferrocenediyltitanium, Ti-00143
- C₃₄H₆₈N₆RuTi₂**
Hexakis(diethylaminato)- μ -1,1'-ruthenocenediyltitanium, Ti-00144
- C₃₅H₃₁BMoN₂O₂**
Bis(acetonitrile)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-molybdenum(1+); Tetraphenylborate, *in* Mo-00054
- C₃₅H₃₅Ta**
Pentabenzyltantalum, Ta-00040
- C₃₆H₂₅O₃V**
Dicarbonyl- η^5 -2,4-cyclopentadien-1-yl(η^4 -tetraphenylcyclopentadienone)vanadium, V -00115
- C₃₆H₃₀BO₂V**
Dicarbonylbis(2,4-cyclopentadien-1-yl)vanadium(1+); Tetraphenylborate, *in* V -00050
- C₃₆H₃₀HfN₂**
Bis(η^5 -cyclopentadienyl)bis(diphenylketimido)hafnium, Hf-00049

- C₃₆H₃₀Li₂U**
Hexaphenyluranate(2–); Di-Li salt, *in* U -00074
- C₃₆H₃₀N₂Zr**
Bis(η⁵-cyclopentadienyl)bis(diphenylketimido)zirconium, Zr-00110
- C₃₆H₃₀Ti₂**
Tetra-π-cyclopentadienylbis(phenylethynyl)ditanium, Ti-00145
- C₃₆H₃₀U^{⊖⊖}**
Hexaphenyluranate(2–), U -00074
- C₃₆H₃₂Hf**
Bis(η⁵-2,4-cyclopentadien-1-yl)bis(diphenylmethyl)-hafnium, Hf-00050
- C₃₆H₃₂Zr**
Bis(η⁵-2,4-cyclopentadien-1-yl)bis(diphenylmethyl)-zirconium, Zr-00111
- C₃₆H₃₃ClU**
Chlorotris(benzylcyclopentadienyl)uranium, U -00075
- C₃₆H₃₄Cl₂Si₂Yb**
Dichlorobis[(1,2,3,4,5-η)-1-(methyldiphenylsilyl)-2,4-cyclopentadien-1-yl]ytterbate(1–), Yb-00034
- C₃₆H₃₄P₂V[⊖]**
Bis(η⁵-2,4-cyclopentadien-1-yl)[1,2-ethanediylbis[diphenylphosphine]-*P,P'*]-vanadium(1+), V -00116
- C₃₆H₃₉ClTh**
Chlorotris[(1,2,3,3a,7a-η)-1,4,7-trimethyl-1*H*-inden-1-yl]thorium, Th-00037
- C₃₆H₃₉ClU**
Chlorotris[(1,2,3,3a,7a-η)-1,4,7-trimethyl-1*H*-inden-1-yl]uranium, U -00076
- C₃₆H₄₂Yb₂**
Tetrakis(1,2,3,4,5-η-1-methyl-2,4-cyclopentadien-1-yl)-bis[μ-3,3-dimethyl-1-butyn-1-yl]diytterbium, Yb-00035
- C₃₆H₄₄V[⊖]**
Tetrakis(2,4,6-trimethylphenyl)vanadate(1–), V -00117
Tetrakis(2,4,6-trimethylphenyl)vanadium, V -00118
- C₃₆H₄₆Sm₂**
Bis[μ-(3,3-dimethyl-1-butyn-1-yl)]tetrakis(1,2,3,4,5-η-1-methyl-2,4-cyclopentadien-1-yl)disamarium, Sm-00018
- C₃₆H₄₈Mn₂N₄**
Bis[μ-[[2-(dimethylamino)phenyl]methyl-C:C,N]][[2-(dimethylamino)phenyl]methyl][[2-(dimethylamino)phenyl]methyl-C,N]dimanganese, Mn-00137
- C₃₆H₅₄Cl₆Nb₃[⊖]**
Hexa-μ-chlorotris(hexamethylbenzene)triniobium(1+), Nb-00049
- C₃₆H₅₄Cl₇Nb₃**
Hexa-μ-chlorotris(hexamethylbenzene)triniobium(1+); Chloride, *in* Nb-00049
- C₃₆H₈₆B₁₈Cl₂Li₂O₈U**
Dichlorobis[(7,8,9,10,11-η)undecahydro-7,8-dicarbaundecaborato]uranate(2–); Di-Li salt, octa-THF complex, *in* U -00001
- C₃₇H₃₀MoO₂PTI**
Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)-(diphenylthallium)(triphenylphosphine)molybdenum, Mo-00142
- C₃₇H₃₀O₂PTIW**
Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)-(diphenylthallium)(triphenylphosphine)tungsten, W -00154
- C₃₇H₃₆BOV**
Bis(η⁵-2,4-cyclopentadien-1-yl)(2-propanone)-vanadium(1+); Tetraphenylborate, *in* V -00060
- C₃₇H₈₉ClLiO₄Si₆Yb**
Tris[bis(triethylsilyl)methyl]chloroytterbate(1–); Li salt, tetra-kis-THF complex, *in* Yb-00025
- C₃₈H₂₀AsMn₃O₁₄**
Tetradecacarbonyltrimanganate(1–); Tetraphenylarsonium salt, *in* Mn-00098
- C₃₈H₃₀CrINO₃P₂**
Dicarbonylodonitrosylbis(triphenylphosphine)chromium, Cr-00177
- C₃₈H₃₀Hf**
Bis(η⁵-2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)hafnium, Hf-00051
- C₃₈H₃₀MnNO₃P₂**
Dicarbonylnitrosylbis(triphenylphosphine)manganese, Mn-00138
- C₃₈H₃₀NO₃P₂Re**
Dicarbonylnitrosylbis(triphenylphosphine)rhenium, Re-00085
- C₃₈H₃₀O₈Ti₂**
Tetrakis[μ-benzoato-*O,O'*]bis(η⁵-2,4-cyclopentadien-1-yl)ditanium, *in* Ti-00102
- C₃₈H₃₀Ti**
Bis(η⁵-2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)titanium, Ti-00146
- C₃₈H₃₀V**
Bis(η⁵-2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)vanadium, V -00119
- C₃₈H₃₀Zr**
Bis(η⁵-2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)zirconium, Zr-00112
- C₃₈H₄₂Cl₄N₄O₂U₃**
Bis[bis(acetonitrile)tris(η⁵-cyclopentadienyl)-uranium(1+)]tetrachlorodioxouranate(2–), U -00077
- C₃₈H₄₄NO₄P₂V**
Tetracarbonyl[1,2-ethanediylbis[diphenylphosphine]-*P,P'*]vanadate(1–); Tetraethylammonium salt, *in* V -00108
- C₃₈H₄₅P₂Re**
Bis(diethylphenylphosphine)triphenylrhenium, Re-00086
- C₃₉H₃₀BClF₄O₃P₂Re**
Tricarbonylchlorobis(triphenylphosphine)rhenium(1+); Tetrafluoroborate, *in* Re-00087
- C₃₉H₃₀ClO₃P₂Re[⊖]**
Tricarbonylchlorobis(triphenylphosphine)rhenium(1+), Re-00087
- C₃₉H₃₀ClO₃P₂Tc**
Tricarbonylchlorobis(triphenylphosphine)technetium, Tc-00012
- C₃₉H₃₁MnO₃P₂**
Tricarbonylhydrobis(triphenylphosphine)manganese, Mn-00139
- C₃₉H₄₄NO₅P₂V**
Pentacarbonyl[η¹-1,2-ethanediylbis[diphenylphosphine]-*P*]vanadate(1–); Tetraethylammonium salt, *in* V -00111
- C₃₉H₅₆NO₄PSnW**
Tetracarbonyl(triphenylstannane)-(triisopropylphosphine)tungstate(1–); Tetraethylammonium salt, *in* W -00152
- C₄₀H₂₀Co₆Hf₂O₂₁**
Tetrakis(η⁵-2,4-cyclopentadien-1-yl)bis[μ₄-[methanolato(4–)-C:C:C:O]-bis(nonacarbonyltricobalt)-μ-oxodihafnium, Hf-00052
- C₄₀H₂₀Co₆O₂₁Zr₂**
Tetrakis(η⁵-2,4-cyclopentadien-1-yl)bis[μ₄-[methanolato(4–)-C:C:C:O]-bis(nonacarbonyltricobalt)-μ-oxodizirconium, Zr-00113

C₄₀H₃₀F₆MnO₄P₃Tetracarbonylbis(triphenylphosphine)manganese(1+); Hexafluorophosphate, *in* Mn-00140**C₄₀H₃₀F₆O₄P₃Re**Tetracarbonylbis(triphenylphosphine)rhenium(1+); Hexafluorophosphate, *in* Re-00088**C₄₀H₃₀MnO₄P₂[⊕]**

Tetracarbonylbis(triphenylphosphine)manganese(1+), Mn-00140

C₄₀H₃₀Nb₂O₂Dicarbonylbis(η⁵-cyclopentadien-1-yl)bis[1,1'-(1,2-ethynediyl)]bis[benzene]]diniobium, Nb-00050**C₄₀H₃₀O₄P₂Re[⊕]**

Tetracarbonylbis(triphenylphosphine)rhenium(1+), Re-00088

C₄₀H₃₅BN OVCarbonylbis(η⁵-2,4-cyclopentadien-1-yl)(pyridine)-vanadium(1+); Tetraphenylborate, *in* V -00071**C₄₀H₃₈Ti₂**[μ-(1,4-Diphenyl-1,3-butadiene-1,2,3,4-tetrayl-C¹,C³:C²,C⁴)]tetrakis[(1,2,3,4,5-η)-1-methyl-2,4-cyclopentadien-1-yl]dititanium, Ti-00147**C₄₀H₄₄Hf**

Tetrakis(2-methyl-1-phenyl-1-propenyl)hafnium, Hf-00053

C₄₀H₄₄Li₄Mo₄Tetrakis[bis(η⁵-2,4-cyclopentadien-1-yl)-hydromolybdenum]tetralithium, *in* Mo-00040**C₄₀H₄₄Li₄W₄**Bis(η⁵-2,4-cyclopentadien-1-yl)hydro(tungsten)lithium; Tetramer, *in* W -00052**C₄₀H₄₄Ti**

Tetrakis(2-methyl-1-phenyl-1-propenyl)titanium, Ti-00148

C₄₀H₄₄Zr

Tetrakis(2-methyl-1-phenyl-1-propenyl)zirconium, Zr-00114

C₄₀H₅₂Cr

Tetrakis(2-methyl-2-phenylpropyl)chromium, Cr-00178

C₄₀H₅₂Mn₂

Bis[μ-(2-methyl-2-phenylpropyl)]bis(2-methyl-2-phenylpropyl)dimanganese, Mn-00141

C₄₀H₆₀N₂Ti₂[η-(Dinitrogen-*N,N'*)]tetrakis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dititanium, Ti-00149**C₄₀H₆₂Sm₂**Di-μ-hydrotetrakis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]disamarium, *in* Sm-00013**C₄₀H₆₄Th₂**Di-μ-hydrodihydrotetrakis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dithorium, *in* Th-00017**C₄₀H₆₄U₂**Di-μ-hydrodihydrotetrakis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]diuranium, *in* U -00039**C₄₀H₈₈Li₂O₈Re₂**Octamethyldirhenate(2-); Bis[tetrakis(tetrahydrofuran)lithium(1+)]salt, *in* Re-00036**C₄₁H₃₀ClCrNO₅P₂**Pentacarbonylchlorochromate(1-); Bis(triphenylphosphine)iminium salt, *in* Cr-00006**C₄₁H₃₀IMoNO₅P₂**Pentacarbonyliodomolybdate(1-); Bis(triphenylphosphine)iminium salt, *in* Mo-00004**C₄₁H₃₀MnNO₅P₂**Pentacarbonylmanganate(1-); Bis(triphenylphosphine)iminium salt, *in* Mn-00014**C₄₁H₃₃N₂O₅P₂V**Amminepentacarbonylvanadate(1-); Bis(triphenylphosphine)iminium salt, *in* V -00001**C₄₁H₃₅AsN₂S₂U**Tris(η⁵-cyclopentadienyl)diisothiocyanatouranate(IV); Tetraphenylarsonium salt, *in* U -00021**C₄₁H₃₅Cl₃O₂P₂U**Trichloro(η⁵-2,4-cyclopentadien-1-yl)-bis(triphenylphosphine oxide-*O*)uranium, U -00078**C₄₁H₃₅F₆MnNO₇P₃**(η⁵-2,4-Cyclopentadien-1-yl)nitrosylbis(triphenyl phosphite-*P*)manganese(1+); Hexafluorophosphate, *in* Mn-00142**C₄₁H₃₅MnNO₇P₂[⊕]**(η⁵-2,4-Cyclopentadien-1-yl)nitrosylbis(triphenyl phosphite-*P*)manganese(1+), Mn-00142**C₄₂H₃₀CrN₂O₅P₂**Pentacarbonyl(cyano-*C*)chromate(1-); Bis(triphenylphosphine)iminium salt, *in* Cr-00016**C₄₂H₃₀CrN₃O₄P₂**Tetracarbonyldicyanochromate(2-); Bis(triphenylphosphine)iminium salt, *in* Cr-00017**C₄₂H₃₀MoN₂P₂O₅**Pentacarbonyl(cyano-*C*)molybdate(1-); Bis(triphenylphosphine)iminium salt, *in* Mo-00006**C₄₂H₃₀N₂O₅P₂W**Pentacarbonyl(cyano-*C*)tungstate(1-); Bis(triphenylphosphine)iminium salt, *in* W -00012**C₄₂H₃₀Nb₂O₄**Tetracarbonylbis(cyclopentadienyl)-bis(diphenylacetylene)diniobium, *in* Nb-00041**C₄₂H₃₃CrNO₅P₂**(T-4)Triphenyl(*P,P,P*-triphenylphosphineimidato-*N*)-phosphorus(1+) pentacarbonylmethylchromate(1-), *in* Cr-00024**C₄₂H₃₃NO₅P₂W**(T-4)Triphenyl(*P,P,P*-triphenylphosphineimidato-*N*)-phosphorus(1+) pentacarbonylmethyltungstate(1-), *in* W -00009**C₄₂H₄₂Cl₃Re₃**

Hexabenzyltri-μ-chlorotrirhenium, Re-00089

C₄₂H₄₂O₆Re₂Tetrakis[μ-(2-methoxyphenyl-*C:O*)]bis(2-methoxyphenyl-*C,O*)dirhenium, Re-00090**C₄₂H₆₂I₂O₂Zr₂**[μ-[1,2-Ethenediolato(2-)-*O:O'*]]-diodotetrakis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dizirconium, Zr-00115**C₄₂H₆₄O₂Zr₂**[μ-[1,2-Ethenediolato(2-)-*O:O'*]]-dihydrotetrakis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dizirconium, Zr-00116**C₄₂H₆₆Lu₂**Methylbis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]lutetium; Dimer, *in* Lu-00019**C₄₂H₆₆Y₂**Methylbis[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]yttrium; Dimer, *in* Y -00012**C₄₃H₃₀OW**

Carbonyltris(diphenylacetylene)tungsten, W -00155

C₄₃H₃₅BF₄MoO₂P₂Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)-bis(triphenylphosphine)molybdenum(1+); Tetrafluoroborate, *in* Mo-00143**C₄₃H₃₅MoO₂P₂[⊕]**Dicarbonyl(η⁵-2,4-cyclopentadien-1-yl)-bis(triphenylphosphine)molybdenum(1+), Mo-00143**C₄₃H₄₈Cl₄N₄O₂U₃**Bis[bis(acetonitrile)tris(η⁵-cyclopentadienyl)-uranium(1+)]tetrachlorodioxouranate(2-); Cyclopentadiene adduct, *in* U -00077

- C₄₄H₃₀O₈P₂Re₂**
Octacarbonylbis(triphenylphosphine)dirhenium, Re-00091
- C₄₄H₃₀O₈P₂Tc₂**
Octacarbonylbis(triphenylphosphine)ditechnetium, Tc-00013
- C₄₄H₃₆NO₃P₂V**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-hydrovanadate(1-); Bis(triphenylphosphine)iminium salt, *in* V -00017
- C₄₄H₅₄Cl₂O₂Si₂Yb**
Dichlorobis[(1,2,3,4,5- η)-1-(methyldiphenylsilyl)-2,4-cyclopentadien-1-yl]ytterbate(1-); Li salt, bis(diethyl ether) complex, *in* Yb-00034
- C₄₄H₈₄Cl₂Pr₂Si₈**
Tetrakis[(1,2,3,4,5- η)-1,3-bis(trimethylsilyl)-2,4-cyclopentadien-1-yl]di- μ -chlorodipraesodymium, *in* Pr-00006
- C₄₄H₈₄Cl₂Sc₂Si₈**
Bis[1,3-bis(trimethylsilyl)cyclopentadienyl]-chloroscandium; Dimer, *in* Sc-00010
- C₄₅H₃₀FeMnNO₉P₂**
Nonacarbonylferratemanganate(1-); Bis(triphenylphosphine)iminium salt, *in* Mn-00041
- C₄₅H₃₈NO₃P₂V**
Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-methylvanadate(1-); Bis(triphenylphosphine)iminium salt, *in* V -00021
- C₄₅H₄₅MoP₃**
(η^6 -Benzene)tris(methyldiphenylphosphine)molybdenum, Mo-00144
- C₄₆H₃₀CrINO₁₀P₂**
Decacarbonyl- μ -iododichromate(1-); Bis(triphenylphosphine)iminium salt, *in* Cr-00065
- C₄₆H₃₁CrNO₁₀P₂**
Decacarbonyl- μ -hydrodichromate(1-); Bis(triphenylphosphine)iminium salt, *in* Cr-00067
- C₄₆H₃₁NO₁₀P₂W₂**
Decacarbonyl- μ -hydroditungstate(1-); Bis(triphenylphosphine)iminium salt, *in* W -00040
- C₄₆H₄₀Ge₂Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)bis(triphenylgermyl)-titanium, Ti-00150
- C₄₆H₄₀O₂Si₂Ti**
Bis(η^5 -2,4-cyclopentadien-1-yl)bis(triphenylsilyloxy)-titanium, Ti-00151
- C₄₆H₄₀Sn₂Ti**
Bis(η -cyclopentadienyl)bis(triphenylstannyl)titanium, Ti-00152
- C₄₆H₅₄Cl₄N₄O₂U₃**
Bis[bis(acetonitrile)tris(η^5 -cyclopentadienyl)-uranium(1+)]tetrachlorodioxouranate(2-); Bis(1,3-butadiene) adduct, *in* U -00077
- C₄₆H₆₅ClEr₃LiO₄**
 μ -Chlorohexakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -hydro- μ_3 -hydrotrierbate(1-); Li salt, tetra-THF complex, *in* Er-00017
- C₄₇H₃₃Cr₂NO₁₀P₂S**
Decarbonyl(μ -methanethiolato)dichromate(1-); Bis(triphenylphosphine)iminium salt, *in* Cr-00083
- C₄₇H₃₅O₅P₂V**
Pentacarbonyl(triphenylphosphine)vanadate(1-); Tetraphenylphosphonium salt, *in* V -00094
- C₄₇H₄₇P₃U**
(η^5 -2,4-Cyclopentadien-1-yl)-tris[(diphenylphosphinidenio)bis(methylene)]-uranium, U -00079
- C₄₈H₃₀Fe₂MnNO₁₂P₂**
Tetracarbonyl(di- μ -carbonylhexacarbonyldiferrate)-manganate(1-); Bis(triphenylphosphine)iminium salt, *in* Mn-00072
- C₄₈H₃₅AsMnO₂P**
Dicarbonyl[(1,2,3,4,5- η)-2,3,4,5-tetraphenyl-1*H*-arsol-1-yl](triphenylphosphine)manganese, Mn-00143
- C₄₈H₃₅NbO**
Cyclopentadienylcarbonyl(diphenylacetylene)-(tetraphenylcyclobutadiene)niobium, Nb-00051
- C₄₈H₄₆P₂U₂**
Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -[methylene(diphenylphosphinidenio)methylidene]]-diuranium, U -00080
- C₄₈H₆₈LiLuO₄**
Tetrakis(2,6-dimethylphenyl)lutetate(1-); Li salt, tetra-THF complex, *in* Lu-00023
- C₄₈H₆₈LiO₄Yb**
Tetrakis(2,6-dimethylphenyl)ytterbate(1-); Li salt, tetra-THF complex, *in* Yb-00032
- C₄₈H₇₂Th₂O₄**
Bis[μ -(2-butene-2,3-diolato(2-)-*O,O'*)-tetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dithorium, Th-00038
- C₅₀H₇₀AsCl₂NdSi₄**
Bis[(1,2,3,4,5- η)-1,3-bis(trimethylsilylmethyl)-2,4-cyclopentadien-1-yl]dichloroneodymium(1-); Tetraphenylarsonium salt, *in* Nd-00011
- C₅₁H₆₀Fe₃Yb₂**
Tetrakis[μ_3 -(carbonyl-C,C,O)](heptacarbonyltriiron)-tetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]diytterbium, Yb-00036
- C₅₁H₇₂Cl₂NdP**
Bis[(1,2,3,4,5- η)-1,3-bis(trimethylsilylmethyl)-2,4-cyclopentadien-1-yl]dichloroneodymium(1-); Benzyltriphenylphosphonium salt, *in* Nd-00011
- C₅₂H₄₈MoN₄P₄**
Bis(dinitrogen)bis[1,2-bis(diphenylphosphino)ethane]-molybdenum, Mo-00145
- C₅₂H₄₈N₄P₄W**
Bis(dinitrogen)bis[1,2-bis(diphenylphosphino)ethane]-tungsten, W -00156
- C₅₂H₇₆LiO₄V**
Tetrakis(2,4,6-trimethylphenyl)vanadate(1-); Li salt, tetrakis(THF) complex, *in* V -00117
- C₅₂H₁₀₀Cl₂Si₈Yb₂**
Tetrakis[(1,2,3,4,5- η)-1,3-bis(trimethylsilylmethyl)-2,4-cyclopentadien-1-yl]di- μ -chlorodiytterbium, *in* Yb-00029
- C₅₃H₄₈Br₃ClOP₄Re**
Carbonylchlorobis[1,2-ethanediybis(diphenylphosphine-*P,P'*)]rhenium(1+); Tribromide, *in* Re-00092
- C₅₃H₄₈ClF₆OP₅Re**
Carbonylchlorobis[1,2-ethanediybis(diphenylphosphine-*P,P'*)]rhenium(1+); Hexafluorophosphate, *in* Re-00092
- C₅₃H₄₈ClOP₄Re[⊕]**
Carbonylchlorobis[1,2-ethanediybis(diphenylphosphine-*P,P'*)]rhenium(1+), Re-00092
- C₅₄H₄₀NO₅P₂V**
▷Pentacarbonyl(cyano-C)vanadate(2-); Bis(tetraphenylphosphonium) salt, *in* V -00011
- C₅₄H₄₇NOP₃Re**
Dihydronitrosyltris(triphenylphosphine)rhenium, Re-00093
- C₅₄H₄₈ClMnO₂P₄**
Dicarbonylbis[1,2-ethanediybis(diphenylphosphine-*P,P'*)]manganese(1+); Chloride, *in* Mn-00144
- C₅₄H₄₈ClMnO₆P₄**
Dicarbonylbis[1,2-ethanediybis(diphenylphosphine-*P,P'*)]manganese(1+); Perchlorate, *in* Mn-00144
- C₅₄H₄₈MnO₂P₄[⊕]**
Dicarbonylbis[1,2-ethanediybis(diphenylphosphine-*P,P'*)]manganese(1+), Mn-00144

$C_{54}H_{82}Cl_2O_4Th_2$

Dichlorotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl][μ -(2,2,9,9-tetramethyl-4,5,6,7-decanetetron- O^4, O^5, O^6, O^7)]dithorium, Th-00039

 $C_{55}H_{44}Mn_2O_5P_4$

μ -Carbonyltetracarbonylbis[μ -[methylenebis[diphenylphosphine]- P, P']-dimanganese, Mn-00145

 $C_{56}H_{48}BCrFe_2$

Bis[(η^6 -phenyl)ferrocene]chromium(1+); Tetraphenylborate, *in* Cr-00174

 $C_{56}H_{56}MoP_4$

Bis[1,2-ethanediylbis[diphenylphosphine]- P, P']bis(η^2 -ethene)molybdenum, Mo-00146

 $C_{58}H_{45}MnNO_4P_3$

Tetracarbonyl(triphenylphosphine)manganate(1-); Bis(triphenylphosphine)iminium salt, *in* Mn-00124

 $C_{58}H_{50}Si_4Ti$

Bis(η^5 -2,4-cyclopentadien-1-yl)(1,1,2,2,3,3,4,4-octaphenyl-1,4-tetrasilanediyl)titanium, Ti-00153

 $C_{60}H_{54}BP_2V$

Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethanediylbis[diphenylphosphine]- P, P']-vanadium(1+); Tetraphenylborate, *in* V -00116

 $C_{60}H_{90}Cl_3U_3$

Tri- μ -chlorohexakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]triuranium, *in* U -00037

 $C_{64}H_{48}U$

Bis[(1,2,3,4,5,6,7,8- η)-1,3,5,7-tetraphenyl-1,3,5,7-cyclooctatetraene]uranium, U -00081

 $C_{82}H_{60}Cr_2N_2O_{10}P_4$

Decacarbonyldichromate(2-); Bis(bis(triphenylphosphine)iminium)salt, *in* Cr-00066

 $C_{82}H_{60}Mo_2N_2O_{10}P_4$

Decarbonyldimolybdate(2-); Bis[bis(triphenylphosphine)iminium]salt, *in* Mo-00045

CAS Registry Number Index

- 309-89-7 Bis(η^5 -2,4-cyclopentadien-1-yl)difluorotitanium, Ti-00029
- 1270-98-0 Trichloro(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00009
- 1271-18-7 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)diti-tanium, *in* Ti-00025
- 1271-19-8 ▶ Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00026
- 1271-24-5 Chromocene, Cr-00075
- 1271-27-8 ▶ Manganocene, Mn-00058
- 1271-29-0 ▶ Titanocene, Ti-00035
- 1271-31-4 Bis(η^5 -2,4-cyclopentadien-1-yl)ytterbium, Yb-00005
- 1271-32-5 Bis(η^5 -2,4-cyclopentadien-1-yl)hydrorhenium, Re-00042
- 1271-33-6 Bis(η^5 -2,4-cyclopentadien-1-yl)dihydrotungsten, W -00055
- 1271-43-8 (η^6 -Benzene)(η^5 -2,4-cyclopentadien-1-yl)manganese, Mn-00067
- 1271-54-1 ▶ Bis(η^6 -benzene)chromium, Cr-00101
- 1271-66-5 Bis(η^5 -2,4-cyclopentadien-1-yl)dimethyltitanium, Ti-00060
- 1272-21-5 Tris(η^5 -2,4-cyclopentadien-1-yl)gadolinium, Gd-00004
- 1272-22-6 Tris(η^5 -2,4-cyclopentadien-1-yl)holmium, Ho-00005
- 1272-23-7 Tris(η^5 -2,4-cyclopentadien-1-yl)lanthanum, La-00004
- 1272-24-8 Tris(η^5 -2,4-cyclopentadien-1-yl)lutetium, Lu-00012
- 1272-25-9 Tris(η^5 -2,4-cyclopentadien-1-yl)terbium, Tb-00002
- 1272-26-0 Tris(η^5 -2,4-cyclopentadien-1-yl)thulium, Tm-00004
- 1273-09-2 Bis(η^5 -cyclopentadien-1-yl)diphenyltitanium, Ti-00118
- 1273-98-9 Tris(η^5 -2,4-cyclopentadien-1-yl)neodymium, Nd-00004
- 1277-47-0 Bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00033
- 1278-83-7 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)methyltitanium, Ti-00045
- 1282-41-3 (π -Cyclopentadienyl)triethoxytitanium, Ti-00048
- 1282-42-4 Tris(acetato-*O*)(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00047
- 1282-45-7 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis(trifluoroacetato-*O*)titanium, Ti-00069
- 1282-51-5 Bis(acetato-*O*)bis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00071
- 1284-81-7 Chlorotris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00013
- 1284-82-8 Chlorotris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00005
- 1284-95-3 Butoxytris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00027
- 1291-32-3 ▶ Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00007
- 1291-40-3 Bis(η^5 -2,4-cyclopentadien-1-yl)dihydromolybdenum, Mo-00043
- 1292-47-3 Bis(benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00117
- 1293-64-7 Dichloro(η^5 -2,4-cyclopentadien-1-yl)oxovanadium, V -00004
- 1293-73-8 Dibromobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00024
- 1294-07-1 Tris(η^5 -2,4-cyclopentadien-1-yl)yttrium, Y -00006
- 1294-67-3 Dibromobis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00006
- 1295-18-7 Tris(η^5 -2,4-cyclopentadien-1-yl)americium, Am-00001
- 1295-20-1 Tris(η^5 -2,4-cyclopentadien-1-yl)ytterbium, Yb-00013
- 1298-37-9 Diazidobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00032
- 1298-41-5 Bis(η^5 -2,4-cyclopentadien-1-yl)diiodozirconium, Zr-00009
- 1298-53-9 Tris(η^5 -2,4-cyclopentadien-1-yl)cerium, Ce-00003
- 1298-54-0 Tris(η^5 -2,4-cyclopentadien-1-yl)scandium, Sc-00005
- 1298-55-1 Tris(η^5 -2,4-cyclopentadien-1-yl)samarium, Sm-00009
- 1298-75-5 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00014
- 1298-76-6 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00035
- 1317-00-6 Chlorotris(η^5 -2,4-cyclopentadien-1-yl)neptunium, Np-00001
- 1317-21-1 Bis(η^5 -2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)titanium, Ti-00146
- 2371-70-2 ▶ Tetramethyltitanium, Ti-00006
- 2371-72-4 Tetraphenyltitanium, Ti-00124
- 2747-38-8 Trichloromethyltitanium, Ti-00002
- 2948-60-9 Dichlorotrimethylniobium, Nb-00004
- 3020-02-8 Dichlorotrimethyltantalum, Ta-00003
- 4984-20-7 Trichloroethyltitanium, Ti-00003
- 10170-69-1 Decacarbonyldimanganese, Mn-00063
- 11057-26-4 Tris(η^5 -2,4-cyclopentadien-1-yl)praseodymium; Cy-clohexylisocyanide adduct, *in* Pr-00003
- 11057-67-3 Tetra- π -cyclopentadienylbis[μ -(dimethylamino)]-dititanium, *in* Ti-00058
- 11058-18-7 Bis(η -cyclopentadienyl)bis(2-phenylethenyl)zirconium, Zr-00093
- 11065-40-0 (η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00064
- 11067-83-7 Di- π -cyclopentadienylbis[μ -(dimethylamino)]-bis(dimethylamino)dititanium, *in* Ti-00022
- 11077-28-4 Bis(η^5 -2,4-cyclopentadienyl)pentathiovanadium, V -00032
- 11077-50-2 Bis(η^6 -benzene)rhenium(1+), Re-00055
- 11077-51-3 Bis(η^6 -benzene)technetium(1+), Tc-00008
- 11077-55-7 Chlorodi- π -cyclopentadienyl[2,2,2-trifluoro-1-(trifluoromethyl)ethylideniminato]titanium, Ti-00063
- 11077-58-0 Tris(η^5 -2,4-cyclopentadien-1-yl)curium, Cm-00001
- 11077-59-1 Tris(η^5 -2,4-cyclopentadien-1-yl)praseodymium, Pr-00003
- 11077-71-7 Bis(η^5 -2,4-cyclopentadien-1-yl)hydrophenyltungsten, W -00108
- 11077-90-0 Bis(η^5 -2,4-cyclopentadien-1-yl)di-1*H*-pyrrol-1-yltitanium, Ti-00097
- 11077-95-5 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis[(trimethylsilyl)methyl]hafnium, Hf-00025
- 11077-96-6 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis[(trimethylsilyl)methyl]titanium, Ti-00101
- 11077-97-7 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis[(trimethylsilyl)methyl]zirconium, Zr-00054
- 11078-10-7 Tetra- π -cyclopentadienyldi- μ -hydrodititanium, *in* Ti-00037
- 11079-26-8 Uranocene, U -00019
- 11082-39-6 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-[(trimethylsilyl)methyl]zirconium, Zr-00035
- 11082-41-0 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)titanium, Ti-00082
- 11082-60-3 Bis(η^5 -2,4-cyclopentadien-1-yl)bis(4-nitrobenzoato-*O'*)titanium, Ti-00123
- 11082-70-5 Chlorotris[(1,2,3,3*a*,7*a*)- η]-1*H*-inden-1-yl]uranium, U -00062
- 11087-14-2 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)diga-dolinium, *in* Gd-00002
- 11087-26-6 Chlorobis(η -cyclopentadienyl)methoxyzirconium, Zr-00016
- 11087-29-9 Bis(η^5 -2,4-cyclopentadien-1-yl)dimethoxyzirconium, Zr-00024

- 11088-05-4 Tetrakis[μ -benzoato-*O,O'*]bis(η^5 -2,4-cyclopentadien-1-yl)ditanium, *in* Ti-00102
- 11090-85-0 Bis(η^5 -2,4-cyclopentadien-1-yl)difluorozirconium, Zr-00008
- 11105-67-2 Bis(η^5 -2,4-cyclopentadien-1-yl)trihydroniobium, Nb-00014
- 11105-68-3 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)hydroniobium, Nb-00018
- 11105-69-4 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)hydrotantalum, Ta-00014
- 11105-70-7 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)hydroniobium, Nb-00027
- 11105-81-0 Bis(η^5 -2,4-cyclopentadien-1-yl)-hydro(triethylphosphine)tantalum, Ta-00030
- 11105-88-7 (1-*tert*-Butyl-2,2-dimethylpropylideneiminato)-chlorodi- π -cyclopentadienyltitanium, Ti-00103
- 11105-93-4 Bis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -(1, η :1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]]dihydrodiniobium, Nb-00040
- 11106-00-6 Chlorodi- π -cyclopentadienyl(1,1-diphenylmethyleniminato)titanium, Ti-00121
- 11106-17-5 Bis(η^5 -cyclopentadienyl)bis(diphenylketimido)hafnium, Hf-00049
- 11106-18-6 Bis(η^5 -cyclopentadienyl)bis(diphenylketimido)zirconium, Zr-00110
- 11108-17-1 Bis(η^5 -2,4-cyclopentadien-1-yl)trihydrotungsten(1+), W -00056
- 11108-17-1 Bis(η^5 -2,4-cyclopentadien-1-yl)trihydrotungsten(1+); Hexafluorophosphate, *in* W -00056
- 11108-30-8 Bis(η -cyclopentadienyl)bis(dimethylamido)zirconium, Zr-00036
- 11133-05-4 Chlorotris[(1,2,3,4,5,6- η)-1*H*-inden-1-yl]]thorium, Th-00028
- 11136-26-8 Bis(η^5 -2,4-cyclopentadien-1-yl)phenyltitanium, Ti-00089
- 11136-36-0 Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, Ti-00111
- 11136-37-1 Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, Ti-00112
- 11136-41-7 Dimethylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, Ti-00119
- 11136-46-2 [η -(Dinitrogen-*N,N'*)]tetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ditanium, Ti-00149
- 12071-51-1 Chloro(η^5 -2,4-cyclopentadien-1-yl)dinitrosylchromium, Cr-00015
- 12078-15-8 Tricarbonylthiophenenechromium, Cr-00030
- 12079-65-1 $\triangleright$ Cyclopentadienyltricarbonylmanganese, Mn-00033
- 12079-73-1 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)rhenium, Re-00033
- 12079-79-7 Bromotricarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum, Mo-00011
- 12082-03-0 Tricarbonyl(η^6 -chlorobenzene)chromium, Cr-00052
- 12082-05-2 (η^6 -Fluorobenzene)tricarbonylchromium, Cr-00053
- 12082-07-4 Tricarbonyl(carboxy- π -cyclopentadienyl)manganese, Mn-00044
- 12082-08-5 $\triangleright$ (η^6 -Benzene)tricarbonylchromium, Cr-00057
- 12082-10-9 Dicarbonyl(η^7 -cycloheptatrienyl)iodotungsten, W -00033
- 12082-25-6 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)methylmolybdenum, Mo-00025
- 12082-27-8 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)methyltungsten, W -00034
- 12082-46-1 Tris(η^3 -2-propenyl)chromium, Cr-00064
- 12083-01-1 Decacarbonyl- μ -hydroditungstate(1-); Tetraethylammonium salt, *in* W -00040
- 12083-16-8 Tricarbonyl(η^7 -cycloheptatrienyl)vanadium, V -00023
- 12083-17-9 Tricarbonyl(η^7 -cycloheptatrienyl)tungsten(1+); Tetrafluoroborate, *in* W -00041
- 12083-24-8 Tricarbonyl[(1,2,3,4,5,6- η)methylbenzene]chromium, Cr-00072
- 12083-34-0 Tricarbonyl[(1,2,3,4,5,6- η)methylbenzene]molybdenum, Mo-00034
- 12083-48-6 Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00030
- 12083-77-1 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis[tetrahydroborato(1-)-*H,H'*]zirconium, Zr-00015
- 12086-52-1 Bis(η^5 -cyclopentadienyl)bis(dimethylamido)titanium, Ti-00076
- 12086-80-5 Tetradeccarbonylhydrotrirhenium, Re-00064
- 12087-16-0 Bis(η^5 -2,4-cyclopentadien-1-yl)[2,3-dimercapto-2-butenedinitrilato(2-)-*S,S'*]titanium, Ti-00070
- 12087-58-0 Bis[(1,2,3,4,5,6- η)methylbenzene]chromium, Cr-00121
- 12088-04-9 Tris(η^5 -2,4-cyclopentadien-1-yl)dysprosium, Dy-00004
- 12088-73-2 Pentacarbonyl[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)iron]manganese, Mn-00075
- 12088-83-4 Tricarbonyl[(3*a*,4,5,6,7,7*a*- η)-2,3-dihydro-1*H*-inden-1-ol]chromium, Cr-00099
- 12089-15-5 (η^6 -1,3,5-Trimethylbenzene)tricarbonylmolybdenum, Mo-00064
- 12089-23-5 Bis(η^6 -benzene)tungsten, W -00073
- 12089-78-0 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis(methanethiolato)titanium, Ti-00059
- 12090-34-5 Tetrakis(η^3 -2-propenyl)zirconium, Zr-00026
- 12091-64-4 Hexacarbonylbis(η^5 -2,4-cyclopentadien-1-yl)dimo-lybdenum, Mo-00093
- 12092-01-2 Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(dimethylphosphino)]- μ -hydrodimolybdenum, Mo-00095
- 12093-03-7 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5,7-cyclooctatetraene]chromium, Cr-00085
- 12093-14-0 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-cyclooctatriene]molybdenum, Mo-00051
- 12093-29-7 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(trimethylstannyl)tungsten, W -00065
- 12093-81-1 (η^7 -Cycloheptatrienyl)(η^5 -2,4-cyclopentadien-1-yl)chromium, Cr-00102
- 12094-55-2 Tricarbonyl- η^6 -phenanthrenechromium, Cr-00141
- 12097-04-0 Dichlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -oxodizirconium, Zr-00061
- 12098-32-7 Tris(η^5 -2,4-cyclopentadien-1-yl)isocyanocyclohexaneholmium, *in* Ho-00005
- 12098-33-8 Tris(η^5 -2,4-cyclopentadien-1-yl)neodymium; Cyclohexylisocyanide adduct, *in* Nd-00004
- 12098-34-9 Tris(η^5 -2,4-cyclopentadien-1-yl)isocyanocyclohexan-eterbium, *in* Tb-00002
- 12098-35-0 Tris(η^5 -2,4-cyclopentadien-1-yl)yttrium; Cyclohexylisocyanide adduct, *in* Y -00006
- 12098-36-1 Tris(η^5 -2,4-cyclopentadien-1-yl)isocyanocyclohexan-eytterbium, *in* Yb-00013
- 12103-45-6 Hexa- μ -chlorotris(hexamethylbenzene)triniobium(1+); Chloride, *in* Nb-00049
- 12107-08-3 Dicarbonyltrichloro(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00015
- 12107-36-7 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungstate(1-); Na salt, *in* W -00023
- 12108-03-1 Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00009
- 12108-04-2 Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00020
- 12108-11-1 (η^6 -Aniline)tricarbonylchromium, Cr-00059
- 12108-13-3 $\triangleright$ (Methylcyclopentadienyl)tricarbonylmanganese, Mn-00046
- 12108-14-4 Tricarbonyl[(1,2,3,4,5- η)-2,4-cyclohexadien-1-yl]manganese, Mn-00047
- 12108-93-9 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5,7-cyclooctatetraene]molybdenum, Mo-00047
- 12108-95-1 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5,7-cyclooctatetraene]tungsten, W -00060
- 12109-14-7 Bis(acetonitrile)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+), Mo-00054
- 12109-61-4 Dicyanobis(η^5 -cyclopentadienyl)titanium, Ti-00050
- 12109-63-6 Bis(cyanato-*N*)bis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00019
- 12109-67-0 Bis(η^5 -2,4-cyclopentadien-1-yl)bis(thiocyanato-*N*)zirconium, Zr-00020
- 12109-74-9 Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]molybdenum, Mo-00065

- 12110-37-1 Tricarbonyl[(1,2,3,4,4a,8a- η)naphthalene]chromium, Cr-00111
- 12111-76-1 Tricarbonyl(η^6 -1,3,5,7-tetramethyl-1,3,5,7-cyclooctatetraene)molybdenum, Mo-00090
- 12111-85-2 Bis(η^5 -2,4-cyclopentadien-1-yl)[(1,2,3- η)-2-methyl-2-butenyl]titanium, Ti-00081
- 12112-27-5 Bis(1,3,5,7-cyclooctatetraene)titanium, Ti-00090
- 12113-02-9 $\blacktriangleright$ Dichlorobis[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]titanium, Ti-00096
- 12114-15-7 Chloro(η^5 -cyclopentadienyl)bis(8-quinolinolato)zirconium, Zr-00079
- 12115-01-4 Dicarbonylchloro(η^5 -2,4-cyclopentadien-1-yl)-(triphenylphosphine)molybdenum, Mo-00127
- 12116-28-8 (Acetyl)cyclopentadienyltricarbonylmanganese, Mn-00055
- 12116-44-8 Tricarbonyl-(1,2,3,4,5- η -methoxybenzene)chromium, Cr-00073
- 12116-66-4 $\blacktriangleright$ Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00003
- 12116-82-4 Bis(η^5 -2,4-cyclopentadien-1-yl)(pentathio)titanium, Ti-00033
- 12116-92-6 Bis(η^5 -2,4-cyclopentadien-1-yl)hydrotechnetium, Tc-00006
- 12116-93-7 Bis(η^5 -2,4-cyclopentadien-1-yl)-hydro[tetrahydroborato(1-)-*H*,*H'*]zirconium, Zr-00013
- 12117-02-1 Bis(cyclopentadienyl)trihydrotantalum, Ta-00011
- 12118-16-0 Dichlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -oxodihafnium, Hf-00027
- 12125-72-3 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-cycloheptatriene]chromium, Cr-00071
- 12125-77-8 $\blacktriangleright$ Tricarbonyl[(1,2,3,4,5,6 η)-1,3,5-cycloheptatriene]molybdenum, Mo-00033
- 12125-87-0 Tricarbonyl[(1,2,3,4,5,6- η)methyl benzoate]chromium, Cr-00089
- 12126-17-9 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungstate(1-), W -00023
- 12126-18-0 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdate(1-), Mo-00014
- 12126-74-8 Tricarbonyl[(4a,5,6,7,8,8a- η)-1,2,3,4-tetrahydro-1-naphthalenol]chromium, Cr-00115
- 12126-95-3 Benzylidencarbonyl- π -cyclopentadienylmolybdenum, Mo-00080
- 12128-14-2 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosyltungsten, W -00016
- 12128-23-3 Tricarbonylchloro(η^5 -2,4-cyclopentadien-1-yl)molybdenum, Mo-00012
- 12128-24-4 Tricarbonylchloro(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00019
- 12128-26-6 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydrotungsten, W -00024
- 12128-53-9 (η^6 -Benzene)tricarbonyltungsten, W -00031
- 12128-81-3 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-cycloheptatriene]tungsten, W -00042
- 12128-82-4 Tricarbonyl[(1,2,3,4,5,6- η)-methylbenzene]tungsten, W -00043
- 12128-87-9 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)molybdenum, Mo-00039
- 12129-25-8 [(2,3,5,6- η)-Bicyclo[2.2.1]hepta-2,5-diene]tetracarbonyltungsten, W -00061
- 12129-51-0 Dicarbonylbis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00051
- 12129-67-8 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]chromium, Cr-00103
- 12129-68-9 Bis(η^6 -benzene)molybdenum, Mo-00063
- 12129-69-0 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]tungsten, W -00071
- 12129-70-3 Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]tungsten, W -00072
- 12129-72-5 Bis(η^6 -benzene)vanadium, V -00051
- 12130-13-1 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-iron]molybdenum, Mo-00087
- 12130-88-0 Tricarbonyl[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]rhenium, Re-00061
- 12131-22-5 Bis[(1,2,3,4,5,6- η)methylbenzene]molybdenum, Mo-00082
- 12131-26-9 Dicarbonylbis[(1,2,3,4- η)-1,3-cyclohexadiene]tungsten, W -00093
- 12131-50-9 Bis[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]molybdenum, Mo-00106
- 12131-66-7 Carbonyltris(3-hexyne)tungsten, W -00124
- 12132-04-6 Tetracarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dimolybdenum, Mo-00124
- 12145-64-1 (η^5 -Cyclopentadienyl)trimethoxytitanium, Ti-00016
- 12146-06-4 Tetrachlorobis(η^5 -2,4-cyclopentadien-1-yl)- μ -oxodititanium, Ti-00027
- 12146-36-0 [(2,3,5,6- η)-Bicyclo[2.2.1]hepta-2,5-diene]tetracarbonylchromium, Cr-00087
- 12146-37-1 [(2,3,5,6- η)-Bicyclo[2.2.1]hepta-2,5-diene]tetracarbonylmolybdenum, Mo-00049
- 12146-93-9 Bis(η^5 -1-methyl-2,4-cyclopentadien-1-yl)vanadium, V -00054
- 12147-78-3 Chloro- π -cyclopentadienylbis(2,4-pentanedionato)hafnium, Hf-00020
- 12147-94-3 Tricarbonyl[(1,2,3,4,5,6- η)-7-phenyl-1,3,5-cycloheptatriene]chromium; *endo-form*, in Cr-00131
- 12147-95-4 Tricarbonyl[(1,2,3,4,5,6- η)-7-phenyl-1,3,5-cycloheptatriene]chromium, Cr-00131
- 12148-49-1 Dichlorobis[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]zirconium, Zr-00048
- 12149-47-2 (η^5 -2,4-Cyclopentadien-1-yl)triphenoxytitanium, Ti-00122
- 12149-66-5 Tris(1,3,5,7-cyclooctatetraene)ditanium, Ti-00126
- 12152-92-0 Bis(η^5 -2,4-cyclopentadien-1-yl)diiodotitanium, Ti-00031
- 12153-11-6 Tricarbonyl[1-(η^6 -phenyl)ethanone]chromium, Cr-00088
- 12153-25-2 (η^6 -Benzene)(η^5 -2,4-cyclopentadien-1-yl)molybdenum, Mo-00053
- 12154-13-1 Di- μ -iodotetrakis(η^3 -2-propenyl)dichromium, in Cr-00026
- 12155-21-4 [1,2-Benzenedithiolato(2-)-*S,S'*]bis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00087
- 12155-24-7 Bis(η^5 -2,4-cyclopentadien-1-yl)[(2,3- η)-dimethyl 2-butyndioate]vanadium, V -00074
- 12155-42-9 Anthracenetricarbonylchromium, Cr-00140
- 12155-89-4 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis(pentafluorophenyl)titanium, Ti-00115
- 12170-02-4 $\blacktriangleright$ Tris(η^3 -2-propenyl)vanadium, V -00022
- 12170-19-3 Tricarbonyl(η^7 -cycloheptatrienyl)chromium(1+); Tetrafluoroborate, in Cr-00070
- 12170-21-7 Tricarbonyl(η^7 -cycloheptatrienyl)molybdenum(1+); Tetrafluoroborate, in Mo-00032
- 12171-57-2 Tetrachlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)-tetra- μ -oxotetratitanium, Ti-00105
- 12176-06-6 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydromolybdenum, Mo-00016
- 12178-34-6 Tris[(3,4- η)-3-buten-2-one-*O*]tungsten, W -00078
- 12184-19-9 Dibromobis(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00046
- 12184-22-4 Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)molybdenum, Mo-00036
- 12184-26-8 Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00048
- 12194-11-5 $\blacktriangleright$ Hexacarbonyldi- π -cyclopentadienyl- μ -mercuriodichromium, Cr-00128
- 12194-12-6 Hexacarbonylbis(η^5 -2,4-cyclopentadien-1-yl)dichromium, Cr-00129
- 12203-12-2 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)chromate(1-); Na salt, in Cr-00038
- 12212-56-5 Bis(η^5 -2,4-cyclopentadien-1-yl)phenylvanadium, V -00073
- 12212-68-9 Bis[(1,2,3,4,5,6- η)ethylbenzene]chromium, Cr-00135
- 12213-09-1 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(triphenylphosphine)vanadium, V -00104
- 12214-92-5 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(trimethylstannyl)molybdenum, Mo-00059
- 12216-08-9 Tris(η^5 -2,4-cyclopentadien-1-yl)plutonium, Pu-00002

- 12216-18-1 Chloro(η^5 -2,4-cyclopentadien-1-yl)bis(2,4-pentanedionato-*O,O'*)zirconium, Zr-00040
- 12240-42-5 Tribromo(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00007
- 12240-43-6 (η^5 -Cyclopentadien-1-yl)triiodotitanium, Ti-00011
- 12241-95-1 Tetrakis(η^3 -2-propenyl)hafnium, Hf-00014
- 12242-63-6 Dicarboxyl[hydrotris(pyrzolato)borato(1-)](η^3 -2-methylpropenyl)tungsten, W -00104
- 12242-79-4 Tetracarbonyl(1,2,3,4,5,6-hexamethylbicyclo[2.2.0]hexa-2,5-diene)chromium, Cr-00134
- 12244-94-9 Dicarboxyl(η^5 -2,4-cyclopentadien-1-yl)(1-methoxyethylidene)manganese, Mn-00060
- 12245-58-8 (2,2'-Bipyridine-*N,N'*)dicarbonylchloro(η^3 -2-propenyl)tungsten, W -00103
- 12245-61-3 Dicarboxyl(η^5 -2,4-cyclopentadien-1-yl)(2-methoxy-1-phenylethylidene)manganese, Mn-00103
- 12246-19-4 Bis(η^5 -2,4-cyclopentadien-1-yl)bis(phenolato-*O*)titanium, Ti-00116
- 12248-79-2 Tricarbonyl(diphenylmethylenecyclopentadiene)chromium, Cr-00152
- 12267-13-9 Di- π -cyclopentadienyl(2,4-pentanedionato)titanium(1+); Perchlorate, *in* Ti-00080
- 12277-27-9 Tris(η^5 -2,4-cyclopentadien-1-yl)promethium, Pm-00001
- 12282-32-5 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(trimethylsilyl)molybdenum, Mo-00058
- 12282-35-8 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(trimethylsilyl)tungsten, W -00064
- 12283-86-2 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-(triphenylsilyl)zirconium, Zr-00098
- 12287-61-5 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)iodomolybdenum, Mo-00013
- 12287-81-9 η^6 -Benzenetricarbonylmolybdenum, Mo-00023
- 12288-70-9 Bis(η^5 -2,4-cyclopentadien-1-yl)methyltitanium, Ti-00046
- 12290-82-3 Tetracarbonyl[[2-(η^2 -ethenyl)phenyl]-diphenylphosphine-*P*]molybdenum, Mo-00122
- 12290-83-4 Tetracarbonyl[2-(η^2 -ethenyl)-phenyldiphenylphosphine-*P*]tungsten, W -00139
- 12295-17-9 Tetra-2-propenyldichromium, Cr-00108
- 12300-89-9 Bis(η^5 -2,4-cyclopentadien-1-yl)iodonitrosylmolybdenum, Mo-00037
- 12301-34-7 Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]chromium, Cr-00104
- 12302-33-9 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5,7-tetramethyl-1,3,5,7-cyclooctatetraene]chromium, Cr-00127
- 12303-93-4 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis(phenylethynyl)titanium, Ti-00129
- 12305-00-9 Chloro(η^5 -2,4-cyclopentadien-1-yl)dinitrosylmolybdenum, Mo-00002
- 12307-22-1 Bis(η^5 -2,4-cyclopentadien-1-yl)-[pentaselenidato(2-)]titanium, Ti-00034
- 12307-27-6 Pentacarbonyl[1-(trimethylsiloxy)ethylidene]chromium, Cr-00080
- 12307-60-7 Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethenedithiolato(2-)-*S,S'*]titanium, Ti-00053
- 12308-48-4 [1,2-Benzenediolato(2-)-*O,O'*]bis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00086
- 12312-71-9 Tris(η^5 -2,4-cyclopentadien-1-yl)- μ_3 -nitrosyltri- μ -nitrosyltrimanganese, Mn-00104
- 12365-46-7 Pentacarbonyl(1-methoxyethylidene)molybdenum, Mo-00017
- 12387-00-7 Pentacarbonyl[1-(methylamino)ethylidene]chromium, Cr-00045
- 12560-43-9 Dodecacarbonylhydromanganesediosmium, Mn-00073
- 12563-65-4 Dodecacarbonylmanganatediosmate(1-); Tetramethylammonium salt, *in* Mn-00085
- 12563-67-6 Dodecacarbonylrhenatediosmate(1-); tetramethylammonium salt, *in* Re-00059
- 12563-75-6 Tridecacarbonyltrihydromanganesetriosmium, Mn-00086
- 12563-76-7 Tridecacarbonyltrihydrosmeriumtriosmium, Re-00060
- 12566-57-3 Hexadecacarbonylhydromanganesetriosmium, Mn-00105
- 12566-58-4 Hexadecacarbonylhydrosmeriumtriosmium, Re-00070
- 12566-66-4 Hexacarbonylbis(η^5 -2,4-cyclopentadien-1-yl)ditungsten, W -00107
- 12636-68-9 (η^7 -Cycloheptatrienyl)(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00052
- 12636-72-5 Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylzirconium, Zr-00025
- 12636-79-2 Chlorotris(η^5 -2,4-cyclopentadien-1-yl)cerium, Ce-00004
- 12636-90-7 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis(pentafluorophenyl)hafnium, Hf-00033
- 12636-97-4 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-(triphenylgermyl)hafnium, Hf-00041
- 12636-98-5 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-(triphenylgermyl)zirconium, Zr-00097
- 12636-99-6 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-(triphenylsilyl)hafnium, Hf-00042
- 12637-00-2 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-(triphenylstannyl)hafnium, Hf-00043
- 12637-01-3 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-(triphenylstannyl)zirconium, Zr-00099
- 12655-17-3 Octacarbonyltetrachlorodimolybdenum, Mo-00008
- 12663-63-7 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)phenyltitanium, Ti-00088
- 12671-05-5 Bis[(1,2,3,4,5,6- η)-1,3,5-cycloheptatriene]vanadium, V -00063
- 12701-35-8 Bis(η^6 -benzene)di- μ -chlorobis(η^3 -2-propenyl)dimolybdenum, *in* Mo-00028
- 12701-52-9 Chloro(cyclooctatetraene)cerium; Bis-THF adduct, *in* Ce-00001
- 12701-79-0 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00029
- 12701-85-8 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)molybdenum, Mo-00050
- 12701-96-1 Tetrakis(η^3 -2-propenyl)uranium, U -00010
- 12702-09-9 $\triangleright$ Bis(η^8 -1,3,5,7-cyclooctatetraene)thorium, Th-00009
- 12715-68-3 Tris(η^5 -2,4-cyclopentadien-1-yl)fluorouranium, U -00016
- 12715-87-6 Bis[(1,2,3,4,5,6,7,8- η)-1,3,5,7-tetramethyl-1,3,5,7-cyclooctatetraene]uranium, U -00053
- 12771-97-0 Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)-bis[μ -(trifluoromethanethiolato)]ditungsten, W -00106
- 12772-20-2 Bis(η^5 -2,4-cyclopentadien-1-yl)-[tetrahydroborato(1-)-*H,H'*]titanium, Ti-00038
- 12793-14-5 $\triangleright$ Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00012
- 13007-92-6 $\triangleright$ Chromium carbonyl, Cr-00020
- 13356-21-3 Tetrakis[2,2-dimethylpropyl]titanium, Ti-00113
- 13601-24-6 Pentacarbonylmethylmanganese, Mn-00016
- 13821-00-6 Pentacarbonyliodorhenium, Re-00011
- 13859-41-1 Pentacarbonylmanganate(1-); Na salt, *in* Mn-00014
- 13939-06-5 Molybdenum carbonyl, Mo-00007
- 13985-77-8 Pentacarbonylphenylmanganese, Mn-00066
- 13986-68-0 Triphenyltris(tetrahydrofuran)chromium, Cr-00171
- 14024-00-1 $\triangleright$ Vanadium hexacarbonyl, V -00013
- 14040-11-0 Tungsten carbonyl, W -00014
- 14057-83-1 Pentacarbonyl-2-propenylmanganese, Mn-00034
- 14099-01-5 Pentacarbonylchlororhenium, Re-00007
- 14100-30-2 Pentacarbonylchloromanganese, Mn-00010
- 14122-94-2 Pentacarbonyl(pentafluorophenyl)manganese, Mn-00064
- 14172-94-2 Octacarbonylbis(triphenylphosphine)dirhenium, Re-00091
- 14220-21-4 Bromopentacarbonylrhenium, Re-00006
- 14285-68-8 Decacarbonylirhenium, Re-00044
- 14516-54-2 Bromopentacarbonylmanganese, Mn-00009
- 14524-92-6 Pentacarbonylmethylrhenium, Re-00014
- 14592-26-8 Nonacarbonyl(triphenylphosphine)dimanganese, Mn-00134
- 14653-43-1 Dicarboxylnitrosylbis(triphenylphosphine)manganese, Mn-00138
- 14693-30-2 Pentacarbonyl(pentacarbonylmanganese)rhenium, Re-00043
- 14724-88-0 $\triangleright$ Diphenyltitanium, Ti-00052
- 14780-93-9 Bromopentacarbonylchromate(1-); Tetramethylammonium salt, *in* Cr-00005

- 14780-95-1 Pentacarbonylchlorochromate(1-); Tetraethylammonium salt, *in* Cr-00006
- 14780-98-4 Pentacarbonyliodochromate(1-), Cr-00007
- 14781-00-1 Pentacarbonyliodomolybdate(1-); Tetraethylammonium salt, *in* Mo-00004
- 14836-77-2 Dicarboxylbis[1,2-ethanediybis(diphenylphosphine)-*P,P'*]manganese(1+); *trans-form*, Perchlorate, *in* Mn-00144
- 14837-15-1 Decacarbonylditechnetium, Tc-00005
- 14872-95-8 Triamminetricarbonylmanganese(1+); *fac-form*, Tetraphenylborate, *in* Mn-00002
- 14872-96-9 Triamminetricarbonylmanganese(1+), Mn-00002
- 14879-42-6 Pentacarbonyliodomanganese, Mn-00013
- 14911-56-9 Pentacarbonylchlorochromate(1-), Cr-00006
- 14911-72-9 Bromopentacarbonylchromate(1-), Cr-00005
- 14951-98-5 Carbonyltrinitrosylmanganese, Mn-00001
- 14971-26-7 Pentacarbonylmanganate(1-), Mn-00014
- 14971-28-9 Pentacarbonyl(cyano-C)chromate(1-), Cr-00016
- 14971-38-1 Pentacarbonylrhenate(1-), Re-00012
- 14971-41-6 Pentacarbonyl(cyano-C)chromate(1-); Na salt, *in* Cr-00016
- 14971-42-7 Pentacarbonyl(triphenylphosphine)molybdenum, Mo-00119
- 15038-41-2 Pentacarbonyl(tetrahydrofuran)chromium, Cr-00061
- 15038-48-9 Tris(acetonitrile)tricarbonylmolybdenum, Mo-00026
- 15189-52-3 Octacarbonyldi- μ -chlorodirhenium, Re-00031
- 15219-49-5 Pentacarbonyl(trifluoroacetato-O)manganese, Mn-00018
- 15228-27-0 Amminepentacarbonylchromium, Cr-00011
- 15335-69-0 Hexamethylchromate(3-); Tri-Li salt, *in* Cr-00027
- 15390-66-6 Bis(diethylphenylphosphine)triphenylrhenium, Re-00086
- 15529-60-9 Octacarbonylbis(triethylphosphine)dimanganese, Mn-00121
- 15531-13-2 Hexacarbonylvanadate(1-); Na salt, bis(diglyme) complex, *in* V -00012
- 15557-71-8 Hexacarbonylmanganese(1+); Tetrafluoroborate, *in* Mn-00017
- 15616-67-8 Decacarbonyldichromate(2-); Di-Na salt, *in* Cr-00066
- 15668-57-2 Tetracarbonylbis(pentacarbonylmanganio)iron, Mn-00092
- 15680-94-1 Bis(μ -benzenethiolato)octacarbonyldirhenium, *in* Re-00041
- 15682-68-5 Decacarbonyldichromate(2-); Bis(tetraethylammonium) salt, *in* Cr-00066
- 15689-01-7 Pentacarbonylmanganate(1-); Li salt, *in* Mn-00014
- 15692-05-4 Pentacarbonyl(ethoxycarbonyl)rhenium, Re-00034
- 15841-96-0 Pentacarbonyliodotechnetium, Tc-00003
- 15841-97-1 Bromopentacarbonyltechnetium, Tc-00001
- 15841-98-2 Pentacarbonylchlorotechnetium, Tc-00002
- 16040-31-6 Tetracarbonylbis(pentacarbonylrhenio)iron, Re-00063
- 16104-17-9 Tetracarbonylnitrosylmanganese, Mn-00007
- 16457-30-0 Pentacarbonylhydridorhenium, Re-00010
- 16635-23-7 Phenyltris(2-propanolato)titanium, Ti-00083
- 16924-36-0 Decacarbonyl- μ -hydrodichromate(1-); Tetraethylammonium salt, *in* Cr-00067
- 16925-29-4 Tetracarbonylhydro(triphenylphosphine)manganese, Mn-00125
- 16972-33-1 ▶ Pentacarbonylhydromanganese, Mn-00011
- 17030-38-5 Tricarbonylhydrobis(triphenylphosphine)manganese, Mn-00139
- 17520-19-3 Tetrabenzyltitanium, Ti-00136
- 17548-29-7 Tetracarbonylbis(trimethylphosphine)chromium, Cr-00081
- 18006-13-8 Methyltris(2-propanolato)titanium, Ti-00042
- 18116-53-5 Pentacarbonyl(phosphine)chromium, Cr-00012
- 18347-09-6 Tetracarbonyl[1,2-ethanediybis(diphenylphosphine)-*P,P'*]vanadium, V -00109
- 18444-56-9 Dodecacarbonyltrihydrotrimanganese, Mn-00074
- 18535-43-8 Di(μ -chloro)octacarbonyldimanganese, Mn-00028
- 18535-44-9 Di(μ -bromo)octacarbonyldimanganese, Mn-00027
- 18947-43-8 Dicarboxylbis(diethylcarbomodithioato-*S,S'*)molybdenum, Mo-00071
- 19457-74-0 Tetracarbonyl(triphenylphosphine)manganate(1-); Na salt, *in* Mn-00124
- 19497-41-7 Hexadecacarbonyltetrarhenate(2-); Di-Na salt, *in* Re-00073
- 19528-32-6 Tetracarbonyl[2-(phenylazo)phenyl]manganese, Mn-00106
- 19529-33-0 Tetracarbonyl[2-(phenylazo)phenyl]rhenium, Re-00071
- 19663-11-7 Octacarbonyl- μ -(diphenylphosphino)- μ -hydrodimanganese, Mn-00117
- 19773-10-5 Decacarbonyl- μ -hydroditungstate(1-), W -00040
- 20540-69-6 Pentacarbonyl(1-methoxyethylidene)chromium, Cr-00042
- 20791-80-4 Pentacarbonyl(pentafluoroethyl)manganese, Mn-00019
- 21321-38-0 Octacarbonylbis(μ -methanethiolato)dimanganese, *in* Mn-00012
- 21331-06-6 Hexacarbonylmanganese(1+), Mn-00017
- 21370-42-3 Tetracarbonylbis(trimethyl phosphite-*P*)chromium, Cr-00082
- 21500-33-4 Triphenylscandium, Sc-00006
- 21500-34-5 Tris(phenylethynyl)scandium, Sc-00011
- 21637-80-9 Decacarbonyl- μ -iododichromate(1-); Bis(triphenylphosphine)iminium salt, *in* Cr-00065
- 22017-07-8 Decarbonyl(μ -methanethiolato)dichromate(1-); Bis(triphenylphosphine)iminium salt, *in* Cr-00083
- 22043-86-3 Pentacarbonyl(cyano-C)chromate(1-); Bis(triphenylphosphine)iminium salt, *in* Cr-00016
- 22043-88-5 Pentacarbonyl(cyano-C)tungstate(1-); Bis(triphenylphosphine)iminium salt, *in* W -00012
- 22142-87-6 Tetracarbonyldicyanochromate(2-); *cis-form*, Bis(triphenylphosphine)iminium salt, *in* Cr-00017
- 22533-62-6 Triindenylsamarium; THF adduct, *in* Sm-00017
- 22696-73-7 Triindenylanthanum; THF adduct, *in* La-00006
- 22696-74-8 Triindenylgadolinium; THF complex, *in* Gd-00008
- 22696-75-9 Triindenyl dysprosium; THF adduct, *in* Dy-00006
- 22696-76-0 Triindenyl ytterbium; THF complex, *in* Yb-00030
- 22852-50-2 (1-Aminoethylidene)pentacarbonylchromium, Cr-00033
- 22877-87-8 Triindenylterbium; THF adduct, *in* Tb-00005
- 23319-44-0 Acetylpentacarbonylrhenium, Re-00020
- 23591-73-3 Dodecacarbonyltetrakis(μ_3 -methanethiolato)tetrarhenium, *in* Re-00004
- 23606-69-1 Tetracarbonyl(1-methoxyethylidene)-(triphenylphosphine)molybdenum; *cis-form*, *in* Mo-00128
- 24356-01-2 Tetraenzylzirconium, Zr-00101
- 24604-40-8 Decarbonyl(μ -methanethiolato)dichromate(1-); Tetraethylammonium salt, *in* Cr-00083
- 24819-01-0 Dodecacarbonyltetrakis(μ_3 -methanethiolato)tetr manganese, *in* Mn-00005
- 25031-36-1 Octacarbonylbis(μ -(trifluoromethanethiolato))dirhenium, *in* Re-00009
- 25259-88-5 Carbonylchlorotetrakis(dimethylphenylphosphine)rhenium, Re-00084
- 25292-08-4 Triphenylttrium, Y -00011
- 25360-92-3 Tetracarbonyldi- μ -chlorodichlorodinitrosyldirhenium, Re-00003
- 25377-12-2 Diperoxoohexamethylphosphoramidomolybdenum, Mo-00005
- 25483-53-8 Tris(dimethylamino)methyltitanium, Ti-00014
- 25483-56-1 Tris(diethylamino)methyltitanium, Ti-00068
- 25839-19-4 Bis(2,2'-bipyridine-*N,N'*)diphenylchromium(1+); Iodide, *in* Cr-00172
- 25879-47-4 Pentacarbonyl(1-ethoxyethylidene)tungsten, W -00036
- 25885-01-2 Tetracarbonylbis(phosphine)chromium, Cr-00003
- 25885-03-4 Tricarbonyltris(phosphine)chromium, Cr-00001
- 25908-19-4 Tricarbonyltrichlororhenate(2-); Bistetraethylammonium salt, *in* Re-00002
- 26500-16-3 Pentacarbonyl(trimethylsilyl)manganese, Mn-00039
- 26555-09-9 Pentacarbonyl(trimethylphosphine)chromium, Cr-00047
- 26566-78-9 Dicarbonylchlorotris(dimethylphenylphosphine)rhenium, Re-00082
- 26901-29-1 Tetracarbonyl(dimethylphenylphosphine)iodorhenium, Re-00053

- 26901-33-7 Heptacarbonyltris(dimethylphenylphosphine)dirhenium, Re-00083
- 26901-38-2 Tetracarbonyl(dimethylphenylphosphine)iodorhenium; *trans-form*, in Re-00053
- 27323-98-4 Hexacarbonyl(triphenylstannyl)vanadium, V -00096
- 27436-93-7 Pentacarbonyl(methoxyphenylmethylene)chromium, Cr-00112
- 27674-37-9 (Acetonitrile)pentacarbonylmanganese(1+), Mn-00020
- 28300-66-5 Pentacarbonyl(ethoxycarbonyl)manganese, Mn-00035
- 28480-04-8 Pentacarbonyl(hexamethyldistannatellurane)chromium, Cr-00093
- 28597-01-5 ▶ Dichlorooxophenylvanadium, V -00009
- 28939-17-5 Dinitrosyl(pentacarbonylmanganio)-(triphenylphosphine)iron, Mn-00128
- 29421-17-8 (Acetonitrile)pentacarbonylrhenium(1+), Re-00018
- 29454-58-8 (Arsine)pentacarbonylchromium, Cr-00010
- 29890-04-8 Tetracarbonyl[1,2-ethanediy]bis(diphenylphosphine)-*P,P'*chromium, Cr-00169
- 30043-33-5 Tribromomethyltitanium, Ti-00001
- 30092-08-1 Pentacarbonyl(hydrazine-*N*)chromium, Cr-00014
- 30169-70-1 ▶ Tetracyclohexyltitanium, Ti-00127
- 30476-93-8 Tricarbonyltris(trimethylphosphine)chromium, Cr-00109
- 30476-94-9 Dicarbonyl(tetrakis(trimethylphosphine)chromium, Cr-00123
- 31011-82-2 Oxotris(trimethylsilylmethyl)vanadium, V -00057
- 31135-22-5 Tetrakis(pentacarbonylmanganio)uranium, Mn-00122
- 31172-83-5 Pentacarbonyl(dimethyl sulfide)chromium, Cr-00034
- 31246-02-3 [1-(Benzylideneamino)ethylidene]pentacarbonylchromium, Cr-00119
- 31406-67-4 Tetrabenzylhafnium, Hf-00044
- 31424-66-5 Tetrakis(μ -tetramethylene)dichromate(4-); Tetra-Li salt, in Cr-00136
- 31724-95-5 (Benzyltrimethylstannane)tricarbonylchromium, Cr-00117
- 31725-05-0 Pentacarbonyl(ferrocenylmethoxymethylene)chromium, Cr-00142
- 31741-76-1 (Carbonothioyl)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)manganese, Mn-00031
- 31760-74-4 Tris(acetato)(η -cyclopentadienyl)zirconium, Zr-00018
- 31781-62-1 Dichloro(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00008
- 31811-41-3 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)tungsten, W -00050
- 31811-51-5 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)dinitrosylvanadium, V -00010
- 31833-59-7 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(α -phenylbenzenemethaniminato)tungsten, W -00125
- 31854-87-2 Tricarbonyl- π -cyclopentadienyl(trimethylstannyl)chromium, Cr-00092
- 31868-92-5 Tricarbonyl(trimethylphenylstannane)chromium, Cr-00106
- 31868-99-2 Tricarbonylhydro(η^6 -1,3,5-trimethylbenzene)vanadium, V -00053
- 31869-16-6 Dicarbonyl(cyclopentadiene)- π -cyclopentadienylniobium, Nb-00023
- 31870-69-6 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)iodotungsten, W -00021
- 31870-76-5 Tricarbonyl(η^6 -trimethylstannylbenzene)molybdenum, Mo-00067
- 31884-35-2 Tricarbonyl- π -cyclopentadienyl(trimethylgermyl)chromium, Cr-00091
- 31921-90-1 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosylmanganese(1+), Mn-00023
- 31921-90-1 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosylmanganese(1+); Hexafluorophosphate, in Mn-00023
- 31921-91-2 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(hydrazine-*N*)manganese, Mn-00026
- 31922-27-7 Pentacarbonyl(ethene)rhenium(1+); Hexafluorophosphate, in Re-00021
- 31960-40-4 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosylrhenium(1+); Tetrafluoroborate, in Re-00023
- 31960-41-5 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-(hydroxymethyl)nitrosylrhenium, Re-00030
- 32356-12-0 Pentacarbonyl(stibine)chromium, Cr-00013
- 32370-44-8 (Aminophenylmethylene)pentacarbonylchromium, Cr-00096
- 32518-07-3 Tetrakis(cyclohexylisocyanide)tetraiodouranium, U -00067
- 32610-90-5 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(2,2,4,4-tetramethyl-3-pentaniminato)tungsten, W -00109
- 32628-95-8 Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)tantalum, Ta-00009
- 32629-44-0 π -Cyclopentadienyl[dimercaptomaleonitrilato(2-)]-nitrosylmanganate(1-), Mn-00043
- 32648-85-4 Tricarbonyl[(2,3,4,5,6,7- η)-2,4,6-cycloheptatrien-1-one]chromium, Cr-00069
- 32649-18-6 Tetracarbonyl[μ -(diphenylphosphino)]-(tetracarbonylmanganio)iron, Mn-00116
- 32665-18-2 ▶ Tetrakis(trimethylsilylmethyl)zirconium, Zr-00045
- 32680-07-2 π -Cyclopentadienyl(diethyldithiocarbamate)nitrosylmanganese, Mn-00061
- 32761-36-7 Tricarbonyl- π -pyrrolylmanganese, Mn-00022
- 32798-86-0 Tricarbonyl[(1,2,3,4,5- η)-2,4-cycloheptadien-1-yl]manganese, Mn-00056
- 32802-03-2 Tricarbonyl(η^6 -phenol)chromium, Cr-00058
- 32825-28-8 Tricarbonyl(ethoxy- π -cycloheptatrienylium)chromium(1+); Tetrafluoroborate, in Cr-00100
- 32880-58-3 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-nitrosyl(triphenylphosphine)manganese; Hexafluorophosphate, in Mn-00132
- 32966-00-0 Dibromodicarbonyl(η^5 -2,4-cyclopentadien-1-yl)rhenium, Re-00022
- 33085-81-3 Bis[(1,2,3,4,4a,8a- η)naphthalene]chromium, Cr-00149
- 33113-68-7 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-nitrosyl(triphenylphosphine)tungsten, W -00140
- 33114-15-7 Tetrachloro(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00006
- 33135-95-4 Dicarbonylchloro[1,2-ethanediy]bis(diphenylphosphine)-*P,P'*(η^3 -2-propenyl)molybdenum, Mo-00137
- 33152-40-8 Tetracarbonylbis(pentacarbonylmanganio)ruthenium, Mn-00097
- 33153-70-7 Tetracarbonylbis(pentacarbonylrhenio)osmium, Re-00068
- 33221-75-9 Bis(acetonitrile)dicarbonylchloro(η^3 -2-propenyl)molybdenum, Mo-00029
- 33221-77-1 Bis(acetonitrile)dicarbonyliodo(η^3 -2-propenyl)molybdenum, Mo-00030
- 33221-79-3 Tetrakis[μ -(acetato-*O,O'*)]bis(η^5 -2,4-cyclopentadien-1-yl)divanadium, V -00083
- 33248-13-4 [Trimethyl(η^6 -phenyl)silane]tricarbonylchromium, Cr-00105
- 33292-90-9 Tetracarbonylbis(pentacarbonylmanganio)osmium, Mn-00096
- 33306-91-1 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(trimethylgermyl)molybdenum, Mo-00056
- 33306-93-3 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(trimethylgermyl)tungsten, W -00063
- 33307-28-7 Tetracarbonyl(η^3 -2-propenyl)manganese, Mn-00025
- 33307-29-8 Tetracarbonyl(η^3 -2-propenyl)rhenium, Re-00024
- 33505-53-2 Tricarbonyl[(1,2,3,4,5,6- η)-hexamethylbenzene]tungsten, W -00105
- 33506-43-3 Tricarbonyl(1-methylpyrrolyl)chromium, Cr-00043
- 33634-75-2 Pentacarbonylrhenate(1-); Na salt, in Re-00012
- 33678-85-2 Pentacarbonyl(1,2-dioxopropyl)manganese, Mn-00029
- 33948-28-6 Tetrakis(trimethylsilylmethyl)titanium, Ti-00093
- 33958-72-4 Pentacarbonyl(pentacarbonylmanganese)-(tetracarbonyliron)rhenium, Re-00062
- 34089-19-5 Pentacarbonyl[η^1 -1,2-ethanediy]bis(diphenylphosphine)-*P*]vanadate(1-); Tetraethylammonium salt, in V -00111
- 34216-63-2 Tris(tetracarbonylcobalto)erbium; Tetrakis-THF complex, in Er-00006

- 34406-98-9 Tetracarbonyl[μ -(tetramethyldiphosphine)]-(pentacarbonylchromium)iron, Cr-00114
- 34439-17-3 Hexakis[(trimethylsilyl)methyl]dimolybdenum, Mo-00126
- 34691-61-7 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-nitrosyl(triphenylphosphine)manganese, Mn-00132
- 34691-66-2 Pentacarbonyl(ethoxyferrocenylmethylene)tungsten, W -00114
- 34738-51-7 (Benzene)hexa- μ -chlorohexachlorotrialluminumuranium, U -00002
- 34767-30-1 Trichloro(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00005
- 34767-44-7 Trichloro(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00002
- 34788-74-4 Pentaqua benzylchromium(2+), Cr-00036
- 34844-61-6 Tetrakis[(trimethylsilyl)methyl]bis[μ -(trimethylsilyl)methylidyne]diniobium, Nb-00046
- 35004-32-1 (η^6 -Benzene)tris(methylphenylphosphine)molybdenum, Mo-00144
- 35084-05-0 Tricarbonyltrichlororhenate(2-); Di-Cs salt, *in* Re-00002
- 35226-88-1 Dicarbonyl[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]-(ferrocenylmethoxymethylene)manganese, Mn-00118
- 35244-74-7 Pentacarbonyl(trimethylphosphine sulfide-*S*)chromium, Cr-00048
- 35394-18-4 Tetrakis[(trimethylsilyl)methyl]chromium, Cr-00138
- 35625-70-8 (η^6 -Benzene)bis(η^3 -2-propenyl)molybdenum, Mo-00069
- 35796-61-3 Bis(η^5 -1,3,5,7-cyclooctatetraene)vanadium, V -00075
- 35886-41-0 η^5 -2,4-Cyclopentadien-1-yl(methoxycarbonyl)-nitrosyl(triphenylphosphine)manganese, Mn-00133
- 36133-73-0 ► Hexamethyltungsten, W -00011
- 36153-02-3 Tricarbonyl[(1,2,3,4,5,6- η)-2,4,6-triphenylphosphorin]chromium, Cr-00161
- 36153-92-1 Dichloromethyltris(tetrahydrofuran)chromium, Cr-00118
- 36153-96-5 Dichloromethyltrispyridinechromium, Cr-00133
- 36223-58-2 (η^5 -2,4-Cyclopentadien-1-yl)-nitrosylbis(triphenyl phosphite-*P*)manganese(1+); Hexafluorophosphate, *in* Mn-00142
- 36312-04-6 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosylchromium, Cr-00032
- 36333-76-3 Tetrakis(bicyclo[2.2.1]-hept-1-yl)titanium, Ti-00139
- 36333-77-4 Tetrakis(bicyclo[2.2.1]hept-1-yl)vanadium, V -00107
- 36354-35-5 Dichlorobis[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]cerium, Ce-00006
- 36495-37-1 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydrochromium, Cr-00041
- 36523-12-3 [(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]triphenoxytitanium, Ti-00137
- 36527-71-6 Pentacarbonyl(trimethylplumbyl)manganese, Mn-00038
- 36571-13-8 Hexacarbonyl(ethylmercury)vanadium, V -00014
- 36580-33-3 Carbonyl(η^7 -cycloheptatrienyl)iodo(triethyl phosphite)tungsten, W -00097
- 36580-51-5 Amminepentacarbonylvanadate(1-); Tetraphenylphosphonium salt, *in* V -00001
- 36580-53-7 ► Pentacarbonyl(cyano-*C*)vanadate(2-); Bis(tetraphenylphosphonium) salt, *in* V -00011
- 36594-09-9 Tetracarbonyl[2-[(phenylimino)methyl]phenyl-*C,N*]manganese, Mn-00110
- 36607-01-9 Bis(η^5 -2,4-cyclopentadien-1-yl)di- μ -nitrosyldinitrosyldichromium, Cr-00078
- 36643-37-5 Hexakis[(trimethylsilyl)methyl]ditungsten, W -00145
- 36669-56-4 Hexacarbonyl(triphenylstannyl)niobium, Nb-00045
- 36681-92-2 Tetracarbonyl[1,2-ethanedylbis(diphenylphosphine)-*P,P'*]hydrovanadium, V -00110
- 36955-48-3 Bis[(1,2,3,4,5,6- η)ethylbenzene]vanadium, V -00076
- 37007-84-4 Tetrakis(2,2-dimethylpropyl)chromium, Cr-00151
- 37007-87-7 Tetrakis(2-methyl-2-phenylpropyl)chromium, Cr-00178
- 37048-11-6 Tricarbonyl[(1,2,3,4,5- η)-ferrocenyl-2,4-cyclopentadien-1-yl]manganese, Mn-00112
- 37131-50-3 Bromotricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00018
- 37176-05-9 Tetracarbonyldiiodomanganate(1-), Mn-00006
- 37176-07-1 Dibromotetracarbonylmanganate(1-), Mn-00003
- 37205-20-2 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis(trifluoroacetato-*O*)zirconium, Zr-00032
- 37205-22-4 Bis(acetonitrile)bis(η^5 -2,4-cyclopentadien-1-yl)vanadium(2+); Bis(hexafluorophosphate), *in* V -00062
- 37205-28-0 Tris(η^5 -2,4-cyclopentadien-1-yl)methyluranium, U -00020
- 37205-32-6 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)dis-candium, *in* Sc-00001
- 37206-34-1 Bis(benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00072
- 37206-36-3 Benzyltricyclopentadienyluranium, U -00043
- 37206-41-0 Bis(benzyl)bis(η^5 -cyclopentadienyl)zirconium, Zr-00085
- 37215-22-8 Bis(η^5 -2,4-cyclopentadien-1-yl)-(diethylcarbomodithioato-*S,S'*)vanadium(1+); Tetrafluoroborate, *in* V -00070
- 37216-56-1 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)neptunium, Np-00005
- 37260-83-6 Dibromobis(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00002
- 37260-84-7 Bis(η^5 -2,4-cyclopentadien-1-yl)difluorohafnium, Hf-00004
- 37260-85-8 Bis(η^5 -2,4-cyclopentadien-1-yl)diiodohafnium, Hf-00005
- 37260-88-1 Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylhafnium, Hf-00013
- 37274-09-2 Bis[(1,2,3,4,5,6,7,8- η)-1-ethenyl-1,3,5,7-cyclooctatetraene]uranium, U -00033
- 37274-13-8 Bis[(1,2,3,4,5,6,7,8- η)-1-phenyl-1,3,5,7-cyclooctatetraene]uranium, U -00065
- 37281-22-4 Bis(η^5 -1,3,5,7-cyclooctatetraene)neptunium, Np-00004
- 37281-23-5 Bis(η^5 -1,3,5,7-cyclooctatetraene)plutonium, Pu-00004
- 37298-41-2 ► Bis(η^5 -2,4-cyclopentadien-1-yl)-[tetrahydroborato(1-)-*H,H'*]niobium, Nb-00015
- 37298-76-3 Tris(η^5 -2,4-cyclopentadien-1-yl)-2-propenyluranium, U -00024
- 37298-77-4 Bromobis(η^5 -2,4-cyclopentadien-1-yl)-(dimethylphenylphosphine)niobium, Nb-00036
- 37298-84-3 Butyltris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00029
- 37298-90-1 Tris(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)uranium, U -00036
- 37298-97-8 Tris(η^5 -2,4-cyclopentadien-1-yl)cerium; Cyclohexylisocyanide adduct, *in* Ce-00003
- 37298-98-9 Tris(2,4-cyclopentadien-1-yl)isocyanocyclohexan-edysprosium, *in* Dy-00004
- 37298-99-0 Tris(2,4-cyclopentadien-1-yl)isocyanocyclohexaneer-bium, *in* Er-00011
- 37299-00-6 Tris(η^5 -2,4-cyclopentadien-1-yl)europium; Cyclohexylisocyanide adduct, *in* Eu-00004
- 37299-01-7 Tris(η^5 -2,4-cyclopentadien-1-yl)gadolinium; Cyclohexylisocyanide adduct, *in* Gd-00004
- 37299-02-8 Tris(η^5 -2,4-cyclopentadien-1-yl)lanthanum; Cyclohexylisocyanide adduct, *in* La-00004
- 37299-03-9 Tris(η^5 -2,4-cyclopentadien-1-yl)isocyanocyclohexa-nelutetium, *in* Lu-00012
- 37299-04-0 Tris(η^5 -2,4-cyclopentadien-1-yl)samarium; Cyclohexylisocyanide adduct, *in* Sm-00009
- 37299-05-1 Tris(2,4-cyclopentadien-1-yl)isocyanocyclohexan-ethulium, *in* Tm-00004
- 37299-11-9 Dibenzylbis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00125
- 37299-12-0 Tetracarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dichrom-ium, Cr-00160

- 37299-20-0 Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2,3-triphenyltriphosphinato(2-)- P^1,P^3]titanium, Ti-00134
- 37299-22-2 Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2,3-triphenyltriphosphinato(2-)- P^1,P^3]zirconium, Zr-00100
- 37325-10-3 Chlorotris(benzylcyclopentadienyl)uranium, U -00075
- 37328-32-8 Bis(η^8 -1,3,5,7-cyclooctatetraene)cerate(1-); K salt, diglyme adduct, *in* Ce-00005
- 37328-40-8 Bis(benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00043
- 37342-97-5 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)hydrozirconium, Zr-00011
- 37342-98-6 Bis(η^5 -2,4-cyclopentadien-1-yl)dihydrozirconium, Zr-00012
- 37343-05-8 Bis(η^5 -cyclopentadienyl)(η^2 -ethylene)molybdenum, Mo-00066
- 37343-06-9 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)tungsten, W -00074
- 37343-09-2 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)hydrotungsten(1+), W -00076
- 37402-69-0 Pentacarbonyltri- μ -chloronitrosyldirhenium, Re-00008
- 37478-32-3 Carbonylpentakis(trimethylphosphite- P)chromium, Cr-00139
- 37504-44-2 (Acetonitrile)pentacarbonylmanganese(1+); Hexafluorophosphate, *in* Mn-00020
- 37668-41-0 Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten(1+); Hexafluorophosphate, *in* W -00030
- 37757-20-3 Tricarbonyl[1,2-ethanediybis(diphenylphosphine)- P,P']nitrosylmolybdenum(1+); Hexafluorophosphate, *in* Mo-00134
- 37757-22-5 Tetracarbonyl[1,2-ethanediybis(diphenylphosphine)- P,P']chromium(1+); Hexafluorophosphate, *in* Cr-00170
- 37759-22-1 Trichloro(pentafluorophenyl)titanium, Ti-00012
- 37766-71-5 Pentacarbonyl(2,3-diphenyl-2-cyclopropen-1-ylidene)molybdenum, Mo-00112
- 37823-96-4 Pentacarbonyl(methoxyphenylmethylene)tungsten, W -00083
- 38010-72-9 Tetrakis(2,2-dimethylpropyl)zirconium, Zr-00068
- 38117-94-1 Dichloro[1,3-propanediybis[(1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]]hafnium, Hf-00015
- 38117-95-2 Dichloro[1,3-propanediybis[(1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]]zirconium, Zr-00028
- 38117-97-4 Dichloro[1,3-propanediybis[(1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]]titanium, Ti-00065
- 38162-89-9 Tetracarbonyl[2-[(dimethylamino)methyl]phenyl-C, N]manganese, Mn-00088
- 38386-55-9 (η^5 -2,4-Cyclopentadien-1-yl)trimethyltitanium, Ti-00017
- 38496-54-7 Tetracarbonylbis(triphenylphosphine)rhenium(1+); *trans*-form, Hexafluorophosphate, *in* Re-00088
- 38600-58-7 Dicarboxyl(η^5 -2,4-cyclopentadien-1-yl)-(dinitrogen)manganese, Mn-00024
- 38656-75-6 Hexacarbonylrhenium(1+); Hexafluorophosphate, *in* Re-00017
- 38711-69-2 ▶Tetraisopropylchromium, Cr-00110
- 38814-45-8 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)methylnitrosylrhenium, Re-00029
- 38814-46-9 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)hydronitrosylrhenium, Re-00015
- 38816-34-1 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)nitrosylchromium, Cr-00046
- 38833-19-1 Bromocarbonyltetrakis(isocyanomethane)manganese, Mn-00051
- 38833-22-6 Tricarbonyltris(isocyanomethane)manganese(1+); Hexafluorophosphate, *in* Mn-00049
- 38834-21-8 Dicarboxyl[hydrotris(1*H*-pyrazolato- N^1)-borato(1-)- N^2,N^2,N^2][(1,2,3- η -2-methyl-2-propenyl)molybdenum, Mo-00091
- 38834-51-4 (η^6 -Benzene)tricarbonylmanganese(1+); Hexafluorophosphate, *in* Mn-00045
- 38855-79-7 Nonacarbonyl(methoxyphenylmethylene)ditechnetium, Tc-00009
- 38855-80-0 Nonacarbonyl(1-methoxyethylidene)ditechnetium, Tc-00007
- 38856-62-1 Tetrachlorodimethylniobate(1-); Tetraethylammonium salt, *in* Nb-00003
- 38883-45-3 Acetylpentacarbonylchromate(1-); Li salt, *in* Cr-00029
- 38883-46-4 Tetracarbonyl[2-[(phenylimino)methyl]phenyl-C, N]rhenium, Re-00075
- 38887-05-7 Octacarbonyldi- μ -hydrodirhenium, Re-00032
- 38893-15-1 Pentacarbonyl[(dimethylamino)methylene]chromium, Cr-00044
- 38904-62-0 (η^6 -Benzene)dicarbonyl(dinitrogen)chromium, Cr-00040
- 38979-19-0 Pentacarbonyl(isocyanomethane)manganese(1+); Hexafluorophosphate, *in* Mn-00021
- 38999-59-6 μ -Carbonylcarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(nitrosyl- $N:N$)]nitrosyldimanganese, Mn-00081
- 39004-14-3 Pentacarbonyliodomolybdate(1-); Bis(triphenylphosphine)iminium salt, *in* Mo-00004
- 39044-46-7 Carbonylpentakis(isocyanomethane)manganese(1+); Hexafluorophosphate, *in* Mn-00068
- 39048-39-0 Pentacarbonyl(cyano-C)molybdate(1-); Bis(triphenylphosphine)iminium salt, *in* Mo-00006
- 39311-60-9 Tris(η^5 -2,4-cyclopentadien-1-yl)(phenylethynyl)uranium, U -00047
- 39330-74-0 Tris(η^5 -2,4-cyclopentadien-1-yl)erbium, Er-00011
- 39330-90-0 Tris(η^5 -2,4-cyclopentadien-1-yl)phenylcerium, Ce-00008
- 39330-96-6 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis(triphenylgermyl)titanium, Ti-00150
- 39333-44-3 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00062
- 39333-45-4 Bis(cyano-C)bis(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00022
- 39333-50-1 Bis(cyano-C)bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00049
- 39333-59-0 Bis(η^5 -2,4-cyclopentadien-1-yl)pentafluorophenyltitanium, Ti-00084
- 39333-72-7 Benzylbis(η^5 -cyclopentadienyl)titanium, Ti-00094
- 39333-76-1 Bis(η^5 -2,4-cyclopentadien-1-yl)(2,6-dimethylphenyl)titanium, Ti-00098
- 39333-86-3 Di- μ -bromotetrakis(η^5 -2,4-cyclopentadien-1-yl)diti-tanium, *in* Ti-00023
- 39333-87-4 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -fluoroditi-tanium, *in* Ti-00028
- 39333-90-9 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -iododiti-tanium, *in* Ti-00030
- 39358-33-3 Triindenylsamarium, Sm-00017
- 39358-56-0 (η^6 -Benzene)(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00043
- 39413-64-4 Chloro[η^8 -1,3,5,7-cyclooctatetraene](η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00027
- 39413-65-5 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)niobium, Nb-00029
- 39413-75-7 (η^8 -1,3,5,7-Cyclooctatetraene)bis(η^3 -2-propenyl)zirconium, Zr-00034
- 39448-14-1 [Tris(η^5 -2,4-cyclopentadien-1-yl)][(4-methylphenyl)methyl]uranium, U -00048
- 39450-72-1 Tetra- μ -chlorobis(dichloroaluminum)-[(1,2,3,4,5,6- η)hexamethylbenzene]titanium, Ti-00061
- 39459-00-2 Di- μ -chlorobis(η^5 -cyclopentadien-1-yl)-(diethylaluminum)titanium, Ti-00075
- 39470-13-8 Tris[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]neodymium, Nd-00006
- 39470-19-4 Diferrocenylbis(diethylamino)titanium, Ti-00138
- 39477-06-0 [μ -(Carbonyl-C, O)]bis(η^5 -2,4-cyclopentadien-1-yl)[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-tungsten]erbium, W -00117
- 39477-07-1 [μ -(Carbonyl-C, O)]bis(η^5 -2,4-cyclopentadien-1-yl)[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-tungsten]ytterbium, W -00118
- 39477-08-2 [μ -(Carbonyl-C, O)]bis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl][tricarboxyl(η^5 -2,4-cyclopentadien-1-yl)tungsten]holmium, W -00129
- 39604-51-8 Bromodicarbonyltris(trimethylphosphite- P)manganese, Mn-00071

- 39912-34-0 Benzoylpentacarbonylchromate(1-); Li salt, *in* Cr-00094
- 40270-21-1 Nonacarbonyl- μ -hydronitrosylditungsten, W -00029
- 40334-04-1 ▶Tetrakis(trimethylsilylmethyl)hafnium, Hf-00021
- 40844-50-6 Tetrakis(2,6-dimethylphenyl)lutetate(1-); Li salt, tetra-THF complex, *in* Lu-00023
- 40901-26-6 Pentacarbonyl-1,3-dioxalan-2-ylidenemanganese(1+), Mn-00030
- 41311-89-1 Cyclopentadienyltricarbonylmethylchromium, Cr-00060
- 41328-40-9 Tetrabenzylvanadium, V -00106
- 41354-56-7 [(2,3,4,5,6,7- η)-Bicyclo[6.1.0]nona-2,4,6-triene]tricarbonylmolybdenum, Mo-00062
- 41354-64-7 Tricarbonyl(3-8- η -[2.2]paracyclophane)chromium, Cr-00147
- 41395-41-9 Di- μ -chlorodichlorobis(η^5 -2,4-cyclopentadien-1-yl)dinitrosyldimolybdenum, *in* Mo-00003
- 41453-01-4 Tetrachloromethylniobium, Nb-00001
- 41453-02-5 Trichlorodimethylniobium, Nb-00002
- 41453-04-7 Tetrachloromethyltantalum, Ta-00001
- 41453-05-8 Trichlorodimethyltantalum, Ta-00002
- 41556-44-9 Chlorotris(η^3 -2-propenyl)uranium, U -00006
- 41558-36-5 (η^8 -1,3,5,7-Cyclooctatetraene)bis(η^3 -2-propenyl)hafnium, Hf-00016
- 41572-08-1 ▶Tetrakis(trimethylsilyl)methyl]vanadium, V -00077
- 41576-43-6 Tricarbonyl(chloromercury)[μ -(1- η :1,2,3,4,5,6- η)phenyl]]chromium, Cr-00051
- 41618-11-5 Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+); Hexafluorophosphate, *in* Mo-00022
- 41654-98-2 ▶Pentacarbonyl(diphenylthallium)manganese, Mn-00111
- 41678-48-2 Bis(2,2'-bipyridine-*N,N'*)bis[(trimethylsilyl)methyl]chromium(1+); Iodide, *in* Cr-00167
- 41699-43-8 Di- μ -carbonyltricarbonylbis(η^5 -2,4-cyclopentadien-1-yl)divanadium, V -00067
- 41700-58-7 Bis(dinitrogen)bis[1,2-bis(diphenylphosphino)ethane]molybdenum, Mo-00145
- 41772-92-3 [Bis[bis(trimethylsilyl)methyl]tin]pentacarbonylchromium, Cr-00148
- 41944-00-7 Hexacarbonylrhenium(1+), Re-00017
- 42077-05-4 Hexakis(2,2-dimethylpropyl)dimolybdenum, Mo-00136
- 42077-14-5 (η^8 -1,3,5,7-cyclooctatetraene)dihydrozirconium, Zr-00005
- 42087-89-8 Bis(η^6 -chlorobenzene)chromium, Cr-00097
- 42087-90-1 Bis(η^6 -fluorobenzene)chromium, Cr-00098
- 42167-74-8 Bis(pentacarbonylmanganese)dimethyllead, Mn-00078
- 42178-05-2 Tetrachlorobis(η^5 -2,4-cyclopentadien-1-yl)[μ -(2,3-dimethyl-2,3-butanediolate(2-)-*O:O'*)]dititanium, Ti-00091
- 42423-66-5 Dichloro(η^8 -1,3,5,7-cyclooctatetraene)zirconium, Zr-00004
- 42536-19-6 Tricarbonylchloronitrosyl(triphenylphosphine)tungsten, W -00133
- 42584-07-6 Tricarbonylchlorobis(triphenylphosphine)rhenium(1+); *mer,trans-form*, Tetrafluoroborate, *in* Re-00087
- 42612-73-7 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)diytterbium, *in* Yb-00004
- 42801-92-3 Iodotris(η^3 -2-propenyl)uranium, U -00007
- 42801-93-4 Bromotris(η^3 -2-propenyl)uranium, U -00005
- 42920-73-0 Hexakis(diethylamino)- μ -1,1'-ferrocenediyl dititanium, Ti-00143
- 42993-54-4 Tris(diethylamino)ferrocenyltitanium, Ti-00120
- 43105-73-3 Dicarbonyl[(1,2,3,4,5,6- η)hexamethylbenzene]nitrosylchromium(1+); Hexafluorophosphate, *in* Cr-00122
- 43184-81-2 Dibromotetracarbonylmanganate(1-); Tetraethylammonium salt, *in* Mn-00003
- 45113-87-9 Pentacarbonyl(isocyanomethane)manganese(1+), Mn-00021
- 45167-07-5 Tricarbonyltris(isocyanomethane)manganese(1+), Mn-00049
- 45211-82-3 Carbonylpentakis(isocyanomethane)manganese(1+), Mn-00068
- 45264-01-5 Decacarbonyldichromate(2-), Cr-00066
- 45978-17-4 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)nitrosylrhenium(1+), Re-00023
- 46238-41-9 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)molybdenum(1+), Mo-00035
- 46238-43-1 Tricarbonyl(η^7 -cycloheptatrienyl)chromium(1+), Cr-00070
- 46238-45-3 Tricarbonyl(η^7 -cycloheptatrienyl)molybdenum(1+), Mo-00032
- 46238-46-4 Tricarbonyl(η^7 -cycloheptatrienyl)tungsten(1+), W -00041
- 46238-54-4 Tricarbonyl(cyano-C)(η^5 -2,4-cyclopentadien-1-yl)vanadate(1-); Na salt, *in* V -00018
- 48121-47-7 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)chromate(1-), Cr-00038
- 49547-63-9 Nonacarbonyl(1-methoxyethylidene)dirhenium, Re-00052
- 49547-64-0 Pentacarbonyl[tetracarbonyl(1-methoxyethylidene)]manganeserhenium, Re-00050
- 49596-04-5 Bis[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]dimethylzirconium, Zr-00062
- 49596-06-7 Bis[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]dimethylhafnium, Hf-00028
- 49596-07-8 Bis[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]diphenyltitanium, Ti-00141
- 49598-13-2 Chloro(η^5 -2,4-cyclopentadien-1-yl)trimethyltantalum, Ta-00007
- 49736-18-7 Decacarbonyldichromate(2-); Bis(bis(triphenylphosphine)iminium)salt, *in* Cr-00066
- 49736-19-8 Decarbonyldimolybdate(2-); Bis[bis(triphenylphosphine)iminium]salt, *in* Mo-00045
- 49742-48-5 Bromodicarbonyltris(trimethylphosphine)rhenium, Re-00047
- 50276-12-5 Pentacarbonyl(diphenylmethylene)tungsten, W -00111
- 50358-90-2 (Carbonothioyl)pentacarbonylchromium, Cr-00018
- 50358-92-4 (Carbonothioyl)pentacarbonyltungsten, W -00013
- 50589-81-6 (2,2'-Bipyridine-*N,N'*)dichlorotrimethyltantalum, Ta-00020
- 50643-51-1 Tris(η^5 -2,4-cyclopentadien-1-yl)(2-methyl-1-propenyl)uranium, U -00026
- 50647-46-6 *tert*-Butyltricyclopentadienyluranium, U -00028
- 50654-35-8 Tetrakis(2,2-dimethylpropyl)hafnium, Hf-00030
- 50701-13-8 Bromotetracarbonyl(phenylmethylidyne)chromium, Cr-00084
- 50701-14-9 Tetracarbonyliodoethylidynechromium, Cr-00023
- 50726-31-3 Bromotetracarbonylethylidyne tungsten, W -00005
- 50726-32-4 Tetracarbonylethylidyneiodotungsten, W -00008
- 50831-23-7 (2-Acetylphenyl-C,O)tetracarbonylmanganese, Mn-00080
- 50923-29-0 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -silylenedititanium, Ti-00110
- 50982-07-5 [Di-*tert*-butyl(pyridine)tin]pentacarbonylchromium, Cr-00145
- 51056-18-9 Bis(η^8 -1,3,5,7-cyclooctatetraene)protactinium, Pa-00001
- 51159-66-1 (Azobenzene)bis(cyclopentadienyl)vanadium, V -00091
- 51177-48-1 Chloro(cyclooctatetraene)praesodymium; Bis-THF complex, *in* Pr-00002
- 51177-49-2 Chloro(cyclooctatetraene)neodymium; Bis-THF adduct, *in* Nd-00002
- 51177-53-8 Bis(η^8 -1,3,5,7-cyclooctatetraene)praesodymate(1-); K salt, *in* Pr-00004
- 51177-54-9 Bis(η^8 -1,3,5,7-cyclooctatetraene)neodymate(1-); K salt, *in* Nd-00005
- 51177-55-0 Bis(η^8 -1,3,5,7-cyclooctatetraene)samarate(1-); K salt, *in* Sm-00010
- 51177-57-2 Bis(η^8 -1,3,5,7-cyclooctatetraene)terbate(1-); K salt, *in* Tb-00003
- 51177-89-0 Bis(η^5 -2,4-cyclopentadien-1-yl)diphenylzirconium, Zr-00073
- 51185-44-5 Tetracarbonyldichlorobis(η^5 -2,4-cyclopentadien-1-yl)ditungsten, W -00089
- 51187-41-8 Bis(η^8 -1,3,5,7-cyclooctatetraene)yttrate(1-); K salt, *in* Y -00007
- 51187-42-9 Bis(η^8 -1,3,5,7-cyclooctatetraene)lanthanate(1-); K salt, *in* La-00005

- 51187-43-0 Bis(η^8 -1,3,5,7-cyclooctatetraene)cerate(1-); K salt, *in* Ce-00005
- 51203-49-7 (η^7 -Cycloheptatrienyl)(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00055
- 51231-81-3 Bis(η^5 -2,4-cyclopentadien-1-yl)diphenylhafnium, Hf-00034
- 51233-19-3 Pentacarbonylchromate(2-); Di-Na salt, *in* Cr-00008
- 51733-16-5 Tris(η^4 -1,3-butadiene)tungsten, W -00079
- 51733-17-6 Tris(η^4 -1,3-butadiene)molybdenum, Mo-00070
- 51809-70-2 Trichlorobis(η^7 -2,4,6-cycloheptatrien-1-yl)dimolybdenum, Mo-00081
- 51831-93-7 Carbonothioyl(η^5 -2,4-cyclopentadien-1-yl)-bis(trimethylphosphite-*P*)manganese, Mn-00084
- 51837-59-3 Tetrakis[bis(η^5 -2,4-cyclopentadien-1-yl)-hydromolybdenum]tetralithium, *in* Mo-00040
- 51877-88-4 Tetrachloromethyl(triphenylphosphine)niobium, Nb-00039
- 51886-84-1 Carbonylchlorobis[1,2-ethanediy]bis(diphenylphosphine-*P,P'*)rhenium(1+); *trans*-form, Hexafluorophosphate, *in* Re-00092
- 52124-67-1 (1,4-Butanediy]bis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00073
- 52138-78-0 Pentacarbonyl[(cyano-*C*)trihydroborato(1-)-*N*]chromate(1-); Tetramethylammonium salt, *in* Cr-00021
- 52193-18-7 Carbonyltris(diethylcarbomodithioato-*S,S'*)rhenium, Re-00072
- 52308-70-0 [(1,2,3,4,5,6- η)-1,3,5-Cycloheptatriene](η^5 -2,4-cyclopentadien-1-yl)manganese, Mn-00083
- 52308-73-3 (η^7 -Cycloheptatrienyl)(η^5 -2,4-cyclopentadien-1-yl)manganese(1+); Hexafluorophosphate, *in* Mn-00082
- 52340-90-6 Tetradecacarbonyltrimanganate(1-); Tetraphenylarsonium salt, *in* Mn-00098
- 52346-34-6 ▶ Bis(η^6 -chlorobenzene)molybdenum, Mo-00061
- 52346-44-8 Bis[(1,2,3,4,5,6- η)methylbenzene]tungsten, W -00094
- 52409-63-9 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)methanesulfonyltungsten, W -00035
- 52445-38-2 Tricarbonyl[(1,2,3,4,5,6- η)-7-(diphenylmethylene)-1,3,5-cycloheptatriene]molybdenum, Mo-00120
- 52456-36-7 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(dimethylarsino)tungsten, W -00051
- 52462-43-8 Bis(η^6 -benzene)titanium, Ti-00054
- 52471-95-1 Tricarbonyl[(1,2,3,4,5,6- η)-7-(1-phenylethylidene)-1,3,5-cycloheptatriene]tungsten, W -00115
- 52472-03-4 Tricarbonyl[(1,2,3,4,5,6- η)-7-methylene-1,3,5-cycloheptatriene]chromium, Cr-00086
- 52472-04-5 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)ferrocenylyltungsten, W -00113
- 52542-59-3 Pentacarbonylmanganate(1-); Bis(triphenylphosphine)iminium salt, *in* Mn-00014
- 52550-20-6 Tris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00008
- 52571-36-5 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(dimethylstilbino)tungsten, W -00053
- 52589-03-4 Decacarbonyl[μ -(diphosphine-*P,P'*)]dichromium, Cr-00068
- 52646-26-1 Bromocarbonyltetrakis(trimethylphosphite-*P*)manganese, Mn-00089
- 52668-25-4 (η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)yttrium, Y -00004
- 52668-26-5 (η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)neodymium, Nd-00003
- 52668-27-6 (η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)samarium, Sm-00007
- 52668-28-7 (η^8 -1,3,5,7-Cyclooctatetraenyl)(η^5 -2,4-cyclopentadien-1-yl)holmium, Ho-00004
- 52676-23-0 μ (η^5 - η^5 -Fulvalene)di- μ -hydridobis(cyclopentadienyl)titanium, Ti-00108
- 52679-41-1 Dichloro(η^5 -2,4-cyclopentadien-1-yl)samarium; Tris-THF adduct, *in* Sm-00001
- 52679-42-2 Dichloro(η^5 -2,4-cyclopentadien-1-yl)holmium; Tris-THF adduct, *in* Ho-00001
- 52679-44-4 Chloro(cyclooctatetraene)samarium; THF complex, *in* Sm-00003
- 52680-31-6 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(ferrocenylcarbonyl)tungsten, W -00121
- 52700-41-1 [(1,2- η)-2,4-cyclopentadien-1-yl]bis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00079
- 52720-93-1 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)thalliummolybdenum, Mo-00015
- 52810-84-1 Dichloro(η^5 -2,4-cyclopentadien-1-yl)yttrium; Tris-THF adduct, *in* Y -00001
- 52827-35-7 Tris(η^5 -2,4-cyclopentadien-1-yl)ethynyluranium, U -00022
- 52827-36-8 Tris(η^5 -2,4-cyclopentadien-1-yl)ferrocenyluranium, U -00057
- 52841-89-1 Bromotricarbonylbis(trimethylphosphite-*P*)manganese, Mn-00053
- 52901-72-1 Tetracarbonyldichloromanganate(1-); Tetraethylammonium salt, *in* Mn-00004
- 53011-14-6 Tricarbonyl[(1,2,3,4,5- η)-2,4,6-cycloheptatrien-1-yl]manganese, Mn-00054
- 53022-70-1 Tetramethyloxorhenium, Re-00005
- 53041-79-5 Tricarbonyl[(1,2,3,4,5,6- η)ethenylbenzene]molybdenum, Mo-00048
- 53079-53-1 Dichloro(η^5 -2,4-cyclopentadien-1-yl)-(diethylcarbomodithioato-*S,S'*)titanium, Ti-00039
- 53127-56-3 (η^6 -Benzene)dicarbonyl(methoxycarbonyl)manganese, Mn-00057
- 53183-18-9 Dicarbonylnitrosylbis(triphenylphosphine)rhenium, Re-00085
- 53224-33-2 Bis(η^5 -2,4-cyclopentadien-1-yl)(phenylethynyl)gadolinium, Gd-00006
- 53224-34-3 Bis(η^5 -2,4-cyclopentadien-1-yl)(phenylethynyl)ytterbium, Yb-00019
- 53224-35-4 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)erbium, Er-00004
- 53235-29-3 Tetraethyltungsten, W -00149
- 53237-33-5 Tetrakis[(dimethylphosphonio)bis(methylene)]dichromium, Cr-00137
- 53291-02-4 Bis(η^5 -2,4-cyclopentadien-1-yl)iodovanadium, V -00031
- 53291-19-3 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)iodovanadium, V -00039
- 53307-60-1 Octamethyldimolybdenum(4-); Tetra-Li salt, tetraakis-THF complex, *in* Mo-00020
- 53321-77-0 Bis(η^7 -2,4,6-cycloheptatrien-1-yl)tri- μ -methoxydimolybdenum, Mo-00100
- 53322-18-2 Bis(η^5 -2,4-cyclopentadien-1-yl)hydro(tungsten)lithium; Tetramer, *in* W -00052
- 53339-41-6 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00040
- 53378-72-6 ▶ Pentamethyltantalum, Ta-00005
- 53418-18-1 Tetracarbonyl(triphenylphosphine)manganate(1-), Mn-00124
- 53419-02-6 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)dinitrosyltungsten(1+), W -00010
- 53419-03-7 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)dinitrosyltungsten(1+); Hexafluorophosphate, *in* W -00010
- 53419-14-0 Chloro(η^5 -cyclopentadien-1-yl)dinitrosyltungsten, W -00003
- 53433-49-1 Tetracarbonyl(di- μ -carbonylhexacarbonyldiferrate)manganate(1-); Tetraethylammonium salt, *in* Mn-00072
- 53433-58-2 Bis(η^5 -2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)zirconium, Zr-00112
- 53433-59-3 Bis(η^5 -2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)hafnium, Hf-00051
- 53437-03-9 [1,2-Ethanediy]bis[diethylphosphine]-*P,P'*pentamethylniobium, Nb-00021
- 53449-94-8 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)molybdenum(1+), Mo-00077
- 53449-95-9 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)molybdenum(1+); Hexafluorophosphate, *in* Mo-00077
- 53470-46-5 Trichlorotrimethylniobate(1-); Tetraethylammonium salt, *in* Nb-00005
- 53470-78-3 Tricarbonyl(η^6 -benzyltrimethylsilyl)chromium, Cr-00116
- 53504-75-9 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)methylyltungsten(1+), W -00085

- 53504-75-9 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)methyltungsten(1+); Hexafluorophosphate, *in* W-00085
- 53504-76-0 Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)oxotungsten, W-00047
- 53522-49-9 Tribromobis(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00010
- 53522-59-1 (η^5 -2,4-Cyclopentadienyl)methyldinitrosylchromium, Cr-00025
- 53593-70-7 Pentacarbonyl(η^3 -2-propenyl)vanadium, V-00016
- 53659-74-8 Tris[bis(trimethylsilyl)methyl]scandium; Bis-THF complex, *in* Sc-00008
- 53659-75-9 Tris[bis(trimethylsilyl)methyl]yttrium; Bis-THF complex, *in* Y-00013
- 53668-81-8 Tris[bis(trimethylsilyl)methyl]yttrium, Y-00013
- 53668-82-9 Tris[bis(trimethylsilyl)methyl]titanium, Ti-00114
- 53668-84-1 Tris[bis(trimethylsilyl)methyl]chlorozirconium, Zr-00070
- 53668-85-2 Tris[bis(trimethylsilyl)methyl]chlorohafnium, Hf-00032
- 53695-79-7 (η^5 -2,4-Cyclopentadien-1-yl)diethoxymethyltitanium, Ti-00041
- 53726-77-5 Tris[bis(trimethylsilyl)methyl]vanadium, V-00089
- 53749-00-1 Tetracarbonyldiiodomanganate(1-); Tetramethylammonium salt, *in* Mn-00006
- 53770-66-4 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)hydrotungsten(1+); Hexafluorophosphate, *in* W-00076
- 54006-99-4 (Cyano-C)tris(η^5 -2,4-cyclopentadien-1-yl)uranium, U-00018
- 54007-00-0 Tris(η^5 -2,4-cyclopentadien-1-yl)uranium, U-00015
- 54008-63-8 Tetrabenzylthorium, Th-00030
- 54039-37-1 Dichlorobis(η^5 -2,4-cyclopentadien-1-yl)tantalum, Ta-00010
- 54039-40-6 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)tantalum, Ta-00019
- 54039-57-5 Pentacarbonyl(triphenylphosphine)manganese(1+); Hexafluorophosphate, *in* Mn-00129
- 54039-60-0 Tris(acetonitrile)tricarbonylmanganese(1+); Hexafluorophosphate, *in* Mn-00050
- 54056-33-6 (η^5 -2,4-Cyclopentadien-1-yl)-tris[(trimethylsilyl)methyl]titanium, Ti-00095
- 54067-92-4 Butyltris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00012
- 54067-93-5 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -(1- η :1,2,3,4,5- η)-2,4-cyclopentadien-1-ylidene]dithorium, Th-00033
- 54068-37-0 Bis(η^5 -2,4-cyclopentadien-1-yl)bis(*N*-ethylethanaminato)uranium, U-00025
- 54111-38-5 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^5 -1-phenyl-2,4-cyclopentadien-1-yl)vanadium, V-00078
- 54111-39-6 Bis(η^5 -2,4-cyclopentadien-1-yl)methylvanadium, V-00047
- 54111-40-9 Benzylbis(cyclopentadienyl)vanadium, V-00079
- 54111-41-0 Acetylcarbonylbis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V-00058
- 54162-08-2 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(phenylcyclopentadiene)vanadium, V-00081
- 54204-88-5 (Carbonothioyl)tricarbonyl[1,2-ethanediy]bis[diphenylphosphine]-*P,P'*]tungsten, W-00151
- 54244-99-4 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)ethylniobium, Nb-00031
- 54294-45-0 Tris(2,2-dimethylpropyl)(2,2-dimethylpropylidene)tantalum, Ta-00035
- 54326-81-7 Bis(η^8 -1,3,5,7-cyclooctatetraene)neptunate(1-); K salt, bis-THF complex, *in* Np-00003
- 54326-82-8 Bis(η^8 -1,3,5,7-cyclooctatetraene)plutonate(1-); K salt, bis-THF complex, *in* Pu-00003
- 54330-36-8 Pentacarbonyl[[diphenylmethylene]amino]ethoxymethylene]chromium, Cr-00153
- 54360-38-2 (η^7 -Cycloheptatrienyl) (η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00025
- 54365-60-5 Di- μ -chlorotetrakis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]diytterbium, *in* Yb-00008
- 54373-66-9 $\triangleright$ Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylniobium, Nb-00028
- 54438-48-1 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-nitrosyl(1,2- η -1-propene)molybdenum, Mo-00031
- 54438-52-7 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-nitrosyl(η^3 -2-propenyl)molybdenum(1+); Hexafluorophosphate, *in* Mo-00027
- 54667-87-7 Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)di-chromium, Cr-00120
- 54688-87-8 Bis(η^4 -1,3-butadiene)carbonylmanganese, Mn-00052
- 54720-88-6 Carbonylchloro(η^5 -2,4-cyclopentadien-1-yl)-(diphenylacetylene)molybdenum, Mo-00113
- 54720-97-7 Chloro(η^5 -2,4-cyclopentadien-1-yl)bis[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne]tungsten, W-00080
- 54721-00-5 Chloro(η^5 -2,4-cyclopentadien-1-yl)bis[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne]molybdenum, Mo-00073
- 54817-05-9 Benzoylpentacarbonylchromate(1-); Tetramethylammonium salt, *in* Cr-00094
- 54873-11-9 Pentacarbonyl(1-methoxy-3-phenyl-2-propenyldiene)chromium, Cr-00126
- 54943-97-4 Trichloro(trimethylsilylmethyl)titanium, Ti-00004
- 55000-28-7 Pentacarbonylhydroxychromate(1-), Cr-00009
- 55029-83-9 Tris(acetonitrile)tricarbonylmanganese(1+), Mn-00050
- 55057-83-5 (Acetonitrile)pentacarbonylrhenium(1+); Hexafluorophosphate, *in* Re-00018
- 55190-76-6 Pentacarbonyl(monomethylcarbonotrithioato-*S*)rhenium, Re-00019
- 55224-20-9 [(1,2,3,4,5- η)-2,5-Dimethyl-1*H*-pyrrol-1-yl]-tris(2,5-dimethyl-1*H*-pyrrol-1-yl)uranium, U-00052
- 55257-39-1 (Di-*tert*-butylsulfurdiimide-*N,N'*)tetracarbonylchromium, Cr-00107
- 55266-92-7 Bis[η^6 -decahydro-*C,C'*-dimethyldicarbadodecaborato(2-)]titanate(2-); Bis(tetramethylammonium) salt, *in* Ti-00019
- 55318-17-7 Bis(pentacarbonylrhenium)dimethyllead, Re-00051
- 55318-19-9 Pentacarbonyl(trimethylplumbyl)rhenium, Re-00035
- 55336-79-3 Tetracarbonylchloro(3-phenyl-2-propynylidene)tungsten, W-00081
- 55405-97-5 Octacarbonyldi- μ -iododitungsten, W-00028
- 55411-20-6 Dicarbonylchloro(η^7 -cycloheptatrienyl)molybdenum, Mo-00024
- 55463-48-4 Octacarbonyldi- μ -iododimolybdenum, Mo-00021
- 55466-98-3 μ -Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-bis(diethylaluminum)- μ -1-ethanyl-2-ylidenezirconium, Zr-00066
- 55500-02-2 (Benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V-00072
- 55527-82-7 Bis[(1,2,3,4,5,6- η)-methylbenzene]titanium, Ti-00072
- 55534-71-9 Bis(cyclopentadienyl)hydro(η^2 -4-octyne)niobium, Nb-00038
- 55650-02-7 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^3 -2-propenyl)tungsten(1+), W-00084
- 55672-18-9 Bis(η^5 -2,4-cyclopentadien-1-yl)phenylgadolinium, Gd-00005
- 55672-19-0 Bis(η^5 -2,4-cyclopentadien-1-yl)methylytterbium, Yb-00006
- 55672-22-5 Bis(η^5 -2,4-cyclopentadien-1-yl)phenylytterbium, Yb-00015
- 55744-43-9 $\triangleright$ Bis(η^5 -2,4-cyclopentadien-1-yl)-[tetrahydroborato(1-)-*H,H'*]vanadium, V-00034
- 55853-06-0 Pentacarbonyl(sulfur dioxide-*S*)manganese(1+); Hexafluoroarsenate, *in* Mn-00015
- 55853-08-2 Pentacarbonyl(sulfur dioxide-*S*)rhenium(1+); Hexafluoroarsenate, *in* Re-00013
- 55928-13-7 Tricarbonyl[(1,2,3,4,5,6- η)-1,3,5-cyclooctatriene]chromium, Cr-00090
- 55954-53-5 Bis(dinitrogen)bis[1,2-bis(diphenylphosphino)-ethane]tungsten, W-00156
- 55960-25-3 Tetracarbonyl[1-[(dimethylamino)methyl]-2-(diphenylphosphino)ferrocene-*N,P*]chromium, Cr-00168

- 55987-17-2 (Carbonoselenoyl)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)manganese, Mn-00032
- 56009-67-7 Bis(benzenethiolato)bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00092
- 56028-53-6 Bis(η^5 -2,4-cyclopentadien-1-yl)diiodoniobium, Nb-00013
- 56090-02-9 ▶ Hexamethylrhenium, Re-00016
- 56172-01-1 Decacarbonyl- μ -hydroditungstate(1-); Bis(triphenylphosphine)iminium salt, *in* W -00040
- 56200-25-0 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)disamarium, *in* Sm-00004
- 56200-26-1 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)holmium, Ho-00002
- 56200-27-2 Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)dimolybdenum, Mo-00079
- 56307-56-3 Bis[1,2-ethanediylbis(diphenylphosphine)-*P,P'*]-bis(η^2 -ethene)molybdenum, Mo-00146
- 56328-27-9 Pentacarbonyl(triphenylphosphine)vanadate(1-); Tetraethylammonium salt, *in* V -00094
- 56379-20-5 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -1,2-ethanediylbis(triethylaluminum)dizirconium, Zr-00109
- 56408-47-0 Tetracarbonyl[1,2-ethanediylbis(dimethylphosphine)-*P,P'*]hydrovanadium, V -00035
- 56408-48-1 Tetracarbonylmethyl[1,2-phenylenebis(dimethylarsine)-*As,As'*]vanadium, V -00069
- 56420-26-9 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis[tetrahydroborato(1-)-*H,H'*]hafnium, Hf-00009
- 56483-30-8 Tetracarbonyl[2-(diphenylphosphinophenyl-*C,P*)]rhenium, Re-00079
- 56665-73-7 μ -Carbonyltetracarbonylbis[μ -methylenebis(diphenylphosphine)-*P,P'*]dimanganese, Mn-00145
- 56708-99-7 (2-Acetylferrocenyl-*C,O*)tetracarbonylmanganese, Mn-00107
- 56765-58-3 Tris(diethylamido)ethylvanadium, V -00066
- 56770-59-3 Bis(benzyl)bis(η^5 -cyclopentadienyl)hafnium, Hf-00039
- 56770-61-7 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)-(trimethylphosphine)titanium, Ti-00074
- 57088-86-5 (η^5 -2,4-Cyclopentadien-1-yl)dioxovanadium, V -00007
- 57088-89-8 Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethanediylbis(diphenylphosphine)-*P,P'*]vanadium(1+); Tetraphenylborate, *in* V -00116
- 57088-91-2 Dicarbonylbis(2,4-cyclopentadien-1-yl)vanadium(1+); Tetraphenylborate, *in* V -00050
- 57088-95-6 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)-(pyridine)vanadium(1+); Tetraphenylborate, *in* V -00071
- 57091-06-2 Bromotetracarbonyl[(diethylamino)methylidyne]chromium, Cr-00062
- 57127-95-4 Pentacarbonylchromate(2-); Di-Cs salt, *in* Cr-00008
- 57196-01-7 Pentacarbonyl(methyl thiocyanate-*N*)chromium, Cr-00028
- 57288-89-8 Hexacarbonyltantalate(1-); Tetraphenylarsonium salt, *in* Ta-00006
- 57347-27-0 Bis[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]titanium, Ti-00100
- 57348-61-5 Decacarbonyldichromate(2-); Di-K salt, *in* Cr-00066
- 57348-62-6 Decarbonyldimolybdate(2-), Mo-00045
- 57348-62-6 Decarbonyldimolybdate(2-); Di-K salt, *in* Mo-00045
- 57398-65-9 Bis(η^5 -2,4-cyclopentadien-1-yl)-(dimethylaluminum)di- μ -methylttrium, Y -00005
- 57560-35-7 Pentacarbonyl[1,3-dimethyl-2-imidazolidinylidene)molybdenum, Mo-00038
- 57574-51-3 *N,N,N*-Triethylethanaminium(1+) pentacarbonylmethyltungstate(1-), *in* W -00009
- 57595-19-4 Pentachloro[(trimethylsilyl)methyl]tungsten, W -00001
- 57603-41-5 Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)- μ -methylene dimanganese, Mn-00102
- 57812-91-6 (Chlorobenzene)tricarbonylmanganese(I), Mn-00042
- 57891-59-5 Diacetyltetracarbonylmanganate(1-); Li salt, *in* Mn-00037
- 57913-16-3 Bis(η^5 -2,4-cyclopentadien-1-yl)-methyl(methylidene)tantalum, Ta-00017
- 57956-59-9 Nonacarbonyl(isocyanomethane)dimanganese, Mn-00065
- 57987-16-3 Bromotetracarbonyl[(4-methylphenyl)methylidyne]chromium, Cr-00095
- 58034-11-0 Hexakis[μ -(acetyl-*C:O*)](aluminum)dodecacarbonyltrimanganese, *in* Mn-00037
- 58034-14-3 Octacarbonylbis(isocyanomethane)dimanganese, Mn-00077
- 58057-99-1 (η^5 -Cyclopentadienyl)tris(dimethylamido)titanium, Ti-00049
- 58355-39-8 [(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl][(1,2,3,4,5,6- η)-7-phenyl-1,3,5-cycloheptatriene]manganese, Mn-00115
- 58384-14-8 μ -Bromooctacarbonyl[μ -(phenylmethylidyne)]dihrenium, Re-00069
- 58689-69-3 Bis(η^5 -benzylcyclopentadienyl)dichlorozirconium, Zr-00084
- 58694-74-9 Dihydronitrosyltris(triphenylphosphine)rhenium; *mer,cis-form*, *in* Re-00093
- 58832-09-0 Tetrakis(2-methyl-2-propanolato)oxotungsten, W -00110
- 58920-14-2 Tris(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)thorium, Th-00015
- 58938-56-0 Pentacarbonyl[chloro(dimethylamino)methylene]manganese(1+), Mn-00036
- 58938-57-1 Pentacarbonyl[chloro(dimethylamino)methylene]manganese(1+); Perchlorate, *in* Mn-00036
- 59123-04-5 Tetracarbonylmanganate(3-); Tri-Na salt, *in* Mn-00008
- 59172-20-2 (η^5 -2,4-Cyclopentadien-1-yl)bis[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne]iodomolybdenum, Mo-00074
- 59218-83-6 Pentacarbonyl[chloro(diethylamino)methylene]chromium, Cr-00074
- 59218-84-7 Tetracarbonylchloro[(diethylamino)methylidyne]chromium, Cr-00063
- 59296-77-4 Bis(1,3,5,7-cyclooctatetraene)phenylniobium, Nb-00044
- 59296-78-5 Bis(1,3,5,7-cyclooctatetraene)methylniobium, Nb-00033
- 59412-84-9 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)oxoniobium, Nb-00011
- 59423-86-8 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(tetrahydrofuran)rhenium, Re-00046
- 59424-00-9 Bis(η^5 -2,4-cyclopentadien-1-yl)ethylvanadium, V -00055
- 59458-55-8 [μ -(1,2- η :1,2,3,4,5,6,7,8- η)-1,3,5,7-Cyclooctatetraene][bis(η^8 -1,3,5,7-cyclooctatetraene)bis(tetrahydrofuran)dineodymium, Nd-00012
- 59464-56-1 (η^6 -Benzene)[(1,2,3,4- η)-1,3,5,7-cyclooctatetraene](η^3 -2-propenyl)molybdenum(1+); Hexafluorophosphate, *in* Mo-00099
- 59464-63-0 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne]-(trifluoromethanethiolato)molybdenum, Mo-00046
- 59487-44-4 Tetrakis[μ -(benzenethiolato)]bis(η^5 -2,4-cyclopentadien-1-yl)divanadium, V -00114
- 59487-85-3 Dicarbonylbis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00021
- 59487-86-4 Dicarbonylbis(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00012
- 59512-63-9 Tribenzyl(piperidinyl)titanium, Ti-00130
- 59512-73-1 Bis(dimethylamido)bis(trimethylsilylmethyl)titanium, Ti-00062
- 59512-75-3 Tris(dimethylamido)(trimethylsilylmethyl)titanium, Ti-00043
- 59512-77-5 Bis(dimethylamido)dimethyltitanium, Ti-00013
- 59547-67-0 Bis(η^5 -2,4-cyclopentadien-1-yl)(1,2,3,4-tetraphenyl-1,3-butadiene-1,4-diyl)vanadium, V -00119
- 59589-12-7 Dicarbonylchloro(η^7 -cycloheptatrienyl)tungsten, W -00032
- 59645-02-2 [μ -(1,4-Diphenyl-1,3-butadiene-1,2,3,4-tetra-*C*¹,*C*³:*C*²,*C*⁴)]tetrakis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]dititanium, Ti-00147

- 59654-41-0 Bis[μ -[(trimethylsilyl)methylidyne]-tetrakis[(trimethylsilyl)methyl]ditungsten, W -00144
- 59714-56-6 [(2,3,4,5,6,7- η)Bicyclo[6.1.0]nona-2,4,6-triene]tricarbonyltungsten, W -00070
- 59774-48-0 Tetrakis(2,4,6-trimethylphenyl)vanadium, V -00118
- 59774-49-1 Tris(2,4,6-trimethylphenyl)vanadium, V -00105
- 59831-13-9 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)(1-methylethylidene)manganese, Mn-00059
- 59831-15-1 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)ethylidene-manganese(1+), Mn-00048
- 59831-16-2 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)ethylidene-manganese(1+); Tetrachloroborate, *in* Mn-00048
- 59831-17-3 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(phenylmethylidyne)manganese(1+), Mn-00093
- 59831-18-4 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(phenylmethylidyne)manganese(1+); Tetrachloroborate, *in* Mn-00093
- 59831-50-4 Tetracarboxylidiodo[(methylthiomethylidyne)]tungsten, W -00007
- 59834-80-9 Tetrakis(2,4,6-trimethylphenyl)vanadate(1-); Li salt, tetrakis(THF) complex, *in* V -00117
- 59975-65-4 Bis(pentafluorophenyl)ytterbium; Tetrakis-THF complex, *in* Yb-00007
- 59982-77-3 Bis(η^5 -2,4-cyclopentadien-1-yl)-[(diphenylphosphinidenio)bis(methylene)]scandium, Sc-00012
- 59982-80-8 [μ -[(1,2,3,4- η :5,6,7,8- η)-1,3,5,7-Cyclooctatetraene][bis(1,2,3,4- η)-1,3,5,7-cyclooctatetraene]dichromium, Cr-00159
- 60020-27-1 Dicarboxylidionitrosylbis(triphenylphosphine)chromium, Cr-00177
- 60039-69-2 Dicarboxyl(η^5 -2,4-cyclopentadien-1-yl)(2-phenylethenylidene)manganese, Mn-00100
- 60109-61-7 Chlorobis(1-phenyl-1-propyne)(η^5 -cyclopentadienyl)molybdenum, Mo-00121
- 60109-96-8 Di- μ -chloro-di- μ_3 -chloro(μ -chlorobis[methylenebis(η^5 -2,4-cyclopentadien-1-ylidene)])-diuraniumbis(tetrahydrofuran)lithium, U -00071
- 60119-18-8 Hexacarboxylniobate(1-); Tetraphenylarsonium salt, *in* Nb-00007
- 60175-22-6 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis(diphenylmethyl)zirconium, Zr-00111
- 60175-23-7 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis(diphenylmethyl)hafnium, Hf-00050
- 60184-30-7 Cyclopentadienyltricarbonyltechnetium, Tc-00004
- 60295-03-6 [μ -[(1,2,3,4a,8a- η :4,5,6,7,8- η)azulene]]hexacarboxylidimolybdenum, Mo-00092
- 60349-51-1 Pentacarboxyl[3-(dimethylamino)-3-phenyl-1,2-propadienylidene]chromium, Cr-00130
- 60349-56-6 Tricarboxyl(η^5 -2,4-cyclopentadien-1-yl)ferrocenylmolybdenum, Mo-00102
- 60349-59-9 Pentacarboxyl(ferrocenylmethyl)manganese, Mn-00108
- 60373-20-8 Bis[(4a,4b,8a,9a- η)-9H-fluoren-9-yl]dimethylzirconium, Zr-00096
- 60429-52-9 Tetracarboxylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(phenylethenylidene)]dimanganese, Mn-00126
- 60475-11-8 Bis(2,4-cyclopentadien-1-yl)(dimethylaluminum)-di- μ -methylscandium, Sc-00004
- 60475-14-1 Bis(η^5 -2,4-cyclopentadien-1-yl)-(dimethylaluminum)di- μ -methylytterbium, Yb-00012
- 60482-72-6 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)ditulium, *in* Tm-00002
- 60482-74-8 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)didysprosium, *in* Dy-00002
- 60530-27-0 Tribromo(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00003
- 60605-80-3 Tris(1,3,5,7-cyclooctatetraene)dicerium, Ce-00009
- 60635-81-6 Pentacarboxyl[(η^2 -ethenyl)benzene]tungsten, W -00082
- 60674-48-8 Pentacarboxyl[(dimethylamino)(triphenylsilyl)methylene]chromium, Cr-00163
- 60674-62-6 [(C,S- η)-Carbon disulfide]bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00041
- 60674-63-7 Bis(η^5 -2,4-cyclopentadien-1-yl)[(2,3- η)-diethyl 2-butenedioate]vanadium, V -00082
- 60686-15-9 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis(isocyanocyclohexane)vanadium(1+); Chloride, *in* V -00100
- 60686-18-2 Bis(η^5 -2,4-cyclopentadien-1-yl)(2-propanone)vanadium(1+); Tetraphenylborate, *in* V -00060
- 60764-63-8 Hexakis(2-methyl-2-propanolato)dimolybdenum, Mo-00125
- 60767-46-6 Tricarboxyl[μ -[(1,2,3- η :4,5,6,7- η)-2,4,6-cycloheptatrien-1-yl]](tricarbonyliron)manganese, Mn-00087
- 60818-71-5 (2,2'-Bipyridine-N,N')bis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00086
- 60830-03-7 (η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)scandium, Sc-00003
- 60872-91-5 Tetracarboxylchloroethylidynetungsten, W -00006
- 60872-92-6 Tetracarboxylidiodo(phenylmethylidyne)tungsten, W -00059
- 60872-93-7 Bromotetracarboxyl(phenylmethylidyne)tungsten, W -00057
- 60872-94-8 Bromotetracarboxyl[(diethylamino)methylidyne]tungsten, W -00037
- 60873-00-9 Tetracarboxylchloro(phenylmethylidyne)tungsten, W -00058
- 60876-22-4 (Acetato-O)chlorobis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00023
- 60898-12-6 Hexakis(diethylamino)- μ -1,1'-ruthenocenediyltitanium, Ti-00144
- 60936-88-1 Bis(η^5 -2,4-cyclopentadien-1-yl)methylscandium; Py complex, *in* Sc-00002
- 60970-97-0 (η^2 -Acetyl)bis(η^5 -2,4-cyclopentadien-1-yl)methylzirconium, Zr-00029
- 60997-40-2 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -methylidytrium, *in* Y -00003
- 60997-41-3 Tetrakis(η^5 -2,4-cyclopentadienyl)-di- μ -methylididysprosium, *in* Dy-00003
- 60997-42-4 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -methylidholmium, *in* Ho-00003
- 60997-43-5 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -methylidyttterbium, *in* Yb-00006
- 61060-80-8 Tris[(dimethylphosphinidenio)bis(methylene)]lanthanum, La-00002
- 61060-87-5 Tris[(dimethylphosphinidenio)bis(methylene)]lutetium, Lu-00008
- 61113-31-3 (η^5 -2,4-Cyclopentadien-1-yl)-tris(dimethylcarbamodithioato-S,S')zirconium, Zr-00037
- 61127-35-3 Bis(η^5 -2,4-cyclopentadien-1-yl)methylerbium, Er-00005
- 61170-98-7 Pentacarboxyl[(dimethylamino)methylidyne]chromium(1+), Cr-00039
- 61202-59-3 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)[(1,2- η)(4-methylphenyl)oxoethenyl]-(trimethylphosphine)tungsten, W -00119
- 61396-31-4 Dicarboxylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00074
- 61396-34-7 Dihydrobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00065
- 61396-37-0 [μ -[1,2-Ethenediolato(2-)-O:O']]-dihydrotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dizirconium, Zr-00116
- 61396-38-1 [μ -[1,2-Ethenediolato(2-)-O:O']]-diodotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dizirconium, Zr-00115
- 61443-37-6 Tetracarboxyl(η^5 -propenyl)(triphenylphosphine)vanadium, V -00102
- 61491-36-9 Dicarboxyl(η^5 -2,4-cyclopentadien-1-yl)(2-propanoneoximate-N,O)molybdenum, Mo-00041
- 61529-60-0 $\triangleright \mu$ (η^1 : η^5 -Cyclopentadienyl)tris(η -cyclopentadienyl)ditanium(Ti-Ti), Ti-00104
- 61649-18-1 Bis(η^5 -2,4-cyclopentadien-1-yl)trimethyltantalum, Ta-00022

- 61663-90-9 Octacarbonylbis(triphenylphosphine)ditechnetium, Tc-00013
- 61732-19-2 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)diterbium, Tb-00004
- 61769-24-2 Tetracarbonylmanganate(3-), Mn-00008
- 61770-99-8 Pentacarbonyl[(dimethylamino)methylidyne]chromium(1+); Tetrachloroborate, *in* Cr-00039
- 61771-01-5 Pentacarbonyl[(dimethylamino)methylidyne]chromium(1+); Hexafluorophosphate, *in* Cr-00039
- 61771-03-7 Pentacarbonyl[cyano(dimethylamino)methylene]chromium, Cr-00055
- 61771-06-0 [Bis(dimethylamino)methylene]pentacarbonylchromium, Cr-00079
- 61818-15-3 Dicarboxyldichlorobis(triethylphosphine)rhenium, Re-00067
- 61906-04-5 Trichloro(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00001
- 61916-37-8 Dicarboxylbis[1,2-ethanediy]bis(dimethylphosphine)-*P,P'*]methyltantulum, Ta-00029
- 61917-87-1 Tricarbonyltrihydro[1,2-phenylenebis(dimethylarsine)-*As,As'*]vanadium, V-00061
- 61930-16-3 (η^8 -1,3,5,7-Cyclooctatetraene)(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+); Hexafluorophosphate, *in* Mo-00076
- 61993-63-3 Dicarboxyl(η^5 -2,4-cyclopentadien-1-yl)-(phenylmethylidyne)rhenium(1+), Re-00066
- 61993-64-4 Dicarboxyl(η^5 -2,4-cyclopentadien-1-yl)-(phenylmethylidyne)rhenium(1+); Tetrachloroborate, *in* Re-00066
- 62015-65-0 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(tetracarbonylcoalt)molybdenum, Mo-00060
- 62044-68-2 Pentabenzyltantulum, Ta-00040
- 62050-66-2 Pentacarbonyl[(1,2,3- η)-1,2,3-triphenyl-2-cyclopropen-1-yl]vanadium, V-00103
- 62050-78-6 Dicarboxylbis[1,2-ethanediy]bis(dimethylphosphine)-*P,P'*]hydrotantulum, Ta-00026
- 62171-36-2 Octamethylidrineate(2-); Bis[tetrakis(tetrahydrofuran)lithium(1+)]salt, *in* Re-00036
- 62197-79-9 (T-4)Triphenyl(*P,P,P*-triphenylphosphineimidato-*N*)phosphorus(1+) pentacarbonylmethyltungstate(1-), *in* W-00009
- 62197-85-7 (T-4)Triphenyl(*P,P,P*-triphenylphosphineimidato-*N*)phosphorus(1+) pentacarbonylmethylchromate(1-), *in* Cr-00024
- 62303-78-0 Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(2,3- η :2,3- η)-dimethyl-2-butynedioate]]ditungsten, W-00127
- 62319-82-8 Bromotetracarbonyl[(triphenylsilyl)methylidyne]tungsten, W-00137
- 62337-31-9 Octamethyltungstate(2-); Di-Li salt, *in* W-00027
- 62341-83-7 Decacarbonyl- μ -hydrodichromate(1-); Bis(triphenylphosphine)iminium salt, *in* Cr-00067
- 62363-03-5 Bis(2,4-cyclopentadien-1-yl)dimethylvanadium, V-00056
- 62450-90-2 Bis[μ -(2-methyl-2-phenylpropyl)]bis(2-methyl-2-phenylpropyl)dimanganese, Mn-00141
- 62559-95-9 Dichlorobis[(7,8,9,10,11- η)undecahydro-7,8-dicarbaundecaborato]uranate(2-); Di-Li salt, octa-THF complex, *in* U-00001
- 62573-31-3 Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)[μ -(1,2- η :2,3- η)-1,2-propadiene]]dimolybdenum, Mo-00098
- 62589-11-1 Pentacarbonyl(diphenylmethylene)chromium, Cr-00143
- 62613-18-7 Tetrakis[μ -(2,6-dimethoxyphenyl-*C:O*)]divanadium, V-00112
- 62651-63-2 Bis[1,2-ethanediy]bis(dimethylphosphine)-*P,P'*]bis(η^2 -ethene)hydrionibium, Nb-00032
- 62680-77-7 Bis(acetonitrile)dicarbonylchloro(η^3 -2-propenyl)tungsten, W-00039
- 62789-86-0 [Bis[bis(trimethylsilyl)methyl]plumbylene]pentacarbonylmolybdenum, Mo-00110
- 62798-73-6 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethyne)-methyltungsten, W-00038
- 62853-03-6 Tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)ditungsten, W-00090
- 62866-03-9 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungstate(1-); K salt, *in* W-00023
- 62866-16-4 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)molybdenum(1+); Tetrafluoroborate, *in* Mo-00035
- 62927-98-4 Tetrachloro(η^5 -2,4-cyclopentadien-1-yl)tantalum, Ta-00004
- 62938-49-2 Tetracarbonylchloroethylidynechromium, Cr-00022
- 62980-54-5 Tricarbonyl[(1,2,3,4,5,6- η)-4-methyl-1-phenylboratabenzene]manganese, Mn-00101
- 62997-61-9 Pentacarbonyl(cyano-*C*)chromate(1-); (THF)₃Cr(3+) salt, *in* Cr-00016
- 63079-59-4 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)tungsten(1+); Tetrafluoroborate, *in* W-00045
- 63118-93-4 Bis(η^5 -2,4-cyclopentadien-1-yl)diethylvanadium, V-00064
- 63118-94-5 Dibenzylbis(cyclopentadienyl)vanadium, V-00099
- 63139-42-4 Pentacarbonylrhenate(1-); K salt, *in* Re-00012
- 63166-76-7 (η^5 -2,4-Cyclopentadien-1-yl)trifluorotitanium, Ti-00010
- 63243-40-3 Di-*tert*-butoxydimethylvanadium, V-00036
- 63339-27-5 Tetracarbonyl(η^5 -methyl-2,4-cyclopentadien-1-yl)vanadium, V-00024
- 63356-86-5 (η^6 -Benzene)(carbonothioyl)dicarbonylchromium, Cr-00056
- 63356-87-6 (Carbonoselenoyl)pentacarbonylchromium, Cr-00019
- 63415-86-1 Ethoxytris(η^5 -2,4-cyclopentadien-1-yl)uranium, U-00023
- 63422-29-7 Tetrakis(2-methyl-1-phenyl-1-propenyl)titanium, Ti-00148
- 63422-30-0 Tetrakis(2-methyl-1-phenyl-1-propenyl)zirconium, Zr-00114
- 63422-31-1 Tetrakis(2-methyl-1-phenyl-1-propenyl)hafnium, Hf-00053
- 63422-41-3 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)(2-methyl-1-phenyl-1-propenyl)zirconium, Zr-00063
- 63428-34-2 [Bis(2,4,6-trimethylphenyl)germylene]pentacarbonylchromium, Cr-00156
- 63590-28-3 (η^6 -Benzene)(carbonothioyl)-carbonyl(triphenylphosphine)chromium, Cr-00164
- 63641-12-3 Dicarboxyl(η^5 -2,4-cyclopentadien-1-yl)(1,3-diphenyltriazenato-*N*¹,*N*³)tungsten, W-00122
- 63643-43-6 Butyltris[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]thorium, Th-00035
- 63643-54-9 Tris[(1,2,3,3a,7a- η)-1*H*-indenyl]methylthorium, Th-00029
- 63643-55-0 Tris[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]methyluranium, U-00066
- 63720-03-6 Bis[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]dimethyluranium, U-00034
- 63720-04-7 Di-*tert*-butyldiindenyluranium, U-00058
- 63726-15-8 Di-2,4-cyclopentadien-1-ylbis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00107
- 63782-46-7 Carbonylchlorobis(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00017
- 63816-92-2 Hexaphenyluranate(2-); Di-Li salt, *in* U-00074
- 63816-93-3 Hexamethyluranate(3-); Tri-Li salt, *in* U-00004
- 63835-71-2 Tricarbonyl[η^6 -5-(1-methylethylidene)-1,3-cyclopentadiene]molybdenum, Mo-00052
- 63882-22-4 Tricarbonyl(diphenylmethylidenecyclopentadiene)-tungsten, W-00132
- 63890-69-7 (2,2'-Bipyridine-*N,N'*)tricarbonylnitrosylmolybdenum(1+), Mo-00075
- 63890-70-0 (2,2'-Bipyridine-*N,N'*)tricarbonylnitrosylmolybdenum(1+); *fac*-form, Tetrafluoroborate, *in* Mo-00075
- 63890-73-3 Tricarbonylnitrosyl(1,10-phenanthroline-*N*¹,*N*¹⁰)-tungsten(1+), W-00098
- 63890-74-4 Tricarbonylnitrosyl(1,10-phenanthroline-*N*¹,*N*¹⁰)-tungsten(1+); *mer*-form, Hexafluorophosphate, *in* W-00098
- 63947-89-7 (η^4 -1,3-Butadiene)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+); Tetrafluoroborate, *in* Mo-00055
- 63950-86-7 Hexakis(η^5 -2,4-cyclopentadien-1-yl)[μ -(pyrazine-*N*¹,*N*⁴)]dytterbium, Yb-00033
- 64041-01-6 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-iron]tungsten, W-00102

- 64061-47-8 ▶ Tris[[2-(dimethylamino)phenyl]methyl-*C,N*]chromium, Cr-00166
- 64061-48-9 [Tris(2-(dimethylamino)phenyl)methyl-*C,N*]scandium, Sc-00014
- 64146-27-6 [(2,3,5,6- η)-Bicyclo[2.2.1]hepta-2,5-diene]-dicarbonylbis(tributylphosphine)molybdenum, Mo-00139
- 64161-94-0 Tetracarbonylbis(1,3-dimethyl-2-imidazolidinylidene)molybdenum, Mo-00084
- 64216-75-7 Bis(trimethylphosphine)bis[μ -[(trimethylsilyl)methyl]]bis[(trimethylsilyl)methyl]dichromium, Cr-00155
- 64347-45-1 Carbonyltrichlorotris(dimethylphenylphosphine)technetium, Tc-00010
- 64347-67-7 [(2,3- η)-2-Butyne][(1,2,3,3a,7a- η)-1*H*-inden-1-yl]bis(trimethylphosphite)molybdenum(1+), Mo-00108
- 64347-68-8 [(2,3- η)-2-Butyne][(1,2,3,3a,7a- η)-1*H*-inden-1-yl]bis(trimethylphosphite)molybdenum(1+); Tetrafluoroborate, *in* Mo-00108
- 64367-79-9 Chlorobis[1,2-ethanediylbis(dimethylphosphine)-*P,P'*](η^4 -naphthalene)tantalum, Ta-00036
- 64376-69-8 Tetramethyltetrakis(trimethylphosphine)dimolybdenum, Mo-00097
- 64396-16-3 Tricarbonylchlorobis(triphenylphosphine)technetium, Tc-00012
- 64426-76-2 Dicarbonyl(dimethylphenylphosphine)-hydro[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]tungsten(1+), W -00123
- 64426-77-3 Dicarbonyl(dimethylphenylphosphine)-hydro[(1,2,3,4,5,6- η)-1,3,5-trimethylbenzene]tungsten(1+); Trifluoromethanesulfonate, *in* W -00123
- 64514-96-1 Tetracarbonylbis(1,3-dimethyl-2-imidazolidinylidene)tungsten, W -00096
- 64515-01-1 Pentacarbonyl(1,3-dimethyl-2-imidazolidinylidene)tungsten, W -00049
- 64539-44-2 [2,2-Bis(diethylaluminum)ethyl]tris(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00088
- 64666-36-0 Acetyltricarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten, W -00044
- 64815-29-8 Bromobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00026
- 64815-30-1 [Bis(trimethylsilyl)methyl]chlorobis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00047
- 64836-04-0 Tetrakis[μ -(2,6-dimethoxyphenyl)-*C,O*]dimolybdenum, Mo-00138
- 64836-05-1 Tetrakis[μ -(2,6-dimethoxyphenyl)-*C,O*]dichromium, Cr-00175
- 64885-82-1 Decacarbonyl(decacarbonyldi- μ -hydrotriosmium)d Ruthenium, Re-00076
- 65036-19-3 (η^8 -1,3,5,7-Cyclooctatetraene)ytterbium, Yb-00003
- 65101-96-4 Tris(1,3,5,7-cyclooctatetraene)-bis(tetrahydrofuran)dilanthanum, La-00007
- 65101-97-5 Tris(1,3,5,7-cyclooctatetraene)-bis(tetrahydrofuran)dierbium, Er-00018
- 65186-91-6 Bis[μ -[[2-(dimethylamino)phenyl]methyl-*C:C,N*]]-[[2-(dimethylamino)phenyl]methyl][[2-(dimethylamino)phenyl]methyl-*C,N*]dimanganese, Mn-00137
- 65198-26-7 (η^6 -Arsenin)tricarbonylmolybdenum, Mo-00010
- 65230-41-3 Bromotetracarbonyl(ferrocenium)methylidyne)tungsten; *trans-form*, *in* W -00099
- 65230-44-6 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(ferrocenylmethylidyne)tungsten, W -00112
- 65274-19-3 Bis(η^5 -2,4-cyclopentadien-1-yl)diferrocenyltitanium, Ti-00142
- 65521-47-3 Tris[2-[(dimethylamino)methyl]phenyl-*C,N*]scandium, Sc-00013
- 65573-54-8 Pentacarbonyl[ethoxy(triphenylsilyl)methylene]molybdenum, Mo-00131
- 65573-55-9 Pentacarbonyl[ethoxy(triphenylsilyl)methylene]tungsten, W -00146
- 65650-76-2 Pentacarbonylchlorochromate(1-); Bis(triphenylphosphine)iminium salt, *in* Cr-00006
- 65652-98-4 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)methylniobium, Nb-00026
- 65888-45-1 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis[tetrahydroborato(1-)-*H,H'*]uranium, U -00009
- 65892-02-6 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(thiocarbonyl)vanadium, V -00019
- 66080-21-5 Bis(phenylethynyl)ytterbium, Yb-00014
- 66118-38-5 Chloro(η^5 -2,4-cyclopentadien-1-yl)bis[(2,3- η)-1,1,1,4,4,4-hexafluoro-2-butyne]-[trimethylphosphine)molybdenum, Mo-00094
- 66125-42-6 ▶ Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(diphenylthallium)tungsten, W -00126
- 66125-44-8 ▶ Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(diethylthallium)molybdenum, Mo-00068
- 66125-45-9 ▶ Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(dimethylthallium)tungsten, W -00054
- 66125-46-0 ▶ Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(diethylthallium)tungsten, W -00075
- 66125-47-1 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(dimethylthallium)(triphenylphosphine)molybdenum, Mo-00132
- 66125-48-2 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(diphenylthallium)(triphenylphosphine)molybdenum, Mo-00142
- 66125-49-3 ▶ Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(dimethylthallium)(triphenylphosphine)tungsten, W -00147
- 66125-50-6 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(diphenylthallium)(triphenylphosphine)tungsten, W -00154
- 66152-53-2 (η^2 -Benzoyl)bis(η^5 -2,4-cyclopentadien-1-yl)phenylzirconium, Zr-00080
- 66152-54-3 (η^2 -Benzoyl)bis(η^5 -2,4-cyclopentadien-1-yl)phenylhafnium, Hf-00038
- 66199-99-3 (η^5 -2,4-Cyclopentadien-1-yl)tris(*O*-methylcarbonodithioato-*S,S'*)zirconium, Zr-00017
- 66228-53-3 Tris(tetrahydrofuran)tris[(trimethylsilyl)methyl]erbium, *in* Er-00008
- 66320-88-5 [(*C,O*)-Acetyl]chlorobis(η^5 -2,4-cyclopentadien-1-yl)titanium, Ti-00056
- 66496-24-0 Tricarbonyl(η^2 -ethene)bis(trimethylphosphine)tungsten, W -00066
- 66531-51-9 Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]rhenium(1+), Re-00054
- 66531-52-0 Tetracarbonyl[(1,2,5,6- η)-1,5-cyclooctadiene]rhenium(1+); Tetrafluoroborate, *in* Re-00054
- 66539-91-1 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)thionitrosylchromium, Cr-00031
- 66562-85-4 Dicarbonyl(η^3 -2-propenyl)-bis(triisopropylphosphite-*P*)manganese, Mn-00131
- 66562-90-1 Dicarbonyl(trifluoromethanesulfonate-*O,O'*)-bis(triisopropylphosphite-*P*)manganese, Mn-00123
- 66562-91-2 Carbonylhydrotetrakis(trimethylphosphite-*P*)manganese; *trans-form*, *in* Mn-00090
- 66610-17-1 Tris(acetonitrile)tricarbonylrhenium(1+), Re-00038
- 66610-18-2 Tris(acetonitrile)tricarbonylrhenium(1+); Hexafluorophosphate, *in* Re-00038
- 66615-14-3 Bis[(2,3- η)-2-butyne]carbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+), Mo-00083
- 66615-15-4 Bis[(2,3- η)-2-butyne]carbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+); Tetrafluoroborate, *in* Mo-00083
- 66615-16-5 Carbonyl(η^5 -cyclopentadienyl)-bis(diphenylacetylene)molybdenum(1+), Mo-00140
- 66615-17-6 Carbonyl(η^5 -cyclopentadienyl)-bis(diphenylacetylene)molybdenum(1+); Tetrafluoroborate, *in* Mo-00140
- 66615-20-1 (η^4 -1,3-Butadiene)dicarbonyl[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]molybdenum(1+), Mo-00089
- 66615-21-2 (η^4 -1,3-Butadiene)dicarbonyl[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]molybdenum(1+); Tetrafluoroborate, *in* Mo-00089
- 66615-32-5 Bis(acetonitrile)dicarbonyl[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]molybdenum(1+), Mo-00088

- 66615-33-6 Bis(acetonitrile)dicarbonyl[(1,2,3,3a,7a- η)-1*H*-inden-1-yl]molybdenum(1+); Tetrafluoroborate, *in* Mo-00088
- 66632-54-0 Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethanediy]bis(dimethylphosphine)-*P,P'*]tantalum(1+); Chloride, *in* Ta-00031
- 66705-66-6 Bis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -(η^5 -2,4-cyclopentadien-1-ylidene)]dimolybdenum, Mo-00115
- 66719-22-0 [μ -[(1,2,3,4- η :5,6,7,8- η)-1,3,5,7-cyclooctatetraene]]bis[(1,2,3,4- η)-1,3,5,7-cyclooctatetraene]dimolybdenum, Mo-00123
- 66719-23-1 [μ -[(1,2,3,4- η :5,6,7,8- η)-1,3,5,7-cyclooctatetraene]]bis[(1,2,3,4- η)-1,3,5,7-cyclooctatetraene]ditungsten, W-00142
- 66862-11-1 Hexamethylerbate(3-); Tris[(tetramethylethylenediamine)lithium] salt, *in* Er-00002
- 66862-13-3 Hexamethylutetate(3-); Tris[(tetramethylethylenediamine)lithium] salt, *in* Lu-00002
- 66901-71-1 (η^1 -2,2,2)Paracyclophane]chromium, Cr-00132
- 66908-84-7 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)methylvanadium, V-00046
- 66915-54-6 Pentacarbonyl(diethylcyanamide-*N'*)chromium, Cr-00076
- 66921-70-8 Hexacarbonylbis[μ -[(1,2,3,4,5- η :1,2,3,4,5- η)-3,4-diethyl-2,5-dihydro-2,5-dimethyl-1,2,5-thiadiborole]](iron)dimanganese, Mn-00127
- 66921-71-9 Tricarbonyl[(η^5 -2,4-cyclopentadien-1-yl)iron]-[μ -[(1,2,3,4,5- η :1,2,3,4,5- η)-3,4-diethyl-2,5-dihydro-2,5-dimethyl-1,2,5-thiadiborole]]manganese, Mn-00109
- 66940-26-9 μ -Carbonyloctacarbonyldirhenium(2-); Di-K salt, *in* Re-00040
- 66964-10-1 Diacetyltetracarbonylmanganate(1-); Bis(triphenylphosphine)iminium salt, *in* Mn-00037
- 66979-94-0 (η^5 -2,4-Cyclopentadien-1-yl)iodonitrosyl(η^3 -2-propenyl)molybdenum, Mo-00019
- 67030-82-4 Dimethyltetrakis(*N*-dimethylamino)dimolybdenum, Mo-00044
- 67047-38-5 Tetracarbonyl(triphenylphosphine)manganate(1-); Bis(triphenylphosphine)iminium salt, *in* Mn-00124
- 67063-43-8 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis(2,2-dimethylpropyl)di- μ -hydrodizirconium, *in* Zr-00041
- 67063-52-9 Hexa-*tert*-butoxy- μ -carbonyldimolybdenum, Mo-00130
- 67108-86-5 Hydro(2-methylpropyl)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00087
- 67158-14-9 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-[(1,2,3,6,7- η)-4,5-dihydro-1-phenyl-1*H*-borepin]manganese, Mn-00113
- 67178-24-9 Tetrakis(η^3 -2-propenyl)dirhenium, Re-00058
- 67202-46-4 $\triangleright$ Tetracarbonyltungstate(4-); Tetra-Na salt, *in* W-00002
- 67202-62-4 $\triangleright$ Tetracarbonylchromate(4-); Tetra-Na salt, *in* Cr-00002
- 67202-63-5 $\triangleright$ Tetracarbonylmolybdate(4-); Tetra-Na salt, *in* Mo-00001
- 67204-23-3 Tetracarbonyl[1,2-ethanediy]bis[diphenylphosphine]-*P,P'*]vanadate(1-); Tetraethylammonium salt, *in* V-00108
- 67204-49-3 Tetracarbonyl(triphenylphosphine)manganate(1-); K salt, *in* Mn-00124
- 67251-59-6 Tetracarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+); Tetrafluoroborate, *in* Mo-00022
- 67407-28-7 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(dimethylaminomethylene)vanadium, V-00044
- 67421-16-3 [μ (η^6 -Phenyl)](tricarbonylchromium)lithium, Cr-00054
- 67421-95-8 (η^5 -2,4-Cyclopentadien-1-yl)[μ_4 -[methanolato(4-)-C:C:C:O]]-(nonacarbonyltricalcobalt)-titanium, Ti-00140
- 67422-50-8 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis[μ_4 -[methanolato(4-)-C:C:C:O]]-bis(nonacarbonyltricalcobalt)- μ -oxodihafnium, Hf-00052
- 67422-52-0 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis[μ_4 -[methanolato(4-)-C:C:C:O]]-bis(nonacarbonyltricalcobalt)- μ -oxodizirconium, Zr-00113
- 67422-53-1 Bis(η^5 -2,4-cyclopentadien-1-yl)bis[μ_4 -[methanolato(4-)-C:C:C:O]]-bis(nonacarbonyltricalcobalt)dizirconium, Zr-00102
- 67422-55-3 Bis(η^5 -2,4-cyclopentadien-1-yl)bis[μ_4 -[methanolato(4-)-C:C:C:O]]-bis(nonacarbonyltricalcobalt)dihafnium, Hf-00045
- 67422-56-4 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)[μ_4 -[methanolato(4-)-C:C:C:O]]-(nonacarbonyltricalcobalt)dihafnium, Hf-00026
- 67422-57-5 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)[μ_4 -[methanolato(4-)-C:C:C:O]]-(nonacarbonyltricalcobalt)zirconium, Zr-00060
- 67422-84-8 Bis[(1,2,3,4,4a,8a- η)naphthalene]molybdenum, Mo-00114
- 67483-82-3 Bis(tetrahydrofuran)tris[(trimethylsilyl)methyl]terbium, *in* Tb-00001
- 67483-83-4 Bis(tetrahydrofuran)tris[(trimethylsilyl)methyl]erbium, *in* Er-00008
- 67483-85-6 Tetrakis[(trimethylsilyl)methyl]yttrate(1-); Li salt, tetrakis-THF complex, *in* Y-00010
- 67483-92-5 Tris[bis(trimethylsilyl)methyl]chloroytterbate(1-); Li salt, tetrakis-THF complex, *in* Yb-00025
- 67483-97-0 [Bis(ethylthio)methylene]pentacarbonylchromium, Cr-00077
- 67506-86-9 Decamethylmanganocene, Mn-00119
- 67506-88-1 Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00016
- 67506-89-2 Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U-00038
- 67506-90-5 Dimethylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00020
- 67506-91-6 Chloro(methyl)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U-00042
- 67506-92-7 Di- μ -hydrodihydrotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dithorium, *in* Th-00017
- 67507-08-8 Bromotris(η^5 -2,4-cyclopentadien-1-yl)uranium, U-00012
- 67507-18-0 Trichloro[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]uranium; Bis-THF complex, *in* U-00003
- 67507-20-4 Trichloro(η^5 -2,4-cyclopentadien-1-yl)-bis(triphenylphosphine oxide)-O)uranium, U-00078
- 67507-24-8 μ -Carbonyltricalcobaltbis(η^5 -2,4-cyclopentadien-1-yl)[μ -[1,1'-(η^2 - η^2 -1,2-ethynediyl)bisbenzene]]dimolybdenum, Mo-00133
- 67552-61-8 Bis(cyclopentadienyl)methyloxoniobium, Nb-00020
- 67574-52-1 Bis[(η^6 -phenyl)ferrocene]chromium, Cr-00173
- 67588-76-5 Di- μ -hydrodihydrotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]diuranium, *in* U-00039
- 67605-92-9 Dimethylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U-00045
- 67624-22-0 Bis(tetrahydrofuran)tris[(trimethylsilyl)methyl]ytterbium, *in* Yb-00010
- 67719-69-1 μ -Chlorobis(η^5 -cyclopentadienyl)-(dimethylaluminum)- μ -methylenetitanium, Ti-00066
- 67771-71-5 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis[μ -[methylene(diphenylphosphinideno)-methylidene]]diuranium, U-00080
- 67891-23-0 (η^5 -2,4-Cyclopentadien-1-yl)-tris(dimethylcarbamoedithioato-*S,S'*)titanium, Ti-00077

- 68033-40-9 Dicarboxyl(η^4 -1,3-cyclobutadiene)(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00038
- 68079-61-8 [η -(2,3- η :2,3- η -2-Butyne)]-tetracarbonylbis(η^5 -2,4-cyclopentadien-1-yl)dimolybdenum, Mo-00105
- 68088-94-8 Bis(η^6 -benzene)niobium, Nb-00024
- 68182-14-9 Dichloro(η^5 -2,4-cyclopentadien-1-yl)(phenylazo)titanium, Ti-00044
- 68185-45-5 Dicarboxyl(η^5 -2,4-cyclopentadien-1-yl)-(hexacarbonyldicobalt)[μ_3 -(phenylmethylidyne)]molybdenum, Mo-00111
- 68349-04-2 Dicarboxyl(η^5 -2,4-cyclopentadien-1-yl)(η^3 -6-methylene-2,4-cyclohexadien-1-yl)tungsten, W -00091
- 68520-37-6 Tetracarbonyl(di- μ -carbonylhexacarbonyldiferrate)manganate(1-); Bis(triphenylphosphine)iminium salt, *in* Mn-00072
- 68550-41-4 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdate(1-); Li salt, *in* Mo-00014
- 68586-58-3 Hexacarbonylbis[(1,2,3,3a,7a- η)-1H-inden-1-yl]ditungsten, W -00138
- 68586-68-5 Bis(cyclopentadienyl)hydropropenetantalum, Ta-00021
- 68643-99-2 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)-(hydrazine-*N*)molybdenum(1+); Chloride, *in* Mo-00018
- 68688-11-9 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)vanadate(2-); Di-Na salt, *in* V -00015
- 68688-15-3 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)methylvanadate(1-); Bis(triphenylphosphine)iminium salt, *in* V -00021
- 68738-02-3 Tricarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydrovanadate(1-); Bis(triphenylphosphine)iminium salt, *in* V -00017
- 68795-84-6 Tetracarbonyl(dimethylcarbomodithioato-*S,S'*)rhenium, Re-00026
- 68830-04-6 Bromotetracarbonyl(ferrocenylmethylidyne)tungsten, W -00099
- 68830-11-5 Pentacarbonyl(ethoxyferrocenylmethylene)molybdenum, Mo-00103
- 68830-12-6 Bromotetracarbonyl(ferrocenylmethylidyne)molybdenum; *trans*-form, *in* Mo-00085
- 68830-17-1 Bromotetracarbonyl(ferrocenylmethylidyne)chromium; *trans*-form, *in* Cr-00124
- 68866-90-0 *N,N,N*-Trimethylmethanaminium(1+) pentacarbonylmethyltungstate(1-), *in* W -00009
- 68868-08-6 Bis(acetonitrile)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+); Tetraphenylborate, *in* Mo-00054
- 68868-91-7 Tetra-*tert*-butylterbate(1-); Li salt, tri-THF complex, *in* Yb-00017
- 68868-92-8 Tetra-*tert*-butylsamarate(1-); Li salt, Tetra-THF complex, *in* Sm-00011
- 68878-72-8 Bis(η^5 -2,4-cyclopentadien-1-yl)[2-[(dimethylamino)methyl]phenyl-*C,N*]scandium, Sc-00007
- 68893-45-8 Tetra-*tert*-butylterbate(1-); Li salt, tetra-THF complex, *in* Er-00013
- 68927-82-2 Pentacarbonyl(cyano-*C*)tungstate(1-), W -00012
- 68927-89-9 (η^6 -Benzene)tricarbonylrhenium(1+), Re-00037
- 68927-90-2 (η^6 -Benzene)tricarbonylrhenium(1+); Hexafluorophosphate, *in* Re-00037
- 68963-85-9 Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis[(trimethylsilyl)methyl]uranium, U -00068
- 68963-89-3 Chloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl][1-(trimethylsilyl)ethenolato]thorium, Th-00025
- 69005-92-1 Chlorotris(η -methylcyclopentadienyl)zirconium, Zr-00051
- 69005-93-2 Chlorotris(η -cyclopentadienyl)zirconium, Zr-00039
- 69021-32-5 Bis[μ -(2-butene-2,3-diolato(2-)-*O,O'*)-tetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dithorium, Th-00038
- 69030-40-6 Iodotris(η^5 -2,4-cyclopentadien-1-yl)uranium, U -00014
- 69040-88-6 Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis[(trimethylsilyl)methyl]thorium, Th-00031
- 69109-78-0 Dibromobis(η^5 -2,4-cyclopentadien-1-yl)vanadium, V -00027
- 69120-57-6 (η^5 -2,4-Cyclopentadien-1-yl)-iodonitrosyl(triphenylphosphine)manganese, Mn-00130
- 69276-81-9 Tetracarbonyltetrakis(cyclopentadienyl)tetravanadium, V -00098
- 69289-49-2 [Bis(η^5 -2,4-cyclopentadien-1-yl)hydro[μ -(methanolato(3-)-*C,O*)]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, W -00153
- 69302-77-8 (η^2 -Benzene)dimethyl[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00033
- 69377-30-6 Tris(η^5 -2,4-cyclopentadien-1-yl)(thiocyanato-*N*)-uranium; MeCN adduct, *in* U -00017
- 69439-84-5 Cyclopentadienyltrinitrosylvanadium(1+); Hexafluorophosphate, *in* V -00006
- 69517-43-7 Methyltris[(hexamethyldisilyl)amino]thorium, Th-00013
- 69517-44-8 Methyltris[(hexamethyldisilyl)amido]uranium, U -00032
- 69526-48-3 Tris(η^5 -2,4-cyclopentadien-1-yl)(thiocyanato-*N*)-uranium, U -00017
- 69552-43-8 Bis(2,2-dimethylpropylidene)(2,4,6-trimethylphenyl)bis(trimethylphosphine)tantalum, Ta-00038
- 69593-26-6 Carbonylchlorobis(η^5 -2,4-cyclopentadien-1-yl)tantalum, Ta-00013
- 69593-37-9 Tris(diethyl ether)methylphenylzirconium, Zr-00059
- 69621-06-3 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-formyl(nitrosyl)rhenium, Re-00025
- 69662-01-7 Bis(benzenethiolato)tetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -oxodizirconium, Zr-00106
- 69793-83-5 Bis(η^5 -2,4-cyclopentadien-1-yl)bis(2,2-dimethylpropyl)zirconium, Zr-00064
- 70083-62-4 Trichloro(2,2-dimethylpropylidene)-bis(trimethylphosphine)tantalum, Ta-00015
- 70083-76-0 Tetracarbonylbis(triphenylphosphine)manganese(1+); Hexafluorophosphate, *in* Mn-00140
- 70197-13-6 Methyltrioxorhenium, Re-00001
- 70388-23-7 Tetrakis[(trimethylsilyl)methyl]luteate(1-); Li salt, tetrakis(tetrahydrofuranate), *in* Lu-00015
- 70445-59-9 Fluorotris(η^5 -2,4-cyclopentadien-1-yl)neptunium, Np-00002
- 70585-10-3 Tricarbonyl(2,3,4,5- η :9,10- η -9-methylenebicyclo[4.2.1]nona-2,4,7-triene)chromium, Cr-00113
- 70605-18-4 Hexacarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]dichromium, Cr-00165
- 70616-56-7 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)methylniobium, Nb-00019
- 70616-59-0 Bis(cyclopentadienyl)methyl(triethylphosphine)niobium, Nb-00034
- 70634-77-4 Tetracarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ditungsten, W -00143
- 70675-84-2 Bis(η^5 -2,4-cyclopentadien-1-yl)-hydro(triphenylgermyl)tungsten, W -00148
- 70756-51-3 Trichloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]titanium, Ti-00040
- 70844-68-7 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -methylidithulium, *in* Tm-00003
- 70969-30-1 Dimethylbis[bis(trimethylsilyl)amido]zirconium, Zr-00038
- 70969-31-2 Diethylbis[bis(trimethylsilyl)amido]hafnium, Hf-00022
- 71000-84-5 Dimethylbis[bis(trimethylsilyl)amido]hafnium, Hf-00019
- 71110-90-2 Tetrakis[μ -(2-methoxyphenyl-*C,O*)]bis(2-methoxyphenyl-*C,O*)dirhenium, Re-00090
- 71163-80-9 Decamethylmanganocenium, Mn-00120
- 71163-81-0 Decamethylmanganocenium; Hexafluorophosphate, *in* Mn-00120
- 71191-42-9 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)oxovanadium, V -00028

- 71191-62-3 (Cyanomethyl)bis(η^5 -2,4-cyclopentadien-1-yl)-(η^2 -ethene)tungsten(1+), W -00092
- 71191-63-4 (Cyanomethyl)bis(η^5 -2,4-cyclopentadien-1-yl)-(η^2 -ethene)tungsten(1+); Hexafluorophosphate, *in* W -00092
- 71341-42-9 (η^5 -2,4-Cyclopentadien-1-yl)iodonitrosyl(η^3 -2-propenyl)tungsten, W -00026
- 71361-39-2 Bis[(1,2,3,4,5,6- η)methylbenzene]-(trimethylphosphine)hafnium, Hf-00023
- 71361-41-6 Bis[(1,2,3,4,5,6- η)methylbenzene]-(trimethylphosphine)zirconium, Zr-00046
- 71411-08-0 Molybdenumcarbonyl(η^5 -2,4-cyclopentadien-1-yl)-[μ -(η^5 -2,4-cyclopentadien-1-ylidene)]tetracarbonylmanganese, Mn-00099
- 71414-47-6 Tetrachloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00012
- 71414-49-8 Dichloro(η^5 -1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl)tantalum, Ta-00018
- 71414-58-9 Dichloro(2,2-dimethylpropylidene)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00028
- 71427-99-1 Bis[μ -(2-propanolato)]bis(2-propanolato)-tetrakis(η^3 -2-propenyl)diuranium, U -00056
- 71486-19-6 (η^5 -2,4-Cyclopentadien-1-yl)[μ -(η^5 -2,4-cyclopentadien-1-ylidene)]hydrotetracarbonylmanganeserhenium, Re-00065
- 71520-96-2 Bis(trimethylsilyl)acetyl-C,O)bis(η^5 -2,4-cyclopentadien-1-yl)methylzirconium, Zr-00058
- 71743-66-3 ▶ 1,1'',1'''-Bivanadocene, V -00084
- 71763-22-9 (η^5 -2,4-Cyclopentadien-1-yl)-methylenenitrosyl(triphenylphosphine)rhenium(1+); Tetrafluoroborate, *in* Re-00080
- 71763-23-0 (η^5 -2,4-Cyclopentadien-1-yl)-methylenenitrosyl(triphenylphosphine)rhenium(1+), Re-00080
- 71763-35-4 [(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]tetramethyltantalum, Ta-00025
- 71763-65-0 Carbonylbis(η^5 -2,4-cyclopentadien-1-yl)-(phosphorous trifluoride)hafnium, Hf-00010
- 71776-21-1 Bis(η^5 -2,4-cyclopentadien-1-yl)-(1,1,2,2,3,3,4,4-octaphenyl-1,4-tetrasilanediy)l)titanium, Ti-00153
- 71794-95-1 Chlorobis(pentamethylcyclopentadienyl)uranium, U -00037
- 71860-94-1 Trichloro(η^2 -ethene)bis(trimethylphosphine)tantalum, Ta-00008
- 72108-52-2 Hydro[(methylimino)methyl]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00075
- 72108-53-3 Dimethylamidohydro(pentamethylcyclopentadienyl)-zirconium, Zr-00078
- 72125-82-7 Dimethylamidoiodobis(η^5 -pentamethylcyclopentadienyl)zirconium, Zr-00076
- 72202-89-2 Dicarbonylbis(2-methyl-2-propanolato)-bis(pyridine)molybdenum, Mo-00116
- 72228-91-2 Heptacarbonyltris(cyclopentadienyl)triniobium, Nb-00042
- 72286-69-2 Dimethyltetrakis(*N*-dimethylamino)ditungsten, W -00120
- 72303-50-5 (Carbonothioyl)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)iodotungsten, W -00020
- 72316-87-1 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)rhenium(1+), Re-00056
- 72316-87-1 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -ethene)rhenium(1+); Tetrafluoroborate, *in* Re-00056
- 72348-00-6 Trichloro(2-methyl-1-phenyl-1-propenyl)titanium, Ti-00036
- 72415-82-8 Dicarbonyl[(1,2,3,4,5- η)-2,3,4,5-tetraphenyl-1*H*-arsol-1-yl](triphenylphosphine)manganese, Mn-00143
- 72622-82-3 Pentacarbonyl(triphenylphosphine)vanadium, V -00095
- 72827-54-4 Tricarbonylbis(diethylcarbamoeditioato-*S,S'*)tungsten, W -00086
- 72894-62-3 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -hydro[μ -[(1,2- η -2- η)-2-naphthalenyl]]dizirconium, Zr-00103
- 72932-64-0 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -hydrodihydroditungsten(1+), W -00130
- 72932-65-1 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)- μ -hydrodihydroditungsten(1+); Perchlorate, *in* W -00130
- 72953-59-4 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)hydrohafnium, Hf-00007
- 72982-57-1 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis(phenylethynyl)zirconium, Zr-00092
- 73153-05-6 1,1'',1'''-Bivanadocenium(2+); Bis(hexafluorophosphate), *in* V -00085
- 73394-64-6 Tricarbonyldichloro(η^5 -2,4-cyclopentadien-1-yl)niobium, Nb-00008
- 73448-06-3 Bis[μ -[2-methyl-2-propanaminato(2-)]bis[2-methyl-2-propanaminato(2-)]tetramethyldimolybdenum, Mo-00117
- 73448-07-4 Bis[μ -[2-methyl-2-propanaminato(2-)]bis[2-methyl-2-propanaminato(2-)]tetramethylditungsten, W -00131
- 73449-72-6 Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylrhenium(1+), Re-00057
- 73449-73-7 Bis(η^5 -2,4-cyclopentadien-1-yl)dimethylrhenium(1+); Hexafluorophosphate, *in* Re-00057
- 73587-39-0 Bis(η^5 -cyclopentadien-1-yl)di-1*H*-pyrrol-1-ylzirconium, Zr-00049
- 73597-12-3 Dichlorobis[(1,2,3,4,5- η)-pentamethyl-2,4-cyclopentadien-1-yl]neodymate(1-); Li salt, THF complex, *in* Nd-00008
- 73652-04-7 Dichloro(η^8 -1,3,5,7-cyclooctatetraene)thorium; Di-THF complex, *in* Th-00001
- 73682-46-9 Hexabenzyltri- μ -chlorotrirhenium, Re-00089
- 73740-63-3 Decacarbonyl- μ -hydrodichromate(1-), Cr-00067
- 73752-27-9 (η^5 -2,4-Cyclopentadien-1-yl)[(1,2,3,4,5,6- η)-2,4,6-triphenylphosphorin]manganese, Mn-00135
- 74042-79-8 Bis(η^5 -*tert*-butylcyclopentadienyl)-[bis(trimethylsilyl)methyl]chlorozirconium, Zr-00089
- 74042-81-2 [Bis(trimethylsilyl)methyl]-chlorobis[(1,2,3,4,5- η)-1-(trimethylsilyl)-2,4-cyclopentadien-1-yl]zirconium, Zr-00083
- 74191-17-6 Tribromo[(1,2,3,3*a*,7*a*- η -1*H*-inden-1-yl)-(triphenylphosphine oxide-*O*)uranium; THF adduct, *in* U -00063
- 74282-44-3 Bis(pentamethylcyclopentadienyl)europium; Complex with 2Et₂O + 1THF, *in* Eu-00005
- 74282-45-4 Bis(pentamethylcyclopentadienyl)europium; THF complex, *in* Eu-00005
- 74282-46-5 Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbium; THF complex, *in* Yb-00024
- 74282-48-7 Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbium; Complex + 1THF + 1/2 toluene, *in* Yb-00024
- 74365-56-3 Tetracarbonyl(triphenylphosphine)manganate(1-); Tetramethylammonium salt, *in* Mn-00124
- 74380-49-7 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-[(diphenylphosphino)methyl]zirconium, Zr-00081
- 74380-92-0 Bis[(2,3- η)-2-butyne]carbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum(1+); Hexafluorophosphate, *in* Mo-00083
- 74380-93-1 Bis[(2,3- η)-2-butyne]carbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten(1+), W -00095
- 74380-94-2 Bis[(2,3- η)-2-butyne]carbonyl(η^5 -2,4-cyclopentadien-1-yl)tungsten(1+); Hexafluorophosphate, *in* W -00095
- 74468-66-9 Tetracarbonyl[(1,2,5,6- η)-1,3,5,7-cyclooctatetraene]tungsten, W -00069
- 74481-90-6 Bis(η^5 -cyclopentadienyl)(2,6-di-*tert*-butyl-4-methylphenoxy)titanium, Ti-00128
- 74507-60-1 Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]vanadium, V -00087
- 74587-36-3 Chloro(3,3-dimethyl-1-oxobutyl-C,O)-bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00027

- 74587-38-5 Dichlorotetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl][μ -(2,2,9,9-tetramethyl-4,5,6,7-decanetetron-*O*⁴,*O*⁵,*O*⁶,*O*⁷)]dithorium, Th-00039
- 74587-39-6 Chloro(2,2-dimethylpropyl)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00026
- 74847-93-1 Bis(acetonitrile)-carbonylchlorotris(dimethylphenylphosphine)-technetium(2+), Tc-00011
- 74847-94-2 Bis(acetonitrile)-carbonylchlorotris(dimethylphenylphosphine)-technetium(2+); Diperchlorate, *in* Tc-00011
- 74890-12-3 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)-iodo[(1,2,3,4- η)-1,2,3,4-tetrakis(trifluoromethyl)cyclobutadiene]molybdenum, Mo-00078
- 74909-91-4 Bis(η^5 -2,4-cyclopentadien-1-yl)-(isocyanomethane)propyltantalum, Ta-00027
- 74920-40-4 Tetrabenzylchlorotantalum, Ta-00039
- 74924-58-6 Acetonitrile(η^5 -2,4-cyclopentadien-1-yl)dinitrosylchromium(1+), Cr-00035
- 74924-59-7 Acetonitrile(η^5 -2,4-cyclopentadien-1-yl)dinitrosylchromium(1+); Hexafluorophosphate, *in* Cr-00035
- 74924-70-2 (η^5 -2,4-Cyclopentadien-1-yl)-[methoxy(methylamino)methylene]dinitrosylchromium, Cr-00049
- 74924-71-3 (η^5 -2,4-Cyclopentadien-1-yl)-[methoxy(methylamino)methylene]dinitrosylchromium; Hexafluorophosphate, *in* Cr-00049
- 74989-73-4 (Carbonothioyl)dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)tungstate(1-); Tetrabutylammonium salt, *in* W-00022
- 75038-98-1 Tris(η^5 -2,4-cyclopentadien-1-yl)gadolinium; THF adduct, *in* Gd-00004
- 75061-55-1 (Dimethyldiphenylgermane)bis[tricarbonsylchromium], Cr-00150
- 75061-57-3 Bis(η^4 -1,3-butadiene)[1,2-ethanediy]bis(dimethylphosphine)-*P,P'*titanium, Ti-00078
- 75070-70-1 Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-phenylenebis(methylene)]zirconium, Zr-00050
- 75112-13-9 Acetylpentacarbonylchromate(1-); Tetramethylammonium salt, *in* Cr-00029
- 75125-14-3 [1,3-Bis(methylene)-1,4-butanediyl]-bis(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00095
- 75181-07-6 Trichloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00014
- 75181-08-7 Trichloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]hafnium, Hf-00008
- 75213-09-1 Bis(η^5 -2,4-cyclopentadien-1-yl)(pentathio)zirconium, Zr-00010
- 75213-10-4 Bis(η^5 -2,4-cyclopentadien-1-yl)(pentathio)hafnium, Hf-00006
- 75280-67-0 Pentacarbonyl(ethoxyruthenocenylmethylene)tungsten, W-00116
- 75280-68-1 Pentacarbonyl(ethoxyruthenocenylmethylene)molybdenum, Mo-00104
- 75280-69-2 Pentacarbonyl(ethoxyruthenocenylmethylene)chromium, Cr-00144
- 75293-20-8 Bromotetracarbonyl(ruthenocenylmethylidyne)tungsten; *trans*-form, *in* W-00100
- 75339-31-0 Tricarbonsyl(η^5 -2,4-cyclopentadien-1-yl)-[dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-iron]chromium, Cr-00125
- 75361-74-9 Bis(η^5 -2,4-cyclopentadien-1-yl)[(1,2,3,4- η)-2,3-dimethyl-1,3-butadiene]zirconium, Zr-00043
- 75374-50-4 (η^4 -1,3-Butadiene)bis(η^5 -2,4-cyclopentadien-1-yl)zirconium; (*s-trans*)-form, *in* Zr-00033
- 75522-28-0 Dichloro(diphenylacetylene)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]tantalum, Ta-00037
- 75593-05-4 Dicarbonyl(η^4 -2-methylene-1,3-propanediyl)-[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]molybdenum(1+), Mo-00096
- 75593-06-5 Dicarbonyl(η^4 -2-methylene-1,3-propanediyl)-[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]molybdenum(1+); Tetrafluoroborate, *in* Mo-00096
- 75663-08-0 Dimethylbis[(1,2,3,4,5- η)-1-(2-methylbutyl)-2,4-cyclopentadien-1-yl]zirconium, Zr-00077
- 75663-08-0 Dimethylbis[(1,2,3,4,5- η)-1-(2-methylbutyl)-2,4-cyclopentadien-1-yl]zirconium; (*S,S*)-form, *in* Zr-00077
- 75673-89-1 Bis(η -*tert*-butylcyclopentadienyl)-bis(phenylthiolato)hafnium, Hf-00046
- 75799-47-2 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-(trimethylsilyl)titanium, Ti-00067
- 75826-53-8 Bis[(η^6 -phenyl)ferrocene]chromium(1+); Iodide, *in* Cr-00174
- 75857-12-4 Chloro[1,3-propanediyl]bis(η^5 -2,4-cyclopentadien-1-ylidene)]lanthanum, La-00003
- 75861-70-0 Chloro[1,3-propanediyl]bis(η^5 -2,4-cyclopentadien-1-ylidene)]cerium, Ce-00002
- 75899-98-8 Carbonyl(η^5 -2,4-cyclopentadien-1-yl)[1,2-ethanediy]bis(dimethylphosphine)-*P,P'*[(4-methylphenyl)oxoethenyl]tungsten, W-00135
- 76083-35-7 Bis(η^5 -2,4-cyclopentadien-1-yl)-bis(trimethylphosphite)titanium, Ti-00092
- 76096-93-0 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-[(triphenylsilyl)methylidyne]rhenium(1+), Re-00081
- 76096-94-1 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)-[(triphenylsilyl)methylidyne]rhenium(1+); Tetrafluoroborate, *in* Re-00081
- 76124-85-1 Bis(η^5 -2,4-cyclopentadien-1-yl)- μ -oxotetrakis(2,4-pentanedionato-*O,O'*)dihafnium, Hf-00047
- 76137-73-0 Bis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]ytterbium; THF complex, *in* Yb-00009
- 76173-79-0 Bis(2,4-cyclopentadien-1-yl)(η^2 -*C,O*-diphenylketene)vanadium, V-00097
- 76206-86-5 Hexamethylpraesodymate(3-); Tris[(tetramethylethylenediamine)lithium] salt, *in* Pr-00001
- 76206-88-7 Hexamethylneodymate(3-); Tris[(tetramethylethylenediamine)lithium] salt, *in* Nd-00001
- 76206-90-1 Hexamethylsamarate(3-); Tris[(tetramethylethylenediamine)lithium] salt, *in* Sm-00002
- 76206-92-3 Hexamethylthulate(3-); Tris[(tetramethylethylenediamine)lithium] salt, *in* Tm-00001
- 76206-94-5 Hexamethylytterbate(3-); Tris[(tetramethylethylenediamine)lithium] salt, *in* Yb-00002
- 76207-05-1 Bis(η^5 -2,4-cyclopentadien-1-yl)methylutetium; THF complex, *in* Lu-00006
- 76207-08-4 *tert*-Butylbis(η^5 -cyclopentadienyl)lutetium, Lu-00010
- 76207-09-5 Bis(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethylpropyl)lutetium, Lu-00014
- 76207-10-8 Bis(η^5 -2,4-cyclopentadien-1-yl)-[(trimethylsilyl)methyl]lutetium; THF complex, *in* Lu-00011
- 76207-11-9 Benzylbis(η^5 -2,4-cyclopentadienyl)lutetium; THF complex, *in* Lu-00016
- 76207-12-0 Bis(η^5 -2,4-cyclopentadien-1-yl)(4-methylphenyl)lutetium; THF complex, *in* Lu-00017
- 76207-13-1 Di- μ -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)dilutetium, *in* Lu-00004
- 76262-42-5 [Bis(methylthio)methylene]pentacarbonyltungsten, W-00025
- 76309-27-8 Pentacarbonyliodochromate(1-); Methyltriphenylphosphonium salt, *in* Cr-00007
- 76346-28-6 Pentacarbonyl(diphenylmethylene)molybdenum, Mo-00101
- 76565-26-9 Tetrakis(3,3-dimethyl-1-butynyl)erbate(1-); Li salt, THF complex, *in* Er-00016
- 76565-28-1 Tetrakis(3,3-dimethyl-1-butynyl)samarate(1-); Li salt, THF complex, *in* Sm-00015
- 76565-30-5 Tetrakis(3,3-dimethyl-1-butynyl)lutetate(1-); Li salt, THF complex, *in* Lu-00020
- 76565-31-6 Tetrakis(1,2,3,4,5- η -1-methyl-2,4-cyclopentadien-1-yl)bis[μ -3,3-dimethyl-1-butyn-1-yl]dytterbium, Yb-00035

- 76603-92-4 Dichloro(2,2-dimethylpropylidene)-oxobis(trimethylphosphine)tungsten, W -00068
- 76642-46-1 Chloromethylidynetetrakis(trimethylphosphine)tungsten, W -00088
- 76671-79-9 [μ -(Acetyl-C:O)][μ -(η^2 -carbonyl)][carbonyl(η^5 -2,4-cyclopentadien-1-yl)molybdenum]bis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Mo-00107
- 76747-86-9 Bis(2,4-cyclopentadien-1-yl)(3,3-dimethylbutynyl)erbium, Er-00012
- 76772-61-7 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-(trimethylsilyl)zirconium, Zr-00030
- 76791-31-6 (η^5 -2,4-Cyclopentadien-1-yl)[(1,2- η)-1,2-diphenylethenyl]bis(trimethylphosphite-P)-molybdenum, Mo-00129
- 76830-38-1 Dicarboxylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]hafnium, Hf-00036
- 76933-95-4 Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-phenylenebis(trimethylsilyl)methylene]zirconium, Zr-00086
- 76933-96-5 Bis(η^5 -2,4-cyclopentadien-1-yl)[1,2-phenylenebis(trimethylsilyl)methylene]hafnium, Hf-00040
- 76992-41-1 (2,2-Dimethylpropylidene)tris(2-methyl-2-propanolato)tantalum, Ta-00032
- 77001-15-1 (Acetyl-C:O)chlorobis(η^5 -2,4-cyclopentadien-1-yl)zirconium, Zr-00022
- 77026-98-3 Benzylidenetrichlorobis(trimethylphosphine)tantalum, Ta-00023
- 77089-97-5 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)[1-(dimethylaluminio)-2-methyl-1-pentenyl]zirconium, Zr-00052
- 77260-81-2 Chloro(diethylamino)-bis(pentamethylcyclopentadienyl)thorium, Th-00022
- 77260-83-4 Chloro(diethylamino)-bis(pentamethylcyclopentadienyl)uranium, U -00054
- 77260-84-5 Chloro(dimethylamino)-bis(pentamethylcyclopentadienyl)thorium, Th-00019
- 77260-85-6 Bis(dimethylamino)-bis(pentamethylcyclopentadienyl)uranium, U -00055
- 77260-87-8 Methyl(*N*-methylmethanaminato)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00021
- 77260-90-3 Chloro[(diethylamino)carbonyl-C:O]-bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00024
- 77260-96-9 Bis[(dimethylamino)carbonyl-C:O]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U -00060
- 77299-51-5 (η^5 -2,4-Cyclopentadien-1-yl)bis[1,2-ethanedijlbis(dimethylphosphine)-*P,P'*]niobium, Nb-00035
- 77357-85-8 Tris(η^5 -2,4-cyclopentadien-1-yl)-[(dimethylphenylphosphoranylidene)methyl]uranium, U -00051
- 77357-86-9 ▶Tris(η^5 -2,4-cyclopentadien-1-yl)-(methyl)diphenylphosphoranylidene(methyl)uranium, U -00069
- 77357-87-0 (η^5 -2,4-Cyclopentadien-1-yl)-tris[(diphenylphosphinideno)-bis(methylene)]uranium, U -00079
- 77424-05-6 Tricarbonyltri- μ -hydro(nonacarbonyl)- μ -hydrotriosmium)rhenium, Re-00049
- 77431-02-8 Bis(dimethylamino)-bis(pentamethylcyclopentadienyl)thorium, Th-00023
- 77507-86-9 Bis(η^5 -2,4-cyclopentadien-1-yl)bis(*N*-methylmethanaminato)uranium, U -00011
- 77507-88-1 Bis(η^5 -2,4-cyclopentadien-1-yl)bis(*N*-phenylbenzenaminato)uranium, U -00073
- 77674-18-1 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)bis(2-methylphenyl)- μ -oxodizirconium, Zr-00108
- 77827-07-7 Pentacarbonyl(cyano-C)tungstate(1-); Tetraethylammonium salt, in W -00012
- 77841-33-9 (Benzoyl-C:O)chlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U -00064
- 78064-47-8 Chlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbium; THF complex, in Yb-00021
- 78064-54-7 Di- μ -chloro(dichloroaluminum)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadienyl]ytterbium, Yb-00020
- 78067-94-4 Dichloro(2,2-dimethylpropyl)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](trimethylphosphine)zirconium, Zr-00055
- 78067-96-6 Tris(2,2-dimethylpropyl)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]zirconium, Zr-00090
- 78091-05-1 [(2,3- η)-2-Butyne][(1,2,3,3a,7a- η)-1*H*-inden-1-yl]bis(trimethylphosphine)molybdenum(1+), Mo-00109
- 78091-06-2 [(2,3- η)-2-Butyne][(1,2,3,3a,7a- η)-1*H*-inden-1-yl]bis(trimethylphosphine)molybdenum(1+); Tetrafluoroborate, in Mo-00109
- 78128-00-4 Diiodobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbate(1-); Li salt, in Yb-00023
- 78128-04-8 Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbate(1-); Li salt, bis(Et₂O) complex, in Yb-00022
- 78128-08-2 Dichlorobis[(1,2,3,4,5- η)-1-(methyl)diphenylsilyl]-2,4-cyclopentadien-1-yl]ytterbate(1-); Li salt, bis(diethyl ether) complex, in Yb-00034
- 78128-20-8 Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ytterbate(1-); Li salt, tetramethylethylenediamine complex, in Yb-00022
- 78163-63-0 Tribenzyl(η -cyclopentadienyl)zirconium, Zr-00094
- 78205-96-6 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-[(trimethylsilyl)methyl]hafnium, Hf-00017
- 78251-20-4 Tetrachloro(1,1-dimethylpropylidene)tungsten(1-); Tetraethylammonium salt, in W -00004
- 78251-21-5 Trichloro(1,1-dimethylpropylidene)-(triethylphosphine oxide-O)tungsten, W -00067
- 78379-40-5 Bis[(1,2,3,4,5,6- η)methylbenzene]-bis(trimethylstannyl)hafnium, Hf-00029
- 78379-41-6 Bis[(1,2,3,4,5,6- η)methylbenzene]-bis(trimethylstannyl)zirconium, Zr-00067
- 78577-75-0 Chlorobis(η^5 -2,4-cyclopentadien-1-yl)-(triphenylphosphonium η -methylide)lutetium, Lu-00022
- 78599-84-5 Chlorotris[(1,2,3,3a,7a- η)-1,4,7-trimethyl-1*H*-inden-1-yl]thorium, Th-00037
- 78599-85-6 Chlorotris[(1,2,3,3a,7a- η)-1,4,7-trimethyl-1*H*-inden-1-yl]uranium, U -00076
- 78607-84-8 (Acetato-O)[(1,2,3,4,5- η)methylbenzene](η^3 -2-propenyl)tungsten, W -00077
- 78683-33-7 *tert*-Butylbis(η^5 -cyclopentadienyl)erbium; THF complex, in Er-00009
- 78789-95-4 Bis(benzeneselenolato)bis(η^5 -2,4-cyclopentadien-1-yl)hafnium, Hf-00035
- 78833-68-8 Dicarboxyl(η^5 -2,4-cyclopentadien-1-yl)-bis(triphenylphosphine)molybdenum(1+); Tetrafluoroborate, in Mo-00143
- 78937-14-1 ▶Pentacarbonylvanadate(3-); Tri-K salt, in V -00008
- 78937-16-3 Amminepentacarbonylvanadate(1-); Tetraphenylarsonium salt, in V -00001
- 78954-02-6 Pentacarbonyl(2-isocyano-2-methylpropane)vanadate(1-); Tetraethylammonium salt, in V -00025
- 79063-52-8 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)protactinium, Pa-00002
- 79102-83-3 Bis[(η^6 -phenyl)ferrocene]chromium(1+); Tetraphenylborate, in Cr-00174
- 79135-08-3 Tetracarbonyl(triisopropylphosphine)tungstate(2-), W -00087
- 79135-09-4 Tetracarbonyl(triphenylstannane)-(triisopropylphosphine)tungstate(1-); Li salt, in W -00152
- 79135-11-8 Tetracarbonyl(triphenylstannane)-(triisopropylphosphine)tungstate(1-); Tetraethylammonium salt, in W -00152

- 79194-27-7 [Bis(trimethylsilyl)methyl]bis(η^5 -2,4-cyclopentadien-1-yl)phenylzirconium, Zr-00082
- 79255-11-1 [(Acetonitrile)decacarbonyl- μ -hydrotriosmium]pentacarbonylrhenium, Re-00074
- 79292-30-1 Bis(η^5 -2,4-cyclopentadien-1-yl)-hydro(tetrahydrofuran)lutetium, *in* Lu-00005
- 79301-20-5 Chloro(methyl)bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00018
- 79372-14-8 Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]samarium; Bis-THF complex, *in* Sm-00012
- 79391-56-3 Tricarbonyl(η^6 -octamethylnaphthalene)chromium, Cr-00154
- 79391-57-4 Tricarbonyl(η^6 -octamethylnaphthalene)molybdenum, Mo-00118
- 79391-58-5 Tricarbonyl(η^6 -octamethylnaphthalene)tungsten, W-00134
- 79503-47-2 Bis(η^5 -2,4-cyclopentadien-1-yl)(2,2-dimethyl-1-oxopropyl-C,O)lutetium, Lu-00013
- 79533-62-3 Tris(η^5 -2,4-cyclopentadien-1-yl)lanthanum; THF adduct, *in* La-00004
- 79643-31-5 Pentacarbonyl[(2,3-diphenyl-2-cyclopropen-1-yl)]-carbonylrhenium, Re-00078
- 79643-33-7 Pentacarbonyl(1,2-diphenyl-2-cyclopropen-1-yl)rhenium, Re-00077
- 79716-32-8 Tetrakis(η^5 -2,4-cyclopentadien-1-yl)[μ -(2,2,7,7-tetramethyl-3,4,5,6-octanetetron- O^3, O^5, O^4, O^6)]dilutetium, Lu-00024
- 79739-15-4 Bis[μ -(1- η :2,3- η)-2-propenyl]bis(η^5 -2-propenyl)dimolybdenum, Mo-00072
- 79847-76-0 Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]diphenylzirconium, Zr-00107
- 79932-08-4 Hydrobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](2,2,4,4-tetramethyl-3-pentanolato)thorium, Th-00032
- 80049-78-1 Decacarbonyl(μ -diphenylphosphido)ditungstate(1-), W-00136
- 80145-92-2 Methylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]lutetium; Et₂O complex, *in* Lu-00019
- 80287-59-8 Dicyclopentenouranocene, U-00044
- 80410-05-5 Tris(η^5 -2,4-cyclopentadien-1-yl)methylthorium, Th-00010
- 80410-09-9 Tris(η^5 -2,4-cyclopentadien-1-yl)(1-methylpropyl)uranium, U-00030
- 80410-12-4 Iodotris(η^5 -2,4-cyclopentadien-1-yl)thorium, Th-00007
- 80432-28-6 Tetracarbonyl[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]niobium, Nb-00030
- 80432-35-5 Tetrachloro[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]niobium, Nb-00016
- 80502-52-9 Tris[(1,2,3,4,5- η)-2,4-dimethyl-2,4-pentadienyl]neodymium, Nd-00009
- 80602-96-6 [1,2-Ethanediy]bis(dimethylphosphine)-*P, P'*-hydrobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U-00061
- 80642-67-7 *tert*-Butylbis(methylcyclopentadienyl)yttrium; THF complex, *in* Y-00008
- 80658-44-2 Di- μ -hydrotetrakis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]bis(tetrahydrofuran)diyttrium, Y-00015
- 80679-14-7 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -diethyldiazomalonate-*N, N'*)vanadium, V-00080
- 80679-48-7 Bis(acetonitrile)bis(η^5 -pentamethyl-2,4-cyclopentadien-1-yl)vanadium(1+); Hexafluorophosphate, *in* V-00101
- 80679-49-8 Dicarbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]vanadium(1+); Hexafluorophosphate, *in* V-00093
- 80737-39-9 Bis(η^5 -2,4-cyclopentadien-1-yl)(η^2 -C,O-formaldehyde)vanadium, V-00045
- 80758-23-2 [μ -(Carbonyl-C,O)]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-(tricarboxylcobalt)ytterbium; THF adduct, *in* Yb-00026
- 80795-37-5 μ -Chlorohexakis(η^5 -2,4-cyclopentadien-1-yl)di- μ -hydro- μ_3 -hydrotrierbate(1-); Li salt, tetra-THF complex, *in* Er-00017
- 80878-91-7 Tetrakis[μ_3 -(carbonyl-C,C,O)]-(heptacarbonyltriiron)tetrakis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]diytterbium, Yb-00036
- 80952-45-0 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)dihydorrhenium, Re-00028
- 80952-46-1 Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)dimethylrhenium, Re-00039
- 81033-04-7 Chlorotris(η^5 -2,4-cyclopentadien-1-yl)plutonium, Pu-00001
- 81276-69-9 Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-diethylcarbomodithioato-S,S'-ytterbium, Yb-00027
- 81276-72-4 Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadienyl]bis(pyridine)ytterbium, Yb-00031
- 81277-17-0 Dichlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](1*H*-pyrazole-*N*²)uranium, U-00050
- 81277-18-1 Chlorobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl](1*H*-pyrazolato-*N*^{1, N}²)uranium, U-00049
- 81293-74-5 Bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]bis(1*H*-pyrazolato-*N*^{1, N}²)uranium, U-00059
- 81388-97-8 Tris(η^5 -2,4-cyclopentadien-1-yl)-[(methyl)diphenylphosphorylidene]acetyl]uranium, U-00070
- 81496-90-4 (Dibenzyl)dimethylstannane)bis(tricarbonylchromium), Cr-00158
- 81507-33-7 Dichlorobis[(1,2,3,4,5- η)-1,3-bis(trimethylsilyl)-2,4-cyclopentadien-1-yl]neodymate(1-); Li salt, Bis-THF complex, *in* Nd-00010
- 81507-53-1 Bis[1,3-bis(trimethylsilyl)cyclopentadienyl]chloroscandium; Dimer, *in* Sc-00010
- 81507-56-4 Bis[1,3-bis(trimethylsilyl)cyclopentadienyl]chloropraesodymium, Pr-00006
- 81536-99-4 Tetrakis[(1,2,3,4,5- η)-1,3-bis(trimethylsilylmethyl)-2,4-cyclopentadien-1-yl]di- μ -chlorodiytterbium, *in* Yb-00029
- 81703-54-0 Dichloro(η^5 -2,4-cyclopentadien-1-yl)erbium; Tris-THF adduct, *in* Er-00001
- 81831-31-4 Amminepentacarbonylvanadate(1-); Na salt, *in* V-00001
- 81831-32-5 Amminepentacarbonylvanadate(1-); Bis(triphenylphosphine)iminium salt, *in* V-00001
- 82293-70-7 Butylbis(η^5 -2,4-cyclopentadien-1-yl)lutetium; THF complex, *in* Lu-00009
- 82293-72-9 Bis(η^5 -2,4-cyclopentadien-1-yl)-[(trimethylsilyl)methyl]ytterbium; THF complex, *in* Yb-00011
- 82293-73-0 Bis(η^5 -2,4-cyclopentadien-1-yl)-[(trimethylsilyl)methyl]samarium, Sm-00008
- 82311-89-5 Bis(η^5 -2,4-cyclopentadien-1-yl)-[(trimethylsilyl)methyl]erbium; THF complex, *in* Er-00010
- 82511-71-5 [(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]trichlorothorium; Bis-THF complex, *in* Th-00002
- 82511-72-6 [(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadienyl]trichlorouranium; Bis-THF complex, *in* U-00008
- 82511-73-7 Tribenzyl(pentamethylcyclopentadienyl)thorium, Th-00036
- 82511-74-8 Tribenzyl(pentamethylcyclopentadienyl)uranium, U-00072
- 82963-77-7 Bis(η^4 -1,3-butadiene)(trimethyl phosphite)manganese, Mn-00070
- 82963-81-3 Bis(η^4 -1,3-butadiene)(trimethyl phosphite)manganate(1-); Tetrabutylammonium salt, *in* Mn-00069

83243-22-5	μ -Chloro- μ_3 -chlorotetrakis(η^5 -2,4-cyclopentadien-1-yl)trihydro[1,1'-oxybis[ethane]]aluminumdiyttrium, Y -00014	84850-72-6	Octacarbonyl- μ -dihydrodichromate(2-); Bis-(tetraethylammonium) salt, <i>in</i> Cr-00037
83350-15-6	μ -Carbonylpentacarbonyl(η^5 -2,4-cyclopentadienyl)iron- μ -methylenemanganese, Mn-00079	84895-68-1	Tris(2-methyl-1-propenyl)[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]uranium, U -00046
83378-77-2	Dicarbonylnitrosyl(η^4 -tetraphenylcyclobutadiene)manganese, Mn-00136	84895-69-2	[(1,2,3,4,5- η)-1,2,3,4,5-Pentamethyl-2,4-cyclopentadien-1-yl]tris(2-propenyl)uranium, U -00031
83463-59-6	Hydridobis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]lutetium, Lu-00018	85962-87-4	Methylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]lutetium, Lu-00019
84254-54-6	[Bis(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-[bis(dimethylphosphino)methane]chloroytterbium, Yb-00028	86528-31-6	Bis- μ - <i>tert</i> -butylformimidoyltetrakis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]diyttrium, Y -00016
84474-41-9	Di- μ -carbonyl[μ_4 -(η^2 -carbonyl-C:C:C)] [μ -carbonylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-dicobalt]bis(η^5 -2,4-cyclopentadien-1-yl)dimo-lybdenum, Mo-00141	86543-76-2	Chloro[1-hydroxy-4,4-dimethyl-1-(trimethylphosphoranylidene)-2-pentanonato- <i>O,O'</i>]bis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]thorium, Th-00034
84582-80-9	(η^8 -1,3,5,7-Cyclooctatetraene)-(trimethylsilylmethyl)bis(tetrahydrofuran)lu-tetium, <i>in</i> Lu-00007	87136-56-9	Methylbis[(1,2,3,4,5- η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]yttrium, Y -00012
84623-27-8	Chlorobis[(1,2,3,4,5- η)-1-methyl-2,4-cyclopentadien-1-yl]samarium; THF adduct, <i>in</i> Sm-00006	87145-50-4	Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)tetramethy-lenerhenium, Re-00045
84642-15-9	Bis[μ -(3,3-dimethyl-1-butyn-1-yl)]-tetrakis(1,2,3,4,5- η -1-methyl-2,4-cyclopentadien-1-yl)disamarium, Sm-00018	87145-51-5	Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydorrhe-nate(1-); K salt, <i>in</i> Re-00027
84850-68-0	Octacarbonyl- μ -dihydrodimolybdate(2-); Tetraeth-ylammonium salt, <i>in</i> Mo-00009	87145-52-6	Dicarbonyl(η^5 -2,4-cyclopentadien-1-yl)hydorrhe-nate(1-); Tetraethylammonium salt, <i>in</i> Re-00027
		87450-50-8	Bis[1,2-ethanediy]bis(dimethylphosphine)]- <i>P,P'</i> -dimethylmanganese, Mn-00095