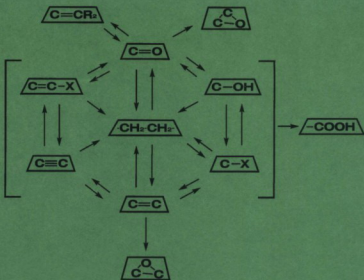


Compendium of Organic Synthetic Methods

Volume 8



Michael B. Smith

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Volume 8

MICHAEL B. SMITH

DEPARTMENT OF CHEMISTRY
THE UNIVERSITY OF CONNECTICUT
STORRS, CONNECTICUT



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DEDICATION

This book is dedicated to Dr. Ted Hoffman, who recently retired as Senior Editor at Wiley-Interscience after a long and distinguished career. Ted was responsible for getting the *Compendium* started and for keeping it going for more than twenty years. The many books and series for which Ted served as editor have contributed enormously both to chemical education and to chemical research. It would be difficult to find a bookshelf in an organic chemistry research lab anywhere in the world that does not contain one or more of the books for which Ted served as editor. On a more personal level, the publication of Volume 6 of this series in 1988 began my career as an author, and many new opportunities have been opened to me because of this. There are certainly many others who can similarly thank Ted.

I want to use this dedication to thank Ted for his help to me, for his help to the previous authors of the *Compendium*, and for his contributions to the chemistry community in general (particularly the organic chemistry community). Those contributions are many and important. Thank you, and good luck in your retirement.

MICHAEL B. SMITH

PREFACE

Since the original volume in this series by Ian and Shuyen Harrison, the goal of the *Compendium of Organic Synthetic Methods* was to facilitate the search for functional group transformations in the original literature of Organic Chemistry. In Volume 2, difunctional compounds were added and this compilation was continued by Louis Hegedus and Leroy Wade for Volume 3 of the series. Wade became the author for Volume 4 and continued with Volume 5. I began editing the series with Volume 6, where I introduced an author index for the first time and added a new chapter (Chapter 15, Oxides). Volume 7 introduced Section 378 (Oxides-Alkynes) through Section 390 (Oxides-Oxides). The *Compendium* is a handy desktop reference that will remain a valuable tool to the working organic chemist, allowing a "quick check" of the literature. It also allows one to "browse" for new reactions and transformations that may be of interest. The body of organic literature is very large and the *Compendium* is a focused and highly representative review of the literature and is offered in that context.

Compendium of Organic Synthetic Methods, Volume 8, contains both functional group transformations and carbon-carbon bond forming reactions from the literature appearing in the years 1990, 1991, and 1992. The classification schemes used for Volumes 6 and 7 have been continued. Difunctional compounds appear in Chapter 16. The experienced user of the *Compendium* will require no special instructions for the use of Volume 8. Author citations and the Author Index have been continued as in Volumes 6 and 7.

Every effort has been made to keep the manuscript error free. Where there are errors, I take full responsibility. If there are questions or comments, the reader is encouraged to contact me directly at the address, phone, fax, or E-mail addresses given below. Note that the phone and fax area code for this section of Connecticut is tentatively scheduled to change in 1996 to (860).

The manuscript for Volume 8 was prepared on a Macintosh-IIci™ PC using Microsoft Word™ (version 5.1) for word processing. All structures were prepared using ChemDraw™ (version 3.1) and the manuscript was printed with a LaserWriter™ II printer. The graph presented in the introduction was prepared using Cricket-Graph.™

As I have throughout my writing career, I want to thank my wife Sarah and my son Steven, who have shown unfailing patience and devotion during this work. I also thank Ms. Carla Fjerstad, who edited this volume and was responsible for its publication.

MICHAEL B. SMITH

University of Connecticut
Department of Chemistry
215 Glenbrook Rd., Room 151
Storrs, CT USA 06269-3060

Voice Phone: 203-486-2881
Fax: 203-486-2981
E-mail: MBSMITH@UCONNVM.edu

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ABBREVIATIONS

Ac

Acetyl



acac

Acetylacetonate

AIBN

azo-*bis*-Isobutyronitrile

aq.

Aqueous



9-Borabicyclo[3.3.1]nonyl

9-BBN

9-Borabicyclo[3.3.1]nonyl

BINAP

2*R*,3*S*-2,2'-*bis*-(diphenylphosphino)-1,1'-binaphthyl

Bn

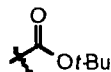
Benzyl

Bz

Benzoyl

BOC

t-Butoxycarbonyl

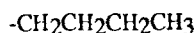


Bpy (Bipy)

2,2'-Bipyridyl

Bu

n-Butyl



CAM

Carboxamidomethyl

CAN

Ceric ammonium nitrate



c-

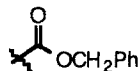
Cyclo-

Cat.

Catalytic

Cbz

Carbobenzyloxy



Chirald

2*S*,3*R*-(+)-4-Dimethylamino-1,2-diphenyl-3-methylbutan-2-ol

COD

1,5-Cyclooctadienyl

COT

1,3,5-Cyclooctatrienyl

Cp

Cyclopentadienyl

CSA

Camphorsulfonic acid

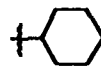
CTAB

cetyltrimethylammonium bromide



Cy (*c*-C6H11)

Cyclohexyl



° C

Temperature in Degrees Centigrade

DABCO

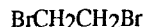
1,4-Diazabicyclo[2.2.2]octane

Dba

Dibenzylidene acetone

DBE

1,2-Dibromoethane



DBN

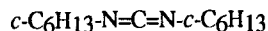
1,5-Diazabicyclo[4.3.0]non-5-ene

DBU

1,8-Diazabicyclo[5.4.0]undec-7-ene

DCC

1,3-Dicyclohexylcarbodiimide

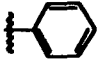
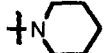


DCE

1,2-Dichloroethane



DDQ	2,3-Dichloro-5,6-dicyano-1,4-benzoquinone	
% de	% Diastereomeric excess	
DEA	Diethylamine	$\text{HN}(\text{CH}_2\text{CH}_3)_2$
DEAD	Diethylazodicarboxylate	$\text{EtO}_2\text{C}-\text{N}=\text{NCO}_2\text{Et}$
Dibal-H	Diisobutylaluminum hydride	$(\text{Me}_2\text{CHCH}_2)_2\text{AlH}$
Diphos (dppe)	1,2- <i>bis</i> -(Diphenylphosphino)ethane	$\text{Ph}_2\text{PCH}_2\text{CH}_2\text{PPh}_2$
Diphos-4 (dppb)	1,4- <i>bis</i> -(Diphenylphosphino)butane	$\text{Ph}_2\text{P}(\text{CH}_2)_4\text{PPh}_2$
DMAP	4-Dimethylaminopyridine	
DME	Dimethoxyethane	$\text{MeOCH}_2\text{CH}_2\text{OMe}$
DMF	<i>N,N'</i> -Dimethylformamide	$\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C}-\text{N}(\text{CH}_3)_2 \end{array}$
Dmp	<i>bis</i> -[1,3-Di(<i>p</i> -methoxyphenyl)-1,3-propanedionato]	
Dpm	Dipivaloylmethanato	
Dppb	1,4- <i>bis</i> -(Diphenylphosphino)butane	$\text{Ph}_2\text{P}(\text{CH}_2)_4\text{PPh}_2$
Dppe	1,2- <i>bis</i> -(Diphenylphosphino)ethane	$\text{Ph}_2\text{PCH}_2\text{CH}_2\text{PPh}_2$
Dppf	<i>bis</i> -(Diphenylphosphino)ferrocene	
Dppp	1,3- <i>bis</i> -(Diphenylphosphino)propane	$\text{Ph}_2\text{P}(\text{CH}_2)_3\text{PPh}_2$
Dvb	Divinylbenzene	
e ⁻	Electrolysis	
% ee	% Enantiomeric excess	
EE	1-Ethoxyethyl	$\text{EtO}(\text{Me})\text{CHO}-$
Et	Ethyl	$-\text{CH}_2\text{CH}_3$
EDA	Ethylenediamine	$\text{H}_2\text{NCH}_2\text{CH}_2\text{NH}_2$
EDTA	Ethylenediaminetetraacetic acid	
FMN	Flavin mononucleotide	
Fod	<i>tris</i> -(6,6,7,7,8,8,8)-Heptafluoro-2,2-dimethyl-3,5-octanedionate	
Fp	Cyclopentadienyl- <i>bis</i> -carbonyl iron	
FVP	Flash Vacuum Pyrolysis	
h	Hour (hours)	
hν	Irradiation with light	
1,5-HD	1,5-Hexadienyl	
HMPA	Hexamethylphosphoramide	$(\text{Me}_3\text{N})_2\text{P}=\text{O}$
HMPT	Hexamethylphosphorus triamide	$(\text{Me}_3\text{N})_3\text{P}$
iPr	Isopropyl	$-\text{CH}(\text{CH}_3)_2$
LICA (LIPCA)	Lithium cyclohexylisopropylamide	
LDA	Lithium diisopropylamide	$\text{LiN}(\text{iPr})_2$
LHMDS	Lithium hexamethyldisilazide	$\text{LiN}(\text{SiMe}_3)_2$
LTMP	Lithium 2,2,6,6-tetramethylpiperidide	
MABR	Methylaluminum <i>bis</i> -(4-bromo-2,6-di- <i>tert</i> -butylphenoxide)	
MAD	<i>bis</i> -(2,6-Di- <i>t</i> -butyl-4-methylphenoxy)methyl aluminum	
mCPBA	<i>meta</i> -Chloroperoxybenzoic acid	
Me	Methyl	$-\text{CH}_3$
MEM	β-Methoxyethoxymethyl	$\text{MeOCH}_2\text{CH}_2\text{OCH}_2-$
Mes	Mesityl	2,4,6-tri-Me-C ₆ H ₂

MOM	Methoxymethyl	MeOCH ₂ -
Ms	Methanesulfonyl	CH ₃ SO ₂ -
MS	Molecular Sieves (3Å or 4Å)	
MTM	Methylthiomethyl	MeSCH ₂ -
NAD	Nicotinamide adenine dinucleotide	
NADP	Sodium triphosphopyridine nucleotide	
Naph	Naphthyl (C ₁₀ H ₇)	
NBD	Norbomadiene	
NBS	<i>N</i> -Bromosuccinimide	
NCS	<i>N</i> -Chlorosuccinimide	
NIS	<i>N</i> -Iodosuccinimide	
Ni(R)	Raney nickel	
Oxone	2 KHSO ₅ •KHSO ₄ •K ₂ SO ₄	
	Polymeric backbone	
PCC	Pyridinium chlorochromate	
PDC	Pyridinium dichromate	
PEG	Polyethylene glycol	
Ph	Phenyl	
PhH	Benzene	
PhMe	Toluene	
Phth	Phthaloyl	
Pic	2-Pyridinecarboxylate	
Pip	Piperidyl	
Pr	<i>n</i> -Propyl	-CH ₂ CH ₂ CH ₃
Py	Pyridine	
quant.	Quantitative yield	
Red-Al	[(MeOCH ₂ CH ₂ O) ₂ AlH ₂]Na	
sBu	<i>sec</i> -Butyl	CH ₃ CH ₂ CH(CH ₃)
sBuLi	<i>sec</i> -Butyllithium	CH ₃ CH ₂ CH(Li)CH ₃
Siamyl	Diisoamyl	[(CH ₃) ₂ CHCH ₂ CH(CH ₃)] ₂
TASF	<i>tris</i> -(Diethylamino)sulfonium difluorotrimethyl silicate	
TBAF	Tetrabutylammonium fluoride	<i>n</i> -Bu ₄ N ⁺ F ⁻
TBDMS	<i>t</i> -Butyldimethylsilyl	<i>t</i> -BuMe ₂ Si
TBHP (<i>t</i> -BuOOH)	<i>t</i> -Butylhydroperoxide	Me ₃ COOH
<i>t</i> -Bu	<i>tert</i> -Butyl	-C(CH ₃) ₃
TEBA	Triethylbenzylammonium	Bn(Et) ₃ N ⁺
TEMPO	Tetramethylpiperidinyloxy free radical	
TFA	Trifluoroacetic acid	CF ₃ COOH

TFAA	Trifluoroacetic anhydride	$(\text{CF}_3\text{CO})_2\text{O}$
Tf (OTf)	Triflate	$-\text{SO}_2\text{CF}_3$ ($-\text{OSO}_2\text{CF}_3$)
THF	Tetrahydrofuran	
THP	Tetrahydropyran	
TMEDA	Tetramethylethylenediamine	$\text{Me}_2\text{NCH}_2\text{CH}_2\text{NMe}_2$
TMS	Trimethylsilyl	$-\text{Si}(\text{CH}_3)_3$
TMP	2,2,6,6-Tetramethylpiperidine	
TPAP	tetra- <i>n</i> -Propylammonium perruthenate	
Tol	Tolyl	4- $\text{C}_6\text{H}_4\text{CH}_3$
Tr	Trityl	$-\text{CPh}_3$
TRIS	Triisopropylphenylsulfonyl	
Ts(Tos)	Tosyl = <i>p</i> -Toluenesulfonyl	4- $\text{MeC}_6\text{H}_4\text{SO}_2-$
))))))	Sonication	
X _C	Chiral auxiliary	

INDEX, MONOFUNCTIONAL COMPOUNDS

Sections—heavy type

Pages—light type

PREPARATION OF →

FROM

Alkynes
Carboxylic acids,
acid halides, anhydrides
Alcohols, phenols
Aldehydes
Alkyls, methylenes,
aryls
Amines
Amides
Esters
Ethers, epoxides
Halides, sulfonates
Hydrides (RH)
Ketones
Nitriles
Alkenes
Oxides

PROTECTION

Sect. Pg.
Carboxylic acids 30A 14
Alcohols, phenols 45A 48
Aldehydes 60A 64
Amides 90A 138
Amines 105A 163
Ketones 180A 239

Blanks in the table correspond to sections for which no additional examples were found in the literature.

Alkynes	1	16	61	76	91	106	121	166	196
1	6	66	117	139	166	184		220	247
Carboxylic acids	2	17	32	47	62	77	92	107	197
acid halides, anhydrides	2	6	16	54	67	117	139	166	212
Alcohols, phenols	18	33	48	63	78	93	108	123	198
7	18	54	68	119	140	168	184	200	213
Aldehydes	4	19	34	49	64	79	94	109	199
2	8	18	58	69	119	140	172	186	214
Alkyls, methylenes, aryls	20	35	50	65					267
9	28	58	69						270
Amides	21	36	51	81	96	111		171	200
9	29	59		120	142	173		227	253
Amines	7		52	67	82	97	112	127	186
3	59	70	127	144	174	188	202	213	201
Esters	23	38	53	68	83	98	113	128	172
10	29	60	70	131	153	174	188	203	187
Ethers, epoxides	24	39	54	69	99	114	129	159	202
11	30	61	71	153	176	189	214	230	219
Halides, sulfonates, sulfates	10	25	40	55	70	85	100	115	189
3	11	35	61	72	132	153	177	191	204
Hydrides (RH)	41	56	71	86	101	116	146	176	219
36	62	78	133	155	178	205	233	244	255
Ketones	12	27	42	57	72	87	102	117	256
4	13	39	63	79	133	155	179	193	205
Nitriles	28	43	58	73	88	103	118	163	177
13	45	63	80	134	157	182		219	234
Alkenes	29	44	59	74	89	104	119	134	178
14	45	63	81	135	158	182	194	207	193
Miscellaneous compounds	15	30	45	60	75	90	105	120	245
5	14	47	64	116	136	159	183	198	261
									272
									273

Pages—light type

Alkyne		Carbonyl acid		Alcohol		Aldehyde		Ketone		Nitride		Alkene		Oxides	
3000	276	312	288	302	277	323	288	324	333	324	333	324	333	324	333
				315	288	323	294	325	334	325	334	325	334	325	334
				288	294	323		306	365	375		306	365	375	
								316	335	343	350	316	335	343	350
				279	291	309		309	366	376	396	309	366	376	396
				306	292	317		327	336	344	351	327	336	344	351
				280	292	318		328	368	380	405	328	368	380	405
				307	281	318		328	337	345	352	328	337	345	352
				281	292	328		329	338	346	353	329	338	346	353
				282	292	336		336	369	382	408	336	369	382	408
				309	283	320		330	339	347	354	330	339	347	354
				283	293	340		340	370	383	409	340	370	383	409
								331	348	355	361	331	348	355	361
								348	386	414	444	348	386	414	444
				311	284	322		332	341	349	356	332	341	349	356
				284	294	352		352	371	386	414	352	371	386	414
				380	341	382		383	383	384	385	383	384	385	386
				540	540	541		541	543	544	547	541	543	544	547
				378											
				540											

Blanks in the table correspond to sections for which no additional examples were found in the literature.

INTRODUCTION

Relationship between Volume 8 and Previous Volumes. *Compendium of Organic Synthetic Methods*, Volume 8, presents about 1400 examples of published reactions for the preparation of monofunctional compounds, updating the 9250 in Volumes 1–7. Volume 8 contains about 1640 examples of reactions which prepare difunctional compounds with various functional groups. Reviews have long been a feature of this series and Volume 8 adds almost 60 pertinent reviews in the various sections. It is interesting that Volume 8 contains approximately 1200 more entries than Volume 7 for an identical three-year period. One or two important new journals appear (such as *SynLett*), but the most dramatic increase was in reactions that prepared difunctional compounds. This increase in reactions led me to “compress” the format of the *Compendium* somewhat, in an attempt to keep the length of the manuscript in line with previous volumes.

Chapters 1–14 continue as in Volumes 1–7, as does Chapter 15, introduced in Volume 6. Difunctional compounds appear in Chapter 16, as in Volumes 6 and 7. The sections on oxides as part of difunctional compounds, introduced in Volume 7, continue in Chapter 16 of Volume 8 with Section 378 (Oxides–Alkynes) through Section 390 (Oxides–Oxides).

Following Chapter 16 is a complete alphabetical listing of all authors (last name, initials). The authors for each citation appear below the reaction. The principle author is indicated by underlining (i.e., Kwon, T. W.; Smith, M. B.), as in Volume 7.

Classification and Organization of Reactions Forming Monofunctional Compounds. Chemical transformations are classified according to the reacting functional group of the starting material and the functional group formed. Those reactions that give products with the same functional group form a chapter. The reactions in each chapter are further classified into sections on the basis of the functional group of the starting material. Within each section, reactions are loosely arranged in ascending order of year cited (1990–1992), although an effort has been made to put similar reactions together when possible. Review articles are collected at the end of each appropriate section.

The classification is unaffected by allylic, vinylic, or acetylenic unsaturation appearing in both starting material and product, or by increases or decreases in the length of carbon chains; for example, the reactions $t\text{-BuOH} \rightarrow t\text{-BuCOOH}$, $\text{PhCH}_2\text{OH} \rightarrow \text{PhCOOH}$, and $\text{PhCH=CHCH}_2\text{OH} \rightarrow \text{PhCH=CHCOOH}$ would all be considered as preparations of carboxylic acids from alcohols. Conjugate reduction and alkylation of unsaturated ketones, al-

dehydes, esters, acids, and nitriles have been placed in Sections 74D and 74E (Alkyls from Alkenes), respectively.

The terms hydrides, alkyls, and aryls classify compounds containing reacting hydrogens, alkyl groups, and aryl groups, respectively; for example, $\text{RCH}_2\text{-H} \rightarrow \text{RCH}_2\text{COOH}$ (carboxylic acids from hydrides), $\text{RMe} \rightarrow \text{RCOOH}$ (carboxylic acids from alkyls), $\text{RPh} \rightarrow \text{RCOOH}$ (carboxylic acids from aryls). Note the distinction between $\text{R}_2\text{CO} \rightarrow \text{R}_2\text{CH}_2$ (methylenes from ketones) and $\text{RCOR}' \rightarrow \text{RH}$ (hydrides from ketones). Alkylations involving additions across double bonds are found in Section 74 (Alkyls, Methylenes, and Aryls from Alkenes).

The following examples illustrate the classification of some potentially confusing cases:

$\text{RCH=CHCOOH} \rightarrow \text{RCH=CH}_2$	Hydrides from carboxylic acids
$\text{RCH=CH}_2 \rightarrow \text{RCH=CHCOOH}$	Carboxylic acids from hydrides
$\text{ArH} \rightarrow \text{ArCOOH}$	Carboxylic acids from hydrides
$\text{ArH} \rightarrow \text{ArOAc}$	Esters from hydrides
$\text{RCHO} \rightarrow \text{RH}$	Hydrides from aldehydes
$\text{RCH=CHCHO} \rightarrow \text{RCH=CH}_2$	Hydrides from aldehydes
$\text{RCHO} \rightarrow \text{RCH}_3$	Alkyls from aldehydes
$\text{R}_2\text{CH}_2 \rightarrow \text{R}_2\text{CO}$	Ketones from aldehydes
$\text{RCH}_2\text{COR} \rightarrow \text{R}_2\text{CHCOR}$	Ketones from ketones
$\text{RCH=CH}_2 \rightarrow \text{RCH}_2\text{CH}_3$	Alkyls from alkenes (Hydrogenation of Alkenes)
$\text{RBr} + \text{HC}\equiv\text{CH} \rightarrow \text{RC}\equiv\text{CR}$	Acetylenes from halides; also acetylenes from acetylenes
$\text{ROH} + \text{RCOOH} \rightarrow \text{RCOOR}$	Esters from alcohols; also esters from carboxylic acids
$\text{RCH}\equiv\text{CHCHO} \rightarrow \text{RCH}_2\text{CH}_2\text{CHO}$	Alkyls from alkenes (Conjugate Reduction)
$\text{RCH}\equiv\text{CHCN} \rightarrow \text{RCH}_2\text{CH}_2\text{CN}$	Alkyls from alkenes (Conjugate Reduction)

How to Use the Book to Locate Examples of the Preparation or Protection of Monofunctional Compounds. Examples of the preparation of one functional group from another are found in the monofunctional index on p. xvii, which lists the corresponding section and page. Sections that contain examples of the reactions of a functional group are found in the horizontal rows of this index. Section 1 gives examples of the reactions of acetylenes that form new acetylenes; Section 16 gives reactions of acetylenes that form carboxylic acids; and Section 31 gives reactions of acetylenes that form alcohols.

Examples of alkylation, dealkylation, homologation, isomerization, and transposition are found in Sections 1, 17, 33, and so on, lying close to a diagonal of the index. These sections correspond to such topics as the preparation of acetylenes from acetylenes; carboxylic acids from carbox-

ylic acids; and alcohols, thiols, and phenols from alcohols, thiols, and phenols. Alkylations that involve conjugate additions across a double bond are found in Section 74E (Alkyls, Methylenes, and Aryls from Alkenes).

Examples of name reactions can be found by first considering the nature of the starting material and product. The Wittig reaction, for instance, is in Section 199 (Alkenes from Aldehydes) and Section 207 (Alkenes from Ketones). The aldol condensation can be found in the chapters on difunctional compounds in Section 324 (Alcohol, Thiol-Aldehyde) and in Section 330 (Alcohol, Thiol-Ketone).

Examples of the protection of acetylenes, carboxylic acids, alcohols, phenols, aldehydes, amides, amines, esters, ketones, and alkenes are also indexed on p. xvii. Sections (designated with an A: 15A, 30A, etc.) with "protecting group" reactions are located at the end of pertinent chapters.

Some pairs of functional groups such as alcohol, ester; carboxylic acid, ester; amine, amide; and carboxylic acid, amide can be interconverted by simple reactions. When a member of these groups is the desired product or starting material, the other member should also be consulted in the text.

The original literature must be used to determine the generality of reactions, although this is occasionally stated in the citation. This is only done in cases where such generality is stated clearly in the original citation. A reaction given in this book for a primary aliphatic substrate may also be applicable to tertiary or aromatic compounds. This book provides very limited experimental conditions or precautions and the reader is referred to the original literature before attempting a reaction. **In no instance should a citation in this book be taken as a complete experimental procedure. Failure to refer to the original literature prior to beginning laboratory work could be hazardous.** The original papers usually yield a further set of references to previous work. Papers that appear after those publications can usually be found by consulting *Chemical Abstracts* and the *Science Citation Index*.

Classification and Organization of Reactions Forming Difunctional Compounds. This chapter considers all possible difunctional compounds formed from the groups acetylene, carboxylic acid, alcohol, thiol, aldehyde, amide, amine, ester, ether, epoxide, thioether, halide, ketone, nitrile, and alkene. Reactions that form difunctional compounds are classified into sections on the basis of two functional groups in the product that are pertinent to the reaction. The relative positions of the groups do not affect the classification. Thus preparations of 1,2-aminoalcohols, 1,3-aminoalcohols, and 1,4-aminoalcohols are included in a single section (Section 326, Alcohol-Amine). Difunctional compounds that have an oxide as the second group are found in the appropriate section (Sections 278–290). The nitroketone product of oxidation of a nitroalcohol is found in Section 386 (Ketone-Oxide). Conversion of an oxide to another functional group is generally found in the "Miscellaneous" section of the sections concerning mono-

functional compounds. Conversion of a nitroalkane to an amine, for example, is found in Section 105 (Amines from Miscellaneous Compounds). The following examples illustrate applications of this classification system:

<i>Difunctional Product</i>	<i>Section Title</i>
$\text{RC}\equiv\text{C}-\text{C}\equiv\text{CR}$	Acetylene-Acetylene
$\text{RCH}(\text{OH})\text{COOH}$	Carboxylic acid-Alcohol
$\text{RCH}=\text{CHOMe}$	Ether-Alkene
RCHF_2	Halide-Halide
$\text{RCH}(\text{Br})\text{CH}_2\text{F}$	Halide-Halide
$\text{RCH}(\text{OAc})\text{CH}_2\text{OH}$	Alcohol-Ester
$\text{RCH}(\text{OH})\text{CO}_2\text{Me}$	Alcohol-Ester
$\text{RCH}=\text{CHCH}_2\text{CO}_2\text{Me}$	Ester-Alkene
$\text{RCH}=\text{CHOAc}$	Ester-Alkene
$\text{RCH}(\text{OMe})\text{CH}_2\text{SO}_2\text{CH}_2\text{CH}_2\text{OH}$	Alcohol-Ether
$\text{RSO}_2\text{CH}_2\text{CH}_2\text{OH}$	Alcohol-Oxide

How to Use the Book to Locate Examples of the Preparation of Difunctional Compounds. The difunctional index on p. xviii gives the section and page corresponding to each difunctional product. Thus Section 327 (Alcohol, Thiol-Ester) contains examples of the preparation of hydroxyesters; Section 323 (Alcohol, Thiol-Alcohol, Thiol) contains examples of the preparation of diols.

Some preparations of alkene and acetylenic compounds from alkene and acetylenic starting materials can, in principle, be classified in either the monofunctional or difunctional sections; for example, the transformation $\text{RCH}=\text{CHBr} \rightarrow \text{RCH}=\text{CHCOOH}$ could be considered as preparing carboxylic acids from halides (Section 25, Monofunctional Compounds) or preparing a carboxylic acid-alkene (Section 322, Difunctional Compounds). The choice usually depends on the focus of the particular paper where this reaction was found. In such cases both sections should be consulted.

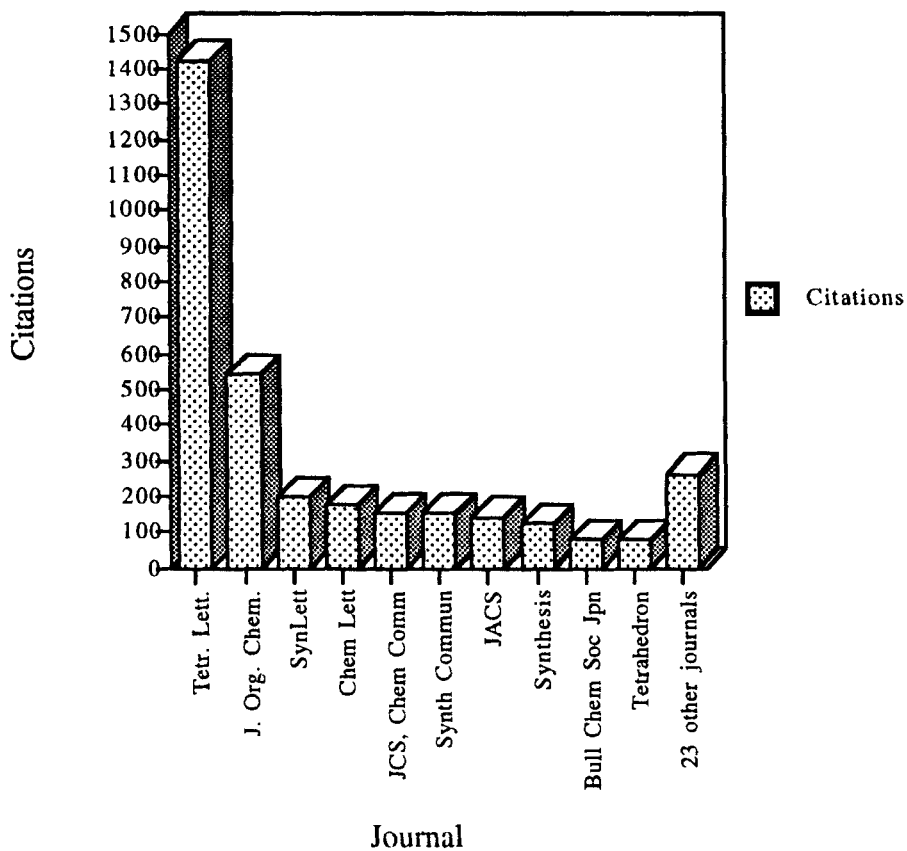
Reactions applicable to both aldehyde and ketone starting materials are in many cases illustrated by an example that uses only one of them. Likewise, many citations for reactions found in the Aldehyde-X sections, will include examples that can be placed in the Ketone-X section. Again, the choice is dictated by the paper where the reaction was found.

Many literature preparations of difunctional compounds are extensions of the methods applicable to monofunctional compounds. As an example, the reaction $\text{RCI} \rightarrow \text{ROH}$ might be used for the preparation of diols from an appropriate dichloro compound. Such methods are difficult to categorize and may be found in either the monofunctional or difunctional sections, depending on the focus of the original paper.

The user should bear in mind that the pairs of functional groups alcohol, ester; carboxylic acids, ester; amine, amide; and carboxylic acid, amide

can be interconverted by simple reactions. Compounds of the type $\text{RCH}(\text{OAc})\text{CH}_2\text{OAc}$ (ester-ester) would thus be of interest to anyone preparing the diol $\text{RCH}(\text{OH})\text{CH}_2\text{OH}$ (alcohol-alcohol).

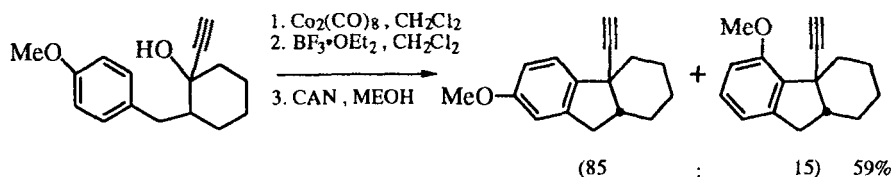
Sources of Literature Citations. I thought it would be useful for a reader of this *Compendium* to see the distribution of citations used in this book (i.e., which journals have the most new synthetic methodology). As seen in the accompanying graph, *Tetrahedron Letters* and *Journal of Organic Chemistry* account for roughly two-thirds of all the citations in Volume 8. This book was not edited to favor one category or type of article over another. Certainly, my own personal preferences undoubtedly creep into the selection of methods, but I believe that this compilation is an accurate representation of new synthetic methods that appear in the literature. Therefore, I believe the accompanying graph accurately reflects those journals where new synthetic methodology is located. I should point out that the category "23 other journals" includes: *Accts. Chem. Res.*; *Acta Chem. Scand.*; *Angew. Chem. Int. Ed. Engl.*; *Aust. J. Chem.*; *Bull. Chim. Soc. Belg.*; *Bull. Chim. Soc. Fr.*; *Can. J. Chem.*; *Chem. Ber.*; *Coll. Czech. Chem. Commun.*; *Gazz. Chim. Ital.*; *Heterocycles*; *Ind. J. Chem.*; *Isr. J. Chem.*; *Izv. Akad. Nauk. SSSR*; *J. Chem. Soc.*; *J. Het. Chem.*; *J. Indian Chem. Soc.*; *Liebigs Ann. Chem.*; *Org. Prep. Proceed Int.*; *Perkin Trans. I*; *Recl. Trav. Chim. Pays-Bas*; *Tetrahedron Asymmetry*; and, *Zhur. Org. Khim.* In addition, six more journals were examined but no references were recorded.



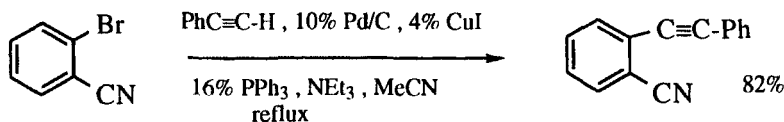
CHAPTER 1

PREPARATION OF ALKYNES

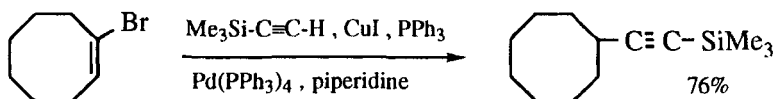
SECTION 1: ALKYNES FROM ALKYNES



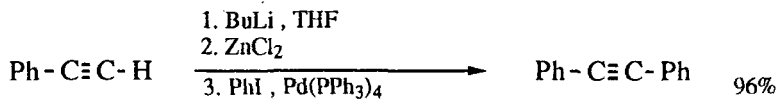
Grove, D.D.; Miskevich, F.; Smith, C.C.; Corte, J.R. *Tetrahedron Lett.*, **1990**, 31, 6277.



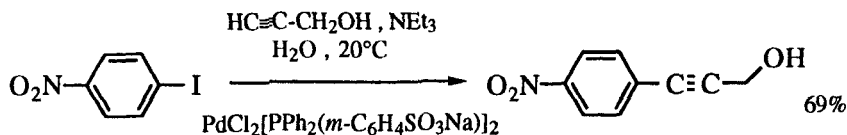
De la Rosa, M.A.; Velarde, E.; Guzmán, A. *Synth. Commun.*, **1990**, 20, 2059.



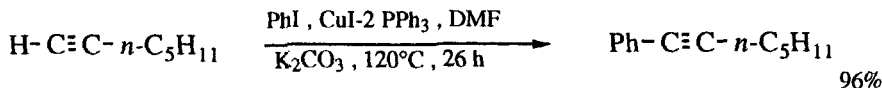
Brandsma, L.; van den Heuvel, H.G.M.; Verkruijsse, H.D. *Synth. Commun.*, **1990**, 20, 1889.



Yoneda, N.; Matsuoka, S.; Miyaura, N.; Fukuhara, T.; Suzuki, A. *Bull. Chem. Soc. Jpn.*, **1990**, 63, 2124.

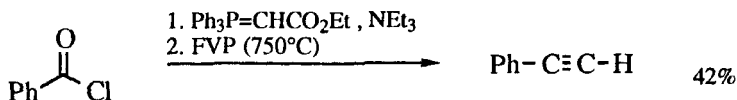


Bumagin, N.A.; Bykov, V.V.; Beletskaya, I.P. *Izv. Akad. Nauk. SSSR*, **1990**, 39, 2665 (Engl., p. 2418).



Okura, K.; Furuune, M.; Miura, M.; Nomura, M. *Tetrahedron Lett.*, **1992**, 33, 5363.

SECTION 2: ALKYNES FROM ACID DERIVATIVES

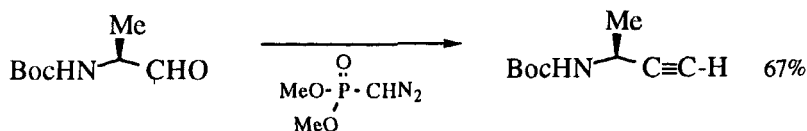


Aitken, R.A.; Seth, S. *SynLett*, **1990**, 211, 212.

SECTION 3: ALKYNES FROM ALCOHOLS AND THIOLS

NO ADDITIONAL EXAMPLES

SECTION 4: ALKYNES FROM ALDEHYDES



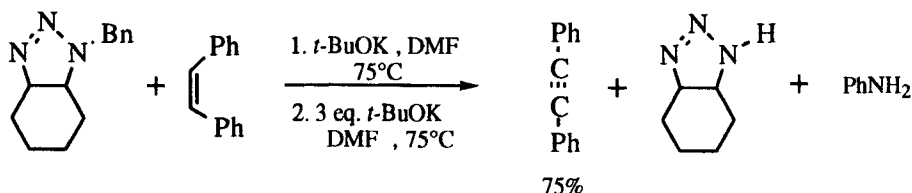
Hauske, J.R.; Dorff, P.; Julin, S.; Martinelli, G.; Bussolari, J. *Tetrahedron Lett.*, **1992**, 33, 3715.

SECTION 5: ALKYNES FROM ALKYL, METHYLENES AND ARYLS

NO ADDITIONAL EXAMPLES

SECTION 6: ALKYNES FROM AMIDES

NO ADDITIONAL EXAMPLES

SECTION 7: ALKYNES FROM AMINES

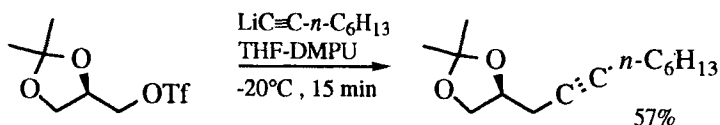
Paventi, M.; Elce, E.; Jackman, R.J.; Hay, A.S. *Tetrahedron Lett.*, **1992**, 33, 6405.

SECTION 8: ALKYNES FROM ESTERS

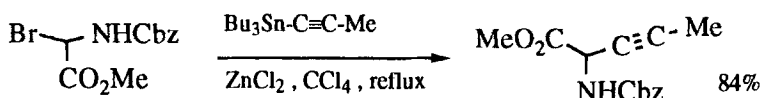
NO ADDITIONAL EXAMPLES

SECTION 9: ALKYNES FROM ETHERS, EPOXIDES AND THIOETHERS

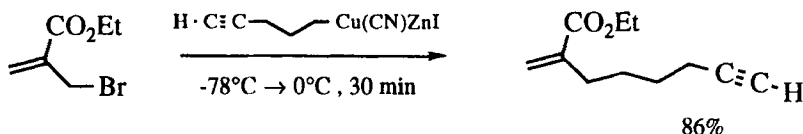
NO ADDITIONAL EXAMPLES

SECTION 10: ALKYNES FROM HALIDES AND SULFONATES

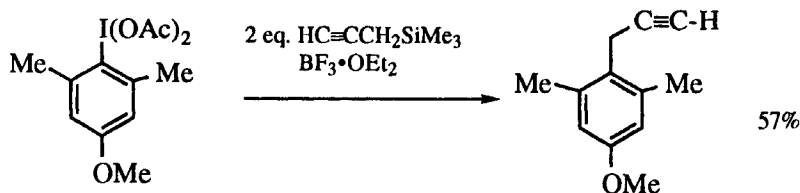
Kotsuki, H.; Kadota, I.; Ochi, M. *Tetrahedron Lett.*, **1990**, 31, 4609.



Williams, R.M.; Aldous, D.J.; Aldous, S.C. *J. Org. Chem.*, **1990**, 55, 4657.



Knoess, H.P.; Furlong, M.T.; Rozema, M.J.; Knochel, P. *J. Org. Chem.*, **1991**, 56, 5974.



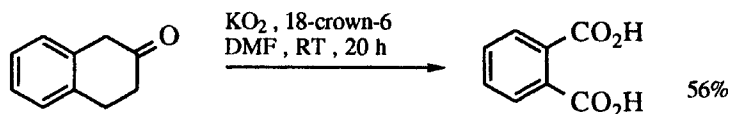
Ochiai, M.; Ito, T.; Masaki, Y. *J. Chem. Soc., Chem. Commun.*, **1992**, 15.

SECTION 11: ALKYNES FROM HYDRIDES

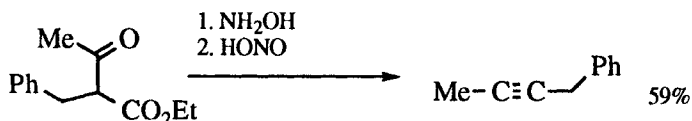
For examples of the reaction $\text{RC}\equiv\text{CH} \rightarrow \text{RC}\equiv\text{C}-\text{C}\equiv\text{CR}^1$, see section 300 (Alkyne-Alkyne).

NO ADDITIONAL EXAMPLES

SECTION 12: ALKYNES FROM KETONES



Sotirious, C.; Lee, W.; Giese, R.W. *J. Org. Chem.*, **1990**, 55, 2159.



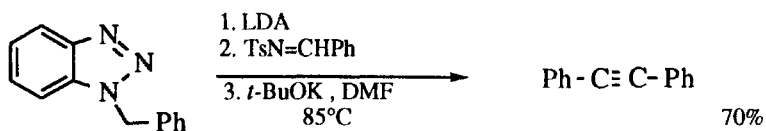
Boivin, J.; Elkaim, L.; Ferro, P.G.; Zard, S.Z. *Tetrahedron Lett.*, **1991**, 32, 5321.

SECTION 13: ALKYNES FROM NITRILES

NO ADDITIONAL EXAMPLES

SECTION 14: ALKYNES FROM ALKENES

NO ADDITIONAL EXAMPLES

SECTION 15: ALKYNES FROM MISCELLANEOUS COMPOUNDS

Katritzky, A.R.; Gordeev, M.F. *J. Chem. Soc., Perkin Trans. I*, **1992**, 1295.

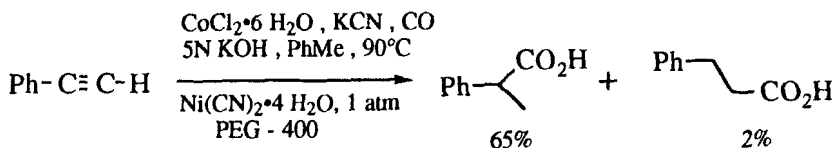
SECTION 15A: PROTECTION OF ALKYNES

NO ADDITIONAL EXAMPLES

CHAPTER 2

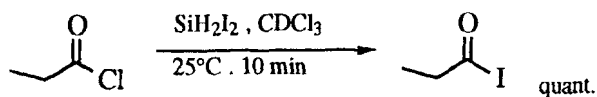
PREPARATION OF ACID DERIVATIVES

SECTION 16: ACID DERIVATIVES FROM ALKYNES

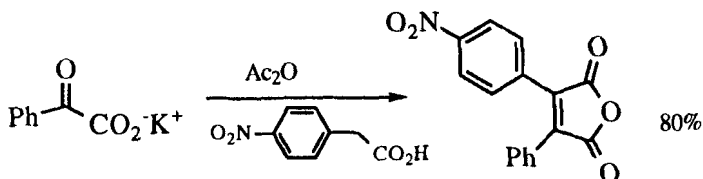


Lee, J.-T.; Alper, H. *Tetrahedron Lett.*, **1991**, 32, 1769.

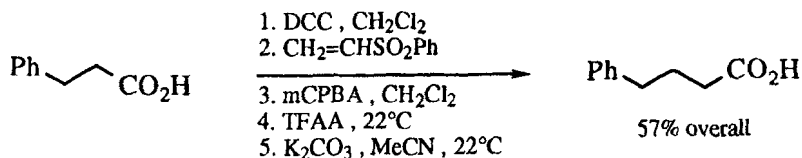
SECTION 17: ACID DERIVATIVES FROM ACID DERIVATIVES



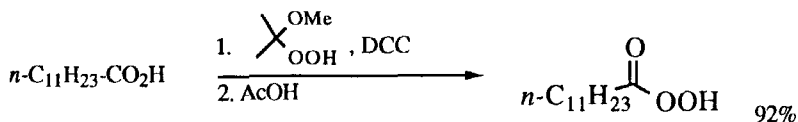
Keinan, E.; Sahai, M. *J. Org. Chem.*, **1990**, 55, 3922.



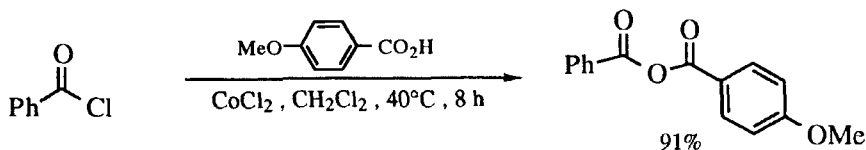
Fields, E.K.; Behrend, S.J.; Meyerson, S.; Wizenburg, M.L.; Ortega, B.R.; Hall, H.K. Jr. *J. Org. Chem.*, **1990**, 55, 5165.



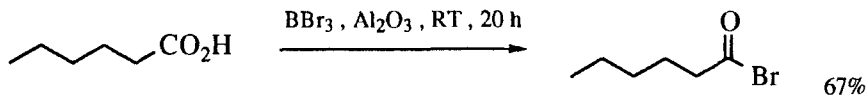
Barton, D.H.R.; Chern, C.-Y.; Jaszberenyi, J. *Tetrahedron Lett.*, **1991**, 32, 3309.



Dussault, P.; Sahli, A. J. *Org. Chem.*, **1992**, 57, 1009.

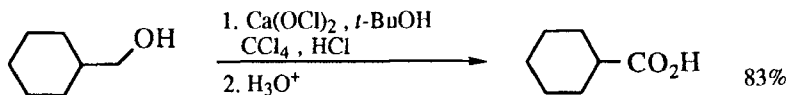


Srivastava, R.R.; Kabalka, G.W. *Tetrahedron Lett.*, **1992**, 33, 593.

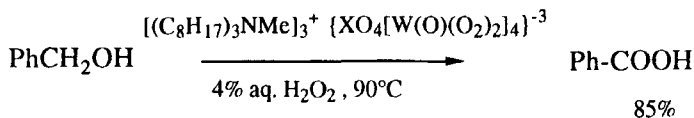


Bains, S.; Green, J.; Tan, L.C.; Pagni, R.M.; Kabalka, G.W. *Tetrahedron Lett.*, **1992**, 33, 7475.

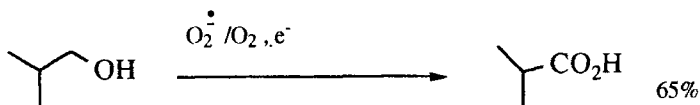
SECTION 18: ACID DERIVATIVES FROM ALCOHOLS AND THIOLS



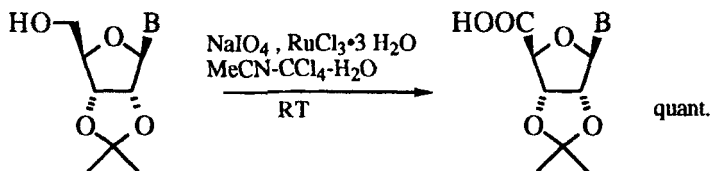
Kabalka, G.W.; Chatla, N.; Wadgaonkar, P.P.; Deshpande, S.M. *Synth. Commun.*, **1990**, 20, 1617.



Venturello, C.; Gambaro, M. *J. Org. Chem.*, **1991**, 56, 5924.

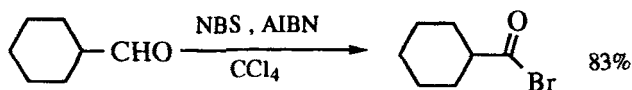


Singh, M.; Singh, K.N.; Dwivedi, S.; Misri, R.A. *Synthesis*, **1991**, 291.

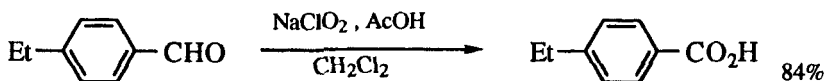


Singh, A.K.; Varma, R.S. *Tetrahedron Lett.*, **1992**, 33, 2307.

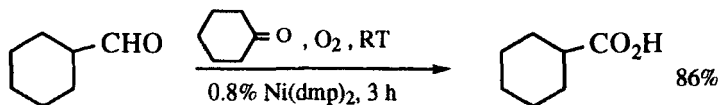
SECTION 19: ACID DERIVATIVES FROM ALDEHYDES



Markó, I.E.; Mekhalfia, A. *Tetrahedron Lett.*, **1990**, 31, 7237.



Bayle, J.P.; Perez, F.; Courtieu, J. *Bull. Soc. Chim. Fr.*, **1990**, 127, 565.

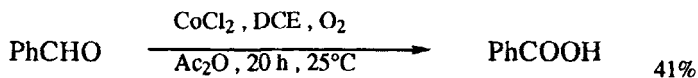


Ni(dmp)_2 = bis-[1,3-di(*p*-methoxyphenyl)-1,3-propanedionato nickel (II)]

Yamada, T.; Rhode, O.; Takai, T.; Mukaiyama, T. *Chem. Lett.*, **1991**, 5.

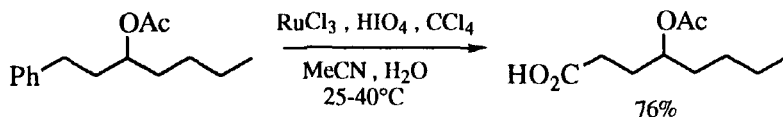


Linderman, R.J.; Chen, K. *Tetrahedron Lett.*, **1992**, 33, 6767.

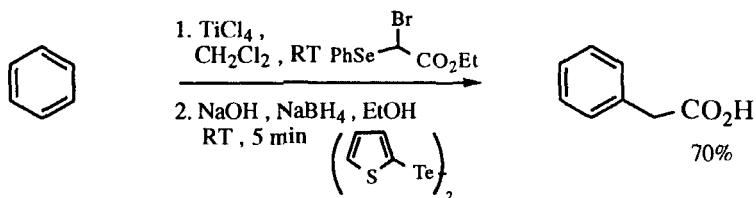


Bhatia, B.; Iqbal, J. *Tetrahedron Lett.*, **1992**, 33, 7961.

SECTION 20: ACID DERIVATIVES FROM ALKYL, METHYLENES AND ARYLS

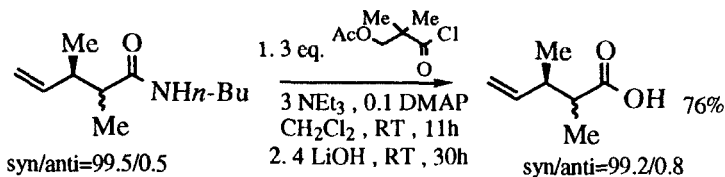


Núñez, M.T.; Martín, V.S., *J. Org. Chem.*, **1990**, 55, 1928.

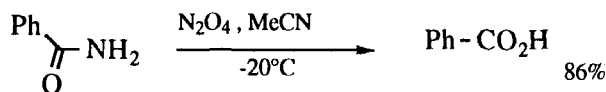


Silveira, C.C.; Lenardão, E.J.; Comasseto, J.V.; Babdoub, M.J. *Tetrahedron Lett.*, **1991**, 32, 5741.

SECTION 21: ACID DERIVATIVES FROM AMIDES



Tsunoda, T.; Sasaki, O.; Itô, S. *Tetrahedron Lett.*, **1990**, 31, 731.

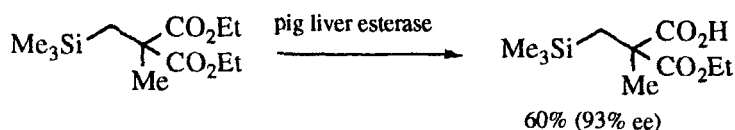


Kim, Y.H.; Kim, K.; Park, Y.J. *Tetrahedron Lett.*, **1990**, 31, 3893.

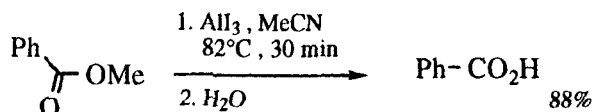
SECTION 22: ACID DERIVATIVES FROM AMINES

NO ADDITIONAL EXAMPLES

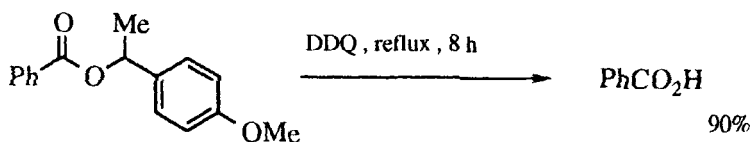
SECTION 23: ACID DERIVATIVES FROM ESTERS



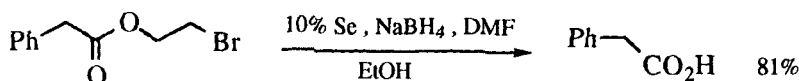
De Jeso, B.; Belair, N.; Deleuze, H.; Rascle, M.-C.; Maillard, B. *Tetrahedron Lett.*, **1990**, 31, 653.



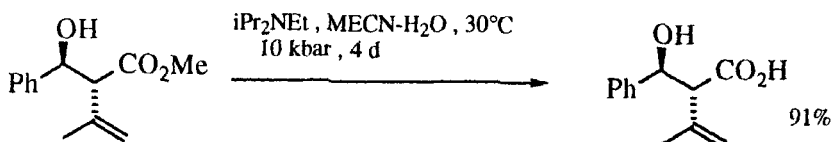
Mahajan, A.R.; Dutta, D.K.; Boruah, R.C.; Sandhu, J.S. *Tetrahedron Lett.*, **1990**, 31, 3943.



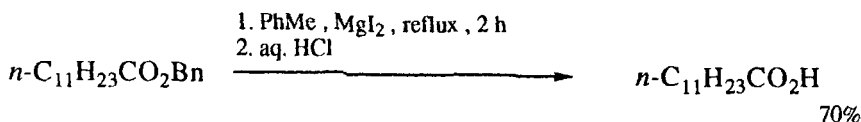
Yoo, S-E.; Kim, H.R.; Yi, K.Y. *Tetrahedron Lett.*, **1990**, 31, 5913.



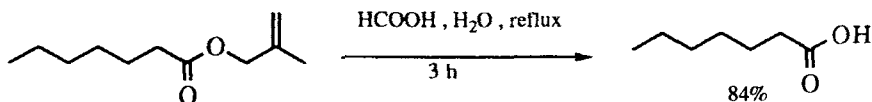
Huang, Z.-Z.; Zhou, X.-L. *Synthesis*, **1990**, 633.



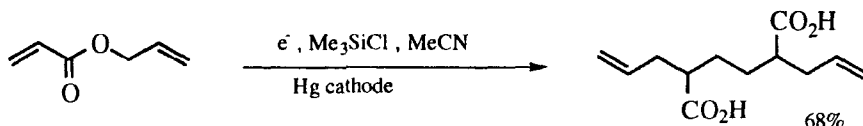
Yamamoto, Y.; Furuta, T.; Matsuo, J.; Kurata, T. *J. Org. Chem.*, **1991**, 56, 5737.



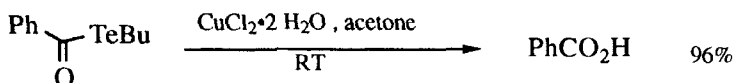
Martínez, A.G.; Barcina, J.O.; del Voggio, G.H.; Hanack, M.; Subramanian, L.R. *Tetrahedron Lett.*, **1991**, 32, 5931.



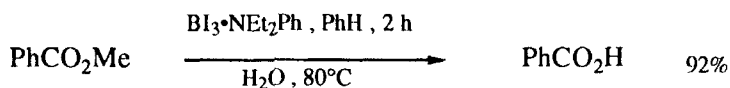
Schmid, C.R. *Tetrahedron Lett.*, **1992**, 33, 757.



Troll, T.; Wiedemann, J. *Tetrahedron Lett.*, **1992**, 33, 3847.



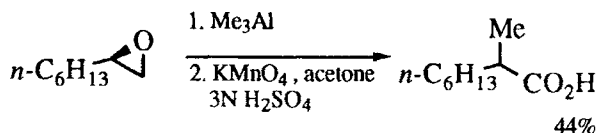
Dabdoub, M.L.; Viana, L.H. *Synth. Commun.*, **1992**, 22, 1619.



Kabalka, G.W.; Narayana, C.; Reddy, N.K. *Synth. Commun.*, **1992**, 22, 1793.

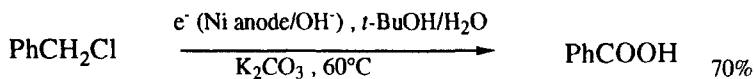
Other reactions useful for the hydrolysis of esters may be found in Section 30A (Protection of Carboxylic Acids).

SECTION 24: ACID DERIVATIVES FROM ETHERS, EPOXIDES AND THIOETHERS

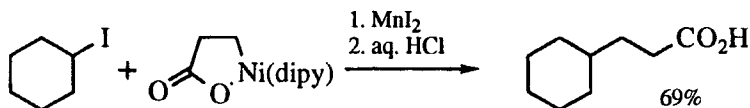


Fukumasa, M.; Furuhashi, K.; Umezama, J.; Takahashi, O.; Hirai, T. *Tetrahedron Lett.*, **1991**, 32, 1059.

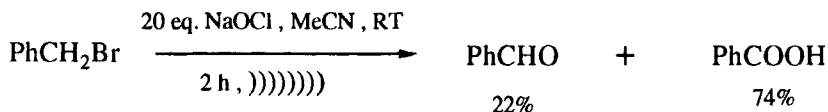
SECTION 25: ACID DERIVATIVES FROM HALIDES AND SULFONATES



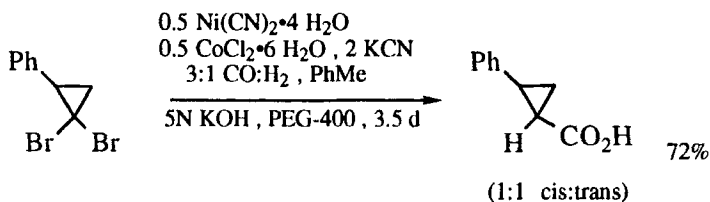
Borsotti, G.P.; Foa', M.; Gatti, N. *Synthesis*, **1990**, 207.



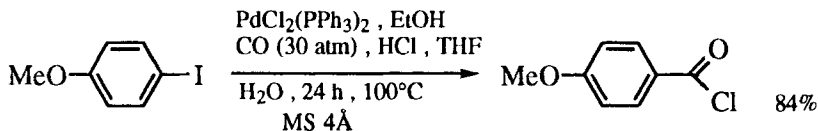
Schönecker, B.; Walther, D.; Fischer, R.; Nestler, B.; Bräunlich, G.; Eibisch, H.; Droscher, P. *Tetrahedron Lett.*, **1990**, 31, 1257.



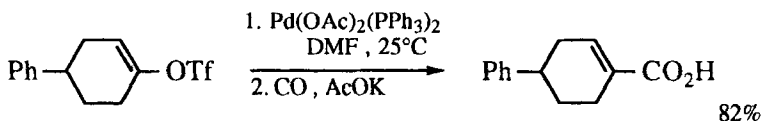
Khurana, J.M.; Sahoo, P.K.; Titus, S.S.; Maikap, G.C. *Synth. Commun.*, **1990**, 20, 1357.



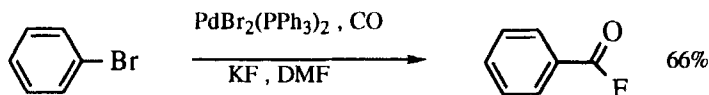
Grushin, V.V.; Alper, H. *Tetrahedron Lett.*, **1991**, 32, 3349.



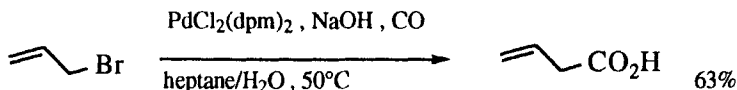
Urata, H.; Hu, N.-X.; Maekawa, H.; Fuchikami, T. *Tetrahedron Lett.*, **1991**, 32, 4733.



Cacchi, S.; Lupi, A. *Tetrahedron Lett.*, **1992**, 33, 3939.



Okano, T.; Harada, N.; Kiji, J. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 1741.

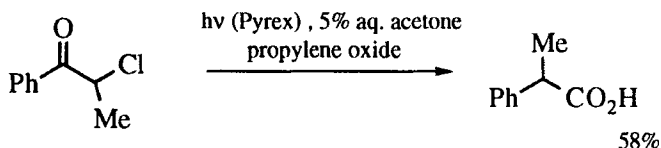


Okano, T.; Okabe, N.; Kiji, J. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 2589.

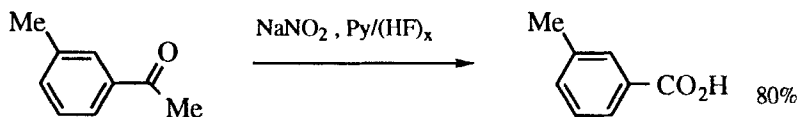
SECTION 26: ACID DERIVATIVES FROM HYDRIDES

NO ADDITIONAL EXAMPLES

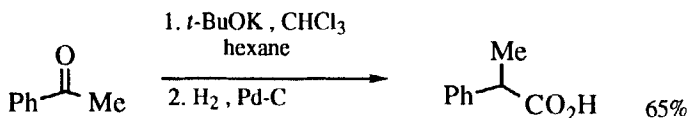
SECTION 27: ACID DERIVATIVES FROM KETONES



Sonawane, H.R.; Kulkarni, D.G.; Ayyangar, N.R. *Tetrahedron Lett.*, **1990**, 31, 7493.

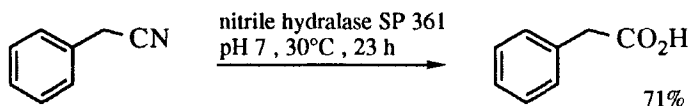


Olah, G.A.; Ramos, M.T.; Wang, Q.; Surya Prakash, G.K. *SynLett*, **1991**, 41.

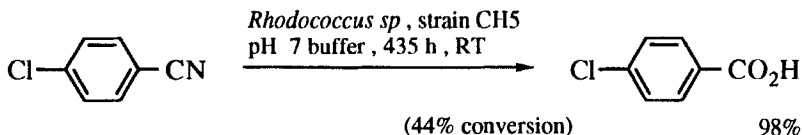


Llama, E.E.; del Campo, C.; Sinisterra, J.V. *Org. Prep. Proceed. Int.*, **1992**, 24, 165.

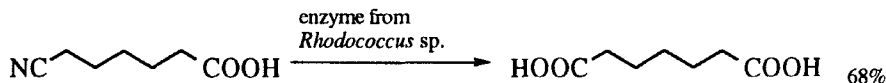
SECTION 28: ACID DERIVATIVES FROM NITRILES



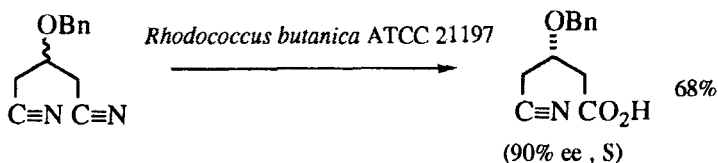
Cohen, M.A.; Sawden, J.; Turner, N.J. *Tetrahedron Lett.*, **1990**, 31, 7223.



Hönicke-Schmidt, P.; Schneider, M.P. *J. Chem. Soc., Chem. Commun.*, **1990**, 648.

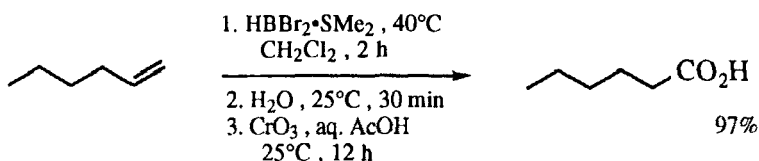


de Raadt, A.; Klempier, N.; Faber, K.; Griengl, H. *J. Chem. Soc., Perkin Trans. I*, **1992**, 137.



Takeya, H.; Sakai, N.; Sano, A.; Yokoyama, M.; Sugai, T.; Ohta, H. *Chem. Lett.*, **1991**, 1823.

SECTION 29: ACID DERIVATIVES FROM ALKENES



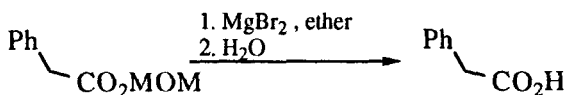
Racherla, U.S.; Khanna, V.V.; Brown, H.C. *Tetrahedron Lett.*, **1992**, 33, 1037.

SECTION 30: ACID DERIVATIVES FROM MISCELLANEOUS COMPOUNDS

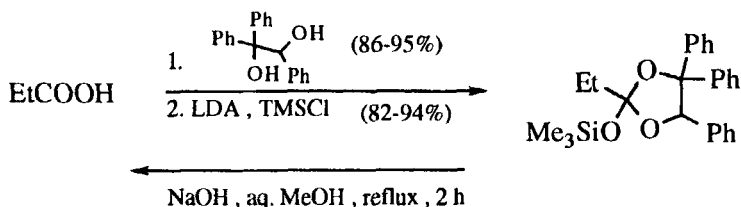


Olah, G.A.; Wu, A.; Bagno, A.; Surya Prakash, G.K.S. *SynLett*, **1990**, 596.

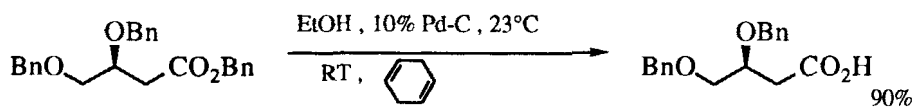
SECTION 30A: PROTECTION OF CARBOXYLIC ACID DERIVATIVES



Kim, S.; Park, Y.H.; Kee, I.S. *Tetrahedron Lett.*, **1991**, 32, 3099.



Waldmüller, D.; Braun, M.; Steigel, A. *SynLett*, **1991**, 160.



Bajwa, J.S., *Tetrahedron Lett.*, 1992, 33, 2299.

Other reactions useful for the protection of carboxylic acids are included in Section 107 (Esters from Carboxylic Acids and Acid Halides) and Section 23 (Carboxylic Acids from Esters).

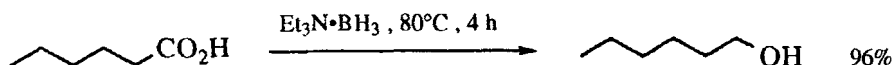
CHAPTER 3

PREPARATION OF ALCOHOLS

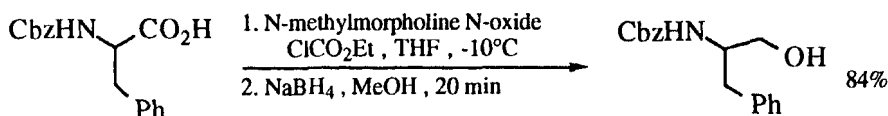
SECTION 31: ALCOHOLS AND THIOLS FROM ALKYNES

NO ADDITIONAL EXAMPLES

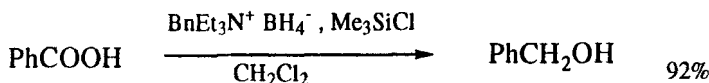
SECTION 32: ALCOHOLS AND THIOLS FROM ACID DERIVATIVES



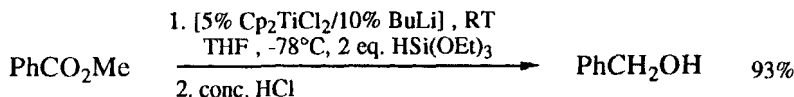
Kříž, O.; Plzák, Z.; Plešek, J. *Coll. Czech. Chem. Commun.*, **1990**, 55, 2956.



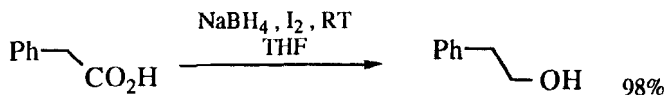
Kokotos, G. *Synthesis*, **1990**, 299.



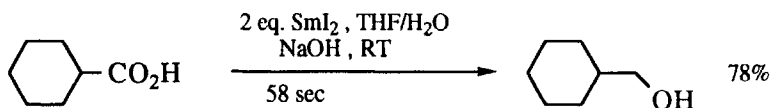
Das, J.; Chandrasekaran, S. *Synth. Commun.*, **1990**, 20, 907.



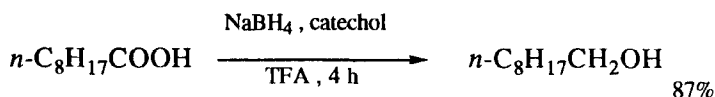
Berk, S.C.; Kreutzer, K.A.; Buchwald, S.L. *J. Am. Chem. Soc.*, **1991**, 113, 5093.



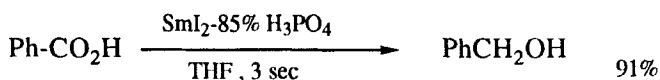
Kanth, J.V.B.; Periasamy, M. *J. Org. Chem.*, **1991**, 56, 5964.



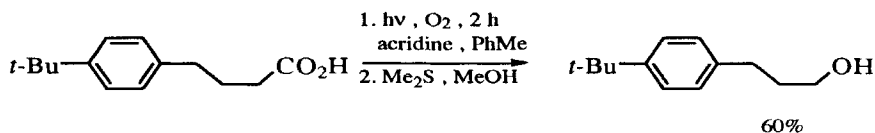
Kamochi, Y.; Kudo, T. *Chem. Lett.*, **1991**, 893.



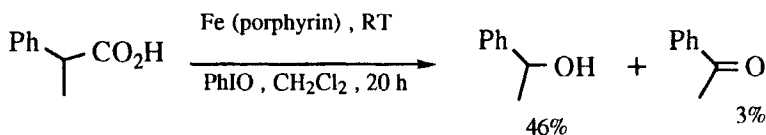
Suseela, Y.; Periasamy, M. *Tetrahedron*, **1992**, 48, 371.



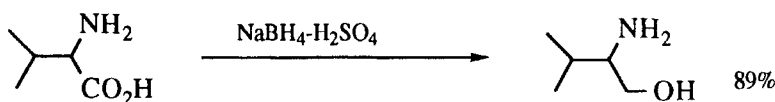
Kamochi, Y.; Kudo, T. *Tetrahedron*, **1992**, 48, 4301.



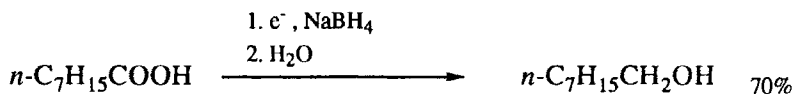
Okada, K.; Okubo, K.; Oda, M. *Tetrahedron Lett.*, **1992**, 33, 83.



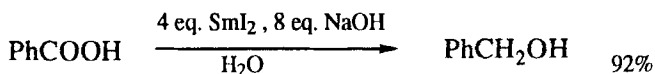
Komuro, M.; Nagatsu, Y.; Higuchi, T.; Hirobe, M. *Tetrahedron Lett.*, **1992**, 33, 4949.



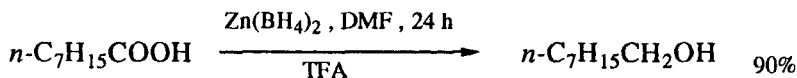
Abiko, A.; Masamune, S. *Tetrahedron Lett.*, **1992**, 33, 5517.



Shundo, R.; Matsubara, Y.; Nishiguchi, I.; Hirashima, T. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 530.

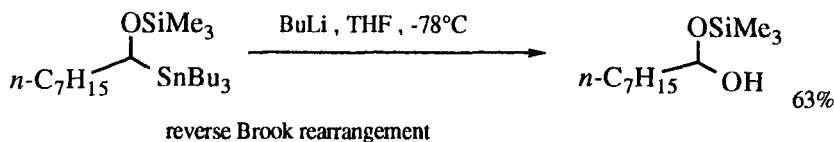


Kamochi, Y.; Kudo, T. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 3049.

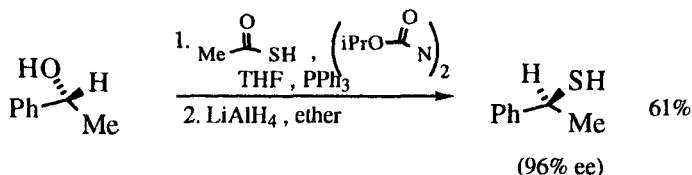


Ranu, B.C.; Das, A.R. *J. Chem. Soc., Perkin Trans. I*, **1992**, 1561.

SECTION 33: ALCOHOLS AND THIOLS FROM ALCOHOLS AND THIOLS



Linderman, R.J.; Ghannam, A. *J. Am. Chem. Soc.*, **1990**, 112, 2392.



Corey, E.J.; Cimprich, K.A. *Tetrahedron Lett.*, **1992**, 33, 4099.

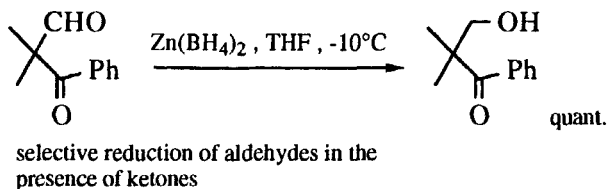
SECTION 34: ALCOHOLS AND THIOLS FROM ALDEHYDES

The following reaction types are included in this section:

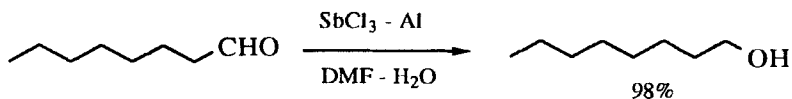
- A. Reductions of Aldehydes to Alcohols
- B. Alkylation of Aldehydes, forming Alcohols.

Coupling of Aldehydes to form Diols is found in Section 323 (Alcohol-Alcohol).

SECTION 34A: REDUCTIONS OF ALDEHYDES TO ALCOHOLS

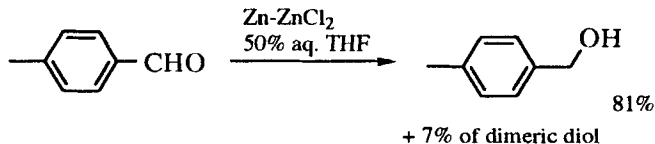


Ranu, B.C.; Chakraborty, R. *Tetrahedron Lett.*, **1990**, 31, 7663.

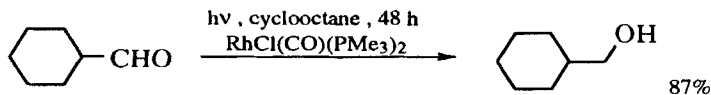


also with aromatic and conjugated aldehydes

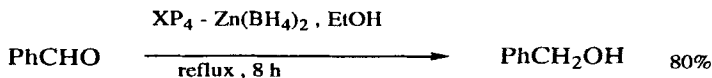
Wang, W-B.; Shi, L-L.; Huang, Y-Z, *Tetrahedron Lett.*, **1990**, 31, 1185.



Tanaka, K.; Kishigami, S.; Toda, E. *J. Org. Chem.*, **1990**, 55, 2981.

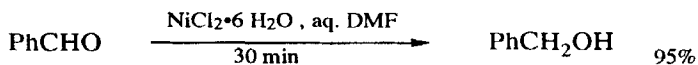


Sakakura, T.; Abe, F.; Tanaka, M. *Chem. Lett.*, **1990**, 583, 585.

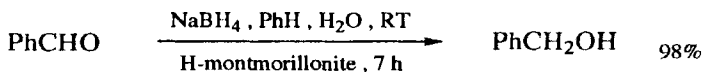


XP₄ = crosslinked poly(4-vinylpyridine)

Firouzabadi, H.; Tamami, B.; Goudarzian, N. *Synth. Commun.*, **1991**, 21, 2275.



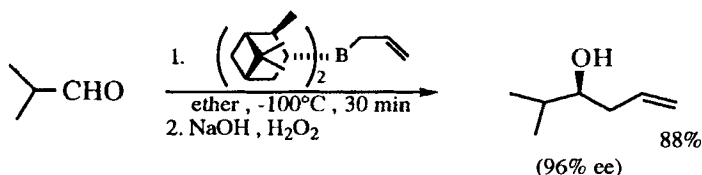
Baruah, R.N. *Tetrahedron Lett.*, **1992**, 33, 5417.



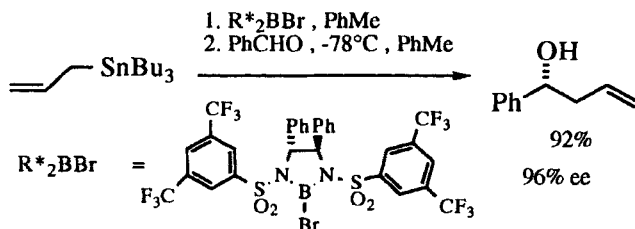
Subba Rao, Y.V.; Choudary, B.M. *Synth. Commun.*, **1992**, 22, 2711.

SECTION 34B: ALKYLATION OF ALDEHYDES, FORMING ALCOHOL

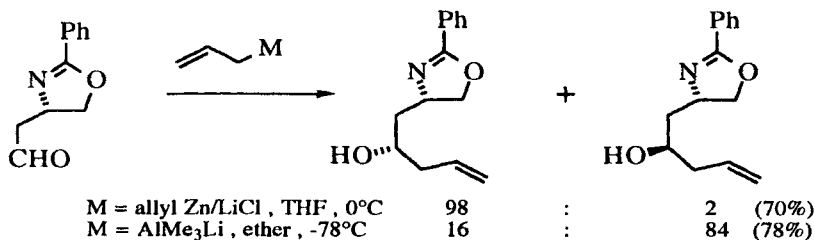
ASYMMETRIC ALKYLATIONS



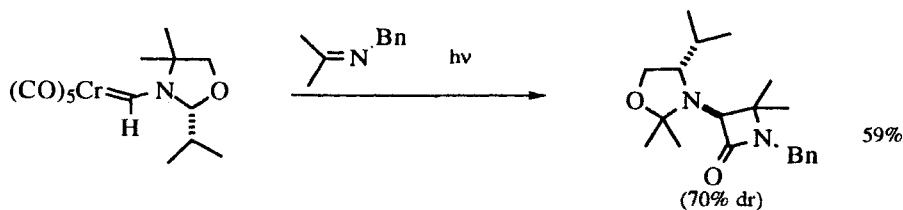
Racherla, U.S.; Brown, H.C. *J. Org. Chem.*, **1991**, 56, 401.



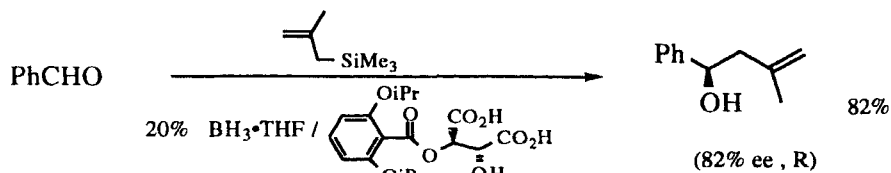
Corey, E.J.; Kim, S.S. *Tetrahedron Lett.*, **1990**, 31, 3715.



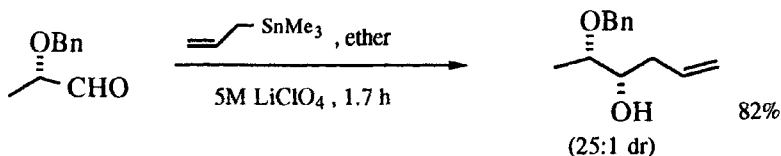
Overly, K.R.; Williams, J.M.; McGarvey, G.J. *Tetrahedron Lett.*, **1990**, 31, 4573.



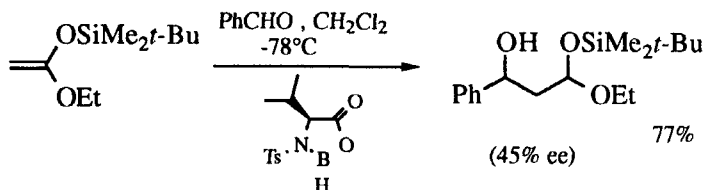
Hegedus, L.S.; Imwinkelried, R.; Alarid-Sargent, M. *J. Am. Chem. Soc.*, **1990**, 112, 1109.



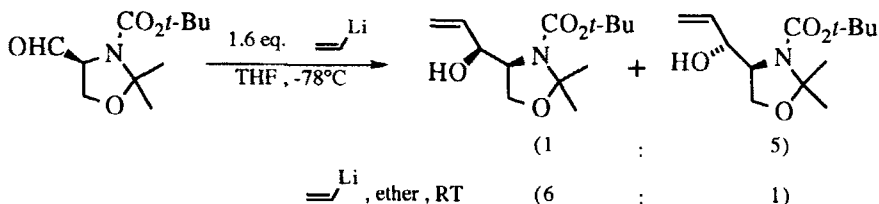
Furata, K.; Mouri, M.; Yamamoto, H. *SynLett*, **1991**, 561.



Nehry, K.J. Jr.; Grieco, P.A.; Jagoe, C.T. *Tetrahedron Lett.*, **1992**, 33, 1817.

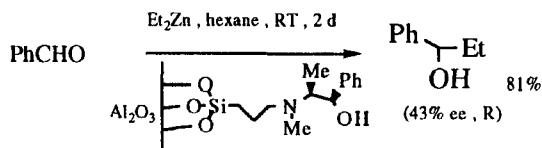


Kiyooka, S.; Kaneko, Y.; Komura, M.; Matsuo, H.; Nakano, M. *J. Org. Chem.*, **1991**, 56, 2276.

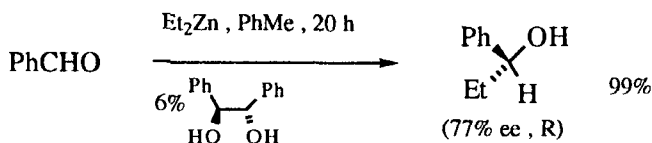


Coleman, R.S.; Carpenter, A.J. *Tetrahedron Lett.*, **1992**, 33, 1697.

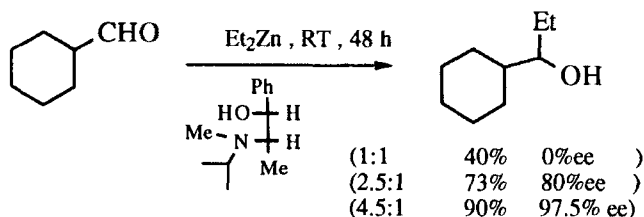
Reactions of Et_2Zn and PhCHO



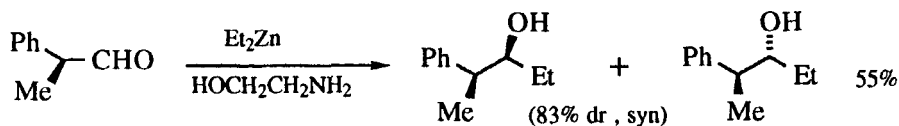
Soai, K.; Watanabe, M.; Yamamoto, A. *J. Org. Chem.*, **1990**, 55, 4832.



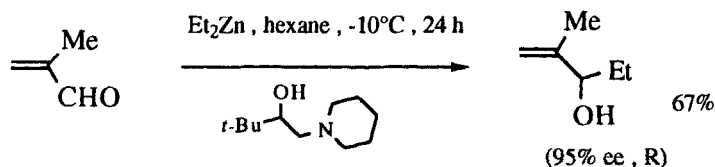
Rosini, C.; Franzini, L.; Pini, D.; Salvadori, P. *Tetrahedron Asymmetry*, **1990**, 1, 587.



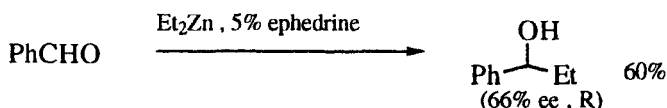
Chaloner, P.A.; Langadianou, E. *Tetrahedron Lett.*, **1990**, 31, 5185.



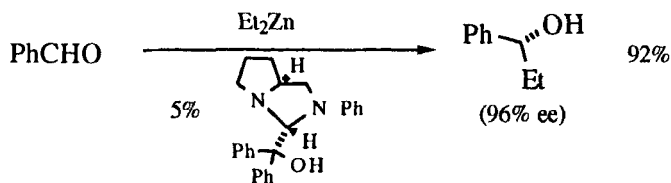
Soai, K.; Niwa, S.; Hatanaka, T. *Bull. Chem. Soc. Jpn.*, **1990**, 63, 2129.



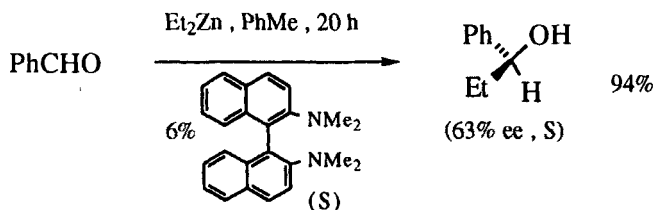
Hayashi, M.; Kaneko, T.; Oguni, N. *J. Chem. Soc., Perkin Trans. I*, **1991**, 25.



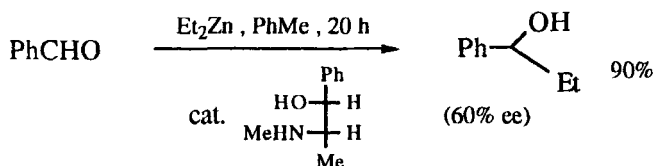
Chaloner, P.A.; Langadianou, E.; Peresa, S.A.R. *J. Chem. Soc., Perkin Trans. I*, **1991**, 2731.



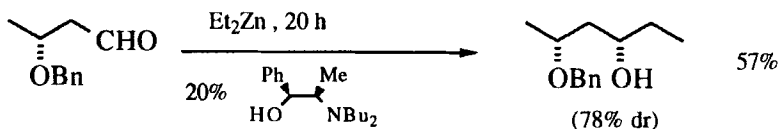
Asami, M.; Inoue, S. *Chem. Lett.*, **1991**, 685.



Rosini, C.; Franzini, L.; Iuliano, A.; Pini, D.; Salvadori, P. *Tetrahedron Asymmetry*, **1991**, 2, 363.

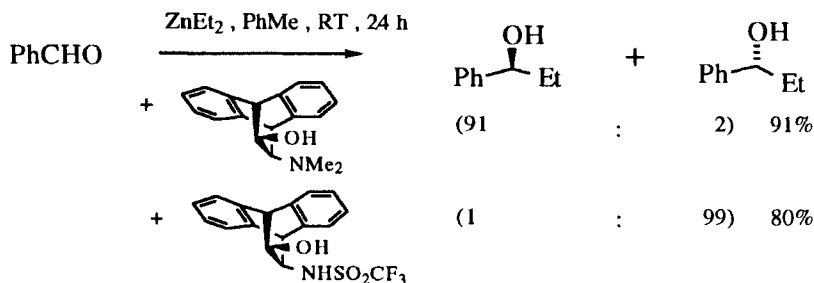


Näslund, J.; Welch, C.J. *Tetrahedron Asymmetry*, **1991**, 2, 1123.

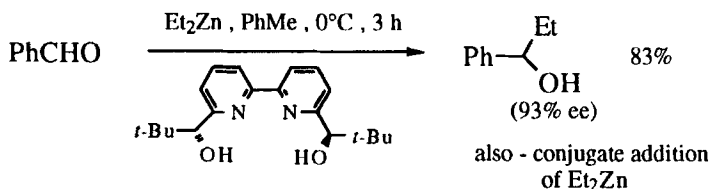


Soai, K.; Hatanaka, T.; Yamashita, T. *J. Chem. Soc., Chem. Commun.*, **1992**, 927.

Soai, K.; Watanabe, M. *J. Chem. Soc., Chem. Commun.*, **1990**, 43.

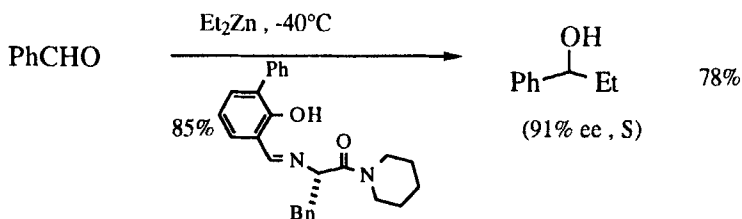


Kimura, K.; Sugiyama, E.; Ishizuka, T.; Kunieda, T. *Tetrahedron Lett.*, **1992**, 33, 3147.

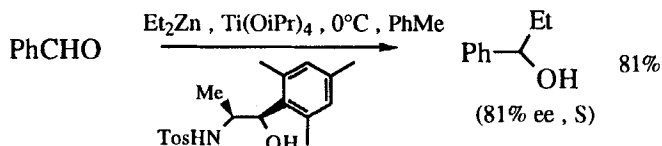


Bolm, C.; Schlingloff, G.; Harms, K. *Chem. Ber.*, **1992**, 125, 1191.

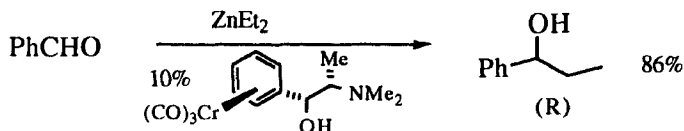
Bolm, C.; Ewald, M.; Felder, M. *Chem. Ber.*, **1992**, 125, 1205 [conjugate addition].



Mori, A.; Yu, D.; Inoue, S. *SynLett*, **1992**, 427.

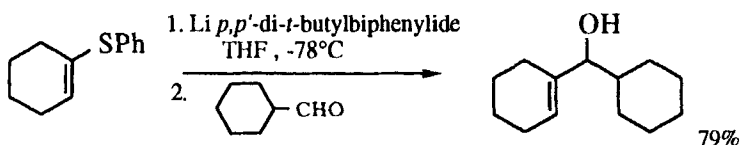


Ito, K.; Kimura, Y.; Okumura, H.; Katsuki, T. *SynLett*, **1992**, 573.

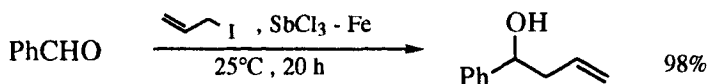


Heaton, S.B.; Jones, G.B. *Tetrahedron Lett.*, **1992**, 33, 1693.

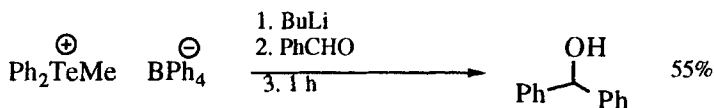
NON-ASYMMETRIC ALKYLATIONS



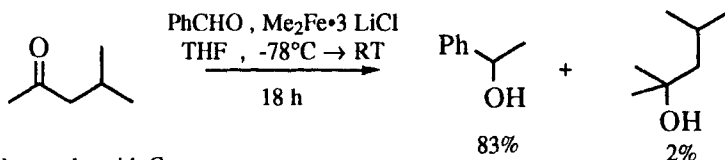
Cohen, T.; Doubleday, M.D. *J. Org. Chem.*, **1990**, 55, 4784.



Wang, W-B.; Shi, L.-L.; Xu, R-H.; Huang, Y-Z. *J. Chem. Soc., Perkin Trans. I*, **1990**, 424.

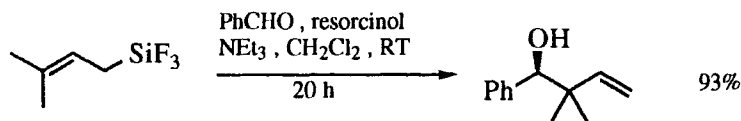


Shi, L.-L.; Zhou, J.L.; Huang, Y-Z. *J. Chem. Soc., Perkin Trans. I*, **1990**, 2847.



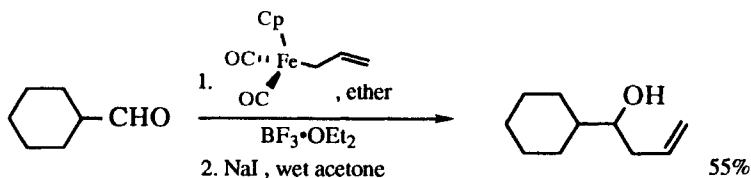
Also works with Co reagents:

Kauffmann, T.; Laarmann, B.; Menges, D. *Tetrahedron Lett.*, **1990**, 31, 507.

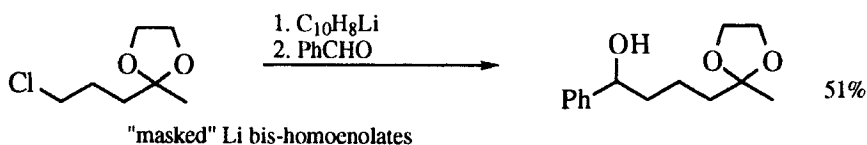


Kira, M.; Sato, K.; Sakurai, H. *J. Am. Chem. Soc.*, **1990**, 112, 257.

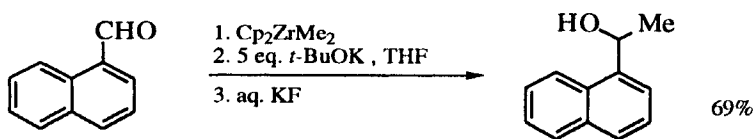
Ishihara, T.; Miwatashi, S.; Kuroboshi, M.; Utimoto, K. *Tetrahedron Lett.*, **1991**, 32, 1069.



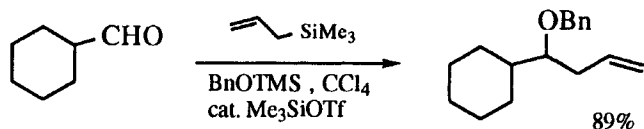
Agoston, G.E.; Cabal, M.P.; Turos, E. *Tetrahedron Lett.*, **1991**, 32, 3001.



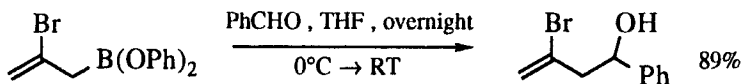
Ramón, D.J.; Yus, M. *J. Org. Chem.*, **1991**, 56, 3825.



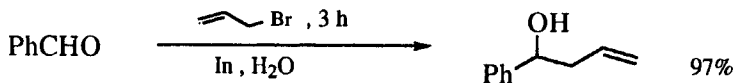
Larson, A.L.; Baker, D.L.; Towne, R.W.; Straus, D.A. *Tetrahedron Lett.*, **1991**, 32, 5893.



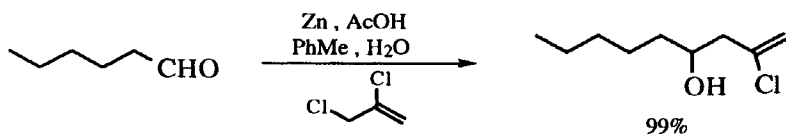
Mekhalfia, A.; Markó, I.E. *Tetrahedron Lett.*, **1991**, 32, 4779.



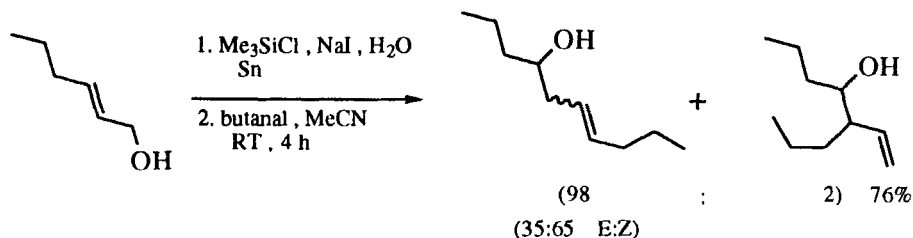
Hara, S.; Suzuki, A. *Tetrahedron Lett.*, **1991**, 32, 6749.



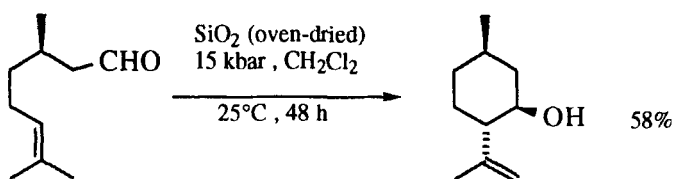
Li, C.J.; Chan, T.H. *Tetrahedron Lett.*, **1991**, 32, 7017.



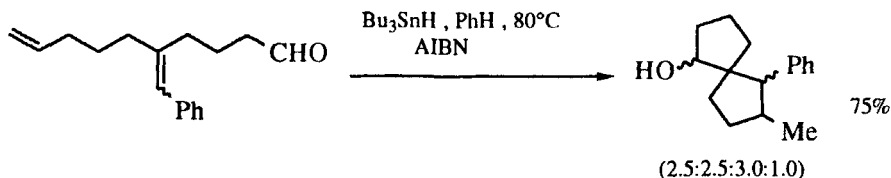
Oda, Y.; Matsuo, S.; Saito, K. *Tetrahedron Lett.*, **1992**, 33, 97.



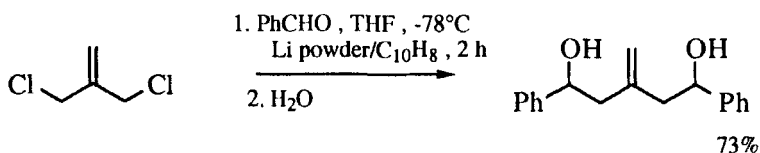
Kanagawa, Y.; Nishiyama, Y.; Ishii, Y. *J. Org. Chem.*, **1992**, 57, 6988.



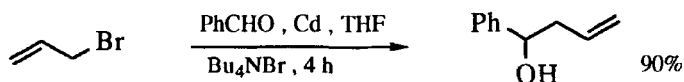
Dauben, W.G.; Hendricks, R.T. *Tetrahedron Lett.*, **1992**, 33, 603.



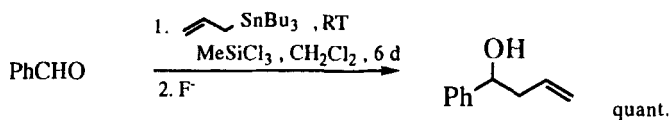
Enholm, E.J.; Burroff, J.A. *Tetrahedron Lett.*, **1992**, 33, 1835.



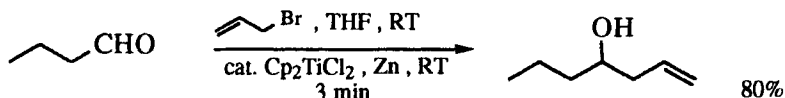
Ramón, D.J.; Yus, M. *Tetrahedron Lett.*, **1992**, 33, 2217.



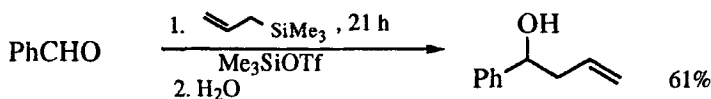
Sain, B.; Prajapati, D.; Sandhu, J.S. *Tetrahedron Lett.*, **1992**, 33, 4795.



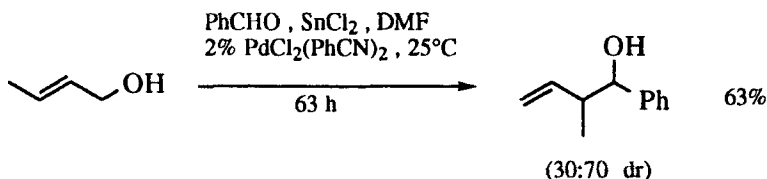
Marshall, R.L.; Young, D.J. *Tetrahedron Lett.*, **1992**, 33, 1365.



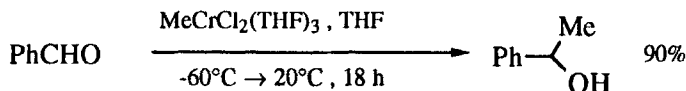
Ding, Y.; Zhao, G. *Tetrahedron Lett.*, **1992**, 33, 8117.



Davis, A.P.; Jaspars, M. *Angew. Chem. Int. Ed. Engl.*, **1992**, 31, 420.



Takahara, J.P.; Masuyama, Y.; Kurusu, Y. *J. Am. Chem. Soc.*, **1992**, 114, 2577.



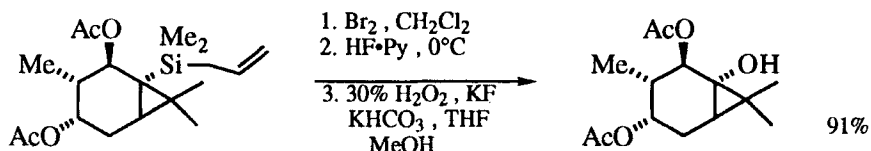
Kauffmann, T.; Beirich, C.; Hamsen, A.; Möller, T.; Philipp, C.; Wingbermühle, D. *Chem. Ber.*, **1992**, 125, 157.

REVIEWS:

"Addition of Organochromium Compounds to Aldehydes: the Nozaki-Hiyama Reaction"
Cintas, P. *Synthesis*, **1992**, 248.

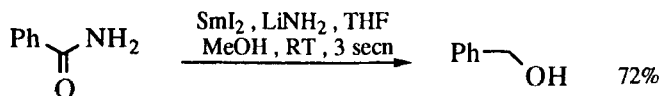
SECTION 35: ALCOHOLS AND THIOLS FROM ALKYL, METHYLENES AND ARYL

No examples of the reaction $\text{RR}^1 \rightarrow \text{ROH}$ ($\text{R}^1 = \text{alkyl, aryl, etc.}$) occur in the literature. For reactions of the type $\text{RH} \rightarrow \text{ROH}$ ($\text{R} = \text{alkyl or aryl}$) see Section 41 (Alcohols and Phenols from Hydrides).



Magar, S.S.; Fuchs, P.L. *Tetrahedron Lett.*, **1991**, 32, 7513.

SECTION 36: ALCOHOLS AND THIOLS FROM AMIDES

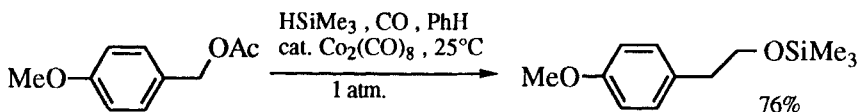


Kamochi, Y.; Kudo, T. *Tetrahedron Lett.*, **1991**, 32, 3511.

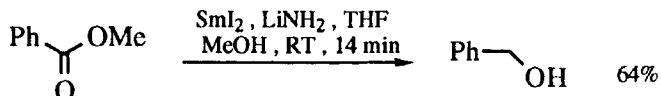
SECTION 37: ALCOHOLS AND THIOLS FROM AMINES

NO ADDITIONAL EXAMPLES

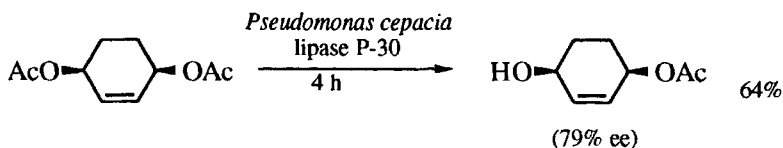
SECTION 38: ALCOHOLS AND THIOLS FROM ESTERS



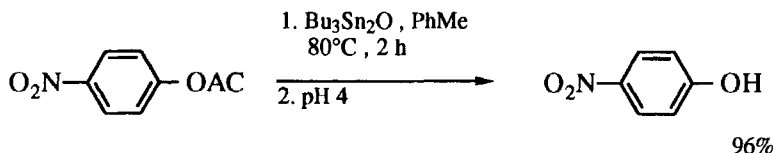
Chatani, N.; Sano, T.; Ohe, K.; Kawasaki, Y.; Murai, S. *J. Org. Chem.*, **1990**, 55, 5923.



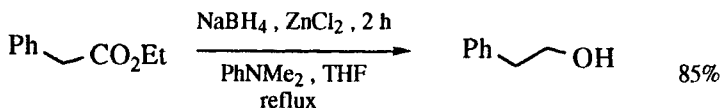
Kamochi, Y.; Kudo, T. *Tetrahedron Lett.*, **1991**, 32, 3511.



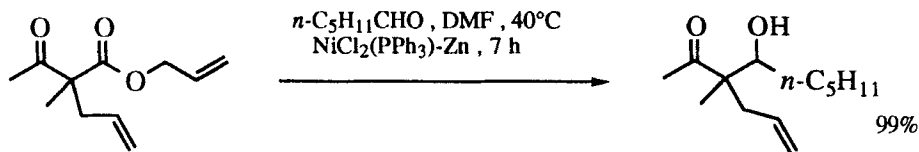
Harris, K.J.; Gu, Q.M.; Shih, Y.-E.; Girdaukas, G.; Sih, C.J. *Tetrahedron Lett.*, **1991**, 32, 3941.



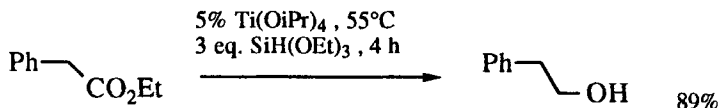
Salomon, C.J.; Mata, E.G.; Mascaretti, O.A. *Tetrahedron Lett.*, **1991**, 32, 4239.



Yamakawa, T.; Masaki, M.; Nohira, H. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 2730.

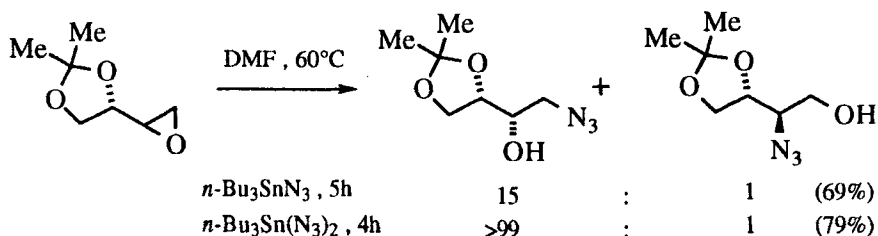


Nokami, I.; Konishi, H.; Matsuura, H. *Chem. Lett.*, **1991**, 2023.

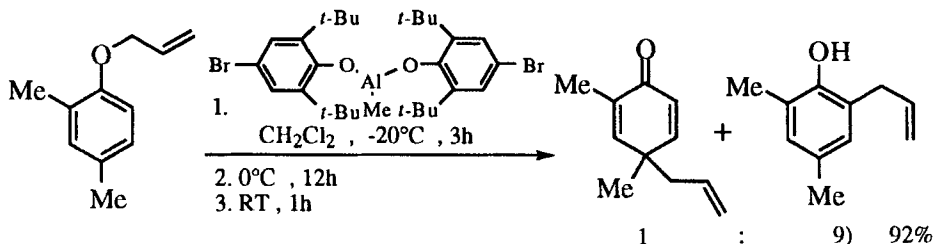


Berk, S.C.; Buchwald, S.L. *J. Org. Chem.*, **1992**, 57, 3751.

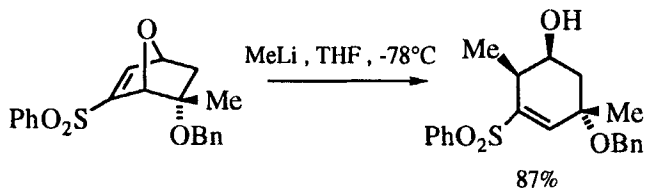
SECTION 39: ALCOHOLS AND THIOLS FROM ETHERS, EPOXIDES AND THIOETHERS



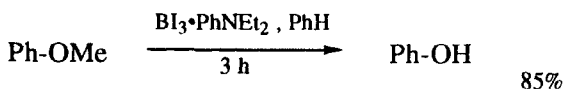
Saito, S.; Nishikawa, T.; Yokoyama, Y.; Moriwake, T. *Tetrahedron Lett.*, **1990**, 31, 221.



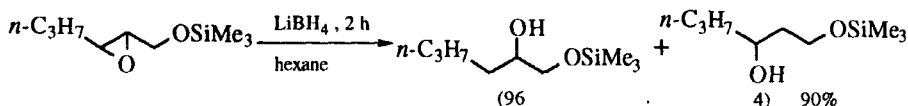
Maruoka, K.; Sato, J.; Banno, H.; Yamamoto, H. *Tetrahedron Lett.*, **1990**, 31, 377.



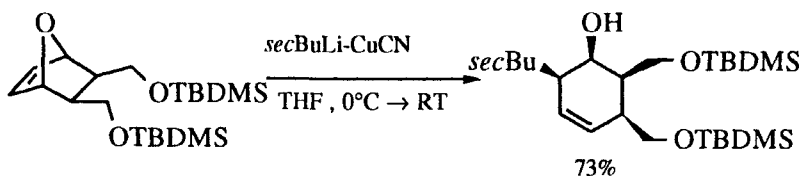
Arjona, O.; de la Pradilla, R.F.; Mallo, A.; Plumet, J.; Viso, A. *Tetrahedron Lett.*, **1990**, 31, 1475.



Narayana, C.; Padmanabhan, S.; Kabalka, G.W. *Tetrahedron Lett.*, **1990**, *31*, 6977.

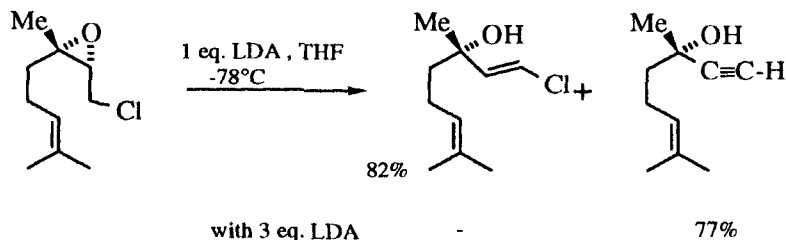


Sugita, K.; Onaka, M.; Izumi, Y. *Tetrahedron Lett.*, **1990**, *31*, 7467.

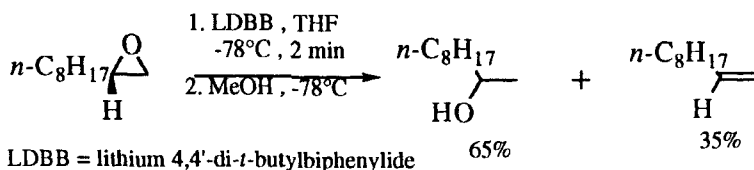


no reaction with MeLi/CuCN or *n*-BuLi/CuCN; 78% with *t*-BuLi/CuCN

Lautens, M.; Smith, A.C.; Abd-El-Aziz, A.S.; Huboux, A.H. *Tetrahedron Lett.*, **1990**, *31*, 3253.

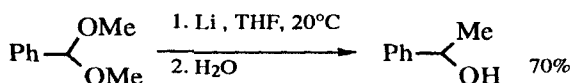


Yadav, J.S.; Deshpande, P.K.; Sharma, G.V.M. *Tetrahedron Lett.*, 1990, 31, 4495.

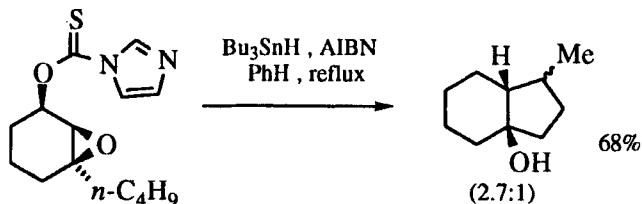


LDBB = lithium 4,4'-di-*t*-butylbiphenylide

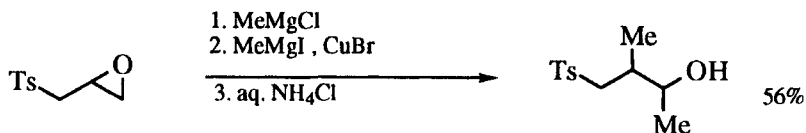
Cohen, T.; Jeong, I-H.; Mudryk, B.; Bhupathy, M.; Awad, M.M.A. *J. Org. Chem.*, **1990**, *55*, 1528.



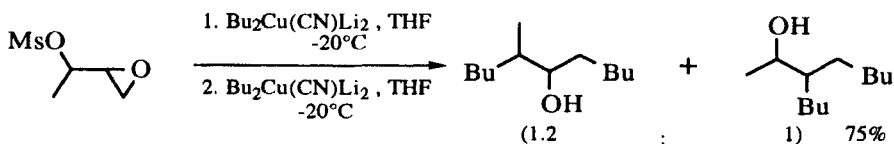
Azzena, U.; Denurra, T.; Melloni, G.; Piroddi, A.M. *J. Org. Chem.*, **1990**, *55*, 5532.



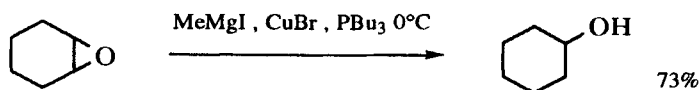
Rawal, V.H.; Newton, R.C.; Krishnamurthy, V. *J. Org. Chem.*, **1990**, 55, 5181.



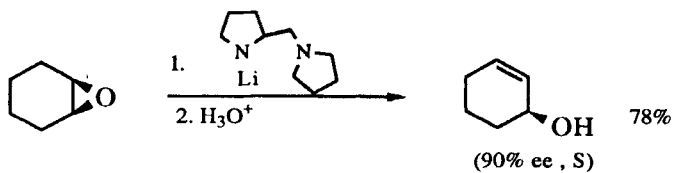
Nájera, C.; Sansano, J.M. *Tetrahedron*, **1990**, 46, 3993.



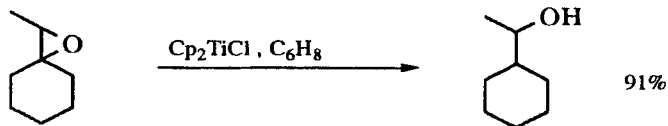
Kurth, M.J.; Abreo, M.A. *Tetrahedron*, **1990**, 46, 5085.



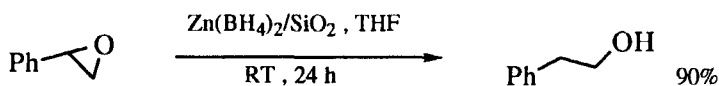
Mitani, M.; Matsumoto, H.; Gouda, N.; Koyama, K. *J. Am. Chem. Soc.*, **1990**, 112, 1286.



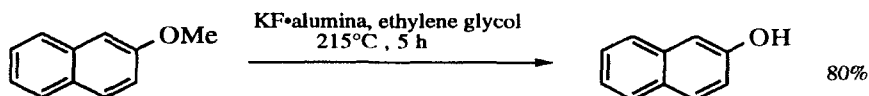
Asami, M. *Bull. Chem. Soc. Jpn.*, **1990**, 63, 721.



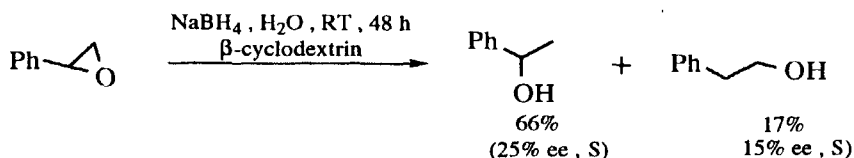
Rajan Babu, T.Y.; Nugent, W.A.; Beattie, M.S. *J. Am. Chem. Soc.*, **1990**, 112, 6408.



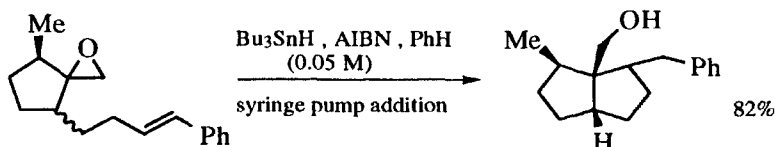
Ranu, B.C.; Das, A.R. *J. Chem. Soc., Chem. Commun.*, **1990**, 1334.



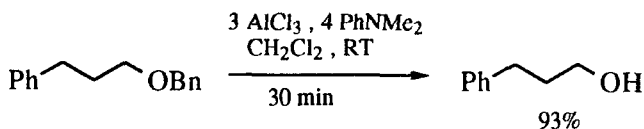
Radhakrishna, A.S.; Prasad Rao, K.R.K.; Suri, S.K.; Sivaprakash, K.; Singh, B.B. *Synth. Commun.*, **1991**, 21, 379.



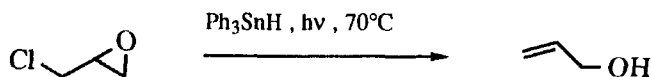
Hu, Y.; Uno, M.; Harada, A.; Takahashi, S. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 1884.



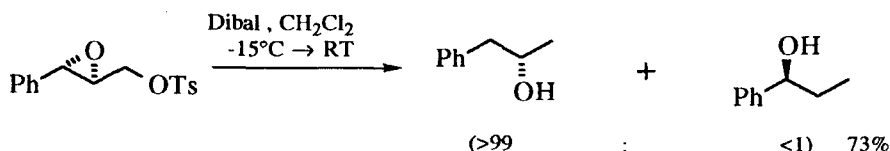
Kim, S.; Lee, S.; Koh, J.S. *J. Am. Chem. Soc.*, **1991**, 113, 5106.



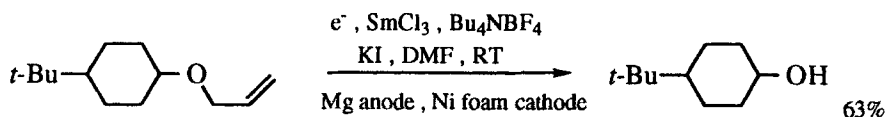
Akiyama, T.; Hirofuji, H.; Ozaki, S. *Tetrahedron Lett.*, **1991**, 32, 1321.



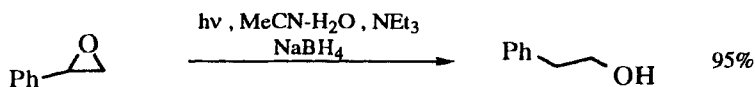
Krosley, K.W.; Gleicher, G.L.; Clapp, G.E. *J. Org. Chem.*, **1992**, 57, 840.



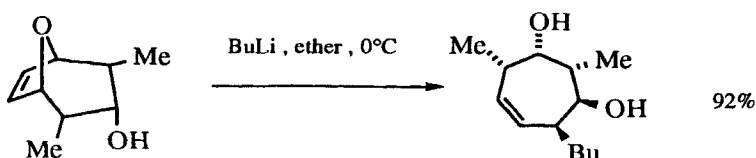
Chong, J.M. *Tetrahedron Lett.*, **1992**, 33, 33.



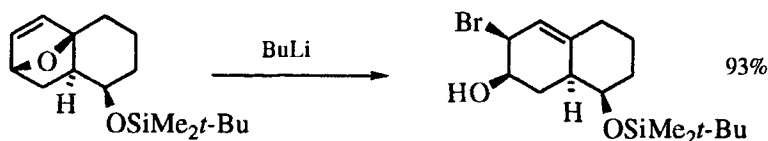
Espanet, B.; Duñach, E.; Périchon, J. *Tetrahedron Lett.*, **1992**, 33, 2485.



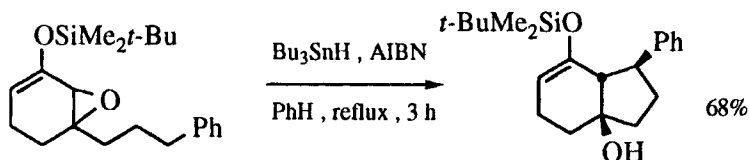
Epling, G.A.; Wang, Q. *J. Chem. Soc., Chem. Commun.*, **1992**, 1133.



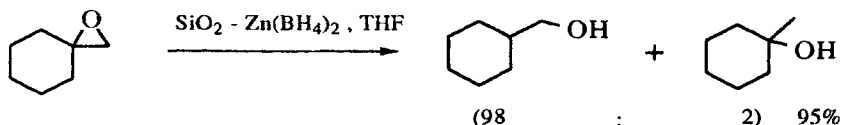
Lautens, M.; Belter, R.K. *Tetrahedron Lett.*, **1992**, 33, 2617.



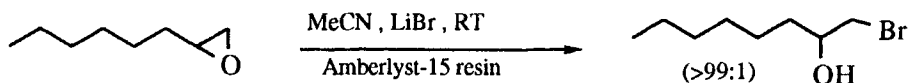
Woo, S.; Keay, B.A. *Tetrahedron Lett.*, **1992**, 33, 2661.



Kim, S.; Koh, J.S. *Tetrahedron Lett.*, **1992**, 33, 7391.



Ranu, B.C.; Das, A.R. *J. Chem. Soc., Perkin Trans. I*, **1992**, 1881.



Bonini, C.; Giuliano, C.; Righi, G.; Rossi, L. *Synth. Commun.*, **1992**, 22, 1863.

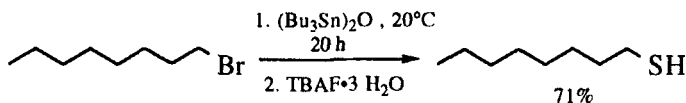
REVIEWS:

"Biosynthetic, Biomimetic, and Related Epoxide Cyclizations"

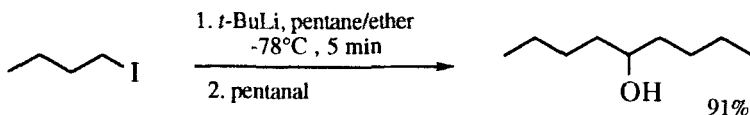
Taylor, S.K. *Org. Prep. Proceed. Int.*, **1992**, 24, 247.

Additional examples of ether cleavages may be found in Section 45A (Protection of Alcohols and Thiols).

SECTION 40: ALCOHOLS AND THIOLS FROM HALIDES AND SULFONATES

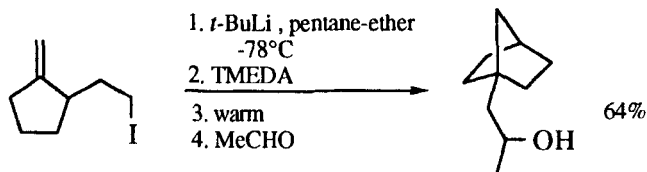


Gingras, M.; Harpp, D.N. *Tetrahedron Lett.*, **1990**, 31, 1397.

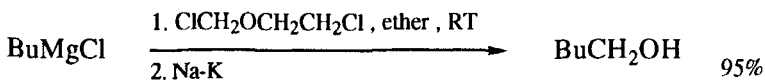


general method - preparation of 1° organolithium reagents

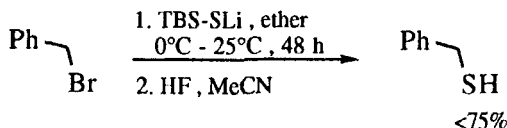
Bailey, W.F.; Punzalan, E.R. *J. Org. Chem.*, **1990**, 55, 5404.



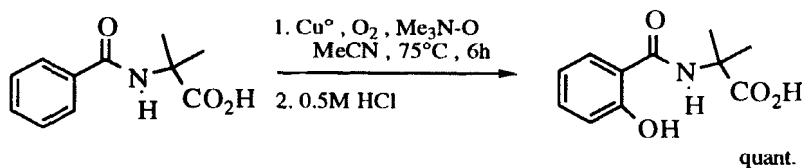
Bailey, W.F.; Khanolkar, A.D. *J. Org. Chem.*, **1990**, 55, 6058.



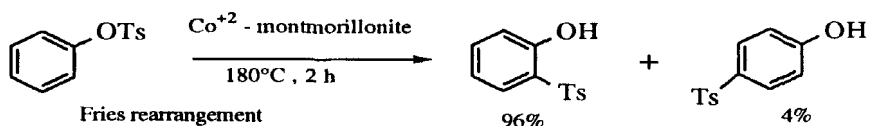
Ogle, C.A.; Wilson, T.E.; Stowe, J.A. *Synthesis*, **1990**, 495.



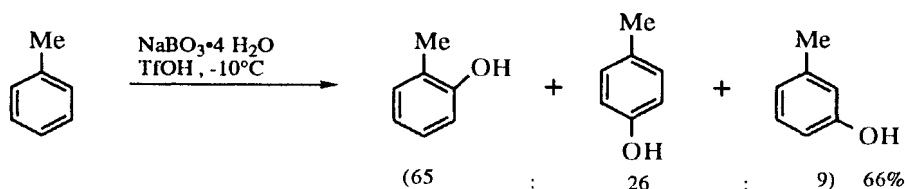
Kraus, G.A.; Andersh, B. *Tetrahedron Lett.*, **1991**, 32, 2189.



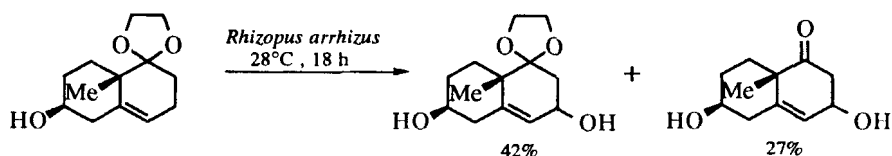
Reinaud, O.; Capdevielle, P.; Maumy, M. *J. Chem. Soc., Chem. Commun.*, **1990**, 566.



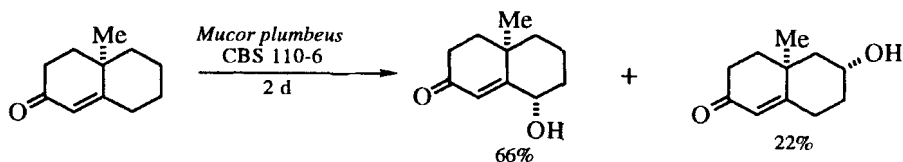
Pitchumani, K.; Pandian, A. *J. Chem. Soc., Chem. Commun.*, **1990**, 1613.



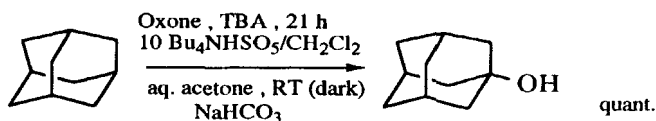
Surya Prakash, G.K.; Krass, N.; Wang, Q.; Olah, G.A. *SynLett*, **1991**, 39.



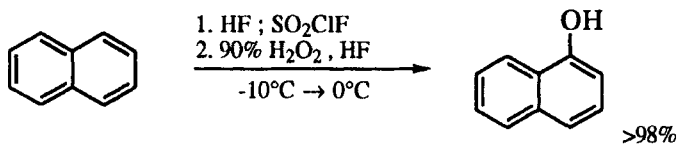
Ouazzani, J.; Arseniyadis, S.; Alvarez-Manzaneda, R.; Cabrera, E.; Ouisson, G. *Tetrahedron Lett.*, **1991**, 32, 647.



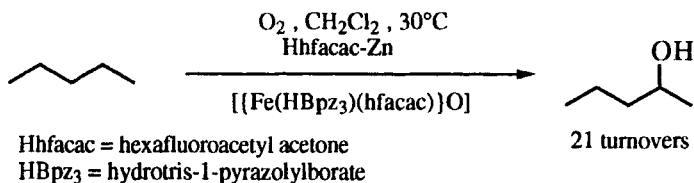
Hammoui, A.; Revial, G.; D'Angelo, J.; Girault, J.P.; Azerad, R. *Tetrahedron Lett.*, **1991**, 32, 651.



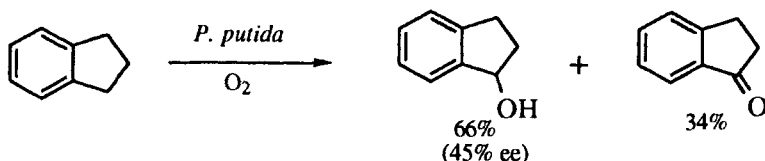
Kumarathasan, R.; Hunter, N.R. *Org. Prep. Proceed. Int.*, **1991**, 23, 651.



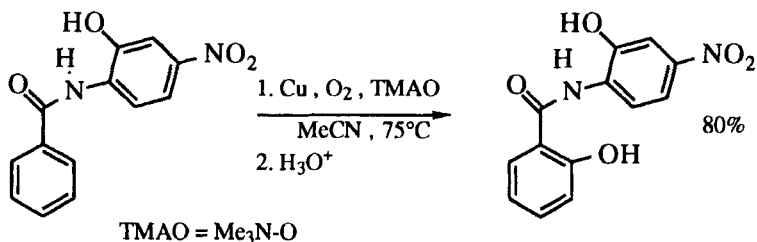
Olah, G.A.; Keumi, T.; Lecoq, J.C.; Fung, A.P.; Olah, J.A. *J. Org. Chem.*, **1991**, 56, 6148.



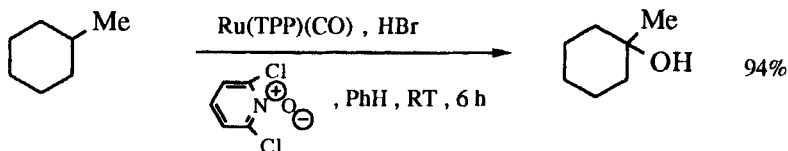
Kitajima, N.; Ito, M.; Fukui, H.; Moro-oka, Y. *J. Chem. Soc., Chem. Commun.*, **1991**, 102.



Boyd, D.R.; Sharma, N.D.; Stevenson, P.J.; Chima, J.; Gray, D.J.; Dalton, H. *Tetrahedron Lett.*, **1991**, 32, 3887.



Reinaud, O.; Capdevielle, P.; Maumy, M. *J. Chem. Soc., Perkin Trans. I*, **1991**, 2129.



Ohtake, H.; Highuchi, T.; Hirobe, M. *J. Am. Chem. Soc.*, **1992**, 114, 10660.

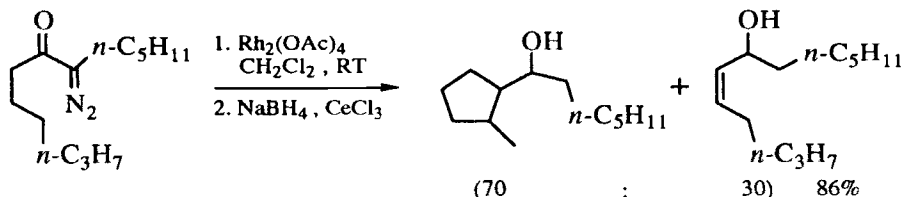
SECTION 42: ALCOHOLS AND THIOLS FROM KETONES

The following reaction types are included in this section:

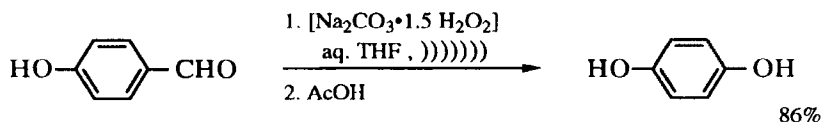
A. Reductions of Ketones to Alcohols

B. Alkylations of Ketones, forming Alcohols

Coupling of ketones to give diols is found in Section 323 (Alcohol $\rightarrow$ Alcohol).



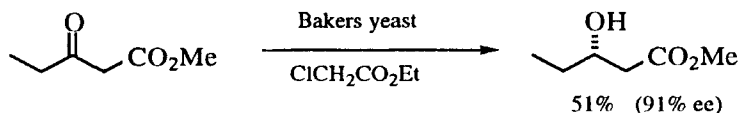
Taber, D.E.; Hennessy, M.J.; Louey, J.P. *J. Org. Chem.*, **1992**, 57, 436.



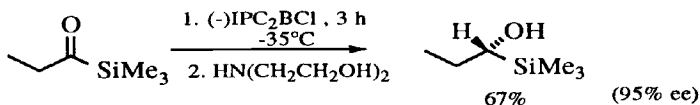
Kabalka, G.W.; Reddy, N.K.; Narayana, C. *Tetrahedron Lett.*, **1992**, 33, 865.

SECTION 42A: REDUCTION OF KETONES TO ALCOHOLS

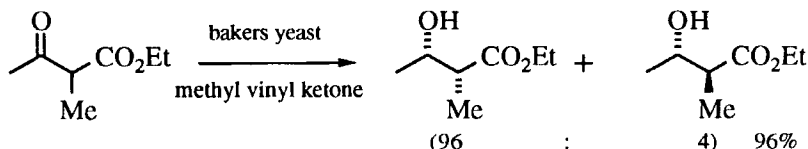
ASYMMETRIC REDUCTION



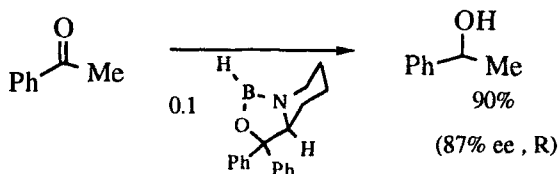
Nakamura, K.; Kawai, Y.; Ohno, A. *Tetrahedron Lett.*, **1990**, 31, 267.



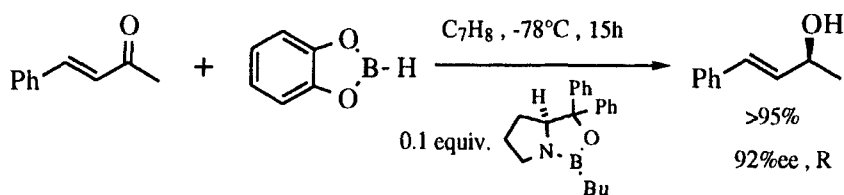
Soderquist, J.A.; Anderson, C.L.; Miranda, E.I.; Rivera, I.; Kabalka, G.W. *Tetrahedron Lett.*, **1990**, 31, 4677.



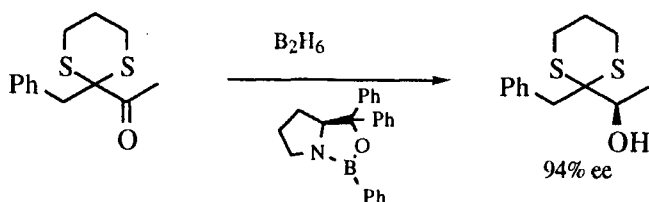
Nakamura, K.; Kawai, Y.; Miyai, T.; Ohno, A. *Tetrahedron Lett.*, **1990**, 31, 3631.



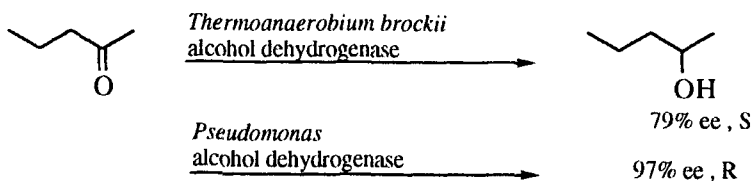
Rama Rao, A.V.; Gurjar, M.K.; Sharma, P.A.; Kaiwar, V. *Tetrahedron Lett.*, **1990**, 31, 2341.



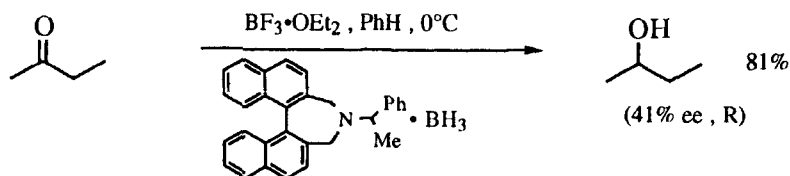
Corey, E.J.; Bakshi, R.K. *Tetrahedron Lett.*, **1990**, 31, 611.



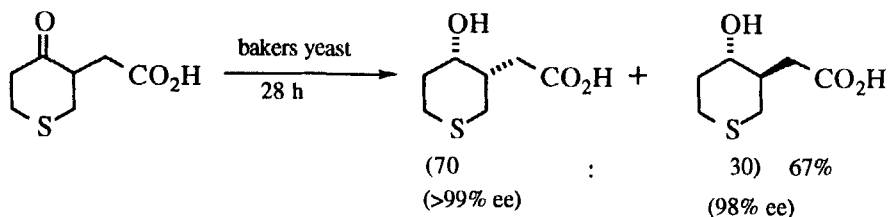
DeNinno, M.P.; Perner, R.J.; Lijewski, L. *Tetrahedron Lett.*, **1990**, 31, 7415.



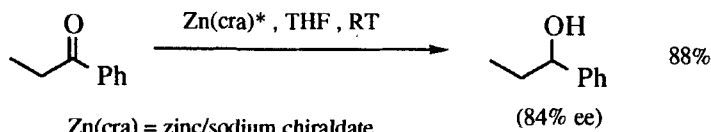
Shen, G-J.; Wang, Y-F.; Bradshaw, C.; Wong, C-H. *J. Chem. Soc., Chem. Commun.*, **1990**, 677.



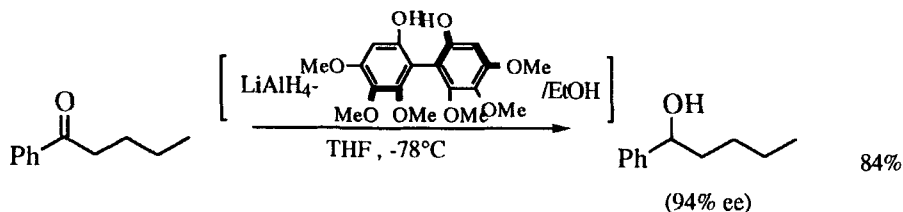
Kanth, J.V.B.; Periasamy, M. *J. Chem. Soc., Chem. Commun.*, **1990**, 1145.



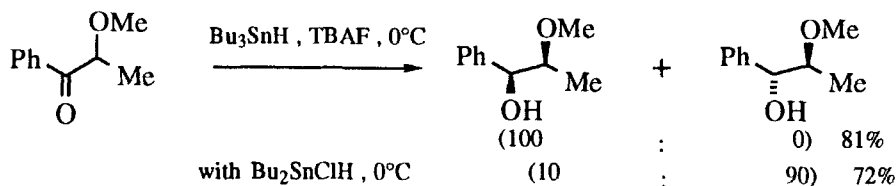
Fujisawa, T.; Mobele, B.I.; Shimizu, M. *Tetrahedron Lett.*, **1991**, 32, 7055.



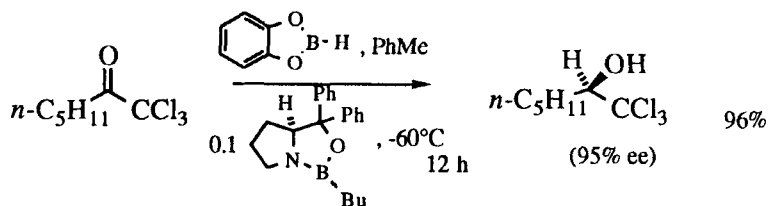
Lalloz, L.; Vanderesse, R.; Mayesky, B.; Caubere, P. *Chem. Lett.*, **1991**, 1961.



Rawson, D.; Meyers, A.I. *J. Chem. Soc., Chem. Commun.*, **1992**, 494.

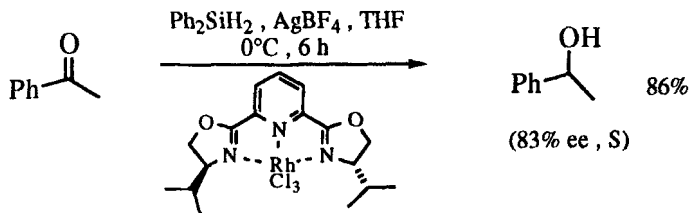


Shibata, I.; Yoshida, T.; Kawakami, T.; Baba, A.; Matsuda, H. *J. Org. Chem.*, **1992**, 57, 4049.



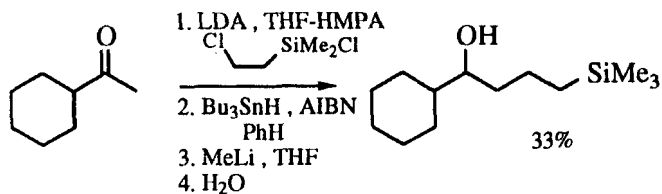
Corey, E.J.; Link, J.O. *Tetrahedron Lett.*, **1992**, 33, 3431.

Corey, E.J.; Cheng, X.-M.; Cimprich, K.A.; Sarshar, S. *Tetrahedron Lett.*, **1991**, 32, 6835.

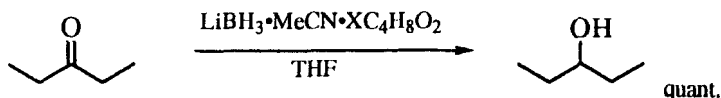


Nishiyama, H.; Yamaguchi, S.; Kondo, M.; Itoh, K. *J. Org. Chem.*, **1992**, *57*, 4306.

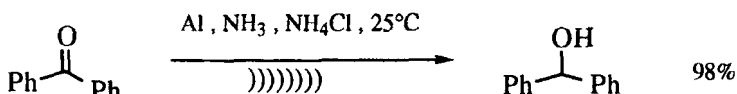
NON-ASYMMETRIC REDUCTION



Walkup, R.D.; Kane, R.R.; Obeyesekene, N.U. *Tetrahedron Lett.*, **1990**, *31*, 1531.



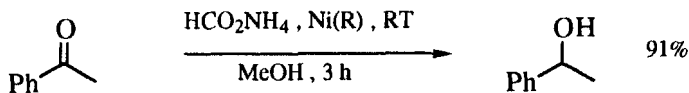
Mittakanti, M.; Peters, J.L.; Morse, K.W. *J. Org. Chem.*, **1990**, *55*, 4464.



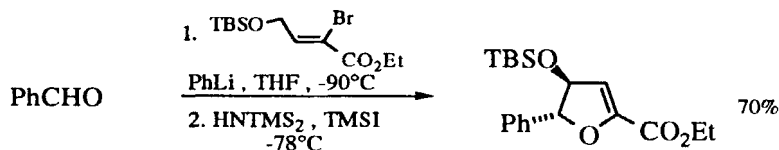
Sato, R.; Nagaoka, T.; Goto, T.; Saito, M. *Bull. Chem. Soc. Jpn.*, **1990**, *63*, 290.



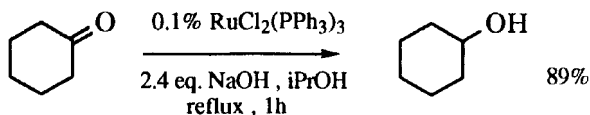
Rao, H.S.P.; *Synth. Commun.*, **1990**, *20*, 45.



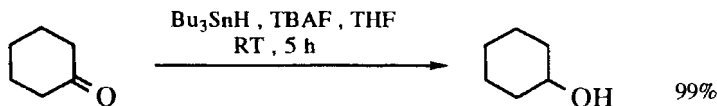
Chen, F-E.; Zhang, H.; Yuan, W.; Zhang, W-W. *Synth. Commun.*, **1991**, *21*, 107.



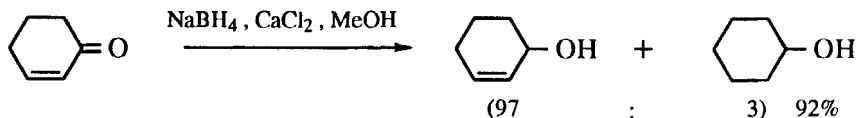
Ranu, B.C.; Das, A.R. *J. Org. Chem.*, **1991**, 56, 4796.



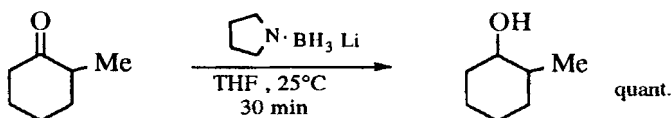
Chowdhury, R.L.; Bäckvall, J.-E. *J. Chem. Soc., Chem. Commun.*, **1991**, 1063.



Shibata, I.; Yoshida, T.; Baba, A.; Matsuda, H. *Chem. Lett.*, **1991**, 307.



Fujii, H.; Oshima, K.; Utimoto, K. *Chem. Lett.*, **1991**, 1847.



Fisher, G.B.; Harrison, J.; Fuller, J.C.; Goralski, C.T.; Singaram, B. *Tetrahedron Lett.*, **1992**, 22, 4533.

REVIEWS:

"Bakers Yeast as a Reagent in Organic Synthesis"

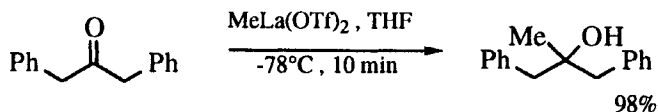
Servi, S. *Synthesis*, **1990**, 1.

"Practical and Useful Methods for the Enantioselective Reduction of Unsymmetrical Ketones"

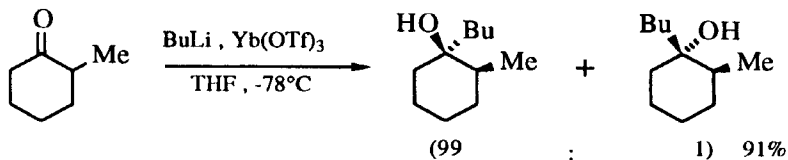
Singh, V.K. *Synthesis*, **1992**, 605.

SECTION 42B: ALKYLATION OF KETONES, FORMING ALCOHOLS

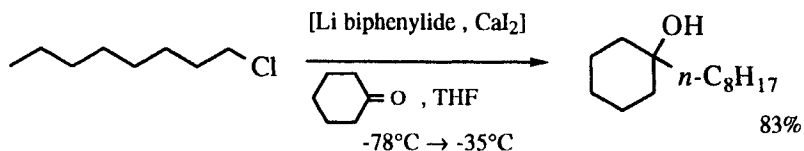
Aldol reactions are listed in Section 330 (Ketone-Alcohol)



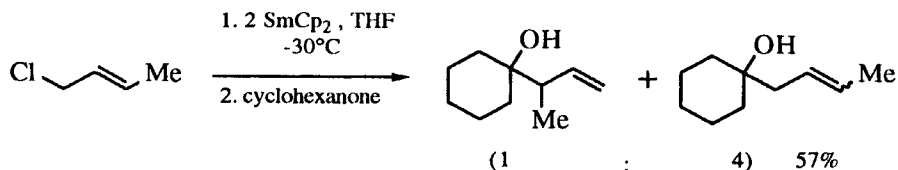
Collins, S.; Hong, Y.; Hoover, G.J.; Veit, J.R. *J. Org. Chem.*, **1990**, 55, 3565.



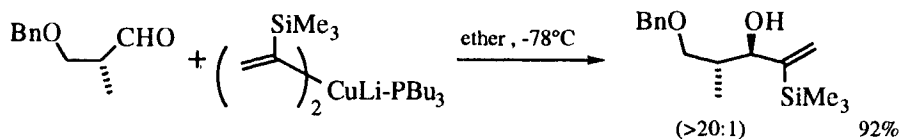
Molander, G.A.; Burkhardt, E.R.; Weining, P. *J. Org. Chem.*, **1990**, 55, 4990.



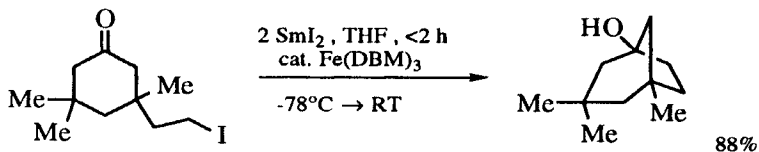
Wu, T.-C.; Xiong, H.; Rieke, R.D. *J. Org. Chem.*, **1990**, 55, 5045.



Collin, J.; Bied, C.; Kagan, H.B. *Tetrahedron Lett.*, **1991**, 32, 629.

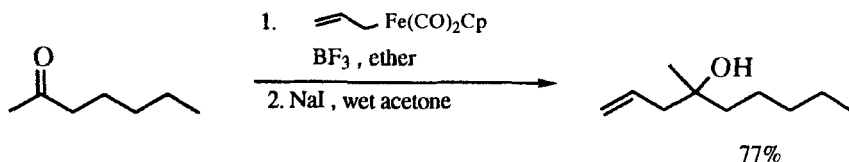


Burke, S.D.; Piscopio, A.D.; Marron, B.E.; Matulenko, M.A.; Pan, G. *Tetrahedron Lett.*, **1991**, 32, 857.

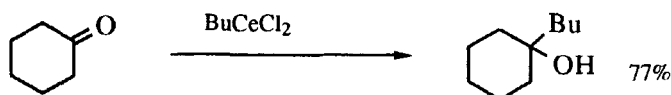


DBM = dibenzoyl methide

Molander, G.A.; McKie, J.A. *J. Org. Chem.*, **1991**, 56, 4112.



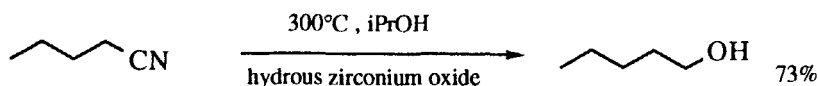
Jiang, S.; Turos, E. *Tetrahedron Lett.*, **1991**, 32, 4619.



ultrasound used with $\text{CeCl}_3 \cdot 7 \text{H}_2\text{O}$ to prepare cerium reagent

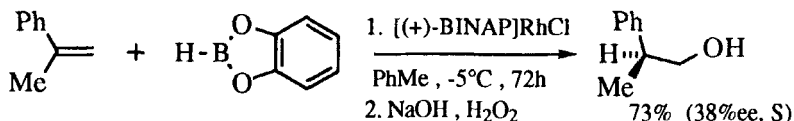
Greeves, N.; Lyford, L. *Tetrahedron Lett.*, **1992**, 33, 4759.

SECTION 43: ALCOHOLS AND THIOLS FROM NITRILES

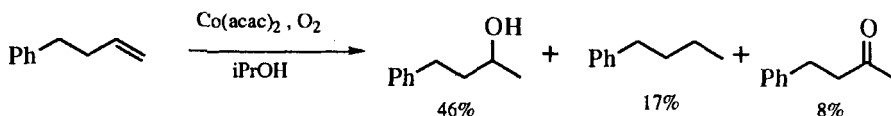


Takahashi, K.; Shibagaki, M.; Matsushita, H. *Chem. Lett.*, **1990**, 311.

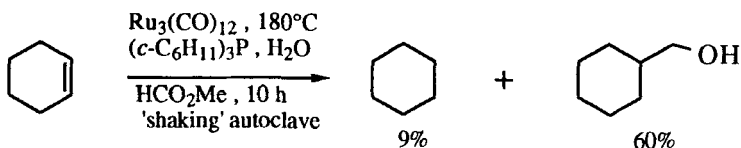
SECTION 44: ALCOHOLS AND THIOLS FROM ALKENES



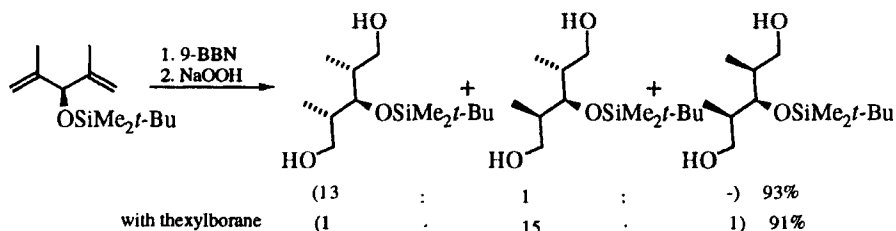
Sato, M.; Miyaura, N.; Suzuki, A. *Tetrahedron Lett.*, **1990**, 31, 231.



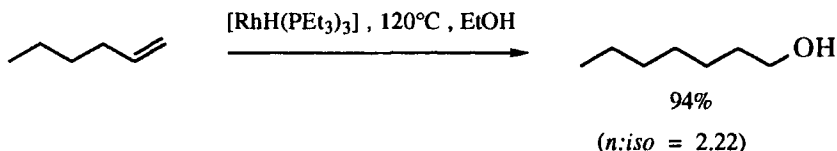
Kato, K.; Yamada, T.; Takai, T.; Inoki, S.; Isayama, S. *Bull. Chem. Soc., Jpn.*, **1990**, 63, 179.



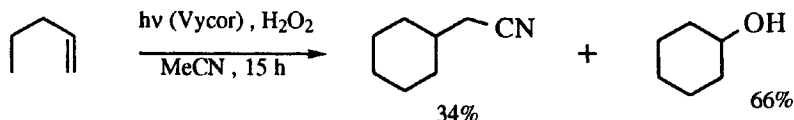
Jenner, G. *Tetrahedron Lett.*, **1991**, 32, 505.



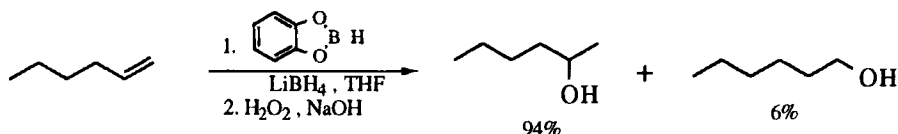
Harada, T.; Matsuda, Y.; Wada, I.; Uchimura, J. *J. Chem. Soc., Chem. Commun.*, **1990**, 21.



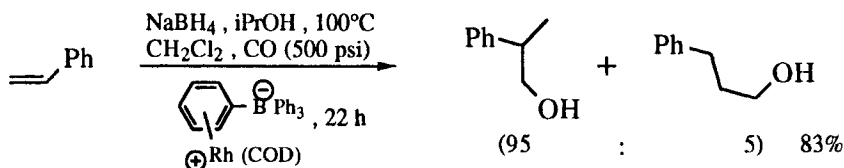
MacDougall, J.K.; Cole-Hamilton, D.J. *J. Chem. Soc., Chem. Commun.*, **1990**, 165.



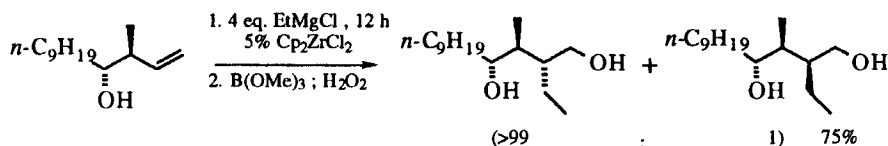
Sonawane, H.R.; Bellur, N.S.; Shah, V.G. *J. Chem. Soc., Chem. Commun.*, **1990**, 1603.



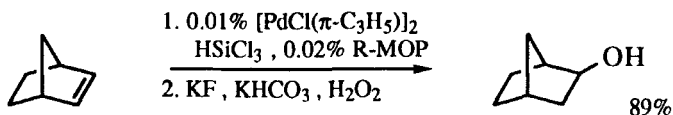
Arase, A.; Nunokawa, Y.; Masuda, Y.; Hoshi, M. *J. Chem. Soc., Chem. Commun.*, **1991**, 205.



Zhou, J-Q.; Alper, H. *J. Chem. Soc., Chem. Commun.*, **1991**, 233.

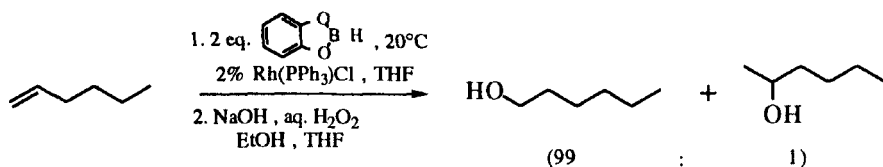


Hoye, A.H.; Xu, Z.; Morken, J.P.; Hour, A.F. *J. Am. Chem. Soc.*, **1991**, 113, 8950.

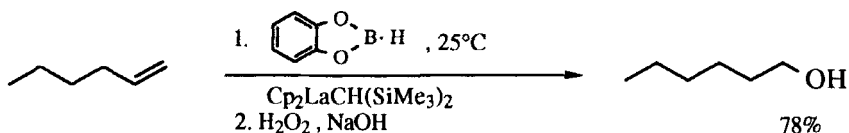


R-MOP = (R)-2-methoxy-2-diphenylphosphino-1,1'-binaphthyl

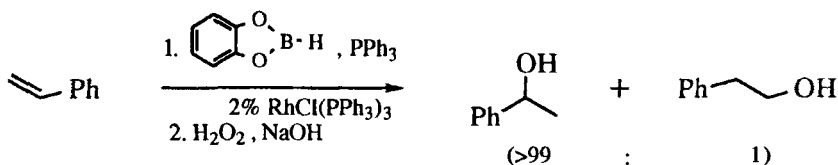
Uozumi, Y.; Lee, S.-Y.; Hayashi, T. *Tetrahedron Lett.*, **1992**, 33, 7185.



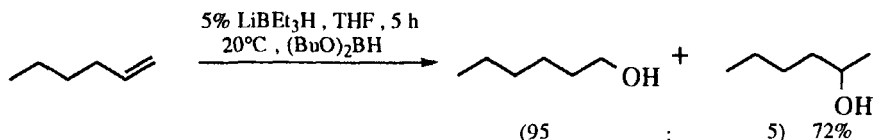
Evans, D.A.; Fu, G.C.; Hoveyda, A.H. *J. Am. Chem. Soc.*, **1992**, 114, 6671.



Harrison, K.N.; Marks, T.L. *J. Am. Chem. Soc.*, **1992**, 114, 9220.



Burgess, K.; van der Donk, W.A.; Westcott, S.A.; Marder, T.B.; Baker, R.T.; Calabrese, J.C. *J. Am. Chem. Soc.*, **1992**, 114, 9350.

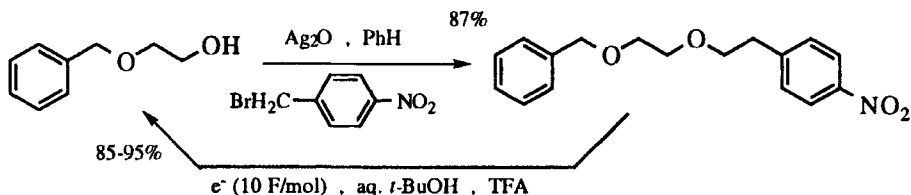


Arase, A.; Nunokawa, Y.; Masuda, Y.; Hoshi, M. *J. Chem. Soc., Chem. Commun.*, **1992**, 51.

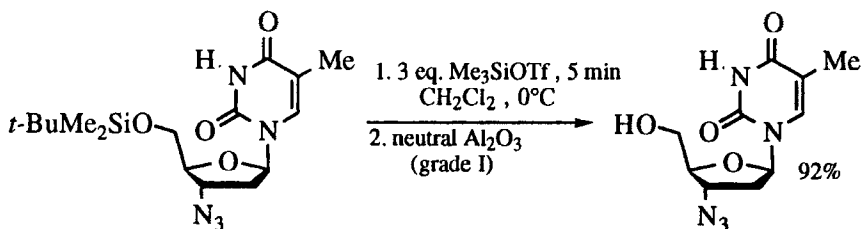
SECTION 45: ALCOHOLS AND THIOLS FROM MISCELLANEOUS COMPOUNDS

NO ADDITIONAL EXAMPLES

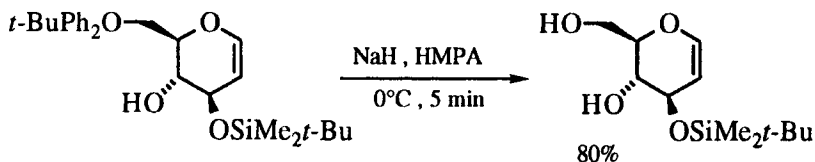
SECTION 45A: PROTECTION OF ALCOHOLS AND THIOLS



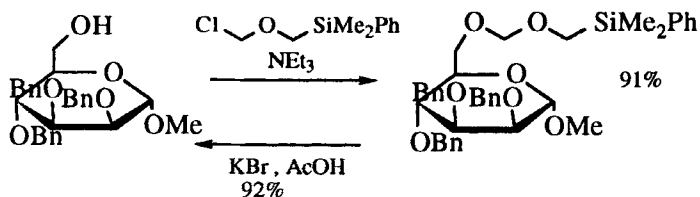
Fukase, K.; Hata, N.; Oishi, T.; Kusumoto, S. *Tetrahedron Lett.*, **1990**, 31, 381.



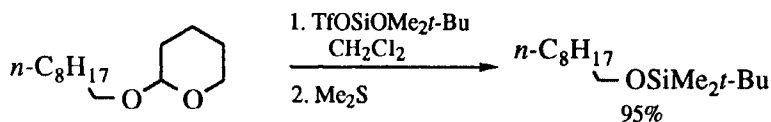
Bou, V.; Villarrasa, J. *Tetrahedron Lett.*, **1990**, 31, 567.



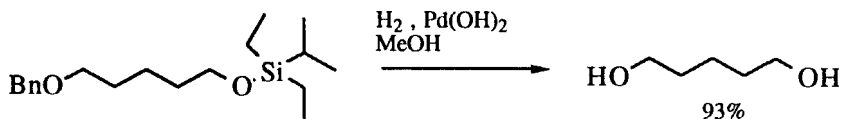
Shekhani, M.S.; Khan, K.M.; Mahmood, K.; Shah, P.M.; Malik, S. *Tetrahedron Lett.*, **1990**, 31, 1669.



Boons, G.J.P.H.; Elie, C.J.J.; van der Marel, G.A.; van Boom, J.H. *Tetrahedron Lett.*, **1990**, 31, 2197.

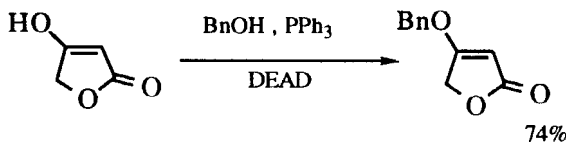


Kim, S.; Kee, I.S. *Tetrahedron Lett.*, **1990**, 31, 2899.

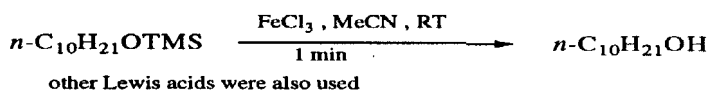


in dioxane, Bn cleaved but not OSiR_3

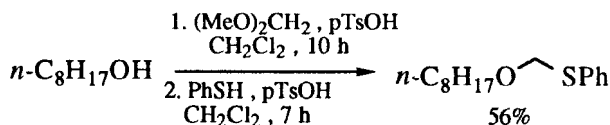
Toshima, K.; Yanagawa, K.; Mukaiyama, S.; Tatsuta, K. *Tetrahedron Lett.*, 1990, 31, 6697.



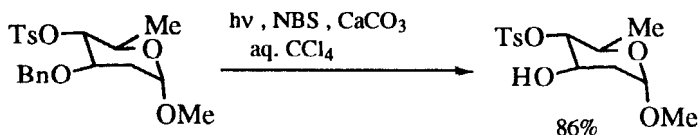
Baiwa, J.S.; Anderson, R.C. *Tetrahedron Lett.*, 1990, 31, 6973.



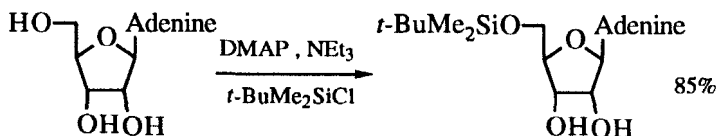
Cort. A.D. Synth. Commun., 1990, 20, 757.



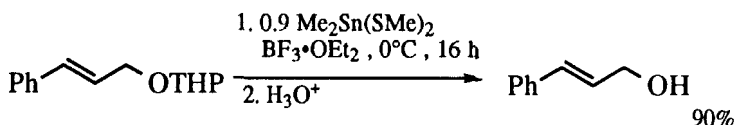
Dieter, R.K.; Datar, R. *Org. Prep. Proceed. Int.*, 1990, 22, 63.



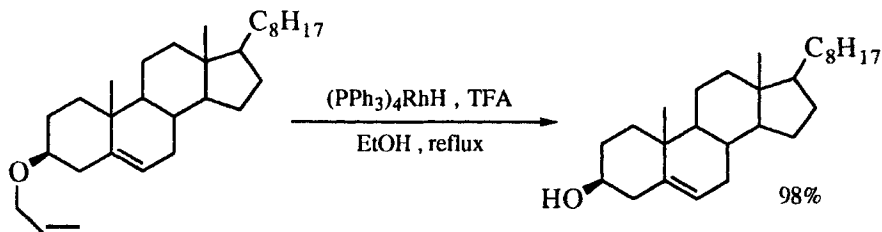
Binkley, R.W.; Hehemann, D.G. *J. Org. Chem.*, **1990**, *55*, 378.



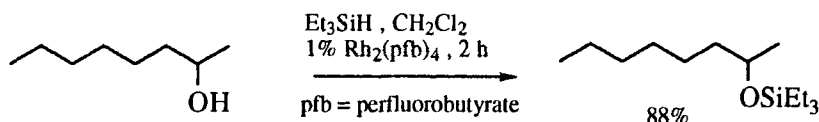
Nair, V.; Buenger, G.S. *Org. Prep. Proceed. Int.*, 1990, 22, 3.



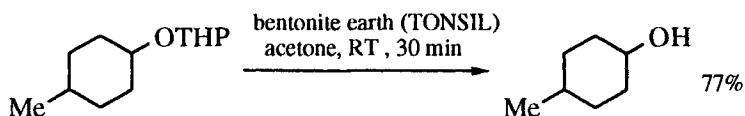
Sato, T.; Otera, J.; Nozaki, H. *J. Org. Chem.*, **1990**, *55*, 4770.



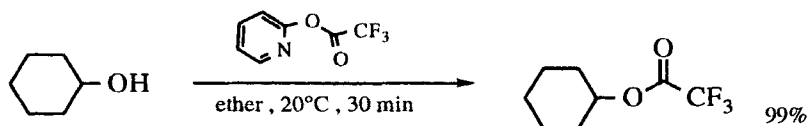
Ziegler, E.E.; Brown, E.G.; Sobolov, S.B. *J. Org. Chem.*, **1990**, *55*, 3691.



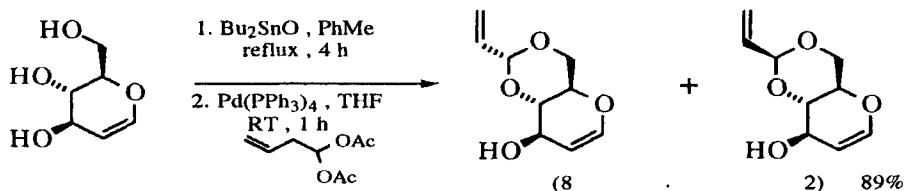
Doyle, M.P.; High, K.G.; Bagheri, V.; Pieters, R.J.; Lewis, P.J.; Pearson, M.M. *J. Org. Chem.*, **1990**, *55*, 6082.



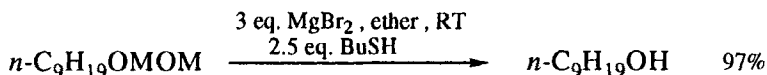
Cruz-Almanza, R.; Pérez-Flores, F.J.; Avila, M. *Synth. Commun.*, **1990**, *20*, 1125.



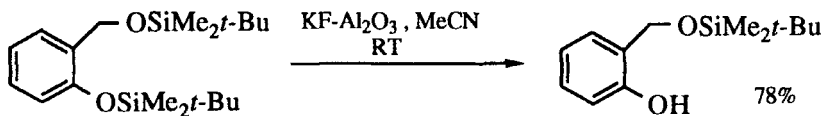
Keumi, T.; Shimada, M.; Morita, T.; Kitajima, H. *Bull. Chem. Soc. Jpn.*, **1990**, *63*, 2252.



Holzapfel, C.W.; Huyser, J.J.; van der Merwe, T.L.; van Heerden, F.R. *Heterocycles*, **1991**, *32*, 1445.

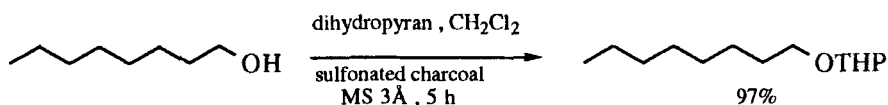


Kim, S.; Kee, I.S.; Park, Y.H.; Park, J.H. *SynLett*, **1991**, 183.

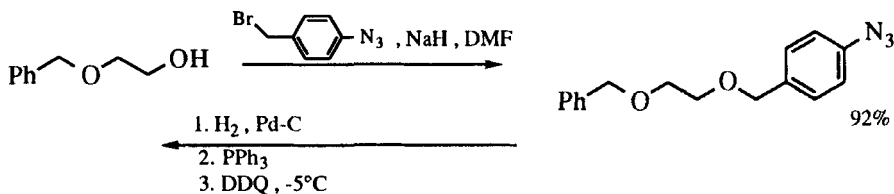


ultrasound used in cases when deprotection is slow

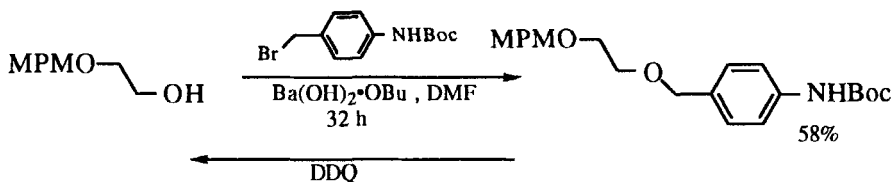
Schmittling, E.A.; Sawyer, J.S. *Tetrahedron Lett.*, **1991**, 32, 7207.



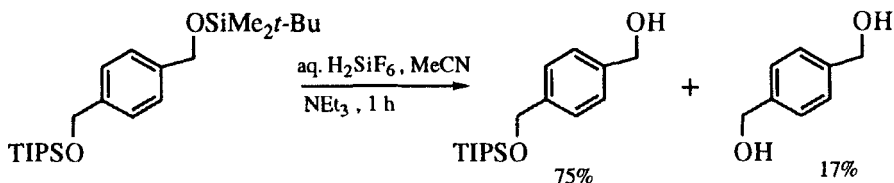
Patney, H.K. *Synth. Commun.*, **1991**, 21, 2329.



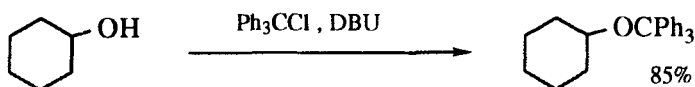
Fukase, K.; Hashida, M.; Kusumoto, S. *Tetrahedron Lett.*, **1991**, 32, 3557.



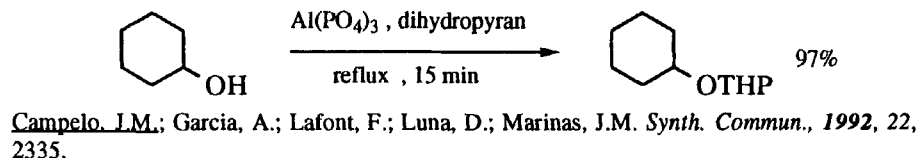
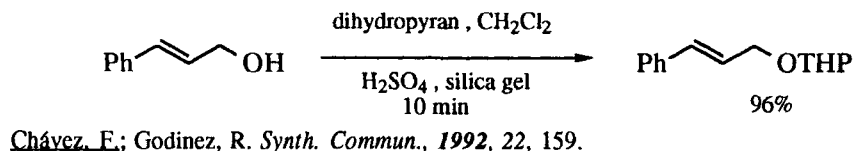
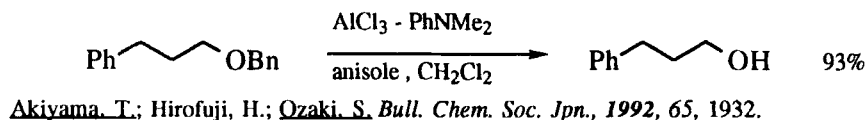
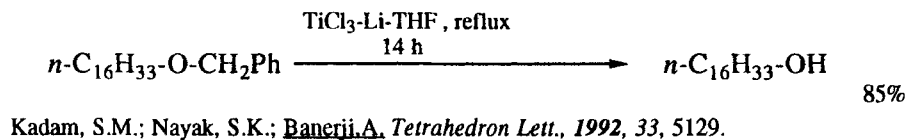
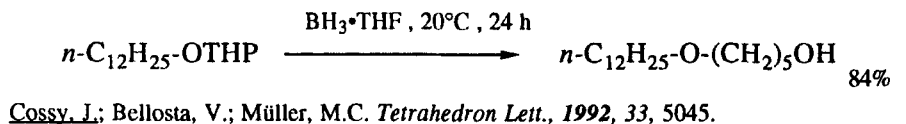
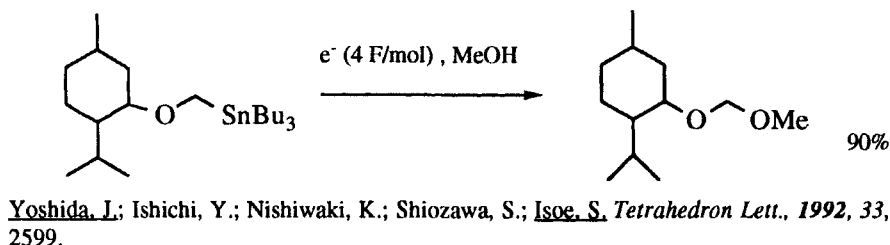
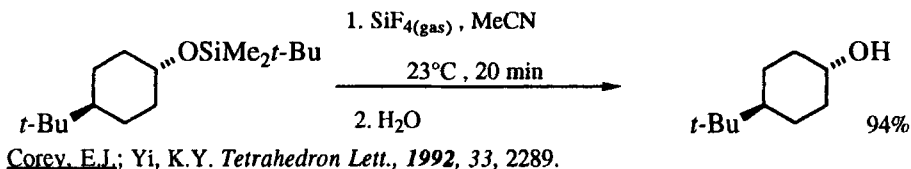
Fukase, K.; Yoshimura, T.; Hashida, M.; Kusumoto, S. *Tetrahedron Lett.*, **1991**, 32, 4019.

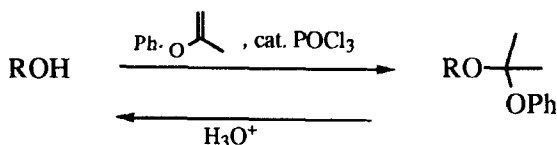


Pilcher, A.S.; Hill, D.K.; Shimshock, S.J.; Waltermire, R.E.; DeShong, P. *J. Org. Chem.*, **1992**, 57, 2492.

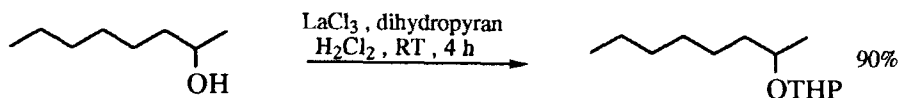


Colin-Mesdager, S.; Girard, J-P.; Ross, J-C. *Tetrahedron Lett.*, **1992**, 33, 2689.

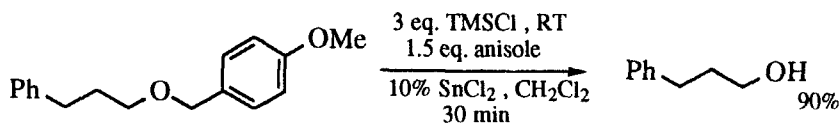




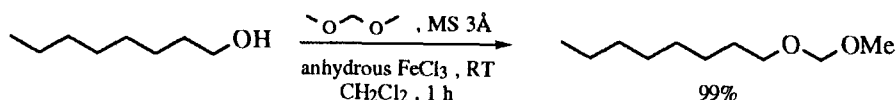
Zandbergen, P.; Willems, H.M.G.; van der Marel, G.A.; Brussee, J.; van der Gen, A. *Synth. Commun.*, **1992**, 22, 2781.



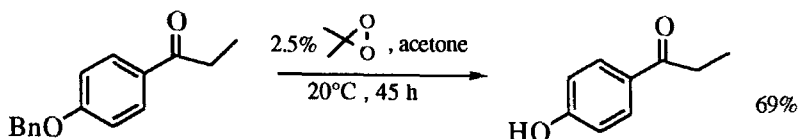
Bhuma, V.; Kantam, M.L. *Synth. Commun.*, **1992**, 22, 2941.



Akiyama, T.; Shima, H.; Ozaki, S. *SynLett*, **1992**, 415.



Patney, H.K. *SynLett*, **1992**, 567.



Marples, B.A.; Muxworthy, J.P.; Baggaley, K.H. *SynLett*, **1992**, 646.

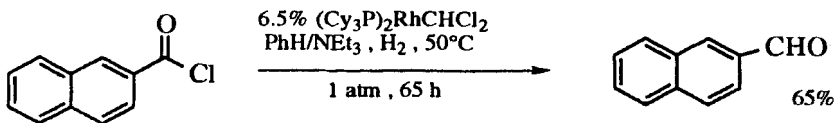
CHAPTER 4

PREPARATION OF ALDEHYDES

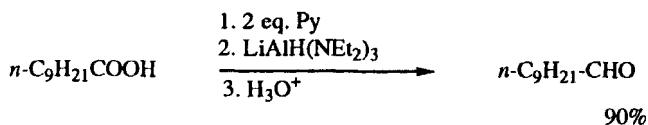
SECTION 46: ALDEHYDES FROM ALKYNES

NO ADDITIONAL EXAMPLES

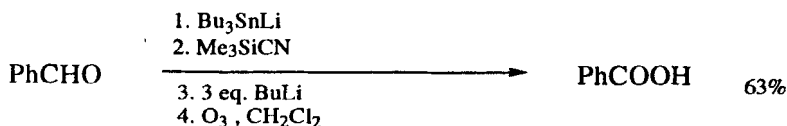
SECTION 47: ALDEHYDES FROM ACID DERIVATIVES



Grushin, V.V.; Alper, H. *J. Org. Chem.*, **1991**, *56*, 5159.

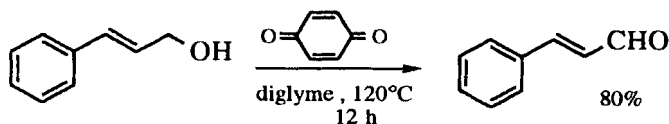


Cha, J.S.; Lee, J.C.; Lee, H.S.; Lee, S.E. *Org. Prep. Proceed. Int.*, **1992**, *24*, 327.

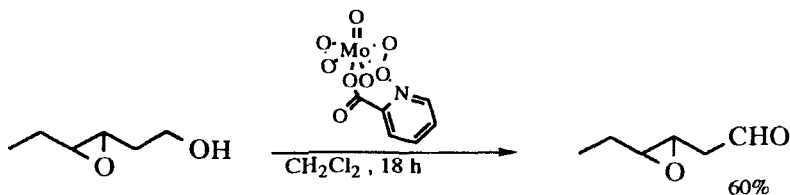


Yu, H.K.B.; Schwartz, J. *Tetrahedron Lett.*, **1992**, *33*, 6787, 6791.

SECTION 48: ALDEHYDES FROM ALCOHOLS AND THIOLS

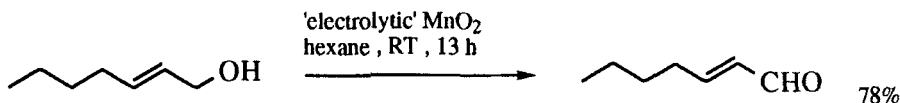


Kulkarni, M.G.; Mathew, T.S. *Tetrahedron Lett.*, **1990**, *31*, 4497.

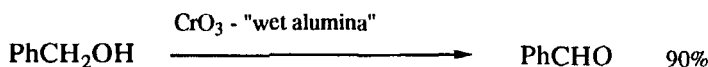


also with 2° alcohols to give ketones

Campestrini, S.; DiFuria, F.; Modena, G.; Bortolini, O. *J. Org. Chem.*, **1990**, *55*, 3658.

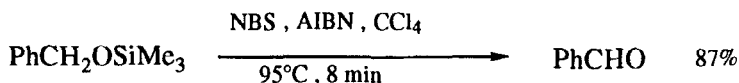


Tsuboi, S.; Ishii, N.; Sakai, T.; Tari, I.; Utake, M. *Bull. Chem. Soc. Jpn.*, **1990**, *63*, 1888.

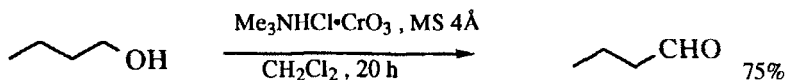


also for the preparation of aryl ketone from aryl alcohols

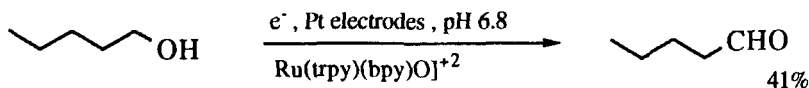
Hirano, M.; Kuroda, H.; Morimoto, T. *Bull. Chem. Soc. Jpn.*, **1990**, *63*, 2433.



Markó, I.E.; Mekhalifa, A.; Ollis, W.D. *SynLett*, **1990**, 345.

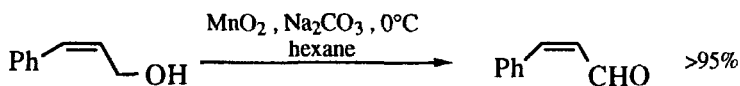


Acharya, S.P.; Rane, R.A. *Synthesis*, **1990**, 127.



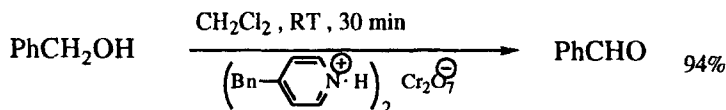
terpy = 2,2',6',2"-terpyridine

Navarro, M.; De Giovanni, W.F.; Romero, J.R. *Synth. Commun.*, **1990**, *20*, 399.

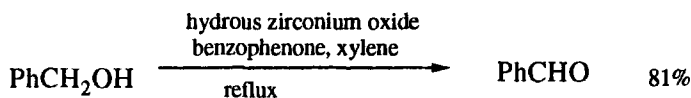


(13:1 retention:isomerization)

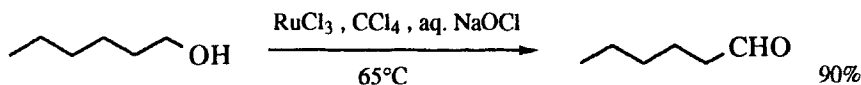
Xiao, X.; Prestwich, G.D. *Synth. Commun.*, **1990**, *20*, 3125.



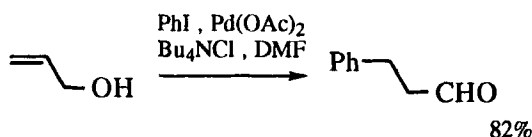
Akamanchi, K.G.; Iyer, L.G.; Meenakshi, R. *Synth. Commun.*, **1991**, 21, 419.



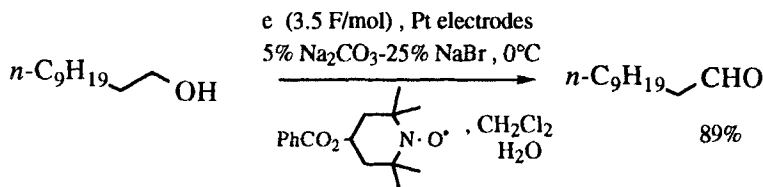
Kuno, H.; Shibagaki, M.; Takahashi, K.; Matsushita, H. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 312.



Ogibin, Yu.N.; Ilovaiskii, A.I.; Nikishin, G.I. *Izv. Akad. Nauk. SSSR*, **1991**, 40, 115 (Engl., p.99).



Jeffery, T. *Tetrahedron Lett.*, **1991**, 32, 2121.



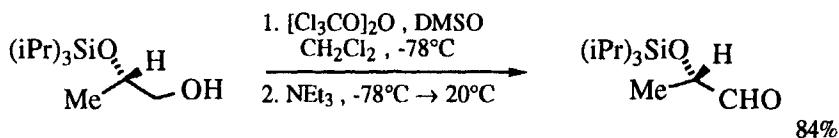
oxidation of 1° alcohols much faster than 2° alcohols

Inokuchi, T.; Matsumoto, S.; Torii, S. *J. Org. Chem.*, **1991**, 56, 2416.

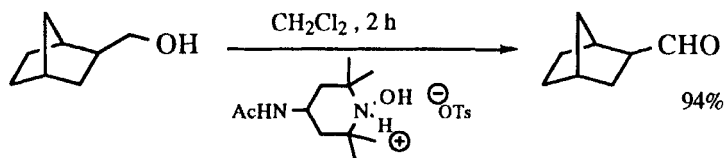
Inokuchi, T.; Matsumoto, S.; Fukushima, M.; Torii, S. *Bull. Chem. Soc. Jpn.* **1991**, 64, 796.

Inokuchi, T.; Matsumoto, S.; Nishiyama, T.; Torii, S. *J. Org. Chem.*, **1990**, 55, 462.

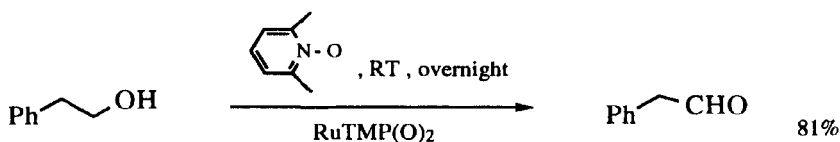
Inokuchi, T.; Matsumoto, S.; Nishiyama, T.; Torii, S. *SynLett*, **1990**, 57.



Palomo, C.; Cossio, F.P.; Ontoria, J.M.; Odriozola, J.M. *J. Org. Chem.*, **1991**, 56, 5948.

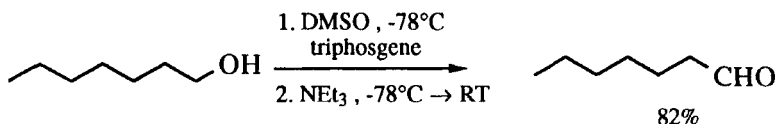


Ma, Z.; Bobbitt, J.M. *J. Org. Chem.*, **1991**, 56, 6110.

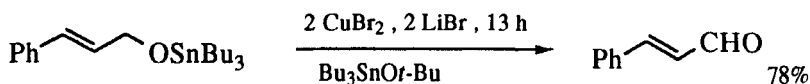


TMP = tetramethylpyrazole

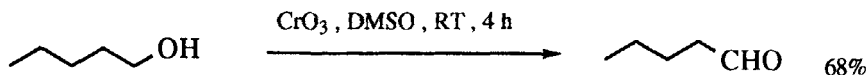
Higuchi, T.; Ohtake, H.; Hirobe, M. *Tetrahedron Lett.*, **1991**, 32, 7435.



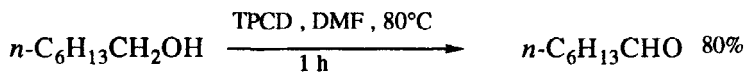
Rivero, I.A.; Somanathan, R.; Hellberg, L.H. *Org. Prep. Proceed. Int.*, **1992**, 24, 363.



Yamaguchi, J.; Takeda, T. *Chem. Lett.*, **1992**, 423.

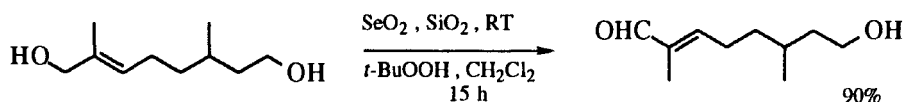


Lou, W-X.; Lou, J-D. *Synth. Commun.*, **1992**, 22, 767.



TPCD = tetrakis-pyridino-cobalt dichromate = $[\text{Py}_4\text{Co}(\text{HCrO}_4)_2]$

Hu, Y.; Hu, H. *Synth. Commun.*, **1992**, 22, 1491.



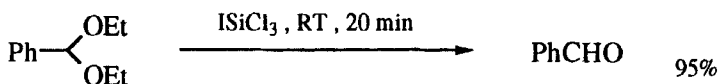
Kalsi, P.S.; Chhabra, B.R.; Singh, J.; Vig, R. *SynLett*, **1992**, 425.

REVIEWS:

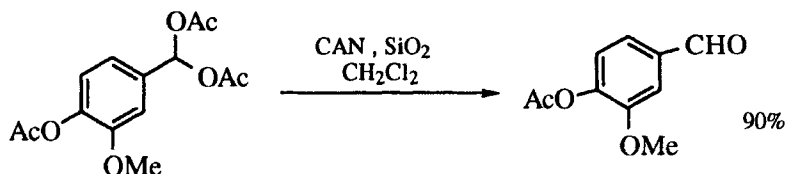
"Oxidation of Alcohols by Activated DMSO and Related Reactions: An Update:
Tidwell, T.T. *Synthesis*, **1990**, 857.

SECTION 49: ALDEHYDES FROM ALDEHYDES

Conjugate reductions and Michael Alkylations of conjugated aldehydes are listed
 in Section 74 (Alkyls from Alkenes).



Elmorsy, S.S.; Bhatt, M.V.; Pelter, A. *Tetrahedron Lett.*, **1992**, 33, 1657.



Cotelle, P.; Catteau, J-P. *Tetrahedron Lett.*, **1992**, 33, 3855.

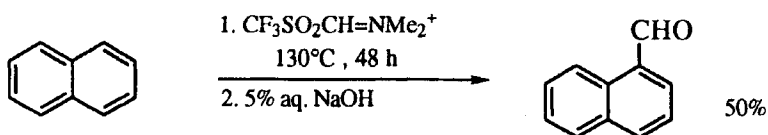
Related Methods:

Aldehydes from Ketones (Section 57)

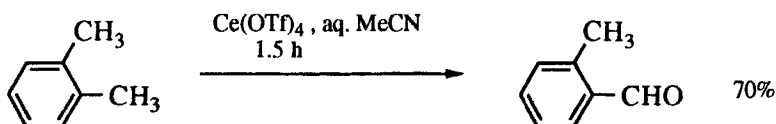
Ketones from Ketones (Section 177)

Also via: Alkenyl aldehydes (Section 341)

SECTION 50: ALDEHYDES FROM ALKYLs, METHYLENES AND ARYLs

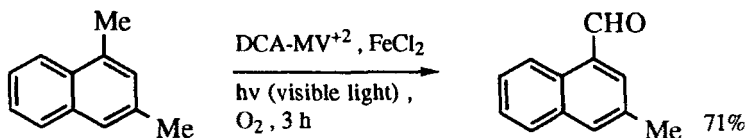


Martinez, A.G.; Alvarez, R.M.; Barcina, J.O.; de la Moya Cerero, S.; Vilar, E.T.; Fraile, A.G.; Hanack, M.; Subramanian, L.R. *J. Chem. Soc., Chem. Commun.*, **1990**, 1571.



also, EtPh converted to acetophenone

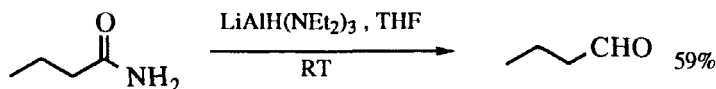
Imamoto, T.; Koide, Y.; Hiyama, S. *Chem. Lett.*, **1990**, 1445.



DCA = 9,10-dicyanoanthracene; MV²⁺ = methyl viologen
ketones are formed from ArCH₂R

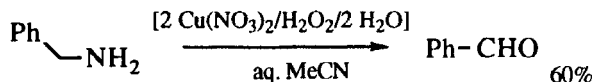
Santamaria, J.; Iroundi, R. *Tetrahedron Lett.*, **1991**, 32, 4291.

SECTION 51: ALDEHYDES FROM AMIDES

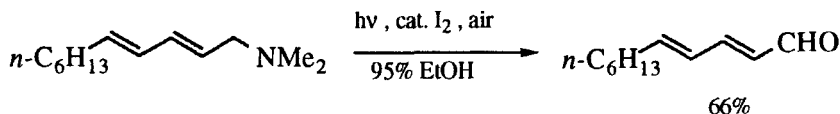


Cha, J.S.; Lee, J.C.; Lee, H.S.; Lee, S.E.; Kim, J.M.; Kwon, O.O.; Min, S.J. *Tetrahedron Lett.*, **1991**, 32, 6903.

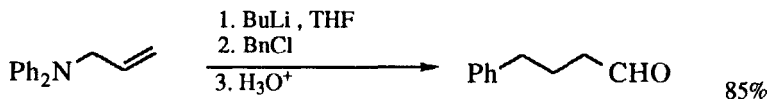
SECTION 52: ALDEHYDES FROM AMINES



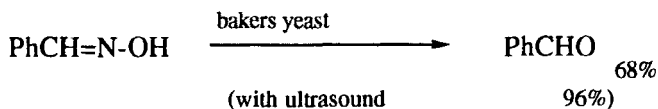
Capdevielle, P.; Maumy, M. *Tetrahedron Lett.*, **1990**, 31, 3891.



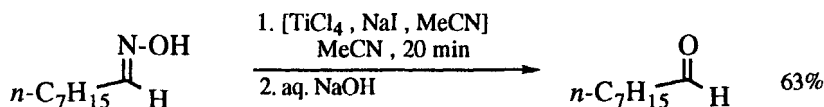
Gangloff, A.R.; Judge, T.M.; Helquist, P. *J. Org. Chem.*, **1990**, 55, 3679.



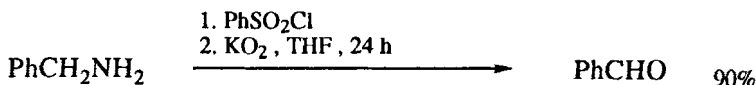
Eisch, J.L.; Shah, J.H. *J. Org. Chem.*, **1991**, 56, 2955.



Kamal, A.; Rao, M.V.; Meshram, H.M. *J. Chem. Soc., Perkin Trans. I*, **1991**, 2056.



Balicki, R.; Kaczmarek, L. *Synth. Commun.*, **1991**, 21, 1777.

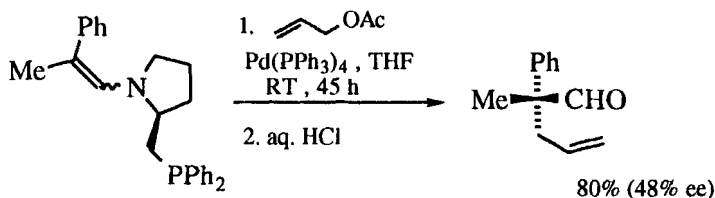


Park, K.H.; Lee, J.B. *Synth. Commun.*, **1992**, 22, 1061.

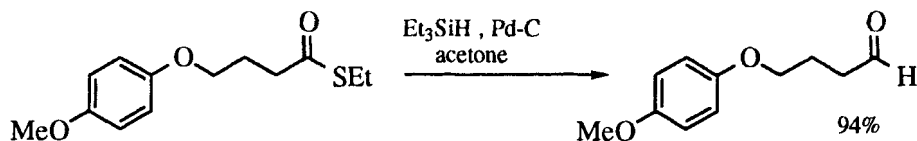
Related Methods:

Ketones from Amines (Section 172)

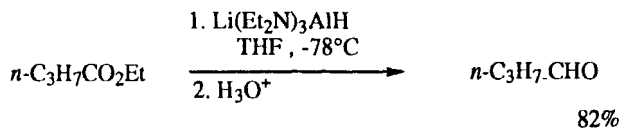
SECTION 53: ALDEHYDES FROM ESTERS



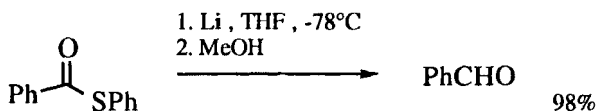
Hiroi, K.; Abe, J. *Tetrahedron Lett.*, **1990**, 31, 3623.



Furuyama, T.; Lin, S.-C.; Li, L. *J. Am. Chem. Soc.*, **1990**, 112, 7050.

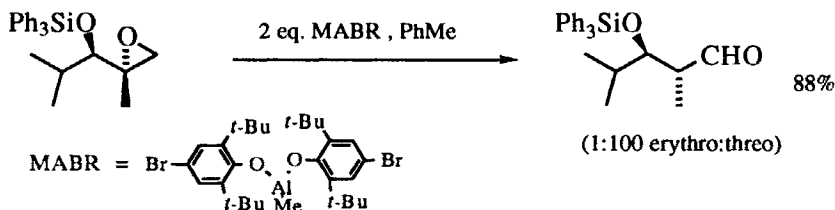


Cha, J.S.; Min, S.J.; Lee, H.S. *Org. Prep. Proceed. Int.*, **1992**, 24, 335.

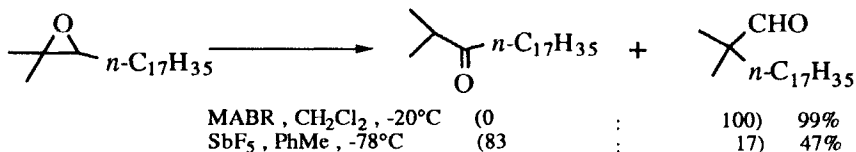


Penn, J.H.; Owens, W.H. *Tetrahedron Lett.*, **1992**, 33, 3737.

SECTION 54: ALDEHYDES FROM ETHERS, EPOXIDES AND THIOETHERS

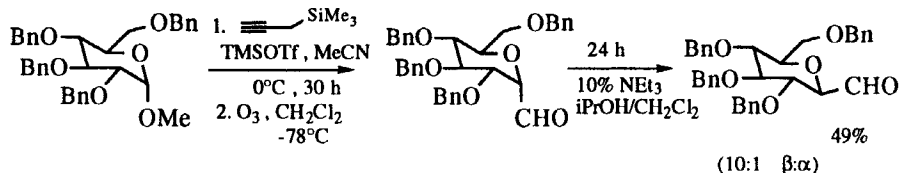


Maruoka, K.; Sato, J.; Yamamoto, H. *J. Am. Chem. Soc.*, **1991**, *113*, 5449.

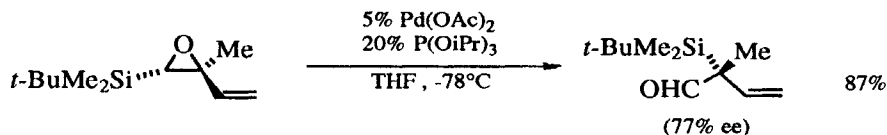


MABR = methyl aluminum bis(4-bromo-2,6-di-*t*-butylphenoxide)

Maruoka, K.; Bureau, R.; Ooi, T.; Yamamoto, H. *SynLett*, **1991**, 491.



Kobertz, W.R.; Bertozzi, C.R.; Bednarski, M.D. *Tetrahedron Lett.*, **1992**, *33*, 737.

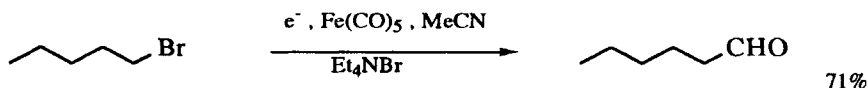


Malacria, M.; Cilloir, F. *Tetrahedron Lett.*, **1992**, *33*, 3859.

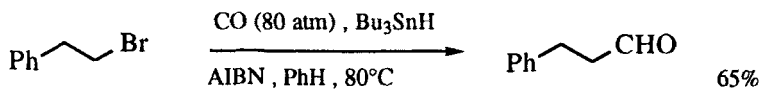
Related Methods:

Ketones from Ethers and Epoxides (Section 174)

SECTION 55: ALDEHYDES FROM HALIDES AND SULFONATES

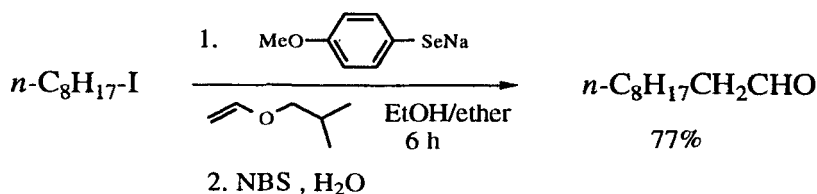


Yoshida, K.; Kobayashi, M.; Amano, S. *J. Chem. Soc., Perkin Trans. I*, **1992**, 1127.

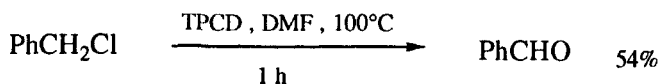


Ryu, I.; Kusano, K.; Ogawa, A.; Kambe, N.; Sonoda, N. *J. Am. Chem. Soc.*, **1990**, *112*, 1295.

Ryu, I.; Kusano, K.; Masumi, N.; Yamazaki, H.; Ogawa, A.; Sonoda, N. *Tetrahedron Lett.*, **1990**, *31*, 6887.



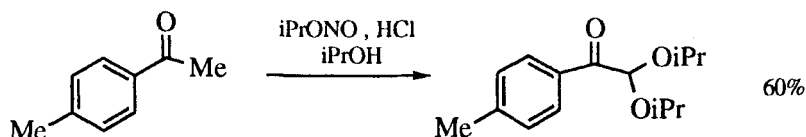
Uneyama, K.; Kitagawa, K. *Tetrahedron Lett.*, **1991**, *32*, 3385.



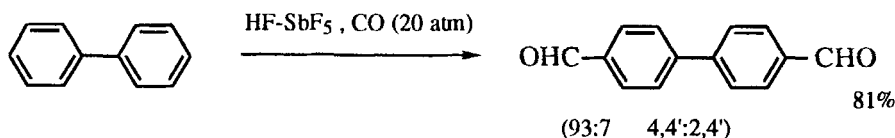
TPCD = tetrakis-pyridino-cobalt dichromate = $[\text{Py}_4\text{Co}(\text{HCrO}_4)_2]$

Hu, Y.; Hu, H. *Synth. Commun.*, **1992**, *22*, 1491.

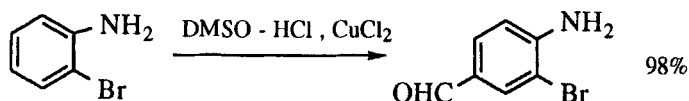
SECTION 56: ALDEHYDES FROM HYDRIDES



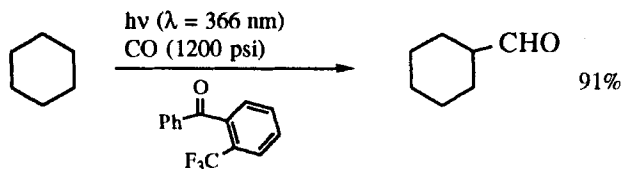
Gordeeva, G.N.; Kalashnikov, S.M.; Gordeev, A.N.; Popov, Yu.N.; Kruglov, E.A.; Imashev, U.B. *Zhur. Org. Khim.*, **1990**, *26*, 2199 (Engl., p. 1896).



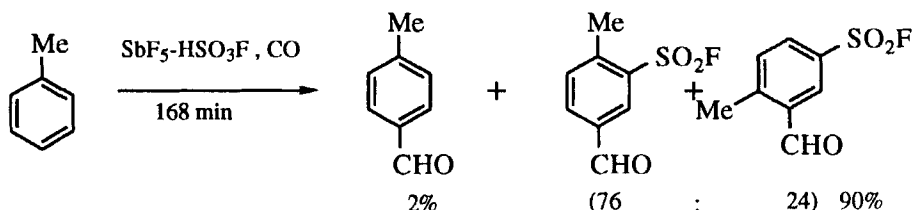
Tanaka, M.; Souma, Y. *J. Chem. Soc., Chem. Commun.*, **1991**, 1551.



Liedholm, B. *J. Chem. Soc., Perkin Trans. I*, **1992**, 2235.

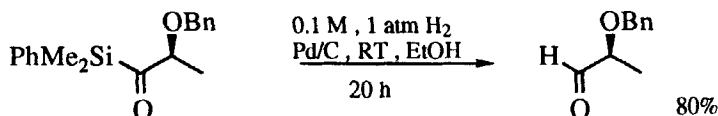


Boese, W.T.; Goldman, A.S. *Tetrahedron Lett.*, **1992**, 33, 2119.



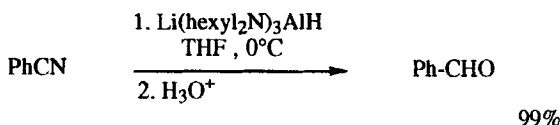
Tanaka, M.; Iyoda, J.; Souma, Y. *J. Org. Chem.*, **1992**, 57, 2677.

SECTION 57: ALDEHYDES FROM KETONES



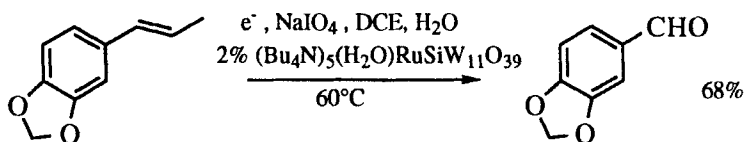
Cirillo, P.F.; Panek, J.S. *Tetrahedron Lett.*, **1991**, 32, 457.

SECTION 58: ALDEHYDES FROM NITRILES



Cha, J.S.; Lee, S.E.; Lee, H.S. *Org. Prep. Proceed. Int.*, **1992**, 24, 331.

SECTION 59: ALDEHYDES FROM ALKENES

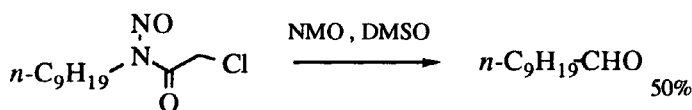


Steckhan, E.; Kandzia, C. *SynLett*, **1992**, 139.

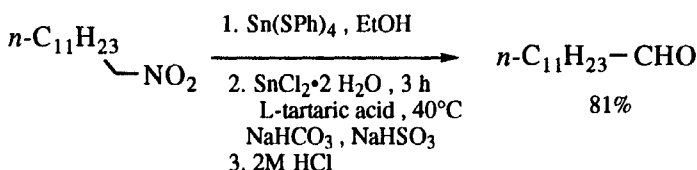
Related Methods:

Ketones from Alkenes (Section 179)

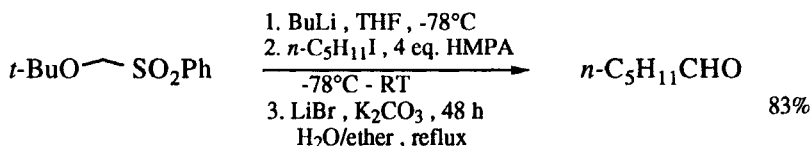
SECTION 60: ALDEHYDES FROM MISCELLANEOUS COMPOUNDS



Nikolaides, N.; Godfrey, A.G.; Ganem, B. *Tetrahedron Lett.*, **1990**, 31, 6009.



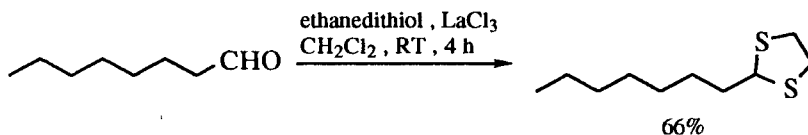
Urpf, F.; Vilarrasa, J. *Tetrahedron Lett.*, **1990**, 31, 7499.



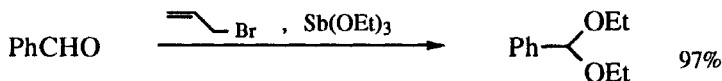
Chemla, F.; Julia, M.; Uguen, D.; Zhang, D. *SynLett*, **1991**, 501.

Julia, M.; Uguen, D.; Zhang, D. *SynLett*, **1991**, 503.

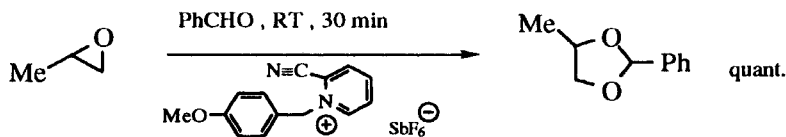
SECTION 60A: PROTECTION OF ALDEHYDES



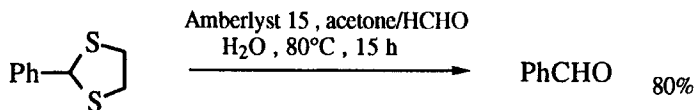
Garlaschelli, L.; Vidari, G. *Tetrahedron Lett.*, **1990**, 31, 5815.



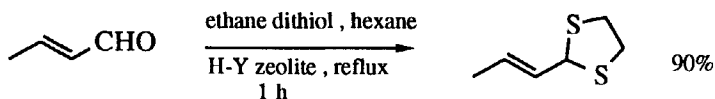
Liao, Y.; Huang, Y-Z.; Zhu, F-H. *J. Chem. Soc., Chem. Commun.*, **1990**, 493.



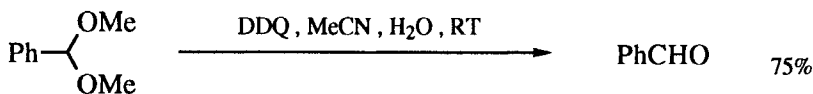
Lee, S-B.; Takata, T.; Endo, T. *Chem. Lett.*, **1990**, 2019.



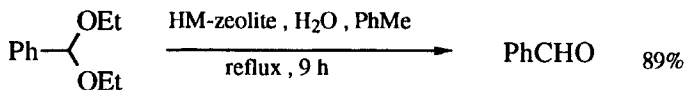
Ballini, R.; Petrin, M. *Synthesis*, **1990**, 336.



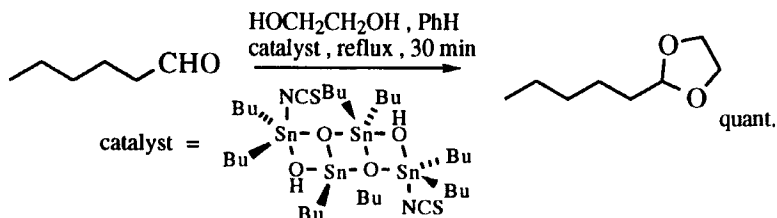
Kumar, P.; Reddy, R.S.; Singh, A.P.; Pandey, B. *Tetrahedron Lett.*, **1992**, 33, 825.



Tanemura, K.; Suzuki, T.; Horaguchi, T. *J. Chem. Soc., Chem. Commun.*, **1992**, 979.



Rao, M.N.; Kumar, P.; Singh, A.P.; Reddy, R.S. *Synth. Commun.*, **1992**, 22, 1299.



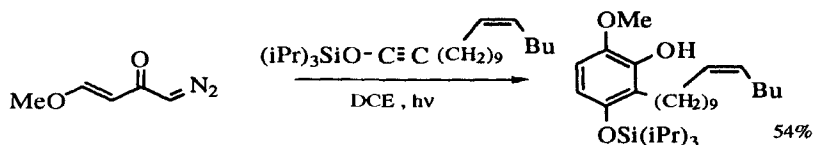
Otera, J.; Dan-oh, N.; Nozaki, H. *Tetrahedron*, **1992**, 48, 1449.

CHAPTER 5

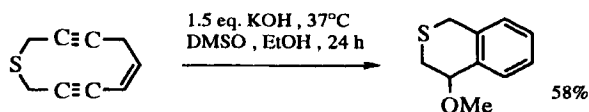
PREPARATION OF ALKYL, METHYLENES AND ARYL

This chapter lists the conversion of functional groups into methyl, ethyl, propyl, etc. as well as methylene (CH₂), phenyl, etc.

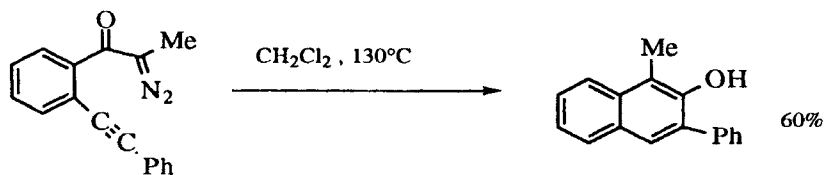
SECTION 61: ALKYL, METHYLENES AND ARYL FROM ALKYNES



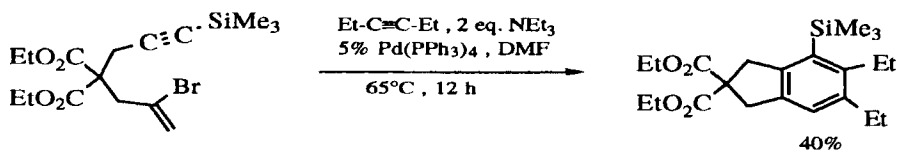
Danheiser, R.L.; Cha, D.D. *Tetrahedron Lett.*, **1990**, 31, 1527.



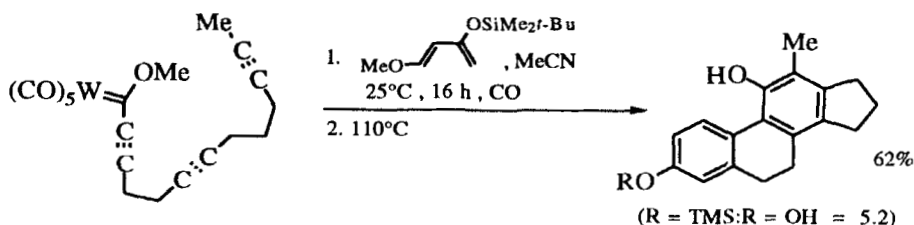
Toshima, K.; Ohta, K.; Ohtake, T.; Tatsuta, K. *Tetrahedron Lett.*, **1991**, 32, 391.



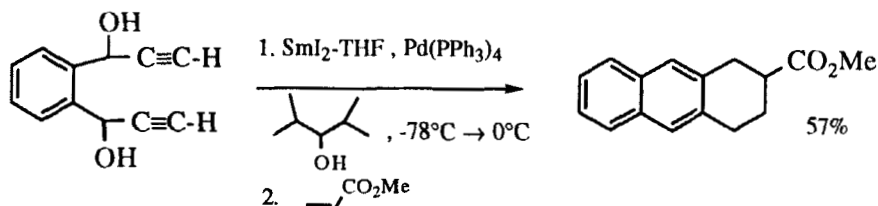
Padwa, A.; Austin, D.J.; Chiacchio, U.; Kassir, J.M.; Rescifina, A.; Xu, S.L. *Tetrahedron Lett.*, **1991**, 32, 5923.



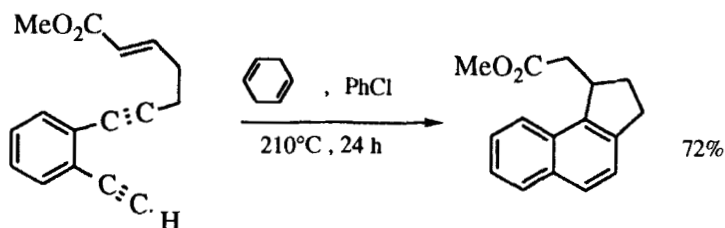
Negishi, E.; Harring, L.S.; Owczarczyk, Z.; Mohamud, M.M.; Ay, M. *Tetrahedron Lett.*, **1992**, 33, 3253.



Bao, J.; Draagisich, V.; Wenglowisky, S.; Wulff, W.D. *J. Am. Chem. Soc.*, **1991**, 113, 9873.

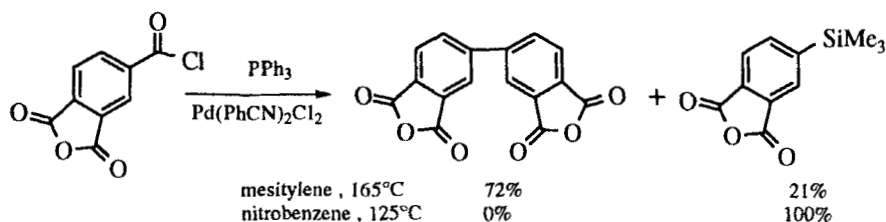


Inanaga, J.; Sugimoto, Y.; Hanamoto, J. *Tetrahedron Lett.*, **1992**, 33, 7035.



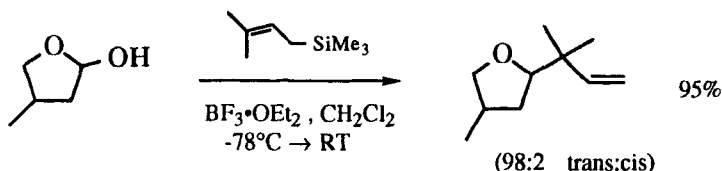
Grissom, J.W.; Calkins, T.L. *Tetrahedron Lett.*, **1992**, 33, 2315.

SECTION 62: ALKYLs, METHYLENES AND ARYLs FROM ACID DERIVATIVES

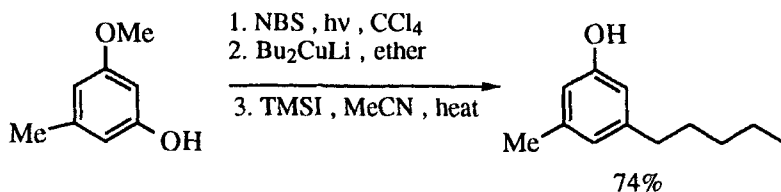


Krafft, T.E.; Rich, J.D.; McDermott, P.J. *J. Org. Chem.*, **1990**, 55, 5430.

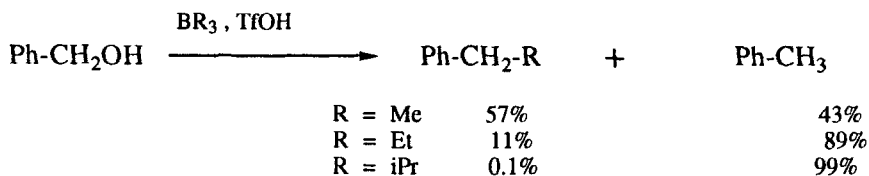
SECTION 63: ALKYL, METHYLENE AND ARYL FROM ALCOHOLS AND THIOLS



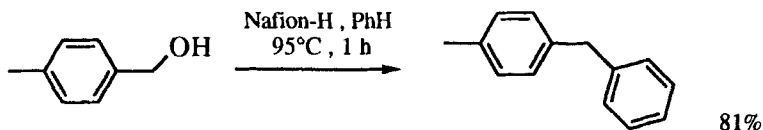
Schmitt, A.; Reissig, H.U. *SynLett*, **1990**, 40.



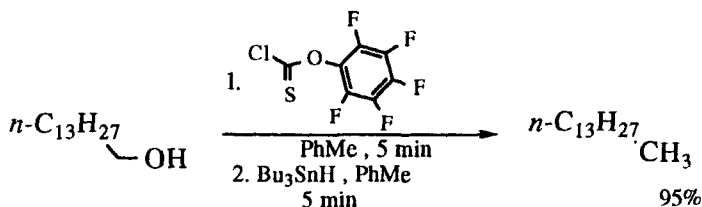
Kotnis, A.S. *Tetrahedron Lett.*, **1991**, 32, 3417.



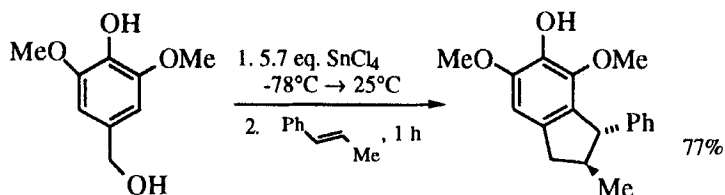
Olah, G.A.; Wu, A.; Farooq, O. *J. Org. Chem.*, **1991**, 56, 2759.



Yamamoto, T.; Hideshima, C.; Surya Prakash, G.K.; Olah, G.A. *J. Org. Chem.*, **1991**, 56, 2089.

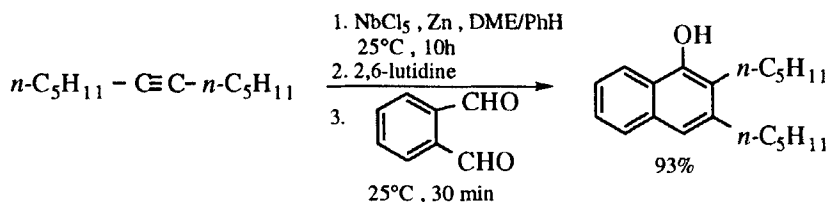


Barton, D.H.R.; Blundell, P.; Dorchak, J.; Jang, D.O.; Jaszberenyi, J.Cs. *Tetrahedron*, **1991**, 47, 8969.

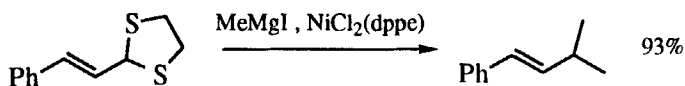


Angle, S.R.; Arnaiz, D.O. *J. Org. Chem.*, **1992**, 57, 5937.

SECTION 64: ALKYL, METHYLENES AND ARYLS FROM ALDEHYDES



Kataoka, Y.; Miyai, J.; Tezuka, M.; Takai, K.; Oshima, K.; Utimoto, K.
Tetrahedron Lett., **1990**, 31, 369.



Tzeng, Y.-L.; Yang, P.-F.; Mei, N.-W.; Yuan, T.-M.; Yu, C.-C.; Luh, T.-Y. *J. Org. Chem.*, **1991**, 56, 5289.

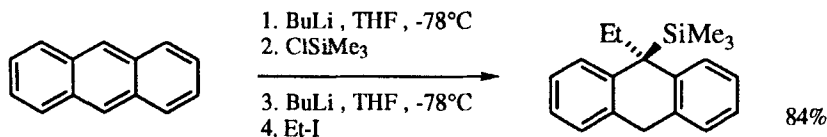
REVIEWS:

"Chiral Acetals in Asymmetric Synthesis"

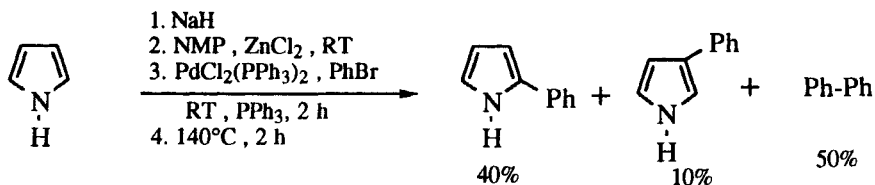
Alexakis, A.; Mangeney, P. *Tetrahedron Asymmetry*, **1990**, 1, 477.

Related Methods: Alkyls, Methylene and Aryls from Ketones (Section 72)

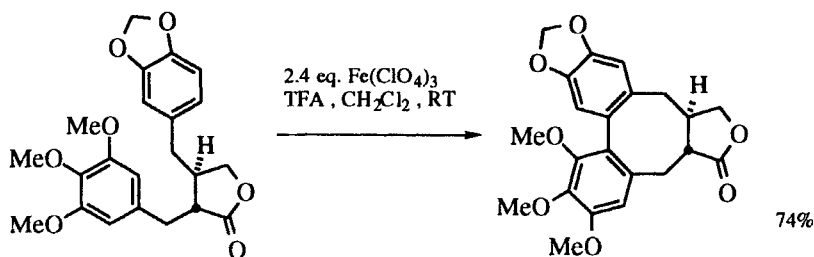
SECTION 65: ALKYL, METHYLENES AND ARYLS FROM ALKYL, METHYLENES AND ARYLS



Rabideau, P.W.; Dhar, R.K.; Clawson, D.K.; Zhan, Z. *Tetrahedron Lett.*, **1991**, 32, 3969.



Elippini, L.; Gusmerol, M.; Riva, R. *Tetrahedron Lett.*, **1992**, 33, 1755.

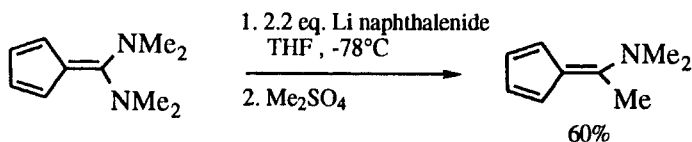


Tanaka, M.; Mitsuhashi, H.; Wakamatsu, T. *Tetrahedron Lett.*, **1992**, 33, 4161.

SECTION 66: ALKYLs, METHYLENES AND ARYLs FROM AMIDES

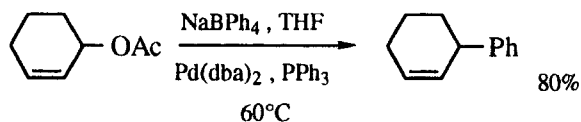
NO ADDITIONAL EXAMPLES

SECTION 67: ALKYLs, METHYLENES AND ARYLs FROM AMINES

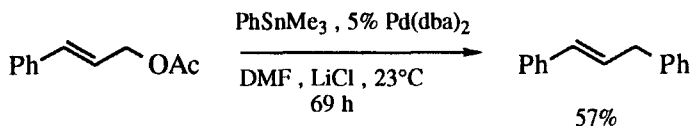


Kawase, T.; Fujino, S.; Oda, M. *Tetrahedron Lett.*, **1990**, 31, 545.

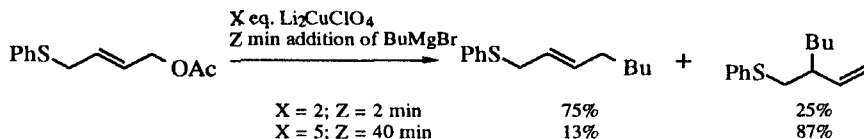
SECTION 68: ALKYLs, METHYLENES AND ARYLs FROM ESTERS



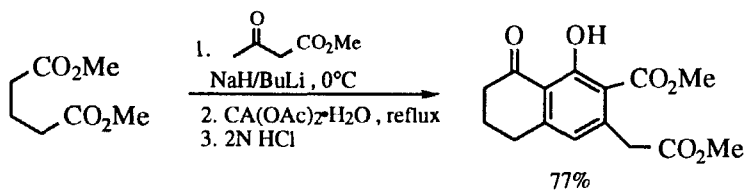
Legros, J-Y.; Fiaud, J-C. *Tetrahedron Lett.*, **1990**, 31, 7453.



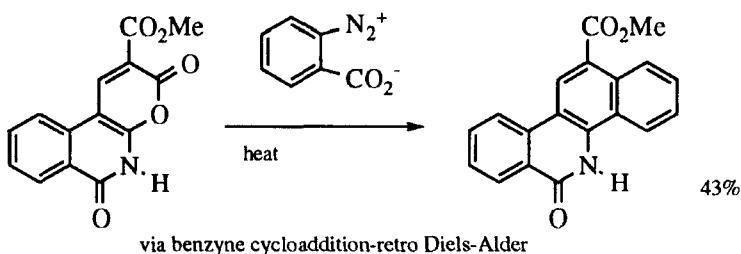
Del Valle, L.; Stille, J.K.; Hegedus, L.S. *J. Org. Chem.*, **1990**, *55*, 3019.



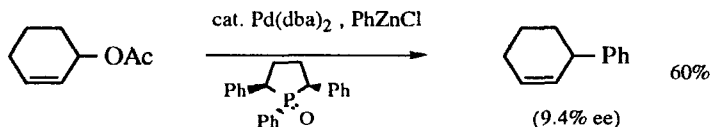
Bäckvall, J.-E.; Sellén, M.; Grant, B. *J. Am. Chem. Soc.*, **1990**, *112*, 6615.



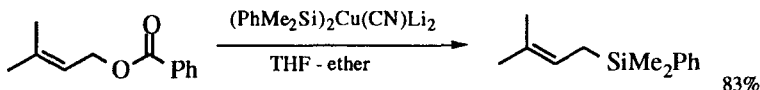
Yamaguchi, M.; Hasebe, K.; Higashi, H.; Uchida, M.; Irie, A.; Minami, T. *J. Org. Chem.*, **1990**, *55*, 1611.



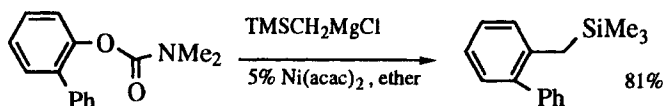
Meirás, D.P.; Guitián, E.; Castedo, L. *Tetrahedron Lett.*, **1990**, *31*, 143.



Fiaud, J.-C.; Legros, J.-Y. *Tetrahedron Lett.*, **1991**, *32*, 5089.



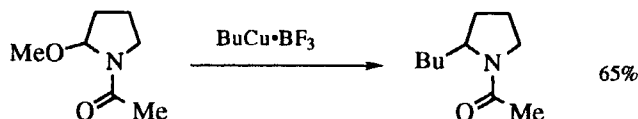
Fleming, I.; Higgins, D.; Lawrence, N.J.; Thomas, A.P. *J. Chem. Soc., Perkin Trans. I*, **1992**, 3331.



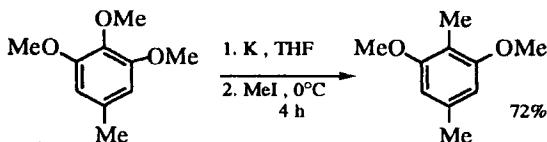
Sengupta, S.; Leite, M.; Raslan, D.S.; Quesnelle, C.; Snieckus, V. *J. Org. Chem.*, **1992**, *57*, 4066.

SECTION 69: ALKYL, METHYLENE AND ARYL FROM ETHERS, EPOXIDES AND THIOETHERS

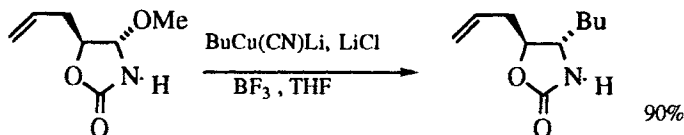
The conversion $\text{ROR} \rightarrow \text{RR}'$ ($\text{R}' = \text{alkyl, aryl}$) is included in this section.



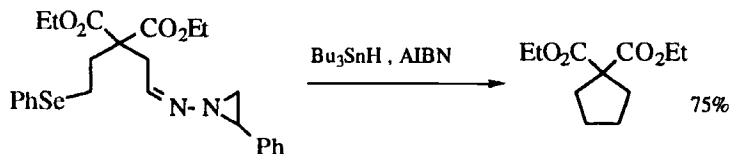
Ludwig, C.; Wistrand, L-G. *Acta Chem. Scand.*, **1990**, *44*, 707.



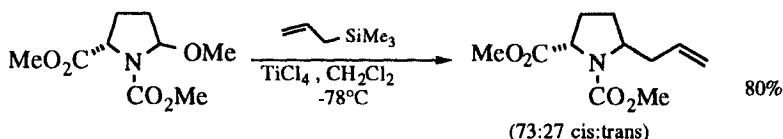
Azzena, U.; Denurra, T.; Melloni, G.; Piroddi, A.M. *J. Org. Chem.*, **1990**, *55*, 5386.



Ishibuchi, S.; Ikematsu, Y.; Ishizuka, T.; Kunieda, T. *Tetrahedron Lett.*, **1991**, *32*, 3523.



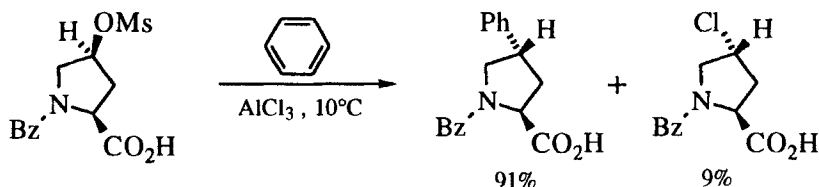
Kim, S.; Kee, I.S.; Lee, S. *J. Am. Chem. Soc.*, **1991**, *113*, 9882.



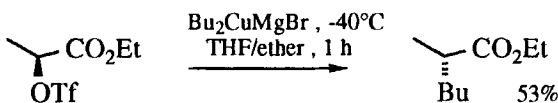
Shono, T.; Fujita, T.; Matsumura, Y. *Chem. Lett.*, **1991**, 81.

SECTION 70: ALKYLs, METHYLENES AND ARYLs FROM HALIDES AND SULFONATES

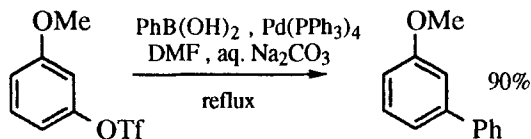
The replacement of halogen by alkyl or aryl groups is included in this section. For the conversion of $RX \rightarrow RH$ (X = halogen) see Section 160 (Hydrides from Halides and Sulfonates).



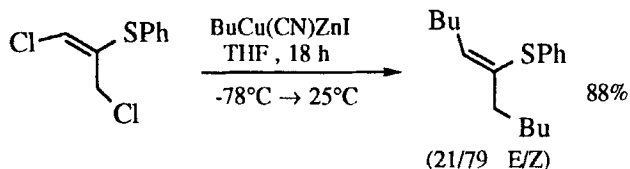
Kronenthal, D.R.; Mueller, R.H.; Kuester, P.L.; Kissick, T.P.; Johnson, E.J. *Tetrahedron Lett.*, **1990**, 31, 1241.



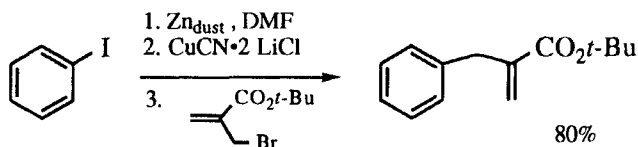
Petit, Y.; Sanner, C.; Larchevêque, M. *Tetrahedron Lett.*, **1990**, 31, 2149.



Fu, J-M.; Snieckus, V. *Tetrahedron Lett.*, **1990**, 31, 1665.

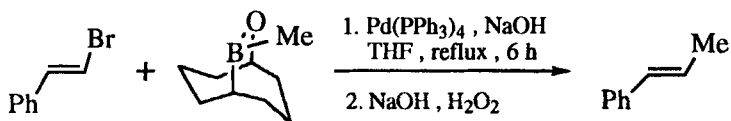


Chen, H.G.; Gage, J.L.; Barrett, S.D.; Knochel, P. *Tetrahedron Lett.*, **1990**, 31, 1829.



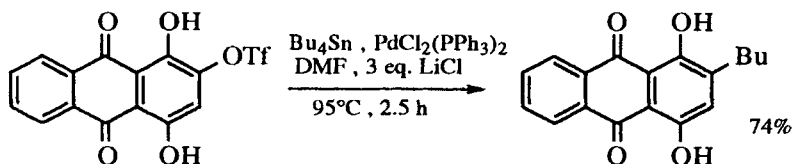
also undergoes conjugate addition reactions

Majid, T.N.; Knochel, P. *Tetrahedron Lett.*, **1990**, 31, 4413.

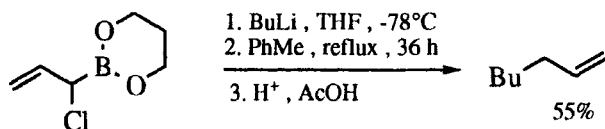


Soderquist, J.A.; Santiago, B. *Tetrahedron Lett.*, **1990**, 31, 5541.

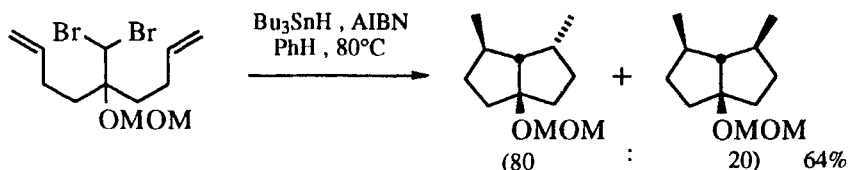
Soderquist, J.A.; Santiago, B.; Rivera, I. *Tetrahedron Lett.*, **1990**, 31, 4981.



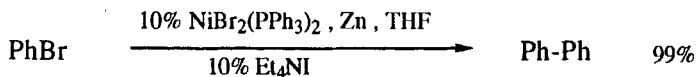
Tamayo, N.; Echavarren, A.M.; Paredes, M.C.; Fariña, F.; Noheda, P. *Tetrahedron Lett.*, **1990**, 31, 5189.



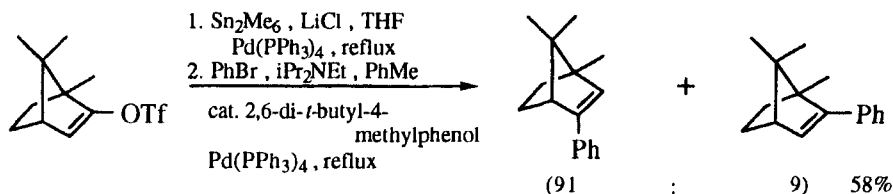
Brown, H.C.; Rangaishenvi, M.V. *Tetrahedron Lett.*, **1990**, 31, 7113, 7115.



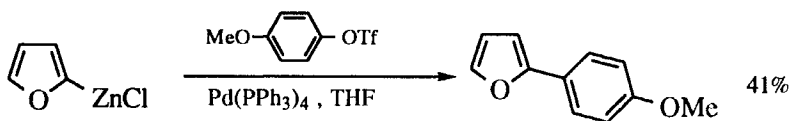
Nagai, M.; Lazor, J.; Wilcox, C.S. *J. Org. Chem.*, **1990**, 55, 3440.



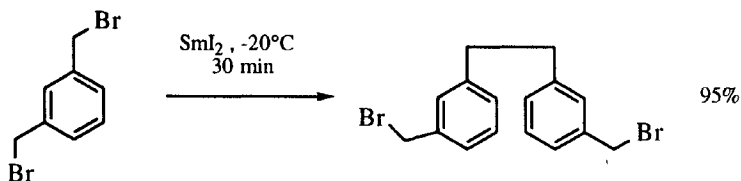
Iyoda, M.; Otsuka, H.; Sato, K.; Nisato, N.; Oda, M. *Bull. Chem. Soc. Jpn.*, **1990**, 63, 80.



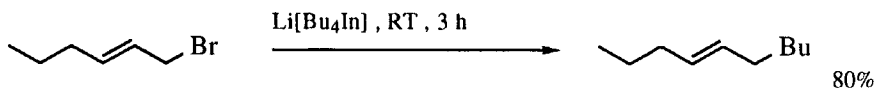
Stork, G.; Isaacs, R.C.A. *J. Am. Chem. Soc.*, **1990**, 112, 7399.



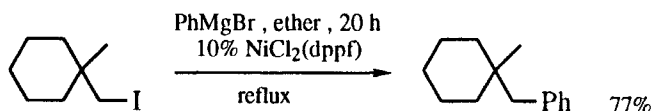
Arcadi, A.; Burini, A.; Cacchi, S.; Delmastro, M.; Marinelli, F.; Pietroni, B. *SynLett*, **1990**, 47.



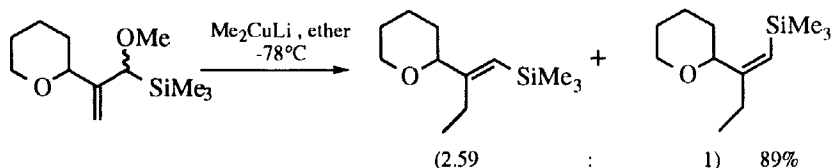
Takahashi, S.; Mori, N. *J. Chem. Soc., Perkin Trans. I*, **1991**, 2029.



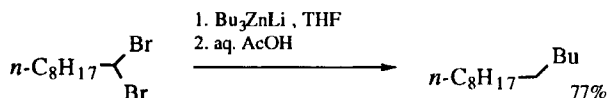
Araki, S.; Shimizu, T.; Jin, S.-J.; Butsugan, Y. *J. Chem. Soc., Chem. Commun.*, **1991**, 824.



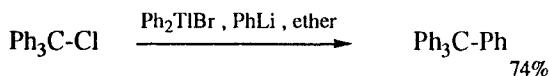
Yuan, K.; Scott, W.J. *Tetrahedron Lett.*, **1991**, 31, 189.



Burke, S.D.; Piscopio, A.D.; Kort, M.E. *Tetrahedron Lett.*, **1991**, 32, 855.

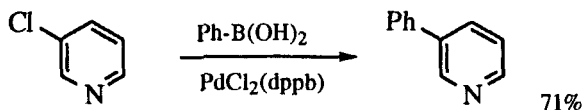


Harada, T.; Kotani, Y.; Katsuhira, T.; Oku, A. *Tetrahedron Lett.*, **1991**, 32, 1573.

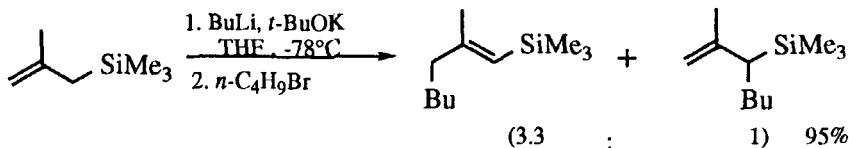


Markó, I.E.; Kantam, M.L. *Tetrahedron Lett.*, **1991**, 32, 2255.

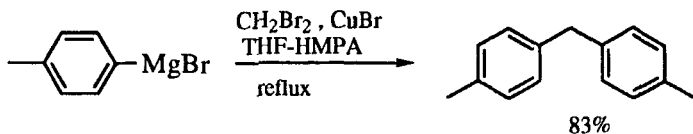
Markó, I.E.; Southern, J.M.; Kantam, M.L. *SynLett*, **1991**, 235.



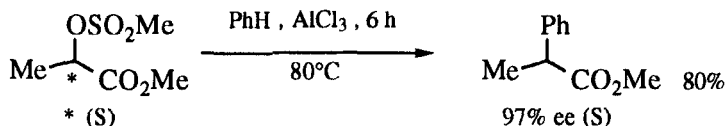
Mitchell, M.B.; Wallbank, P.J. *Tetrahedron Lett.*, **1991**, 32, 2273.



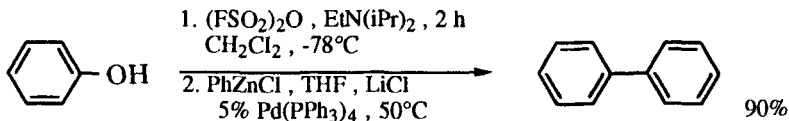
Li, L.-H.; Wang, D.; Chan, T.H. *Tetrahedron Lett.*, **1991**, 32, 2879.



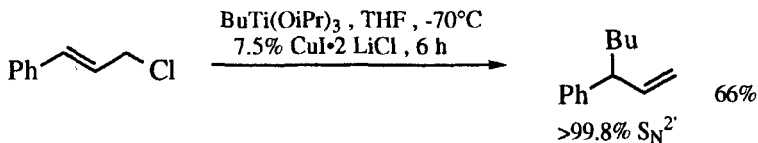
Yamato, T.; Sakaue, N.; Suehiro, K.; Tashiro, M. *Org. Prep. Proceed. Int.*, **1991**, 23, 617.



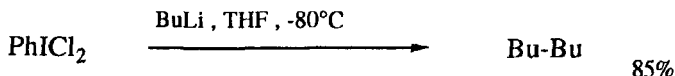
Piccolo, O.; Azzena, U.; Melloni, G.; Delogu, G.; Valoti, E. *J. Org. Chem.*, **1991**, 56, 183.



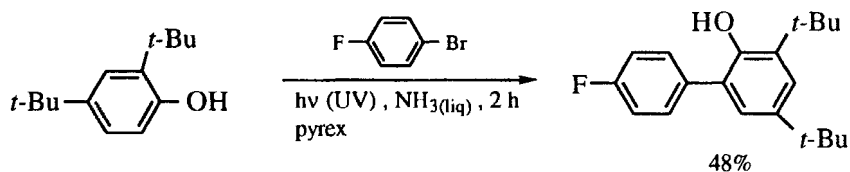
Roth, G.P.; Fuller, C.E. *J. Org. Chem.*, **1991**, 56, 3493.



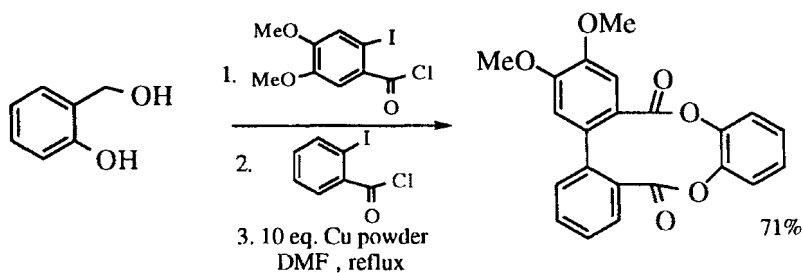
Arai, M.; Nakamura, E. *J. Org. Chem.*, **1991**, 56, 5490.



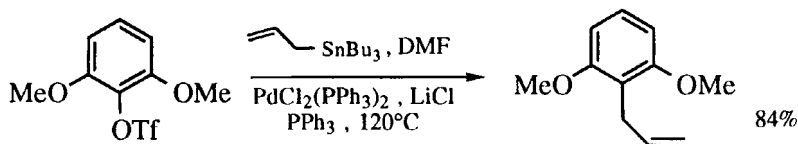
Barton, D.H.R.; Jaszberenyi, J.Cs.; Leßmann, K.; Timár, T. *Tetrahedron*, **1992**, 48, 8881.



Beugelmans, R.; Chastanet, J. *Tetrahedron Lett.*, **1991**, 32, 3487.

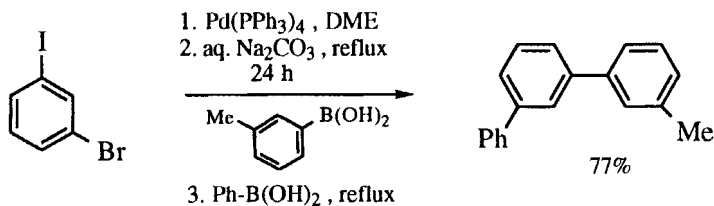


Takahashi, M.; Kuroda, T.; Orgiku, T.; Ohmizu, H.; Kondo, K.; Iwasaki, T. *Tetrahedron Lett.*, **1991**, 32, 6919.

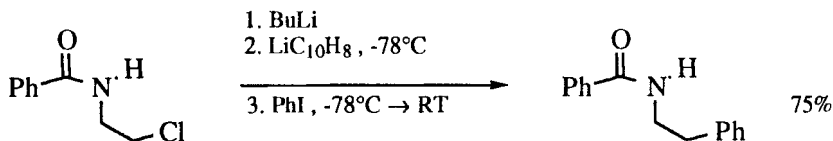


Saá, J.M.; Martorell, G.; García-Raso, A. *J. Org. Chem.*, **1992**, 57, 678.

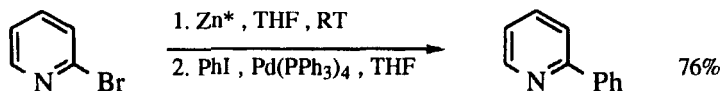
Martorell, G.; García-Raso, A.; Saá, J.M. *Tetrahedron Lett.*, **1990**, 31, 2357.



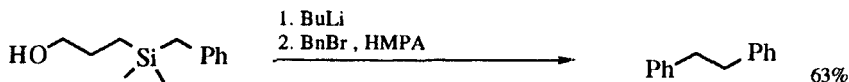
Unrau, C.M.; Campbell, M.G.; Snieckus, V. *Tetrahedron Lett.*, **1992**, 33, 2773.



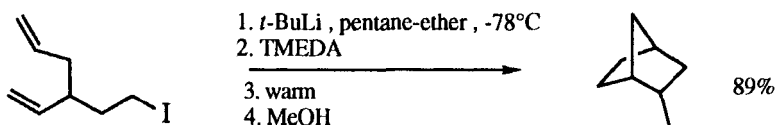
Barluenga, J.; Montserrat, J.M.; Flórez, J. *Tetrahedron Lett.*, **1992**, 33, 6183.



Sakamoto, T.; Kondo, Y.; Murata, N.; Yamanaka, H. *Tetrahedron Lett.*, **1992**, 33, 5373.

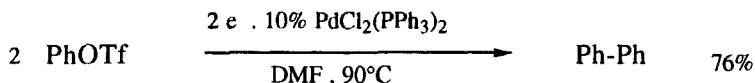


Hudrlik, P.E.; Abdallah, Y.M.; Hudrlik, A.M. *Tetrahedron Lett.*, **1992**, 33, 6747, 6743.

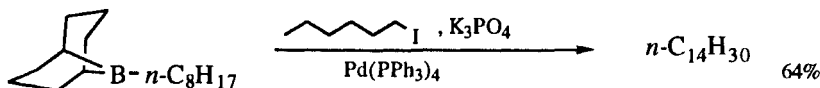


Bailey, W.E.; Khanolkar, A.D.; Gavaskar, K.V. *J. Am. Chem. Soc.*, **1992**, 114, 8053.

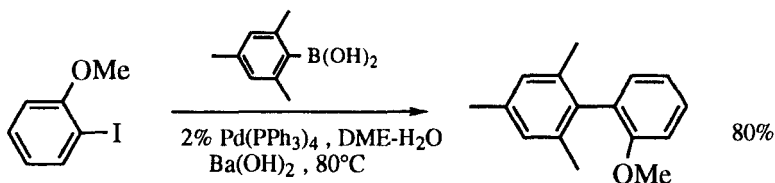
Bailey, W.E.; Khanolkar, A.D. *Tetrahedron Lett.*, **1990**, 31, 5993.



Intand, A.; Négri, S.; Mosleh, A. *J. Chem. Soc., Chem. Commun.*, **1992**, 1729.



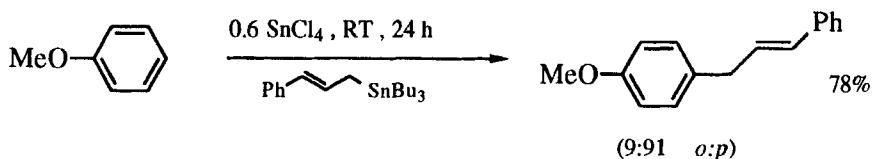
Ishiyama, T.; Abe, S.; Miyaura, N.; Suzuki, A. *Chem. Lett.*, **1992**, 691.



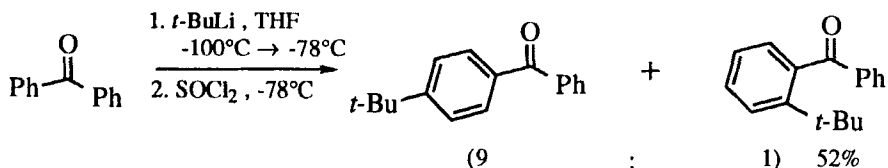
Watanabe, T.; Miyaura, N.; Suzuki, A. *SynLett*, **1992**, 207.

SECTION 71: ALKYL, METHYLENES AND ARYL FROM HYDRIDES

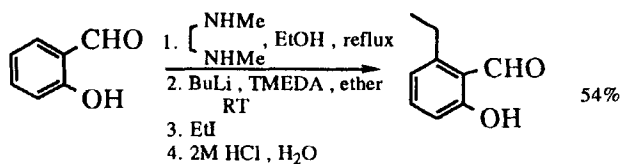
This section lists examples of the reaction of $\text{RH} \rightarrow \text{RR}'$ ($\text{R}, \text{R}' = \text{alkyl or aryl}$). For the reaction $\text{C}=\text{CH} \rightarrow \text{C}=\text{C-R}$ ($\text{R} = \text{alkyl or aryl}$), see Section 209 (Alkenes from Alkenes). For alkylations of ketones and esters, see Section 177 (Ketones from Ketones) and Section 113 (Esters from Esters).



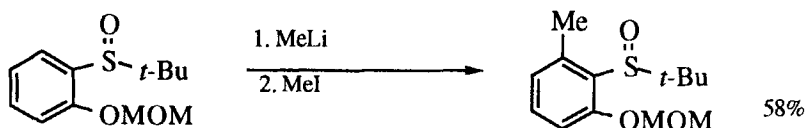
Yamaguchi, J.; Takagi, Y.; Nakayama, A.; Fujiwara, T.; Takeda, T. *Chem. Lett.*, **1991**, 133.



Olah, G.A.; Wu, A.; Farooq, O. *Synthesis*, **1991**, 1179.



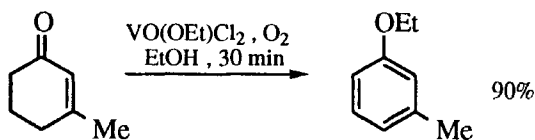
Gray, M.; Parsons, P.J. *SynLett*, **1991**, 729.



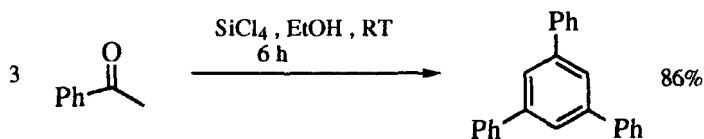
Quesnelle, C.; Iihama, T.; Aubert, T.; Perrier, H.; Snieckus, V. *Tetrahedron Lett.*, **1992**, 33, 2625.

SECTION 72: ALKYLs, METHYLENES AND ARYLS FROM KETONES

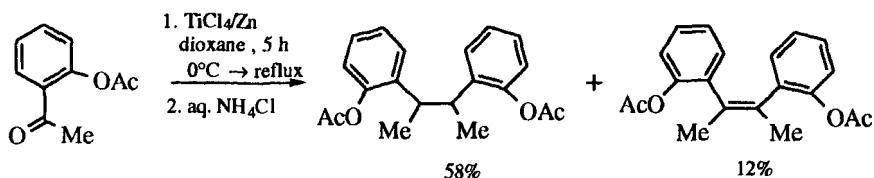
The conversions R₂C=O → R-R, R₂CH₂, R₂CHR', etc. are listed in this section.



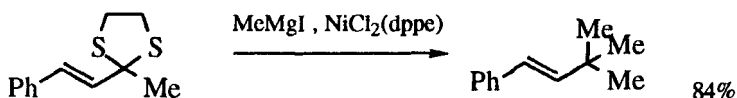
Hirao, T.; Mori, M.; Ohshiro, Y. *J. Org. Chem.*, **1990**, 55, 358.



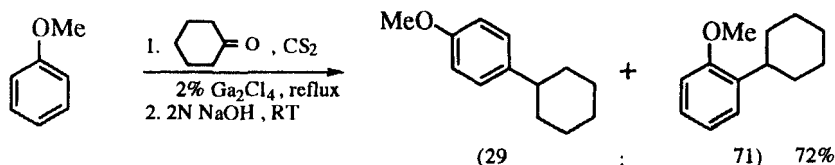
Elmorsy, S.S.; Pelter, A.; Smith, K. *Tetrahedron Lett.*, **1991**, 32, 4175.



Nayak, S.K.; Banerji, A. *Ind. J. Chem.*, **1991**, 30B, 286.

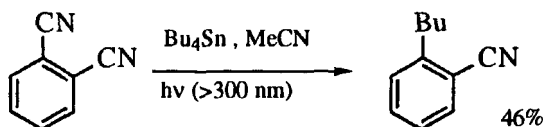


Yuan, T.-M.; Luh, T.-Y. *J. Org. Chem.*, **1992**, 57, 4550.

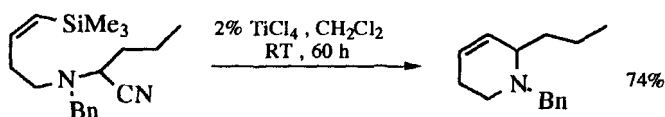


Hashimoto, Y.; Hirata, K.; Kihara, N.; Hasegawa, M.; Saigo, K. *Tetrahedron Lett.*, **1992**, 33, 6351.

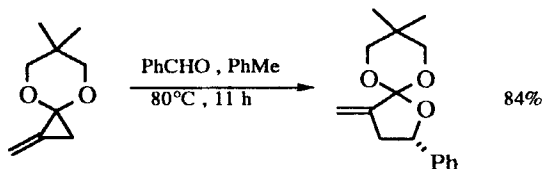
SECTION 73: ALKYL, METHYLENES AND ARYL FROM NITRILES



Kyushin, S.; Masuda, Y.; Matsushita, K.; Nakadaira, Y.; Ohashi, M. *Tetrahedron Lett.*, **1990**, 31, 6395.



Teng, T.-F.; Lin, J.-H.; Yang, T.-K. *Heterocycles*, **1990**, 31, 1201.



Rychnovsky, S.D.; Zeller, S.; Skalitzy, D.J.; Griesgraber, G. *J. Org. Chem.*, **1990**, 55, 5550.

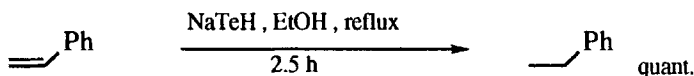
SECTION 74: ALKYL, METHYLENES AND ARYL FROM ALKENES

The following reaction types are included in this section:

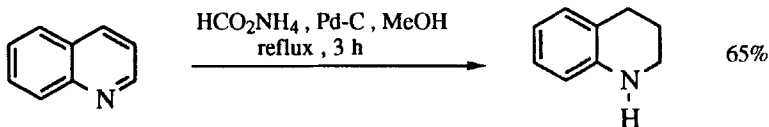
A. Hydrogenation of Alkenes (and Aryls); **B.** Formation of Aryls; **C.** Alkylations and Arylations of Alkenes; **D.** Conjugate Reduction of Conjugated Carbonyl Compounds and Nitriles; **E.** Conjugate Alkylations; **F.** Cyclopropanations, including halocyclopropanations

SECTION 74A: Hydrogenation of Alkenes (and Aryls)

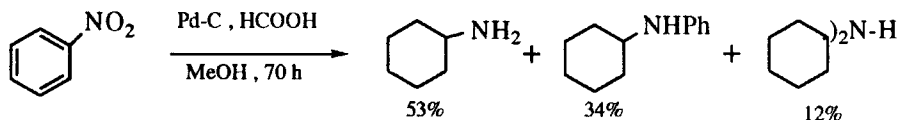
Reduction of aryls to dienes are listed in Section 377 (Alkene-Alkene).



Barton, D.H.R.; Bohé, L.; Lusinchi, X. *Tetrahedron*, **1990**, 46, 5273.



Balczewski, P.; Joule, J.A. *Synth. Commun.*, **1990**, 20, 2815.



Ar also reduced with other Ar-X groups

Alper, H.; Vasapollo, G. *Tetrahedron Lett.*, **1992**, 33, 7477.

REVIEWS:

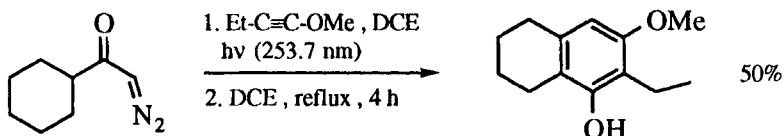
"Electrocatalytic Hydrogenation Hydrogen-Activity Electrodes"

Moutet, J-C. *Org. Prep. Proceed. Int.*, **1992**, 24, 309.

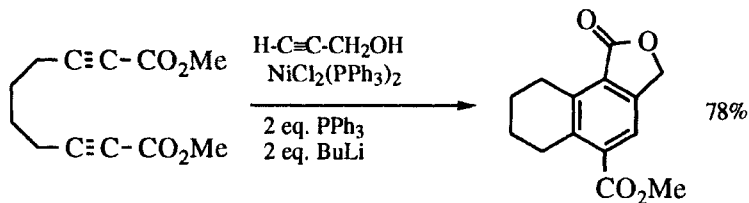
"Design Concepts for Developing Highly Efficient Chiral Bisphosphine Ligands in Rhodium-Catalyzed Asymmetric Hydrogenations"

Inoguchi, K.; Sakuraba, S.; Achiwa, K. *SynLett*, **1992**, 169.

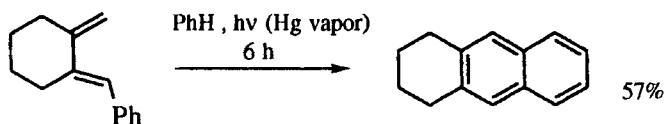
SECTION 74B: Formation of Aryls



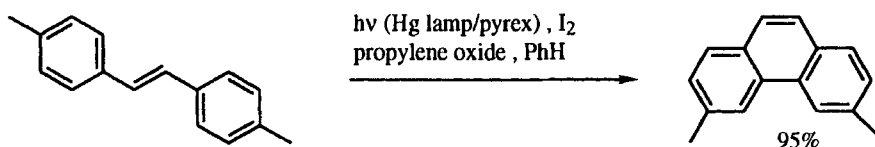
Danheiser, R.L.; Brisbois, R.G.; Kowalczyk, J.J.; Miller, R.F. *J. Am. Chem. Soc.*, **1990**, 112, 3093.



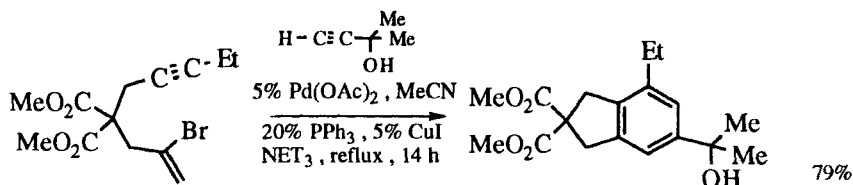
Bhatarah, P.; Smith, E.H. *J. Chem. Soc., Chem. Commun.*, **1991**, 277.



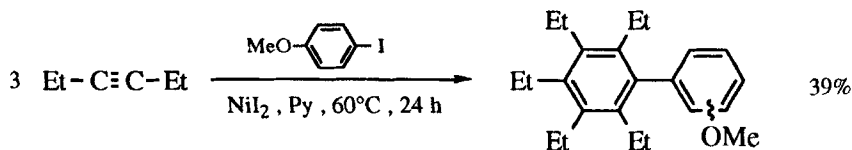
Olsen, R.J.; Minniear, J.C.; Overton, W.M.; Sherrick, J.M. *J. Org. Chem.*, **1991**, 56, 989.



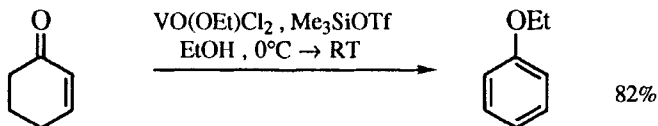
Liu, L.; Yang, B.; Katz, T.J.; Poindexter, M.K. *J. Org. Chem.*, **1991**, 56, 3769.



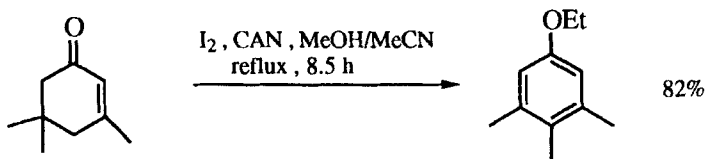
Torii, S.; Okumoto, H.; Nishimura, A. *Tetrahedron Lett.*, **1991**, 32, 4167.



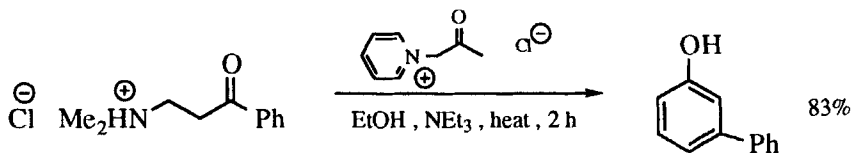
Kong, K.-C.; Cheng, C.-H. *J. Chem. Soc., Chem. Commun.*, **1991**, 423.



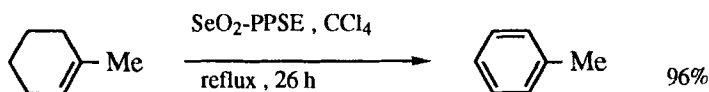
Hirao, T.; Mori, M.; Ohshiro, Y. *Chem. Lett.*, **1991**, 783.



Horiuchi, C.A.; Fukunishi, H.; Kajita, M.; Yamaguchi, A.; Kiyomiya, H.; Kiji, S. *Chem. Lett.*, **1991**, 1921.

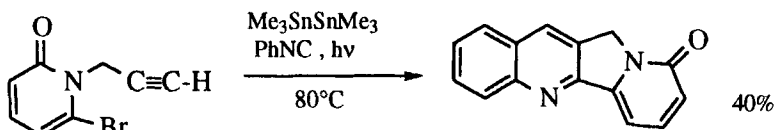


Eichinger, K.; Nussbaumer, P. *Synthesis*, **1991**, 663.

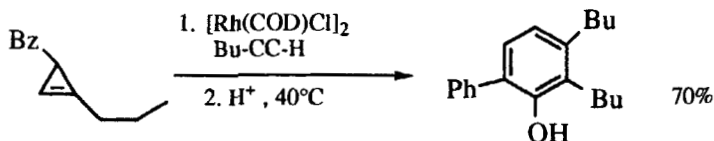


PPSE = trimethylsilyl polyphosphate = $\text{P}_2\text{O}_5/\text{Me}_3\text{SiOSiMe}_3$

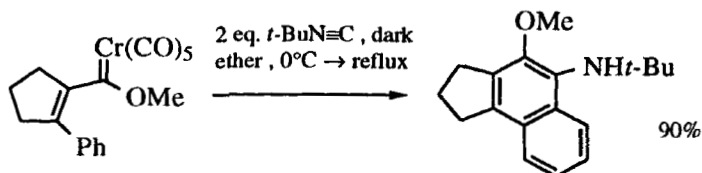
Lee, J.G.; Kim, K.C. *Tetrahedron Lett.*, **1992**, 33, 6363.



Curran, D.P.; Liu, H. *J. Am. Chem. Soc.*, **1992**, 114, 5863.

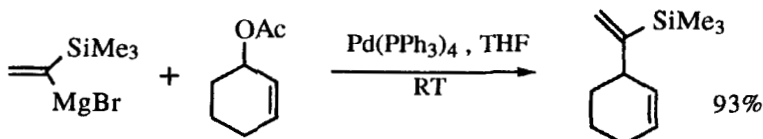


Padwa, A.; Xu, S.L. *J. Am. Chem. Soc.*, **1992**, *114*, 5881.

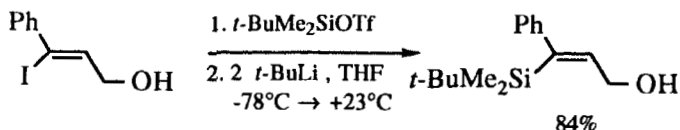


Merlic, C.A.; Burns, E.E.; Xu, D.; Chen, S.Y. *J. Am. Chem. Soc.*, **1992**, *114*, 8722.

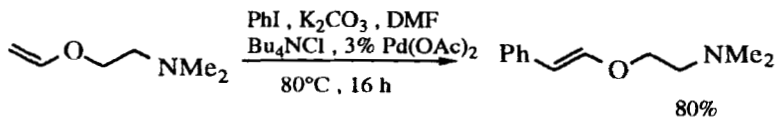
SECTION 74C: Alkylations and Arylations of Alkenes



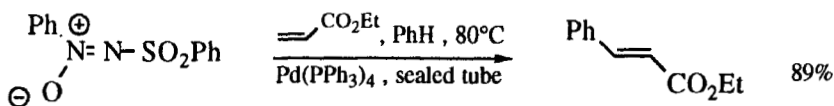
Fotiadu, F.; Cros, P.; Faure, B.; Buono, G. *Tetrahedron Lett.*, **1990**, *31*, 77.



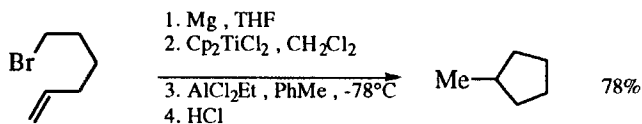
Kim, K.D.; Magriotis, P.A. *Tetrahedron Lett.*, **1990**, *31*, 6137.



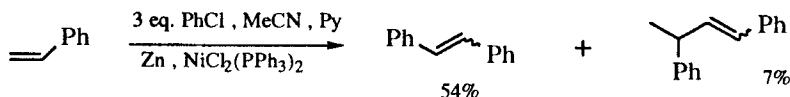
Andersson, C.-M.; Larsson, J.; Hallberg, A. *J. Org. Chem.*, **1990**, *55*, 5757.



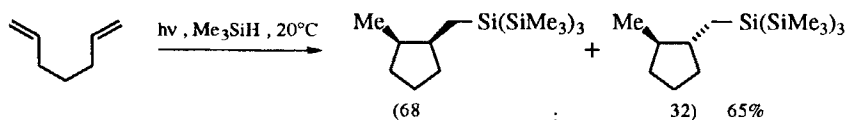
Kamigata, N.; Satoh, M.; Fukushima, T. *Bull. Chem. Soc. Jpn.*, **1990**, *63*, 2118.



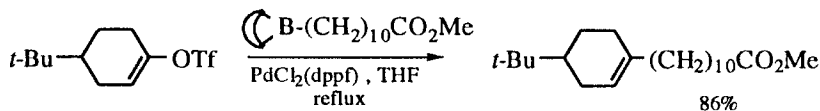
Rigollier, P.; Young, J.R.; Fowley, L.A.; Stille, J.R., *J. Am. Chem. Soc.*, **1990**, *112*, 9441.



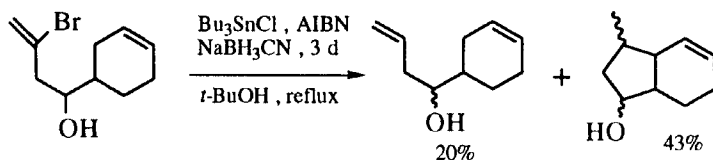
Lebedev, S.A.; Pedchenko, V.V.; Lopatina, V.S.; Berestova, S.S.; Petrov, Ê.S. *Zhur. Org. Khim.*, **1990**, *26*, 1520 (Engl., p. 1312).



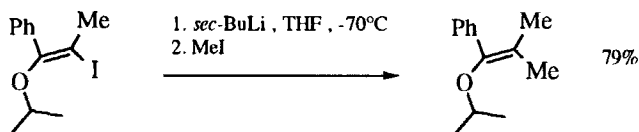
Kulicke, K.J.; Giese, B., *SynLett*, **1990**, 91.



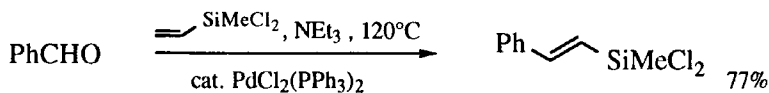
Oh-e, T.; Miyaura, N.; Suzuki, A., *SynLett*, **1990**, 221.



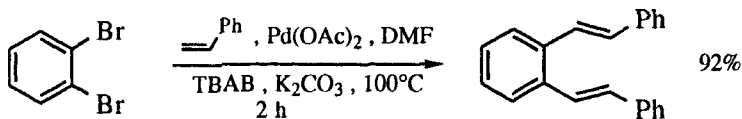
Bothwick, A.D.; Caddick, S.; Parsons, P.J., *Tetrahedron Lett.*, **1990**, *31*, 6911.



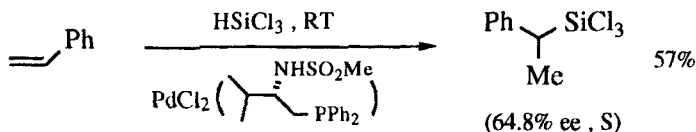
Barluenga, J.; Rodríguez, M.A.; Campos, P.J. *SynLett*, **1990**, 270.



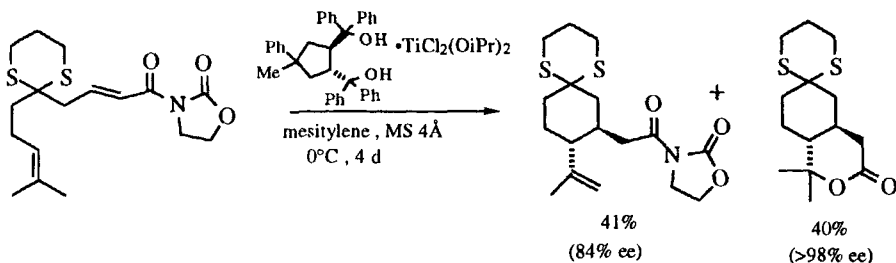
Yamashita, H.; Roan, B.L.; Tanaka, M., *Chem. Lett.*, **1990**, 2175.



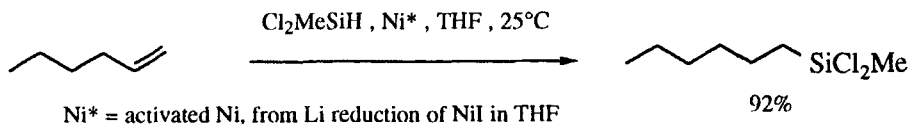
Lansky, A.; Reiser, O.; de Meijere, A. *SynLett*, **1990**, 405.



Okada, T.; Morimoto, T.; Achiwa, K. *Chem. Lett.*, **1990**, 999.

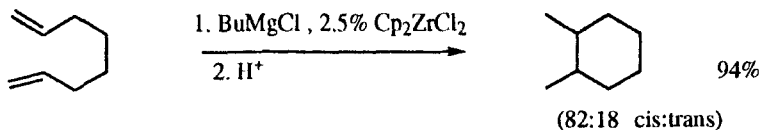


Narasaka, K.; Hayashi, Y.; Shimada, S.; Yamada, J. *Isr. J. Chem.*, **1991**, 31, 261.

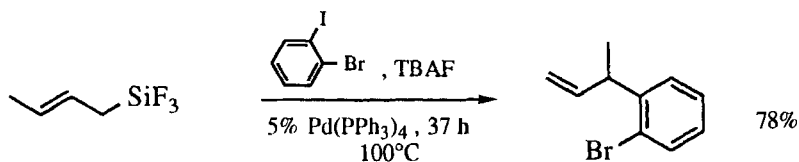


Ni* = activated Ni, from Li reduction of NiI in THF

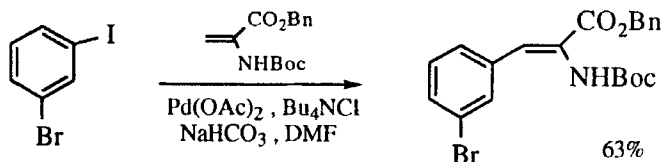
Boudjouk, P.; Han, B-H.; Jacobsen, J.R.; Hauck, B.J. *J. Chem. Soc., Chem. Commun.*, **1991**, 1424.



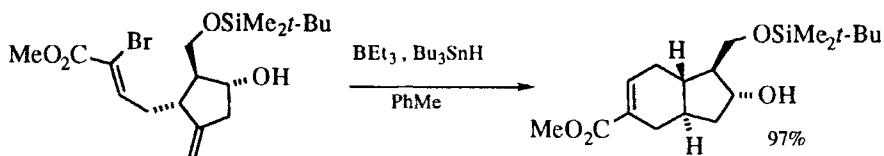
Knight, K.S.; Waymouth, R.M. *J. Am. Chem. Soc.*, **1991**, 113, 6268.



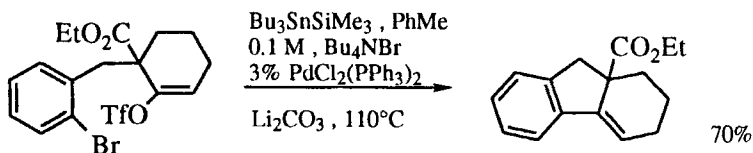
Hatanaka, Y.; Ebina, Y.; Hiyama, T. *J. Am. Chem. Soc.*, **1991**, 113, 7075.



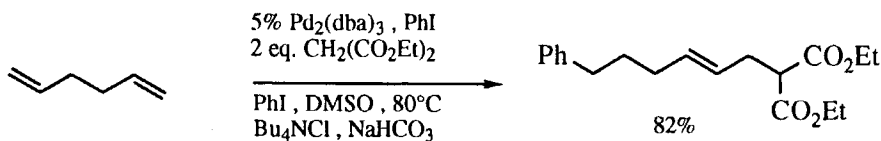
Carlström, A.-S.; Frejd, T. *J. Org. Chem.*, **1991**, *56*, 1289.



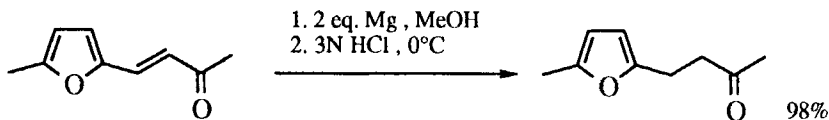
Sato, S.; Sodeoka, M.; Sasai, H.; Shibasaki, M. *J. Org. Chem.*, **1991**, *56*, 2278.



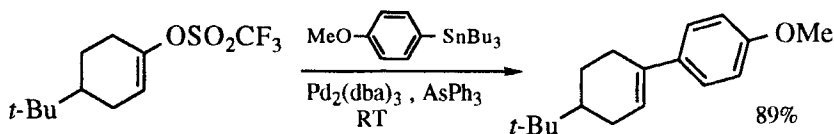
Mori, M.; Kaneta, N.; Shibasaki, M. *J. Org. Chem.*, **1991**, *56*, 3486.



Larock, R.C.; Lu, Y.; Bain, A.C.; Russell, C.E. *J. Org. Chem.*, **1991**, *56*, 4589.

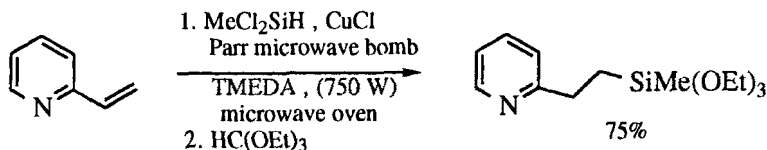


Domínguez, C.; Csáky, A.G.; Plumet, J. *Tetrahedron Lett.*, **1991**, *32*, 4183.

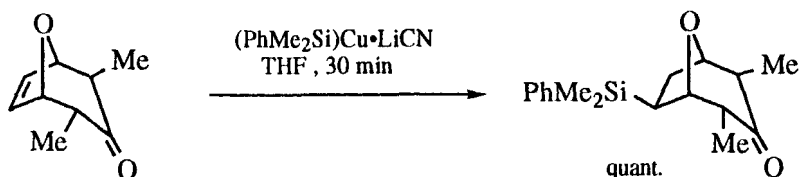


tailors catalyst to substrate

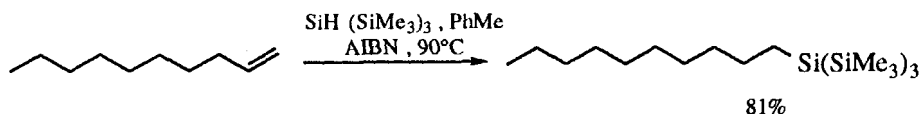
Farina, V.; Roth, G.P. *Tetrahedron Lett.*, **1991**, *32*, 4243.



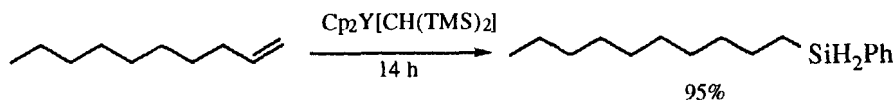
Abramovitch, R.A.; Abramovitch, D.A.; Iyanar, K.; Tamareselvy, K. *Tetrahedron Lett.*, **1991**, 32, 5251.



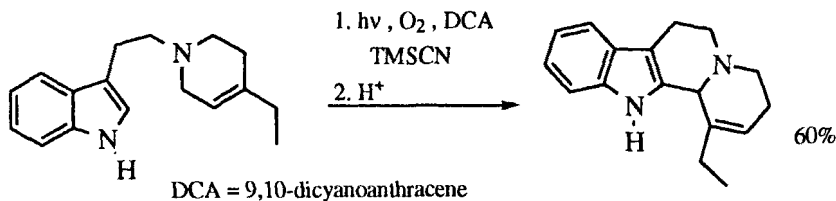
Lautens, M.; Belter, R.K.; Lough, A.J. *J. Org. Chem.*, **1992**, 57, 422.



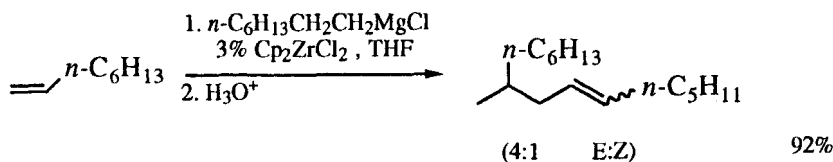
Kopping, B.; Chatgililoglu, C.; Zehnder, M.; Giese, B. *J. Org. Chem.*, **1992**, 57, 3994.



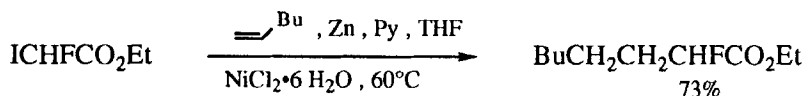
Molander, G.A.; Julius, M. *J. Org. Chem.*, **1992**, 57, 6347.



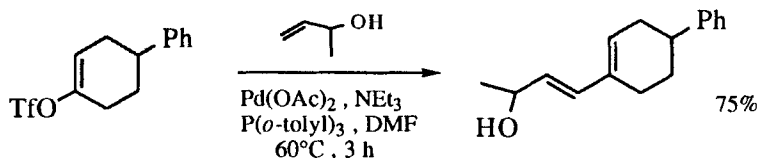
Santamaria, J.; Kaddachi, M.T.; Ferroud, C. *Tetrahedron Lett.*, **1992**, 33, 781.



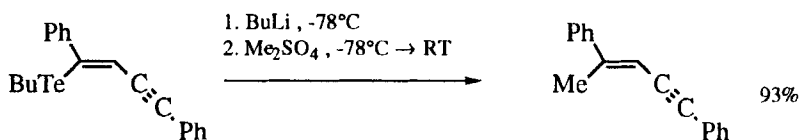
Rousset, C.J.; Negishi, E.; Suzuki, N.; Takahashi, T. *Tetrahedron Lett.*, **1992**, 33, 1965.



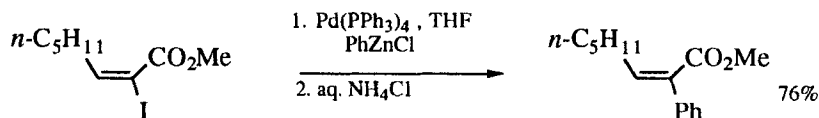
Wang, Y.; Yang, Z-Y.; Burton, D.J. *Tetrahedron Lett.*, **1992**, 33, 2137.



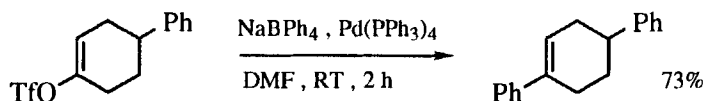
Bernocchi, E.; Cargchi, S.; Ciattini, P.G.; Morera, E.; Ortar, G. *Tetrahedron Lett.*, **1992**, *33*, 3073.



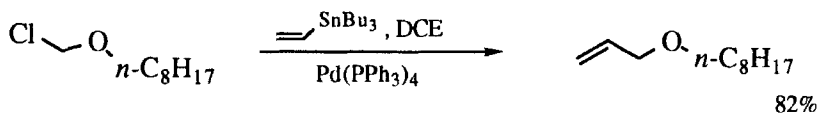
Dabdoub, M.J.; Dabdoub, V.B.; Comasseto, J.V. *Tetrahedron Lett.*, 1992, 33, 2261.



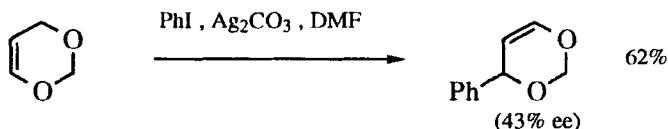
Rossi, R.; Carpita, A.; Cossi, P. *Tetrahedron Lett.*, 1992, 33, 4495.



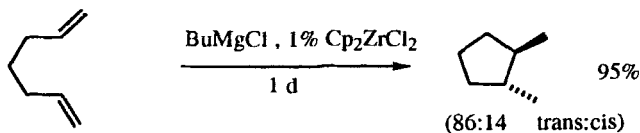
Ciattini, P.G.; Morena, E.; Ortar, G. *Tetrahedron Lett.*, **1992**, 33, 4815.



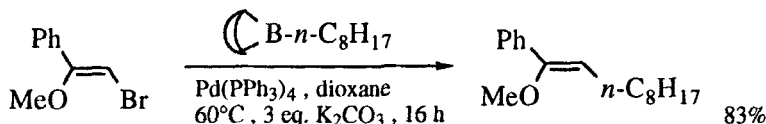
Bhatt, R.K.; Shin, D-S.; Falck, J.R.; Mioskowski, C. *Tetrahedron Lett.*, 1992, 33, 4885.



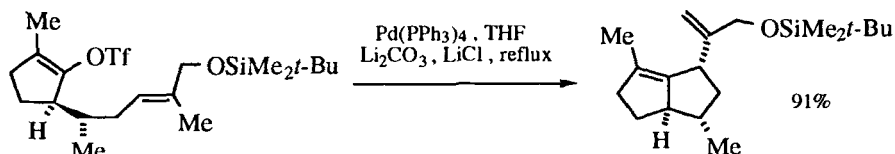
Sakamoto, T.; Kondo, Y.; Yamanaka, H. *Tetrahedron Lett.*, **1992**, 33, 6845.



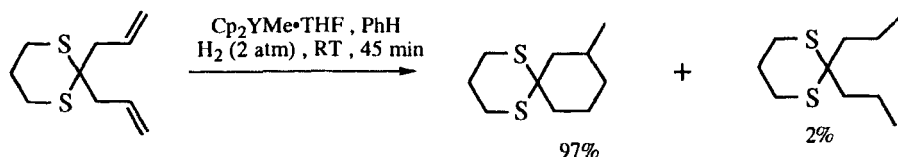
Wischmeyer, U.; Knight, K.S.; Waymouth, R.M. *Tetrahedron Lett.*, **1992**, 33, 7735.



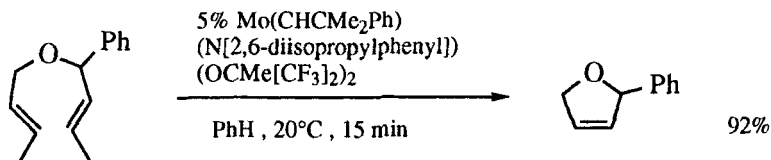
Abe, S.; Miyaura, N.; Suzuki, A. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 2863.



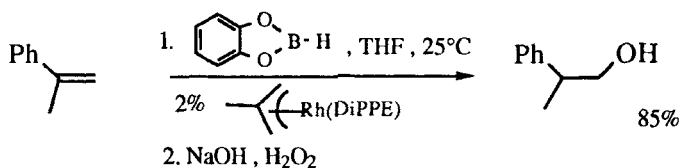
Liang, S.; Paquette, L.A. *Acta Chem. Scand.*, **1992**, 46, 597.



Molander, G.A.; Hoberg, J.O. *J. Am. Chem. Soc.*, **1992**, 114, 3123.

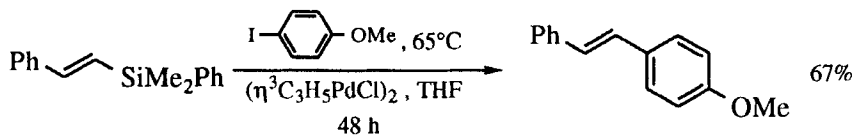


Fu, G.C.; Grubbs, R.H. *J. Am. Chem. Soc.*, **1992**, 114, 5426.

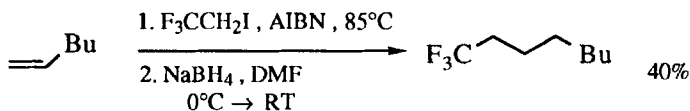


DiPPE = 1,2-bis(diisopropylphosphino)ethane

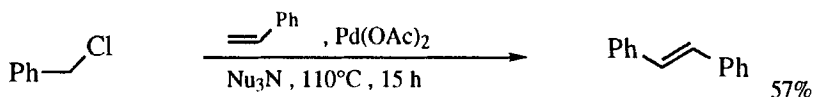
Wescott, S.A.; Blom, H.P.; Marder, T.B.; Baker, R.T. *J. Am. Chem. Soc.*, **1992**, 114, 8863.



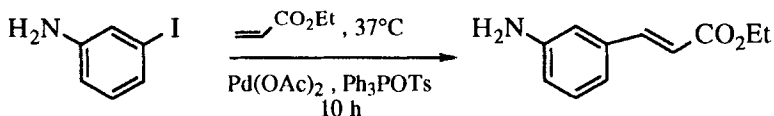
Rossi, R.; Carpita, A.; Messeri, T. *Gazz. Chim. Ital.*, **1992**, 122, 65.



Cloux, R.; Kováts, Ez. *Synthesis*, **1992**, 409.

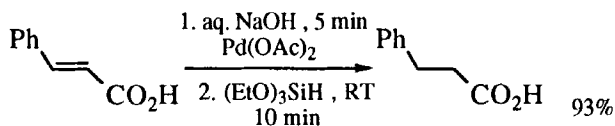


Yi, P.; Zhuangyu, Z.; Hongwen, H. *Synth. Commun.*, **1992**, 22, 2019.

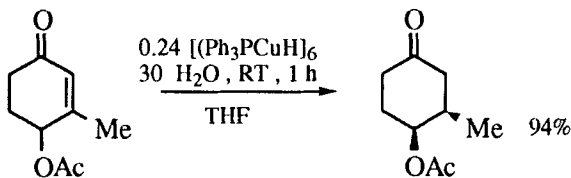


Genet, J.P.; Blart, E.; Savignac, M. *SynLett*, **1992**, 715.

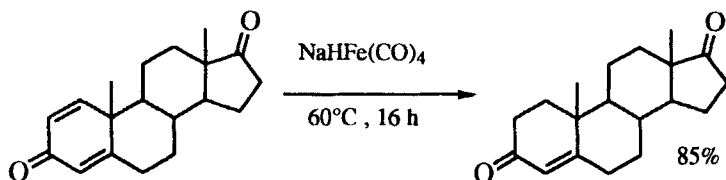
SECTION 74D: Conjugate Reduction of α,β -Unsaturated Carbonyl Compounds and Nitriles



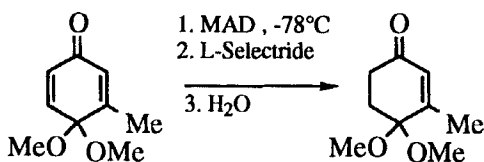
Tour, J.M.; Pandalwar, S.L. *Tetrahedron Lett.*, **1990**, 31, 4719.



Koenig, T.M.; Dacuble, J.F.; Brestensky, D.M.; Stryker, J.M. *Tetrahedron Lett.*, **1990**, 31, 3237.

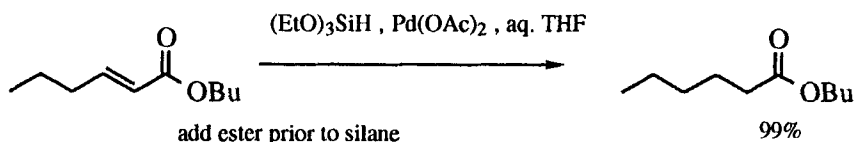


Künzer, H.; Stahnke, M.; Sauer, G.; Wiechert, R. *Tetrahedron Lett.*, **1990**, 31, 3859.



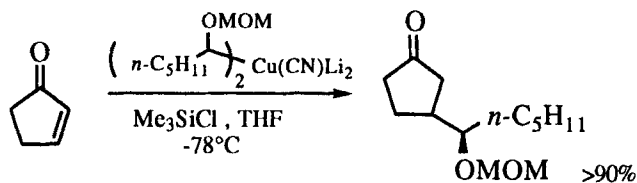
MAD = bis(2,6-di-*t*-butyl-4-methylphenoxy)methyl aluminum

Doty, B.J.; Morrow, G.W. *Tetrahedron Lett.*, **1990**, 31, 6125.



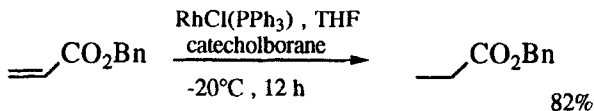
add ester prior to silane

Tour, J.M.; Cooper, J.P.; Pendalwar, S.L. *J. Org. Chem.*, **1990**, 55, 3452.

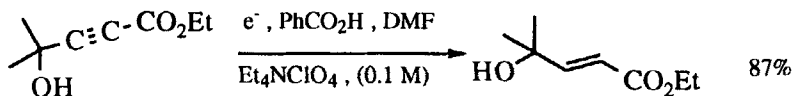


(70:30 diastereomers)

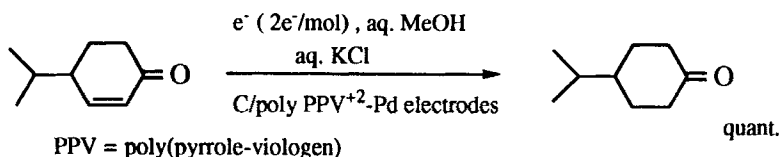
Linderman, R.L.; Griedel, B.D. *J. Org. Chem.*, **1990**, 55, 5428.



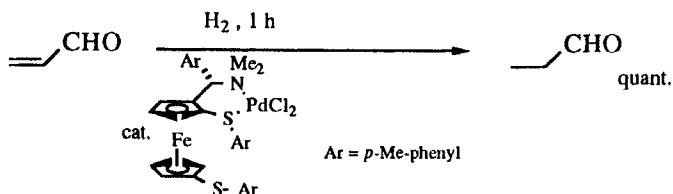
Evans, D.A.; Fu, G.C. *J. Org. Chem.*, **1990**, 55, 5678.



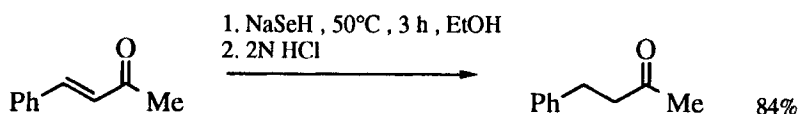
Arcadi, A.; Cacchi, S.; Carelli, I.; Curulli, A.; Inesi, A.; Marinelli, F. *SynLett*, **1990**, 408.



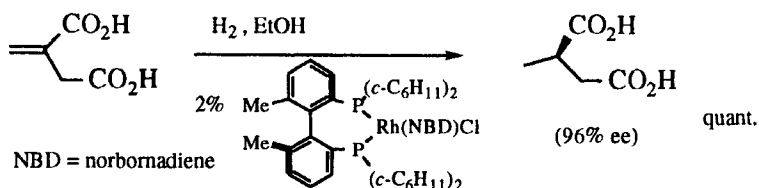
Coche, L.; Ehui, B.; Limosin, D.; Moutet, J.-C. *J. Org. Chem.*, **1990**, *55*, 5905.



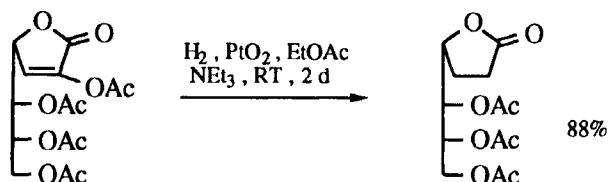
Ali, H.M.; Naiini, A.A.; Brubaker, C.J. Jr. *Tetrahedron Lett.*, **1991**, *32*, 5489.



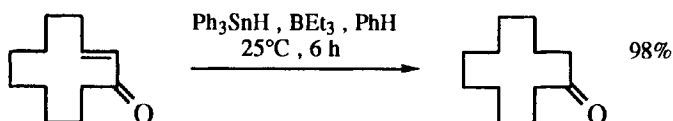
Nishiyama, Y.; Yoshida, M.; Ohkawa, S.; Hamanaka, S. *J. Org. Chem.*, **1991**, *56*, 6720.



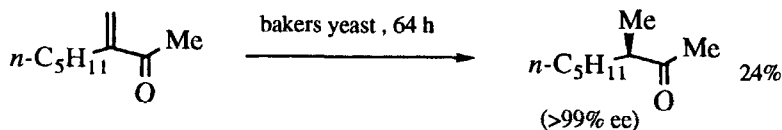
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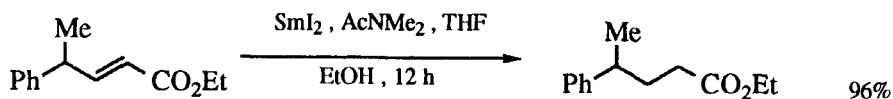
Katsuki, J.; Inanaga, J. *Tetrahedron Lett.*, **1991**, *32*, 4963.



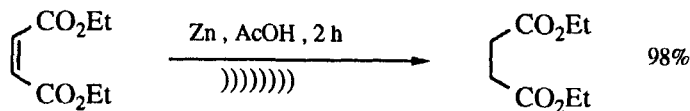
Nozaki, K.; Oshima, K.; Utimoto, K. *Bull. Chem. Soc. Jpn.*, **1991**, *64*, 2585.



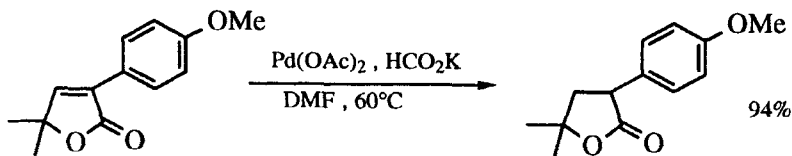
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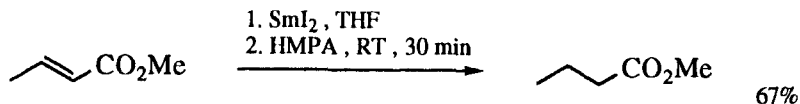
Inanaga, I.; Sakai, S.; Handa, Y.; Yamaguchi, M.; Yokoyama, Y. *Chem. Lett.*, **1991**, 2117.



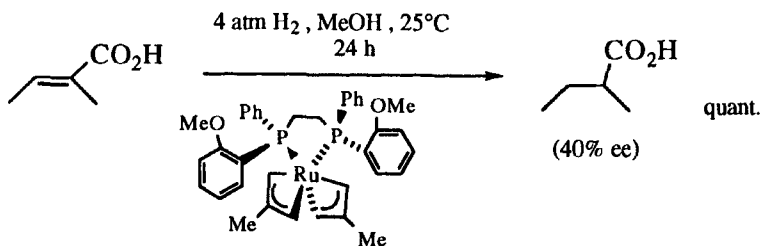
Marchand, A.P.; Reddy, G.M. *Synthesis*, **1991**, 198.



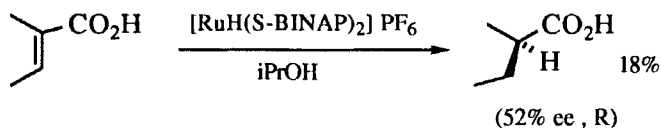
Arcadi, A.; Bernocchi, E.; Cacchi, S.; Marinelli, F. *SynLett*, **1991**, 27.



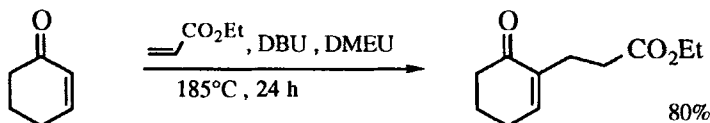
Cabrera, A.; Alper, H. *Tetrahedron Lett.*, **1992**, *33*, 5007.



Genet, J.-P.; Pinel, C.; Mallart, S.; Juge, S.; Cailhil, N.; Laffitte, J.A. *Tetrahedron Lett.*, **1992**, *33*, 5343.



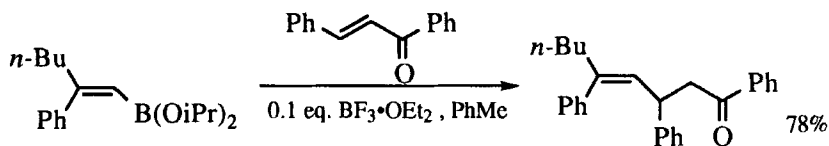
Saburi, M.; Ohnuki, M.; Ogawawara, M.; Takahashi, T.; Uchida, Y. *Tetrahedron Lett.*, **1992**, 33, 5783.



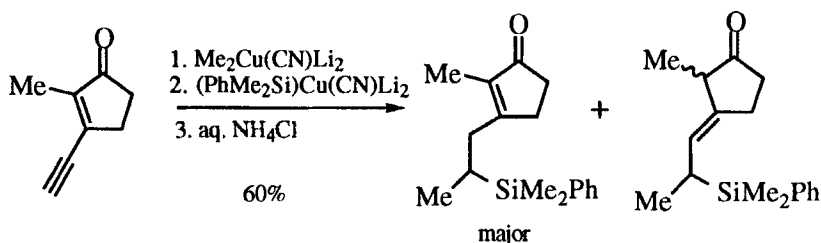
DMEU = 1,3-dimethyl-2-imidazolidinone

Hwu, J.R.; Kakimelahi, G.H.; Chou, C-T. *Tetrahedron Lett.*, **1992**, 33, 6469.

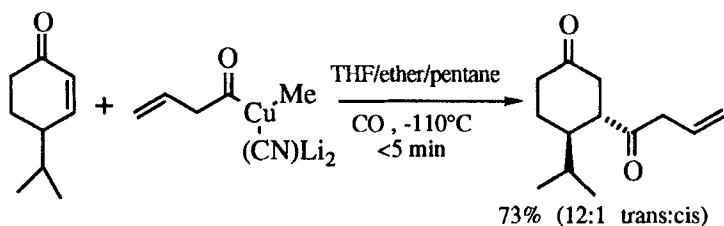
SECTION 74E: Conjugate Alkylations



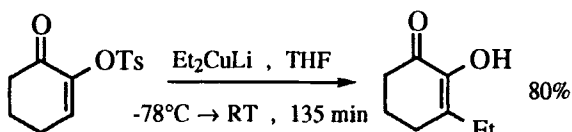
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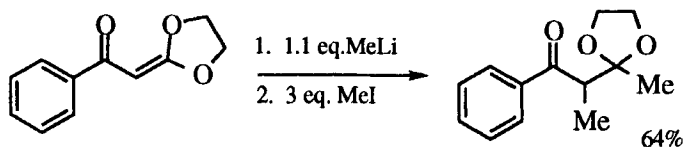
Lee, S.-H.; Hulce, M. *Tetrahedron Lett.*, **1990**, 31, 311.



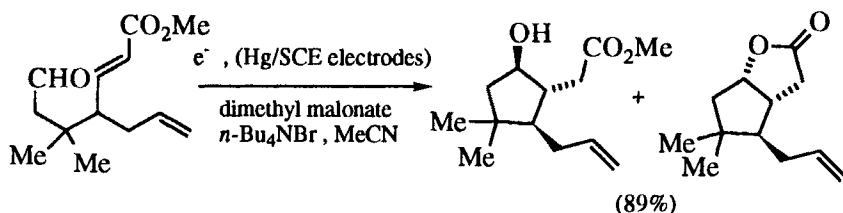
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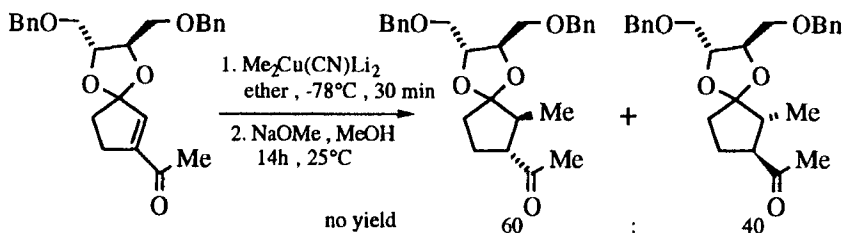
Charonnat, J.A.; Mitchell, A.L.; Keogh, B.P. *Tetrahedron Lett.*, **1990**, 31, 315.



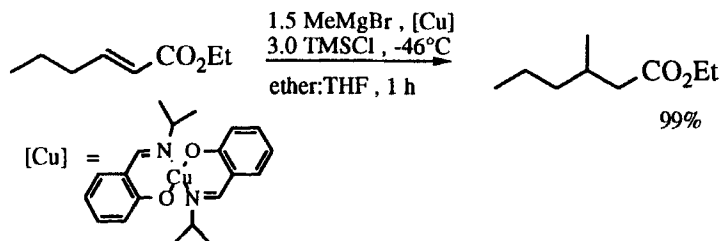
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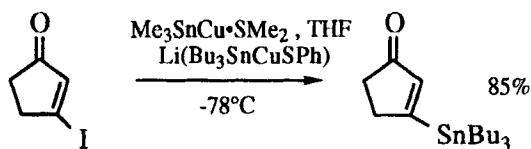
Sowell, C.G.; Wolin, R.L.; Little, R.D. *Tetrahedron Lett.*, **1990**, 31, 485.



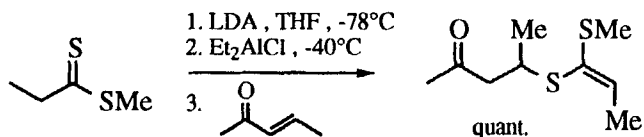
Jung, M.E.; Lew, W. *Tetrahedron Lett.*, **1990**, 31, 623.



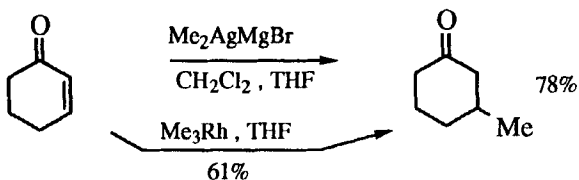
Sakata, H.; Aoki, Y.; Kuwajima, I. *Tetrahedron Lett.*, **1990**, 31, 1161.



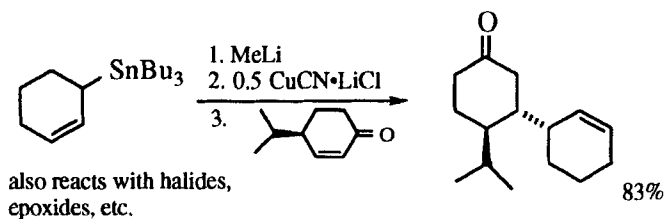
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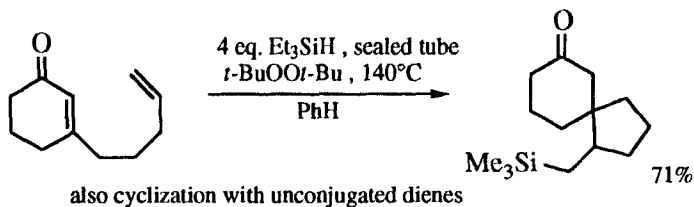
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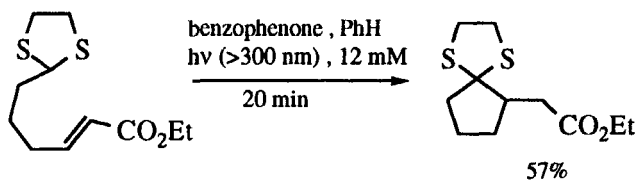
Kauffmann, T.; Hülzdünker, A.; Menges, D.; Nienaber, H.; Rethmeier, L.; Robber, S.; Scherler, D.; Schrickel, J.; Wingbermühle, D. *Tetrahedron Lett.*, **1990**, 31, 1553.



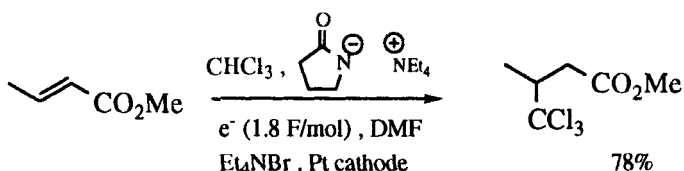
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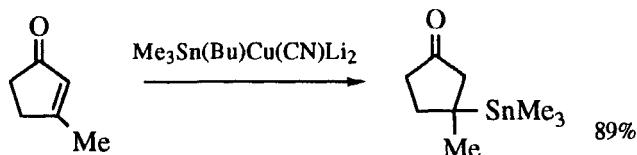
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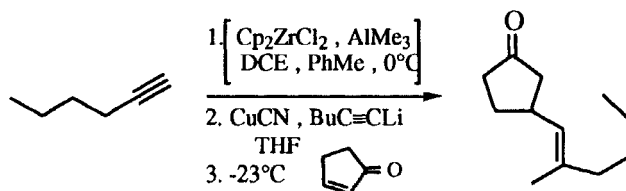
Nishida, A.; Nishida, M.; Yonemitsu, O. *Tetrahedron Lett.*, **1990**, 31, 7035.



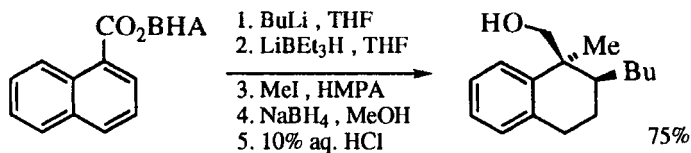
Shono, T.; Ishifune, M.; Ishige, O.; Uyama, H.; Kashimura, S. *Tetrahedron Lett.*, **1990**, 31, 7181.



Lipshutz, B.H.; Sharma, S.; Reuter, D.C. *Tetrahedron Lett.*, **1990**, 31, 7253.



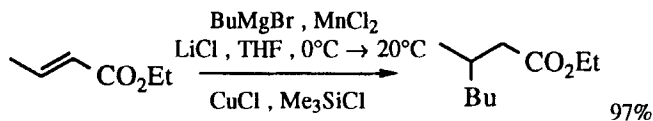
Ireland, R.E.; Wipf, P. *J. Org. Chem.*, **1990**, 55, 1425.



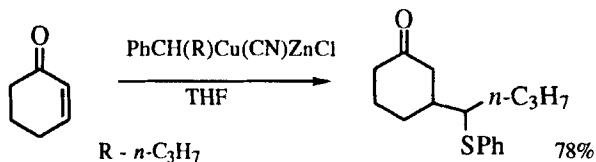
BHA = 2,6-di-*t*-butyl-4-(methoxyphenyl)-1-naphthalenecarboxaldehyde

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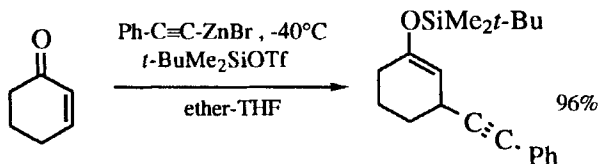
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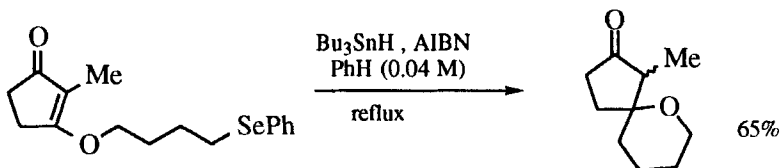
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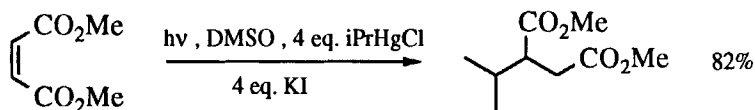
Achyutha Rao, S.; Tucker, C.E.; Knochel, P. *Tetrahedron Lett.*, **1990**, 31, 7575.



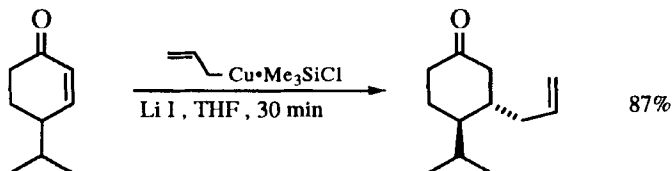
Kim, S.; Lee, J.M. *Tetrahedron Lett.*, **1990**, 31, 7627.



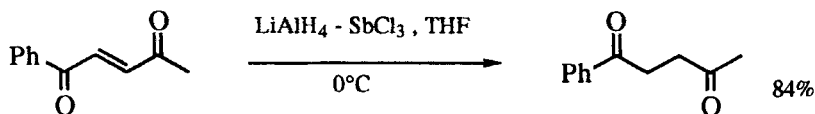
Middleton, D.S.; Simpkins, N.S.; Terrett, N.K. *Tetrahedron*, **1990**, 46, 545.



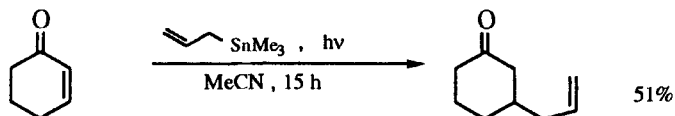
Russell, G.A.; Kim, B.H. *SynLett*, **1990**, 87.



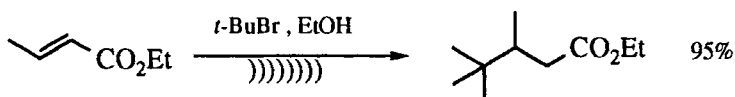
Lipshutz, B.H.; Ellsworth, E.L.; Dimock, S.H.; Smith, R.A.J. *J. Am. Chem. Soc.*, **1990**, 112, 4404.



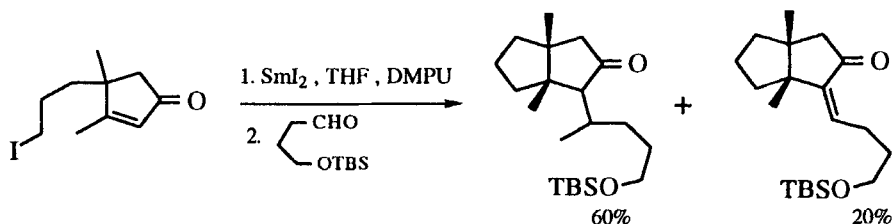
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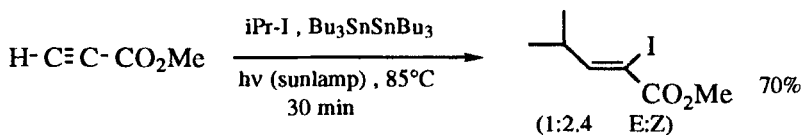
Takuwa, A.; Nishigaichi, Y.; Iwamoto, H. *Chem. Lett.*, **1991**, 1013.



Dupuy, C.; Petrier, C.; Sarandeses, L.A.; Lucche, J.L. *Synth. Commun.*, **1991**, 21, 643.

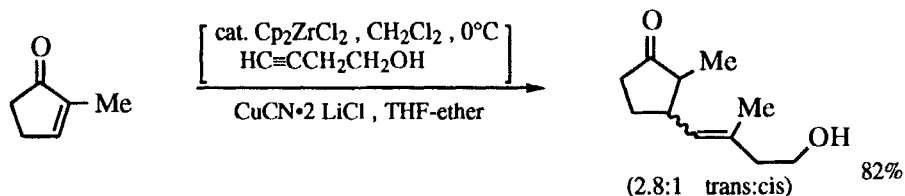


Curran, D.P.; Wolin, R.L. *SynLett*, **1991**, 317.

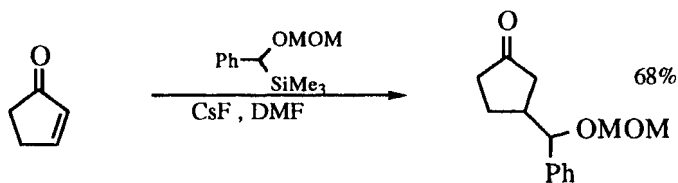


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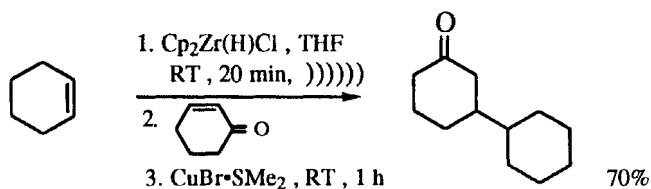
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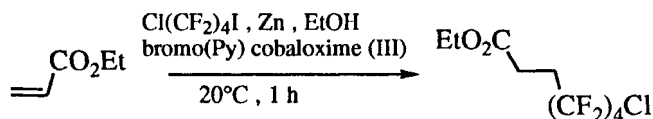
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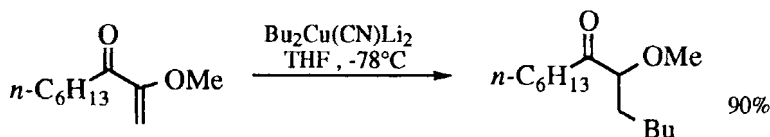
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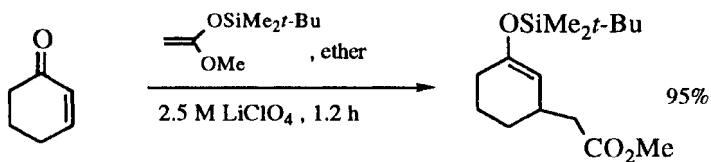
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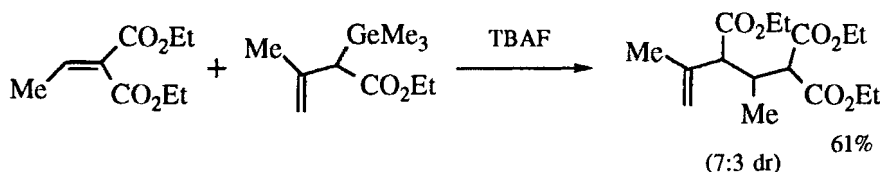
Hu, C-M.; Qiu, Y-L. *Tetrahedron Lett.*, **1991**, 32, 4001.



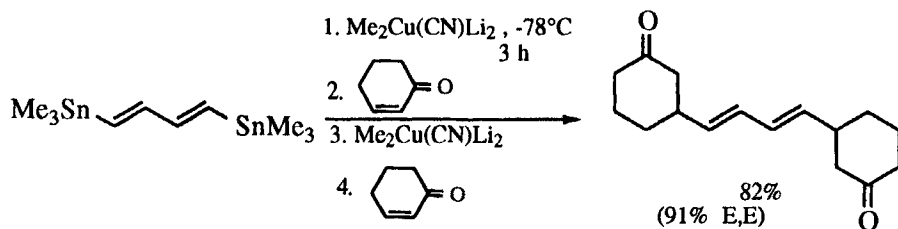
Soderquist, J.A.; Rosado, I. *Tetrahedron Lett.*, **1991**, 32, 4451.



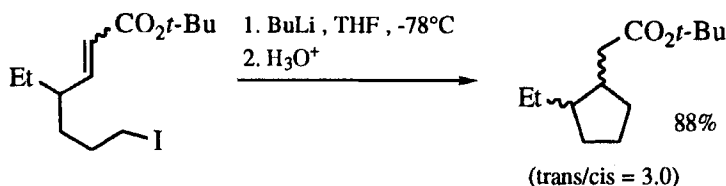
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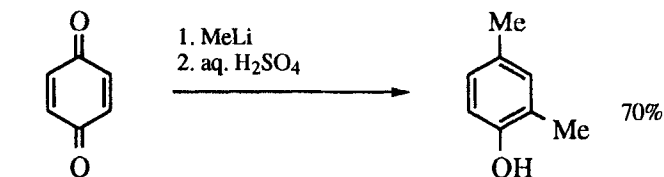
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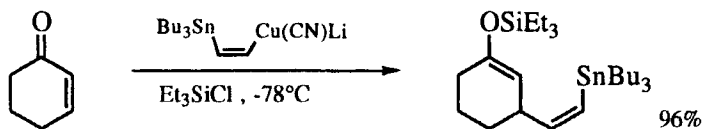
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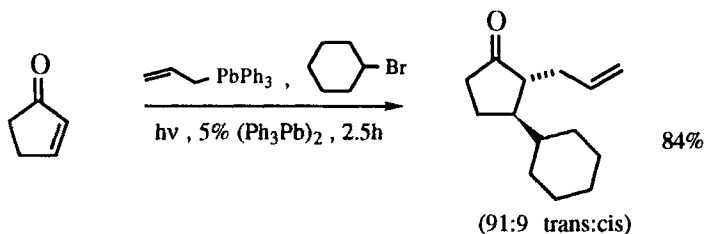
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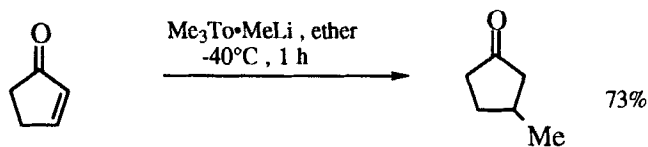
Alonso, F.; Yus, M. *Tetrahedron*, **1992**, 48, 2709.



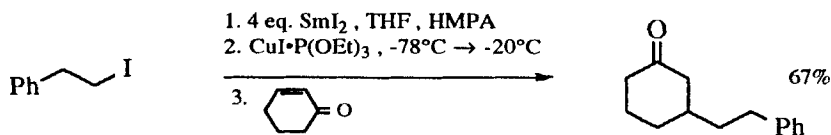
Marino, J.P.; Emonds, M.V.M.; Stengel, P.J.; Oliveira, A.R.M.; Simonelli, F.; Ferreira, J.T.B. *Tetrahedron Lett.*, **1992**, 33, 49.



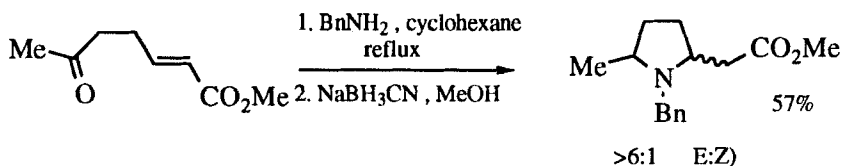
Toru, T.; Watanabe, Y.; Tsusaka, M.; Gautam, R.K.; Tazawa, K.; Bakouetila, M.; Yoneda, T.; Ueno, Y. *Tetrahedron Lett.*, **1992**, 33, 4037.



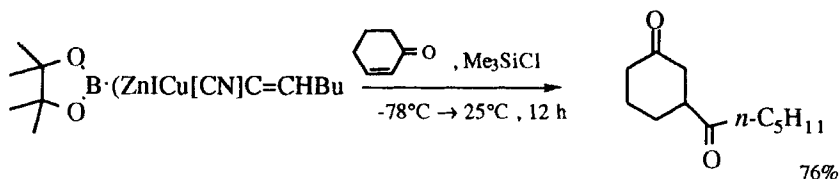
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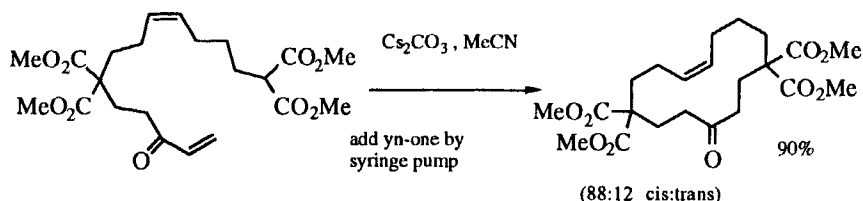
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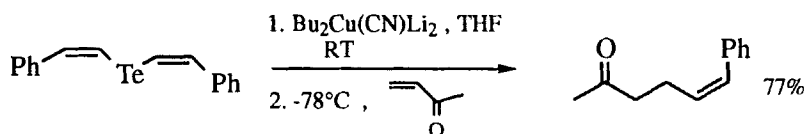
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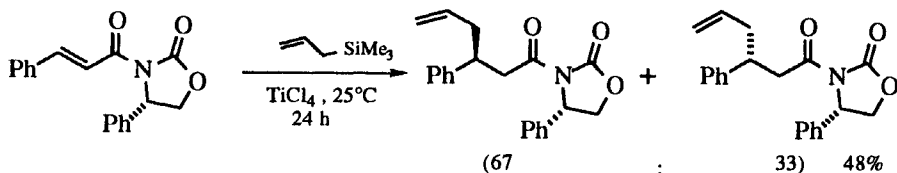
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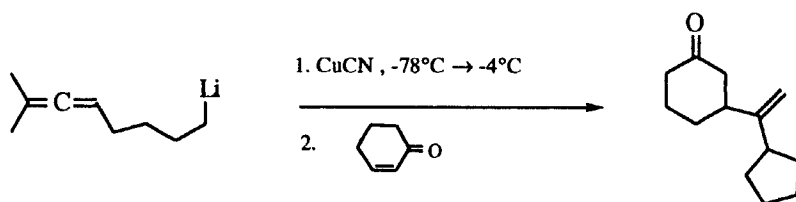
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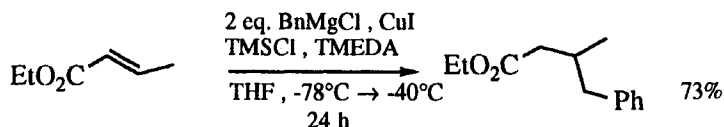
Tucci, F.C.; Chieffi, A.; Comasseto, J.V. *Tetrahedron Lett.*, **1992**, 33, 5721.



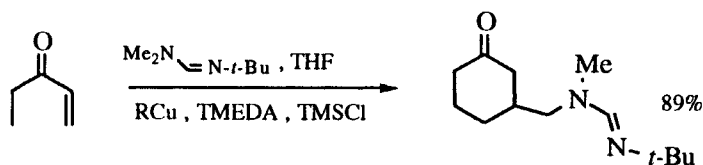
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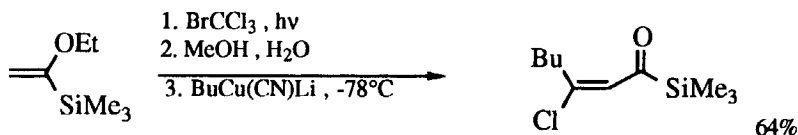
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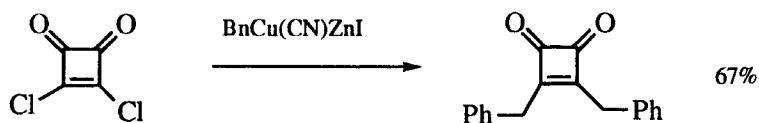
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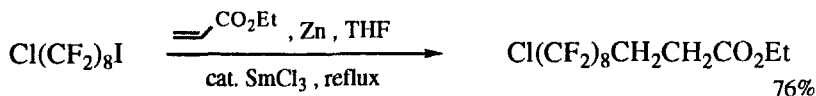
Dieter, R.K.; Alexander, C.W. *Tetrahedron Lett.*, **1992**, 33, 5693.



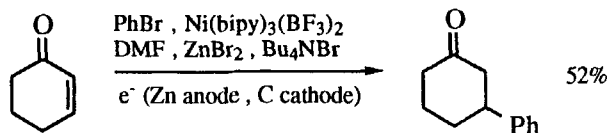
Cunico, R.E.; Zhang, C. *Tetrahedron Lett.*, **1992**, 33, 6751.



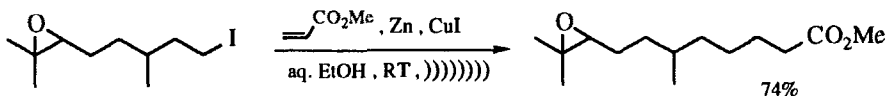
Sidduri, A.R.; Budries, N.; Laine, R.M.; Knochel, P. *Tetrahedron Lett.*, **1992**, 33, 7515.



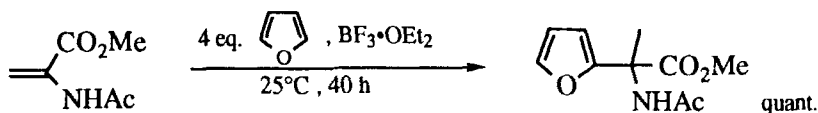
Ding, Y.; Zhao, G.; Huang, W. *Tetrahedron Lett.*, **1992**, 33, 8119.



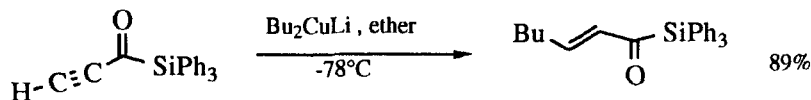
Sibille, S.; Ratovelomanana, V.; Périchon, J. *J. Chem. Soc., Chem. Commun.*, **1992**, 283.



Sarandeses, L.A.; Mouriffo, A.; Luche, J.-L. *J. Chem. Soc., Chem. Commun.*, **1992**, 798.

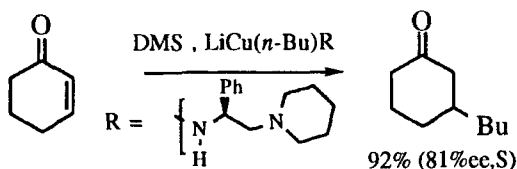


Cativiela, C.; López, M.P.; Mayoral, J.A. *SynLett*, **1992**, 121.

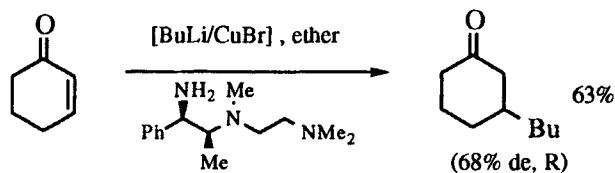


Degl'Innocenti, A.; Stocchi, E.; Capperucci, A.; Mordini, A.; Reginato, G.; Ricci, A. *SynLett*, **1992**, 329, 332.

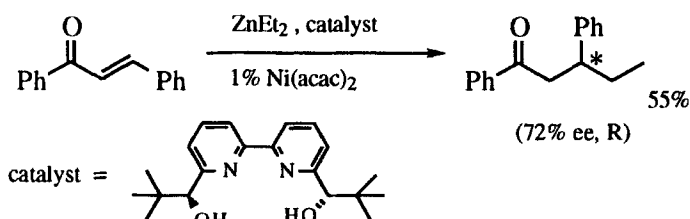
ASYMMETRIC CONJUGATE ADDITION REACTIONS



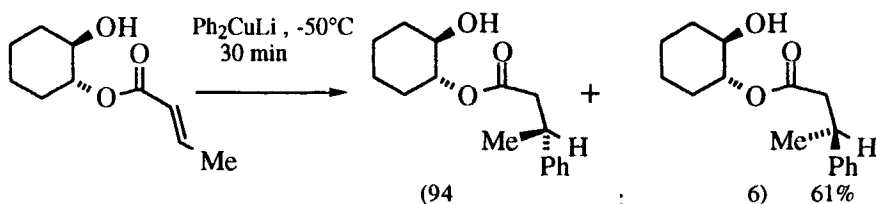
Rossiter, B.E.; Eguchi, M. *Tetrahedron Lett.*, **1990**, 31, 965.



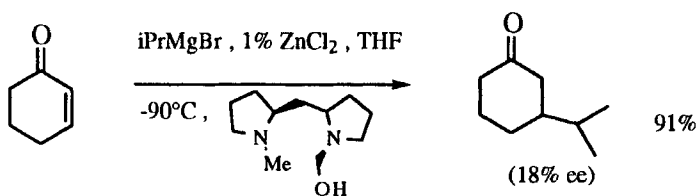
Dieter, R.K.; Lagu, B.; Deo, N.; Dieter, J.W. *Tetrahedron Lett.*, **1990**, 31, 4105.



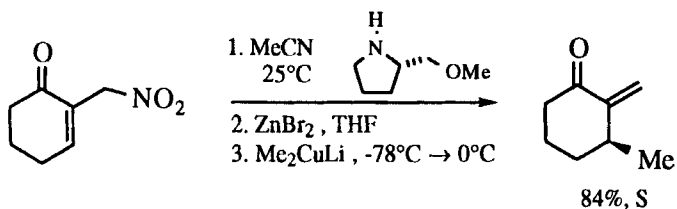
Bolm, C.; Ewald, M. *Tetrahedron Lett.*, **1990**, 31, 5011.



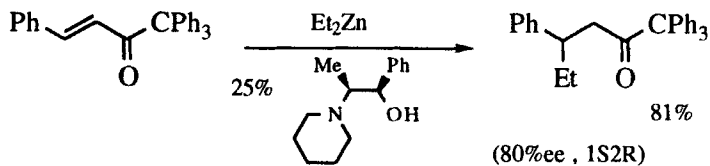
Fang, C.; Suemune, H.; Sakai, K. *Tetrahedron Lett.*, **1990**, 31, 4751.



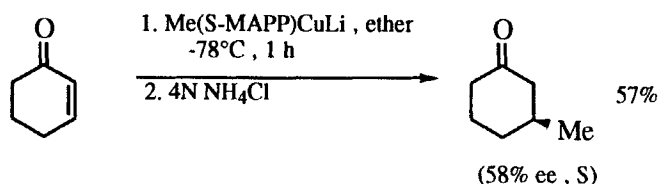
Jansen, J.F.G.A.; Feringa, B.L. *J. Org. Chem.*, **1990**, 55, 4168.



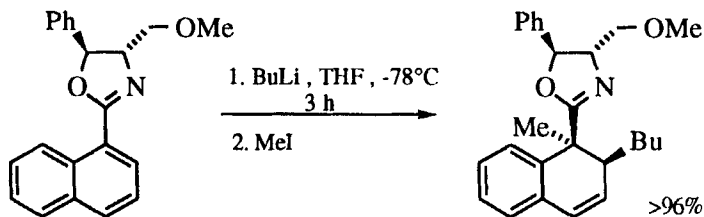
Tamura, R.; Watabe, K.; Katayama, H.; Suzuki, H.; Yamamoto, Y. *J. Org. Chem.*, **1990**, 55, 408.



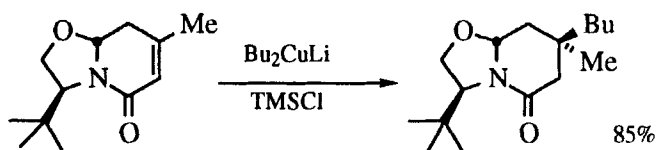
Soai, K.; Okudo, M.; Okamoto, M. *Tetrahedron Lett.*, **1991**, 32, 95.



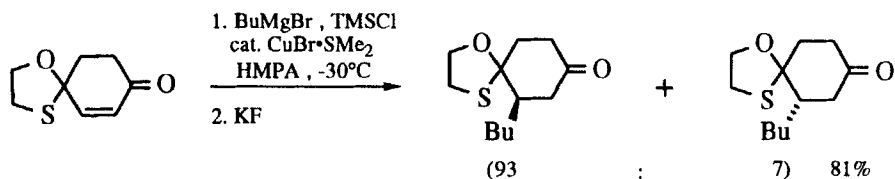
Rossiter, B.E.; Eguchi, M.; Hernández, A.E.; Vickers, D.; Medich, J.; Marr, J.; Heinis, D. *Tetrahedron Lett.*, **1991**, 32, 3973.



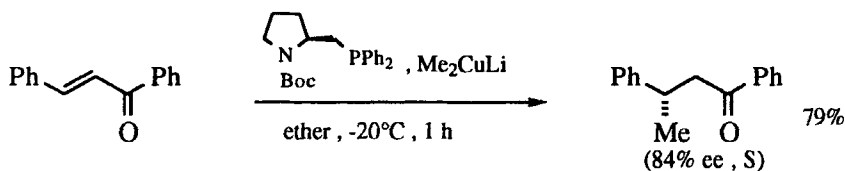
Rawson, D.J.; Meyers, A.I. *Tetrahedron Lett.*, **1991**, 32, 2095.



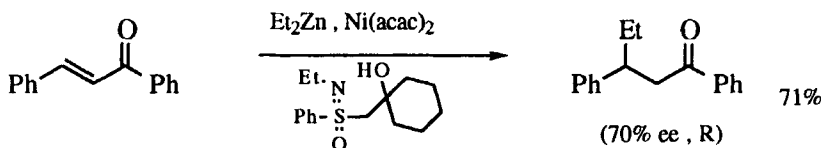
Meyers, A.I.; Leonard, W.R. Jr.; Romine, J.L. *Tetrahedron Lett.*, **1991**, 32, 597.



Sonoda, S.; Houchigai, H.; Asaoka, M.; Takei, H. *Tetrahedron Lett.*, **1992**, 33, 3145.



Kanai, M.; Koga, K.; Tomioka, K., *Tetrahedron Lett.*, **1992**, 33, 7193.



Bolm, C.; Felder, M.; Müller, J. *SynLett*, **1992**, 439.

REVIEWS:

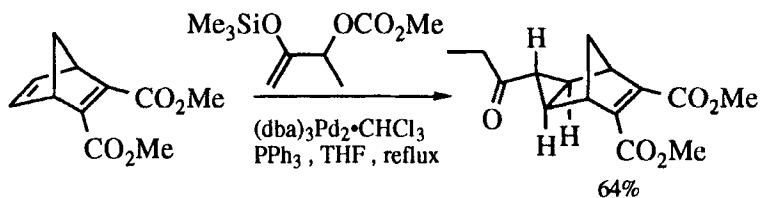
"The Evolution of Higher Order Cuprates"

Lipshutz, B.H. *SynLett*, **1990**, 119.

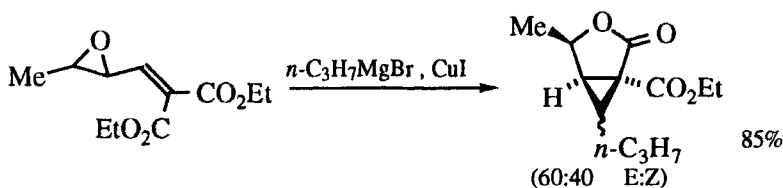
"New Aspects of Organocopper Reagents: 1,2- and 1,2- Chiral Induction and Reaction Mechanism"

Ibuka, T.; Yamamoto, Y. *SynLett*, **1992**, 769.

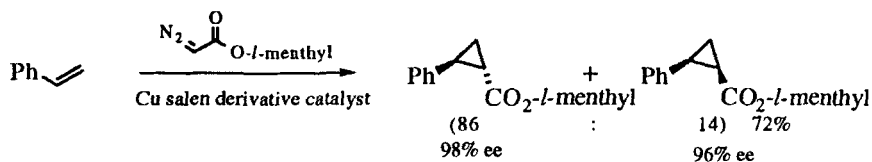
SECTION 74F: Cyclopropanations, including Halocyclopropanations



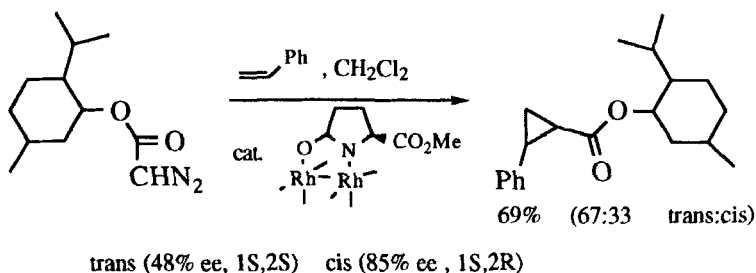
Trost, B.M.; Urabe, H. *Tetrahedron Lett.*, **1990**, 31, 615.



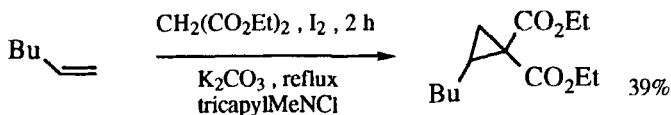
Kasatkin, A.N.; Kulak, A.N.; Biktimirov, R.Kh.; Tolstikov, G.A. *Tetrahedron Lett.*, **1990**, 31, 4915.



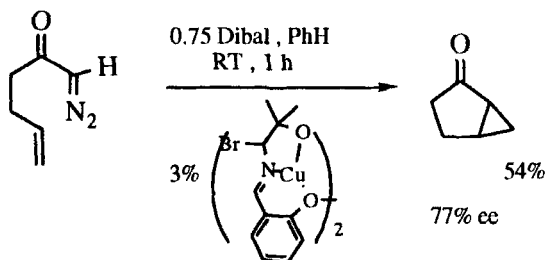
Lowenthal, R.E.; Abiko, A.; Masamune, S. *Tetrahedron Lett.*, **1990**, 31, 6005.



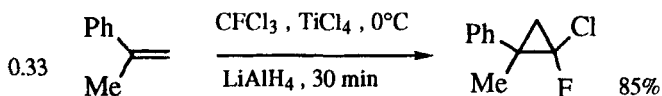
Doyle, M.P.; Brandes, B.D.; Kazala, A.P.; Pieters, R.J.; Jarstfer, M.B.; Watkins, L.M.; Eagle, C.T. *Tetrahedron Lett.*, **1990**, 31, 6613.



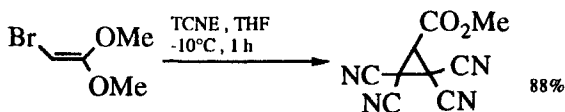
Tóke, L.; Szabó, G.T.; Hell, Z.; Tóth, G. *Tetrahedron Lett.*, **1990**, 31, 7501.



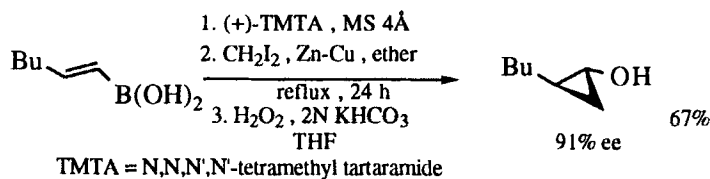
Dauben, W.G.; Hendricks, R.T.; Luzzio, M.J.; Ng, H.P. *Tetrahedron Lett.*, **1990**, 31, 6969.



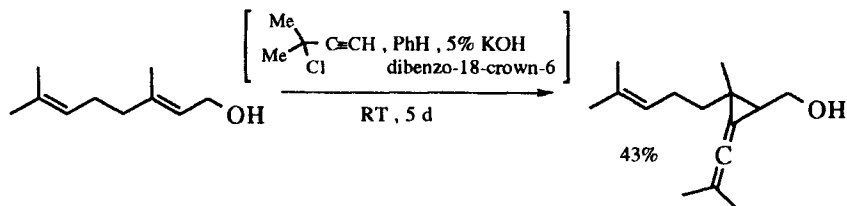
Dolbier, W.R. Jr.; Burkholder, C.R. *J. Org. Chem.*, **1990**, 55, 589.



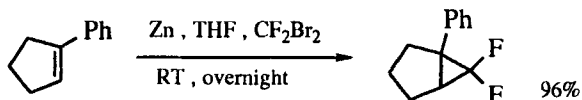
Lee, J.-Y.; Hall, H.K. Jr. *J. Org. Chem.*, **1990**, *55*, 4963.



Imai, T.; Mineta, H.; Nishida, S. *J. Org. Chem.*, **1990**, *55*, 4986.

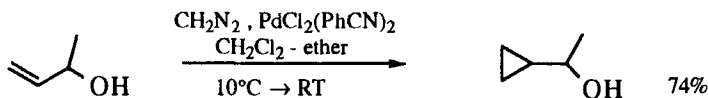


Sheu, J.-H.; Yen, C.-F.; Chan, Y.-L.; Chung, J.-F. *J. Org. Chem.*, **1990**, *55*, 5232.



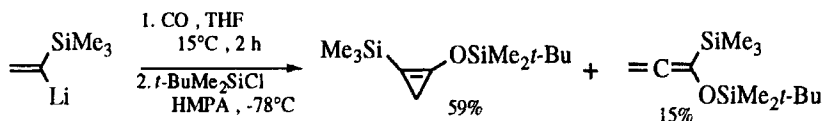
yields range from 4-96% with various alkenes

Dolbier, W.R. Jr.; Wojtowicz, H.; Burkholder, C.R. *J. Org. Chem.*, **1990**, *55*, 5420.

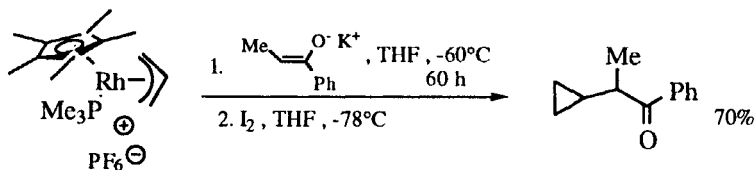


also used to convert allylamines to aminomethyl cyclopropanes

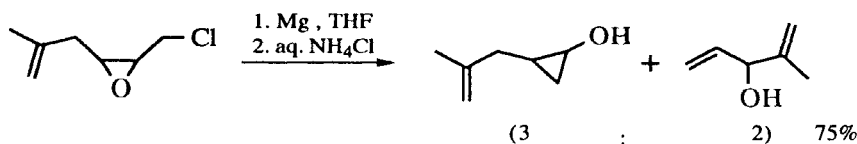
Tomilov, Yu.V.; Kostitsyn, A.B.; Shulishov, E.V.; Nefedov, O.M. *Synthesis*, **1990**, 246.



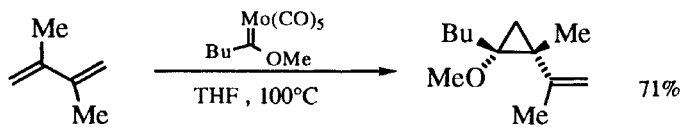
Ryu, I.; Hayama, Y.; Hirai, A.; Sonoda, N.; Orita, A.; Ohe, K.; Murai, S. *J. Am. Chem. Soc.*, **1990**, *112*, 7061.



Tjaden, E.B.; Stryker, I.M. *J. Am. Chem. Soc.*, **1990**, *112*, 6420.

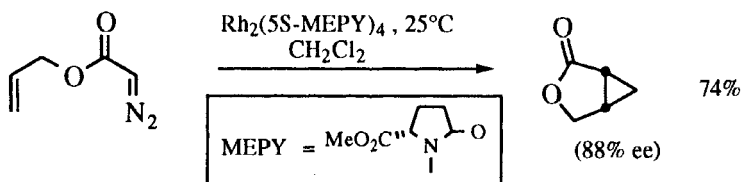


Akhmedov, M.A.; Akhmedov, I.M.; Mustafaeva, Z.G.; Sardarov, I.K.; Kostikov, R.R.; Musaeva, Kh.E. *Zhur. Org. Khim.*, **1990**, *26*, 1257 (Engl., p. 1087).

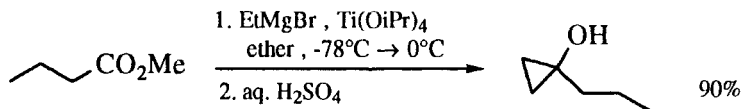


Harvey, D.E.; Lund, K.P. *J. Am. Chem. Soc.*, **1991**, *113*, 8916.

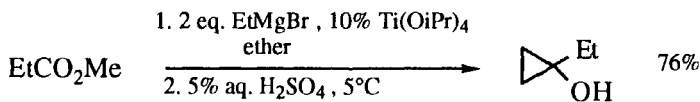
Harvey, D.E.; Lund, K.P.; Neil, D.A. *Tetrahedron Lett.*, **1991**, *32*, 6311.



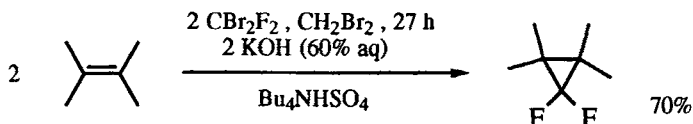
Doyle, M.P.; Pieters, R.J.; Martin, S.F.; Austin, R.E.; Oalman, C.J.; Müller, P. *J. Am. Chem. Soc.*, **1991**, *113*, 1423.



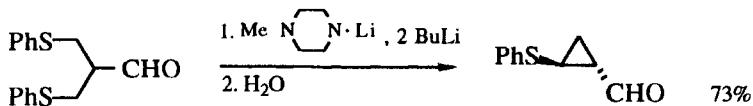
Kulinkovich, O.G.; Sviridov, S.V.; Vasilevskii, D.A.; Savchenko, A.I.; Pritytskaya, T.S. *Zhur. Org. Khim.*, **1991**, *27*, 294 (Engl., p. 250).



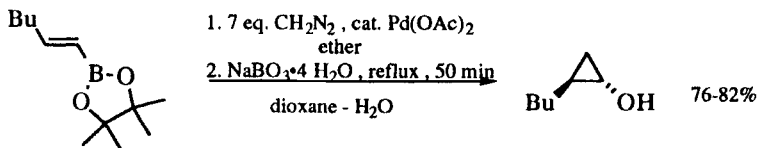
Kulinkovich, O.G.; Sviridov, S.V.; Vasilevskii, D.A. *Synthesis*, **1991**, 234.



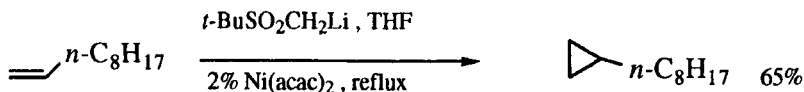
Balcerzak, P.; Fedoryński, M.; Jończyk, A. *J. Chem. Soc., Chem. Commun.*, **1991**, 826.



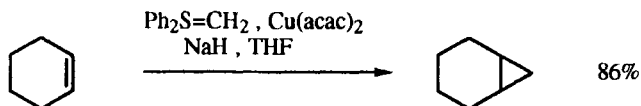
Tanaka, K.; Matsuura, H.; Funaki, I.; Suzuki, H. *J. Chem. Soc., Chem. Commun.*, **1991**, 1145.



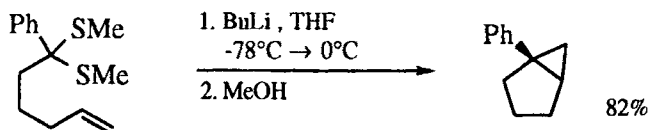
Fontani, P.; Carboni, B.; Vaultier, M.; Maas, G. *Synthesis*, **1991**, 605.



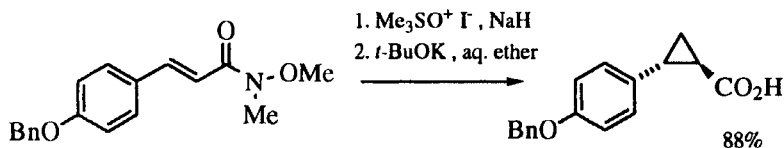
Gai, Y.; Julia, M.; Verpeaux, J-N. *SynLett*, **1991**, 56, 269.



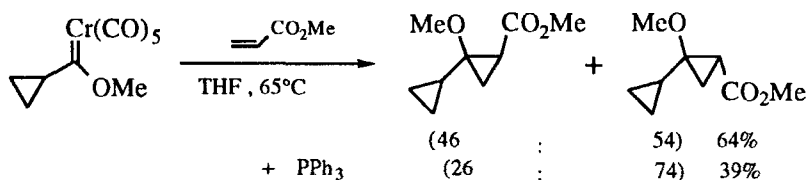
Cimetière, B.; Julia, M. *SynLett*, **1991**, 271.



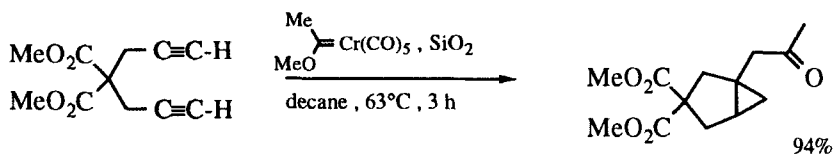
Krief, A.; Batbeaux, P. *Tetrahedron Lett.*, **1991**, 32, 417.



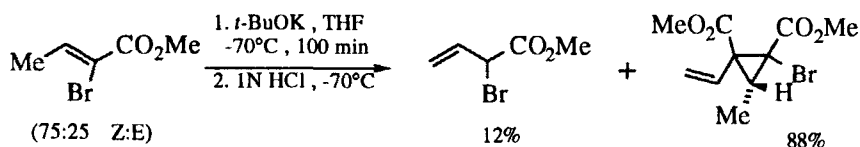
Rodrigues, K.E. *Tetrahedron Lett.*, **1991**, 32, 1275.



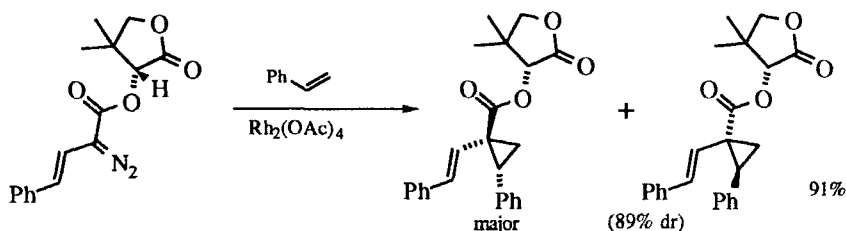
Herndon, J.W.; Tumer, S.U. *J. Org. Chem.*, **1991**, 56, 286.



Katz, T.J.; Yang, G.X-Q. *Tetrahedron Lett.*, **1991**, 32, 5895.

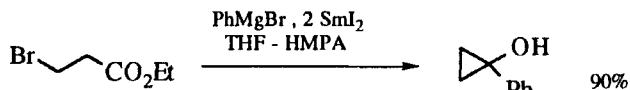


Duhamel, L.; Peschard, O.; Plé, G. *Tetrahedron Lett.*, **1991**, 32, 4695.

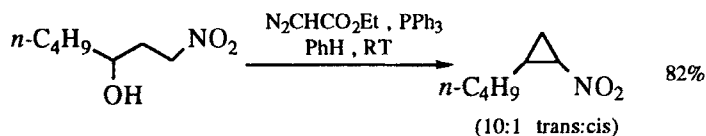


Davies, H.M.L.; Cantrell, W.R. Jr. *Tetrahedron Lett.*, **1991**, 32, 6509.

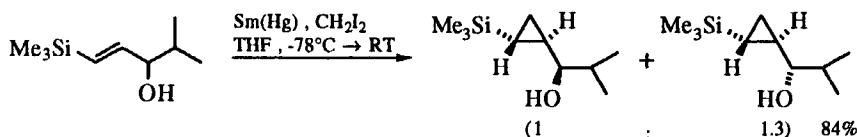
Davies, H.M.L.; Hu, B. *Tetrahedron Lett.*, **1992**, 33, 453.



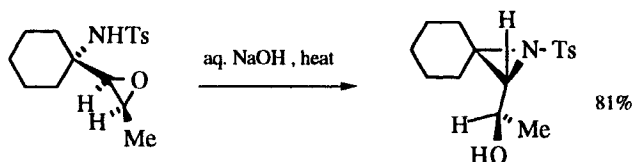
Fukuzawa, S.; Niimoto, Y.; Sakai, S. *Tetrahedron Lett.*, **1991**, 32, 7691.



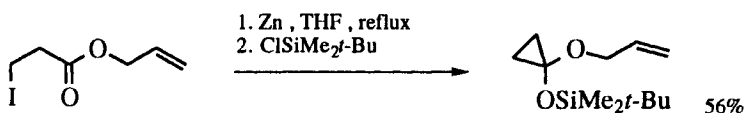
Yu, J.; Falck, J.R.; Mioskowski, C. *J. Org. Chem.*, **1992**, 57, 3757.



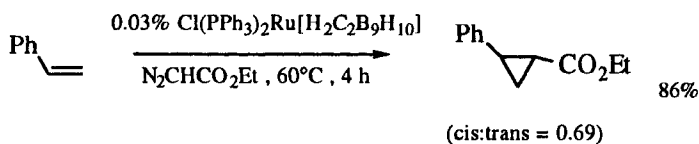
Lautens, M.; Delanghe, P.H.M. *J. Org. Chem.*, **1992**, 57, 798.



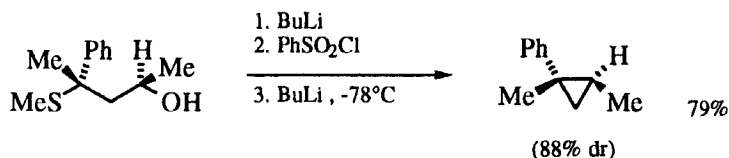
Moulines, J.; Charpentier, P.; Bats, J-P.; Nuhrich, A.; Lamidey, A-M. *Tetrahedron Lett.*, **1992**, 33, 487.



Yasui, K.; Fugami, K.; Tanaka, S.; Tamaru, Y.; Ii, A.; Yoshida, Z.; Saidi, M.R. *Tetrahedron Lett.*, **1992**, 33, 785, 789.

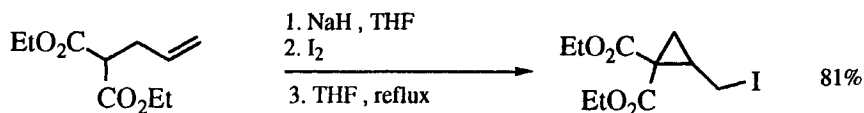


Demonceau, A.; Saive, E.; de Froidmont, Y.; Noels, A.F.; Hubert, A.J. *Tetrahedron Lett.*, **1992**, 33, 2009.

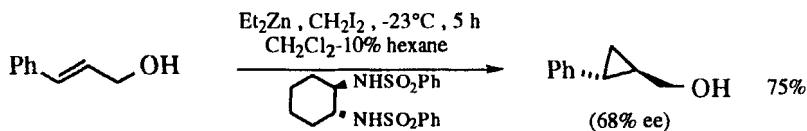


Krief, A.; Hobe, M.; Dumont, W.; Badaou, E.; Guittet, E.; Evrard, G. *Tetrahedron Lett.*, **1992**, 33, 3381.

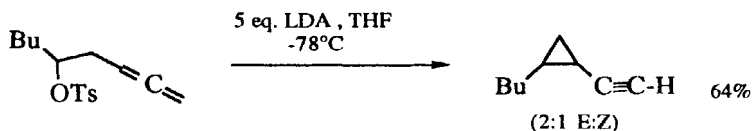
Krief, A.; Hobe, M. *SynLett*, **1992**, 317.



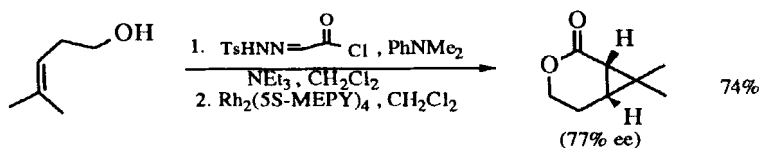
Beckwith, A.L.J.; Tozer, M.J. *Tetrahedron Lett.*, **1992**, 33, 4975.



Takahashi, H.; Yoshioka, M.; Ohno, M.; Kobayashi, S. *Tetrahedron Lett.*, **1992**, 33, 2575.

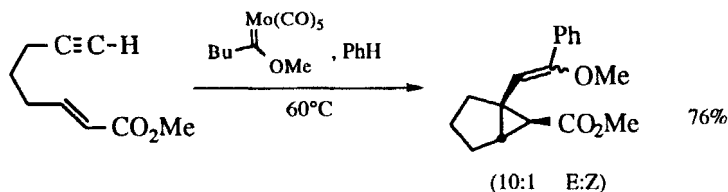


Pyo, S.; Skowron, J.F. III; Cha, J.K. *Tetrahedron Lett.*, **1992**, 33, 4703.



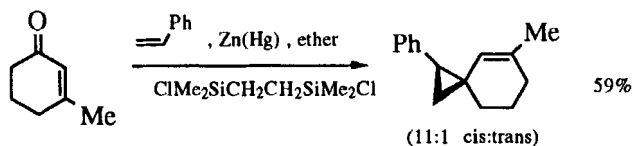
MEPY = tetrakis[methyl-2-pyrrolidinone-5S-carboxylate]

Martin, S.E.; Oalmann, C.J.; Liras, S. *Tetrahedron Lett.*, **1992**, 33, 6727.

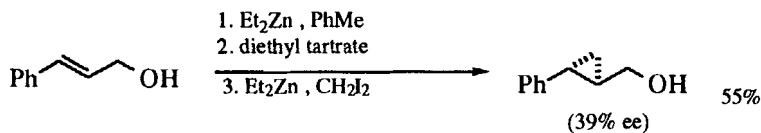


Harvey, D.F.; Lund, K.P.; Neil, D.A. *J. Am. Chem. Soc.*, **1992**, 114, 8424.

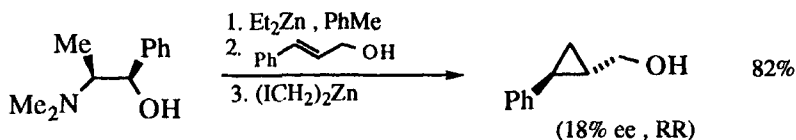
Harvey, D.F.; Brown, M.F. *Tetrahedron Lett.*, **1990**, 31, 2529.



Motherwell, W.B.; Roberts, L.R. *J. Chem. Soc., Chem. Commun.*, **1992**, 1582.

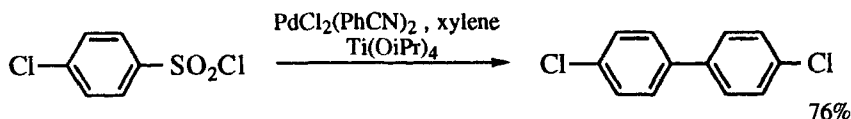


Ukaji, Y.; Nishimura, M.; Fujisawa, T. *Chem. Lett.*, **1992**, 61.

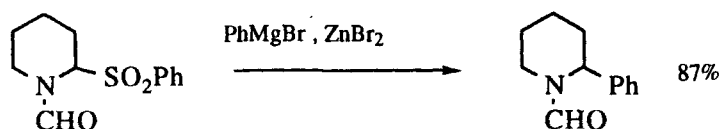


Denmark, S.E.; Edwards, J.P. *SynLett*, **1992**, 229.

SECTION 75: ALKYL, METHYLENES AND ARYL FROM MISCELLANEOUS COMPOUNDS

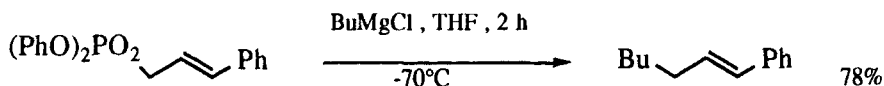


Miura, M.; Hashimoto, H.; Itoh, K.; Nomura, M. *Chem. Lett.*, **1990**, 449.



Brown, D.S.; Hansson, T.; Ley, S.V. *SynLett*, **1990**, 48.

Brown, D.S.; Charreau, P.; Ley, S.V. *SynLett*, **1990**, 749 [with ZnCl_2].

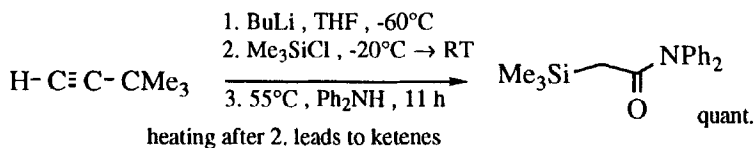


Yanagisawa, A.; Nomura, N.; Yamamoto, H. *SynLett*, **1991**, 513.

CHAPTER 6

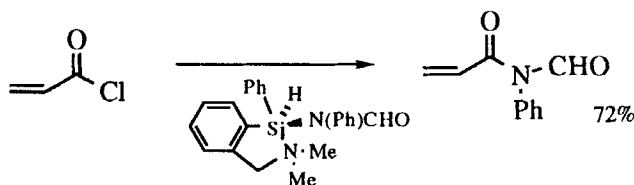
PREPARATION OF AMIDES

SECTION 76: AMIDES FROM ALKYNES

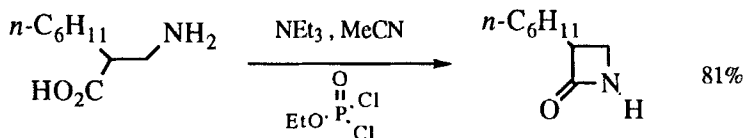


Valentí, E.; Pericàs, M.A.; Serratosa, F. *J. Org. Chem.*, **1990**, *55*, 395.

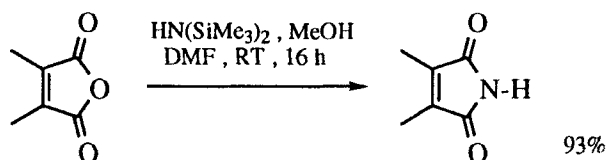
SECTION 77: AMIDES FROM ACID DERIVATIVES



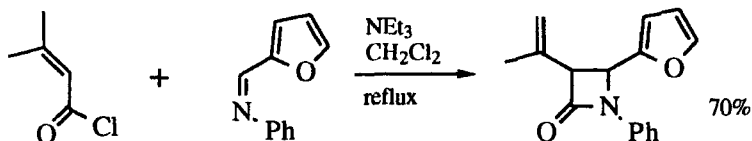
Corriu, R.J.P.; Lanneau, G.F.; Perrot-Petta, M.; Mehta, V.D. *Tetrahedron Lett.*, **1990**, *31*, 2585.



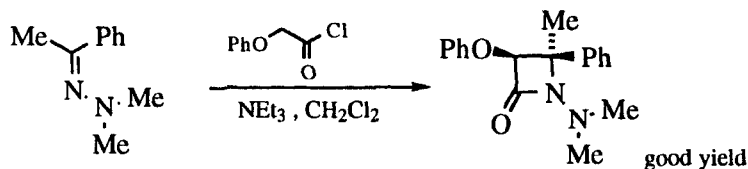
Kim, C.W.; Chung, B.Y.; Nam Kung, J.-Y.; Lee, J.M.; Kim, S. *Tetrahedron Lett.*, **1990**, *31*, 2905.



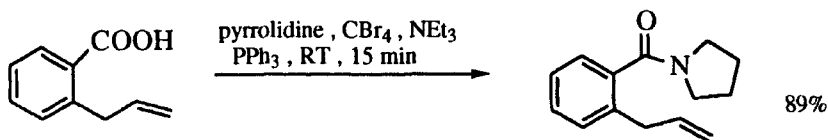
Davis, P.D.; Bit, R.A. *Tetrahedron Lett.*, **1990**, *31*, 5201.



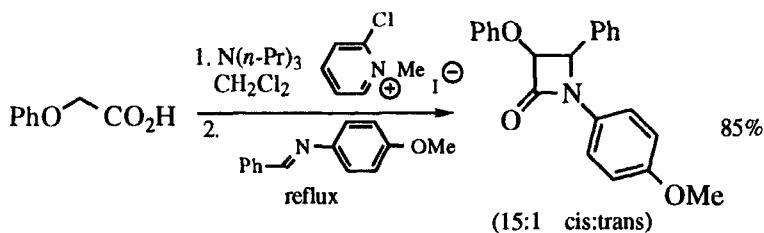
Manhas, M.S.; Ghosh, M.; Bose, A.K. *J. Org. Chem.*, **1990**, 55, 575.



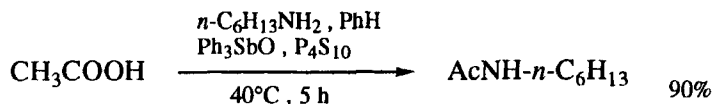
Sharma, S.D.; Pandhi, S.B. *J. Org. Chem.*, **1990**, 55, 2196.



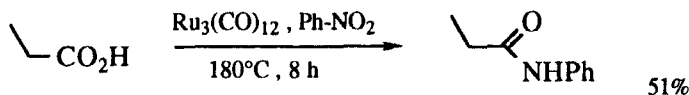
Einhorn, J.; Einhorn, C.; Luche, J-L. *Synth. Commun.*, **1990**, 20, 1105.



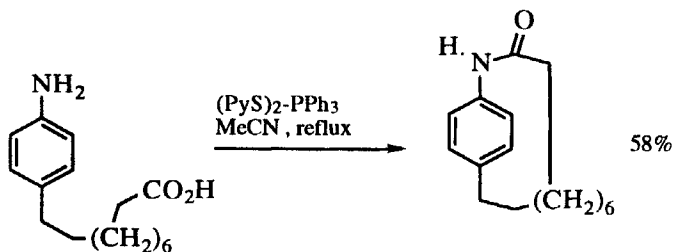
Georg, G.I.; Mashava, P.M.; Guan, X. *Tetrahedron Lett.*, **1991**, 32, 581.



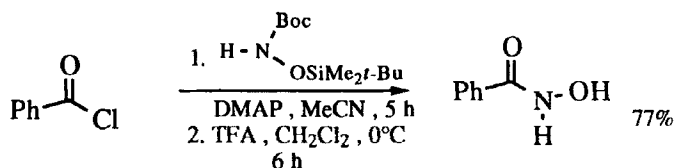
Nomura, R.; Nakano, T.; Yamada, Y.; Matsuda, H. *J. Org. Chem.*, **1991**, 56, 4076.



Nahmed, E.M.; Jenner, G. *Tetrahedron Lett.*, **1991**, 32, 4917.

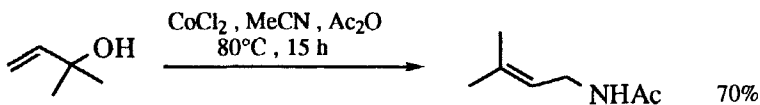


Bai, D.; Shi, Y. *Tetrahedron Lett.*, **1992**, 33, 943.



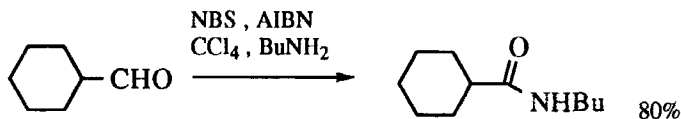
Altenburger, J.M.; Mioskowski, C.; d'Orchymont, H.; Schirlin, D.; Schalk, C.; Tarnus, C. *Tetrahedron Lett.*, **1992**, 33, 5055.

SECTION 78: AMIDES FROM ALCOHOLS AND THIOLS

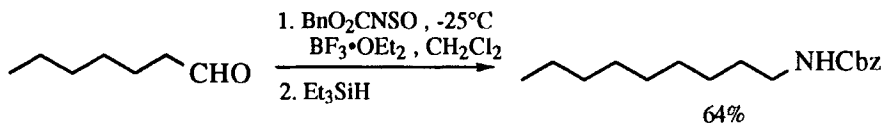


Nayyar, N.K.; Reddy, M.M.; Iqbal, I. *Tetrahedron Lett.*, **1991**, 32, 6965.

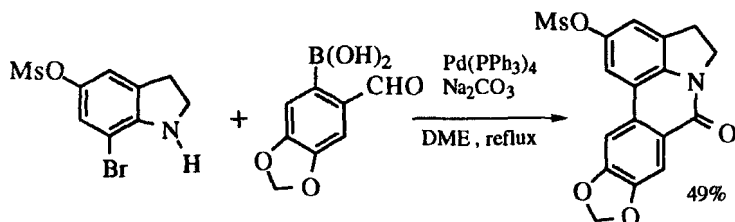
SECTION 79: AMIDES FROM ALDEHYDES



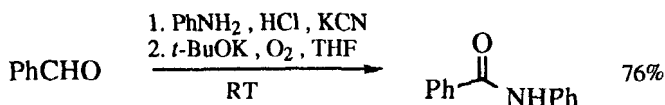
Markó, I.E.; Mekhelfia, A. *Tetrahedron Lett.*, **1990**, 31, 7237.



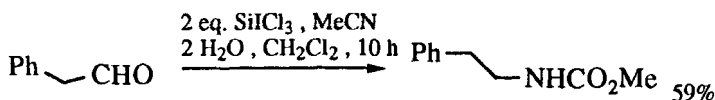
Alexander, M.D.; Anderson, R.E.; Sisko, J.; Weinreb, S.M. *J. Org. Chem.*, **1990**, 55, 2563.



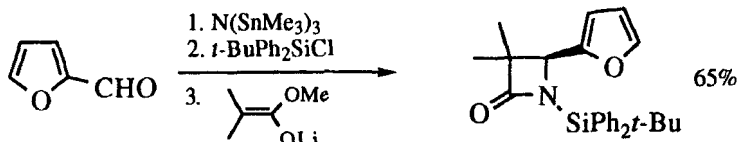
Siddiqui, M.A.; Snieckus, V. *Tetrahedron Lett.*, **1990**, 31, 1523.



Chuang, T-H.; Yang, C-C.; Chiang, C-J.; Fang, J-M. *SynLett*, **1990**, 733.



Elmorsy, S.S.; Nour, M.A.; Kandeel, E.M.; Pelter, A. *Tetrahedron Lett.*, **1991**, 32, 1825.



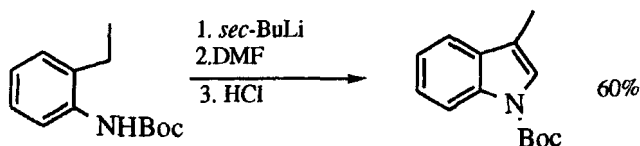
Busato, S.; Cainelli, G.; Panunzio, M.; Bandini, E.; Martelli, G.; Spunta, G. *SynLett*, **1991**, 243.

SECTION 80: AMIDES FROM ALKYL, METHYLENES AND ARYLS

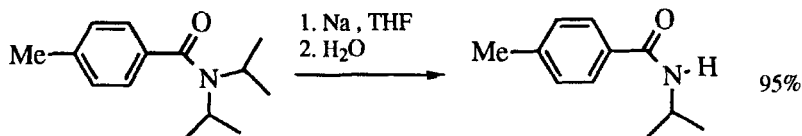
NO ADDITIONAL EXAMPLES

SECTION 81: AMIDES FROM AMIDES

Conjugate reductions of unsaturated amides are listed in Section 74D (Alkyls from Alkenes).

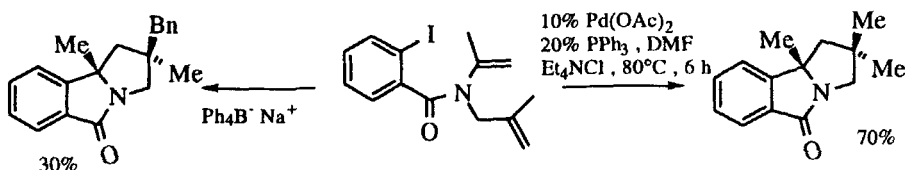


Clark, R.D.; Muchowski, J.M.; Souchet, M.; Repke, D.B. *SynLett*, **1990**, 207.

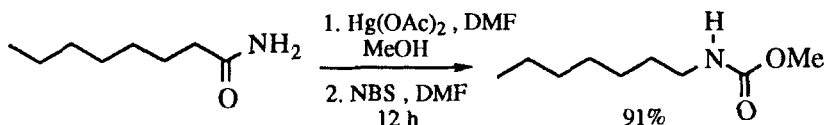


coupling occurs in some cases

Karaman, R.; Fry, J.L. *Tetrahedron Lett.*, **1990**, 31, 941.

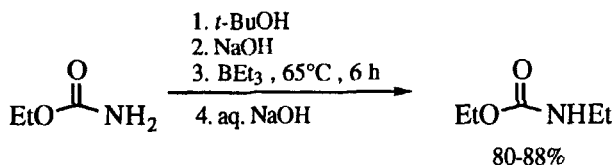


Grigg, R.; Dorrity, M.J.; Malone, J.F.; Sridharan, V.; Sukirthalingam, S. *Tetrahedron Lett.*, **1990**, 31, 1343.

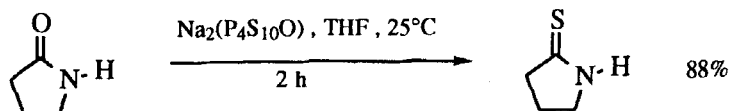


new Hofmann rearrangement

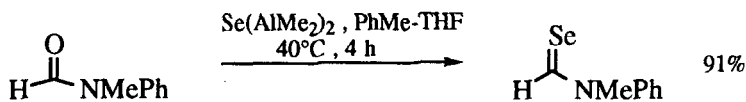
Jew, S.; Park, H.G.; Park, H.-J.; Park, M.; Cho, Y. *Tetrahedron Lett.*, **1990**, 31, 1559.



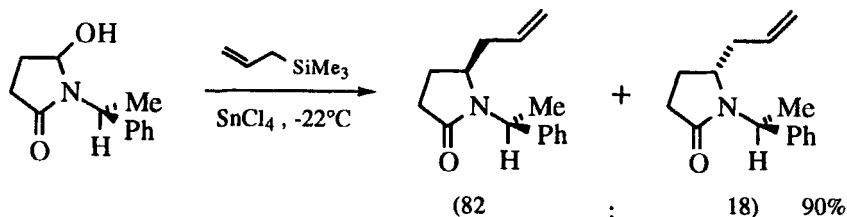
Wachter-Jurcsak, N.; Scully, F.R., Jr. *Tetrahedron Lett.*, **1990**, 31, 5261.



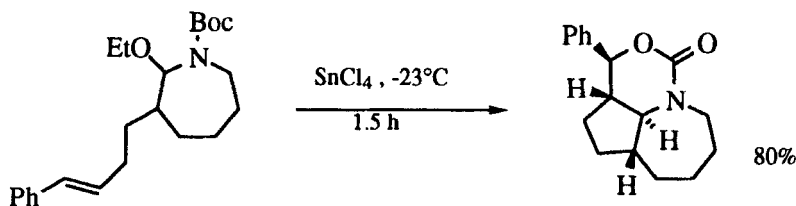
Brillon, D. *Synth. Commun.*, **1990**, 20, 3085.



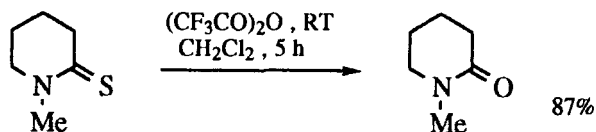
Segi, M.; Kojima, A.; Nakajima, T.; Suga, S. *SynLett*, **1991**, 105.



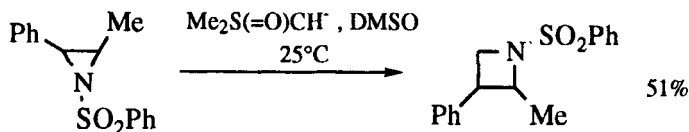
Polniaszek, R.P.; Belmont, S.E.; Alvarez, R. *J. Org. Chem.*, **1990**, *55*, 215.



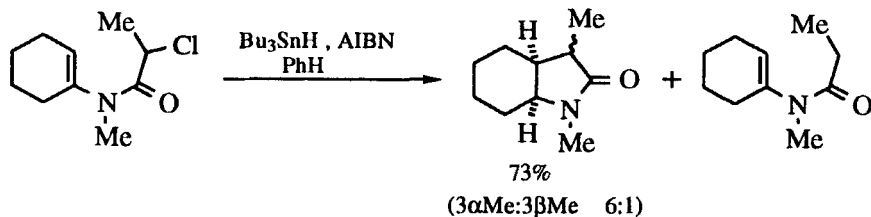
Fisher, M.J.; Overman, L.E. *J. Org. Chem.*, **1990**, *55*, 1447.



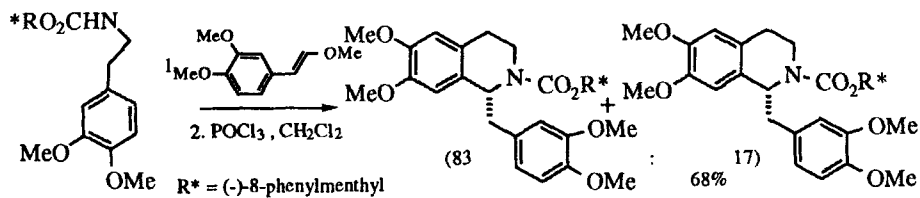
Masuda, R.; Hojo, M.; Ichi, T.; Sasano, S.; Kobayashi, T.; Kuroda, C. *Tetrahedron Lett.*, **1991**, *32*, 1195.



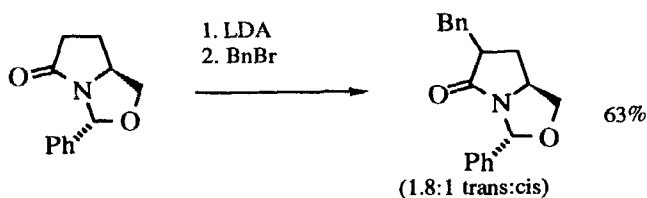
Nadir, U.K.; Sharma, R.I.; Koul, V.K. *J. Chem. Soc., Perkin Trans. I*, **1991**, 2015.



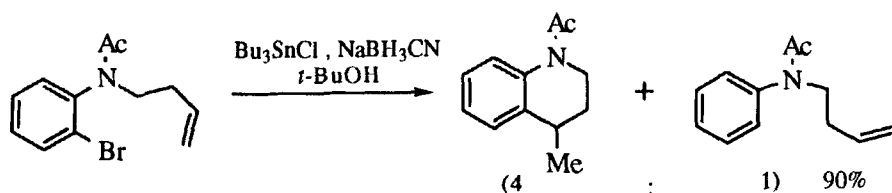
Ishibashi, H.; Nakamura, N.; Sato, T.; Takeuchi, M.; Ikeda, M. *Tetrahedron Lett.*, **1991**, *32*, 1725.



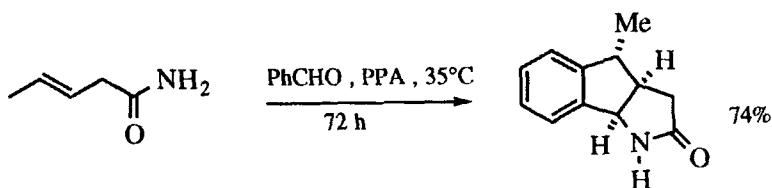
Comins, D.L.; Badawi, M.M. *Tetrahedron Lett.*, **1991**, 32, 2995.



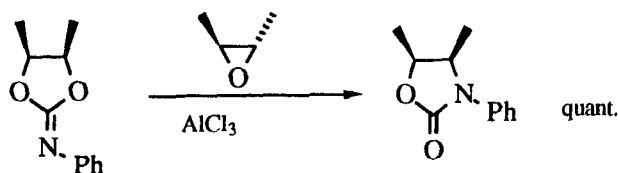
Baldwin, J.E.; Moloney, M.G.; Shim, S.B. *Tetrahedron Lett.*, **1991**, 32, 1379.



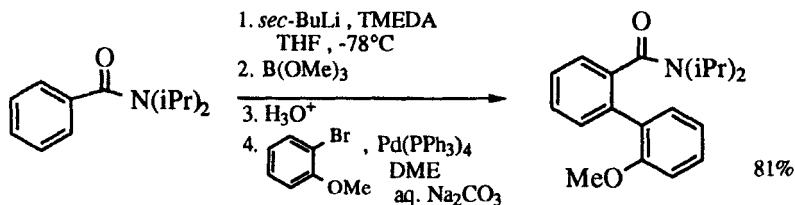
Clark, A.J.; Jones, K.; McCarthy, C.; Storey, J.M.D. *Tetrahedron Lett.*, **1991**, 32, 2829.



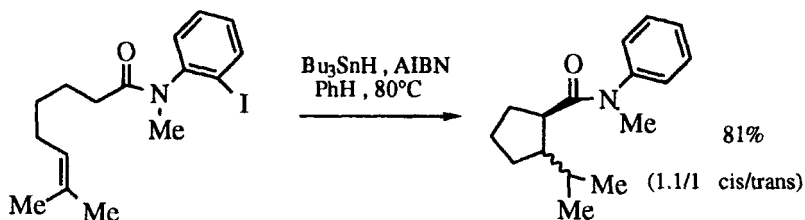
Marson, C.M.; Grabowska, U; Walgrove, T.; Eggleston, D.S.; Baures, P.W. *J. Org. Chem.*, **1991**, 56, 2603.



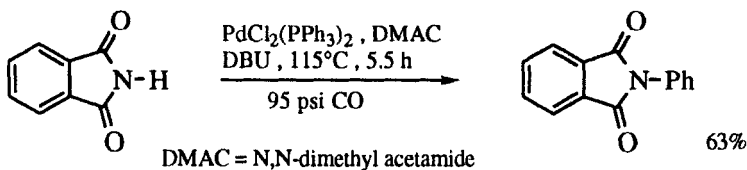
Baba, A.; Seki, K.; Matsuda, H. *J. Org. Chem.*, **1991**, 56, 2684.



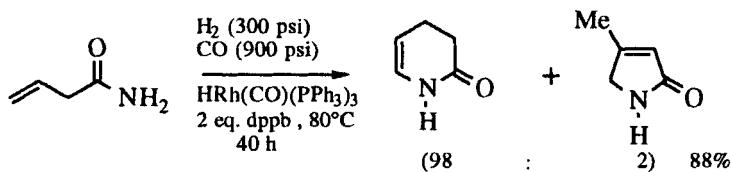
Alo, B.I.; Kandil, A.; Patil, P.A.; Sharp, M.J.; Siddiqui, M.A.; Snieckus, V.; Josephy, P.D.
J. Org. Chem., **1991**, *56*, 3763.



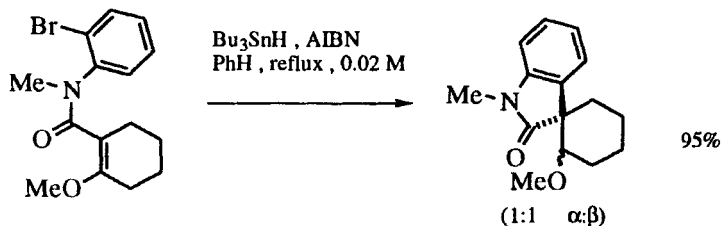
Curran, D.P.; Abraham, A.C.; Liu, H. *J. Org. Chem.*, **1991**, *56*, 4335.



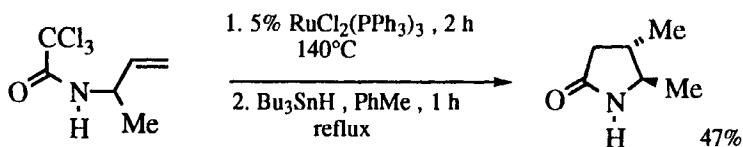
Perry, R.L.; Turner, S.R. *J. Org. Chem.*, **1991**, *56*, 6573.



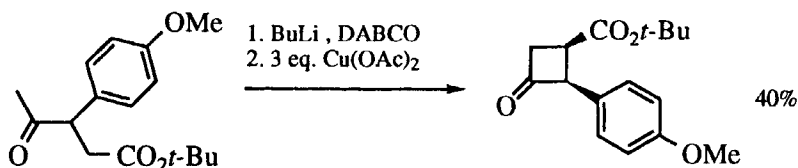
Ojima, I.; Korda, A.; Shay, W.R. *J. Org. Chem.*, **1991**, *56*, 2024.



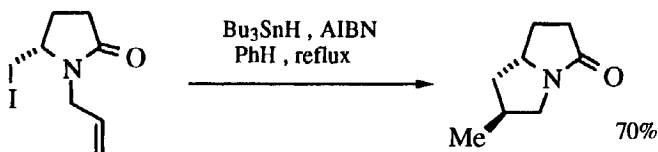
Hart, D.L.; Wu, S.C. *Tetrahedron Lett.*, **1991**, *32*, 4099.



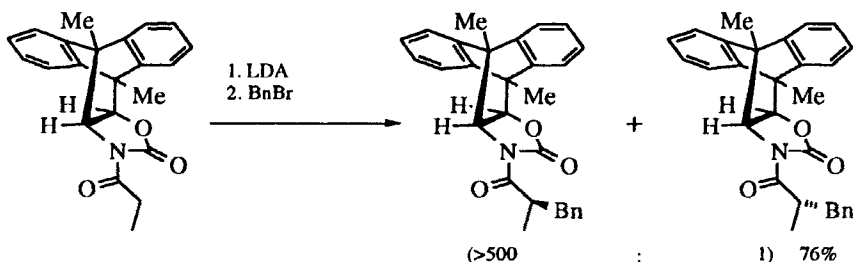
Nagashima, H.; Wakamatsu, H.; Ozaki, N.; Ishii, T.; Watanabe, M.; Tajima, T.; Itoh, K. *J. Org. Chem.*, **1992**, *57*, 1682.



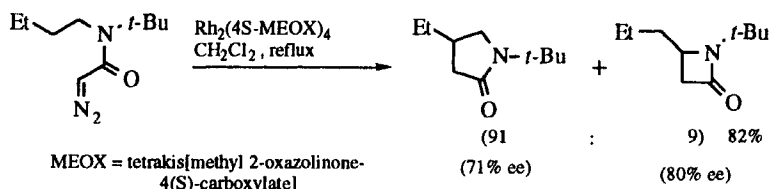
Kawabata, T.; Minami, T.; Hiyama, T. *J. Org. Chem.*, **1992**, *57*, 1864.



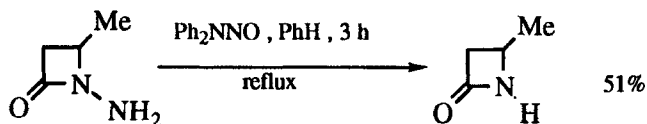
Keusenkothen, P.F.; Smith, M.B. *Tetrahedron*, **1992**, *48*, 2977.



Kimura, K.; Murata, K.; Otsuka, K.; Ishizuka, T.; Haratake, M.; Kunieda, T. *Tetrahedron Lett.*, **1992**, *33*, 4461.



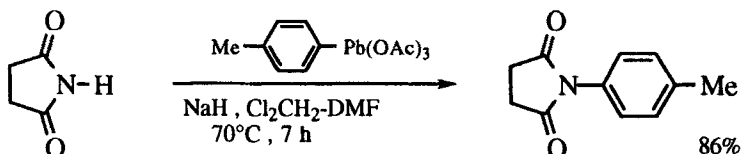
Doyle, M.P.; Protopopova, M.N.; Winchester, W.R.; Daniel, K.L. *Tetrahedron Lett.*, **1992**, *33*, 7819.



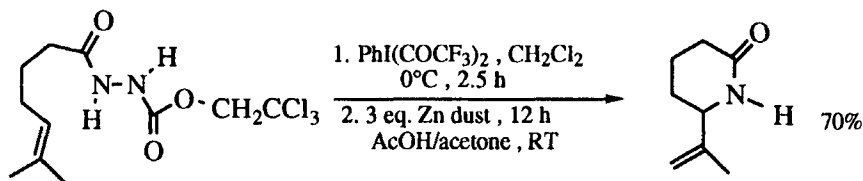
White, J.D.; Perri, S.T.; Toske, S.G. *Tetrahedron Lett.*, **1992**, 33, 433.



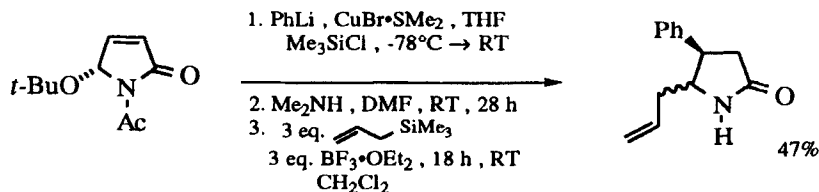
Kotsuki, H.; Iwaski, M.; Nishizawa, H. *Tetrahedron Lett.*, **1992**, 33, 4945.



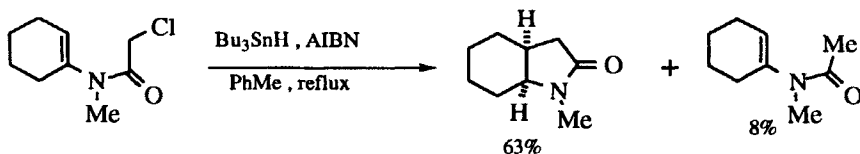
López-Alvarado, P.; Avendaño, C.; Menéndez, J.C. *Tetrahedron Lett.*, **1992**, 33, 6875.



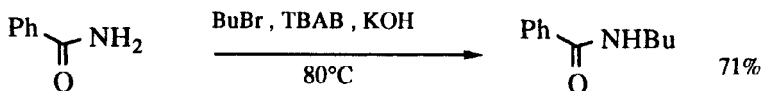
Scartozzi, M.; Grondin, R.; Leblanc, Y. *Tetrahedron Lett.*, **1992**, 33, 5717.



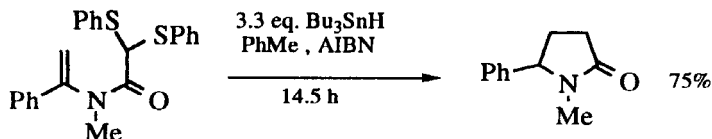
Koot, W-J.; Hiemstra, H.; Speckamp, W.N. *Tetrahedron Lett.*, **1992**, 33, 7969.



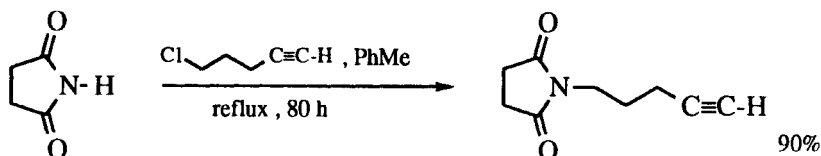
Sato, T.; Nakamura, N.; Ikeda, K.; Okada, M.; Ishibashi, H.; Ikeda, M. *J. Chem. Soc., Perkin Trans. 1*, **1992**, 2399.



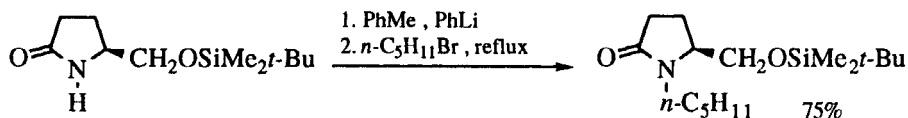
Loupy, A.; Sansoulet, J.; Díez-Barra, E.; Carrillo, J.R. *Synth. Commun.*, **1992**, 22, 1661.



Sato, T.; Machigashira, N.; Ishibashi, H.; Ikeda, M. *Heterocycles*, **1992**, 33, 139.

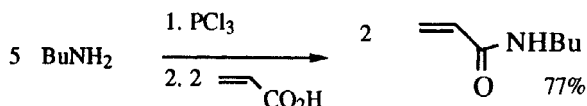


Gesson, J.P.; Jacquesy, J.C.; Rambaud, D. *Bull. Soc. Chim. Fr.*, **1992**, 129, 227.

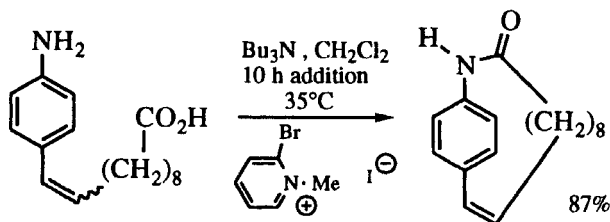


Keusenkothen, P.F.; Smith, M.B. *Synth. Commun.*, **1992**, 22, 2935.

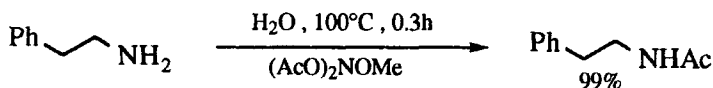
SECTION 82: AMIDES FROM AMINES



Cabral, J.; Laszlo, P.; Montaufier, M.-T.; Randriamahafa, S.L. *Tetrahedron Lett.*, **1990**, 31, 1705.

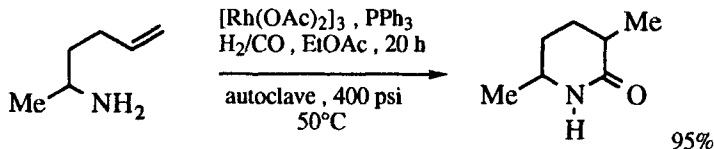


Bai, D.; Bo, Y.; Zhou, Q. *Tetrahedron Lett.*, **1990**, 31, 2161.

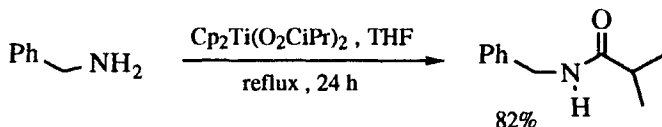


N-methoxy diacetamide - a new acetylating reagent
many amines are acetylated at RT

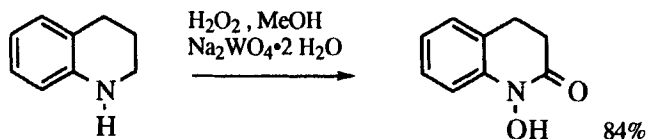
Kikugawa, Y.; Mitsui, K.; Sakamoto, T. *Tetrahedron Lett.*, **1990**, 31, 243.



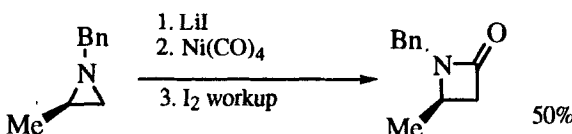
Anastasiou, D.; Jackson, W.R. *Tetrahedron Lett.*, **1990**, 31, 4795.



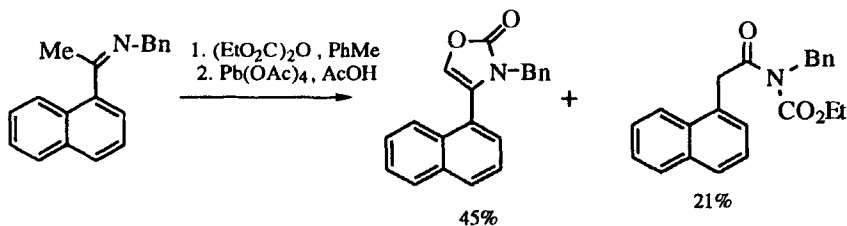
Recht, J.; Cohen, B.I.; Goldman, A.S.; Kohn, J. *Tetrahedron Lett.*, **1990**, 31, 7281.



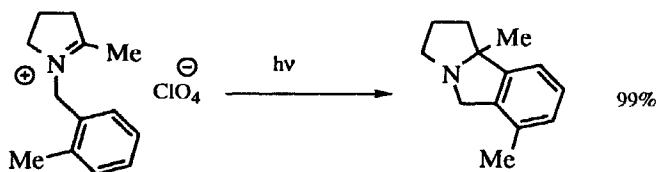
Murahashi, S.; Oda, T.; Sugahara, T.; Masui, Y. *J. Org. Chem.*, **1990**, 55, 1744.



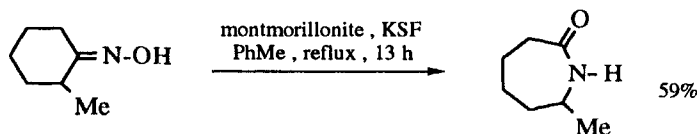
Chamchaang, W.; Pinhas, A.R. *J. Org. Chem.*, **1990**, 55, 2943.



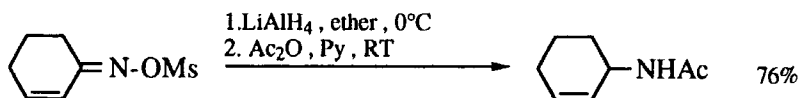
Lenz, G.R.; Costanza, C.; Lessor, R.A.; Ezell, E.F. *J. Org. Chem.*, **1990**, 55, 1753.



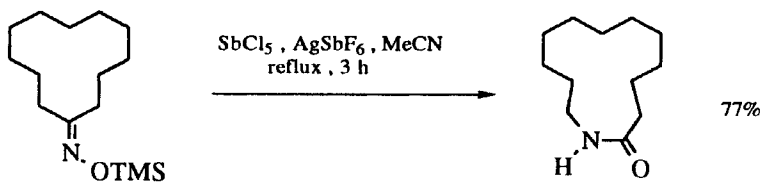
Cho, I.-S.; Tu, C.-L.; Mariano, P.S. *J. Am. Chem. Soc.*, **1990**, *112*, 3594.



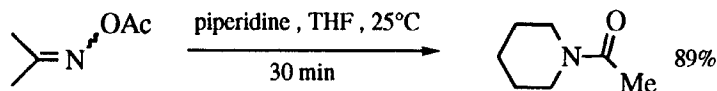
Meshram, H.M. *Synth. Commun.*, **1990**, *20*, 3253.



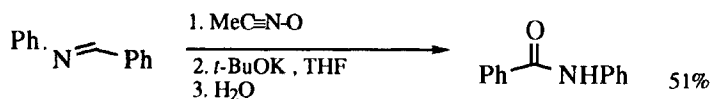
Kočovsky, P. *SynLett*, **1990**, 677.



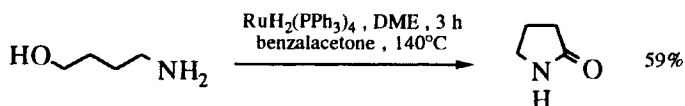
Mukaiyama, T.; Harada, T. *Chem. Lett.*, **1991**, 1653.



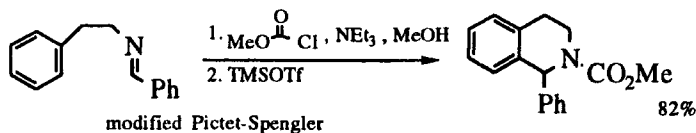
Fernández, S.; Menéndez, E.; Gotor, V. *Synthesis*, **1991**, 713.



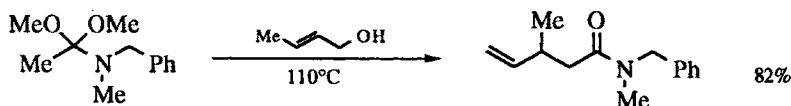
Aitken, R.A.; Raut, S.V. *SynLett*, **1991**, 189.



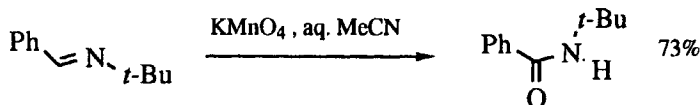
Naota, T.; Murahashi, S. *SynLett*, **1991**, 693.



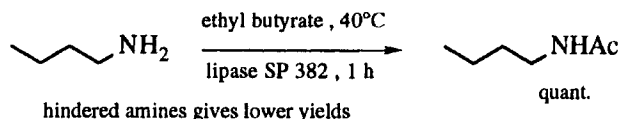
Cheung, G.K.; Earle, M.J.; Fairhurst, R.A.; Heaney, H.; Shuhaibar, K.F.; Eyley, S.C.; Ince, F. *SynLett*, **1991**, 721.



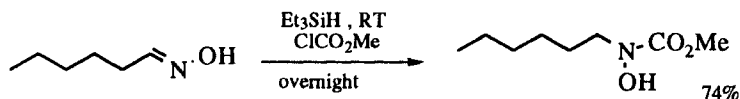
Bauermeister, S.; Gows, I.D.; Strauss, H.F.; Venter, E.M.M. *J. Chem. Soc., Perkin Trans. I*, **1991**, 561.



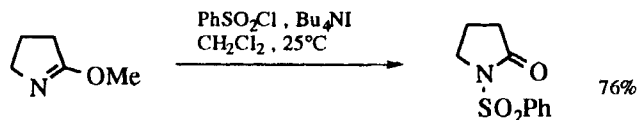
Larsen, J.; Jørgensen, K.A.; Christensen, D. *J. Chem. Soc., Perkin Trans. I*, **1991**, 1187.



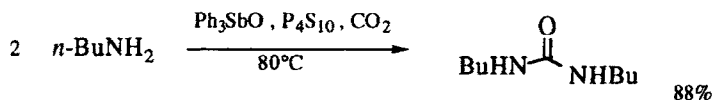
Djeghaba, Z.; Deleuze, H.; De Jeso, B.; Messadi, D.; Maillard, B. *Tetrahedron Lett.*, **1991**, 32, 761.



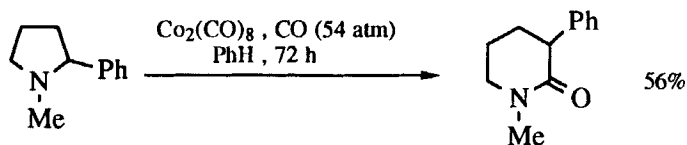
Wu, P.-L.; Sun, C.-J. *Tetrahedron Lett.*, **1991**, 32, 4137.



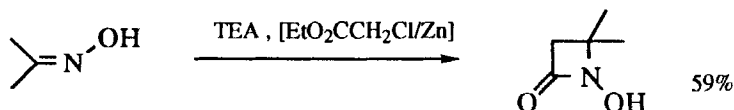
Sheu, J.; Smith, M.B.; Oeschger, T.R.; Satchell, J. *Org. Prep. Proceed. Int.*, **1992**, 24, 147.



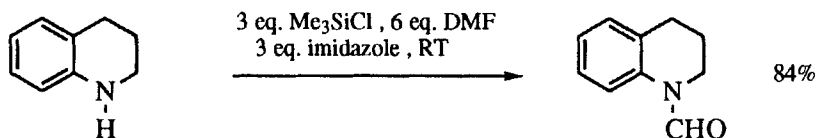
Nomura, R.; Hasegawa, Y.; Ishimoto, M.; Toyosaki, T.; Matsuda, H. *J. Org. Chem.*, **1992**, 57, 7339.



Wang, M.D.; Alper, H. *J. Am. Chem. Soc.*, **1992**, *114*, 7018.

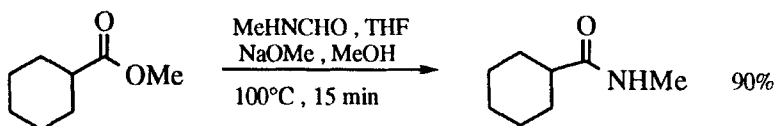


Mulengi, J.K.; Fatmi, N. *Bull. Soc. Chim. Belg.*, **1992**, *101*, 257.

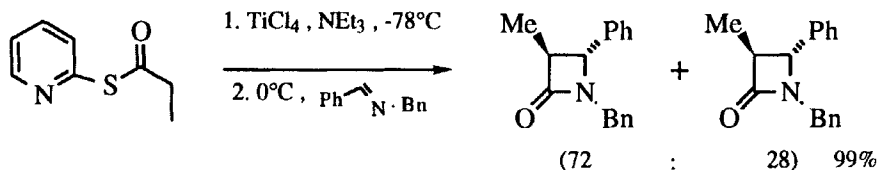


Berry, M.B.; Blagg, J.; Craig, D.; Willis, M.C. *SynLett*, **1992**, 659.

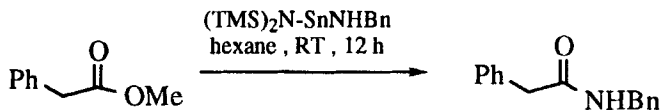
SECTION 83: AMIDES FROM ESTERS



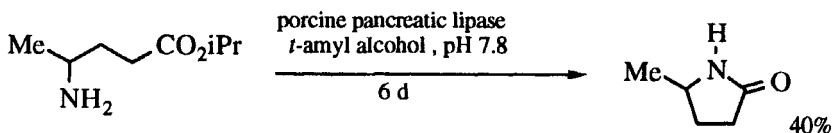
Jagdmann, G.E. Jr.; Munson, H.R. Jr.; Gero, T.W. *Synth. Commun.*, **1990**, *20*, 1203.



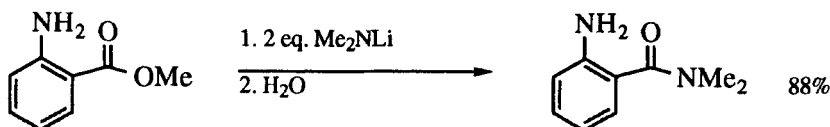
Cinquini, M.; Cozzi, F.; Cozzi, P.G.; Consolandi, E. *Tetrahedron*, **1991**, *47*, 8767.



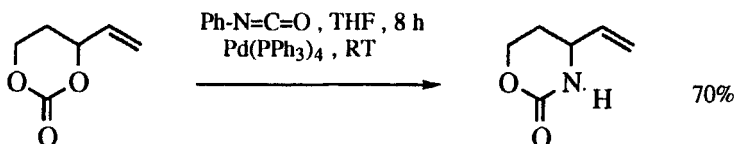
Wang, W-B.; Roskamp, E.L. *J. Org. Chem.*, **1992**, *57*, 6101.



Gutman, A.L.; Meyer, E.; Yue, X.; Abell, C. *Tetrahedron Lett.*, **1992**, 33, 3943.



Rivière-Baudet, M.; Morère, A.; Dias, M. *Tetrahedron Lett.*, **1992**, 33, 6453.

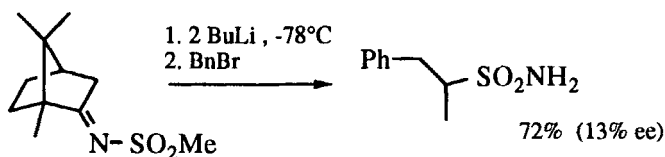


Tamaru, Y.; Bando, T.; Kawamura, Y.; Okamura, K.; Yoshida, Z.; Shiro, M. *J. Chem. Soc., Chem. Commun.*, **1992**, 1498.

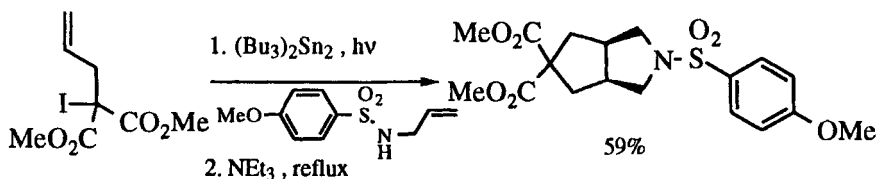
SECTION 84: AMIDES FROM ETHERS, EPOXIDES AND THIOETHERS

NO ADDITIONAL EXAMPLES

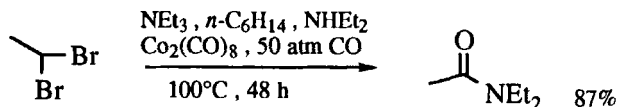
SECTION 85: AMIDES FROM HALIDES AND SULFONATES



Davis, F.A.; Zhou, P.; Lal, G.S. *Tetrahedron Lett.*, **1990**, 31, 1653.

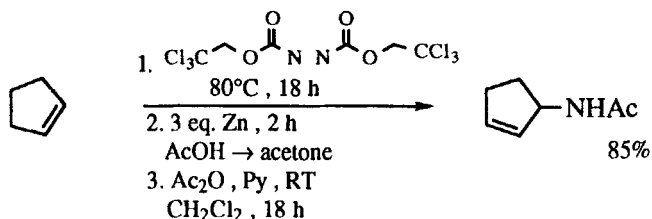


Flynn, D.L.; Zabrowski, D.L. *J. Org. Chem.*, **1990**, 55, 3673.

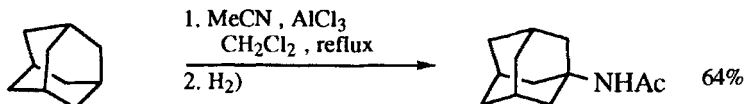


Miyashita, A.; Kawashima, T.; Kaji, S.; Nomura, K.; Nohira, H. *Tetrahedron Lett.*, **1991**, 32, 781.

SECTION 86: AMIDES FROM HYDRIDES



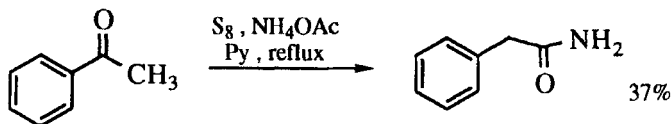
Leblanc, Y.; Zamboni, R.; Bernstein, M.A. *J. Org. Chem.*, **1991**, 56, 1871.



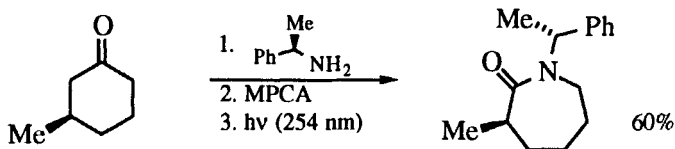
with addition of CO, get a low yield of the aldehyde

Olah, G.A.; Wang, Q. *Synthesis*, **1992**, 1090.

SECTION 87: AMIDES FROM KETONES

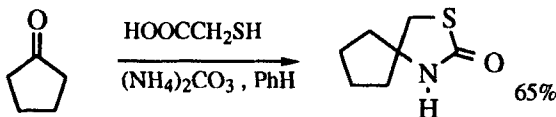


You, Q-D.; Zhou, H-Y.; Wang, Q-Z.; Lei, X-H. *Org. Prep. Proceed. Int.*, **1991**, 23, 435.

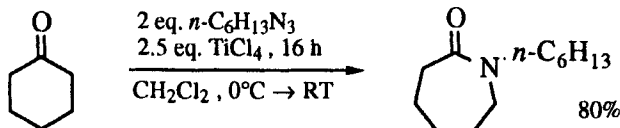


MPCA = monoperoxycamphoric acid

Aubé, J.; Hammond, M.; Gherardini, E.; Takusagawa, F. *J. Org. Chem.*, **1991**, 56, 499.

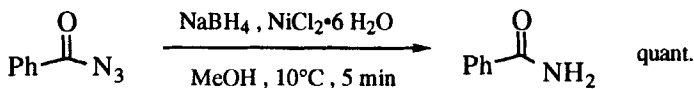


El-Zohry, M.E. *Org. Prep. Proceed. Int.*, **1992**, 24, 81.

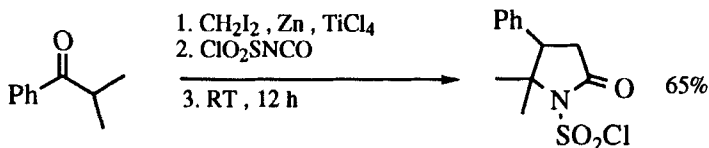


Aubé, J.; Milligan, G.L.; Mossman, C.J. *J. Org. Chem.*, **1992**, 51, 1635.

Aubé, J.; Milligan, G.L. *J. Am. Chem. Soc.*, **1991**, 113, 8965.



Rao, H.S.P.; Reddy, K.S.; Turnbull, K.; Borchers, V. *Synth. Commun.*, **1992**, 22, 1339.



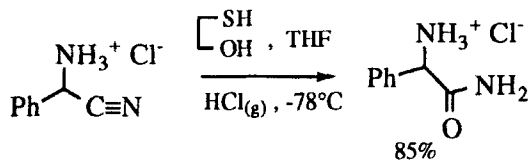
Black, T.H.; Olson, J.T.; Abt, D.C. *Synth. Commun.*, **1992**, 22, 2729.

REVIEWS:

"Carbon-Carbon Bond Cleavage by the Haller-Bauer and Related Reactions"

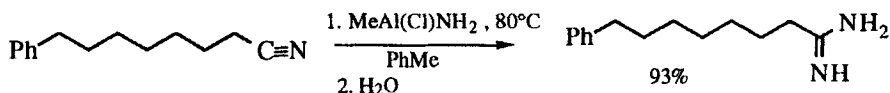
Gilday, J.P.; Paquette, L.A. *Org. Prep. Proceed. Int.*, **1990**, 22, 167.

SECTION 88: AMIDES FROM NITRILES

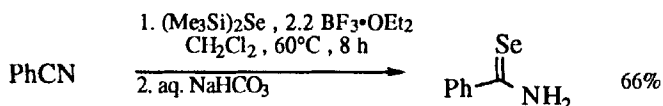


new Pinner type reaction

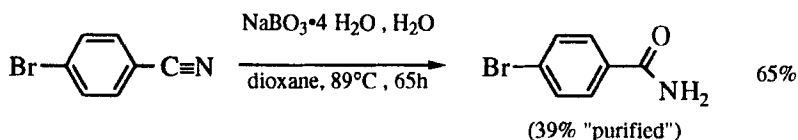
Lee, Y.B.; Goo, Y.M.; Lee, Y.Y.; Lee, J.K. *Tetrahedron Lett.*, **1990**, 31, 1169.



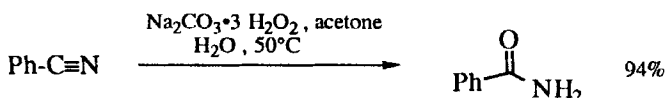
Garigipati, R.S., *Tetrahedron Lett.*, **1990**, 31, 1969.



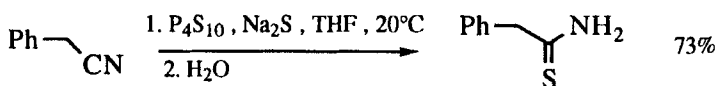
Shimada, K.; Hikage, S.; Takeishi, Y.; Takikawa, Y. *Chem. Lett.*, **1990**, 1403.



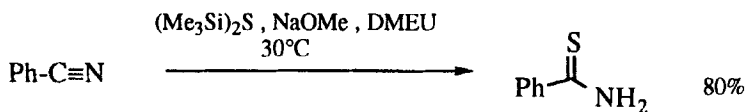
Reed, K.L.; Gupton, J.T.; Solarz, T.L. *Synth. Commun.*, **1990**, 20, 563.



Kabalka, G.W.; Deshpande, S.M.; Wadgaonkar, P.P.; Chatla, N. *Synth. Commun.*, **1990**, 20, 1445.



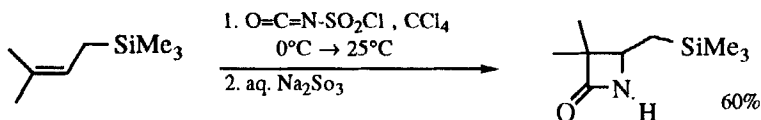
Brillon, D. *Synth. Commun.*, **1992**, 22, 1397.



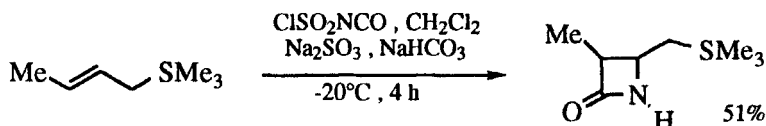
DMEU = 1,3-dimethyl-2-imidazolidinone

Lin, P.-Y.; Ku, W.-S.; Shiao, M.-J. *Synthesis*, **1992**, 1219.

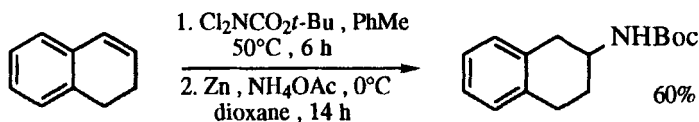
SECTION 89: AMIDES FROM ALKENES



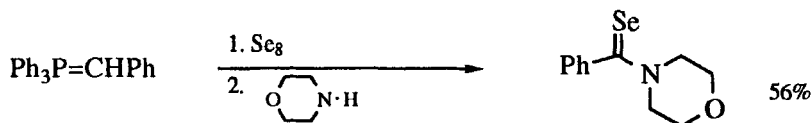
Colvin, E.W.; Monteith, M. *J. Chem. Soc., Chem. Commun.*, **1990**, 1230.



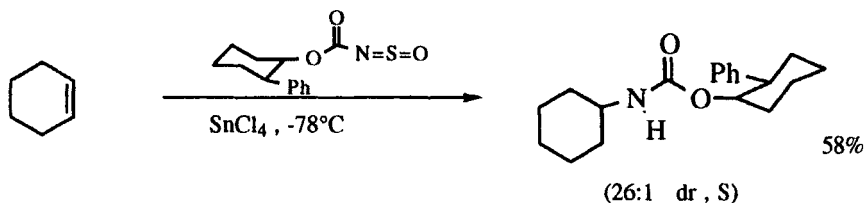
Nativi, C.; Perrotta, E.; Ricci, A.; Taddei, M. *Tetrahedron Lett.*, **1991**, 32, 2265.



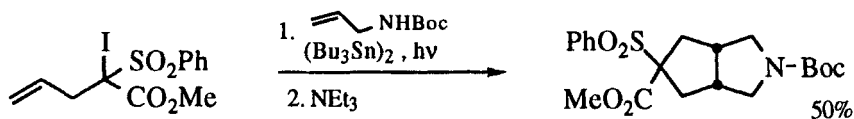
Orlek, B.S.; Stemp, G. *Tetrahedron Lett.*, **1991**, 32, 4045.



Okuma, K.; Komiya, Y.; Ohta, H. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 2402.

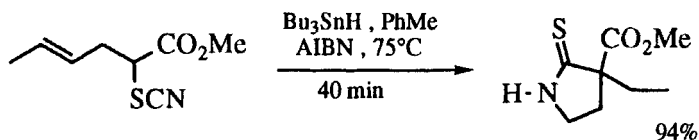


Whitesell, J.K.; Yaser, H.K. *J. Am. Chem. Soc.*, **1991**, 113, 3526.

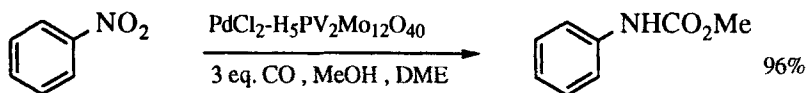


Flynn, D.L.; Zabrowski, D.L.; Nosal, R. *Tetrahedron Lett.*, **1992**, 33, 7281.

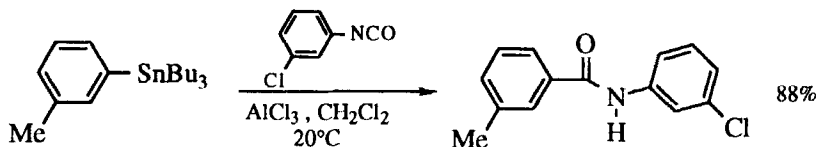
SECTION 90: AMIDES FROM MISCELLANEOUS COMPOUNDS



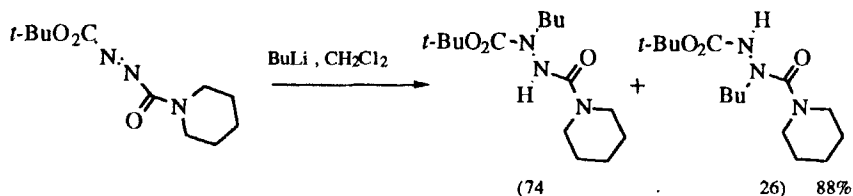
Bachi, M.D.; Denenmark, D. *J. Org. Chem.*, **1990**, 55, 3442.



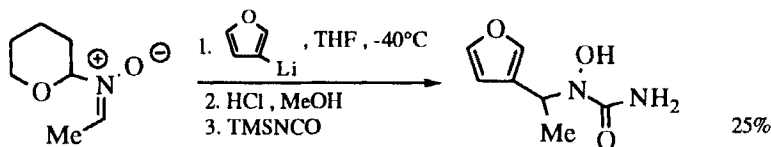
Izumi, Y.; Satoh, Y.; Urabe, K. *Chem. Lett.*, **1990**, 795.



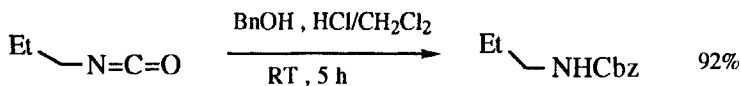
Kobs, U.; Neumann, W.P. *Chem. Ber.*, **1990**, 123, 2191.



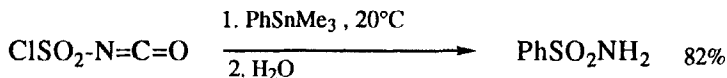
Yamamoto, Y.; Yumoto, M.; Yamada, J. *Tetrahedron Lett.*, **1991**, 32, 3079.



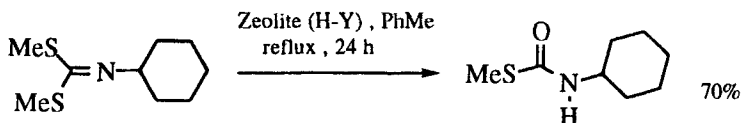
Basha, A.; Ratajczyk, J.D.; Brooks, D.W. *Tetrahedron Lett.*, **1991**, 32, 3783.



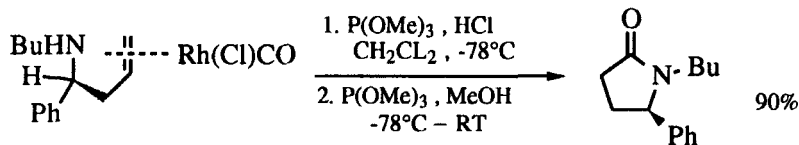
Benalil, A.; Roby, P.; Carboni, B.; Vaultier, M. *Synthesis*, **1991**, 787.



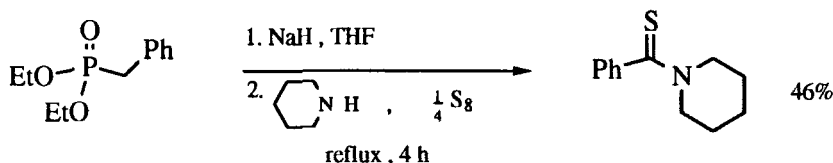
Arnsward, M.; Neumann, W.F. *Chem. Ber.*, **1991**, 124, 1997.



Reddy, T.I.R.; Bhawal, B.M.; Rajappa, S. *Tetrahedron Lett.*, **1992**, 33, 2857.



Krafft, M.E.; Yu, X.Y.; Milczanowski, S.E.; Donnelly, K.D. *J. Am. Chem. Soc.*, **1992**, *114*, 9215.



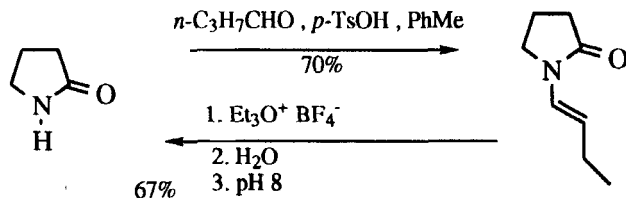
Okuma, K.; Ikari, K.; Ohta, H. *Chem. Lett.*, **1992**, 131.

REVIEWS:

"Organometallic Carboxamidation"

Screttas, C.G.; Steele, B.R. *Org. Prep. Proceed. Int.*, **1990**, *22*, 271.

SECTION 90A: PROTECTION OF AMIDES

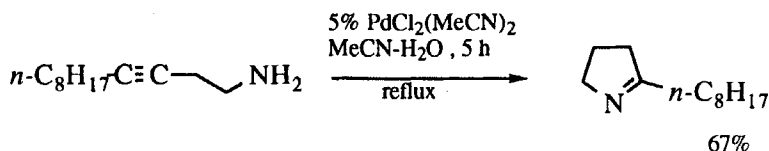


Smith, M.B.; Wang, C-J.; Keusenkothen, P.F.; Dembofsky, B.T.; Fay, J.G.; Zezza, C.A.; Kwon, T.W.; Sheu, J-L.; Son, Y.C.; Menezes, R.F. *Chem. Lett.*, **1992**, 247.

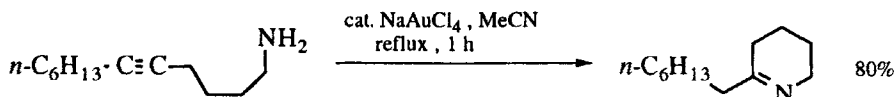
CHAPTER 7

PREPARATION OF AMINES

SECTION 91: AMINES FROM ALKYNES

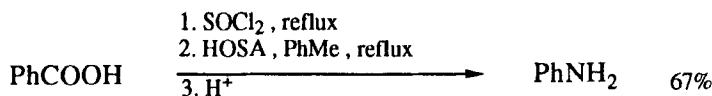


Fukuda, Y.; Matsubara, S.; Utimoto, K. *J. Org. Chem.*, **1991**, *56*, 5812.



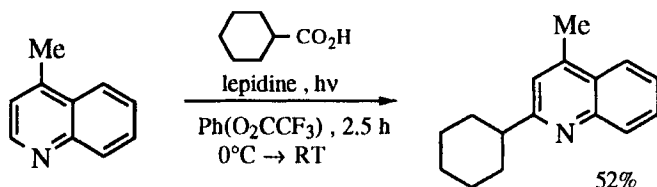
Fukuda, Y.; Utimoto, K. *Synthesis*, **1991**, 975.

SECTION 92: AMINES FROM ACID DERIVATIVES



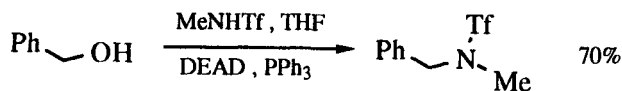
HOSA = hydroxylamine O-sulfonic acid

Wallace, R.G.; Barker, J.M.; Wood, M.L. *Synthesis*, **1990**, 1143.

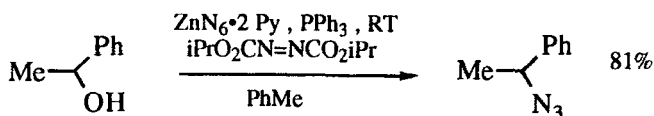


Togo, H.; Aoki, M.; Yokoyama, M. *Tetrahedron Lett.*, **1991**, *32*, 6559.

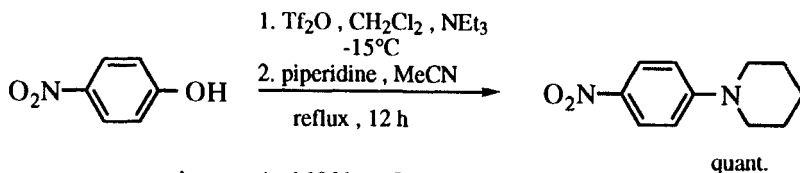
SECTION 93: AMINES FROM ALCOHOLS AND THIOLS



Edwards, M.L.; Stermerick, D.M.; McCarthy, J.R. *Tetrahedron Lett.*, **1990**, 31, 3417.

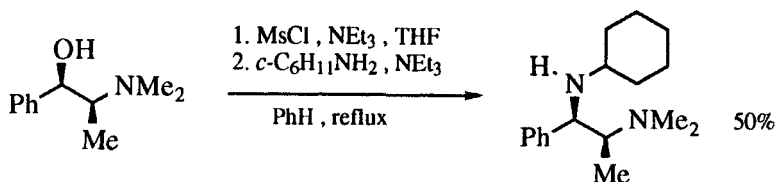


Viaud, M.C.; Rollin, P. *Synthesis*, **1990**, 130.



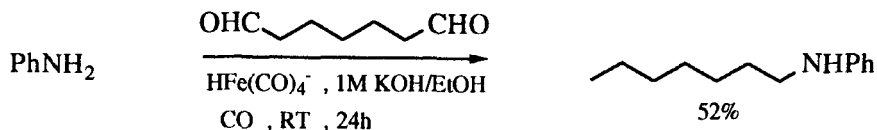
some amines required 10 kbar of pressure

Kotsuki, H.; Kibayashi, S.; Suenaga, H.; Nishizawa, H. *Synthesis*, **1990**, 1145, 1147.

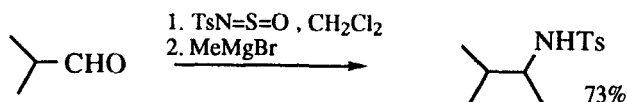


Dieter, R.K.; Deo, N.; Lagu, B.; Dieter, J.W. *J. Org. Chem.*, **1992**, 57, 1663.

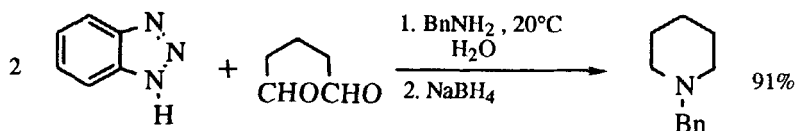
SECTION 94: AMINES FROM ALDEHYDES



Shim, S.C.; Kwon, Y.G.; Doh, C.H.; Kim, H.S.; Kim, T.J. *Tetrahedron Lett.*, **1990**, 31, 105.

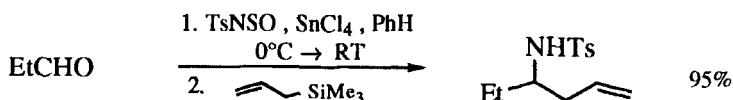


Sisko, J.; Weinreb, S.M. *J. Org. Chem.*, **1990**, 55, 393.

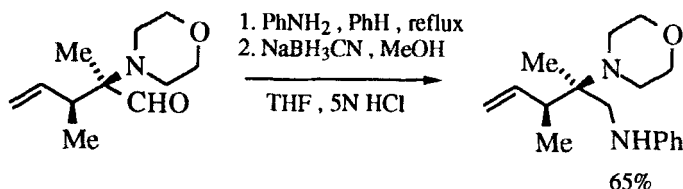


Katritzky, A.R.; Fan, W-Q. *J. Org. Chem.*, **1990**, *55*, 3205.

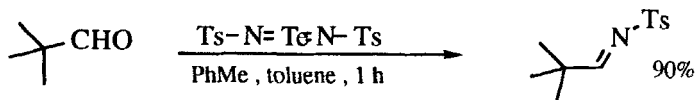
Katritzky, A.R.; Fan, W-Q.; Fu, C. *J. Org. Chem.*, **1990**, *55*, 3209.



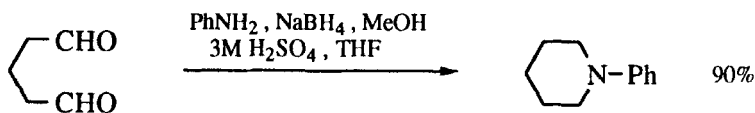
Ralbovsky, J.L.; Kinsella, M.A.; Sisko, J.; Weinreb, S.M. *Synth. Commun.*, **1990**, *20*, 573.



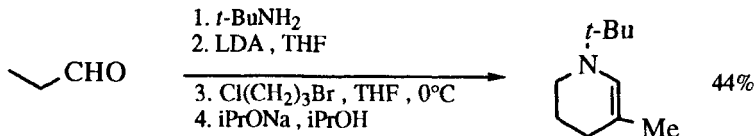
Barluenga, J.; Aznar, F.; Fraiz, S. Jr.; Pinto, A.C. *Tetrahedron Lett.*, **1991**, *32*, 3205.



Trost, B.M.; Marrs, C. *J. Org. Chem.*, **1991**, *56*, 6468.



Verardo, G.; Giumanini, A.G.; Favret, G.; Strazzolini, P. *Synthesis*, **1991**, 447.



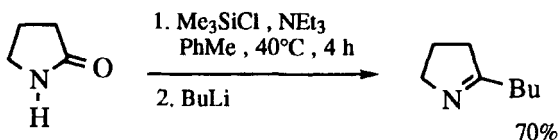
Stevens, C.; De Kimpe, N. *SynLett*, **1991**, 351.

Related Methods: Section 102 (Amines from Ketones)

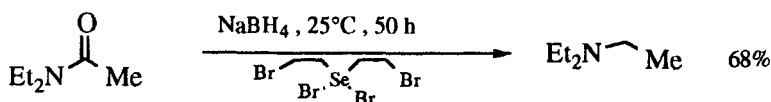
SECTION 95: AMINES FROM ALKYL, METHYLENES AND ARYL

NO ADDITIONAL EXAMPLES

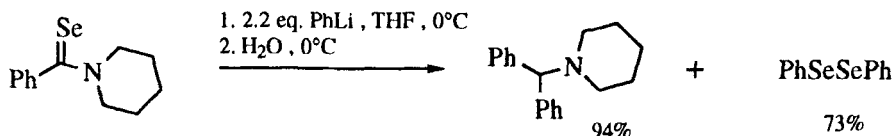
SECTION 96: AMINES FROM AMIDES



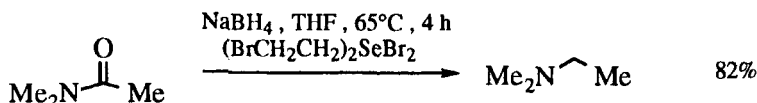
Hua, D.H.; Miao, S.W.; Bharathi, S.N.; Katsuhira, T.; Bravo, A.A. *J. Org. Chem.*, **1990**, 55, 3682.



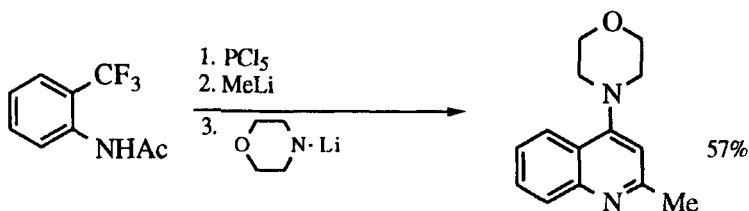
Akabori, S.; Takanohashi, Y. *Chem. Lett.*, **1990**, 251.



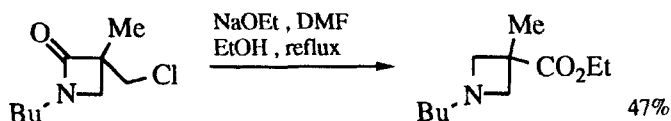
Sekiguchi, M.; Ogawa, A.; Fujiwara, S.; Ryu, I.; Kambe, N.; Sonoda, N. *Chem. Lett.*, **1990**, 2053.



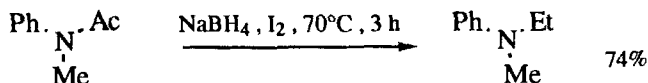
Akabori, S.; Takanohashi, Y. *J. Chem. Soc., Perkin Trans. I*, **1991**, 479.



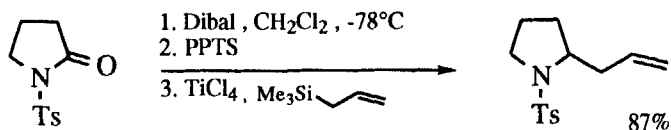
Strekowski, L.; Petterson, S.E.; Janda, L.; Wydra, R.L.; Harden, D.B.; Lipowska, M.; Cegla, M.T. *J. Org. Chem.*, **1992**, 57, 196.



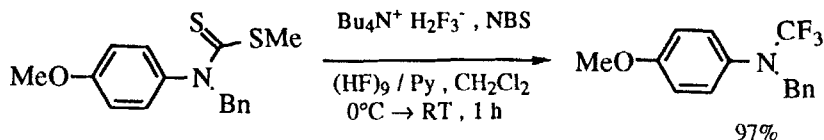
Bartholomew, D.; Stocks, M.J. *Tetrahedron Lett.*, **1991**, 32, 4795.



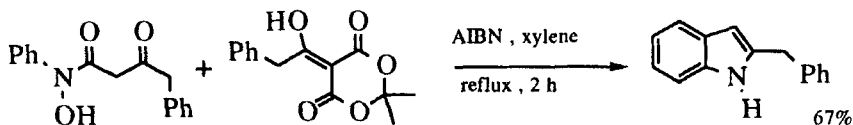
Prasad, A.S.B.; Kanth, J.V.B.; Periasamy, M. *Tetrahedron*, **1992**, 48, 4623.



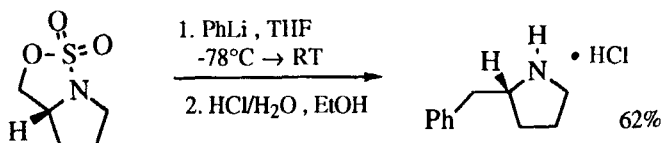
Åhman, J.; Somfai, P. *Tetrahedron*, **1992**, 48, 9537.



Kuroboshi, M.; Hiyama, T. *Tetrahedron Lett.*, **1992**, 33, 4177.



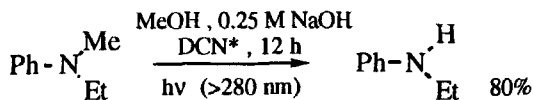
Hirao, K.; Mohri, K.; Yonemitsu, O.; Tabata, M.; Sohma, J. *Tetrahedron Lett.*, **1992**, 33, 1459.



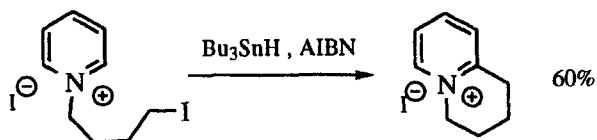
Cooper, G.E.; McCarthy, K.E.; Martin, M.G. *Tetrahedron Lett.*, **1992**, 33, 5895.

Related Methods: Section 105A (Protection of Amines)

SECTION 97: AMINES FROM AMINES



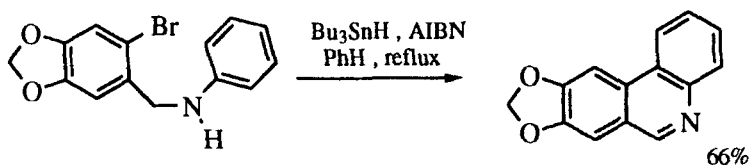
Pandey, G.; Sudha Rani, K.; Bhalarao, U.T. *Tetrahedron Lett.*, **1990**, 31, 1199.



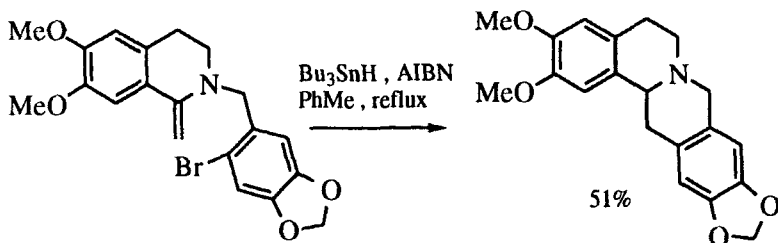
Murphy, J.A.; Sherburn, M.S. *Tetrahedron Lett.*, **1990**, 31, 1625, 3495.

Murphy, J.A.; Sherburn, M.S.; Dickinson, J.M.; Goodman, C. *J. Chem. Soc., Chem. Commun.*, **1990**, 1065.

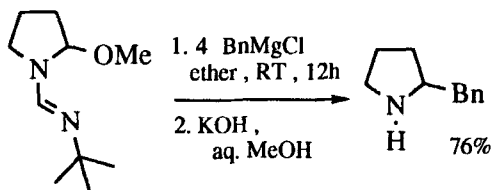
Murphy, J.A.; Sherburn, M.S. *Tetrahedron*, **1991**, 47, 4077.



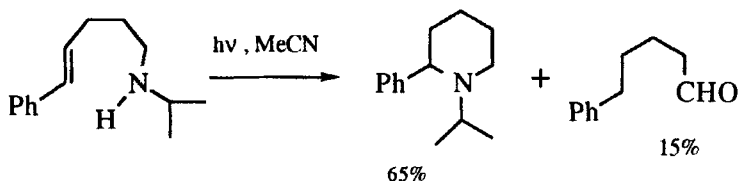
Rosa, A.M.; Prabhakar, S.; Lobo, A.M. *Tetrahedron Lett.*, **1990**, 31, 1881.



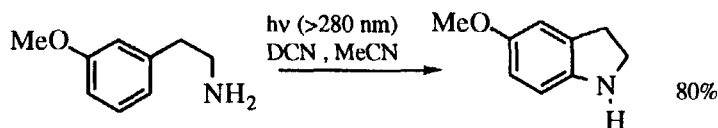
Takano, S.; Suzuki, M.; Kijima, A.; Ogasawara, K. *Tetrahedron Lett.*, **1990**, 31, 2315.



Gottlieb, L.; Meyers, A.I. *Tetrahedron Lett.*, **1990**, 31, 4723.

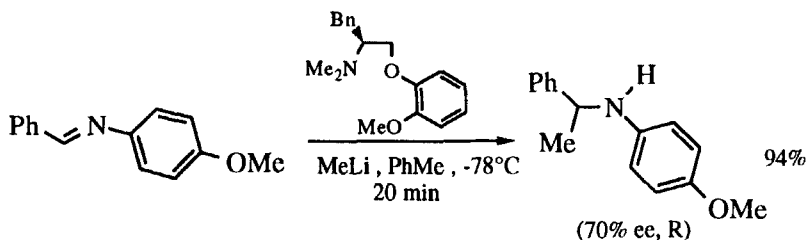


Lewis, F.D.; Reddy, G.D. *Tetrahedron Lett.*, **1990**, 31, 5293.

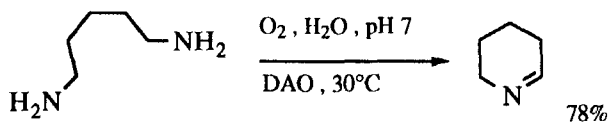


DCN = 1,4-dicyanonaphthalene

Pandey, G.; Sridhar, M.; Bhalarao, U.T. *Tetrahedron Lett.*, **1990**, 31, 5373.

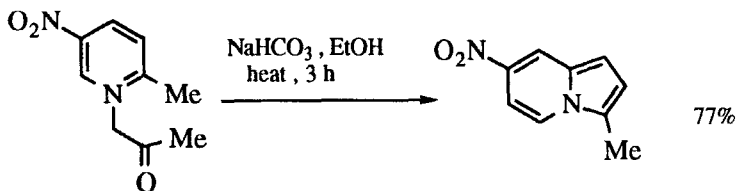


Tomioaka, K.; Inoue, I.; Shindo, M.; Koga, K. *Tetrahedron Lett.*, **1990**, 31, 6681.

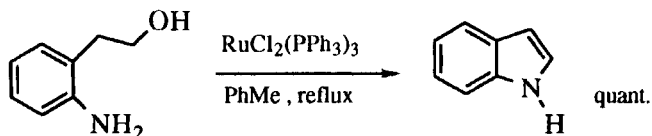


DAO = pea seedling diamine oxidase

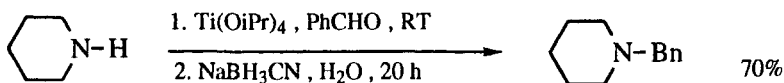
Cragg, J.E.; Herbert, R.B.; Kgaphola, M.M. *Tetrahedron Lett.*, **1990**, 31, 6907.



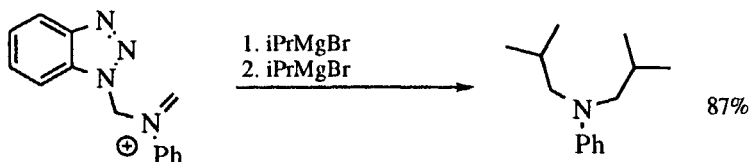
Fadda, A.A. *Ind. J. Chem.*, **1990**, 29B, 1017.



Tsuiji, Y.; Kotachi, S.; Huh, K.-T.; Watanabe, Y. *J. Org. Chem.*, **1990**, 55, 580.



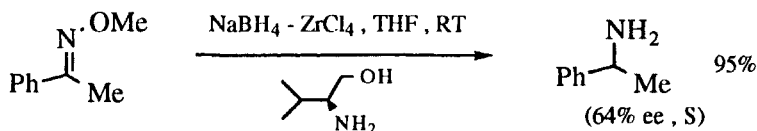
Mattson, R.J.; Pham, K.M.; Leuck, D.J.; Cowen, K.A. *J. Org. Chem.*, **1990**, 55, 2552.



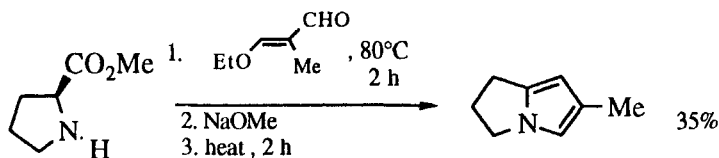
Katritzky, A.R.; Rachwal, S.; Wu, J. *Can. J. Chem.*, **1990**, 68, 456.

Katritzky, A.R.; Latif, M.; Urogdi, L. *J. Chem. Soc., Perkin Trans. I*, **1990**, 667.

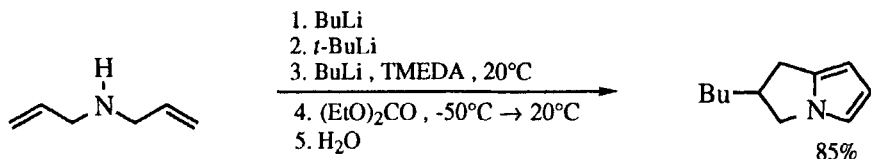
Katritzky, A.R.; Noble, G.; Pilarski, B.; Harris, P. *Chem. Ber.*, **1990**, 123, 1443.



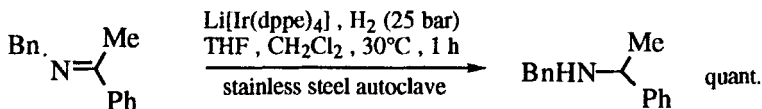
Itsuno, S.; Sakurai, Y.; Shimizu, K.; Ito, K. *J. Chem. Soc., Perkin Trans. I*, **1990**, 1859.



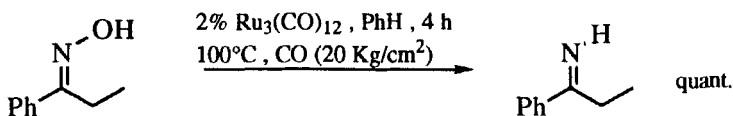
Walizei, G.H.; Breitmaier, E. *Liebigs Ann. Chem.*, **1990**, 605.



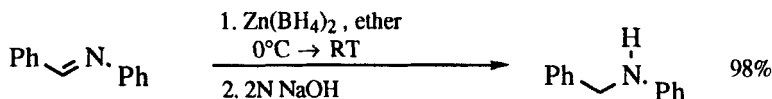
Barluenga, J.; Foubelo, F.; González, R.; Fañanás, F.J.; Yus, M. *J. Chem. Soc., Chem. Commun.*, **1990**, 1521.



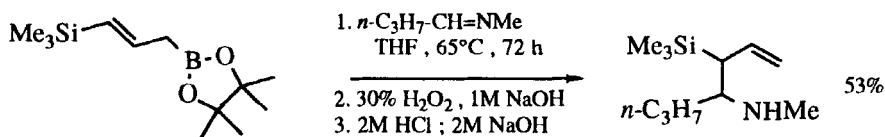
Chan, Y.N.C.; Meyer, D.; Osborn, J.A. *J. Chem. Soc., Chem. Commun.*, **1990**, 869.



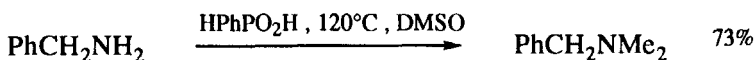
Akazome, M.; Tsuji, Y.; Watanabe, Y. *Chem. Lett.*, **1990**, 635.



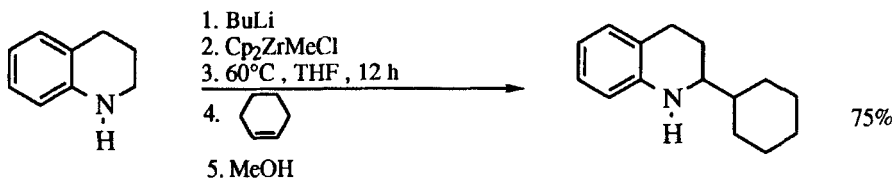
Kotsuki, H.; Yoshimura, N.; Kadota, I.; Ushio, Y.; Ochi, M. *Synthesis*, **1990**, 401.



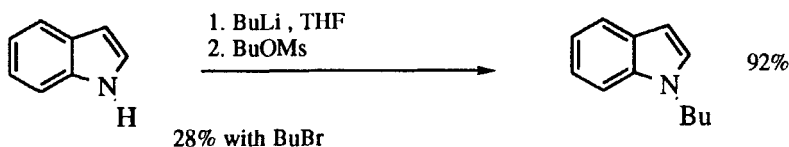
Guyot, B.; Pornet, J.; Miginiac, L. *Synth. Commun.*, **1990**, 20, 2409.



Chaucin, R. *Synth. Commun.*, **1991**, 21, 1425.

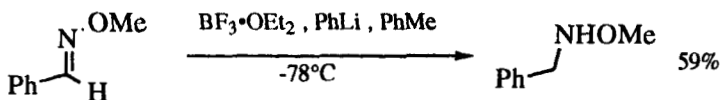


Coles, N.; Whitby, R.J.; Blagg, J. *SynLett*, **1990**, 271.

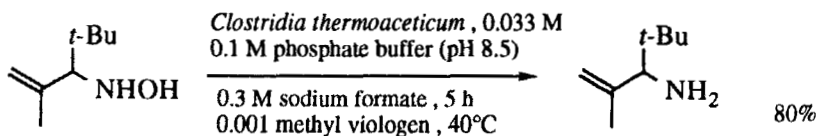


28% with BuBr

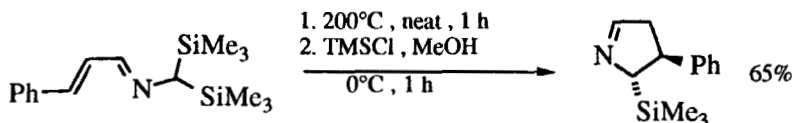
Epling, G.A.; Kumar, A. *SynLett*, **1991**, 347.



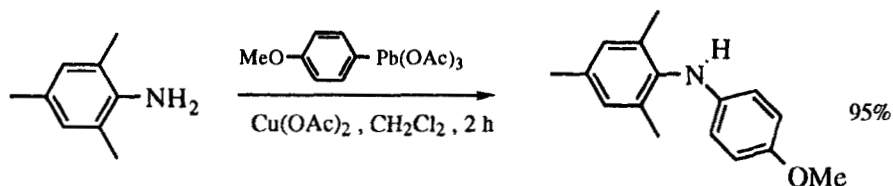
Uno, H.; Terakawa, T.; Suzuki, H. *SynLett*, **1991**, 559.



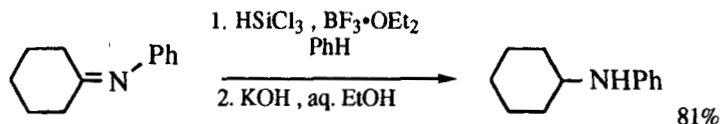
Braun, H.; Schmidtchen, F.P.; Schneider, A.; Simon, H. *Tetrahedron*, **1991**, 47, 3329.



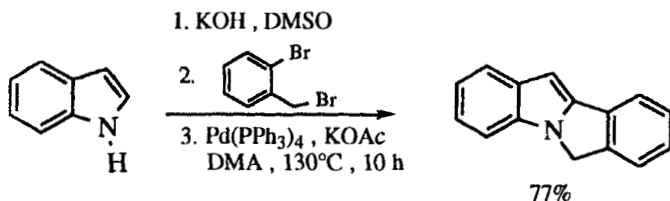
Palomo, C.; Aizpurua, J.M.; García, J.M.; Legido, M. *J. Chem. Soc., Chem. Commun.*, **1991**, 524.



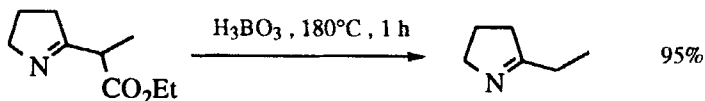
Barton, D.H.R.; Donnelly, D.M.X.; Finet, J-P.; Guiry, P.J. *J. Chem. Soc., Perkin Trans. I*, **1991**, 2095.



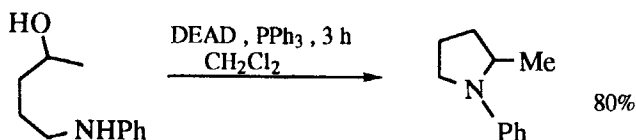
Okamoto, H.; Kato, S. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 3466.



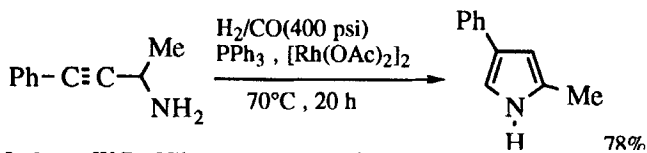
Kozikowski, A.P.; Ma, D. *Tetrahedron Lett.*, **1991**, 32, 3317.



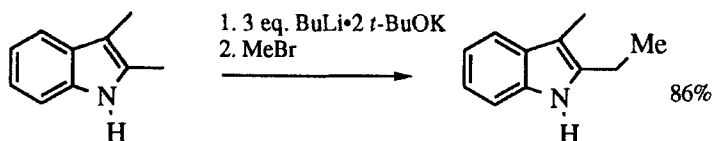
Delbecq, P.; Bacos, D.; Celerier, J.P.; Lhomme, G. *Can. J. Chem.*, **1991**, 69, 1201.



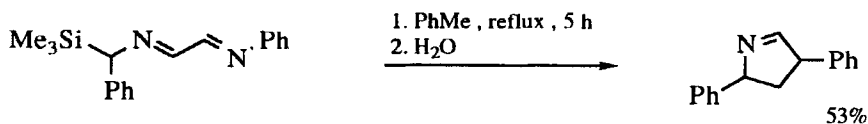
Bernotas, R.C.; Cube, R.V. *Tetrahedron Lett.*, **1991**, 32, 161.



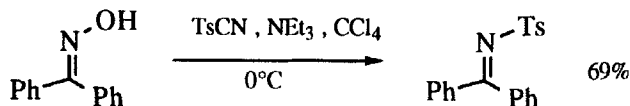
Campi, E.M.; Jackson, W.R.; Nilsson, Y. *Tetrahedron Lett.*, **1991**, 32, 1093.



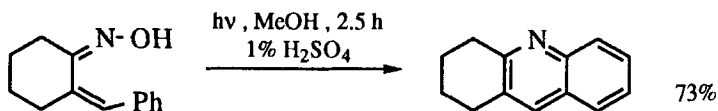
Naruse, Y.; Ito, Y.; Inagaki, S. *J. Org. Chem.*, **1991**, 56, 2256.



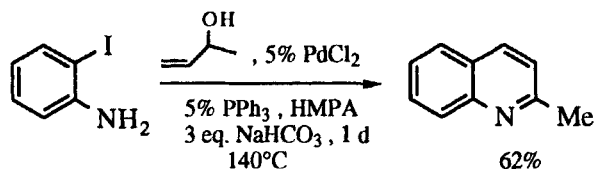
Ohno, M.; Miyata, H.; Komatsu, M.; Ohshiro, Y. *Tetrahedron Lett.*, **1991**, 32, 5093.



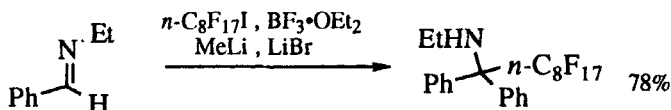
Boger, D.L.; Corbett, W.L. *J. Org. Chem.*, **1992**, 57, 4777.



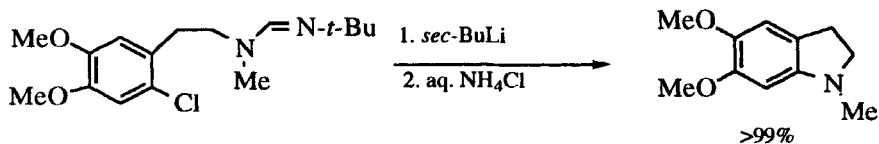
Olsen, R.J. *Tetrahedron Lett.*, **1991**, 32, 5235.



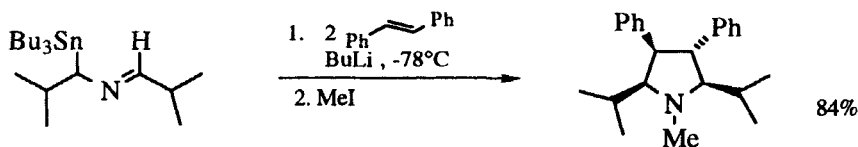
Larock, R.C.; Kuo, M-Y. *Tetrahedron Lett.*, **1991**, 32, 569.



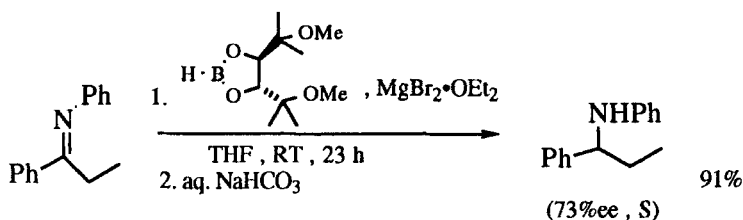
Uno, H.; Okada, S.; Ono, T.; Shiraishi, Y.; Suzuki, H. *J. Org. Chem.*, **1992**, 57, 1504.



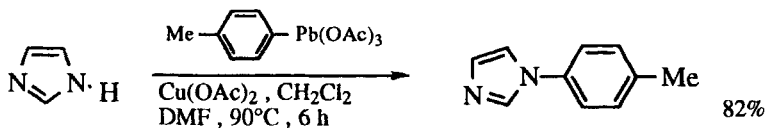
Sielecki, T.M.; Meyers, A.I. *J. Org. Chem.*, **1992**, 57, 3673.



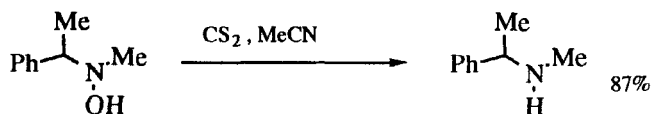
Pearson, W.H.; Postich, M.J. *J. Org. Chem.*, **1992**, 57, 6354.



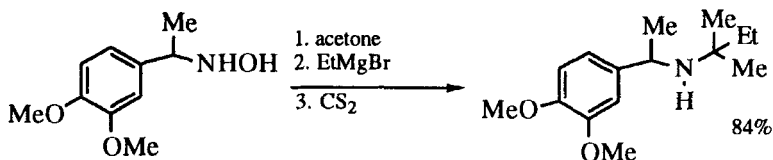
Kawate, T.; Nakagawa, M.; Kakikawa, T.; Hino, T. *Tetrahedron Asymmetry*, **1992**, 3, 227.



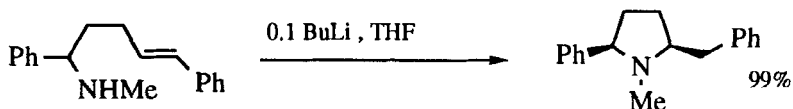
López-Alvarado, P.; Avendaño, C.; Menéndez, J.C. *Tetrahedron Lett.*, **1992**, 33, 659.



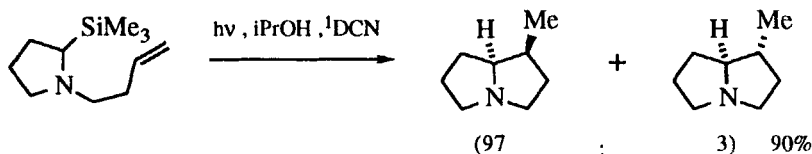
Schwartz, M.A.; Gu, J.; Hu, X. *Tetrahedron Lett.*, **1992**, 33, 1687.



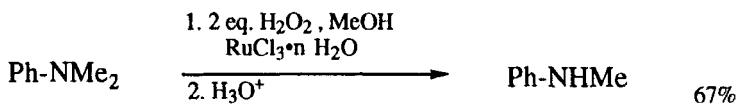
Schwartz, M.A.; Hu, X. *Tetrahedron Lett.*, **1992**, 33, 1689.



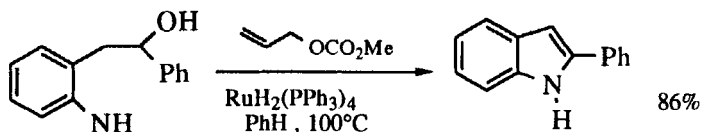
Fujita, H.; Tokuda, M.; Nitta, M.; Siginome, H. *Tetrahedron Lett.*, **1992**, 33, 6359.



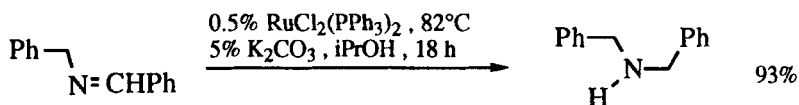
Pandey, G.; Reddy, G.D. *Tetrahedron Lett.*, **1992**, 33, 6533.



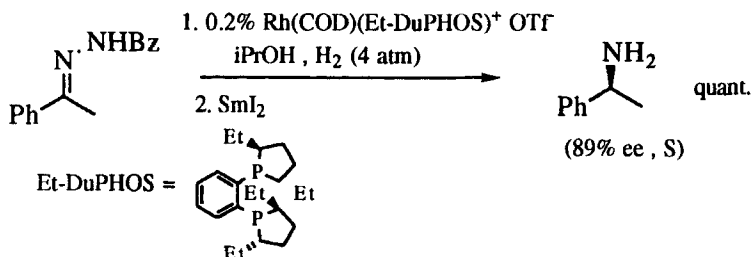
Murahashi, S.-I.; Naota, T.; Miyaguchi, N.; Nakato, T. *Tetrahedron Lett.*, **1992**, 33, 6991.



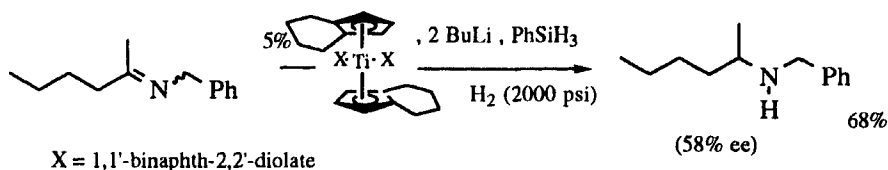
Izumi, T.; Yokota, T. *J. Het. Chem.*, **1992**, 29, 1085.



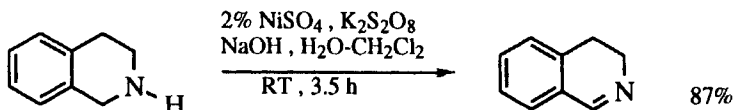
Wang, G.-Z.; Bäckvall, J.-E. *J. Chem. Soc., Chem. Commun.*, **1992**, 980.



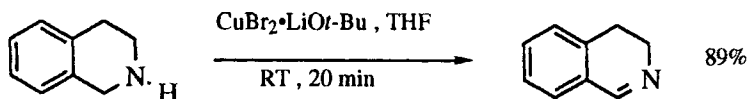
Burk, M.J.; Feaster, J.E. *J. Am. Chem. Soc.*, **1992**, *114*, 6266.



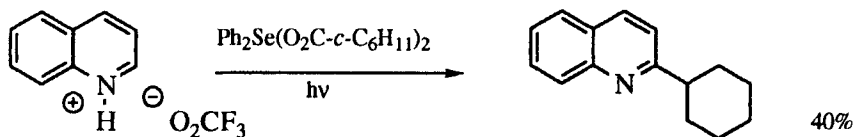
Willoughby, C.A.; Buchwald, S.L. *J. Am. Chem. Soc.*, **1992**, *114*, 7562.



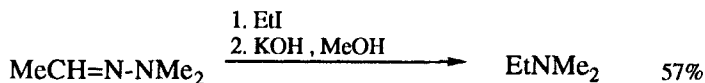
Yamazaki, S. *Chem. Lett.*, **1992**, 823.



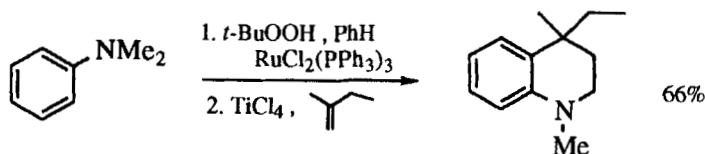
Yamaguchi, J.; Takeda, T. *Chem. Lett.*, **1992**, 1933.



Togo, H.; Miyagawa, N.; Yokoyama, M. *Chem. Lett.*, **1992**, 1677.

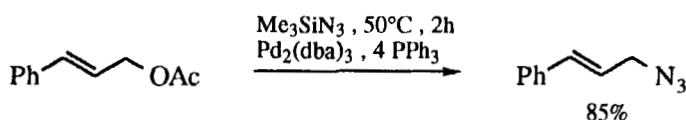


Smith, R.E.; Marcucci, J.L.; Tingle, P.S. *Synth. Commun.*, **1992**, *22*, 381.



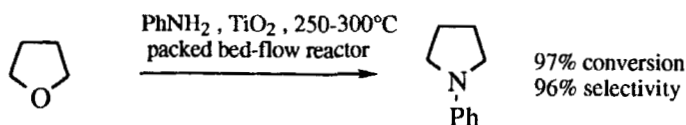
Murahashi, S.; Naota, T.; Nakato, T. *SynLett*, **1992**, 835.

SECTION 98: AMINES FROM ESTERS

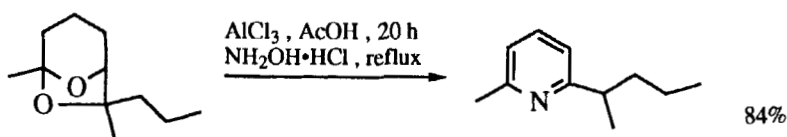


Safi, M.; Fahrang, R.; Sinou, D. *Tetrahedron Lett.*, **1990**, 31, 527.

SECTION 99: AMINES FROM ETHERS, EPOXIDES AND THIOETHERS

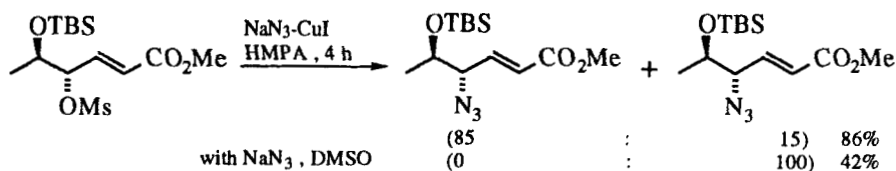


Hargis, D.C.; Shubkin, R.L. *Tetrahedron Lett.*, **1990**, 31, 2991.

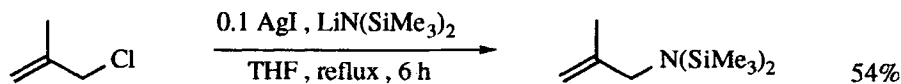


Jun, J-G.; Shin, H.S. *Tetrahedron Lett.*, **1992**, 33, 4593.

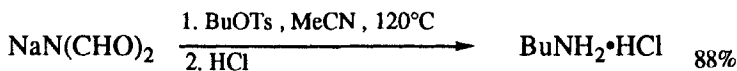
SECTION 100: AMINES FROM HALIDES AND SULFONATES



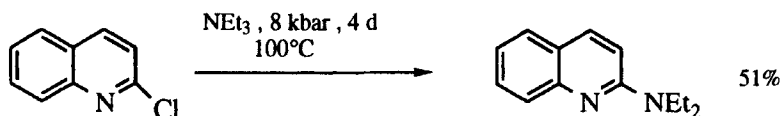
Yamamoto, Y.; Asao, N. *J. Org. Chem.*, **1990**, 55, 5304.



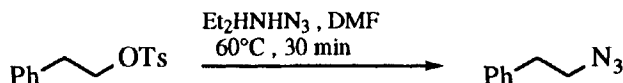
Murai, T.; Yamamoto, M.; Kato, S. *J. Chem. Soc., Chem. Commun.*, **1990**, 789.



Yinglin, H.; Hongwen, H. *Synthesis*, **1990**, 122.

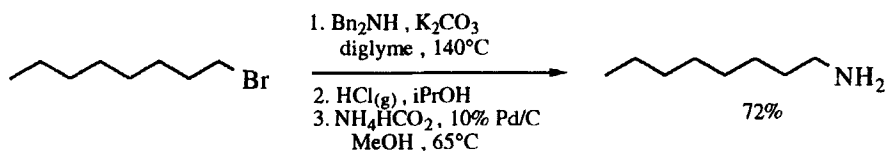


Matsumoto, K.; Hashimoto, S.; Otani, S. *J. Chem. Soc., Chem. Commun.*, **1991**, 306.

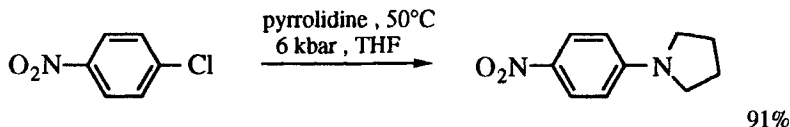


Saito, S.; Yokoyama, H.; Ishikawa, T.; Niwa, N.; Moriwake, T. *Tetrahedron Lett.*, **1991**, 32, 663.

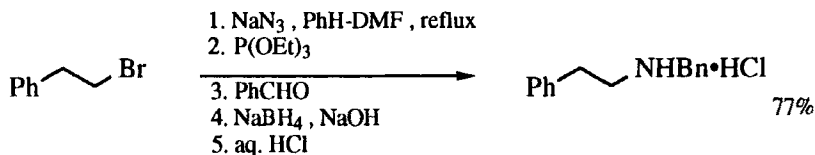
Saito, S.; Takahashi, N.; Ishiwawa, T.; Moriwake, T. *Tetrahedron Lett.*, **1991**, 32, 667.



Purchase, C.F. II.; Goel, O.P. *J. Org. Chem.*, **1991**, 56, 457.

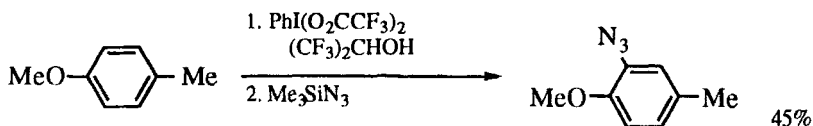


Ibata, T.; Isogami, Y.; Toyoda, J. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 42.

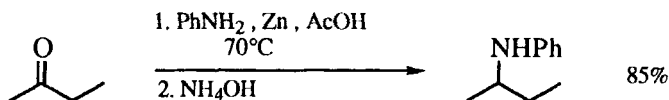


Gajda, T.; Koziara, A.; Osowska-Pacewicz, K.; Zawadzki, S.; Zwierzak, A. *Synth. Commun.*, **1992**, 22, 1929.

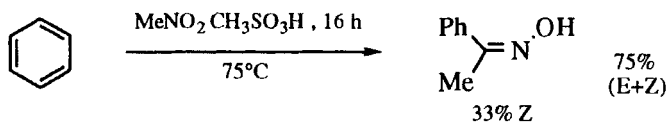
SECTION 101: AMINES FROM HYDRIDES



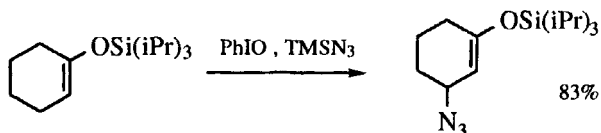
Kita, Y.; Tohma, H.; Inagaki, M.; Hatanka, K.; Yakura, T. *Tetrahedron Lett.*, **1991**, 32, 4321.



Mićović, I.V.; Ivanović, M.D.; Piatak, D.M.; Bojić, V.D. *Synthesis*, **1991**, 1043.

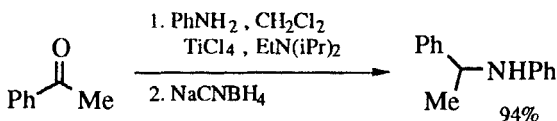


Coustard, J-M.; Jacquesy, J-C.; Violeau, B. *Tetrahedron Lett.*, **1992**, 33, 8085.

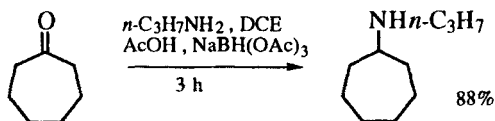


Magnus, P.; Lacour, J. *J. Am. Chem. Soc.*, **1992**, 114, 767.

SECTION 102: AMINES FROM KETONES



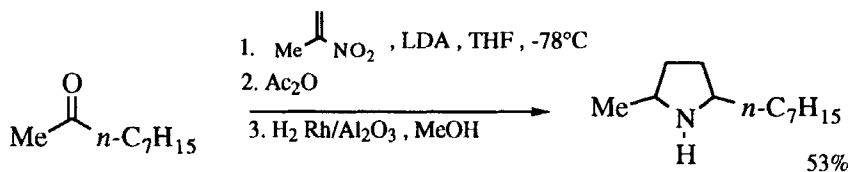
Barney, C.L.; Huber, E.W.; McCarthy, J.R. *Tetrahedron Lett.*, **1990**, 31, 5547.



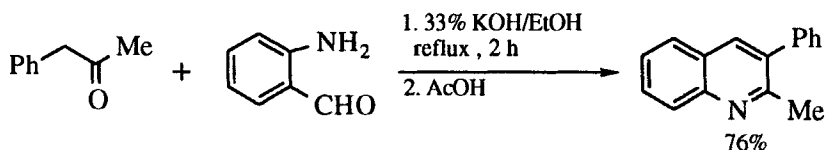
also works with aldehydes

Abdel-Magid, A.F.; Maryanoff, C.A.; Carson, K.G. *Tetrahedron Lett.*, **1990**, 31, 5595.

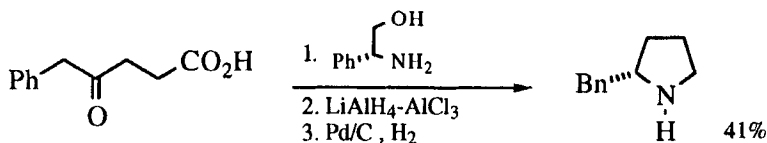
Abdel-Magid, A.F.; Maryanoff, C.A. *SynLett*, **1990**, 537.



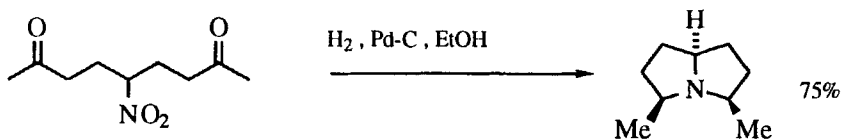
H₂ with PtO₂ and treatment of amine with pTsOH leads to a pyrroline
 Miyashita, M.; Awen, B.Z.E.; Yoshikoshi, A. *Chem. Lett.*, **1990**, 239.



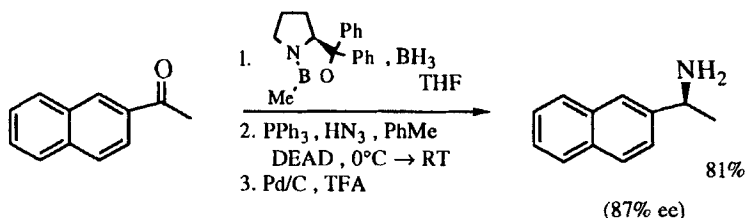
Akula, M.R.; Wolowyk, M.W.; Knaus, E.E. *Org. Prep. Proceed. Int.*, **1991**, 23, 23.



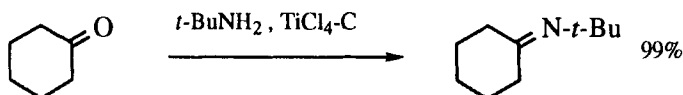
Meyers, A.I.; Burgess, L.E. *J. Org. Chem.*, **1991**, 56, 2294.



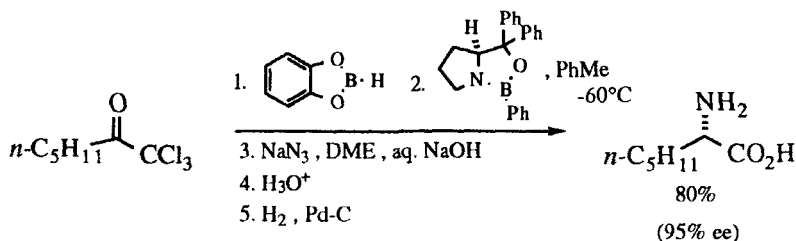
Janowitz, A.; Vavrecka, M.; Hesse, M. *Helv. Chim. Acta*, **1991**, 74, 1352.



Chen, C-P.; Prasad, K.; Repic, O. *Tetrahedron Lett.*, **1991**, 32, 7155.



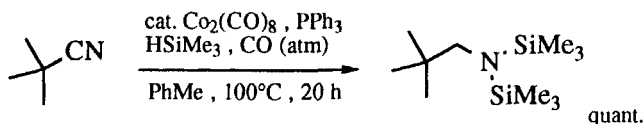
Carlson, R.; Larsson, U.; Hansson, L. *Acta Chem. Scand.*, **1992**, 46, 1211.



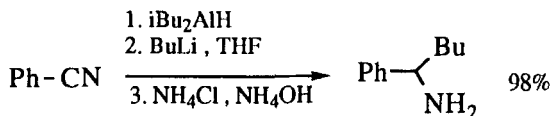
Corey, E.J.; Link, J.O. *J. Am. Chem. Soc.*, **1992**, *114*, 1906.

Related Methods: Section 94 (Amines from Aldehydes)

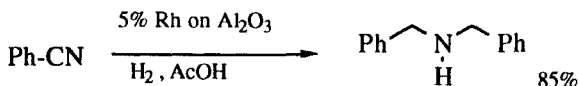
SECTION 103: AMINES FROM NITRILES



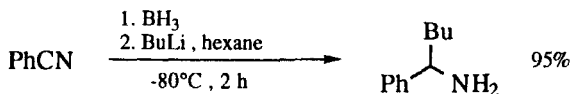
Murai, T.; Sakane, T.; Kato, S. *J. Org. Chem.*, **1990**, *55*, 449.



Andreoli, P.; Billi, L.; Cainelli, G.; Panunzio, M.; Martelli, G.; Spunta, G. *J. Org. Chem.*, **1990**, *55*, 4199.

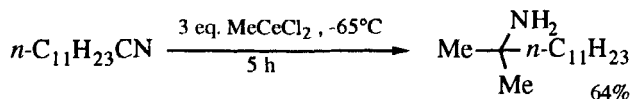


Galán, A.; de Mendoza, J.; Prados, P.; Rojo, J.; Echavarren, A.M. *J. Org. Chem.*, **1991**, *56*, 452.

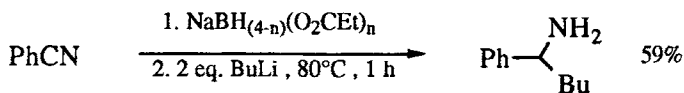


Itsuno, S.; Hachisuka, C.; Ito, K. *J. Chem. Soc., Perkin Trans. I*, **1991**, 1767.

Itsuno, S.; Hachisuka, C.; Kitano, K.; Ito, K. *Tetrahedron Lett.*, **1992**, *33*, 627.

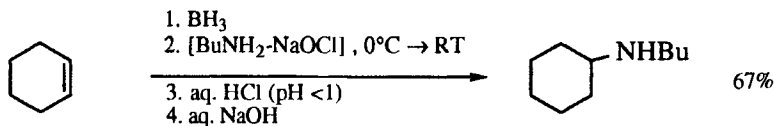


Ciganek, E. *J. Org. Chem.*, **1992**, *57*, 4521.

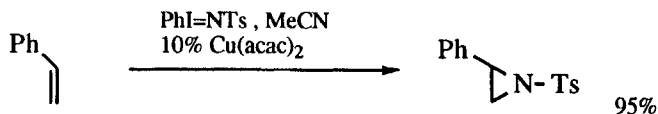


Itsuno, S.; Hachisuka, C.; Ushijima, Y. *Synth. Commun.*, **1992**, 22, 3229.

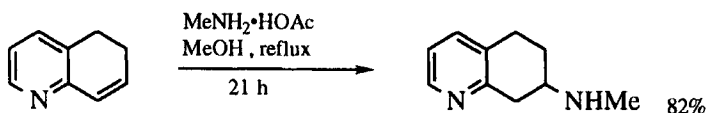
SECTION 104: AMINES FROM ALKENES



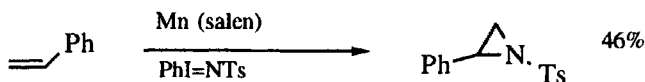
Kabalka, G.W.; Wang, Z. *Synth. Commun.*, **1990**, 20, 231.



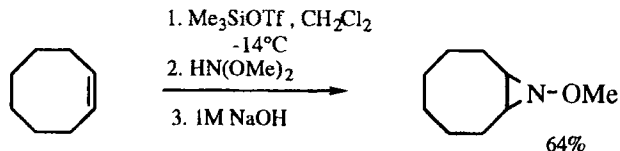
Evans, D.A.; Faul, M.M.; Bilodeau, M.T. *J. Org. Chem.*, **1991**, 56, 6744.



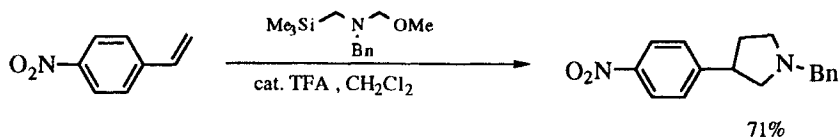
Cliffe, I.A.; Ifill, A.D.; Mansell, H.L.; Todd, R.S.; White, A.C. *Tetrahedron Lett.*, **1991**, 32, 6789.



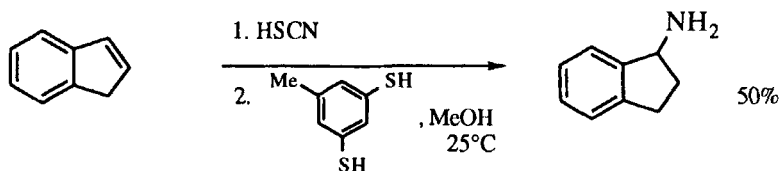
O'Connor, K.J.; Wey, S.-J.; Burrows, C.J. *Tetrahedron Lett.*, **1992**, 33, 1001.



Vedejs, E.; Sano, H. *Tetrahedron Lett.*, **1992**, 33, 3261.



Laborde, E. *Tetrahedron Lett.*, **1992**, 33, 6607.



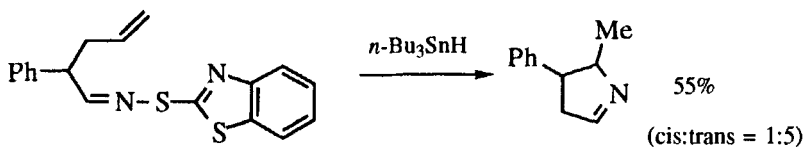
Cho, C-G.; Posner, G.H. *Tetrahedron Lett.*, **1992**, 33, 3599.

REVIEWS:

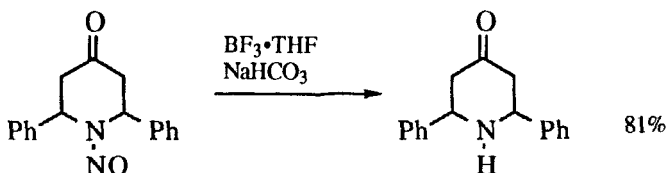
"An Overview of the Total Synthesis of Pyrrolizidine Alkaloids via [4+1] Azide-Diene Annulation Methodology"

Hudlicky, T.; Seoane, G.; Price, J.D.; Gadamasetti, K.G. *SynLett*, **1990**, 433.

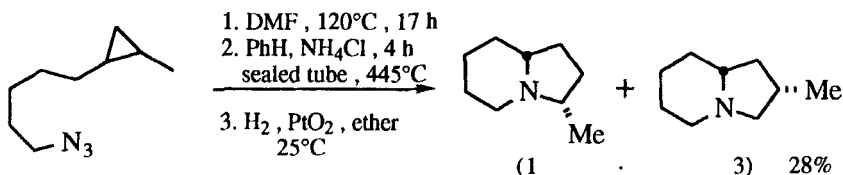
SECTION 105: AMINES FROM MISCELLANEOUS COMPOUNDS



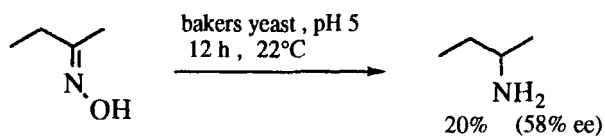
Boivin, J.; Fouquet, E.; Zard, S.Z. *Tetrahedron Lett.*, **1990**, 31, 85.



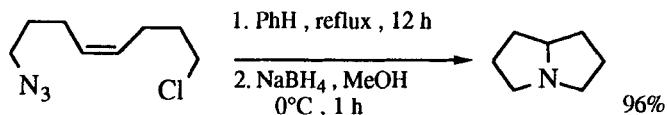
Jeyaraman, R.; Ravindran, T. *Tetrahedron Lett.*, **1990**, 31, 2787.



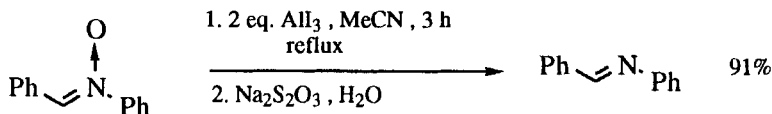
Heidt, P.C.; Bergmeier, S.C.; Pearson, W.H. *Tetrahedron Lett.*, **1990**, 31, 5441.



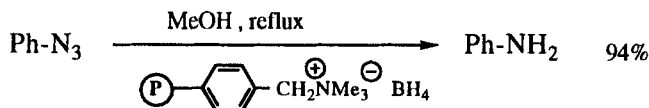
Gibbs, D.E.; Barnes, D. *Tetrahedron Lett.*, **1990**, 31, 5555.



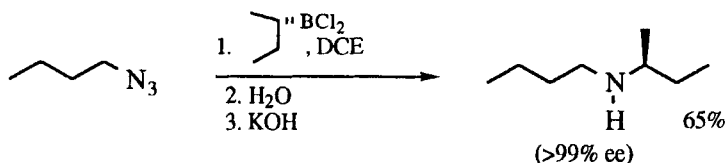
Pearson, W.H.; Lin, K-C. *Tetrahedron Lett.*, **1990**, 31, 7571.



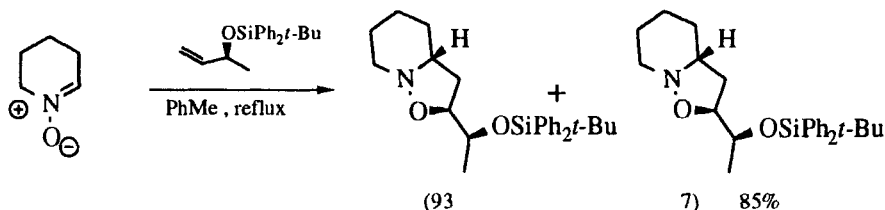
Konwar, D.; Boruah, R.C.; Sandhu, J.S. *Synthesis*, **1990**, 337.



Kabalka, G.W.; Wadgaonkar, P.P.; Chatla, N. *Synth. Commun.*, **1990**, 20, 293.

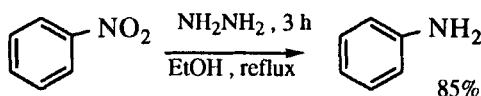


Brown, H.C.; Salunkhe, A.M.; Singaram, B. *J. Org. Chem.*, **1991**, 56, 1170.

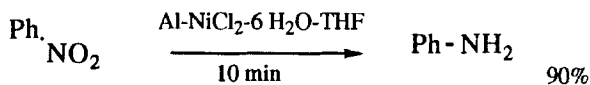


Ito, M.; Maeda, M.; Kibayashi, C. *Tetrahedron Lett.*, **1992**, 33, 3765.

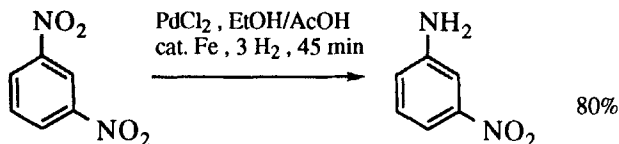
AMINES FROM NITRO COMPOUNDS



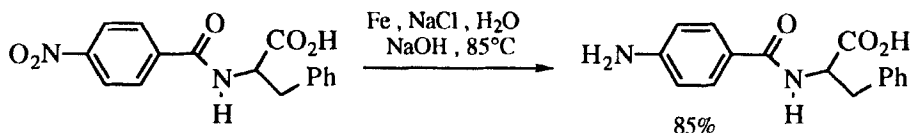
Han, B.H.; Jang, D.G. *Tetrahedron Lett.*, **1990**, 31, 1181.



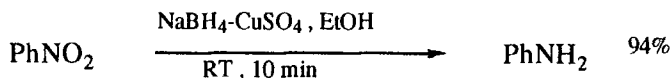
Sarmah, P.; Barua, N.C. *Tetrahedron Lett.*, **1990**, 31, 4065.



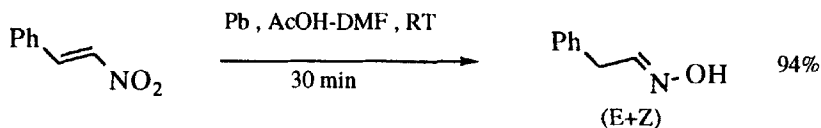
Theodoridis, G.; Manfredi, M.C.; Krebs, J.D. *Tetrahedron Lett.*, **1990**, 31, 6141.



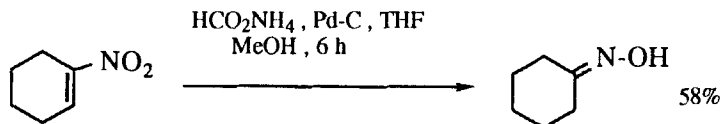
Reddy, A.P.; Kasi Reddy, C.P.R. *Org. Prep. Proceed. Int.*, **1990**, 22, 117.



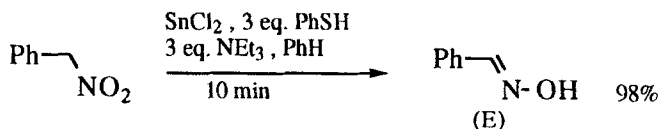
Yoo, S.; Lee, S. *SynLett*, **1990**, 419.



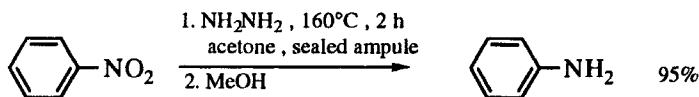
Sera, A.; Yamauchi, H.; Yamada, H.; Itoh, K. *SynLett*, **1990**, 477.



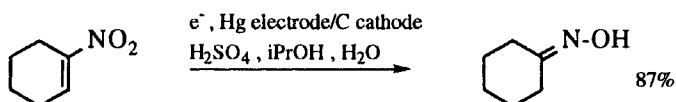
Kabalka, G.W.; Pace, R.D.; Wadgaonkar, P.P. *Synth. Commun.*, **1990**, 20, 2453.



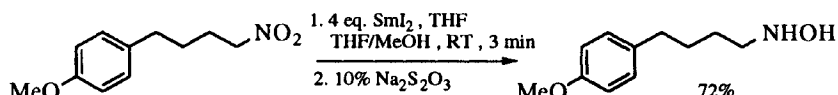
Bartra, M.; Romea, P.; Urfí, F.; Vilarrasa, J. *Tetrahedron*, **1990**, 46, 587.



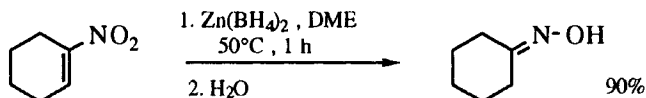
Abdel-Baky, S.; Zhuang, M.; Giese, R.W. *Synth. Commun.*, **1991**, 21, 161.



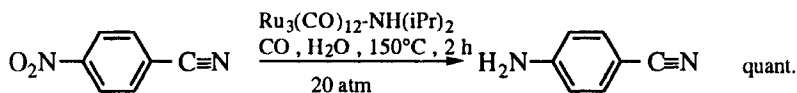
Wessling, M.; Schäfer, H.J. *Chem. Ber.*, **1991**, 124, 2303.



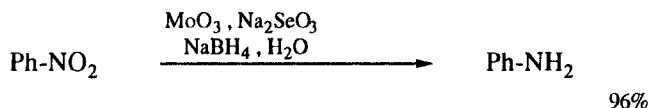
Kende, A.S.; Mendoza, J.S. *Tetrahedron Lett.*, **1991**, 32, 1699.



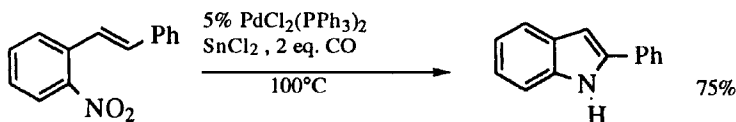
Ranu, B.C.; Chakraborty, R. *Tetrahedron Lett.*, **1991**, 32, 3579.



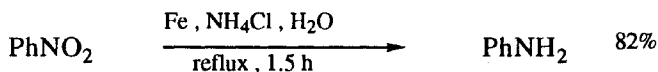
Nomura, K. *Chem. Lett.*, **1991**, 1679.



Yanada, K.; Yanada, R.; Meguir, H. *Tetrahedron Lett.*, **1992**, 33, 1463.



Akazome, M.; Kondo, T.; Watanabe, Y. *Chem. Lett.*, **1992**, 769.



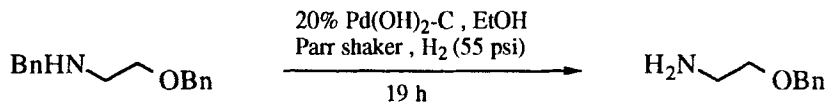
Ramadas, K.; Srinivasan, N. *Synth. Commun.*, **1992**, 22, 3189.

REVIEWS:

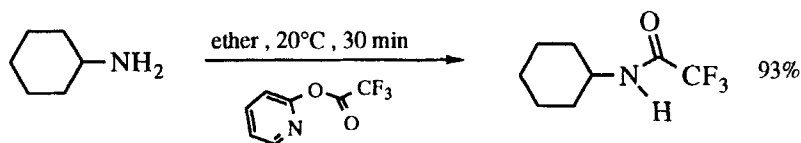
"Electrophilic Aminations with Oxaziridines"

Andreae, S.; Schmitz, E. *Synthesis*, **1991**, 327.

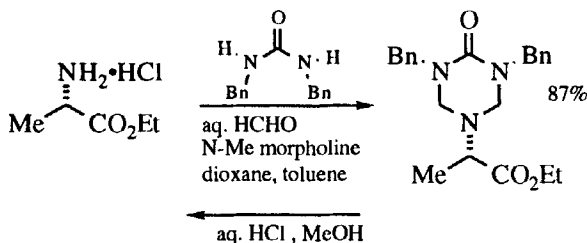
SECTION 105A: PROTECTION OF AMINES



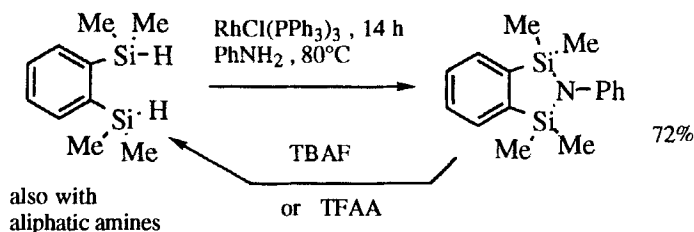
Bernotas, R.C.; Cube, R.V. *Synth. Commun.*, **1990**, 20, 1209.



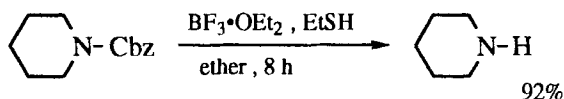
Keumi, T.; Shimada, M.; Morita, T.; Kitajima, H. *Bull. Chem. Soc. Jpn.*, **1990**, 63, 2252.



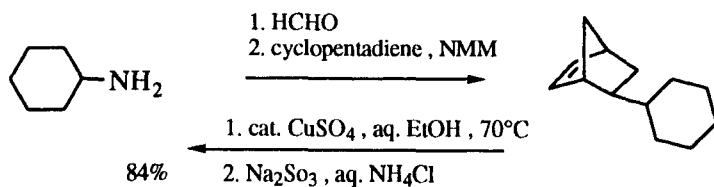
Knapp, S.; Hale, J.J.; Bastos, M.; Gibson, F.S. *Tetrahedron Lett.*, **1990**, 31, 2109.



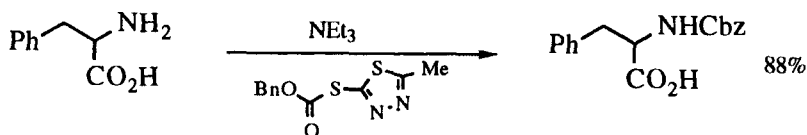
Bonar-Law, R.P.; Davis, A.P.; Dorgan, B.J. *Tetrahedron Lett.*, **1990**, 31, 6721, 6725.



Subhas Bose, D.; Thurston, D.E. *Tetrahedron Lett.*, **1990**, 31, 6903.

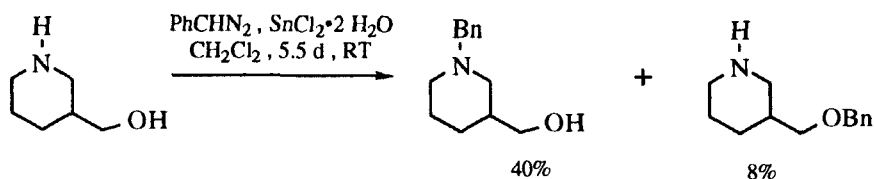


Grieco, P.A.; Clark, J.D. *J. Org. Chem.*, **1990**, *55*, 2271.

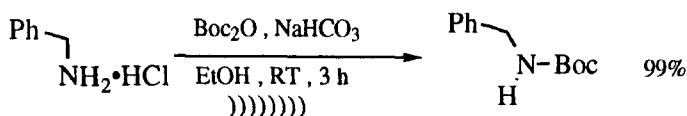


also for protection of poly-ols

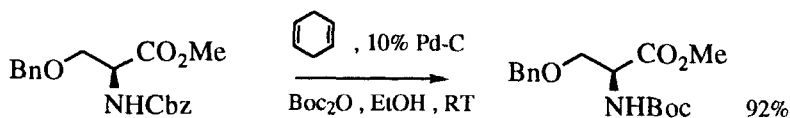
Allainmat, M.; L'Haridon, P.; Toupet, L.; Plusquellec, D. *Synthesis*, **1990**, 27.



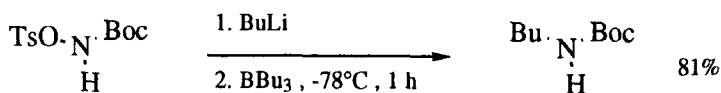
Liotta, L.J.; Ganem, B. *Isr. J. Chem.*, **1991**, *31*, 215.



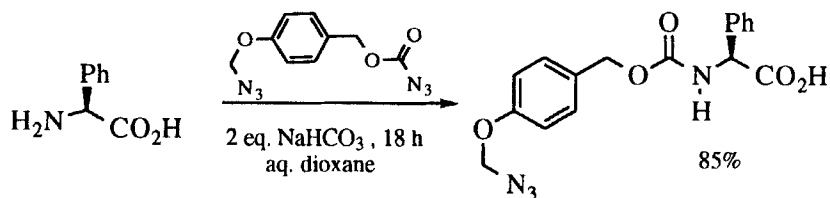
Einhorn, J.; Einhorn, C.; Luche, J-L. *SynLett*, **1991**, 37.



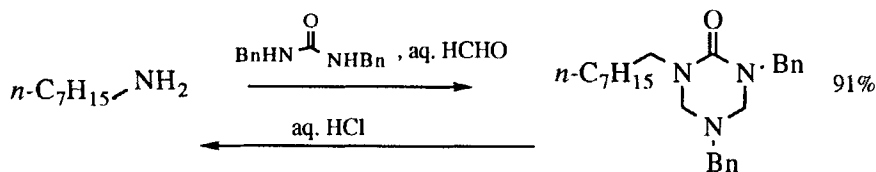
Bajwa, J.S. *Tetrahedron Lett.*, **1992**, *33*, 2955.



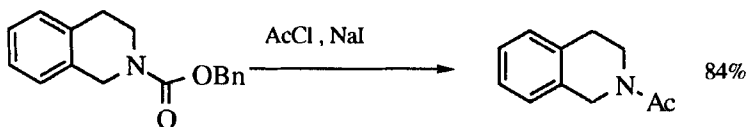
Genêt, J-P.; Hajicek, J.; Bischoff, L.; Greck, C. *Tetrahedron Lett.*, **1992**, *33*, 2677.



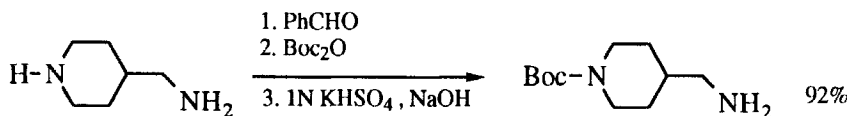
Loubinoux, B.; Gerardin, P. *Tetrahedron Lett.*, **1991**, 32, 351.



Knapp, S.; Hale, J.J.; Bastos, M.; Molina, A.; Chen, K.Y. *J. Org. Chem.*, **1992**, 57, 6239.



Ihara, M.; Hirabayashi, A.; Taniguchi, N.; Fukumoto, K. *Heterocycles*, **1992**, 33, 851.



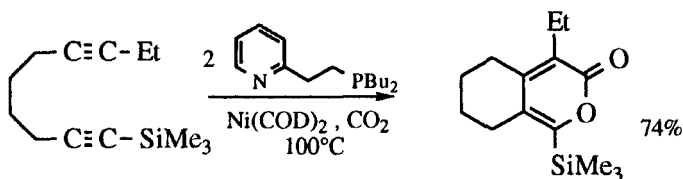
Prugh, J.D.; Birchenough, L.A.; Egbertson, M.S. *Synth. Commun.*, **1992**, 22, 2357.

Also see Section 82 (Amides from Amines)

CHAPTER 8

PREPARATION OF ESTERS

SECTION 106: ESTERS FROM ALKYNES

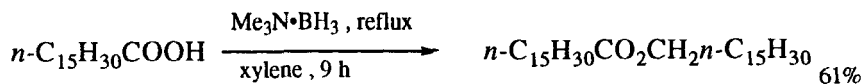


Tsuda, T.; Morikawa, S.; Hasegawa, N.; Saegusa, T. *J. Org. Chem.*, **1990**, 55, 2978.

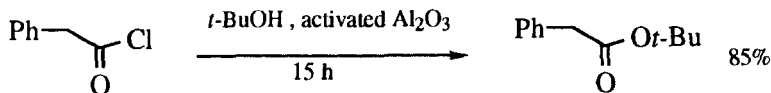
SECTION 107: ESTERS FROM ACID DERIVATIVES

The following types of reactions are found in this section:

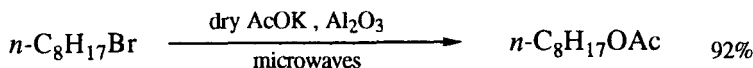
1. Esters from the reaction of alcohols with carboxylic acids, acid halides and anhydrides.
2. Lactones from hydroxy acids
3. Esters from carboxylic acids and halides, sulfoxides and miscellaneous compounds



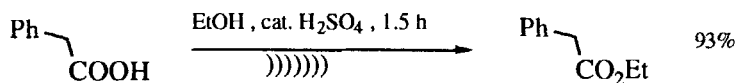
Trapani, G.; Reho, A.; Latrofa, A.; Liso, G. *Synthesis*, **1990**, 853.



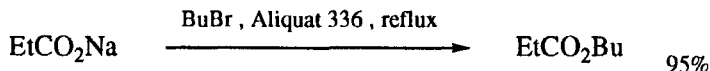
Nagasawa, K.; Yoshitake, S.; Amiya, T.; Ito, K. *Synth. Commun.*, **1990**, 20, 2033.



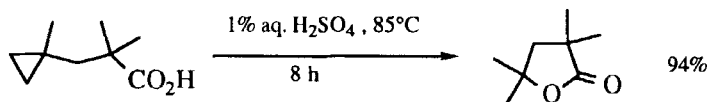
Bram, G.; Loupy, A.; Majdoub, M.; Gutierrez, E.; Ruiz-Hitzky, E. *Tetrahedron*, **1990**, 46, 5167.



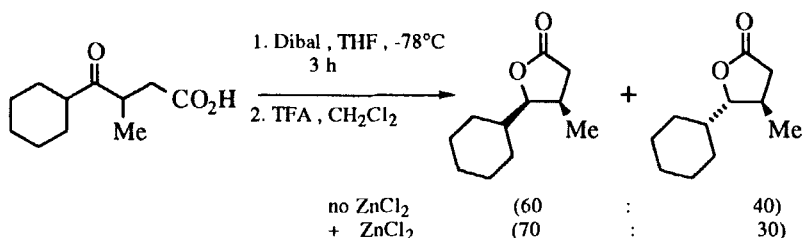
Khurana, J.M.; Sahoo, P.K.; Maikap, G.C. *Synth. Commun.*, **1990**, *20*, 2267.



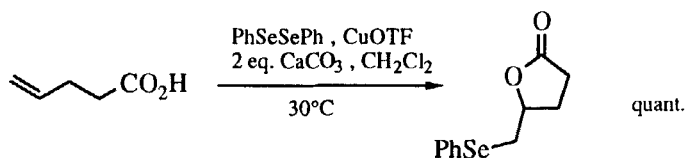
Vinczer, P.; Novak, L.; Szantay, C. *Synth. Commun.*, **1991**, *21*, 1545.



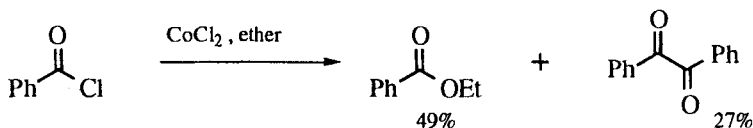
Sugahara, K.; Fujita, T.; Watanabe, S.; Sakamoto, M.; Sugimoto, K. *Synthesis*, **1990**, 783.



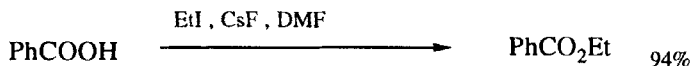
Frenette, R.; Monette, M.; Bernstein, M.A.; Young, R.N.; Verhoeven, T.R. *J. Org. Chem.*, **1991**, *56*, 3083.



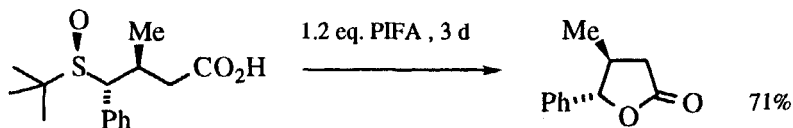
Miyachi, N.; Satoh, H.; Shibasaki, M. *J. Chem. Soc., Perkin Trans. I*, **1991**, 2049.



Iqbal, J.; Srivastava, R.R. *Tetrahedron*, **1991**, *47*, 3155.

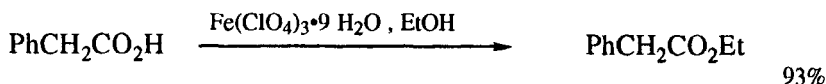


Sato, T.; Otera, J.; Nozaki, H. *J. Org. Chem.*, **1992**, *57*, 2166.

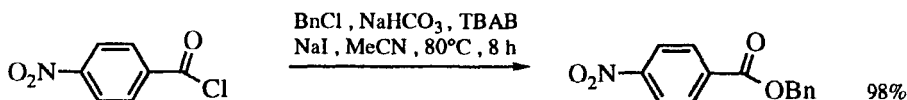


PIFA = phenyliodonium bis-trifluoroacetate

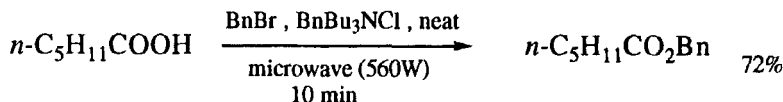
Casey, M.; Manage, A.C.; Murphy, P.J. *Tetrahedron Lett.*, **1992**, 33, 965.



Kumar, B.; Kumar, H.; Parmar, A. *Synth. Commun.*, **1992**, 22, 1087.



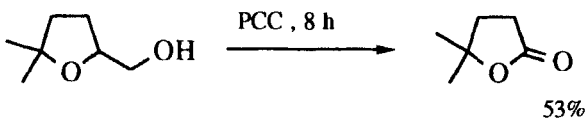
Hu, Y.; Pa, W.; Cui, W.; Wang, J. *Synth. Commun.*, **1992**, 22, 2763.



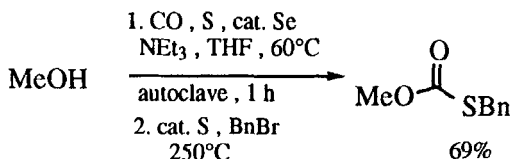
Yuncheng, Y.; Yulin, J.; Dabin, G. *Synth. Commun.*, **1992**, 22, 3109.

Further examples of the reaction $\text{RCO}_2\text{H} + \text{R}'\text{OH} \rightarrow \text{RCO}_2\text{R}'$ are included in Section 108 (Esters from Alcohols and Phenols) and in Section 30A (Protection of Carboxylic Acids).

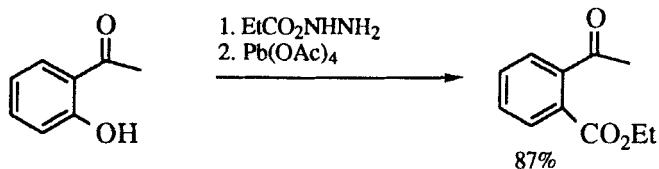
SECTION 108: ESTERS FROM ALCOHOLS AND THIOLS



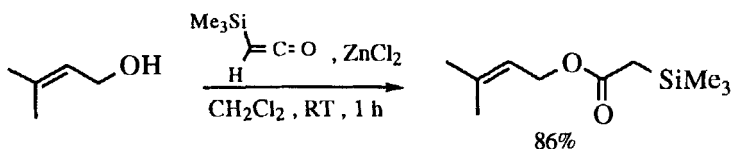
Baskaran, S.; Chandrasekaran, S. *Tetrahedron Lett.*, **1990**, 31, 2775.



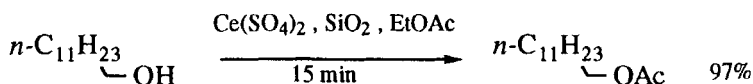
Mizuno, T.; Nishiguchi, I.; Hirashima, T.; Ogawa, A.; Kambe, N.; Sonoda, N. *Tetrahedron Lett.*, **1990**, 31, 4773.



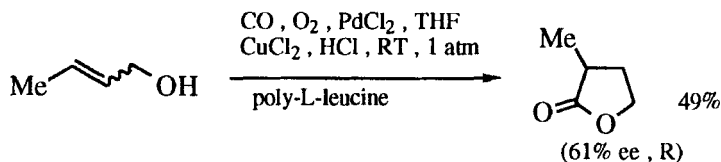
Katritzky, A.R.; Kotali, A. *Tetrahedron Lett.*, 1990, 31, 6781.



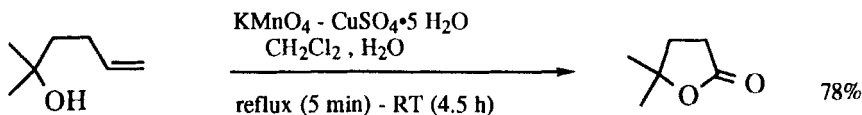
Kita, Y.; Sekihachi, J.; Hayashi, Y.; Da, Y.-Z.; Yamamoto, M.; Akai, S. *J. Org. Chem.*, 1990, 55, 1108.



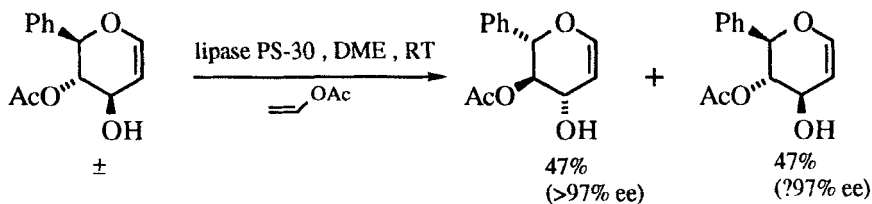
Nishiguchi, T.; Taya, J. *J. Chem. Soc., Perkin Trans I*, 1990, 172.



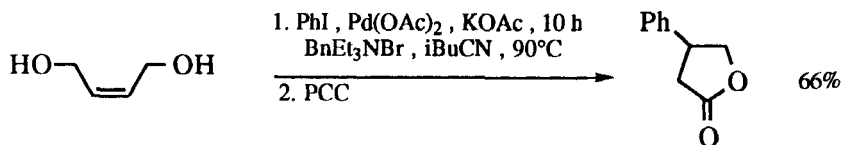
Alper, H.; Hamel, N. *J. Chem. Soc., Chem. Commun.*, 1990, 135.



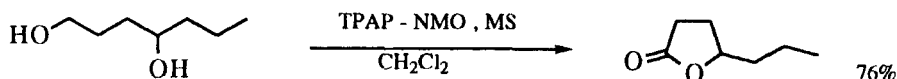
Baskaran, S.; Islam, I.; Vankar, P.S.; Chandrasekaran, S. *J. Chem. Soc., Chem. Commun.*, 1990, 1670.



Berkowitz, D.B.; Danishefsky, S.J. *Tetrahedron Lett.*, 1991, 32, 5497.

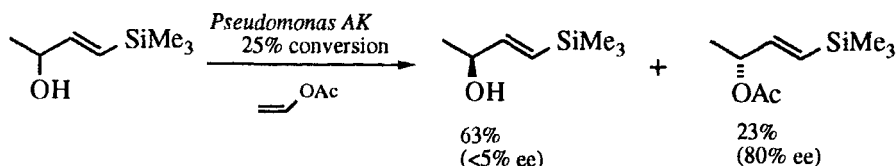


Mandai, T.; Hasegawa, S.; Fujimoto, T.; Kawada, M.; Nokami, J.; Tsuji, J. *SynLett*, **1990**, 85.

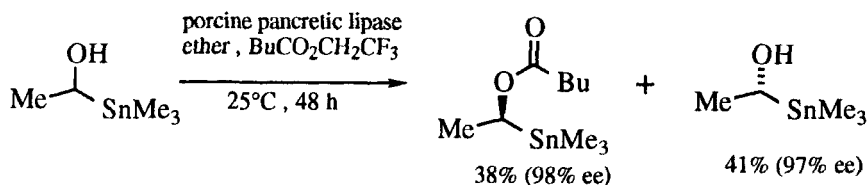


TPAP = tetra-*n*-propylammonium perruthenate

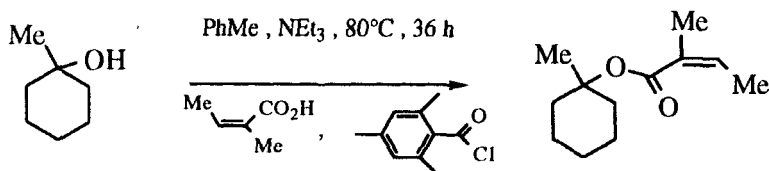
Bloch, R.; Brillet, C. *SynLett*, **1991**, 829.



Sparks, M.A.; Panek, J.S. *Tetrahedron Lett.*, **1991**, 32, 4085.

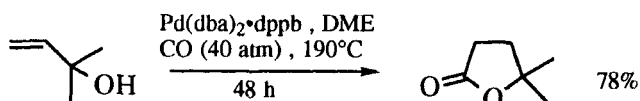


Chong, J.M.; Mar, E.K. *Tetrahedron Lett.*, **1991**, 32, 5683.

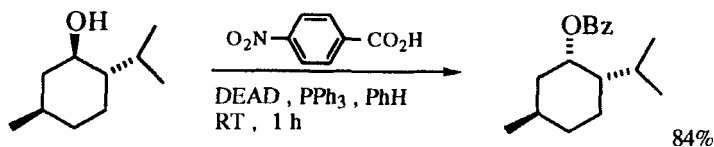


general preparation of angelate esters

Hartmann, B.; Kanazawa, A.M.; Deprés, J-P.; Greene, A.E. *Tetrahedron Lett.*, **1991**, 32, 5077.

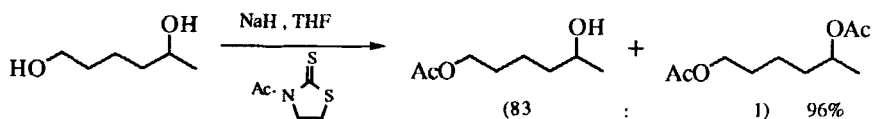


El Ali, B.; Alper, H. *J. Org. Chem.*, **1991**, 56, 5357.



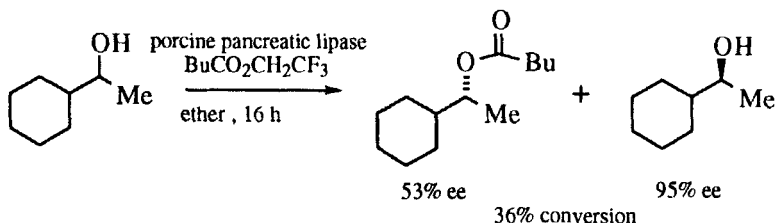
modified Mitsunobu - for sterically hindered 2° alcohols

Martin, S.E.; Dodge, J.A. *Tetrahedron Lett.*, **1991**, 32, 3017.

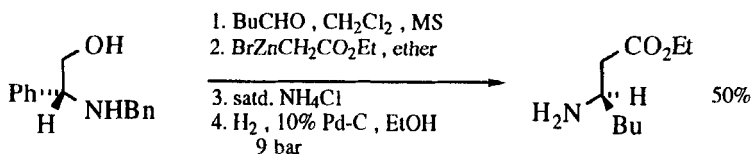


Yamada, S. *J. Org. Chem.*, **1992**, 57, 1591.

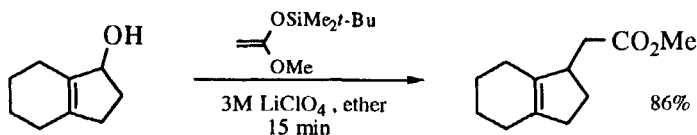
Yamada, S. *Tetrahedron Lett.*, **1992**, 33, 2171.



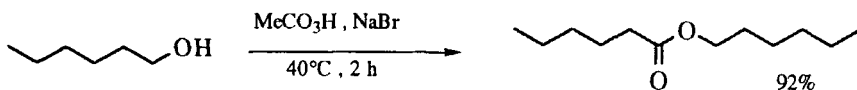
Morgan, B.; Oehlschlager, A.C.; Stokes, T.M. *J. Org. Chem.*, **1992**, 57, 3231.



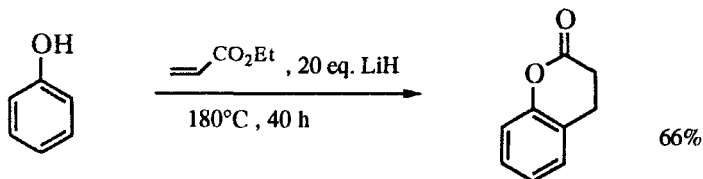
Andrés, C.; González, A.; Pedrosa, R.; Pérez-Encabo, A. *Tetrahedron Lett.*, **1992**, 33, 2895.



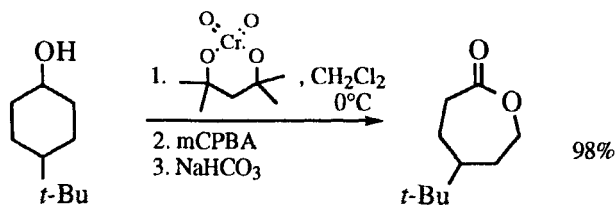
Grieco, P.A.; Collins, J.L.; Henry, K.J. Jr. *Tetrahedron Lett.*, **1992**, 33, 4735.



Morimoto, T.; Hirano, M.; Hamaguchi, T.; Shimoyama, M.; Zhuang, X. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 703.



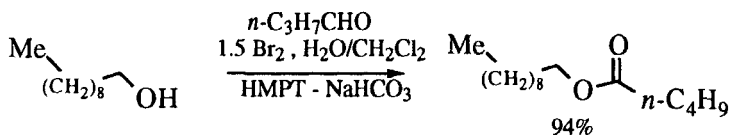
Pickett, J.E.; Van Dort, P.C. *Tetrahedron Lett.*, **1992**, 33, 1161.



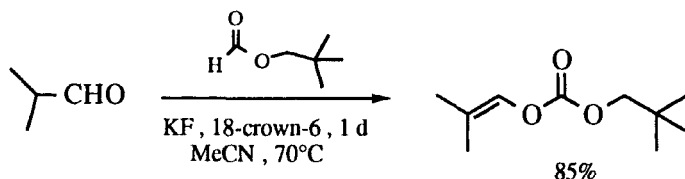
Morin-Fox, M.L.; Lipton, M.A. *Tetrahedron Lett.*, **1992**, 33, 5699.

Further examples of the reaction $\text{ROH} \rightarrow \text{RCO}_2\text{R}'$ are included in Section 107 (Esters from Acid Derivatives) and in Section 45A (Protection of Alcohols and Phenols).

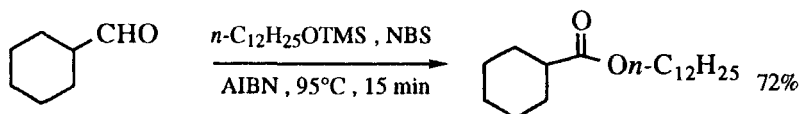
SECTION 109: ESTERS FROM ALDEHYDES



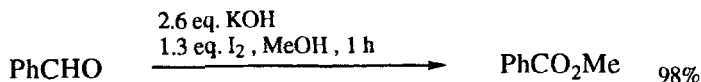
Al Neirabeyeh, M.; Pujol, M.D. *Tetrahedron Lett.*, **1990**, 31, 2273.



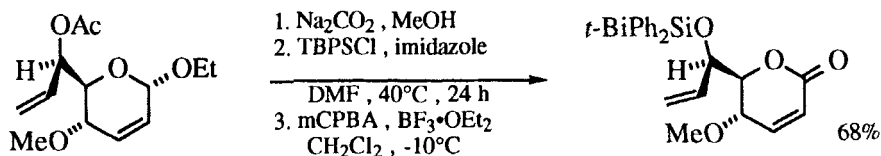
Olofson, R.A.; Dang, V.A.; Morrison, D.S.; DeCusati, D.F. *J. Org. Chem.*, **1990**, 55, 1.



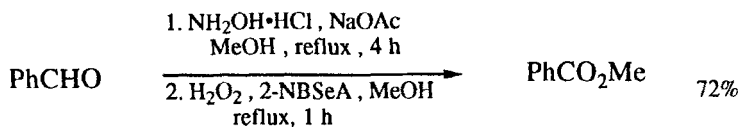
Markó, I.E.; Mekhalfia, A.; Ollis, W.D. *SynLett*, **1990**, 347.



Yamada, S.; Morizono, D.; Yamamoto, K. *Tetrahedron Lett.*, **1992**, 33, 4329.



Gómez, A.M.; Valverde, S.; López, J.C. *Tetrahedron Lett.*, **1992**, 33, 5105.



2-NBSeA = 2-nitrobenzene seleninic acid

Said, S.B.; Skarzewski, J.; Młochowski, J. *Synth. Commun.*, **1992**, 22, 1851.

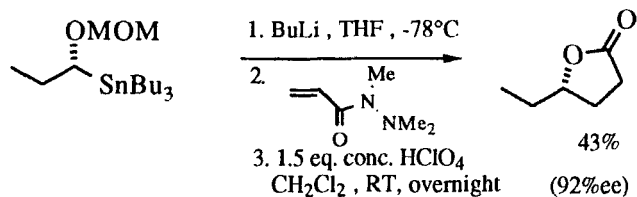
Related Methods: Section 117 (Esters from Ketones)

SECTION 110: ESTERS FROM ALKYL, METHYLENES AND ARYLS

No examples of the reaction $\text{R-R} \rightarrow \text{RCO}_2\text{R}'$ or $\text{R}'\text{CO}_2\text{R}$ ($\text{R}, \text{R}' = \text{alkyl, aryl, etc.}$) occur in the literature. For the reaction $\text{R-H} \rightarrow \text{RCO}_2\text{R}'$ or $\text{R}'\text{CO}_2\text{R}$, see Section 116 (Esters from Hydrides).

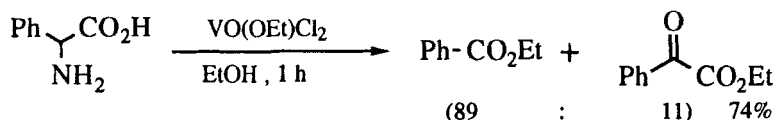
NO ADDITIONAL EXAMPLES

SECTION 111: ESTERS FROM AMIDES



Chong, J.M.; Mar, E.K. *Tetrahedron Lett.*, **1990**, 31, 1981.

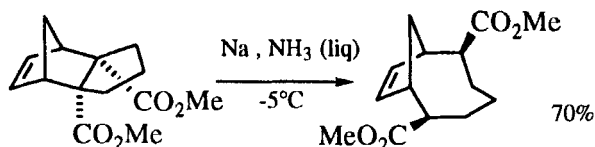
SECTION 112: ESTERS FROM AMINES



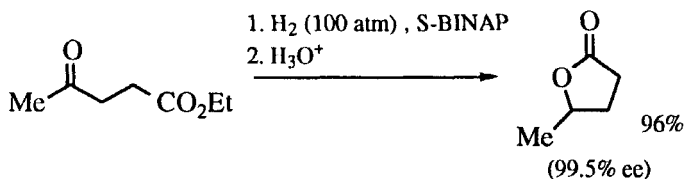
Hirao, T.; Ohshiro, Y. *Tetrahedron Lett.*, **1990**, 31, 3917.

SECTION 113: ESTERS FROM ESTERS

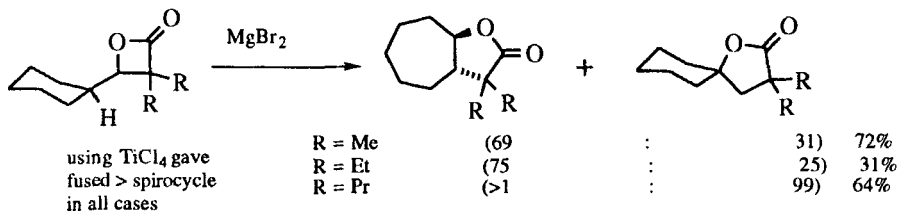
Conjugate reductions and conjugate alkylations of unsaturated esters are found in Section 74 (Alkyls from Alkenes).



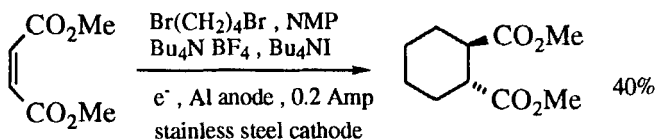
Saha, G.; Bhattacharya, A.; Roy, S.S.; Ghosh, S. *Tetrahedron Lett.*, **1990**, 31, 1483.



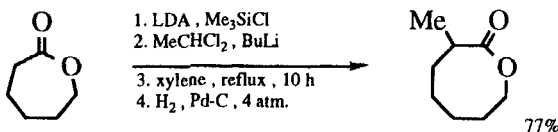
Ohkuma, T.; Kitamura, M.; Noyori, R. *Tetrahedron Lett.*, **1990**, 31, 5509.



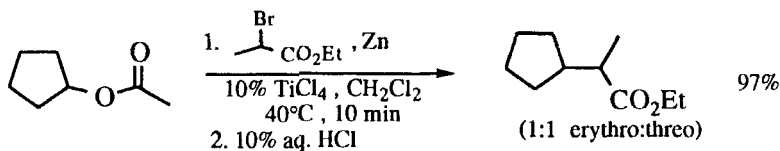
Black, T.H.; McDermott, T.S.; Eisenbeis, S.A. *Tetrahedron Lett.*, **1990**, 31, 6617.



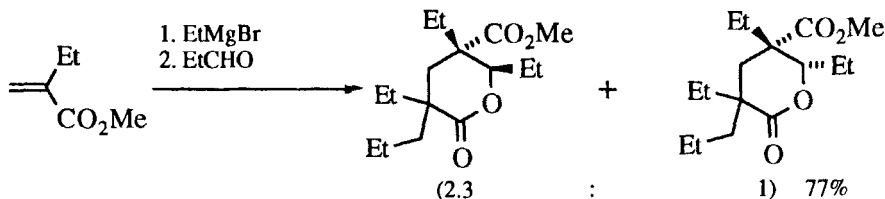
Lu, Y-W.; Nédélec, J-Y.; Folest, J-C.; Périchon, J. *J. Org. Chem.*, **1990**, 55, 2503.



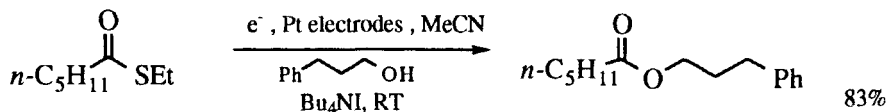
Fouque, E.; Rousseau, G.; Seyden-Penne, J. *J. Org. Chem.*, **1990**, 55, 4807.



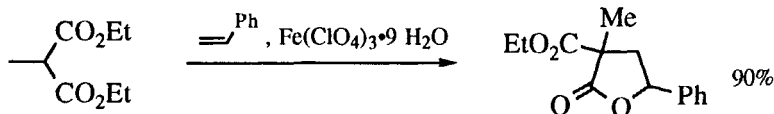
Hayashi, M.; Sugiyama, M.; Toba, T.; Oguni, N. *J. Chem. Soc., Chem. Commun.*, **1990**, 767.



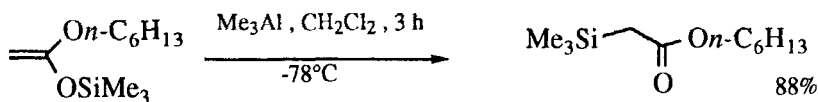
Yamaguchi, K.; Kurasawa, Y.; Yokota, K. *Chem. Lett.*, **1990**, 719.



Yamaguchi, M.; Tsukamoto, Y.; Minami, T. *Chem. Lett.*, **1990**, 1223.



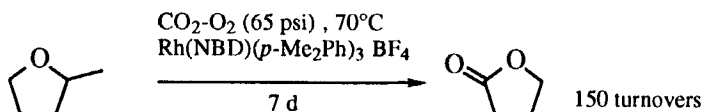
Citterio, A.; Sebastiano, R.; Nicolini, M.; Santi, R. *SynLett*, **1990**, 42.



other R₃Al and R₂AlCl reagents used

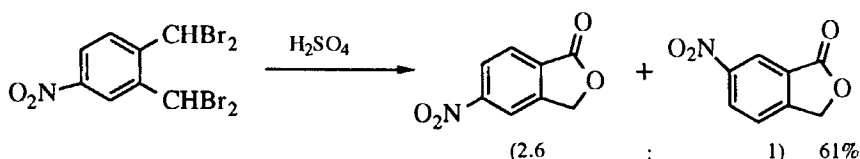
Maruoka, K.; Banno, H.; Yamamoto, H. *SynLett*, **1991**, 253.

Section 113

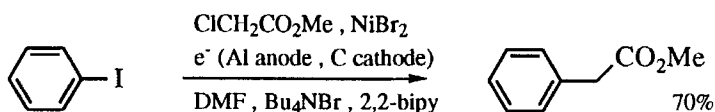


Fazlur-Rahman, A.K.; Tsai, J.-C.; Nicholas, K.M. *J. Chem. Soc., Chem. Commun.*, **1992**, 1334.

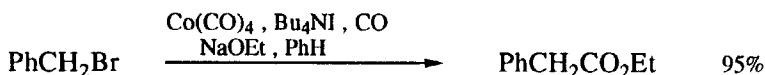
SECTION 115: ESTERS FROM HALIDES AND SULFONATES



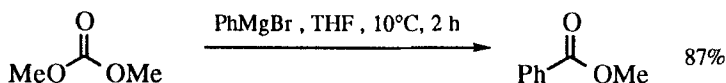
Guo, W.; Duann, Y.F. *Org. Prep. Proceed. Int.*, **1990**, 22, 85.



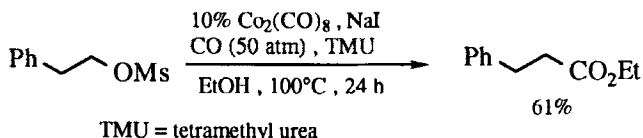
Conan, A.; Sibille, S.; d'Incan, E.' P  richon, J. *J. Chem. Soc., Chem. Commun.*, **1990**, 48.



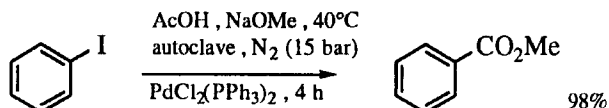
Kantam, M.L.; Reddy, N.P.; Choudary, B.M. *Synth. Commun.*, **1990**, 20, 2631.



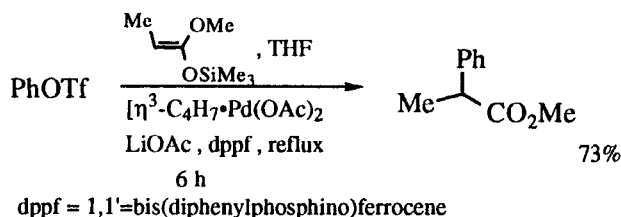
Satyanarayana, G.; Sivaram, S. *Synth. Commun.*, **1990**, 20, 3273.



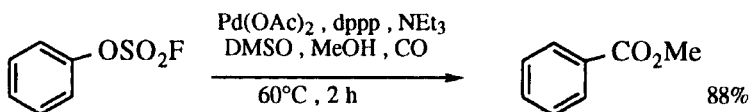
Urata, H.; Goto, D.; Fuchikami, T. *Tetrahedron Lett.*, **1991**, 32, 3091.



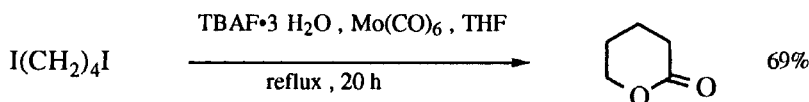
Carpentier, J.-F.; Castanet, Y.; Brocard, J.; Mortreux, A.; Petit, F. *Tetrahedron Lett.*, **1991**, 32, 4705.



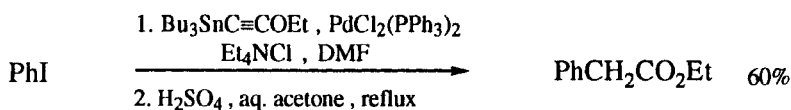
Carfagna, C.; Musco, A.; Sallese, G.; Santi, R.; Fiorani, T. *J. Org. Chem.*, **1991**, 56, 261.



Roth, G.P.; Thomas, J.A. *Tetrahedron Lett.*, **1992**, 33, 1959.



Imbeaux, M.; Mesdagh, H.; Moughamir, K.; Rolando, C. *J. Chem. Soc., Chem. Commun.*, **1992**, 1678.

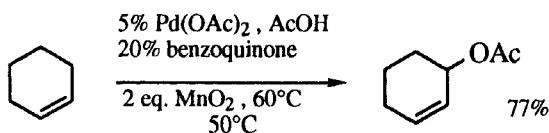


Sakamoto, T.; Yasuhara, A.; Kondo, Y.; Yamanaka, H. *SynLett*, **1992**, 502.

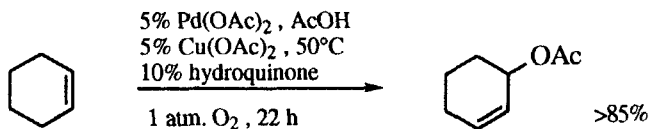
Related Methods: Section 25 (Acid Derivatives from Halides).

SECTION 116: ESTERS FROM HYDRIDES

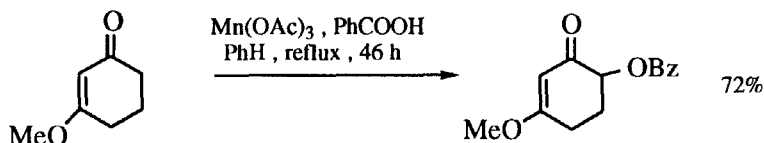
This section contains examples of the reaction $\text{R-H} \rightarrow \text{RCO}_2\text{R}'$ or $\text{R}'\text{CO}_2\text{R}$ (R = alkyl, aryl, etc.).



Hansson, S.; Heumann, A.; Rein, T.; Åkermark, B. *J. Org. Chem.*, **1990**, 55, 975.



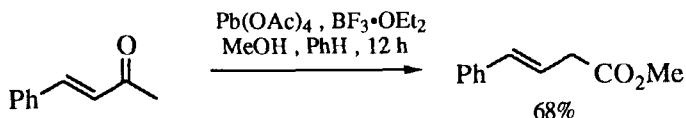
Byström, S.E.; Larsson, E.M.; Åkermark, B. *J. Org. Chem.*, **1990**, *55*, 5674.



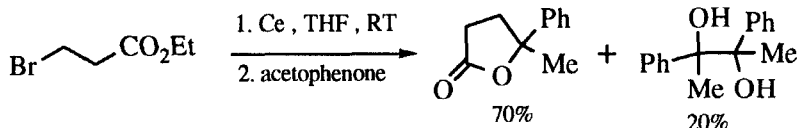
Demir, A.S.; Sayrac, T.; Watt, D.S. *Synthesis*, **1990**, 1119.

Also via: Section 26 (Acid Derivatives) and Section 41 (Alcohols).

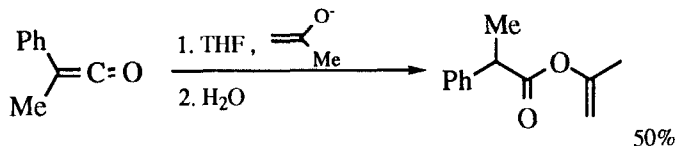
SECTION 117: ESTERS FROM KETONES



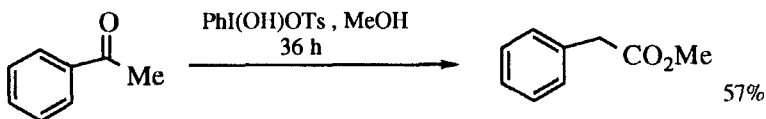
Mathew, F.; Myrbök, B. *Tetrahedron Lett.*, **1990**, *31*, 3757.



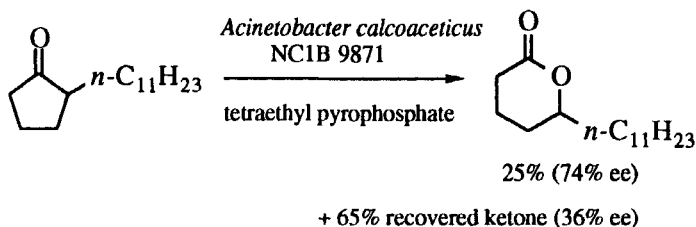
Fukuzawa, S.; Sumimoto, N.; Fujinami, T.; Sakai, S. *J. Org. Chem.*, **1990**, *55*, 1628.



Gong, L.; Leung-Toung, R.; Tidwell, T.T. *J. Org. Chem.*, **1990**, *55*, 3634.

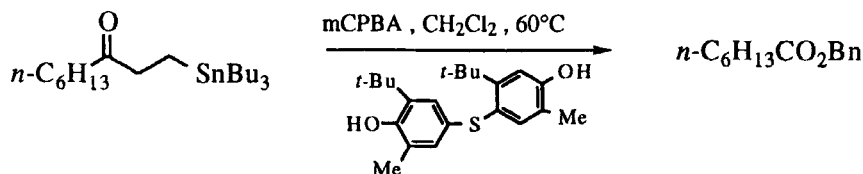


Prakash, O.; Goyal, S.; Moriarty, R.M.; Khosrowshah, J.S. *Ind. J. Chem.*, **1990**, *29B*, 304.

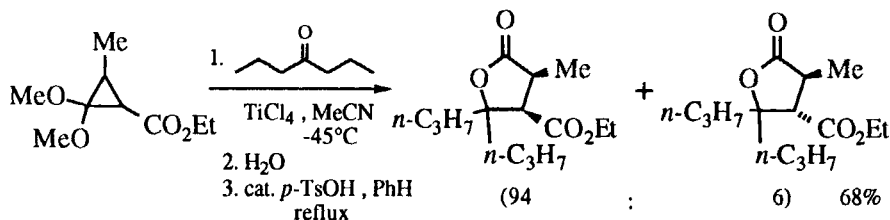


+ 65% recovered ketone (36% ee)

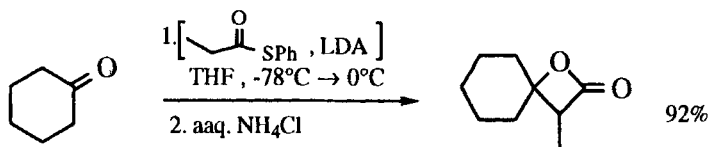
Alphand, V.; Archelas, A.; Furstoss, R. *J. Org. Chem.*, **1990**, 55, 347.



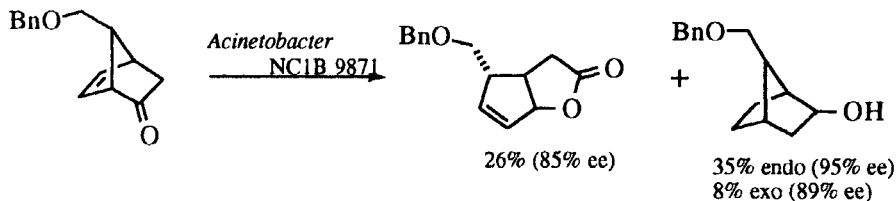
Bakale, R.P.; Scialdone, M.A.; Johnson, C.R. *J. Am. Chem. Soc.*, **1990**, 112, 6729.



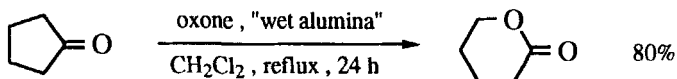
Saigo, K.; Shimada, S.; Hashimoto, Y.; Nagashima, T.; Hasegawa, M. *Chem. Lett.*, **1990**, 1101.



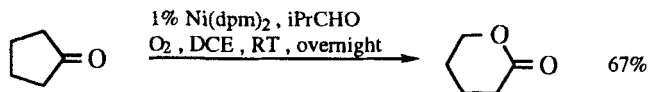
Danheiser, R.L.; Nowick, J.S. *J. Org. Chem.*, **1991**, 56, 1176.



Königsberger, K.; Alphand, V.; Furstoss, R.; Griengl, H. *Tetrahedron Lett.*, **1991**, 32, 499.

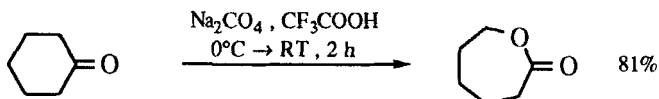


Hirano, M.; Oose, M.; Morimoto, T. *Chem. Lett.*, **1991**, 331.

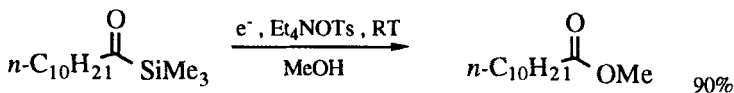


$\text{Ni}(\text{dpm})_2$ = bis-(dipivaloylmethanato) nickel (II)

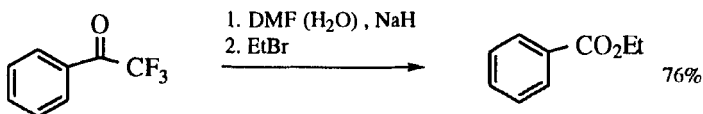
Yamada, T.; Takahashi, K.; Kato, K.; Takai, T.; Inoki, S.; Mukaiyama, T. *Chem. Lett.*, **1991**, 641.



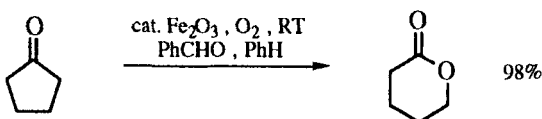
Olah, G.A.; Wang, Q.; Trivedi, N.J.; Surya Prakash, G.K. *Synthesis*, **1991**, 739.



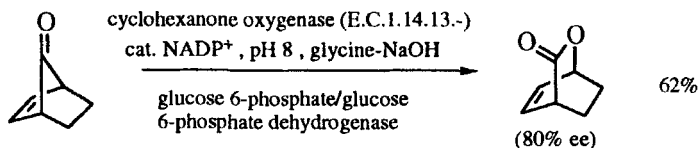
Yoshida, J.; Itoh, M.; Matsunaga, S.; Isoe, S. *J. Org. Chem.*, **1992**, 57, 4877.



Delgado, A.; Clardy, J. *Tetrahedron Lett.*, **1992**, 33, 2789.



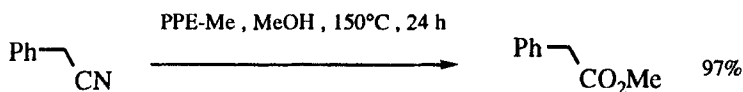
Murahashi, S-I.; Oda, Y.; Naota, T. *Tetrahedron Lett.*, **1992**, 33, 7557.



Taschner, M.J.; Peddada, L. *J. Chem. Soc., Chem. Commun.*, **1992**, 1384.

Also via: Section 27 (Acid Derivatives).

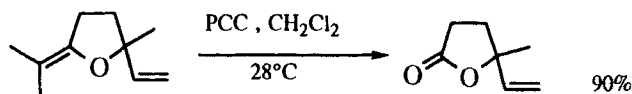
SECTION 118: ESTERS FROM NITRILES



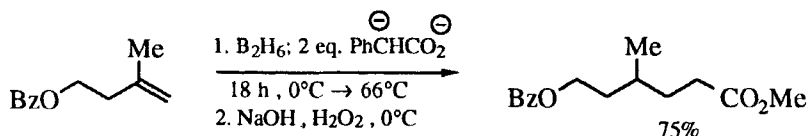
PPE-Me = polyphosphate methyl ester - see *J. Org. Chem.*, **1969**, *34*, 2665

Mills, F.D.; Brown, R.T. *Synth. Commun.*, **1990**, *20*, 3131.

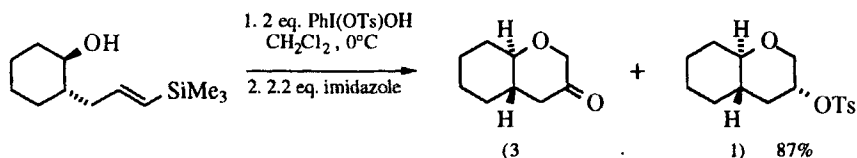
SECTION 119: ESTERS FROM ALKENES



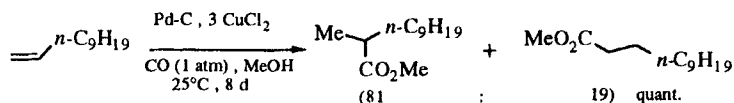
Baskaran, S.; Islam, I.; Chandrasekaran, S. *J. Org. Chem.*, **1990**, *55*, 891.



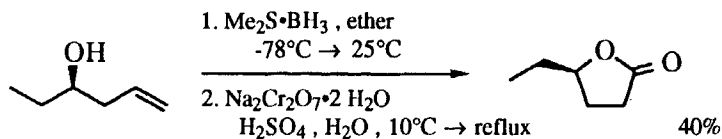
Hara, S.; Kishimura, K.; Suzuki, A.; Dhillon, R.S. *J. Org. Chem.*, **1990**, *55*, 6356.



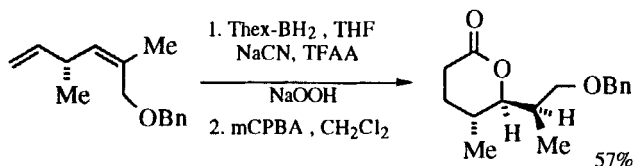
Schaumann, E.; Kirshning, A. *J. Chem. Soc., Perkin Trans. I*, **1990**, 1481.



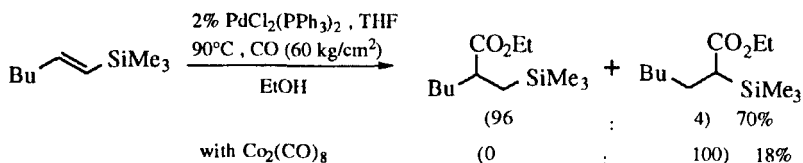
Inomata, K.; Toda, S.; Kinoshita, H. *Chem. Lett.*, **1990**, 1567.



Mandal, A.K.; Mahajan, S.W. *Synthesis*, **1991**, 311.



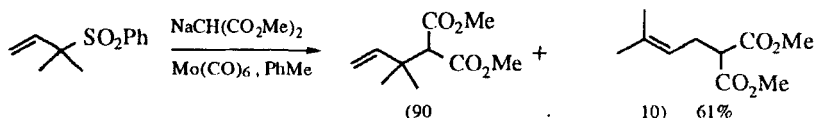
Yokoyama, Y.; Kawashima, H.; Kohno, M.; Ogawa, Y.; Uchida, S. *Tetrahedron Lett.*, **1991**, 32, 1479



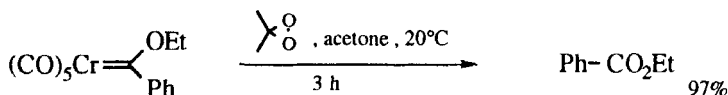
Takeuchi, R.; Ishii, N.; Sato, N. *J. Chem. Soc., Chem. Commun.*, **1991**, 1247.

Also via: Section 44 (Alcohols).

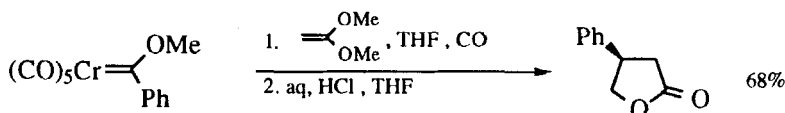
SECTION 120: ESTERS FROM MISCELLANEOUS COMPOUNDS



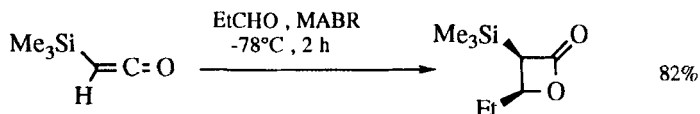
Trost, B.M.; Merlic, C.A. *J. Org. Chem.*, **1990**, 55, 1127.



Lluch, A-M.; Jordes, L.; Sánchez-Baeza, F.; Ricart, S.; Camps, F.; Messeguer, A.; Moretó, J.M. *Tetrahedron Lett.*, **1992**, 33, 3021.



Wang, S.L.B.; Su, J.; Wulff, W.D. *J. Am. Chem. Soc.*, **1992**, 114, 10665.



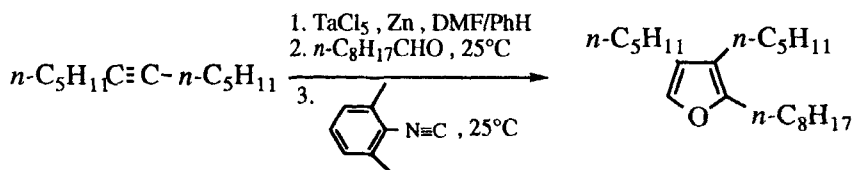
MABR = methyl aluminum bis(4-bromo-2,6-di-*t*-butylphenoxide)

Maruoka, K.; Concepcion, A.B.; Yamamoto, H. *SynLett*, **1992**, 31.

CHAPTER 9

PREPARATION OF ETHERS, EPOXIDES AND THIOETHERS

SECTION 121: ETHERS, EPOXIDES AND THIOETHERS FROM ALKYNES

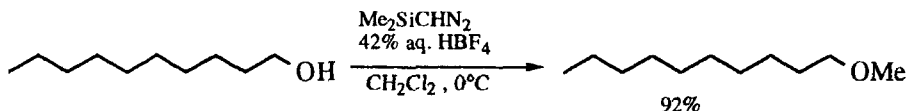


Takai, K.; Tezuka, M.; Kataoka, Y.; Utimoto, K. *J. Org. Chem.*, **1990**, 55, 5310.

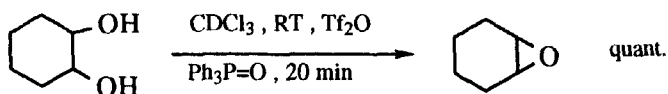
SECTION 122: ETHERS, EPOXIDES AND THIOETHERS FROM ACID DERIVATIVES

NO ADDITIONAL EXAMPLES

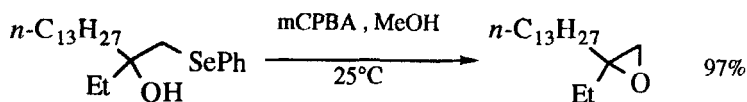
SECTION 123: ETHERS, EPOXIDES AND THIOETHERS FROM ALCOHOLS AND THIOLS



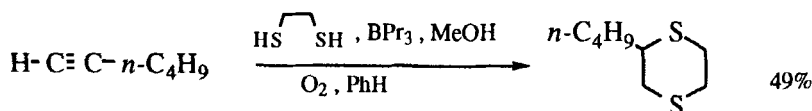
Aoyama, T.; Shiori, T. *Tetrahedron Lett.*, **1990**, 31, 5507.



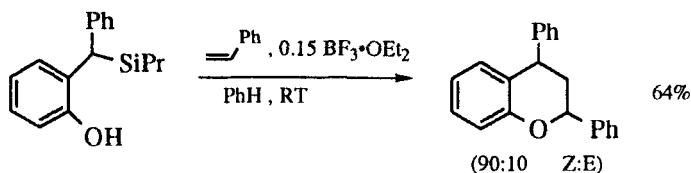
Hendrickson, J.B.; Hussoin, Md.S. *SynLett*, **1990**, 423.



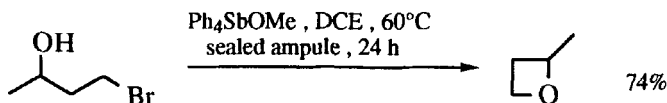
Uemura, S.; Ohe, K.; Sugita, N. *J. Chem. Soc., Perkin Trans. I*, **1990**, 1697.



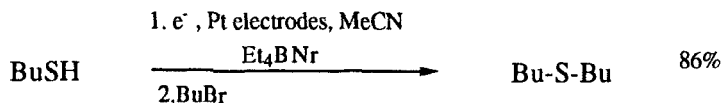
Demchuk, D.V.; Lutsenko, A.I.; Troyanskii, E.I.; Nikishin, G.I. *Izv. Akad. Nauk. SSSR*, **1990**, 39, 2801 (Engl., p. 2542).



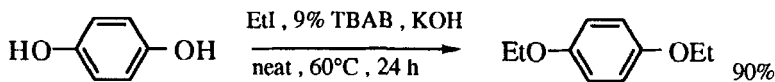
Inoue, T.; Inoue, S.; Sato, K. *Chem. Lett.*, **1990**, 55.



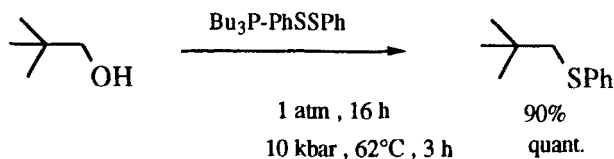
Fujiwara, M.; Hitomi, K.; Baba, A. *Synthesis*, **1990**, 106.



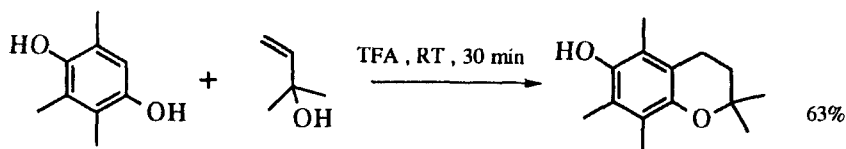
Petrosyan, V.A.; Niyazymbetov, M.E.; Konyushkin, L.D.; Litvinov, V.P. *Synthesis*, **1990**, 841.



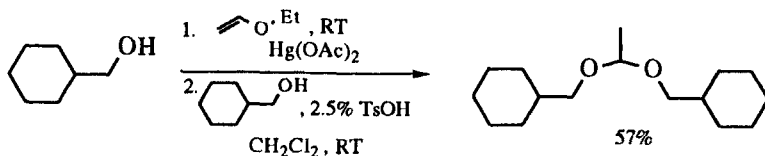
Loupy, A.; Sansoulet, J.; Díez-Barra, E.; Carrillo, J.R. *Synth. Commun.*, **1991**, 21, 1465.



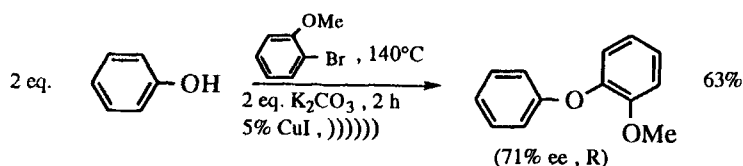
Kotsuki, H.; Matsumoto, K.; Nishizawa, H. *Tetrahedron Lett.*, **1991**, 32, 4155.



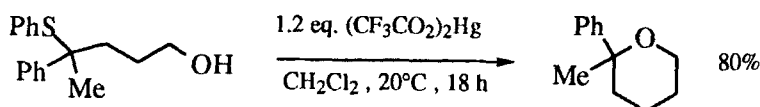
Ismail, E.M.D.; Hilton, M.J.; Štefinović, M. *Tetrahedron Lett.*, **1992**, 33, 3795.



Guy, R.K.; DiPietro, A. *Synth. Commun.*, **1992**, 22, 687.

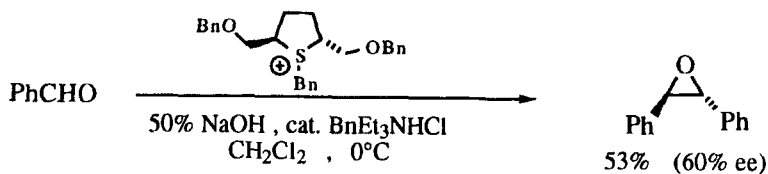


Smith, K.; Jones, D. J. *Chem. Soc., Perkin Trans. I*, **1992**, 407.

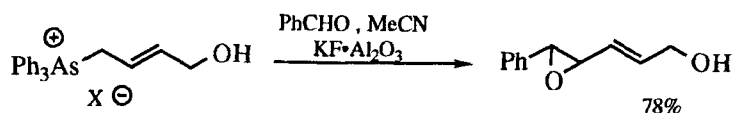


Krief, A.; Bousbaa, J.; Hobe, M. *SynLett*, **1992**, 320.

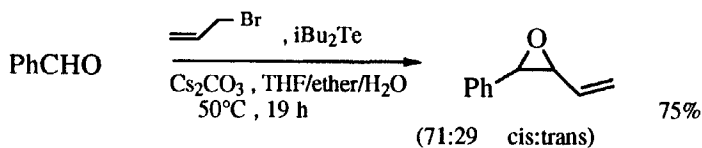
SECTION 124: ETHERS, EPOXIDES AND THIOETHERS FROM ALDEHYDES



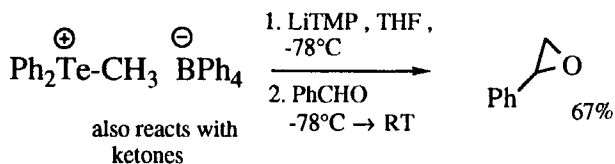
Breau, L.; Ogilvie, W.W.; Durst, T. *Tetrahedron Lett.*, **1990**, 31, 35.



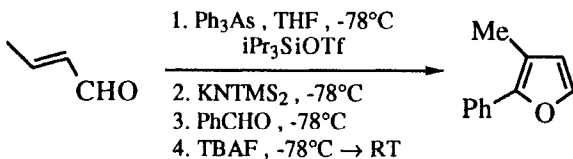
Wang, W-B.; Shi, L-L.; Li, Z-Q.; Huang, Y-Z. *Tetrahedron Lett.*, **1991**, 32, 3999.



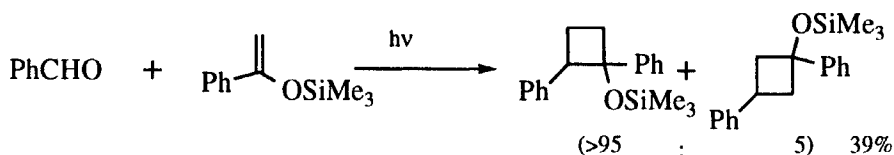
Zhou, Z.-L.; Shi, L.-L.; Huang, Y.-Z. *Tetrahedron Lett.*, **1990**, 31, 7657.



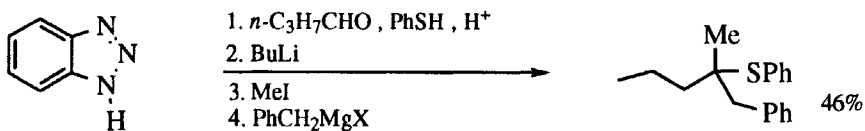
Shi, L.-L.; Zhou, Z.-L.; Huang, Y.-Z. *Tetrahedron Lett.*, **1990**, 31, 4173.



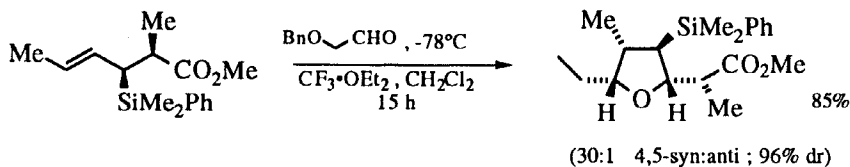
Kim, S.; Kim, Y.G. *Tetrahedron Lett.*, **1991**, 32, 2913.



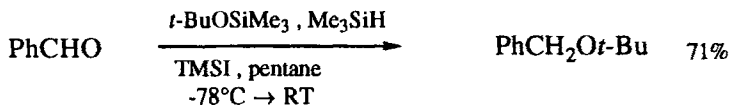
Bach, T. *Tetrahedron Lett.*, **1991**, 32, 7037.



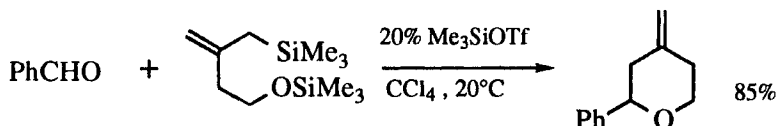
Katritzky, A.R.; Perumal, S.; Kuzmierkiewicz, W.; Lue, P.; Greenhill, J.V. *Helv. Chim. Acta*, **1991**, 74, 1924.



Panek, J.S.; Yang, M. *J. Am. Chem. Soc.*, **1991**, 113, 9868.



Hartz, N.; Surya Prakash, G.K.; Olah, G.A. *SynLett*, **1992**, 569.



Markó, I.E.; Mekhalfia, A. *Tetrahedron Lett.*, **1992**, 33, 1799.

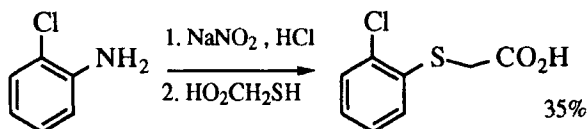
SECTION 125: ETHERS, EPOXIDES AND THIOETHERS FROM ALKYL, METHYLENES AND ARYLS

NO ADDITIONAL EXAMPLES

SECTION 126: ETHERS, EPOXIDES AND THIOETHERS FROM AMIDES

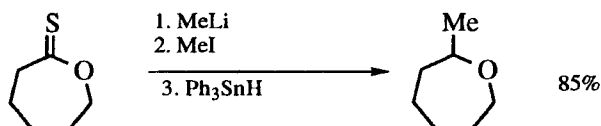
NO ADDITIONAL EXAMPLES

SECTION 127: ETHERS, EPOXIDES AND THIOETHERS FROM AMINES

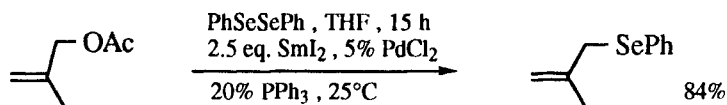


Yildirim, Y.; Okay, G. *Org. Prep. Proceed. Int.*, **1991**, 23, 198.

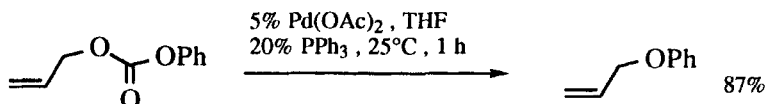
SECTION 128: ETHERS, EPOXIDES AND THIOETHERS FROM ESTERS



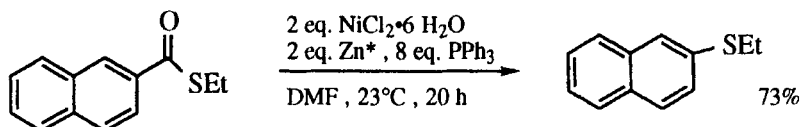
Nicolaou, K.C.; McGarry, D.G.; Somers, P.K.; Kim, B.H.; Ogilvie, W.W.; Yiannikouros, G.; Prasad, C.V.V.; Veale, C.A.; Hark, R.R. *J. Am. Chem. Soc.*, **1990**, 112, 6263.



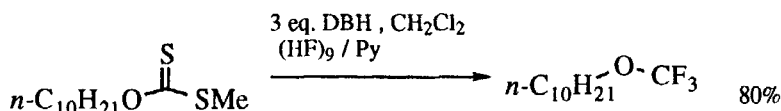
Fukuzawa, S.; Fujinami, T.; Sakai, S. *Chem. Lett.*, **1990**, 927.



Larock, R.C.; Lee, N.H. *Tetrahedron Lett.*, **1991**, 32, 6315.

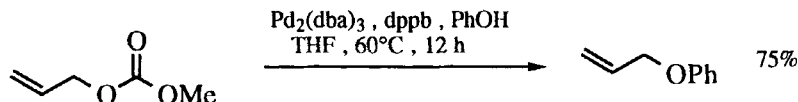


Wenkert, E.; Chianelli, D. *J. Chem. Soc., Chem. Commun.*, **1991**, 627.



DBH = 1,3-dibromo-5,5-demethyl hydantoin

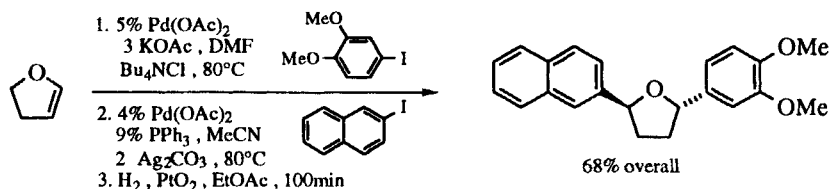
Juroboshi, M.; Suzuki, K.; Hiyama, T. *Tetrahedron Lett.*, **1992**, 33, 4173.



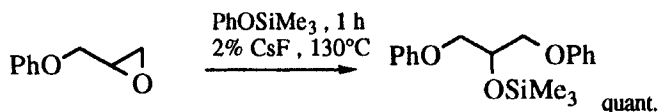
Goux, C.; Lhoste, P.; Sinou, D. *SynLett*, **1992**, 725.

Goux, C.; Lhoste, P.; Sinou, D. *Tetrahedron Lett.*, **1992**, 33, 8099 [with thiols].

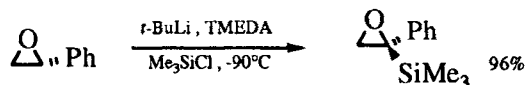
SECTION 129: ETHERS, EPOXIDES AND THIOETHERS FROM ETHERS, EPOXIDES AND THIOETHERS



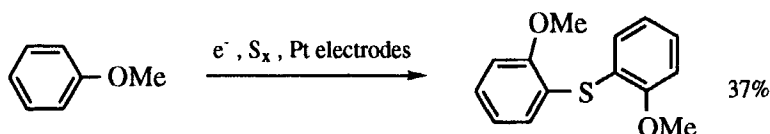
Larock, R.C.; Gong, W.H. *J. Org. Chem.*, **1990**, 55, 407.



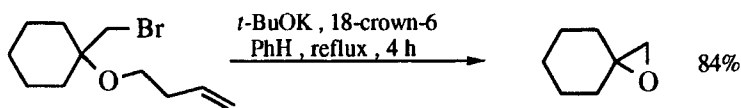
Nambu, Y.; Endo, T. *Tetrahedron Lett.*, **1990**, 31, 1723.



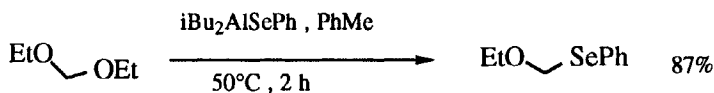
Eisch, J.L.; Galle, J.E. *J. Org. Chem.*, **1990**, 55, 4835.



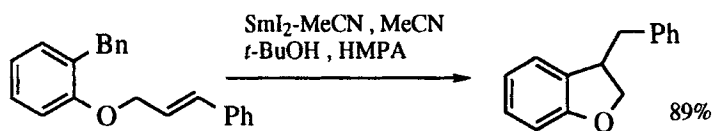
Le Guillanton, G.; Do, Q.T.; Simonet, J. *J. Chem. Soc., Chem. Commun.*, **1990**, 393.



Dulcère, J-P.; Rodriguez, J. *Synth. Commun.*, **1990**, 20, 1893.

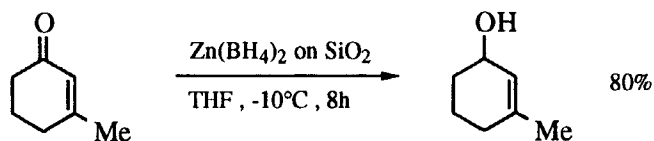


Nishiyama, Y.; Nakata, S.; Hamanaka, S. *Chem. Lett.*, **1991**, 1775.

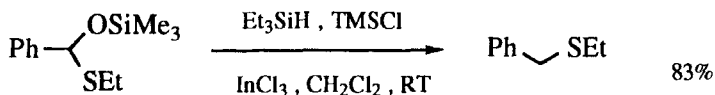


with amines as well as ethers

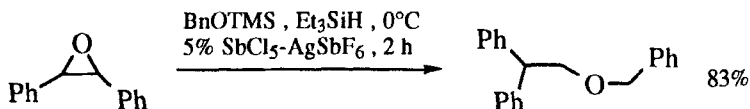
Inanaga, J.; Ujikawa, O.; Yamaguchi, M. *Tetrahedron Lett.*, **1991**, 32, 1737.



Rawal, V.H.; Singh, S.P.; Dufour, C.; Michoud, C. *J. Org. Chem.*, **1991**, 56, 5245.

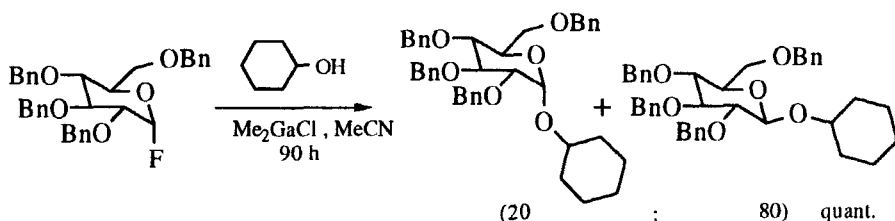


Mukaiyama, T.; Ohno, T.; Nishimura, T.; Han, J.S.; Kobayashi, S. *Bull. Chem. Soc. Jpn.*, **1991**, *64*, 2524.

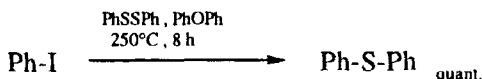


Harada, T.; Mukaiyama, T. *Chem. Lett.*, **1992**, 1901.

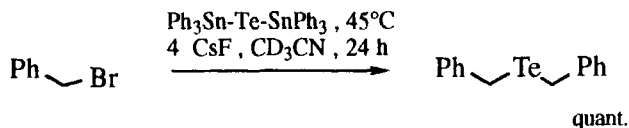
SECTION 130: ETHERS, EPOXIDES AND THIOETHERS FROM HALIDES AND SULFONATES



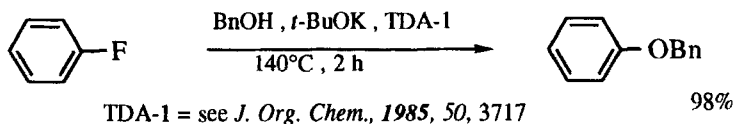
Kobayashi, S.; Koide, K.; Ohno, M. *Tetrahedron Lett.*, **1990**, *31*, 2435.



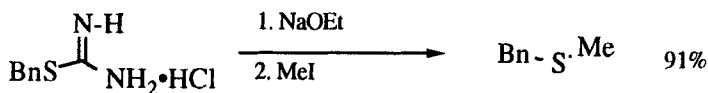
Wang, Z.Y.; Hay, A.S. *Tetrahedron Lett.*, **1990**, *31*, 5685.



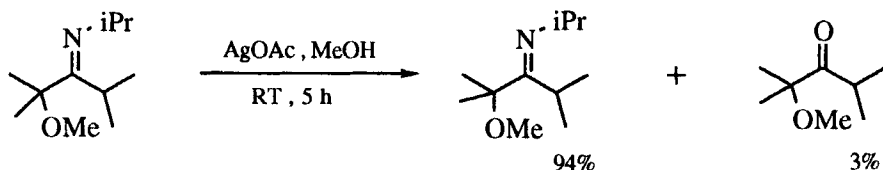
Li, C.J.; Harpp, D.N. *Tetrahedron Lett.*, **1990**, *31*, 6291.



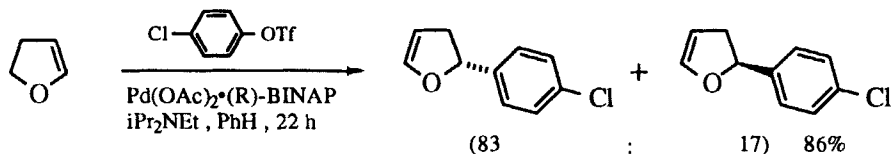
Loupy, A.; Philippon, N.; Pigeon, P.; Sansoulet, J.; Galons, H. *Synth. Commun.*, **1990**, *20*, 2855.



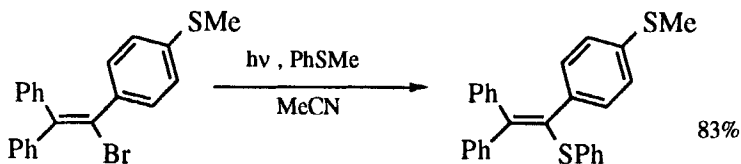
Hengchang, C.; Zhenzhong, L.; Wei, L. *Synth. Commun.*, **1990**, 20, 3313.



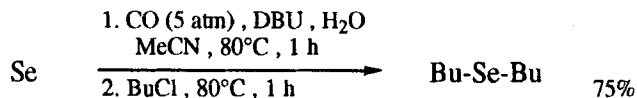
De Kimpe, N.; Stevens, C. *Tetrahedron*, **1990**, 46, 6753.



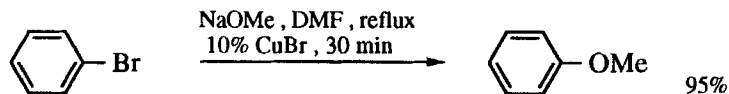
Ozawa, E.; Kubo, A.; Hayashi, T. *J. Am. Chem. Soc.*, **1991**, 113, 1417.



Kitamura, T.; Kabashima, T.; Taniguchi, H. *J. Org. Chem.*, **1991**, 56, 3739.



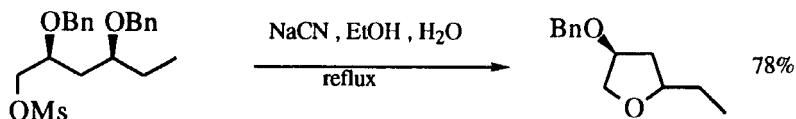
Nishiyama, Y.; Katsuura, A.; Negoro, A.; Hamanaka, S.; Miyoshi, N.; Yamana, Y.; Ogawa, A.; Sonoda, N. *J. Org. Chem.*, **1991**, 56, 3776.



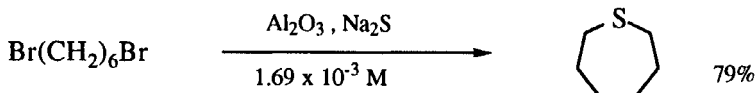
Keegstra, M.A.; Peters, T.H.A.; Brandsma, L. *Tetrahedron*, **1992**, 48, 3633.



Nedugov, A.N.; Pavlova, N.N. *Zhur. Org. Khim.*, **1992**, 28, 1401 (Engl., p. 1103).



Dehmlow, H.; Muler, J.; Seilz, C.; Strecker, A.R.; Kohlmann, A. *Tetrahedron Lett.*, **1992**, 33, 3607.



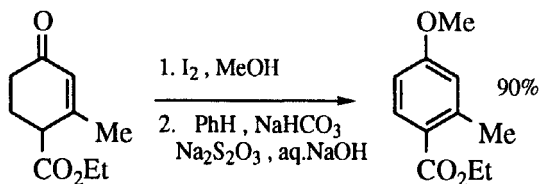
Tan, L.C.; Pagni, R.M.; Kabalka, G.W.; Hillmyer, M.; Woosley, J. *Tetrahedron Lett.*, **1992**, 33, 7709.

Related Methods: Section 123 (Ethers from Alcohols).

SECTION 131: ETHERS, EPOXIDES AND THIOETHERS FROM HYDRIDES

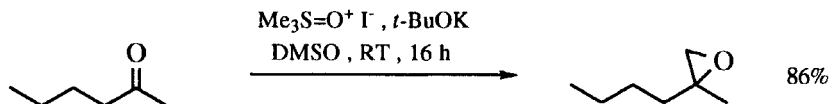
NO ADDITIONAL EXAMPLES

SECTION 132: ETHERS, EPOXIDES AND THIOETHERS FROM KETONES

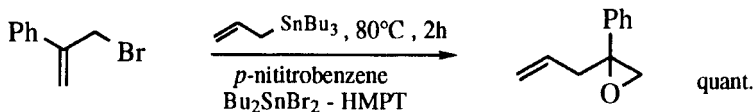


see Tamara Y.; Yoshimoto, Y. *Chem. Ind.*, **1980**, 888.

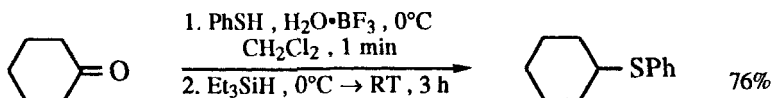
Kotnis, A.S. *Tetrahedron Lett.*, **1990**, 31, 481.



Ng, J.S. *Synth. Commun.*, **1990**, 20, 1193.



Yano, K.; Hatta, Y.; Baba, A.; Matsuda, H. *SynLett*, **1991**, 555.



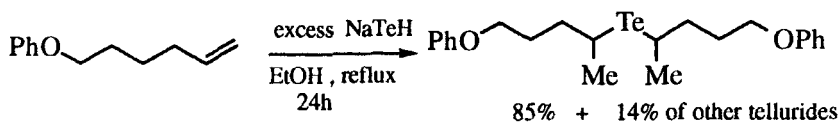
Olah, G.A.; Wang, Q.; Trivedi, N.J.; Surya Prakash, G.K. *Synthesis*, **1992**, 465.

Related Methods: Section 124 (Epoxides from Aldehydes).

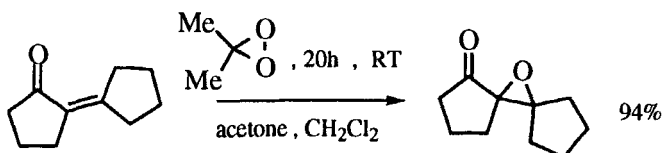
SECTION 133: ETHERS, EPOXIDES AND THIOETHERS FROM NITRILES

NO ADDITIONAL EXAMPLES

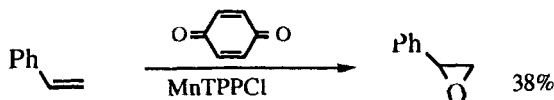
SECTION 134: ETHERS, EPOXIDES AND THIOETHERS FROM ALKENES



Barton, D.H.R.; Bohé, L.; Lusinchi, X. *Tetrahedron Lett.*, **1990**, 31, 93.

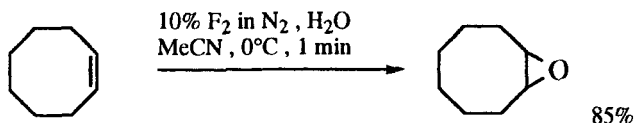


Adam, W.; Hadjiarapoglou, L.; Nestler, B. *Tetrahedron Lett.*, **1990**, 31, 331.

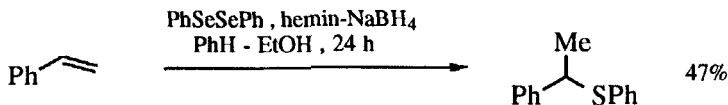


TPPCL was undefined; other quinones led to higher yields

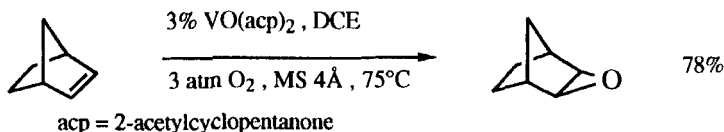
Hirao, T.; Ohno, M.; Ohshiro, Y. *Tetrahedron Lett.*, **1990**, 31, 6039.



Rozen, S.; Kol, M. *J. Org. Chem.*, **1990**, 55, 5155.

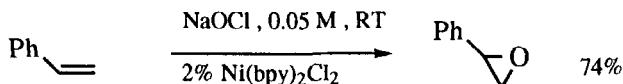


Kano, K.; Takeuchi, M.; Hashimoto, S.; Yoshida, Z. *Chem. Lett.*, **1990**, 1381.

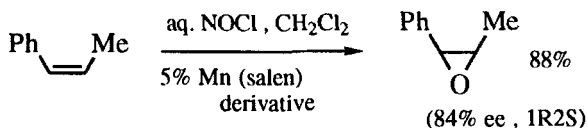


acp = 2-acetylcyclopentanone

Takai, T.; Yamada, T.; Mukaiyama, T. *Chem. Lett.*, **1990**, 1657.



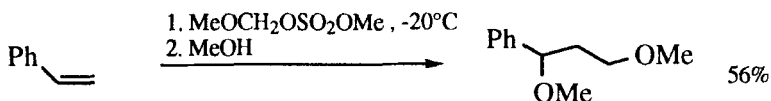
Yamazaki, S.; Yamazaki, Y. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 3185.



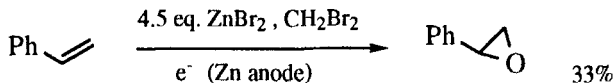
Jacobsen, E.N.; Zhang, W.; Muci, A.R.; Ecker, J.R.; Deng, L. *J. Am. Chem. Soc.*, **1991**, 113, 7063.

Zhang, W.; Jacobsen, E.N. *J. Org. Chem.*, **1991**, 56., 2296.

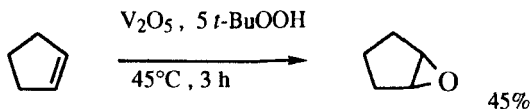
Lee, N.H.; Muci, A.R.; Jacobsen, E.N. *Tetrahedron Lett.*, **1991**, 32, 5055.



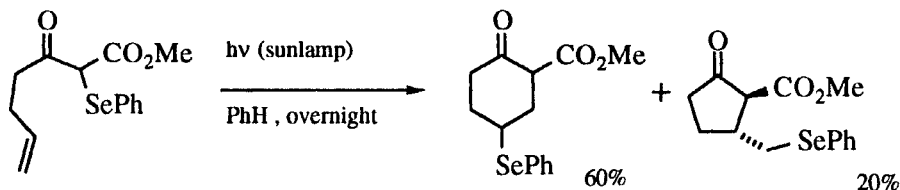
Lebedev, M.Yu.; Balenkova, E.S. *Zhur. Org. Khim.*, **1991**, 27, 1388 (Engl., p. 1214).



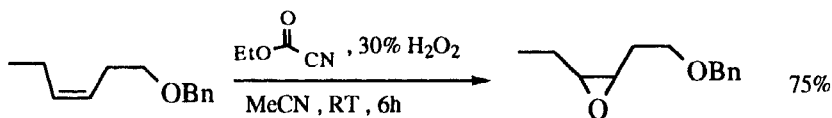
Durandetti, S.; Sibille, S.; Périchon, J. *J. Org. Chem.*, **1991**, 56, 3255.



Laszlo, P.; Levart, M.; Singh, G.P. *Tetrahedron Lett.*, **1991**, 32, 3167.

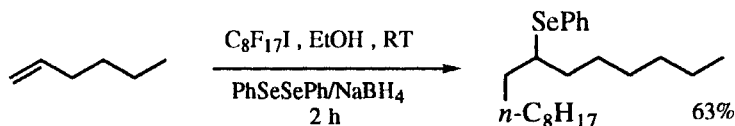


Byers, J.H.; Gleason, T.G.; Knight, K.S. *J. Chem. Soc., Chem. Commun.*, **1991**, 354.

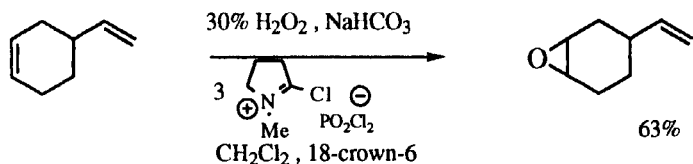


yields are poor (16%) with 1-decene as a substrate

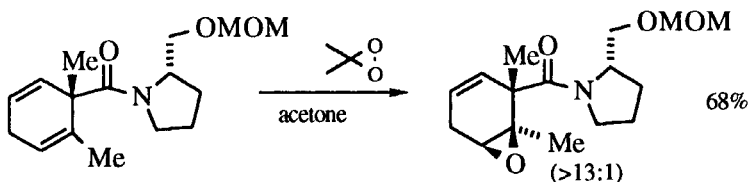
Masaki, Y.; Miura, T.; Mukai, I.; Itoh, A.; Oda, H. *Chem. Lett.*, **1991**, 1937.



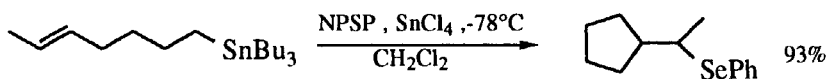
Uneyama, K.; Kitagawa, K. *Tetrahedron Lett.*, **1991**, 32, 375.



Rodriguez, T.; Dulcère, J-P. *J. Org. Chem.*, **1991**, 56, 469.

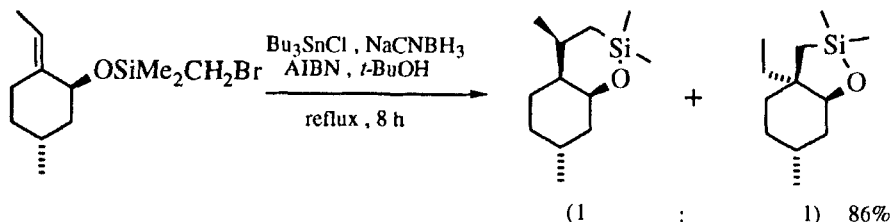


Schultz, A.G.; Harrington, R.E.; Tham, F.S. *Tetrahedron Lett.*, **1992**, 33, 6097.

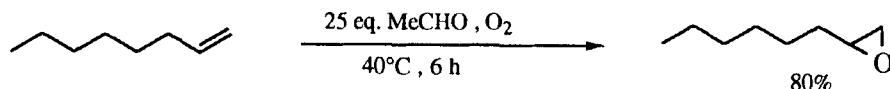


NPSP = N-phenylselenophthalimide

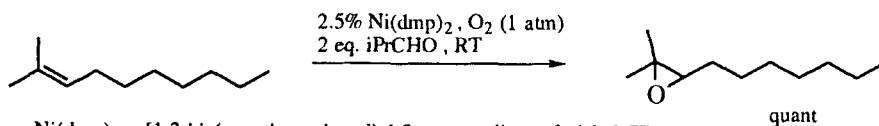
Herndon, J.W.; Harp, J.J. *Tetrahedron Lett.*, **1992**, 33, 6243.



Koreeda, M.; Visger, D.C. *Tetrahedron Lett.*, **1992**, 33, 6603.



Kaneda, K.; Haruna, S.; Imanaka, T.; Hamamoto, M.; Nishiyama, Y.; Ishii, Y. *Tetrahedron Lett.*, **1992**, 33, 6827.



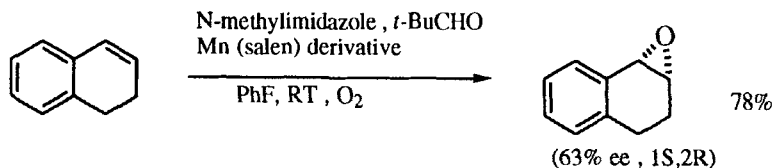
Ni(dmp)_2 = [1,3-bis(*p*-methoxyphenyl)-1,3-propanedionato] nickel (II)

Yamada, T.; Takai, T.; Rhode, O.; Mukaiyama, T. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 2109.

Takai, T.; Hata, E.; Yamada, T.; Mukaiyama, T. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 2513 [with Fe(dmp)_3].

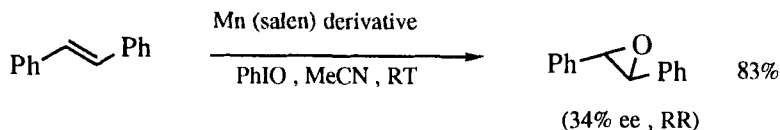
Mukaiyama, T.; Takai, T.; Yamada, T.; Rhode, O. *Chem. Lett.*, **1990**, 1661.

Yamada, T.; Takai, T.; Rhode, O.; Mukaiyama, T. *Chem. Lett.*, **1991**, 1.



Yamada, T.; Imagawa, K.; Nagata, T.; Mukaiyama, T. *Chem. Lett.*, **1992**, 2231.

Takai, T.; Hata, E.; Yorozu, K.; Mukaiyama, T. *Chem. Lett.*, **1992**, 2077.

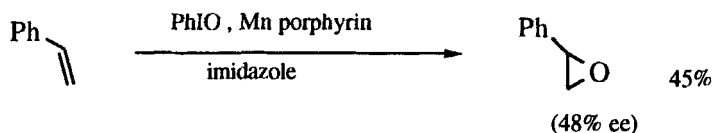


Hatayama, A.; Hosoya, N.; Irie, R.; Ito, Y.; Katsuki, T. *SynLett*, **1992**, 407.

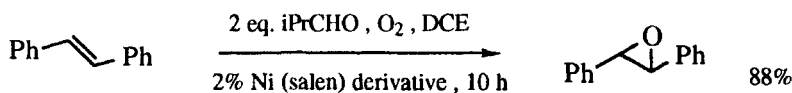
Irie, R.; Noda, K.; Ito, Y.; Matsumoto, N.; Katsuki, T. *Tetrahedron Lett.*, **1990**, 31, 7345.

Irie, R.; Noda, K.; Ito, Y.; Katsuki, T. *Tetrahedron Lett.*, **1991**, 32, 1055.

Irie, R.; Noda, K.; Ito, Y.; Matsumoto, N.; Katsuki, T. *Tetrahedron Asymmetry*, **1991**, 2, 481.



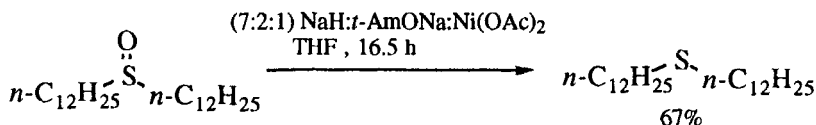
Konishi, K.; Oda, K.; Nishida, K.; Aida, T.; Inoue, S. *J. Am. Chem. Soc.*, **1992**, *114*, 1313.



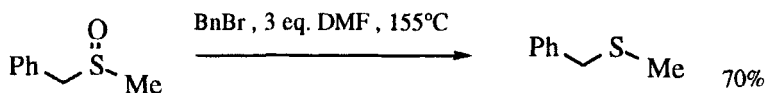
Oda, T.; Irie, R.; Katsuki, T.; Okawa, H. *SynLett*, **1992**, 641.

Irie, R.; Ito, Y.; Katsuki, T. *Tetrahedron Lett.*, **1991**, *32*, 6891.

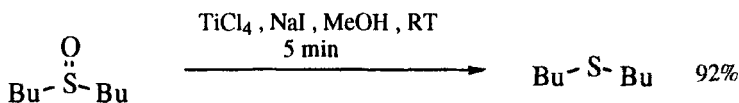
SECTION 135: ETHERS, EPOXIDES AND THIOETHERS FROM MISCELLANEOUS COMPOUNDS



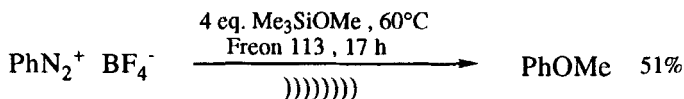
Becker, S.; Fort, Y.; Caubère, P. *J. Org. Chem.*, **1990**, *55*, 6194.



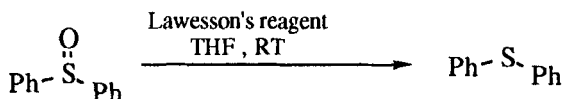
Bernard, A.M.; Caredda, M.C.; Piras, P.P.; Serra, E. *Synthesis*, **1990**, 329.



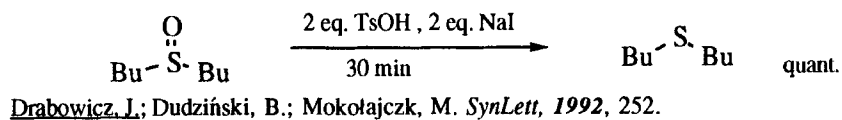
Balicki, R. *Synthesis*, **1991**, 155.



Olah, G.A.; Wu, A. *Synthesis*, **1991**, 204.



Bartsch, H.; Erker, R. *Tetrahedron Lett.*, **1992**, *33*, 199.

**REVIEWS:**

"Recent Developments in the Area of Annulated Furans"
Padwa, A.; Murphree, S.S. *Org. Prep. Proceed. Int.*, **1991**, 23, 547.

CHAPTER 10

PREPARATION OF HALIDES AND SULFONATES

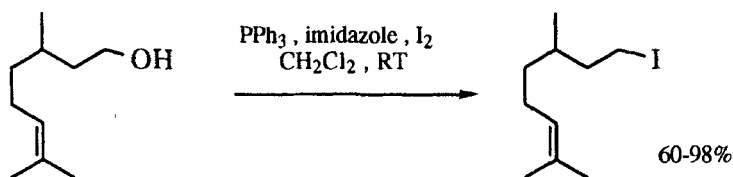
SECTION 136: HALIDES AND SULFONATES FROM ALKYNES

NO ADDITIONAL EXAMPLES

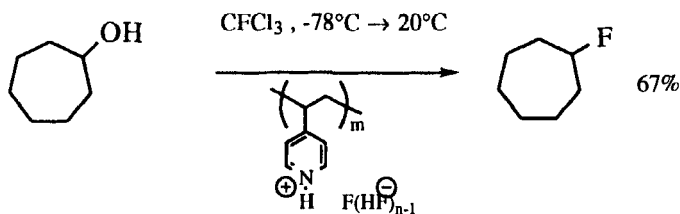
SECTION 137: HALIDES AND SULFONATES FROM ACID DERIVATIVES

NO ADDITIONAL EXAMPLES

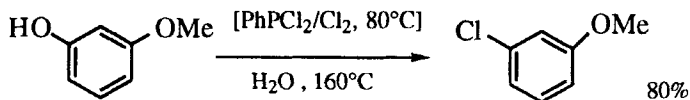
SECTION 138: HALIDES AND SULFONATES FROM ALCOHOLS AND THIOLS



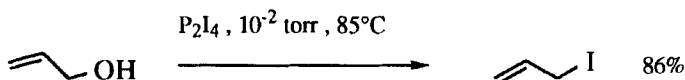
Lange, G.L.; Gottardo, C. *Synth. Commun.*, **1990**, 20, 1473.



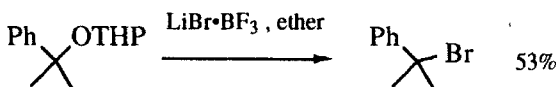
Olah, G.A.; Li, X-Y. *SynLett*, **1990**, 267.



Bay, E.; Bak, D.A.; Timony, P.E.; Leone-Bay, A. *J. Org. Chem.*, **1990**, 55, 3415.

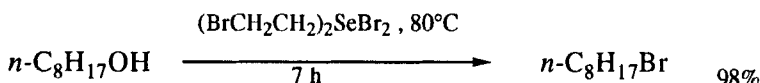


Lasne, M.-C.; Cairon, P.; Villemin, D. *Synth. Commun.*, **1990**, 20, 41.

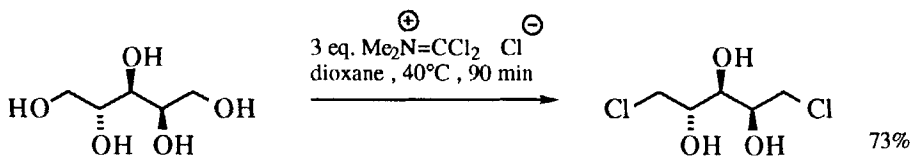


also with $\text{NaI}\cdot\text{BF}_3$ to give iodides
and with 1° and 2° OTHP derivatives

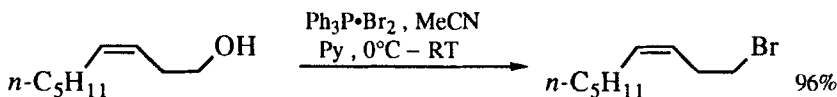
Vankar, Y.D.; Shah, K. *Tetrahedron Lett.*, **1991**, 32, 1081.



Akabori, S.; Takanohashi, Y. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 3482.

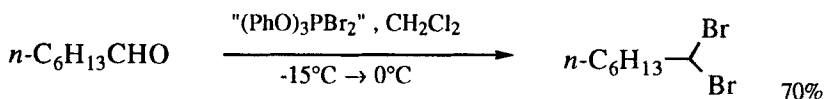


Benazza, M.; Uzan, R.; Beaupère, D.; Demailly, G. *Tetrahedron Lett.*, **1992**, 33, 3129, 4901.

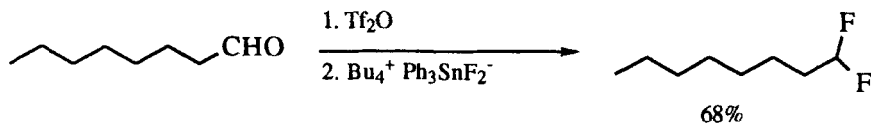


Sandri, J.; Viala, J. *Synth. Commun.*, **1992**, 22, 2945.

SECTION 139: HALIDES AND SULFONATES FROM ALDEHYDES



Hoffmann, R.W.; Bovicelli, P. *Synthesis*, **1990**, 657.



Martínez, A.G.; Barcina, J.O.; Rys, A.Z.; Subramanian, L.R. *Tetrahedron Lett.*, **1992**, 33, 7787.

SECTION 140: HALIDES AND SULFONATES FROM ALKYL, METHYLENES AND ARYLS

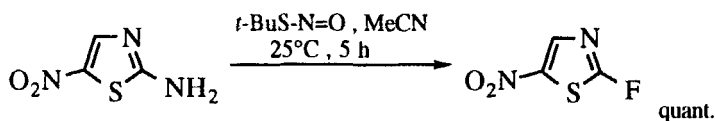
For the conversion $\text{R-H} \rightarrow \text{R-Halogen}$, see Section 146 (Halides from Hydrides).

NO ADDITIONAL EXAMPLES

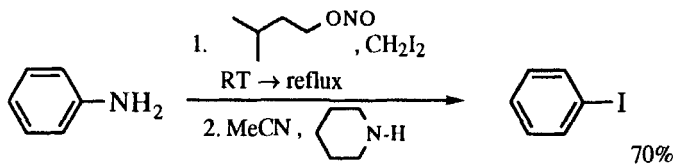
SECTION 141: HALIDES AND SULFONATES FROM AMIDES

NO ADDITIONAL EXAMPLES

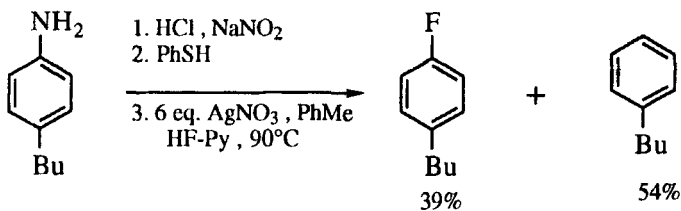
SECTION 142: HALIDES AND SULFONATES FROM AMINES



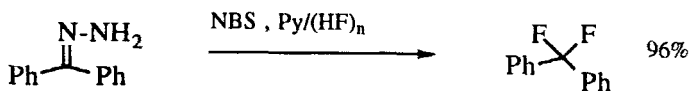
Kim, Y.H.; Lee, C.H.; Chang, K.Y. *Tetrahedron Lett.*, **1990**, 31, 3019.



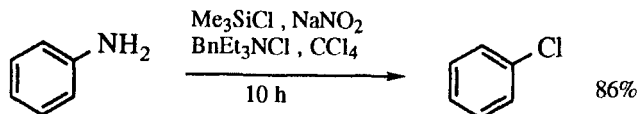
Smith, W.B.; Ho, O-C. *J. Org. Chem.*, **1990**, 55, 2543.



Haroutounian, S.A.; Di Zio, J.P.; Katzenellenbogen, J.A. *J. Org. Chem.*, **1991**, 56, 4993.

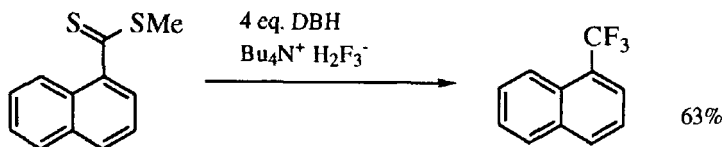


Surya Prakash, G.K.; Reddy, V.P.; Li, X-Y.; Olah, G.A. *SynLett*, **1990**, 594.



Lee, J.G.; Cha, H.T. *Tetrahedron Lett.*, **1992**, 33, 3167.

SECTION 143: HALIDES AND SULFONATES FROM ESTERS



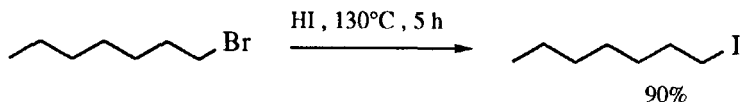
DBH = 1,3-dibromo-5,5-dimethyl hydantoin

Kuroboshi, M.; Hiyama, T. *Chem. Lett.*, **1992**, 827.

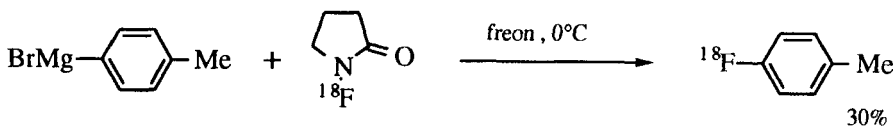
SECTION 144: HALIDES AND SULFONATES FROM ETHERS, EPOXIDES AND THIOETHERS

NO ADDITIONAL EXAMPLES

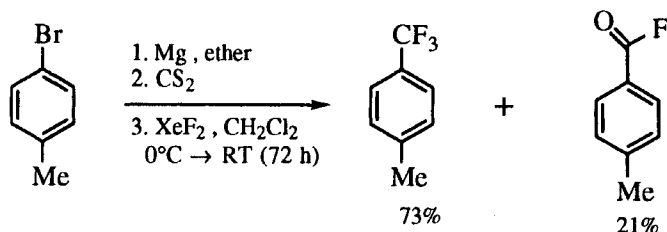
SECTION 145: HALIDES AND SULFONATES FROM HALIDES AND SULFONATES



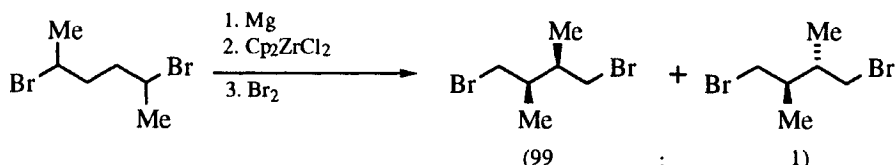
Namavari, M.; Satyamurthy, N.; Phelps, M.E.; Barrio, J.R. *Tetrahedron Lett.*, **1990**, 31, 4973.



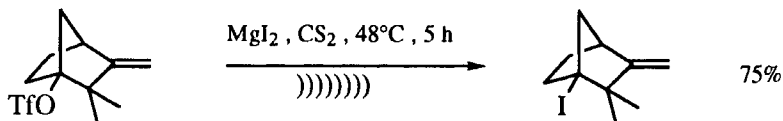
Satyamurthy, N.; Bida, G.T.; Phelps, M.E.; Barrio, J.R. *J. Org. Chem.*, **1990**, 55, 3373.



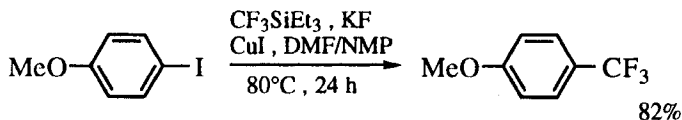
Zupan, M.; Bregar, Z. *Tetrahedron Lett.*, **1990**, *31*, 3357.



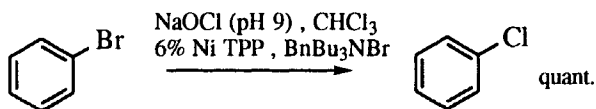
Takahashi, T.; Fujimori, T.; Seki, T.; Saburi, M.; Uchida, Y.; Rousset, C.J.; Negishi, E.
J. Chem. Soc., Chem. Commun., **1990**, 182.



Martínez, A.G.; Vilar, E.T.; López, J.C.; Alonso, J.M.; Hanack, M.; Subramanian, L.R. *Synthesis*, 1991, 353.

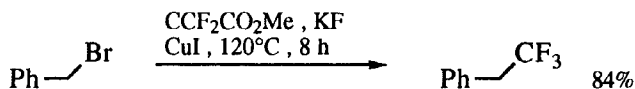


Urata, H.; Fuchikami, T. *Tetrahedron Lett.*, **1991**, 32, 91.

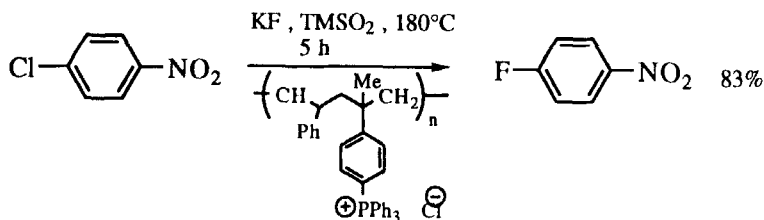


TPP = 5,10,15,20-tetraphenyl porphyrin

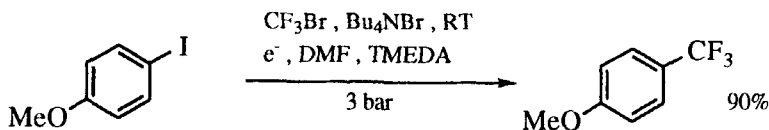
O'Connor, K.J.; Burrows, C.J. *J. Org. Chem.*, **1991**, *56*, 1344.



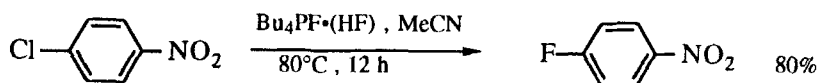
Su, D-B.; Duan, J-X.; Chen, O-Y. *Tetrahedron Lett.*, **1991**, 32, 7689.



Yoshida, Y.; Kimura, Y.; Tomoi, M. *Chem. Lett.*, **1990**, 769.

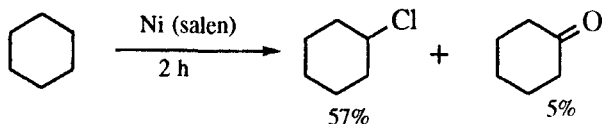


Paratian, J.M.; Sibille, S.; Périchon, J. *J. Chem. Soc., Chem. Commun.*, **1992**, 53.

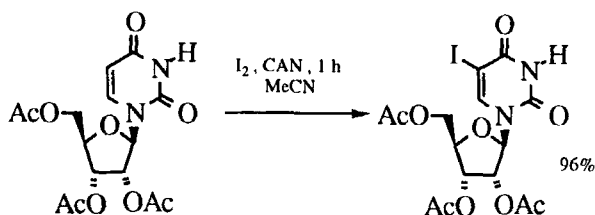


Uchibori, Y.; Umeno, M.; Seto, H.; Qian, Z.; Yoskioka, H. *SynLett*, **1992**, 345.

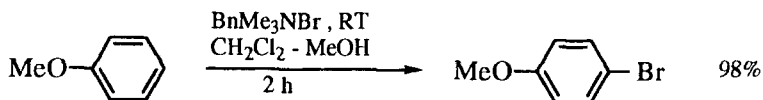
SECTION 146: HALIDES AND SULFONATES FROM HYDRIDES



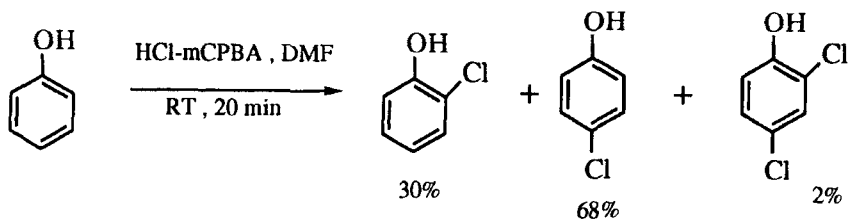
Querci, C.; Strologo, S.; Ricci, M. *Tetrahedron Lett.*, **1990**, 31, 6577.



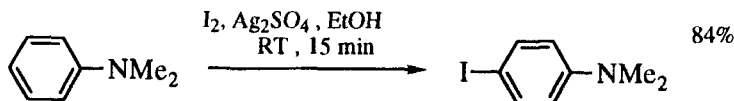
Asakura, J.; Robins, M.J. *J. Org. Chem.*, **1990**, 55, 4928.



Kajigaeshi, S.; Moriwaki, M.; Tanaka, T.; Fujisaki, S.; Kakinami, T.; Okamoto, T. *J. Chem. Soc., Perkin Trans. 1*, **1990**, 897.

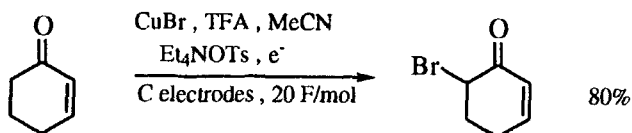


Chung, K.H.; Kim, H.J.; Kim, H.R.; Ryu, E.K. *Synth. Commun.*, **1990**, 20, 2991.

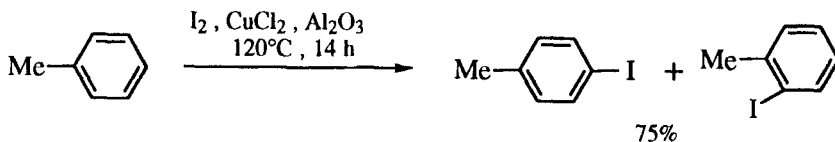


Sy, W-W. *Synth. Commun.*, **1992**, 22, 3215.

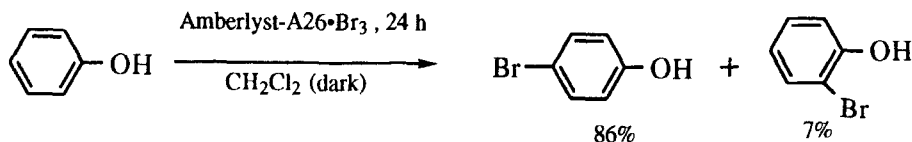
Sy, W-W.; Lodge, B.A.; By, A.W. *Synth. Commun.*, **1990**, 877.



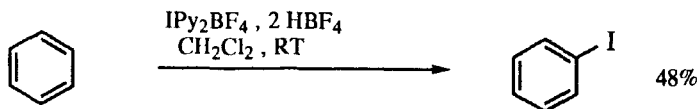
Mitani, M.; Kobayashi, T.; Koyama, K. *J. Chem. Soc., Chem. Commun.*, **1991**, 1418.



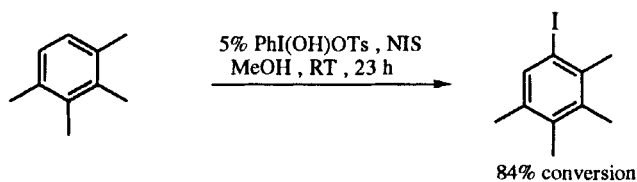
Kodomari, M.; Amanokura, N.; Takeuchi, K.; Yoshitomi, S. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 306.



Smith, K.; James, D.M.; Matthews, I.; Bye, M.R. *J. Chem. Soc., Perkin Trans. I*, **1992**, 1877.



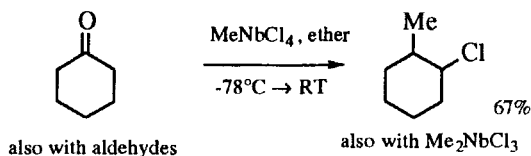
Barluenga, J.; González, J.M.; García-Martín, M.A.; Campos, P.J.; Asensio, G. *J. Chem. Soc., Chem. Commun.*, **1992**, 1016.



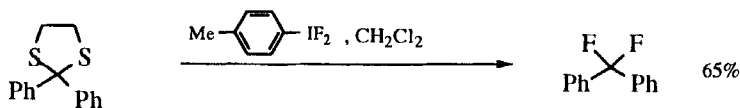
Bovonsombat, P.; Angara, G.J.; McNelis, E. *SynLett*, **1992**, 131.

α -Halogenations of aldehydes, ketones and acids are found in Sections 338 (Halide-Aldehyde), 369 (Halide-Ketone), 359 (Halide-Esters) and 319 (Halide-Acids).

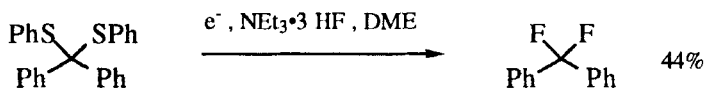
SECTION 147: HALIDES AND SULFONATES FROM KETONES



Kauffmann, T.; Abel, T.; Neiteler, G.; Schreer, M. *Tetrahedron Lett.*, **1990**, 31, 493.



Motherwell, W.B.; Wilkinson, J.A. *SynLett*, **1991**, 191.



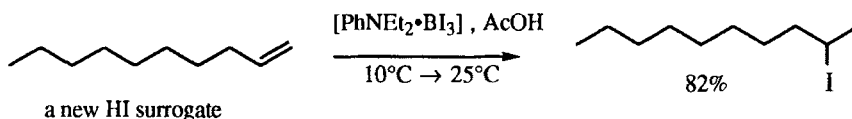
Yoshiyama, T.; Fuchigami, T. *Chem. Lett.*, **1992**, 1995.

SECTION 148: HALIDES AND SULFONATES FROM NITRILES

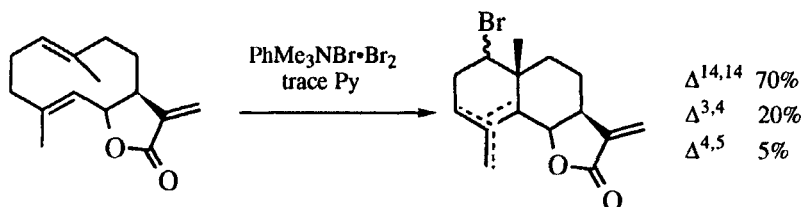
NO ADDITIONAL EXAMPLES

SECTION 149: HALIDES AND SULFONATES FROM ALKENES

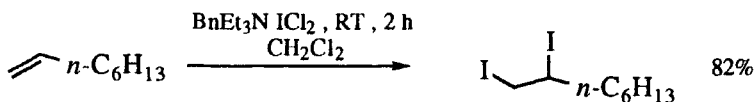
For halocyclopropanations, see Section 74E (Alkyls from Alkenes).



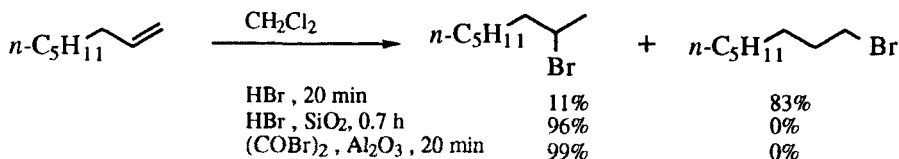
Reddy, Ch.K.; Periasamy, M. *Tetrahedron Lett.*, **1990**, 31, 1919.



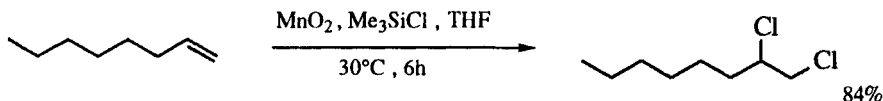
Collado, I.G.; Madero, J.G.; Massanet, G.M.; Luis, F.R. *Tetrahedron Lett.*, **1990**, 31, 563.



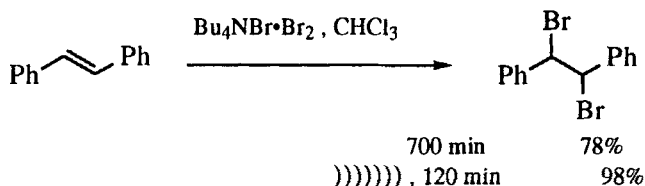
Kajigaeshi, S.; Moriwaki, M.; Fujisaki, S.; Kakinami, T.; Okamoto, T. *Bull. Chem. Soc. Jpn.*, **1990**, 63, 3033.



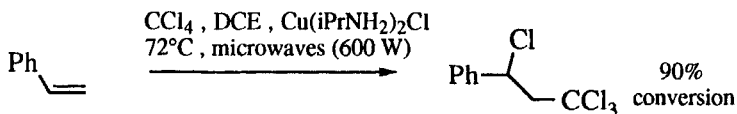
Kropp, P.J.; Daus, K.A.; Crawford, S.D.; Tubergen, M.W.; Kepler, K.D.; Craig, S.L.; Wilson, V.P. *J. Am. Chem. Soc.*, **1990**, 112, 7433.



Bellesia, F.; Ghelfi, F.; Pagnoni, U.M.; Pinetti, A. *Synth. Commun.*, **1991**, 21, 489.



Berthelot, J.; Benammar, Y.; Lange, C. *Tetrahedron Lett.*, **1991**, 32, 4135.



Adámek, F.; Hájek, M. *Tetrahedron Lett.*, **1992**, 33, 2039.

**SECTION 150: HALIDES AND SULFONATES FROM
 MISCELLANEOUS COMPOUNDS**

NO ADDITIONAL EXAMPLES

CHAPTER 11

PREPARATION OF HYDRIDES

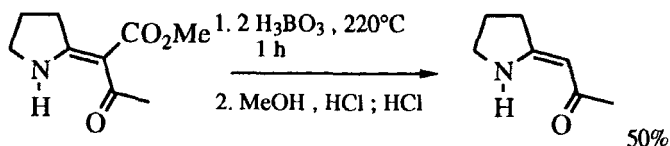
This chapter lists hydrogenolysis and related reactions by which functional groups are replaced by hydrogen: e.g. $\text{RCH}_2\text{X} \rightarrow \text{RCH}_2\text{-H}$ or R-H .

SECTION 151: HYDRIDES FROM ALKYNES

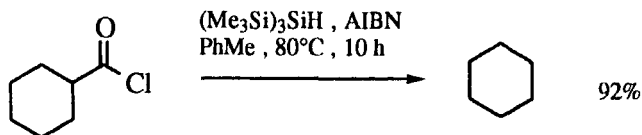
NO ADDITIONAL EXAMPLES

SECTION 152: HYDRIDES FROM ACID DERIVATIVES

This section lists examples of decarboxylations ($\text{RCO}_2\text{H} \rightarrow \text{R-H}$) and related reactions.



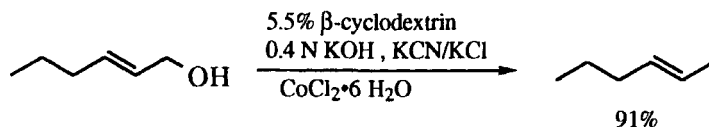
Delbecq, P.; Celerier, J-P.; Lhomme, G. *Tetrahedron Lett.*, **1990**, 31, 4873.



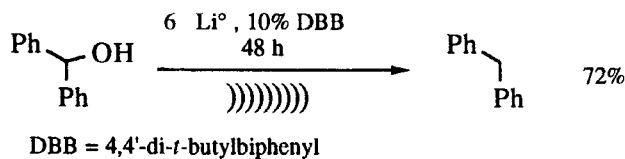
Ballestri, M.; Chatgililoglu, C.; Cardì, N.; Sommazzi, A. *Tetrahedron Lett.*, **1992**, 33, 1787.

SECTION 153: HYDRIDES FROM ALCOHOLS AND THIOLS

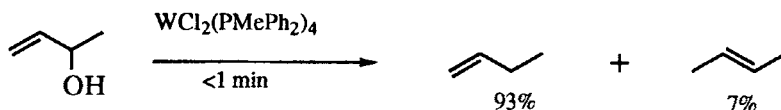
This section lists examples of the hydrogenolysis of alcohols and phenols ($\text{ROH} \rightarrow \text{R-H}$).



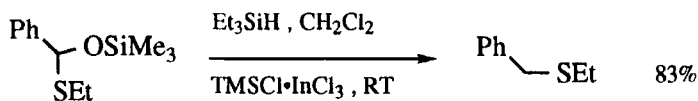
Lee, J-T.; Alper, H. *Tetrahedron Lett.*, **1990**, 31, 4101.



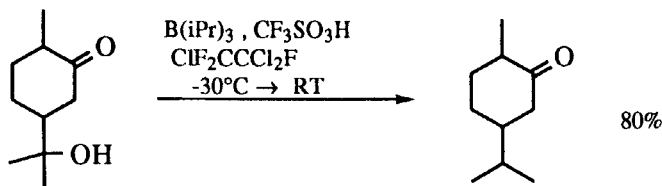
Karaman, R.; Kohlman, D.T.; Ery, J.L., *Tetrahedron Lett.*, **1990**, 31, 6155.



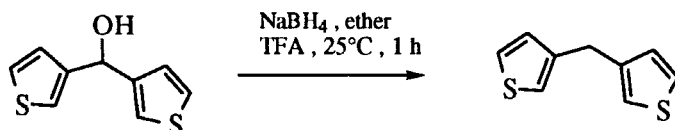
Jang, S.; Atagi, L.M.; Mayer, J.M., *J. Am. Chem. Soc.*, **1990**, 112, 6413.



Mukaiyama, T.; Ohno, T.; Nishimura, T.; Han, J.S.; Kobayashi, S. *Chem. Lett.*, **1990**, 2239.

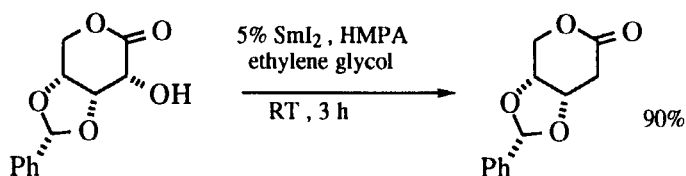


Olah, G.A.; Wu, A. *Synthesis*, **1991**, 407.

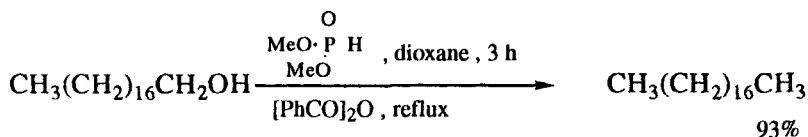


Nutaitis, C.F.; Patragnoni, R.; Goodkin, G.; Neighbour, B.; Obaza-Nutaitis, J. *Org. Prep. Proceed. Int.*, **1991**, 23, 403.

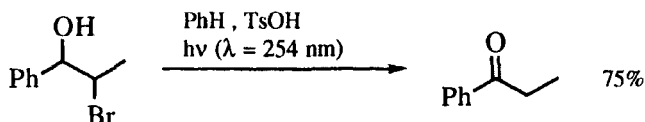
Nutaitis, C.F.; Bernardo, J.E. *Synth. Commun.*, **1990**, 20, 487.



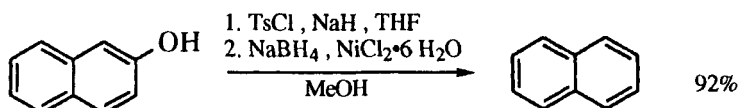
Hanessian, S.; Girard, C.; Chiara, J.L. *Tetrahedron Lett.*, **1992**, 33, 573.



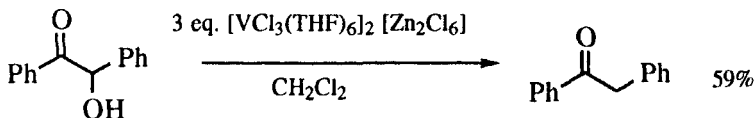
Barton, D.H.R.; Jang, D.O.; Jaszberenyi, J.Cs. *Tetrahedron Lett.*, **1992**, 33, 2311.



Piva, O. *Tetrahedron Lett.*, **1992**, 33, 2459.



Wang, F.; Chiba, K.; Tada, M. *J. Chem. Soc., Perkin Trans. I*, **1992**, 1897.



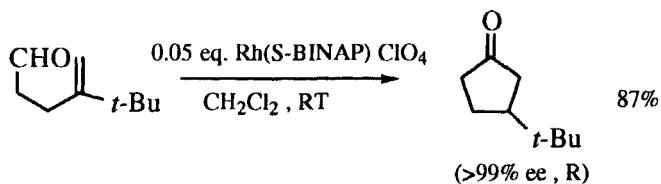
using acetate as starting material led to 91% yield of ketone

Inokuchi, T.; Kawafuchi, H.; Torii, S. *Chem. Lett.*, **1992**, 1895.

Also via: Section 160 (Halides and Sulfonates).

SECTION 154: HYDRIDES FROM ALDEHYDES

For the conversion $\text{RCHO} \rightarrow \text{R-Me}$, etc., see Section 64 (Alkyls from Aldehydes).



Wu, X-M.; Funakoshi, K.; Sakai, K. *Tetrahedron Lett.*, **1992**, 33, 6331.

SECTION 155: HYDRIDES FROM ALKYL, METHYLENES AND ARYL

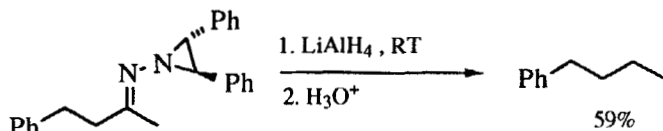
NO ADDITIONAL EXAMPLES

SECTION 156: HYDRIDES FROM AMIDES

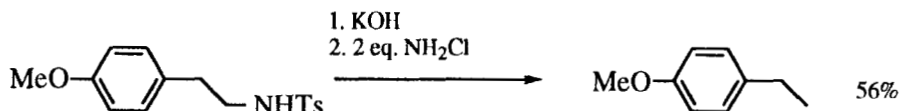
NO ADDITIONAL EXAMPLES

SECTION 157: HYDRIDES FROM AMINES

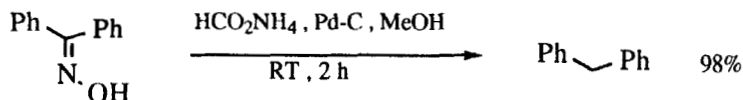
This section lists examples of the conversion RNH_2 (or R_2NH) $\rightarrow$ R-H .



Leone, C.L.; Chamberlin, A.R. *Tetrahedron Lett.*, **1991**, 32, 1691.



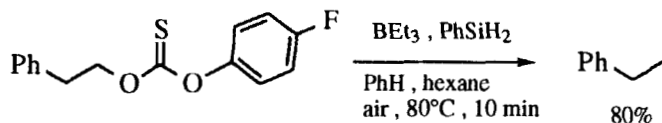
Guziec, F.S. Jr.; Wei, D. *J. Org. Chem.*, **1992**, 57, 3772.



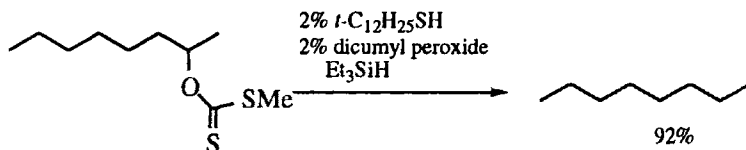
Balicki, R. *Gazz. Chim. Ital.*, **1992**, 122, 133.

SECTION 158: HYDRIDES FROM ESTERS

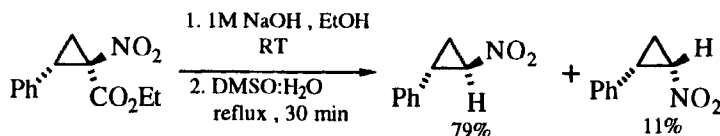
This section lists examples of the reactions $\text{RCO}_2\text{R}' \rightarrow \text{R-H}$ and $\text{RO}_2\text{CR}' \rightarrow \text{RH}$.



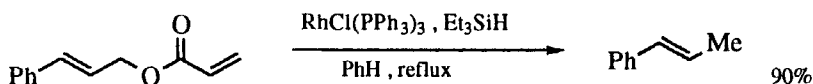
Barton, D.H.R.; Jang, D.O.; Jaszberenyi, J.C. *Tetrahedron Lett.*, **1990**, 31, 4681.



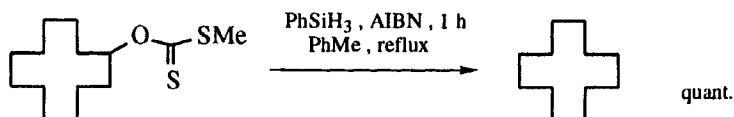
Kirwan, J.N.; Roberts, B.P.; Willis, C.R. *Tetrahedron Lett.*, **1990**, 31, 5093.



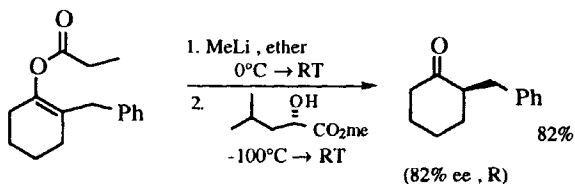
O'Bannon, P.E.; Dailey, W.P. *J. Org. Chem.*, **1990**, 55, 353.



Liu, H-L.; Zhu, B-Y. *Synth. Commun.*, **1990**, 20, 557.



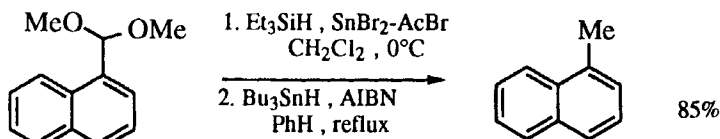
Barton, D.H.R.; Jang, D.O.; Jaszberenyi, J.Cs. *SynLett*, **1991**, 435.



Matsumoto, K.; Ohta, H. *Tetrahedron Lett.*, **1991**, 32, 4729.

SECTION 159: HYDRIDES FROM ETHERS, EPOXIDES AND THIOETHERS

This section lists examples of the reaction $\text{R-O-R}' \rightarrow \text{R-H}$.



Oriyama, T.; Ichimura, Y.; Koga, G. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 2581.

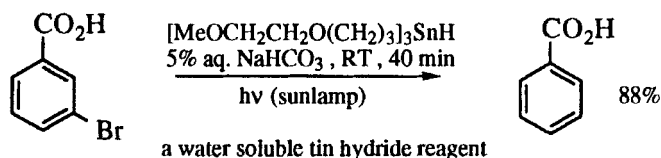
REVIEWS:

"Transition Metal Mediated C-S Bond Cleavage Reactions"

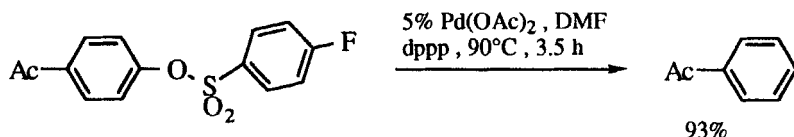
Luh, T-Y; Ni, Z-J. *Synthesis*, **1990**, 89.

SECTION 160: HYDRIDES FROM HALIDES AND SULFONATES

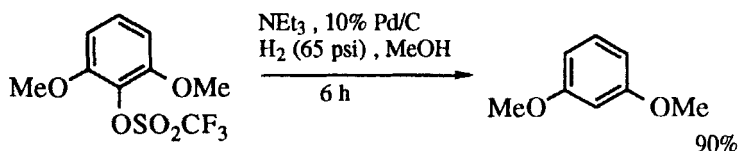
This section lists the reductions of halides and sulfonates, $R-X \rightarrow R-H$.



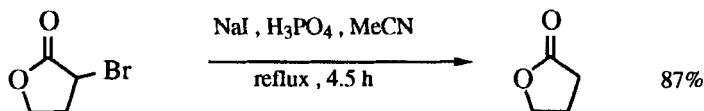
Light, J.; Breslow, R. *Tetrahedron Lett.*, **1990**, 31, 2957.



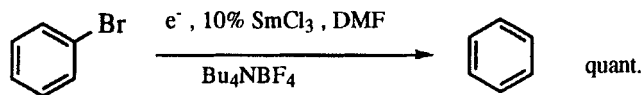
Cabri, W.; De Bernardinis, S.; Francalanci, F.; Panco, S.; Santi, R. *J. Org. Chem.*, **1990**, 55, 350.



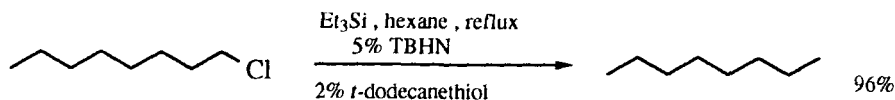
Saá, J.M.; Dopico, M.; Martorell, G.; García-Raso, A. *J. Org. Chem.*, **1990**, 55, 991.



Mandal, A.K.; Nijasure, A.M. *SynLett*, **1990**, 554.

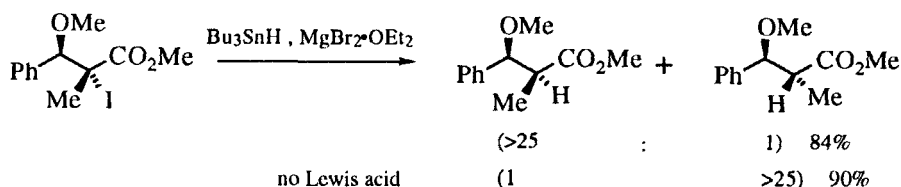


Hebri, H.; Duñach, E.; Périchon, J. *Synth. Commun.*, **1991**, 21, 2377.

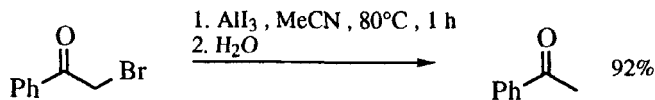


TBHN = di-*t*-butyl hyponitrite

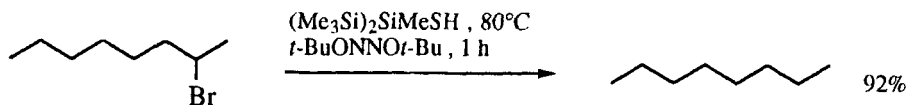
Cole, S.J.; Kirwan, J.N.; Roberts, B.P.; Willis, C.R. *J. Chem. Soc., Perkin Trans. I*, **1991**, 103.



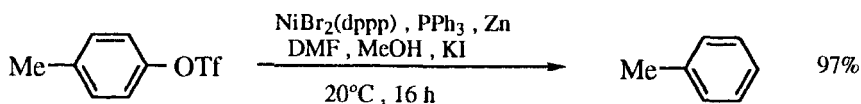
Guindon, Y.; Lavallée, J-F.; Llinas-Brunet, M.; Horner, G.; Rancourt, J. *J. Am. Chem. Soc.*, **1991**, 113, 9701.



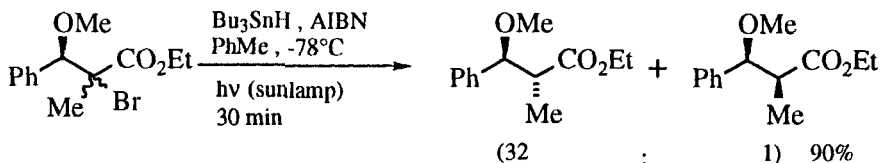
Borah, H.N.; Boruah, R.C.; Sandhu, J.S. *J. Chem. Soc., Chem. Commun.*, **1991**, 154.



Daroszewski, J.; Luszytko, J.; Degueil, M.; Navarro, C.; Maillard, B. *J. Chem. Soc., Chem. Commun.*, **1991**, 586.

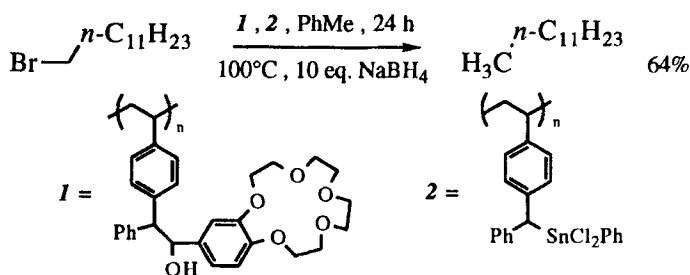


Sasaki, K.; Sakai, M.; Sakaibara, Y.; Takagi, K. *Chem. Lett.*, **1991**, 2017.

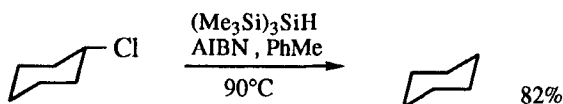


Guindon, Y.; Lavallée, J-F.; Boisvert, L.; Chabot, C.; Delorme, D.; Yoakim, C.; Hall, D.; Lemieux, R.; Simoneau, B. *Tetrahedron Lett.*, **1991**, 32, 27.

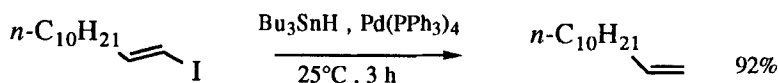
Guindon, Y.; Yoakim, C.; Lemieux, R.; Boisvert, L.; Delorme, D.; Lavallée, J-F. *Tetrahedron Lett.*, **1990**, 31, 2845.



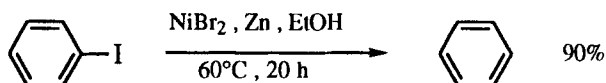
Blanton, J.R.; Salley, J.M. *J. Org. Chem.*, **1991**, 56, 490.



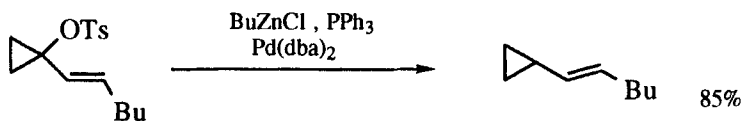
Ballestri, M.; Chatgililoglu, C.; Clark, K.B.; Griller, D.; Giese, B.; Kopping, B. *J. Org. Chem.*, **1991**, 56, 678.



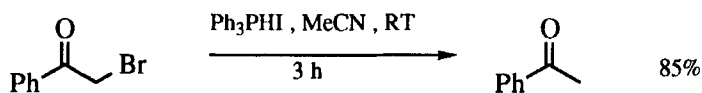
Taniguchi, M.; Takeyama, Y.; Fugami, K.; Oshima, K.; Utimoto, K. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 2593.



Sakai, M.; Lee, M.-S.; Yamaguchi, K.; Kawai, Y.; Sasaki, K.; Sakakibara, Y. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 1739.



Ollivier, J.; Piras, P.P.; Stolle, A.; Aufranc, P.; de Meijere, A.; Salauin, J. *Tetrahedron Lett.*, **1992**, 33, 3307.



Kamiya, N.; Tanmatu, H.; Ishii, Y. *Chem. Lett.*, **1992**, 293.

REVIEWS:

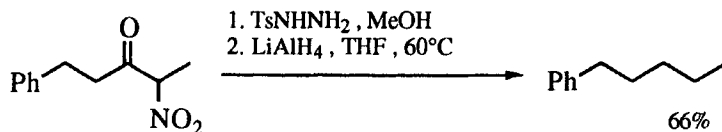
"New Mechanistic Insight into Reductions of Halides and Radicals with Samarium (II) Iodide"
Curran, D.P.; Fevig, T.L.; Jasperse, C.P.; Totleben, M.J. *SynLett*, **1992**, 943.

SECTION 161: HYDRIDES FROM HYDRIDES

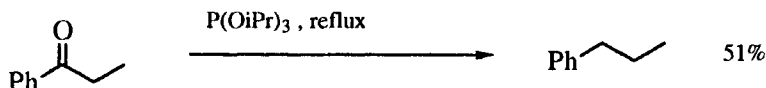
NO ADDITIONAL EXAMPLES

SECTION 162: HYDRIDES FROM KETONES

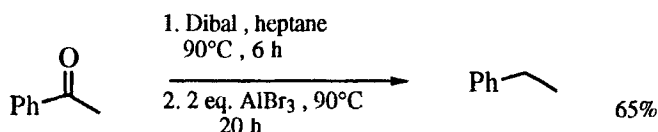
This section lists examples of the reaction $R_2C-(C=O)R \rightarrow R_2C-H$.



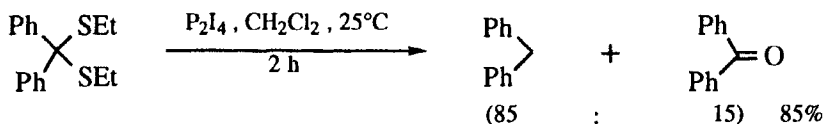
Ballini, R.; Petrini, M.; Rosini, G. *J. Org. Chem.*, **1990**, 55, 5159.



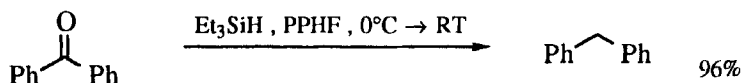
Olah, G.A.; Wu, A. *SynLett*, **1990**, 54.



Eisch, J.J.; Liu, Z-R.; Boleslawski, M.P. *J. Org. Chem.*, **1992**, 57, 2143.



Saimoto, H.; Kanzaki, A.; Miyazaki, K.; Sashiwa, H.; Shigemasa, Y. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 2842.

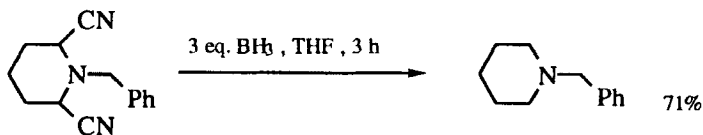


PPHF = pyridinium poly(hydrogen fluoride)

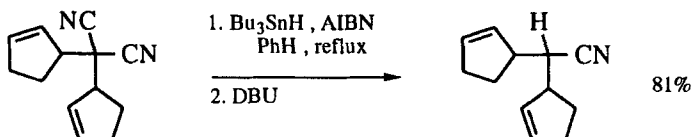
Olah, G.A.; Wang, Q.; Surya Prakash, G.K. *SynLett*, **1992**, 647.

SECTION 163: HYDRIDES FROM NITRILES

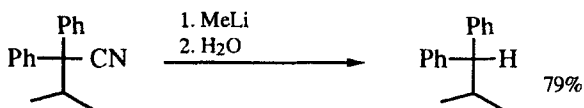
This section lists examples of the reaction, $R-C\equiv N \rightarrow R-H$ (includes reactions of isonitriles ($R-N\equiv C$)).



Ogura, K.; Shimamura, Y.; Fujita, M. *J. Org. Chem.*, **1991**, *56*, 2920.



Curran, D.P.; Seong, C.M. *SynLett*, **1991**, 107.



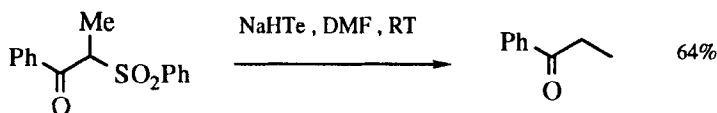
"normal" nitrile addition with $RMgX$

Kulp, S.S.; Romanelli, A. *Org. Prep. Proceed. Int.*, **1992**, *24*, 7.

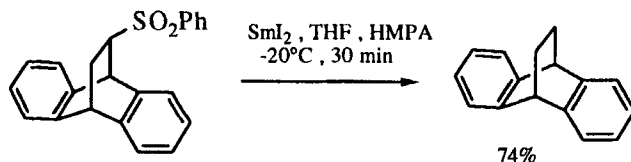
SECTION 164: HYDRIDES FROM ALKENES

NO ADDITIONAL EXAMPLES

SECTION 165: HYDRIDES FROM MISCELLANEOUS COMPOUNDS



Huang, X.; Pi, J-H. *Synth. Commun.*, **1990**, *20*, 2297.

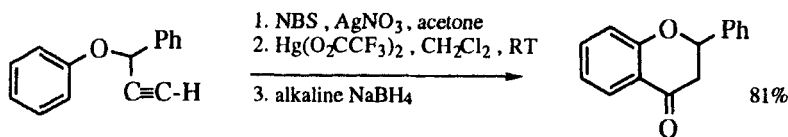


Künzer, H.; Stahnke, M.; Sauer, G.; Wiechert, R. *Tetrahedron Lett.*, **1991**, *32*, 1949.

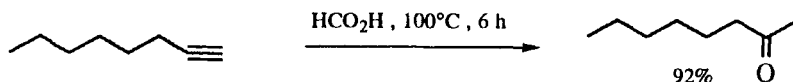
CHAPTER 12

PREPARATION OF KETONES

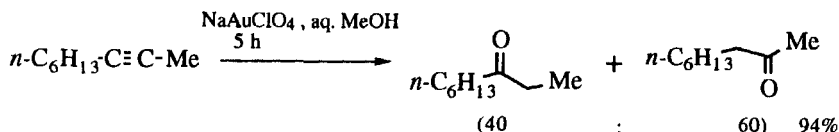
SECTION 166: KETONES FROM ALKYNES



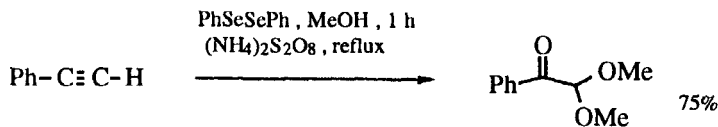
Subramanian, R.S.; Balasubramanian, K.K. *J. Chem. Soc., Chem. Commun.*, **1990**, 1469.



Menashe, N.; Reshef, D.; Shvo, Y. *J. Org. Chem.*, **1991**, 56, 2912.

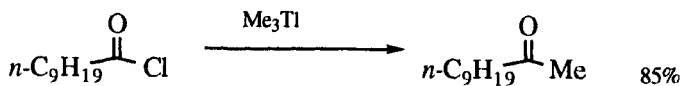


Fukuda, Y.; Utimoto, K. *J. Org. Chem.*, **1991**, 56, 3729.

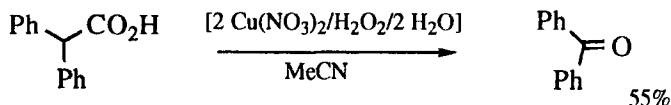


Tiecco, M.; Testaferri, L.; Tingoli, M.; Chianelli, D.; Bartoli, D. *J. Org. Chem.*, **1991**, 56, 4529.

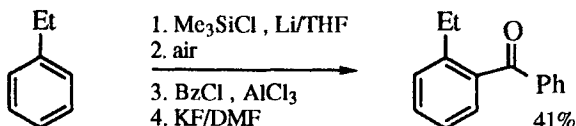
SECTION 167: KETONES FROM ACID DERIVATIVES



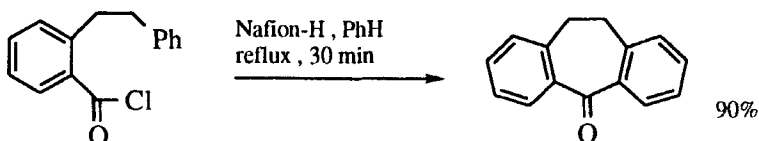
Markó, I.E.; Southern, J.M. *J. Org. Chem.*, **1990**, 55, 3368.



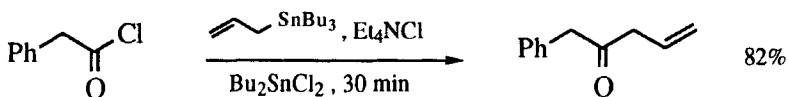
Capdevielle, P.; Maumy, M. *Tetrahedron Lett.*, **1990**, 31, 3891.



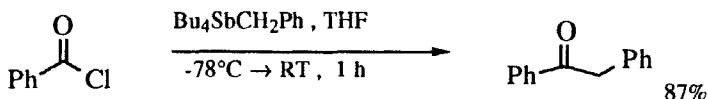
Bennetau, B.; Krempp, M.; Dunogues, J.; Ratton, S. *Tetrahedron Lett.*, **1990**, 31, 6179.



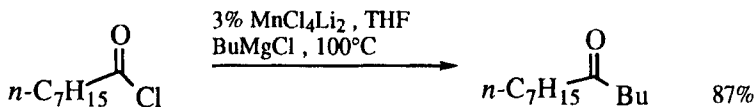
Yamato, T.; Hideshima, C.; Surya Prakash, G.K.; Olah, G.A. *J. Org. Chem.*, **1991**, 56, 3955.



Yano, K.; Baba, A.; Matsuda, H. *Chem. Lett.*, **1991**, 1181.

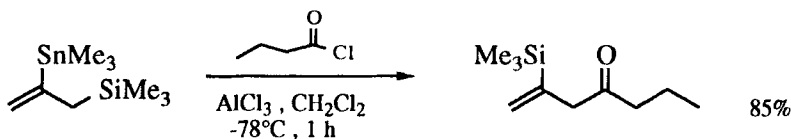


Zhang, L-J.; Huang, Y-Z.; Jiang, H-X.; Duan-Mu, J.; Liao, Y. *J. Org. Chem.*, **1992**, 57, 774.

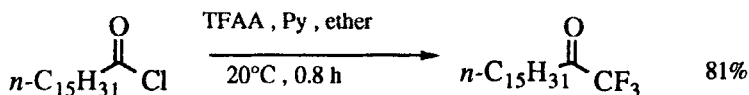


Cahiez, G.; Laboue, B. *Tetrahedron Lett.*, **1992**, 33, 4439.

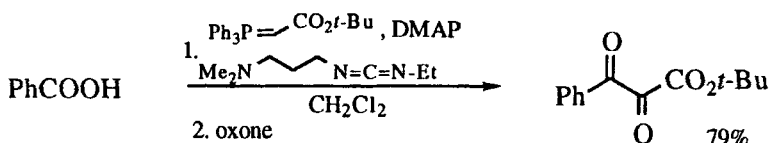
Cahiez, G.; Chavant, P-Y.; Metais, E. *Tetrahedron Lett.*, **1992**, 33, 5245.



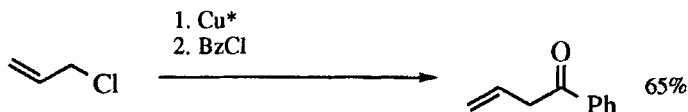
Kang, K-T.; Lee, J.C.; SunU, J. *Tetrahedron Lett.*, **1992**, 33, 4953.



Boivin, J.; El Kaim, L.; Zard, S.Z. *Tetrahedron Lett.*, **1992**, 33, 1285.



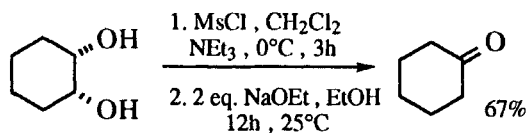
Wasserman, H.H.; Ennis, D.S.; Blum, C.A.; Rotello, V.M. *Tetrahedron Lett.*, **1992**, 33, 6003.



Cu^* = activated zerovalent copper

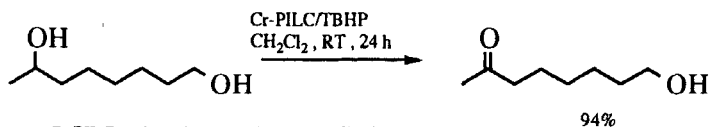
Stack, D.E.; Dawson, B.T.; Rieke, R.D. *J. Am. Chem. Soc.*, **1992**, 114, 5110.

SECTION 168: KETONES FROM ALCOHOLS AND THIOLS



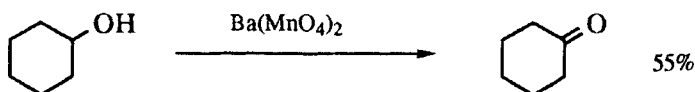
a Grob-like reaction

Pestchanker, M.J.; Giordano, O.S. *Tetrahedron Lett.*, **1990**, 31, 463.

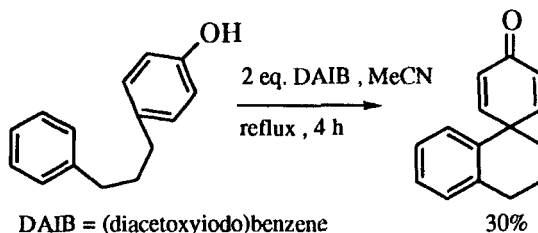


Cr-PILC = chromia-pillared montmorillonite

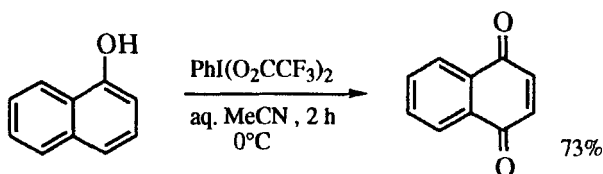
Choudary, B.M.; Durgaprasad, A.; Valli, V.L.K. *Tetrahedron Lett.*, **1990**, 31, 5785.



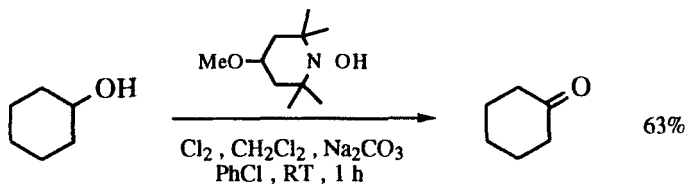
Firouzabadi, H.; Seddighi, M.; Mottaghinejad, E.; Bolourchian, M. *Tetrahedron*, **1990**, 46, 6869.



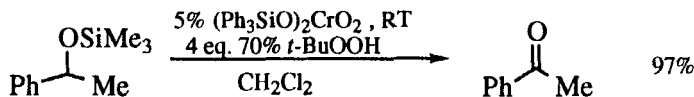
Rama Krishna, K.V.; Sujatha, K.; Kapil, R.S. *Tetrahedron Lett.*, **1990**, 31, 1351.



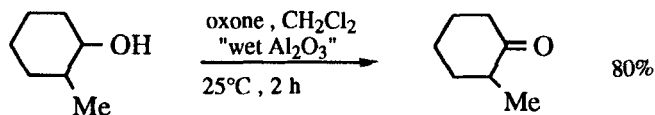
Barret, R.; Daudon, M. *Tetrahedron Lett.*, **1990**, 31, 4871.



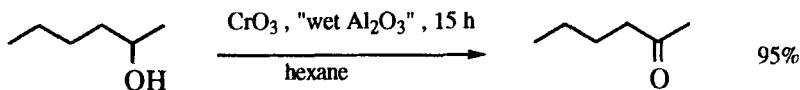
Yamaguchi, M.; Takata, T.; Endo, T. *Bull. Chem. Soc. Jpn.*, **1990**, 63, 947.



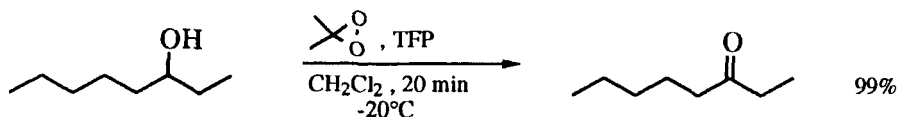
Muzart, J.; Ajjou, A.N. *SynLett*, **1991**, 497.



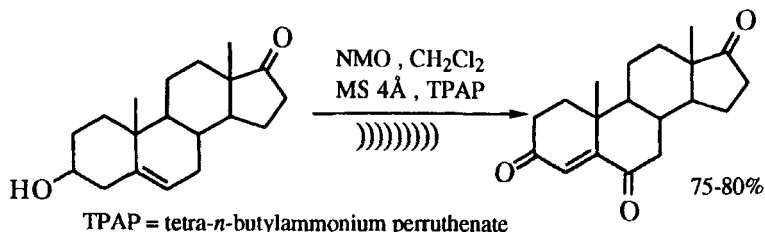
Hirano, M.; Oose, M.; Morimoto, T. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 1046.



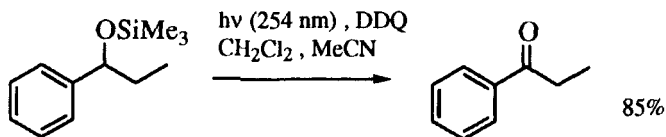
Hirano, M.; Nagasawa, S.; Morimoto, T. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 2857.



Mello, R.; Cassidei, L.; Fiorentino, M.; Fusco, C.; Hümmer, W.; Jäger, V.; Curci, R. *J. Am. Chem. Soc.*, **1991**, *113*, 2205.

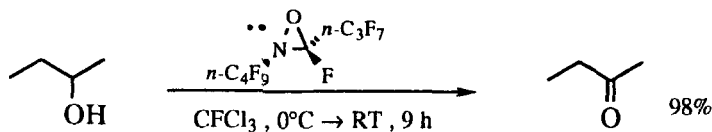


Miranda Moreno, M.J.S.; Sáe Melo, M.L.; Campos Neves, A.S. *Tetrahedron Lett.*, **1991**, *32*, 3201.

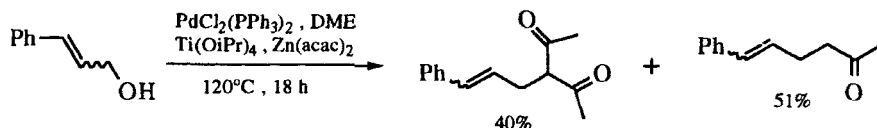


also - aldehydes from $\text{R-CH}_2\text{OTMS}$

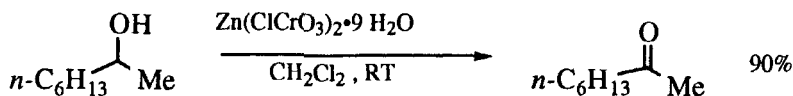
Piva, O.; Amougay, A.; Pete, J-P. *Tetrahedron Lett.*, **1991**, *32*, 3993.



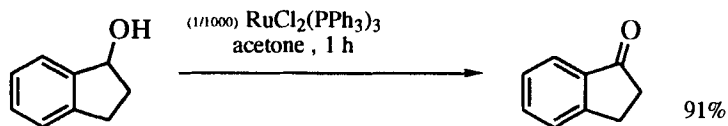
DesMarteau, D.D.; Petrov, V.A.; Montanari, V.; Pregnolato, M.; Resnati, G. *Tetrahedron Lett.*, **1992**, *33*, 7245.



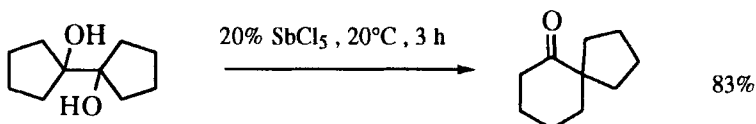
Itoh, K.; Hamaguchi, N.; Miura, M.; Nomura, M. *J. Chem. Soc., Perkin Trans. I*, **1992**, 2833.



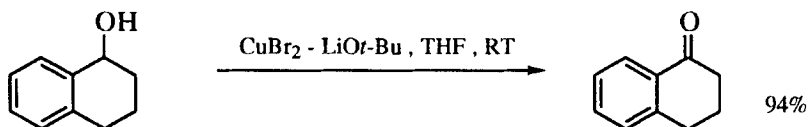
Firouzabadi, H.; Sharifi, A. *Synthesis*, **1992**, 999.



Wang, G-Z.; Bäckvall, J-E. *J. Chem. Soc., Chem. Commun.*, **1992**, 337.

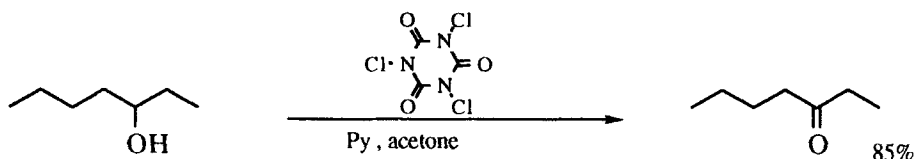


Harada, T.; Mukaiyama, T. *Chem. Lett.*, **1992**, 81.



also for preparation of aldehydes from 1° alcohols

Yamaguchi, J.; Yamamoto, S.; Takeda, T. *Chem. Lett.*, **1992**, 1185.



Hiegel, G.A.; Nalbandy, M. *Synth. Commun.*, **1992**, 22, 1589.

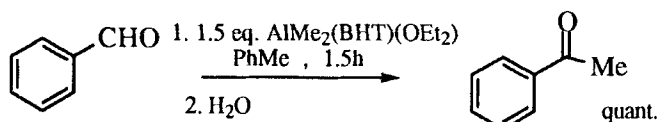
REVIEWS:

"Synthetic Oxidations with Hypochlorites"

Skarzewski, J.; Siedlecka, R. *Org. Prep. Proceed. Int.*, **1992**, 24, 625.

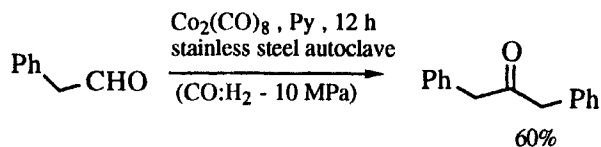
Related Methods: Section 48 (Aldehydes from Alcohols and Phenols).

SECTION 169: KETONES FROM ALDEHYDES

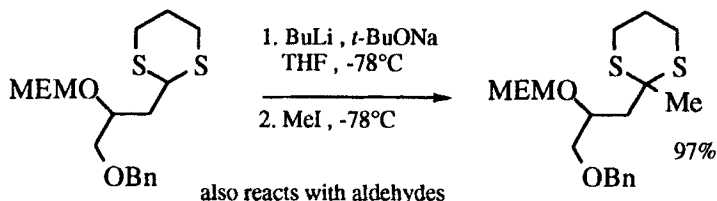


BHT = 2,6-di-*t*-butyl-4-methylphenol

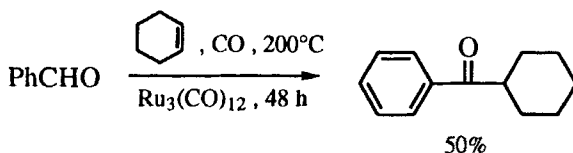
Power, M.B.; Barron, A.R. *Tetrahedron Lett.*, **1990**, 31, 323.



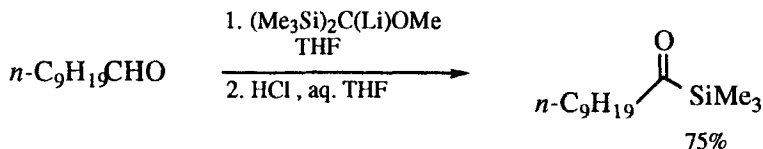
Fontaine, M.; Noels, A.F.; Demonceau, A.; Hubert, A.J. *Tetrahedron Lett.*, **1990**, 31, 3117.



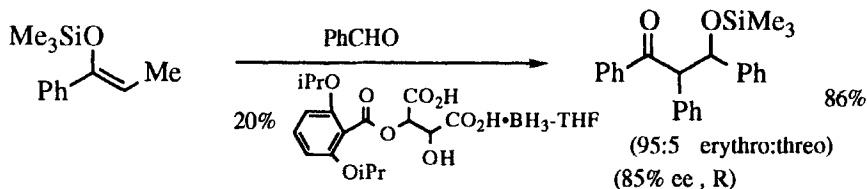
Lipshutz, B.H.; Garcia, E. *Tetrahedron Lett.*, **1990**, 31, 7261.



Kondo, T.; Akazome, M.; Tsuji, Y.; Watanabe, Y. *J. Org. Chem.*, **1990**, 55, 1286.



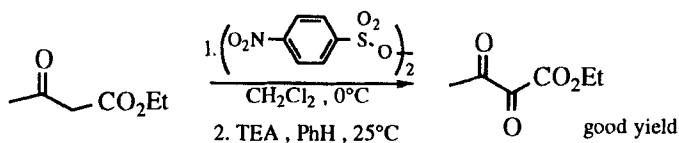
Yoshida, J.; Matsunaga, S.; Ishichi, Y.; Maekawa, T.; Isoe, S. *J. Org. Chem.*, **1991**, 56, 1307.



Furuta, K.; Maruyama, T.; Yamamoto, H. *J. Am. Chem. Soc.*, **1991**, 113, 1041.

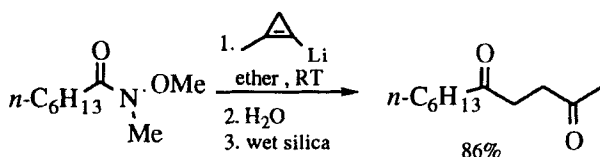
SECTION 170: KETONES FROM ALKYL, METHYLENES AND ARYLS

This section lists examples of the reaction, $R-CH_2-R' \rightarrow R(C=O)-R'$.

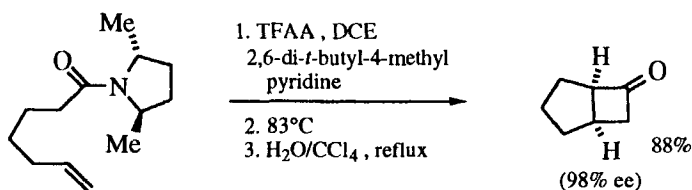


Hoffman, R.V.; Kim, H-O.; Wilson, A.L. *J. Org. Chem.*, **1990**, 55, 2820.

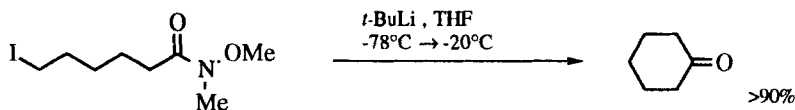
SECTION 171: KETONES FROM AMIDES



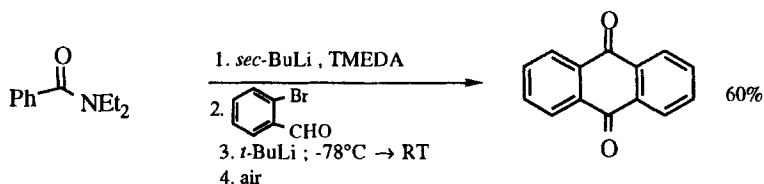
Bergman, R.; Nilsson, B.; Wickberg, B. *Tetrahedron Lett.*, **1990**, 31, 2783.



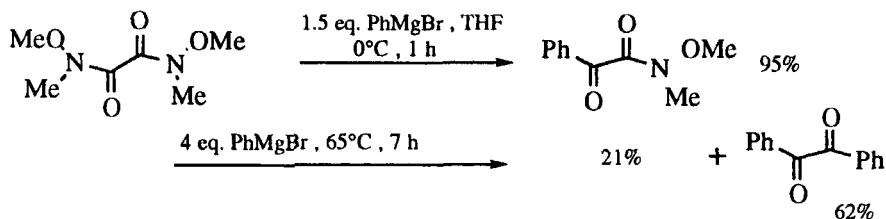
Chen, L.; Ghosez, L. *Tetrahedron Lett.*, **1990**, 31, 4467.



Souchet, M.; Clark, R.D. *SynLett*, **1990**, 151.

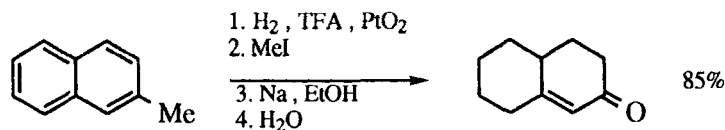


Wang, X.; Snieckus, V. *SynLett*, **1990**, 313.

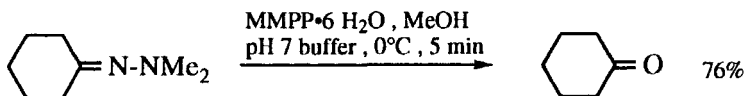


Sibi, M.P.; Sharma, R.; Paulson, K.L. *Tetrahedron Lett.*, **1992**, 33, 1941.

SECTION 172: KETONES FROM AMINES

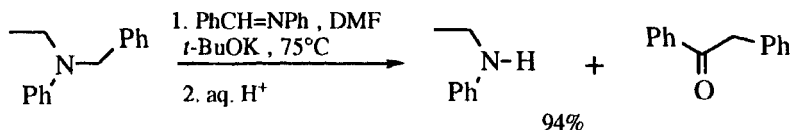


Stevens, R.V.; Canary, J.W. *J. Org. Chem.*, **1990**, 55, 2237.

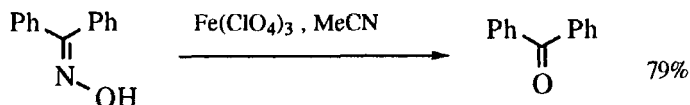


MMPP = magnesium monoperoxyphthalate

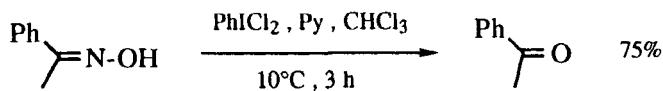
Enders, D.; Plant, A. *SynLett*, **1990**, 725.



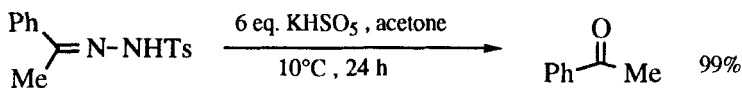
Paventi, M.; Hay, A.S. *Tetrahedron Lett.*, **1991**, 32, 1617.



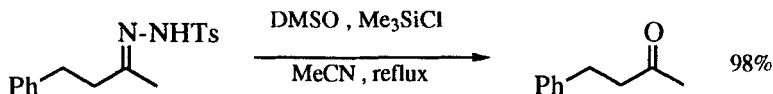
Kumar, H.; Kaur, B.; Kumar, B. *Ind. J. Chem.*, **1991**, 30B, 869.



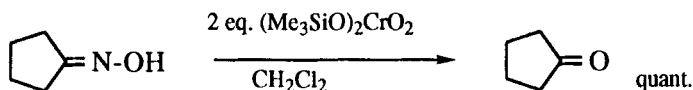
Radhakrishna, A.S.; Augustine, B.; Sivaprakash, K.; Singh, B.B. *Synth. Commun.*, **1991**, 21, 1473.



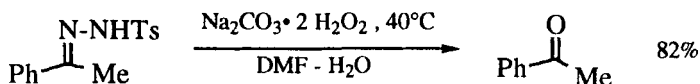
Jung, J.C.; Kim, K.S.; Kim, Y.H. *Synth. Commun.*, **1992**, 22, 1583.



Ghelfi, F.; Grandi, R.; Pagnoni, U.M. *Synth. Commun.*, **1992**, 22, 1845.

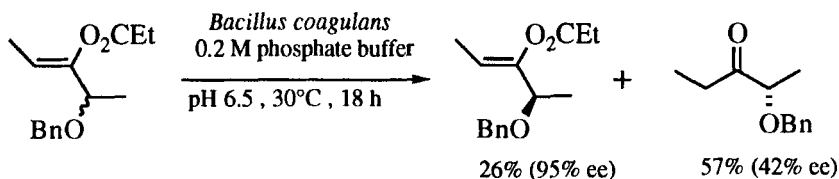


Lee, J.G.; Kwak, K.H.; Hwang, J.P. *Synth. Commun.*, **1992**, 22, 2425.

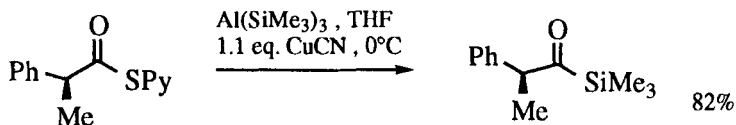


Narayana, C.; Reddy, N.K.; Kabalka, G.W. *Synth. Commun.*, **1992**, 22, 2587.

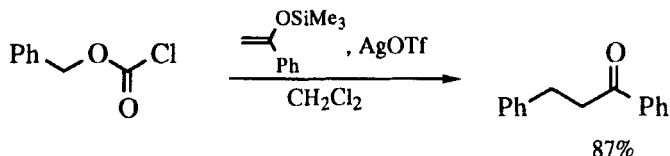
SECTION 173: KETONES FROM ESTERS



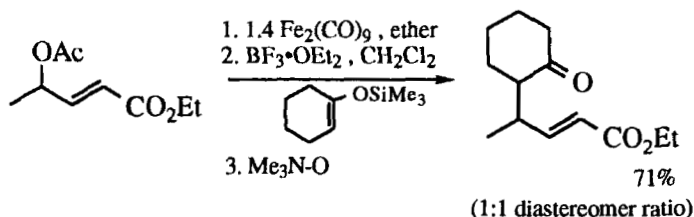
Matsumoto, K.; Suzuki, N.; Ohia, H. *Tetrahedron Lett.*, **1990**, 31, 7159.



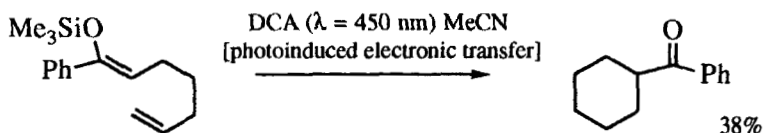
Nakada, M.; Nakamura, S.; Kobayashi, S.; Ohno, M. *Tetrahedron Lett.*, **1991**, 32, 4929.



Takeda, K.; Ayabe, A.; Kawashima, H.; Harigaya, Y. *Tetrahedron Lett.*, **1992**, 33, 951.

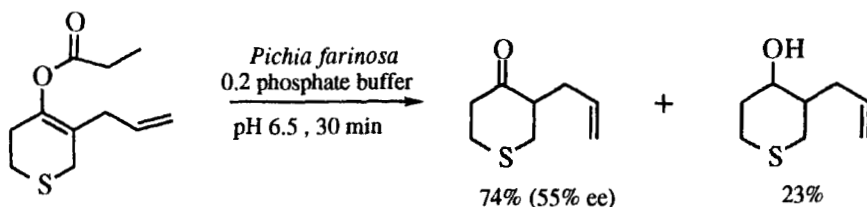


Green, J.R.; Carroll, M.K. *Tetrahedron Lett.*, **1991**, 32, 1141.



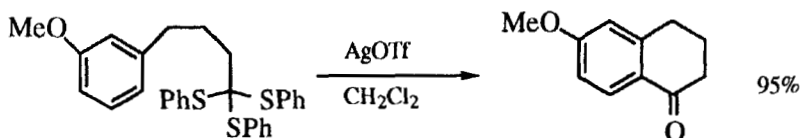
DCA = 9,10-dicyanoanthracene

Heidbreder, A.; Mattay, J. *Tetrahedron Lett.*, **1992**, 33, 1973.

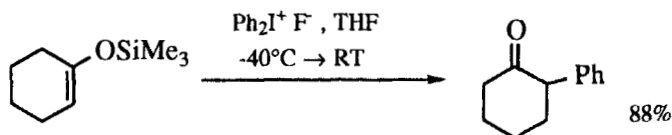


Kume, Y.; Ohta, H. *Tetrahedron Lett.*, **1992**, 33, 6367.

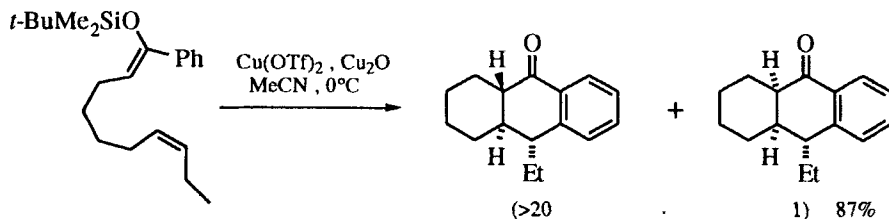
SECTION 174: KETONES FROM ETHERS, EPOXIDES AND THIOETHERS



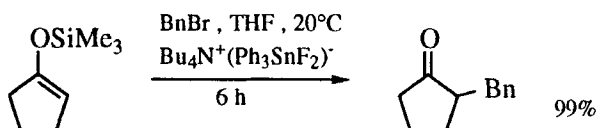
Gramage, S.A.; Smith, R.A.J. *Aust. J. Chem.*, **1990**, 43, 815.



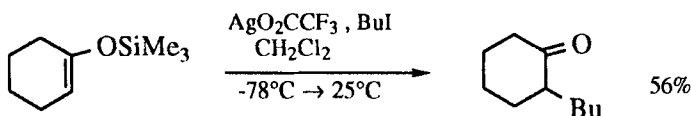
Chen, K.; Koser, G.F. *J. Org. Chem.*, **1991**, 56, 5764.



Snider, B.B.; Kwon, T. *J. Org. Chem.*, **1990**, *55*, 4786.

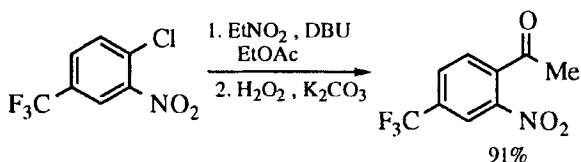


Gingras, M. *Tetrahedron Lett.*, **1991**, *32*, 7381.

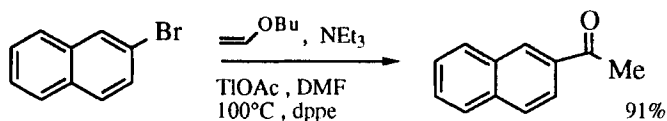


Jefford, C.W.; Sledeski, A.W.; Lelandais, P.; Boukouvalas, J. *Tetrahedron Lett.*, **1992**, *33*, 1855.

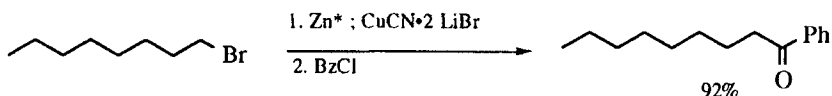
SECTION 175: KETONES FROM HALIDES AND SULFONATES



Reid, J.G.; Reny Runge, J.M. *Tetrahedron Lett.*, **1990**, *31*, 1093.



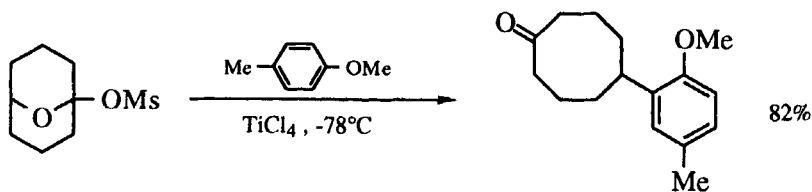
Cabri, W.; Candiani, I.; Bedeschi, A.; Santi, R. *Tetrahedron Lett.*, **1991**, *32*, 1753.



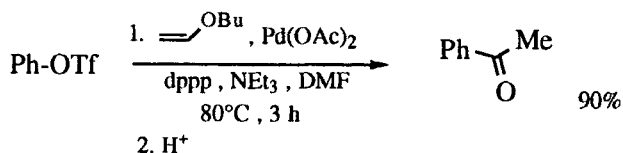
$\text{Zn}^* = \text{ZnCl}_2/\text{Li naphth.}$

also for conjugate addition
reactions and reaction with ArX

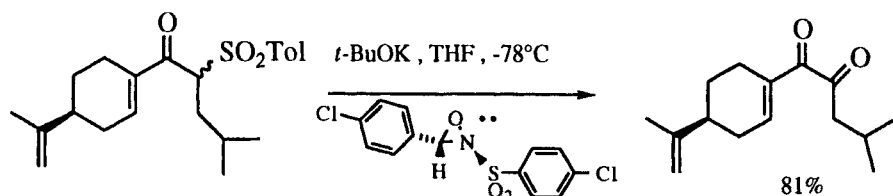
Zhu, L.; Wehmeyer R.M.; Riecke, R.D. *J. Org. Chem.*, **1991**, *56*, 1445.



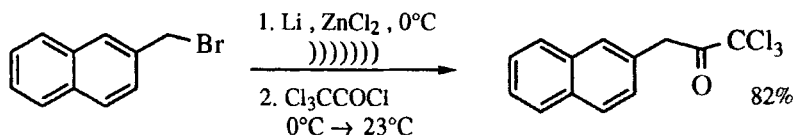
Kraus, G.A.; Hansen, J. *SynLett*, **1990**, 483.



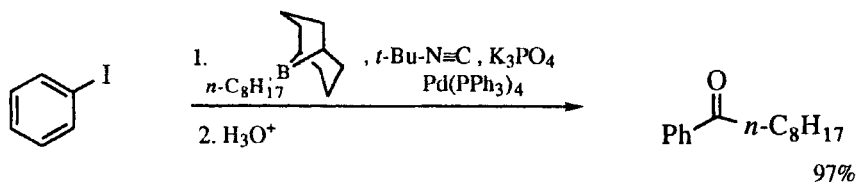
Cabri, W.; Candiani, I.; Bedeschi, A.; Pence, S.; Santi, R. *J. Org. Chem.*, **1992**, 57, 1481.



Williams, D.R.; Robinson, L.A.; Amato, G.S.; Osterhout, M.H. *J. Org. Chem.*, **1992**, 57, 3740.



Corey, E.L.; Link, J.O. *Tetrahedron Lett.*, **1992**, 33, 3435.

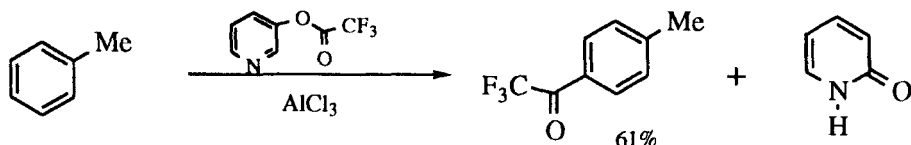


Ishiyama, T.; Oh-e, T.; Miyaura, N.; Suzuki, A. *Tetrahedron Lett.*, **1992**, 33, 4465.

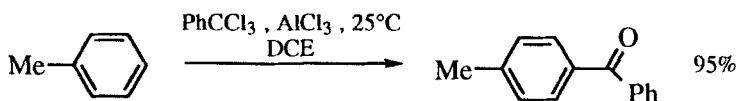
Related Methods: Section 177 (Ketones from Ketones).
Section 55 (Aldehydes from Halides).

SECTION 176: KETONES FROM HYDRIDES

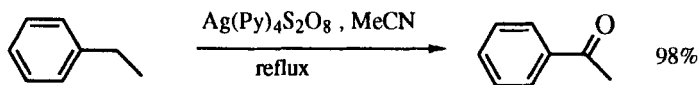
This section lists examples of the replacement of hydrogen by ketonic groups, $R-H \rightarrow R(C=O)-R'$. For the oxidation of methylenes, $R_2CH_2 \rightarrow R_2C=O$, see section 170 (Ketones from Alkyls).



Keumi, T.; Shimada, M.; Takahashi, M.; Kitajima, H. *Chem. Lett.*, **1990**, 783.

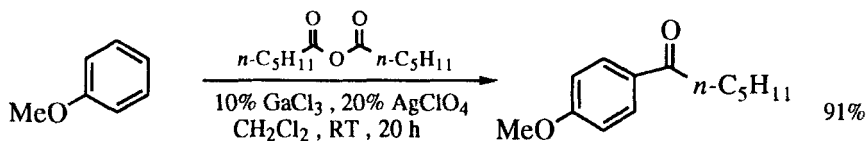


Ayyangar, N.R.; Lahoti, R.J.; Srinivasan, K.V.; Daniel, T. *Synthesis*, **1991**, 322.

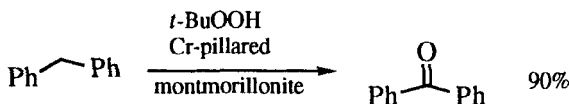


ArMe gives ArCHO

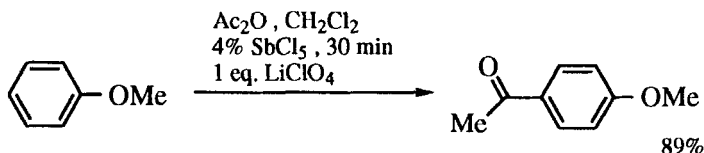
Firouzabadi, H.; Salehi, P.; Sardarian, A.R.; Seddighi, M. *Synth. Commun.*, **1991**, 21, 1121.



Mukaiyama, T.; Ohno, T.; Nishimura, T.; Suda, S.; Kobayashi, S. *Chem. Lett.*, **1991**, 1059.



Choudary, B.M.; Prasad, A.D.; Bhuma, V.; Swapna, V. *J. Org. Chem.*, **1992**, 57, 5841.

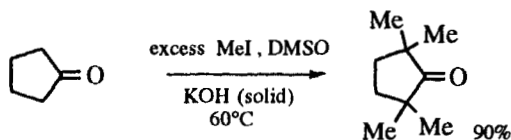


Mukaiyama, T.; Suzuki, K.; Han, J.S.; Kobayashi, S. *Chem. Lett.*, **1992**, 435.

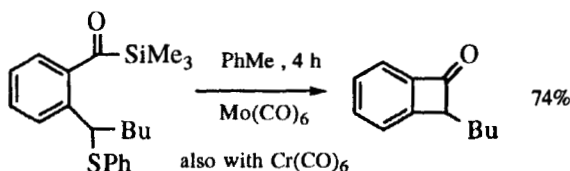
SECTION 177: KETONES FROM KETONES

This section contains alkylations of ketones and protected ketones, ketone transpositions and annulations, ring expansions and ring openings and dimerizations. Conjugate reductions and Michael alkylations of enone are listed in Section 74 (Alkyls from Alkenes).

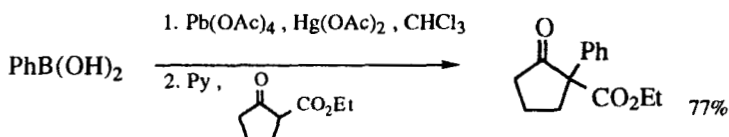
For the preparation of enamines or imines from ketones, see Section 356 (Amine-Alkene).



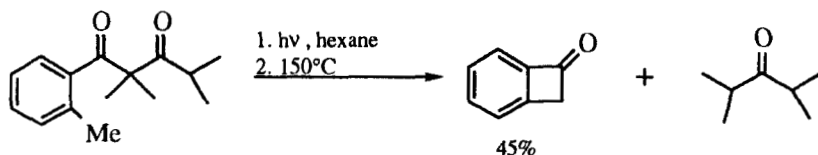
Langhals, E.; Langhals, H. *Tetrahedron Lett.*, **1990**, 31, 859.



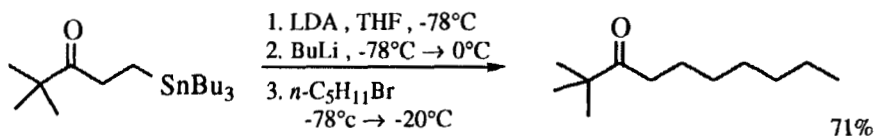
Kang, J.; Choi, Y.R.; Kim, B.J.; Jeong, J.U.; Lee, S.; Lee, J.H.; Pyun, C. *Tetrahedron Lett.*, **1990**, 31, 2713.



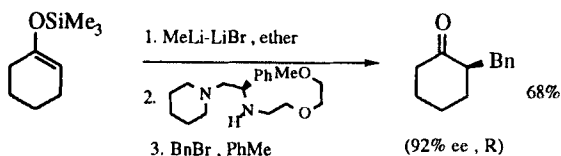
Morgan, J.; Pinhey, J.T. *J. Chem. Soc., Perkin Trans. I*, **1990**, 715.



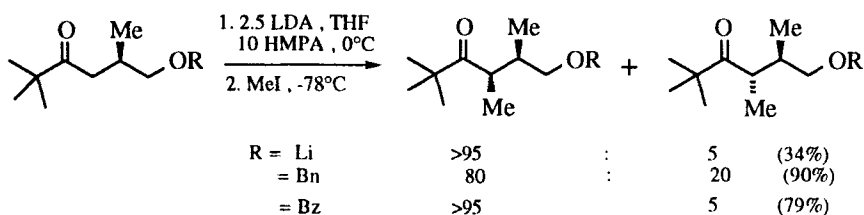
Yoshioka, M.; Arai, M.; Nishizawa, K.; Hasegawa, T. *J. Chem. Soc., Chem. Commun.*, **1990**, 374.



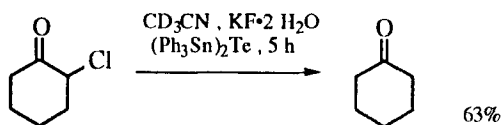
Nakahira, H.; Ryu, I.; Ikebe, M.; Kanbe, N.; Sonoda, N. *Angew. Chem. Int. Ed. Engl.*, **1991**, 30, 177.



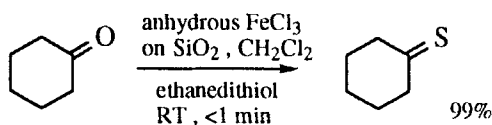
Murakata, M.; Nakajima, M.; Koga, K. *J. Chem. Soc., Chem. Commun.*, **1990**, 1657.



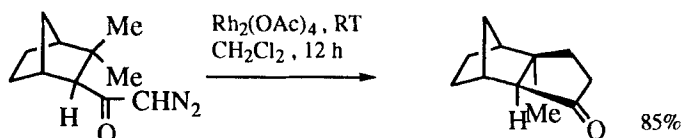
McGarvey, G.J.; Andersen, M.W. *Tetrahedron Lett.*, **1990**, 31, 4569.



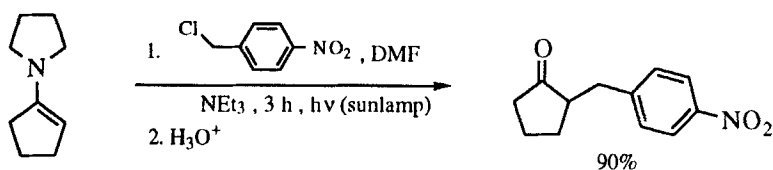
Li, C.-J.; Harpp, D.N. *Tetrahedron Lett.*, **1991**, 32, 1545.



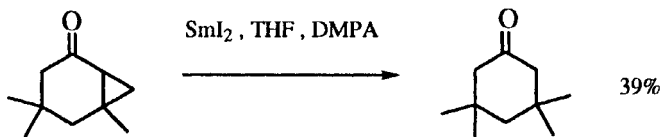
Patney, H.K. *Tetrahedron Lett.*, **1991**, 32, 2259.



Sonawane, H.R.; Bellur, N.S.; Ahuja, J.R.; Kulkarni, D.G. *J. Org. Chem.*, **1991**, 56, 1434.

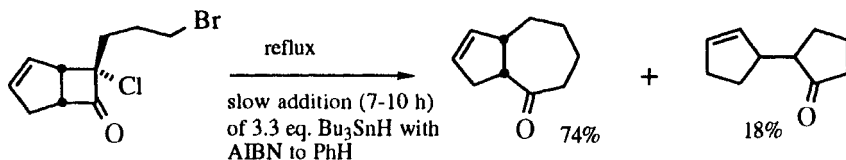


Russell, G.A.; Wang, K. *J. Org. Chem.*, **1991**, 56, 3475.



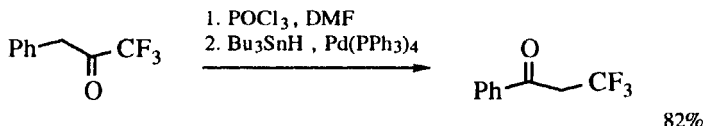
DMPU = 1,3-dimethyl-3,4,5,6-tetrahydro-2(1H)-pyrimidinone

Batey, R.A.; Motherwell, W.B. *Tetrahedron Lett.*, **1991**, 32, 6211, 6649.

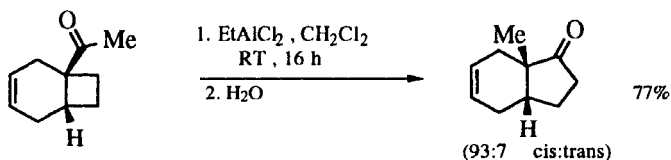


Dowd, P.; Zhang, W. *J. Am. Chem. Soc.*, **1991**, 113, 9875.

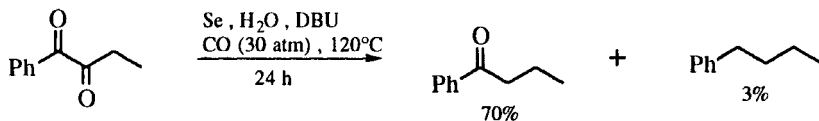
Zhang, W.; Dowd, P. *Tetrahedron Lett.*, **1992**, 33, 3285.



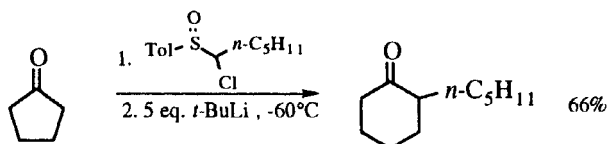
Laurent, A.J.; Lesniak, S. *Tetrahedron Lett.*, **1992**, 33, 3311.



Fujiwara, T.; Tomaru, J.; Suda, A.; Takeda, T. *Tetrahedron Lett.*, **1992**, 33, 2583.



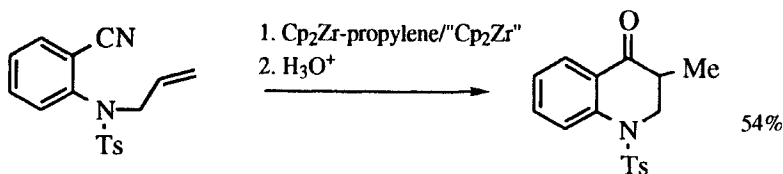
Nishiyama, Y.; Inoue, J.; Teranishi, K.; Moriwaki, M.; Hamanaka, S. *Tetrahedron Lett.*, **1992**, 33, 6347.



Satoh, T.; Itoh, N.; Gengyo, K.; Yamakawa, K. *Tetrahedron Lett.*, **1992**, 33, 7543.

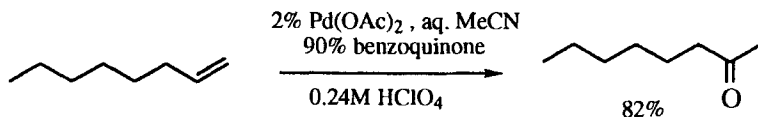
Related Methods: Section 49 (Aldehydes from Aldehydes).

SECTION 178: KETONES FROM NITRILES

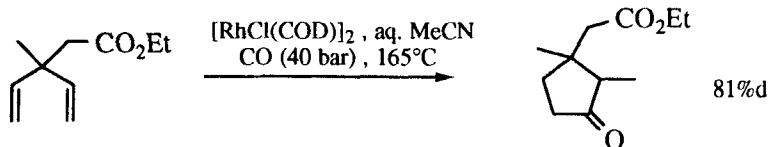


Mori, M.; Uesaka, N.; Shibasaki, M. *J. Chem. Soc., Chem. Commun.*, **1990**, 1222.

SECTION 179: KETONES FROM ALKENES

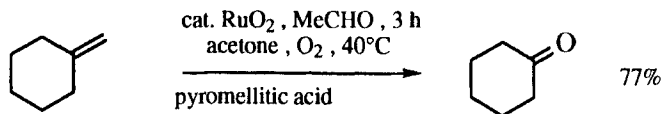


Miller, D.G.; Wayner, D.D.M. *J. Org. Chem.*, **1990**, 55, 2924.



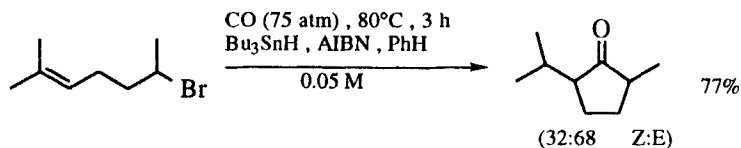
Eilbracht, P.; Hüttmann, G-E. *Chem. Ber.*, **1990**, 123, 1053.

Eilbracht, P.; Hüttmann, G-E.; Deußen, R. *Chem. Ber.*, **1990**, 123, 1063.

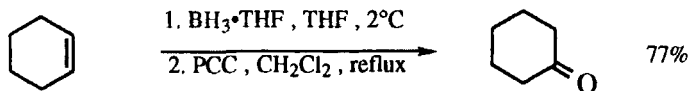


pyromellitic acid = 1,2,4,5-benzenetetracarboxylic acid

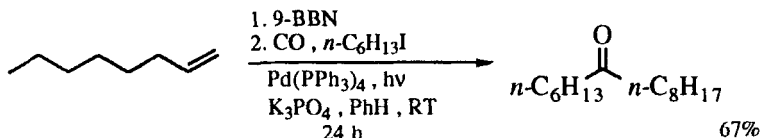
Kaneda, K.; Haruna, S.; Imanaka, T.; Kawamoto, K. *J. Chem. Soc., Chem. Commun.*, **1990**, 1467.



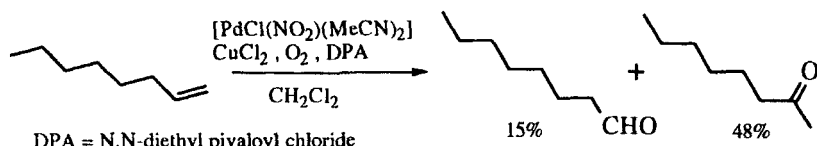
Ryu, I.; Kusano, K.; Hasegawa, M.; Kambe, N.; Sonoda, N. *J. Chem. Soc., Chem. Commun.*, **1991**, 1018.



Parish, E.L.; Parish, S.; Honda, H. *Synth. Commun.*, **1990**, *20*, 3265.



Ishiyama, T.; Miyama, N.; Suzuki, A. *Tetrahedron Lett.*, **1991**, *32*, 6923.



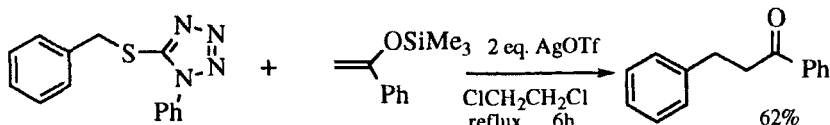
DPA = N,N-diethyl pivaloyl chloride

Kiers, N.H.; Feringa, B.L.; van Leeuwen, P.W.N.M. *Tetrahedron Lett.*, **1992**, *33*, 2403.

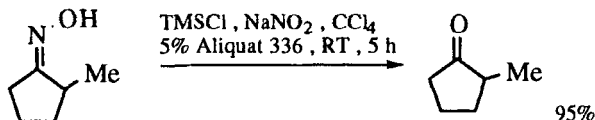
See also: Section 134 (Ethers from Alkenes). Section 174 (Ketones from Ethers).

SECTION 180: KETONES FROM MISCELLANEOUS COMPOUNDS

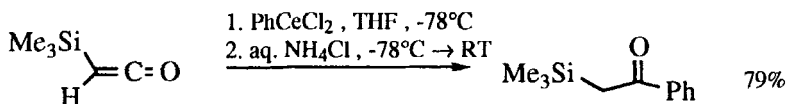
Conjugate reductions and reductive alkylations of enones are listed in Section 74 (Alkyls from Alkenes). Ketones from oximes are listed here.



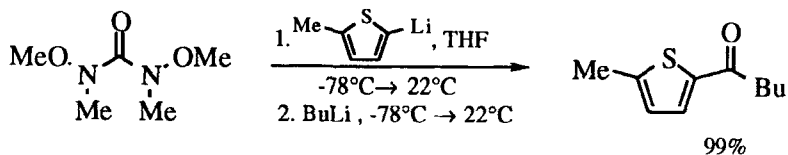
Takeda, K.; Torii, K.; Ogura, H. *Tetrahedron Lett.*, **1990**, *31*, 265.



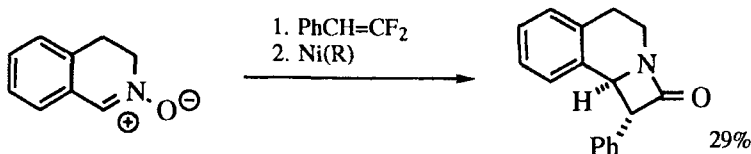
Lee, J.G.; Kwak, K.H.; Hwang, J.P. *Tetrahedron Lett.*, **1990**, *31*, 6677.



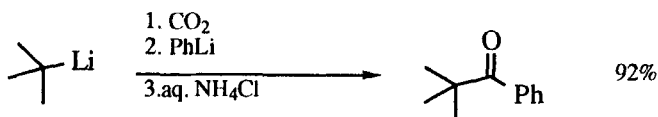
Kita, Y.; Matsuda, S.; Kitagaki, S.; Tsuzuki, Y.; Akai, S. *SynLett*, **1991**, 401.



Whipple, W.L.; Reich, H.J. *J. Org. Chem.*, **1991**, *56*, 2911.

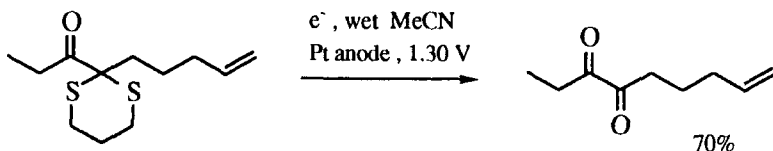


Purington, S.T.; Sheu, K-W. *Tetrahedron Lett.*, **1992**, *33*, 3289.

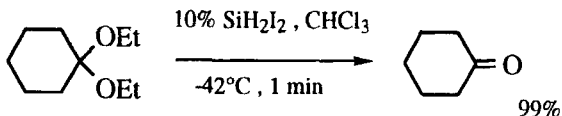


Zadel, G.; Breitmaier, E. *Angew. Chem. Int. Ed. Engl.*, **1992**, *31*, 1035.

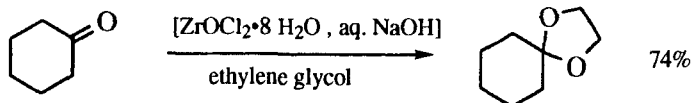
SECTION 180A: PROTECTION OF KETONES



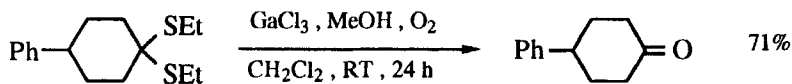
Martre, A-M.; Mousset, G.; Bel Rhlid, R.; Veschambre, H. *Tetrahedron Lett.*, **1990**, *31*, 2599.



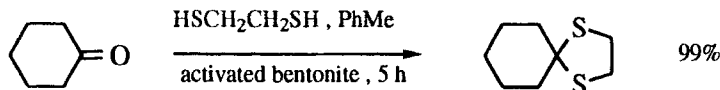
Keinan, E.; Perez, D.; Sahai, M.; Shvily, R. *J. Org. Chem.*, **1990**, *55*, 2927.



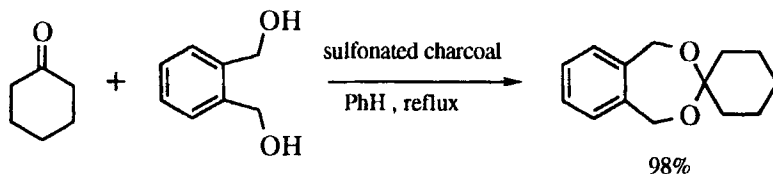
Shibagaki, M.; Takahashi, K.; Kuno, H.; Matsushita, H. *Bull. Chem. Soc. Jpn.*, **1990**, *63*, 1258.



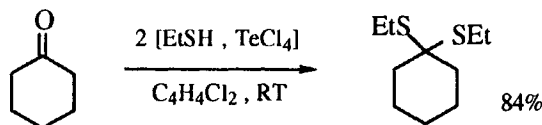
Saigo, K.; Hashimoto, Y.; Kihara, N.; Umehara, H.; Hasegawa, M. *Chem. Lett.*, **1990**, 831.



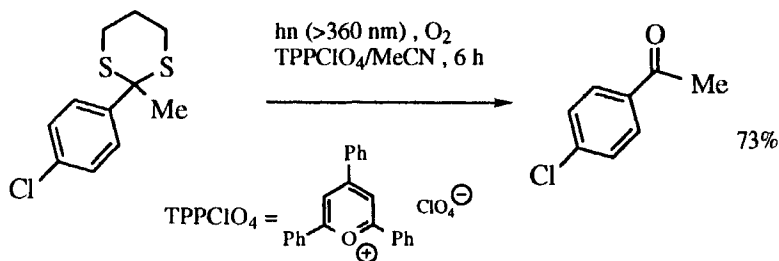
Miranda, R.; Cervantes, H.; Joseph-Nathan, P. *Synth. Commun.*, **1990**, 20, 153.



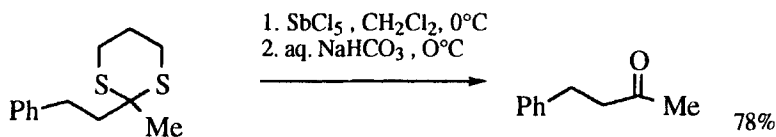
Patney, H.K. *Tetrahedron Lett.*, **1991**, 32, 413.



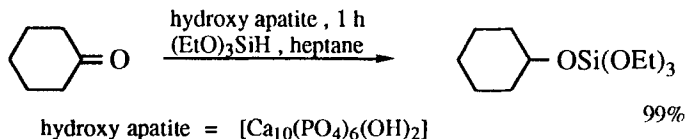
Tani, H.; Masumoto, K.; Inamasu, T.; Suzuki, H. *Tetrahedron Lett.*, **1991**, 32, 2039.



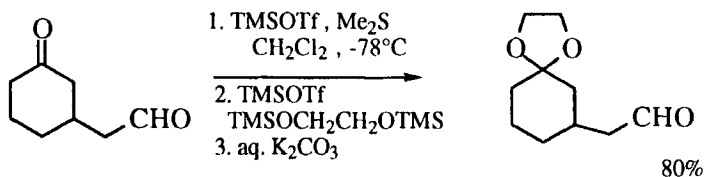
Kamata, M.; Kato, Y.; Hasegawa, E. *Tetrahedron Lett.*, **1991**, 32, 4349.



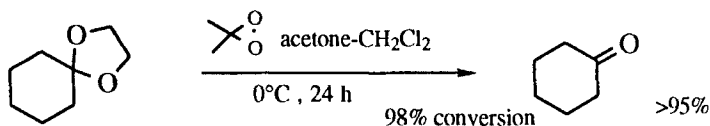
Kamata, M.; Otogawa, H.; Hasegawa, E. *Tetrahedron Lett.*, **1991**, 32, 7421.



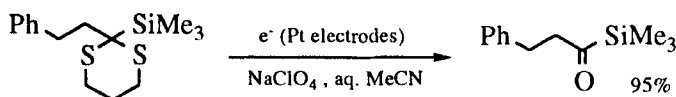
Izumi, Y.; Nanami, H.; Higuchi, K.; Onanaka, M. *Tetrahedron Lett.*, **1991**, 32, 4741.



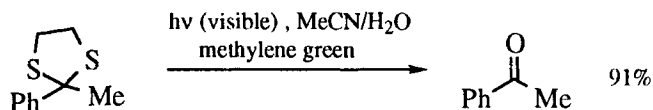
Kim, S.; Kim, Y.G.; Kim, D. *Tetrahedron Lett.*, **1992**, 33, 2565.



Curci, R.; D'Accolti, L.; Fiorentino, M.; Fusco, C.; Adam, W.; González-Núñez, M.E.; Mello, R. *Tetrahedron Lett.*, **1992**, 33, 4225.

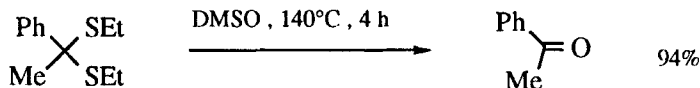


Suda, K.; Watanabe, J.; Takanami, T. *Tetrahedron Lett.*, **1992**, 33, 1355.



Epling, G.A.; Wang, Q. *Tetrahedron Lett.*, **1992**, 33, 5909.

Epling, G.A.; Wang, Q. *SynLett*, **1992**, 335.



Rao, Ch.S.; Chandrasekharam, M.; Ila, H.; Junjappa, H. *Tetrahedron Lett.*, **1992**, 33, 8163.

See Section 362 (Ester-Alkene) for the formation of enol esters and Section 367 (Ether-Alkenes) for the formation of enol ethers. Many of the methods in Section 60A (Protection of Aldehydes) are also applicable to ketones.

CHAPTER 13

PREPARATION OF NITRILES

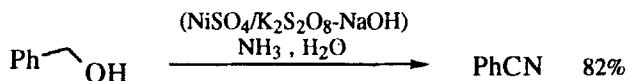
SECTION 181: NITRILES FROM ALKYNES

NO ADDITIONAL EXAMPLES

SECTION 182: NITRILES FROM ACID DERIVATIVES

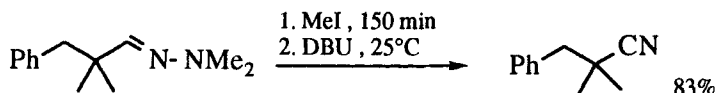
NO ADDITIONAL EXAMPLES

SECTION 183: NITRILES FROM ALCOHOLS AND THIOLS

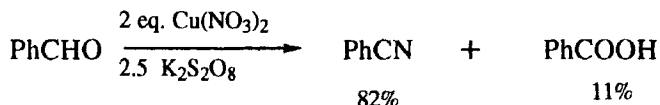


Yamazaki, S.; Yamazaki, Y. *Chem. Lett.*, **1990**, 571.

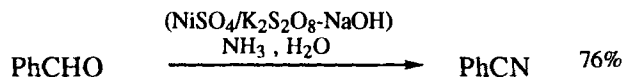
SECTION 184: NITRILES FROM ALDEHYDES



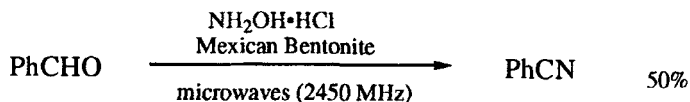
Moore, J.S.; Stupp, S.I. *J. Org. Chem.*, **1990**, 55, 3374.



Arora, P.K.; Sayre, L.M. *Tetrahedron Lett.*, **1991**, 32, 1007.



Yamazaki, S.; Yamazaki, Y. *Chem. Lett.*, **1990**, 571.

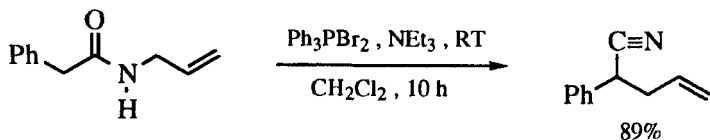


Delgado, F.; Cano, A.C.; García, O.; Alvarado, J.; Velasco, L.; Alvarez, C.; Rudler, H. *Synth. Commun.*, **1992**, 22, 2125.

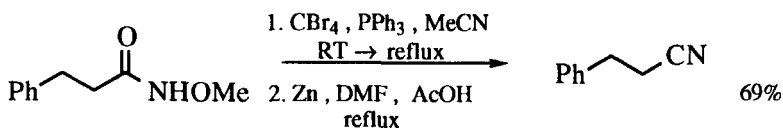
SECTION 185: NITRILES FROM ALKYL, METHYLENES AND ARYLS

NO ADDITIONAL EXAMPLES

SECTION 186: NITRILES FROM AMIDES

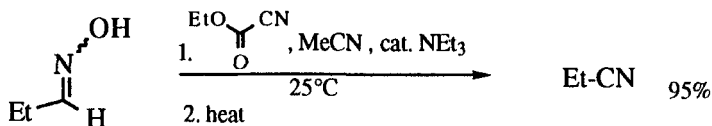


Walters, M.A.; McDonough, C.S.; Brown, P.S. Jr.; Hoem, A.B. *Tetrahedron Lett.*, **1991**, 32, 179.

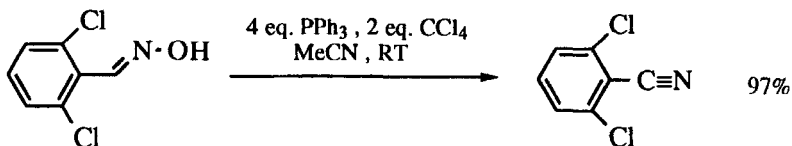


Sakamoto, T.; Mori, H.; Takizawa, M.; Kikygawa, Y. *Synthesis*, **1991**, 750.

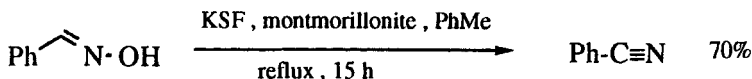
SECTION 187: NITRILES FROM AMINES



Thomas, H.G.; Greyn, H.D. *Synthesis*, **1990**, 129.



Kim, J.N.; Chung, K.H.; Ryu, E.K. *Synth. Commun.*, **1990**, 20, 2785.

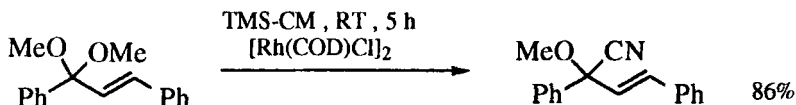


Meshram, H.M., *Synthesis*, **1992**, 943.

SECTION 188: NITRILES FROM ESTERS

NO ADDITIONAL EXAMPLES

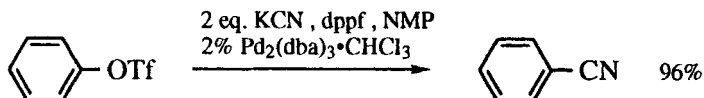
SECTION 189: NITRILES FROM ETHERS, EPOXIDES AND THIOETHERS



Soga, T.; Takenoshita, H.; Yamada, M.; Han, J.S.; Mukaiyama, T., *Bull. Chem. Soc. Jpn.*, **1991**, 64, 1108.

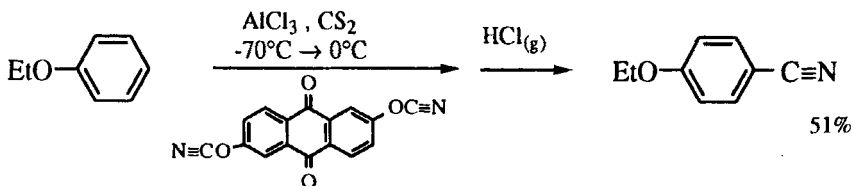
Mukaiyama, T.; Takenoshita, H.; Yamada, M.; Soga, T. *Chem. Lett.*, **1990**, 229 (Z product).

SECTION 190: NITRILES FROM HALIDES AND SULFONATES



Takagi, K.; Sasaki, K.; Sakakibara, Y. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 1118.

SECTION 191: NITRILES FROM HYDRIDES



Butke, K.; Reiher, T.; Niclas, H.-J., *Synth. Commun.*, **1992**, 22, 2237.

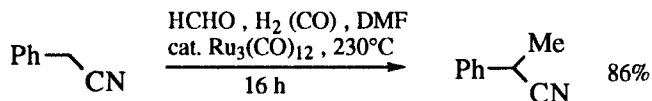
SECTION 192: NITRILES FROM KETONES

Preparations of nitriles from oximes and hydrazones, which are ketone derivatives, are found in Section 195.

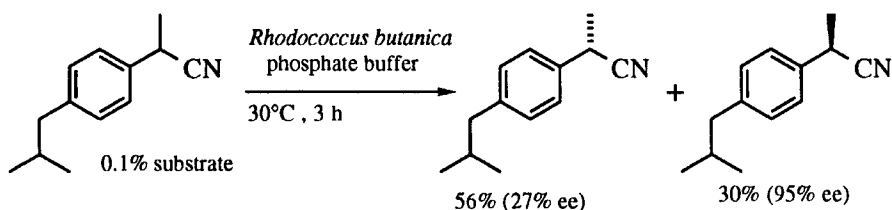
NO ADDITIONAL EXAMPLES

SECTION 193: NITRILES FROM NITRILES

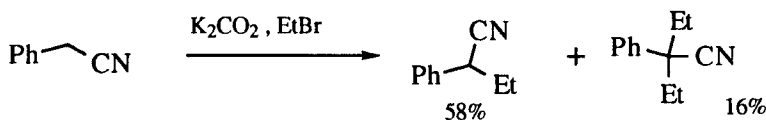
Conjugate reductions and Michael alkylations of alkene nitriles are found in Section 74D (Alkyls from Alkenes).



Abe, F.; Hayashi, T.; Tanaka, M. *Chem. Lett.*, **1990**, 765.



Kakeya, H.; Sakai, N.; Sugai, T.; Ohta, H. *Tetrahedron Lett.*, **1991**, 32, 1343.



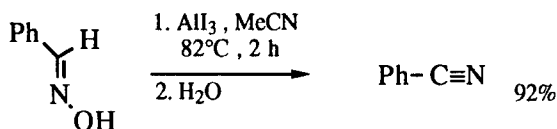
Xu, C.Z.; Mao, X.J.; Shen, H.B.; Chen, W.Q. *Org. Prep. Proceed. Int.*, **1991**, 23, 153.

SECTION 194: NITRILES FROM ALKENES

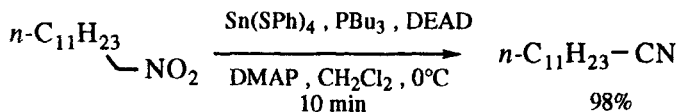
NO ADDITIONAL EXAMPLES

SECTION 195: NITRILES FROM MISCELLANEOUS COMPOUNDS

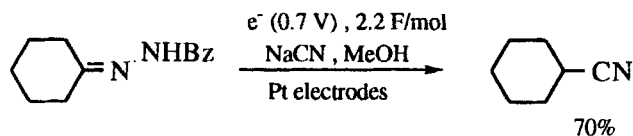
The preparation of nitriles from oximes and other compounds are presented here.



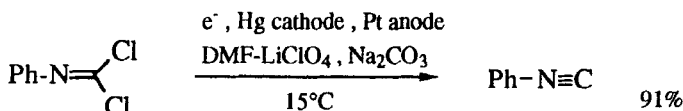
Konwar, D.; Boruah, R.C.; Sandhu, J.S. *Tetrahedron Lett.*, **1990**, 31, 1063.



Urpí, F.; Vilarrasa, J. *Tetrahedron Lett.*, **1990**, 31, 7499.



Okimoto, M.; Chiba, T. *J. Org. Chem.*, **1990**, 55, 1070.



Guirado, A.; Zapata, A.; Fenor, M. *Tetrahedron Lett.*, **1992**, 33, 4779.

REVIEWS:

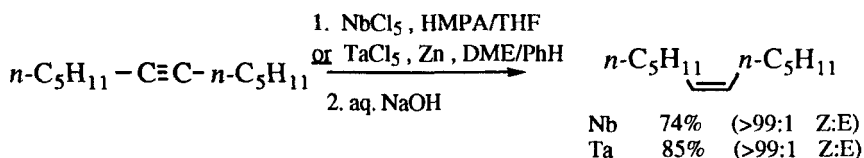
"The Isocyanide-Cyanide Rearrangement; Mechanism and Preparative Applications"

Rüchardt, C.; Meier, M.; Haaf, K.; Pakusch, J.; Wolber, E.K.A.; Müller, B. *Angew. Chem. Int. Ed. Engl.*, **1991**, 30, 893.

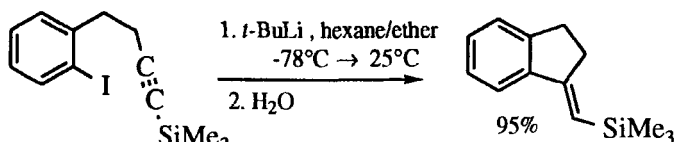
CHAPTER 14

PREPARATION OF ALKENES

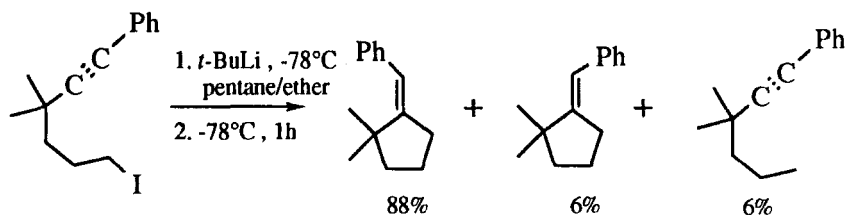
SECTION 196: ALKENES FROM ALKYNES



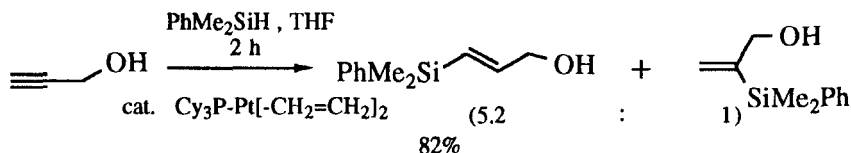
Kataoka, Y.; Takai, K.; Oshima, K.; Utimoto, K. *Tetrahedron Lett.*, **1990**, 31, 365.



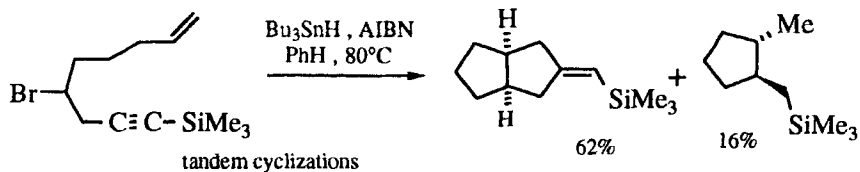
Wu, G.; Cederbaum, F.E.; Negishi, E. *Tetrahedron Lett.*, **1990**, 31, 493.



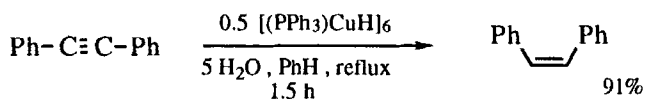
Bailey, W.E.; Ovaska, T.V. *Tetrahedron Lett.*, **1990**, 31, 627.



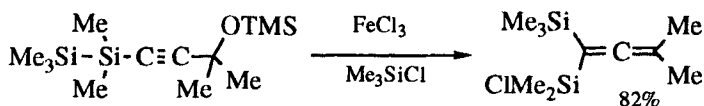
Murphy, P.J.; Spencer, J.L.; Procter, G. *Tetrahedron Lett.*, **1990**, 31, 1051.



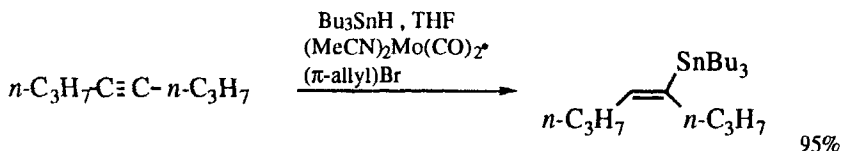
Kilburn, J.D. *Tetrahedron Lett.*, **1990**, 31, 2193.



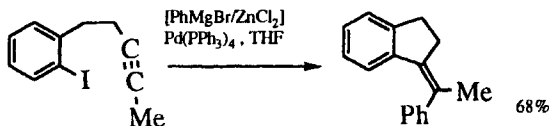
Daeuble, J.F.; McGettigan, C.; Stryker, J.M. *Tetrahedron Lett.*, **1990**, 31, 2397.



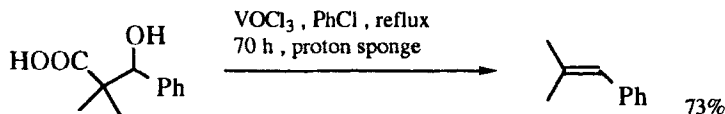
Cunico, R.F. *Tetrahedron Lett.*, **1990**, 31, 5607.



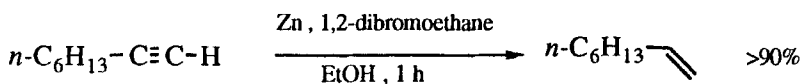
Zhang, H.X.; Guibé, F.; Balavoine, G. *J. Org. Chem.*, **1990**, 55, 1857.



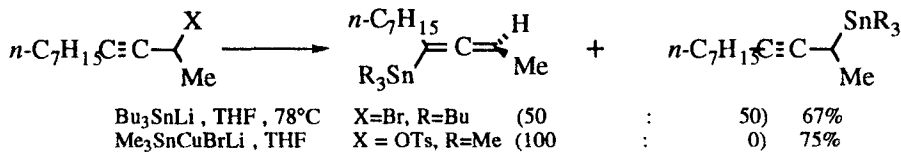
Wang, R.-T.; Chou, F.-L.; Luo, F.-T. *J. Org. Chem.*, **1990**, 55, 4846.



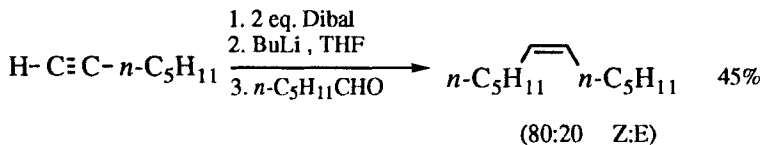
Meier, I.K.; Schwartz, I. *J. Org. Chem.*, **1990**, 55, 5619.



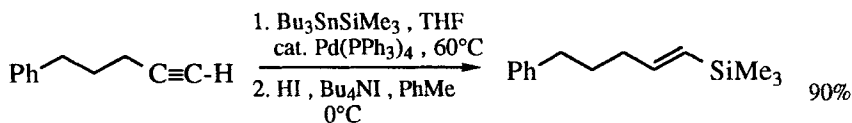
Aerrsens, M.H.P.J.; van der Heiden, R.; Heus, M.; Brandsma, L. *Synth. Commun.*, **1990**, 20, 3421.



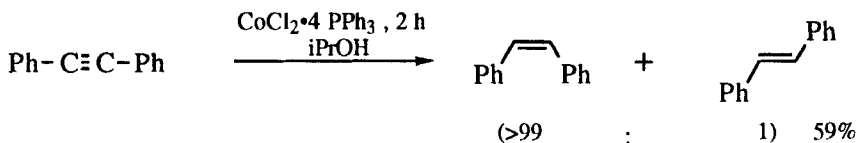
Marshall, J.A.; Wang, X J. *Org. Chem.*, **1990**, *55*, 6246.



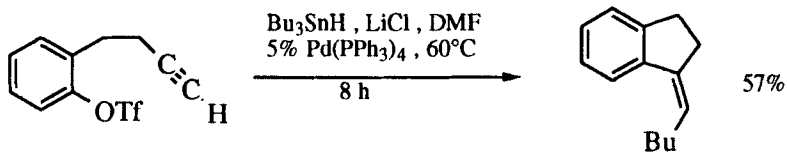
Kuchin, A.V.; Markova, S.A.; Gorobets, E.V.; Tolstikov, G.A. *Izv. Akad. Nauk. SSSR*, **1990**, *39*, 1151 (Engl., p. 1034).



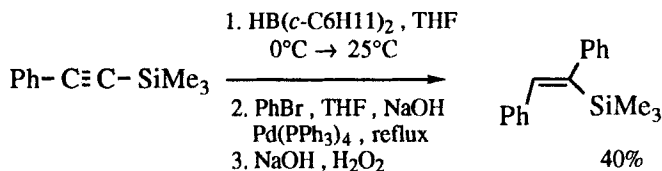
Mori, M.; Watanabe, N.; Kaneta, N.; Shibasaki, M. *Chem. Lett.*, **1991**, 1615.



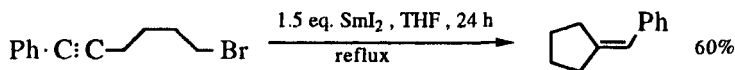
Inanaga, J.; Yokoyama, Y.; Baba, Y.; Yamaguchi, M. *Tetrahedron Lett.*, **1991**, *32*, 5559.



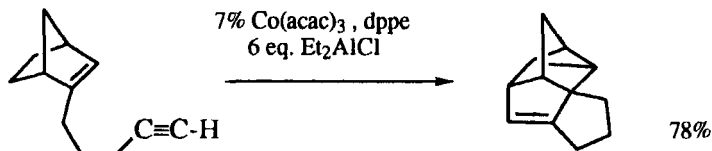
Luo, F.-T.; Wang, R.-T. *Tetrahedron Lett.*, **1991**, *32*, 7703.



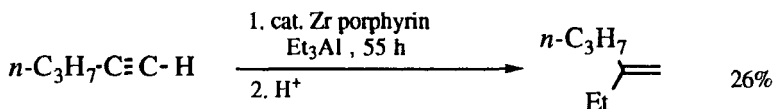
Soderquist, J.A.; León-Colón, G. *Tetrahedron Lett.*, **1991**, *32*, 43.



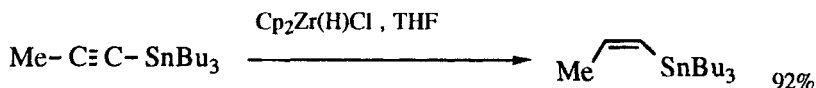
Bennett, S.M.; Larouche, D. *SynLett*, **1991**, 805.



Lautens, M.; Tam, W.; Edwards, L.G. *J. Org. Chem.*, **1992**, 57, 8.

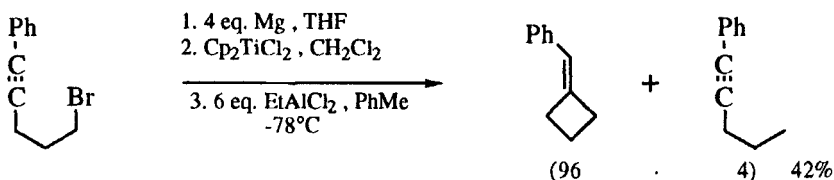


Shibata, K.; Aida, T.; Inoue, S. *Tetrahedron Lett.*, **1992**, 33, 1077.

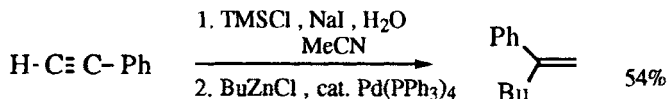


Lipshutz, B.H.; Keil, R.; Barton, J.C. *Tetrahedron Lett.*, **1992**, 33, 5861.

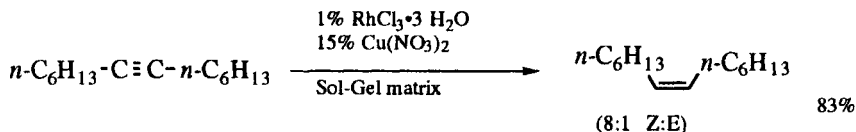
Lipshutz, B.H.; Keil, R.; Ellsworth, E.L. *Tetrahedron Lett.*, **1990**, 31, 7257.



Harms, A.E.; Stille, J.R. *Tetrahedron Lett.*, **1992**, 33, 6565.

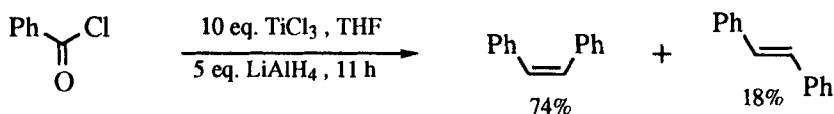


Luo, F.-T.; Fwu, S.-L.; Huang, W.-S. *Tetrahedron Lett.*, **1992**, 33, 6839.



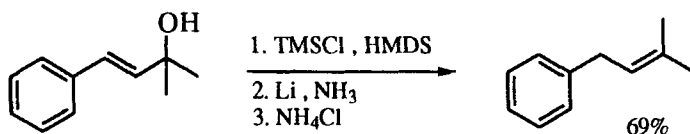
Tour, J.M.; Pandalwar, S.L.; Kafka, C.M.; Cooper, J.P. *J. Org. Chem.*, **1992**, 57, 4786.

SECTION 197: ALKENES FROM ACID DERIVATIVES

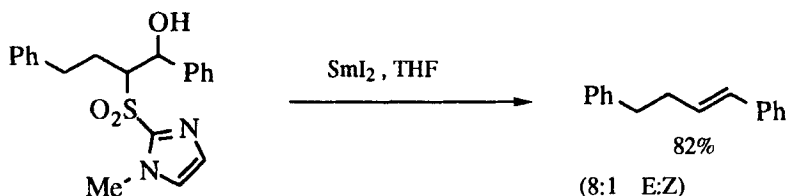


Dang, Y.; Giese, H.J. *Bull. Soc. Chim. Belg.*, **1991**, *100*, 375.

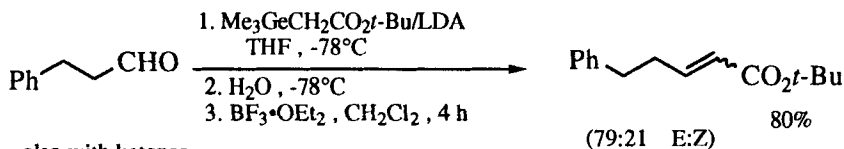
SECTION 198: ALKENES FROM ALCOHOLS AND THIOLS



Ballester, P.; Capó, M.; Saá, J.M. *Tetrahedron Lett.*, **1990**, *31*, 1339.

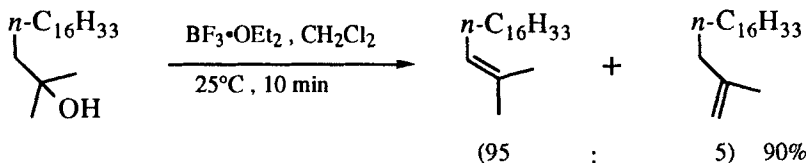


Kende, A.S.; Mendoza, J.S. *Tetrahedron Lett.*, **1990**, *31*, 7105.

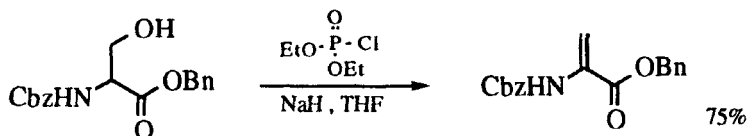


also with ketones

Inoue, S.; Sato, Y. *J. Org. Chem.*, **1991**, *56*, 437.

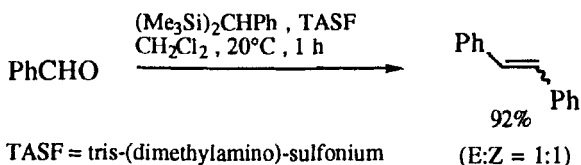


Posner, G.H.; Shulman-Roskes, E.M.; Oh, C.H.; Carry, J.-C.; Green, J.V.; Clark, A.B.; Dai, H.; Anjeh, T.E.N. *Tetrahedron Lett.*, **1991**, *32*, 6489.



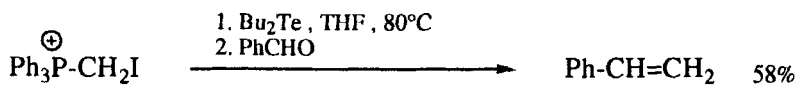
Berti, F.; Ebert, C.; Gardossi, L. *Tetrahedron Lett.*, **1992**, 33, 8145.

SECTION 199: ALKENES FROM ALDEHYDES

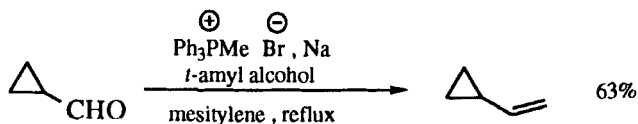


TASF = tris-(dimethylamino)-sulfonium difluorotrimethyl siliconate

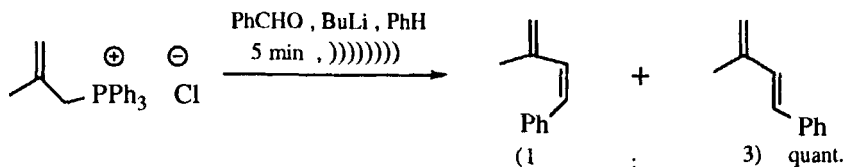
Palomo, C.; Aizpurua, J.M.; García, J.M.; Ganboa, I.; Cossio, F.P.; Lecea, B.; López, C. *J. Org. Chem.*, **1990**, 55, 2498.



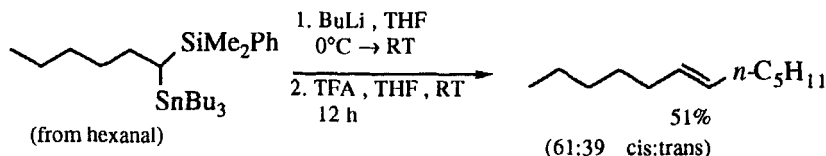
Li, S-W.; Huang, Y-Z.; Shi, L-L. *Chem. Ber.*, **1990**, 123, 1441.



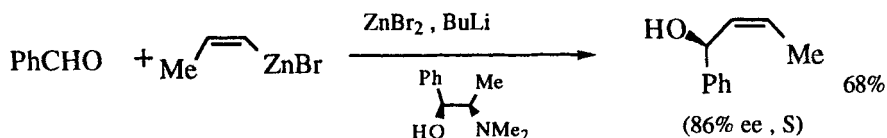
Tsunoda, T.; Hudlicky, T. *SynLett*, **1990**, 322.



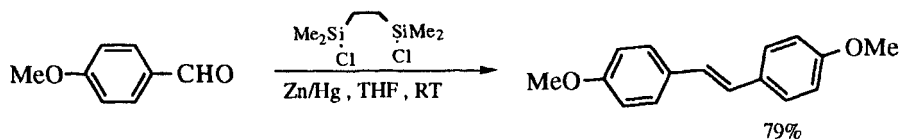
Low, C.M.R. *SynLett*, **1991**, 123.



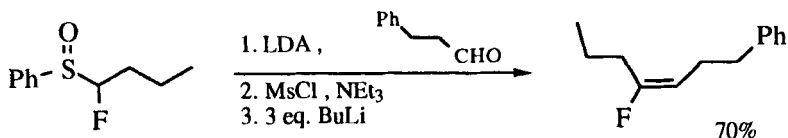
Barrett, A.G.M.; Hill, J.M. *Tetrahedron Lett.*, **1991**, 32, 3285.



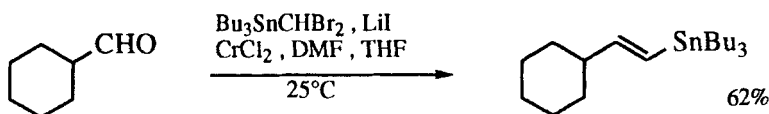
Oppolzer, W.; Radinov, R.N. *Tetrahedron Lett.*, **1991**, 32, 5777.



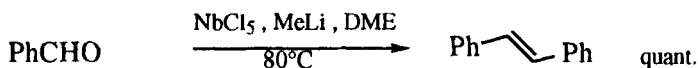
Afonso, C.A.M.; Motherwell, W.B.; O'Shea, D.M.; Roberts, L.R. *Tetrahedron Lett.*, **1992**, 33, 3899.



Sato, T.; Itoh, N.; Onda, K.; Kitoh, Y.; Yamakawa, K. *Tetrahedron Lett.*, **1992**, 33, 1483.



Hodgson, D.M. *Tetrahedron Lett.*, **1992**, 33, 5603.

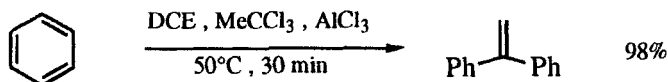


Kauffmann, T.; Kallweit, H. *Chem. Ber.*, **1992**, 125, 149.

Related Methods: Section 207 (Alkenes from Ketones).

SECTION 200: ALKENES FROM ALKYL, METHYLENES AND ARYLS

This section contains dehydrogenations to form alkenes and unsaturated ketones, esters and amides. It also includes the conversion of aromatic rings to alkenes. Reduction of aryls to dienes is found in Section 377 (Alkene-Alkene). Hydrogenation of aryls to alkanes and dehydrogenations to form aryls are included in Section 74 (Alkyls from Alkenes).



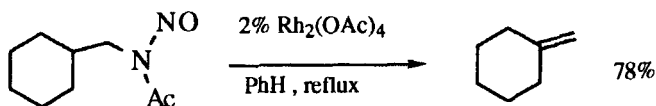
Sonawane, H.R.; Sudalai, A.; Daniel, T.; Ayyangar, N.R. *SynLett*, **1991**, 925.

SECTION 201: ALKENES FROM AMIDES

Related Methods:

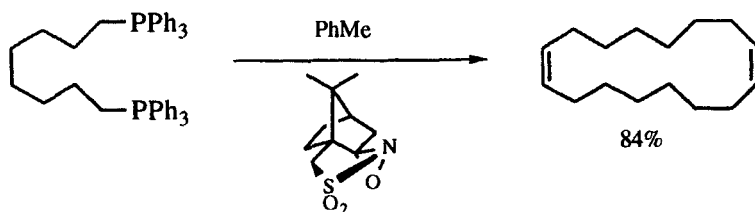
Section 65 (Alkyls from Alkyls).

Section 74 (Alkyls from Alkenes).

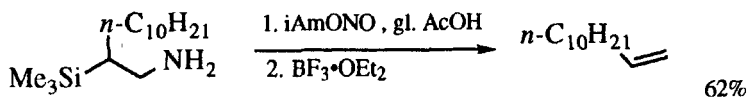


Godfrey, A.G.; Ganem, B. *J. Am. Chem. Soc.*, **1990**, 112, 3717.

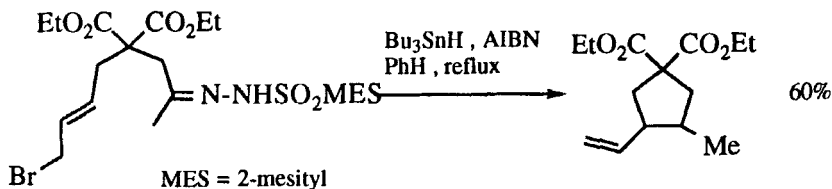
SECTION 202: ALKENES FROM AMINES



Davis, F.A.; Chen, B. *J. Org. Chem.*, **1990**, 55, 360.

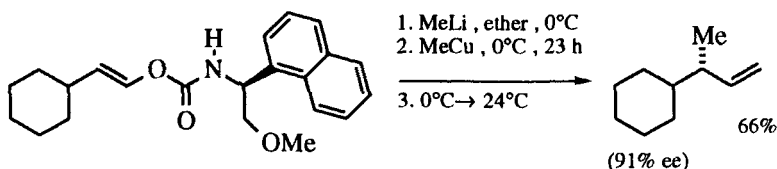


Cunico, R.F. *J. Org. Chem.*, **1990**, 55, 4474.

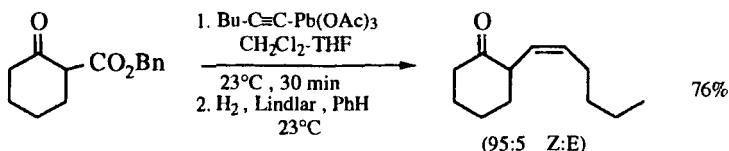


Kim, S.; Cho, J.R. *SynLett*, **1992**, 629.

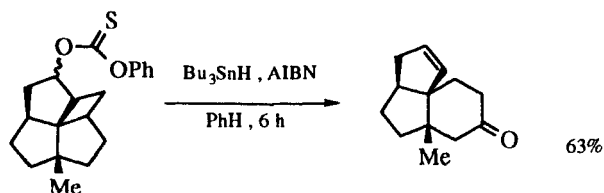
SECTION 203: ALKENES FROM ESTERS



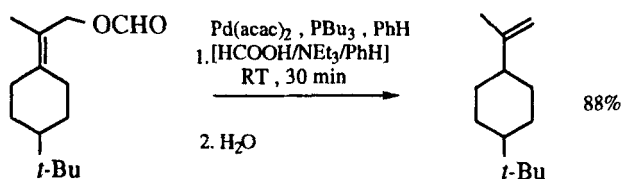
Denmark, S.E.; Marble, L.K. *J. Org. Chem.*, **1990**, *55*, 1984.



Hashimoto, S.; Miyazaki, Y.; Shinoda, T.; Ikegami, S. *J. Chem. Soc., Chem. Commun.*, **1990**, 1100.

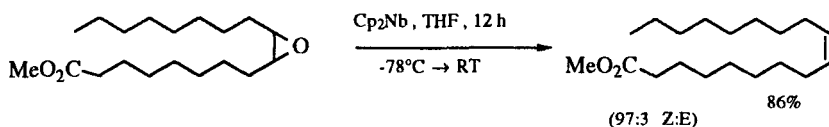


Crimmins, M.T.; Dudek, C.M.; Cheung, A.W.-H. *Tetrahedron Lett.*, **1992**, *33*, 181.

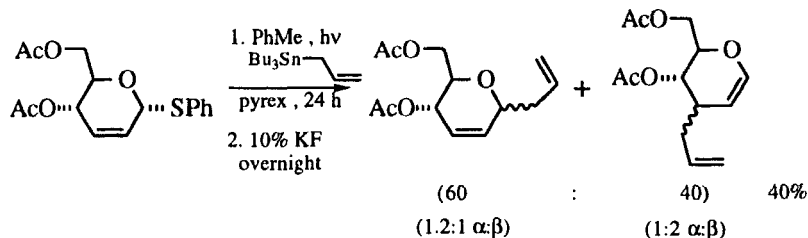


Mandai, T.; Suzuki, S.; Murakami, T.; Fujita, M.; Kawada, M.; Tsuji, J. *Tetrahedron Lett.*, **1992**, *33*, 2987.

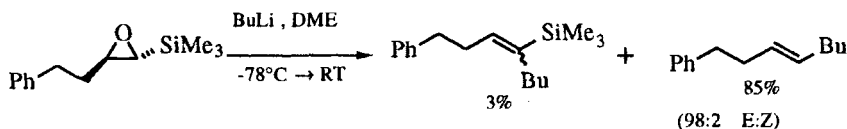
SECTION 204: ALKENES FROM ETHERS, EPOXIDES AND THIOETHERS



Schobert, R.; Höhle, U. *SynLett*, **1990**, 465.



Marco-Contelles, J.L.; Fernández, C.; Gómez, A.; Martín-León, N. *Tetrahedron Lett.*, **1990**, 31, 1467.



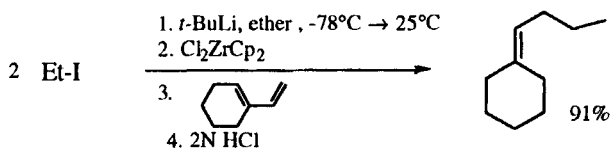
Ukaji, Y.; Yoshida, A.; Fujisawa, T. *Chem. Lett.*, **1990**, 157.



Santiago, B.; Lopez, C.; Soderquist, J.A. *Tetrahedron Lett.*, **1991**, 32, 3457.

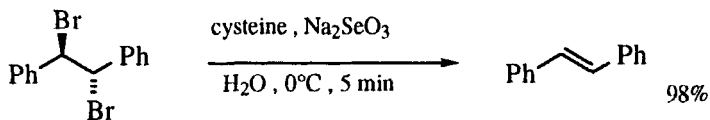
Soderquist, J.A.; Lopez, C. *Tetrahedron Lett.*, **1991**, 32, 6305.

SECTION 205: ALKENES FROM HALIDES AND SULFONATES



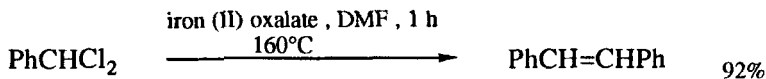
general method - preparation of 1° organolithium reagents

Negishi, E.; Swanson, D.R.; Rousset, C.J. *J. Org. Chem.*, **1990**, 55, 5406.

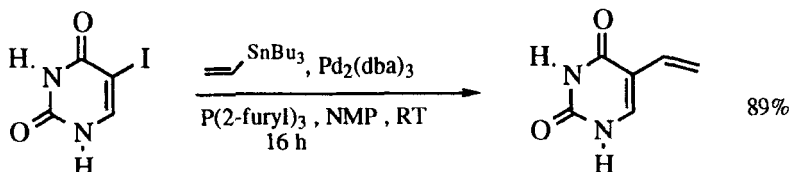


the R,R-diastereomer gave 0% yield of alkene

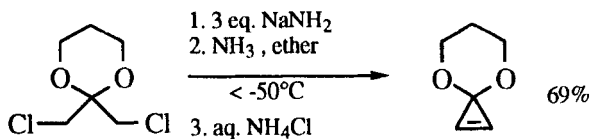
Yanada, K.; Yanada, R.; Meguri, H. *J. Chem. Soc., Chem. Commun.*, **1990**, 730.



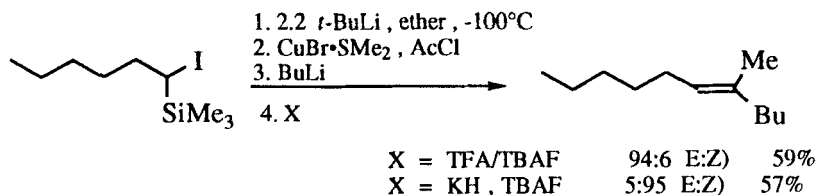
Khurana, J.M.; Maikap, G.C.; Mehta, S. *Synthesis*, **1990**, 731.



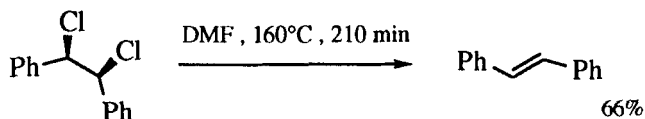
Farina, V.; Hauck, S.I. *SynLett*, **1991**, 157.



Isaka, M.; Ando, R.; Morinaka, Y.; Nakamura, E. *Tetrahedron Lett.*, **1991**, 32, 1339.

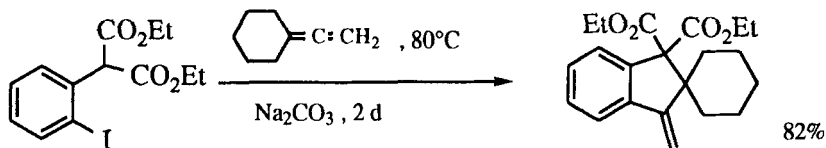


Barrett, A.G.M.; Flygare, J.A. *J. Org. Chem.*, **1991**, 56, 638.

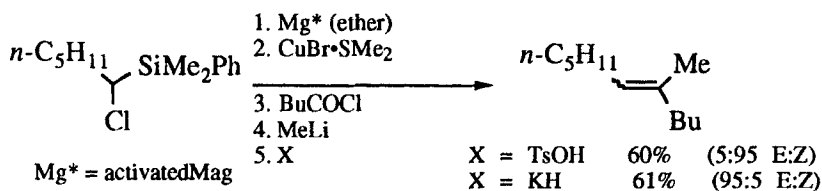


Khurana, J.M.; Maikap, G.C. *J. Org. Chem.*, **1991**, 56, 2582.

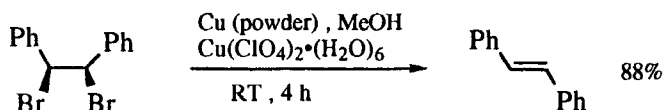
Khurana, J.M.; Maikap, G.C.; Sahoo, P.K. *Synthesis*, **1991**, 827.



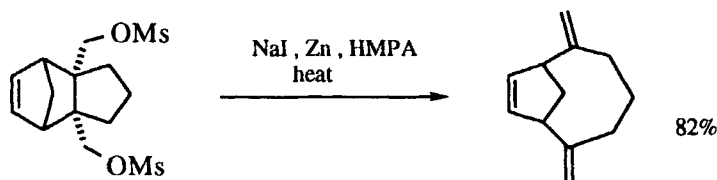
Larock, R.C.; Berrios-Pefia, N.G.; Fried, C.A. *J. Org. Chem.*, **1991**, 56, 2615.



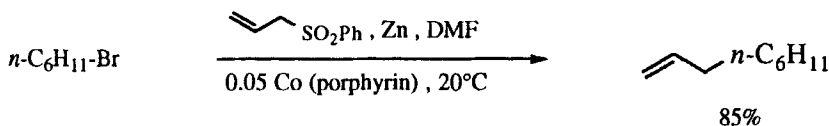
Barrett, A.G.M.; Hill, J.M.; Wallace, E.M. *J. Org. Chem.*, **1992**, 57, 386.



Vijayashree, N.; Samuelson, A.G. *Tetrahedron Lett.*, **1992**, 33, 559.



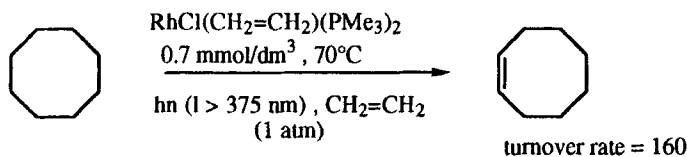
Ghosh, S.; Karpa, A.; Saha, G.; Patra, D. *Tetrahedron Lett.*, **1992**, 33, 2363.



Giese, B.; Erdmann, P.; Göbel, T.; Springer, R. *Tetrahedron Lett.*, **1992**, 33, 545.

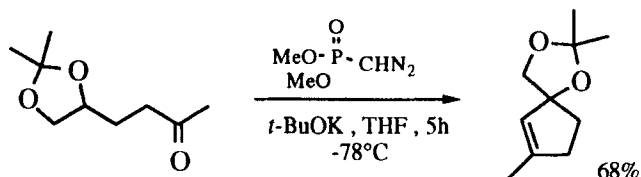
SECTION 206: ALKENES FROM HYDRIDES

For conversions of methylenes to alkenes ($\text{RCH}_2\text{R}' \rightarrow \text{RR}'\text{C}=\text{CH}_2$), see Section 200 (Alkenes from Alkyls).

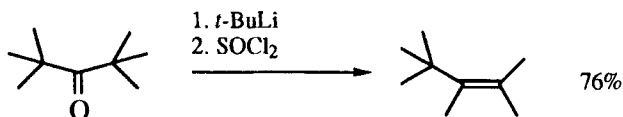


Sakakura, T.; Abe, F.; Tanaka, M. *Chem. Lett.*, **1991**, 297, 359.

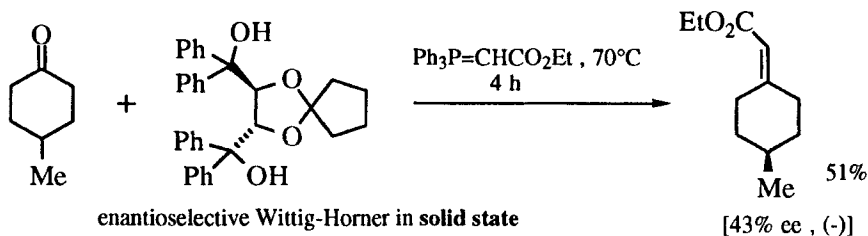
SECTION 207: ALKENES FROM KETONES



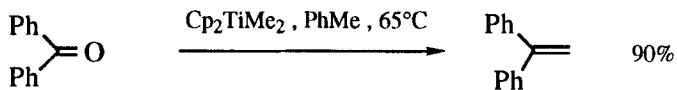
Ohira, S.; Ishi, S.; Shinohara, K.; Nozaki, H. *Tetrahedron Lett.*, **1990**, 31, 1039.



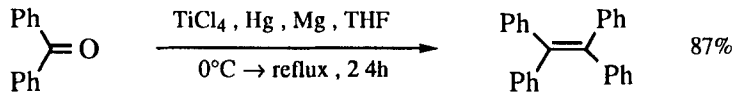
Olah, G.A.; Wu, A.; Farooq, O.; Surya Prakash, G.K. *J. Org. Chem.*, **1990**, 55, 1792.



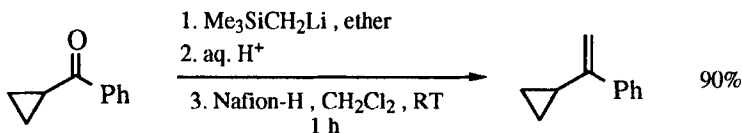
Toda, E.; Akai, H. *J. Org. Chem.*, **1990**, 55, 3446.



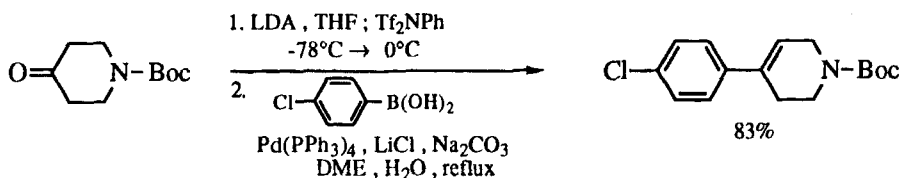
Petasis, N.A.; Bzowej, E.I. *J. Am. Chem. Soc.*, **1990**, 112, 6392.



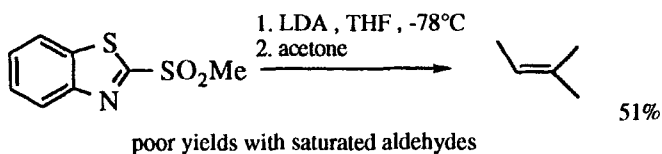
Carroll, A.R.; Taylor, W.C. *Aust. J. Chem.*, **1990**, 43, 1439.



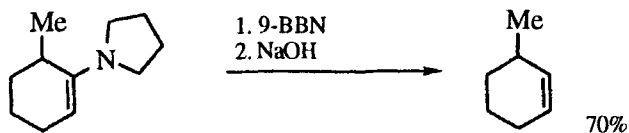
Olah, G.A.; Reddy, V.P.; Surya Prakash, G.K. *Synthesis*, **1991**, 29.



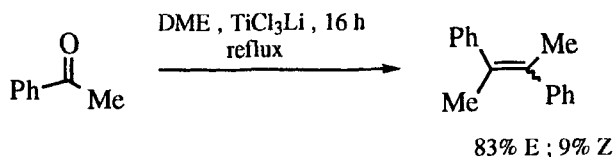
Wustrow, D.J.; Wise, L.D. *Synthesis*, **1991**, 993.



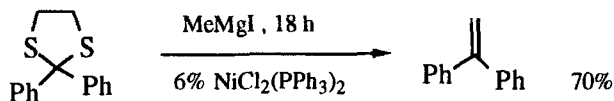
Baudin, J.B.; Hareau, G.; Julia, S.A.; Ruel, O. *Tetrahedron Lett.*, **1991**, 32, 1175.



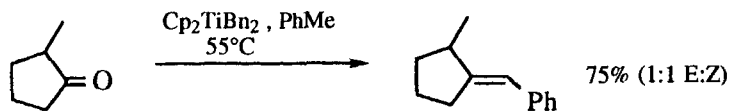
Singaram, B.; Rangaishenvi, M.V.; Brown, H.C.; Goralski, C.T.; Hasha, D.L. *J. Org. Chem.*, **1991**, 56, 1543.



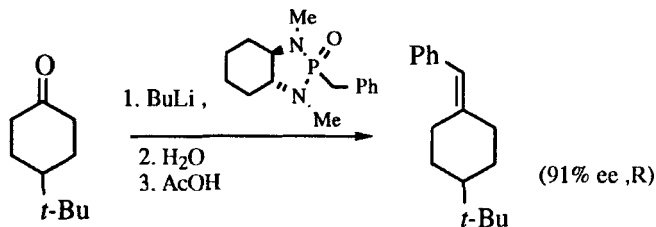
Nayak, S.K.; Banerji, A. *J. Org. Chem.*, **1991**, 56, 1940.



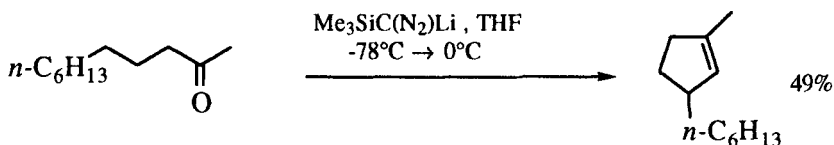
Ni, Z.-J.; Mei, N.-W.; Shi, X.; Tzeng, Y.-L.; Wang, M.C.; Luh, T.-Y. *J. Org. Chem.*, **1991**, 56, 4035.



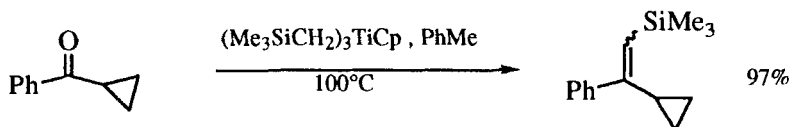
Petasis, N.A.; Bzowej, E.I. *J. Org. Chem.*, **1992**, 57, 1327.



Hanessian, S.; Beaudoin, S. *Tetrahedron Lett.*, **1992**, 33, 7655, 7659.



Ohira, S.; Okai, K.; Moritani, T. *J. Chem. Soc., Chem. Commun.*, **1992**, 721.



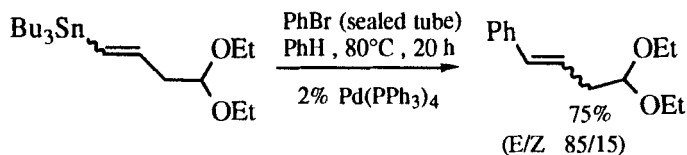
Petasis, N.A. Akritopoulou, I. *SynLett*, **1992**, 665.

Related Methods: Section 199 (Alkenes from Aldehydes).

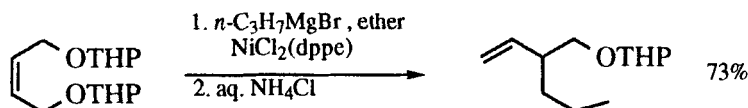
SECTION 208: ALKENES FROM NITRILES

NO ADDITIONAL EXAMPLES

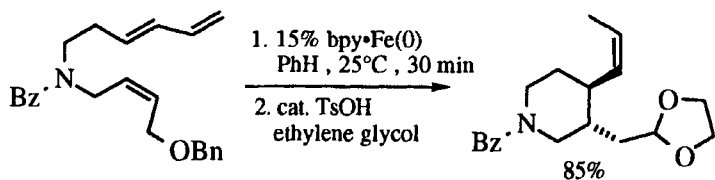
SECTION 209: ALKENES FROM ALKENES



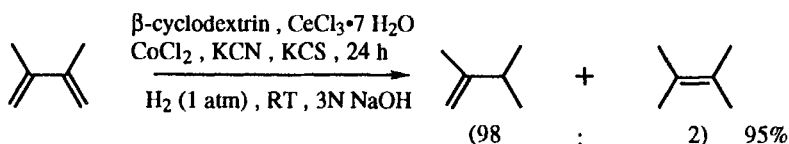
Parrain, J.-L.; Duchene, A.; Quintard, J.-P. *Tetrahedron Lett.*, **1990**, 31, 1857.



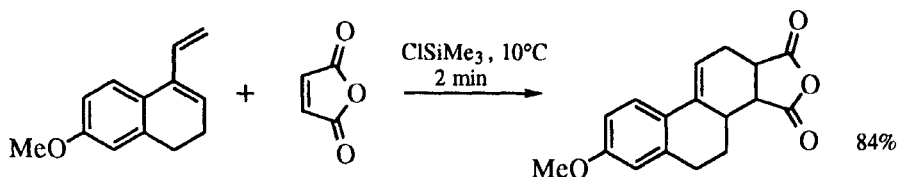
Malanga, C.; Menicagli, R.; Lardicci, L. *Gazz. Chim. Ital.*, **1990**, 120, 217.



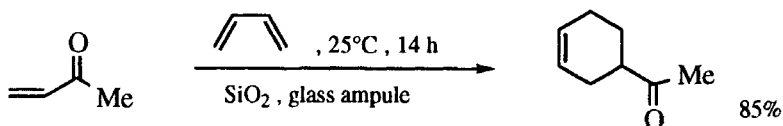
Takacs, B.E.; Takacs, J.M. *Tetrahedron Lett.*, **1990**, 31, 2865.



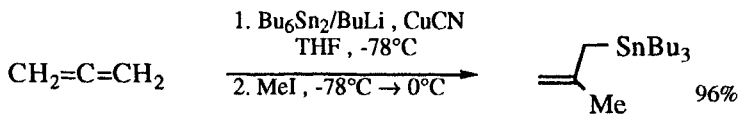
Lee, J-T.; Alper, H. *J. Org. Chem.*, **1990**, 55, 1854.



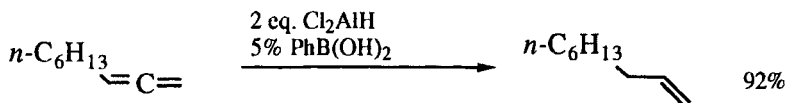
Verma, P.; Ray, S. *Ind. J. Chem.*, **1990**, 29B, 652.



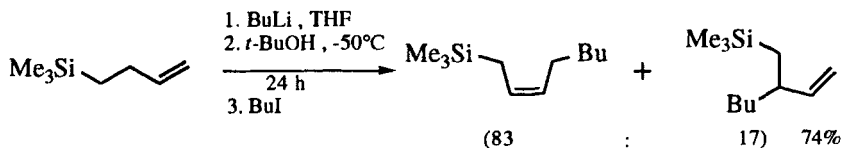
Veselovskii, V.V.; Gybini, A.S.; Lozanova, A.V.; Moiseenkov, A.M.; Smit, V.A. *Izv. Akad. Nauk. SSSR*, **1990**, 39, 107 (Engl., p. 94).



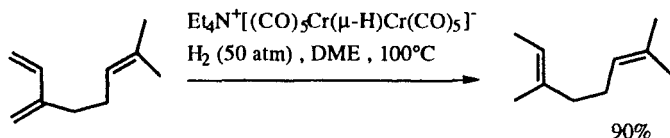
Barbero, A.; Cuadrado, P.; Fleming, I.; González, A.M.; Pulido, F.J. *J. Chem. Soc., Chem. Commun.*, **1990**, 1030.



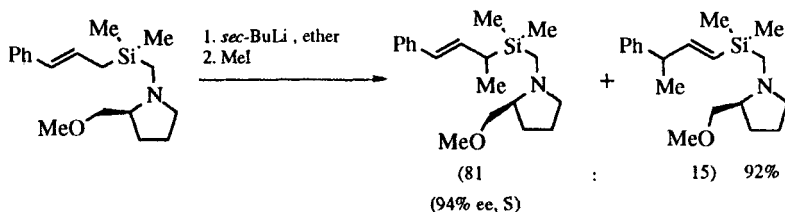
Nagahara, S.; Maruoka, K.; Doi, Y.; Yamamoto, H. *Chem. Lett.*, **1990**, 1595.



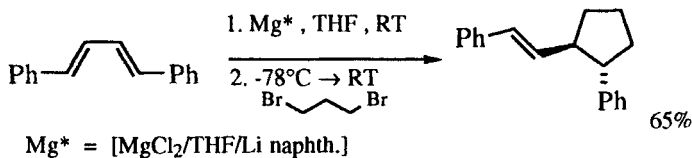
Degl'Innocenti, A.; Mordini, A.; Pagliai, L.; Ricci, A. *SynLett*, **1991**, 155.



Fuchikami, T.; Ubukata, Y.; Tanaka, Y. *Tetrahedron Lett.*, **1991**, 32, 1199.

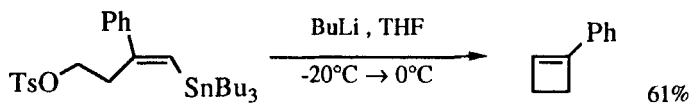


Lamothe, S.; Chan, T.H. *Tetrahedron Lett.*, **1991**, 32, 1847.

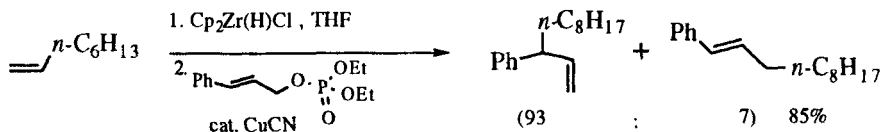


Rieke, R.D.; Xiong, H. *J. Org. Chem.*, **1991**, 56, 3109; *J. Org. Chem.*, **1992**, 57, 6560.

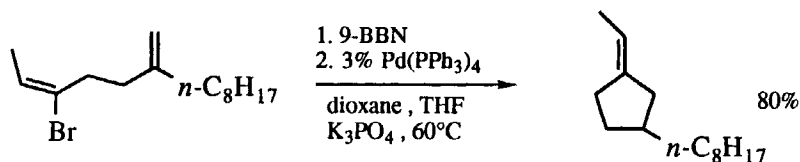
Xiong, H.; Rieke, R.D. *Tetrahedron Lett.*, **1991**, 32, 5269.



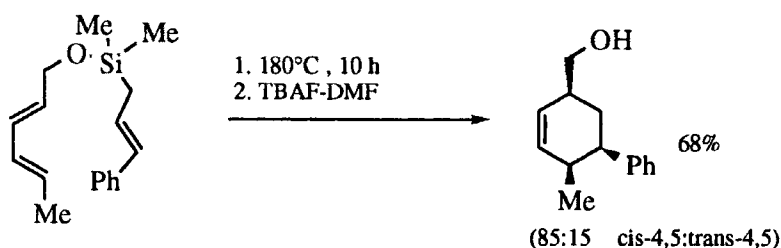
Barbero, A.; Cuadrado, P.; González, A.M.; Pulido, F.J.; Rubio, R.; Fleming, I. *Tetrahedron Lett.*, **1992**, 33, 5841.



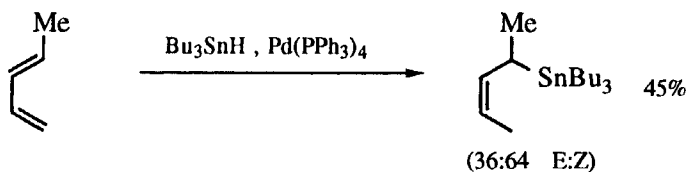
Venanzi, L.M.; Lehmann, R.; Keil, R.; Lipshutz, B.H. *Tetrahedron Lett.*, **1992**, 33, 5857.



Miyaura, N.; Ishikawa, N.; Suzuki, A. *Tetrahedron Lett.*, **1992**, 33, 2571.



Stork, G.; Chan, T.Y.; Breault, G.A. *J. Am. Chem. Soc.*, **1992**, 114, 7578.



Miyake, H.; Yamamura, K. *Chem. Lett.*, **1992**, 473.

REVIEWS:

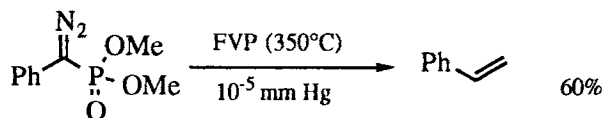
"Ketene Dithioacetals in Organic Synthesis: Recent Developments"

Kolb, M. *Synthesis*, **1990**, 171.

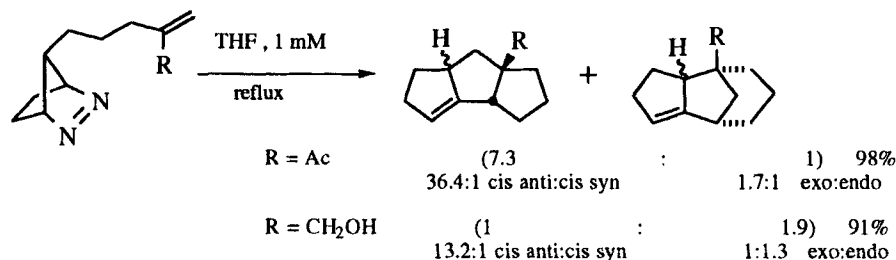
"Acyclic Stereocontrol via [2,3]-Wittig Sigmatropic Rearrangement"

Mikami, K.; Nakai, T. *Synthesis*, **1991**, 594.

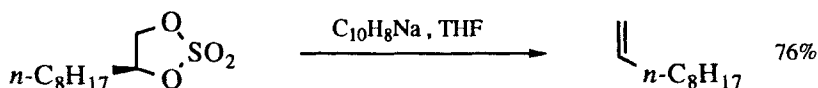
SECTION 210: ALKENES FROM MISCELLANEOUS COMPOUNDS



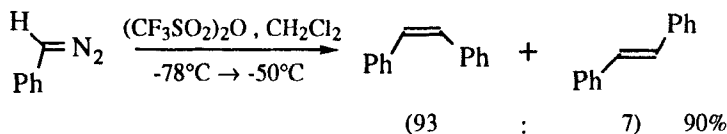
Tomioaka, H.; Watanabe, M.; Kobayashi, N.; Hirai, K. *Tetrahedron Lett.*, **1990**, 31, 5061.



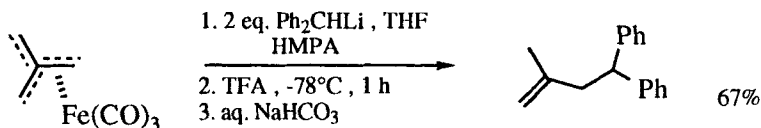
Masjedizadeh, M.R.; Dannecker-Doerig, I.; Little, R.D. *J. Org. Chem.*, **1990**, *55*, 2742.



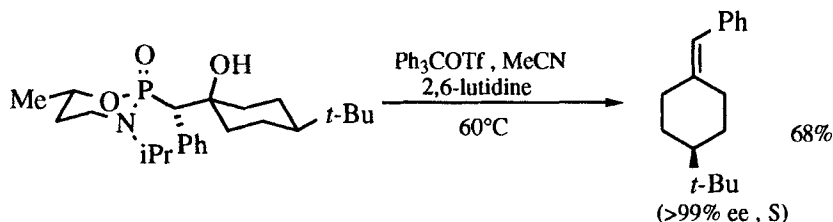
Beels, C.M.D.; Coleman, M.J.; Taylor, R.J.K. *SynLett*, **1990**, 479.



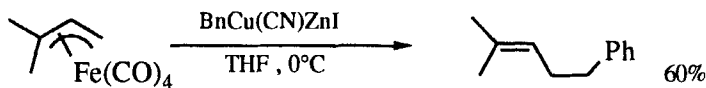
Creary, X.; Wang, Y-X.; Gill, W. *Tetrahedron Lett.*, **1991**, *32*, 729.



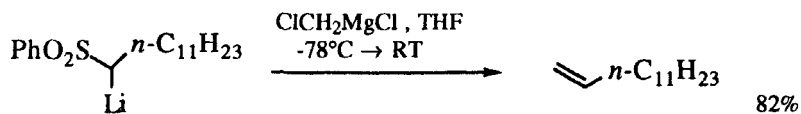
Donaldson, W.A.; Hossain, M.A. *Tetrahedron Lett.*, **1992**, *33*, 4107.



Denmark, S.E.; Chen, C-T. *J. Am. Chem. Soc.*, **1992**, *114*, 10674.



Yeh, M-C.P.; Tau, S-I. *J. Chem. Soc., Chem. Commun.*, **1992**, 13.



DeLima, C.; Julia, M.; Verpeaux, J.-N. *SynLett*, **1992**, 133.

REVIEWS:

"Methods for the Synthesis of Allyl Silanes"

Sarkar, T.K. *Synthesis*, **1990**, 969, 1101.

"Vinyl Phosphonates in Organic Synthesis"

Minami, T.; Motoyoshiya, J. *Synthesis*, **1992**, 333.

CHAPTER 15

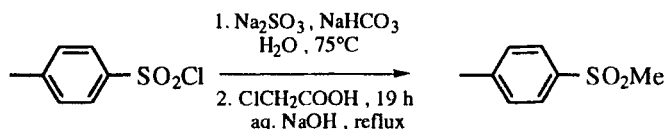
PREPARATION OF OXIDES

This chapter contains reactions which prepare the oxides of nitrogen, sulfur and selenium. Included are *N*-oxides, nitroso and nitro compounds, nitrile oxides, sulfoxides, selenoxides and sulfones. Oximes are considered to be amines and appear in those sections. Preparation of sulfonic acid derivatives are found in Chapter Two and the preparation of sulfonates in Chapter Ten.

SECTION 211: OXIDES FROM ALKYNES

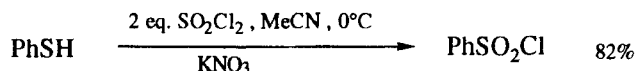
NO ADDITIONAL EXAMPLES

SECTION 212: OXIDES FROM ACID DERIVATIVES



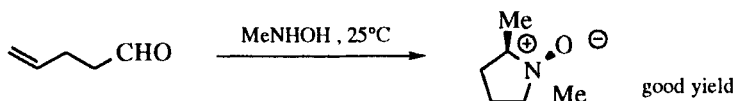
Brown, R.W., *J. Org. Chem.*, **1991**, *56*, 4974.

SECTION 213: OXIDES FROM ALCOHOLS AND THIOLS

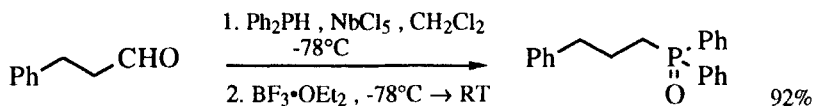


Park, Y.J.; Shin, H.H.; Kim, Y.H. *Chem. Lett.*, **1992**, 1483.

SECTION 214: OXIDES FROM ALDEHYDES



Ciganek, E., *J. Org. Chem.*, **1990**, *55*, 3007.



Suzuki, K.; Hashimoto, T.; Maeta, H.; Matsumoto, T. *SynLett*, **1992**, 125.

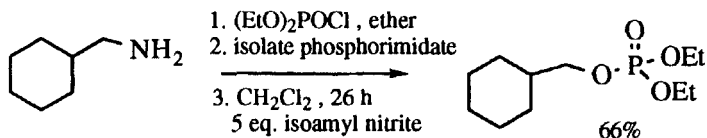
SECTION 215: OXIDES FROM ALKYL, METHYLENES AND ARYLS

NO ADDITIONAL EXAMPLES

SECTION 216: OXIDES FROM AMIDES

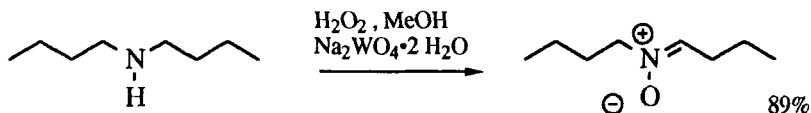
NO ADDITIONAL EXAMPLES

SECTION 217: OXIDES FROM AMINES

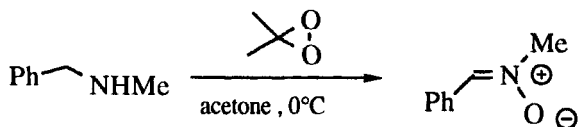


Nikolaides, N.; Ganem, B. *Tetrahedron Lett.*, **1990**, 31, 1113.

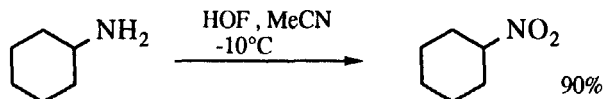
Luo, J.; Ganem, B. *Tetrahedron Lett.*, **1991**, 32, 3145 [with (BnO₂)POH].



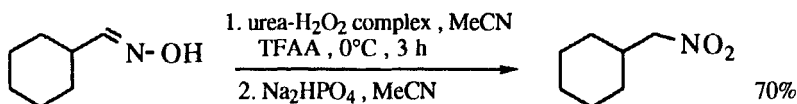
Murahashi, S.-I.; Mitsui, H.; Shiota, T.; Tsuda, T.; Watanabe, S. *J. Org. Chem.*, **1990**, 55, 1736.



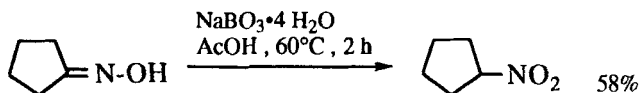
Murray, R.W.; Singh, M. *J. Org. Chem.*, **1990**, 55, 2954.



Rozen, S.; Kol, M. *J. Org. Chem.*, **1992**, 57, 7342.



Ballini, R.; Marcantoni, E.; Petrini, M. *Tetrahedron Lett.*, **1992**, 33, 4835.

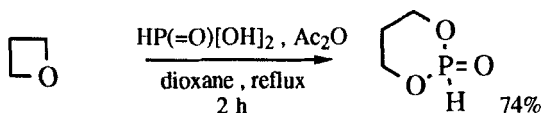


Olah, G.A.; Ramaiah, P.; Lee, G.K.; Surya Prakash, G.K. *SynLett*, **1992**, 337.

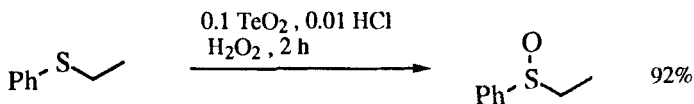
SECTION 218: OXIDES FROM ESTERS

NO ADDITIONAL EXAMPLES

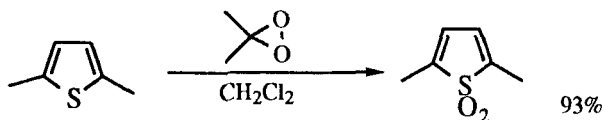
SECTION 219: OXIDES FROM ETHERS, EPOXIDES AND THIOETHERS



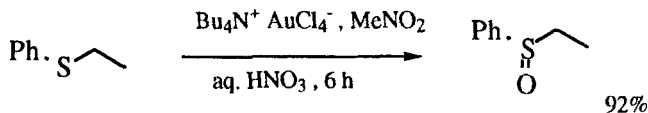
Klosinski, P. *Tetrahedron Lett.*, **1990**, 31, 2025.



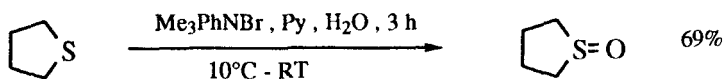
Kim, K.S.; Hwang, H.J.; Cheong, C.S.; Hahn, C.S. *Tetrahedron Lett.*, **1990**, 31, 2893.



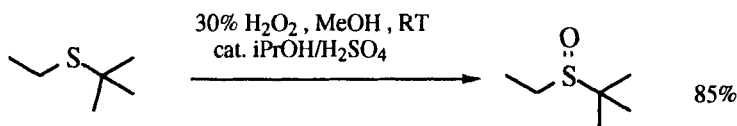
Miyahara, Y.; Inazu, T. *Tetrahedron Lett.*, **1990**, 31, 5955.



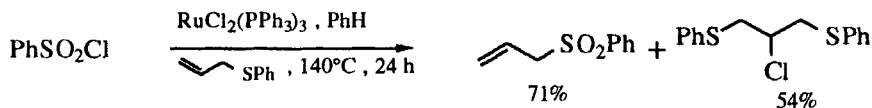
Gasparrini, E.; Giovannoli, M.; Misiti, D.; Natile, G.; Palmieri, G. *J. Org. Chem.*, **1990**, 55, 1323.



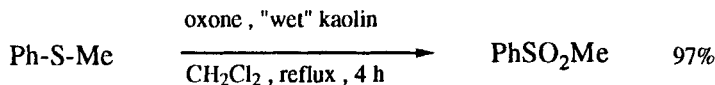
Rábai, J.; Kapovits, I.; Tanács, B.; Tamás, J. *Synthesis*, **1990**, 847.



Drabowicz, J.; Łyżwa, P.; Popielarczyk, M.; Mikołajczyk, M. *Synthesis*, **1990**, 937.

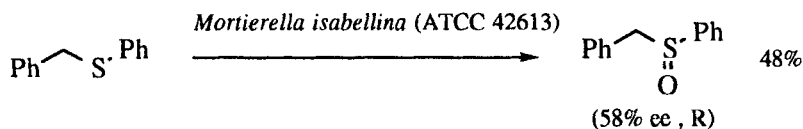


Kamigata, N.; Ishii, K.; Ohtsuka, T.; Matsuyama, H. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 3479.

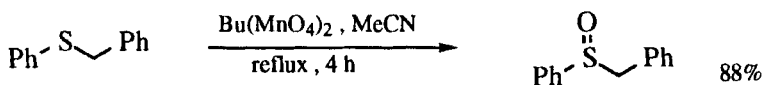


Hirano, M.; Tomaru, J.; Morimoto, T. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 3752.

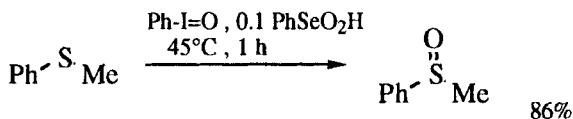
Hirano, M.; Tomaru, J.; Morimoto, T. *Chem. Lett.*, **1991**, 523 [with montunorillonite].



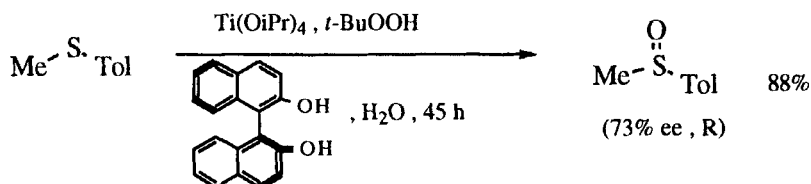
Holland, H.L.; Rand, C.G.; Viski, P.; Brown, F.M. *Can. J. Chem.*, **1991**, 69, 1989.



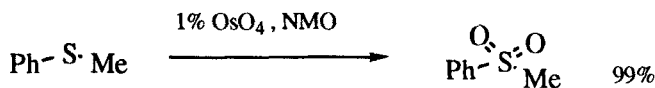
Firouzabadi, H.; Seddighi, M. *Synth. Commun.*, **1991**, 21, 211.



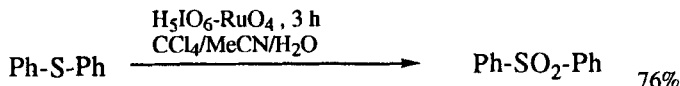
Roh, K.R.; Kim, K.S.; Kim, Y.H. *Tetrahedron Lett.*, **1991**, 32, 793.



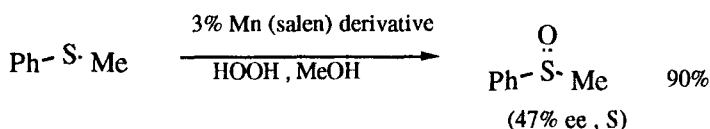
Komatsu, N.; Nishibayashi, Y.; Sugita, T.; Uemura, S. *Tetrahedron Lett.*, **1992**, 33, 5391.



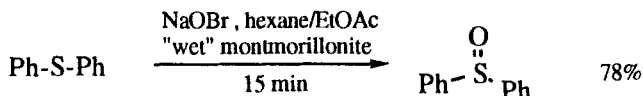
Kaldor, S.W.; Hammond, M. *Tetrahedron Lett.*, **1991**, 32, 5043.



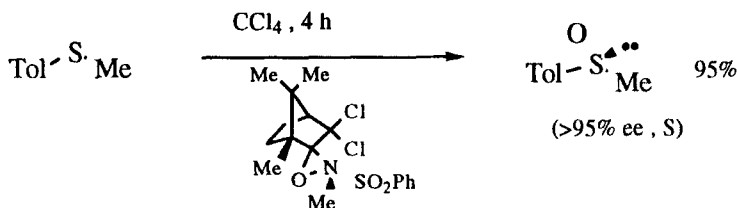
Rodríguez, C.M.; Ode, J.M.; Palazón, J.M.; Marín, V.S. *Tetrahedron*, **1992**, 48, 3571.



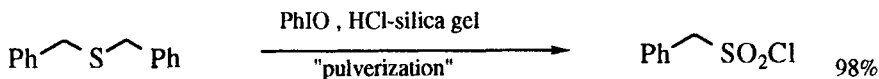
Palucki, M.; Hanson, P.; Jacobsen, E.N. *Tetrahedron Lett.*, **1992**, 33, 7111.



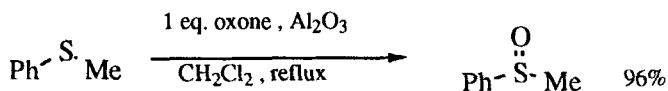
Hirano, M.; Kudo, H.; Morimoto, T. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 1744.



Davis, F.A.; Reddy, R.T.; Han, W.; Carroll, P.J. *J. Am. Chem. Soc.*, **1992**, 114, 1428.



Sohmiya, H.; Kimura, T.; Fujita, M.; Ando, T. *Chem. Lett.*, **1992**, 891.



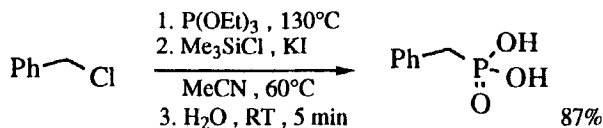
3 eq. of oxone led to the sulfone

Greenhalgh, R.P. *SynLett*, **1992**, 235.

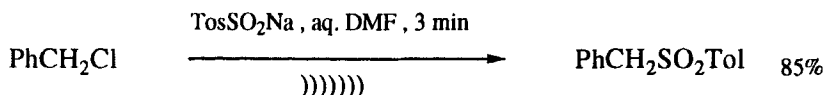
REVIEWS:

"Some Routes to Chiral Sulfoxides with Very High Enantiomeric Excesses"
Kagan, H.B.; Reviere, F. *SynLett*, **1990**, 643.

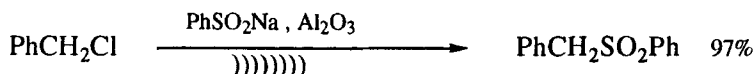
SECTION 220: OXIDES FROM HALIDES AND SULFONATES



Katritzky, A.R.; Pilarski, B.; Johnson, J.W. *Org. Prep. Proceed. Int.*, **1990**, 22, 209.

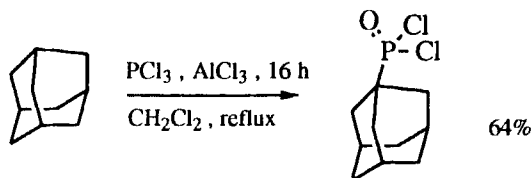


Biswas, G.K.; Jash, S.S.; Bhattacharyya, P. *Ind. J. Chem.*, **1990**, 29B, 491.

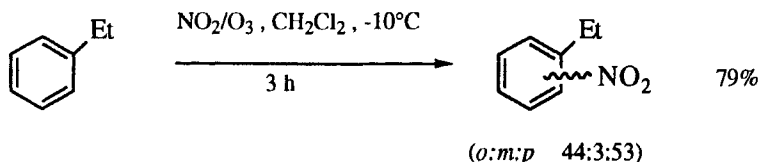


Villemin, D.; Ben Alloum, A. *Synth. Commun.*, **1990**, 20, 925.

SECTION 221: OXIDES FROM HYDRIDES



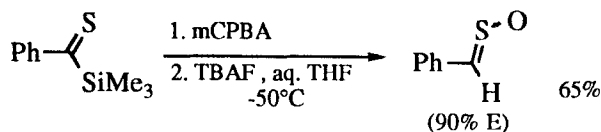
Olah, G.A.; Farooq, O.; Wang, Q.; Wu, A. *J. Org. Chem.*, **1990**, 55, 1224.



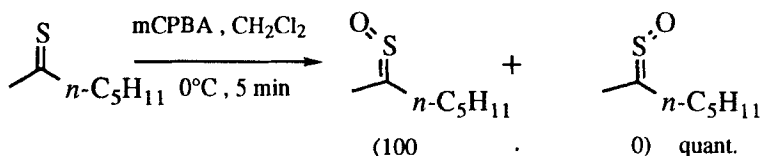
Suzuki, H.; Murashima, T.; Shimizu, K.; Tsukamoto, K. *Chem. Lett.*, **1991**, 817.

Suzuki, H.; Murashima, T.; Shimizu, K.; Tsukamoto, K. *J. Chem. Soc., Chem. Commun.*, **1991**, 1049.

SECTION 222: OXIDES FROM KETONES



Barbaro, G.; Battaglia, A.; Giorgianni, P.; Bonini, B.F.; Maccagnani, G.; Zani, P. *J. Org. Chem.*, **1990**, *55*, 3744.



with $\text{MeC}(=\text{S})\text{SBu}$ - obtain 80:20 mixture

Le Nocher, A.M.; Metzner, P. *Tetrahedron Lett.*, **1991**, *32*, 747.

SECTION 223: OXIDES FROM NITRILES

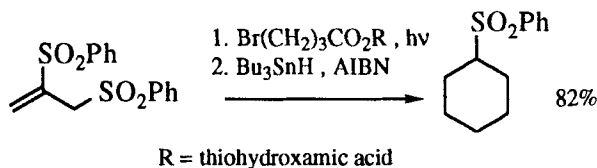
NO ADDITIONAL EXAMPLES

SECTION 224: OXIDES FROM ALKENES

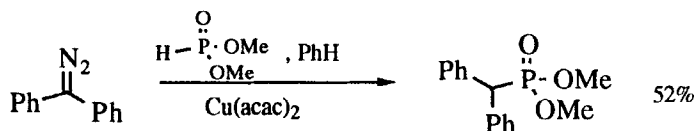
NO ADDITIONAL EXAMPLES

SECTION 225: OXIDES FROM MISCELLANEOUS COMPOUNDS

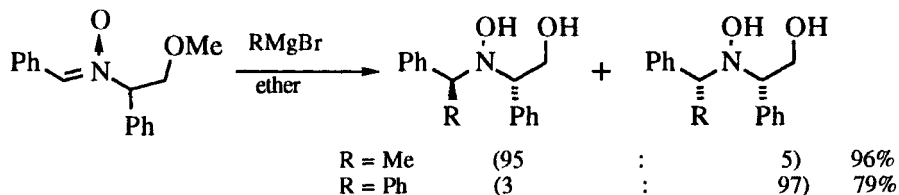
This section includes oxides prepared from other oxides



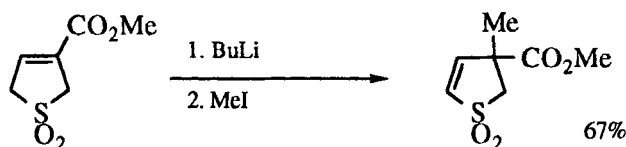
Padwa, A.; Murphree, S.S.; Yeske, P.E. *Tetrahedron Lett.*, **1990**, *31*, 2983.



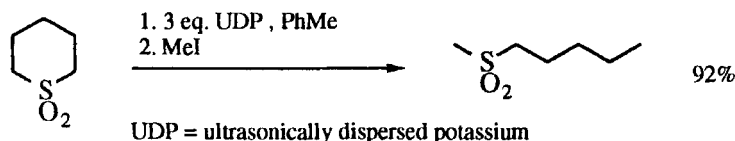
Polozov, A.M.; Polezhaeva, N.A.; Mustaphin, A.H.; Khotinen, A.V.; Arbuzov, B.A. *Synthesis*, **1990**, 515.



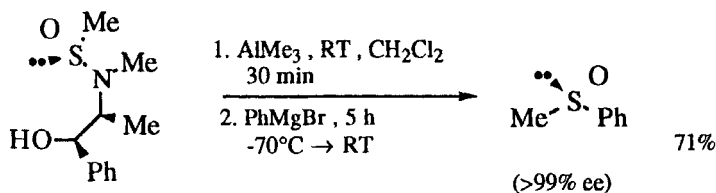
Chang, Z-Y.; Coates, R.M. *J. Org. Chem.*, **1990**, *55*, 3464.



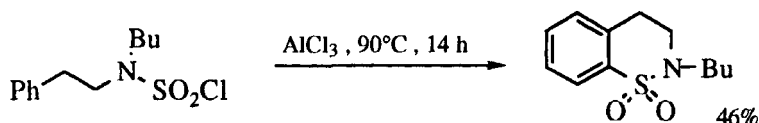
Chou, T.; Tsai, C-Y.; Huang, L-J. *J. Org. Chem.*, **1990**, *55*, 5410.



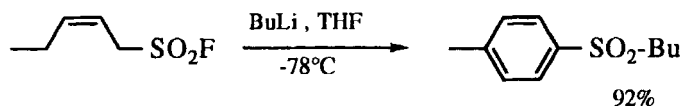
Chou, T-s; Hung, S-H.; Peng, M-L.; Lee, S-J. *Tetrahedron Lett.*, **1991**, *32*, 3551.



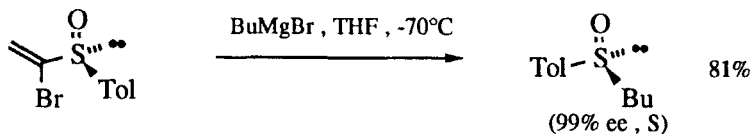
Benson, S.C.; Snyder, J.K. *Tetrahedron Lett.*, **1991**, *32*, 5885.



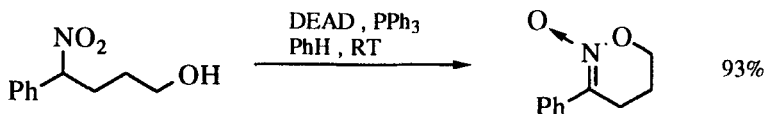
Katritzky, A.R.; Wu, J.; Rachwal, S.; Rachwal, B.; Macomber, D.W.; Smith, T.P. *Org. Prep. Proceed. Int.*, **1992**, *24*, 463.



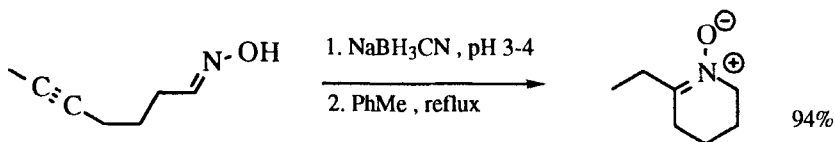
Frye, L.L.; Sullivan, E.L.; Cusak, K.P.; Funaro, J.M. *J. Org. Chem.*, **1992**, *57*, 697.



Cardellicchio, C.; Fiandanese, V.; Naso, F.; Scilimati, A. *Tetrahedron Lett.*, **1992**, 33, 5121.



Falck, J.R.; Yu, J. *Tetrahedron Lett.*, **1992**, 33, 6723.



Fox, M.E.; Holmes, A.B.; Forbes, I.T.; Thompson, M. *Tetrahedron Lett.*, **1992**, 33, 7421.

REVIEWS:

"Asymmetric Carbon-Carbon Bond Formation Using Sulfoxide-Stabilized Carbanions"

Walker, A.J. *Tetrahedron Asymmetry*, **1992**, 3, 961.

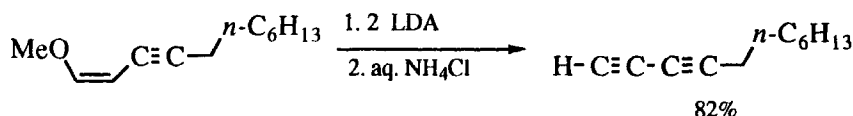
"Cyclic Sulfites and Cyclic Sulfates"

Lohray, B.B. *Synthesis*, **1992**, 1035.

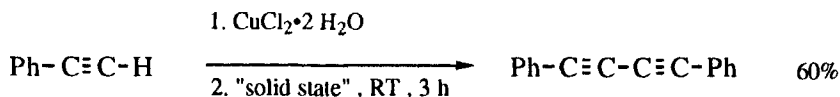
CHAPTER 16

PREPARATION OF DIFUNCTIONAL COMPOUNDS

SECTION 300: ALKYNE - ALKYNE

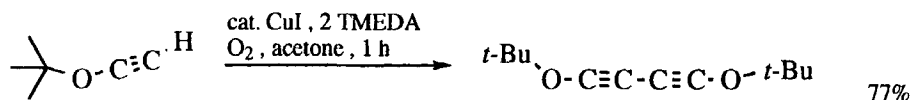


Stracker, E.C.; Zweifel, G. *Tetrahedron Lett.*, **1990**, 31, 6815.

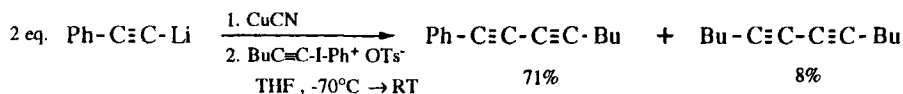


A solid-state Glaser reaction

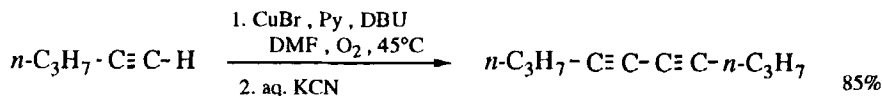
Toda, E.; Tokumaru, Y. *Chem. Lett.*, **1990**, 987.



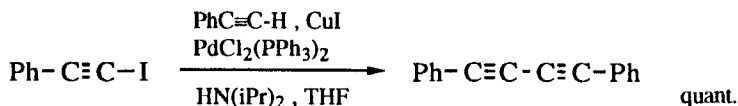
Valentí, E.; Pericàs, M.A.; Serratos, F. *J. Am. Chem. Soc.*, **1990**, 112, 7405.



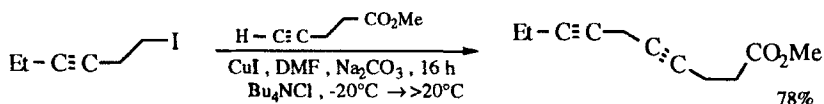
Kitamura, T.; Tanaka, T.; Taniguchi, H.; Stang, P.J. *J. Chem. Soc., Perkin Trans. I*, **1991**, 2892.



Brandsma, L.; Verkruijsse, H.D.; Walda, B. *Synth. Commun.*, **1991**, 21, 137.



Wityak, J.; Chan, J.B. *Synth. Commun.*, **1991**, 21, 977.

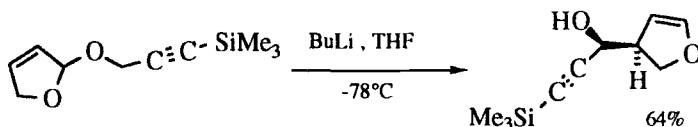


Jeffery, T.; Gueugnot, S.; Linstumelle, G. *Tetrahedron Lett.*, **1992**, 33, 5757.

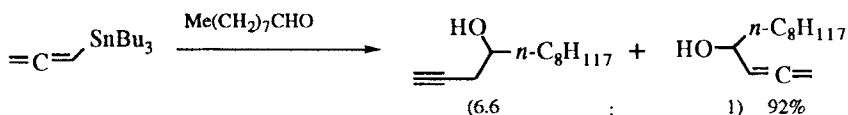
SECTION 301: ALKYNE - ACID DERIVATIVES

NO ADDITIONAL EXAMPLES

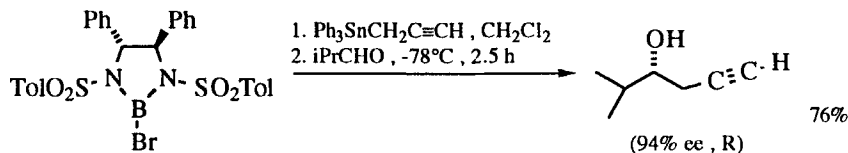
SECTION 302: ALKYNE - ALCOHOL, THIOL



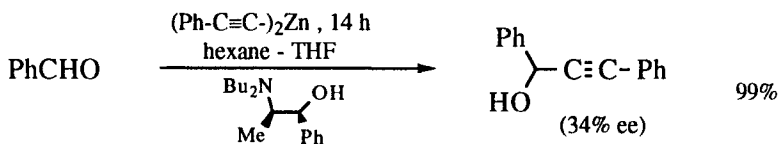
Tomooka, K.; Watanabe, M.; Naka, T. *Tetrahedron Lett.*, **1990**, 31, 7353.



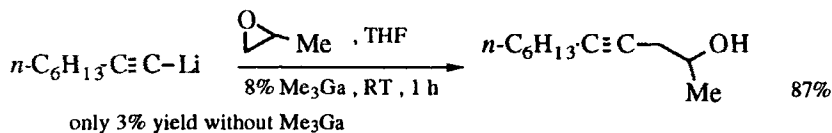
Suzuki, M.; Morita, Y.; Noyori, R. *J. Org. Chem.*, **1990**, 55, 441.



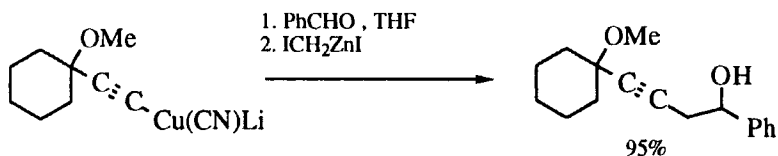
Corey, E.J.; Yu, C.-M.; Lee, D.-H. *J. Am. Chem. Soc.*, **1990**, 112, 878.



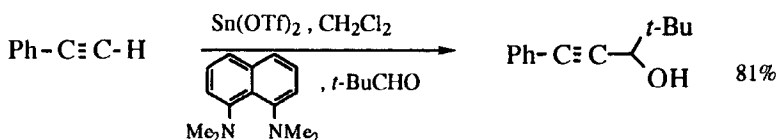
Niwa, S.; Soai, K. *J. Chem. Soc., Perkin Trans. I*, **1990**, 937.



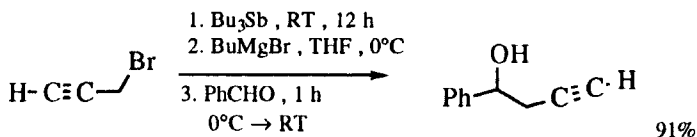
Fukuda, Y.; Matsubara, S.; Lambert, C.; Shiragami, H.; Nanko, T.; Utimoto, K.; Nozaki, H. *Bull. Chem. Soc. Jpn.*, **1991**, *64*, 1810.



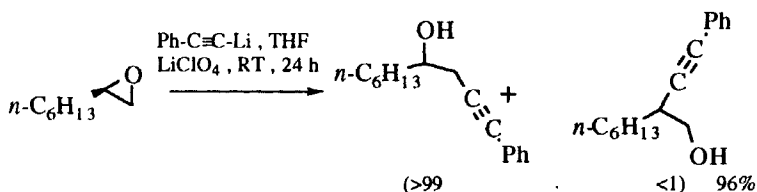
Rozema, M.J.; Knochel, P. *Tetrahedron Lett.*, **1991**, *32*, 1855.



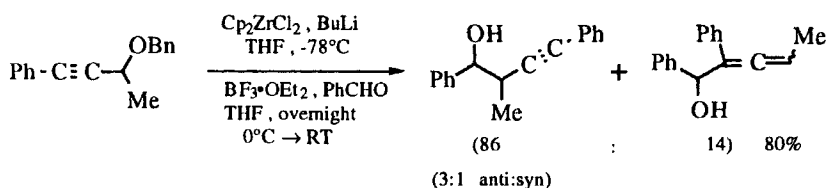
Yamaguchi, M.; Hayashi, A.; Minami, T. *J. Org. Chem.*, **1991**, *56*, 4091.



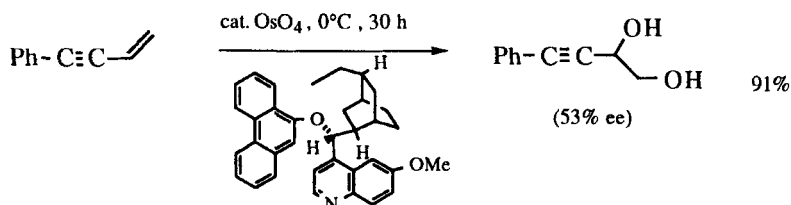
Zhang, L.J.; Huang, Y.-Z.; Huang, Z.-H. *Tetrahedron Lett.*, **1991**, *32*, 6579.



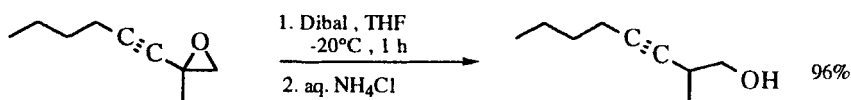
Chini, M.; Crotti, P.; Favero, L.; Macchia, F. *Tetrahedron Lett.*, **1991**, *32*, 6617.



Ito, H.; Nakamura, T.; Taguchi, T.; Hanzawa, Y. *Tetrahedron Lett.*, **1992**, *33*, 3769.



Jeong, K.-S.; Sjö, P.; Sharpless, K.B. *Tetrahedron Lett.*, **1992**, 33, 3833.

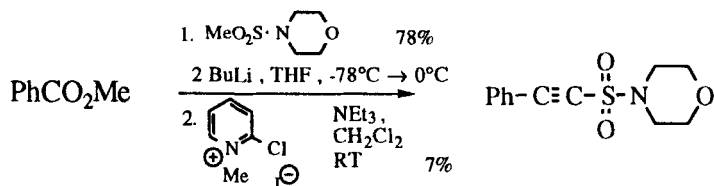


Nussbaumer, P.; Stütz, A. *Tetrahedron Lett.*, **1992**, 33, 7507.

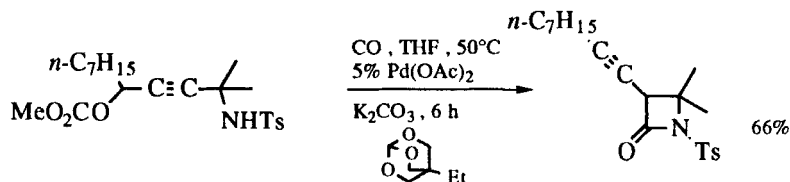
SECTION 303: ALKYNE - ALDEHYDE

NO ADDITIONAL EXAMPLES

SECTION 304: ALKYNE - AMIDE

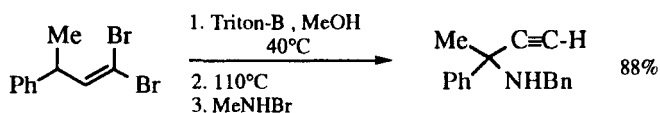


LeClercq, M.; Brienne, M.J. *Tetrahedron Lett.*, **1990**, 31, 3875.

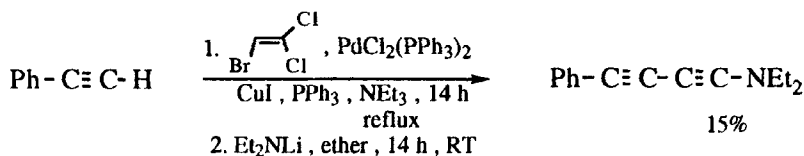


Mandai, T.; Ryoden, K.; Kawada, M.; Tsuji, J. *Tetrahedron Lett.*, **1991**, 32, 7683.

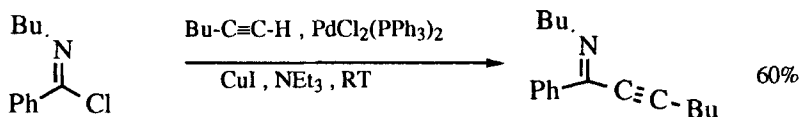
SECTION 305: ALKYNE - AMINE



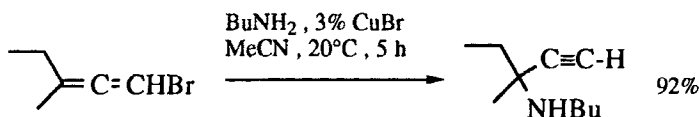
Frey, H.; Kaupp, G. *Synthesis*, **1990**, 931.



Löffler, A.; Himbert, G. *Synthesis*, **1990**, 125.

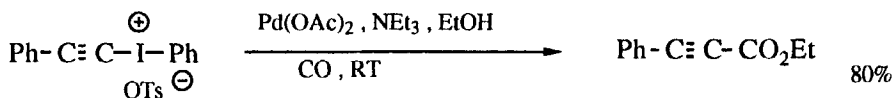


Lin, S.-Y.; Sheng, H.-Y.; Huang, Y.-Z. *Synthesis*, **1990**, 235.

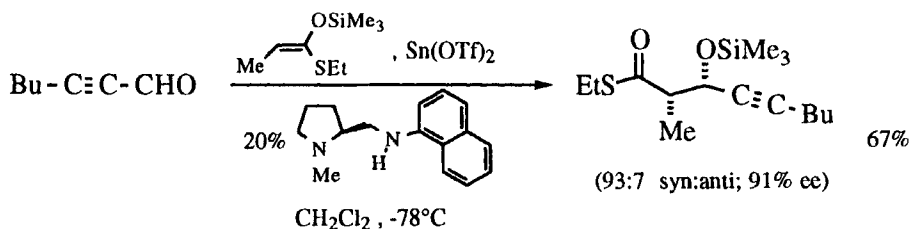


Caporusso, A.M.; Geri, R.; Polizzi, C.; Lardicci, L. *Tetrahedron Lett.*, **1991**, 32, 7471.

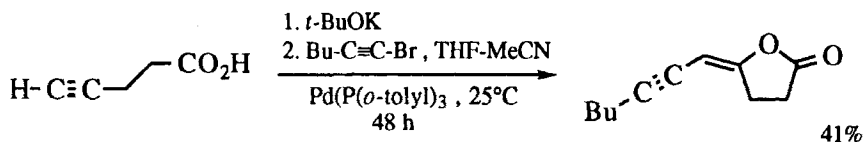
SECTION 306: ALKYNE - ESTER



Kitamura, T.; Mihara, I.; Taniguchi, H.; Stang, P.J. *J. Chem. Soc., Chem. Commun.*, **1990**, 614.

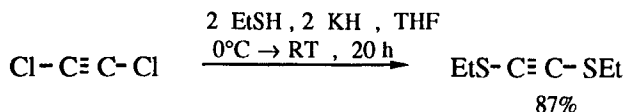


Mukaiyama, T.; Furuya, M.; Ohsubo, A.; Kobayashi, S. *Chem. Lett.*, **1991**, 989.

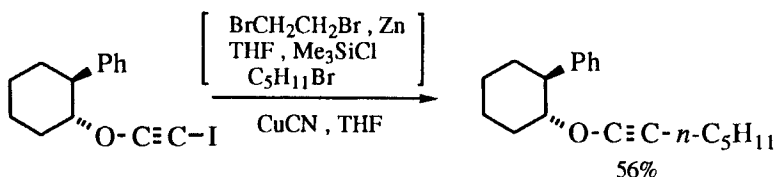


Bouyssi, D.; Gore, J.; Balme, G. *Tetrahedron Lett.*, **1992**, 33, 2811.

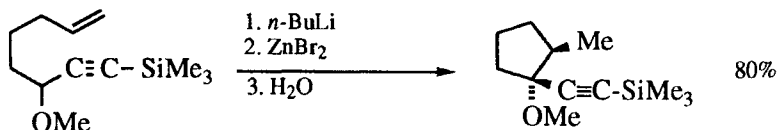
SECTION 307: ALKYNE - ETHER, EPOXIDE, THIOETHER



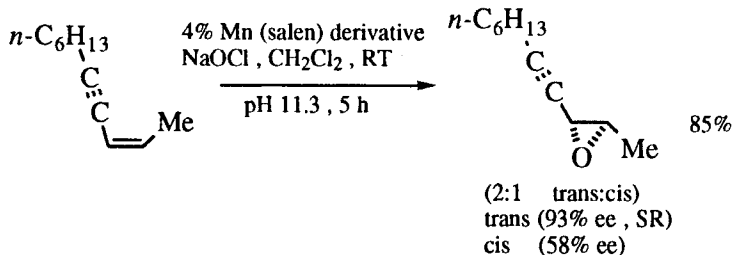
Riera, A.; Cabré, F.; Moyano, A.; Pericàs, M.A.; Santamaría, J. *Tetrahedron Lett.*, **1990**, 31, 2169.



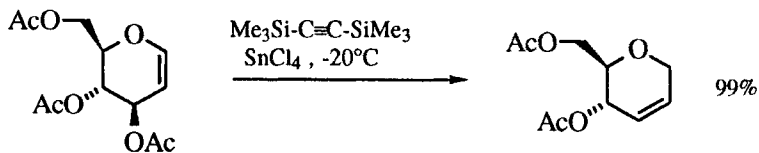
Sörensen, H.; Greene, A.E. *Tetrahedron Lett.*, **1990**, 31, 7597.



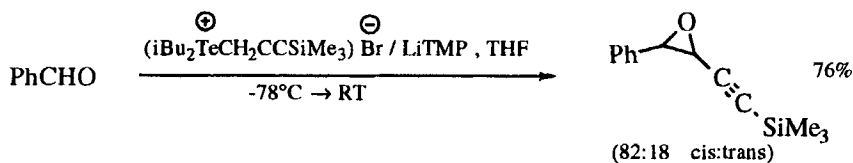
Courtemanche, G.; Normant, J-E. *Tetrahedron Lett.*, **1991**, 32, 5317.



Lee, N.H.; Jacobsen, E.N. *Tetrahedron Lett.*, **1991**, 32, 6533.

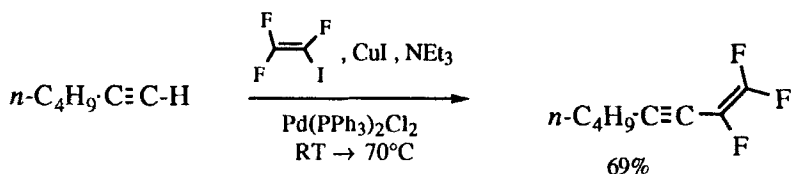


Tsukiyama, T.; Isobe, M. *Tetrahedron Lett.*, **1992**, 33, 7911.

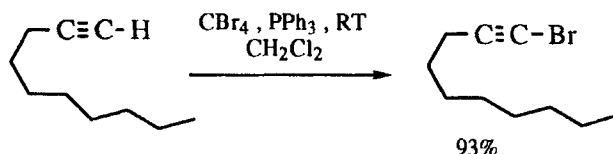


Mukai, C.; Uchiyama, M.; Hanaoka, M. *J. Chem. Soc., Chem. Commun.*, **1992**, 1014.

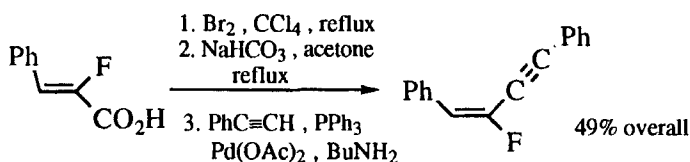
SECTION 308: ALKYNE - HALIDE



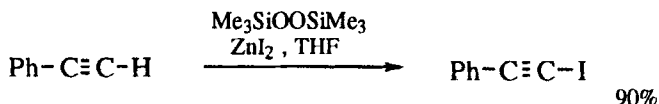
Yang, Z-Y.; Burton, D.J. *Tetrahedron Lett.*, **1990**, 31, 1369.



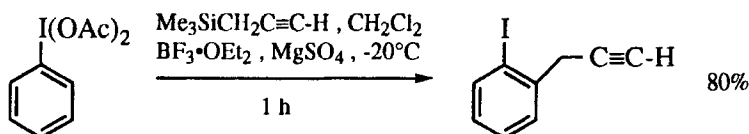
Wagner, A.; Heitz, M.P.; Mioskowski, C. *Tetrahedron Lett.*, **1990**, 31, 3141.



Eddarir, S.; Francesch, C.; Mestdagh, H.; Rolando, C. *Tetrahedron Lett.*, **1990**, 31, 4449.

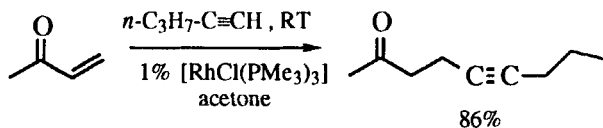


Casarini, A.; Dembech, P.; Reginato, G.; Ricci, A.; Seconi, G. *Tetrahedron Lett.*, **1991**, 32, 2165.

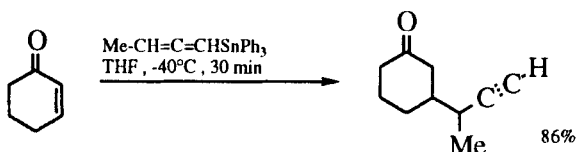


Ochiai, M.; Ito, T.; Takaoka, Y.; Masaki, Y. *J. Am. Chem. Soc.*, **1991**, 113, 1319.

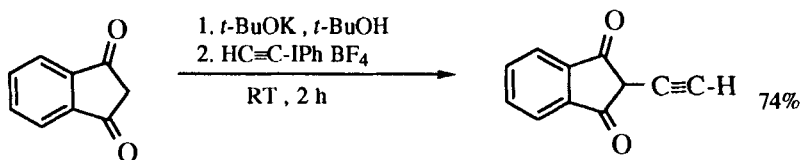
SECTION 309: ALKYNE - KETONE



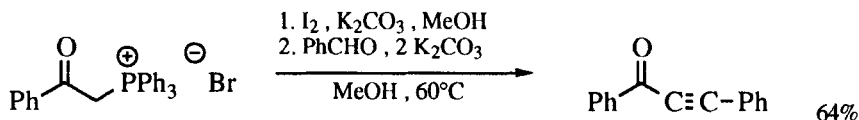
Nikishin, G.I.; Kovalev, I. *Tetrahedron Lett.*, **1990**, 31, 7063.



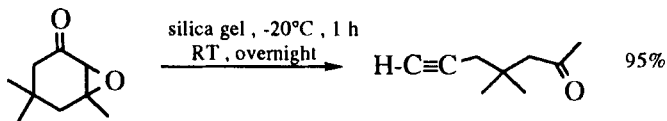
Haruta, J.; Nishi, K.; Matsuda, S.; Akai, S.; Tamura, Y.; Kita, Y. *J. Org. Chem.*, **1990**, 55, 4853.



Ochiai, M.; Ito, T.; Takaoka, Y.; Masaki, Y.; Kunishima, M.; Tani, S.; Nagao, Y. *J. Chem. Soc., Chem. Commun.*, **1990**, 118.

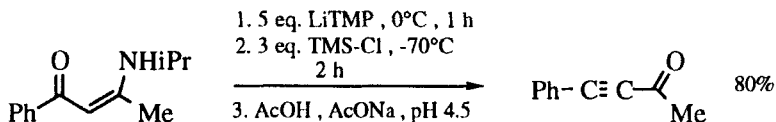


Iman, M.; Bouyssou, P.; Chenault, J. *Synthesis*, **1990**, 631.

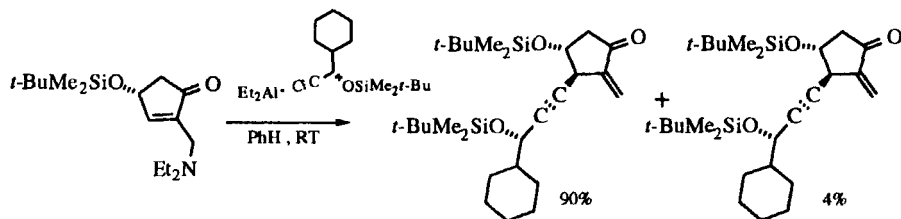


silica gel catalyzed Eschenmoser reaction

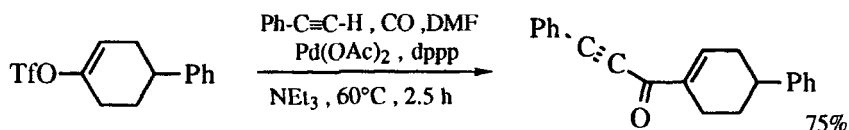
Abad, A.; Agulló, C.; Arnó, M.; Cuñat, A.C.; Zaragoza, R.J. *SynLett*, **1991**, 787.



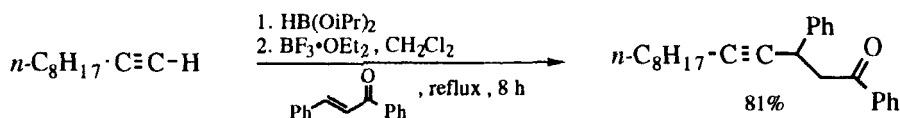
Bartoli, G.; Cimarelli, C.; Palmieri, G. *Tetrahedron Lett.*, **1991**, 32, 7091.



Yoshino, T.; Okamoto, S.; Sato, F. *J. Org. Chem.*, **1991**, *56*, 3205.



Ciattini, P.G.; Morera, E.; Ortar, G. *Tetrahedron Lett.*, **1991**, *32*, 6449.

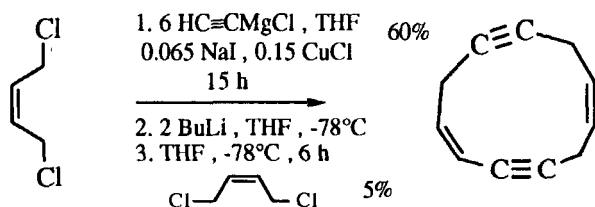


Fujishima, H.; Takada, E.; Hara, S.; Suzuki, A. *Chem. Lett.*, **1992**, 695.

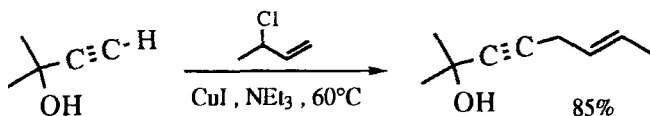
SECTION 310: ALKYNE - NITRILE

NO ADDITIONAL EXAMPLES

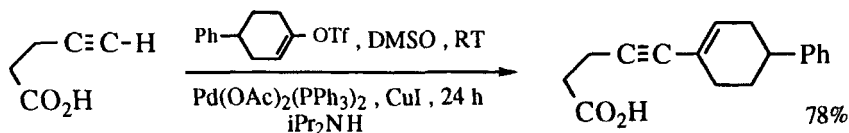
SECTION 311: ALKYNE - ALKENE



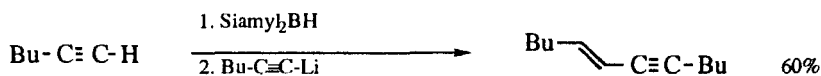
Gleiter, R.; Merger, R. *Tetrahedron Lett.*, **1990**, *31*, 1845.



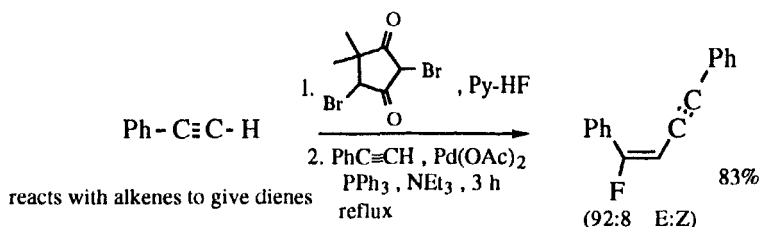
Mignani, G.; Chevalier, C.; Grass, F.; Allmang, G.; Morel, D. *Tetrahedron Lett.*, **1990**, *31*, 5161.



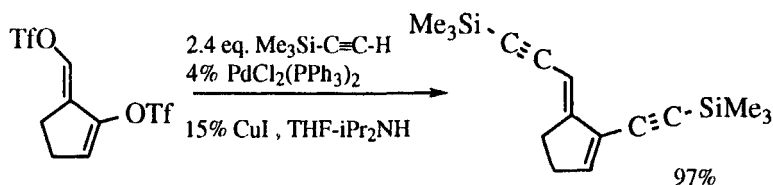
Arcadi, A.; Cacchi, S.; Del Mastro, M.; Marinelli, F. *SynLett*, **1991**, 409.



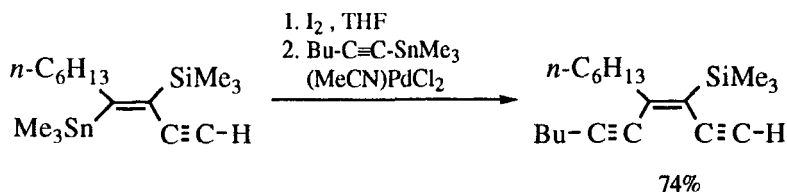
Negishi, E.; Yoshida, T.; Abramovitch, A.; Lew, G.; Williams, R.M. *Tetrahedron*, **1991**, 47, 343.



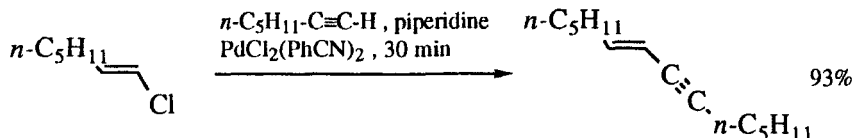
Eddarir, S.; Mestdag, H.; Rolando, C. *Tetrahedron Lett.*, **1991**, 32, 69.



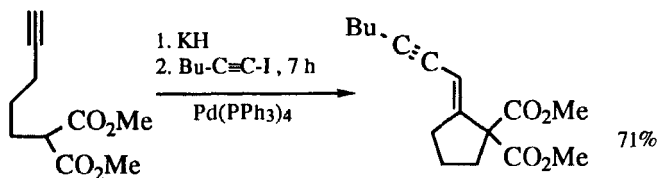
Suffert, J.; Brückner, R. *Tetrahedron Lett.*, **1991**, 32, 1453.



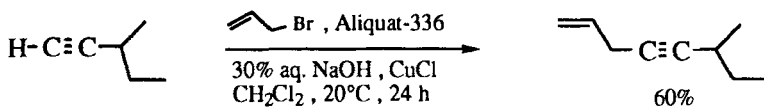
Stracker, E.C.; Zweifel, G. *Tetrahedron Lett.*, **1991**, 32, 3329.



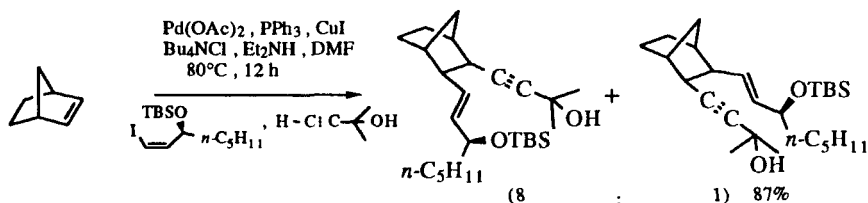
Alami, M.; Linstrumelle, G. *Tetrahedron Lett.*, **1991**, 32, 6109.



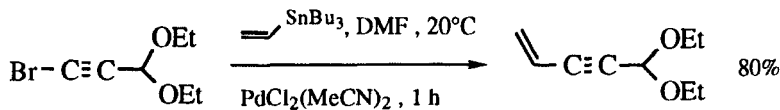
Bouyssi, D.; Balme, G.; Gore, J. *Tetrahedron Lett.*, **1991**, 32, 6541.



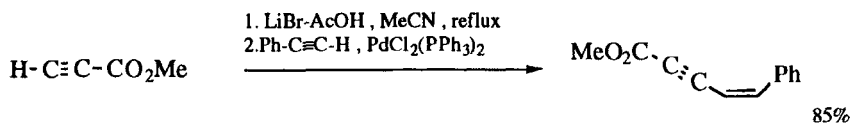
Grushin, V.V.; Alper, H. *J. Org. Chem.*, **1992**, 57, 2188.



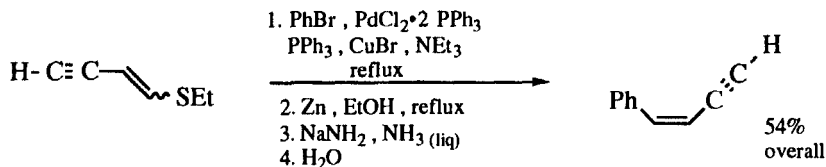
Torii, S.; Okumoto, H.; Kotani, T.; Nakayasu, S.; Ozaki, H. *Tetrahedron Lett.*, **1992**, 33, 3503.



Beaudet, I.; Parrain, J-L.; Quintard, J-P. *Tetrahedron Lett.*, **1992**, 33, 3647.



Lu, X.; Huang, X.; Ma, S. *Tetrahedron Lett.*, **1992**, 33, 2535.



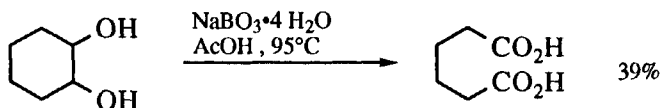
Fossatelli, M.; van der Kerk, A.C.T.H.M.; Vasilevsky, S.F.; Brandsma, L. *Tetrahedron Lett.*, **1992**, 33, 4229.

REVIEWS:

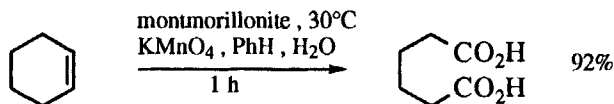
"Molecular Design, Chemical Synthesis, and Biological Action of Enediynes"

Nicolaou, K.C.; Smith, A.L. *Accs. Chem. Res.*, **1992**, *24*, 497.

SECTION 312: CARBOXYLIC ACID - CARBOXYLIC ACID

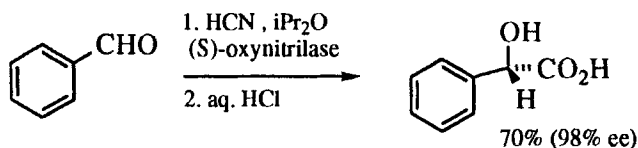


Muzart, L.; Ajjou, A.N. *Synth. Commun.*, **1991**, *21*, 575.

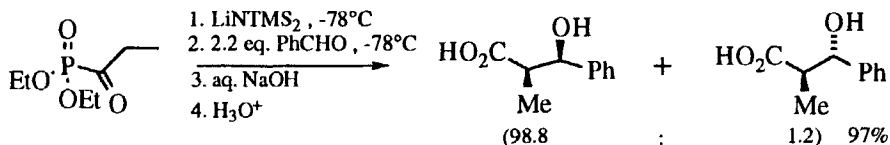


Choudary, B.M.; Valli, V.L.K.; Durga Prasad, A. *Synth. Commun.*, **1991**, *21*, 2007.

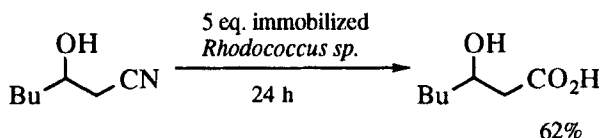
SECTION 313: CARBOXYLIC ACID - ALCOHOL, THIOL



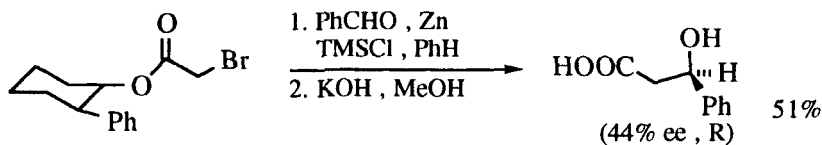
Effenberger, F.; Hörsch, B.; Förster, S.; Ziegler, T. *Tetrahedron Lett.*, **1990**, *31*, 1249.



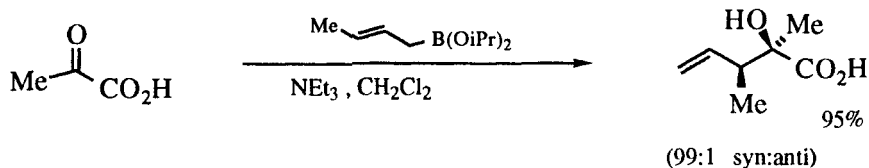
Longmire, C.F.; Evans, S.A. Jr. *J. Chem. Soc., Chem. Commun.*, **1990**, 922.



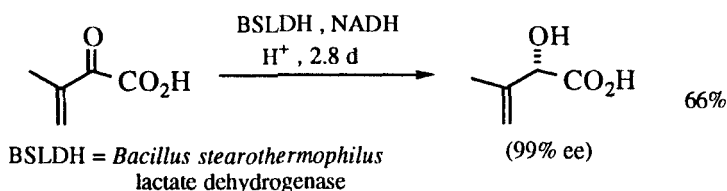
Klempier, N.; de Raadt, A.; Faber, K.; Griengl, H. *Tetrahedron Lett.*, **1991**, *32*, 341.



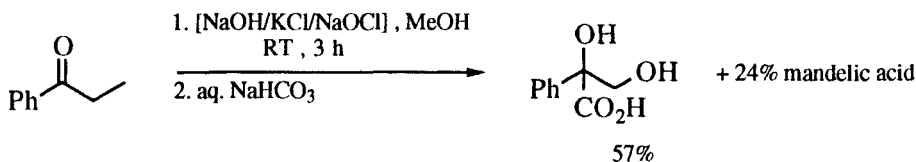
Basavaiah, D.; Bharathi, T.K. *Tetrahedron Lett.*, 1991, 32, 3417.



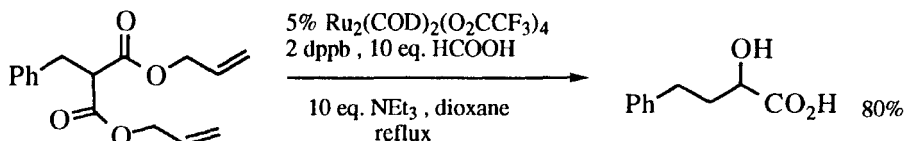
Wang, Z.; Meng, X.-J.; Kabalka, G.W. *Tetrahedron Lett.*, 1991, 32, 5677.



Casy, G.; Lee, T.V.; Lovell, H. *Tetrahedron Lett.*, 1992, 33, 817.



Guthrie, J.P.; Cossar, J.; Lu, J. *Can. J. Chem.*, 1991, 69, 1904.

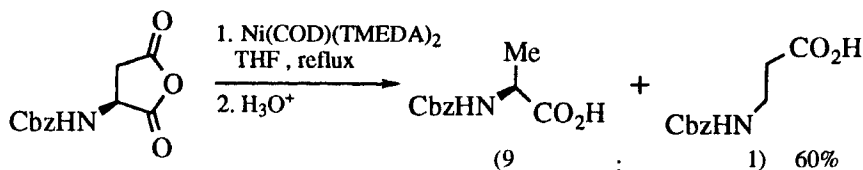


Shimizu, I.; Tekawa, M.; Maruyama, Y.; Yamamoto, A. *Chem. Lett.*, 1992, 1365.

SECTION 314: CARBOXYLIC ACID - ALDEHYDE

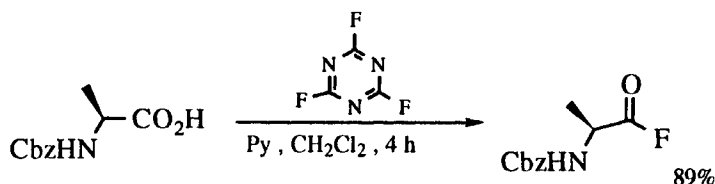
NO ADDITIONAL EXAMPLES

SECTION 315: CARBOXYLIC ACID - AMIDE

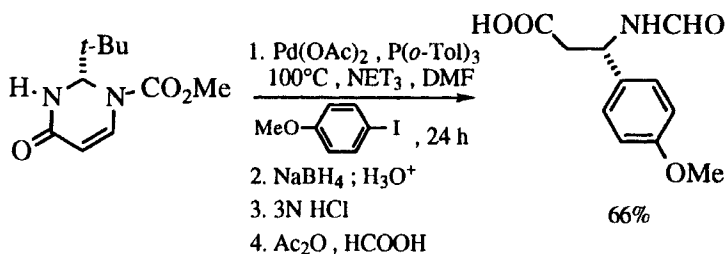


1:1 mixture when Ni(COD)(bipy)_2 was used

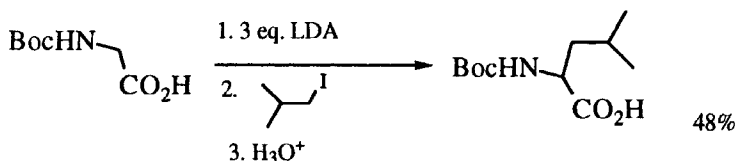
Castaño, A.M.; Echavarren, A.M. *Tetrahedron Lett.*, **1990**, 31, 4783.



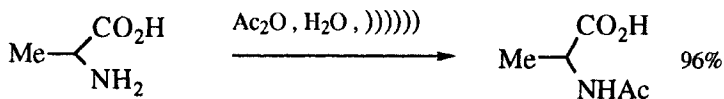
Bertho, J-N.; Loffet, A.; Pinel, C.; Reuther, F.; Sennyey, G. *Tetrahedron Lett.*, **1991**, 32, 1303.



Konopelski, J.P.; Chu, K.S.; Negrete, G.R. *J. Org. Chem.*, **1991**, 56, 1355.

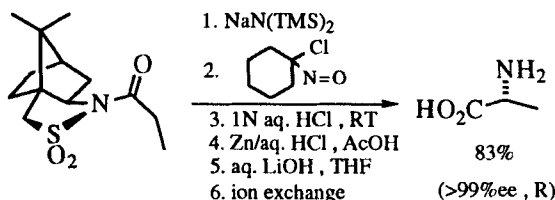


De Nicola, A.; Einhorn, J.; Luche, J-L. *Tetrahedron Lett.*, **1992**, 33, 6461.

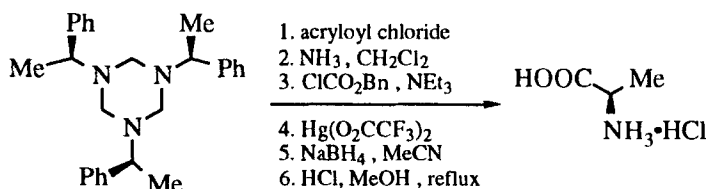


Veera Reddy, A.; Ravindranath, B. *Synth. Commun.*, **1992**, 22, 257.

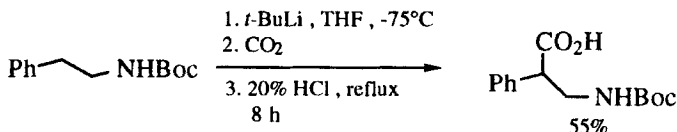
SECTION 316: CARBOXYLIC ACID - AMINE



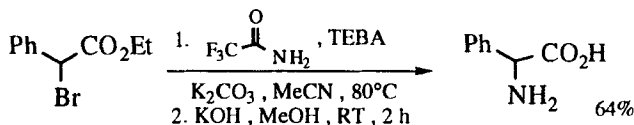
Oppolzer, W.; Tamura, O. *Tetrahedron Lett.*, **1990**, 31, 991.



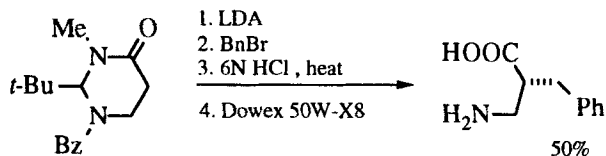
Amoroso, R.; Cardillo, G.; Tomasini, C. *Tetrahedron Lett.*, **1990**, 31, 6413.



Simig, G.; Schlosser, M. *Tetrahedron Lett.*, **1991**, 32, 1963, 1965.



Landini, D.; Penso, M. *J. Org. Chem.*, **1991**, 56, 420.



Iuaristi, E.; Quintana, D.; Lamatsch, B.; Seebach, D. *J. Org. Chem.*, **1991**, 56, 2553.

REVIEWS:

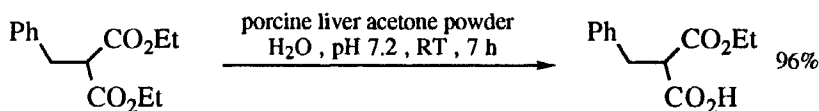
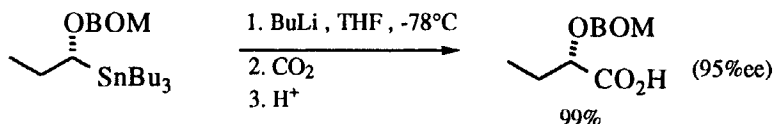
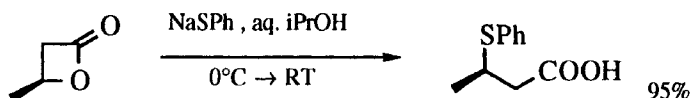
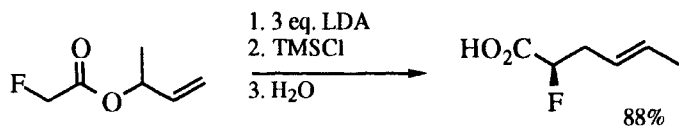
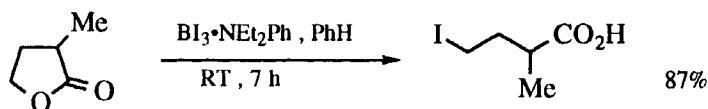
"New Approaches to the Use of Amino Acids as Chiral Building Blocks in Organic Synthesis"
 Reetz, M.T. *Angew. Chem. Int. Ed. Engl.*, **1991**, 30, 1531.

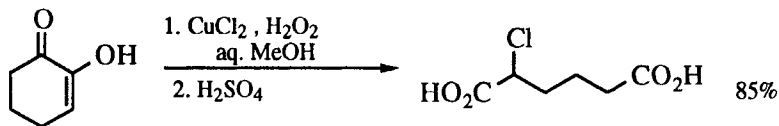
Related Methods:

Section 315 (Carboxylic Acid - Amide).

Section 344 (Amide - Ester).

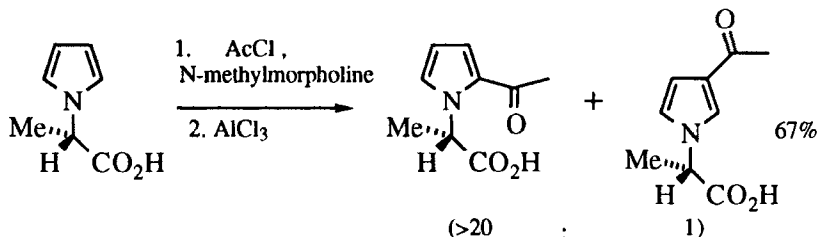
Section 351 (Amine - Ester).

SECTION 317: CARBOXYLIC ACID - ESTERAhmar, M.; Bloch, R.; Bortolussi, M. *Synth. Commun.*, **1991**, *21*, 1071.**SECTION 318: CARBOXYLIC ACID - ETHER, EPOXIDE, THIOETHER**Chan, P.C-M.; Chong, J.M. *Tetrahedron Lett.*, **1990**, *31*, 1985.Breitschuh, R.; Seebach, D. *Synthesis*, **1992**, 83.**SECTION 319: CARBOXYLIC ACID - HALIDE, SULFONATE**Welch, J.T.; Plummer, J.S.; Chou, T.S. *J. Org. Chem.*, **1991**, *56*, 353.Narayana, C.; Reddy, N.K.; Kabalka, G.W. *Tetrahedron Lett.*, **1991**, *32*, 6855.

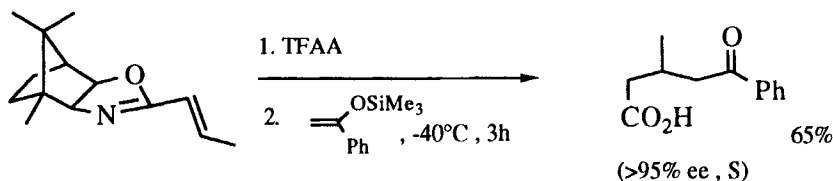


Starostin, E.K.; Mazurchik, A.A.; Ignatenko, A.V.; Nikishin, G.I., *Synthesis*, **1992**, 917.

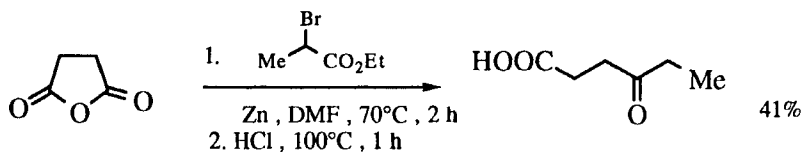
SECTION 320: CARBOXYLIC ACID - KETONE



Jefford, C.W.; Tang, Q.; Boukouvalas, J. *Tetrahedron Lett.*, **1990**, 31, 995.



Michelon, F.; Pouilhès, A.; Bac, N.V.; Langlois, N., *Tetrahedron Lett.*, **1992**, 33, 1743.



Schick, H.; Ludwig, R. *Synthesis*, **1992**, 369.

Also via: Section 360 (Ketone - Ester).

SECTION 321: CARBOXYLIC ACID - NITRILE

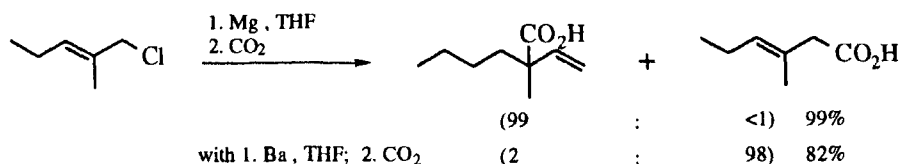
NO ADDITIONAL EXAMPLES

Also via: Section 361 (Nitrile - Ester).

SECTION 322: CARBOXYLIC ACID - ALKENE



Aurell, M.J.; Gil, S.; Parra, M.; Tortajada, A.; Mestres, R. *Tetrahedron*, **1991**, 47, 1997.

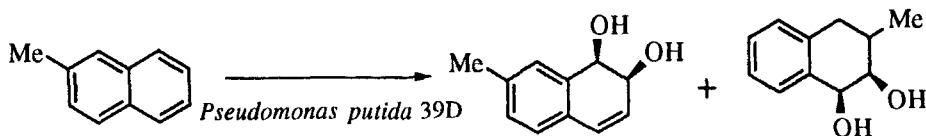


Yanagisawa, A.; Yasue, K.; Yamamoto, H. *SynLett*, **1992**, 593.

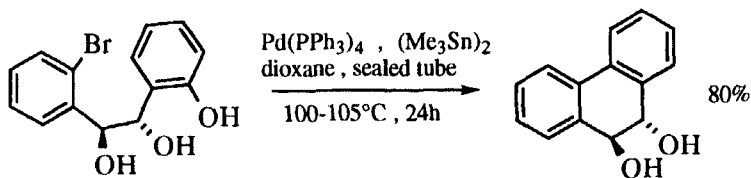
Also via: Section 313 (Alcohol - Carboxylic Acids).
Section 362 (Ester - Alkene).

Section 349 (Amide - Alkene).
Section 376 (Nitrile - Alkene).

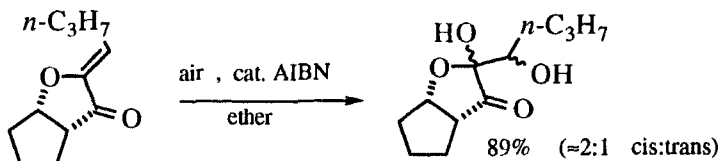
SECTION 323: ALCOHOL, THIOL - ALCOHOL, THIOL



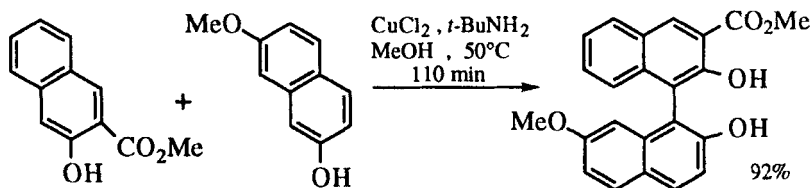
Deluca, M.E.; Hudlicky, T. *Tetrahedron Lett.*, **1990**, 31, 13.



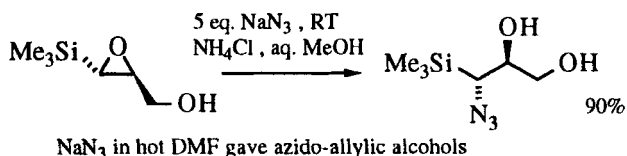
Kelly, T.R.; Li, Q.; Bhushan, V. *Tetrahedron Lett.*, **1990**, 31, 161.



Kánai, K.; Tömösközi, I *Tetrahedron Lett.*, **1990**, 31, 403.

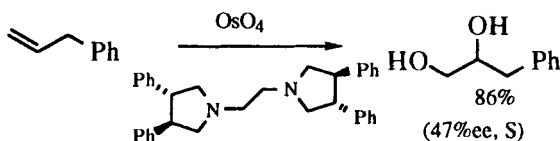


Hovorka, M.; Gunterová, J.; Závada, J. *Tetrahedron Lett.*, **1990**, 31, 413.

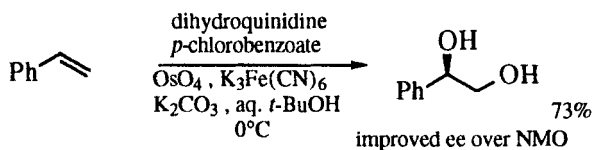


NaN_3 in hot DMF gave azido-allylic alcohols

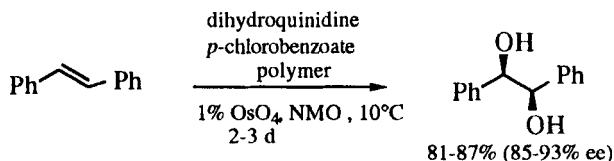
Chakraborty, T.K.; Reddy, G.V. *Tetrahedron Lett.*, **1990**, 31, 1335.



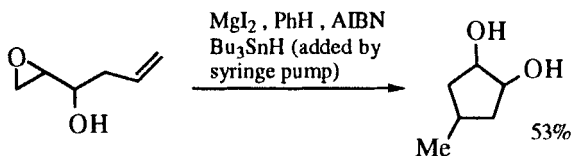
Tomioaka, K.; Nakajima, M.; Koga, K. *Tetrahedron Lett.*, **1990**, 31, 1741.



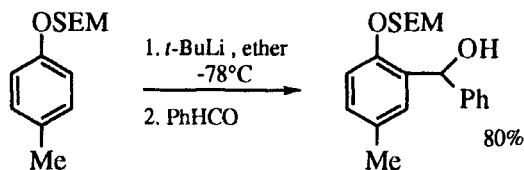
Kwong, H.-L.; Sorato, C.; Ogino, Y.; Chen, H.; Sharpless, K.B. *Tetrahedron Lett.*, **1990**, 31, 2999.



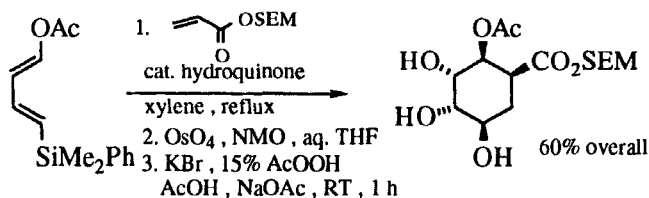
Kim, B.M.; Sharpless, K.B. *Tetrahedron Lett.*, **1990**, 31, 3003.



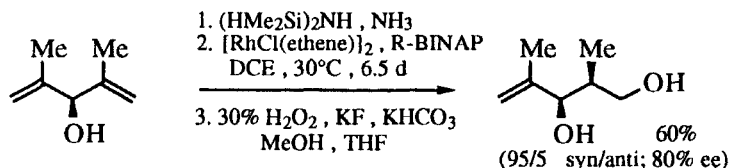
Bonini, C.; Di Fabio, R.; Mecozzi, S.; Right, G. *Tetrahedron Lett.*, **1990**, 31, 5369.



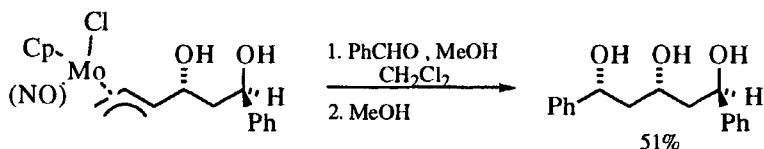
Sengupta, S.; Snieckus, V. *Tetrahedron Lett.*, **1990**, 31, 4267.



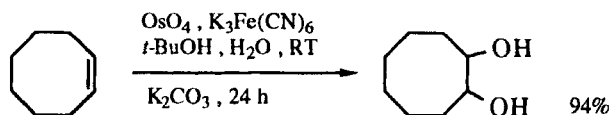
Koreeda, M.; Teng, K.; Murat, T. *Tetrahedron Lett.*, **1990**, 31, 5997.



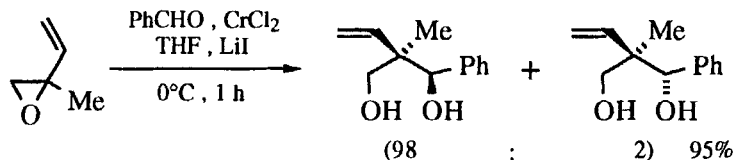
Tamao, K.; Tohma, T.; Inui, N.; Nakayama, O.; Ito, Y. *Tetrahedron Lett.*, **1990**, 31, 7333.



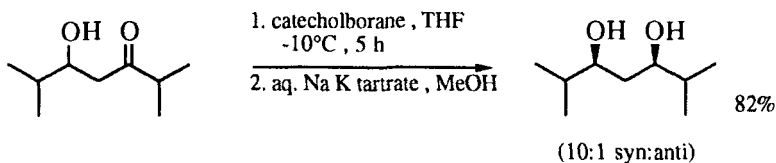
Lin, S-H.; Vong, W-J.; Cheng, C-Y.; Wang, S-L.; Liu, R-S *Tetrahedron Lett.*, **1990**, 31, 7645.



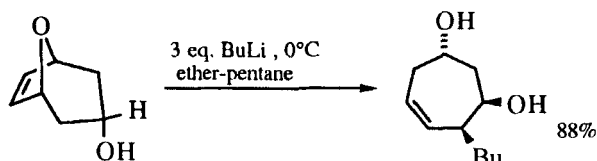
Minato, M.; Yamamoto, K.; Tsuji, J. *J. Org. Chem.*, **1990**, 55, 766.



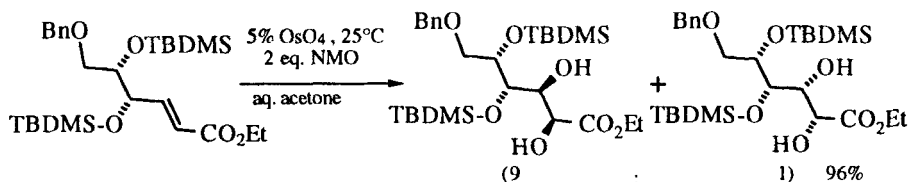
Fujimura, O.; Takai, K.; Utimoto, K. *J. Org. Chem.*, **1990**, 55, 1705.



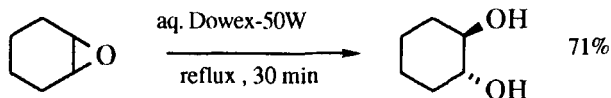
Evans, D.A.; Hoveyda, A.H. *J. Org. Chem.*, **1990**, *55*, 5190.



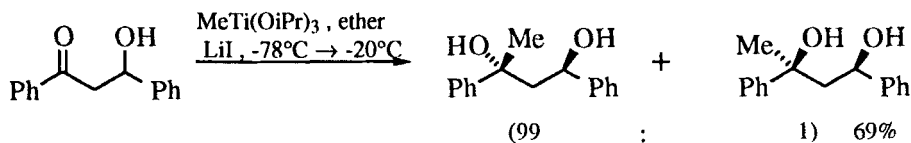
Lautens, M.; Abd-El-Aziz, A.S.; Lough, A. *J. Org. Chem.*, **1990**, *55*, 5305.



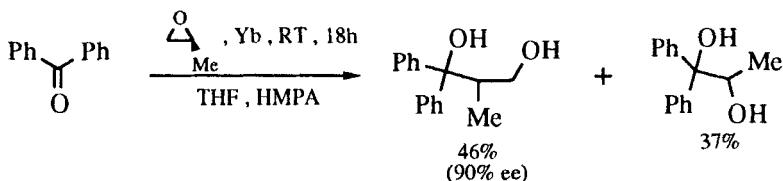
Saito, S.; Morikawa, Y.; Moriwaka, T. *J. Org. Chem.*, **1990**, *55*, 5429.



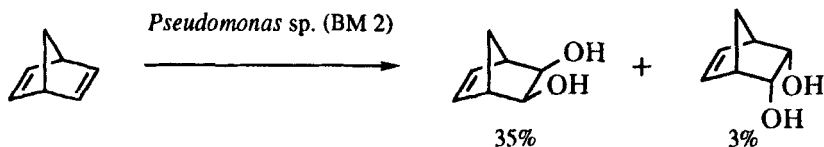
Ranu, B.C.; Chakraborty, R. *Synth. Commun.*, **1990**, *20*, 1751.



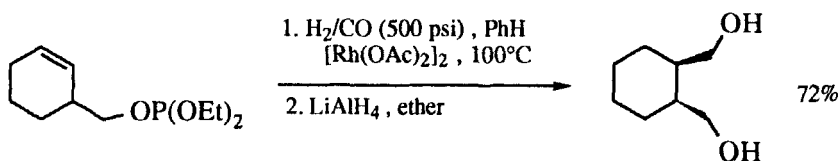
Ukaji, Y.; Kanda, H.; Yamamoto, K.; Fujiwara, T. *Chem. Lett.*, **1990**, 597.



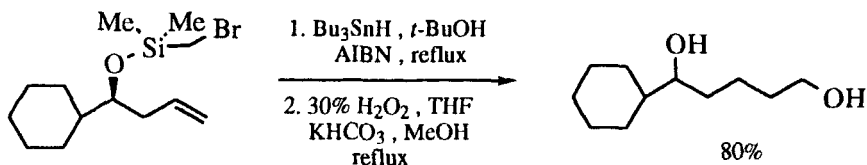
Takaki, K.; Tanaka, S.; Beppu, F.; Tsubaki, Y.; Fujiwara, Y. *Chem. Lett.*, **1990**, 1427.



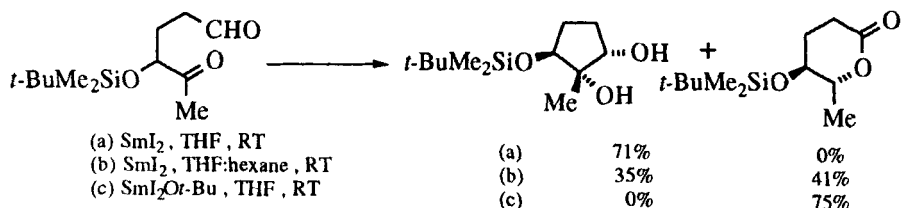
Geary, P.J.; Pryce, R.J.; Roberts, S.M.; Ryback, G.; Winders, J.A. *J. Chem. Soc., Chem. Commun.*, **1990**, 204.



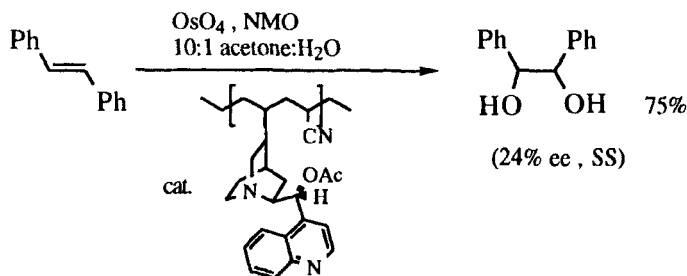
Jackson, W.R.; Perlmutter, P.; Tasdelen, E.E. *J. Chem. Soc., Chem. Commun.*, **1990**, 763.



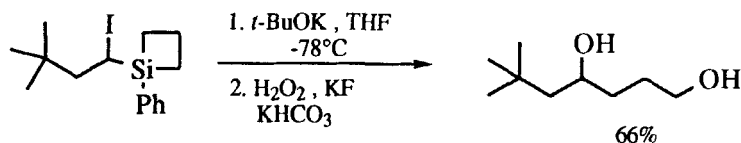
Koreeda, M.; Hamann, L.G. *J. Am. Chem. Soc.*, **1990**, 112, 8175.



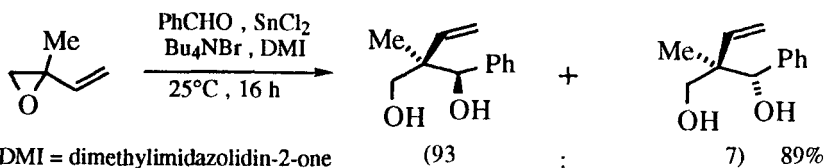
Uenishi, J.; Masuda, S.; Wakabayashi, S. *Tetrahedron Lett.*, **1991**, 32, 5097.



Pini, D.; Petri, A.; Nardi, A.; Rosini, C.; Salvadori, P. *Tetrahedron Lett.*, **1991**, 32, 5175.

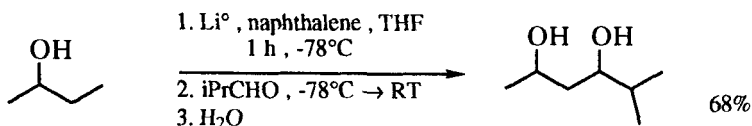


Matsumoto, K.; Miura, K.; Oshima, K.; Utimoto, K. *Tetrahedron Lett.*, **1991**, 32, 6383.

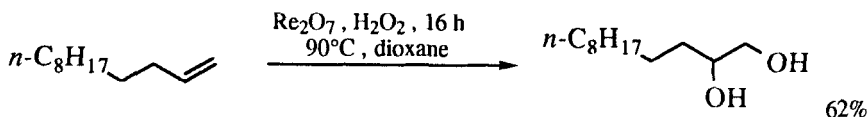


DMI = dimethylimidazolidin-2-one

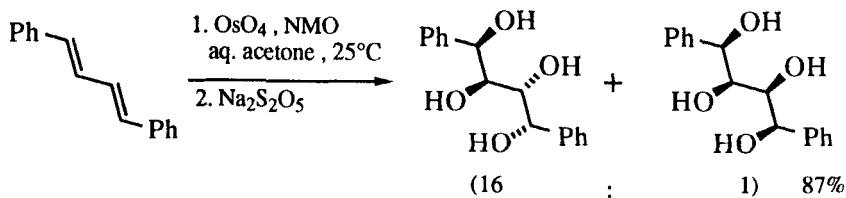
Masuyama, Y.; Nakata, J.; Kurusu, Y. *J. Chem. Soc., Perkin Trans. I*, **1991**, 2598.



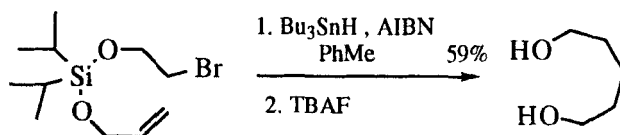
Yus, M.; Ramón, D.J. *J. Chem. Soc., Chem. Commun.*, **1991**, 398.



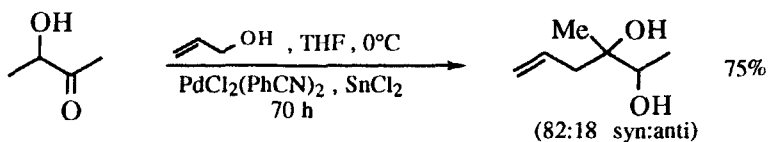
Warwel, S.; Klass, M.Rg.; Sojka, M. *J. Chem. Soc., Chem. Commun.*, **1991**, 1578.



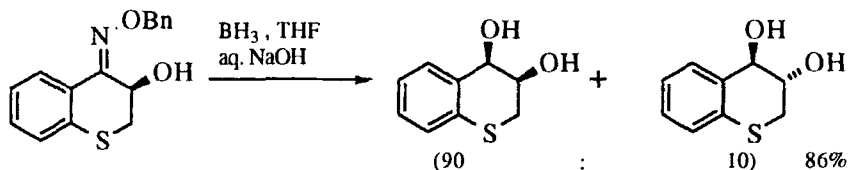
Park, C.Y.; Kim, B.M.; Sharpless, K.B. *Tetrahedron Lett.*, **1991**, 32, 1003.



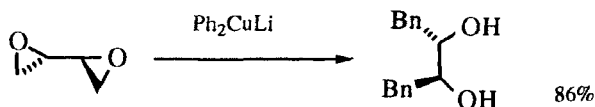
Hutchinson, J.H.; Daynard, T.S.; Gillard, J.W. *Tetrahedron Lett.*, **1991**, 32, 573.



Takahara, J.P.; Masuyama, Y.; Kurusu, Y. *Chem. Lett.*, **1991**, 879.

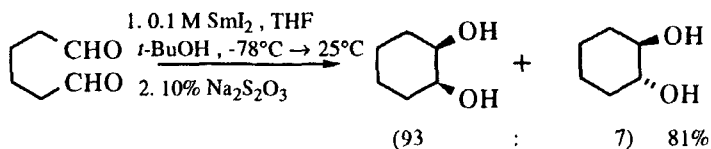


Ghosh, A.K.; McKee, S.P.; Sanders, W.M. *Tetrahedron Lett.*, **1991**, 32, 711.

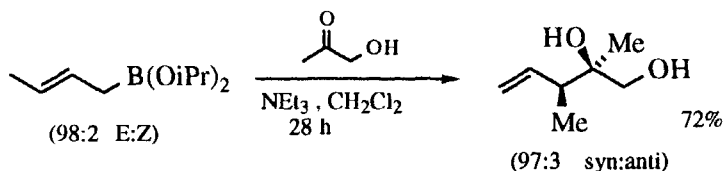


similar results with RMgX , R_2CuLi

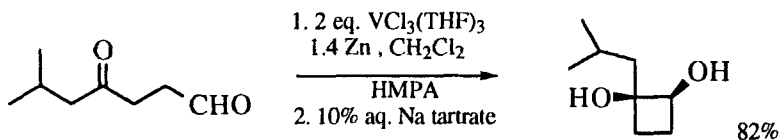
Devine, P.N.; Oh, T. *Tetrahedron Lett.*, **1991**, 32, 883.



Chiara, J.L.; Cabri, W.; Hanessian, S. *Tetrahedron Lett.*, **1991**, 32, 1125.

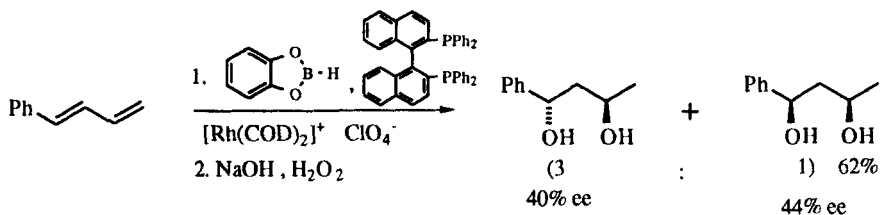


Wang, Z.; Meng, X.-J.; Kabalka, G.W. *Tetrahedron Lett.*, **1991**, 32, 1945.

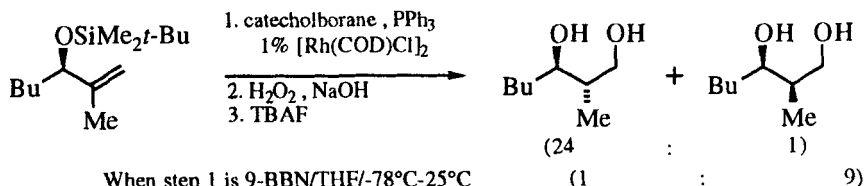


Raw, A.S.; Pedersen, S.E. *J. Org. Chem.*, **1991**, 56, 830.

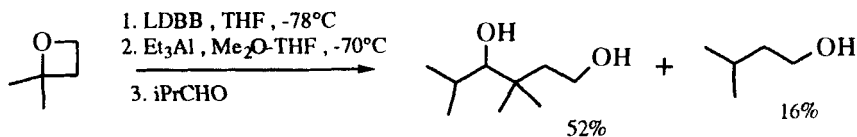
Park, J.; Pedersen, S.E. *Tetrahedron*, **1992**, 48, 2069.



Matsumoto, Y.; Hayashi, T. *Tetrahedron Lett.*, **1991**, 32, 3387.

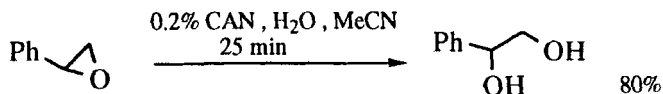


Burgess, K.; Cassidy, J.; Ohlmeyer, M.J. *J. Org. Chem.*, **1991**, 56, 1020.

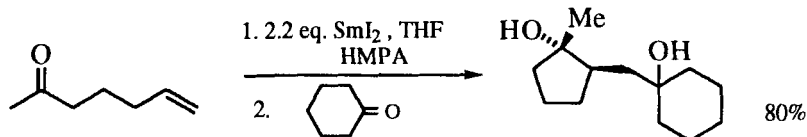


LDBB = 4,4'-di-*t*-butyl biphenylide

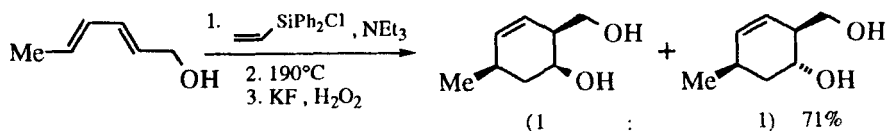
Mudryk, B.; Cohen, T. *J. Org. Chem.*, **1991**, 56, 5760.



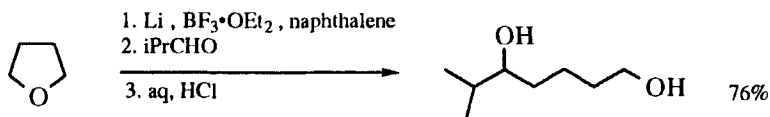
Iranpoor, N.; Baltork, I.M.; Zardaloo, F.S. *Tetrahedron*, **1991**, 47, 9861.



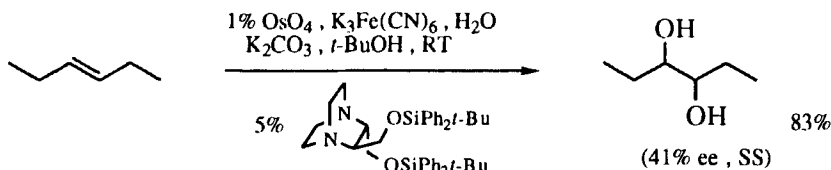
Molander, G.A.; McKie, J.A. *J. Org. Chem.*, **1992**, 57, 3132.



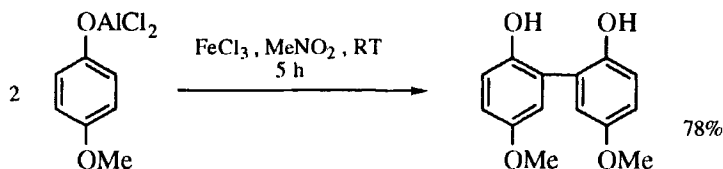
Sieburth, S.M.; Fensterbank, L. *J. Org. Chem.*, **1992**, 57, 5279.



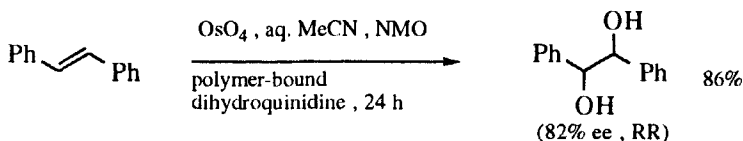
Ramón, D.J.; Yus, M. *Tetrahedron*, **1992**, 48, 3585.



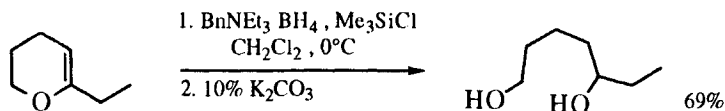
Oishi, T.; Hiram, M. *Tetrahedron Lett.*, **1992**, 33, 639.



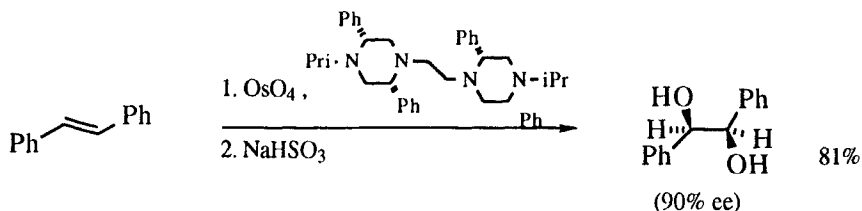
Sartori, G.; Maggi, R.; Bigi, F.; Arienti, A.; Casnati, G. *Tetrahedron Lett.*, **1992**, 33, 2207.



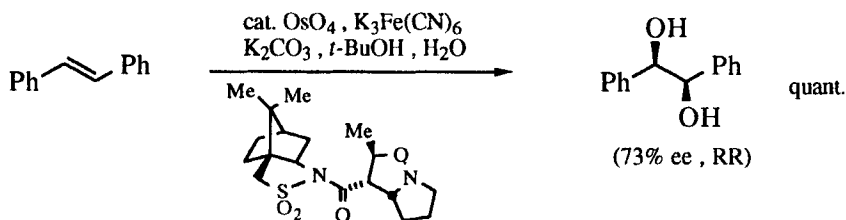
Lohray, B.B.; Thomas, A.; Chittari, P.; Ahuja, J.; Dhal, P.K. *Tetrahedron Lett.*, **1992**, 33, 5453.



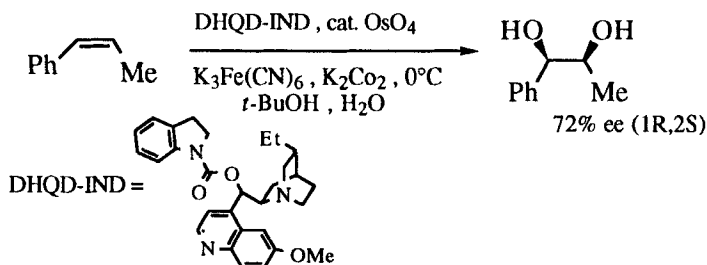
Baskaran, S.; Chidambaram, N.; Narasimhan, N.; Chandrasekaran, S. *Tetrahedron Lett.*, **1992**, 33, 6371.



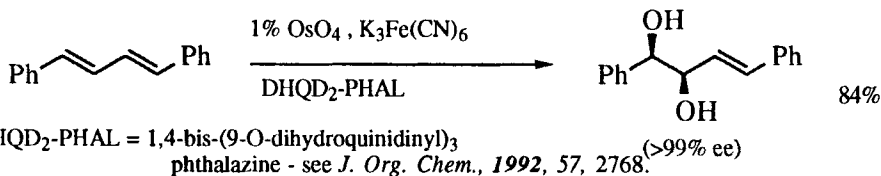
Fuji, K.; Tanaka, K.; Miyamoto, H. *Tetrahedron Lett.*, **1992**, 33, 4021.



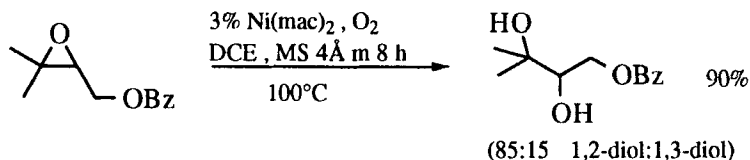
Imada, Y.; Saito, T.; Kawakami, T.; Murahashi, S.-I. *Tetrahedron Lett.*, **1992**, 33, 5081.



Wang, L.; Sharpless, K.B. *J. Am. Chem. Soc.*, **1992**, 114, 7568.

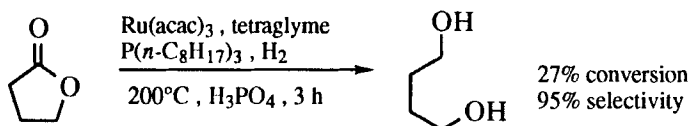


Xu, D.; Crispino, G.A.; Sharpless, K.B. *J. Am. Chem. Soc.*, **1992**, 114, 7570.

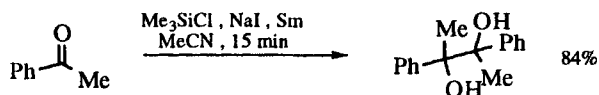


Ni(mac)₂ = bis-(3-methyl-2,4-pentanedionato) nickel (II)

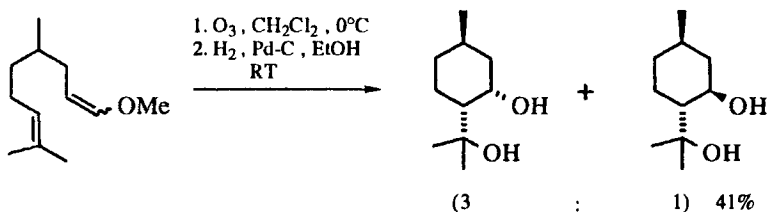
Mukaiyama, T.; Imagawa, K.; Yamada, T.; Takai, T. *Chem. Lett.*, **1992**, 231.



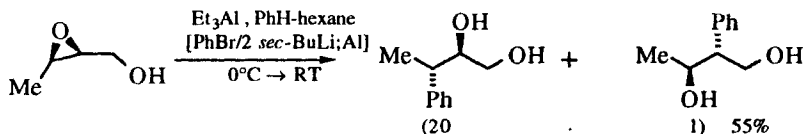
Hara, Y.; Inagaki, H.; Nishimura, S.; Wada, K. *Chem. Lett.*, **1992**, 1983.



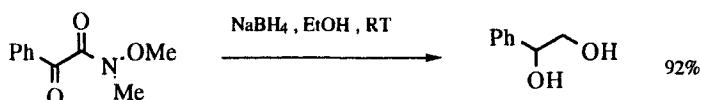
Akane, N.; Kanagawa, Y.; Nishiyama, Y.; Ishii, Y. *Chem. Lett.*, **1992**, 2431.



Casey, M.; Culshaw, A.J. *SynLett*, **1992**, 214.



Ahn, K.H.; Kim, J.S.; Jin, C.S.; Kang, D.H.; Han, D.S.; Shin, Y.S.; Kim, D.H. *SynLett*, **1992**, 306.



Sibi, M.P.; Sharma, R. *SynLett*, **1992**, 497.

REVIEWS:

"Recent Advances in the Asymmetric Dihydroxylation of Alkenes"

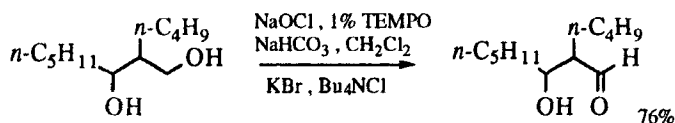
Lohray, B.B. *Tetrahedron Asymmetry*, **1992**, 3, 1317.

"New Aspects of Stereoselective Syntheses of 1,3-Polyols"

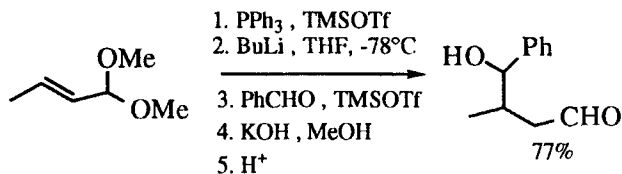
Oishi, T.; Nakata, T. *Synthesis*, **1990**, 635.

Also via: Section 327 (Alcohol - Ester); Section 357 (Ester - Ester).

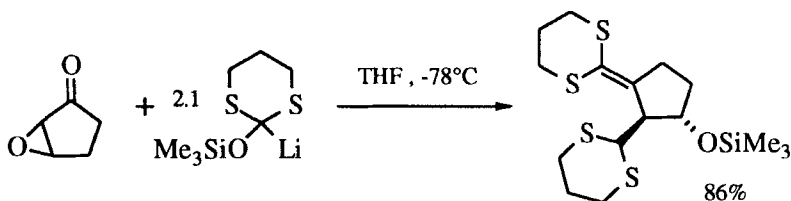
SECTION 324: ALCOHOL, THIOL - ALDEHYDE



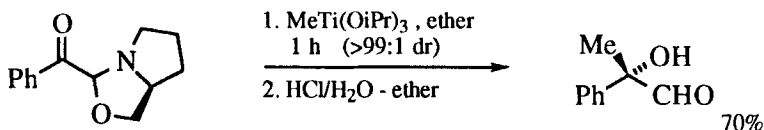
Siedlecka, R.; Skarzewski, J.; Młochowski, J. *Tetrahedron Lett.*, **1990**, 31, 2177.



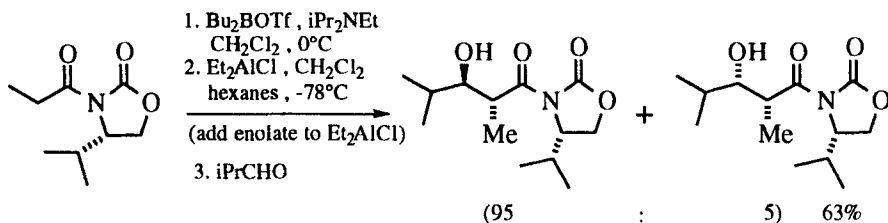
Kim, S.; Kim, Y.C. *Tetrahedron Lett.*, **1990**, 31, 2901.



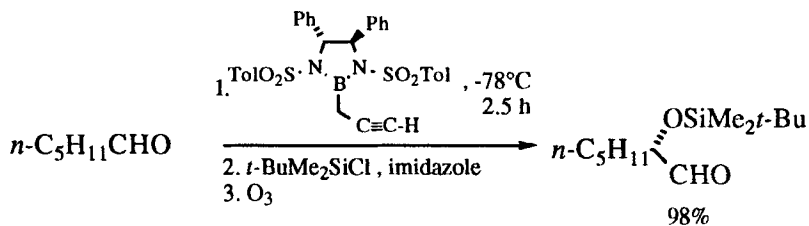
Kang, I.; Kim, D.H.; Lee, J.H.; Rim, J.G.; Yoon, Y.B.; Kim, K. *J. Org. Chem.*, **1990**, 55, 5555.



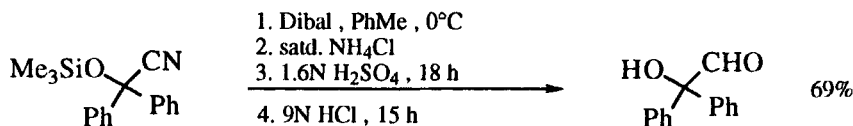
Ukaji, Y.; Yamamoto, K.; Kukui, M.; **Fujiisawa, T.** *Tetrahedron Lett.*, **1991**, 32, 2919.



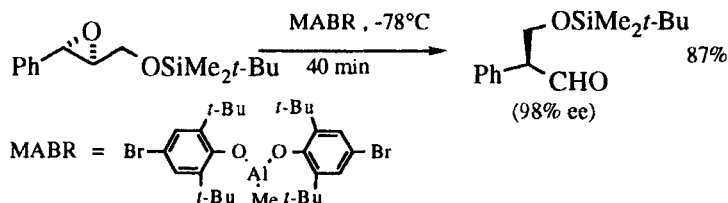
Walker, M.A.; **Heathcock, C.H.** *J. Org. Chem.*, **1991**, 56, 5747.



Corey, E.J.; Jones, G.B. *Tetrahedron Lett.*, **1991**, 32, 5713.



Hayashi, M.; Yoshiga, T.; Oguni, N. *SynLett*, **1991**, 479.

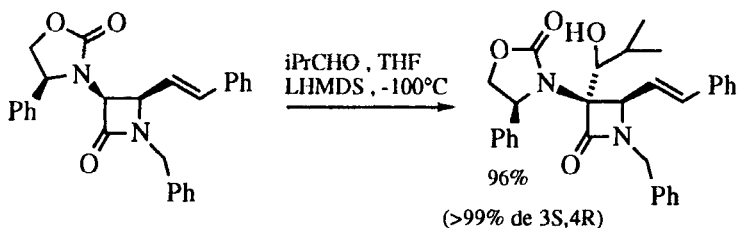


Maruoka, K.; Ooi, T.; Nagahara, S.; Yamamoto, H. *Tetrahedron*, **1991**, 47, 6983.

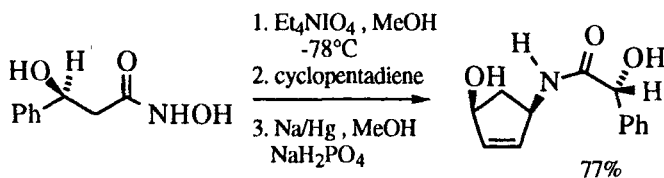
Related Methods:

Section 330 (Alcohol - Ketone).

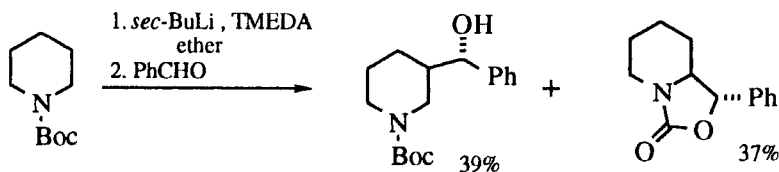
SECTION 325: ALCOHOL, THIOL - AMIDE



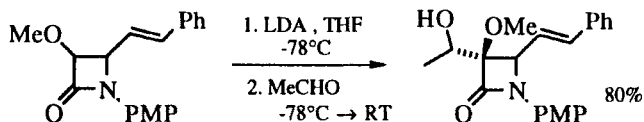
Ojima, I.; Pei, Y. *Tetrahedron Lett.*, **1990**, 31, 977.



Miller, A.; Procter, G. *Tetrahedron Lett.*, **1990**, 31, 1043.

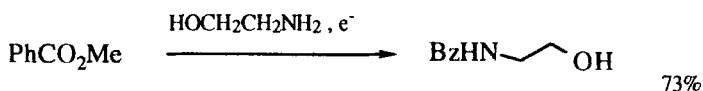


Beak, P.; Lee, W.K. *J. Org. Chem.*, **1990**, 55, 2578.

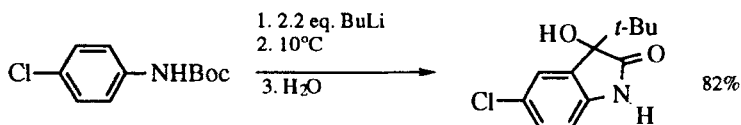


PMP = *p*-methoxyphenyl

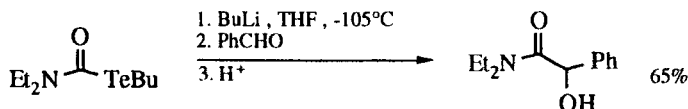
Durst, T.; Sharma, M.K.; Gabe, E.L.; Lee, F.L. *J. Org. Chem.*, **1990**, 55, 5525.



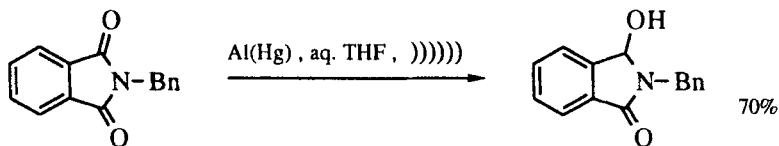
Arai, K.; Tamura, S.; Masumizu, T.; Kawai, K.; Nakajima, S.; Ueda, A. *Can. J. Chem.*, **1990**, 68, 903.



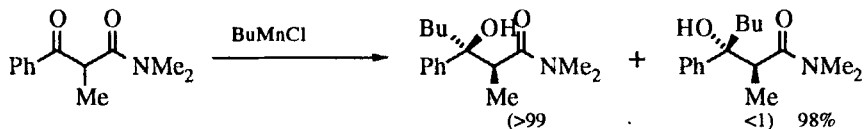
Smith, K.; Pritchard, G.J. *Angew. Chem. Int. Ed. Engl.*, **1990**, 29, 282.



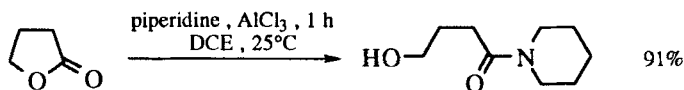
Hiroy, T.; Mogami, T.; Kambe, N.; Fujiwara, S.; Sonoda, N. *Synth. Commun.*, **1990**, 20, 703.



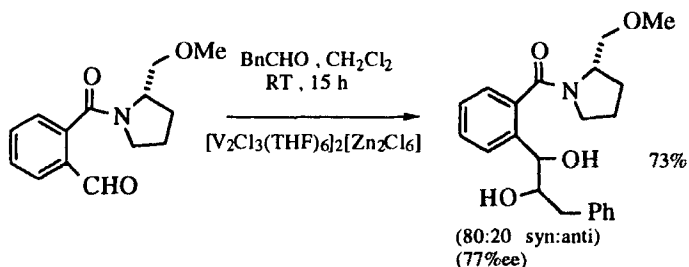
Luzzio, F.A.; O'Hara, L.C. *Synth. Commun.*, **1990**, 20, 3223.



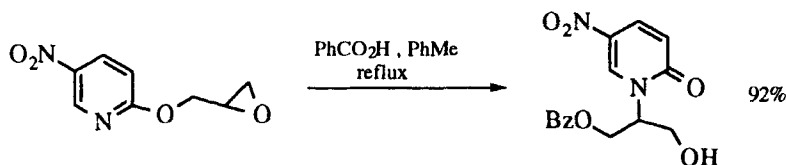
Taniguchi, M.; Fujii, H.; Oshima, K.; Utimoto, K. *Tetrahedron Lett.*, **1992**, 33, 4353.



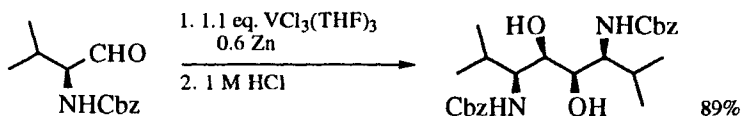
Lesimple, P.; Bigg, D.C.H. *Synthesis*, **1991**, 306.



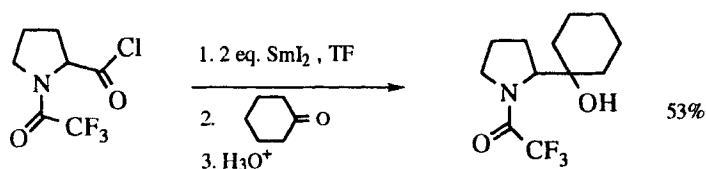
Annunziata, R.; Cinquini, M.; Cozzi, F.; Giaroni, P. *Tetrahedron Asymmetry*, **1990**, 1, 355.



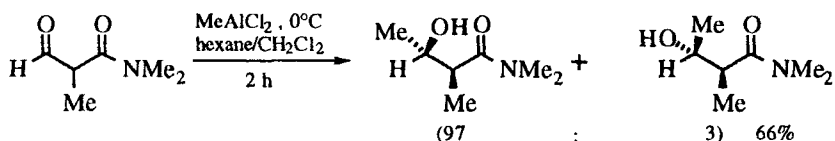
Schmidhauser, J.C.; Longley, K.L. *Tetrahedron Lett.*, **1991**, 32, 7155.



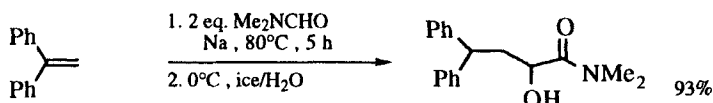
Konradi, A.W.; Pedersen, S.E. *J. Org. Chem.*, **1992**, 57, 28.



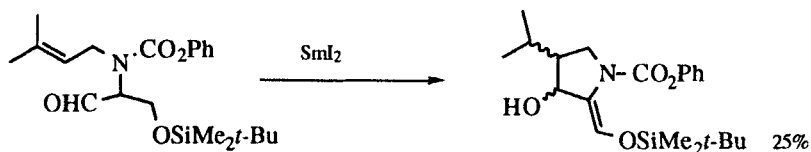
Collin, J.; Namy, J.L.; Jones, G.; Kagan, H.B. *Tetrahedron Lett.*, **1992**, 33, 2973.



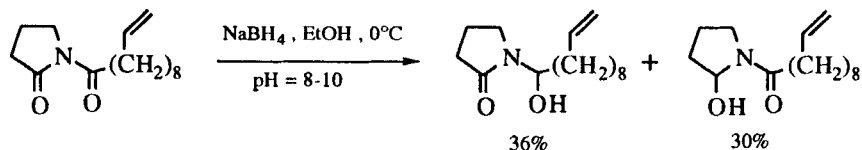
Fujii, H.; Taniguchi, M.; Oshima, K.; Utimoto, K. *Tetrahedron Lett.*, **1992**, 33, 4579.



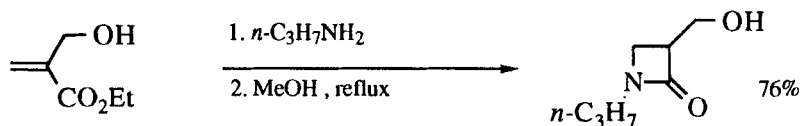
Botteghi, C.; Gotta, S.; Marchetti, M.; Melloni, G. *Tetrahedron Lett.*, **1992**, 33, 5601.



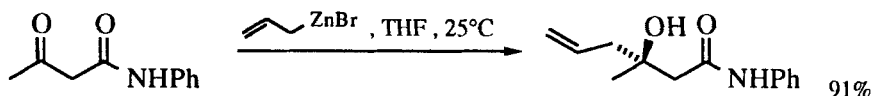
Baldwin, J.E.; Turner, S.C.M.; Moloney, M.G. *Tetrahedron Lett.*, **1992**, 33, 1517.



Moeller, K.D.; Hanau, C.E. *Tetrahedron Lett.*, **1992**, 33, 6041.

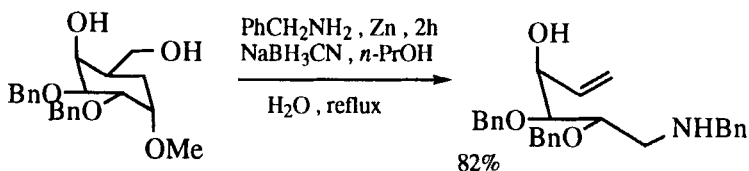


Amri, H.; El Gaied, M.M.; Ben Ayed, T.; Villeras, J. *Tetrahedron Lett.*, **1992**, 33, 6159.

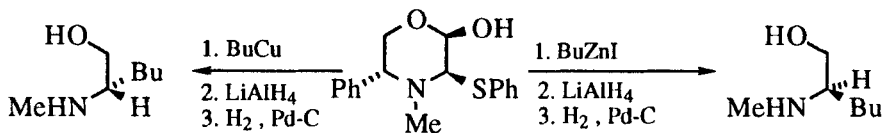


Taniguchi, M.; Oshima, K.; Utimoto, K. *Chem. Lett.*, **1992**, 2135.

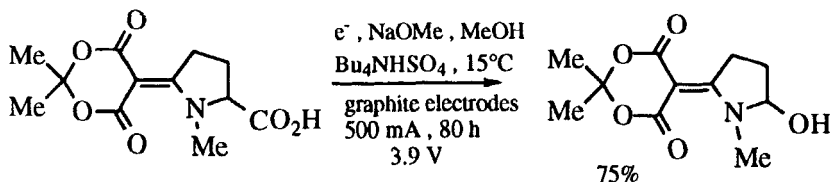
SECTION 326: ALCOHOL, THIOL - AMINE



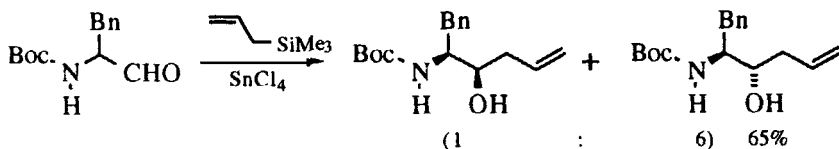
Bernoas, R.C. *Tetrahedron Lett.*, **1990**, 31, 469.



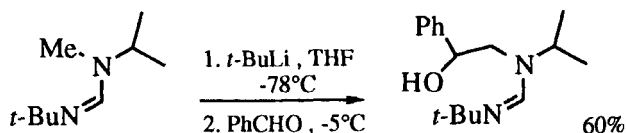
Agami, C.; Couty, F.; Daran, J.-C.; Prince, B.; Puchot, C. *Tetrahedron Lett.*, **1990**, 31, 2889.



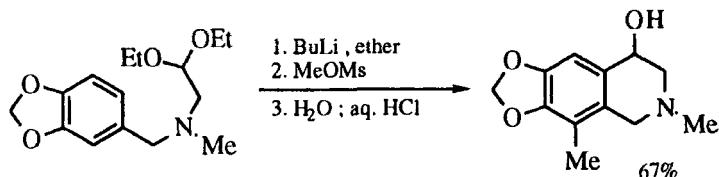
Fasseur, D.; Rigo, B.; Cauliez, P.; Debacker, M.; Couturier, D. *Tetrahedron Lett.*, **1990**, *31*, 1713.



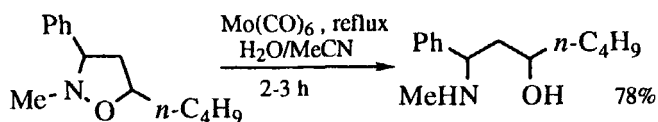
Vara Prasad, J.V.N.; Rich, H. *Tetrahedron Lett.*, **1990**, *31*, 1803.



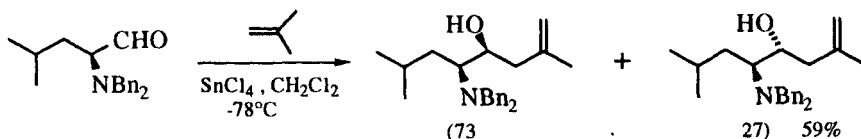
Solladié-Cavallo, A.; Bencheqroun, M. *Tetrahedron Lett.*, **1990**, *31*, 2157.



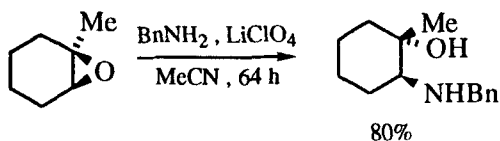
Simig, G.; Schlosser, M. *Tetrahedron Lett.*, **1990**, *31*, 3125.



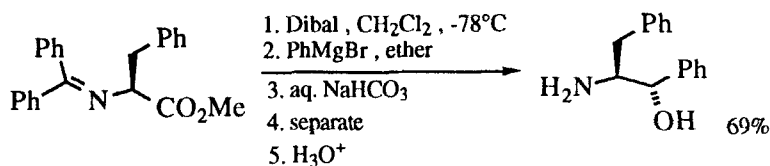
Cicchi, S.; Goti, A.; Brandi, A.; Guarna, A.; De Sarlo, F. *Tetrahedron Lett.*, **1990**, *31*, 3351.



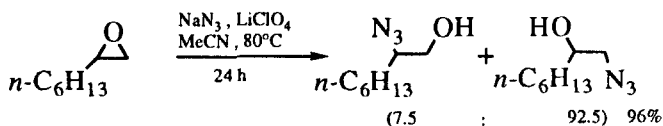
Mikami, K.; Kaneko, M.; Loh, T-P.; Terada, M.; Nakai, T. *Tetrahedron Lett.*, **1990**, *31*, 3909.



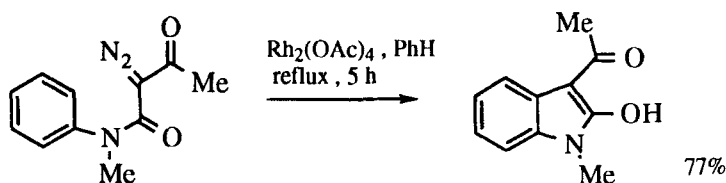
Chini, M.; Crotti, P.; Macchia, F. *Tetrahedron Lett.*, **1990**, 31, 4661.



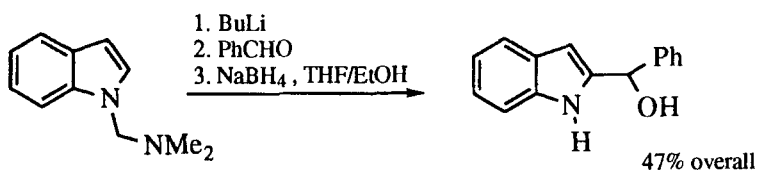
Polt, R.; Peterson, M.A. *Tetrahedron Lett.*, **1990**, 31, 4985.



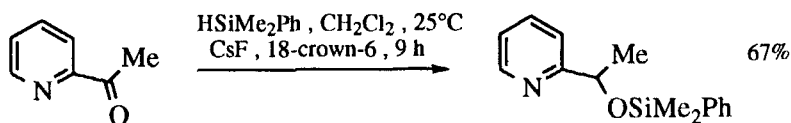
Chini, M.; Crotti, P.; Macchia, F. *Tetrahedron Lett.*, **1990**, 31, 5641.



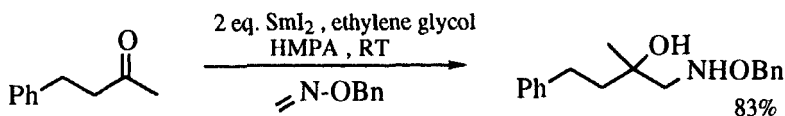
Etkin, N.; Babu, S.D.; Fooks, C.J.; Durst, T. *J. Org. Chem.*, **1990**, 55, 1093.



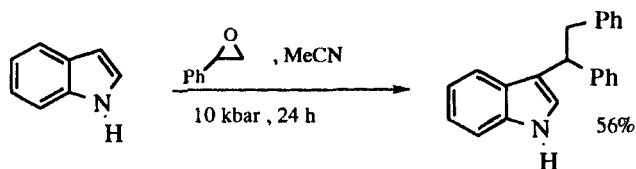
Katritzky, A.R.; Lue, P.; Chen, Y-X. *J. Org. Chem.*, **1990**, 55, 3688.



Goldberg, Yu.; Rubina, K.; Shymanska, M.; Lukevics, E. *Synth. Commun.*, **1990**, 20, 2439.

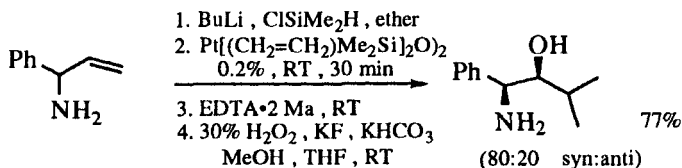


Hanamoto, T.; Inanaga, J. *Tetrahedron Lett.*, **1991**, 32, 3555.

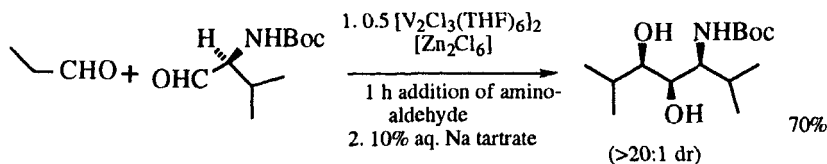


15% at atmospheric pressure

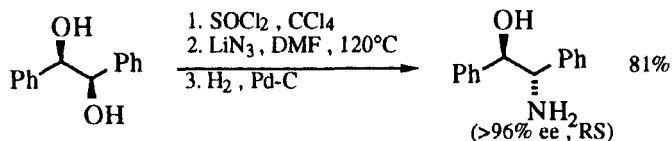
Kotsuki, H.; Nishiuchi, M.; Kobayashi, S.; Nishizawa, H. *J. Org. Chem.*, **1990**, 55, 2969.



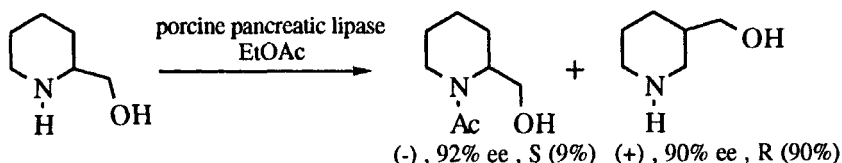
Tamao, K.; Nakagawa, Y.; Ito, Y. *J. Org. Chem.*, **1990**, 55, 3438.



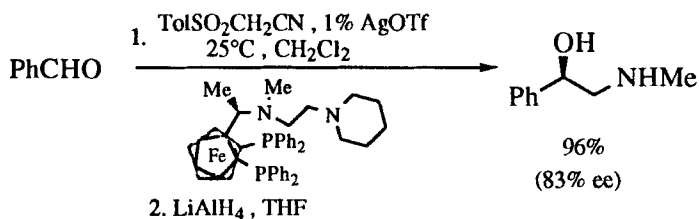
Konradi, A.W.; Pedersen, S.E. *J. Org. Chem.*, **1990**, 55, 4506.



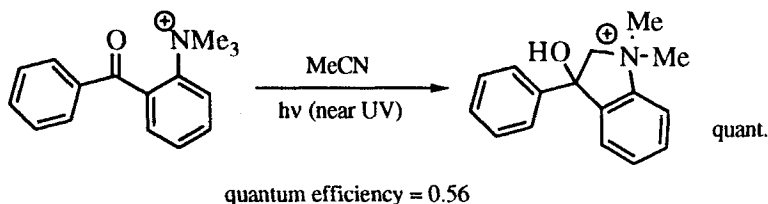
Lohray, B.B.; Ahuja, J.R. *J. Chem. Soc., Chem. Commun.*, **1991**, 95.



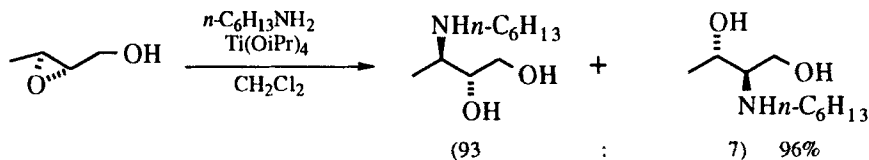
Asensio, G.; Andreu, C.; Marco, J.A. *Tetrahedron Lett.*, **1991**, 32, 4197.



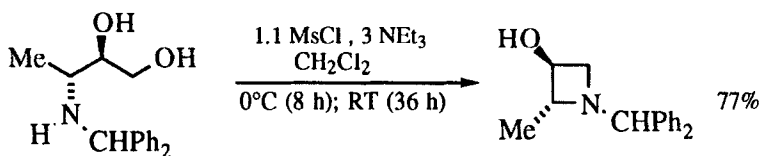
Sawamura, M.; Hamashima, H.; Ito, Y. *J. Org. Chem.*, **1990**, 55, 5935.



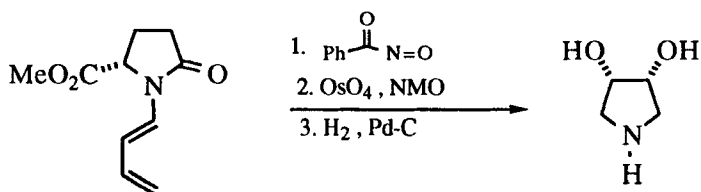
Wagner, P.J.; Cao, Q. *Tetrahedron Lett.*, **1991**, 32, 3915.



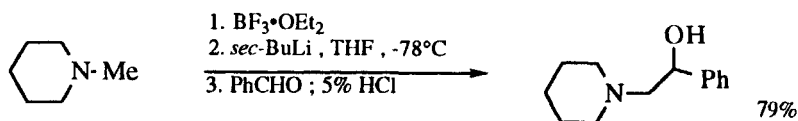
Canas, M.; Poch, M.; Verdagueur, X.; Moyano, A.; Pericàs, M.A.; Riera, A. *Tetrahedron Lett.*, **1991**, 32, 6931.



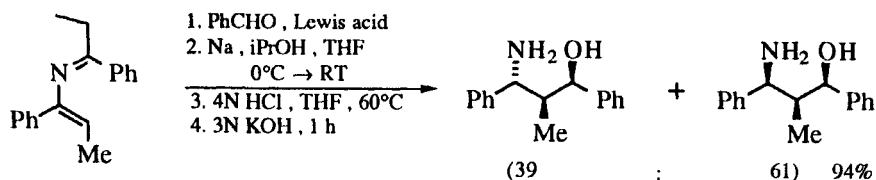
Poch, M.; Verdagueur, X.; Moyano, A.; Pericàs, M.A.; Riera, A. *Tetrahedron Lett.*, **1991**, 32, 6935.



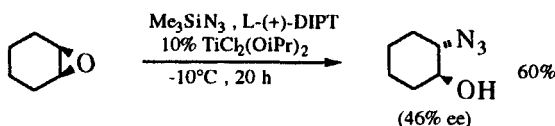
Defoin, A.; Pires, J.; Streith, J. *SynLett*, **1991**, 417.



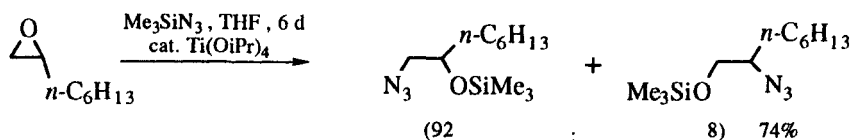
Kessar, S.V.; Singh, P.; Vohra, R.; Kaur, N.P.; Singh, K.N. *J. Chem. Soc., Chem. Commun.*, **1991**, 568.



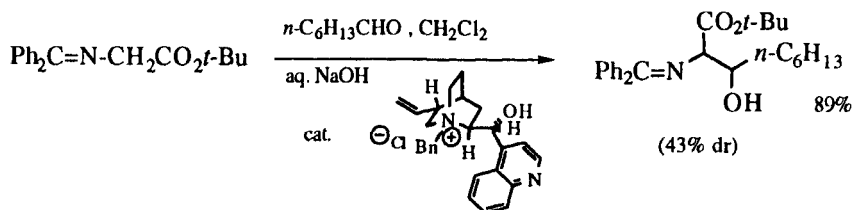
Barluenga, J.; Joglar, J.; González, F.J.; Fustero, S.; Krüger, C.; Tsay, Y-H. *Synthesis*, **1991**, 387.



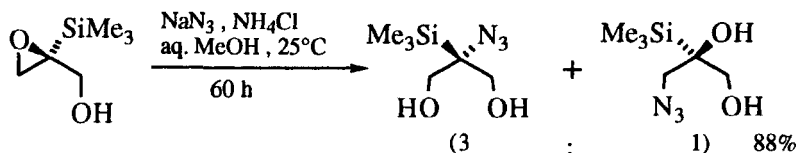
Hayashi, M.; Kohmura, K.; Oguni, N. *SynLett*, **1991**, 774.



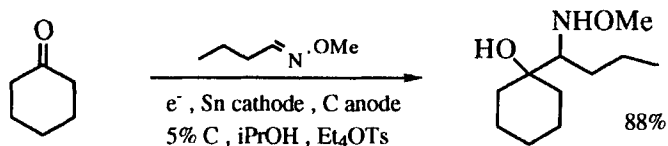
Sutowardoyo, K.I.; Emziane, M.; Lhoste, P.; Sinou, D. *Tetrahedron*, **1991**, 47, 1435.



Gasparski, C.M.; Miller, M.J. *Tetrahedron*, **1991**, 47, 5367.

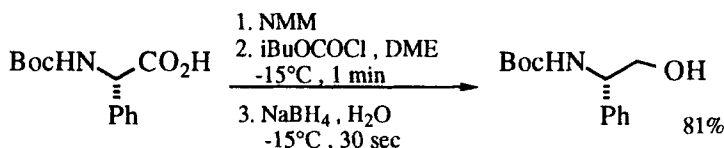


Chakraborty, T.K.; Reddy, G.V. *Tetrahedron Lett.*, **1991**, 32, 679.

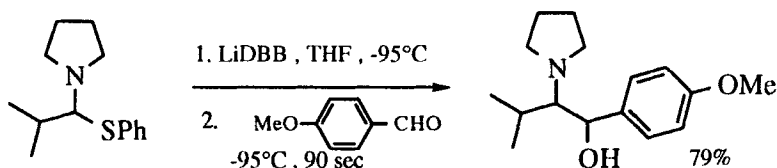


Shono, T.; Kise, N.; Fujimoto, T. *Tetrahedron Lett.*, **1991**, 32, 525.

Shono, T.; Kise, N.; Kunimi, N.; Nomura, R. *Chem. Lett.*, **1991**, 2191.

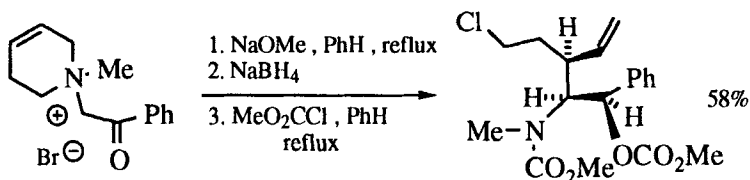


Rodriguez, M.; Llinares, M.; Doulut, S.; Heitz, A.; Martinez, J. *Tetrahedron Lett.*, **1991**, 32, 923.

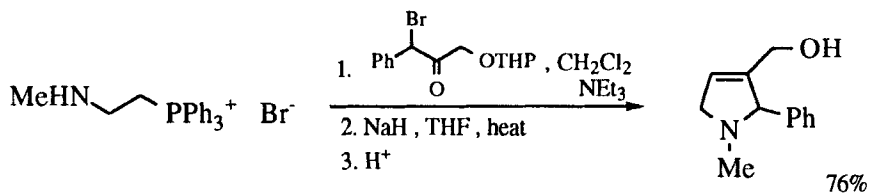


LiDBB = lithium di-*t*-butylbiphenyl radical anion

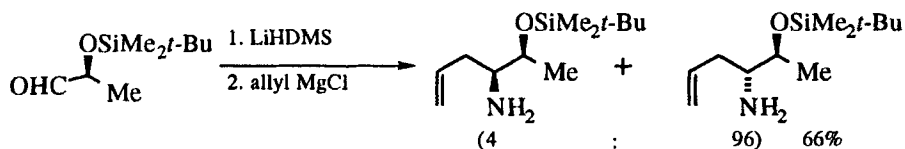
Tsunoda, T.; Fujiwara, K.; Yamamoto, Y.; Ito, S. *Tetrahedron Lett.*, **1991**, 32, 1975.



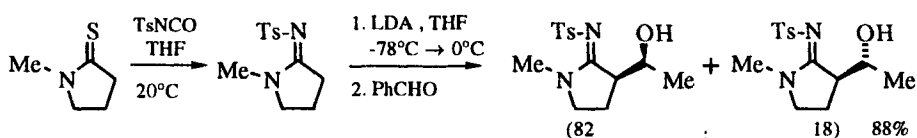
Coates, A.J.; Malone, J.F.; McCarney, M.T.; Stevenson, P.J. *Tetrahedron Lett.*, **1991**, 32, 2827.



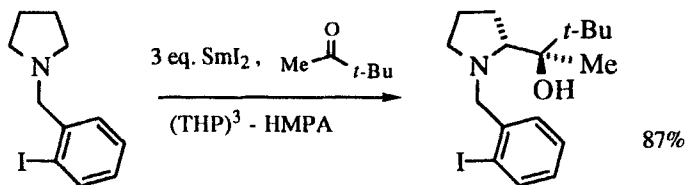
Kinder, F.R. Jr.; Jarosinski, M.A.; Anderson, W.K. *J. Org. Chem.*, **1991**, 56, 6475.



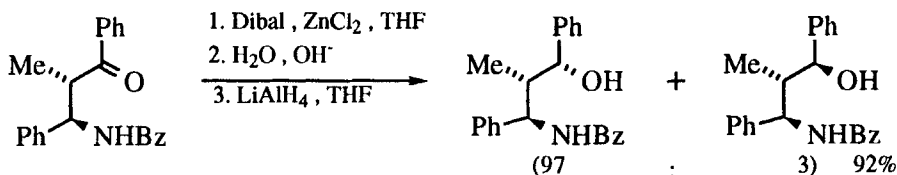
Cainelli, G.; Giacomini, D.; Mezzina, E.; Panunzio, M.; Zarantonello, P. *Tetrahedron Lett.*, **1991**, 32, 2967.



Magnus, P.; Moursounidis, T. *J. Org. Chem.*, **1991**, 56, 1529.

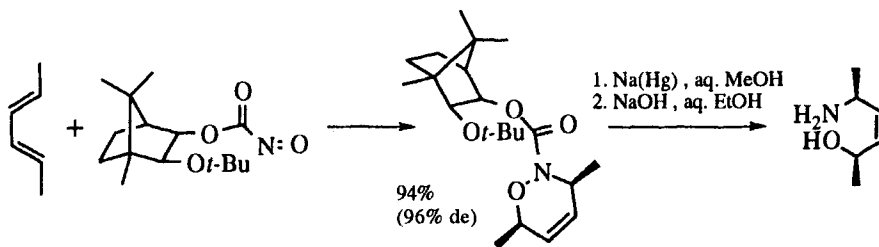


Murakami, M.; Hayashi, M.; Ito, Y. *J. Org. Chem.*, **1992**, 57, 793.

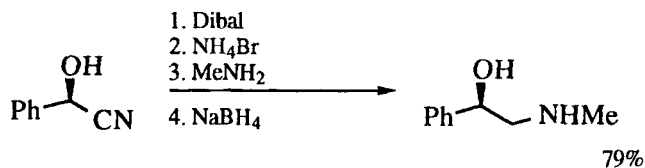


Barluenga, J.; Aguilar, E.; Fustero, S.; Olano, B.; Viado, A.L. *J. Org. Chem.*, **1992**, 57, 1219.

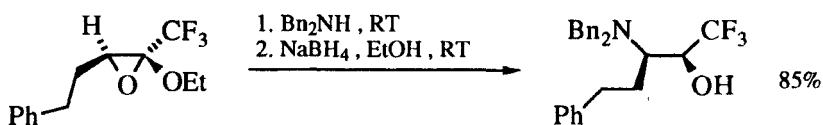
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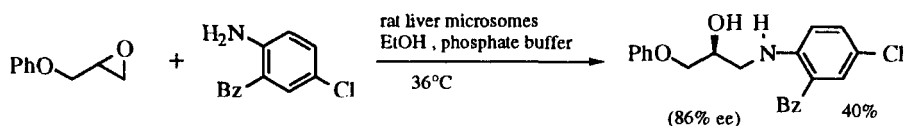
Martin, S.F.; Hartmann, M.; Josey, J.A. *Tetrahedron Lett.*, **1992**, 33, 3583.



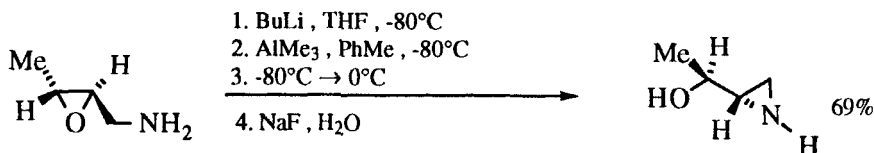
Zandbergen, P.; van den Nieuwendijk, A.M.C.H.; Brussee, J.; van der Gen, A.; Kruse, C.G. *Tetrahedron*, **1992**, *48*, 3977.



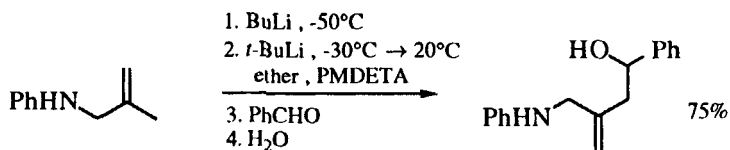
Bégué, J.-P.; Bonnet-Deppon, D.; Sdassi, H. *Tetrahedron Lett.*, **1992**, *33*, 1879.



Kamal, A.; Rao, A.B.; Rao, M.V. *Tetrahedron Lett.*, **1992**, *33*, 4077.

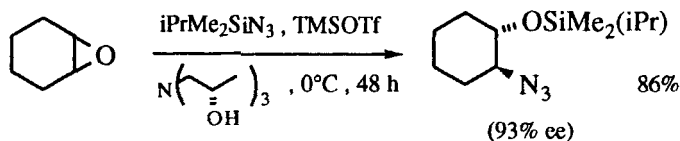


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PMDETA = N,N,N',N',N"-pentamethyldiethylenediamine

Barluenga, J.; González, R.; Fañanás, F.J. *Tetrahedron Lett.*, **1992**, *33*, 7573.



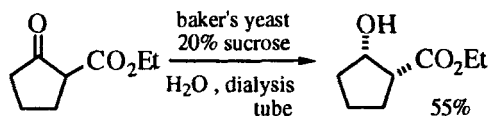
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REVIEWS:

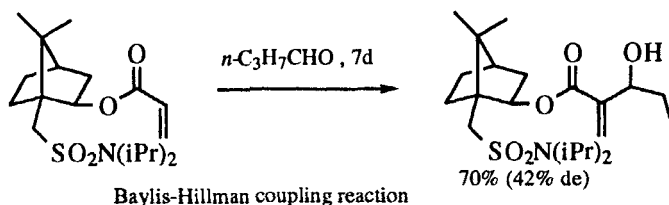
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Comins, D.L. *SynLett*, **1992**, 615.

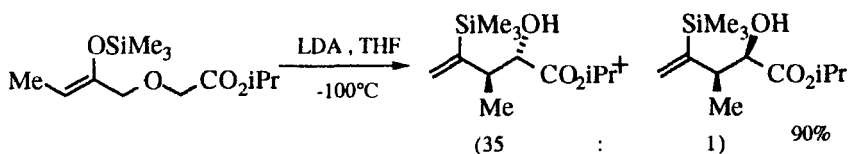
SECTION 327: ALCOHOL, THIOL - ESTER



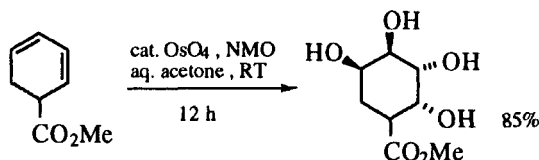
Spiliotis, V.; Papahaatjis, D.; Ragoussis, N. *Tetrahedron Lett.*, **1990**, 31, 1615.



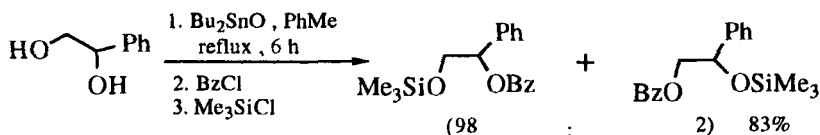
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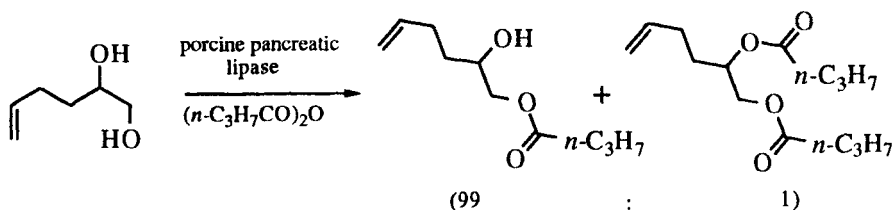
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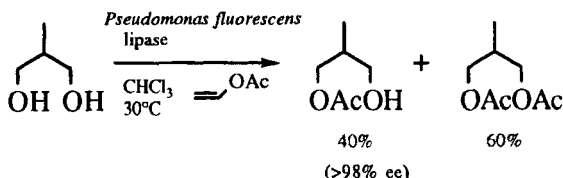
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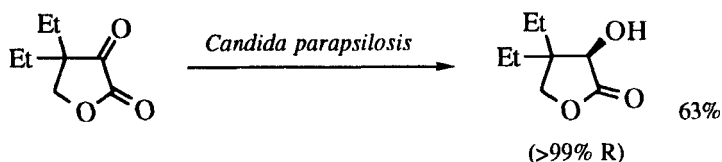
Reginato, G.; Ricci, A.; Roelens, S.; Scapecchi, S. *J. Org. Chem.*, **1990**, 55, 5132.



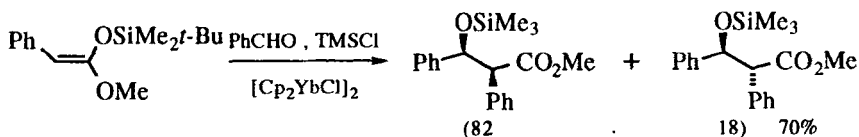
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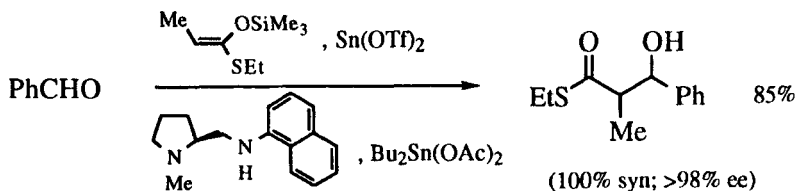
Santaniello, E.; Ferrabuschi, P.; Grisenti, P. *Tetrahedron Lett.*, **1990**, 31, 5657.



Hata, H.; Shimizu, S.; Hattori, S.; Yamada, H. *J. Org. Chem.*, **1990**, 55, 4377.



Gong, L.; Streitwieser, A. *J. Org. Chem.*, **1990**, 55, 6235.

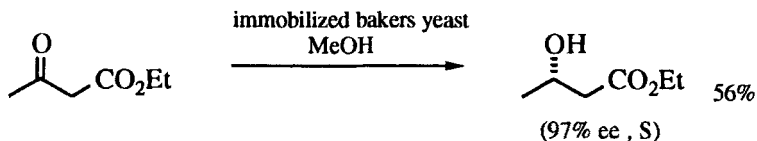


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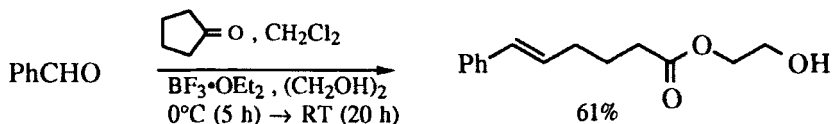
Mukaiyama, T.; Uchiro, H.; Shiina, I.; Kobayashi, S. *Chem. Lett.*, **1990**, 1019.

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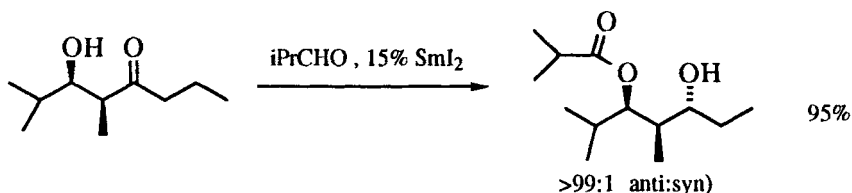
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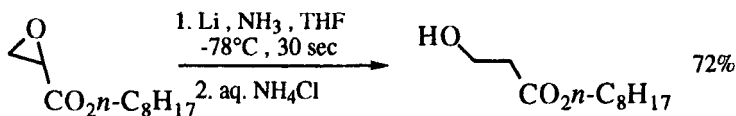
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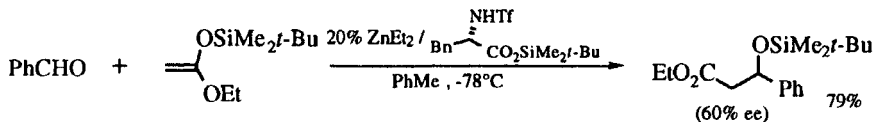
Nagumo, S.; Matsukuma, A.; Inoue, F.; Yamamoto, T.; Suemune, H.; Sakai, K. *J. Chem. Soc., Chem. Commun.*, **1990**, 1538.



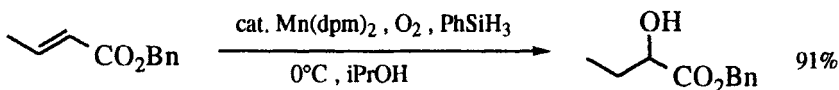
Evans, D.A.; Hoveyda, A.H. *J. Am. Chem. Soc.*, **1990**, 112, 6447.



van der Baan, J.L.; Barnick, J.W.F.K.; Bickelhaupt, F. *Synthesis*, **1990**, 897.

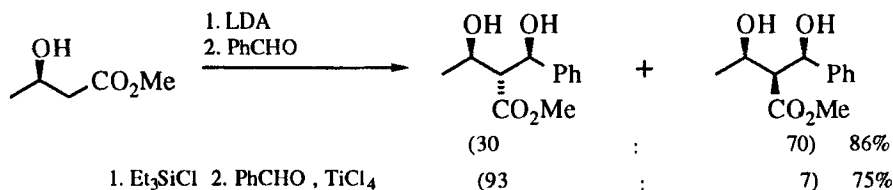


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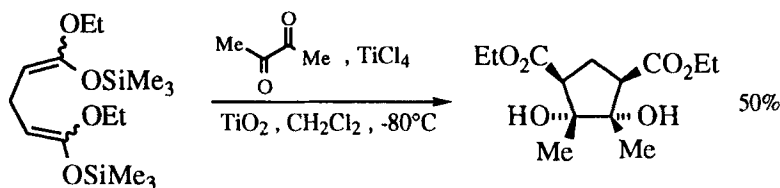


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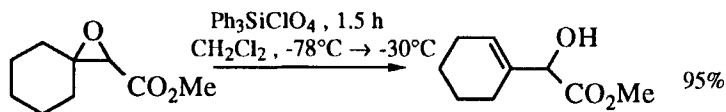
Inoki, S.; Kato, K.; Isayama, S.; Mukaiyama, T. *Chem. Lett.*, **1990**, 1869.



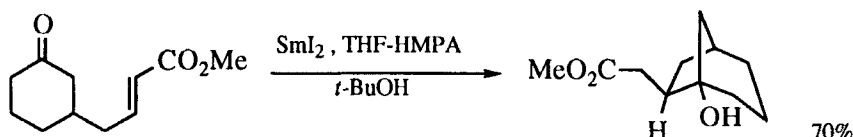
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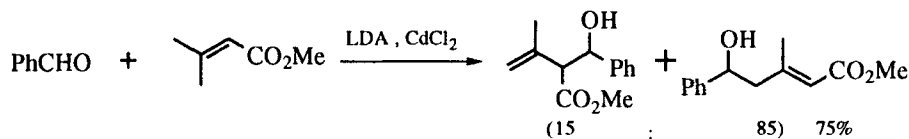
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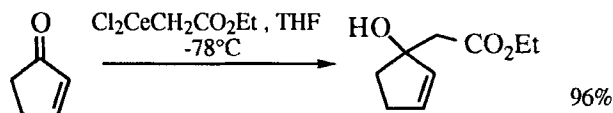
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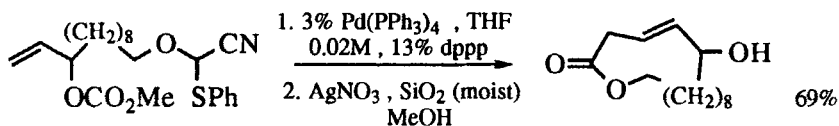
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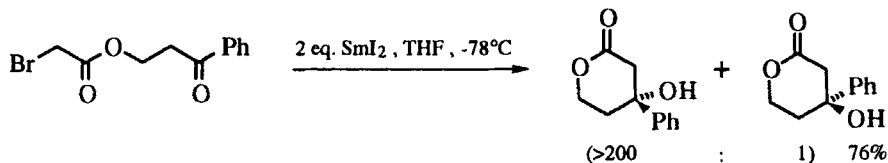
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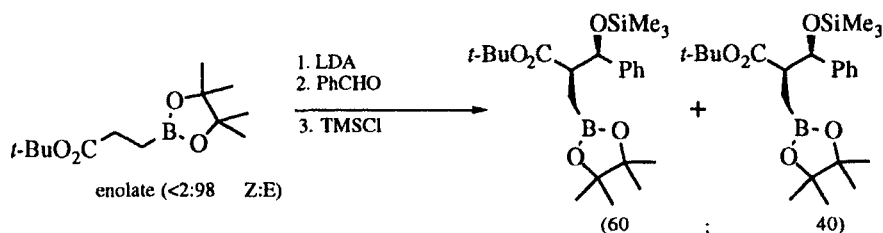
Liu, H-J.; Zhu, B-Y. *Can. J. Chem.*, **1991**, 69, 2008.



Trost, B.M.; Granja, J.R. *J. Am. Chem. Soc.*, **1991**, *113*, 1044.

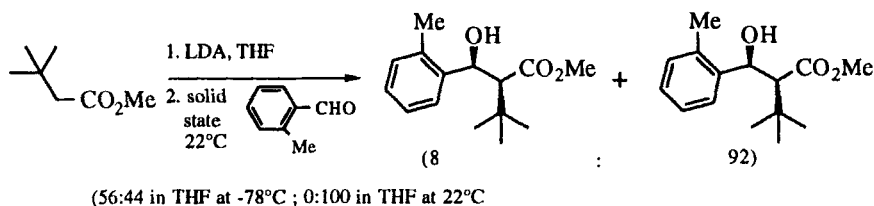


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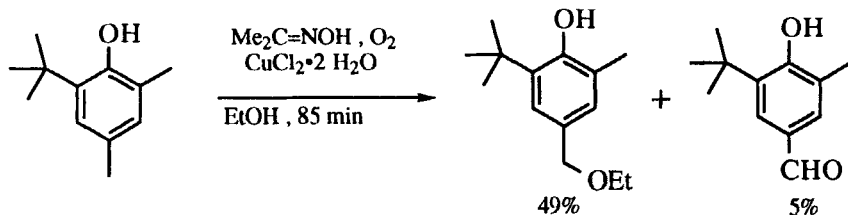


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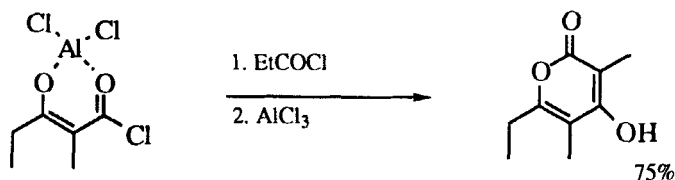
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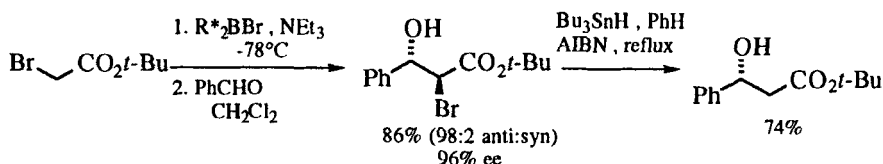
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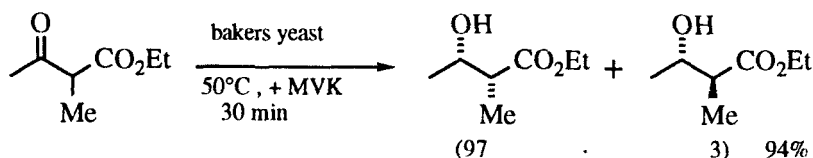
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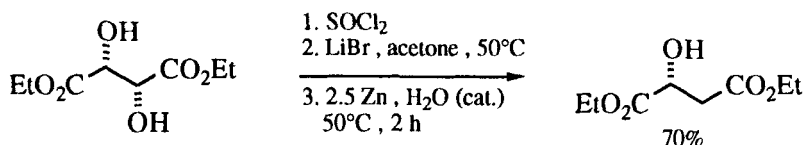


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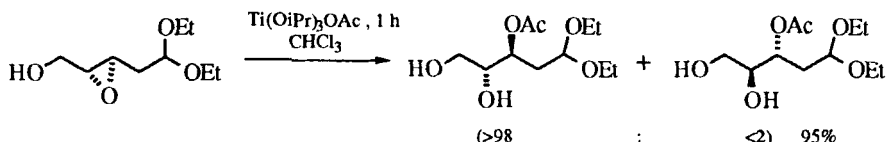


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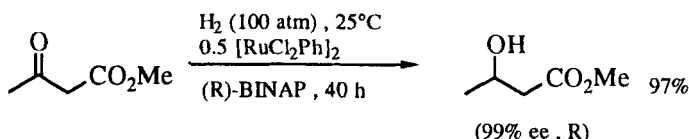
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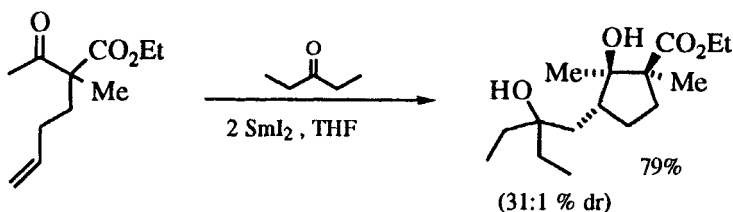
Gao, Y.; Zepp, C.M. *Tetrahedron Lett.*, **1991**, 32, 3155.



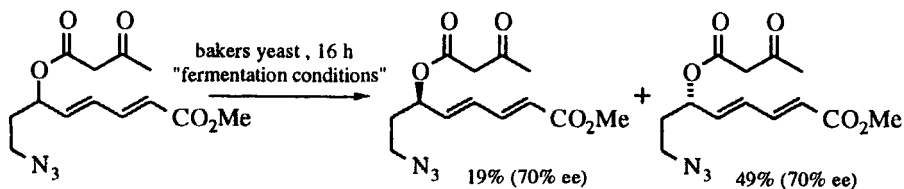
Raifeld, Y.E.; Nikitenko, A.A.; Arshava, B.M. *Tetrahedron Asymmetry*, **1991**, 2, 1083.



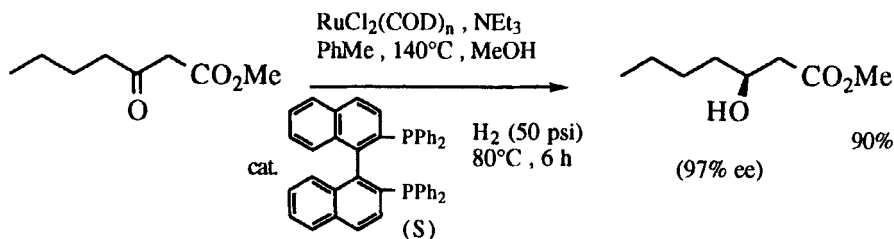
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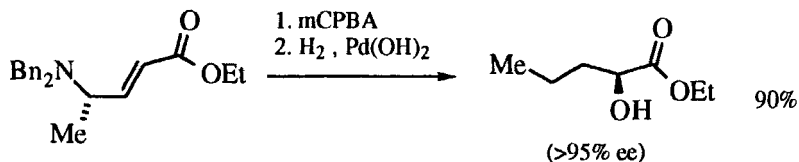
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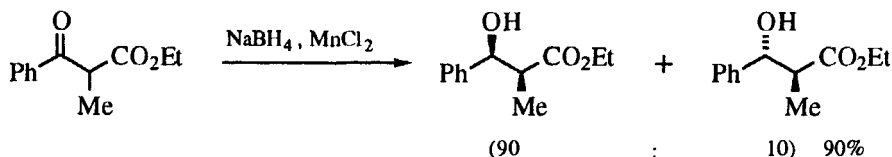
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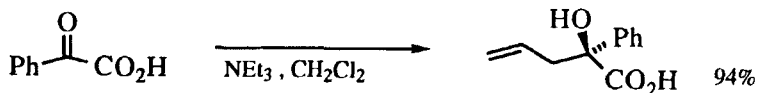
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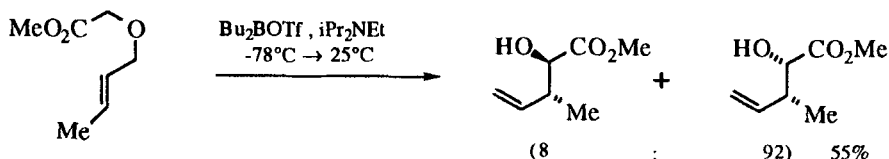
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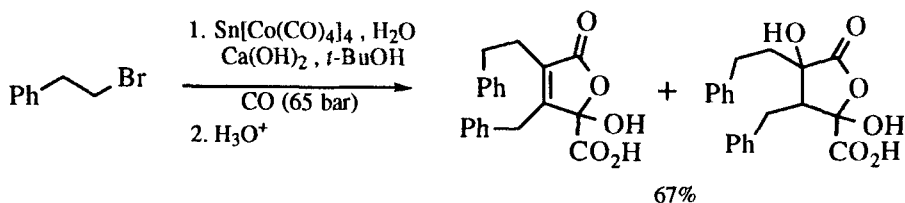
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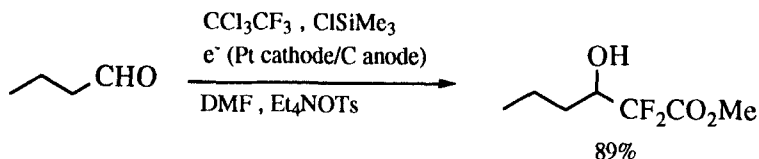
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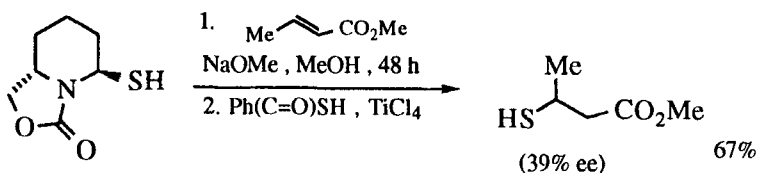
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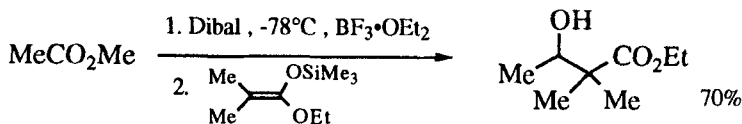
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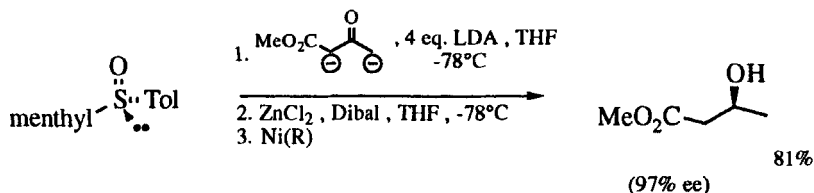
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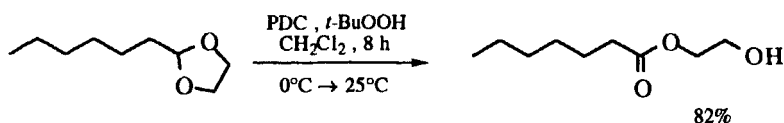
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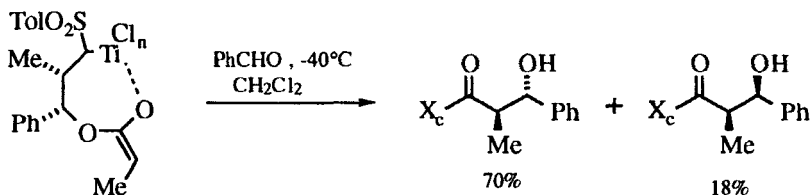
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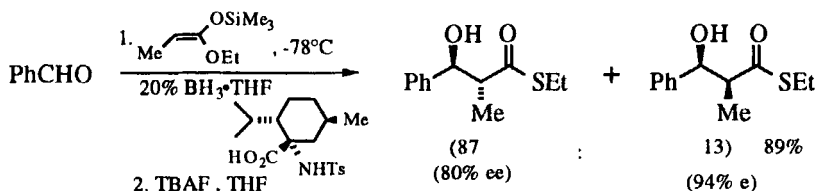
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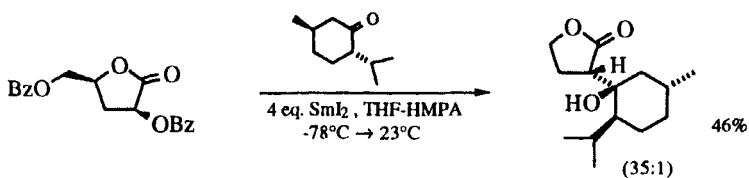
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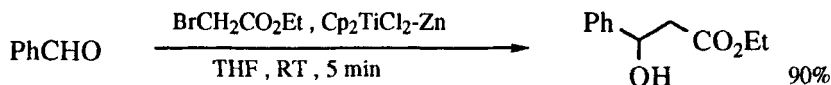
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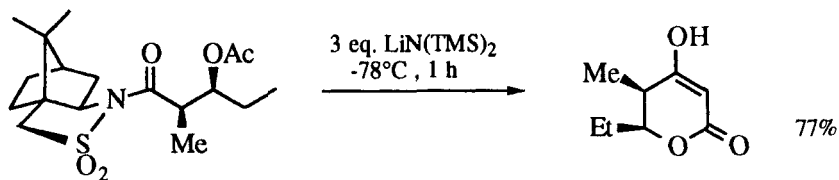
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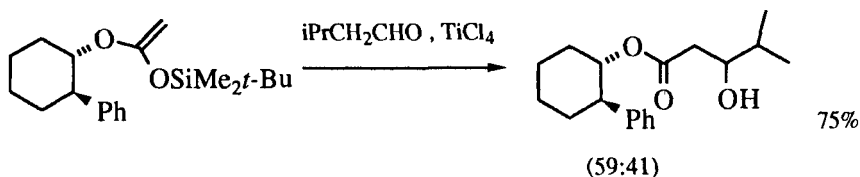
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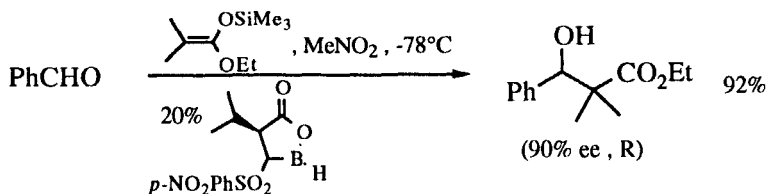
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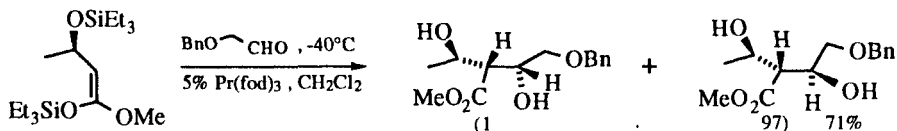
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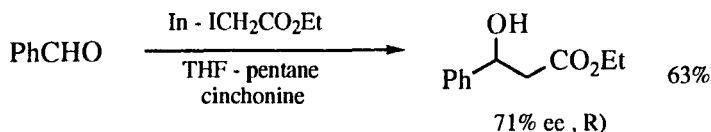
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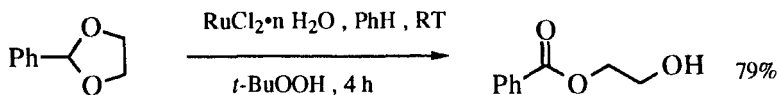
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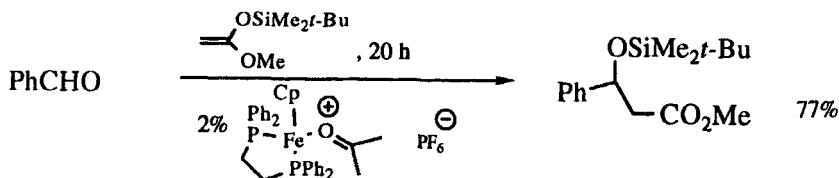
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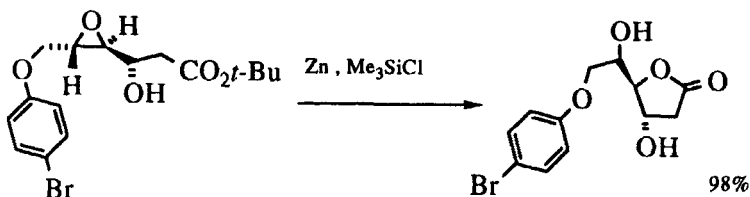
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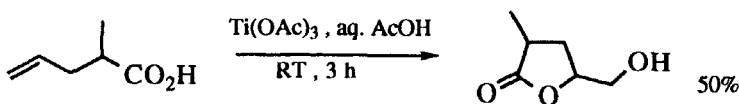
Murahashi, S.; Oda, Y.; Naota, T. *Chem. Lett.*, **1992**, 2237.



Bach, T.; Fox, D.N.A.; Reetz, M.T. *J. Chem. Soc., Chem. Commun.*, **1992**, 1634.



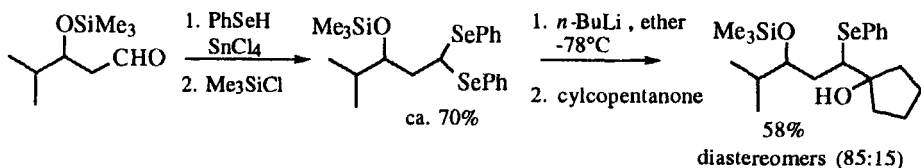
Escudier, J-M.; Baltas, M.; Gorrichon, L. *Tetrahedron Lett.*, **1992**, 33, 1439.



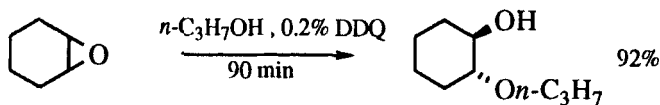
Ferraz, H.M.C.; Ribeiro, C.M.R. *Synth. Commun.*, **1992**, 22, 399.

Also via: Section 313 (Alcohol - Carboxylic Acid).

SECTION 328: ALCOHOL, THIOL - ETHER, EPOXIDE, THIOETHER

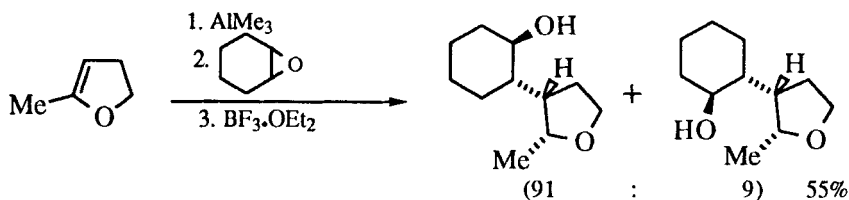


Hoffmann, R.W.; Bewersdorf, M. *Tetrahedron Lett.*, **1990**, 31, 67.

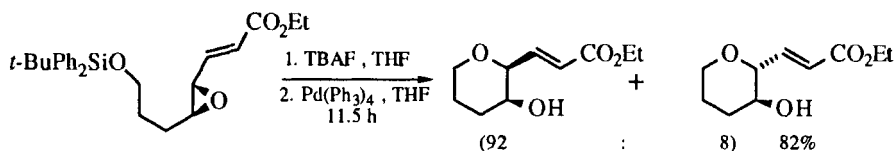


Iranpoor, N.; Baltork, I.M. *Tetrahedron Lett.*, **1990**, 31, 735.

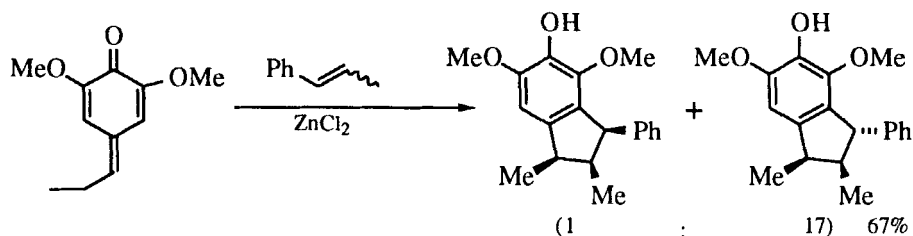
Iranpoor, N.; Baltork, I.M. *Synth. Commun.*, **1990**, 20, 2789.



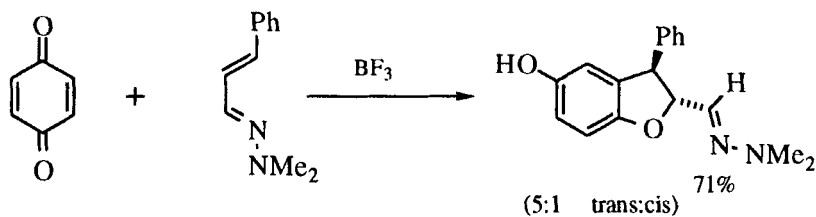
Alexakis, A.; Hanaïzi, J.; Jachiet, D.; Normant, J-F. *Tetrahedron Lett.*, **1990**, 31, 1271.



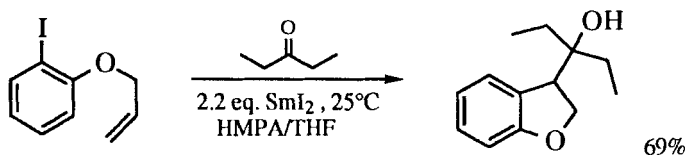
Suzuki, T.; Sato, O.; Hirama, M. *Tetrahedron Lett.*, **1990**, 31, 4747.



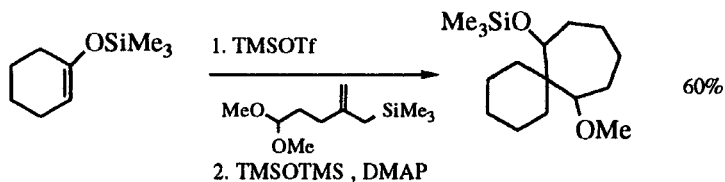
Angle, S.R.; Arnaiz, D.O. *J. Org. Chem.*, **1990**, 55, 3708.



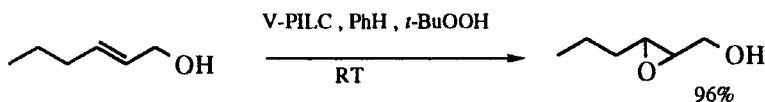
Echavarren, A.M. *J. Org. Chem.*, **1990**, 55, 4255.



Molander, G.A.; Haring, L.S. *J. Org. Chem.*, **1990**, 55, 6171.

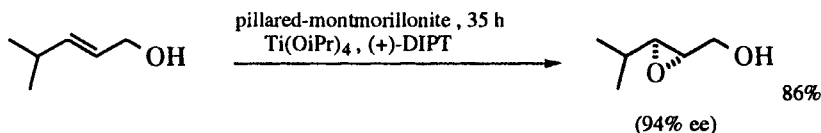


Lee, T.V.; Cregg, C. *SynLett*, **1990**, 317.

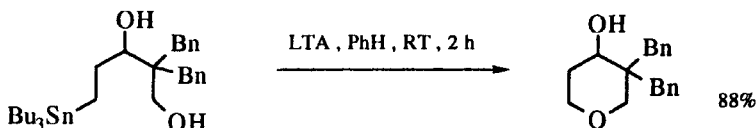


V-PILC = vanadium-pillared montmorillonite catalyst

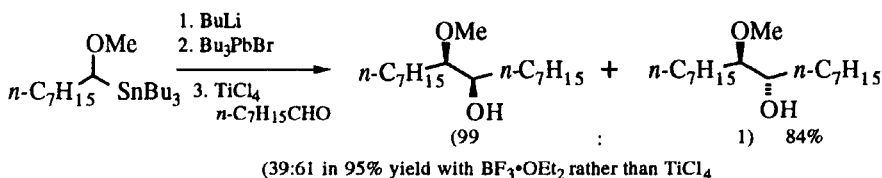
Choudary, B.M.; Valli, V.L.K.; Prasad, A.D. *J. Chem. Soc., Chem. Commun.*, **1990**, 721.



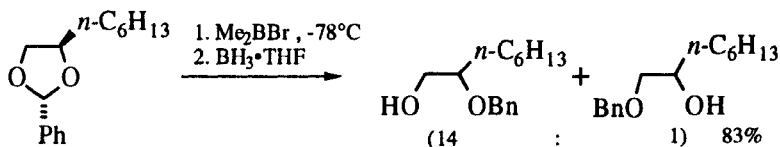
Choudary, B.M.; Valli, V.L.K.; Prasad, A.D. *J. Chem. Soc., Chem. Commun.*, **1990**, 1186.



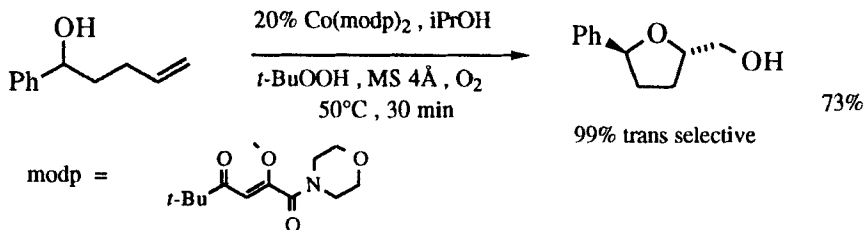
Yamamoto, M.; Irie, S.; Arase, T.; Kohmoto, S.; Yamada, K. *J. Chem. Soc., Chem. Commun.*, **1990**, 1492.



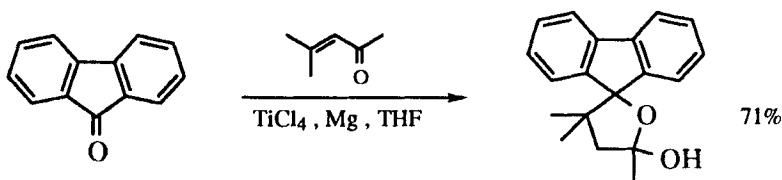
Yamada, J.; Abe, H.; Yamamoto, Y. *J. Am. Chem. Soc.*, **1990**, 112, 6118.



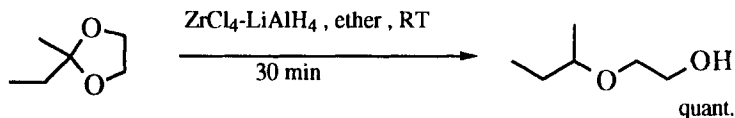
Guindon, Y.; Girard, Y.; Berthiaume, S.; Gorys, V.; Lemieux, R.; Yoakim, C. *Can. J. Chem.*, **1990**, 68, 897.



Inoki, S.; Mukaiyama, T. *Chem. Lett.*, **1990**, 67.

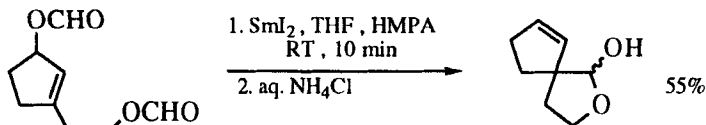


Pons, J-M.; Santelli, M. *Tetrahedron*, **1990**, 46, 513.

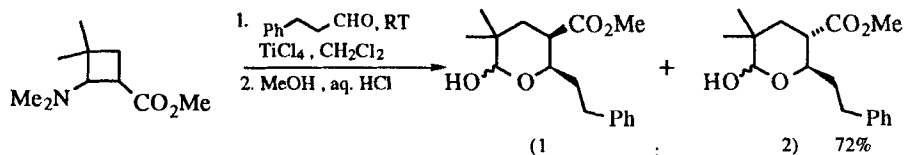


Shaozu, W.; Tianhui, R.; Yulan, Z. *Bull. Soc. Chim. Belg.*, **1991**, 100, 357.

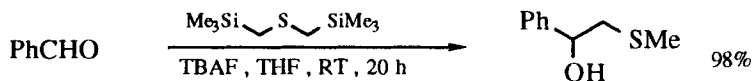
Shaozu, W.; Yin, C.; Yulan, Z. *Bull. Soc. Chim. Belg.*, **1991**, 100, 421 (with $\text{CpTiCl}_3 \cdot \text{LiAlH}_4$).



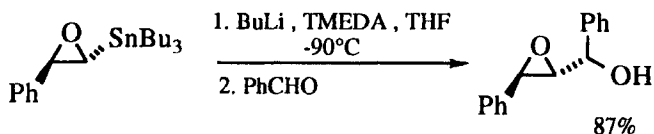
Shibuya, K.; Nagaoka, H.; Yamada, Y. *J. Chem. Soc., Chem. Commun.*, **1991**, 1545.



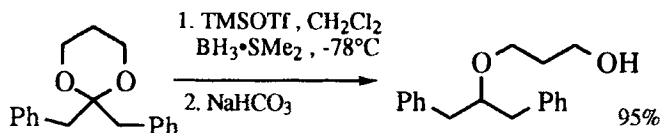
Shimada, S.; Saigo, K.; Makamura, H.; Hagegawa, M. *Chem. Lett.*, **1991**, 1149.



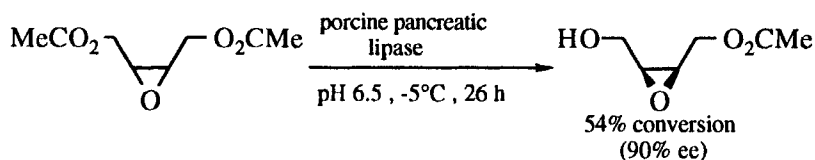
Hosomi, A.; Ogata, K.; Ohkuma, M.; Hojo, M. *SynLett*, **1991**, 557.



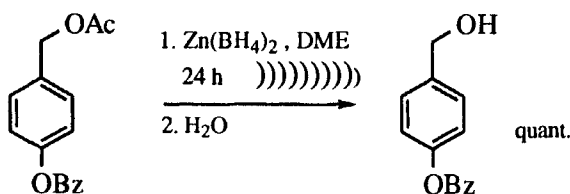
Lohse, P.; Loner, H.; Acklin, P.; Sternfeld, F.; Pfaltz, A. *Tetrahedron Lett.*, **1991**, 32, 615.



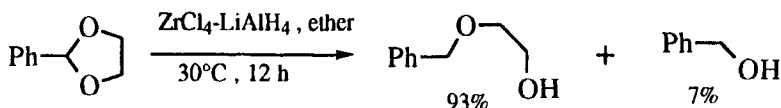
Hunter, R.; Bartels, B.; Michael, J.P. *Tetrahedron Lett.*, **1991**, 32, 1095.



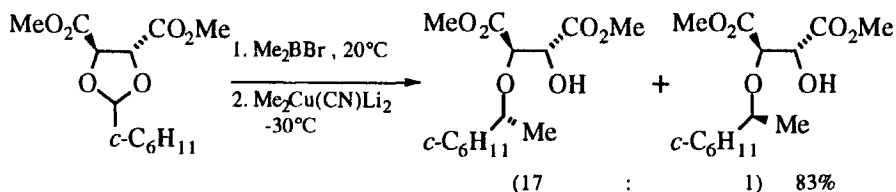
Grandjean, D.; Pale, P.; Chucho, J. *Tetrahedron Lett.*, **1991**, 32, 3043.



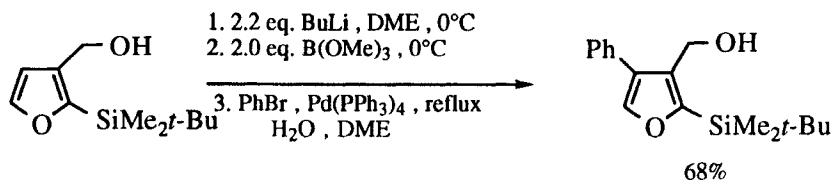
Ranu, B.C.; Basu, M.K. *Tetrahedron Lett.*, **1991**, 32, 3243.



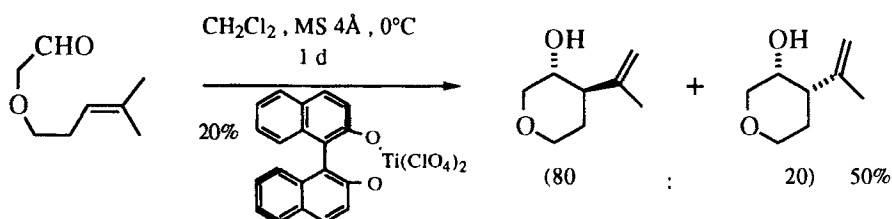
Shaozu, W.; Tianhui, R.; Ning, C.; Yulan, Z. *Org. Prep. Proceed. Int.*, **1991**, 23, 427.



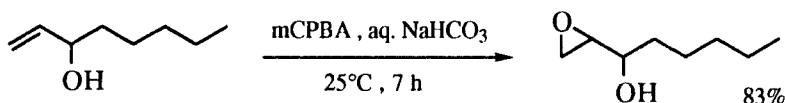
Guidon, Y.; Simoneau, B.; Yoakim, C.; Gorys, V.; Lemieux, R.; Ogilvie, W. *Tetrahedron Lett.*, **1991**, 32, 5453.



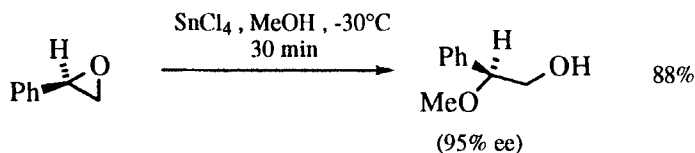
Cristofoli, W.A.; Keay, B.A. *Tetrahedron Lett.*, **1991**, 32, 5881.



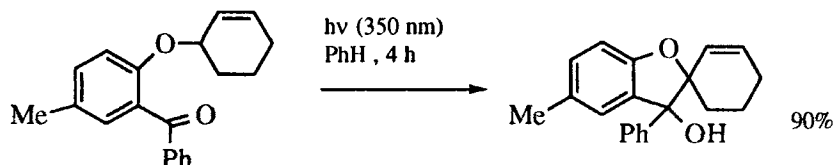
Mikami, K.; Terada, M.; Sawa, E.; Nakai, T. *Tetrahedron Lett.*, **1991**, 32, 6571.



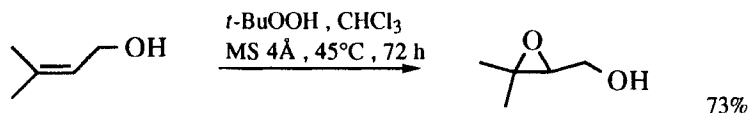
Fringuelli, E.; Germani, R.; Pizzo, F.; Santinelli, F.; Savelli, G. *J. Org. Chem.*, **1992**, 57, 1198.



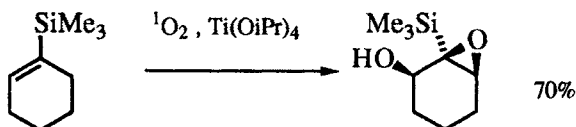
Moberg, C.; Rákos, L.; Tottie, L. *Tetrahedron Lett.*, **1992**, 33, 2191.



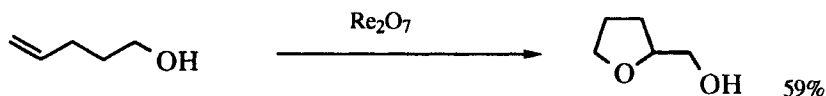
Sumathi, T.; Balasubramanian, K.K. *Tetrahedron Lett.*, **1992**, 33, 2213.



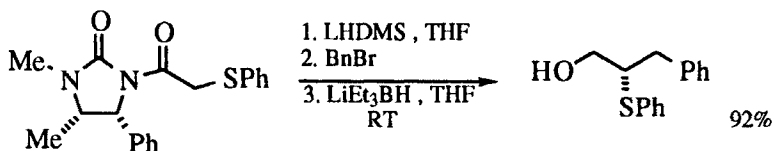
Antonioletti, R.; Bonadies, F.; Locati, L.; Screttri, A. *Tetrahedron Lett.*, **1992**, 33, 3205.



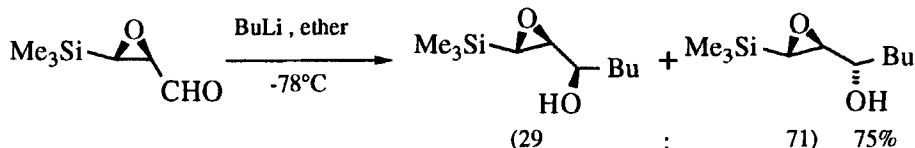
Adam, W.; Richter, M. *Tetrahedron Lett.*, **1992**, 33, 3461.



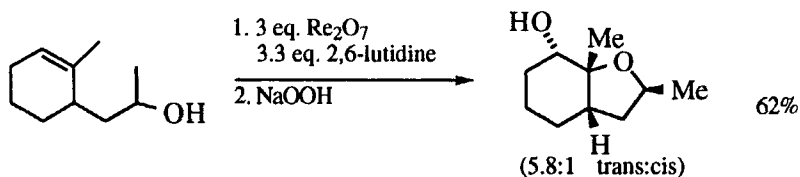
Kennedy, R.M.; Tang, S. *Tetrahedron Lett.*, **1992**, 33, 3729.



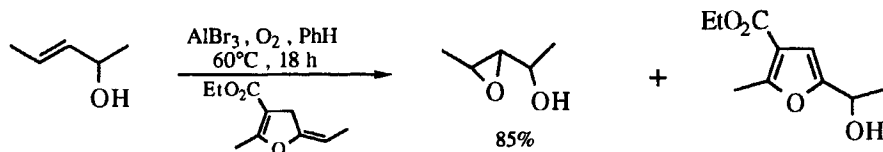
Orena, M.; Porzi, G.; Sandri, S. *Tetrahedron Lett.*, **1992**, 33, 3797.



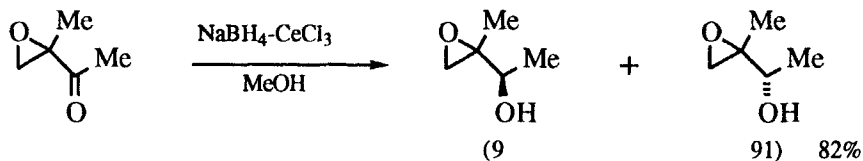
Urabe, H.; Matsuka, T.; Sato, F. *Tetrahedron Lett.*, **1992**, 33, 4179.



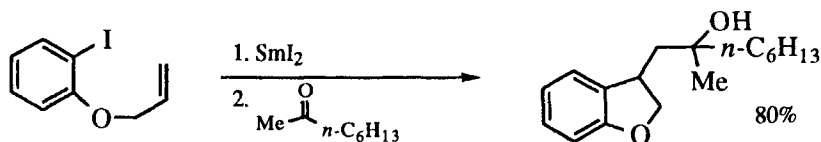
Tang, S.; Kennedy, R.M. *Tetrahedron Lett.*, **1992**, 33, 5299, 5303.



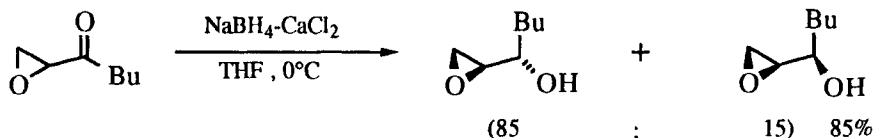
Antonioletti, R.; Bonadies, F.; Lattanzi, A.; Monteagudo, E.S.; Scettri, A. *Tetrahedron Lett.*, **1992**, 33, 5433.



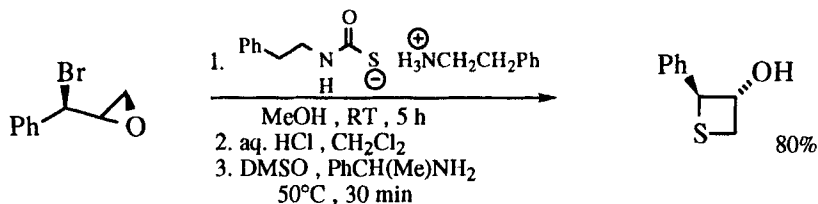
Li, K.; Hamann, L.G.; Koreeda, M. *Tetrahedron Lett.*, **1992**, 33, 6569.



Curran, D.P.; Tottleben, M.J. *J. Am. Chem. Soc.*, **1992**, 114, 6050.



Fujii, H.; Oshima, K.; Utimoto, K. *Chem. Lett.*, **1992**, 967.



Karikomi, M.; Narabu, S.; Yoshida, M.; Toda, T. *Chem. Lett.*, **1992**, 1655.

REVIEWS:

"Rearrangement of Epoxyalcohols and Related Compounds"

Magnusson, G. *Org. Prep. Proceed. Int.*, **1990**, 22, 547.

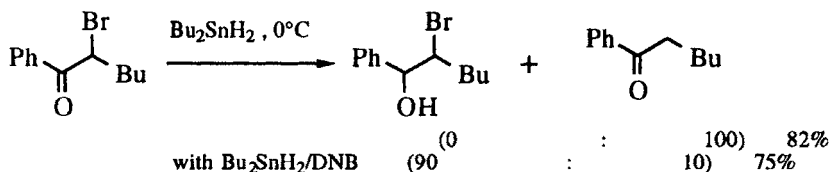
"Transformation of β -Hydroxyalkylselenides to Aldehydes and Ketones. A Review"

Krief, A.; Laboureur, J.L.; Dumont, W.; Labar, D. *Bull. Soc. Chim. Fr.*, **1990**, 127, 681.

"Stereocontrolled Manipulations of Chromatographically Resolved Pyranosides"

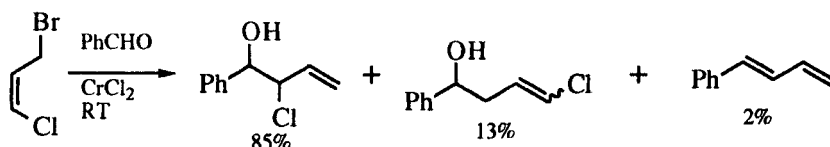
Mash, E.A. *SynLett*, **1991**, 529.

SECTION 329: ALCOHOL, THIOL - HALIDE, SULFONATE

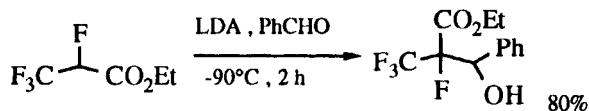


DNB = *p*-dinitrobenzene (radical inhibitor)

Shibata, I.; Nakamura, K.; Baba, A.; Matsuda, H. *Tetrahedron Lett.*, **1990**, 31, 6381.

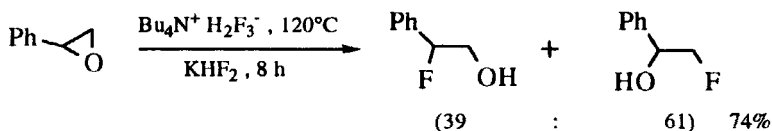


Wender, P.A.; Grissom, J.W.; Hoffmann, U.; Ma, R. *Tetrahedron Lett.*, **1990**, 31, 6605.

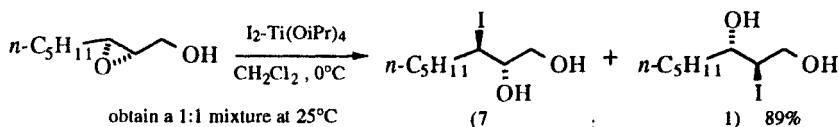


also undergoes conjugate addition and alkylation reactions

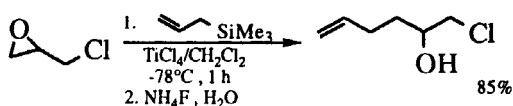
Qian, C-P.; Nakai, T. *Tetrahedron Lett.*, **1990**, 31, 7043.



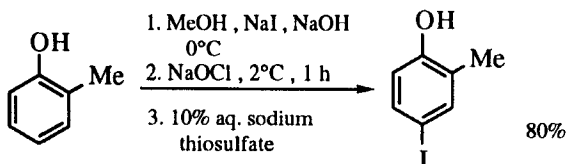
Landini, D.; Penso, M. *Tetrahedron Lett.*, **1990**, 31, 7209.



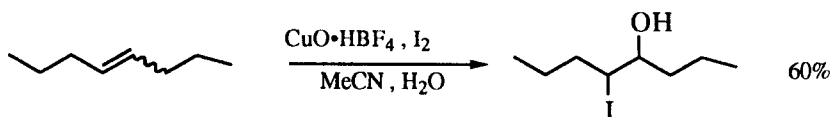
Alvarez, E.; Núñez, M.T.; Martín, V.S. *J. Org. Chem.*, **1990**, 55, 3429.



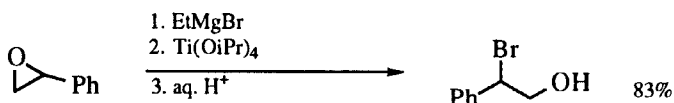
Imai, T.; Mishida, S. *J. Org. Chem.*, **1990**, 55, 4849.



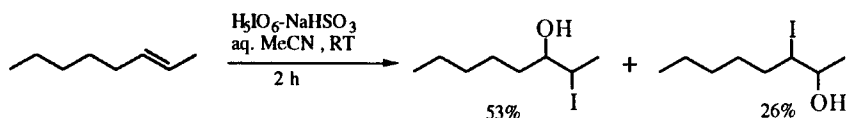
Edgar, K.J.; Felling, S.N. *J. Org. Chem.*, **1990**, *55*, 5287.



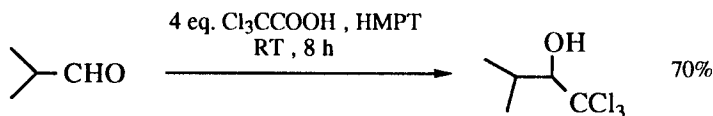
Barluenga, J.; Rodríguez, M.A.; Campos, P.J. *J. Chem. Soc., Perkin Trans. I*, **1990**, 2807.



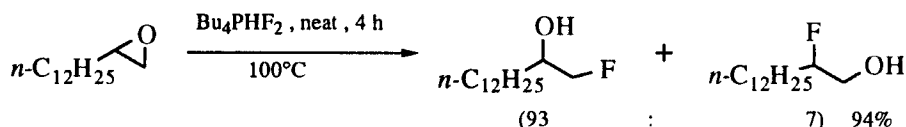
Sosnovskii, G.M.; Astapovich, I.V. *Zhur. Org. Khim.*, **1990**, *26*, 911 (Engl., p. 781).



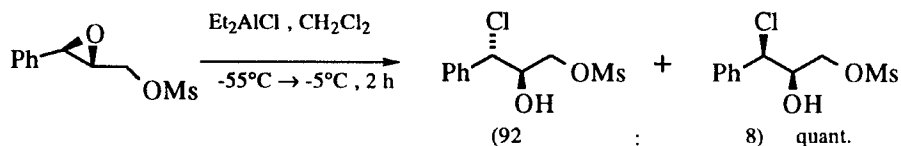
Ohta, H.; Sakata, Y.; Takeuchi, T.; Ishii, Y. *Chem. Lett.*, **1990**, 733.



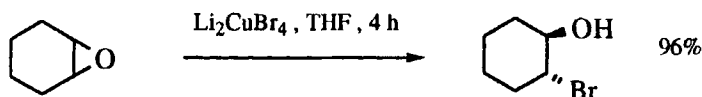
Ferraccioli, R.; Gallina, C.; Giordano, C. *Synthesis*, **1990**, 327.



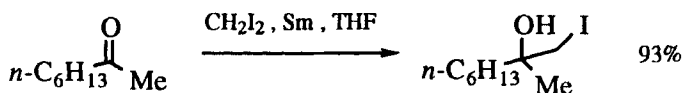
Seto, H.; Qian, Z.; Yoshioka, H.; Uchibori, Y.; Umeno, M. *Chem. Lett.*, **1991**, 1185.



Gao, L.; Saitoh, H.; Feng, F.; Murai, A. *Chem. Lett.*, **1991**, 1787.

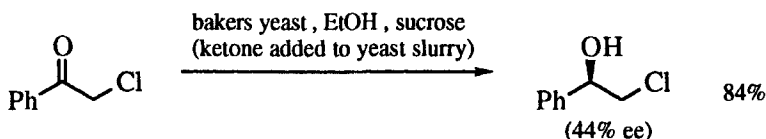


Ciaccio, J.A.; Heller, E.; Talbot, A. *SynLett*, **1991**, 248.

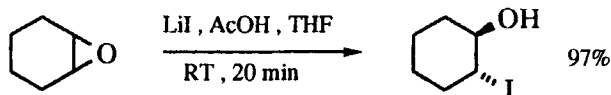


diols available from chloromethyl ethers

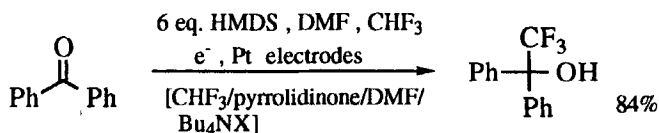
Imamoto, T.; Hatajima, T.; Takiyama, N.; Takeyama, T.; Kamiya, Y.; Yoshizawa, T. *J. Chem. Soc., Perkin Trans. I*, **1991**, 3127.



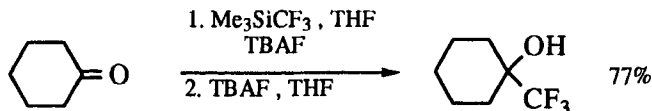
de Carvalho, M.; Okamoto, M.T.; Moran, P.J.S.; Rodrigues, J.A.R. *Tetrahedron*, **1991**, 47, 2073.



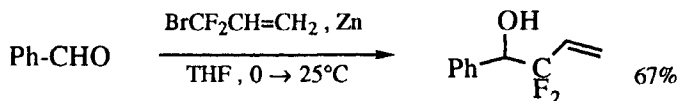
Bajwa, J.S.; Anderson, R.C. *Tetrahedron Lett.*, **1991**, 32, 3020.



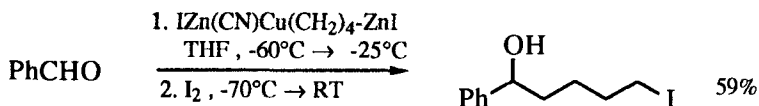
Shono, T.; Ishifune, M.; Okada, T.; Kashimura, S. *J. Org. Chem.*, **1991**, 56, 2.



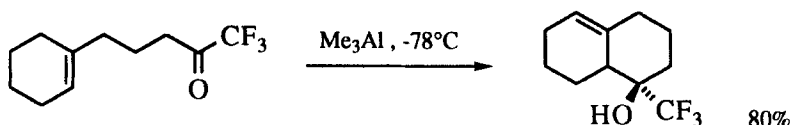
Krishnamurti, R.; Bellew, D.R.; Prakash, G.K.S. *J. Org. Chem.*, **1991**, 56, 984.



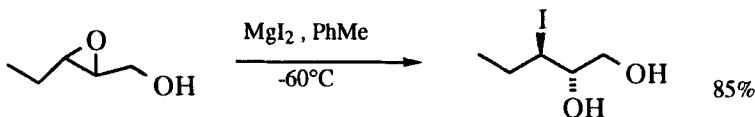
Yang, Z.-Y.; Burton, D.J. *J. Org. Chem.*, **1991**, 56, 1037.



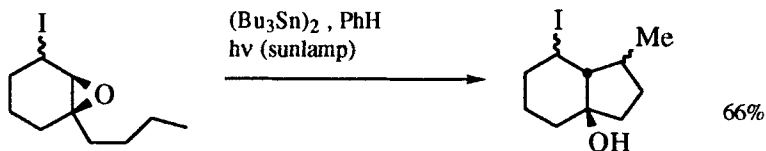
Achyutha Rao, S.; Knochel, P. *J. Org. Chem.*, **1991**, 56, 4593.



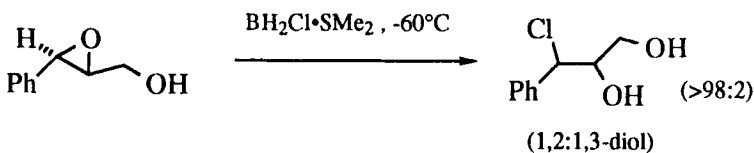
Abouabdellah, A.; Bégue, J.-P.; Connet-Delpon, D.; Lequeux, T. *J. Org. Chem.*, **1991**, 56, 5800.



Bonini, C.; Righi, G.; Sotgiu, G. *J. Org. Chem.*, **1991**, 56, 6206.

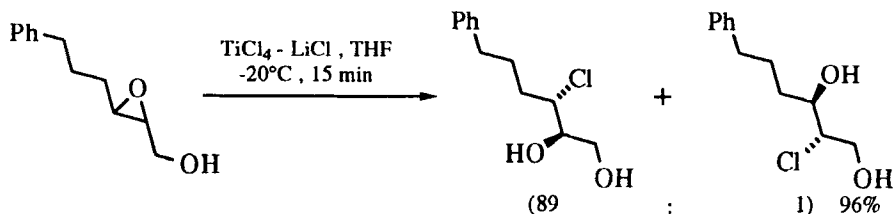


Rawal, V.H.; Iwasa, S. *Tetrahedron Lett.*, **1992**, 33, 4687.

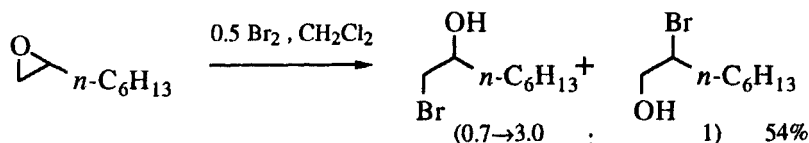


Bovicelli, P.; Lupattelli, P.; Bersani, M.T.; Mincione, E. *Tetrahedron Lett.*, **1992**, 33, 6181.

Bovicelli, P.; Mincione, E.; Ortaggi, G. *Tetrahedron Lett.*, **1992**, 32, 3719.

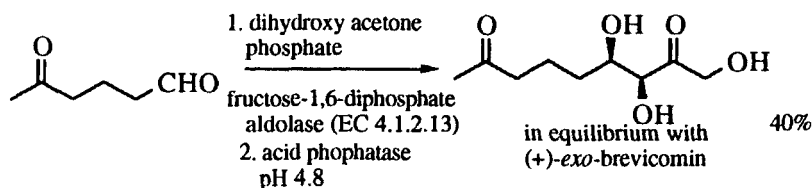


Shimizu, M.; Yoshida, A.; Fujisawa, T. *SynLett*, **1992**, 204.

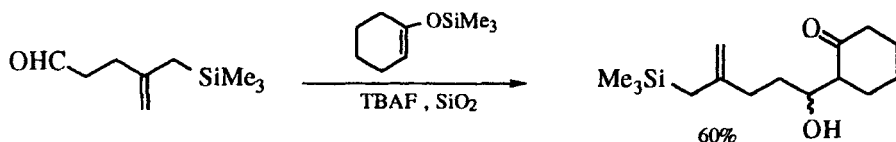


Konaklieva, M.I.; Dahl, M.L.; Turos, E. *Tetrahedron Lett.*, **1992**, *33*, 7093.

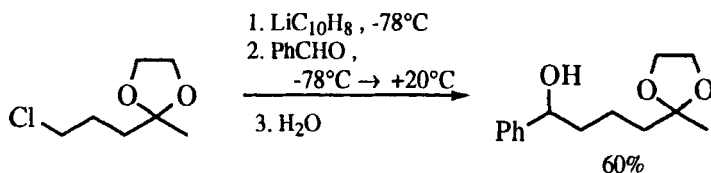
SECTION 330: ALCOHOL, THIOL - KETONE



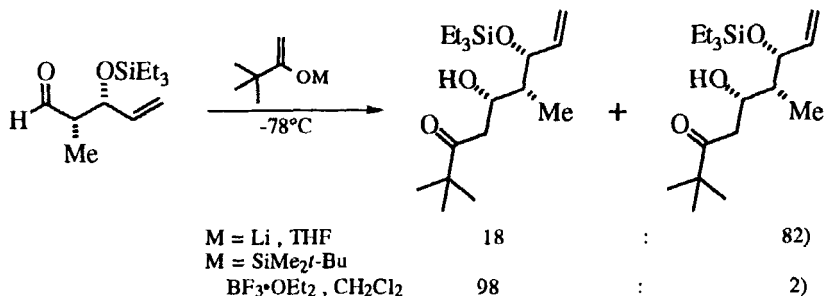
Schultz, M.; Waldmann, H.; Vogt, W.; Kunz, H. *Tetrahedron Lett.*, **1990**, *31*, 867.



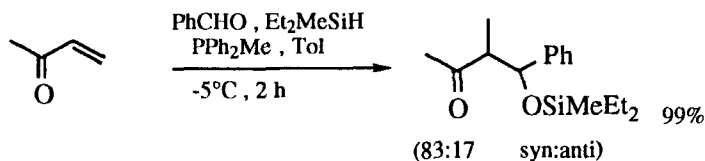
Lee, T.V.; Roden, F.S. *Tetrahedron Lett.*, **1990**, *31*, 2067.



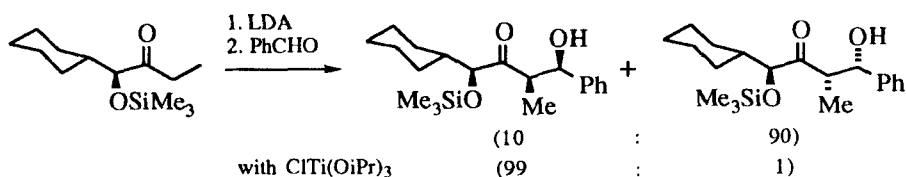
Ramón, D.J.; Yus, M. *Tetrahedron Lett.*, **1990**, *31*, 3763, 3767.



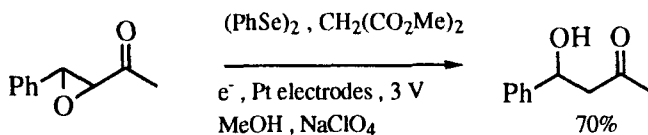
Evans, D.A.; Gage, J.R. *Tetrahedron Lett.*, **1990**, *31*, 6129.



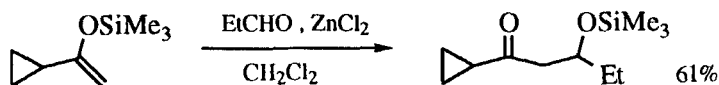
Matsuda, I.; Takahashi, K.; Sato, S. *Tetrahedron Lett.*, **1990**, 31, 5331.



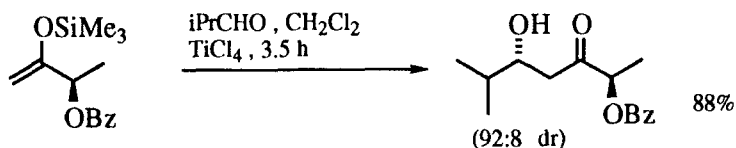
Panyachotipun, C.; Thornton, E.R. *Tetrahedron Lett.*, **1990**, 31, 6001.



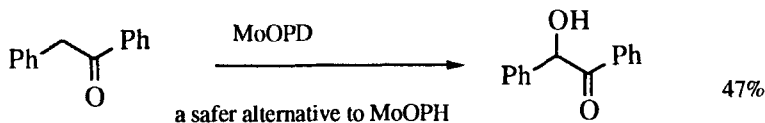
Inokuchi, T.; Kusumoto, M.; Torii, S. *J. Org. Chem.*, **1990**, 55, 1548.



Moiseenkov, A.M.; Czeskis, B.A.; Ivanova, N.M.; Nefedov, O.M. *Org. Prep. Proceed. Int.*, **1990**, 22, 215.

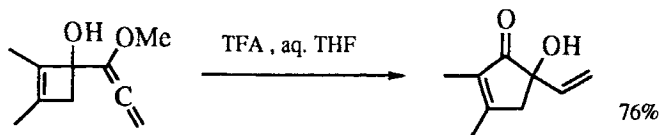


Trost, B.M.; Urabe, H. *J. Org. Chem.*, **1990**, 55, 3982.

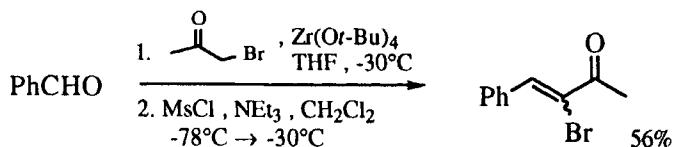


MoOPD = oxodiperoxymolybdenum (pyridine)-1,3-dimethyl-3,4,5,6-tetrahydro-2(1H)pyrimidinone = MoO₅•Py•DMPU

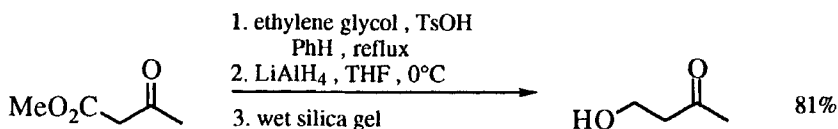
Anderson, J.C.; Smith, S.C. *SynLett*, **1990**, 107.



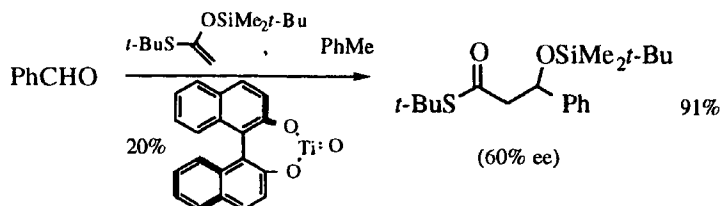
Stone, G.B.; Liebeskind, L.S. *J. Org. Chem.*, **1990**, *55*, 4614.



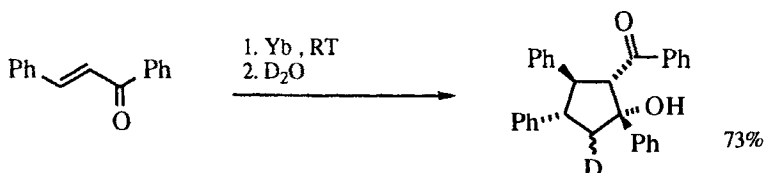
Sasai, H.; Kirio, Y.; Shibasaki, M. *J. Org. Chem.*, **1990**, *55*, 5306.



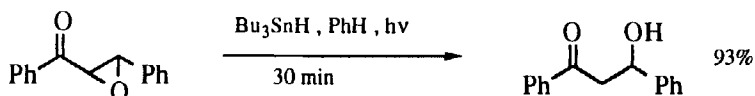
Hitchcock, S.R.; Perron, F.; Martin, V.A.; Albizati, K.E. *Synthesis*, **1990**, 1059.



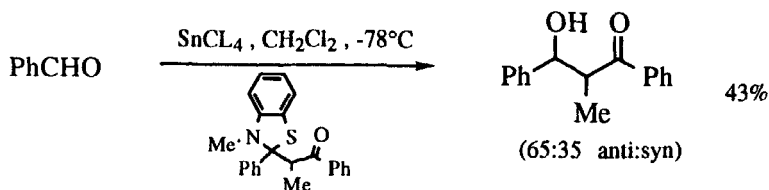
Mukaiyama, T.; Inubushi, A.; Suda, S.; Hara, R.; Kobayashi, S. *Chem. Lett.*, **1990**, 1015.



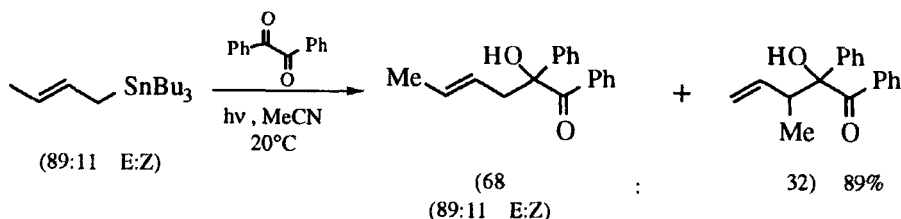
Takaki, K.; Beppu, F.; Tanaka, S.; Tsubaki, Y.; Jintoku, T.; Fujiwara, Y. *J. Chem. Soc., Chem. Commun.*, **1990**, 516.



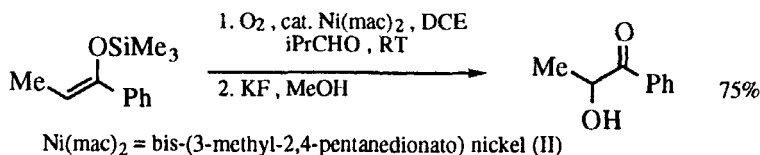
Hasegawa, E.; Ishiyama, K.; Horaguchi, T.; Shimizu, T. *J. Chem. Soc., Chem. Commun.*, **1990**, 550.



Chikashita, H.; Tame, S.; Yamada, S.; Itoh, K. *Bull. Chem. Soc. Jpn.*, **1990**, 63, 497.

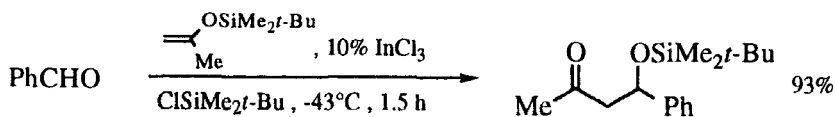


Takuwa, A.; Nishigaichi, Y.; Yamaoka, T.; Iichama, K. *J. Chem. Soc., Chem. Commun.*, **1991**, 1359.

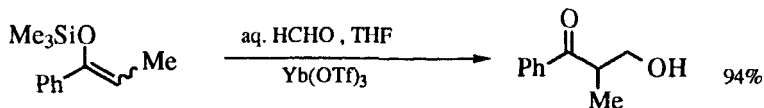


Takai, T.; Yamada, T.; Rhode, O.; Mukaiyama, T. *Chem. Lett.*, **1991**, 281.

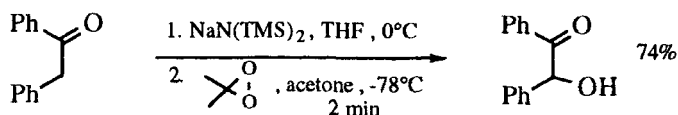
Takai, T.; Yamada, T.; Mukaiyama, T. *Chem. Lett.*, **1991**, 1499.



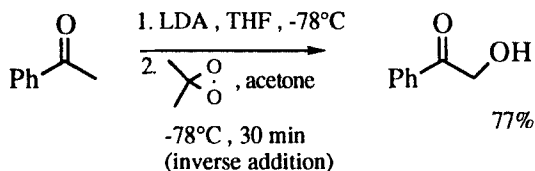
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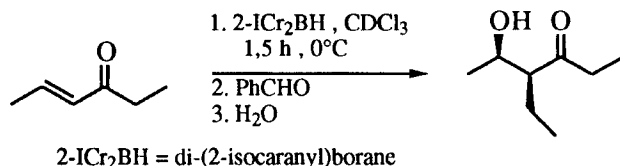
Kobayashi, S. *Chem. Lett.*, **1991**, 2087.



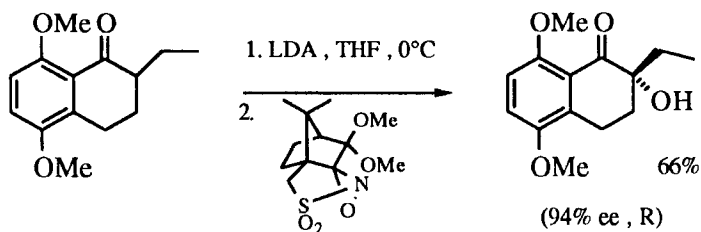
Adam, W.; Prechtel, F. *Chem. Ber.*, **1991**, 124, 2369.



Guertin, K.R.; Chan, T.-H. *Tetrahedron Lett.*, **1991**, 32, 715.

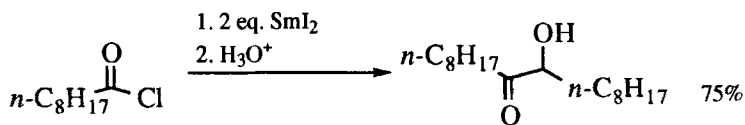


Boldrini, G.P.; Bortolitti, M.; Tagliavini, E.; Trombini, C.; Umani-Ronchi, A. *Tetrahedron Lett.*, **1991**, 32, 1229.



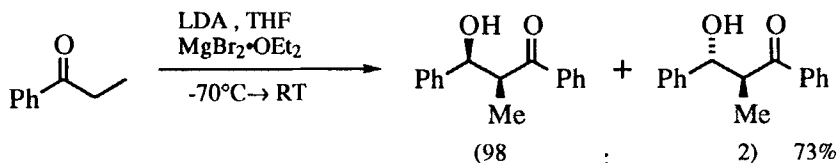
Davis, F.A.; Kumar, A.; Chen, B.-C. *J. Org. Chem.*, **1991**, 56, 1143.

Davis, F.A.; Weismiller, M.C. *J. Org. Chem.*, **1990**, 55, 3715. [dimethoxy derivative]

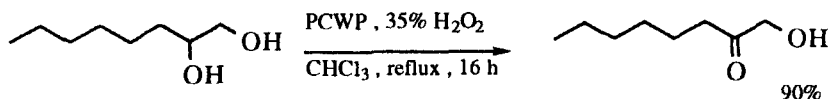


Aryl acid chlorides lead to 1,2-diketones

Collin, J.; Namy, J.-L.; Dallemer, F.; Kagan, H.B. *J. Org. Chem.*, **1991**, 56, 3118.

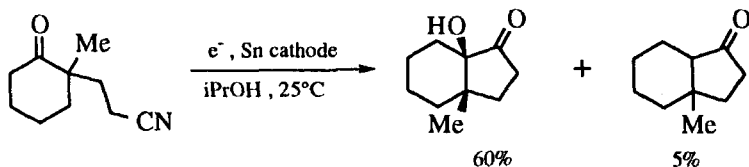


Swiss, K.A.; Choi, W.-B.; Liotta, D.C.; Abdel-Magid, A.F.; Maryanoff, C.A. *J. Org. Chem.*, **1991**, 56, 5978.



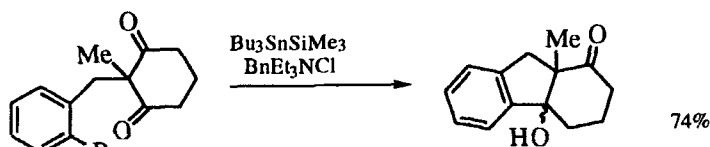
PCWP = peroxytungsto phosphate

Sakata, Y.; Ishii, Y. *J. Org. Chem.*, **1991**, *56*, 6233.

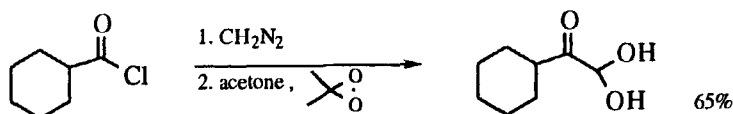


Shono, T.; Kise, N.; Fujimoto, T.; Tominaga, N.; Morita, H. *J. Org. Chem.*, **1992**, *57*, 7175.

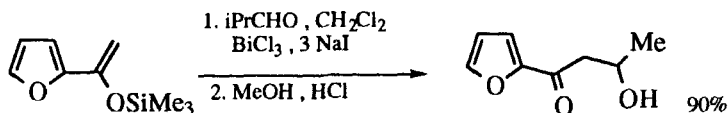
Shono, T.; Kise, N. *Tetrahedron Lett.*, **1990**, *31*, 1303.



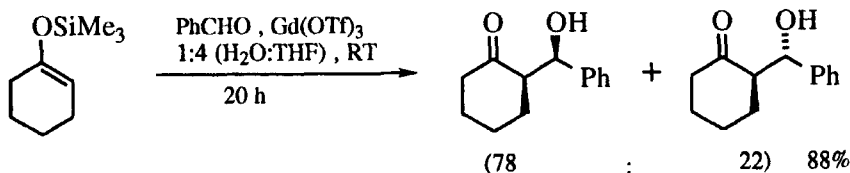
Mori, M.; Kaneta, N.; Isono, N.; Shibasaki, M. *Tetrahedron Lett.*, **1991**, *32*, 6139.



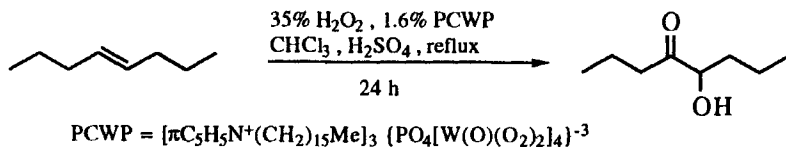
Ihmels, H.; Maggini, M.; Prato, M.; Scorrano, G. *Tetrahedron Lett.*, **1991**, *32*, 6215.



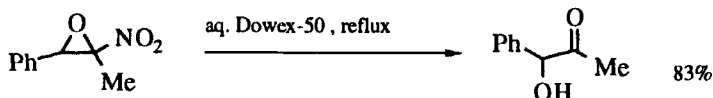
Le Roux, C.; Maraval, M.; Borredon, M.E.; Gaspard-Iloughmane, H.; Dubac, J. *Tetrahedron Lett.*, **1992**, *33*, 1053.



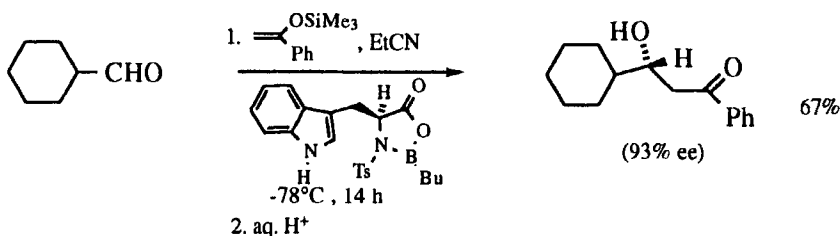
Kobayashi, S.; Hachiya, I. *Tetrahedron Lett.*, **1992**, *33*, 1625.



Sakata, Y.; Katayama, Y.; Ishii, Y. *Chem. Lett.*, **1992**, 671.



Chakraborty, R.; Das, A.R.; Ranu, B.C. *Synth. Commun.*, **1992**, 22, 1523.



Corey, E.J.; Cywin, C.L.; Roper, T.D. *Tetrahedron Lett.*, **1992**, 33, 6907.

REVIEWS:

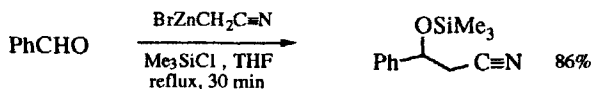
"Uses of the Fries Rearrangement for the Preparation of Hydroxyarylketones"

Martin, R. *Org. Prep. Proceed. Int.*, **1992**, 24, 392.

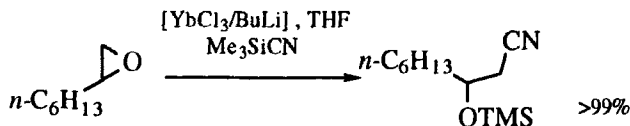
"Selective Oxidation of α,β -Unsaturated Ketones at the α -Position"

Demir, A.S.; Jeganathan, A. *Synthesis*, **1992**, 235.

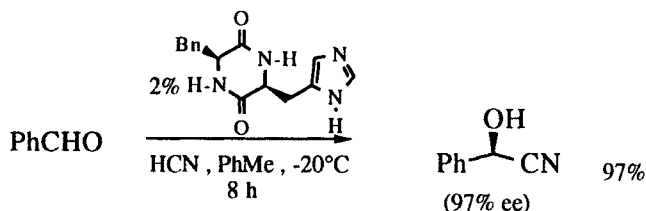
SECTION 331: ALCOHOL, THIOL - NITRILE



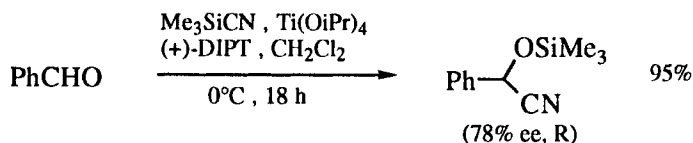
Palomo, C.; Aizpurua, J.M.; López, M.C.; Aurrekoetxea, N. *Tetrahedron Lett.*, **1990**, 31, 2205.



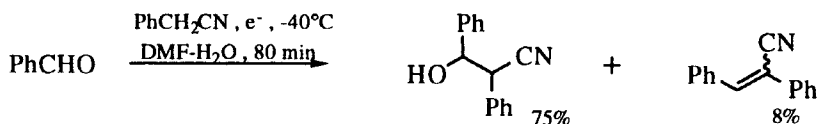
Matsubara, S.; Onishi, H.; Utimoto, K. *Tetrahedron Lett.*, **1990**, 31, 6209.



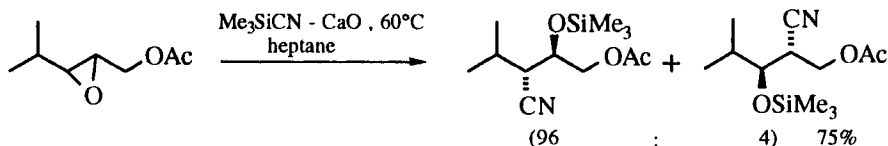
Tanaka, K.; Mori, A.; Inoue, S. *J. Org. Chem.*, **1990**, 55, 181.



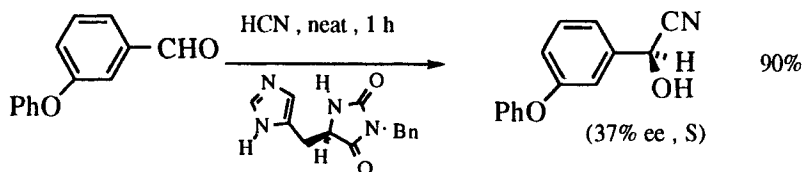
Hayashi, M.; Matsuda, T.; Oguni, N. *J. Chem. Soc., Chem. Commun.*, **1990**, 1364.



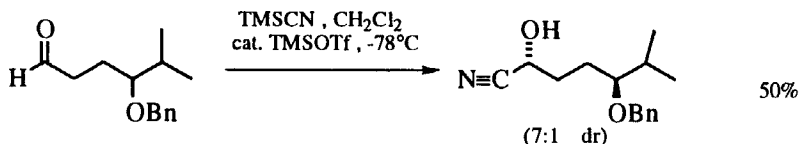
Torii, S.; Kawafuchi, H.; Inokuchi, T. *Bull. Chem. Soc. Jpn.*, **1990**, 63, 2430.



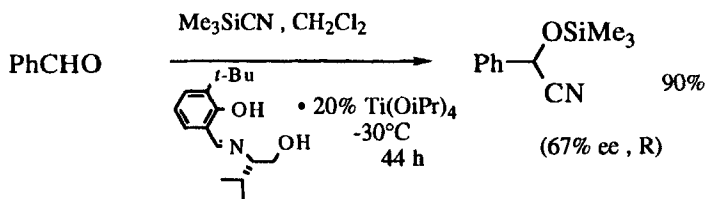
Sugita, K.; Ohta, A.; Onaka, M.; Izumi, Y. *Chem. Lett.*, **1990**, 481.



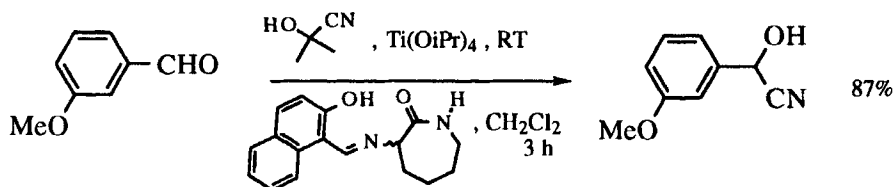
Danda, H. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 3743.



Molander, G.A.; Haar, J.P. Jr. *J. Am. Chem. Soc.*, **1991**, 113, 3608.

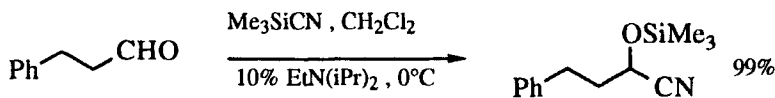


Hayashi, M.; Miyamoto, Y.; Inoue, T.; Oguni, N. *J. Chem. Soc., Chem. Commun.*, **1991**, 1752.

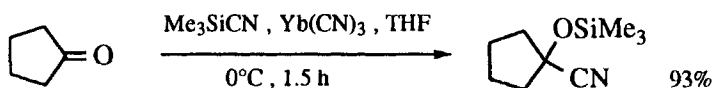


Mori, A.; Inoue, S. *Chem. Lett.*, **1991**, 145.

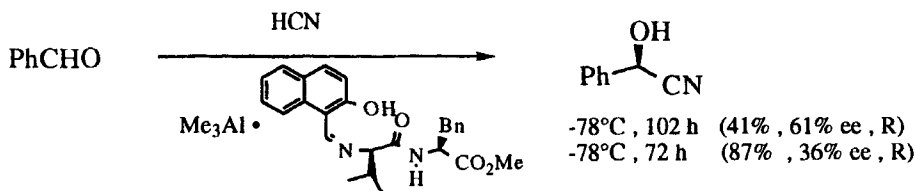
Mori, A.; Kinoshita, K.; Osaka, M.; Inoue, S. *Chem. Lett.*, **1990**, 1171.



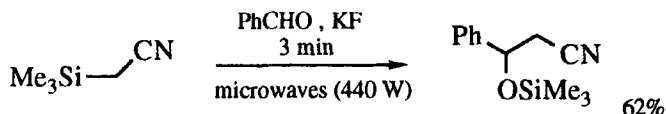
Kobayashi, S.; Tsuchiya, Y.; Mukaiyama, T. *Chem. Lett.*, **1991**, 537, 541.



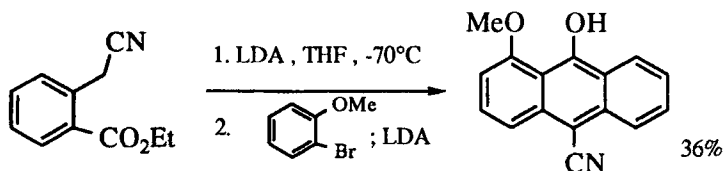
Matsubara, S.; Takai, T.; Utimoto, K. *Chem. Lett.*, **1991**, 1447.



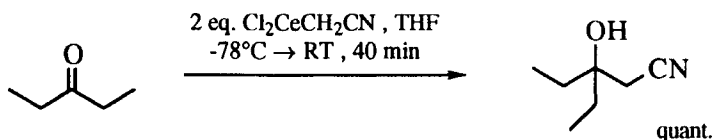
Mori, A.; Ohno, H.; Nitta, H.; Tanaka, K.; Inoue, S. *SynLett*, **1991**, 567.



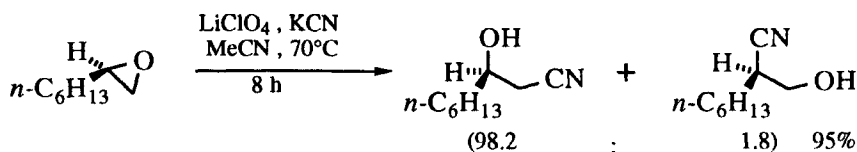
Latouche, R.; Texier-Boullet, E.; Hamelin, J. *Tetrahedron Lett.*, **1991**, 32, 1179.



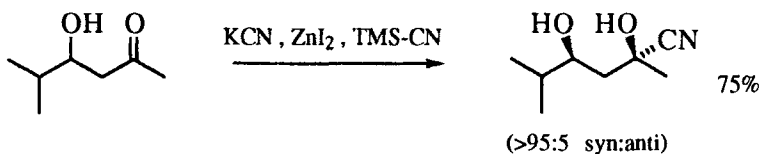
Bhawal, B.M.; Khanapure, S.P.; Zhang, H.; Biehl, E.R. *J. Org. Chem.*, **1991**, *56*, 2846.



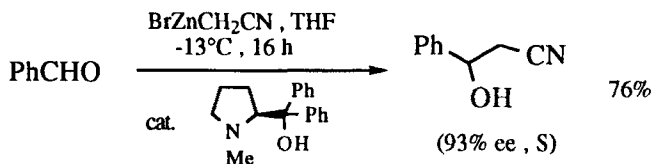
Liu, H.-J.; Al-Said, N.H. *Tetrahedron Lett.*, **1991**, *32*, 5473.



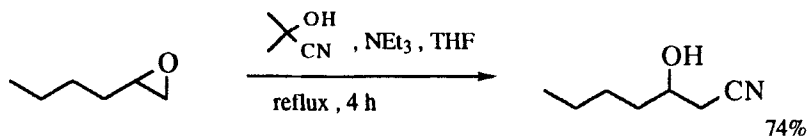
Chini, M.; Crotti, P.; Favero, L.; Macchia, F. *Tetrahedron Lett.*, **1991**, *32*, 4775.



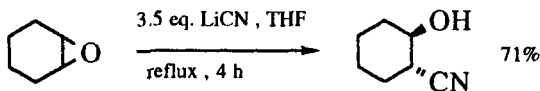
Brunet, E.; Batra, M.S.; Aguilar, F.J.; Ruano, J.L.G. *Tetrahedron Lett.*, **1991**, *32*, 5423.



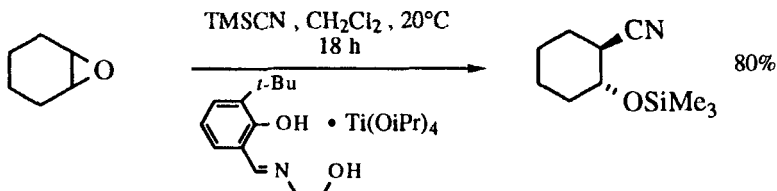
Soai, K.; Hirose, Y.; Sakata, S. *Tetrahedron Asymmetry*, **1992**, *3*, 677.



Mitchell, D.; Koenig, T.M. *Tetrahedron Lett.*, **1992**, *33*, 3281.

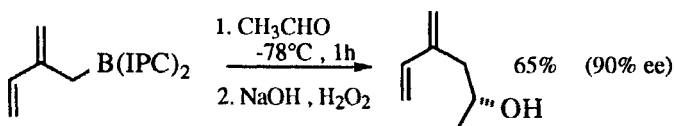


Ciaccio, J.A.; Stanesco, C.; Bontemps, J. *Tetrahedron Lett.*, **1992**, 33, 1431.

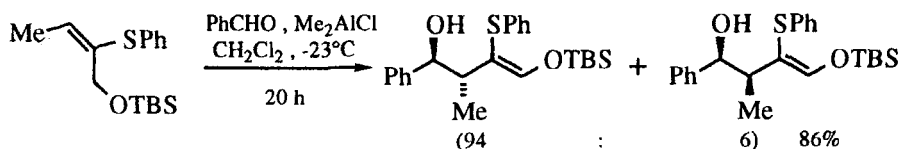


Hayashi, M.; Tamura, M.; Oguni, N. *SynLett*, **1992**, 663.

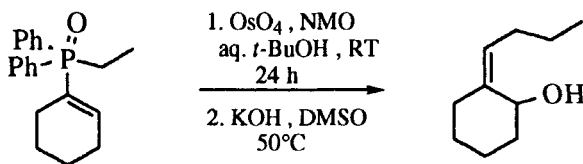
SECTION 332: ALCOHOL, THIOL - ALKENE



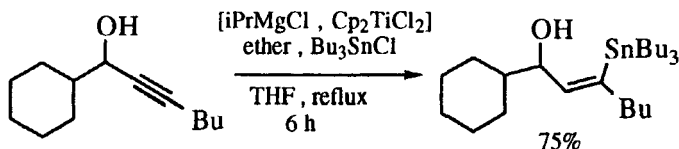
Brown, H.C.; Randad, R.S. *Tetrahedron Lett.*, **1990**, 31, 455.



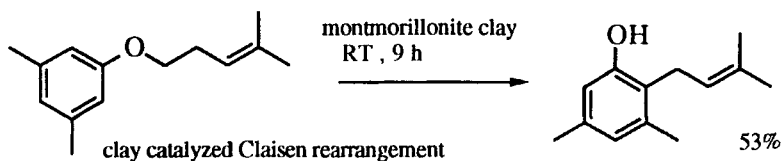
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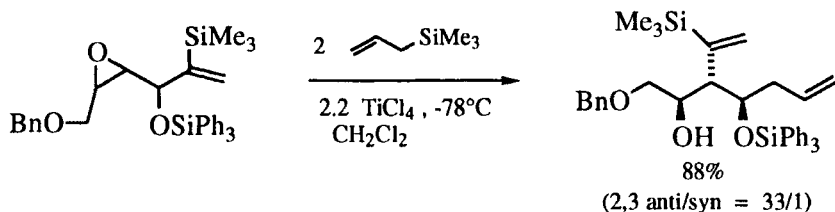
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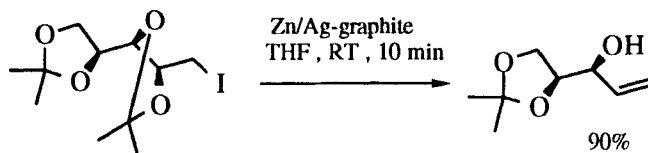
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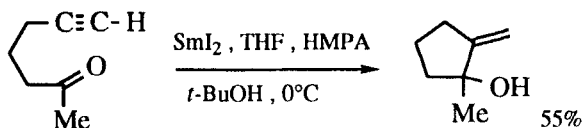
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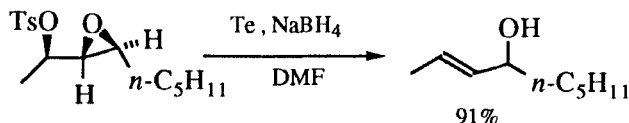
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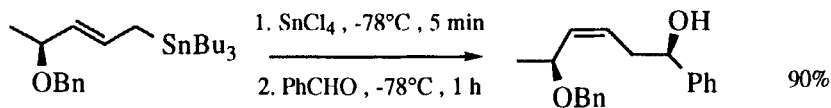
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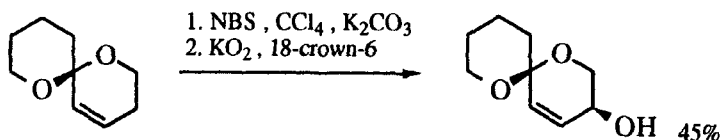
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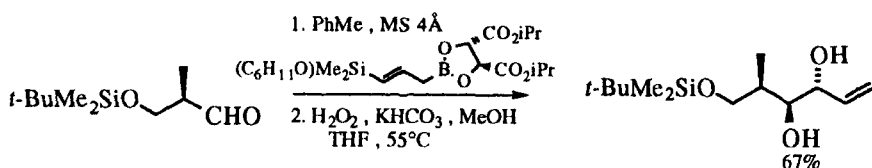
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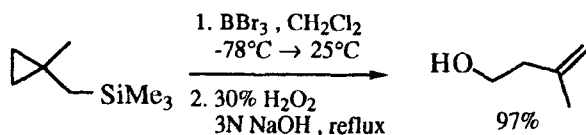


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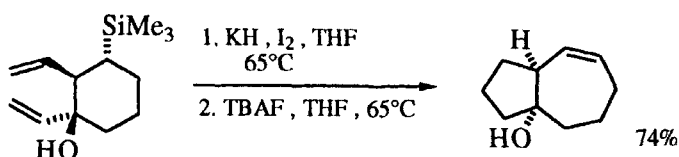


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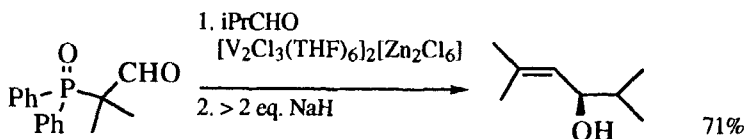


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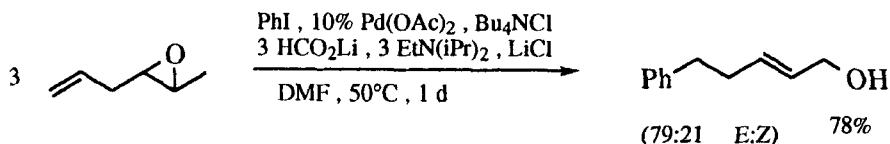


tandem anionic oxy-Cope•allyl silane cyclization

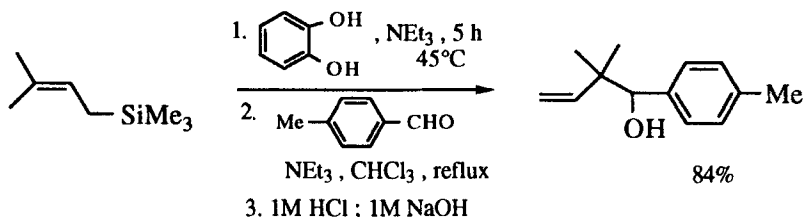
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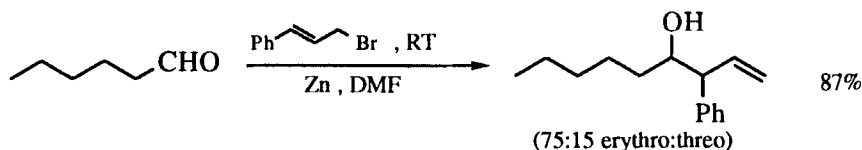
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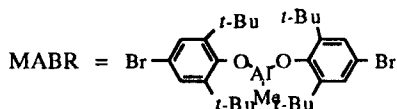
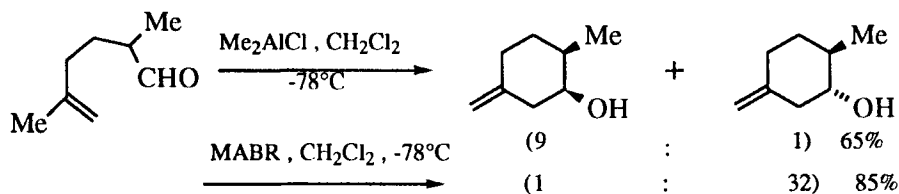
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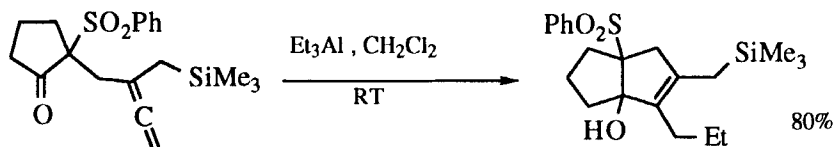
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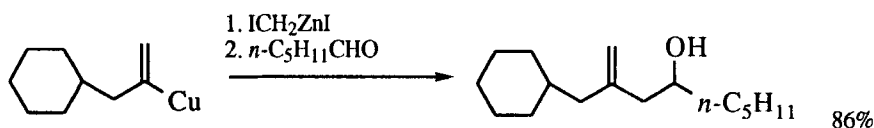
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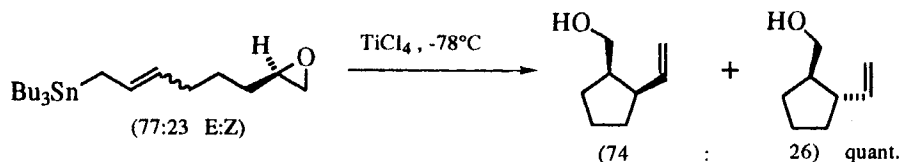
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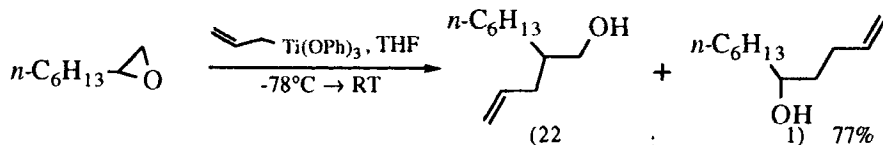
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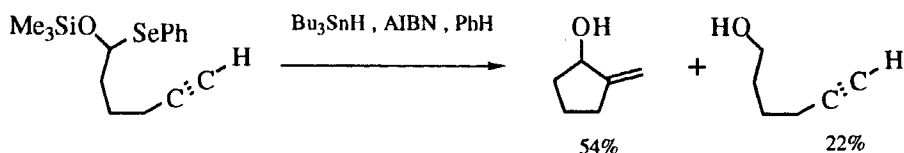
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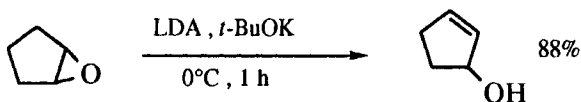
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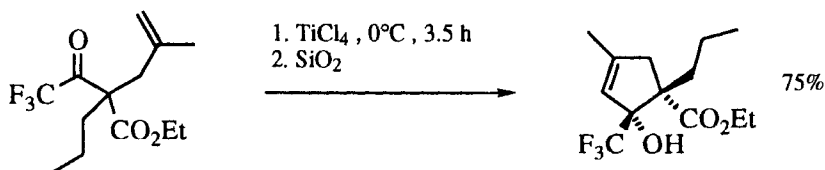
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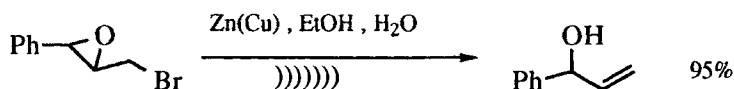
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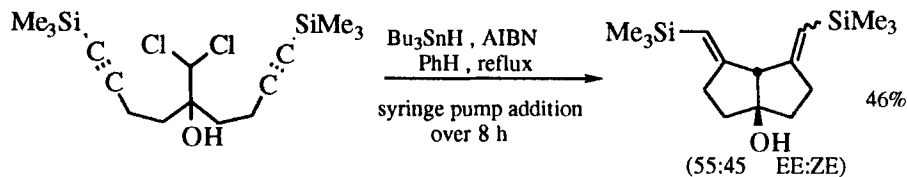
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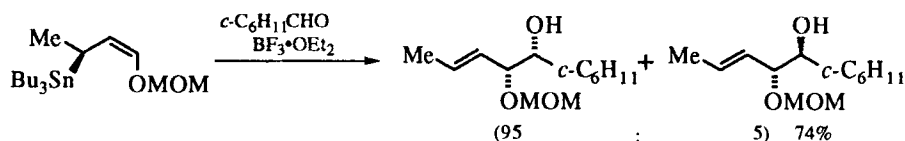
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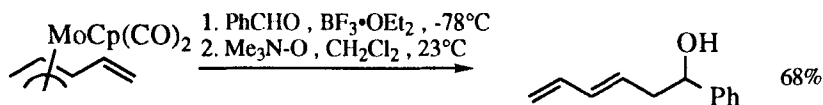


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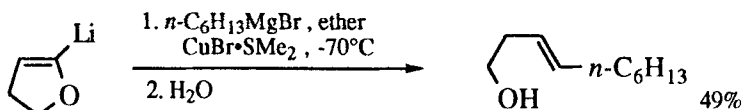


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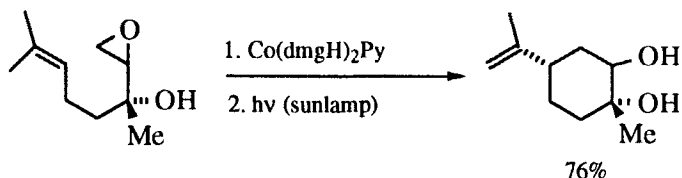
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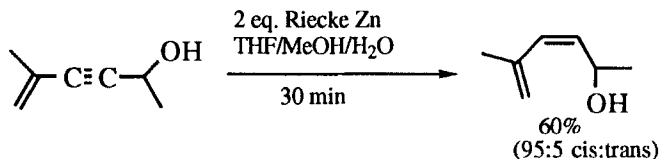
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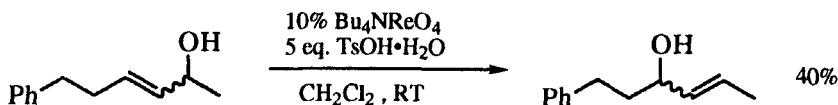
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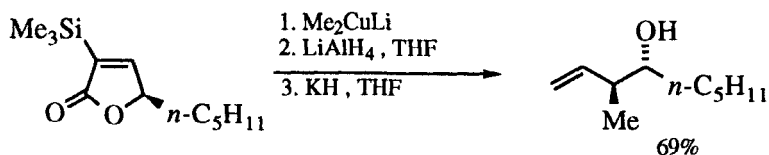
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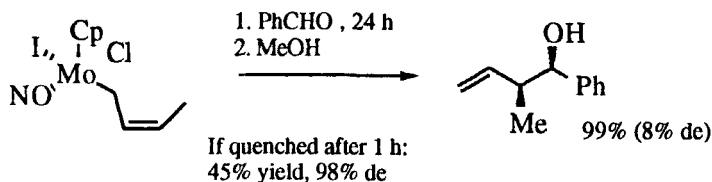
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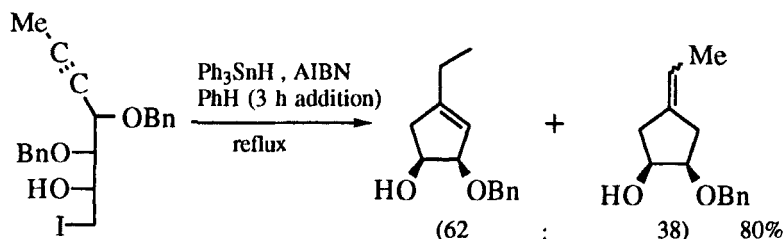
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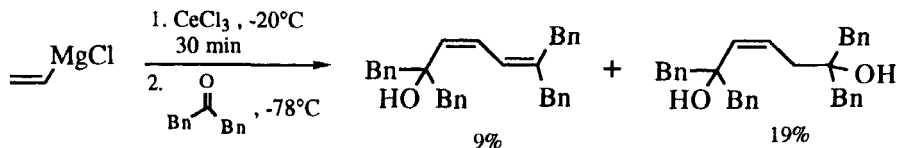
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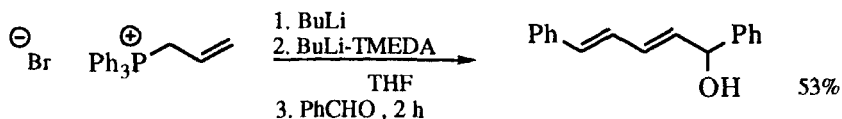
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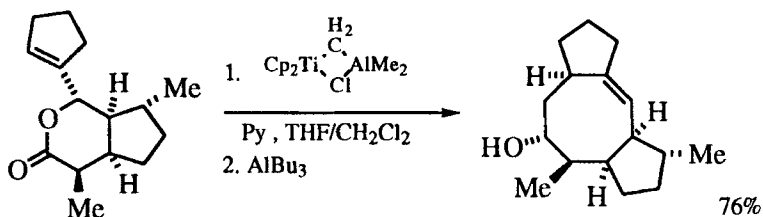
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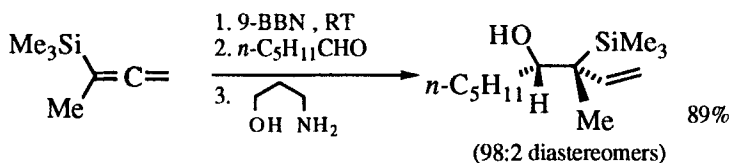


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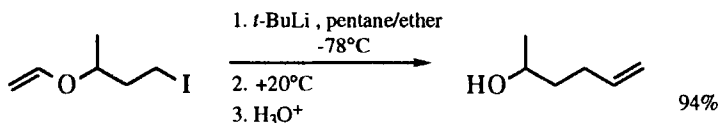


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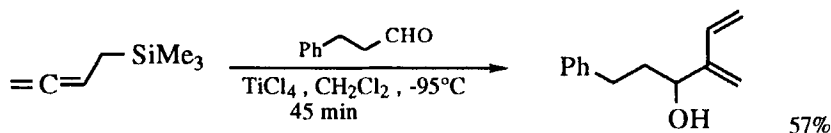
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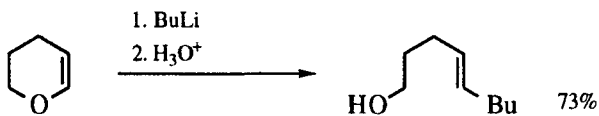
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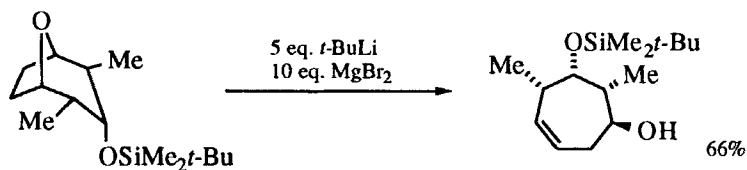
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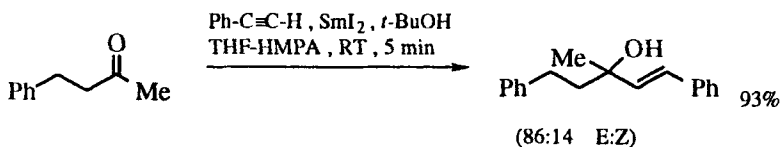
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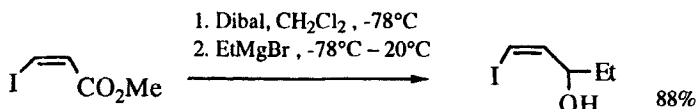
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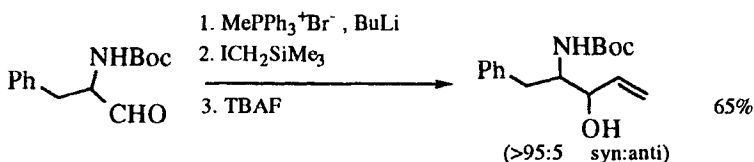
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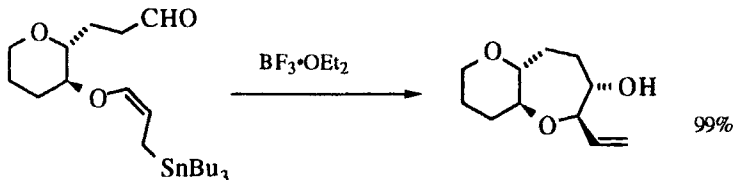
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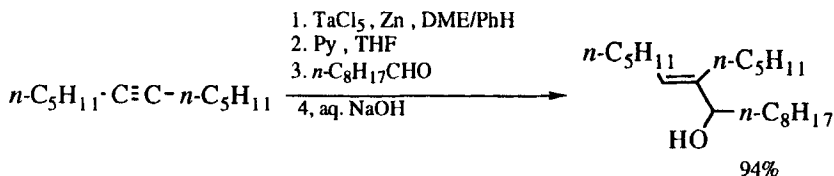
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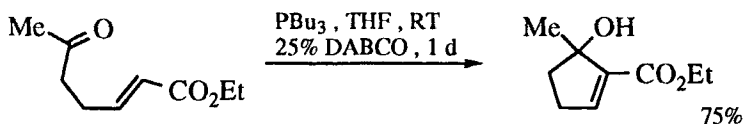


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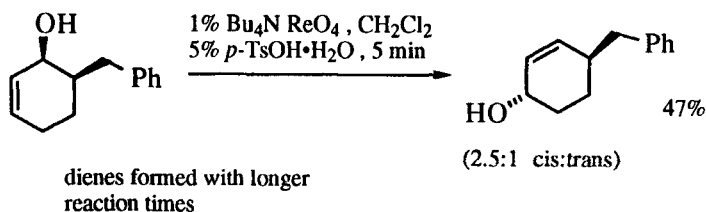


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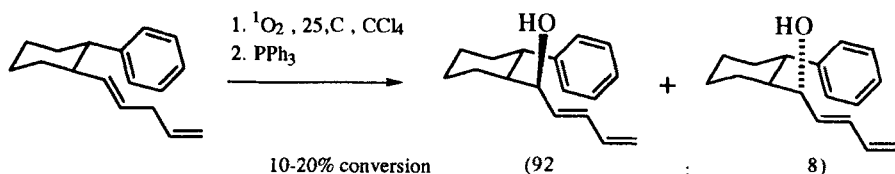
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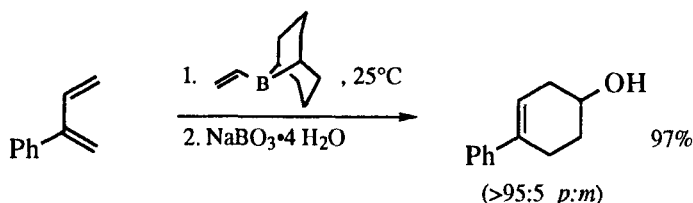
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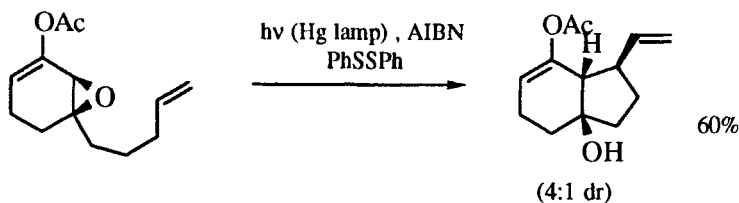


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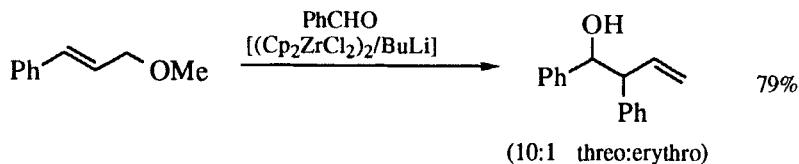


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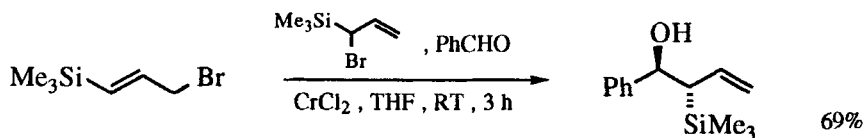
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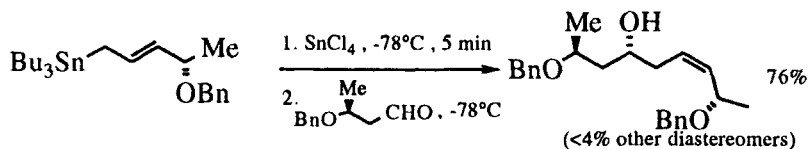
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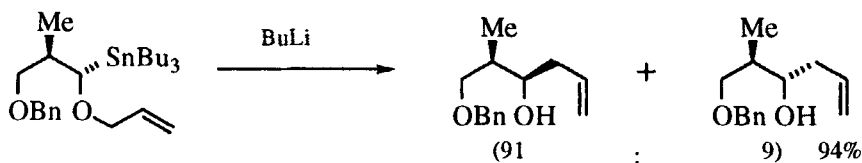
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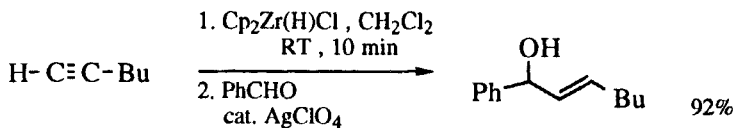
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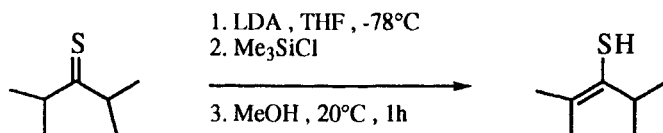
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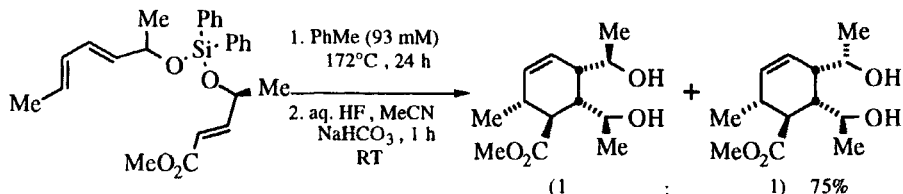
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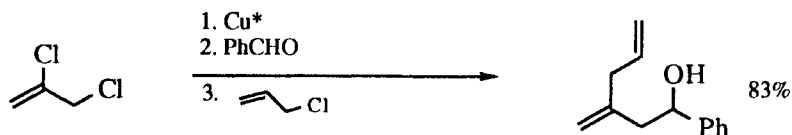
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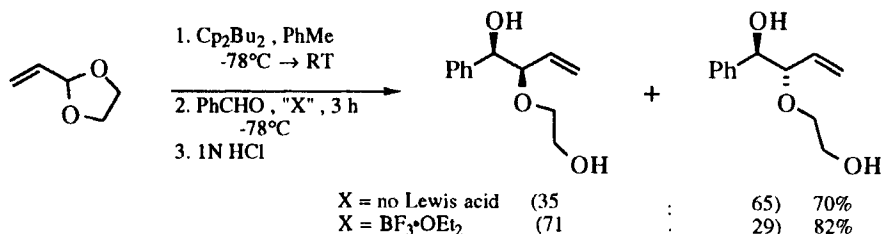


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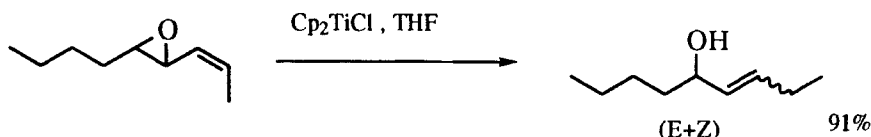


Cu^* = zero-valent copper (from $\text{CuCN} \cdot 2 \text{LiCl}$)

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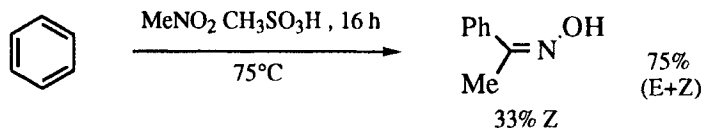


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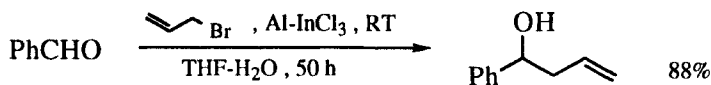


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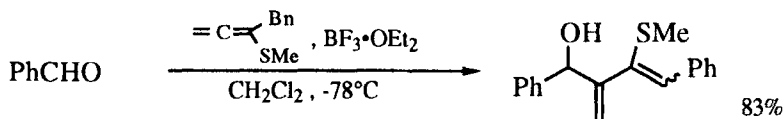
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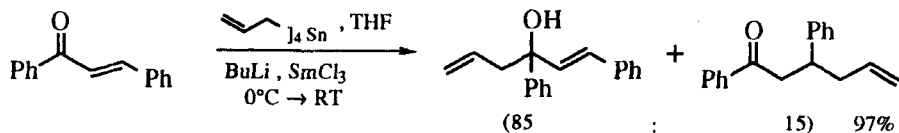
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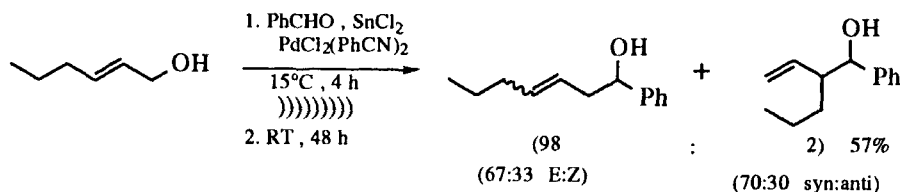
Araki, S.; Jin, S.-J.; Idou, Y.; Butsugan, Y. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 1736.



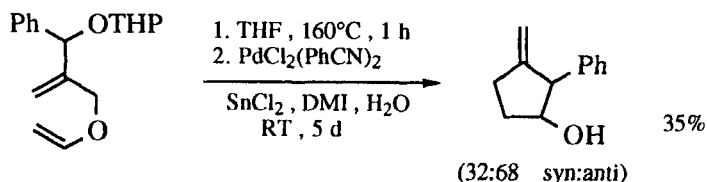
Narasaka, K.; Shibata, T.; Hayashi, Y. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 2825.



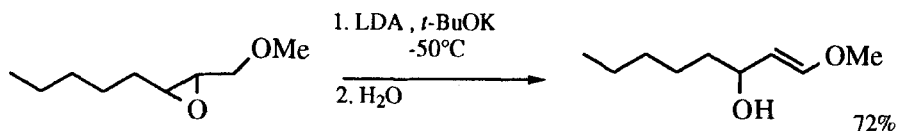
Fukuzawa, S.; Sakai, S. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 3308.



Masuyama, Y.; Hayakawa, A.; Kurusu, Y. *J. Chem. Soc., Chem. Commun.*, **1992**, 1102.



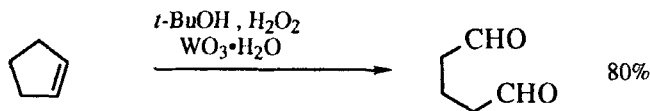
Masuyama, Y.; Nimura, Y.; Kurusu, Y. *Tetrahedron Lett.*, **1992**, 33, 6477.



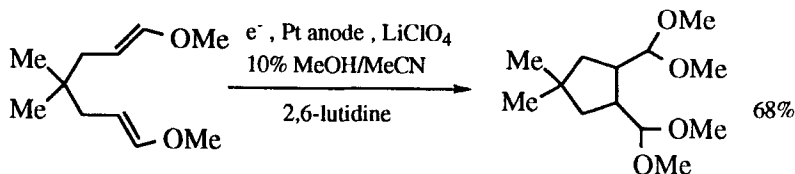
Degl'Innocenti, A.; Mordini, A.; Pecchi, S.; Pinzani, D.; Reginato, G.; Ricci, A. *SynLett*, **1992**, 753, 803.

Allylic and benzylic hydroxylation ($C=C-C-H \rightarrow C=C-C-OH$, etc.) is listed in Section 41 (Alcohols from Hydrides). Also via: Section 302 (Alkyne - Alcohol).

SECTION 333: ALDEHYDE - ALDEHYDE



Jingfa, D.; Xinhua, X.; Haiying, C.; Anren, J. *Tetrahedron*, **1992**, 48, 3503.



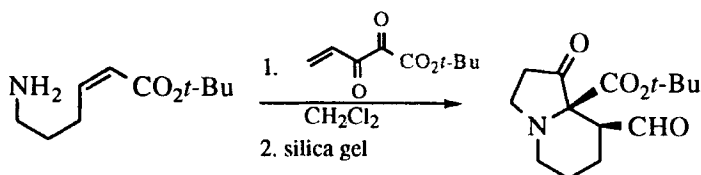
Moeller, K.D.; Tinao, L.V. *J. Am. Chem. Soc.*, **1992**, *114*, 1033.

REVIEWS:

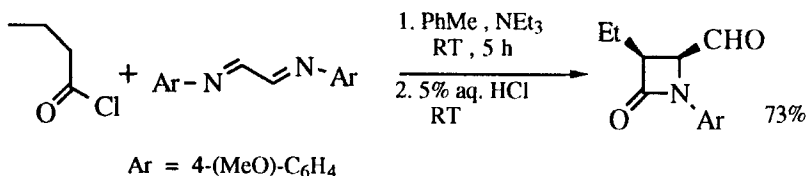
"Oxidative Rearrangement of Furyl Carbinols to 6-Hydroxyl 2H-pyran-3(6H)ones, a Useful Synthon for the Preparation of a Variety of Heterocyclic Compounds"

Georgiadia, M.P.; Albizati, K.F.; Georgiadia, T.M. *Org. Prep. Proceed. Int.*, **1992**, *24*, 97.

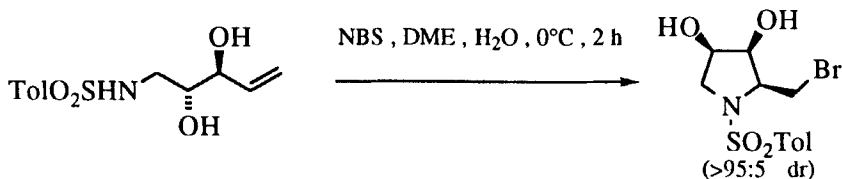
SECTION 334: ALDEHYDE - AMIDE



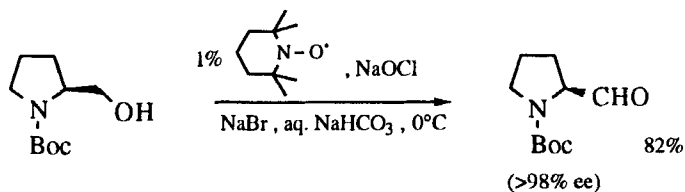
Wasserman, H.H.; Cook, J.D.; Vu, C.B. *J. Org. Chem.*, **1990**, *55*, 1701.



Alcaide, B.; Martín-Cantalejo, Y.; Plumet, J.; Rodríguez-López, J.; Sierra, M.A. *Tetrahedron Lett.*, **1991**, *32*, 803.

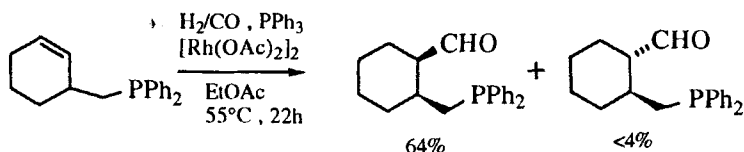


Jäger, V.; Hümer, W. *Angew. Chem. Int. Ed. Engl.*, **1990**, *29*, 1171.

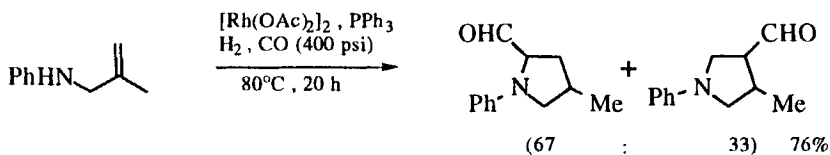


Leanna, M.R.; Sowin, T.J.; Morton, H.E. *Tetrahedron Lett.*, **1992**, 33, 5029.

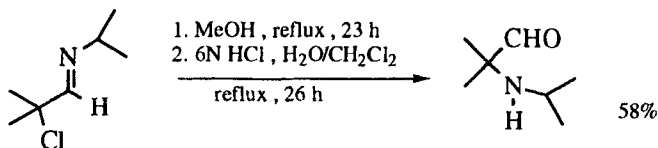
SECTION 335: ALDEHYDE - AMINE



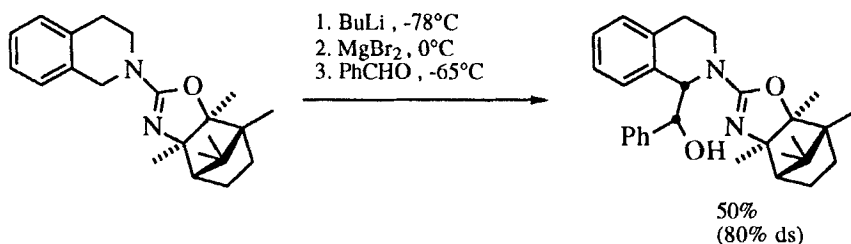
Jackson, W.R.; Perlmuter, P.; Tasdelen, E.E. *Tetrahedron Lett.*, **1990**, 31, 2461.



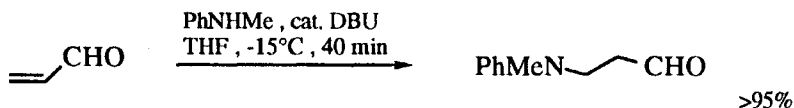
Anastasiou, D.; Campi, E.M.; Chaouk, H.; Jackson, W.R.; McCubbin, Q.J. *Tetrahedron Lett.*, **1991**, 33, 2211.



De Kimpe, N.; Boeykens, M.; Boelens, M.; De Buck, K.; Cornelis, J. *Org. Prep. Proceed. Int.*, **1992**, 24, 679.



Zhang, P.; Gawley, R.E. *Tetrahedron Lett.*, **1992**, 33, 2945.



Markó, I.E.; Chesney, A. *SynLett*, **1992**, 275.

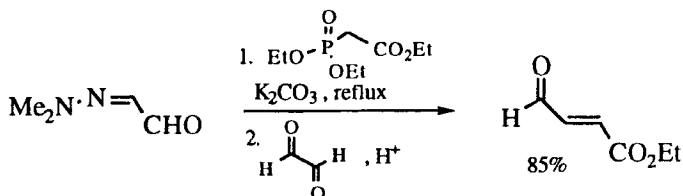
Chesney, A.; Markó, I.E. *Synth. Commun.*, **1990**, 20, 3167.

REVIEWS:

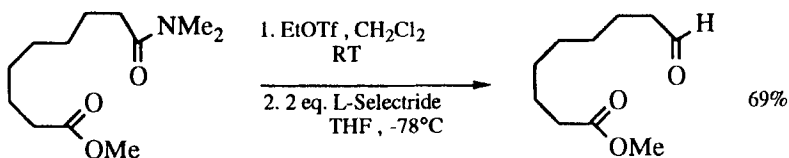
"Synthesis of α -Amino Aldehydes and α -Amino Ketones"

Fisher, L.E.; Muchowski, J.M. *Org. Prep. Proceed. Int.*, **1990**, 22, 399.

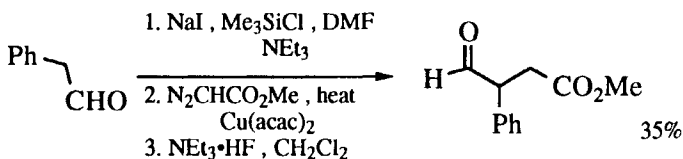
SECTION 336: ALDEHYDE - ESTER



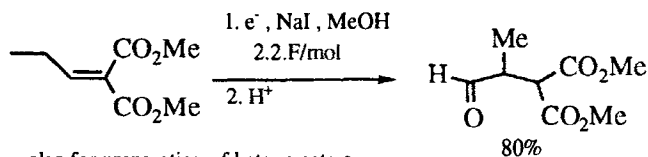
Schmitt, M.; Bourguignon, J.J.; Wermuth, C.G. *Tetrahedron Lett.*, **1990**, 31, 2145.



Tsay, S.-C.; Robl, J.A.; Hwu, J.R. *J. Chem. Soc., Perkin Trans. I*, **1990**, 757.

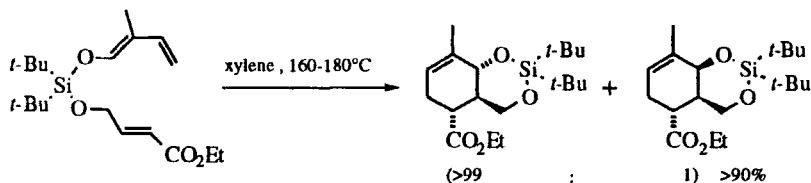


Kunz, T.; Janowitz, A.; Reißig, H.-U. *Synthesis*, **1990**, 43.

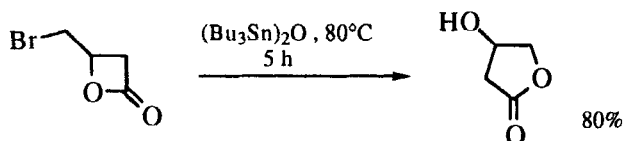


also for preparation of ketone-esters

Nikishin, G.I.; Elinson, M.N.; Feducovich, S.K. *Tetrahedron Lett.*, **1991**, 32, 799.

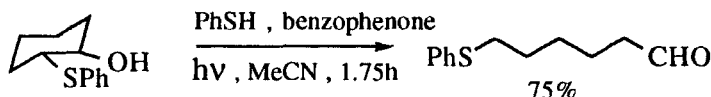


Gillard, J.W.; Fortin, R.; Grimm, E.L.; Maillard, M.; Tjepkema, M.; Bernstein, M.A.; Glaser, R. *Tetrahedron Lett.*, **1991**, 32, 1145.

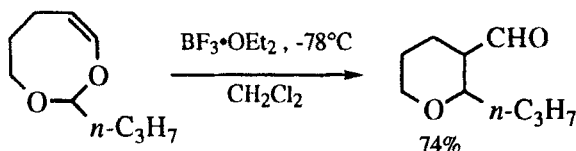


Shibata, I.; Matsuo, F.; Baba, A.; Matsuda, H. *J. Org. Chem.*, **1991**, 56, 475.

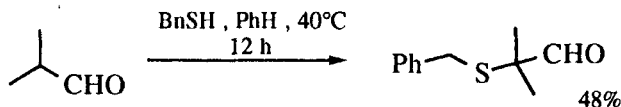
SECTION 337: ALDEHYDE - ETHER, EPOXIDE, THIOETHER



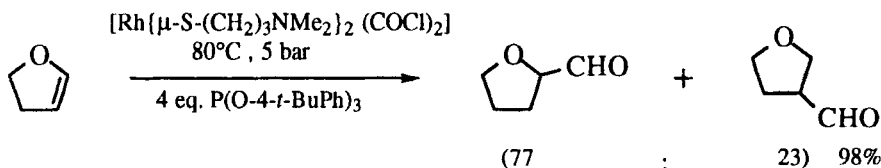
Gravel, D.; Farmer, L.; Ayotte, C. *Tetrahedron Lett.*, **1990**, 31, 63.



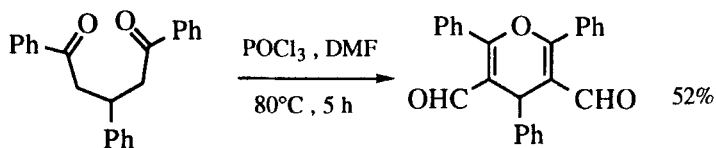
Frauenrath, H.; Sawicki, M. *Tetrahedron Lett.*, **1990**, 31, 649.



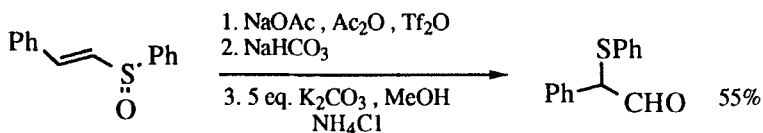
Jones, G.S. Jr.; Elmaleh, D.R. *Org. Prep. Proceed. Int.*, **1990**, 22, 112.



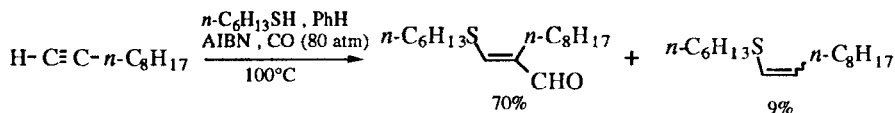
Polo, A.; Real, J.; Claver, C.; Castellón, S.; Bayón, J.C. *J. Chem. Soc., Chem. Commun.*, **1990**, 600.



Venugopal, M.; Umarani, R.; Perumal, P.T.; Rajadurai, S. *Tetrahedron Lett.*, **1991**, 32, 3235.

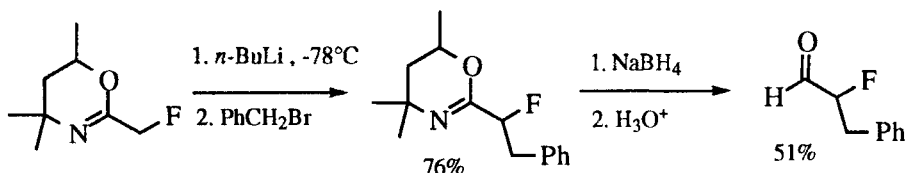


Craig, D.; Daniels, K.; MacKenzie, A.R. *Tetrahedron Lett.*, **1991**, 32, 6973.

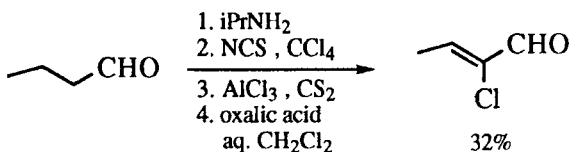


Nakatani, S.; Yoshida, I.; Isoe, S. *J. Chem. Soc., Chem. Commun.*, **1992**, 880.

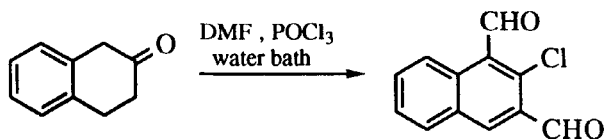
SECTION 338: ALDEHYDE - HALIDE, SULFONATE



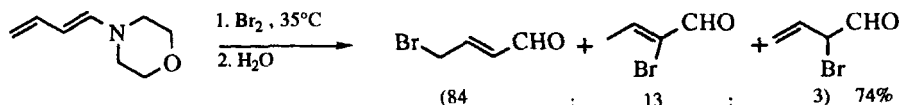
Patrick, T.B.; Hosseini, S.; Bains, S. *Tetrahedron Lett.*, **1990**, 31, 179.



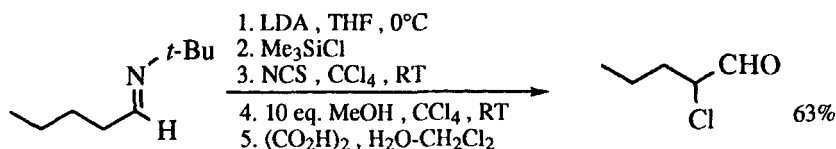
Stevens, C.; De Kimpe, N. *Org. Prep. Proceed. Int.*, **1990**, 22, 589.



Evans, S.L.; Lloyd, H.A.; LaBeau, D.; Sokoloski, E.B. *Org. Prep. Proceed. Int.*, **1990**, 22, 764.

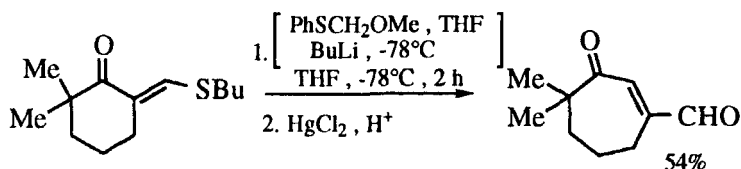


Duhamel, L.; Guillemont, J.; Poirier, J-M.; Chabardes, P. *Tetrahedron Lett.*, **1992**, 33, 5051.

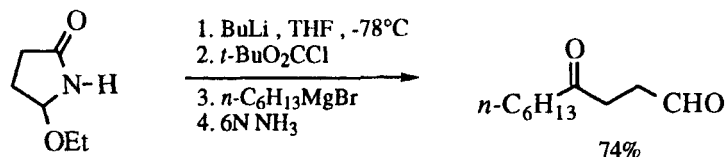


De Kimpe, N.; Coppens, W.; Krauze, A.; De Corte, B.; Stevens, C.; Welch, J. *Bull. Soc. Chim. Fr.*, **1992**, 101, 237.

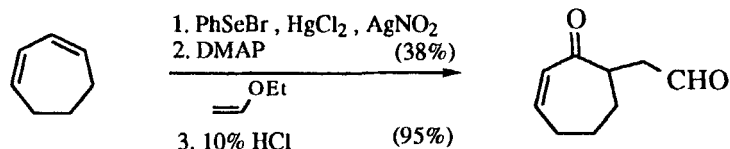
SECTION 339: ALDEHYDE - KETONE



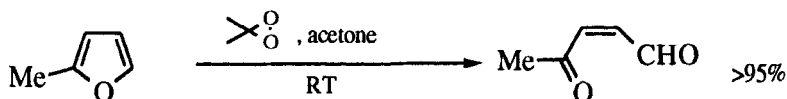
Guerrero, A.; Parrilla, A.; Camps, F. *Tetrahedron Lett.*, **1990**, 31, 1873.



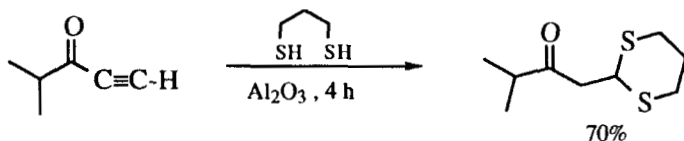
Savoia, D.; Concialini, V.; Roffia, S.; Tarsi, L. *J. Org. Chem.*, **1991**, 56, 1822.



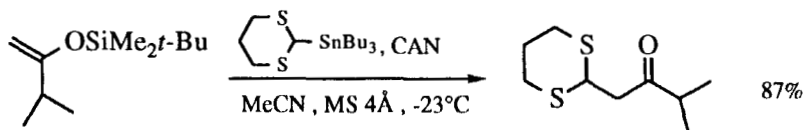
Bäckvall, J-E.; Karlsson, U.; Chinchilla, R. *Tetrahedron Lett.*, **1991**, 32, 5607.



Adger, B.M.; Barrett, C.; Brennan, J.; McKervey, M.A.; Murray, R.W. *J. Chem. Soc., Chem. Commun.*, **1991**, 1553.



Ranu, B.C.; Bhar, S.; Chakraborti, R. *J. Org. Chem.*, **1992**, 57, 7349.



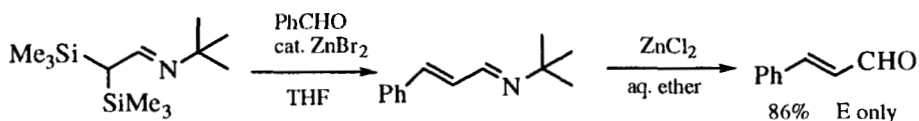
Narasaka, K.; Okauchi, T.; Arai, N. *Chem. Lett.*, **1992**, 1229.

SECTION 340: ALDEHYDE - NITRILE

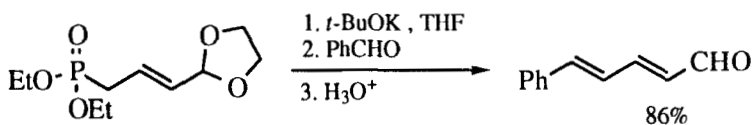
NO ADDITIONAL EXAMPLES

SECTION 341: ALDEHYDE - ALKENE

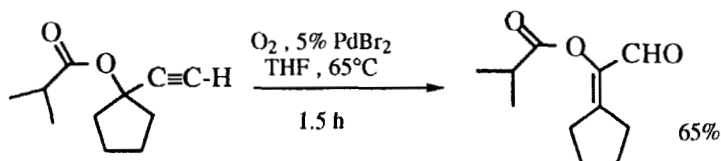
For the oxidation of allylic alcohols to alkene aldehydes, see Section 48
(Aldehydes from Alcohols).



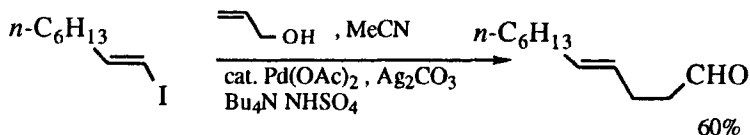
Gaudemar, M.; Bellassoued, M. *Tetrahedron Lett.*, **1990**, 31, 349.



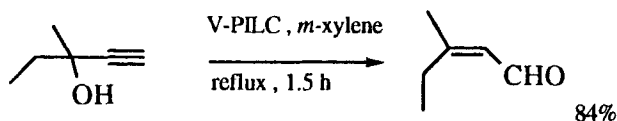
Duhamel, L.; Guillemont, J.; LeGallic, Y.; Plé, G.; Poirier, J.-M.; Ramondenc, Y.; Chabardes, P. *Tetrahedron Lett.*, **1990**, 31, 3129.



Kataoka, H.; Watanabe, K.; Goto, K. *Tetrahedron Lett.*, **1990**, 31, 4181.

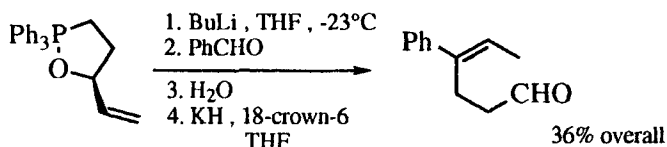


Jeffery, T. *Tetrahedron Lett.*, **1990**, 31, 6641.

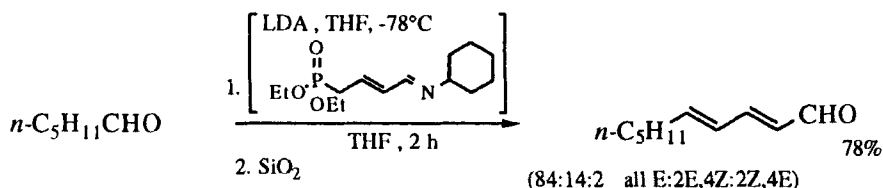


V-PILC = vanadium-pillared montmorillonite clay

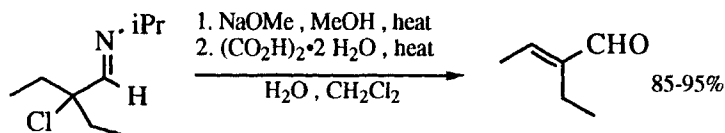
Choudary, B.M.; Prasad, A.D.; Valli, V.L.K. *Tetrahedron Lett.*, **1990**, 31, 7521.



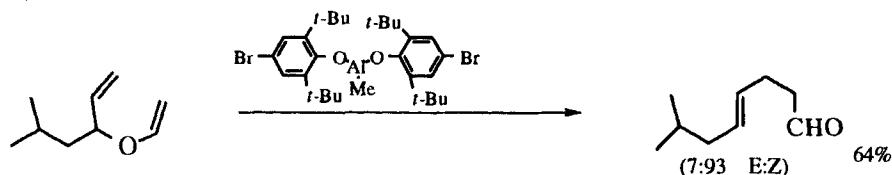
Enholm, E.J.; Satıcı, H.; Prasad, G. *J. Org. Chem.*, **1990**, 55, 324.



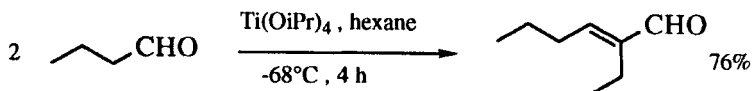
Kann, N.; Rein, T.; Åkermark, B.; Helquist, P. *J. Org. Chem.*, **1990**, 55, 5312.



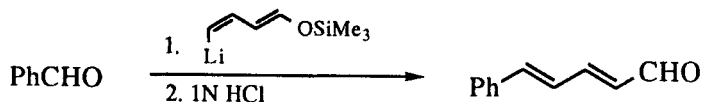
De Kimpe, N.; Stevens, C. *Bull. Soc. Chim. Belg.*, **1990**, 99, 41.



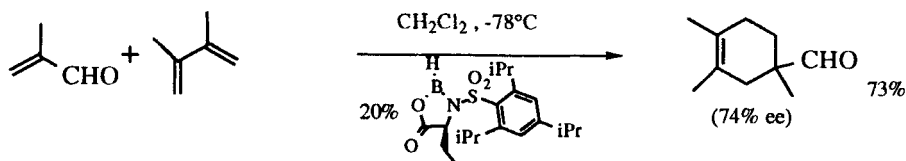
Nonoshita, K.; Banno, H.; Maruoka, K.; Yamamoto, H. *J. Am. Chem. Soc.*, **1990**, 112, 316.



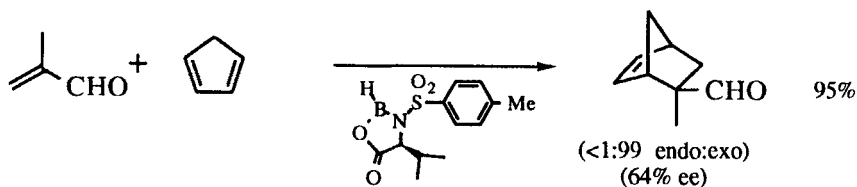
Mahrwald, R.; Schick, H. *Synthesis*, **1990**, 592.



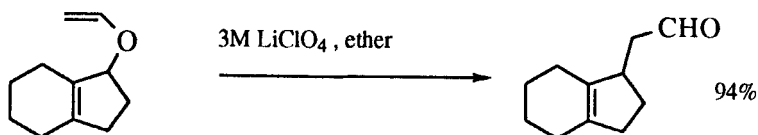
Contreras, B.; Duhamel, L.; Ple, G. *Synth. Commun.*, **1990**, *20*, 2983.



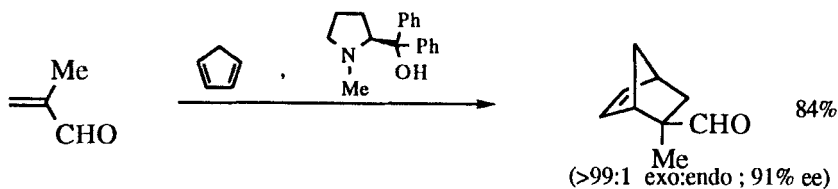
Takasu, M.; Yamamoto, H. *SynLett*, **1990**, 194.



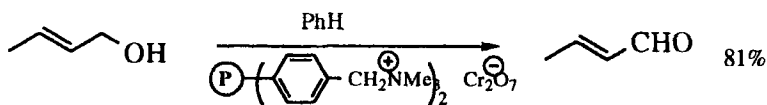
Sartor, D.; Saffrich, J.; Helmchen, G. *SynLett*, **1990**, 197.



Grieco, P.A.; Clark, J.D.; Jagoe, C.T. *J. Am. Chem. Soc.*, **1991**, *113*, 5488.

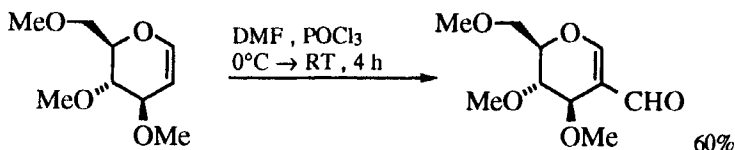


Kobayashi, S.; Murakami, M.; Harada, T.; Mukaiyama, T. *Chem. Lett.*, **1991**, 1341.

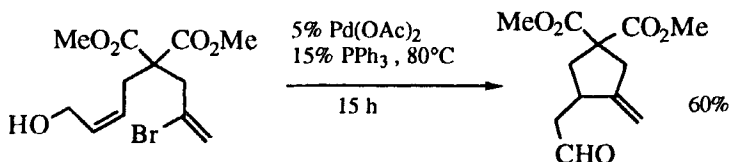


no oxidation of non-allylic alcohols

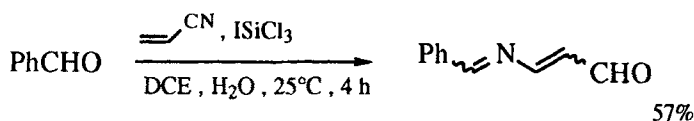
Yang, H.; Li, B. *Synth. Commun.*, **1991**, *21*, 1521.



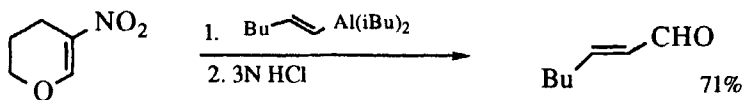
Ramesh, N.G.; Balasubramanian, K.K. *Tetrahedron Lett.*, **1991**, *32*, 3875.



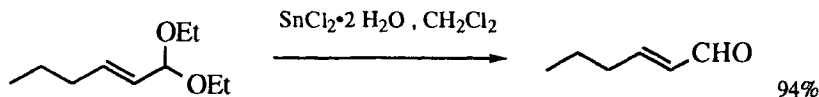
Gaudin, J-M. *Tetrahedron Lett.*, **1991**, *32*, 6113.



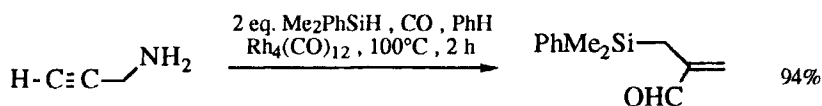
Elmorsy, S.S.; Badawy, D.S.; Nour, M.A.; Pelter, A. *Tetrahedron Lett.*, **1991**, *32*, 5421.



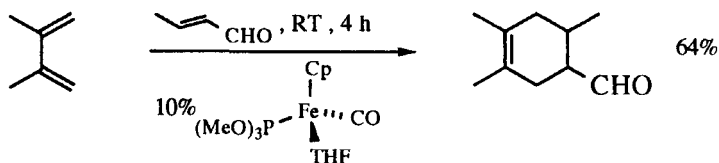
Menicagli, R.; Malanga, C.; Guagnano, V. *Tetrahedron Lett.*, **1992**, *33*, 2867.



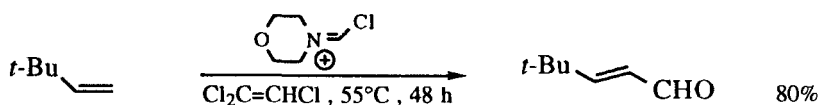
Ford, K.L.; Roskamp, E.J. *Tetrahedron Lett.*, **1992**, *33*, 1135.



Matsuda, I.; Sakakibara, J.; Inoue, H.; Nagashima, H. *Tetrahedron Lett.*, **1992**, *33*, 5799.



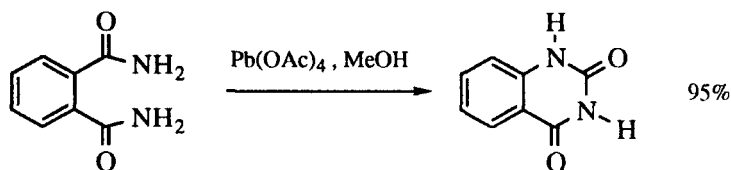
Olson, A.S.; Seitz, W.J.; Hossain, M.M. *Tetrahedron Lett.*, **1991**, 32, 5299.



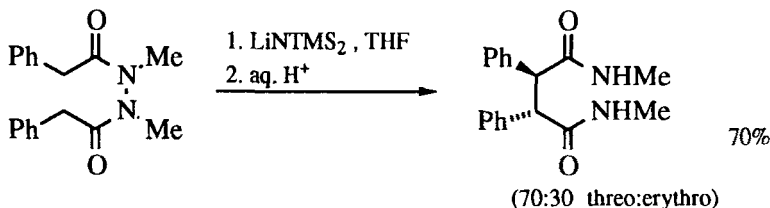
Katritzky, A.R.; Scherbakova, I.V.; Taek, R.D.; Steel, P.J. *Can. J. Chem.*, **1992**, 70, 2040.

Also via β -Hydroxy aldehydes: Section 324 (Alcohols - Aldehyde).

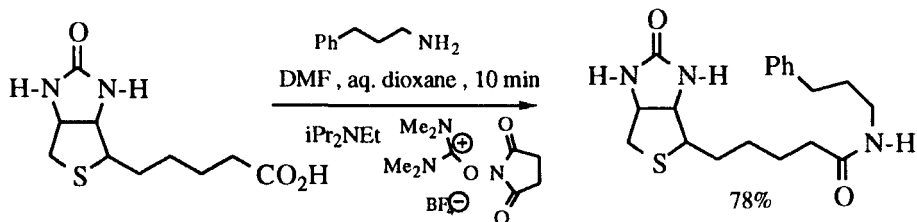
SECTION 342: AMIDE - AMIDE



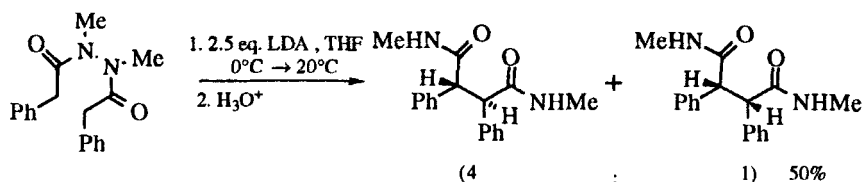
Beckwith, A.L.J.; Dyall, L.K. *Aust. J. Chem.*, **1990**, 43, 451.



Magedov, I.V.; Smushkevich, Y.I. *J. Chem. Soc., Chem. Commun.*, **1990**, 1686.



Bannworth, W.; Knorr, R. *Tetrahedron Lett.*, **1991**, 32, 1157.

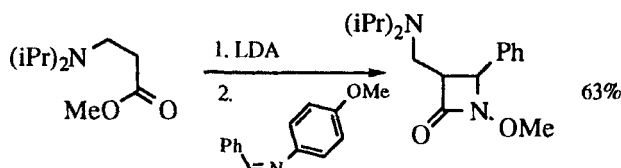


Endo, Y.; Shudo, K. *Tetrahedron Lett.*, **1991**, 32, 4517.

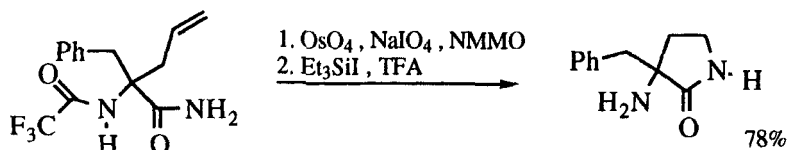
Also via Dicarboxylic Acids:
Diamines

Section 312 (Carboxylic Acid - Carboxylic Acid)
Section 350 (Amines - Amines)

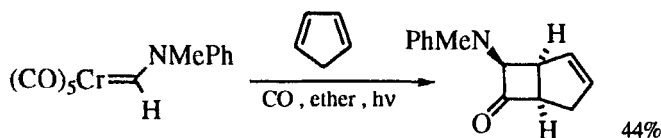
SECTION 343: AMIDE - AMINE



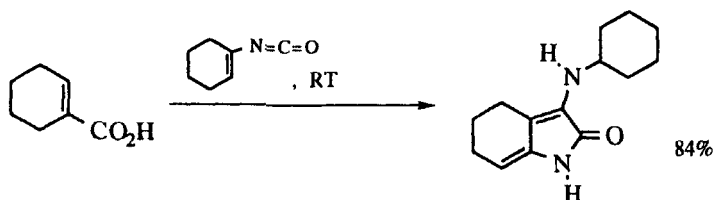
Alcaide, B.; Plumet, J.; Rodríguez-Lopez, J.; Sánchez-Cantelejo, Y.M. *Tetrahedron Lett.*, **1990**, 31, 2493.



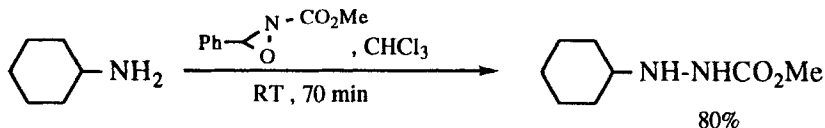
Holladay, M.W.; Nadzan, A.M. *J. Org. Chem.*, **1991**, 56, 3900.



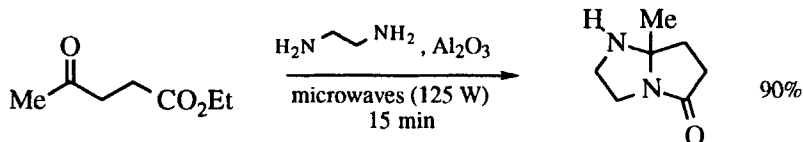
Söderberg, B.C.; Hegedus, L.S. *J. Org. Chem.*, **1991**, 56, 2209.



Rigby, J.H.; Qabar, M. *J. Am. Chem. Soc.*, **1991**, 113, 8975.



Vidal, J.; Drouin, J.; Collet, A. *J. Chem. Soc., Chem. Commun.*, **1991**, 435.



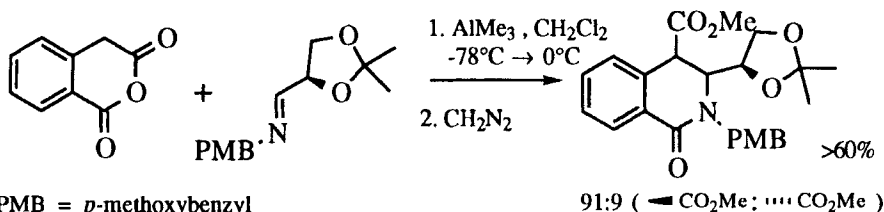
Pilard, J-F.; Klein, B.; Texier-Boullet, F.; Hamelin, J. *SynLett*, **1992**, 219.

REVIEWS:

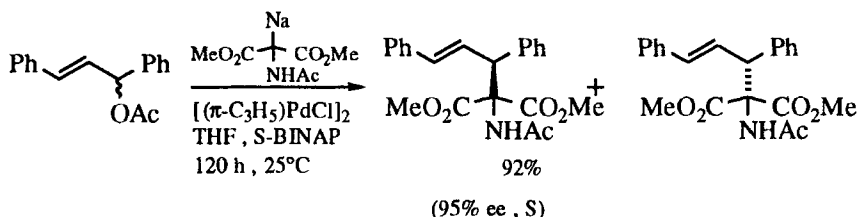
"The Chemistry of Pyrazolidinones"

Claramunt, R.M.; Elguero, J. *Org. Prep. Proceed. Int.*, **1991**, 23, 275.

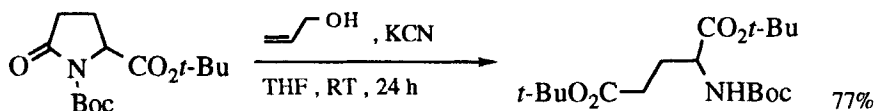
SECTION 344: AMIDE - ESTER



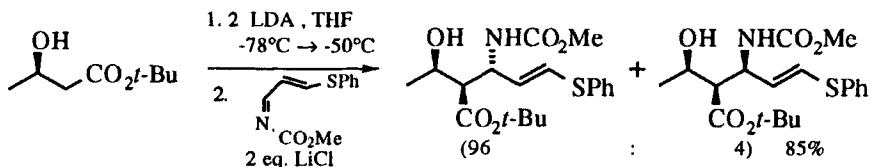
Clark, R.D.; Souchet, M. *Tetrahedron Lett.*, **1990**, 31, 193.



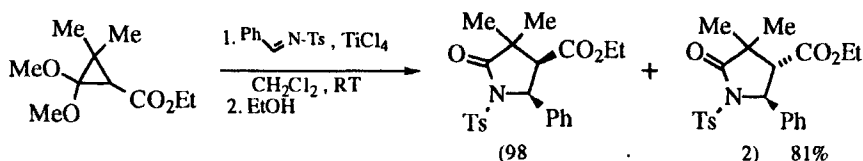
Yamaguchi, M.; Shima, T.; Yamagishi, T.; Hida, M. *Tetrahedron Lett.*, **1990**, 31, 5049.



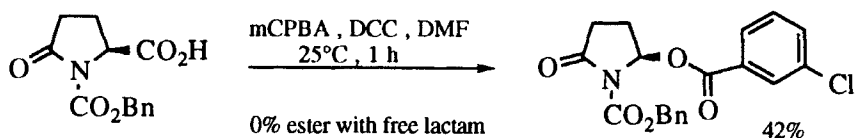
Schoenfelder, A.; Mann, A. *Synth. Commun.*, **1990**, 20, 2585.



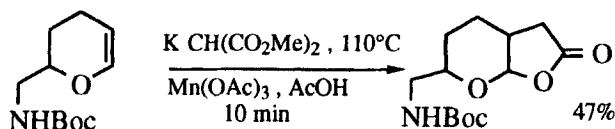
Hatanaka, M.; Park, O-S.; Ueda, I. *Tetrahedron Lett.*, **1990**, 31, 7631.



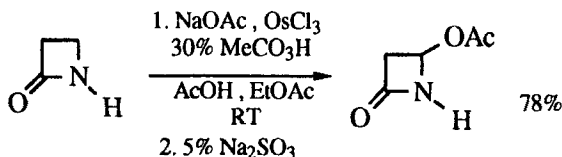
Saigo, K.; Shimada, S.; Hasegawa, M. *Chem. Lett.*, **1990**, 905.



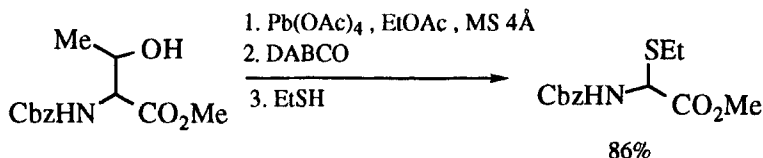
Shiozaki, M. *Synthesis*, **1990**, 691.



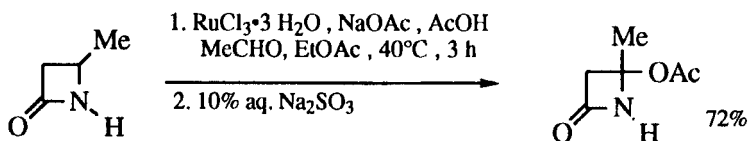
del Rosario-Chow, M.; Ungwitayatorn, J.; Currie, B.L. *Tetrahedron Lett.*, **1991**, 32, 1011.



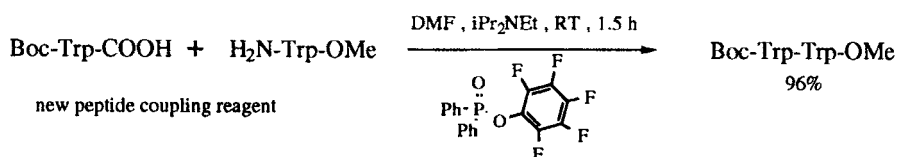
Murahashi, S.; Saito, T.; Naota, T.; Kumobayashi, H.; Akutagawa, S. *Tetrahedron Lett.*, **1991**, 32, 2145.



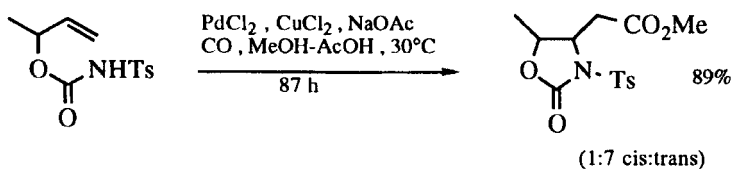
Apitz, G.; Steglich, W. *Tetrahedron Lett.*, **1991**, 32, 3163.



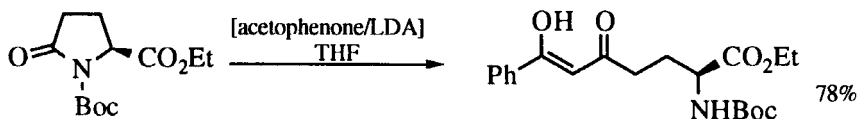
Murahashi, S.-I.; Saito, T.; Naota, T.; Kumobayashi, H.; Akutagawa, S. *Tetrahedron Lett.*, **1991**, 32, 5991.



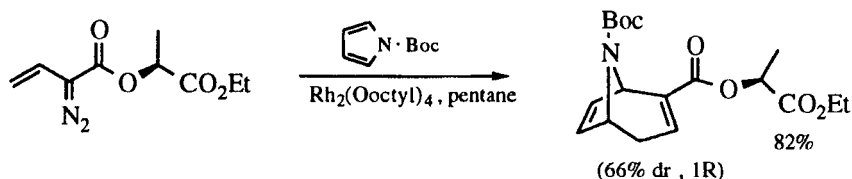
Chen, S.; Xu, J. *Tetrahedron Lett.*, **1991**, 32, 6711.



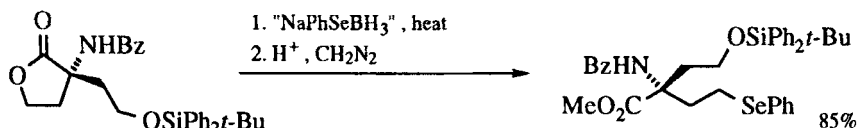
Tamaru, Y.; Tanigawa, H.; Itoh, S.; Kimura, M.; Tanaka, S.; Fugami, K.; Sekiyama, T.; Yoshida, Z. *Tetrahedron Lett.*, **1992**, 33, 631.



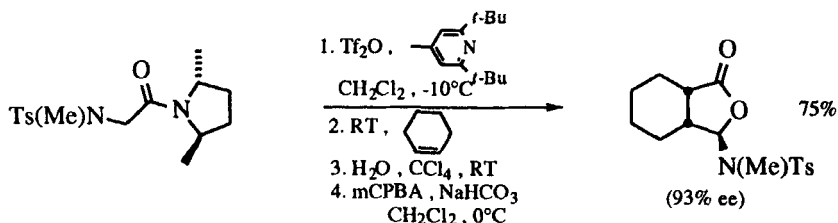
Ezquerro, J.; de Mendoza, J.; Pedregal, C.; Ramírez, C. *Tetrahedron Lett.*, **1992**, 33, 5589.



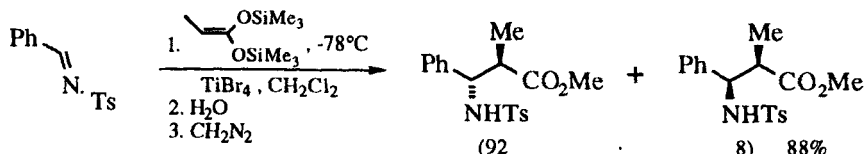
Davies, H.M.L.; Huby, N.J.S. *Tetrahedron Lett.*, **1992**, 33, 6935.



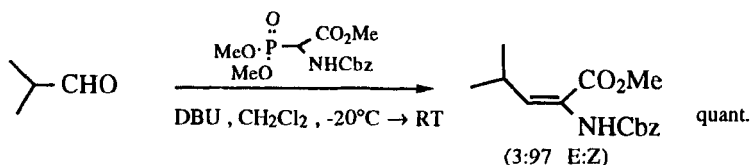
Pedersen, M.L.; Berkowitz, D.B. *Tetrahedron Lett.*, **1992**, 33, 7315.



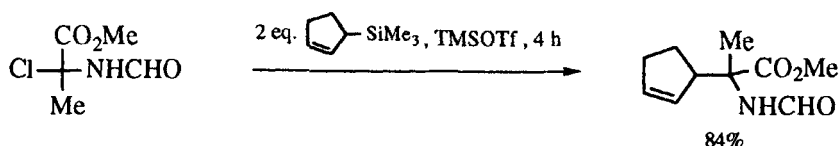
Genicot, C.; Ghosez, L. *Tetrahedron Lett.*, **1992**, 33, 7357.



Shimada, S.; Saigo, K.; Abe, M.; Sudo, A.; Hasegawa, A. *Chem. Lett.*, **1992**, 1445.
Shiozaki, M. *Synthesis*, **1990**, 691.



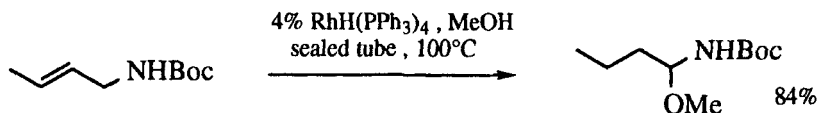
Schmidt, U.; Griesser, H.; Leitenberger, V.; Lieberknecht, A.; Mangold, R.; Meyer, R.; Riedl, B. *Synthesis*, **1992**, 487.



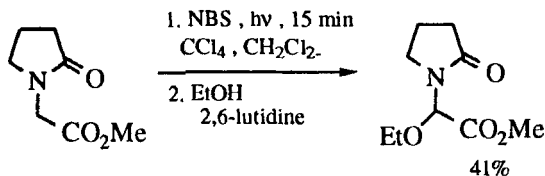
Roos, E.C.; Hiemstra, H.; Speckamp, W.N.; Kaptein, B.; Kamphuis, J.; Schoemaker, H.E. *SynLett*, **1992**, 451.

Related Methods: Section 315 (Carboxylic Acid - Amide). Section 316 (Carboxylic Acid - Amine). Section 351 (Amine - Ester)

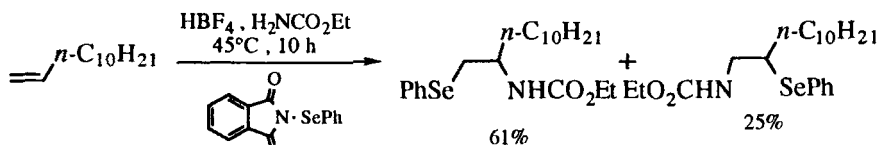
SECTION 345: AMIDE - ETHER, EPOXIDE, THIOETHER



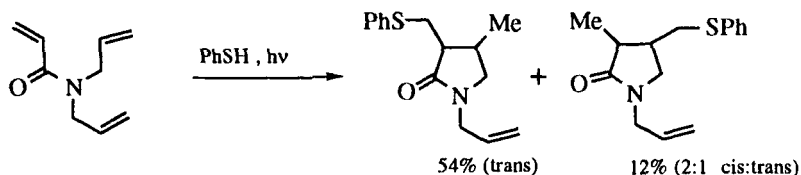
Nemoto, H.; Jimenez, H.N.; Yamamoto, Y. *J. Chem. Soc., Chem. Commun.*, **1990**, 1304.



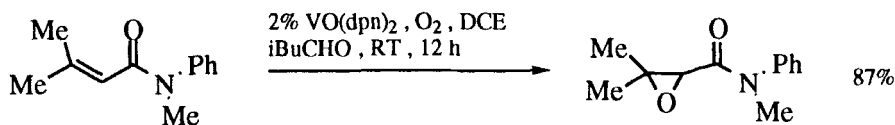
Easton, C.J.; Pitt, M.J. *Tetrahedron Lett.*, **1990**, 31, 3471.



Francisco, C.G.; Hernández, R.; León, E.I.; Salazar, J.A.; Suárez, E. *J. Chem. Soc., Perkin Trans. I*, **1990**, 2417.

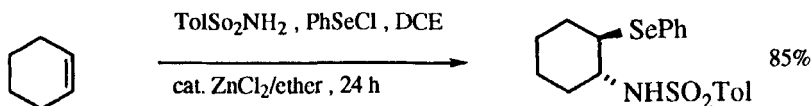


Naito, T.; Honda, Y.; Miyata, O.; Nonomiya, I. *Heterocycles*, **1991**, 32, 2319.

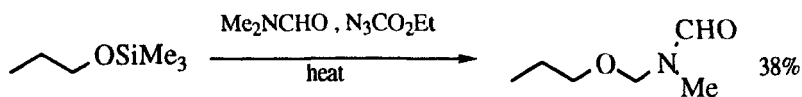


VO(dpm)₂ = bis-(dipivaloylmethanato)oxovanadium (IV)

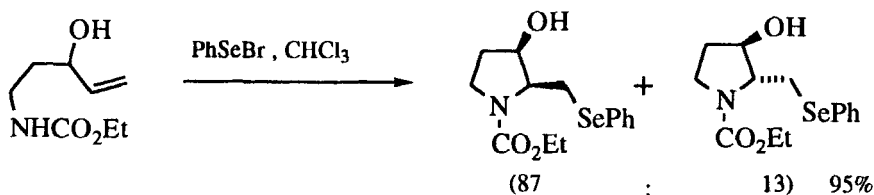
Inoki, S.; Takai, T.; Yamada, T.; Mukaiyama, T. *Chem. Lett.*, **1991**, 893.



Toshimitsu, A.; Kusumoto, T.; Oida, T.; Tanimoto, S. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 2148.

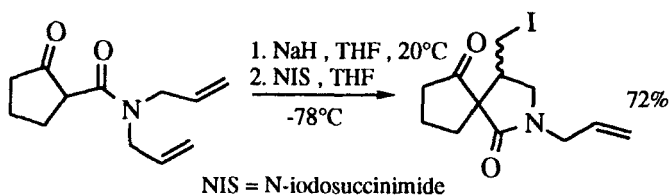


Mitani, M.; Watanabe, K.; Tachizawa, O.; Koyama, K. *Chem. Lett.*, **1992**, 813.

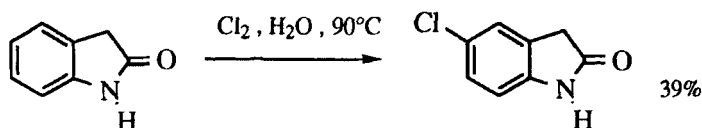


Cooper, M.A.; Ward, A.D. *Tetrahedron Lett.*, **1992**, 33, 5999.

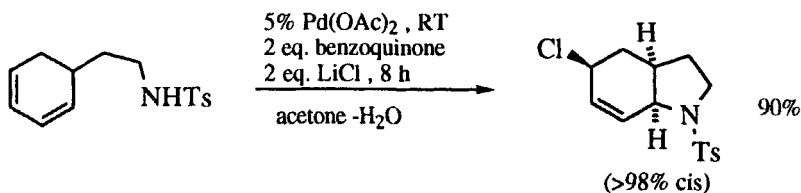
SECTION 346: AMIDE - HALIDE, SULFONATE



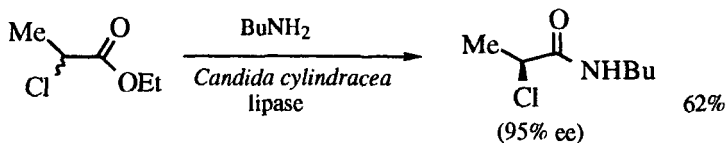
Cossy, J.; Thellend, A. *Tetrahedron Lett.*, **1990**, 31, 1427.



Pranc, P. *Org. Prep. Proceed. Int.*, **1990**, 22, 104.

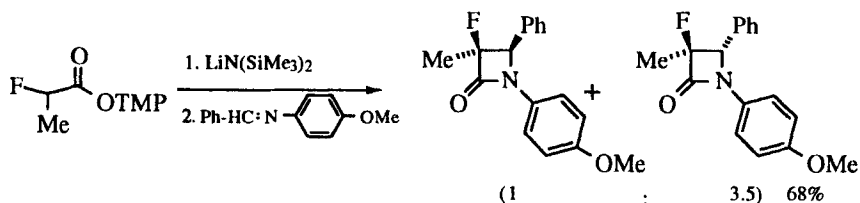


Bäckvall, J.-E.; Andersson, P.G. *J. Am. Chem. Soc.*, **1990**, 112, 3683.

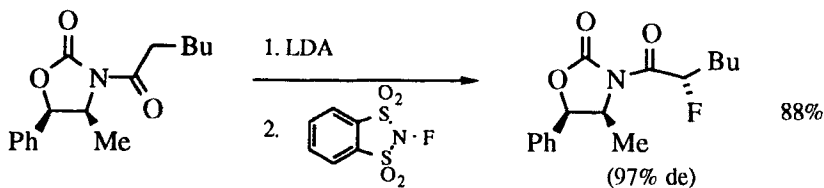


Gotor, V.; Brieva, R.; González, C.; Rebollo, F. *Tetrahedron*, **1991**, 47, 9207.

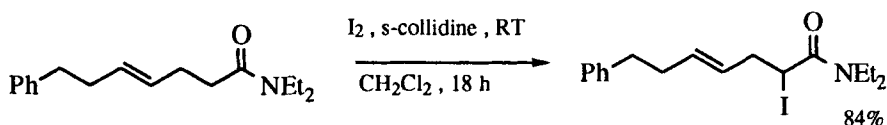
Brieva, R.; Rebollo, F.; Gotor, V. *J. Chem. Soc., Chem. Commun.*, **1990**, 1386 [with subtilisin].



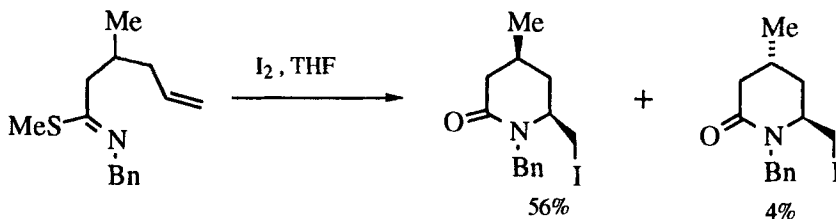
Araki, K.; Wichtowski, J.A.; Welch, J.T. *Tetrahedron Lett.*, **1991**, 32, 5461.



Davis, E.A.; Han, W. *Tetrahedron Lett.*, **1992**, 33, 1153.

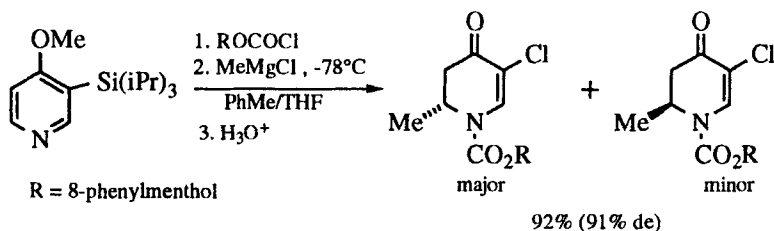


Kitagawa, O.; Hanano, T.; Hirata, T.; Inoue, T.; Taguchi, T. *Tetrahedron Lett.*, **1992**, 33, 1299.

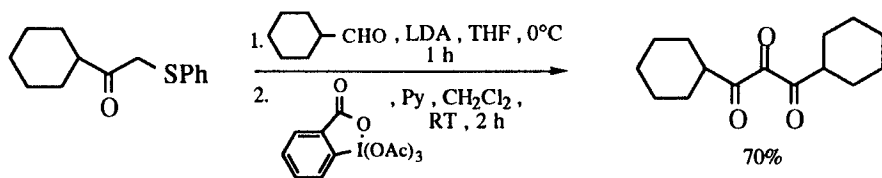


Takahata, H.; Wang, E.-C.; Ikuro, K.; Yamazaki, T.; Momose, T. *Heterocycles*, **1992**, 34, 435.

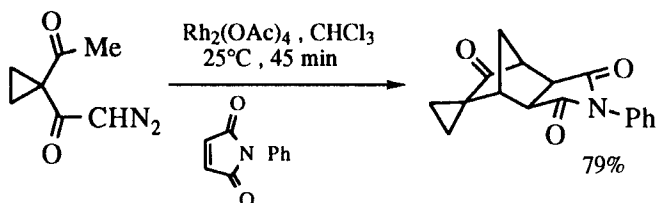
SECTION 347: AMIDE - KETONE



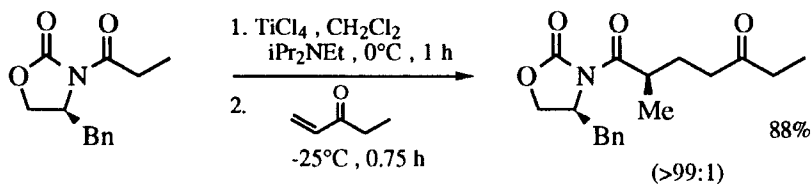
Comins, D.L.; Guehring, R.R.; Joseph, S.P.; O'Connor, S. *J. Org. Chem.*, **1990**, 55, 2574.



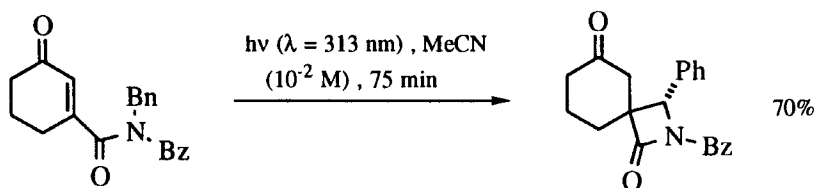
Linde, R.G. II; Deronicic, L.O.; Danishefsky, S.J. *J. Org. Chem.*, **1991**, *56*, 2534.



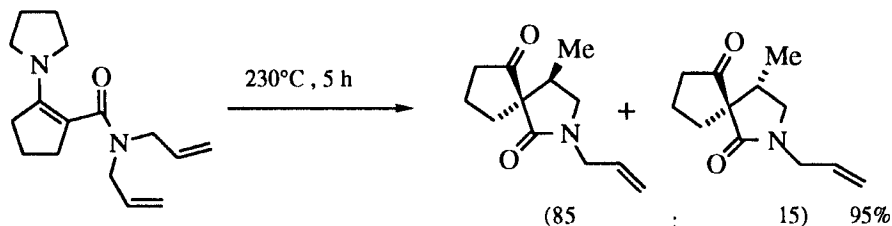
Padwa, A.; Chinn, R.L.; Hornbuckle, S.F.; Zhang, Z.J. *J. Org. Chem.*, **1991**, *56*, 3271.



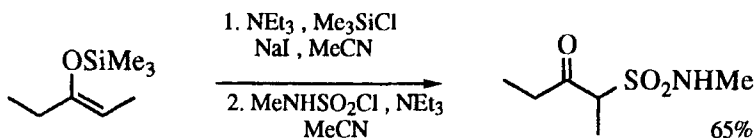
Evans, D.A.; Bilodeau, M.T.; Somers, T.C.; Clardy, J.; Cherry, D.; Kato, Y. *J. Org. Chem.*, **1991**, *56*, 5750.



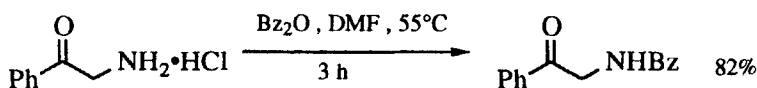
Le Blanc, S.; Pete, J-P.; Piva, O. *Tetrahedron Lett.*, **1992**, *33*, 1993.



Cossy, J.; Bouzide, A. *Tetrahedron Lett.*, **1992**, *33*, 2505.

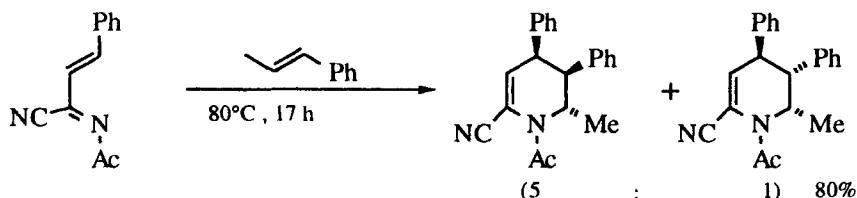


Vega, J.A.; Molina, A.; Alajarin, R.; Vaquero, J.J.; García Navío, J.; Alvarez-Builla, J. *Tetrahedron Lett.*, **1992**, *33*, 3677.

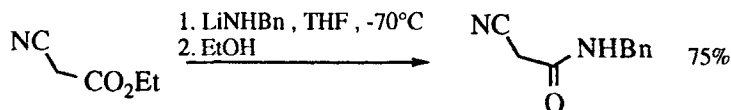


Shipton, M.R. *SynLett*, **1992**, 491.

SECTION 348: AMIDE - NITRILE

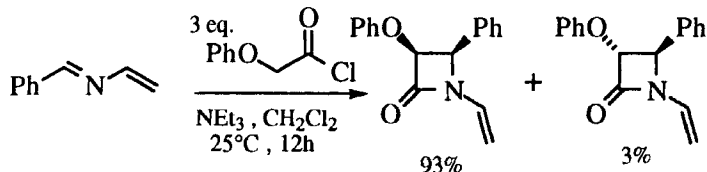


Teng, M.; Fowler, F.W. *J. Org. Chem.*, **1990**, *55*, 5646.

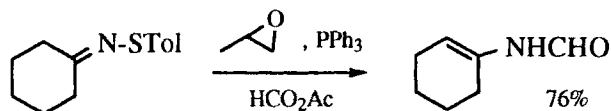


Bhawal, B.M.; Khanapure, S.P.; Biehl, E.R. *Synth. Commun.*, **1990**, *20*, 3235.

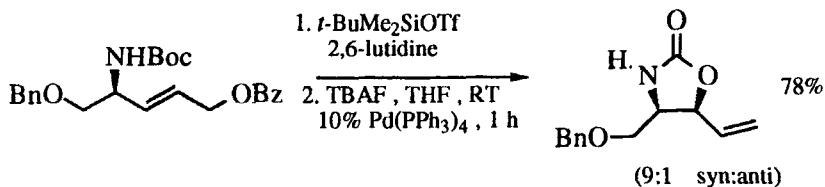
SECTION 349: AMIDE - ALKENE



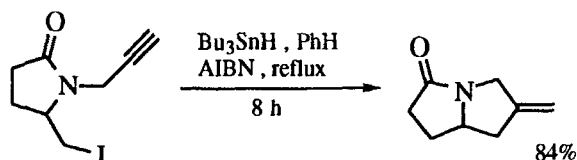
Georg, G.L.; He, P.; Kant, J.; Mudd, J. *Tetrahedron Lett.*, **1990**, *31*, 451.



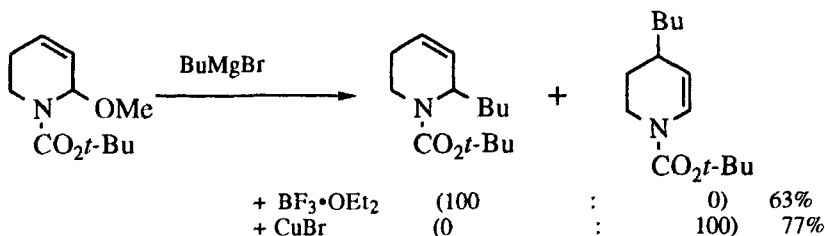
Baldwin, J.E.; Aldous, D.J.; O'Neil, I.A. *Tetrahedron Lett.*, **1990**, *31*, 2051.



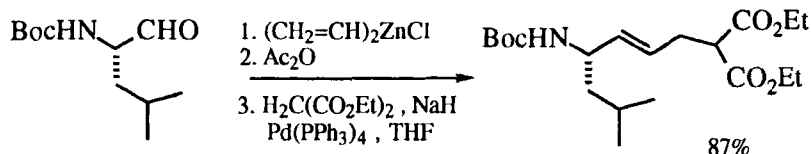
Spears, G.W.; Nakanishi, K.; Ohfuné, Y. *Tetrahedron Lett.*, **1990**, 31, 5339.



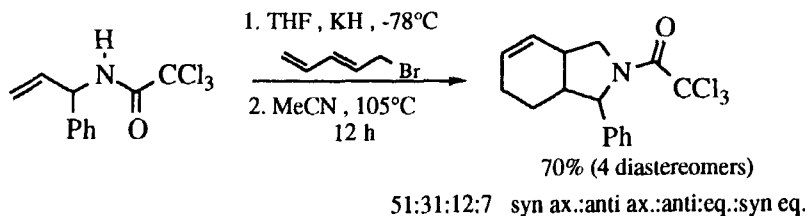
Knapp, S.; Gibson, F.S.; Choe, Y.H. *Tetrahedron Lett.*, **1990**, 31, 5397.



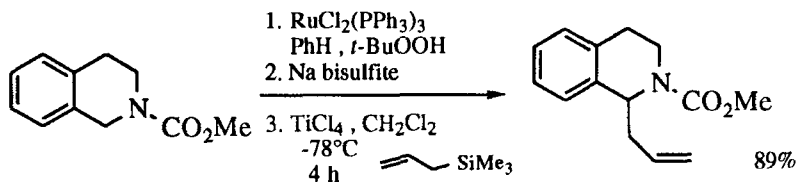
Shono, T.; Terauchi, J.; Ohki, Y.; Matsumura, Y. *Tetrahedron Lett.*, **1990**, 31, 6385.



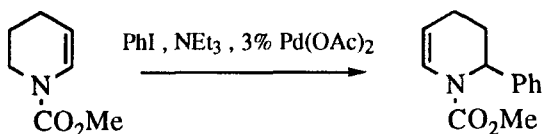
Thompson, W.J.; Tucker, T.J.; Schwering, J.E.; Barnes, J.L. *Tetrahedron Lett.*, **1990**, 31, 6819.



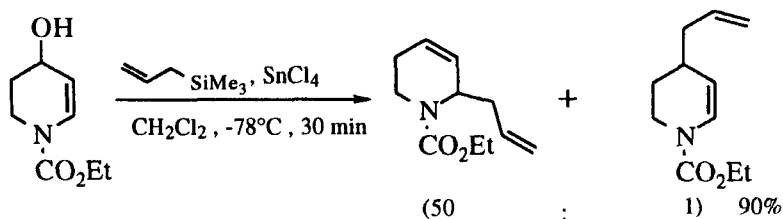
Guy, A.; Graillot, Y. *Tetrahedron Lett.*, **1990**, 31, 7315.



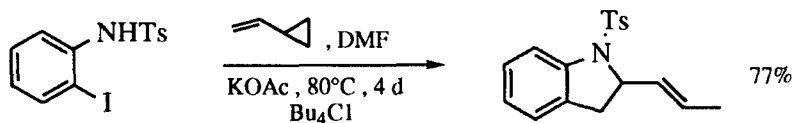
Naota, T.; Nakato, T.; Murahashi, S. *Tetrahedron Lett.*, **1990**, 31, 7475.



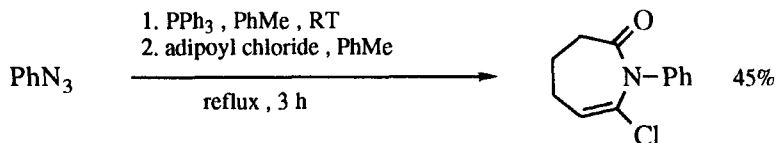
Nilsson, K.; Hallberg, A. *J. Org. Chem.*, **1990**, 55, 2464.



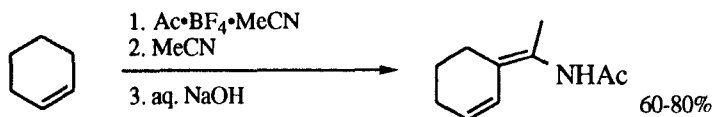
Kozikowski, A.P.; Park, P. *J. Org. Chem.*, **1990**, 55, 4668.



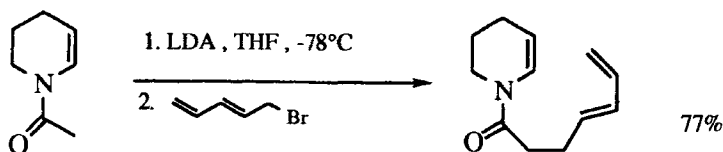
Larock, R.C.; Yum, E.K. *SynLett*, **1990**, 529.



Aubert, T.; Farnier, M.; Guilard, R. *Synthesis*, **1990**, 149.

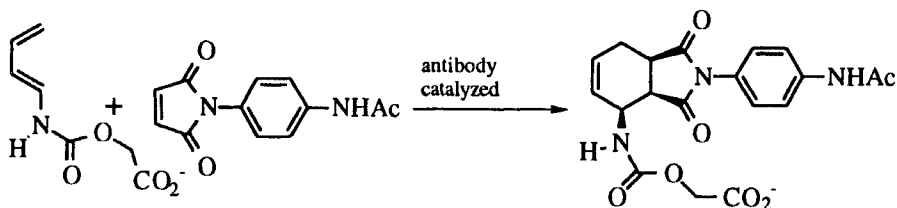


Gridnev, I.D.; Balenkova, E.S. *Zhur. Org. Khim.*, **1990**, 26, 50 (Engl., p. 40).

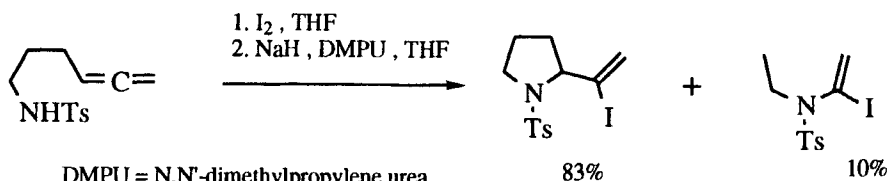


Diels-Alder reported previously

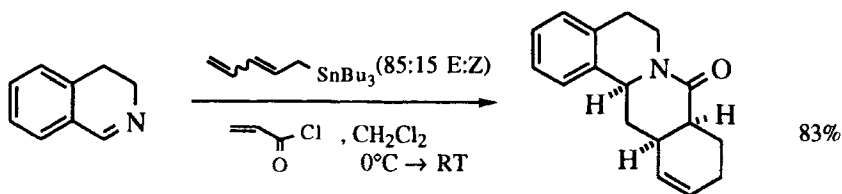
Chockalingam, K.; Harirchian, B.; Bauld, N.L. *Synth. Commun.*, **1990**, 20, 189.



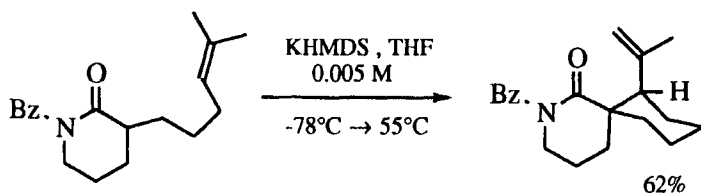
Braisted, A.C.; Schultz, P.G. *J. Am. Chem. Soc.*, **1990**, 112, 7430.



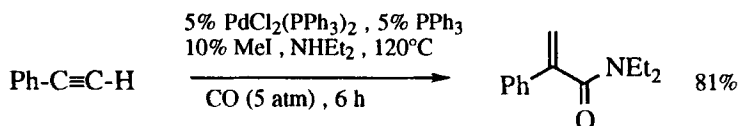
Shaw, R.; Anderson, M.; Gallagher, T. *SynLett*, **1990**, 584.



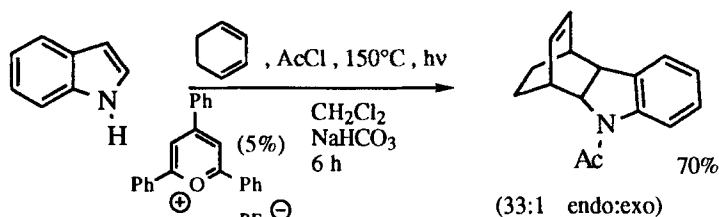
Yamaguchi, R.; Hamasaki, T.; Utimoto, K.; Kozima, S.; Takaya, H. *Chem. Lett.*, **1990**, 2161.



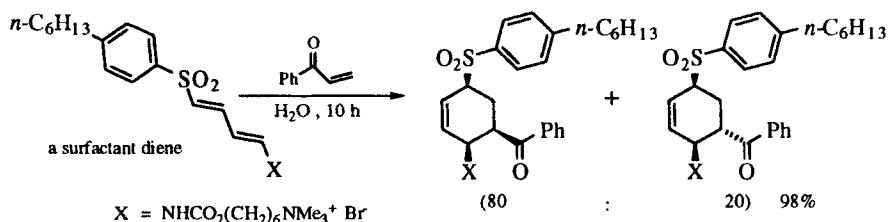
Kim, D.; Kim, H.S.; Yoo, J.Y. *Tetrahedron Lett.*, **1991**, 32, 1577.



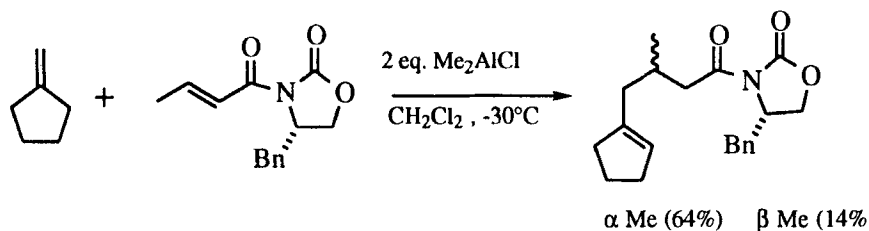
Torii, S.; Okumoto, H.; Sadakane, M.; Xu, L.H. *Chem. Lett.*, **1991**, 1673.



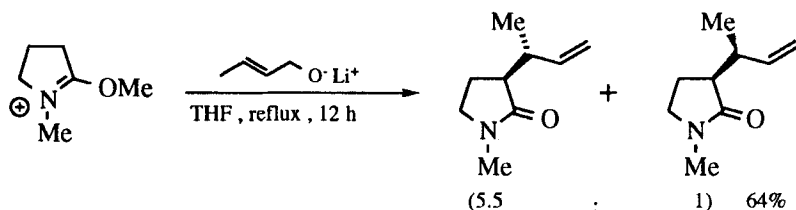
Giesler, A.; Steckhan, E.; Wiest, O.; Knoch, F. *J. Org. Chem.*, **1991**, 56, 1405.



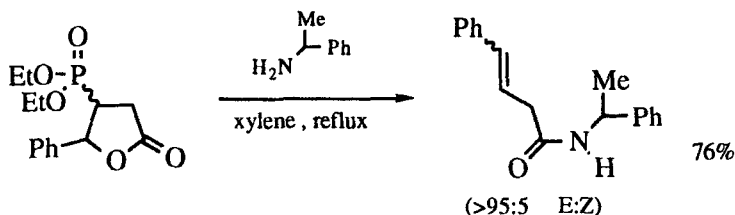
Jaeger, D.A.; Shinozaki, H.; Goodson, P.A. *J. Org. Chem.*, **1991**, 56, 2482.



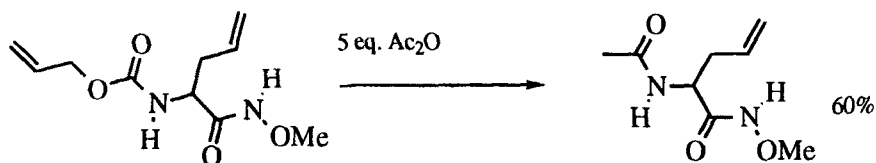
Snider, B.B.; Zhang, Q. *J. Org. Chem.*, **1991**, 56, 4908.



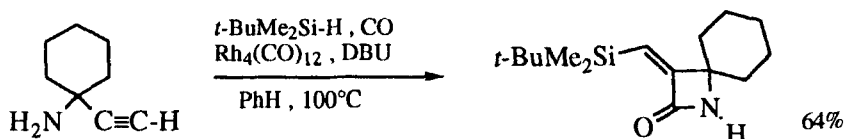
Coates, B.; Montgomery, D.; Stevenson, P.J. *Tetrahedron Lett.*, **1991**, 32, 4199.



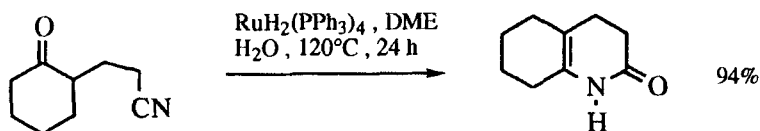
Janecki, T.; Bodalski, R. *Tetrahedron Lett.*, **1991**, 32, 6231.



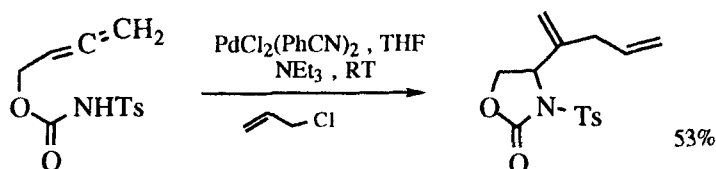
Roos, E.C.; Bernabé, P.; Hiemstra, H.; Speckamp, W.N. *Tetrahedron Lett.*, **1991**, 32, 6633.



Matsuda, I.; Sakakibara, J.; Nagashima, H. *Tetrahedron Lett.*, **1991**, 32, 7431.



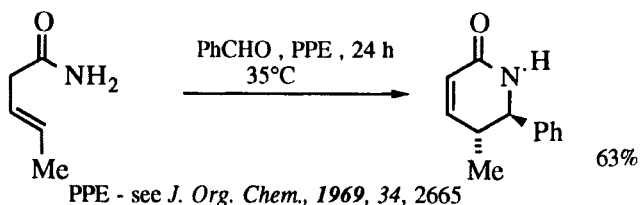
Murahashi, S.; Sasao, S.; Saito, E.; Naota, T. *J. Org. Chem.*, **1992**, 57, 2521.



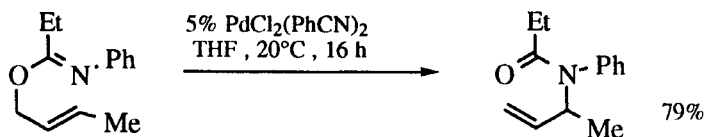
Kimura, M.; Fugami, K.; Tanaka, S.; Tamaru, Y. *J. Org. Chem.*, **1992**, 57, 6377.

Kimura, M.; Kure, S.; Yoshida, Z.; Tanaka, S.; Fugami, K.; Tamaru, Y. *Tetrahedron Lett.*, **1990**, 31, 4887 [with CuCl , NEt_3].

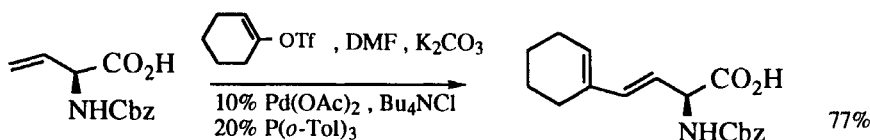
Kimura, M.; Fugami, K.; Tanaka, S.; Tamaru, Y. *Tetrahedron Lett.*, **1991**, 32, 6359 [with AgNCO].



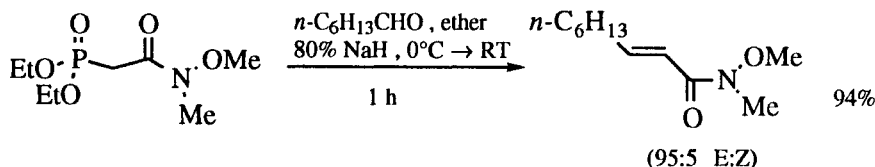
Marson, C.M.; Grabowska, U.; Walsgrove, T. *J. Org. Chem.*, **1992**, *57*, 5045.



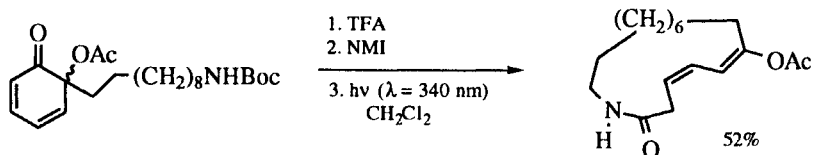
Metz, P.; Mues, C.; Schoop, A. *Tetrahedron*, **1992**, *48*, 1071.



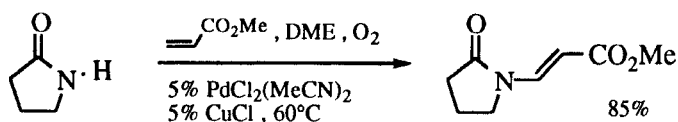
Criso, G.T.; Glink, P.T. *Tetrahedron*, **1992**, *48*, 3541.



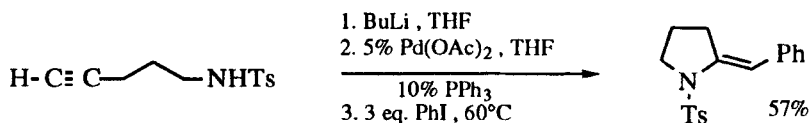
Netz, D.F.; Seidel, J.L. *Tetrahedron Lett.*, **1992**, *33*, 1957.



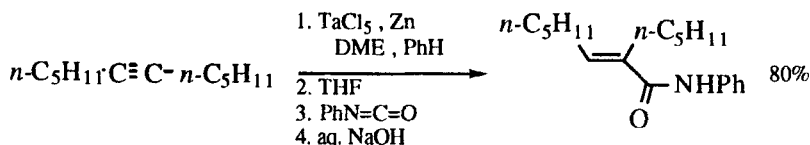
Quinkert, G.; Nestler, H.P.; Schumacher, B.; del Grosso, M.; Dürner, G.; Bats, J.W. *Tetrahedron Lett.*, **1992**, *33*, 1977.



Hosokawa, T.; Takano, M.; Kuroki, Y.; Murahashi, S.-I. *Tetrahedron Lett.*, **1992**, *33*, 6643.

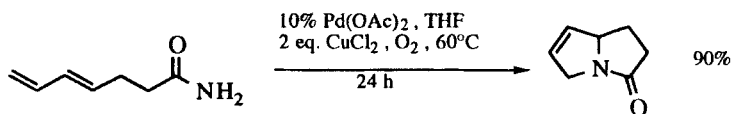


Luo, F.-T.; Wang, R.-T. *Tetrahedron Lett.*, **1992**, 33, 6835.

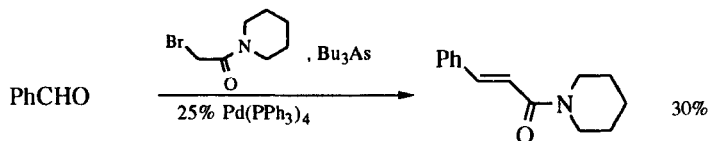


Kataoka, Y.; Oguchi, Y.; Yoshizumi, K.; Miwatashi, S.; Takai, K.; Utimoto, K. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 1543.

Takai, K.; Kataoka, Y.; Yoshizumi, K.; Oguchi, Y.; Utimoto, K. *Chem. Lett.*, **1991**, 1479.

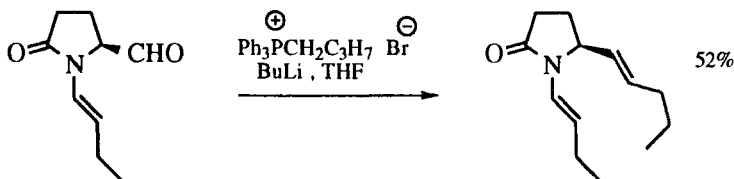


Andersson, P.G.; Bäckvall, J.-E. *J. Am. Chem. Soc.*, **1992**, 114, 8696.



Shen, Y.; Zhou, Y. *Synth. Commun.*, **1992**, 22, 657.

Zheng, J.; Wang, Z.; Shen, Y. *Synth. Commun.*, **1992**, 22, 1611 [with Zn, Bu_3P , 70%].



Smith, M.B.; Kwon, T.W. *Synth. Commun.*, **1992**, 22, 2865.

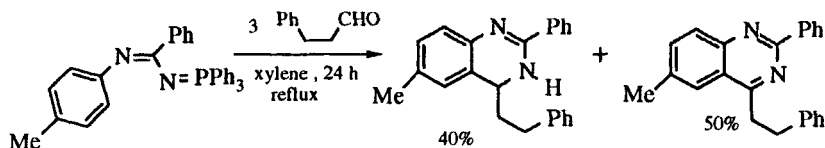
REVIEWS:

"N-Dienyl Amides and Lactams: Preparation and Diels-Alder Reactivity"

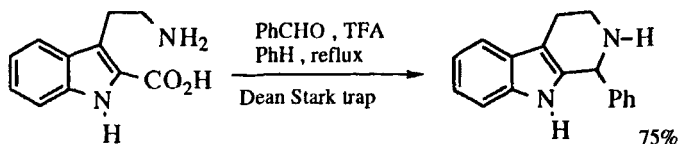
Smith, M.B. *Org. Prep. Proceed. Int.*, **1990**, 22, 315.

Also via Alkenyl Acids: Section 322 (Carboxylic Acid -Alkene)

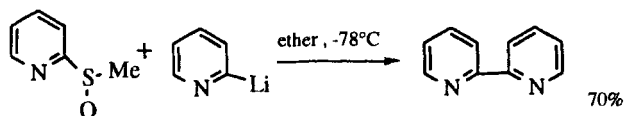
SECTION 350: AMINE - AMINE



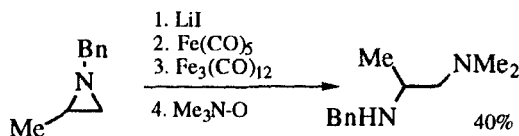
Rossi, E.; Celentano, G.; Stradi, R.; Strada, A. *Tetrahedron Lett.*, **1990**, 31, 903.



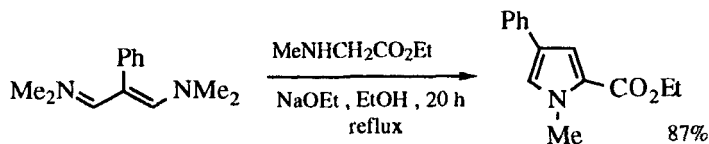
Narayanan, K.; Cook, J.M. *Tetrahedron Lett.*, **1990**, 31, 3389.



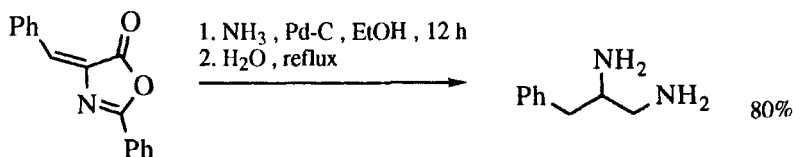
Uenishi, J.; Tanaka, T.; Wakabayashi, S.; Oae, S. *Tetrahedron Lett.*, **1990**, 31, 4625.



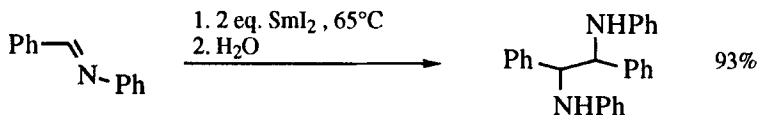
Chamchaang, W.; Pinbas, A.R. *J. Org. Chem.*, **1990**, 55, 2531.



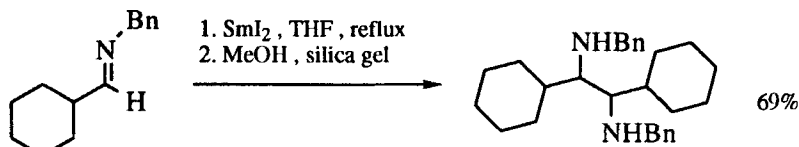
Gupton, J.T.; Krolkowski, D.A.; Yu, R.H.; Riesinger, S.W.; Sikorski, J.A. *J. Org. Chem.*, **1990**, 55, 4735.



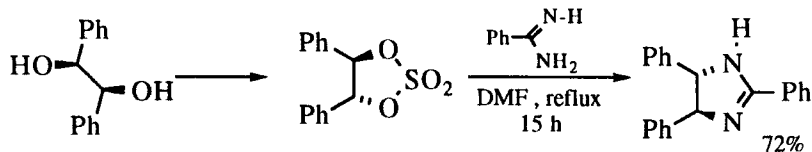
Kidwai, M. *J. Indian Chem. Soc.*, **1990**, 67, 470.



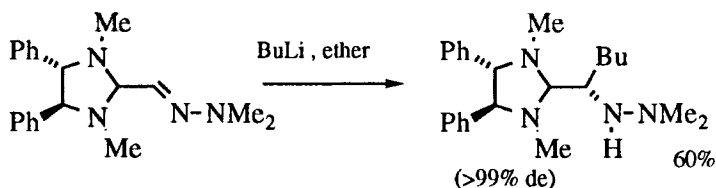
Imamoto, T.; Nishimura, S. *Chem. Lett.*, **1990**, 1141.



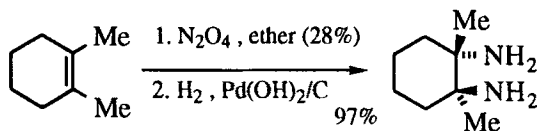
Enholm, E.J.; Forbes, D.C.; Holub, D.P. *Synth. Commun.*, **1990**, 20, 981.



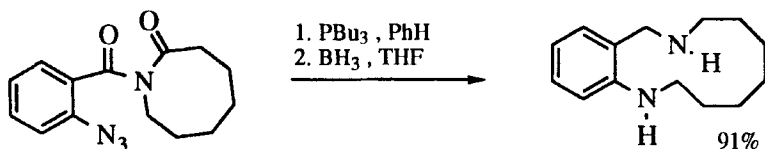
Oi, R.; Sharpless, K.B. *Tetrahedron Lett.*, **1991**, 32, 999.



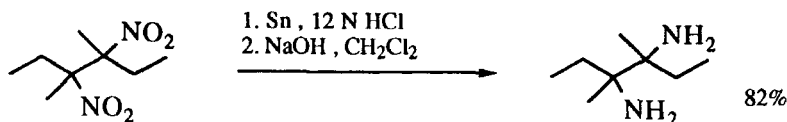
Alexakis, A.; Lensen, N.; Mangeney, P. *Tetrahedron Lett.*, **1991**, 32, 1171.



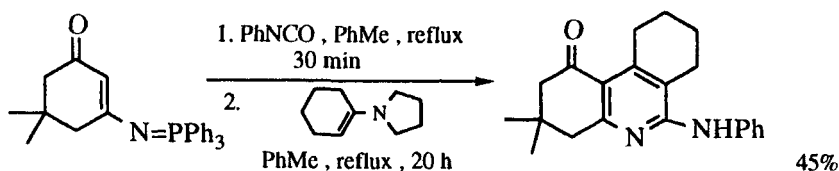
Zhang, W.; Jacobsen, E.N. *Tetrahedron Lett.*, **1991**, 32, 1711.



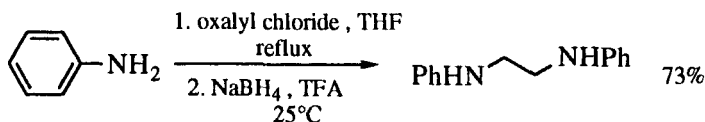
Takeuchi, H.; Matsushita, Y.; Eguchi, S. *J. Org. Chem.*, **1991**, 56, 1535.



Asaro, M.F.; Nakayama, I.; Wilson, R.B. Jr. *J. Org. Chem.*, **1992**, 57, 778.



Noguchi, M.; Onimura, K.; Isomura, Y.; Kajigaeshi, S. *J. Het. Chem.*, **1991**, 28, 885.



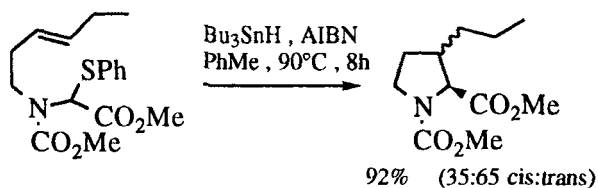
Nutaitis, C.F. *Synth. Commun.*, **1992**, 22, 1081.

REVIEWS:

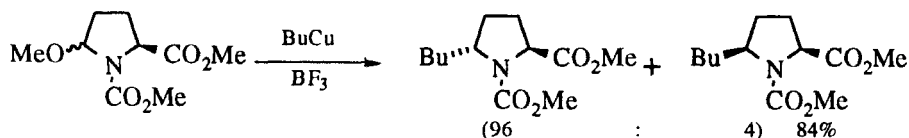
"The Chemistry of 1,3-Dioximes"

Kotali, A.; Papageorgiou, V.P. *Org. Prep. Proceed. Int.*, **1991**, 23, 595.

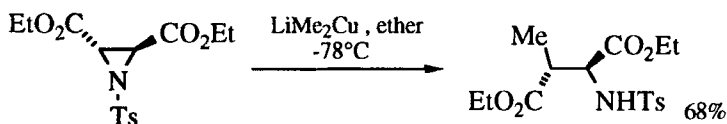
SECTION 351: AMINE - ESTER



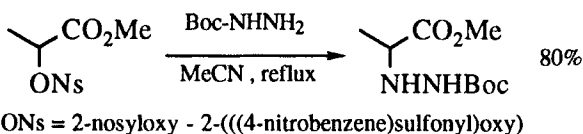
Esch, P.M.; Hiemstra, H.; Speckamp, W.N. *Tetrahedron Lett.*, **1990**, 31, 759.



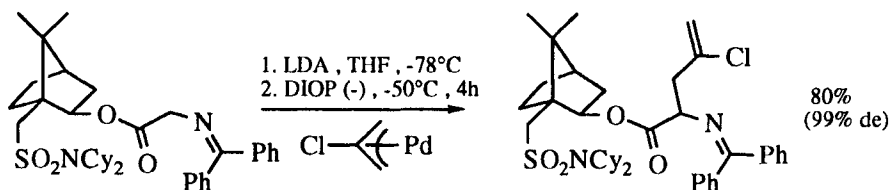
Skrinjar, M.; Wistrand, L-G. *Tetrahedron Lett.*, **1990**, 31, 1775.



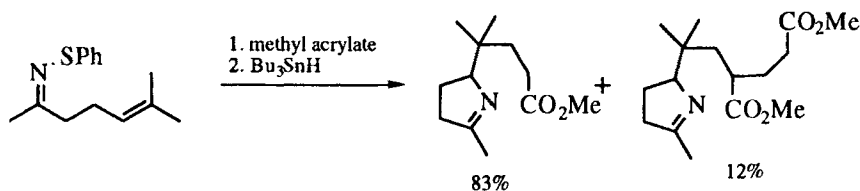
Tanner, D.; Birgersson, C.; Dhaliwal, H.K. *Tetrahedron Lett.*, **1990**, 31, 1903.



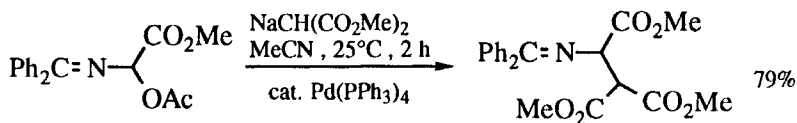
Hoffman, R.V.; Kim, H-O. *Tetrahedron Lett.*, **1990**, 31, 2953.



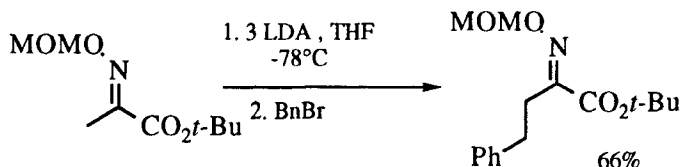
Genet, J.P.; Kopola, N.; Juge, S.; Ruiz-Montes, J.; Antunes, O.A.C.; Tanier, S. *Tetrahedron Lett.*, **1990**, 31, 3133.



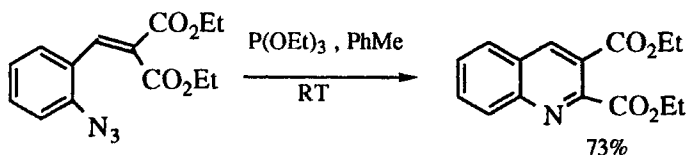
Boivin, J.; Fouquet, E.; Zard, S.Z. *Tetrahedron Lett.*, **1990**, 31, 3545.



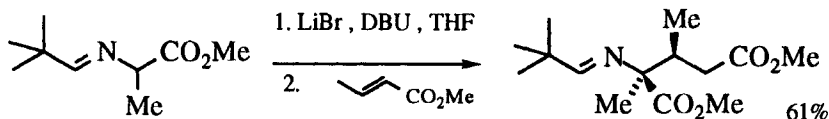
O'Donnell, M.J.; Yang, X.; Li, M. *Tetrahedron Lett.*, **1990**, 31, 5135.



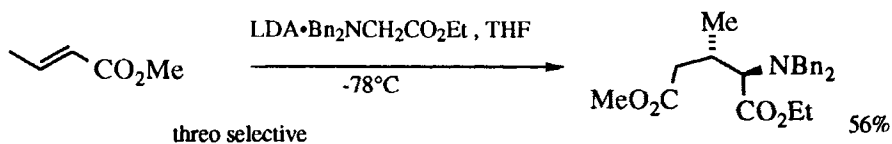
Williams, D.R.; Benbow, J.W. *Tetrahedron Lett.*, **1990**, 31, 5881.



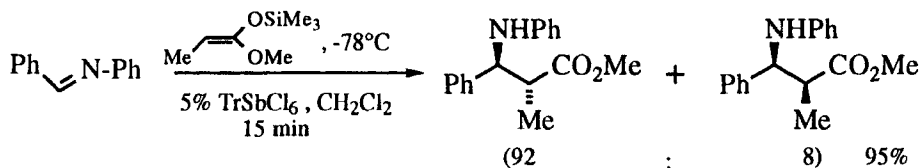
Luheshi, A-B.N.; Salem, S.M.; Smalley, R.K., *Tetrahedron Lett.*, **1990**, 31, 6561.



Kanemasa, S.; Uchida, O.; Wada, E. *J. Org. Chem.*, **1990**, 55, 4411.



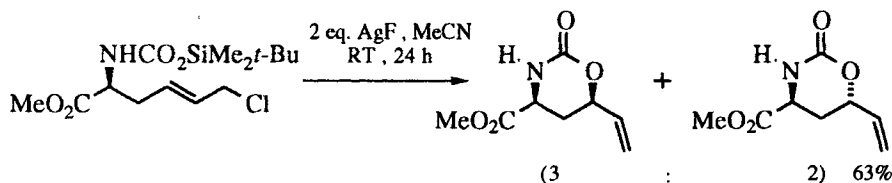
Yamaguchi, M.; Torisu, K.; Minami, T. *Chem. Lett.*, **1990**, 377.



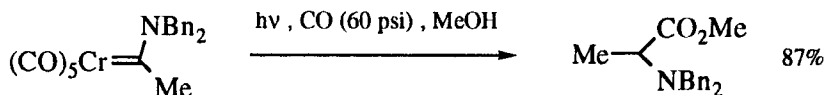
other Lewis acids used, with varying selectivity

Mukaiyama, T.; Akamatsu, H.; Han, J.S. *Chem. Lett.*, **1990**, 889.

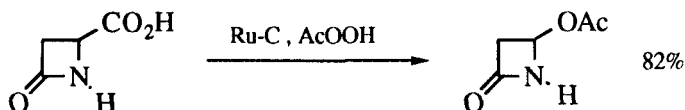
Kato, K.; Mukaiyama, T. *Chem. Lett.*, **1990**, 1917.



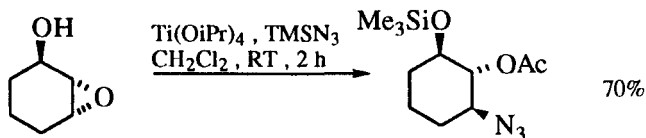
Sakaitani, M.; Ohfunu, Y., *J. Am. Chem. Soc.*, **1990**, 112, 1150.



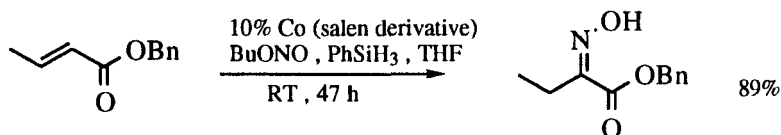
Hegedus, L.S.; Schwindt, M.A.; DeLombaert, S.; Imwinkelried, R. *J. Am. Chem. Soc.*, **1990**, 112, 2264.



Murahashi, S.; Naota, T.; Kuwabara, T.; Saito, T.; Kumobayashi, H.; Akutagawa, S. *J. Am. Chem. Soc.*, **1990**, *112*, 7820.

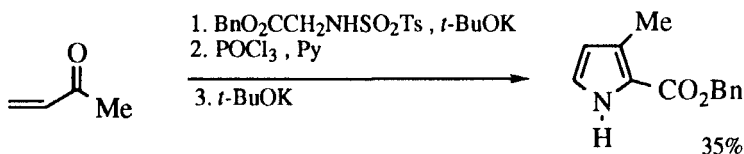


Sutowardoyo, K.I.; Sinou, D. *Bull. Soc. Chim. Fr.*, **1991**, *128*, 387.

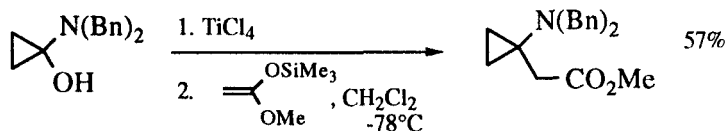


Kato, K.; Mukaiyama, T. *Bull. Chem. Soc. Jpn.*, **1991**, *64*, 2948.

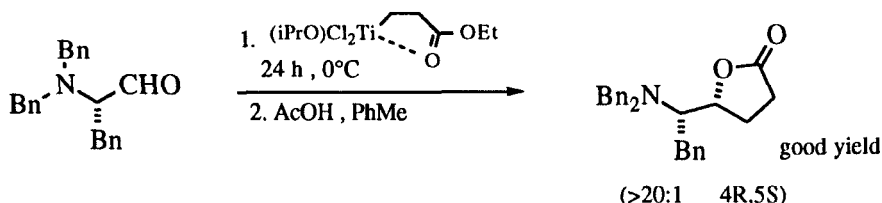
Kato, K.; Mukaiyama, T. *Chem. Lett.*, **1990**, 1917.



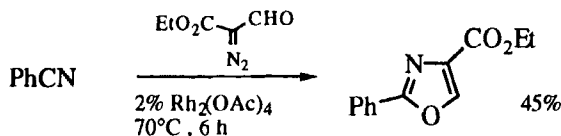
Lash, T.D.; Hoehner, M.C. *J. Het. Chem.*, **1991**, *28*, 1671.



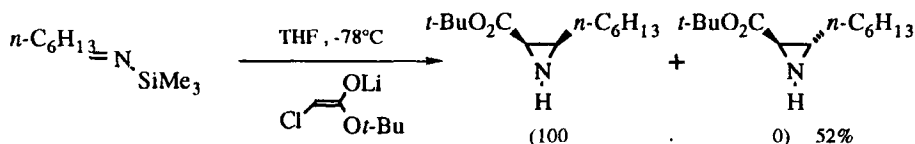
Mertin, A.; Thiemann, T.; Hanss, I.; de Meijere, A. *SynLett*, **1991**, 87.



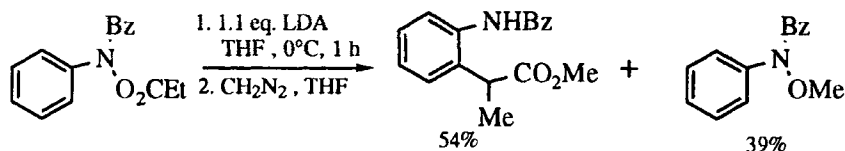
De Camp, A.E.; Kawaguchi, A.T.; Volante, R.P.; Shinkai, I. *Tetrahedron Lett.*, **1991**, *32*, 1867.



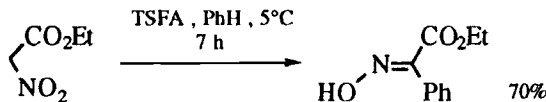
Connell, R.D.; Tebbe, M.; Helquist, P.; Åkermark, B. *Tetrahedron Lett.*, **1991**, 32, 17.



Cainelli, G.; Panunzio, M.; Giacomini, D. *Tetrahedron Lett.*, **1991**, 32, 121.

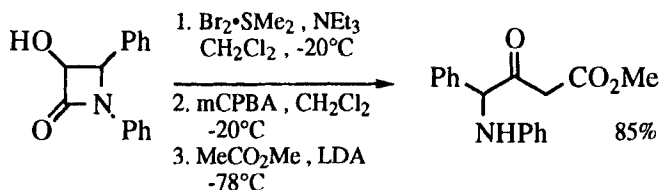


Endo, Y.; Hizata, S.; Shudo, K. *Tetrahedron Lett.*, **1991**, 32, 2803.

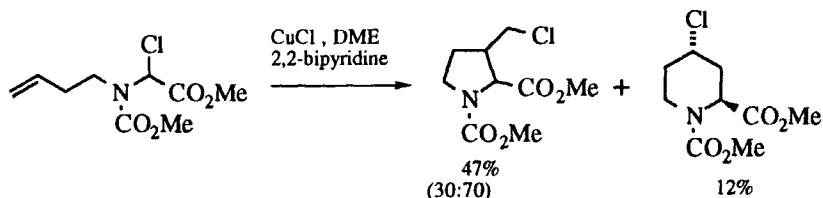


TSFA = triflic acid

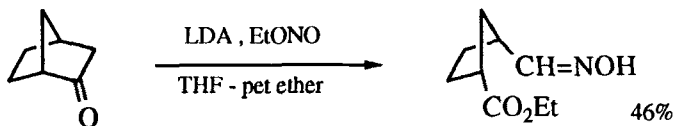
Coustard, J.-M.; Jacquesy, J.-C.; Violeau, B. *Tetrahedron Lett.*, **1991**, 32, 3075.



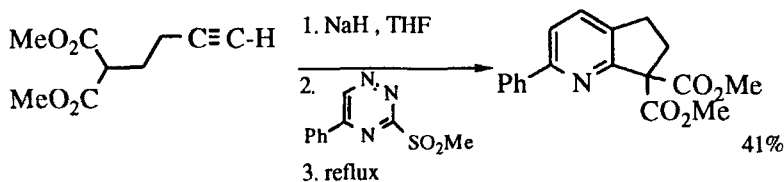
Palomo, C.; Cossío, F.P.; Rubiales, G.; Apáricio, D. *Tetrahedron Lett.*, **1991**, 32, 3115.



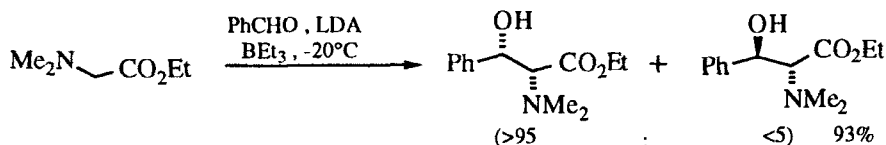
Udding, J.H.; Hiemstra, H.; van Zanden, M.N.A.; Speckamp, W.N. *Tetrahedron Lett.*, **1991**, 32, 3123.



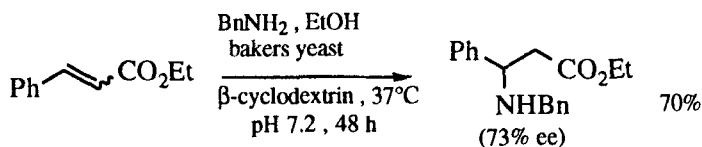
Moorhoff, C.M.; Paquette, L.A. *J. Org. Chem.*, **1991**, *56*, 703.



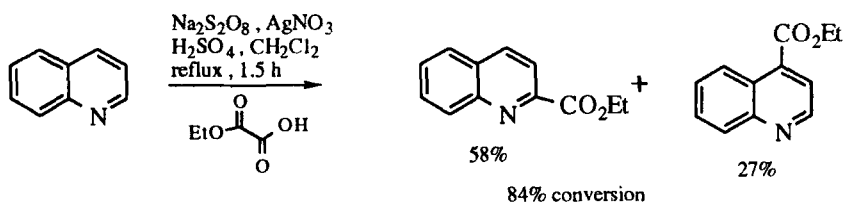
Taylor, E.C.; Macor, J.E.; French, L.G. *J. Org. Chem.*, **1991**, *56*, 1807.



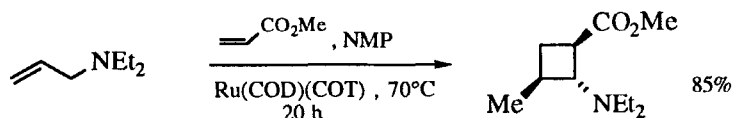
Georg, G.I.; Akgün, E. *Tetrahedron Lett.*, **1991**, *32*, 5521.



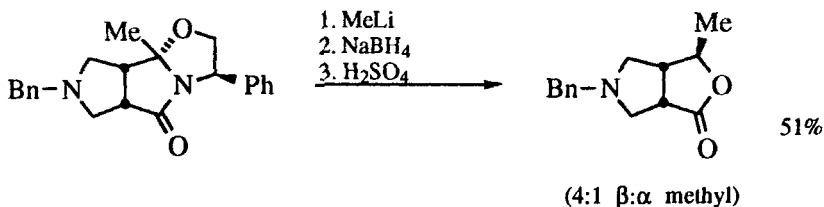
Rama Rao, K.; Nageswar, Y.V.D.; Kumar, H.M.S. *Tetrahedron Lett.*, **1991**, *32*, 6611.



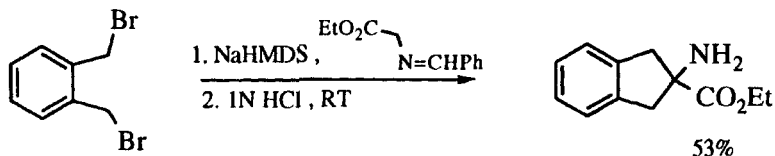
Copa, F.; Fontana, F.; Lazzarini, E.; Minisci, F.; Pianese, G.; Zhao, L. *Tetrahedron Lett.*, **1992**, *33*, 3057.



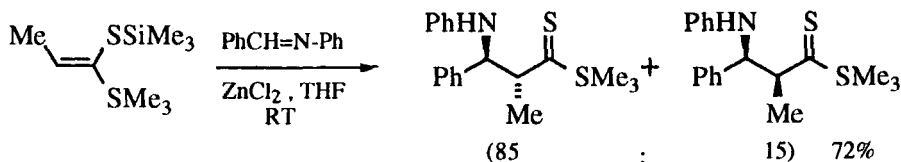
Mitsudo, T.; Zhang, S-W.; Satake, N.; Kondo, T.; Watanabe, Y. *Tetrahedron Lett.*, **1992**, *33*, 5533.



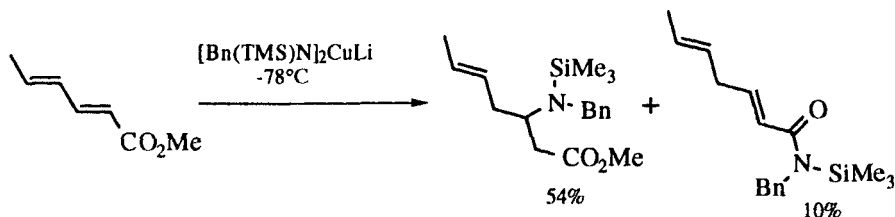
Fray, A.H.; Meyers, A.I. *Tetrahedron Lett.*, **1992**, 33, 3575.



Kotha, S.; Kuki, A. *Tetrahedron Lett.*, **1992**, 33, 1565.



Bestin, P.; Marion, P. *Tetrahedron Lett.*, **1992**, 33, 5339.



Yamamoto, Y.; Asao, N.; Ueyhara, T. *J. Am. Chem. Soc.*, **1992**, 114, 5427.

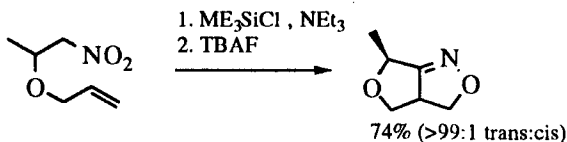
REVIEWS:

"The Asymmetric Michael Addition Reaction Using Chiral Imines"

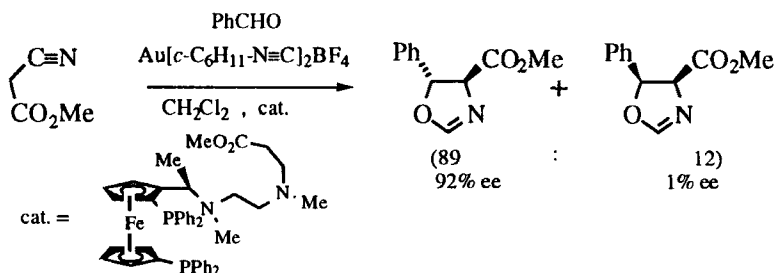
d'Angelo, J.; Desmaële, D.; Dumas, F.; Guingant, A. *Tetrahedron Asymmetry*, **1992**, 3, 227.

Related Methods: Section 315 (Carboxylic Acid - Amide). Section 316
(Carboxylic Acid - Amine). Section 344 (Amide - Ester)

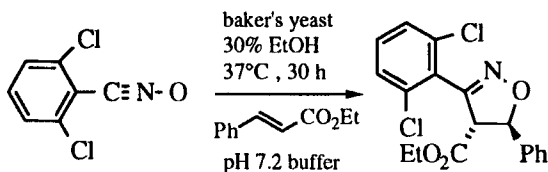
SECTION 352: AMINE - ETHER, EPOXIDE, THIOETHER



Dehaen, W.; Hassner, A. *Tetrahedron Lett.*, **1990**, 1990, 743.

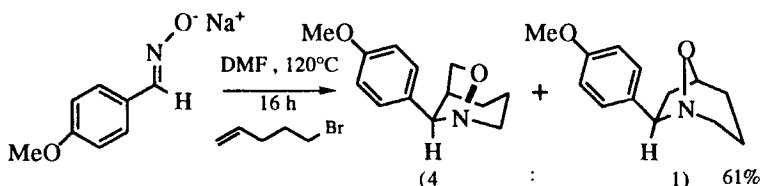


Pastor, S.D.; Togni, A. *Tetrahedron Lett.*, **1990**, 31, 839.

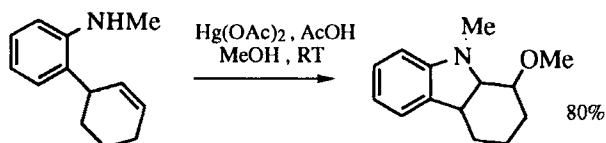


lower selectivity with ethyl cinnamate or 2,4,6-trimethylphenyl nitrile oxide

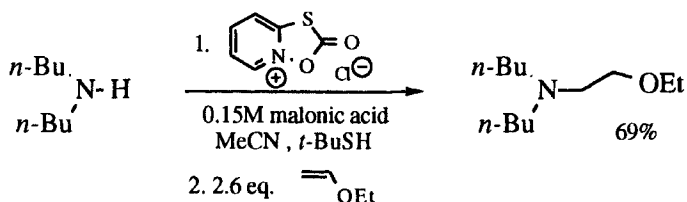
Rao, K.R.; Bhanumathi, N.; Srinivasan, T.N.; Sattur, P.B. *Tetrahedron Lett.*, **1990**, 31, 899.



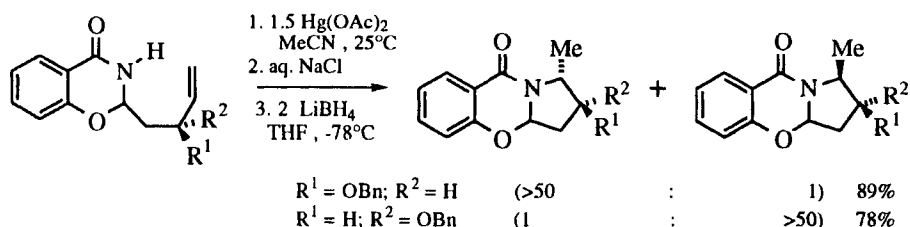
Grigg, R.; Markandu, J.; Surendrakumar, S. *Tetrahedron Lett.*, **1990**, 31, 1191.



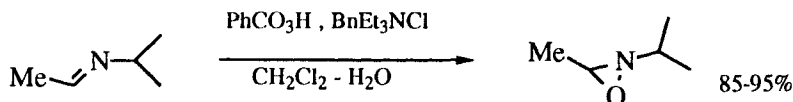
Majumdar, K.C.; De, R.N.; Saha, S. *Tetrahedron Lett.*, **1990**, 31, 1207.



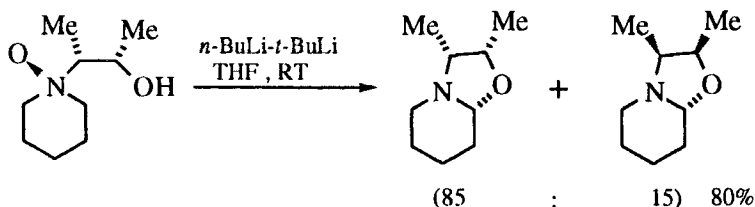
Newcomb, M.; Kumar, M.U. *Tetrahedron Lett.*, **1990**, 31, 1675.



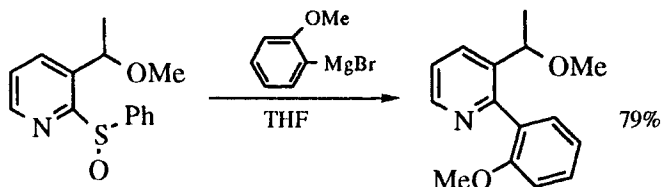
Takacs, J.M.; Helle, M.A.; Sanyal, B.J.; Eberspacher, T.A. *Tetrahedron Lett.*, **1990**, 31, 6765.



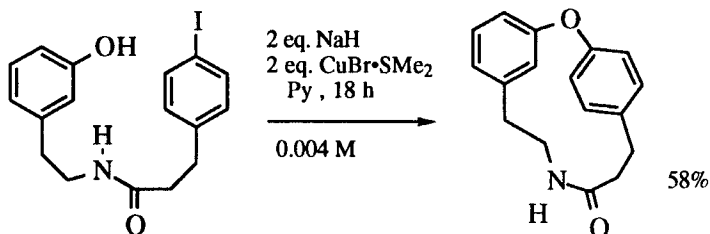
Balachkova, A.I.; Koldobskii, G.I.; Drozdetskii, A.G.; Tereshchenko, G.F. *Zhur. Org. Khim.*, **1990**, 26, 216 (Engl., p. 185).



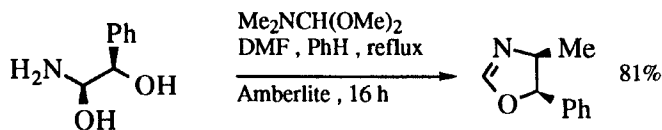
Roussi, G.; Zhang, J. *Tetrahedron Lett.*, **1991**, 32, 1443.



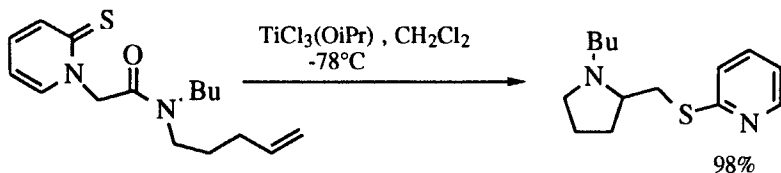
Shibutani, T.; Fujihara, H.; Furukawa, N. *Tetrahedron Lett.*, **1991**, 32, 2943.



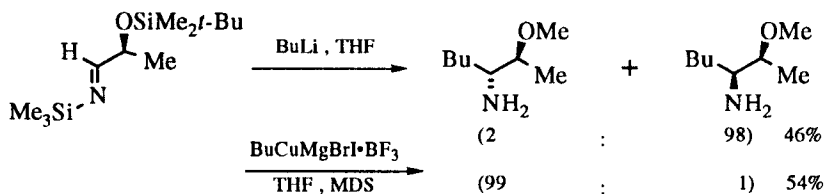
Boger, D.L.; Yohannes, D. *J. Org. Chem.*, **1991**, 56, 1763.



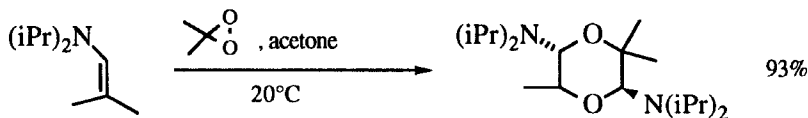
Leonard, W.R.; Romine, J.L.; Meyers, A.I. *J. Org. Chem.*, **1991**, 56, 1961.



Newcomb, M.; Ha, C. *Tetrahedron Lett.*, **1991**, 32, 6493.



Cainelli, G.; Giacomini, D.; Panunzio, M.; Zarantonello, P. *Tetrahedron Lett.*, **1992**, 33, 7783.



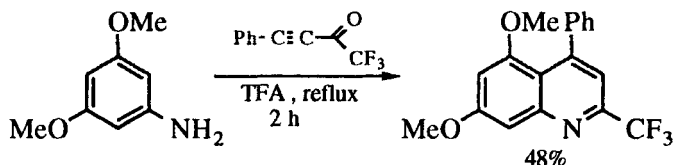
Adam, W.; Peters, E-M.; Peters, K.; von Schnering, H.G.; Voerckel, V. *Chem. Ber.*, **1992**, 125, 1263.

REVIEWS:

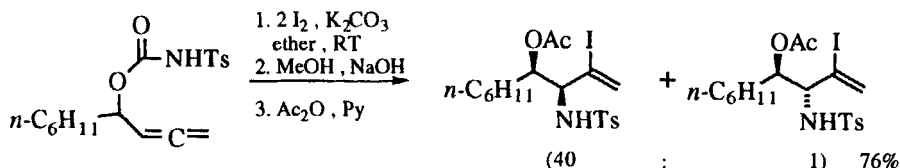
"Preparation of Diaminoethers and Polyamines"

Bradshaw, J.S.; Krakowiak, K.E.; Izatt, R.M. *Tetrahedron*, **1992**, 48, 4475.

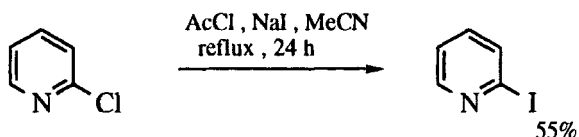
SECTION 353: AMINE - HALIDE, SULFONATE



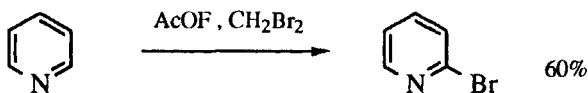
Linderman, R.L.; Kirolos, K.S. *Tetrahedron Lett.*, **1990**, 31, 2689.



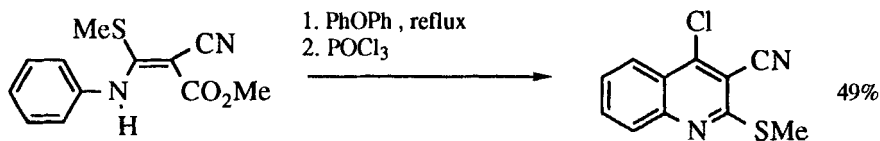
Friesen, R.W. *Tetrahedron Lett.*, **1990**, 31, 4249.



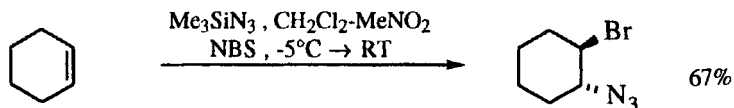
Corcoran, R.C.; Bang, S.H. *Tetrahedron Lett.*, **1990**, 31, 6757.



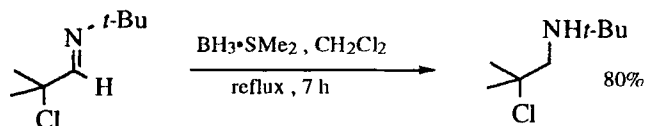
Hebel, D.; Rozen, S. *J. Org. Chem.*, **1991**, 56, 6298.



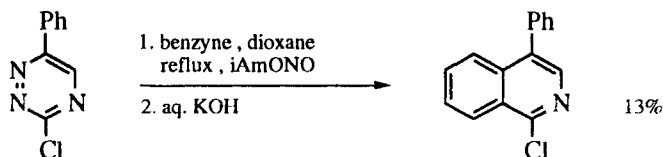
Tominaga, Y.; Michioka, T.; Moriyama, K.; Hosomi, A. *J. Het. Chem.*, **1990**, 27, 1217.



Olah, G.A.; Wang, Q.; Li, X-Y.; Surya Prakash, G.K. *SynLett*, **1990**, 487.

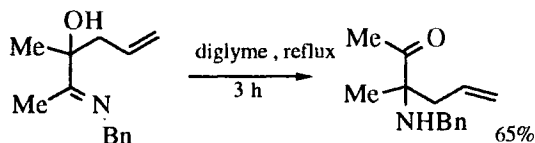


De Kimpe, N.; Stevens, C. *Tetrahedron*, **1991**, 47, 3407.

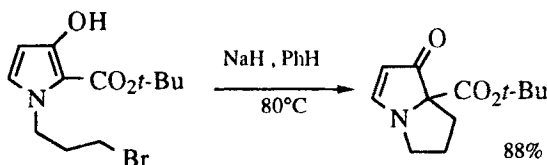


Gonsalves, A.M.d'A.R.; Pinho e Melo, T.M.V.D.; Gilchrist, T.L. *Tetrahedron*, **1992**, 48, 6821.

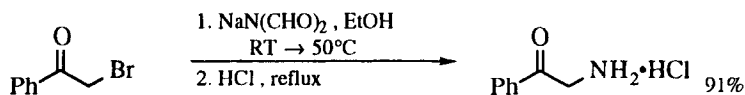
SECTION 354: AMINE - KETONE



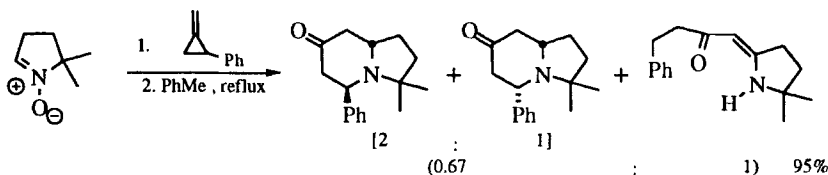
Vatele, J.-M.; Dumas, D.; Gore, J. *Tetrahedron Lett.*, **1990**, 31, 2277.



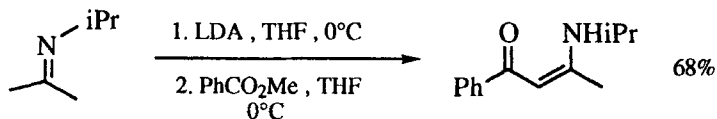
Wasserman, H.H.; Cook, J.D.; Vu, C.B. *Tetrahedron Lett.*, **1990**, 31, 4945.



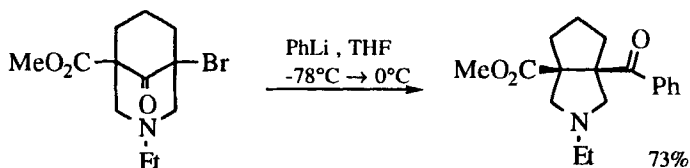
Yinglin, H.; Hongwen, H. *Synthesis*, **1990**, 615.



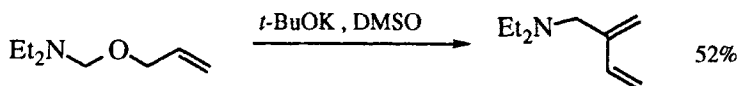
Cordero, F.M.; Brandi, A.; Querci, C.; Goti, A.; DeSarlo, F.; Guarino, A. *J. Org. Chem.*, **1990**, 55, 1762.



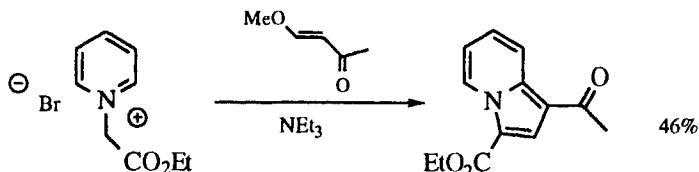
Bartoli, G.; Cimarelli, C.; Palmieri, G.; Bosco, M.; Dalpozzo, R. *Synthesis*, **1990**, 895.



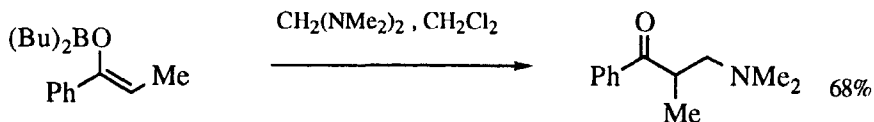
Kraus, G.A.; Shi, J. *J. Org. Chem.*, **1990**, 55, 5423.



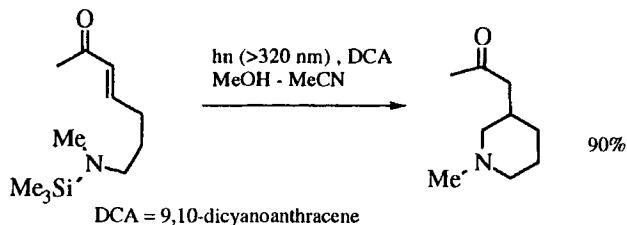
Arenz, T.; Frauenrath, H. *Angew. Chem. Int. Ed. Engl.*, **1990**, 29, 932.



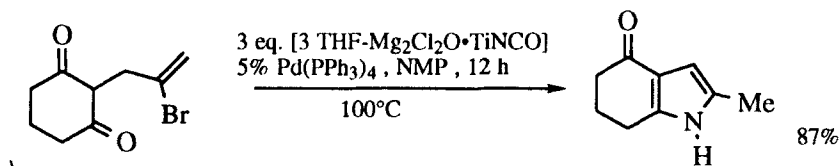
Tominaga, Y.; Ichihara, Y.; Mori, T.; Kamio, C.; Hosomi, A. *J. Het. Chem.*, **1990**, 27, 263.



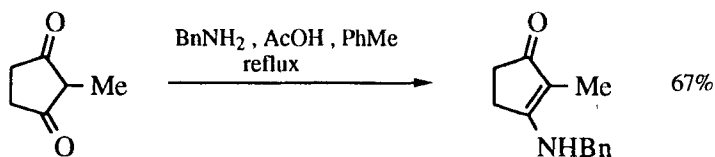
Nolen, E.G.; Allocco, A.; Vitarius, J.; McSorely, K. *J. Chem. Soc., Chem. Commun.*, **1990**, 1532.



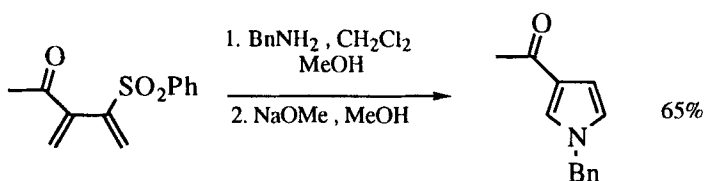
Jeon, Y.T.; Lee, C-P.; Mariano, P.S. *J. Am. Chem. Soc.*, **1991**, 113, 8847.



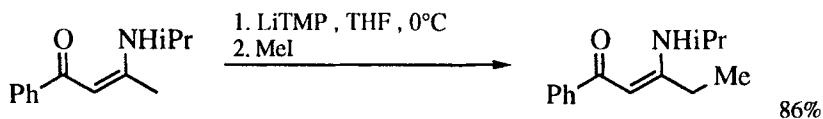
Uozumi, Y.; Mori, M.; Shibasaki, M. *J. Chem. Soc., Chem. Commun.*, **1991**, 81.



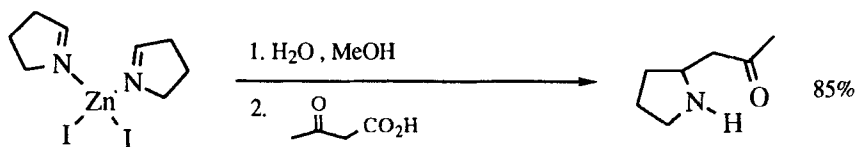
Otto, A.; Schick, H. *Synthesis*, **1991**, 115.



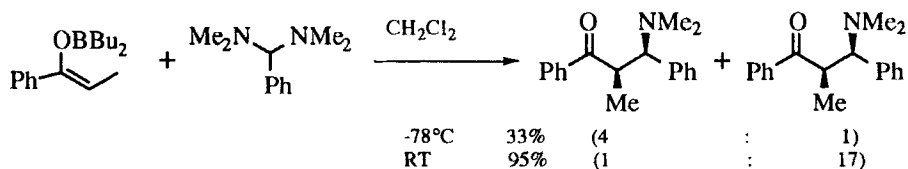
Chou, S-S.P.; Yuan, T-M. *Synthesis*, **1991**, 171.



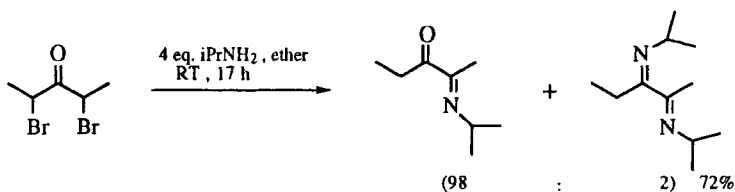
Bartoli, G.; Bosco, M.; Cimarelli, C.; Dalpozzo, R.; Palmieri, G. *SynLett*, **1991**, 229.



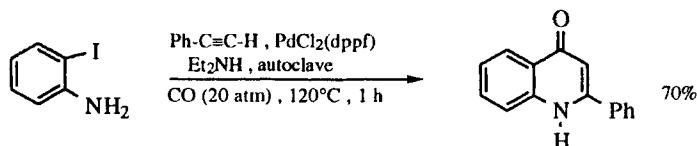
Baxter, G.; Melville, J.C.; Robins, D.J. *SynLett*, **1991**, 359.



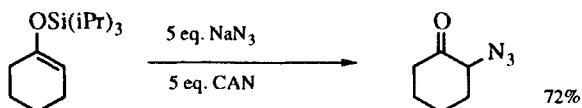
Nolen, E.G.; Allocco, A.; Broody, M.; Zuppa, A. *Tetrahedron Lett.*, **1991**, 32, 73.



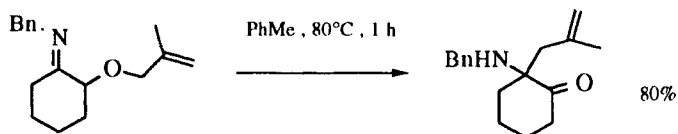
De Kimpe, N.; D'Hondt, L.; Moens, L. *Tetrahedron*, **1992**, 48, 3183.



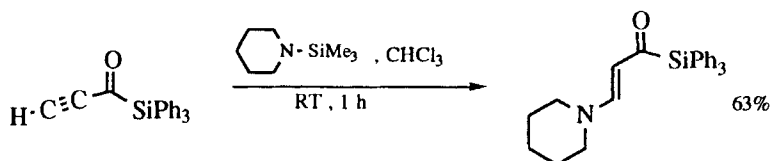
Kalinin, V.N.; Shostakovskiy, M.V.; Ponomaryov, A.B. *Tetrahedron Lett.*, **1992**, 33, 373.



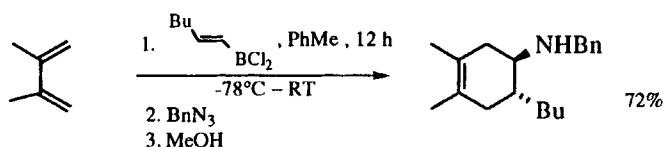
Magnus, P.; Barth, L. *Tetrahedron Lett.*, **1992**, 33, 2789.



Desmaële, D.; Champion, N. *Tetrahedron Lett.*, **1992**, 33, 4447.



Degl'Innocenti, A.; Capperucci, A.; Reginato, G.; Mordini, A.; Ricci, A. *Tetrahedron Lett.*, **1992**, 33, 1507.



Noiret, N.; Youssofi, A.; Carboni, B.; Vaultier, M. *J. Chem. Soc., Chem. Commun.*, **1992**, 1105.

REVIEWS:

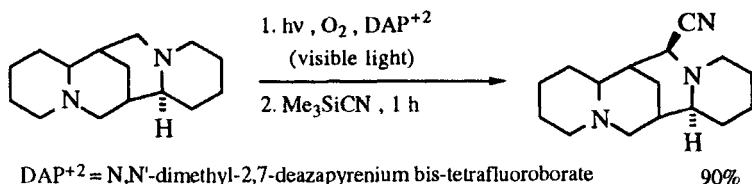
"Synthesis of α -Amino Aldehydes and α -Amino Ketones"

Fisher, L.E.; Muchowski, J.M. *Org. Prep. Proceed. Int.*, **1990**, 22, 399.

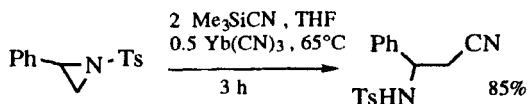
"Further Advances in the Chemistry of Mannich Bases"

Tramontini, M.; Angiolini, L. *Tetrahedron*, **1990**, 46, 1791.

SECTION 355: AMINE - NITRILE

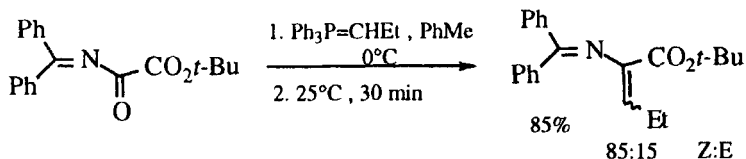


Santamaria, J.; Kaddachi, M.T.; Riglaudy, J. *Tetrahedron Lett.*, **1990**, 31, 4735.



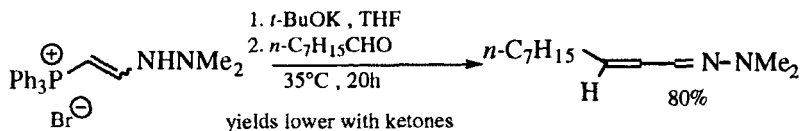
Matsubara, S.; Kodama, T.; Utimoto, K. *Tetrahedron Lett.*, **1990**, 31, 6379.

SECTION 356: AMINE - ALKENE

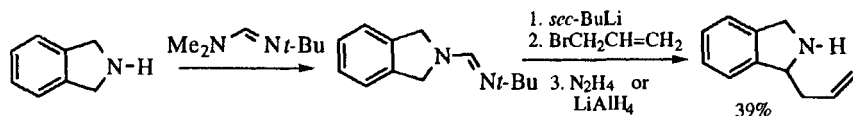


O'Donnell, M.J.; Arasappan, A.; Hornback, W.J.; Huffman, J.C.

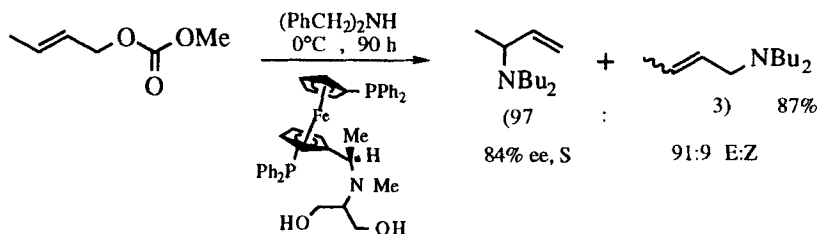
Tetrahedron Lett., **1990**, 31, 157.



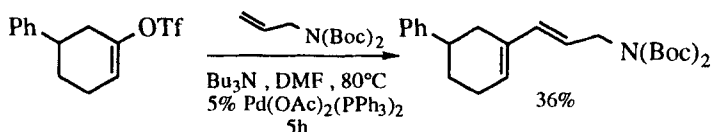
Cristau, H.-J.; Gasc, M.-B. *Tetrahedron Lett.*, **1990**, 31, 341.



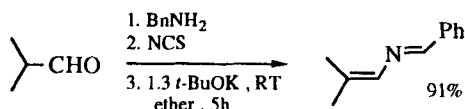
Beeley, L.J.; Rockell, C.J.M. *Tetrahedron Lett.*, **1990**, 31, 417.



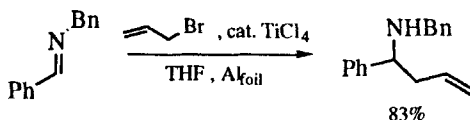
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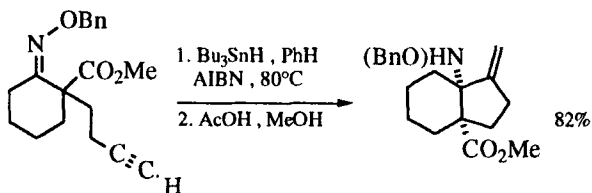
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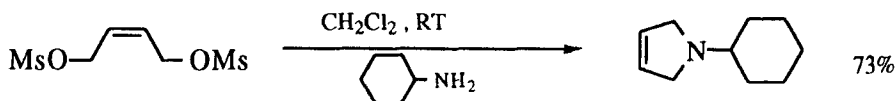
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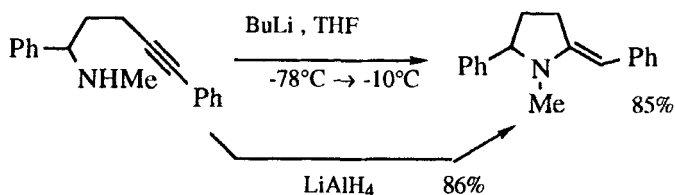
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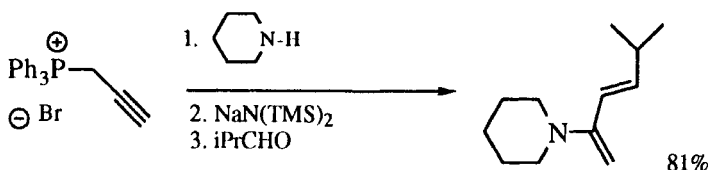
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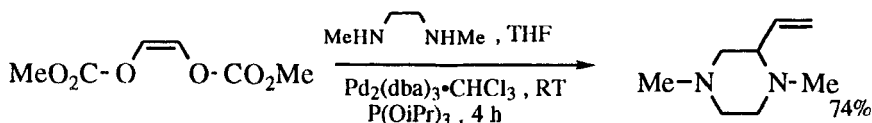
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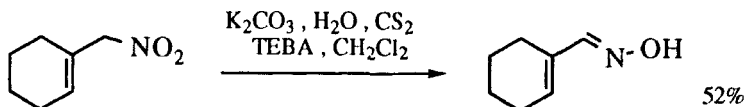
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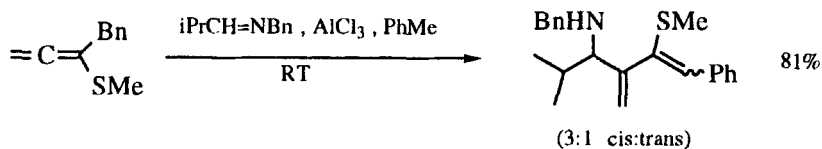
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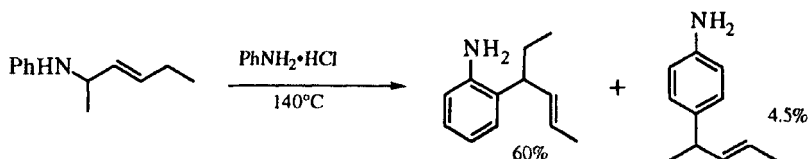
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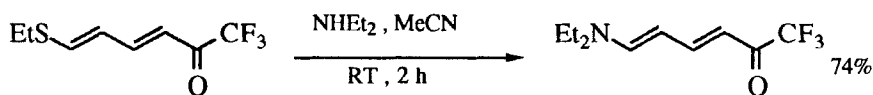
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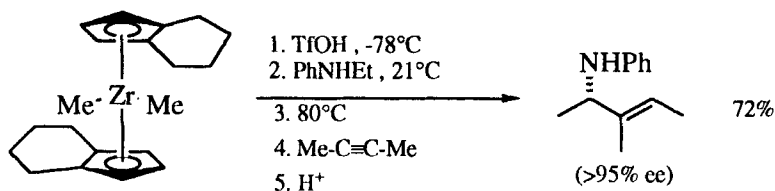
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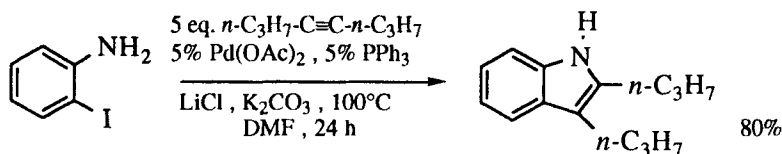
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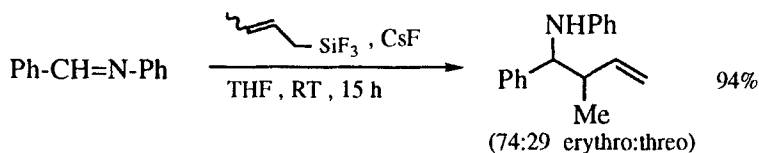
Hojo, M.; Masuda, R.; Okada, E. *Chem. Lett.*, **1990**, 2095.



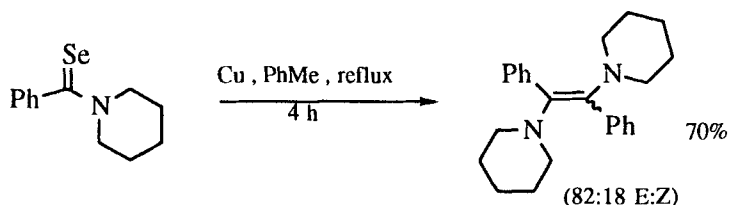
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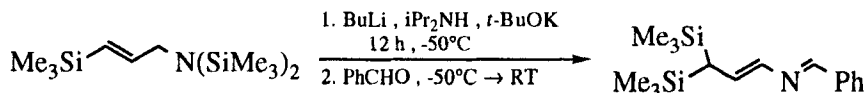
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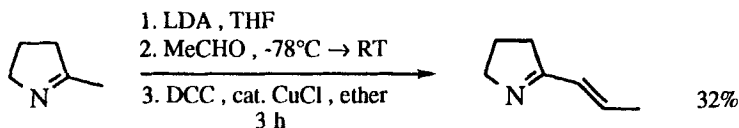
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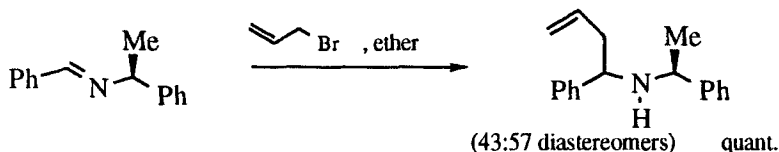
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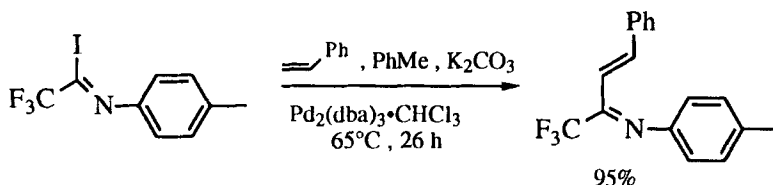
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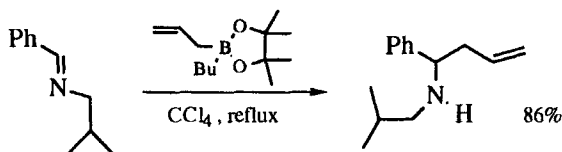
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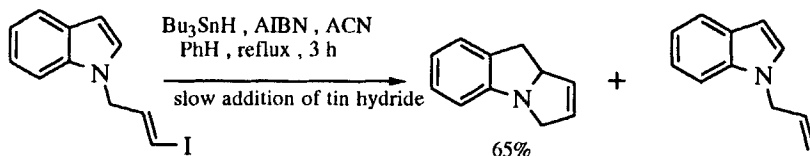
Bocum, A.; Boga, C.; Savoia, D.; Umani-Ronchi, A. *Tetrahedron Lett.*, **1991**, 32, 1367.



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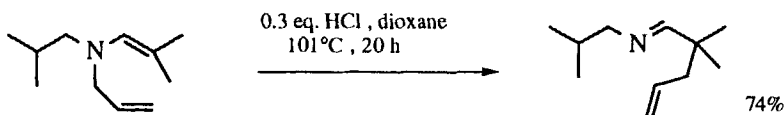


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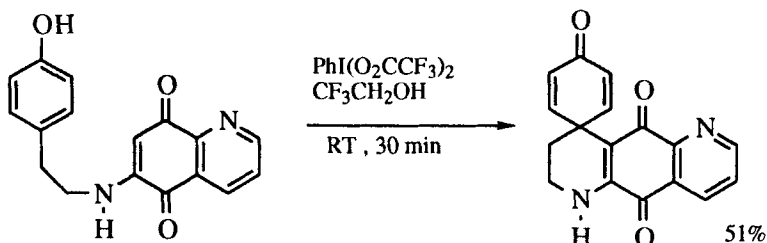


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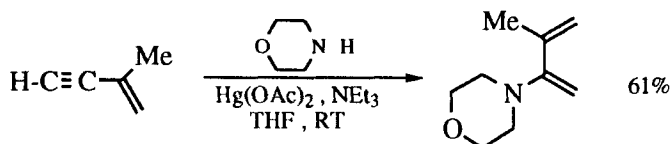
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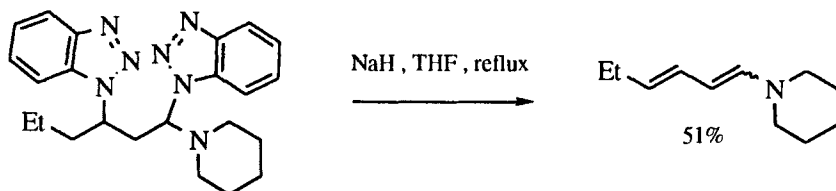
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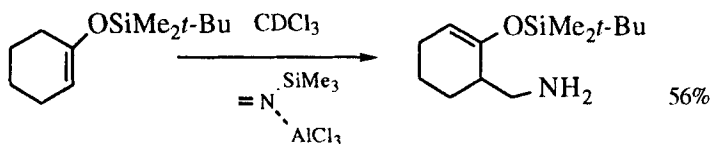
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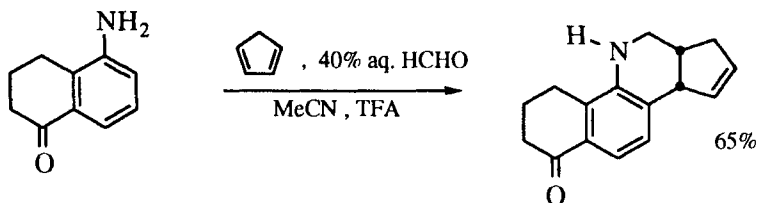
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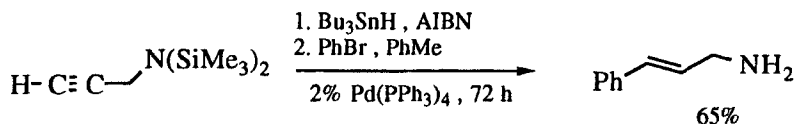
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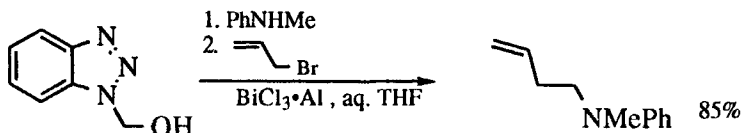
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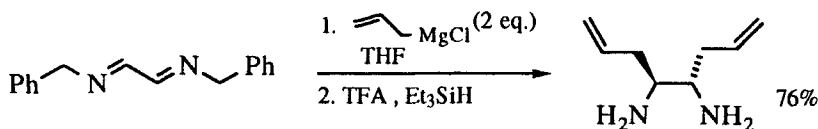
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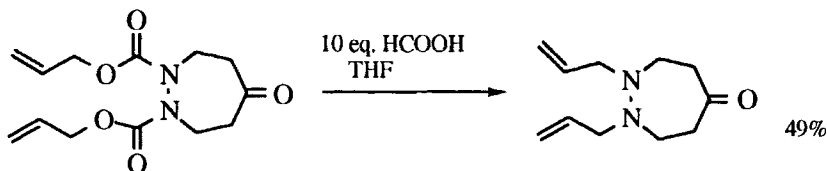
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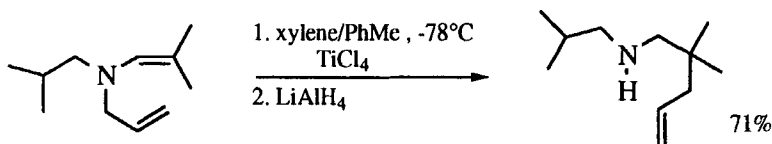
Katritzky, A.R.; Shoban, N.; Harris, P.A. *Tetrahedron Lett.*, **1991**, 32, 4247.



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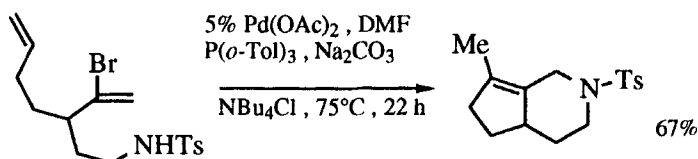


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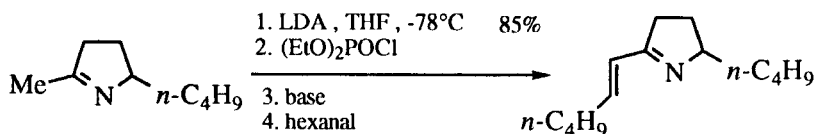


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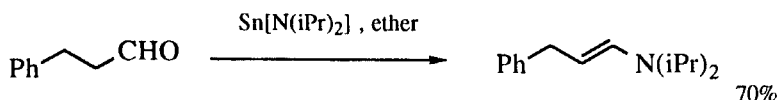
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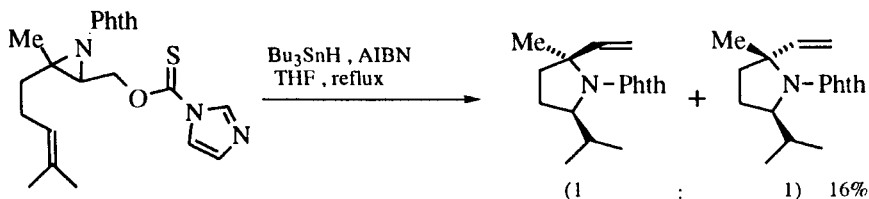
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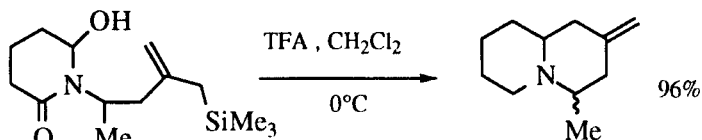
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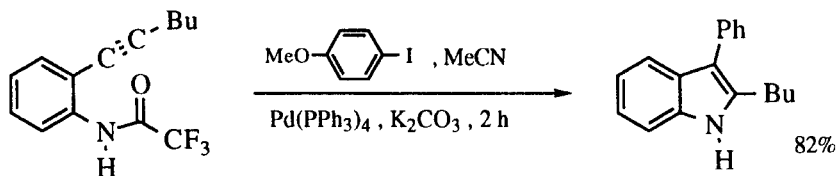
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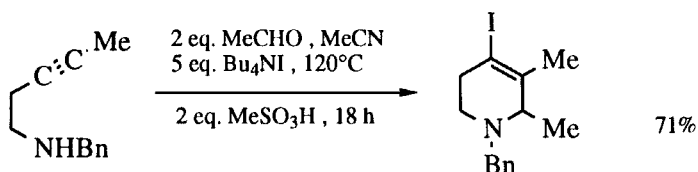
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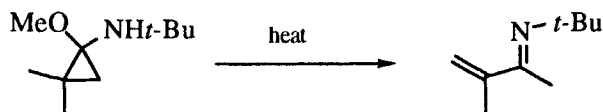
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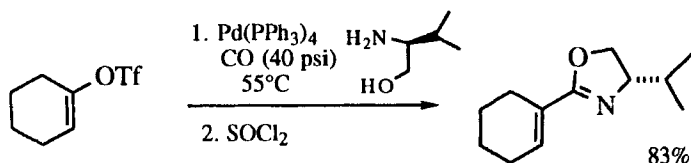
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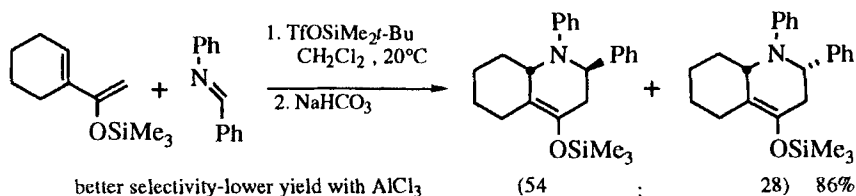
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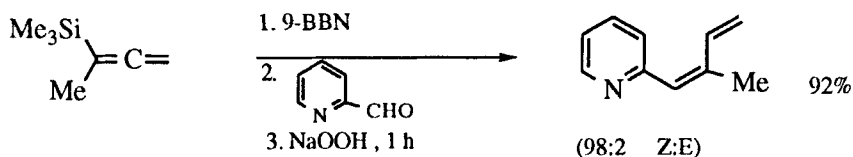
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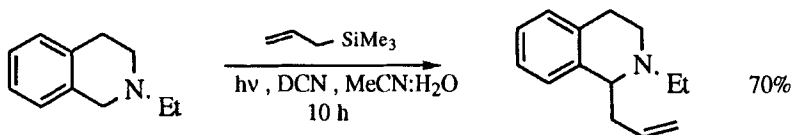
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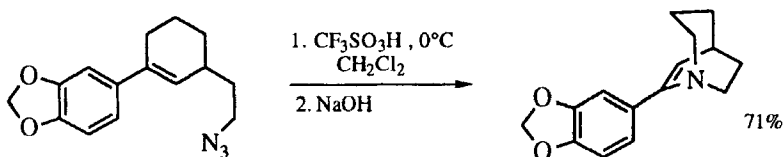
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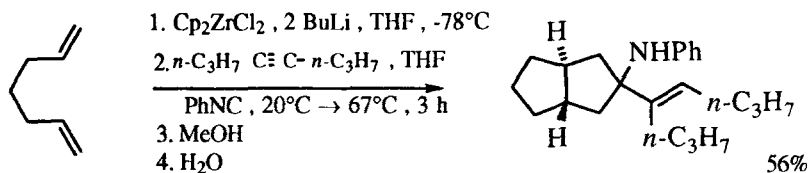
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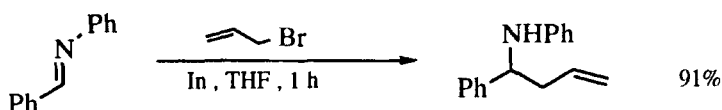
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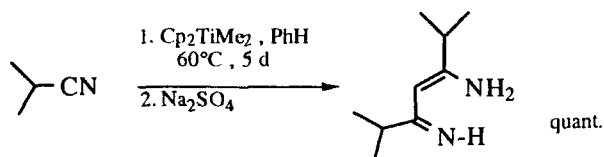
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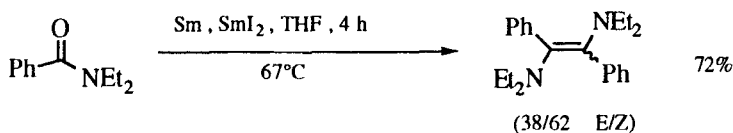
Davis, J.M.; Whitby, R.J.; Jaxa-Chamiec, A. *Tetrahedron Lett.*, **1992**, 33, 5655.



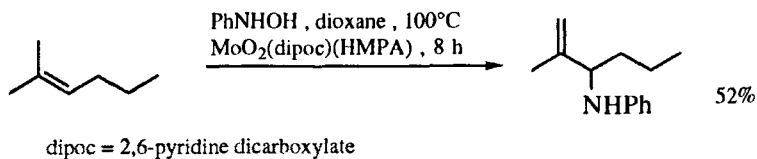
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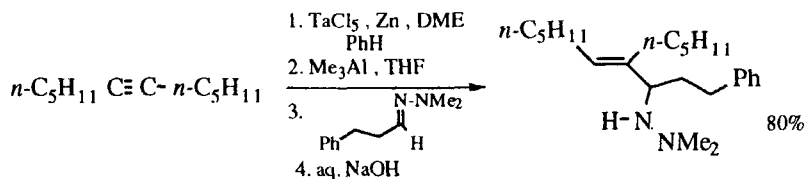
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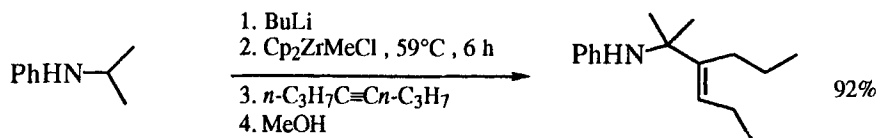
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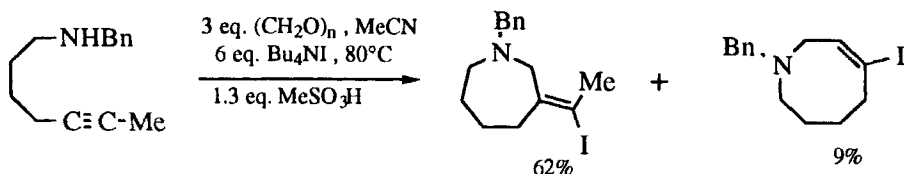
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REVIEWS:

"Diels-Alder Reactions of Azadienes: Scope and Limitations"

Boger, D.L. *Bull. Soc. Chim. Belg.*, **1990**, 99, 599.

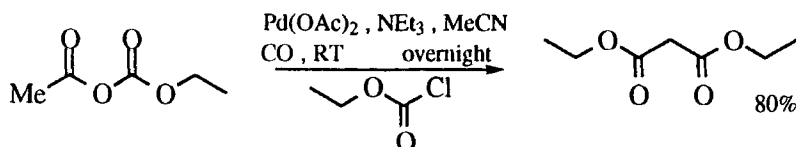
"Electronically Neutral 2-Aza-1,3-dienes: Are They Useful Intermediates in Organic Synthesis?"

Barluenga, J.; Joglar, J.; González, F.J.; Fustero, S. *SynLett*, **1990**, 129.

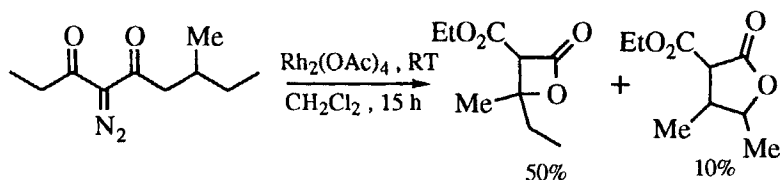
"The aza-Wittig Reaction in Heterocyclic Synthesis"

Eguchi, S.; Matsushita, Y.; Yamashita, K. *Org. Prep. Proceed. Int.*, **1992**, 24, 209.

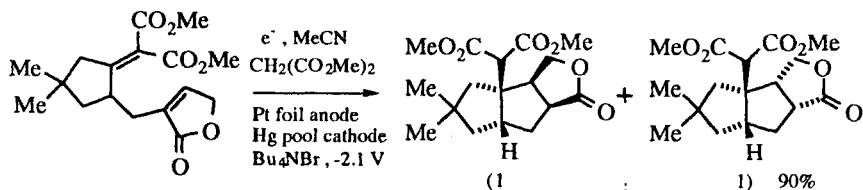
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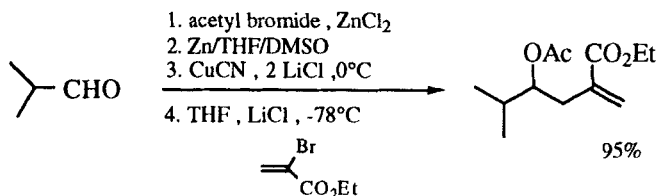
Barton, D.H.R.; Langlois, P.; Okano, T.; Ozbalik, N. *Tetrahedron Lett.*, **1990**, 31, 325.



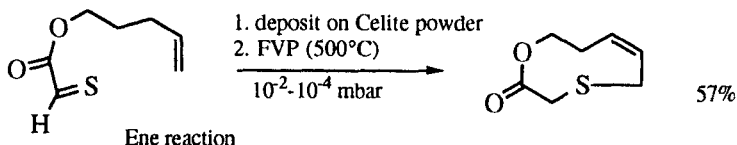
Lee, E.; Jung, K.W.; Kim, Y.S. *Tetrahedron Lett.*, **1990**, 31, 1023.



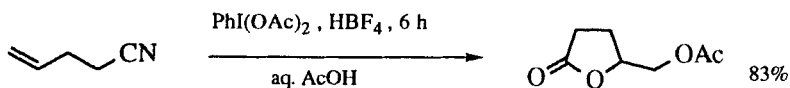
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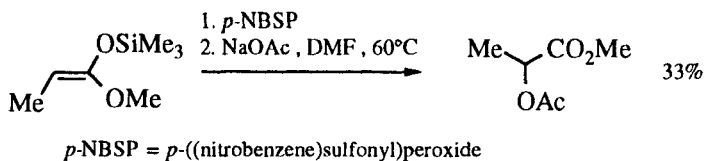
Chou, T.-S.; Knochel, P. *J. Org. Chem.*, **1990**, 55, 4791.



Choi, S.S.-M.; Kirby, G.W.; Mahajan, M.P. *J. Chem. Soc., Chem. Commun.*, **1990**, 138.

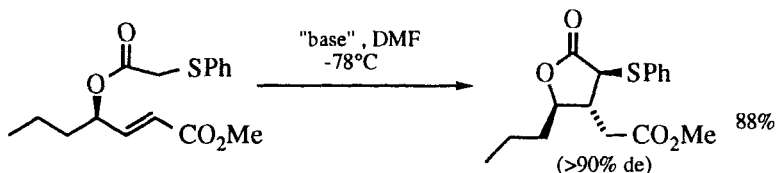


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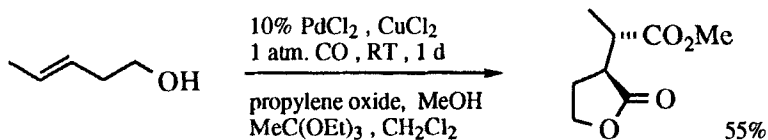


$p\text{-NBSP} = p\text{-}((\text{nitrobenzene})\text{sulfonyl})\text{peroxide}$

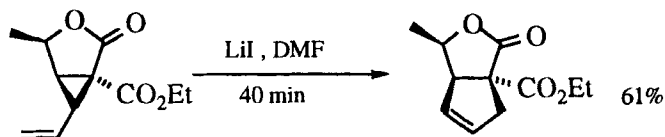
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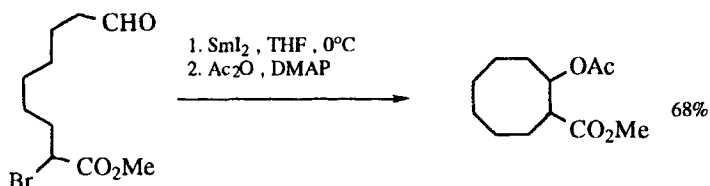
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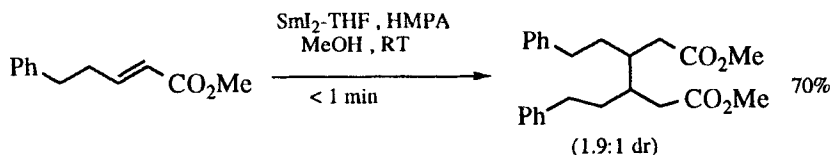
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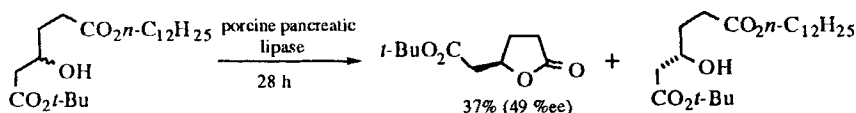
Kasatkin, A.N.; Kulak, A.N.; Tolstikov, G.A.; Shitikova, O.V. *Tetrahedron Lett.*, **1991**, *32*, 4591.



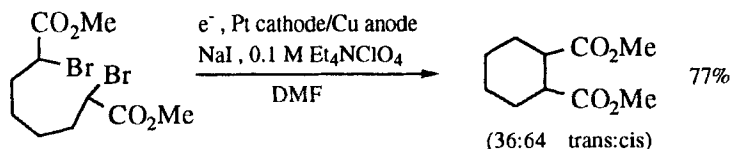
Inanaga, J.; Yokoyama, Y.; Handa, Y.; Yamaguchi, M. *Tetrahedron Lett.*, **1991**, *32*, 6371.



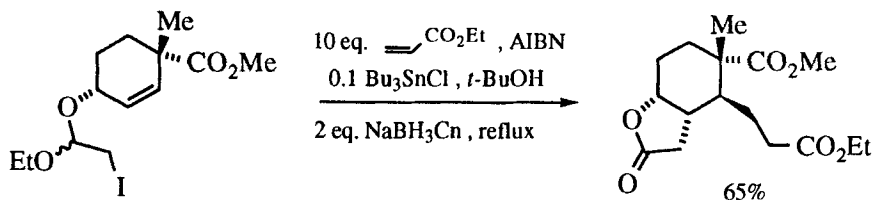
Inanaga, J.; Handa, Y.; Tabuchi, T.; Otsubo, K.; Yamaguchi, M.; Hanamoto, T. *Tetrahedron Lett.*, **1991**, *32*, 6557.



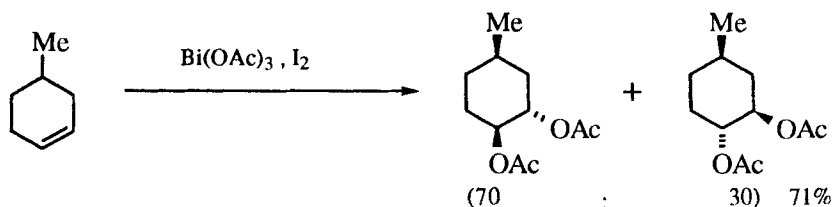
Sibi, M.P.; Gaboury, J.A. *Tetrahedron Lett.*, **1992**, *33*, 5681.



Tokuda, M.; Hayashi, A.; Suginome, H. *Bull. Chem. Soc. Jpn.*, **1991**, *64*, 2590.



Stork, G.; Franklin, P.J. *Aust. J. Chem.*, **1991**, *44*, 275.

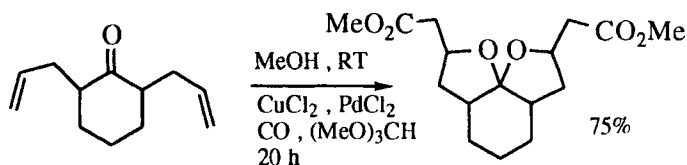


Trainor, R.W.; Deacon, G.B.; Jackson, W.R.; Giunta, N. *Aust. J. Chem.*, **1992**, *45*, 1265.

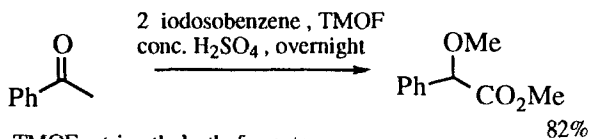
Also via Dicarboxylic Acids: Section 312 (Carboxylic Acids - Carboxylic Acids).

Hydroxy-esters Section 327 (Alcohol - Ester). Diols Section 323 (Alcohol - Alcohol)

SECTION 358: ESTER - ETHER, EPOXIDE, THIOETHER

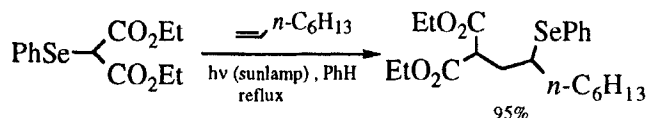


Yadav, J.S.; Rao, E.S.; Rao, V.S.; Choudary, B.M. *Tetrahedron Lett.*, **1990**, *31*, 2491.

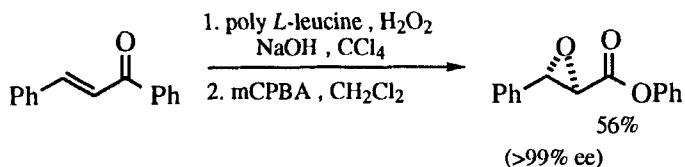


TMOF = trimethylorthoformate

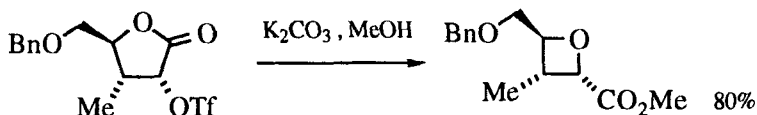
Singh, O.V. *Tetrahedron Lett.*, **1990**, *31*, 3055.



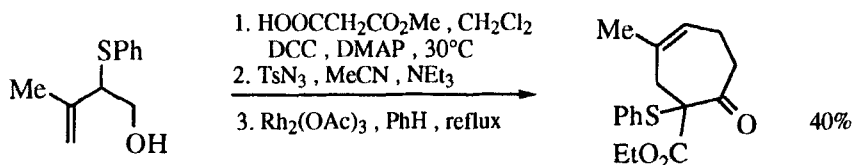
Byers, J.H.; Lane, G.H. *Tetrahedron Lett.*, **1990**, *31*, 5697.



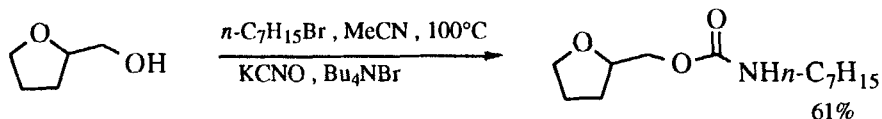
Baures, P.W.; Eggleston, D.S.; Flisak, J.R.; Gombatz, K.; Lantos, J.; Mendelson, W.; Remich, J.J. *Tetrahedron Lett.*, **1990**, *31*, 6501.



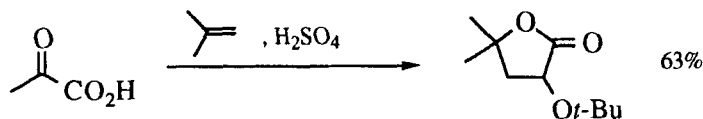
Witty, D.R.; Fleet, G.W.I.; Choi, S.; Vogt, K.; Wilson, F.X.; Wang, Y.; Storer, R.; Myers, P.L.; Wallis, C.J. *Tetrahedron Lett.*, **1990**, *31*, 6927.



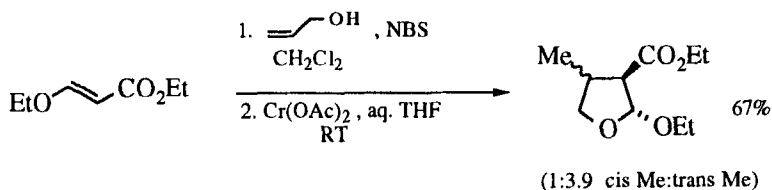
Kido, F.; Kazi, A.B.; Yoshikoshi, A. *Chem. Lett.*, **1990**, 613.



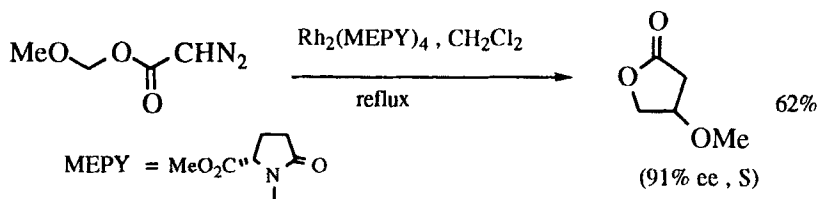
Prashad, M.; Tomesch, J.C.; Houlihan, W.J. *Synthesis*, **1990**, 477.



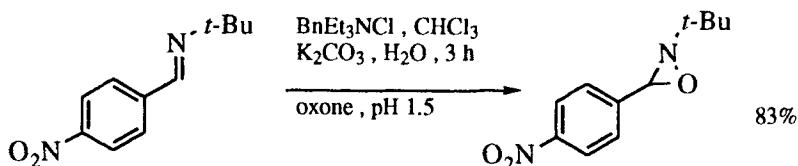
Jarvis, B.B.; Wells, K.M.; Kaufmann, T. *Synthesis*, **1990**, 1079.



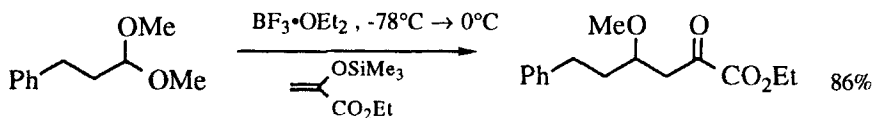
Lübbbers, T.; Schäfer, H.J. *SynLett*, **1990**, 44.



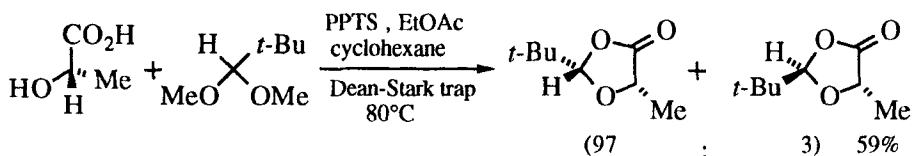
Doyle, M.P.; Van Oeveren, A.; Westrum, L.J.; Protopopova, M.N.; Clayton, T.W. Jr. *J. Am. Chem. Soc.*, **1991**, *113*, 8982.



Bulachkova, A.I.; Koldobskii, G.I.; Drozdetskii, A.G.; Tereshchenko, G.F. *Zhur. Org. Khim.*, **1991**, *27*, 215 (Engl., p. 189).

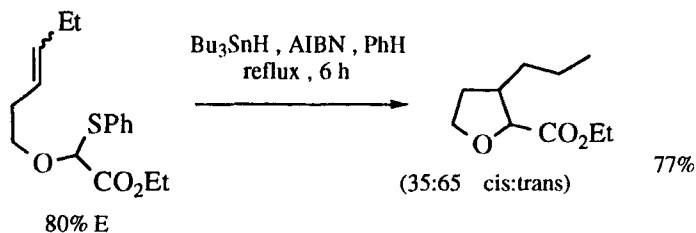


Sugimura, H.; Shigekawa, Y.; Uematsu, M. *SynLett*, **1991**, 153.

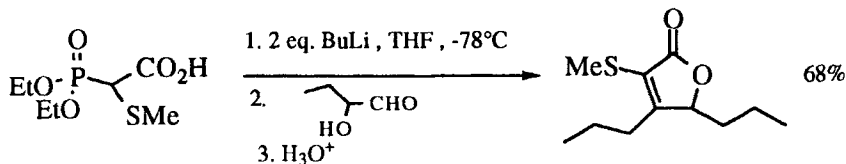


Chapel, N.; Greiner, A.; Ortholand, J-Y. *Tetrahedron Lett.*, **1991**, *32*, 1441.

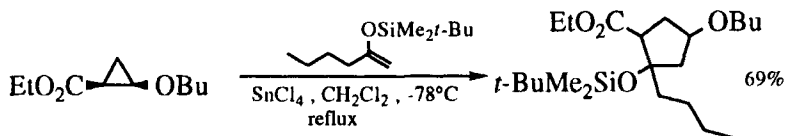
Greiner, A.; Ortholand, J-Y. *Tetrahedron Lett.*, **1990**, *31*, 2135.



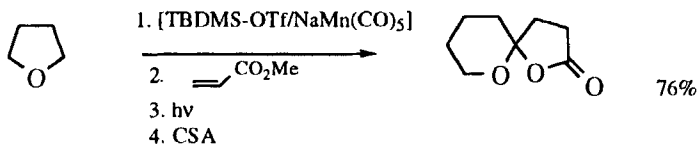
Lolkema, L.D.M.; Hiemstra, H.; Ghouch, A.A.A.; Speckamp, W.N. *Tetrahedron Lett.*, **1991**, *32*, 1491.



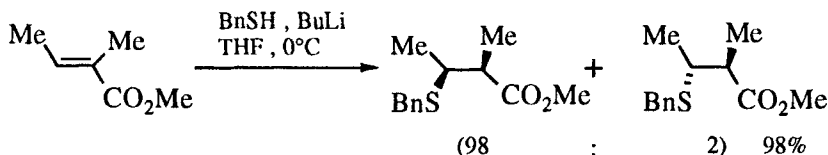
Mikołajczyk, M.; Midura, W.H. *SynLett*, **1991**, 245.



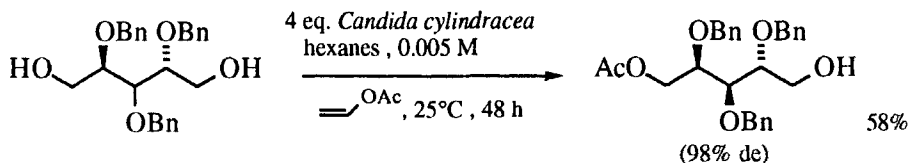
Komatsu, M.; Suehiro, I.; Horiguchi, Y.; Kuwajima, I. *SynLett*, **1991**, 771.



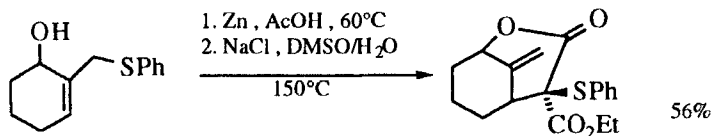
De Shong, P.; Rybczynski, P.J. *J. Org. Chem.*, **1991**, 56, 3207.



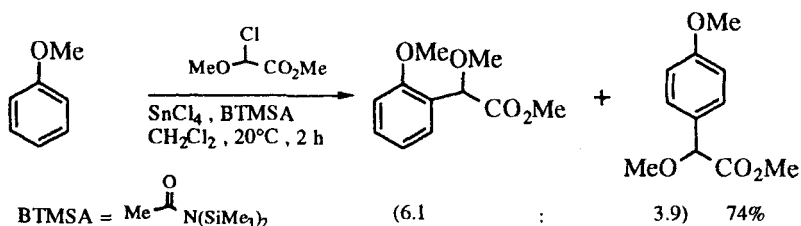
Miyata, O.; Shinada, T.; Ninomiya, I.; Naito, T.; Date, T.; Okamura, K.; Inagaki, S. *J. Org. Chem.*, **1991**, 56, 6556.



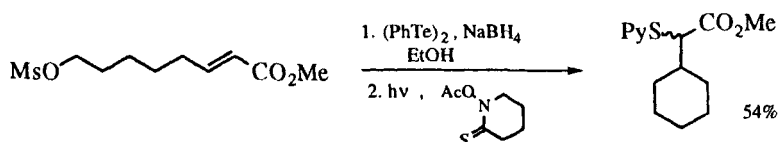
Burgess, K.; Henderson, I. *Tetrahedron Lett.*, **1991**, 32, 5701.



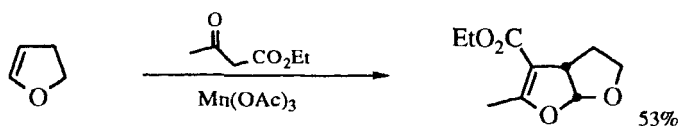
Kido, E.; Kawada, Y.; Kato, M.; Yoshikoshi, A. *Tetrahedron Lett.*, **1991**, 32, 6159.



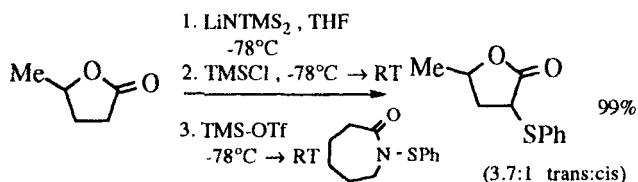
Earle, M.J.; Fairhurst, R.A.; Heaney, H. *Tetrahedron Lett.*, **1991**, 32, 6171.



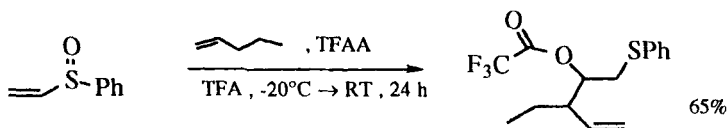
Barton, D.H.R.; Dalko, P.I.; Géro, S.D. *Tetrahedron Lett.*, **1991**, 32, 4713.



Mellor, J.M.; Mohammed, S. *Tetrahedron Lett.*, **1991**, 32, 7107, 7111.

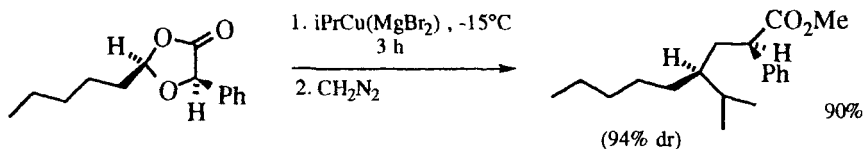


Wilson, L.J.; Liotta, D.C. *J. Org. Chem.*, **1992**, 57, 1948.

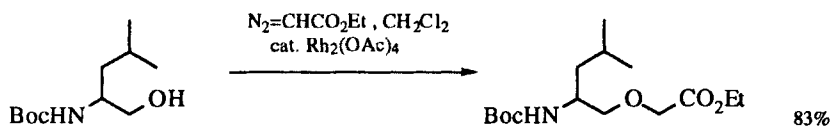


Brichard, M-H.; Janousek, Z.; Merény, R.; Viehe, H.G. *Tetrahedron Lett.*, **1992**, 33, 2511.

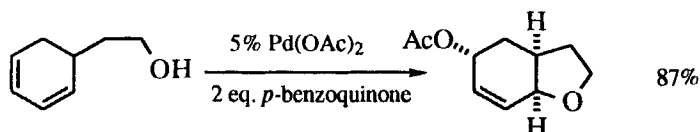
Brichard, M-H.; Musick, H.; Janousek, Z.; Viehe, H.G. *Synth. Commun.*, **1990**, 20, 2379.



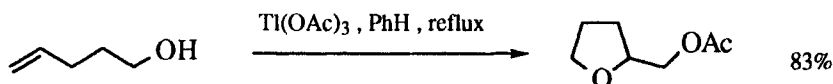
Heckmann, B.; Mjoskowski, C.; Yu, J.; Falck, J.R. *Tetrahedron Lett.*, **1992**, 33, 5201.



Hlavacek, J.; Kral, V. *Coll. Czech. Chem. Commun.*, **1992**, 57, 525.

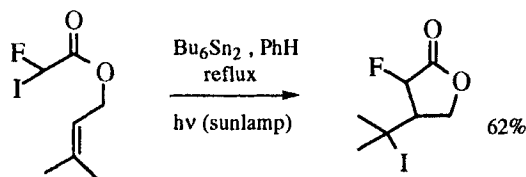


Bäckvall, J.-E.; Andersson, P.G. *J. Am. Chem. Soc.*, **1992**, 114, 6374.

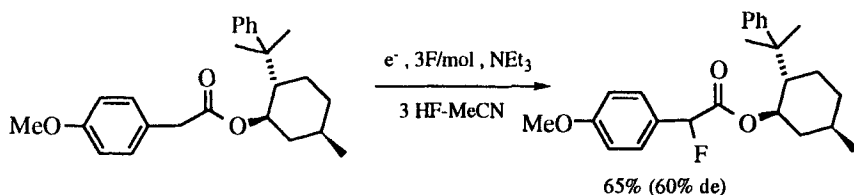


Mihailović, M.Lj.; Vukićević, R.; Konstantinović, S.; Milosavljević, S.; Schroth, G. *Liebigs Ann. Chem.*, **1992**, 305.

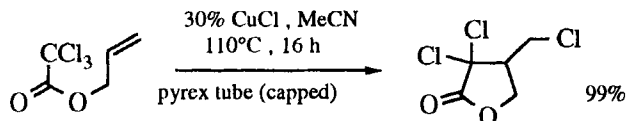
SECTION 359: ESTER - HALIDE, SULFONATE



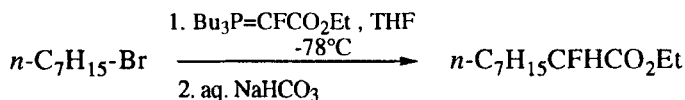
Barth, F.; O-Yang, C. *Tetrahedron Lett.*, **1990**, 31, 1121.



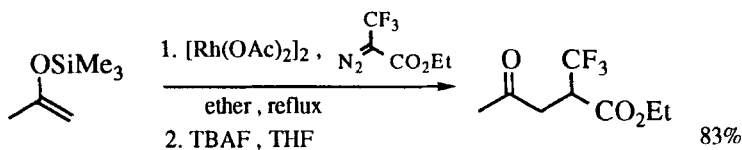
Kabore, L.; Chebli, S.; Faure, R.; Laurent, E.; Marquet, B. *Tetrahedron Lett.*, **1990**, 31, 3137.



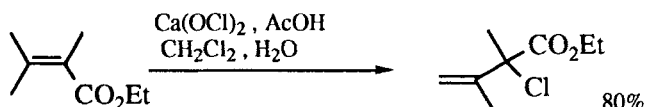
Nagashima, H.; Seki, K.; Ozaki, N.; Wakamatsu, H.; Itoh, K.; Tomo, Y.; Tsuji, J. *J. Org. Chem.*, **1990**, 55, 985.



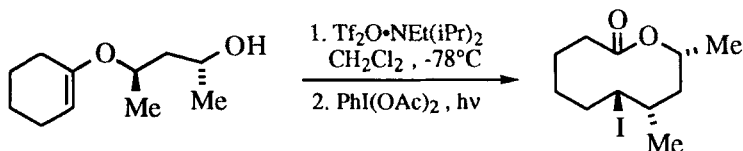
Thenappan, A.; Burton, D.J. *J. Org. Chem.*, **1990**, *55*, 2311.



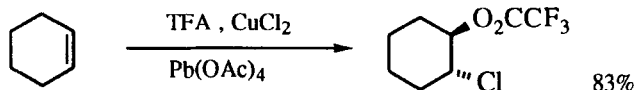
Shi, G.; Xu, Y. *J. Org. Chem.*, **1990**, *55*, 3383.



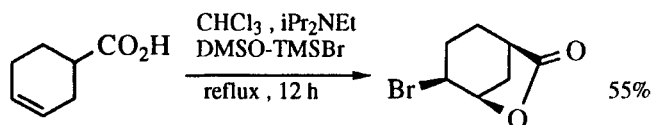
Mathew, J.; Alink, B. *J. Org. Chem.*, **1990**, *55*, 3850.



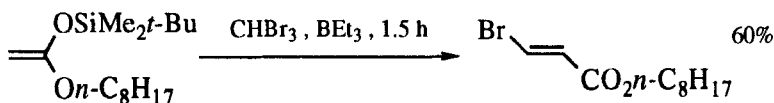
Kaino, M.; Naruse, Y.; Ishihara, K.; Yamamoto, H. *J. Org. Chem.*, **1990**, *55*, 5814.



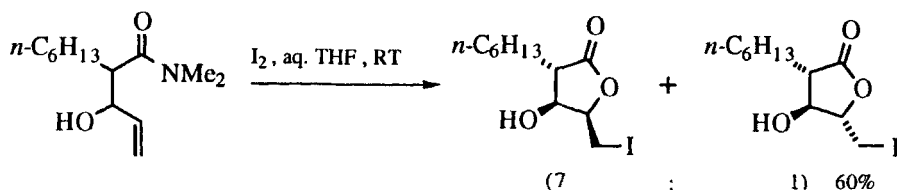
Serguchev, Yu.A.; Gutsulyak, R.B. *Zhur. Org. Khim.*, **1990**, *26*, 2066 (Engl., p. 1784).



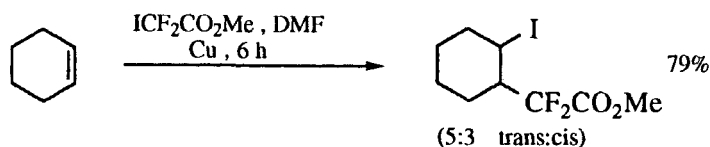
Iwata, C.; Tanaka, A.; Mizuno, H.; Miyashita, K. *Heterocycles*, **1990**, *31*, 987.



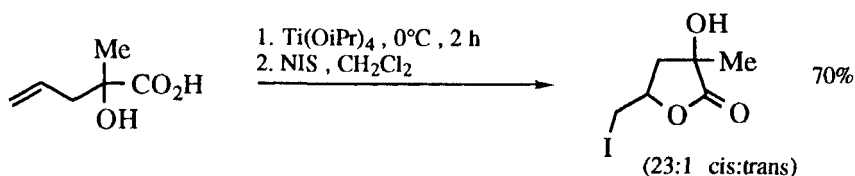
Sugimoto, J.; Miura, K.; Oshima, K.; Utimoto, K. *Chem. Lett.*, **1991**, 1319.



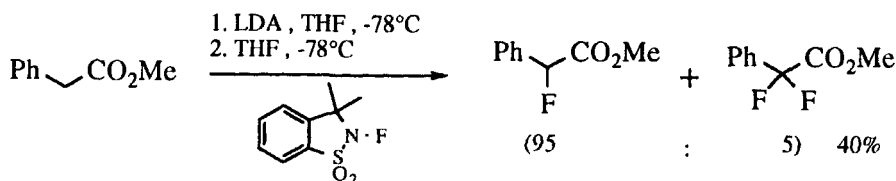
Rotella, D.P.; Li, X. *Heterocycles*, **1990**, *31*, 1205.



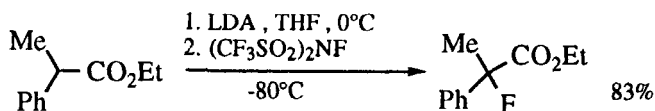
Kitagawa, O.; Miura, A.; Kobayashi, Y.; Taguchi, T. *Chem. Lett.*, **1990**, 1011.



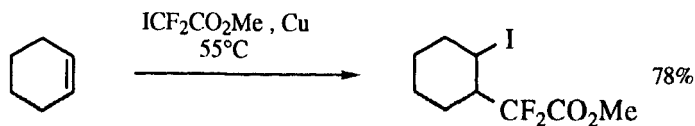
Kitagawa, O.; Sato, T.; Taguchi, T. *Chem. Lett.*, **1991**, 177.



Differding, E.; Rüegg, G.M.; Lang, R.W. *Tetrahedron Lett.*, **1991**, *32*, 1779.

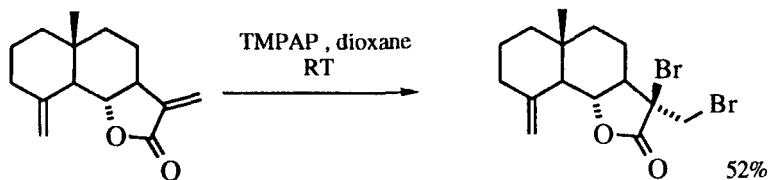


Resnati, G.; Des Marceaux, D.D. *J. Org. Chem.*, **1991**, *56*, 4925.



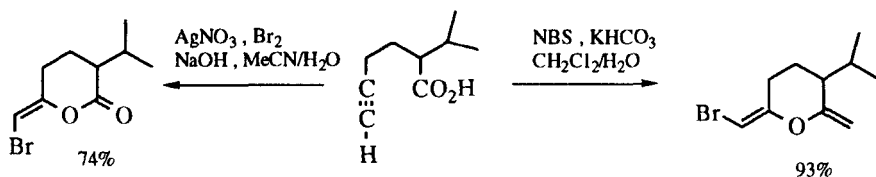
Yang, Z-Y.; Burton, D.J. *J. Org. Chem.*, **1991**, *56*, 5125.

Yang, Z-Y.; Burton, D.J. *J. Chem. Soc., Chem. Commun.*, **1992**, 233.

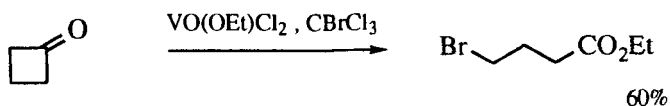


TMPAP = trimethyl(phenyl)ammonium perbromide

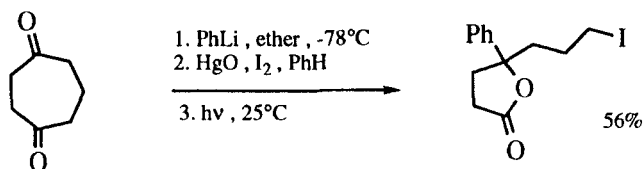
Collado, I.G.; Massanet, G.M.; Alonso, M.S. *Tetrahedron Lett.*, **1991**, 32, 3217.



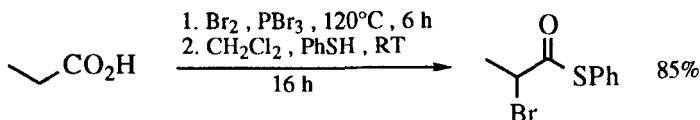
Dai, W.; Katzenellenbogen, J.A. *J. Org. Chem.*, **1991**, 56, 6893.



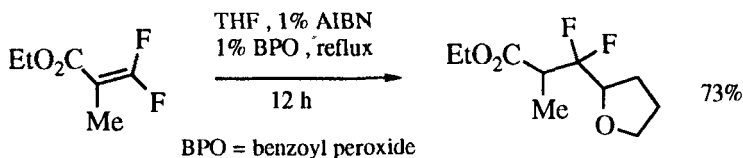
Hirao, T.; Fujii, T.; Miyata, S.; Ohshiro, Y. *J. Org. Chem.*, **1991**, 56, 2264.



Kobayashi, K.; Sasaki, A.; Kanno, Y.; Suginome, H. *Tetrahedron*, **1991**, 47, 7245.

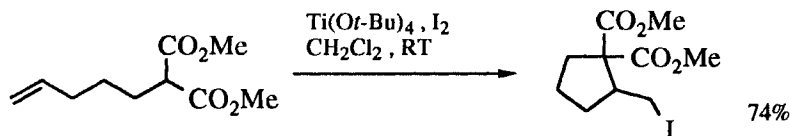


Liu, H.-L.; Luo, W. *Synth. Commun.*, **1991**, 21, 2097.

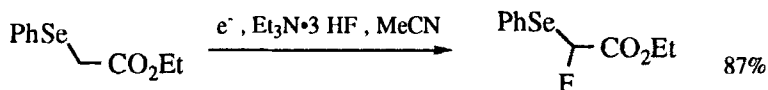


BPO = benzoyl peroxide

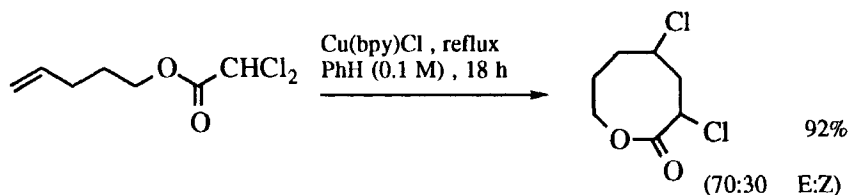
Bumgardner, C.L.; Burgess, J.P. *Tetrahedron Lett.*, **1992**, 33, 1683.



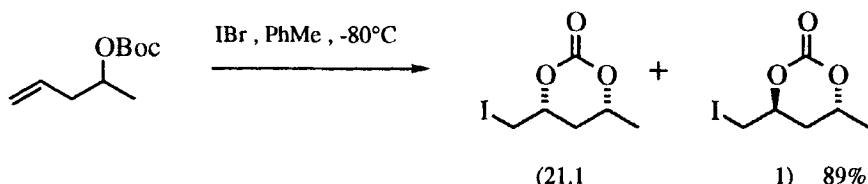
Kitagawa, O.; Inoue, T.; Taguchi, T. *Tetrahedron Lett.*, **1992**, 33, 2167.



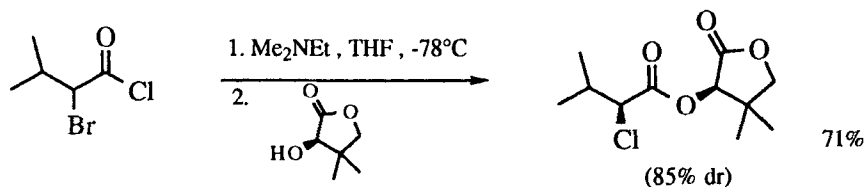
Fuchigami, T.; Hayashi, T.; Konno, A. *Tetrahedron Lett.*, **1992**, 33, 3161.



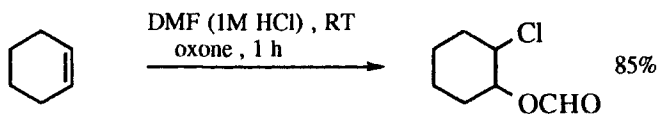
Pirrung, F.O.H.; Steeman, W.J.M.; Hiemstra, H.; Speckamp, W.N.; Kaptein, B.; Boesten, W.H.J.; Schoemaker, H.E.; Kamphuis, J. *Tetrahedron Lett.*, **1992**, 33, 5141.



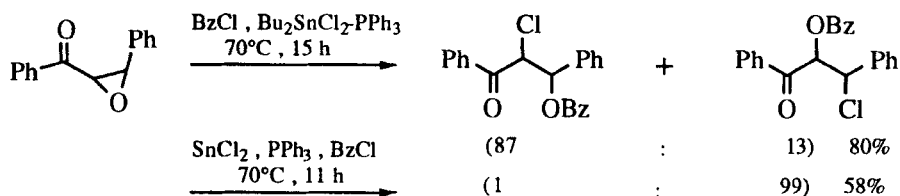
Duan, J.J.-W.; Sprengeler, P.A.; Smith, A.B. III *Tetrahedron Lett.*, **1992**, 33, 6439.



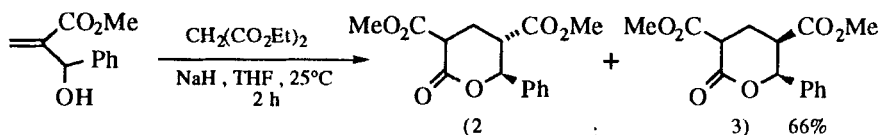
Durst, T.; Koh, K. *Tetrahedron Lett.*, **1992**, 33, 6799.



Kim, J.N.; Kim, H.R.; Ryu, E.K. *Synth. Commun.*, **1992**, 22, 2521.

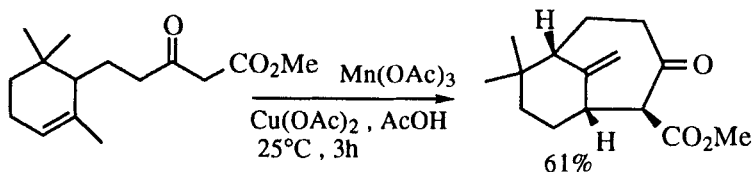


Shibata, I.; Yoshimura, N.; Baba, A.; Matsuda, H. *Tetrahedron Lett.*, **1992**, 33, 7149.



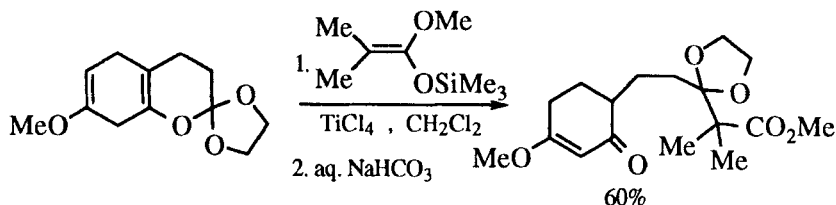
Lawrence, R.M.; Perlmutter, P. *Chem. Lett.*, **1992**, 305.

SECTION 360: ESTER - KETONE

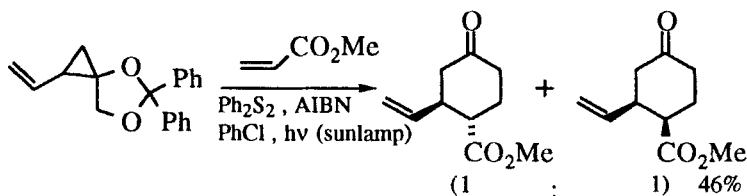


Method extended to include formation of bridged molecules

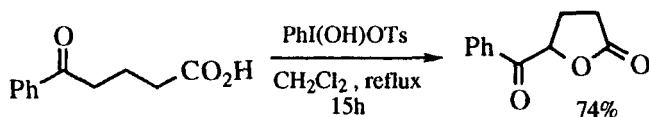
White, J.D.; Somers, T.C.; Yager, K.M. *Tetrahedron Lett.*, **1990**, 31, 59.



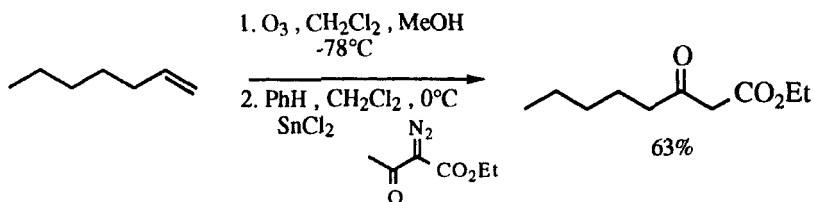
Collins, D.J.; Dosen, M.; Jhingran, A.G. *Tetrahedron Lett.*, **1990**, 31, 421.



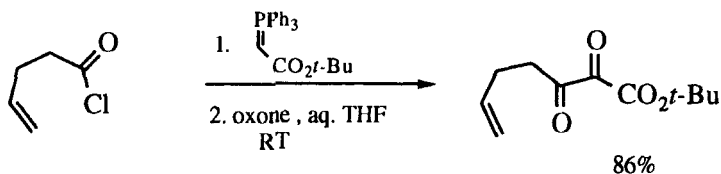
Feldman, K.S.; Vong, A.K.K. *Tetrahedron Lett.*, **1990**, 31, 823.



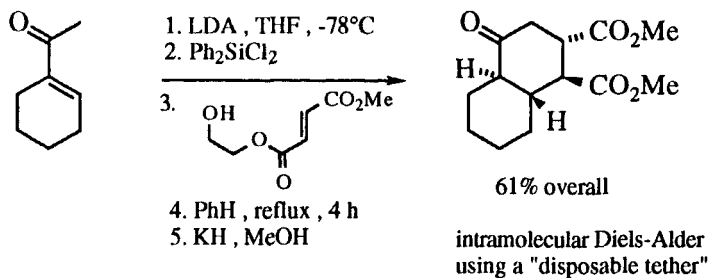
Moriarty, R.M.; Vaid, R.K. Hopkins, T.E.; Vaid, B.K.; Prakash, O. *Tetrahedron Lett.*, **1990**, 31, 201.



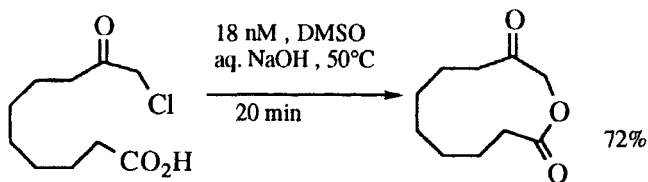
Holmquist, C.R.; Roskamp, E.J. *Tetrahedron Lett.*, **1990**, 31, 4991.



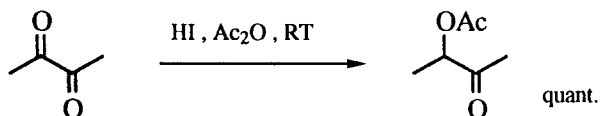
Wasserman, H.H.; Vu, C.B. *Tetrahedron Lett.*, **1990**, 31, 5205.



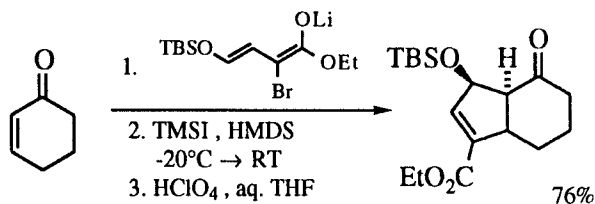
Shea, K.J.; Zandi, K.S.; Staab, A.J.; Carr, R. *Tetrahedron Lett.*, **1990**, 31, 5885.



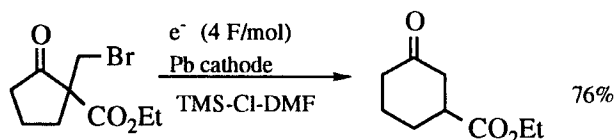
Karim, M.R.; Sampson, P. *J. Org. Chem.*, **1990**, 55, 598.



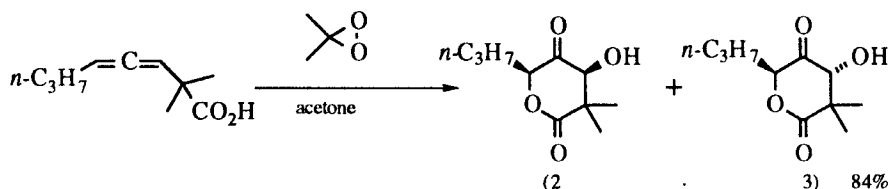
Zoeller, J.R.; Ackerman, C.J. *J. Org. Chem.*, **1990**, *55*, 1354.



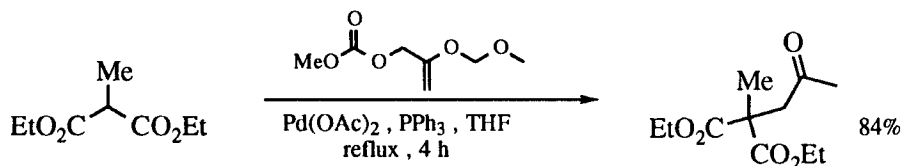
Hudlicky, T.; Heard, N.E.; Fleming, A. *J. Org. Chem.*, **1990**, *55*, 2570.



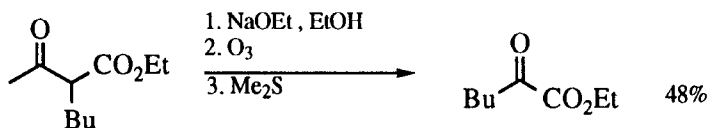
Shono, T.; Kise, N.; Uematsu, N.; Morimoto, S. *J. Org. Chem.*, **1990**, *55*, 5037.



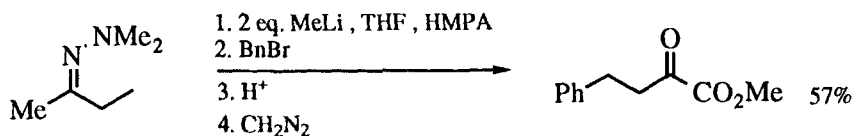
Crandall, J.K.; Rambo, E. *J. Org. Chem.*, **1990**, *55*, 5929.



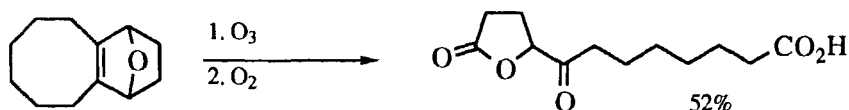
Ikeda, I.; Gu, X-P.; Okuhara, T.; Okahara, M. *Synthesis*, **1990**, 32.



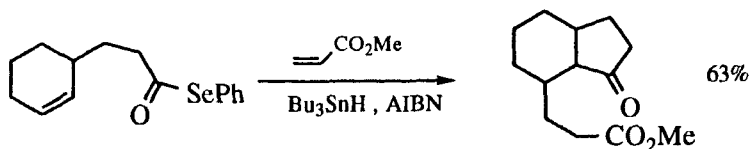
Si, Z-X.; Jiao, X-Y.; Hu, B-F *Synthesis*, **1990**, 509.



Tapia, I.; Alcazar, V.; Moran, J.R.; Caballero, C.; Grande, M. *Chem. Lett.*, **1990**, 697.

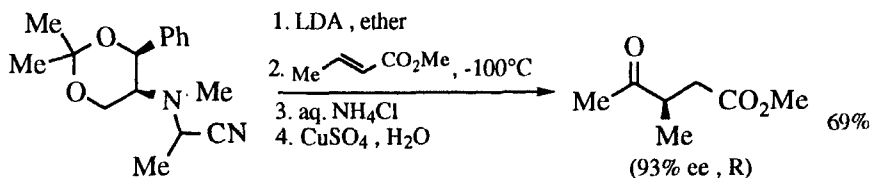


Scholz, G.; Konusch, J.; Tochtermann, W. *Liebigs Ann. Chem.*, **1990**, 593.

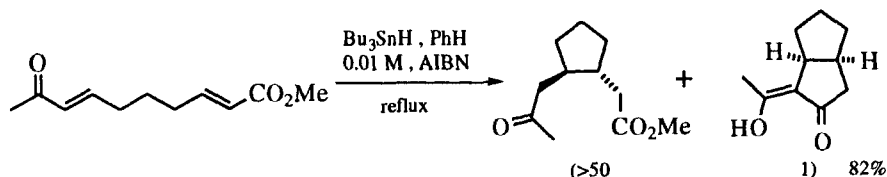


Boger, D.L.; Mathvink, R.J. *J. Am. Chem. Soc.*, **1990**, 112, 4003, 4008.

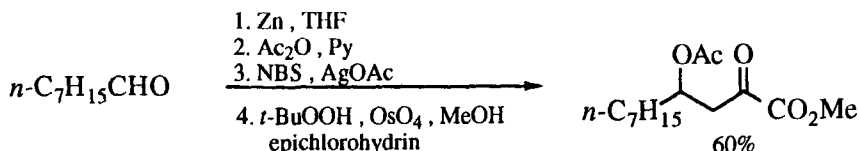
Boger, D.L.; Mathvink, R.J. *J. Org. Chem.*, **1992**, 57, 1429.



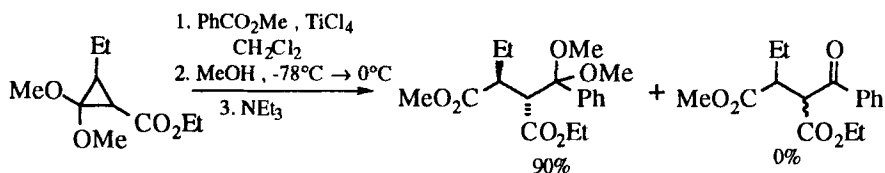
Enders, D.; Gerdes, P.; Kipphardt, H. *Angew. Chem. Int. Ed. Engl.*, **1990**, 29, 179.



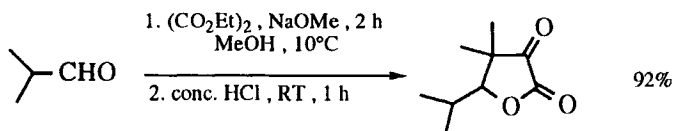
Enholm, E.J.; Kinter, K.S. *J. Am. Chem. Soc.*, **1991**, 113, 7784.



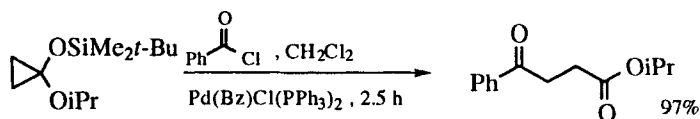
Chen, C.; Crich, D. *J. Chem. Soc., Chem. Commun.*, **1991**, 1289.



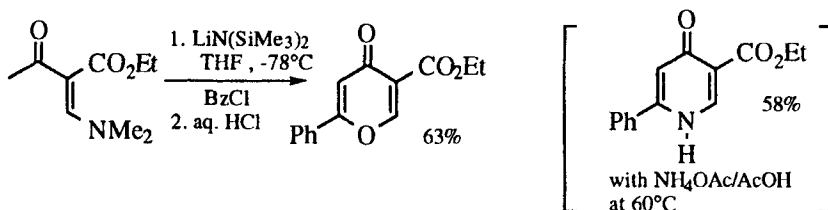
Shimada, S.; Saigo, K.; Hashimoto, Y.; Maekawa, Y.; Yamashita, T.; Yamamoto, T.; Hasegawa, M. *Chem. Lett.*, **1991**, 1475.



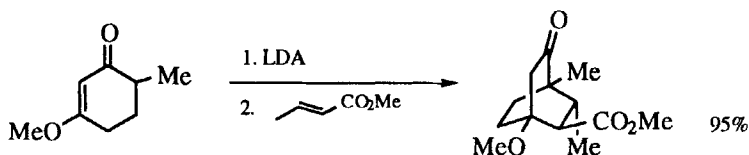
Hata, H.; Morishita, T.; Akutsu, S.; Kawamura, M. *Synthesis*, **1991**, 289.



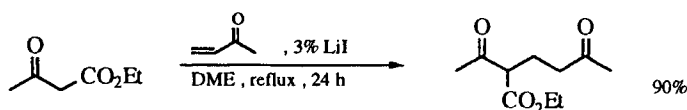
Fujimura, T.; Aoki, S.; Nakamura, E. *J. Org. Chem.*, **1991**, 56, 2809.



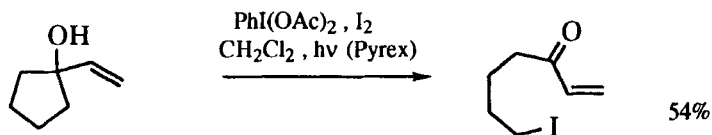
McCombie, S.W.; Metz, W.A.; Nazareno, D.; Shankar, B.B.; Tagat, J. *J. Org. Chem.*, **1991**, 56, 4963.



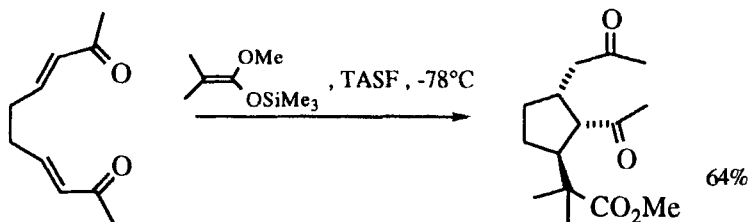
Schinzler, D.; Kalesse, M. *Tetrahedron Lett.*, **1991**, 32, 4691.



Antonioletti, R.; Bonadies, F.; Monteagudo, E.S.; Scettri, A. *Tetrahedron Lett.*, **1991**, 32, 5373.

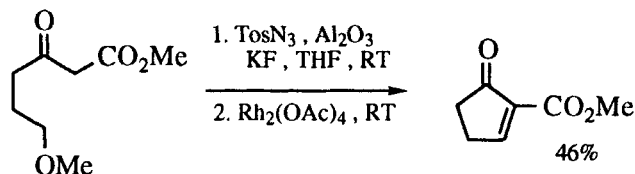


Galatsis, P.; Millan, S.D. *Tetrahedron Lett.*, **1991**, 32, 7493.

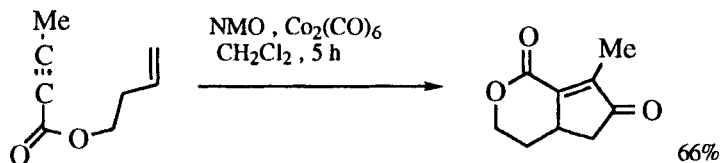


TASF = tris(dimethylamino)sulfonium trimethyl difluorosilicate

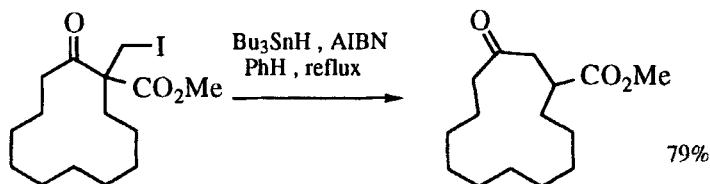
Klimko, P.G.; Singleton, D.A. *J. Org. Chem.*, **1992**, 57, 1733.



Ceccherelli, P.; Curini, M.; Marcotullio, M.C.; Rosati, O. *Org. Prep. Proceed. Int.*, **1992**, 24, 497.

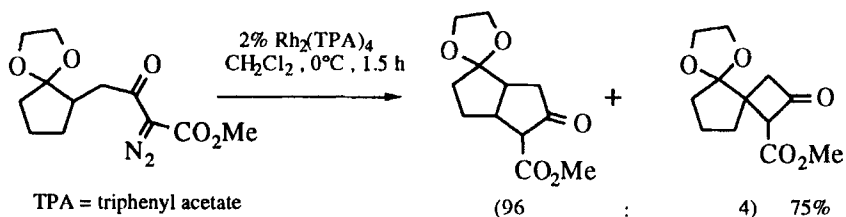


Krafft, M.E.; Romero, R.H.; Scott, I.L. *J. Org. Chem.*, **1992**, 57, 5277.



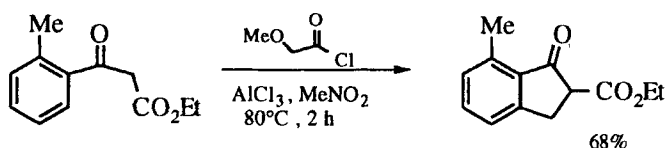
Dowd, P.; Choi, S-C. *Tetrahedron*, **1992**, 48, 4773.

Dowd, P.; Choi, S-C. *Tetrahedron Lett.*, **1991**, 32, 565.

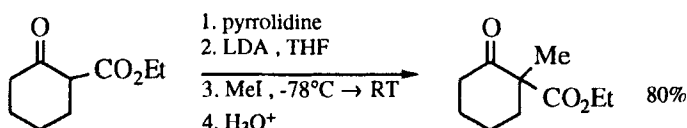


Hashimoto, S.; Watanabe, N.; Ikegami, S. *Tetrahedron Lett.*, **1992**, 33, 2709.

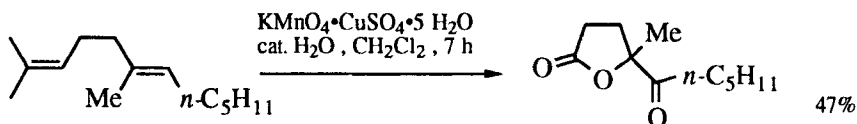
Hashimoto, S.; Watanabe, N.; Ikegami, S. *Tetrahedron Lett.*, **1990**, 31, 5173.



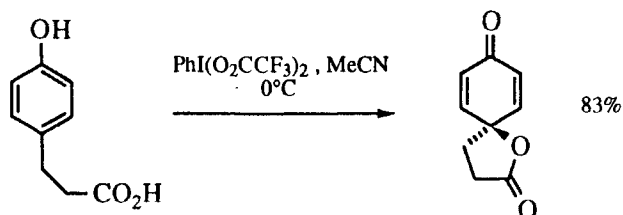
Sartori, G.; Bigi, F.; Tao, X.; Casnati, G.; Canali, G. *Tetrahedron Lett.*, **1992**, 33, 4771.



Hodgson, A.; Marshall, J.; Hallett, P.; Gallagher, T. *J. Chem. Soc., Perkin Trans. I*, **1992**, 2169.



Baskaran, S.; Islam, I.; Vankar, P.S.; Chandrasekaran, S. *J. Chem. Soc., Chem. Commun.*, **1992**, 626.

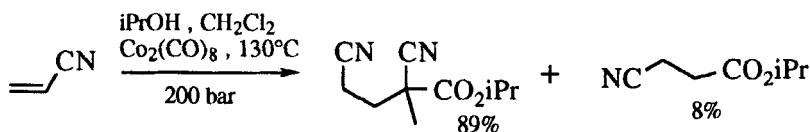


McKillop, A.; McLaren, L.; Taylor, R.J.K.; Watson, R.J.; Lewis, N. *SynLett*, **1992**, 201.

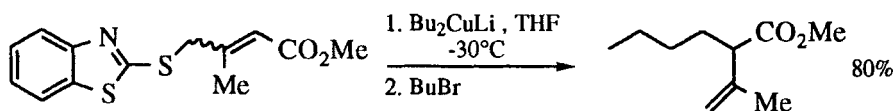
Also via Ketoacids
Hydroxyketones

Section 320 (Carboxylic Acid - Ketone)
Section 330 (Alcohol - Ketone)

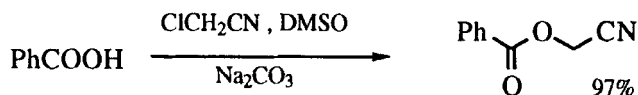
SECTION 361: ESTER - NITRILE



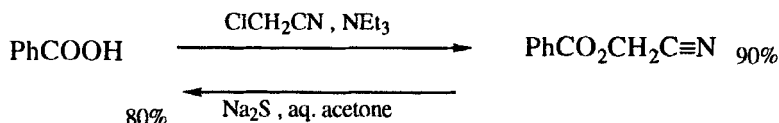
Sisak, A.; Ungváry, F.; Markó, L. *J. Org. Chem.*, **1990**, 55, 2508.



Calò, V.; Lopez, L.; Pesce, G. *Gazz. Chim. Ital.*, **1990**, 120, 203.



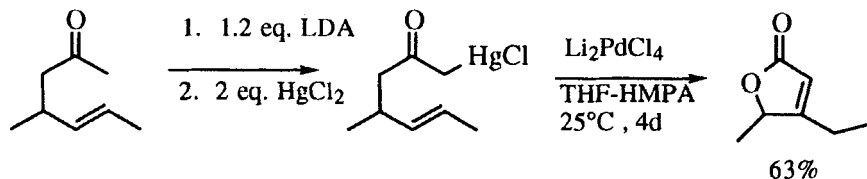
Byers, J.H.; Baran, R.C.; Craig, M.E.; Jackson, J.T. *Org. Prep. Proceed. Int.*, **1991**, 23, 373.



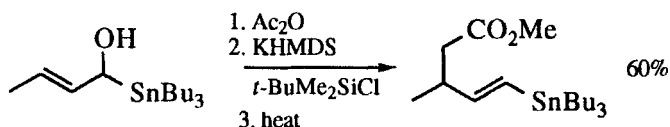
Hugel, H.M.; Bhaskar, K.V.; Longmore, R.W. *Synth. Commun.*, **1992**, 22, 693.

SECTION 362: ESTER - ALKENE

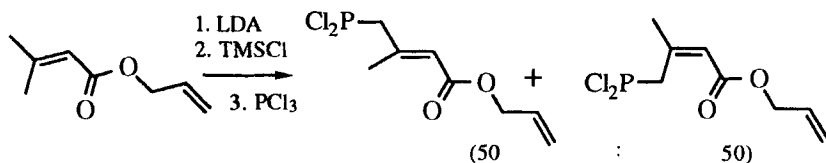
This section contains syntheses of enol esters and esters of unsaturated acids as well as ester molecules bearing a remote alkenyl unit.



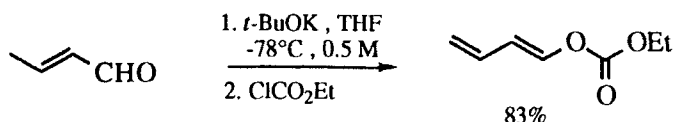
Larock, R.C.; Stinn, D.E.; Kuo, M-Y. *Tetrahedron Lett.*, **1990**, 31, 17.



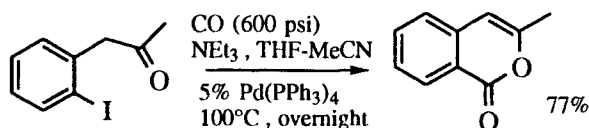
Ritter, K. *Tetrahedron Lett.*, **1990**, 31, 869.



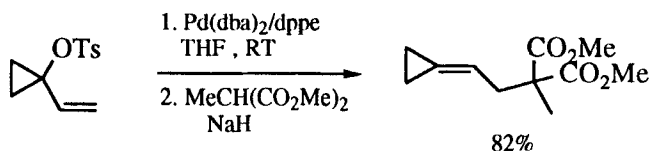
Pellon, P.; Himdi-Kabbab, S.; Rault, I.; Tonnard, F.; Hamelin, J. *Tetrahedron Lett.*, **1990**, *31*, 1147.



De Cusati, P.F.; Olofson, R.A. *Tetrahedron Lett.*, **1990**, *31*, 1405.

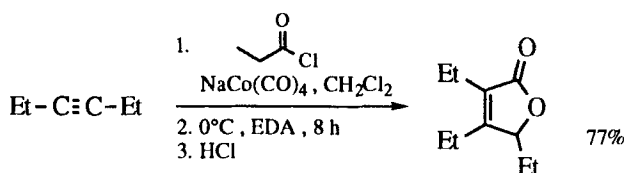


Shimoyama, I.; Zhang, Y.; Wu, G.; Nigishi, E. *Tetrahedron Lett.*, **1990**, *31*, 2841.



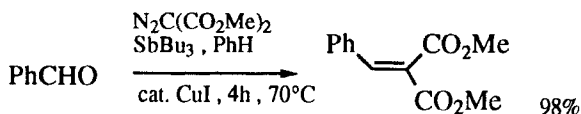
Stolle, A.; Salaün, J.; de Meijere, A. *Tetrahedron Lett.*, **1990**, *31*, 4593.

Stolle, A.; Salaün, J.; de Meijere, A. *SynLett.*, **1991**, 321.



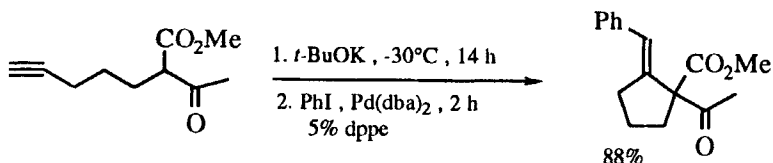
Krafft, M.E.; Pankowski, J. *Tetrahedron Lett.*, **1990**, *31*, 5139.

Krafft, M.E.; Pankowski, J. *SynLett.*, **1991**, 865.

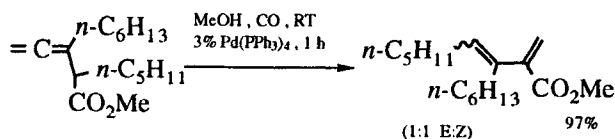


also works with ketones

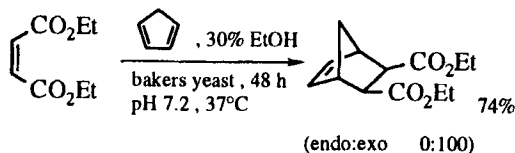
Liao, Y.; Huang, Y-Z. *Tetrahedron Lett.*, **1990**, *31*, 5897.



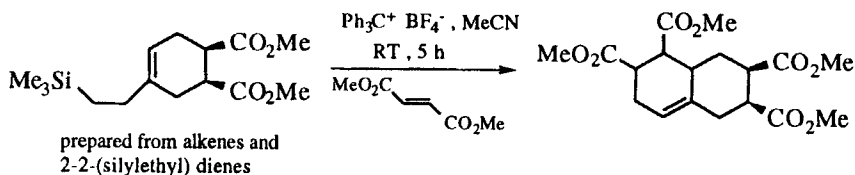
Fournet, G.; Balme, G.; Van Hemelryck, B.; Gore, J. *Tetrahedron Lett.*, **1990**, 31, 5147.



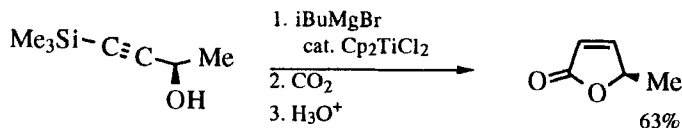
Nokami, J.; Maihara, A.; Tsuji, J. *Tetrahedron Lett.*, **1990**, 31, 5629.



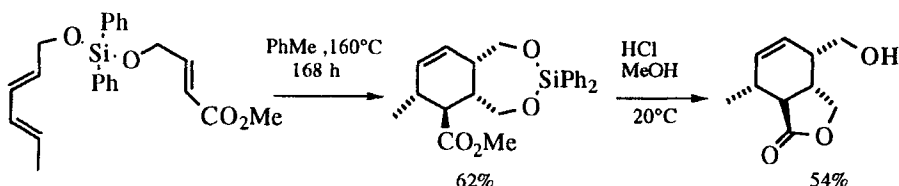
Rama Rao, K.; Srinivasan, T.N.; Bhanumathi, N. *Tetrahedron Lett.*, **1990**, 31, 5959.



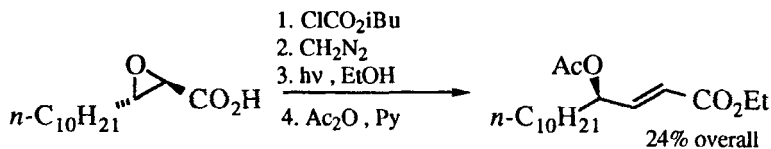
Hosomi, A.; Masunari, T.; Tominaga, Y.; Yanagi, T.; Hojo, M. *Tetrahedron Lett.*, **1990**, 31, 6201.



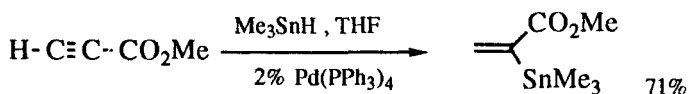
Ito, T.; Okamoto, S.; Sato, F. *Tetrahedron Lett.*, **1990**, 31, 6399.



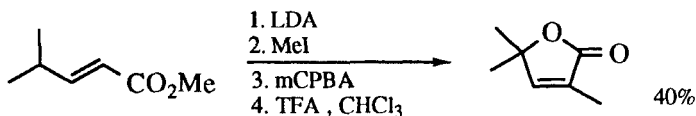
Craig, D.; Reader, J.C. *Tetrahedron Lett.*, **1990**, 31, 6585.



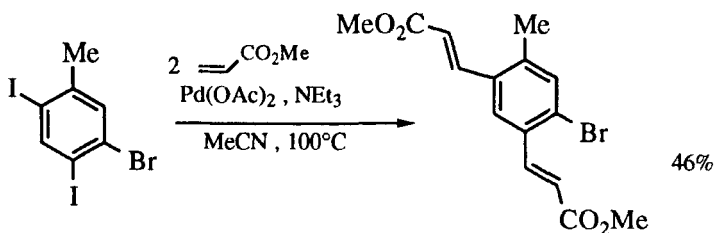
Thijs, L.; Dommerholt, F.J.; Leemhuis, F.M.C.; Zwanenburg, B. *Tetrahedron Lett.*, **1990**, 31, 6589.



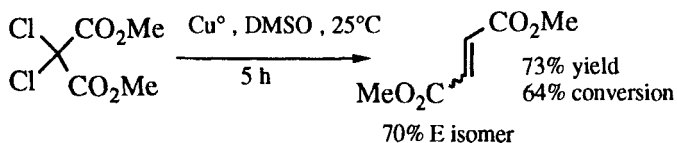
Cochran, J.C.; Bronk, B.S.; Terrence, K.M.; Phillips, H.K. *Tetrahedron Lett.*, **1990**, 31, 6621.



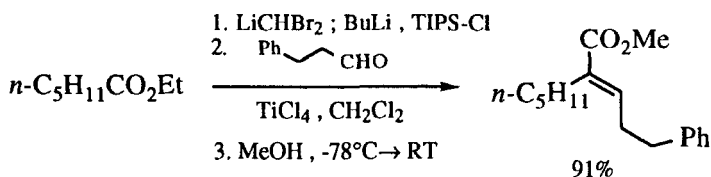
Cory, R.M.; Ritchie, B.M.; Shrier, A.M. *Tetrahedron Lett.*, **1990**, 31, 6789.



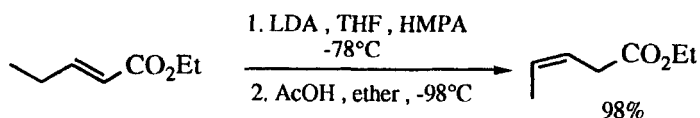
Tao, W.; Nesbitt, S.; Heck, R.S. *J. Org. Chem.*, **1990**, 55, 63.



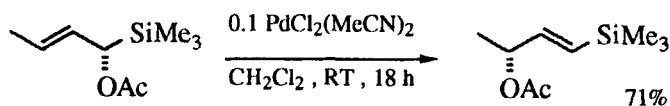
Tezuka, Y.; Hashimoto, A.; Ushizaka, K.; Imai, K. *J. Org. Chem.*, **1990**, 55, 329.



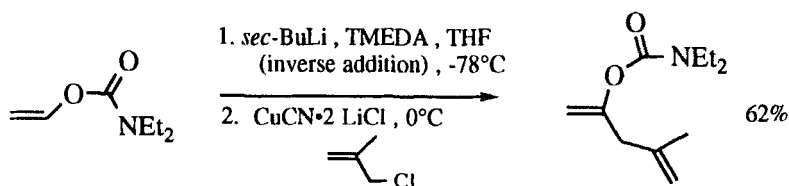
Kowalski, C.J.; Sakdarat, S. *J. Org. Chem.*, **1990**, 55, 1977.



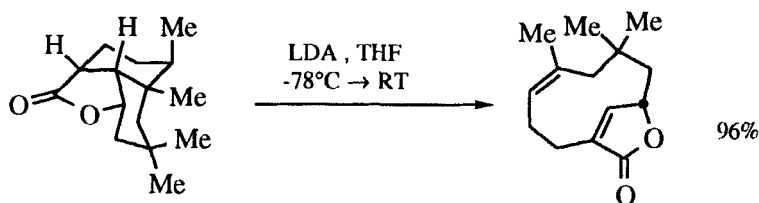
Piers, E.; Gavai, A.V. *J. Org. Chem.*, **1990**, *55*, 2374.



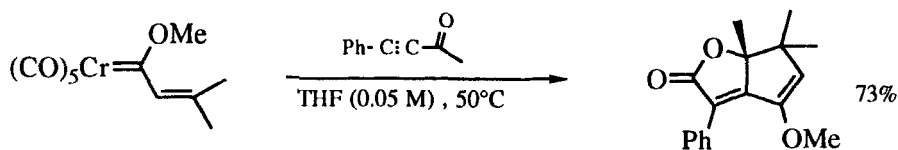
Panek, J.S.; Sparks, M.A. *J. Org. Chem.*, **1990**, *55*, 5564.



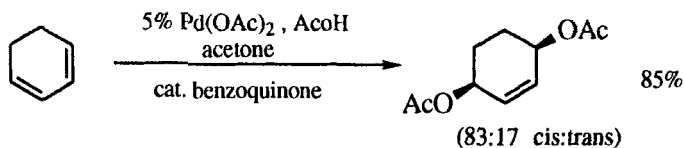
Sengupta, S.; Snieckus, V. *J. Org. Chem.*, **1990**, *55*, 5680.



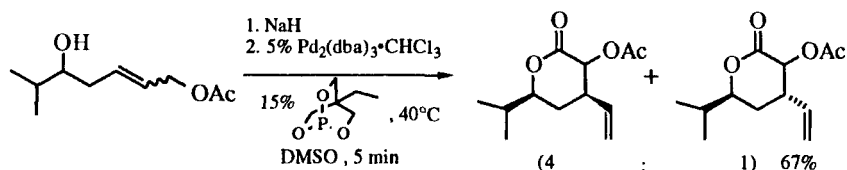
Wender, P.A.; Manly, C.J. *J. Am. Chem. Soc.*, **1990**, *112*, 8579.



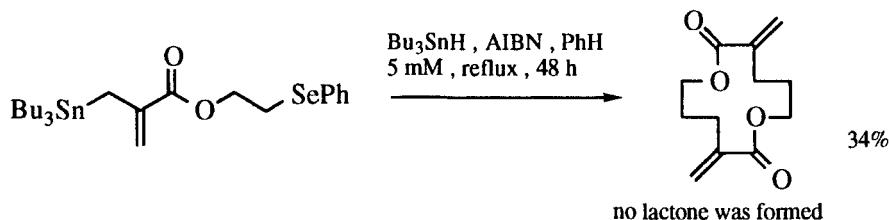
Brandvold, T.A.; Wulff, W.D.; Rheingold, A.L. *J. Am. Chem. Soc.*, **1990**, *112*, 1645.



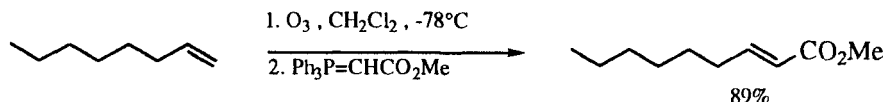
Bäckvall, J.-E.; Grandberg, K.L.; Hopkins, R.B. *Acta Chem. Scand.*, **1990**, *44*, 492.



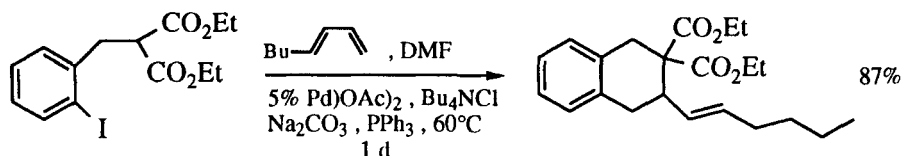
Hanzawa, Y.; Ishizawa, S.; Ito, H.; Kobayashi, Y.; Taguchi, T. *J. Chem. Soc., Chem. Commun.*, **1990**, 394.



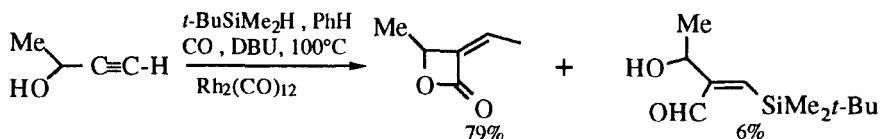
Baldwin, J.E.; Adlington, R.M.; Mitchell, M.B.; Robertson, J. *J. Chem. Soc., Chem. Commun.*, **1990**, 1574.



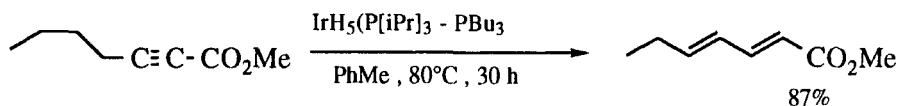
Hon, Y.-S.; Lu, L.; Li, S.-Y. *J. Chem. Soc., Chem. Commun.*, **1990**, 1627.



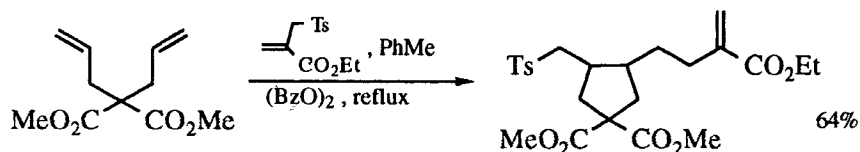
Larock, R.C.; Fried, C.A. *J. Am. Chem. Soc.*, **1990**, 112, 5882.



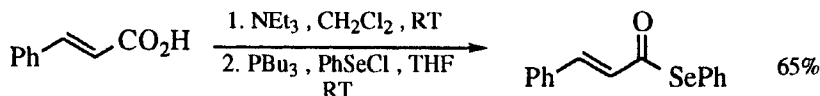
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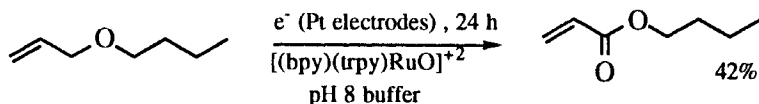
Ma, D.; Lu, X. *Tetrahedron*, **1990**, 46, 3189.



Chuang, C-P. *SynLett*, **1990**, 527.

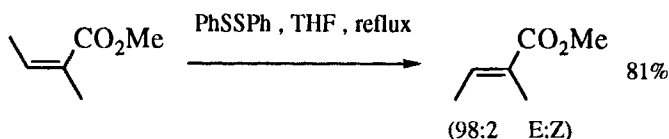


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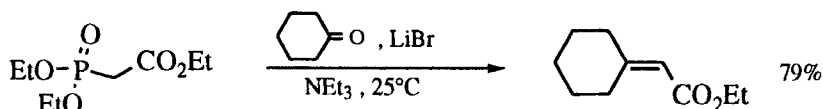


$\text{trpy} = 2,2',6',2''\text{-terpyridine}$

Campos, J.L.; De Giovanni, W.F.; Romero, J.R. *Synthesis*, **1990**, 597.



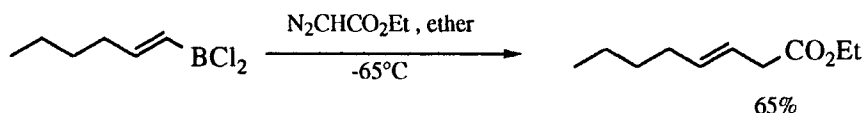
Miyata, O.; Shinada, T.; Ninomiya, I.; Naito, T. *Synthesis*, **1990**, 1123.



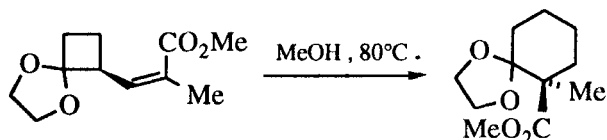
Rathke, M.W.; Bouhlef, E. *Synth. Commun.*, **1990**, 20, 869.



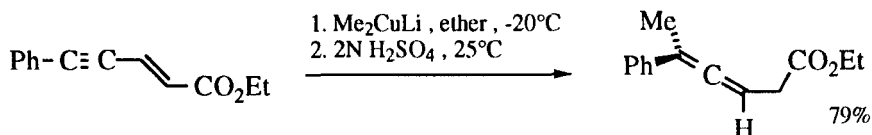
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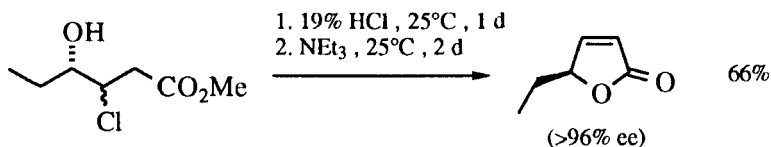
Brown, H.C.; Salunkhe, A.M. *SynLett*, **1991**, 684.



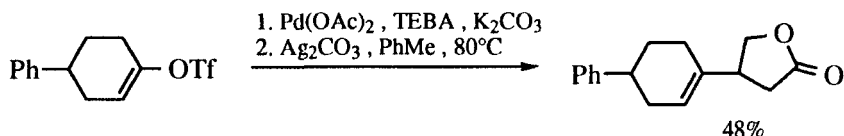
Gruseck, U.; Heuschmann, M. *Chem. Ber.*, **1990**, 123, 1911, 1905.



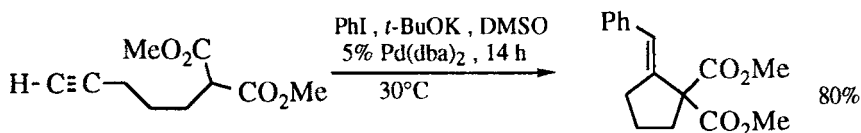
Krause, N. *Chem. Ber.*, **1990**, 123, 2173.



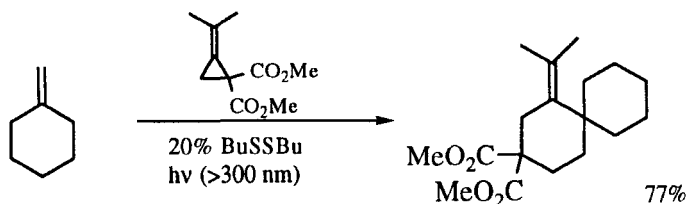
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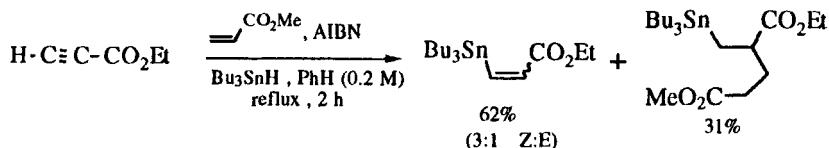
Arcadi, A.; Bernocchi, E.; Cacchi, S.; Marinelli, F. *Tetrahedron*, **1991**, 47, 1525.



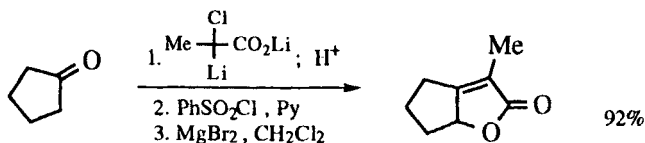
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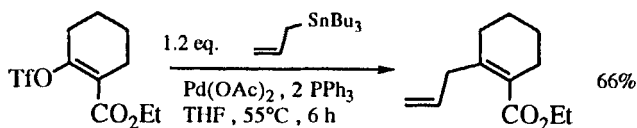
Singleton, D.A.; Huval, C.C.; Church, K.M.; Priestley, E.S. *Tetrahedron Lett.*, **1991**, 32, 5765.



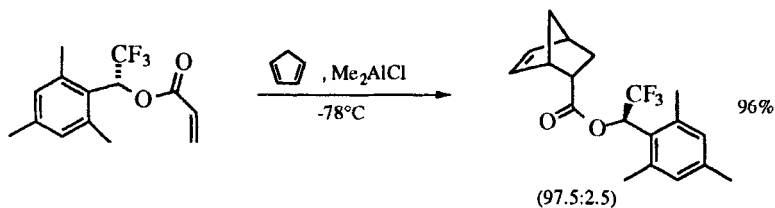
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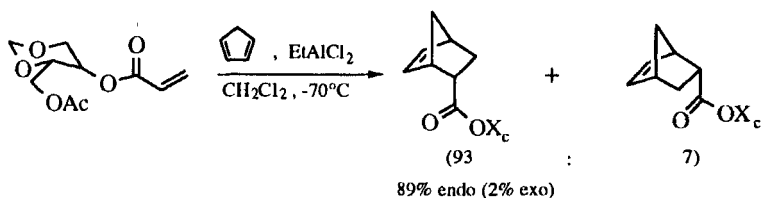
Black, T.H.; McDermott, T.S.; Brown, G.A. *Tetrahedron Lett.*, **1991**, 32, 6501.



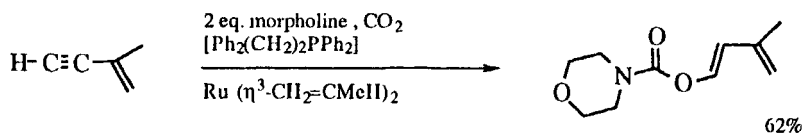
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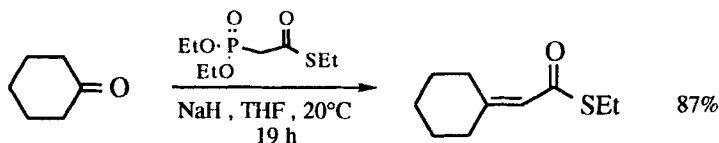
Corey, E.L.; Cheng, X-M.; Cünprich, K.A. *Tetrahedron Lett.*, **1991**, 32, 6839.



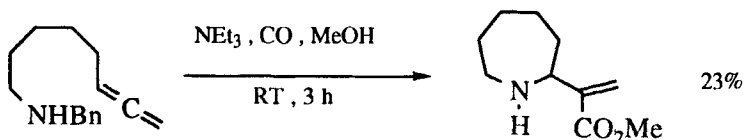
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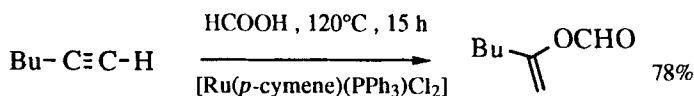
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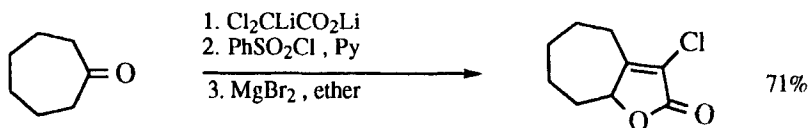


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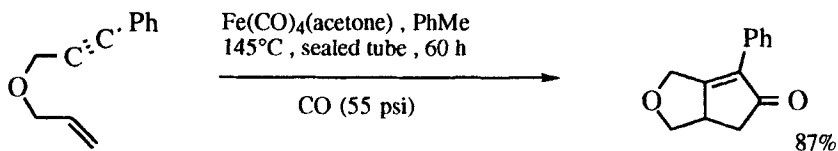
Neveux, M.; Bruneau, C.; Dixneuf, P.H. *J. Chem. Soc., Perkin Trans. I*, **1991**, 1197.

Philippot, K.; Devanne, D.; Dixneuf, P.H. *J. Chem. Soc., Chem. Commun.*, **1990**, 1199.

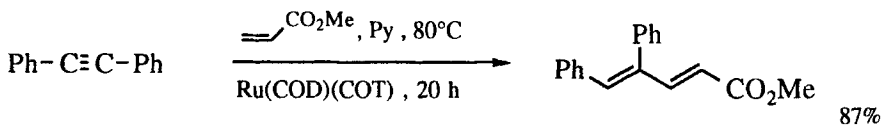


Black, T.H.; McDermott, T.S. *J. Chem. Soc., Chem. Commun.*, **1991**, 184.

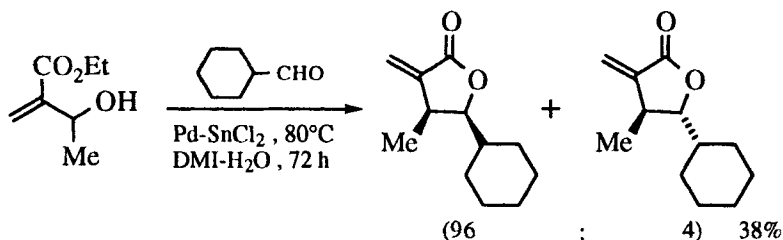
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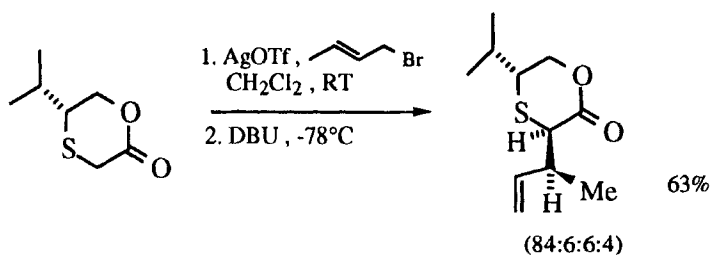
Pearson, A.J.; Dubbert, R.A. *J. Chem. Soc., Chem. Commun.*, **1991**, 202.



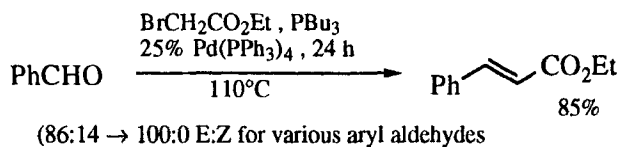
Mitsudo, T.; Zhang, S-W.; Nagao, M.; Watanabe, Y. *J. Chem. Soc., Chem. Commun.*, **1991**, 598.



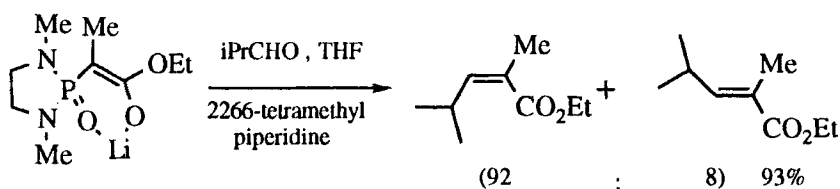
Masuyama, Y.; Nimura, Y.; Kurusu, Y. *Tetrahedron Lett.*, **1991**, 32, 225.



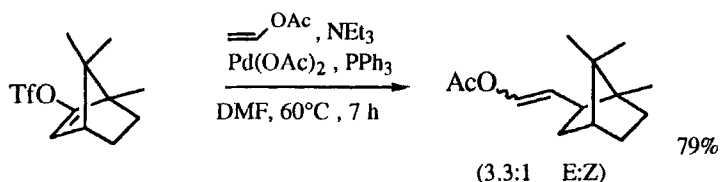
Tahir, S.H.; Olmstead, M.M.; Kurth, M.J. *Tetrahedron Lett.*, **1991**, 32, 335.



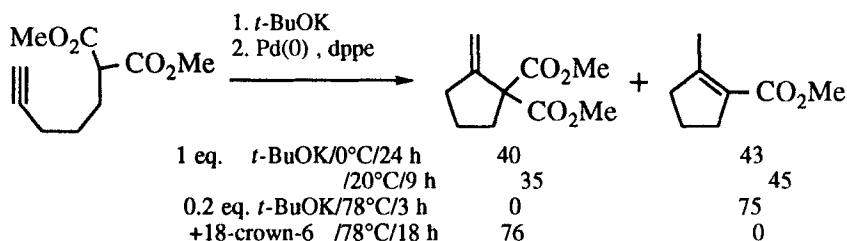
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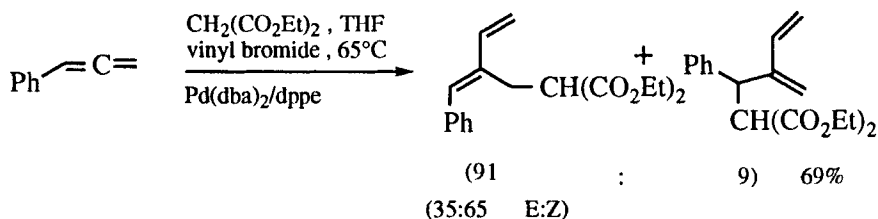
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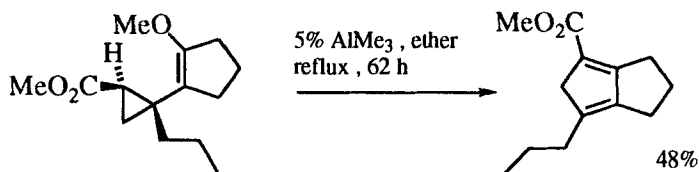
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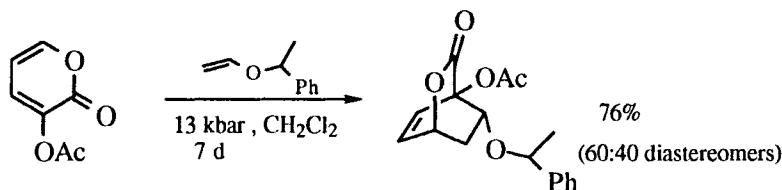
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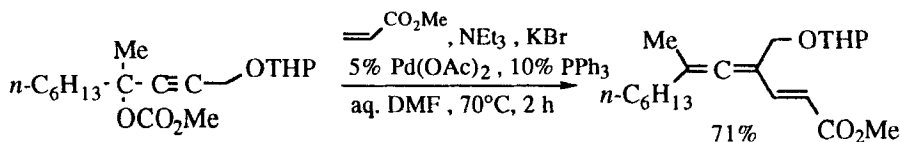
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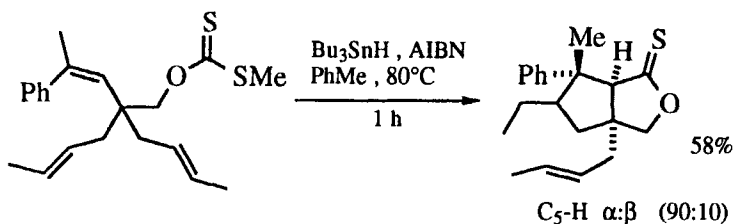
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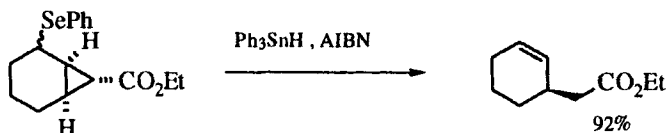
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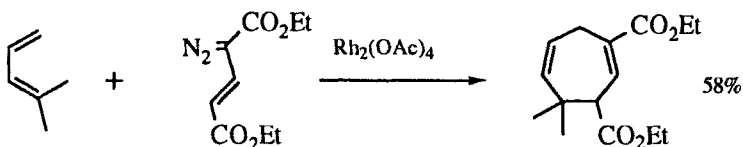
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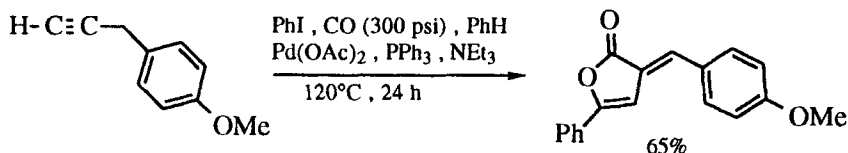
Iwasa, S.; Yamamoto, M.; Kohmoto, S.; Yamada, K. *J. Org. Chem.*, **1991**, *56*, 2849.



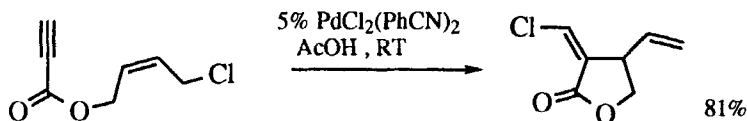
Clive, D.L.I.; Daigneault, S. *J. Org. Chem.*, **1991**, *56*, 3801.



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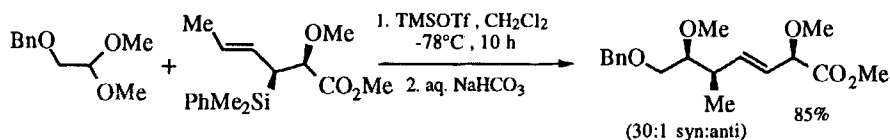


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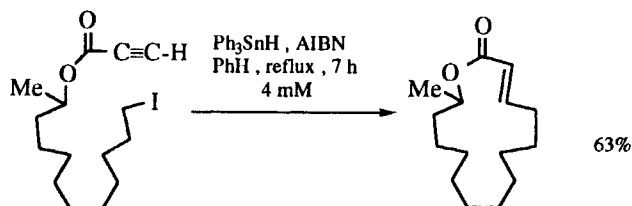


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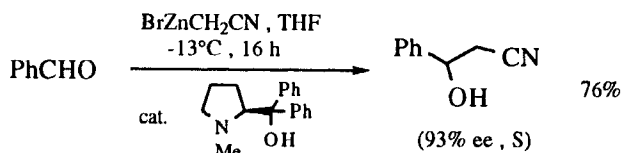
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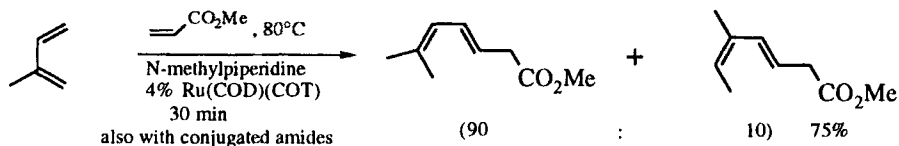
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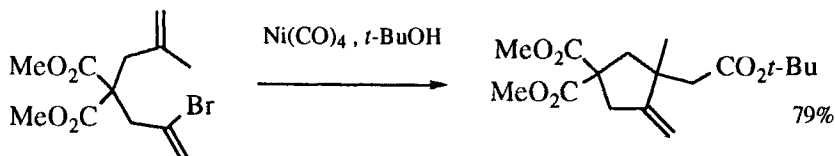
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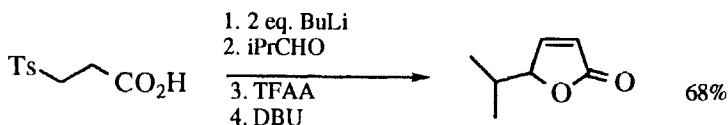
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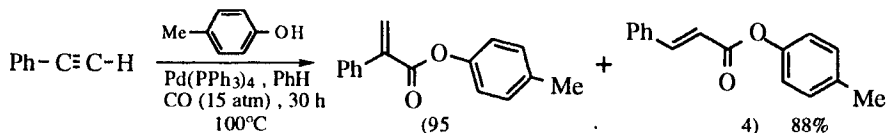
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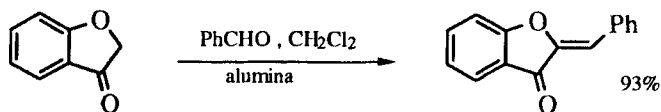
Llebaria, A.; Camps, F.; Moretó, J.M. *Tetrahedron Lett.*, **1992**, *33*, 3683.



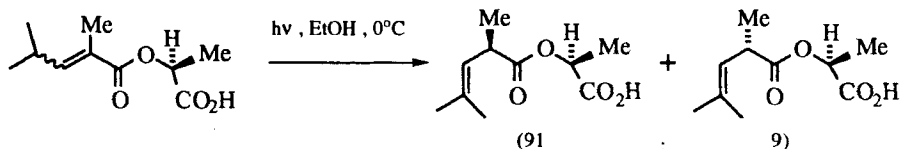
Bonete, P.; Nájera, C. *Tetrahedron Lett.*, **1992**, *33*, 4065.



Itoh, K.; Miura, M.; Nomura, M. *Tetrahedron Lett.*, **1992**, *33*, 5369.

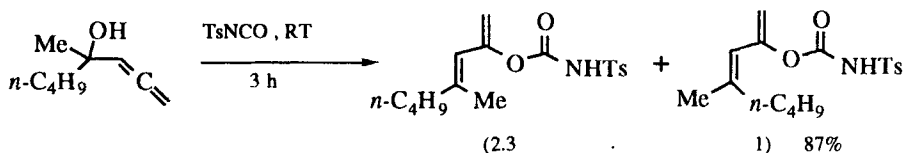


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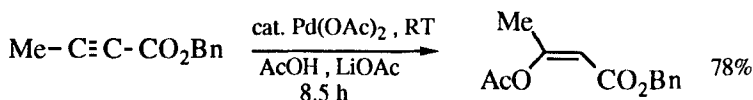


Charlton, J.L.; Pham, V.C.; Pete, J-P. *Tetrahedron Lett.*, **1992**, 33, 6073.

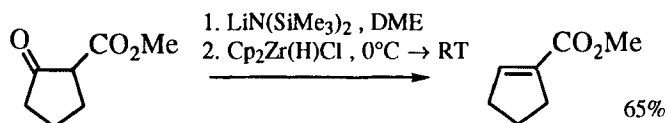
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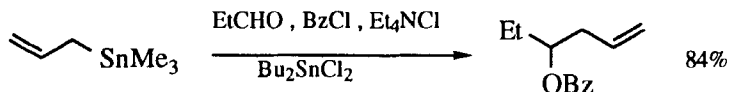
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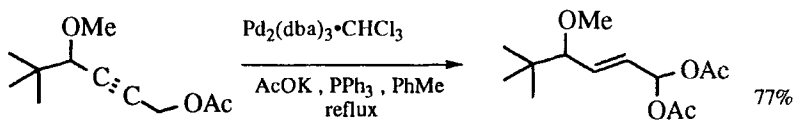
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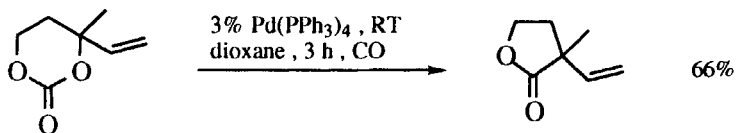
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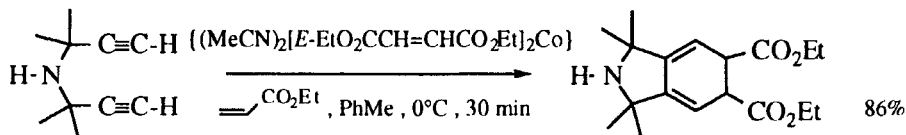
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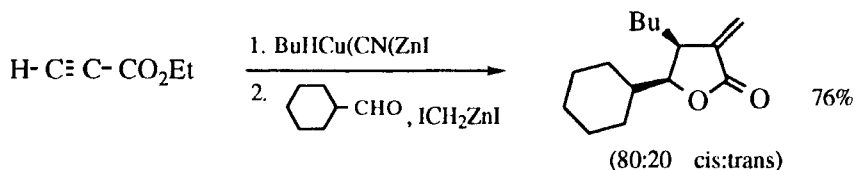
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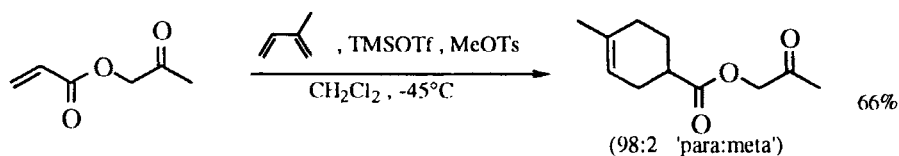
Bando, T.; Tanaka, S.; Fugami, K.; Yoshida, Z.; Tamaru, Y. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 97.



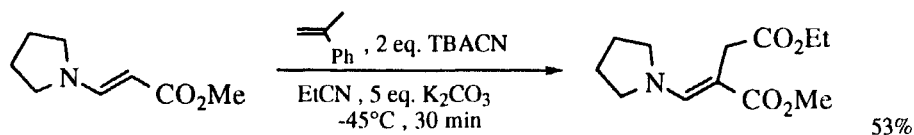
Zhou, Z.; Costa, M.; Chiusoli, G.P. *J. Chem. Soc., Perkin Trans. I*, **1992**, 1399, 1407.



Sidduri, A.R.; Knochel, P. *J. Am. Chem. Soc.*, **1992**, 114, 7579.

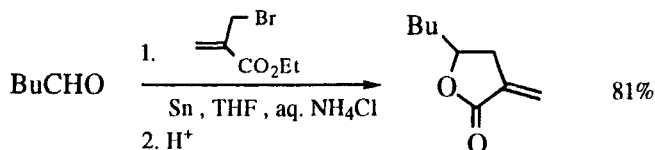


Hashimoto, Y.; Nagashima, T.; Hasegawa, M.; Saigo, K. *Chem. Lett.*, **1992**, 1353.



TBACN = tetrabutylammonium cerium (IV) nitrate

Narasaka, K.; Okauchi, T.; Tanaka, K.; Murakami, M. *Chem. Lett.*, **1992**, 2099.

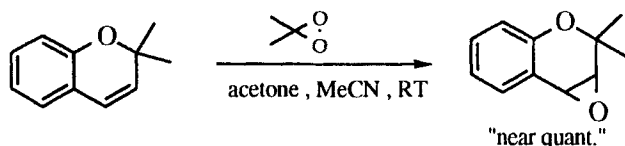


Zhou, J.; Lu, G.; Wu, S. *Synth. Commun.*, **1992**, 22, 481.

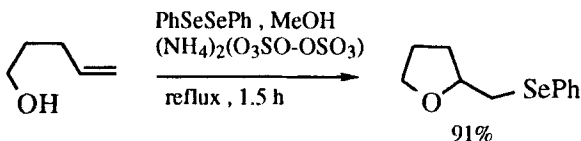
Related Methods: Section 60A (Protection of Aldehydes). Section 180A (Protection of Ketones).
 Also via Acetylenic Esters: Section 306 (Alkyne - Ester). Alkenyl Acids: Section 322
 (Carboxylic Acid - Alkene). β -Hydroxy-esters: Section 327 (Alcohol - Ester).

SECTION 363: ETHER, EPOXIDE, THIOETHER - ETHER, EPOXIDE, THIOETHER

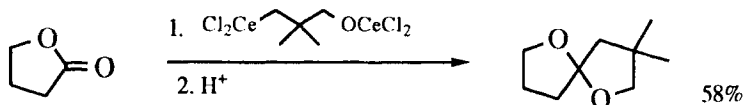
See Section 60A (Protection of Aldehydes) and Section 180A (Protection of Ketones) for reactions involving formation of Acetals and Ketals.



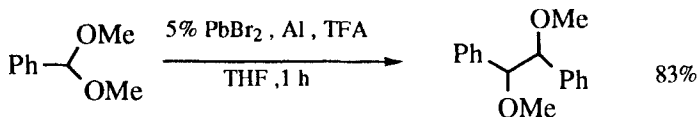
Bujons, J.; Camps, F.; Messegueur, A. *Tetrahedron Lett.*, **1990**, 31, 5235.



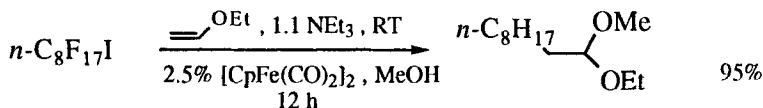
Tiecco, M.; Testaferri, L.; Tingoli, M.; Bartoli, D.; Balducci, R. *J. Org. Chem.*, **1990**, 55, 429.



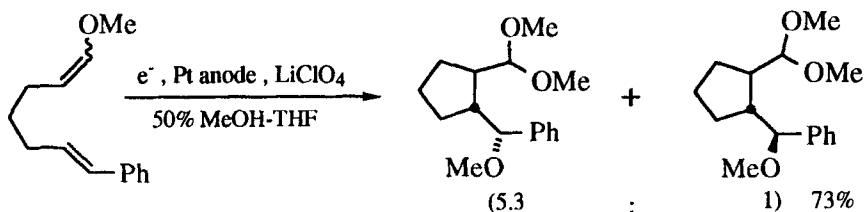
Mudryk, B.; Shook, C.A.; Cohen, T. *J. Am. Chem. Soc.*, **1990**, 112, 6389.



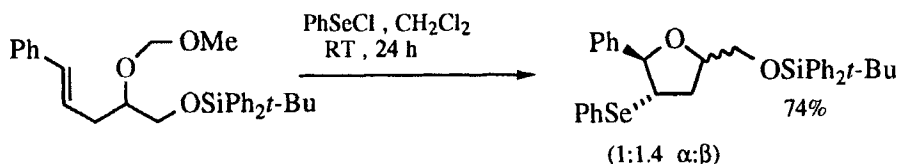
Dhimane, H.; Tanaka, H.; Torii, S. *Bull. Soc. Chim. Fr.*, **1990**, 127, 283.



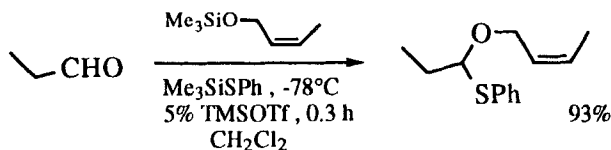
Sasaoka, S.; Uno, M.; Joh, T.; Imazaki, H.; Takahashi, S. *J. Chem. Soc., Chem. Commun.*, **1991**, 86.



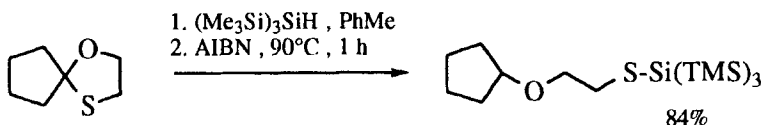
Moeller, K.D.; Marzabadi, M.R.; New, D.G.; Chiang, M.Y.; Keith, S. *J. Am. Chem. Soc.*, **1990**, *112*, 6123.



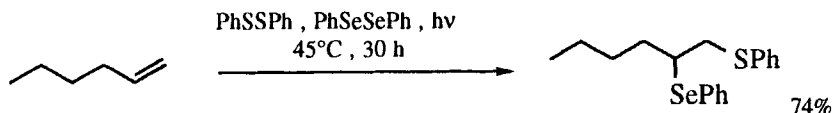
Kang, S.H.; Hwang, T.S.; Kim, W.J.; Lim, J.K. *Tetrahedron Lett.*, **1991**, *32*, 4015.



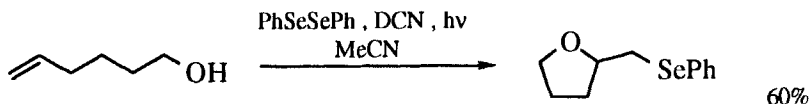
Kusche, A.; Hoffmann, R.; Münster, I.; Keiner, P.; Brückner, R. *Tetrahedron Lett.*, **1991**, *32*, 467.



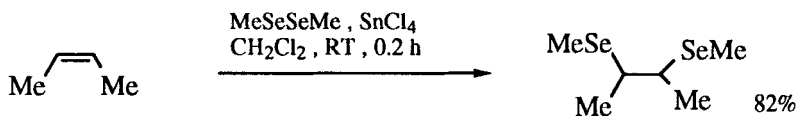
Arya, P.; Lesage, M.; Wayner, D.D.M. *Tetrahedron Lett.*, **1991**, *32*, 2853.



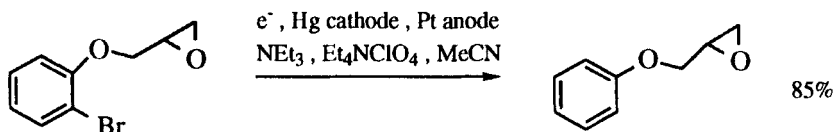
Ogawa, A.; Tanaka, H.; Yokoyama, H.; Obayashi, R.; Yokoyama, K.; Sonoda, N. *J. Org. Chem.*, **1992**, *57*, 111.



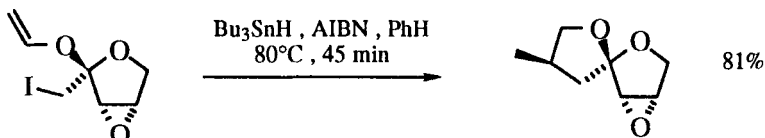
Pandey, G.; Somasekhar, B.B.V. *J. Org. Chem.*, **1992**, *57*, 4019.



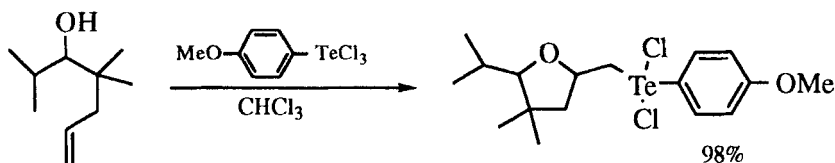
Hermans, B.; Colard, N.; Hevesi, L., *Tetrahedron Lett.*, **1992**, 33, 4629.



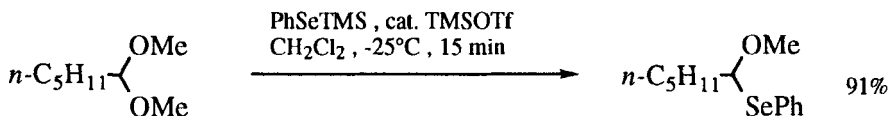
Bhuvaneswari, N.; Venkatachalam, C.S.; Balasubramanian, K.K., *Tetrahedron Lett.*, **1992**, 33, 1499.



Dalla, V.; Pale, P., *Tetrahedron Lett.*, **1992**, 33, 7857.

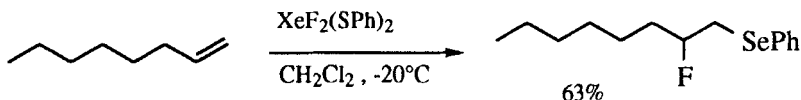


Comasseto, J.V.; Grazini, M.V.A., *Synth. Commun.*, **1992**, 22, 1061.

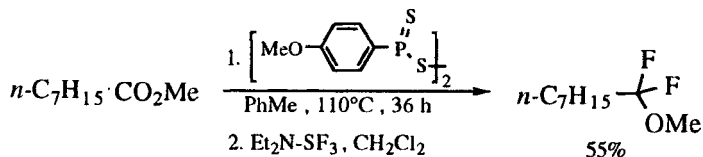


Sakakibara, M.; Katsumata, K.; Watanabe, Y.; Toru, T.; Ueno, Y., *SynLett.*, **1992**, 965.

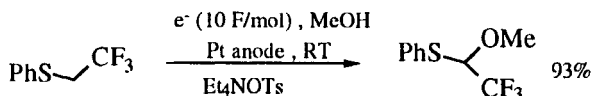
SECTION 364: ETHER, EPOXIDE, THIOETHER - HALIDE, SULFONATE



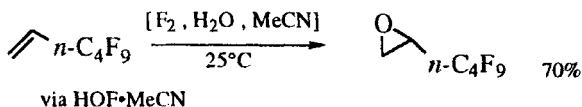
Uneyama, K.; Kanai, M. *Tetrahedron Lett.*, **1990**, 31, 3583.



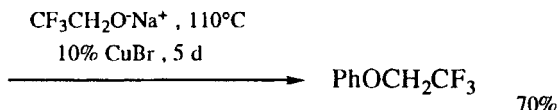
Brunnelle, W.H.; McKinnis, B.R.; Narayanan, B.A. *J. Org. Chem.*, **1990**, 55, 768.



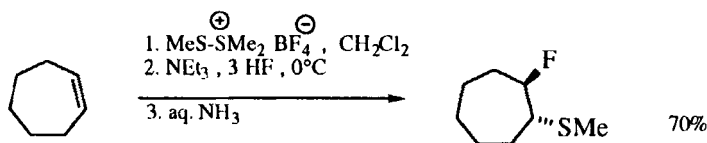
Euchigami, T.; Yamamoto, K.; Nakagawa, Y. *J. Org. Chem.*, **1991**, 56, 137.



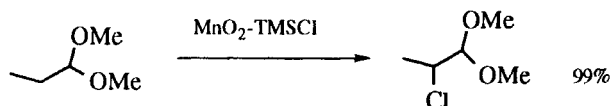
Hung, M.H.; Smart, B.E.; Feiring, A.E.; Rozen, S. *J. Org. Chem.*, **1991**, 56, 3187.



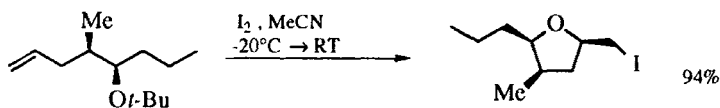
Keegstra, M.A.; Brandsma, L. *Rec. Trav. Chim. Pays-Bas*, **1991**, 110, 299.



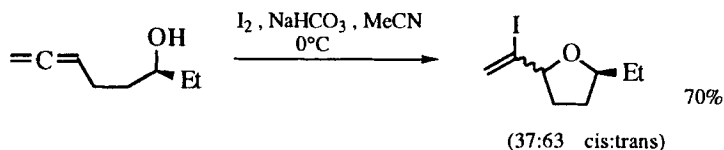
Haufe, G.; Alvernhe, G.; Anker, D.; Laurent, A.; Saluzzo, C. *J. Org. Chem.*, **1992**, 57, 714.
Saluzzo, C.; Alvernhe, G.; Anker, D. *Tetrahedron Lett.*, **1990**, 31, 663.



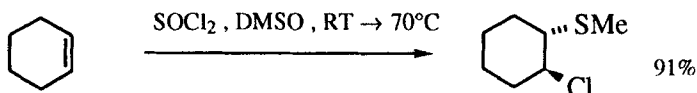
Bellesia, F.; Boni, M.; Ghelfi, E.; Grandi, R.; Pagnoni, U.M.; Pinetti, A. *Tetrahedron*, **1992**, 48, 4579.



Marck, I.; Lefrançois, J.-M.; Normant, J.-E. *Tetrahedron Lett.*, **1992**, 33, 1747.

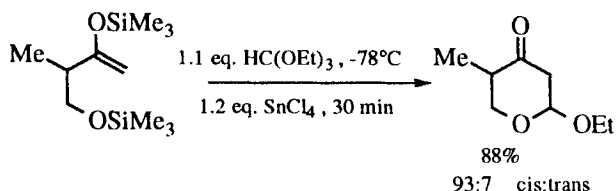


Walkup, R.D.; Guan, L.; Kim, S.W.; Kim, Y.S. *Tetrahedron Lett.*, **1992**, 33, 3969.

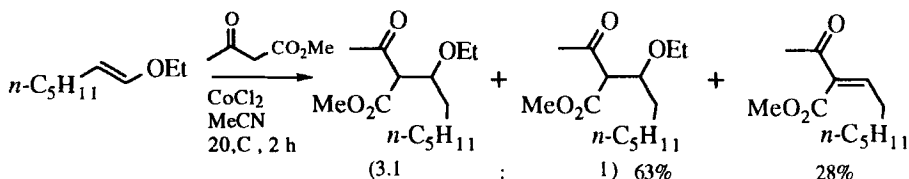


Bellesia, F.; Boni, M.; Ghelfi, E.; Pagnoni, U.M.; Pinetti, A. *Synth. Commun.*, **1992**, 22, 1101.

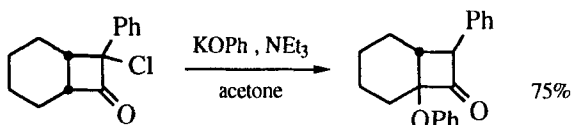
SECTION 365: ETHER, EPOXIDE, THIOETHER - KETONE



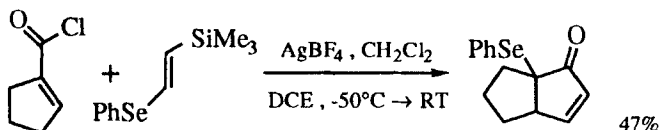
Martin, V.A.; Perron, F.; Albizati, K.F. *Tetrahedron Lett.*, **1990**, 31, 301.



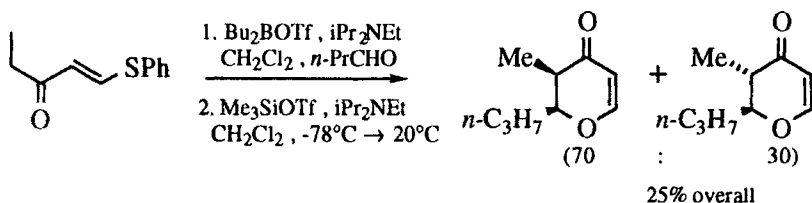
Iqbal, J.; Srivastava, R.R.; Khan, M.A. *Tetrahedron Lett.*, **1990**, 31, 1485.



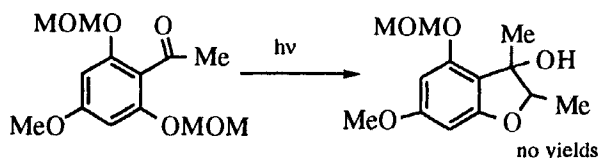
Hassner, A.; Naidorf-Meir, S.; Gottlieb, H.E. *Tetrahedron Lett.*, **1990**, 31, 2181.



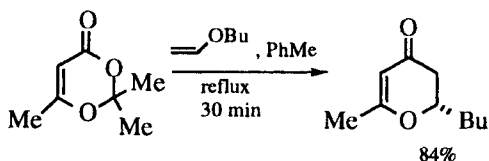
Yamazaki, S.; Hama, M.; Yamabe, S. *Tetrahedron Lett.*, **1990**, 31, 2917.



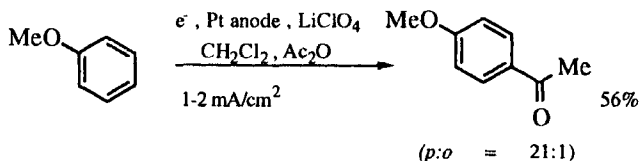
Paterson, I.; Osborne, S. *Tetrahedron Lett.*, **1990**, 31, 2213.



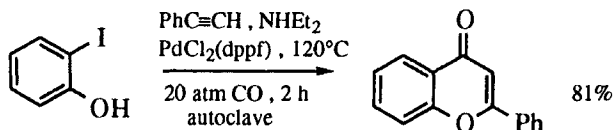
Kraus, G.A.; Thomas, P.J.; Schwinden, M.D. *Tetrahedron Lett.*, **1990**, 31, 1819.



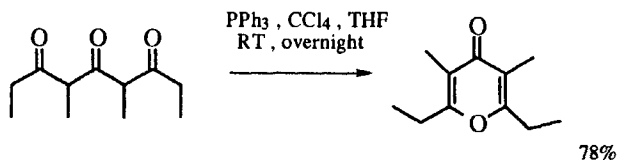
Coleman, R.S.; Grant, E.B. *Tetrahedron Lett.* **1990**, 31, 3677.



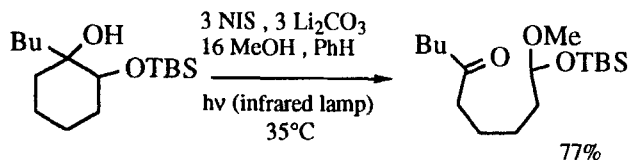
Gatti, N. *Tetrahedron Lett.*, **1990**, 31, 3933.



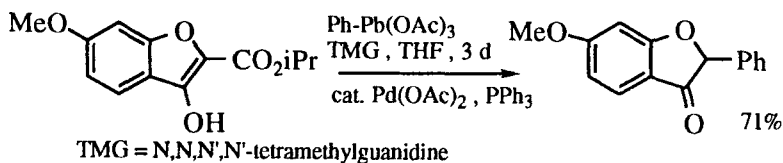
Kalinin, V.N.; Shostakovskiy, M.V.; Ponomaryav, A.B. *Tetrahedron Lett.*, **1990**, 31, 4073.



Arimoto, H.; Nishiyama, S.; Yamamura, S. *Tetrahedron Lett.*, **1990**, 31, 5619.

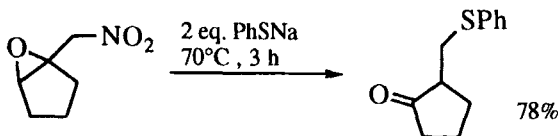


McDonald, C.E.; Holcomb, H.; Leathers, T.; Ampadu-Nyarko, F.; Frommer, J. Jr. *Tetrahedron Lett.*, **1990**, 31, 6283.

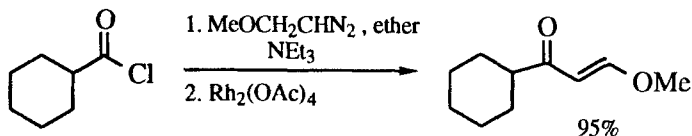


TMG = N,N,N',N'-tetramethylguanidine

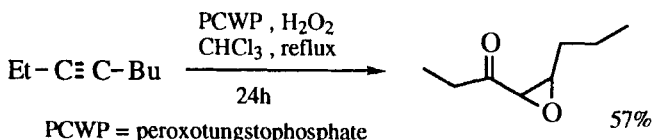
Barton, D.H.R.; Donnelly, D.M.X.; Finet, J-P.; Guiry, P.J.; Kielty, J.M. *Tetrahedron Lett.*, **1990**, 31, 6637.



Tamura, R.; Kusama, Y.; Oda, D. *J. Org. Chem.*, **1990**, 55, 595.

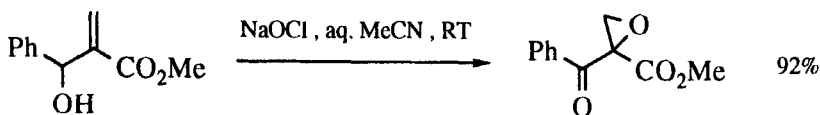


Hudlicky, T.; Olivo, H.F.; Natchus, M.G.; Umpierrez, E.F.; Pandolfi, E.; Volonterio, C. *J. Org. Chem.*, **1990**, 55, 4767.

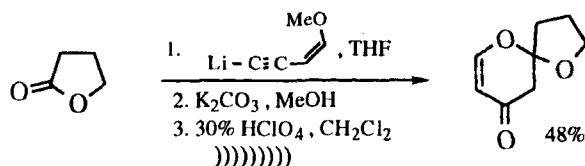


PCWP = peroxotungstophosphate

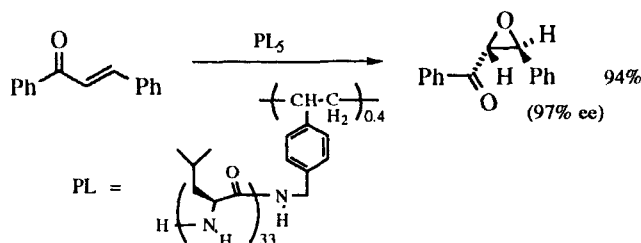
Ishii, Y.; Sakata, Y. *J. Org. Chem.*, **1990**, 55, 5545.



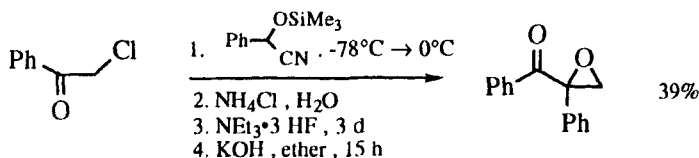
Foucaud, A.; le Rouillé, E. *Synthesis*, **1990**, 787.



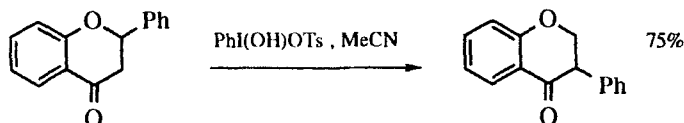
Crimmins, M.T.; O'Mahony, R. *J. Org. Chem.*, **1990**, 55, 5894.



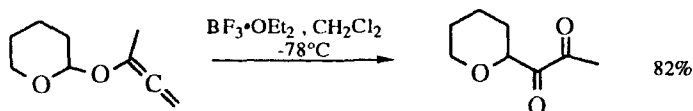
Itsuno, S.; Sakakura, M.; Ito, K. *J. Org. Chem.*, **1990**, 55, 6047.



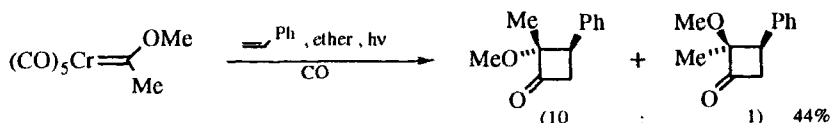
Hünig, S.; Marschner, C. *Chem. Ber.*, **1990**, 123, 107.



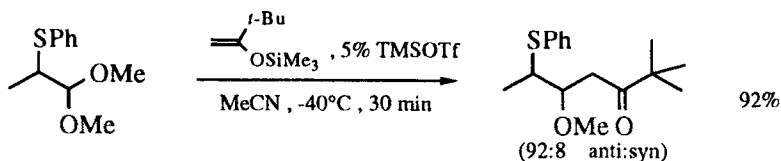
Prakash, O.; Pahuja, S.; Goyal, S.; Sawhney, S.N.; Moriarty, R.M. *SynLett*, **1990**, 337.



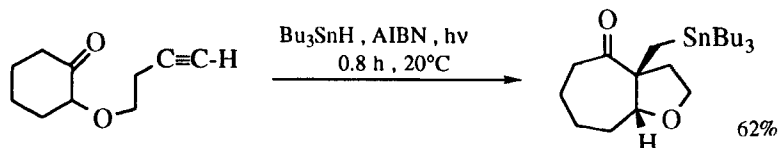
Ricci, A.; Deg'Innocenti, A.; Capperucci, A.; Faggi, C.; Seconi, G.; Favaretto, L. *SynLett*, **1990**, 471.



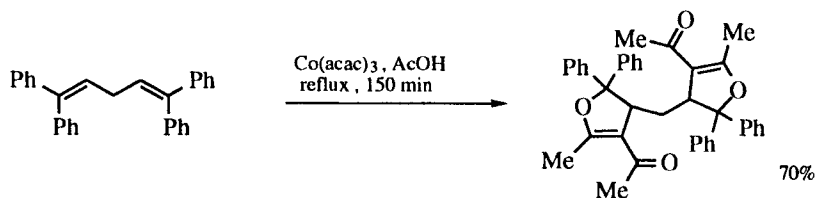
Söderberg, B.C.; Hegedus, L.S.; Sierra, M.A. *J. Am. Chem. Soc.*, **1990**, 112, 4364.



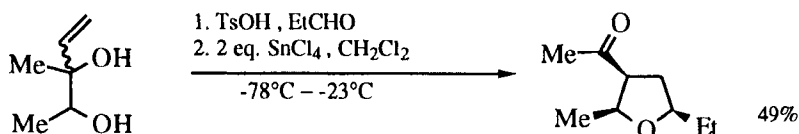
Saigo, K.; Kudo, K.; Hashimoto, Y.; Kimoto, H.; Hasegawa, M. *Chem. Lett.*, **1990**, 941.



Nishida, A.; Takahashi, H.; Takeda, H.; Takada, N.; Yonemitsu, O. *J. Am. Chem. Soc.*, **1990**, *112*, 902.

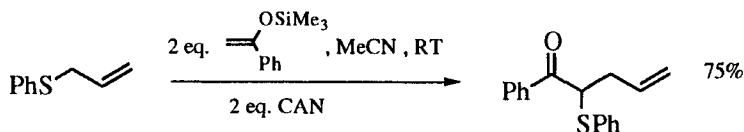


Nishino, H.; Yoshida, T.; Kurosawa, K. *Bull. Chem. Soc. Jpn.*, **1991**, *64*, 1108.

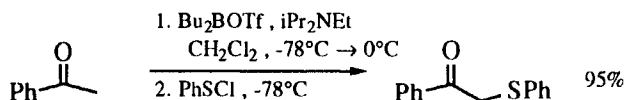


Hopkins, M.H.; Overman, L.E.; Rishton, G.M. *J. Am. Chem. Soc.*, **1991**, *113*, 5354.

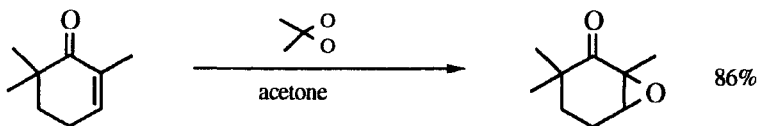
Brown, M.J.; Harrison, T.; Herrinton, P.M.; Hopkins, M.H.; Hutchinson, K.D.; Mishra, P.; Overman, L.E. *J. Am. Chem. Soc.*, **1991**, *113*, 5365.



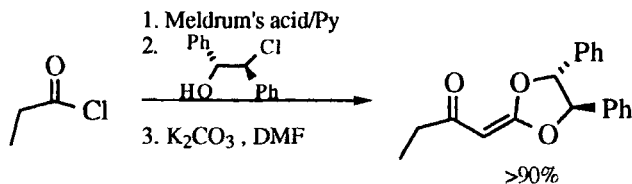
Narasaka, K.; Okauchi, T. *Chem. Lett.*, **1991**, 515.



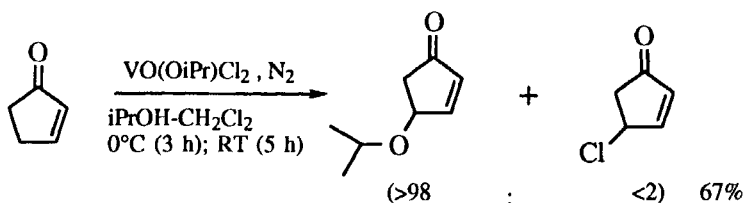
Paterson, J.; Osborne, S. *SynLett*, **1991**, 145.



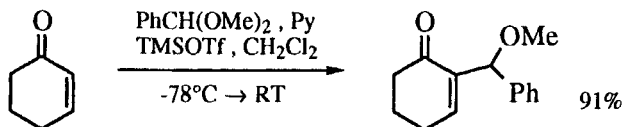
Adam, W.; Hadjiarapoglou, L.; Smerz, A. *Chem. Ber.*, **1991**, 124, 227.



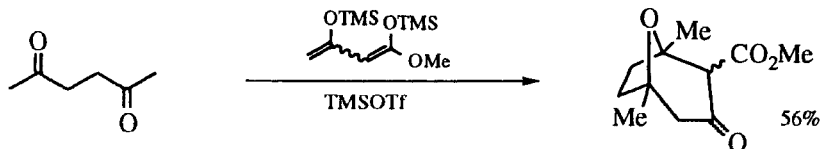
Eid, C.N. Jr.; Konopelski, J.P. *Tetrahedron Lett.*, **1991**, 32, 461.



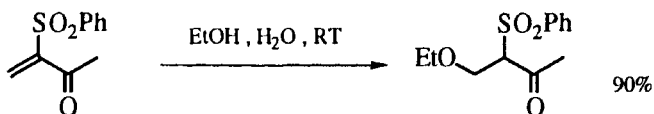
Hirao, T.; Mikami, S.; Mori, M.; Ohshiro, Y. *Tetrahedron Lett.*, **1991**, 32, 1741.



Kim, S.; Kim, Y.G.; Park, J.H. *Tetrahedron Lett.*, **1991**, 32, 2043.

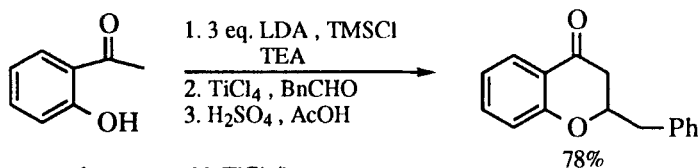


Molander, G.A.; Cameron, K.O. *J. Org. Chem.*, **1991**, 56, 2617.



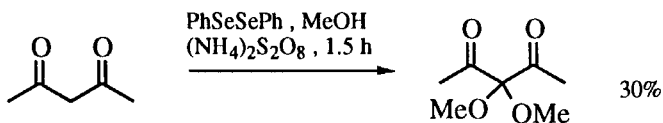
also reacts with other nucleophiles

Weichert, A.; Hoffmann, H.M.R. *J. Org. Chem.*, **1991**, 56, 4098.



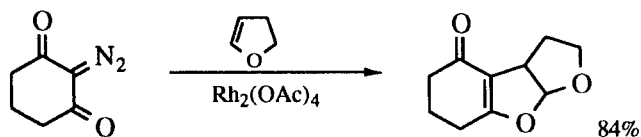
also reacts with TiCl_4 /ketones

Kelly, S.E.; Vanderplas, B.C. *J. Org. Chem.*, **1991**, 56, 1325.



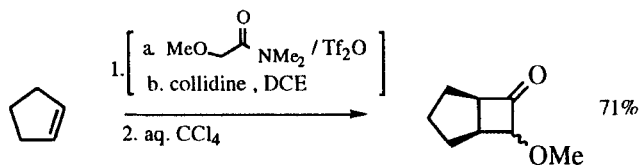
Tiecco, M.; Testaferri, L.; Tingoli, M.; Bartoli, D.; Marini, F. *J. Org. Chem.*, **1991**, 56, 5207.

Tiecco, M.; Testaferri, L.; Tingoli, M.; Bartoli, D. *J. Org. Chem.*, **1990**, 55, 4523.

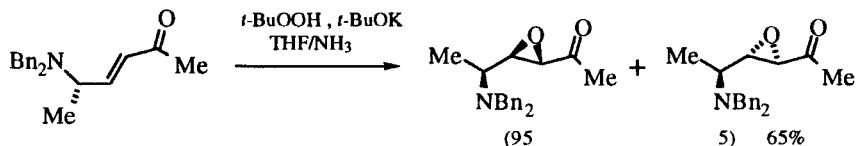


Pirrung, M.C.; Zhang, J.; McPhail, A.T. *J. Org. Chem.*, **1991**, 56, 6269.

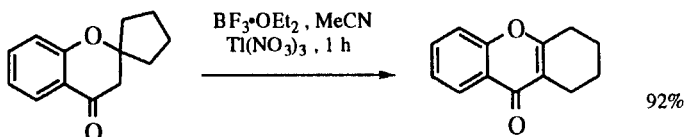
Pirrung, M.C.; Zhang, J. *Tetrahedron Lett.*, **1992**, 33, 5987.



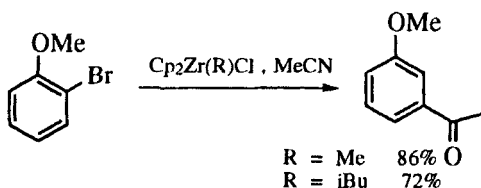
Genicot, C.; Gobeaux, B. Ghosez, I. *Tetrahedron Lett.*, **1991**, 32, 3827.



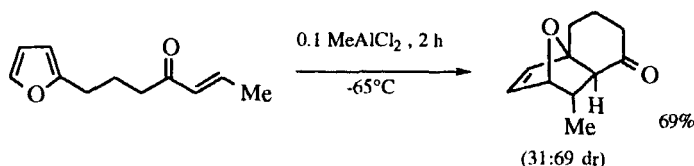
Reetz, M.T.; Lauterbach, E.H. *Tetrahedron Lett.*, **1991**, 32, 4477.



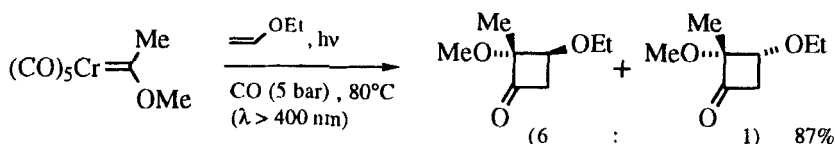
Singh, O.V.; Kapil, R.S.; Garg, C.P.; Kapoor, R.P. *Tetrahedron Lett.*, **1991**, 32, 5619.



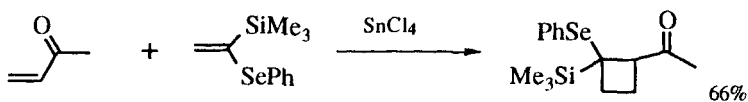
Barr, K.J.; Watson, B.T.; Buchwald, S.L. *Tetrahedron Lett.*, **1991**, 32, 5465.



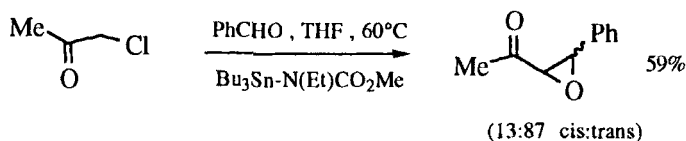
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Köbbing, S.; Mattay, J. *Tetrahedron Lett.*, **1992**, 33, 927.

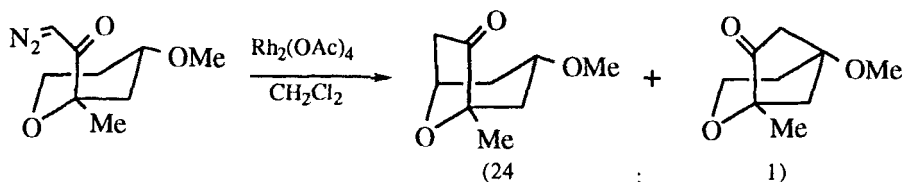


Yamazaki, S.; Fujitsuka, H.; Yamabe, S.; Tamura, H. *J. Org. Chem.*, **1992**, 57, 5610.

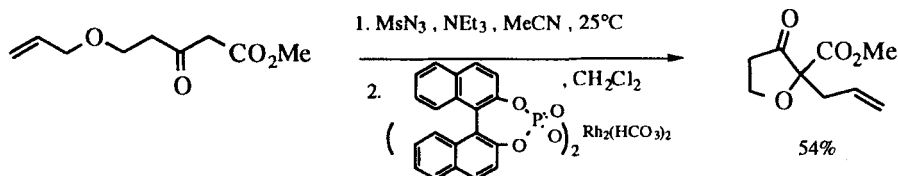


Shibata, J.; Yamasaki, H.; Baba, A.; Matsuda, H. *J. Org. Chem.*, **1992**, 57, 6909.

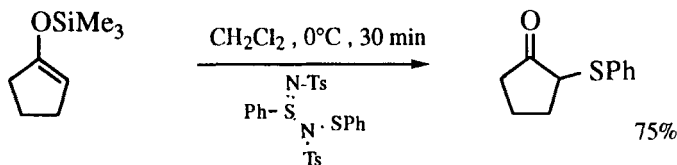
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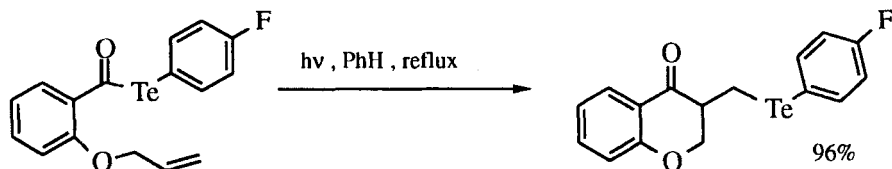
Spero, D.M.; Adams, J. *Tetrahedron Lett.*, **1992**, 33, 1143.



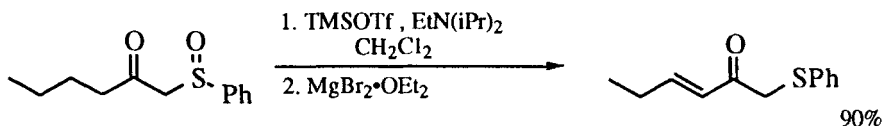
McCarthy, N.; McKervey, M.A.; Ye, T.; McCann, M.; Murphy, E.; Doyle, M.P. *Tetrahedron Lett.*, **1992**, 33, 5983.



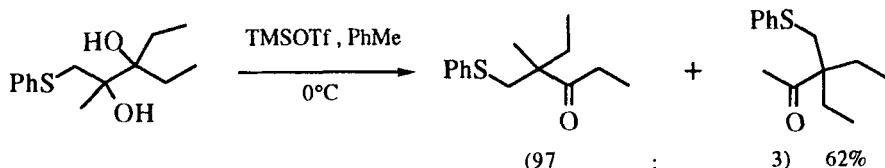
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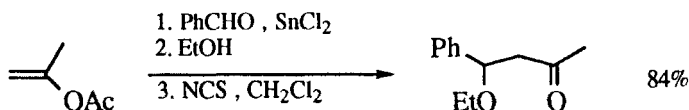
Chen, C.; Crich, D.; Papadatos, A. *J. Am. Chem. Soc.*, **1992**, 114, 8313.



Kosugi, H.; Hoshino, K.; Uda, H. *J. Chem. Soc., Chem. Commun.*, **1992**, 560.

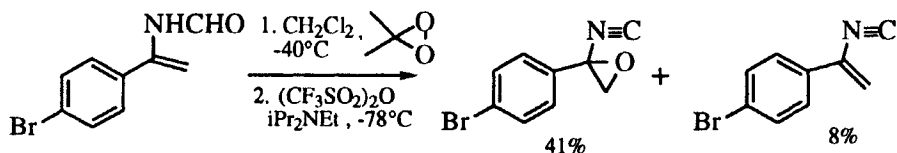


Kudo, K.; Saigo, K.; Hashimoto, Y.; Saito, K.; Hasegawa, M. *Chem. Lett.*, **1992**, 1449.

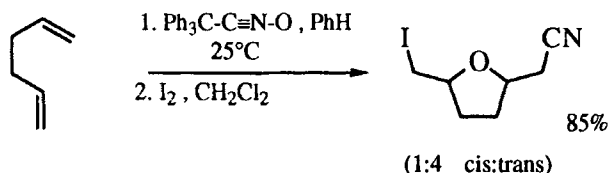


Masuyama, Y.; Kobayashi, Y.; Yanagi, R.; Kurusu, Y. *Chem. Lett.*, **1992**, 2039.

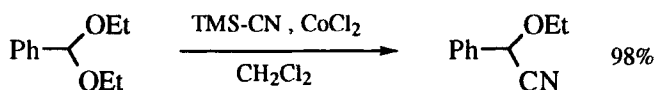
SECTION 366: ETHER, EPOXIDE, THIOETHER - NITRILE



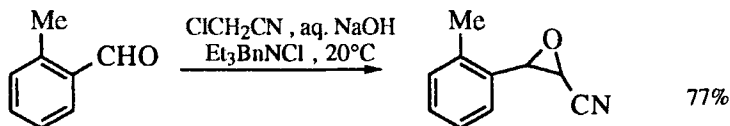
Baldwin, J.E.; O'Neil, I.A. *Tetrahedron Lett.*, **1990**, 31, 2047.



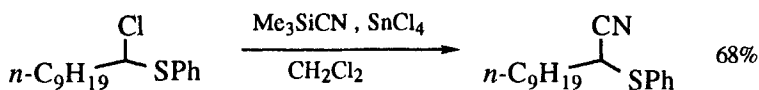
Kurth, M.J.; Rodriguez, M.J.; Olmstead, M.M. *J. Org. Chem.*, **1990**, 55, 283.



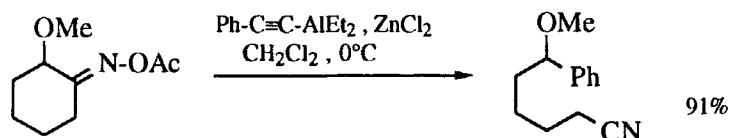
Soga, T.; Takenoshita, H.; Yamada, M.; Mukaiyama, T. *Bull. Chem. Soc. Jpn.*, **1990**, 63, 3122.



Sadanandam, Y.S.; Leelavati, P. *J. Ind. Chem. Soc.*, **1990**, 67, 253.



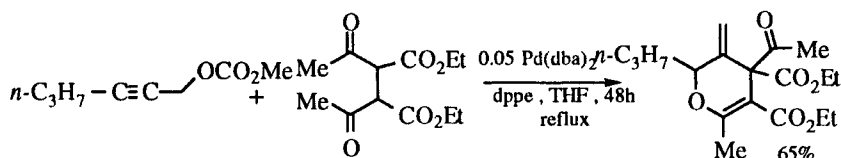
Fortes, C.C.; Okino, E.A. *Synth. Commun.*, **1990**, 20, 1943.



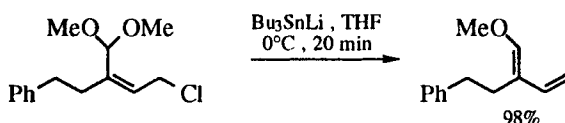
Fujioka, H.; Yamanaka, T.; Yakuma, K.; Miyazaki, M.; Kita, Y. *J. Chem. Soc., Chem. Commun.*, **1991**, 533.

SECTION 367: ETHER, EPOXIDE, THIOETHER - ALKENE

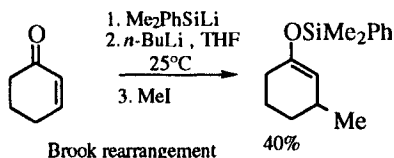
Enol ethers are found in this section as well as alkenyl ethers.



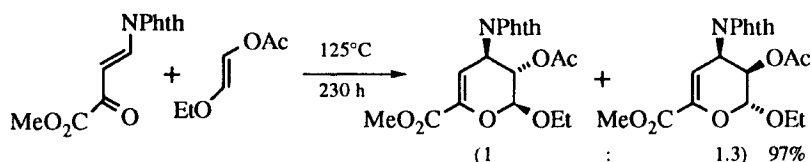
Geng, L.; Liu, X. *Tetrahedron Lett.*, **1990**, 31, 111.



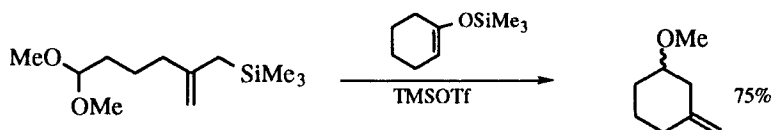
Fujiwara, S.; Katsumura, S.; Ise, S. *Tetrahedron Lett.*, **1990**, 31, 691.



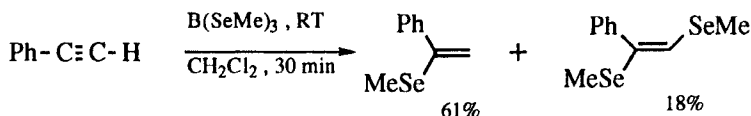
Koreeda, M.; Koo, S. *Tetrahedron Lett.*, **1990**, 31, 831.



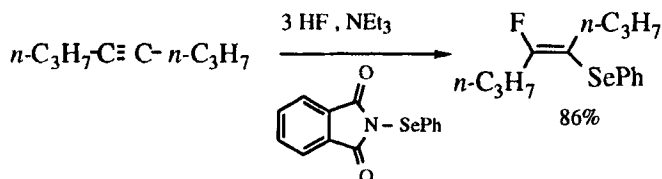
Tietze, L.E.; Hartfiel, U. *Tetrahedron Lett.*, **1990**, 31, 1697.



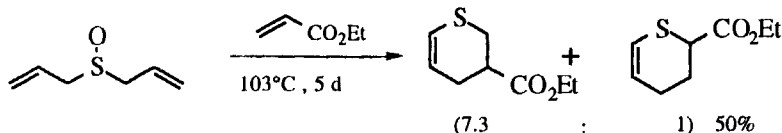
Lee, T.V.; Roden, F.S.; Yeoh, H.T-L. *Tetrahedron Lett.*, **1990**, 31, 2063.



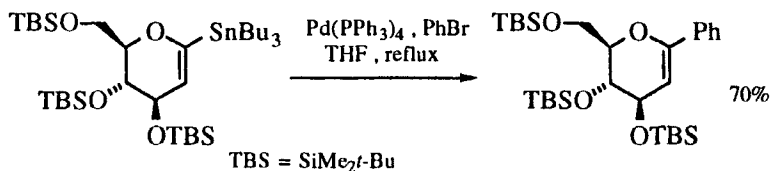
Kataoka, T.; Yoshimatsu, M.; Shimizu, H.; Hori, M. *Tetrahedron Lett.*, **1990**, 31, 5927.



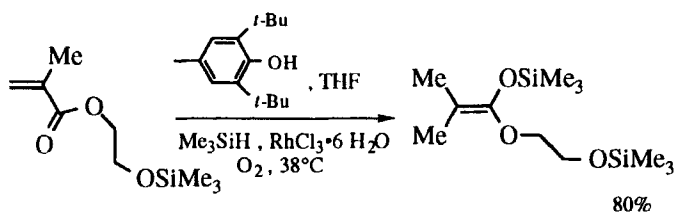
Saluzzo, C.; Alvermhe, G.; Anker, D. *Tetrahedron Lett.*, **1990**, 31, 2127.



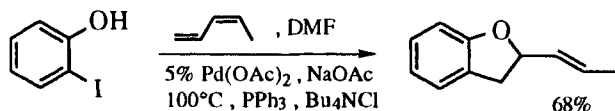
Block, E.; Zhao, S.H. *Tetrahedron Lett.*, **1990**, 31, 5003.



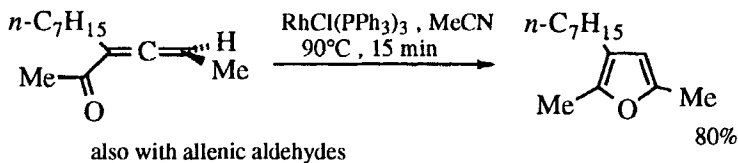
Friesen, R.W.; Sturino, C.F. *J. Org. Chem.*, **1990**, 55, 2572.



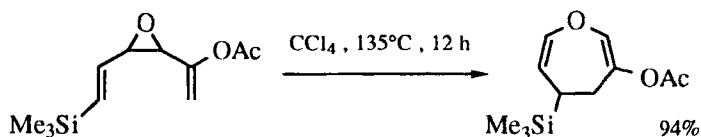
Revis, A.; Hilty, T.K. *J. Org. Chem.*, **1990**, 55, 2972.



Larock, R.C.; Berrios-Peña, N.; Narayanan, K. *J. Org. Chem.*, **1990**, 55, 3447.

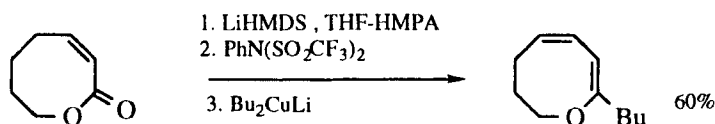


Marshall, J.A.; Robinson, E.D. *J. Org. Chem.*, **1990**, 55, 3450.

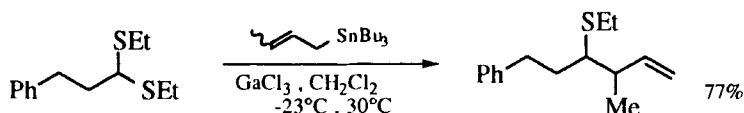


Clark, D.L.; Chou, W.-N.; White, J.B. *J. Org. Chem.*, **1990**, 55, 3975.

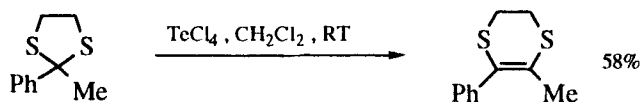
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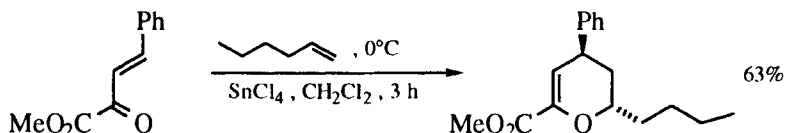
Tsushima, K.; Murai, A. *Chem. Lett.*, **1990**, 761.



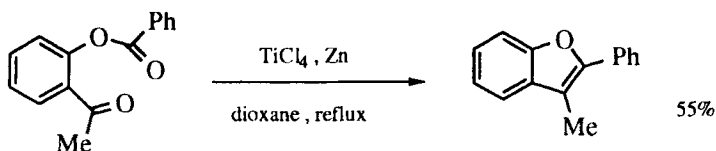
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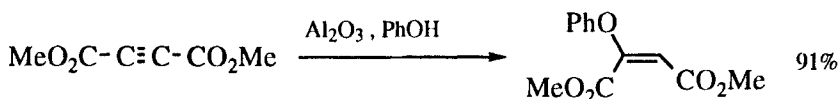
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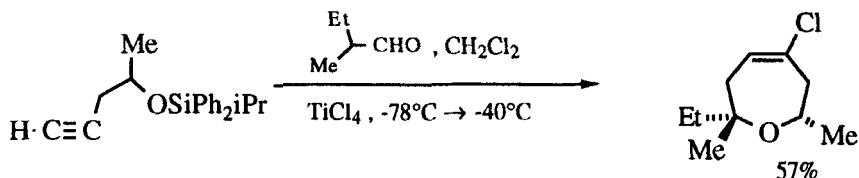
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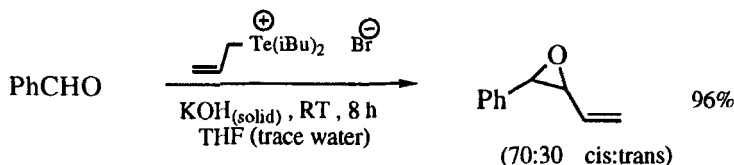
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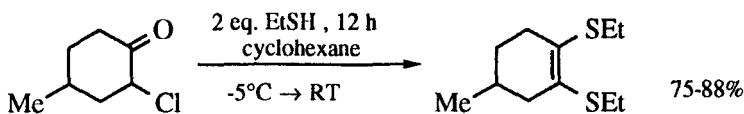
Kodomari, M.; Sakamoto, T.; Yoshitomi, S. *J. Chem. Soc., Chem. Commun.*, **1990**, 701.



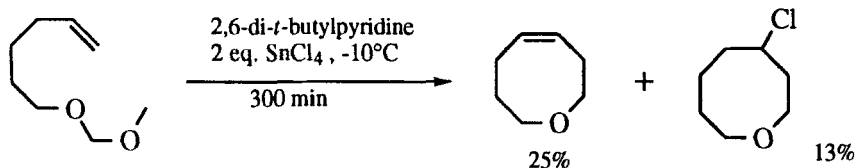
Arya, P.; Chan, T-H. *J. Chem. Soc., Chem. Commun.*, **1990**, 967.



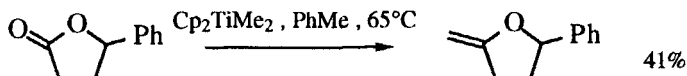
Zhou, Z-L.; Sun, Y-S.; Shi, L-L.; Huang, Y-Z. *J. Chem. Soc., Chem. Commun.*, **1990**, 1439.



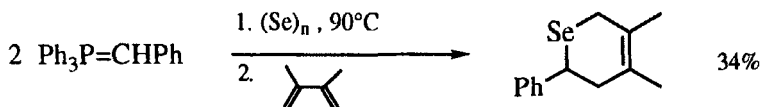
Mursakulov, I.G.; Ramazanov, Ê.A.; Kerimov, F.F.; Abbasov, I.M.; Zefirov, N.S. *Zhur. Org. Khim.*, **1990**, 26, 1638 (Engl., p. 1416).



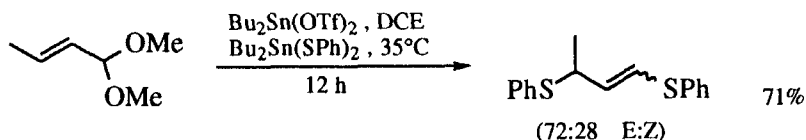
Blumenkopf, T.A.; Bratz, M.; Castañeda, A.; Look, G.C.; Overman, L.E.; Rodriguez, D.; Thompson, A.S. *J. Am. Chem. Soc.*, **1990**, 112, 4386.



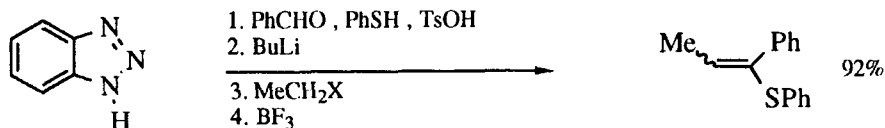
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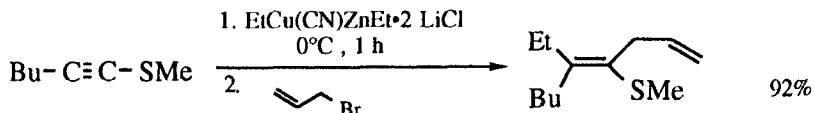
Okuma, K.; Komiya, Y.; Kaneko, I.; Tachibana, Y.; Iwata, E.; Ohta, H. *Bull. Chem. Soc. Jpn.*, **1990**, 63, 1653.



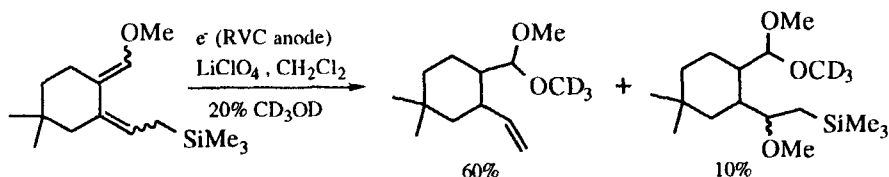
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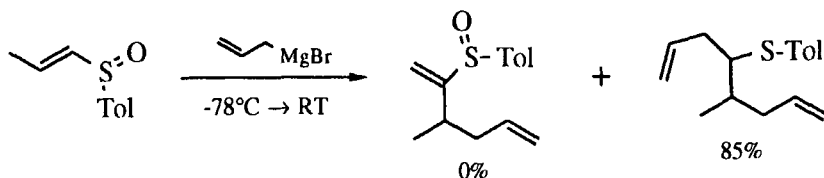
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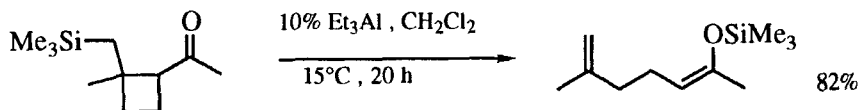
Rao, S.A.; Knochel, P. *J. Am. Chem. Soc.*, **1991**, 113, 5735.



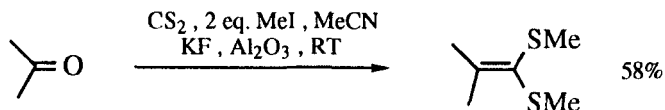
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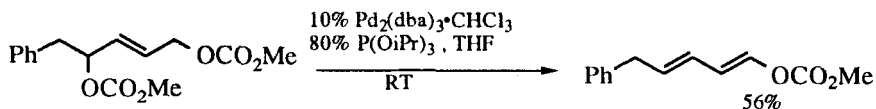
Iwata, C.; Maezaki, N.; Kurumada, T.; Fukuyama, H.; Sugiyama, K.; Imanishi, T. *J. Chem. Soc., Chem. Commun.*, **1991**, 1408.



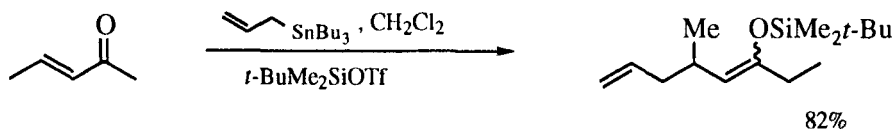
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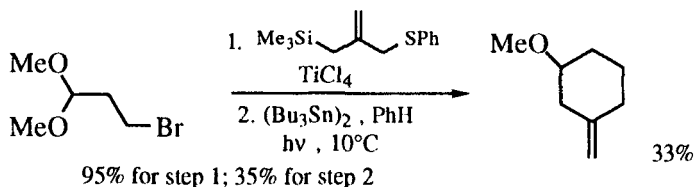
Villemin, D.; Ben Alloum, A. *Synthesis*, **1991**, 301.



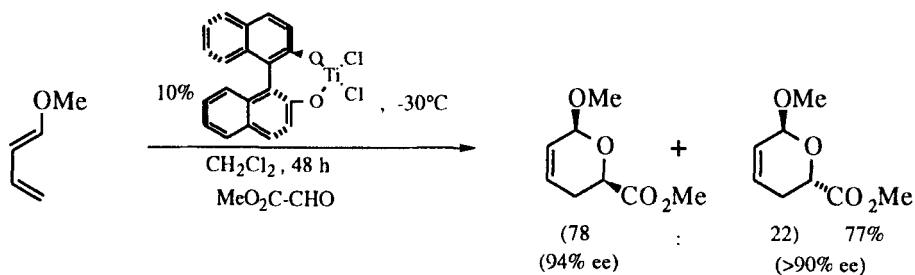
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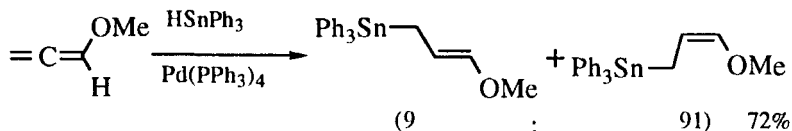
Kim, S.; Lee, J.M. *Synth. Commun.*, **1991**, 21, 25.



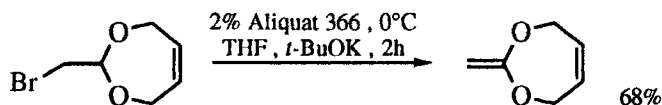
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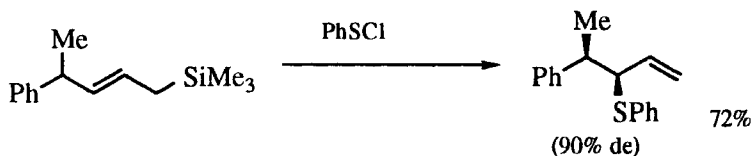
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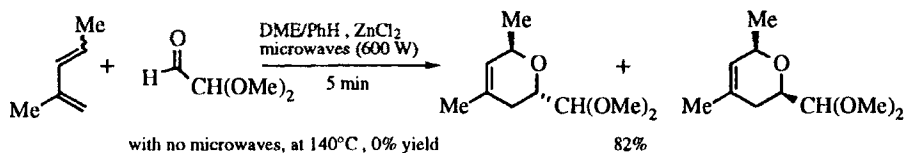
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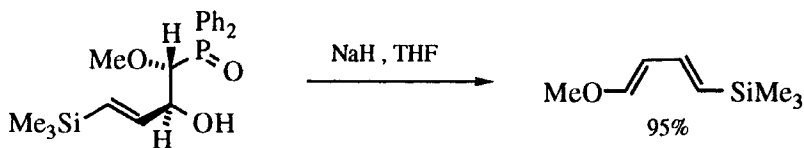
Bailey, W.J.; Zhou, L.-L. *Tetrahedron Lett.*, **1991**, 32, 1539.



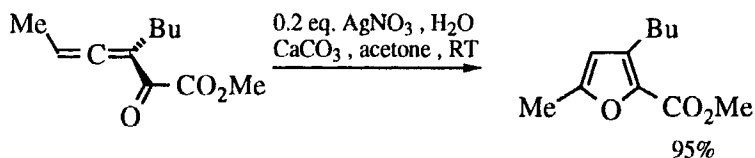
Nativi, C.; Palio, G.; Taddei, M. *Tetrahedron Lett.*, **1991**, 32, 1583.



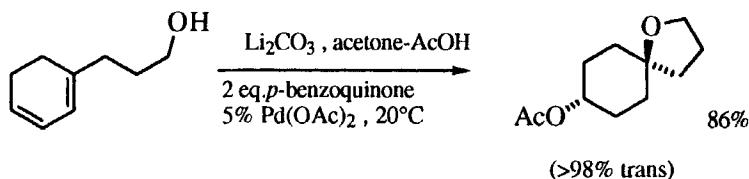
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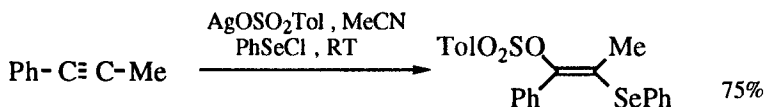
Pegram, J.J.; Anderson, C.B. *Tetrahedron Lett.*, **1991**, 32, 2197.



Marshall, J.A.; Wang, X. *J. Org. Chem.*, **1991**, 56, 960.

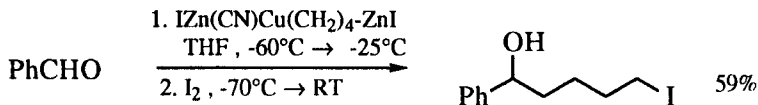


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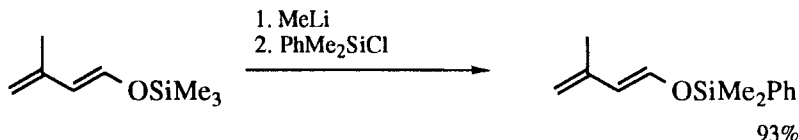


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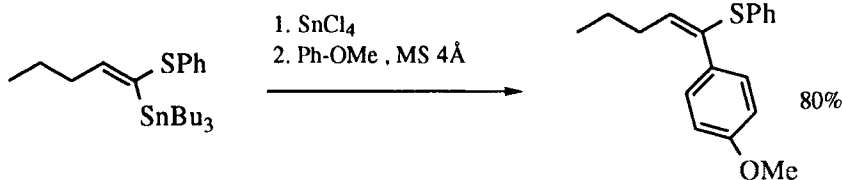
Back, T.G.; Muralidharan, K.R. *Tetrahedron Lett.*, **1990**, *31*, 1957.



Hudlicky, T.; Barbieri, G. *J. Org. Chem.*, **1991**, *56*, 4598.

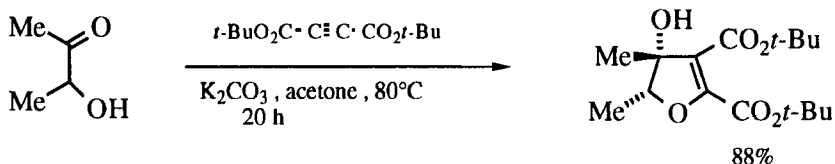


Duhamel, L.; Guillemont, J.; Poirier, J.-M.; Chabardes, P. *Tetrahedron Lett.*, **1991**, *32*, 4495, 4499.

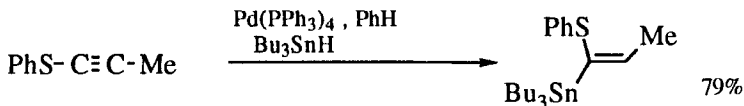


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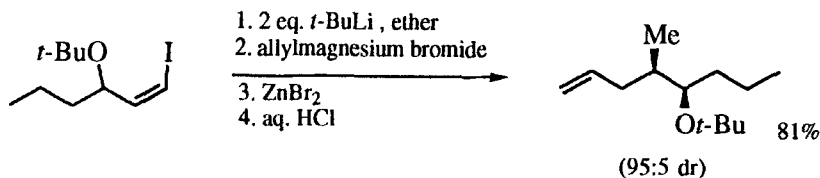
Takeda, T.; Kanamori, F.; Matsusita, H.; Fujiwara, T. *Tetrahedron Lett.*, **1991**, *32*, 6563 [with NBS; AlCl_3].



Jauch, J.; Schurig, V. *Tetrahedron Lett.*, **1991**, *32*, 4687.



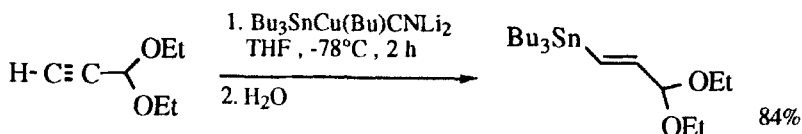
Magriotis, P.A.; Brown, J.T.; Scott, M.E. *Tetrahedron Lett.*, **1991**, *32*, 5047.



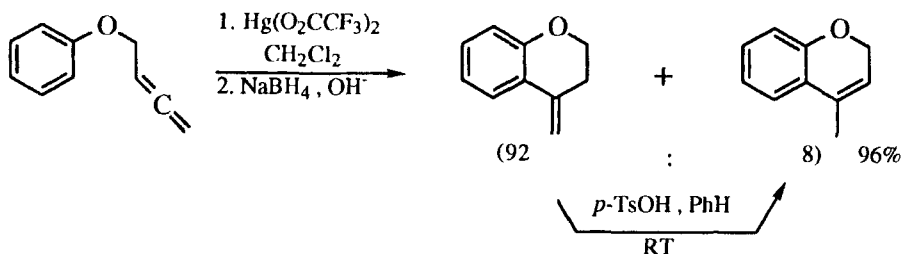
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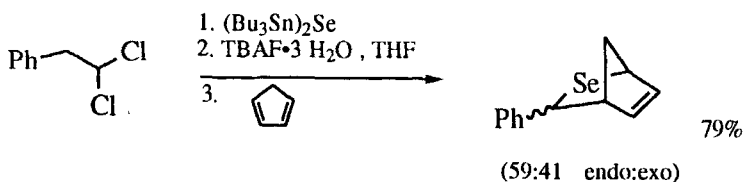
Marek, I.; Alexakis, A.; Normant, J.-F. *Tetrahedron Lett.*, **1991**, 32, 6337. (95% yield)



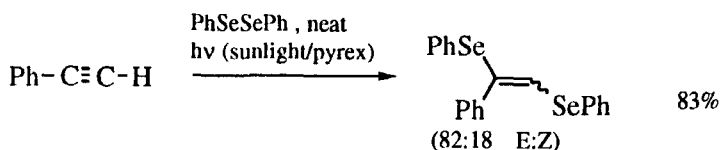
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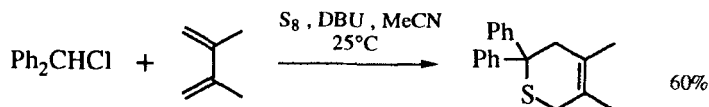


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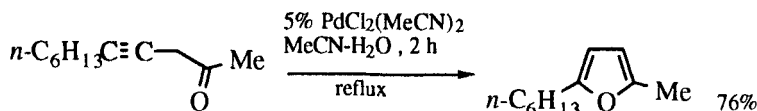


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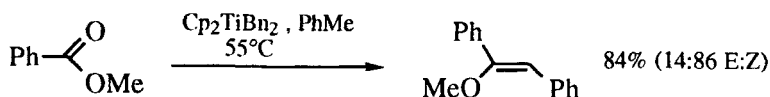


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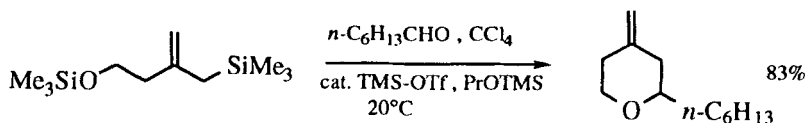


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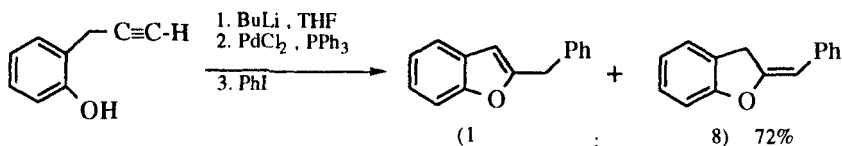


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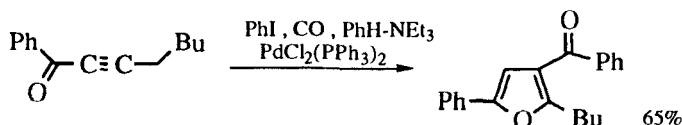


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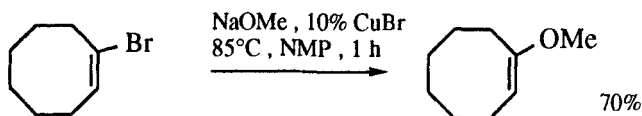
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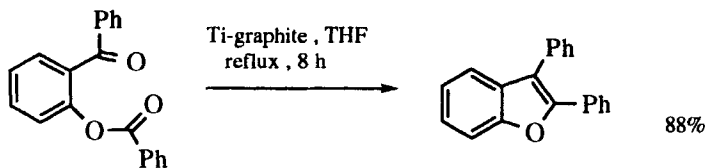
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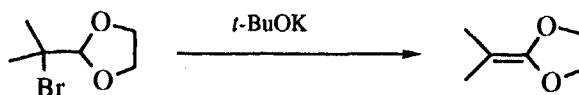


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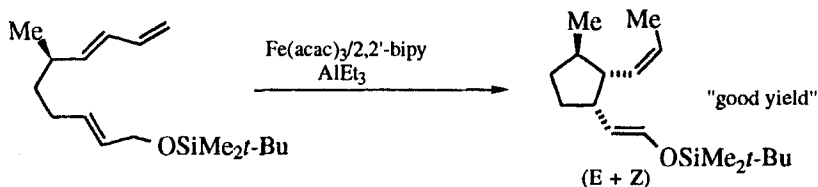


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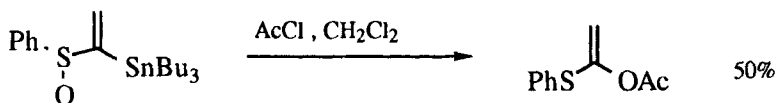
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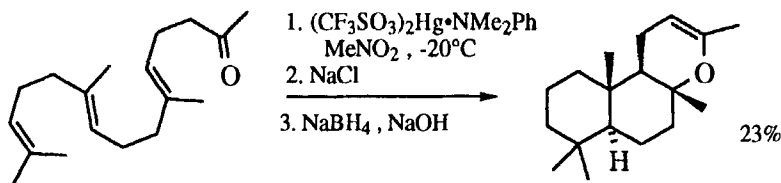
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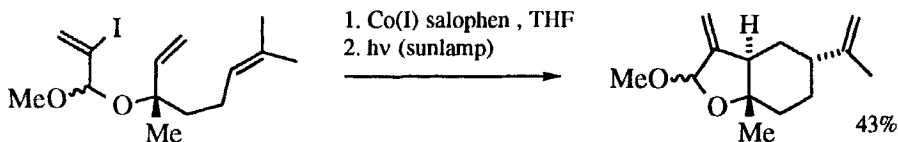
Takacs, J.M.; Myoung, Y.C. *Tetrahedron Lett.*, **1992**, 33, 317.



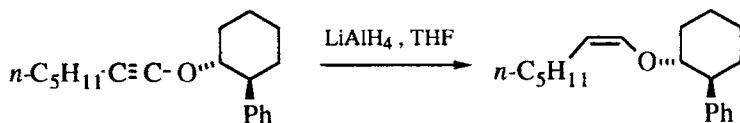
Beddoes, R.L.; MacLeod, D.; Moorcroft, D.; Quale, P.; Zhao, Y. *Tetrahedron Lett.*, **1992**, 33, 417.



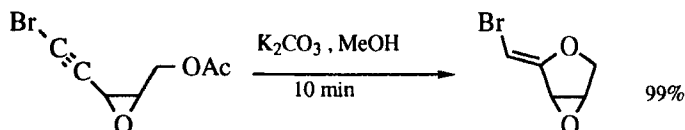
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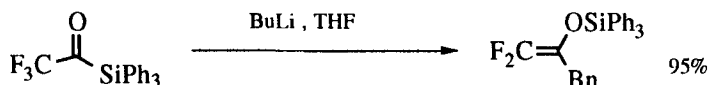
Ali, A.; Harrowven, D.C.; Pattenden, G. *Tetrahedron Lett.*, **1992**, 33, 2851.



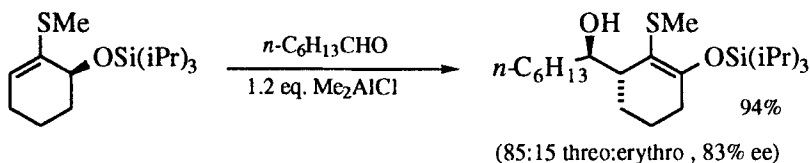
Solà, L.; Castro, J.; Moyano, A.; Pericàs, M.A.; Riera, A. *Tetrahedron Lett.*, **1992**, 33, 2863.



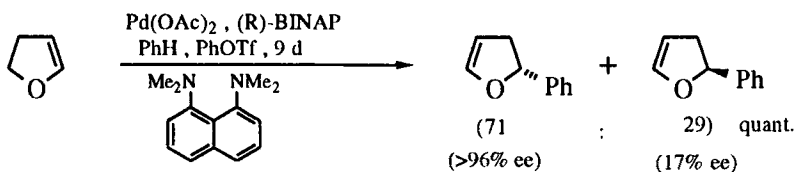
Grandjean, D.; Pale, P.; Chucho, J. *Tetrahedron Lett.*, **1992**, 33, 4905.



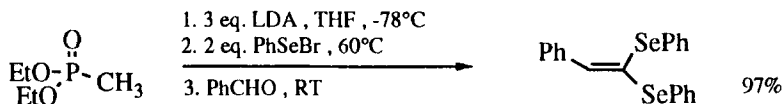
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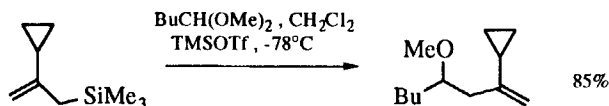
Tanino, K.; Shoda, H.; Nakamura, T.; Kuwajima, I. *Tetrahedron Lett.*, **1992**, 33, 1337.



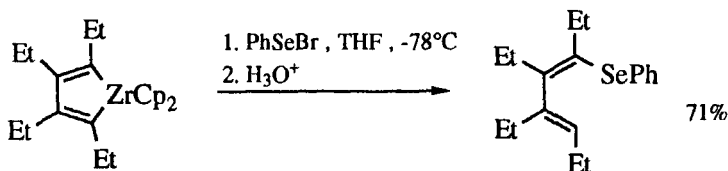
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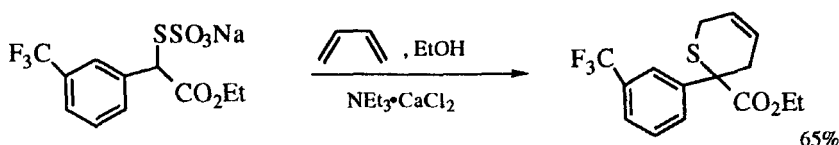
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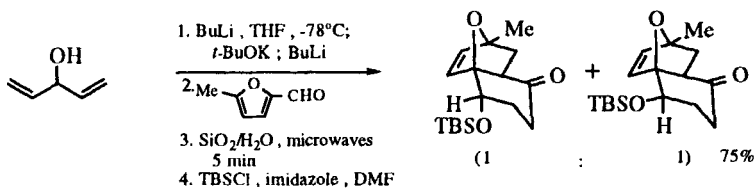
Hojo, M.; Ohsumi, K.; Hosomi, A. *Tetrahedron Lett.*, **1992**, 33, 5981.



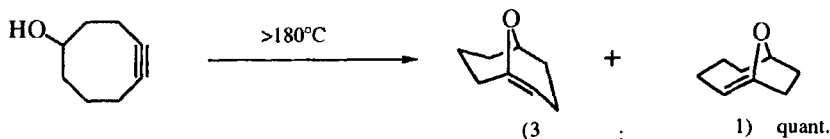
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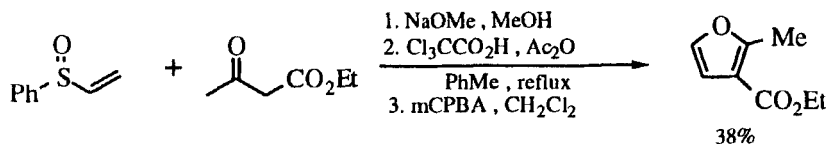
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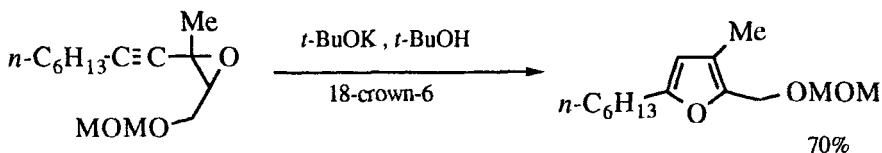
Wang, W-B.; Roskamp, E.J. *Tetrahedron Lett.*, **1992**, 33, 7631.



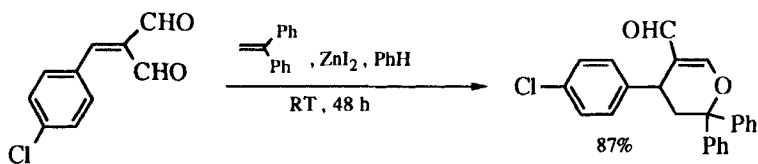
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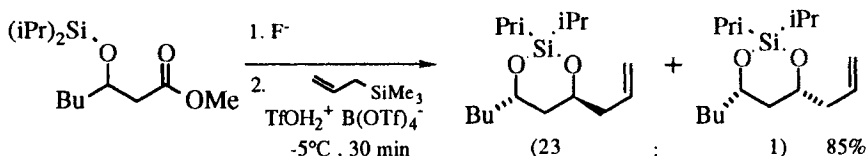
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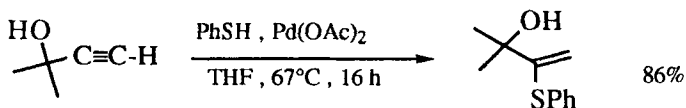
Marshall, J.A.; BuBay, W.J. *J. Am. Chem. Soc.*, **1992**, 114, 1450.



Dvorak, D.; David, S.; Arnold, Z.; Ivana, C.; Petricek, V. *Coll. Czech. Chem. Commun.*, **1992**, 57, 2337.

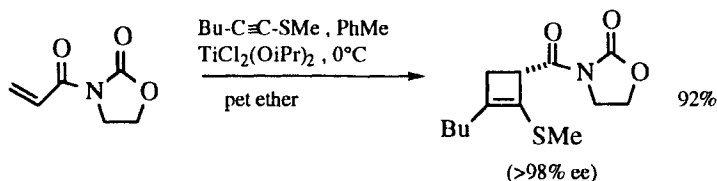


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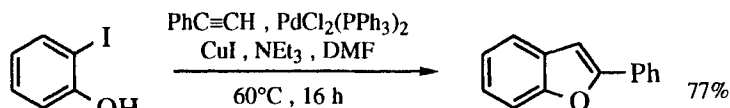


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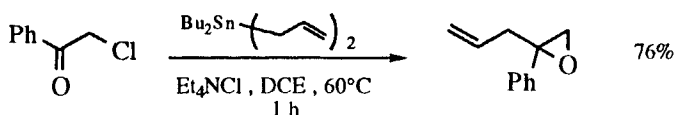
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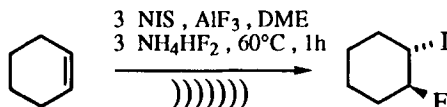
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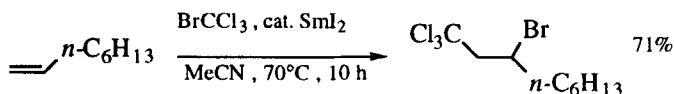
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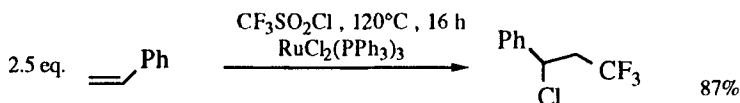
Yano, K.; Hatta, Y.; Baba, A.; Matsuda, H. *Synthesis*, **1992**, 693.



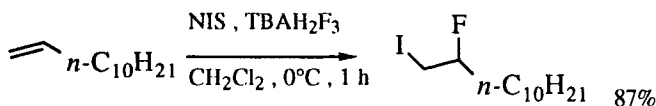
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Ma, S.; Lu, X. *J. Chem. Soc., Perkin Trans. I*, **1990**, 2031.



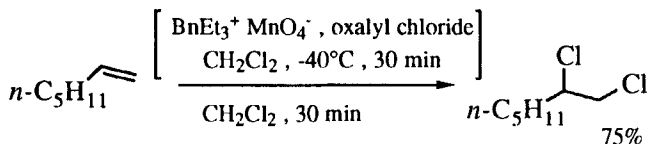
Kamigata, N.; Fukushima, T.; Terakawa, Y.; Yoshida, M.; Sawada, H. *J. Chem. Soc., Perkin Trans. I*, **1991**, 627.



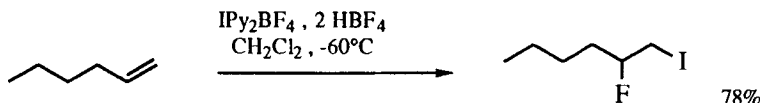
TBAH₂F₃ = tetrabutylammonium dihydrogen trifluoride

Kuroboshi, M.; Hiyama, T. *Tetrahedron Lett.*, **1991**, 32, 1215.

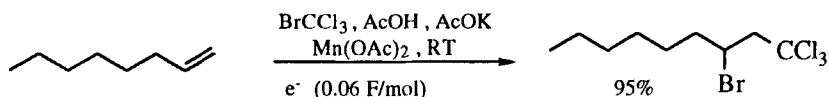
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Markó, I.E.; Richardson, P.F. *Tetrahedron Lett.*, **1991**, 32, 1831.

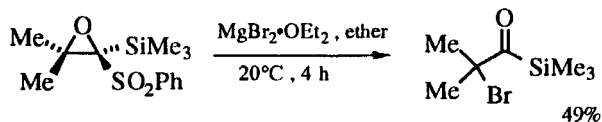


Barluenga, J.; Campos, P.J.; González, J.M.; Suárez, J.L.; Asensio, G. *J. Org. Chem.*, **1991**, 56, 2234.

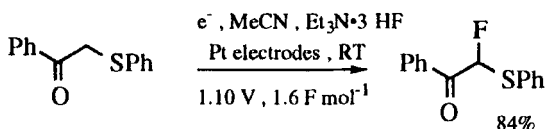


Nohair, K.; Lachaise, I.; Paugram, J-P.; Nédélec, J-Y. *Tetrahedron Lett.*, **1992**, 33, 213.

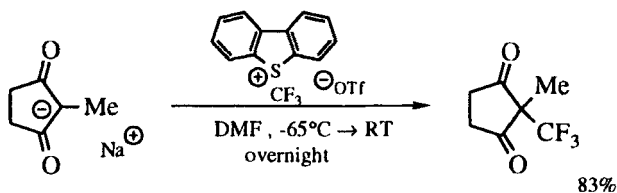
SECTION 369: HALIDE, SULFONATE - KETONE



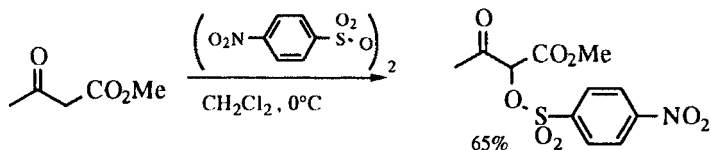
Hewkin, C.T.; Jackson, R.F.W. *Tetrahedron Lett.*, **1990**, 31, 1877.



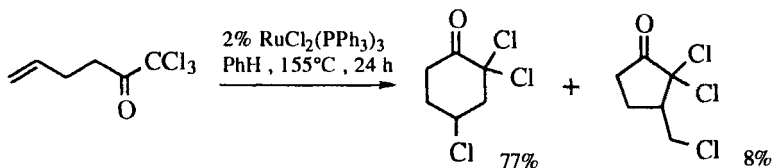
Brigaud, T.; Laurent, E. *Tetrahedron Lett.*, **1990**, 31, 2287.



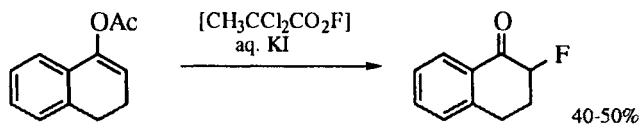
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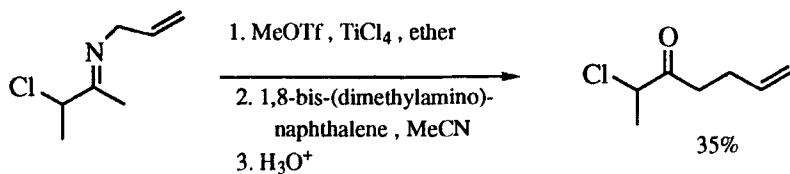
Hoffman, R.V.; Wilson, A.L.; Kim, H-O. *J. Org. Chem.*, **1990**, 55, 1267.



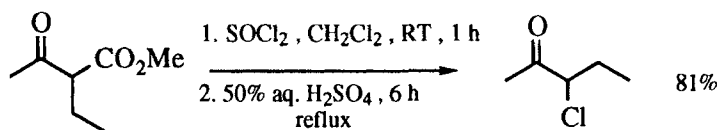
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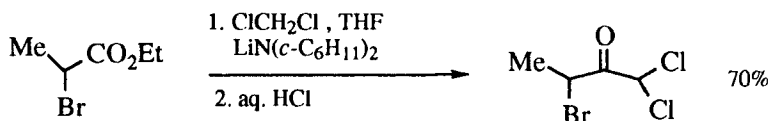
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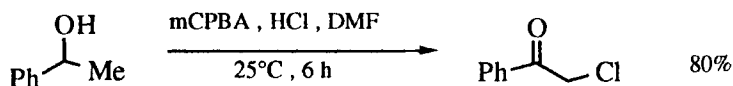
Welch, J.T.; De Corte, B.; De Kimpe, N. *J. Org. Chem.*, **1990**, *55*, 4981.



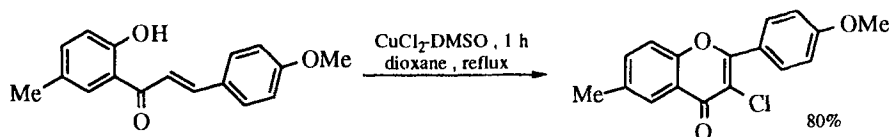
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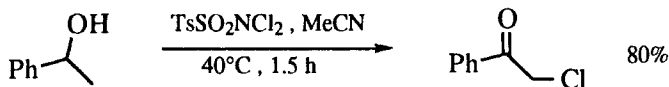
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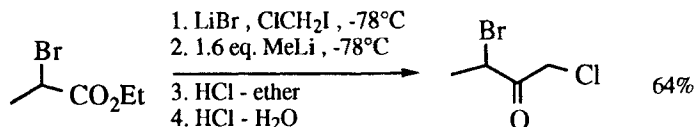
Kim, H.J.; Kim, H.R.; Ryu, E.K. *Synth. Commun.*, **1990**, *20*, 1625.



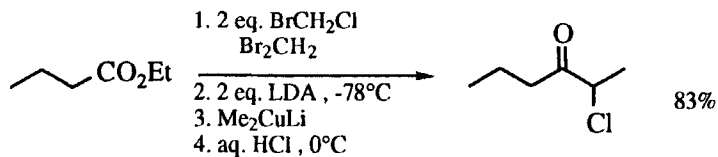
Sahasrabhuddhe, A.S.; Ghiya, B.J. *Ind. J. Chem.*, **1990**, *29B*, 61.



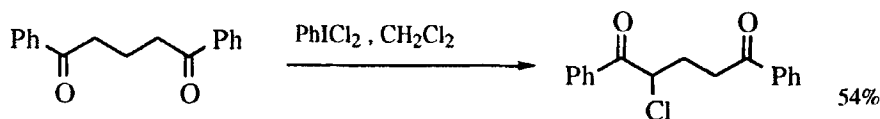
Kim, Y.H.; Lee, I.S.; Lim, S.C. *Chem. Lett.*, **1990**, 1125.



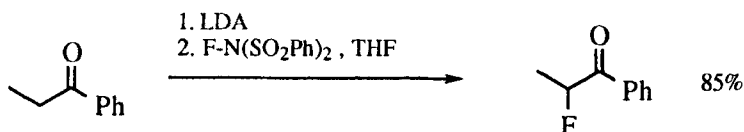
Barluenga, J.; Llavona, L.; Concellón, J.M. *J. Chem. Soc., Perkin Trans I*, **1990**, 417.



Barluenga, J.; Llavona, L.; Yus, M.; Concellón, J.M. *J. Chem. Soc., Perkin Trans. I*, **1991**, 2890.

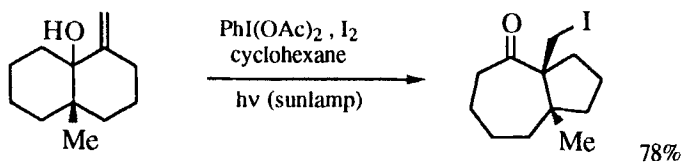


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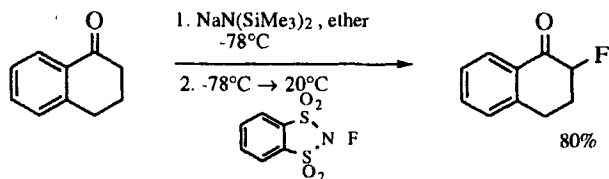


also for fluorination of Ar-H

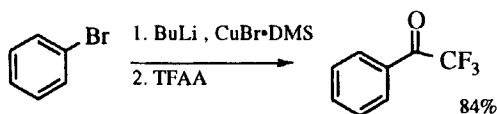
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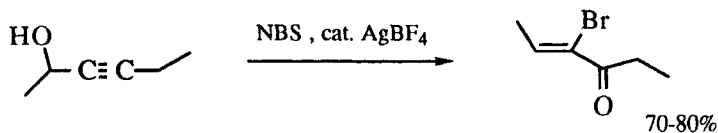
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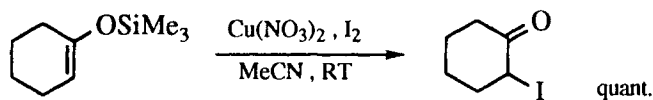
Davis, F.A.; Han, W. *Tetrahedron Lett.*, **1991**, 32, 1631.



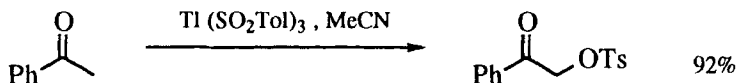
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Angara, G.J.; McNelis, E. *Tetrahedron Lett.*, **1991**, 32, 2099.

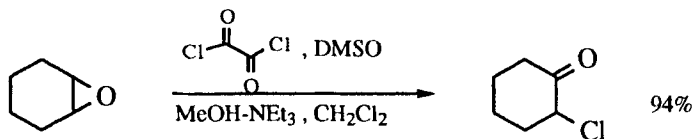


Cort, A.D. *J. Org. Chem.*, **1991**, 56, 6708.

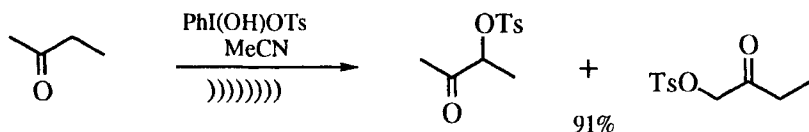


Khanna, M.S.; Garg, C.P.; Kapoor, R.P. *Tetrahedron Lett.*, **1992**, 33, 1495.

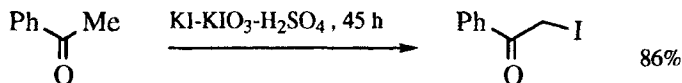
Khanna, M.S.; Garg, C.P.; Kapoor, R.P. *SynLett*, **1992**, 393.



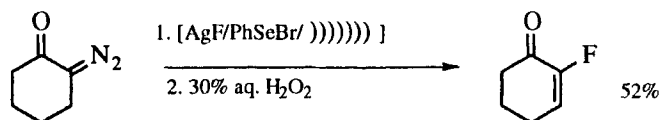
Raina, S.; Bhuniya, D.; Singh, V.K. *Tetrahedron Lett.*, **1992**, 33, 6021.



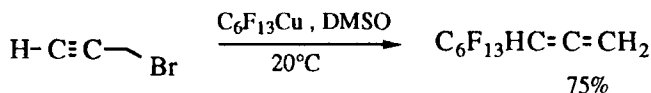
Tuncay, A.; Dustman, J.A.; Fisher, G.; Tuncay, C.I.; Suslick, K.S. *Tetrahedron Lett.*, **1992**, 33, 7647.



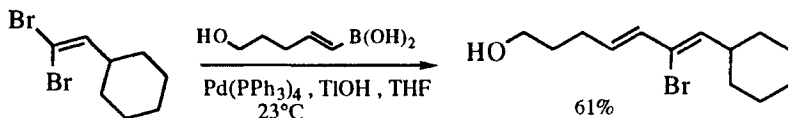
Okamoto, T.; Kakinami, T.; Nishimura, T.; Hermawan, T.; Kajigaeshi, S. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 1731.



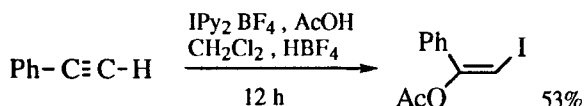
Usuki, Y.; Iwaoka, M.; Tomoda, S. *J. Chem. Soc., Chem. Commun.*, **1992**, 1148.



Hung, H.-H. *Tetrahedron Lett.*, **1990**, *31*, 3703.



Roush, W.R.; Moriarty, K.J.; Brown, B.B. *Tetrahedron Lett.*, **1990**, *31*, 6509.

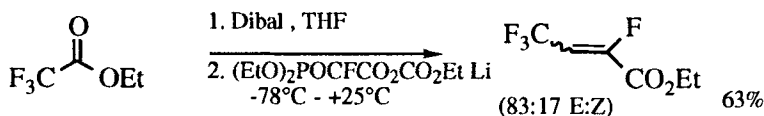


Barluenga, J.; Rodríguez, M.A.; Campos, P.J. *J. Org. Chem.*, **1990**, *55*, 3104.

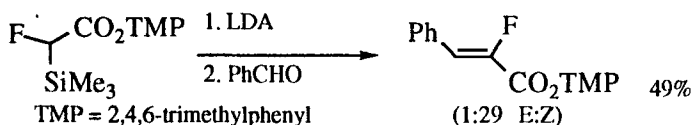
Barluenga, J.; Rodríguez, M.A.; Campos, P.J. *Tetrahedron Lett.*, **1990**, *31*, 2751.

Barluenga, J.; Campos, P.J.; López, F.; Llorente, I.; Rodríguez, M.A. *Tetrahedron Lett.*, **1990**, *31*, 7375.

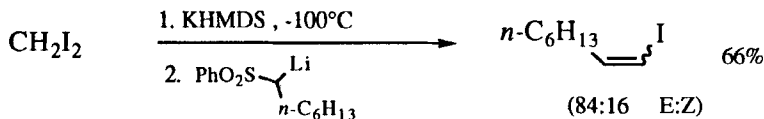
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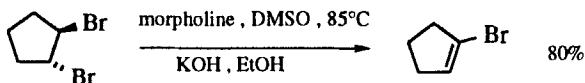
Thenappan, A.; Burton, D.J. *J. Org. Chem.*, **1990**, *55*, 4639.



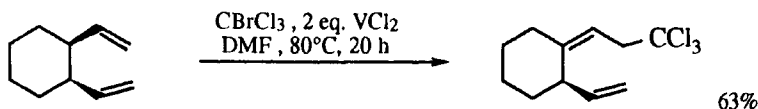
Welch, J.T.; Herbert, R.W. *J. Org. Chem.*, **1990**, *55*, 4782.



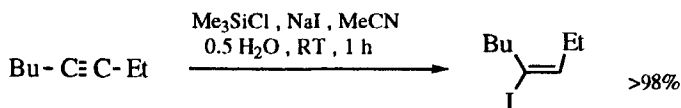
Charreau, P.; Julia, M.; Verpeaux, J.N. *Bull. Soc. Chim. Fr.*, **1990**, *127*, 275.



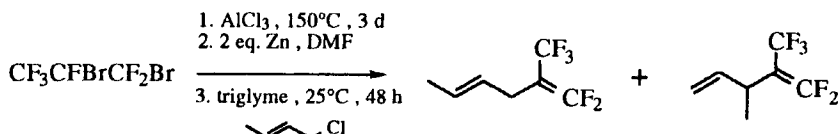
Bandodakar, B.S.; Nagendrappa, G. *Synthesis*, **1990**, 843.



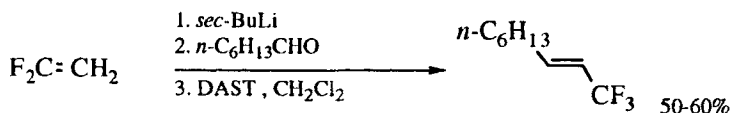
Hirao, T.; Ohshiro, Y. *SynLett*, **1990**, 217.



Kamiya, N.; Chikami, Y.; Ishii, Y. *SynLett*, **1990**, 675.

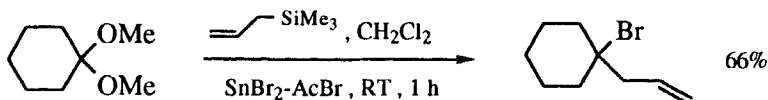


Morken, P.A.; Lu, H.; Nakamura, A.; Burton, D.J. *Tetrahedron Lett.*, **1991**, 32, 4271.

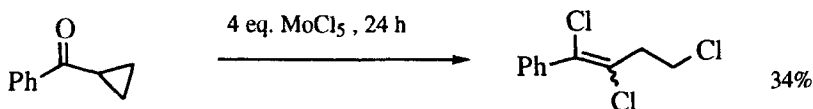


DAST = diethylaminosulfur trifluoride

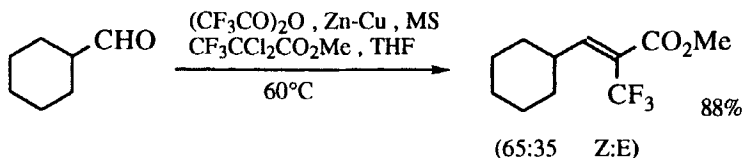
Tellier, F.; Sauvêtre, R. *Tetrahedron Lett.*, **1991**, 32, 5963.



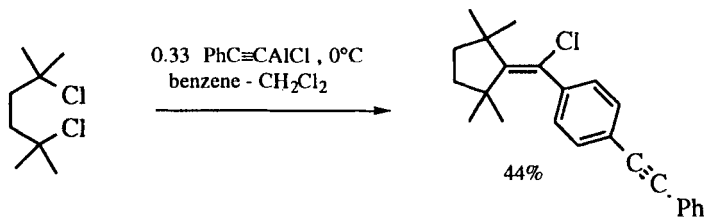
Oriyama, T.; Iwanami, K.; Tsukamoto, K.; Ichimura, Y.; Koga, G. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 1410.



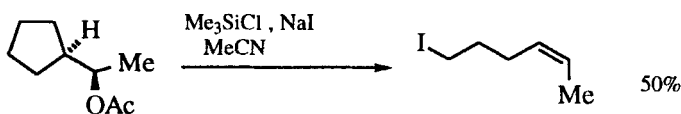
Hirao, T.; Nagata, S.; Yamaguchi, M.; Oshiro, Y. *Bull. Chem. Soc. Jpn.*, **1991**, 64, 1717.



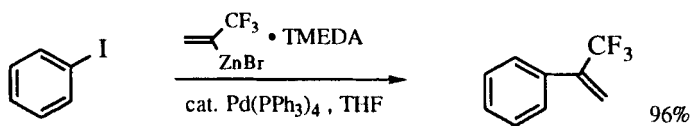
Allmendinger, T.; Lang, R.W. *Tetrahedron Lett.*, **1991**, 32, 339.



Bhaskar Ready, G.; Hanamoto, T.; Hiyama, T. *Tetrahedron Lett.*, **1991**, 32, 521.

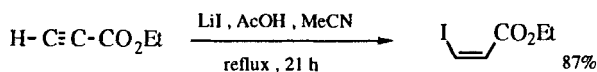


Amouroux, R.; Ejjiyar, S. *Tetrahedron Lett.*, **1991**, 32, 3059.



Jiang, B.; Xu, Y. *J. Org. Chem.*, **1991**, 56, 7336.

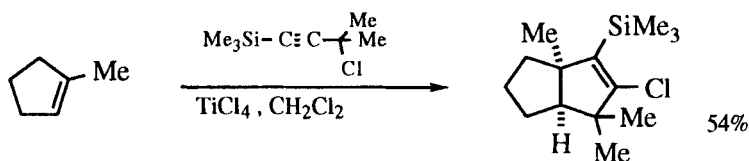
Jiang, B.; Xu, Y. *Tetrahedron Lett.*, **1992**, 33, 511[coupling of two vinyl halides].



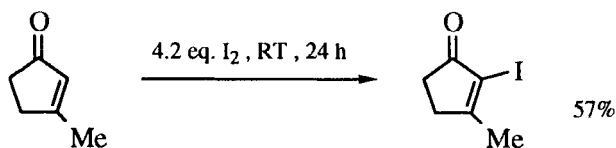
Ma, S.; Lu, X.; Li, Z. *J. Org. Chem.*, **1992**, 57, 709.

Ma, S.; Lu, X. *Tetrahedron Lett.*, **1990**, 31, 7653.

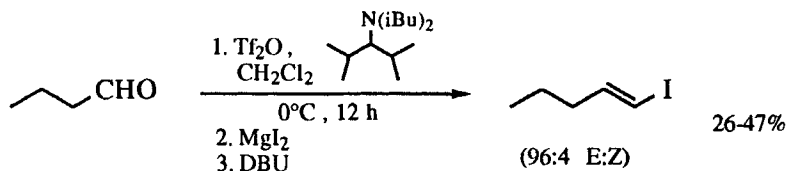
Ma, S.; Lu, X. *J. Chem. Soc., Chem. Commun.*, **1990**, 1643 [with LiBr].



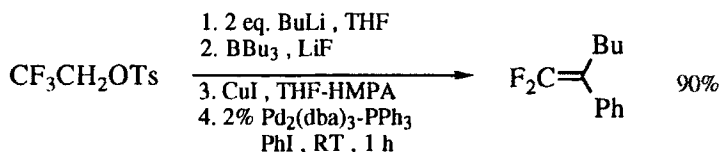
Mayr, H.; Bäuml, E.; Cibura, G.; Koschinsky, R. *J. Org. Chem.*, **1992**, 57, 768.



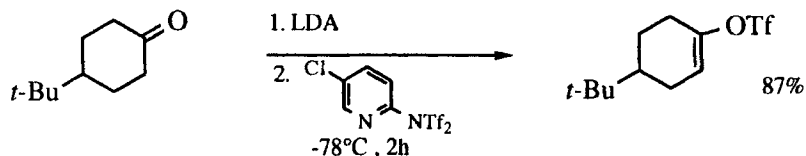
Johnson, C.R.; Adams, J.P.; Braun, M.P.; Senanayake, C.B.W.; Wovkulich, P.M.; Uskoković, M.R. *Tetrahedron Lett.*, **1992**, 33, 917.



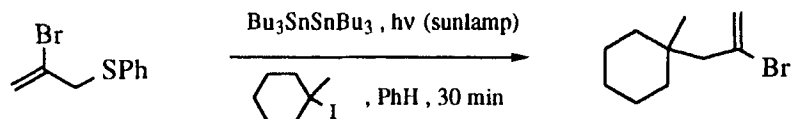
Martínez, A.G.; Alvarez, R.M.; González, S.M.; Subramanian, L.R.; Conrad, M. *Tetrahedron Lett.*, **1992**, 33, 2043.



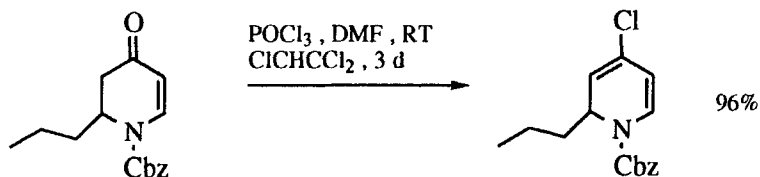
Ichikawa, J.; Minami, T.; Sonoda, T.; Kobayashi, H. *Tetrahedron Lett.*, **1992**, 33, 3779.



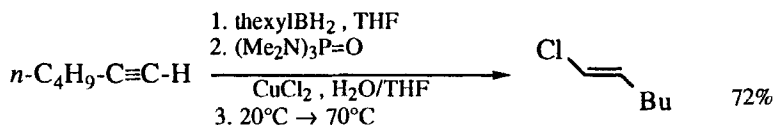
Comins, D.L.; Dehghani, A. *Tetrahedron Lett.*, **1992**, 33, 6299.



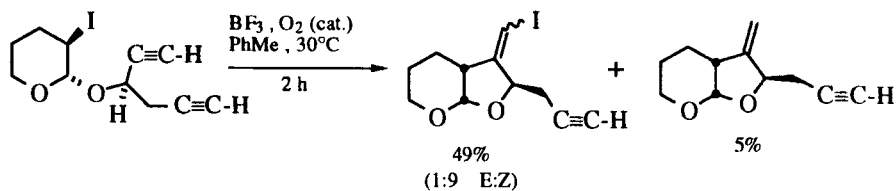
Curran, D.P.; Yoo, B. *Tetrahedron Lett.*, **1992**, 33, 6931.



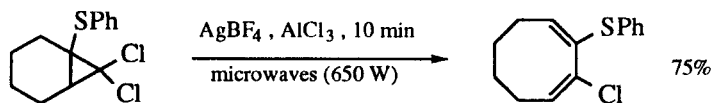
Al-awar, R.S.; Joseph, S.P.; Comins, D.L. *Tetrahedron Lett.*, **1992**, 33, 7635.



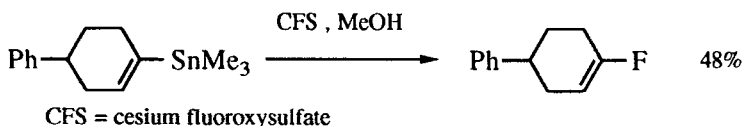
Masuda, Y.; Hoshi, M.; Arase, A. *J. Chem. Soc., Perkin Trans. I*, **1992**, 2725.



Albrecht, U.; Warthow, R.; Hoffmann, H.M.R. *Angew. Chem. Int. Ed. Engl.*, **1992**, *31*, 910.

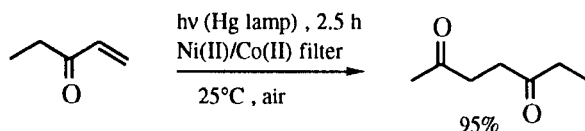


Villemin, D.; Labiad, B. *Synth. Commun.*, **1992**, *22*, 2043.

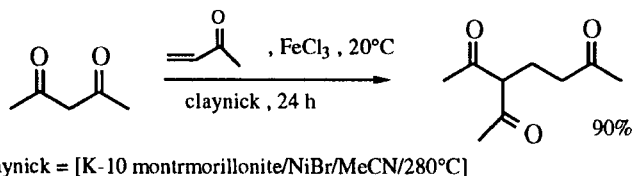


Hodson, H.F.; Madge, D.J.; Widdowson, D.A. *SynLett*, **1992**, 831.

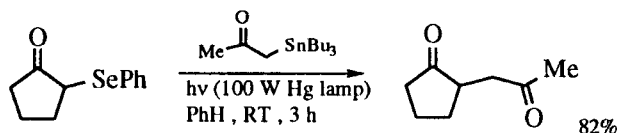
SECTION 372: KETONE - KETONE



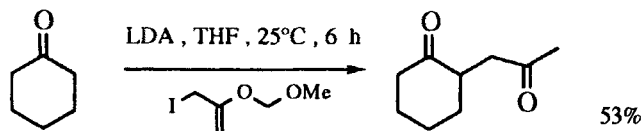
Macias, F.A.; Molinillo, J.M.G.; Collado, I.G.; Massanet, G.M.; Rodriquez-Luis, F. *Tetrahedron Lett.*, **1990**, *31*, 3063.



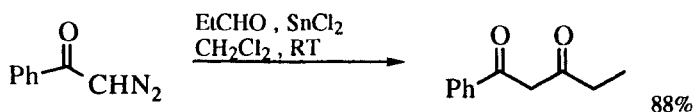
Laszlo, P.; Montaufer, M.-T.; Randriamahefa, S.L. *Tetrahedron Lett.*, **1990**, *31*, 4867.



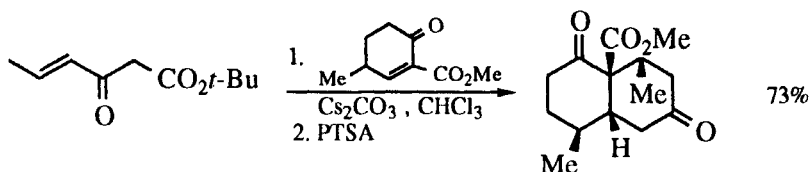
Watanabe, Y.; Yoneda, T.; Ueno, Y.; Toru, T. *Tetrahedron Lett.*, **1990**, *31*, 6669.



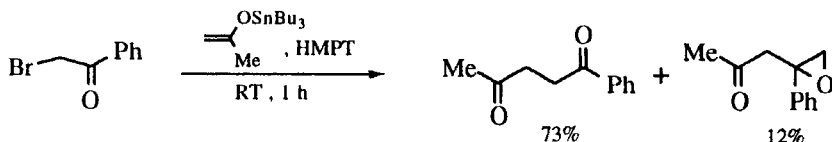
Gu, X-P.; Kirito, Y.; Ikeda, I.; Okahara, M. *J. Org. Chem.*, **1990**, *55*, 3390.



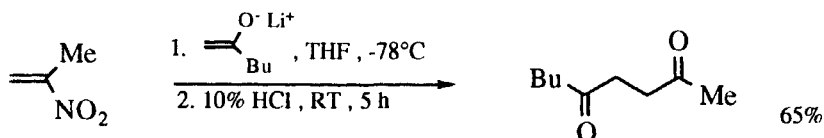
Padwa, A.; Hornbuckle, S.F.; Zhang, Z.; Zhi, L. *J. Org. Chem.*, **1990**, *55*, 5297.



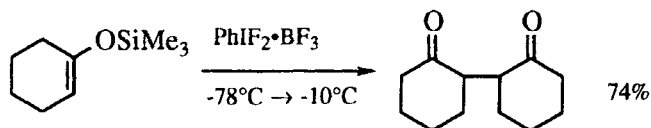
Ruel, R.; Hogan, K.T.; Deslongchamps, P. *SynLett*, **1990**, 516.



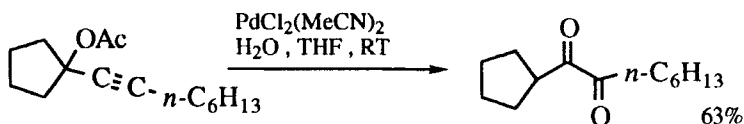
Baba, A.; Yasuda, M.; Yano, K.; Shibata, I.; Matsuda, H. *J. Chem. Soc., Perkin Trans. 1*, **1990**, 3205.



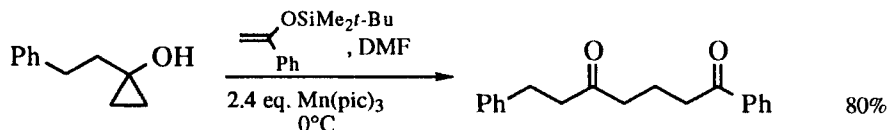
Miyashita, M.; Awen, B.Z.E.; Yoshikoshi, A. *Synthesis*, **1990**, 563.



Zefirov, N.S.; Samoniya, N.Sh.; Jutateladze, T.G.; Zhdankin, V.V. *Zhur. Org. Khim.*, **1991**, 27, 220 (Engl., p. 194).

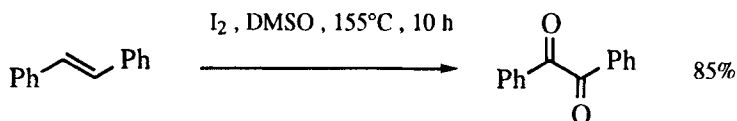


Mahrwald, R.; Schick, H. *Angew. Chem. Int. Ed. Engl.*, **1991**, 30, 593.

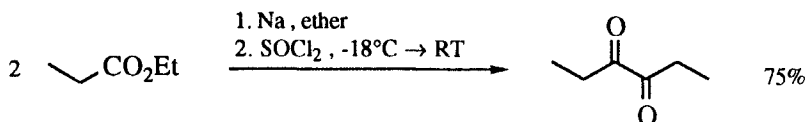


$\text{Mn}(\text{pic})_3$ = manganese (III) 2-pyridinecarboxylate

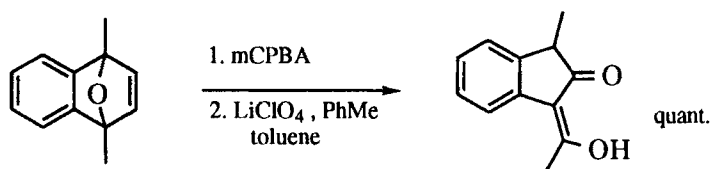
Iwasawa, N.; Hayakawa, S.; Isobe, K.; Narasaka, K. *Chem. Lett.*, **1991**, 1193.



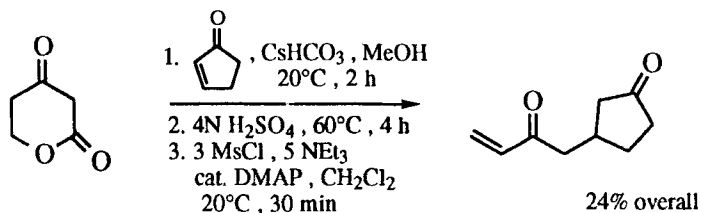
Yusybov, M.S.; Filimonov, V.D. *Synthesis*, **1991**, 131.



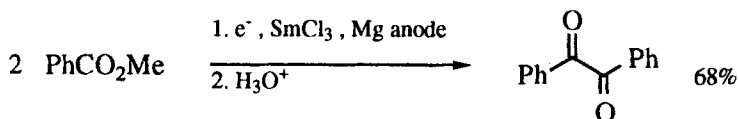
Olah, G.A.; Wu, A. *Synthesis*, **1991**, 1177.



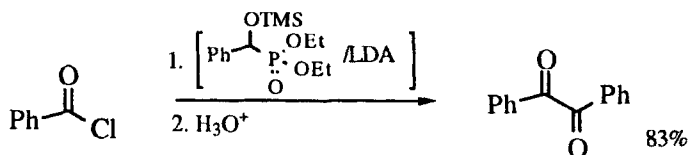
French, L.G.; Fenlon, E.E.; Charlton, T.P. *Tetrahedron Lett.*, **1991**, 32, 851.



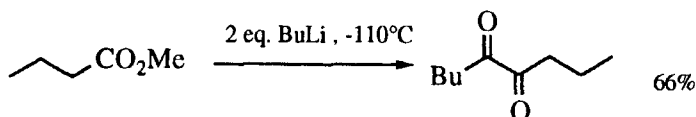
d'Angelo, J.; Gomez-Pardo, D. *Tetrahedron Lett.*, **1991**, 32, 3063.



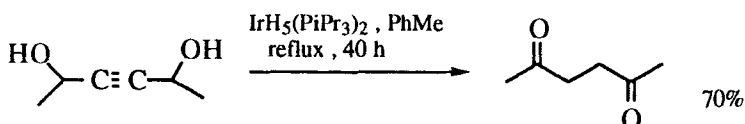
Hébri, H.; Dufach, E.; Heintz, M.; Troupel, M.; Périchon, J. *SynLett*, **1991**, 901.



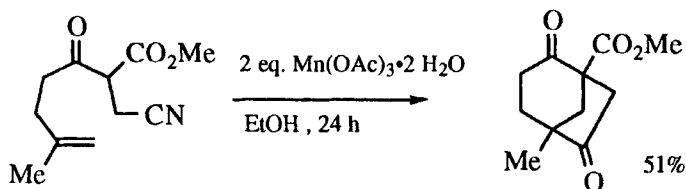
Olah, G.A.; Wu, A. *J. Org. Chem.*, **1991**, 56, 902.



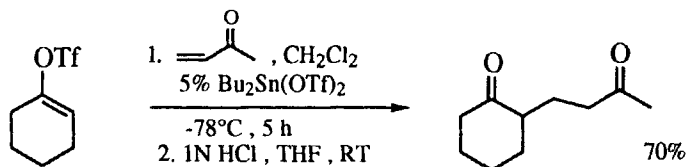
Seyferth, D.; Weinstein, R.M.; Hui, R.C.; Wang, W-L.; Archer, C.M. *J. Org. Chem.*, **1991**, 56, 5768.



Lu, X.; Ji, J.; Ma, D.; Shen, W. *J. Org. Chem.*, **1991**, 56, 5774.

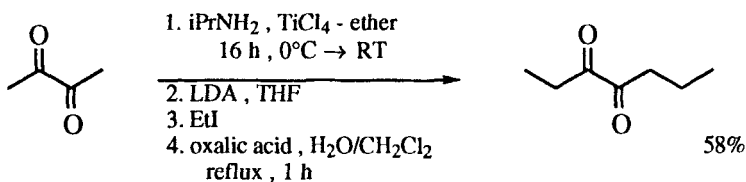


Snider, B.B.; Buckman, B.O. *J. Org. Chem.*, **1992**, 57, 322.

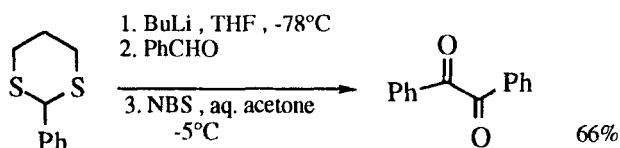


Sato, T.; Wakahara, Y.; Otera, J.; Nozaki, H. *Tetrahedron*, **1991**, 47, 9773.

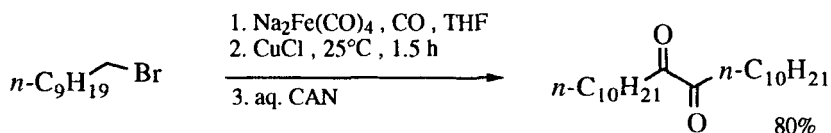
Sato, T.; Wakahara, Y.; Otera, J.; Nozaki, H. *Tetrahedron Lett.*, **1990**, 31, 1581.



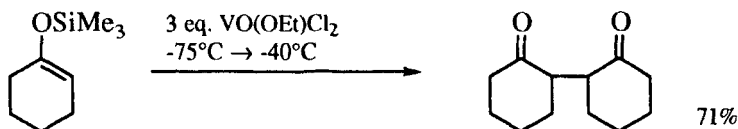
De Kimpe, N.; D'Hondt, L.; Stanoeva, E. *Tetrahedron Lett.*, **1991**, 32, 3879.



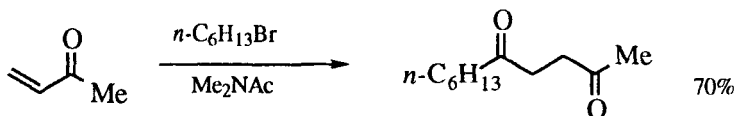
Page, P.C.B.; Graham, A.E.; Park, B.K. *Tetrahedron*, **1992**, 48, 7265.



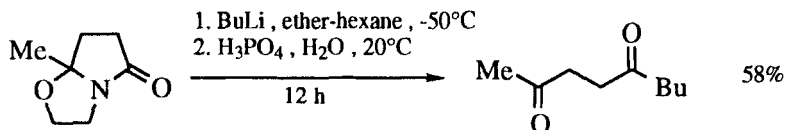
Devasagayara, A.; Periasamy, M. *Tetrahedron Lett.*, **1992**, 33, 1227.



Fujii, T.; Hirao, T.; Ohshiro, Y. *Tetrahedron Lett.*, **1992**, 33, 5823.

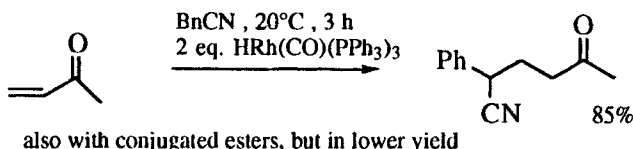


Yamashita, M.; Tashika, H.; Uchida, M. *Bull. Chem. Soc. Jpn.*, **1992**, 65, 1257.

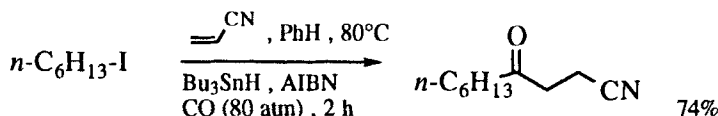


Wedler, C.; Schick, H. *Synthesis*, **1992**, 543.

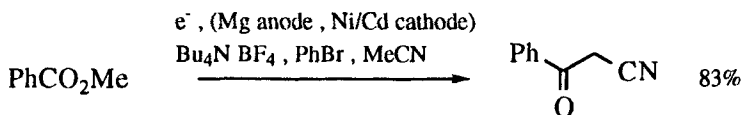
SECTION 373: KETONE - NITRILE



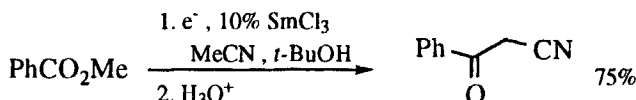
Paganelli, S.; Schionato, A.; Botteghi, C. *Tetrahedron Lett.*, **1991**, 32, 2807.



Ryu, I.; Kusano, K.; Yamazaki, H.; Sonoda, N. *J. Org. Chem.*, **1991**, 56, 5003.



Barhadi, R.; Gal, J.; Heintz, M.; Troupel, M. *J. Chem. Soc., Chem. Commun.*, **1992**, 50.



Hébri, H.; Duñach, E.; Périchon, J. *SynLett*, **1992**, 293.

REVIEWS:

"Stereocontrolled Construction of Complex Cyclic Ketones via oxy-Cope Rearrangement"

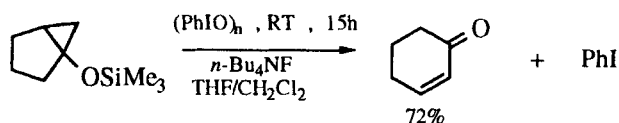
Paquette, L.A. *Angew. Chem. Int. Ed. Engl.*, **1990**, 29, 609.

SECTION 374: KETONE - ALKENE

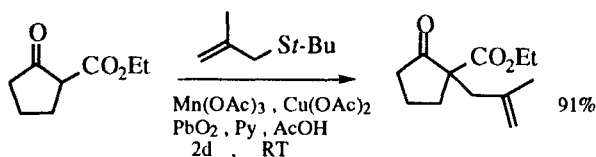
For the oxidation of allylic alcohols to alkene ketones, see Section 168 (Ketones from Alcohols and Phenols)

For the oxidation of allylic methylene groups ($C=C-CH_2 \rightarrow C=C-C(=O)$), see Section 170 (Ketones from Alkyls and Methylene).

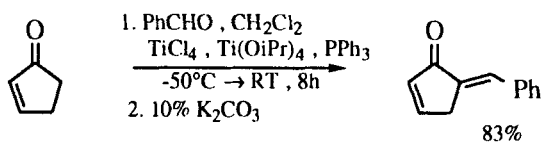
For the alkylation of alkene ketones, also see Section 177 (Ketones from Ketones) and for conjugate alkylations see Section 74E (Alkyls from Alkenes).



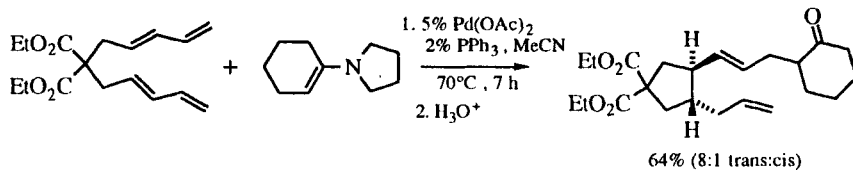
Moriarty, R.M.; Vaid, R.K.; Hopkins, E.; Vaid, B.K.; Prakash, O. *Tetrahedron Lett.*, **1990**, 31, 197.



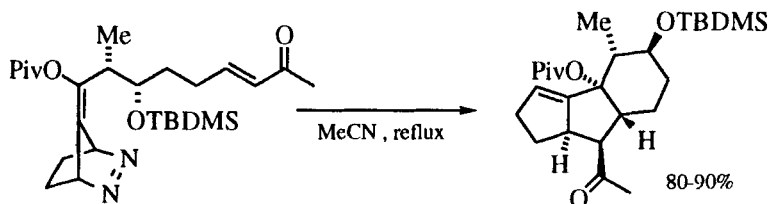
Breuilles, P.; Ugen, D. *Tetrahedron Lett.*, **1990**, 31, 357.



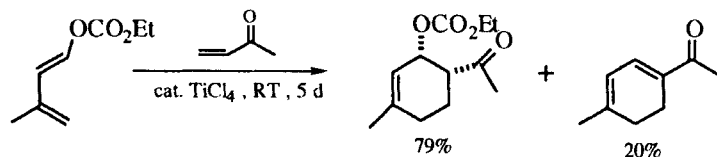
Takanami, T.; Suda, K.; Ohmori, H. *Tetrahedron Lett.*, **1990**, 31, 677.



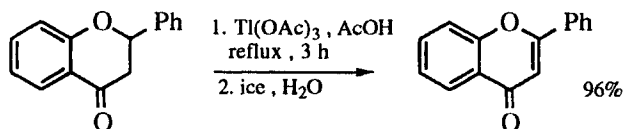
Takacs, J.M.; Zhu, J. *Tetrahedron Lett.*, **1990**, 31, 1117.



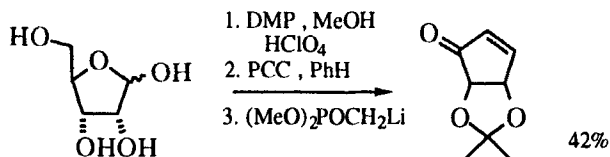
McLoughlin, J.I.; Brahma, R.; Campopiano, O.; Little, R.D. *Tetrahedron Lett.*, **1990**, 31, 1377.



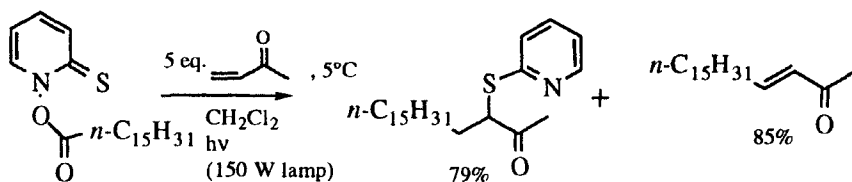
De Cusati, P.F.; Olofson, R.A. *Tetrahedron Lett.*, **1990**, 31, 1409.



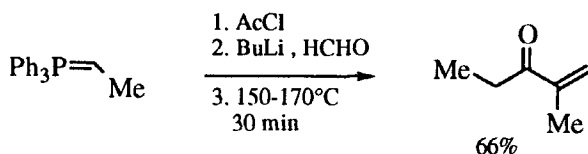
Singh, O.V.; Kapoor, R.P. *Tetrahedron Lett.*, **1990**, 31, 1459.



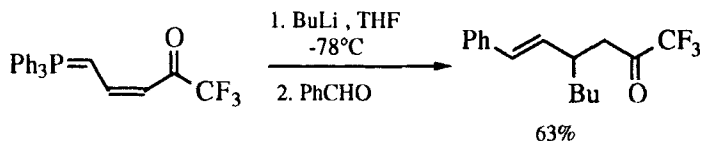
Ali, S.M.; Ramesh, K.; Borchardt, R.T. *Tetrahedron Lett.*, **1990**, 31, 1509.



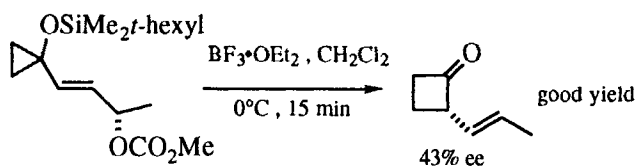
Barton, D.H.R.; Sarma, J.C. *Tetrahedron Lett.*, **1990**, 31, 1965.



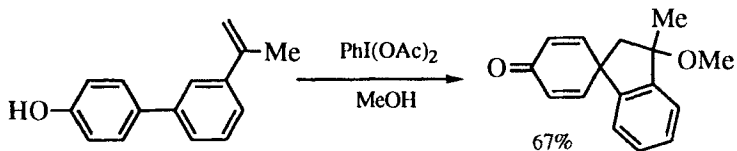
LeRoux, J.; Le Corre, M. *Tetrahedron Lett.*, **1990**, 31, 2591.



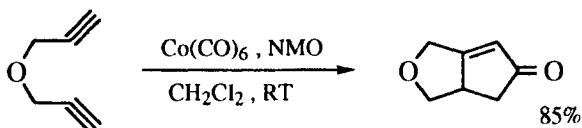
Shen, Y.; Wang, T. *Tetrahedron Lett.*, **1990**, 31, 3161.



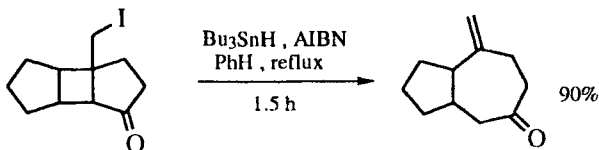
Ollivier, J.; Legros, J-Y.; Fiaud, J-C.; de Meijere, A.; Salaün, J. *Tetrahedron Lett.*, **1990**, 31, 4135.



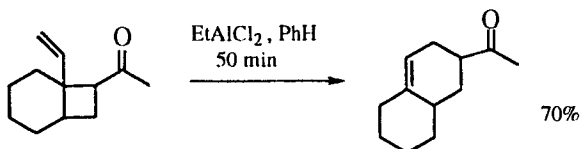
Callinan, A.; Chen, Y.; Morrow, G.W.; Swenton, J.S. *Tetrahedron Lett.*, **1990**, 31, 4551.



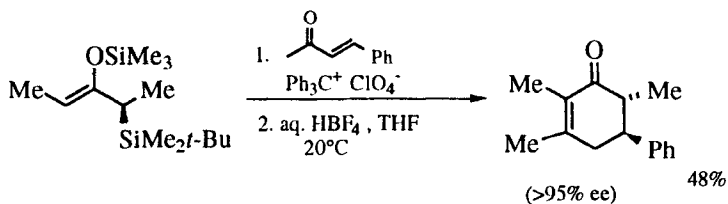
Shambayati, S.; Crowe, W.E.; Schreiber, S.L. *Tetrahedron Lett.*, **1990**, 31, 5289.



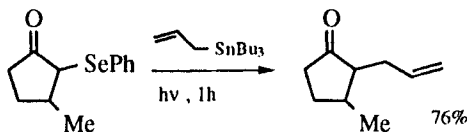
Lange, G.L.; Gottardo, C. *Tetrahedron Lett.*, **1990**, 31, 5985.



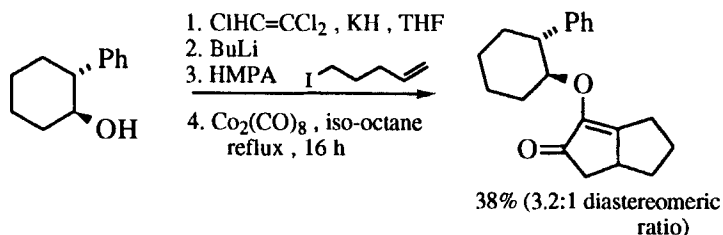
Fujiwara, T.; Takeda, T. *Tetrahedron Lett.*, **1990**, 31, 6027.



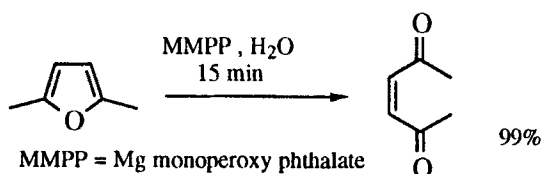
Lohray, B.B.; Zimbiniski, R. *Tetrahedron Lett.*, **1990**, 31, 7273.



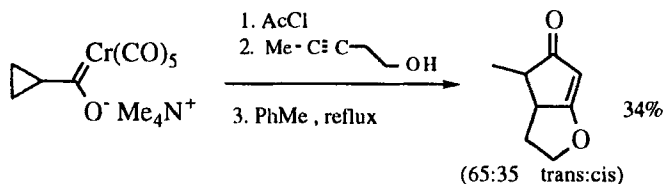
Toru, T.; Okumura, T.; Ueno, Y. *J. Org. Chem.*, **1990**, 55, 1277.



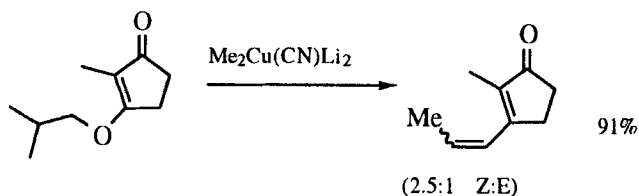
Poch, M.; Valentí, E.; Moyano, A.; Pericàs, M.A.; Castro, J.; DeNicola, A.; Greene, A.E. *Tetrahedron Lett.*, **1990**, 31, 7505.



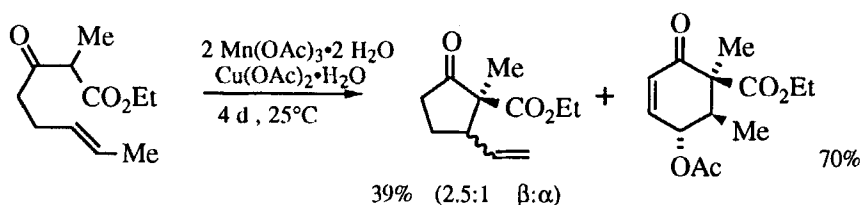
Domínguez, C.; Csáky, A.G.; Plumet, J. *Tetrahedron Lett.*, **1990**, 31, 7669.



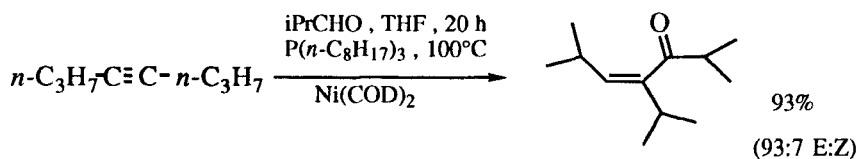
Herndon, J.W.; Matasi, J.J. *J. Org. Chem.*, **1990**, 55, 786.



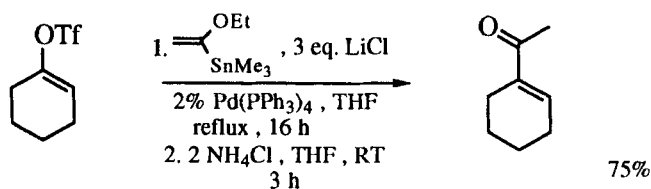
Cheng, M.; Hulce, M. *J. Org. Chem.*, **1990**, 55, 964.



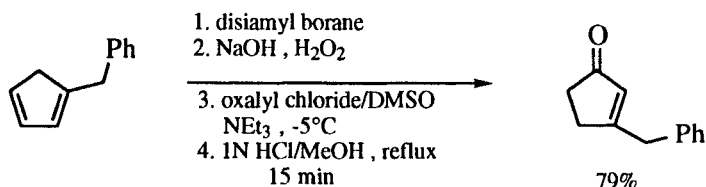
Kates, S.A.; Dombroski, M.A.; Snider, B.B. *J. Org. Chem.*, **1990**, 55, 2427.



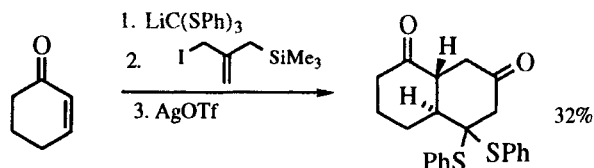
Tsuda, T.; Kiyoi, T.; Saegusa, T. *J. Org. Chem.*, **1990**, *55*, 2554.



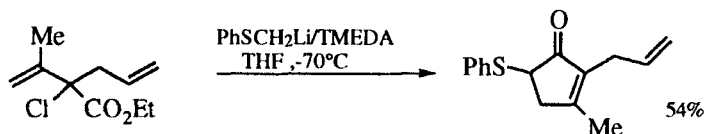
Kwon, H.B.; McKee, B.H.; Stille, J.K. *J. Org. Chem.*, **1990**, *55*, 3114.



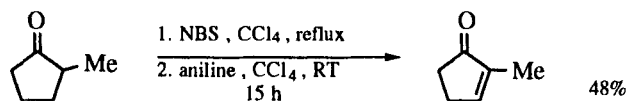
Collins, S.; Hong, Y.; Kataoka, M.; Nguyen, T. *J. Org. Chem.*, **1990**, *55*, 3395.



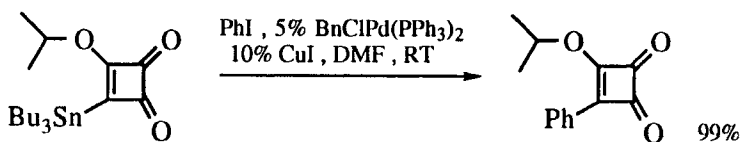
Posner, G.H.; Asirvatham, E.; Hamill, T.G.; Webb, K.S. *J. Org. Chem.*, **1990**, *55*, 2132.



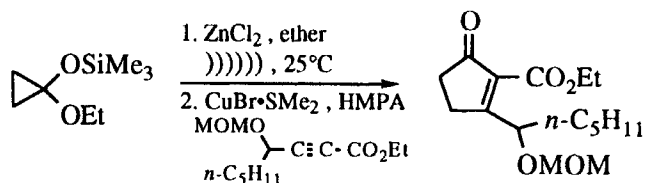
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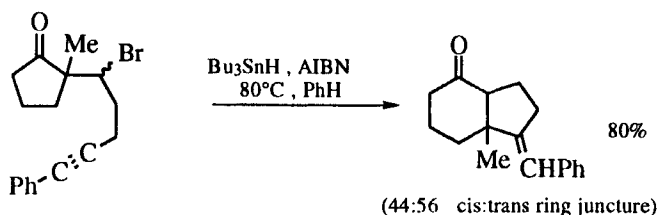
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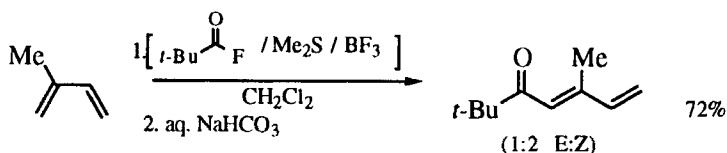
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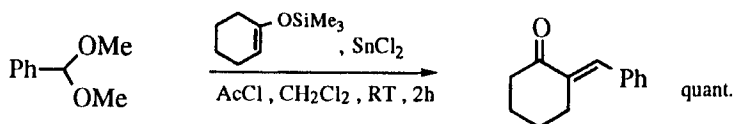
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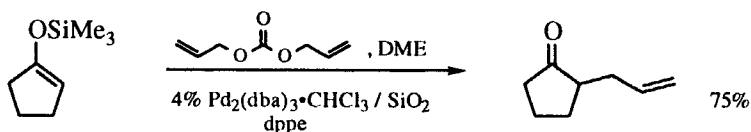
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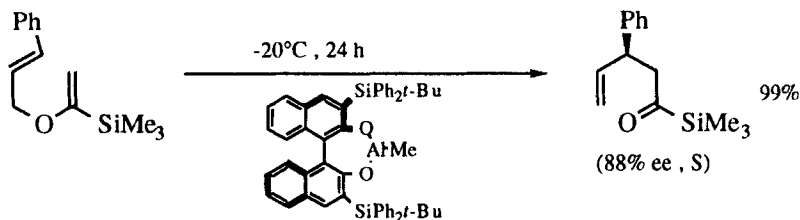
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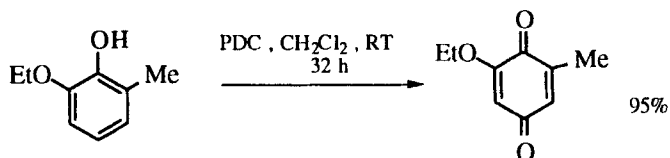
Oriyama, T.; Iwanami, K.; Miyauchi, Y.; Koga, G. *Bull. Chem. Soc. Jpn.*, **1990**, 63, 3716.



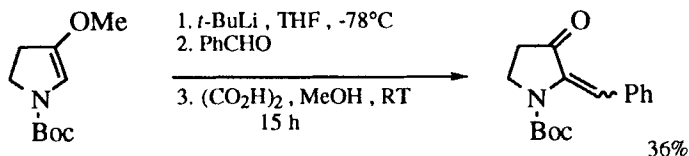
Baba, T.; Nakano, K.; Nishiyama, S.; Tsurya, S. *J. Chem. Soc., Chem. Commun.*, **1990**, 348.



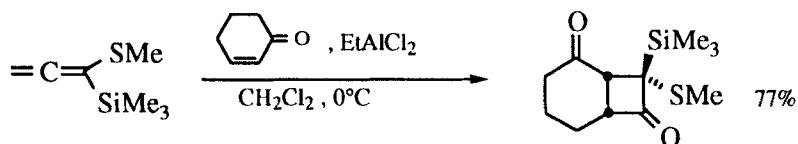
Maruoka, K.; Banno, H.; Yamamoto, H. *J. Am. Chem. Soc.*, **1990**, *112*, 7791.



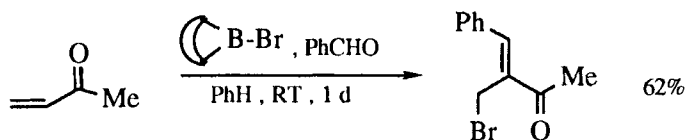
Mukhopadhyay, A.; Suryawanshi, S.N.; Bhakuni, D.S. *Ind. J. Chem.*, **1990**, *29B*, 1060.



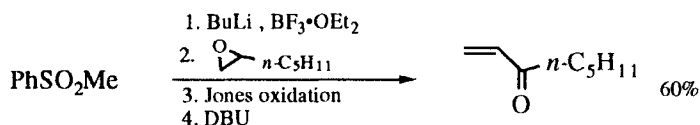
Giles, M.; Hadley, M.S.; Gallagher, T. *J. Chem. Soc., Chem. Commun.*, **1990**, 831.



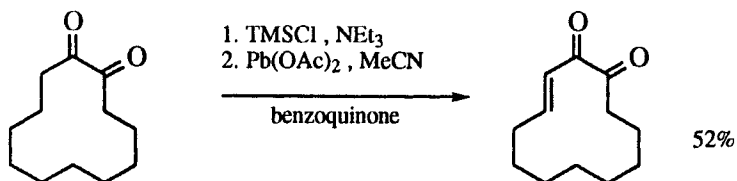
Hayashi, Y.; Niihata, S.; Narasaka, K. *Chem. Lett.*, **1990**, 2091.



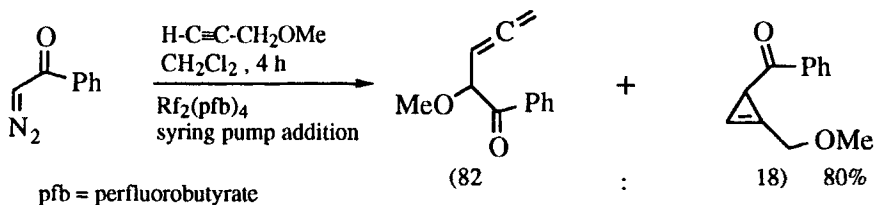
Shimizu, H.; Hara, S.; Suzuki, A. *Synth. Commun.*, **1990**, *20*, 549.



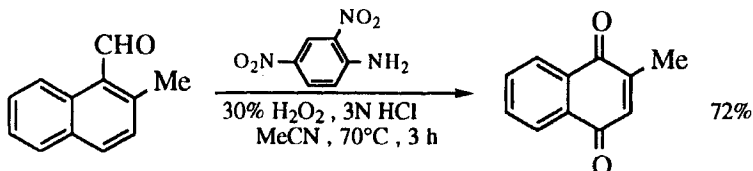
Marczak, S.; Wicha, J. *Synth. Commun.*, **1990**, *20*, 1511.



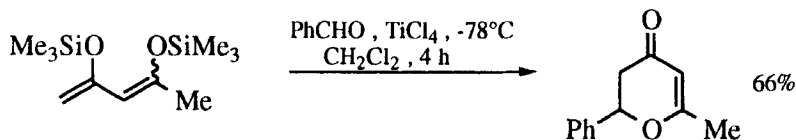
Kim, M.; Applegate, L.A.; Park, O.-S.; Vasudevan, S.; Watt, D.S. *Synth. Commun.*, **1990**, 20, 985.



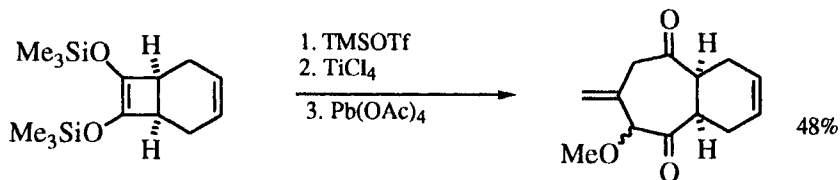
Dole, M.P.; Bagheri, V.; Claxton, E.E. *J. Chem. Soc., Chem. Commun.*, **1990**, 46.



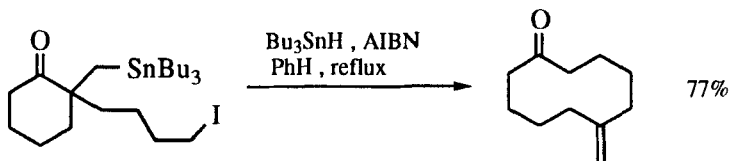
Gupta, R.B.; Franck, R.W. *SynLett*, **1990**, 355.



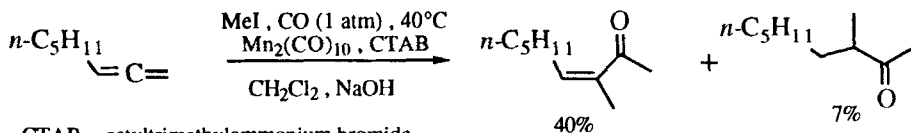
Peterson, J.R.; Kirchhoff, E.W. *SynLett*, **1990**, 394.



Lee, T.V.; Porter, J.R.; Roden, F.S. *Tetrahedron*, **1991**, 47, 139.

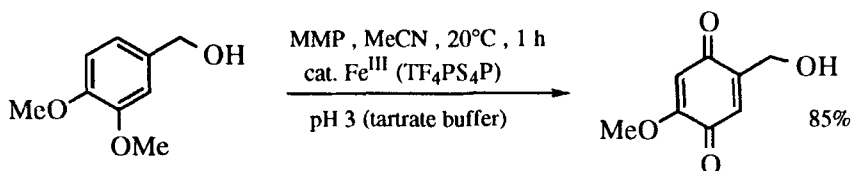


Baldwin, J.E.; Adlington, R.M.; Robertson, J. *Tetrahedron*, **1991**, 47, 6795.



CTAB = cetyltrimethylammonium bromide

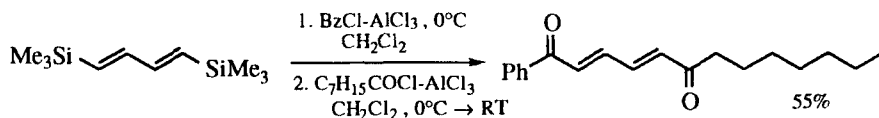
Satyanarayana, N.; Alper, H. *J. Chem. Soc., Chem. Commun.*, **1991**, 8.



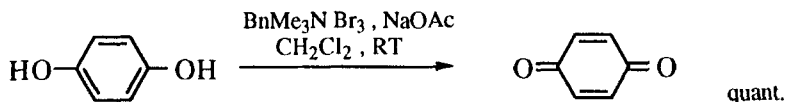
MMP = magnesium monoperoxyphthalate

$\text{Fe}(\text{TF}_4\text{PS}_4\text{P})$ = iron-meso-tetrakis(2,3,5,6-tetrafluorophenyl) tetrasulfonatoporphyrin

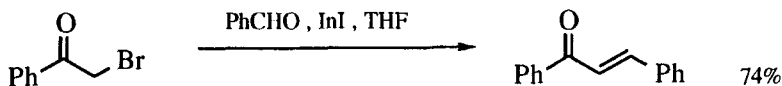
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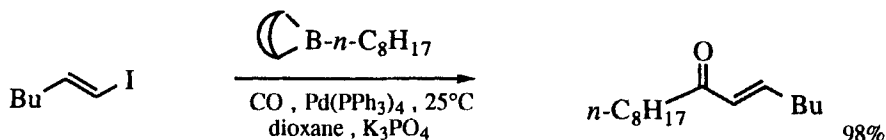
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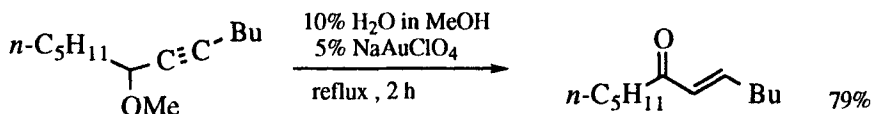
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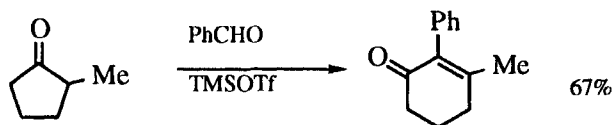
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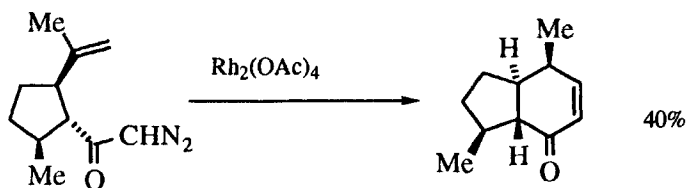
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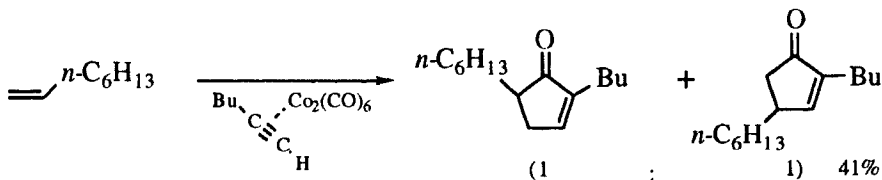
Fukuda, Y.; Utimoto, K. *Bull. Chem. Soc. Jpn.*, **1991**, *64*, 2013.



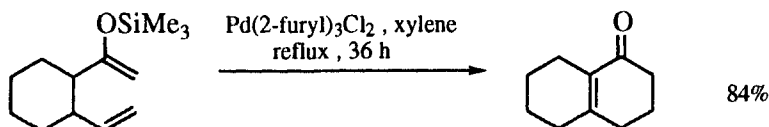
Sato, T.; Hayase, K. *Bull. Chem. Soc. Jpn.*, **1991**, *64*, 3384.



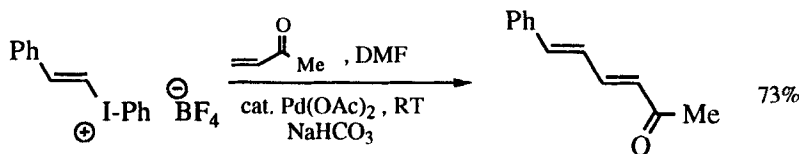
Honda, T.; Ishige, H.; Tsubuki, M.; Naito, K.; Suzuki, Y. *J. Chem. Soc., Perkin Trans. I*, **1991**, 954.



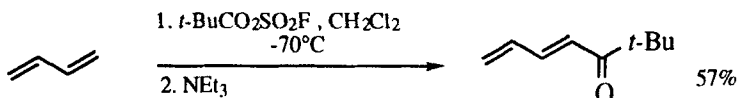
Krafft, M.E.; Juliano, C.A.; Scott, I.L.; Wright, C.; McEachin, M.D. *J. Am. Chem. Soc.*, **1991**, *113*, 1693.



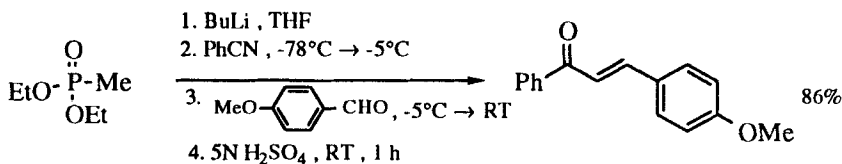
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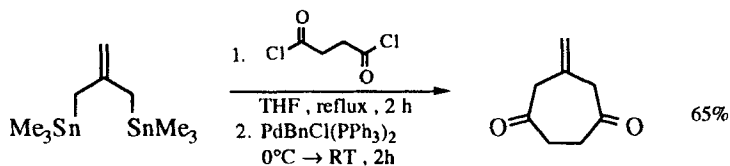
Moriarty, R.M.; Epa, W.R.; Awasthi, A.K. *J. Am. Chem. Soc.*, **1991**, 113, 6315.



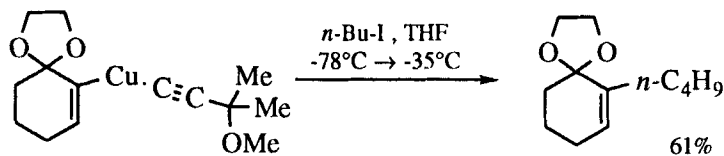
Gavrishova, T.I.; Shastin, A.V.; Balenkova, E.S. *Zhur. Org. Khim.*, **1991**, 27, 673 (Engl., p. 580).



Lee, K.; Oh, D.Y. *Synthesis*, **1991**, 213.

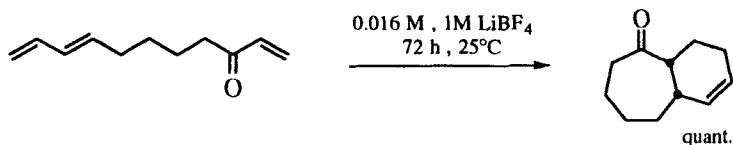


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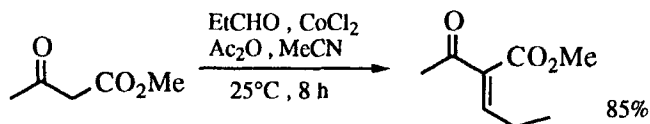


Majetich, G.; Leigh, A.J.; Condon, S. *Tetrahedron Lett.*, **1991**, 32, 605.

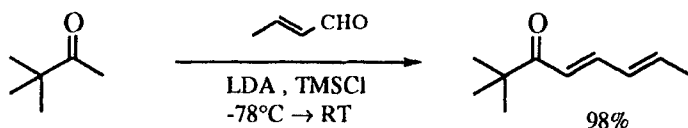
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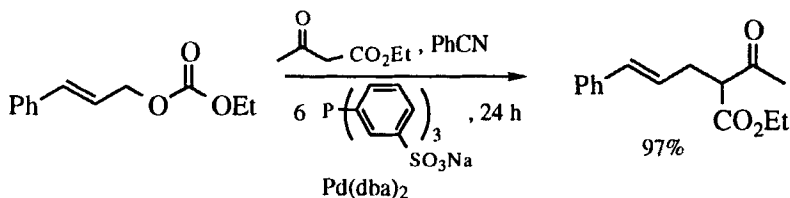
Smith, D.A.; Houk, K.N. *Tetrahedron Lett.*, **1991**, 32, 1549.



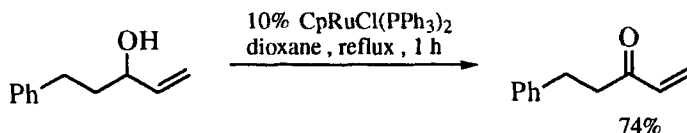
Iqbal, J.; Srivastava, R.R. *Tetrahedron Lett.*, **1991**, 32, 1663.



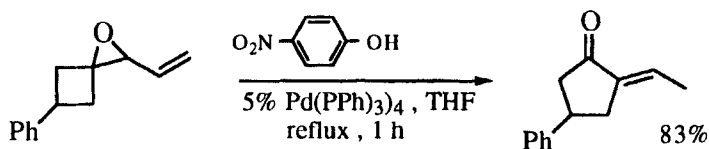
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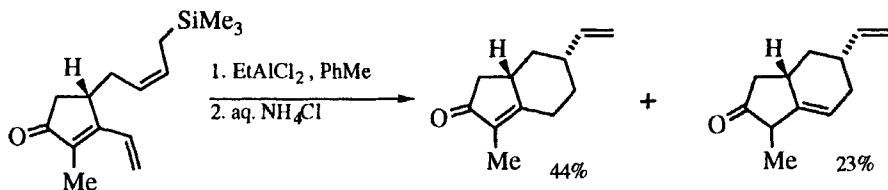
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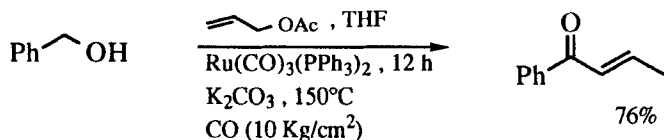
Trost, B.M.; Kulawiec, R.J. *Tetrahedron Lett.*, **1991**, 32, 3039.



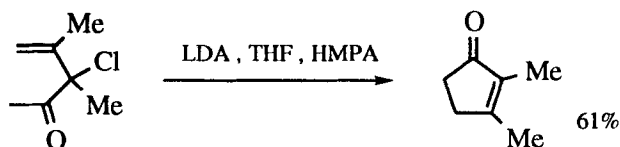
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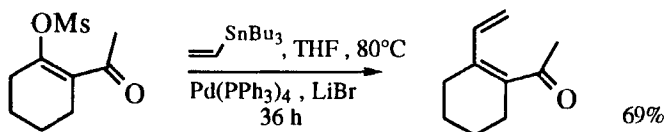
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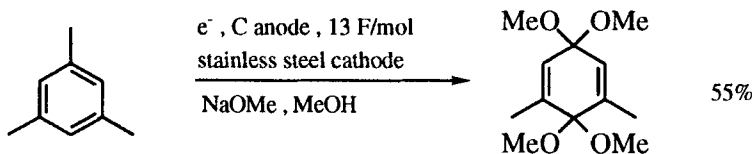
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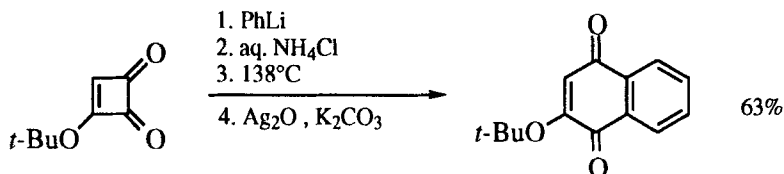
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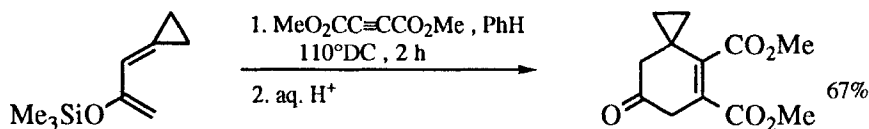
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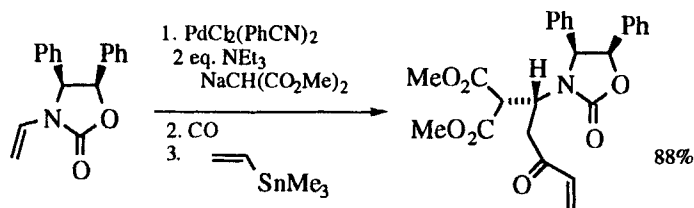
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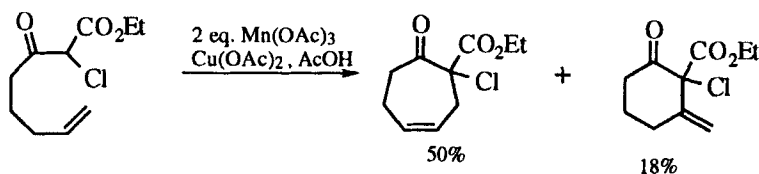
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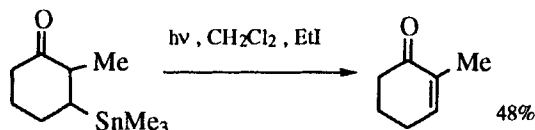
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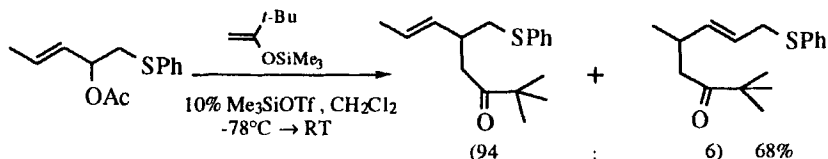
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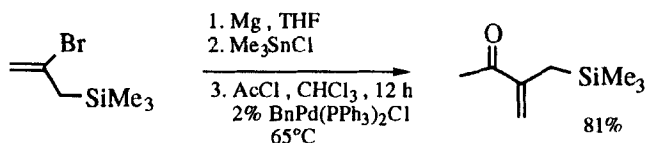
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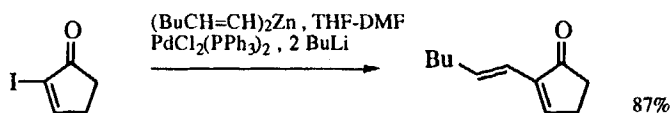
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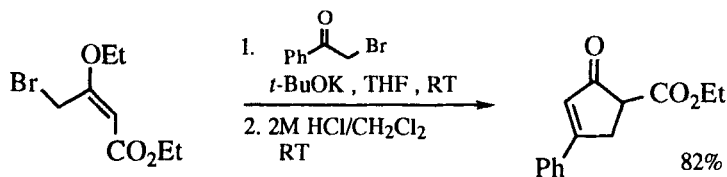
Kudo, K.; Saigo, K.; Hashimoto, Y.; Houchigai, H.; Hasegawa, M. *Tetrahedron Lett.*, **1991**, *32*, 4311.



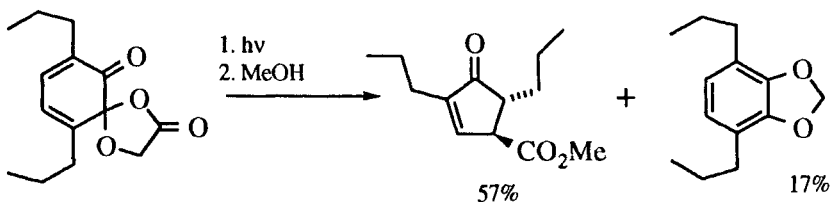
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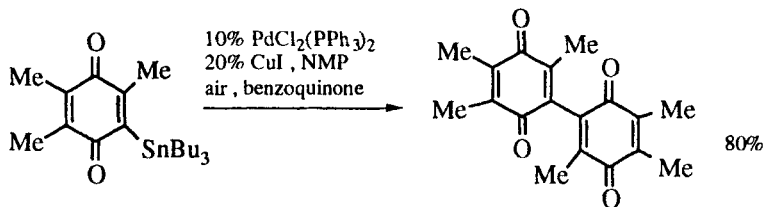
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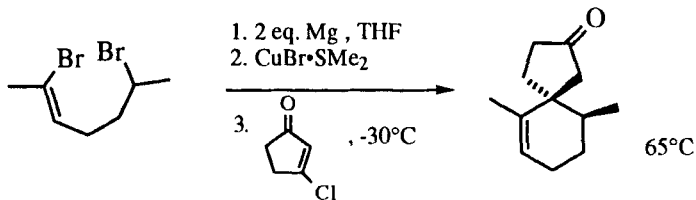
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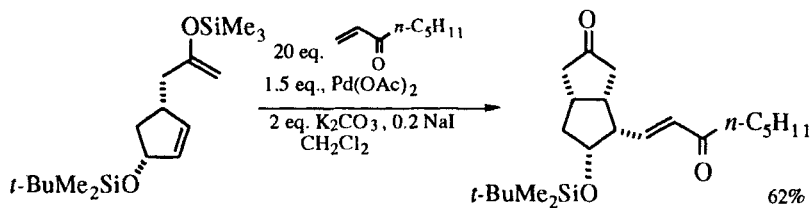
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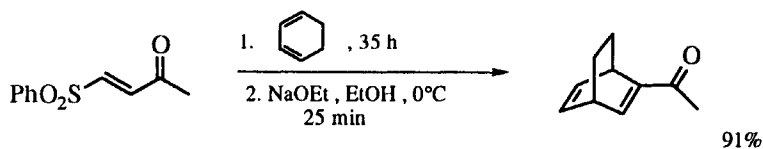
Liebeskind, L.S.; Riesinger, S.W. *Tetrahedron Lett.*, **1991**, 32, 5681.



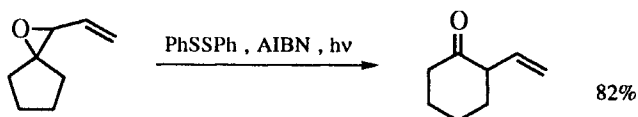
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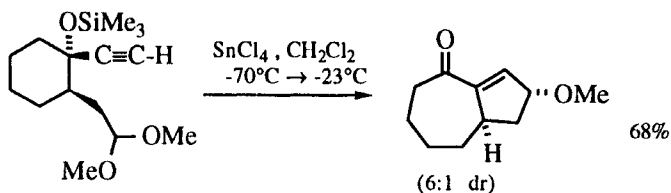
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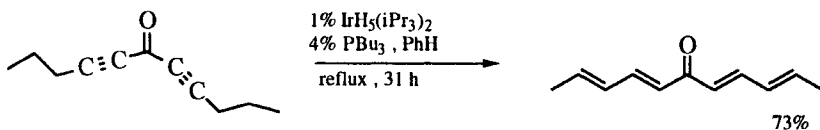
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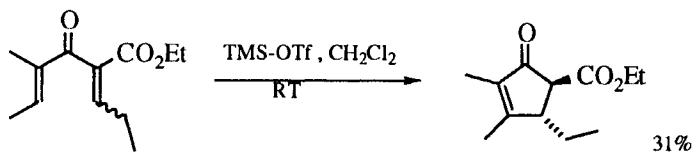
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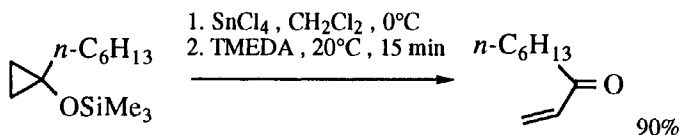
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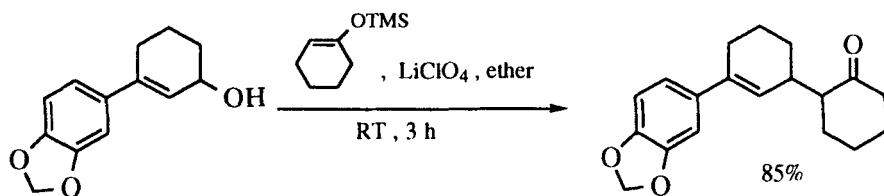


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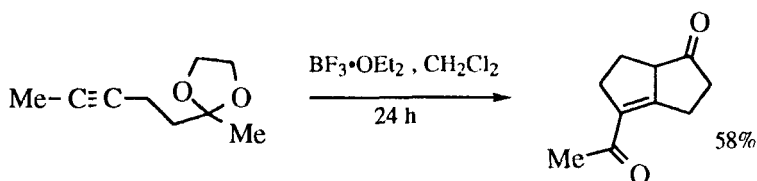


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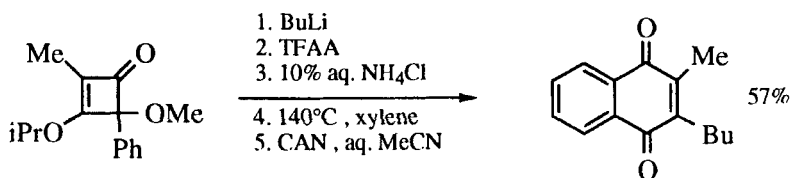
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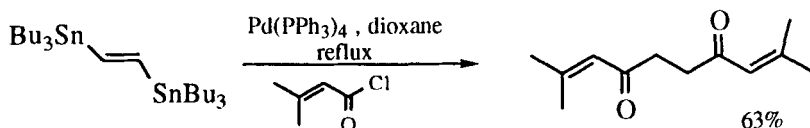
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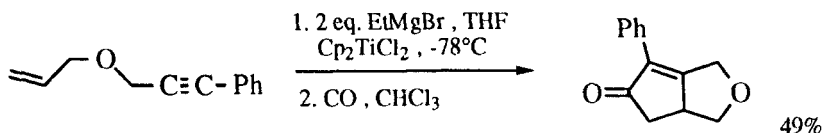
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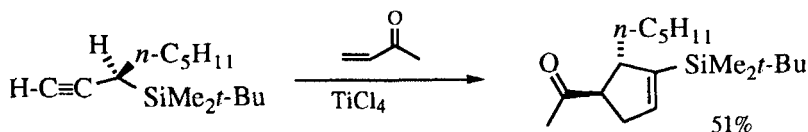
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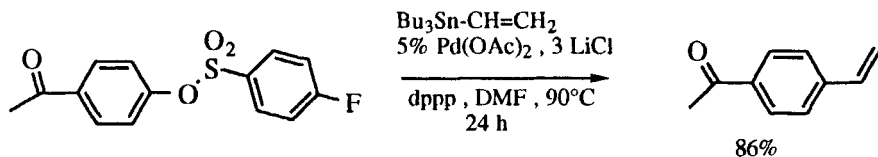
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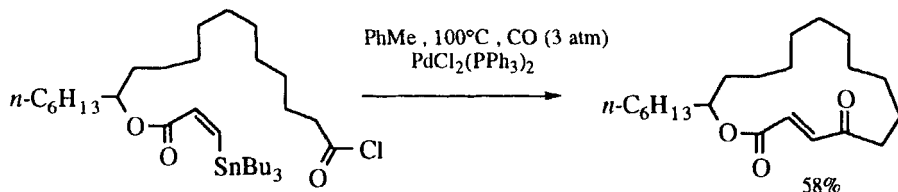
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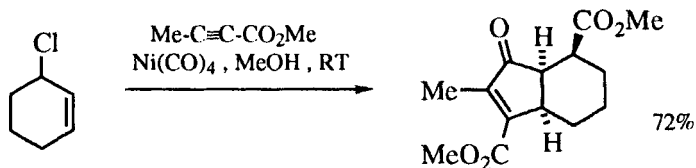
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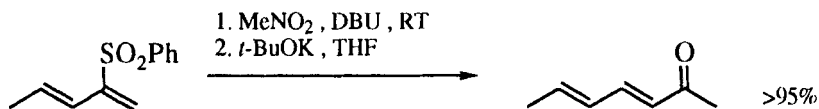
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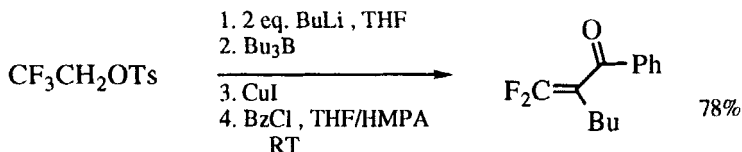
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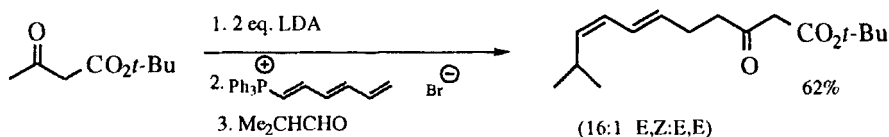
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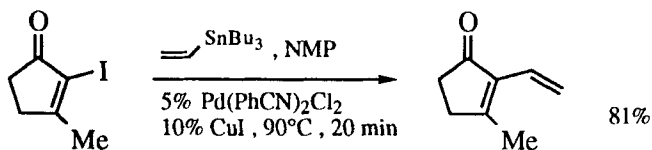
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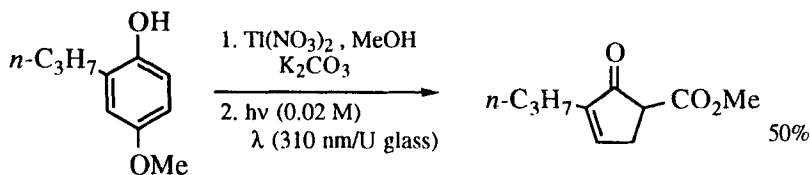
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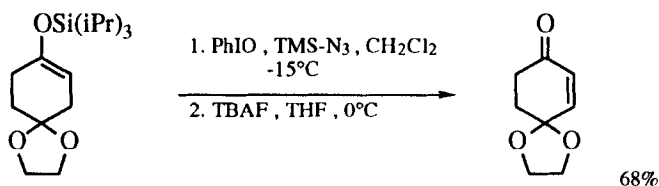
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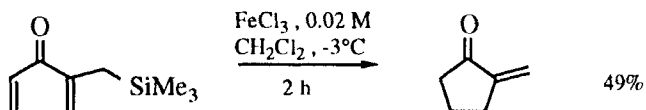
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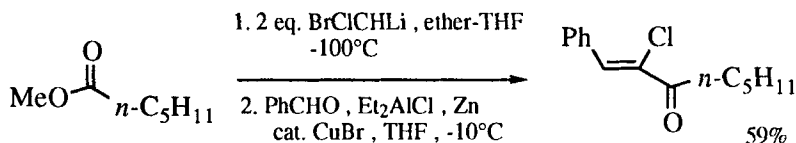
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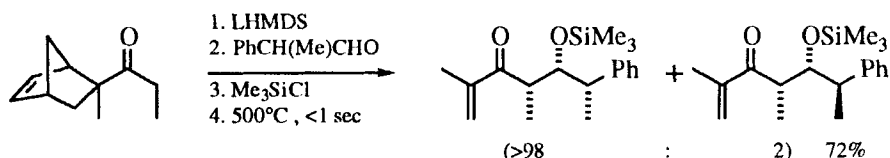
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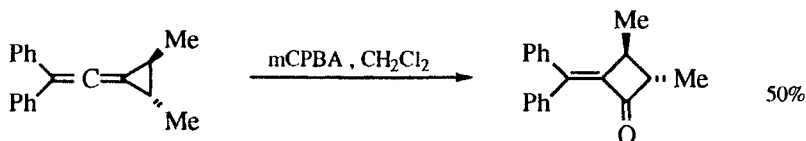
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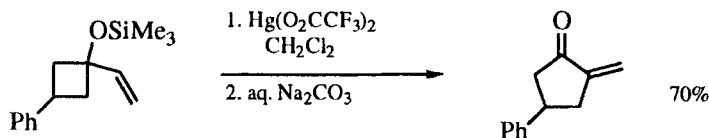
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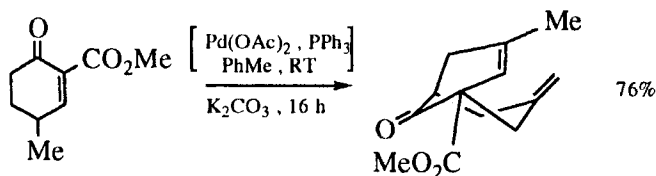
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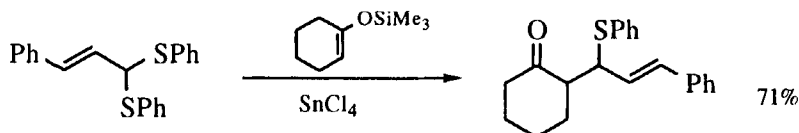
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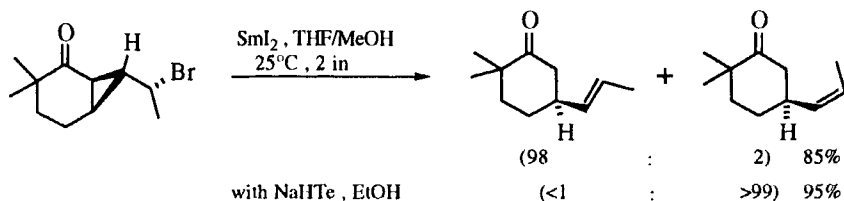
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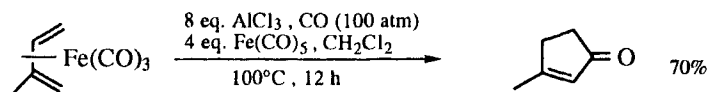
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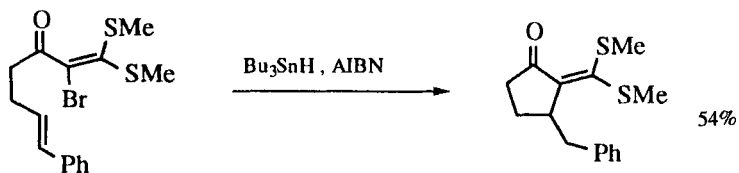
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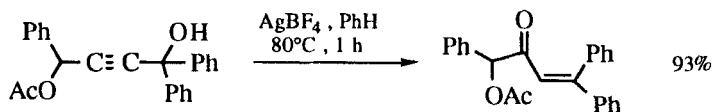
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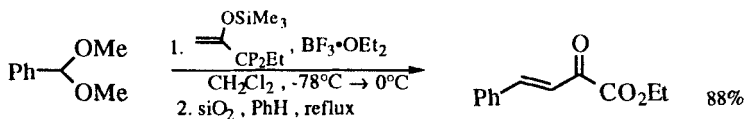
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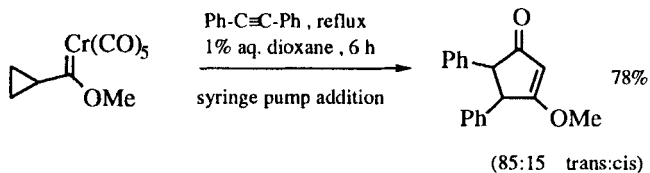
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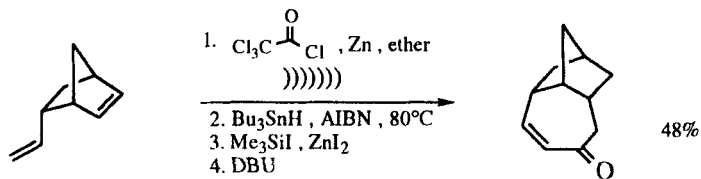
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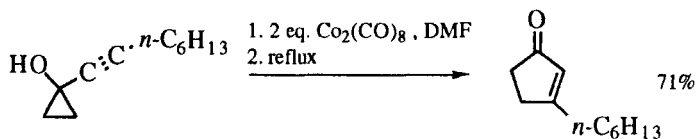
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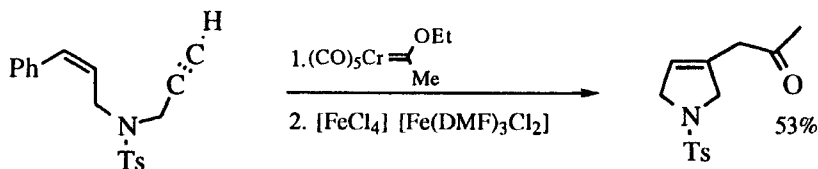
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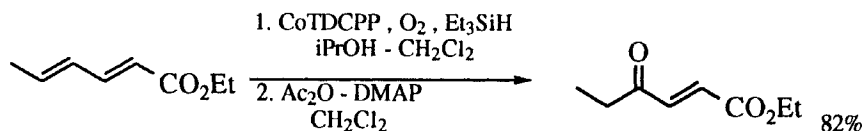
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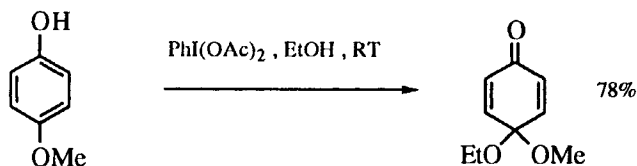


Awen, B.Z.; Miyashita, M.; Shiratani, T.; Yoshikoshi, A.; Irie, H. *Chem. Lett.*, **1992**, 767.

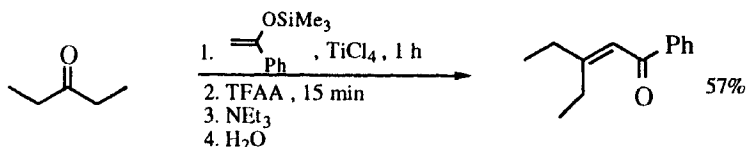


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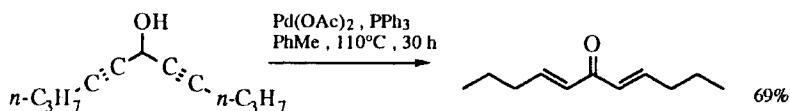
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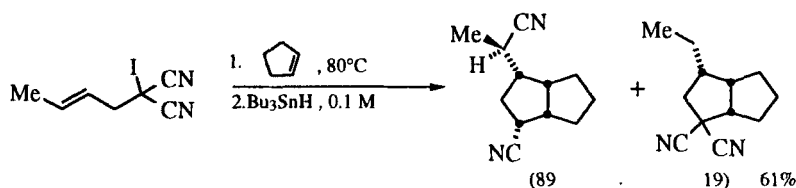
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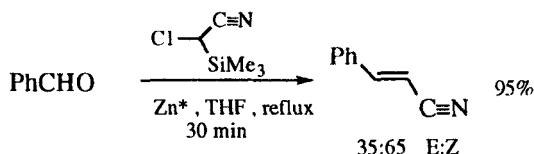
Barrett, A.G.M.; Hill, J.M.; Wallace, E.M.; Flygare, J.A. *SynLett*, **1991**, 764.

SECTION 375: NITRILE - NITRILE

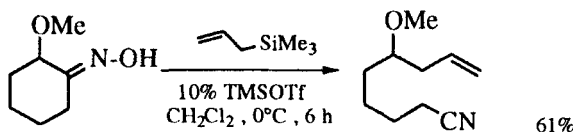


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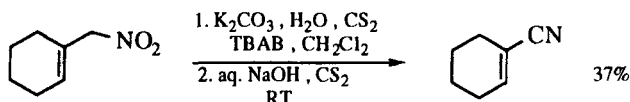
SECTION 376: NITRILE - ALKENE



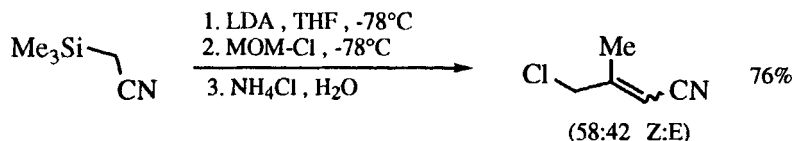
Palomo, C.; Aizpurua, J.M.; Aurrekoetxea, N. *Tetrahedron Lett.*, **1990**, 31, 2209.



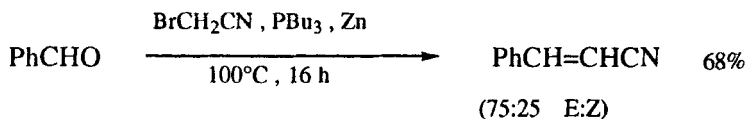
Fujioka, H.; Miyazaki, M.; Yamanaka, T.; Yamamoto, H.; Kita, Y. *Tetrahedron Lett.*, **1990**, 31, 5951.



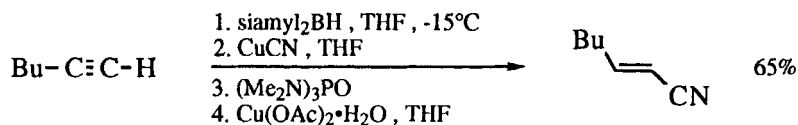
Albanese, D.; Landini, D.; Penso, M.; Pozzi, G. *Synth. Commun.*, **1990**, 20, 965.



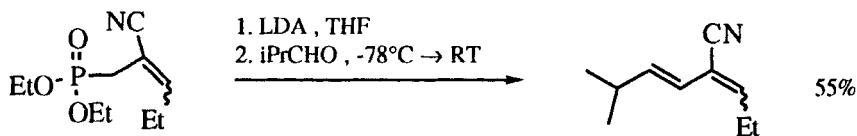
Mauzé, B.; Miginiac, L. *Synth. Commun.*, **1990**, 20, 2251.



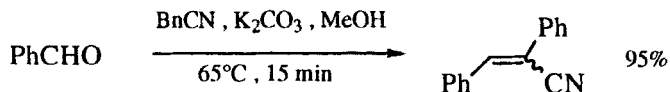
Zheng, J.; Yu, Y.; Shen, Y. *Synth. Commun.*, **1990**, 20, 3277.



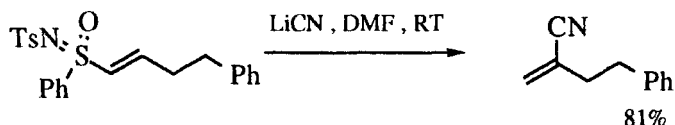
Masuda, Y.; Hoshi, M.; Arase, A. *J. Chem. Soc., Chem. Commun.*, **1991**, 748.



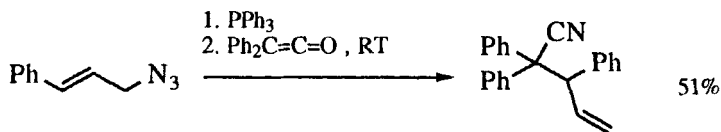
Janecki, T. *Synthesis*, **1991**, 167.



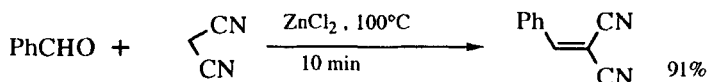
Ladhar, F.; El Gharbi, R. *Synth. Commun.*, **1991**, 21, 413.



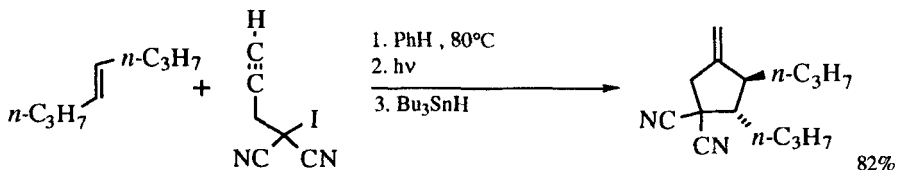
Bailey, P.L.; Jackson, R.F.W. *Tetrahedron Lett.*, **1991**, 32, 3119.



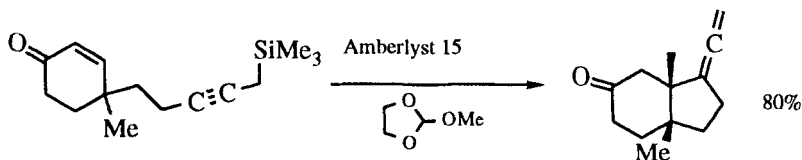
Molina, P.; Alajarin, M.; Lopez-Leonardo, C. *Tetrahedron Lett.*, **1991**, 32, 4041.



Rao, P.S.; Venkataratnam, R.V. *Tetrahedron Lett.*, **1991**, 32, 5821.

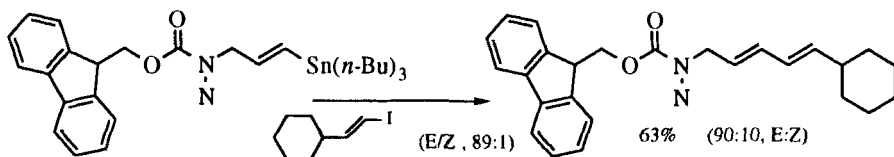


Curran, D.P.; Seong, C.M. *Tetrahedron*, **1992**, 48, 2157, 275.



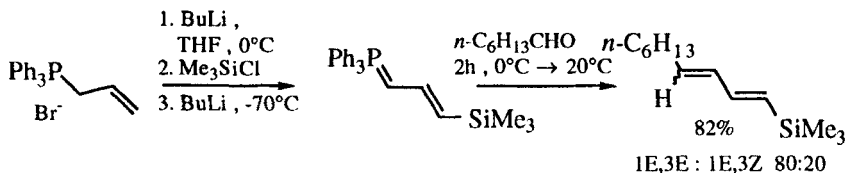
Schinker, D.; Kabbara, J.; Ringe, K. *Tetrahedron Lett.*, **1992**, 33, 8017.

SECTION 377: ALKENE - ALKENE

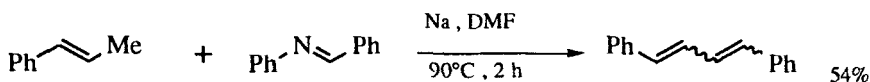


5% $\text{PdCl}_2(\text{MeCN})_2$, DMF, 20°C , 24h

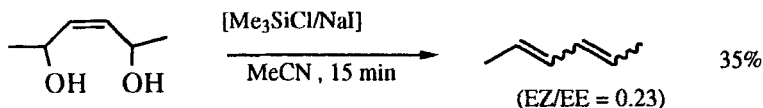
Kende, A.S.; DeVita, R.J. *Tetrahedron Lett.*, **1990**, 31, 307.



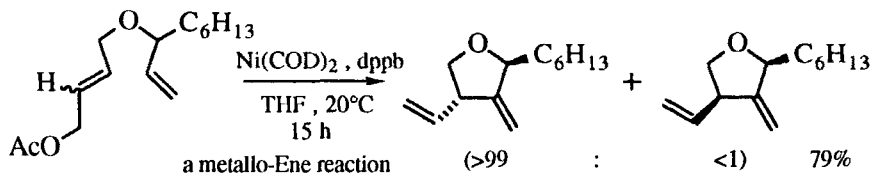
Shen, Y.; Wang, T. *Tetrahedron Lett.*, **1990**, 31, 543.



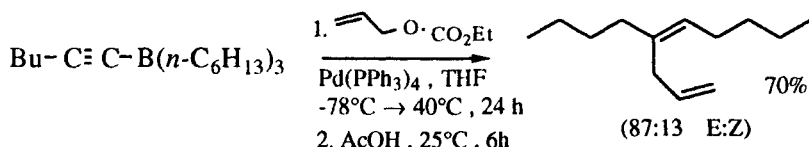
Paventi, M.; Hay, A.S. *Synthesis*, **1990**, 878.



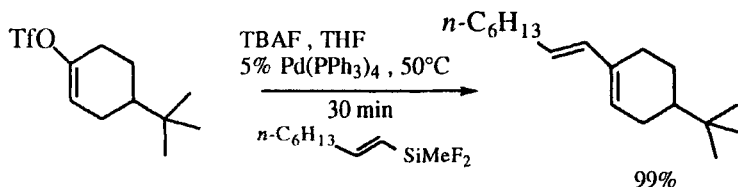
Hill, R.K.; Pendalwar, S.L.; Kielbasinski, K.; Baevsky, M.F.; Nugara, P.N. *Synth. Commun.*, **1990**, 20, 1877.



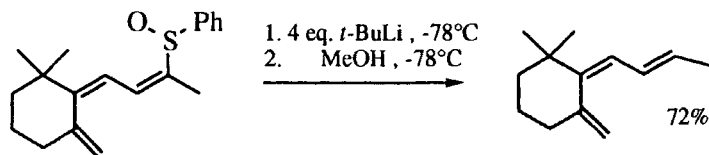
Oppolzer, W.; Keller, T.H.; Kuo, D.L.; Pachinger, W. *Tetrahedron Lett.*, **1990**, 31, 1265.



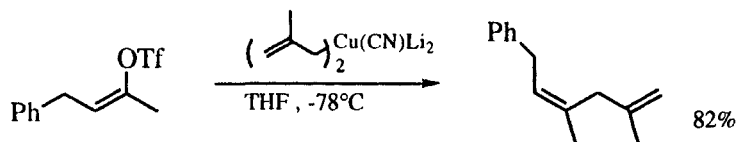
Chen, Y.; Li, N.-S.; Deng, M.-Z. *Tetrahedron Lett.*, **1990**, 31, 2405.



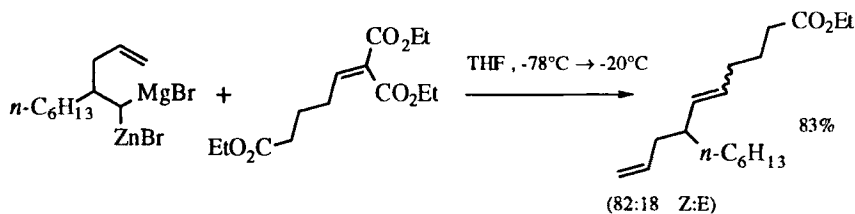
Hatanaka, Y.; Hiyama, T. *Tetrahedron Lett.*, **1990**, 31, 2719.



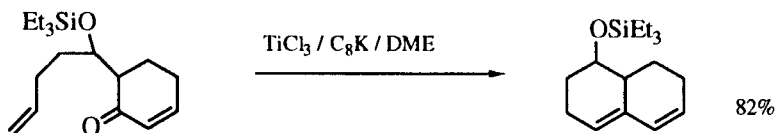
Theobald, P.G.; Okamura, W.H. *J. Org. Chem.*, **1990**, 55, 741.



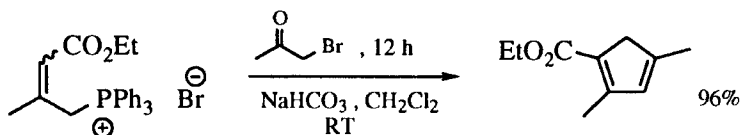
Lipshutz, B.H.; Elworthy, T.R. *J. Org. Chem.*, **1990**, 55, 1695.



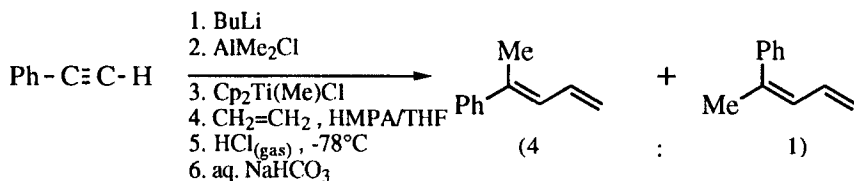
Tucker, C.E.; Rao, S.A.; Knochel, P. *J. Org. Chem.*, **1990**, 55, 5446.



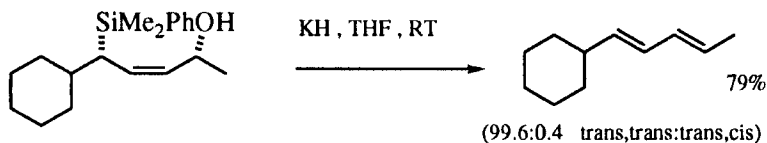
Clive, D.L.J.; Murthy, K.S.K.; Zhang, C.; Hayward, W.D.; Daigneault, S. *J. Chem. Soc., Chem. Commun.*, **1990**, 509.



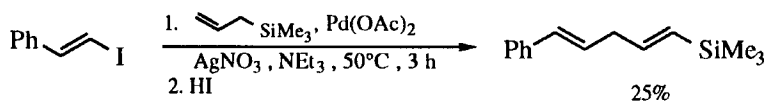
Hatanaka, M.; Himeda, Y.; Ueda, I. *J. Chem. Soc., Chem. Commun.*, **1990**, 526.



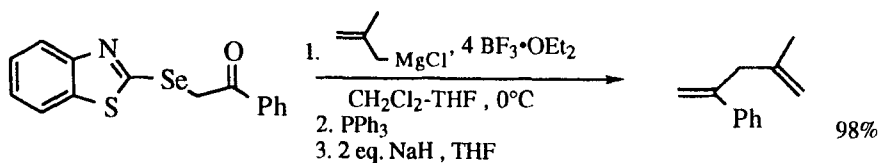
Dennehy, R.D.; Whitby, R.J. *J. Chem. Soc., Chem. Commun.*, **1990**, 1060.



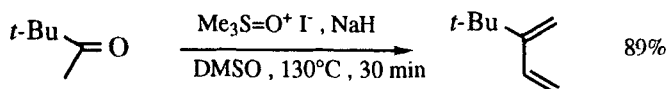
Fleming, I.; Morgan, I.T.; Sarkar, A.K. *J. Chem. Soc., Chem. Commun.*, **1990**, 1575.



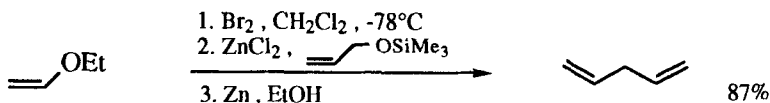
Karabelas, K.; Hallberg, A. *Acta Chem. Scand.*, **1990**, 44, 257.



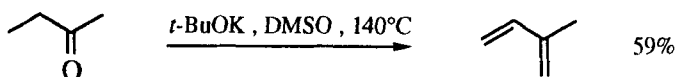
Shibaa, K.; Shiono, H.; Mitsunobu, O. *Chem. Lett.*, **1991**, 661.



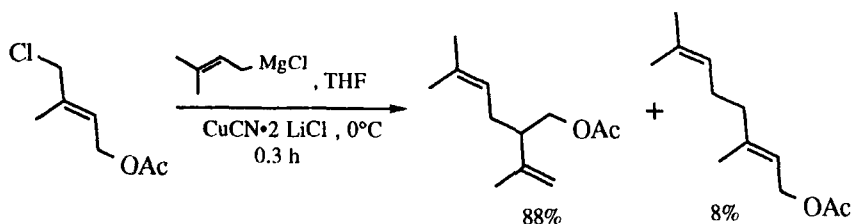
Yurchenko, A.G.; Kyrij, A.B.; Likhotvorik, I.R.; Melnik, N.N.; Zaharzh, P.; Bzhezovski, V.V.; Kushko, A.D. *Synthesis*, **1991**, 393.



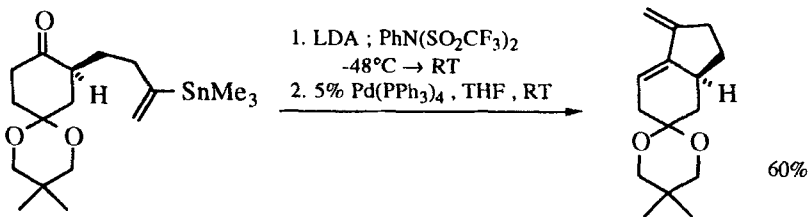
Ohm, S.; Bäuml, E.; Mayr, H. *Chem. Ber.*, **1991**, 124, 2785.



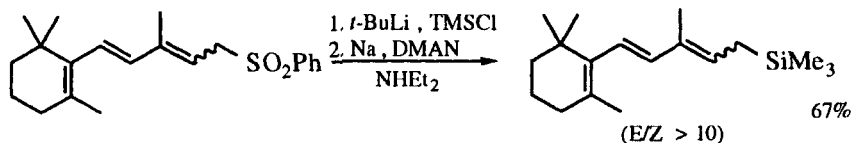
Arenz, T.; Vostell, M.; Frauenrath, H. *SynLett*, **1991**, 23.



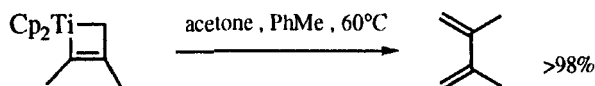
Yanagisawa, A.; Noritake, Y.; Nomura, N.; Yamamoto, H. *SynLett*, **1991**, 251.



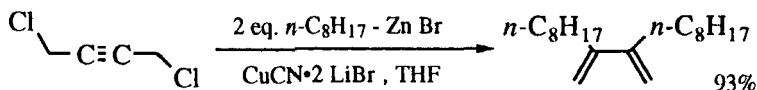
Piers, E.; Friesen, R.W.; Keay, B.A. *Tetrahedron*, **1991**, 47, 4555.



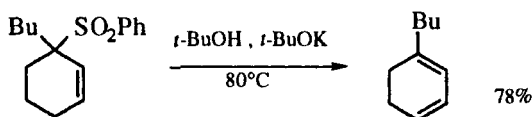
Chan, T.H.; Labrecque, D. *Tetrahedron Lett.*, **1991**, 32, 1149.



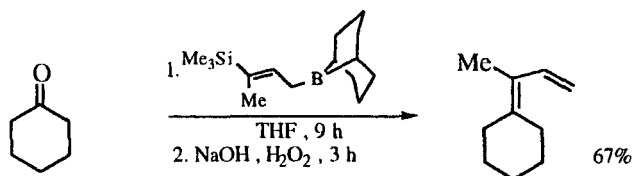
Doxsee, K.M.; Mouser, J.K.M. *Tetrahedron Lett.*, **1991**, 32, 1687.



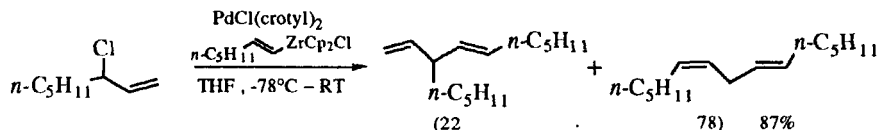
Zhu, L.; Riecke, R.D. *Tetrahedron Lett.*, **1991**, 32, 2865.



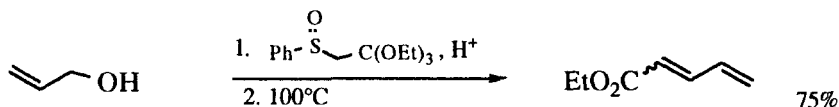
Sellén, M.; Bäckvall, J-E.; Helquist, P. *J. Org. Chem.*, **1991**, 56, 835.



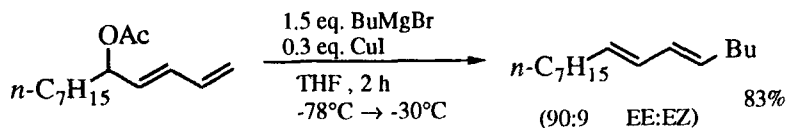
Wang, K.K.; Liu, C.; Gu, Y.G.; Burnett, F.N.; Sattsangi, P.D. *J. Org. Chem.*, **1991**, 56, 1914.



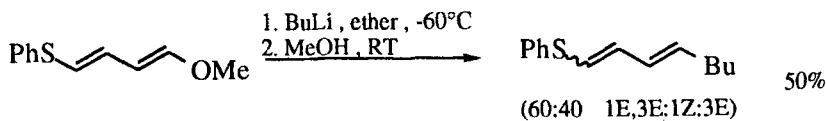
Hutzinger, M.W.; Oehlschlager, A.C. *J. Org. Chem.*, **1991**, 56, 2918.



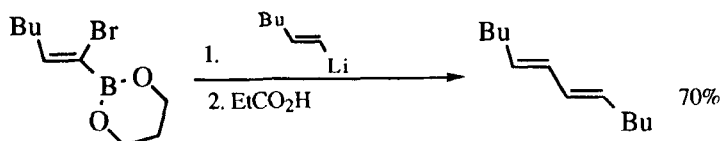
Posner, G.H.; Crouch, R.D.; Kinter, C.M.; Carry, J-C. *J. Org. Chem.*, **1991**, 56, 6981.



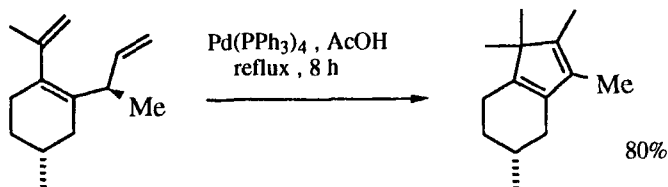
Nakanishi, N.; Matsubara, S.; Utimoto, K.; Kozima, S.; Yamaguchi, R. *J. Org. Chem.*, **1991**, *56*, 3278.



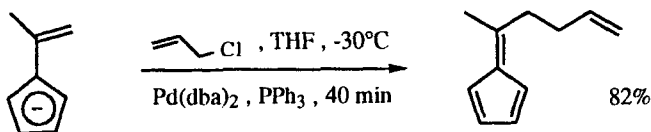
Gaonac'h, O.; Maddaluno, J.; Chauvin, J.; Duhamel, L. *J. Org. Chem.*, **1991**, *56*, 4045.



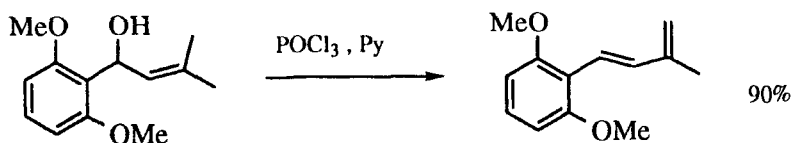
Brown, H.C.; Bhat, N.G.; Iyer, R.R. *Tetrahedron Lett.*, **1991**, *32*, 3655.



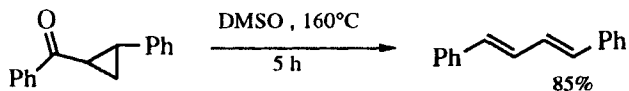
Zair, T.; Santelli-Rouvier, C.; Santelli, M. *Tetrahedron Lett.*, **1991**, *32*, 4501.



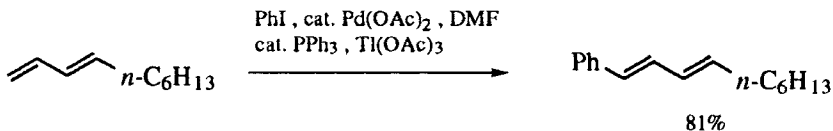
Nyström, J-E.; Vågberg, J.O.; Söderberg, B.C. *Tetrahedron Lett.*, **1991**, *32*, 5247.



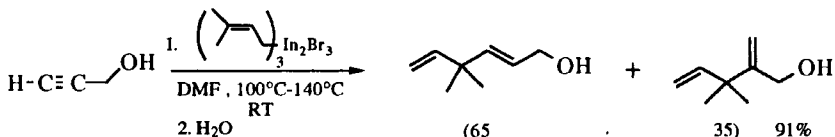
Runk, C.S.; Haverty, S.M.; Klein, D.A.; McCrea, W.R.; Strobel, E.D.; Pinnick, H.W. *Tetrahedron Lett.*, **1992**, *33*, 2665.



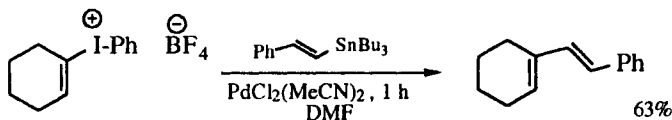
Patro, B.; Ila, H.; Juniappa, H. *Tetrahedron Lett.*, **1992**, 33, 809.



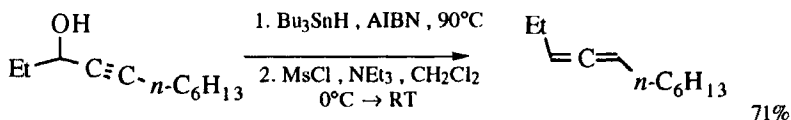
Jeffery, T. *Tetrahedron Lett.*, **1992**, 33, 1989.



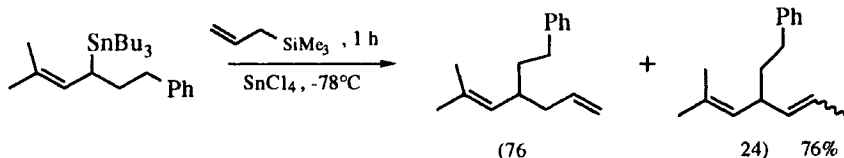
Araki, S.; Imai, A.; Shimizu, K.; Butsugan, Y. *Tetrahedron Lett.*, **1992**, 33, 2581.



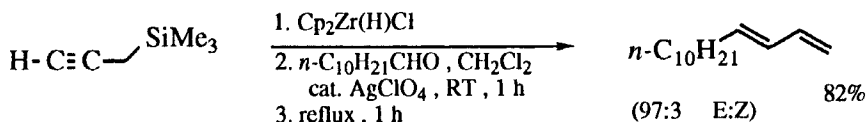
Moriarty, R.M.; Epa, W.R. *Tetrahedron Lett.*, **1992**, 33, 4095.



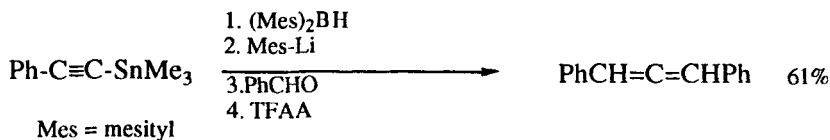
Konoike, T.; Araki, Y. *Tetrahedron Lett.*, **1992**, 33, 5093.



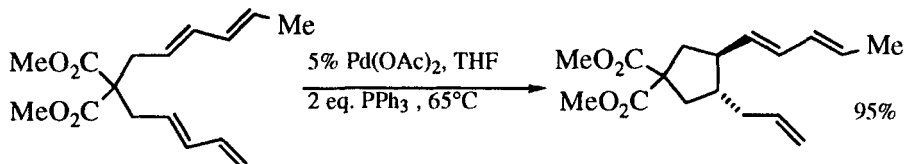
Takeda, T.; Takagi, Y.; Takano, H.; Fujiwara, T. *Tetrahedron Lett.*, **1992**, 33, 5381.



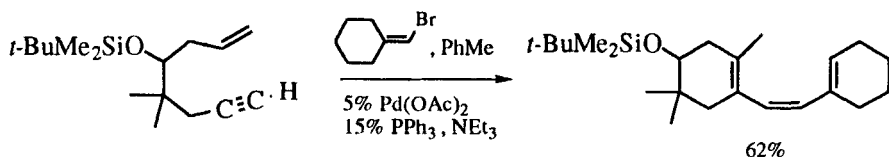
Maeta, H.; Suzuki, K. *Tetrahedron Lett.*, **1992**, 33, 5969.



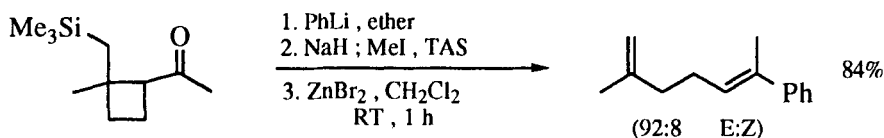
Pelter, A.; Smith, K.; Jones, K.D. *J. Chem. Soc., Perkin Trans. I*, **1992**, 747.



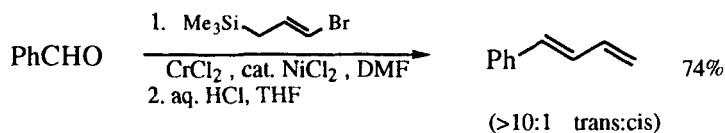
Takacs, J.M.; Zhu, J.; Chandramouli, S. *J. Am. Chem. Soc.*, **1992**, 114, 773.



Trost, B.M.; Pfrenge, W.; Urabe, H.; Dumas, J. *J. Am. Chem. Soc.*, **1992**, 114, 1923.



Fujiwara, T.; Suda, A.; Takeda, T. *Chem. Lett.*, **1992**, 1631.



Angell, R.; Parsons, P.J.; Naylor, A.; Tyrrell, E. *SynLett*, **1992**, 599.

REVIEWS:

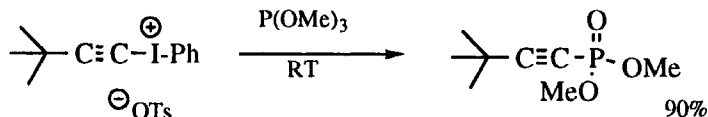
"Synthetic and Mechanistic aspects of 1,3-Diene Photooxidation"

Clennan, E.L. *Tetrahedron*, **1991**, 47, 1343.

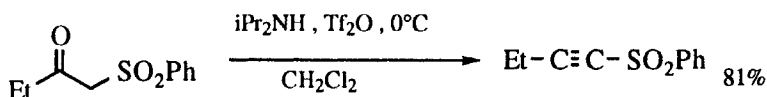
"Nickel (0)-Mediated Intramolecular Cyclizations of Enynes, Dienynes, bis-Dienes, and Diynes"

Tamao, K.; Kobayashi, K.; Ito, Y. *SynLett*, **1992**, 539.

SECTION 378: OXIDES - ALKYNES



Lodaya, J.S.; Koser, G.F. *J. Org. Chem.*, **1990**, *55*, 1513.

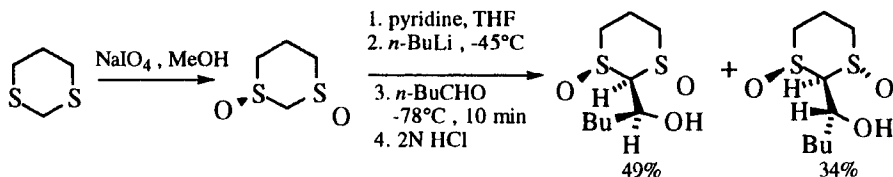


Clasby, M.C.; Craig, D. *SynLett*, **1992**, 825.

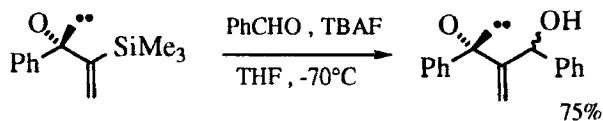
SECTION 379: OXIDES - ACID DERIVATIVES

NO ADDITIONAL EXAMPLES

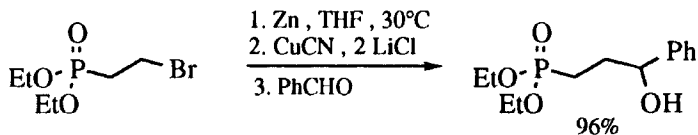
SECTION 380: OXIDES - ALCOHOLS, THIOLS



Aggarwal, V.K.; Davies, I.W.; Maddock, J.; Mahon, M.F.; Molloy, K.C. *Tetrahedron Lett.*, **1990**, *31*, 135.

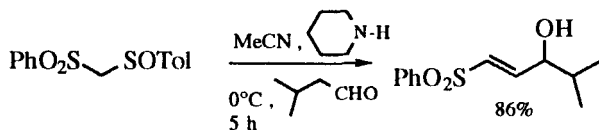


Cheng, H.-C.; Yan, T. *Tetrahedron Lett.*, **1990**, *31*, 673.

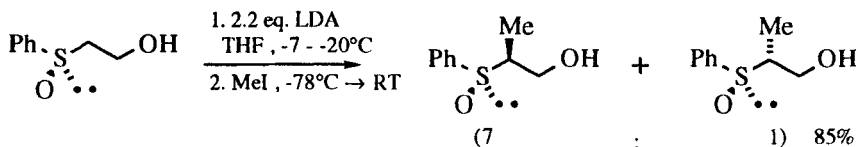


also with ketones, acid chlorides, conjugate addition

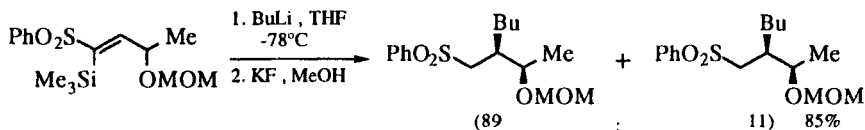
Retherford, C.; Chou, T.-S.; Schelkun, R.M.; Knochel, P. *Tetrahedron Lett.*, **1990**, *31*, 1833.



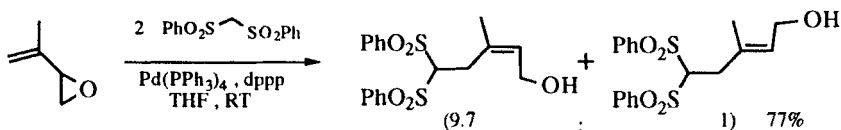
Dominguez, E.; Carretero, J.C. *Tetrahedron Lett.*, **1990**, 31, 2487.



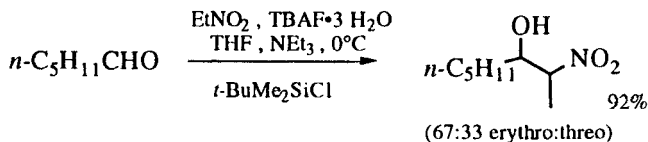
Ohta, H.; Matsumoto, S.; Sugai, T. *Tetrahedron Lett.*, **1990**, 31, 2895.



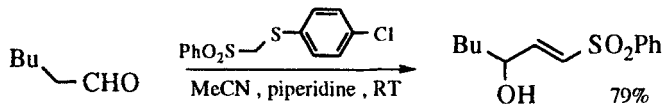
Alcaraz, C.; Carretero, J.C.; Domínguez, E. *Tetrahedron Lett.*, **1991**, 32, 1385.



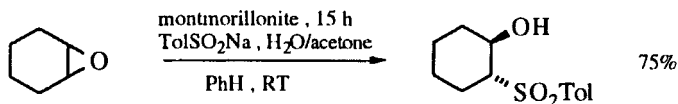
Trost, B.M.; Granja, J.R. *Tetrahedron Lett.*, **1991**, 32, 2193.



Fernández, R.; Gasch, C.; Gómez-Sánchez, A.; Vilchez, J.E. *Tetrahedron Lett.*, **1991**, 32, 3225.

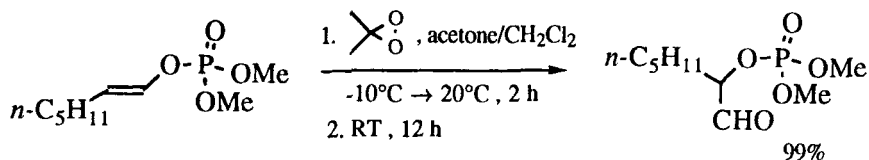


Trost, B.M.; Grese, T.A. *J. Org. Chem.*, **1991**, 56, 3189.

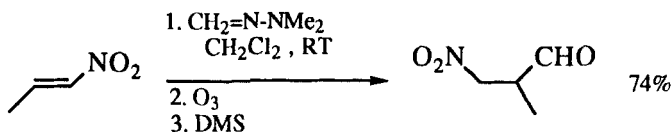


Biswas, G.K.; Bhattacharyya, P. *Synth. Commun.*, **1991**, 21, 569.

SECTION 381: OXIDES - ALDEHYDES

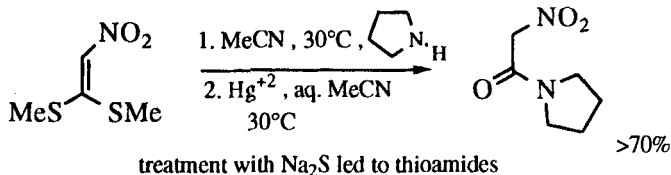


Adam, W.; Hadjiarapoglou, L.; Klicic, J. *Tetrahedron Lett.*, **1990**, 31, 6517.

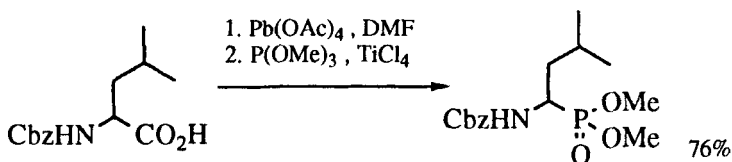


Lassaletta, J.-M.; Fernández, R. *Tetrahedron Lett.*, **1992**, 33, 3691.

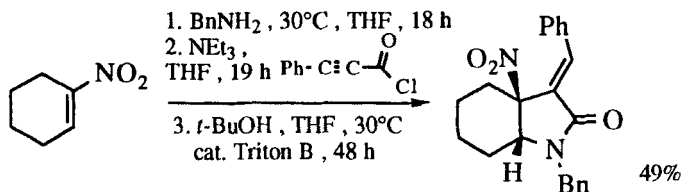
SECTION 382: OXIDES - AMIDES



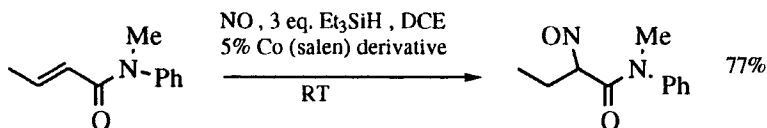
Manjunatha, S.G.; Reddy, K.V.; Rajappa, S. *Tetrahedron Lett.*, **1990**, 31, 1327.



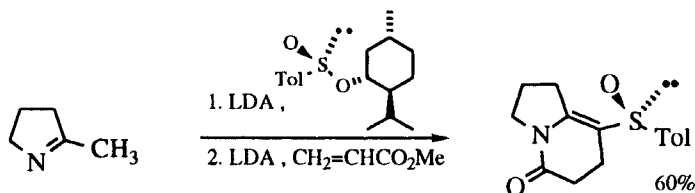
Corcoran, R.C.; Green, J.M. *Tetrahedron Lett.*, **1990**, 31, 6827.



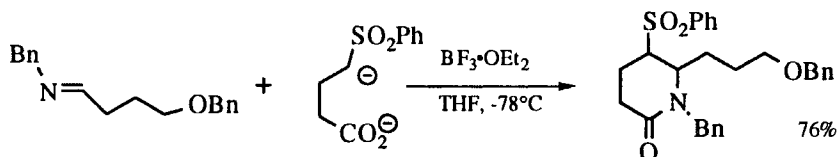
Patra, R.; Maiti, S.B.; Chatterjee, A.; Chakravarty, A.K. *Tetrahedron Lett.*, **1991**, 32, 1363.



Kato, K.; Mukaiyama, T. *Chem. Lett.*, **1990**, 1395.

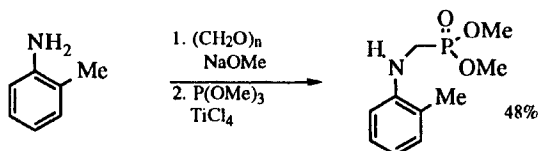


Hua, D.H.; Bharathi, S.N.; Panangadan, J.A.K.; Tsujimoto, A. *J. Org. Chem.*, **1991**, 56, 6998.

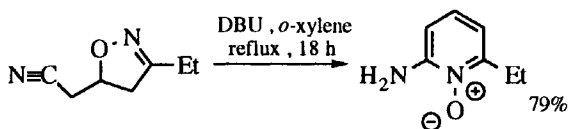


Green, D.L.C.; Thompson, C.M. *Tetrahedron Lett.*, **1991**, 32, 5051.

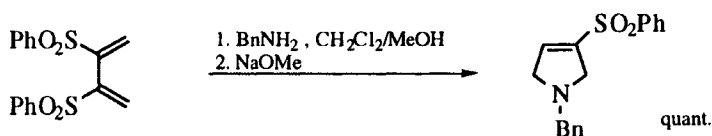
SECTION 383: OXIDES - AMINES



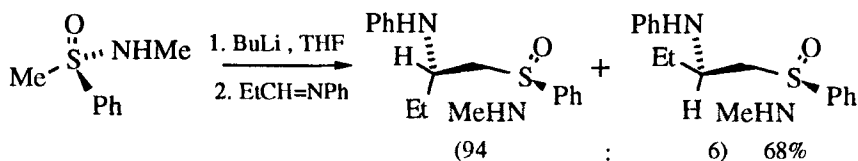
Ha, H.-I.; Nam, G.-S.; Park, K.P. *Tetrahedron Lett.*, **1990**, 31, 1567.



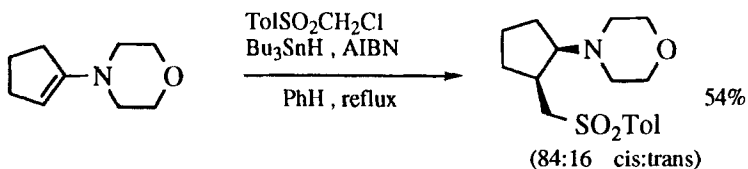
Chucholowski, A.W.; Uhlendorf, S. *Tetrahedron Lett.*, **1990**, 31, 1949.



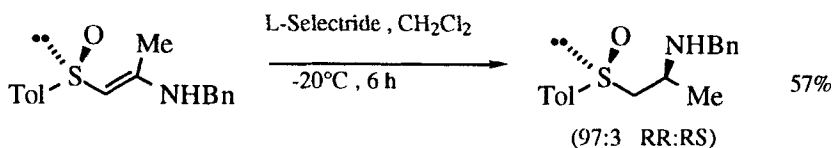
Padwa, A.; Norman, B.H. *J. Org. Chem.*, **1990**, 55, 4801.



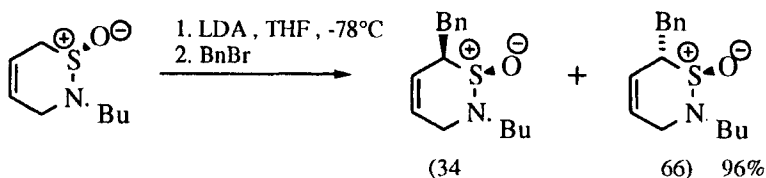
Pyne, S.G.; Dikic, B. *Tetrahedron Lett.*, **1990**, 31, 5231.



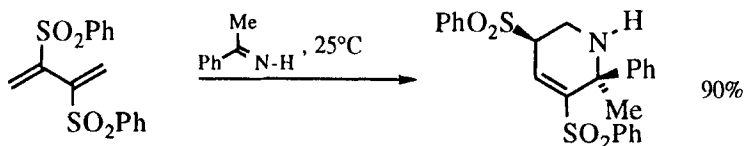
Renaud, P.; Schubert, S. *Angew. Chem. Int. Ed. Engl.*, **1990**, 29, 433.



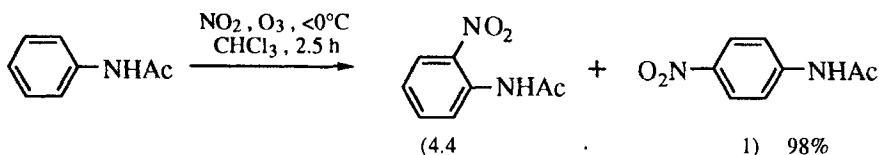
Ogura, K.; Tomori, H.; Fujita, M. *Chem. Lett.*, **1991**, 1407.



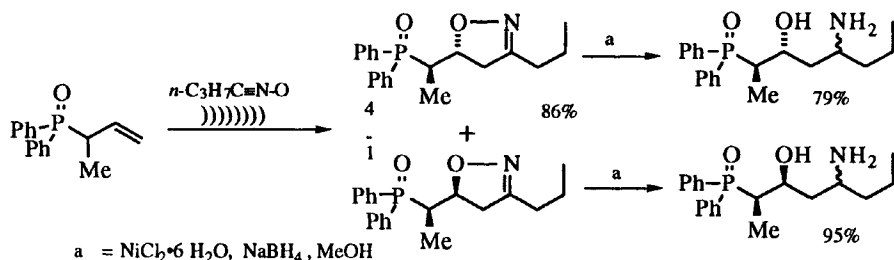
Bell, S.I.; Parvez, M.; Weinreb, S.M. *J. Org. Chem.*, **1991**, 56, 373.



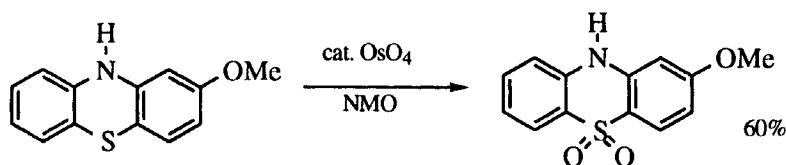
Padwa, A.; Gareau, Y.; Harrison, B.; Norman, B.H. *J. Org. Chem.*, **1991**, 56, 2713.



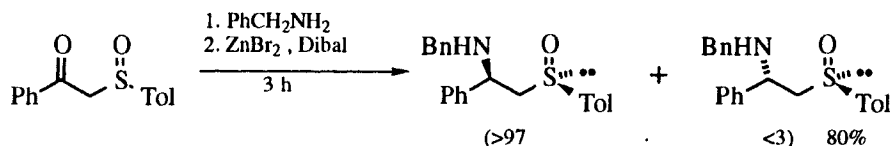
Suzuki, H.; Ishibashi, T.; Murashima, T.; Tsukamoto, K. *Tetrahedron Lett.*, **1991**, 32, 6591.



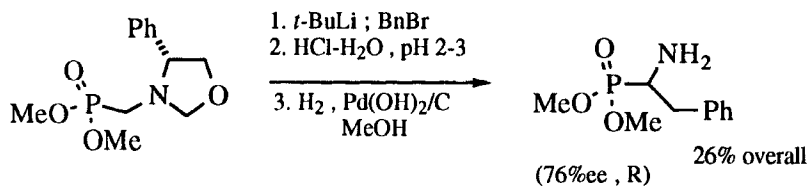
Armstrong, S.K.; Warren, S.; Collington, E.W.; Naylor, A. *Tetrahedron Lett.*, **1991**, 32, 4171.



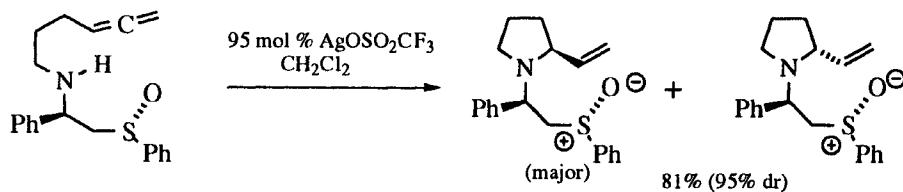
Priebe, W.; Gryniewicz, G. *Tetrahedron Lett.*, **1991**, 32, 7353.



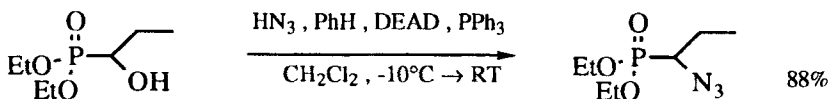
Ruano, J.L.G.; Lorente, A.; Rodríguez, J.H. *Tetrahedron Lett.*, **1992**, 33, 5637.



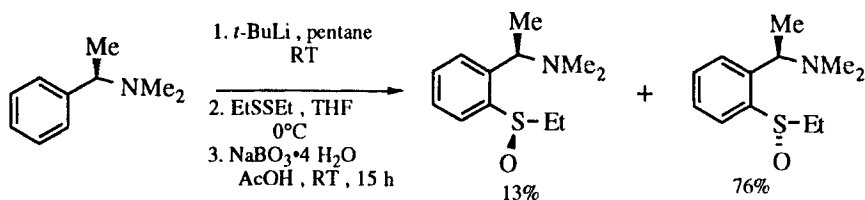
Maury, C.; Royer, J.; Husson, H-P. *Tetrahedron Lett.*, **1992**, 33, 6127.



Davies, I.W.; Gallagher, T.; Lamont, R.B.; Scopes, D.I.C. *J. Chem. Soc., Chem. Commun.*, **1992**, 335.

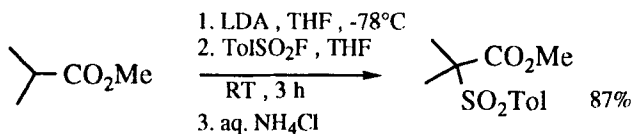


Gajda, T.; Matusiak, M. *Synthesis*, **1992**, 367.

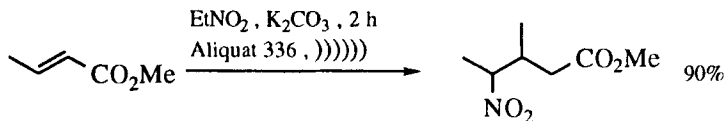


Shimazaki, M.; Takahashi, M.; Komatsu, H.; Ohta, A.; Kajii, K.; Kodama, Y. *Synthesis*, **1992**, 555.

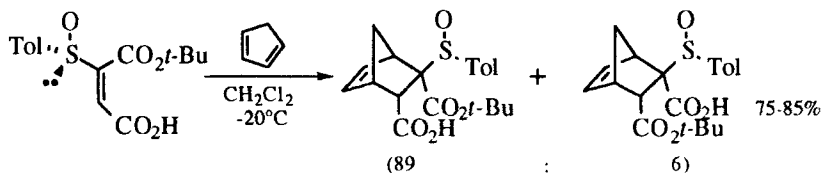
SECTION 384: OXIDES - ESTERS



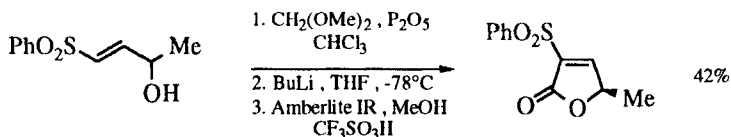
Kende, A.S.; Mendoza, J.S. *J. Org. Chem.*, **1990**, 55, 1125.



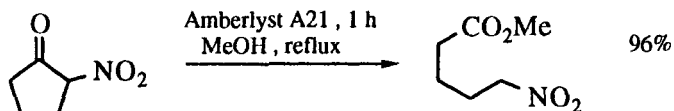
Joulet, B.; Blanco, L.; Rousseau, G. *SynLett*, **1991**, 907.



Alonso, I.; Carretero, J.C.; Ruano, J.L.G. *Tetrahedron Lett.*, **1991**, 32, 947.

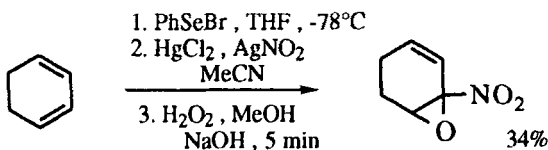


Carretero, J.C.; Rojo, J. *Tetrahedron Lett.*, **1992**, 33, 7407.

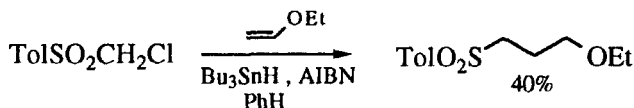


Ballini, R.; Petrini, M.; Polzonetti, V. *Synthesis*, **1992**, 355.

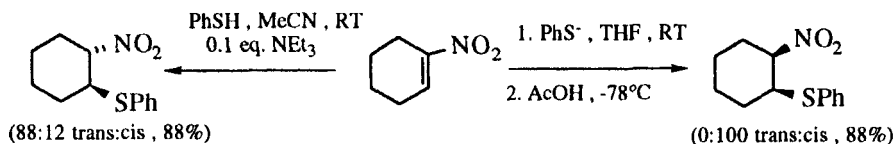
SECTION 385: OXIDES - ETHERS, EPOXIDES, THIOETHERS



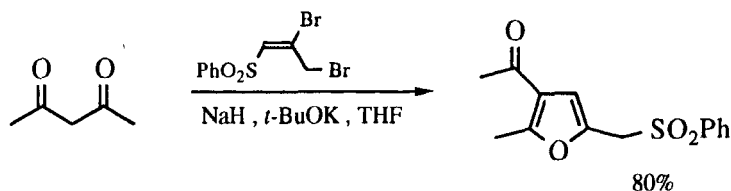
Nájera, C.; Yus, M.; Karlsson, U.; Gogoll, A.; Bäckvall, J-E. *Tetrahedron Lett.* **1990**, 31, 4199.



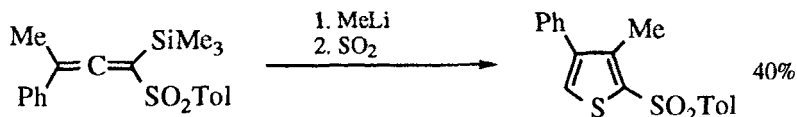
Renaud, P. *Tetrahedron Lett.*, **1990**, 31, 4601.



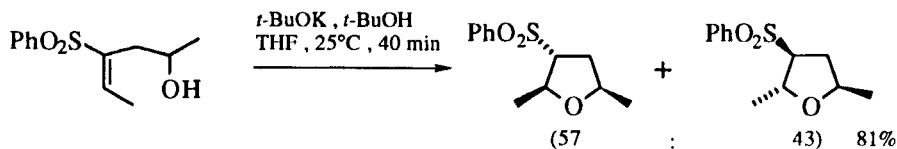
Kamimura, A.; Sasatani, H.; Hashimoto, T.; Kawai, T.; Hori, K.; Ono, N. *J. Org. Chem.*, **1990**, 55, 2437.



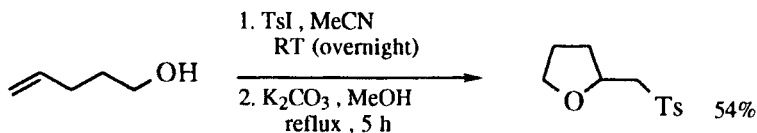
Padwa, A.; Murphree, S.S.; Yeske, P.E. *J. Org. Chem.*, **1990**, 55, 4241.



Braverman, S.; van Asten, P.F.T.M.; van der Linden, J.B.; Zwanenburg, B. *Tetrahedron Lett.*, **1991**, 32, 3867.

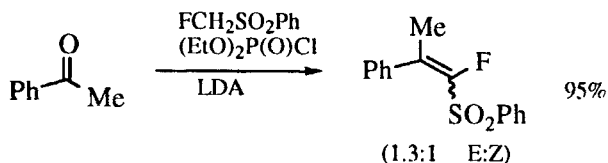


Craig, D.; Smith, A.M. *Tetrahedron Lett.*, **1992**, 33, 695.

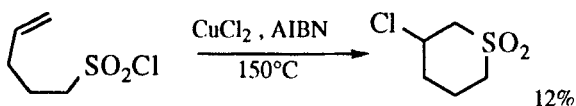


Edwards, G.L.; Walker, K.A. *Tetrahedron Lett.*, **1992**, 33, 1779.

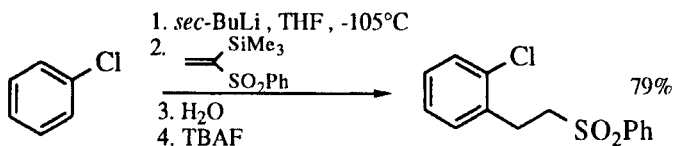
SECTION 386: OXIDES - HALIDES, SULFONATES



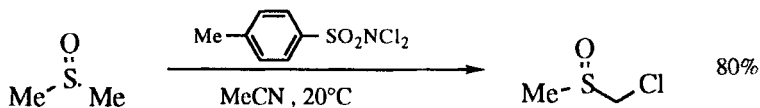
McCarthy, J.R.; Matthews, D.P.; Edwards, M.L.; Stemerick, D.M.; Jarvi, E.T. *Tetrahedron Lett.*, **1990**, 31, 5449.



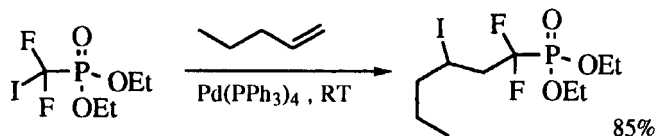
Culshaw, P.N.; Walton, J.C. *Tetrahedron Lett.*, **1990**, 31, 6433.



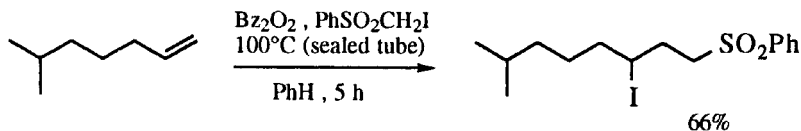
Iwao, M. *J. Org. Chem.*, **1990**, 55, 3622.



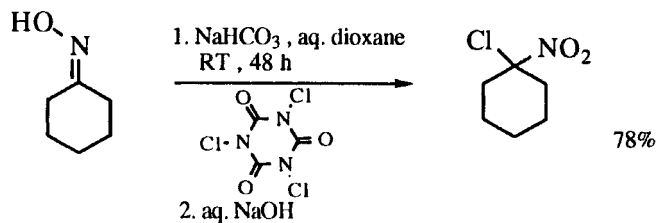
Kim, Y.H.; Lim, S.C.; Kim, H.R.; Yoon, D.C. *Chem. Lett.*, **1990**, 79.



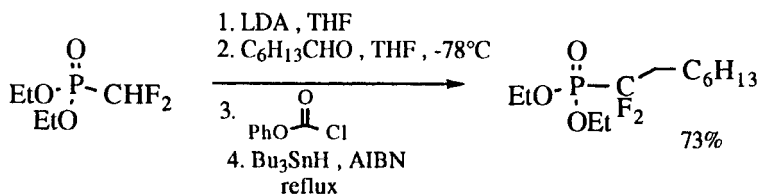
Yang, Z.-Y.; Burton, D.J. *Tetrahedron Lett.*, **1991**, 32, 1019.



Masnyk, M. *Tetrahedron Lett.*, **1991**, 32, 3259.

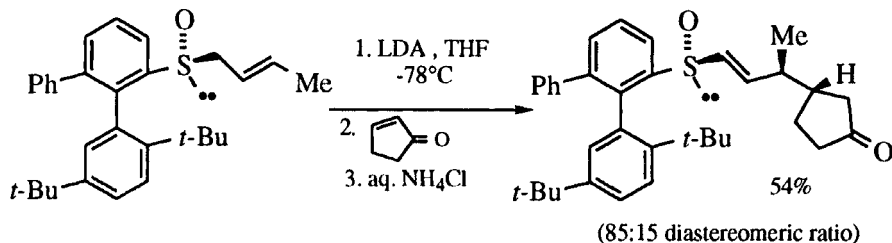


Walters, T.R.; Zajac, W.W., Jr.; Woods, J.M. *J. Org. Chem.*, **1991**, 56, 316.

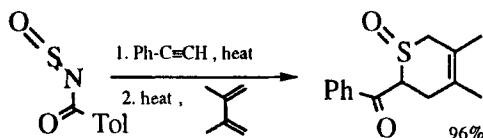


Martin, S.E.; Dean, D.W.; Wagman, A.S. *Tetrahedron Lett.*, **1992**, 33, 1839.

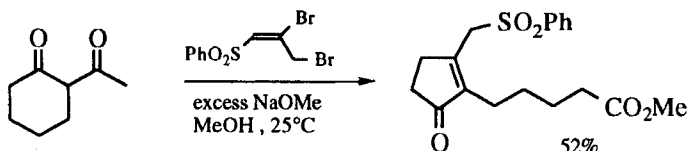
SECTION 387: OXIDES - KETONES



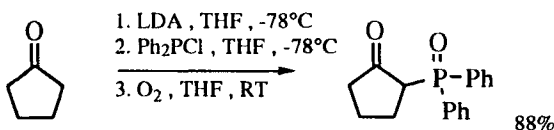
Swindell, C.S.; Blase, F.R.; Eggleston, D.S.; Krause, J. *Tetrahedron Lett.*, **1990**, 31, 5409.



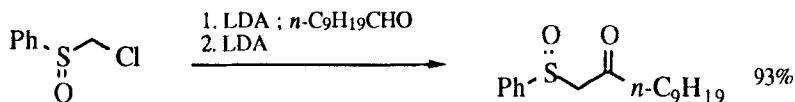
Pfeifer, K-P.; Himbert, G. *Tetrahedron Lett.*, **1990**, 31, 5725.



Murphree, S.S.; Muller, C.L.; Padwa, A. *Tetrahedron Lett.*, **1990**, 31, 6145.

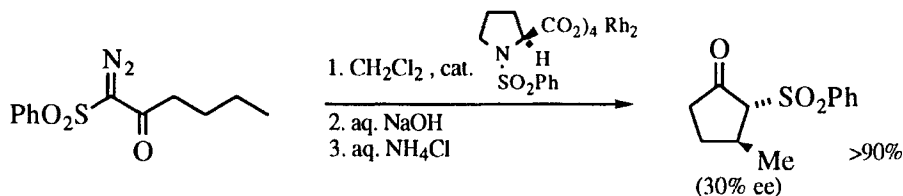


Mikolajczyk, M.; Kietbasiński, P.; Wieczorek, M.W.; Blaszczyk, J.; Kolbe, A. *J. Org. Chem.*, **1990**, 55, 1198.

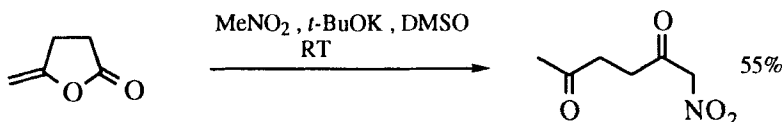


Satoh, T.; Fujii, T.; Yamakawa, K. *Bull. Chem. Soc. Jpn.*, **1990**, 63, 1266.

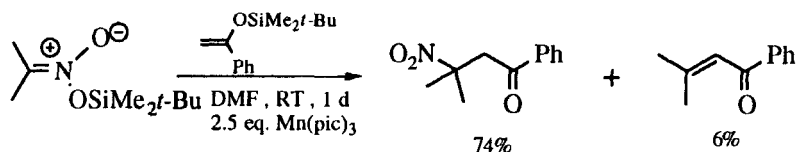
Satoh, T.; Hayashi, Y.; Mizu, Y.; Yamakawa, K. *Tetrahedron Lett.*, **1992**, 33, 7181.



Kennedy, M.; McKervey, M.A.; Maguire, A.R.; Roos, G.H.P. *J. Chem. Soc., Chem. Commun.*, **1990**, 361.

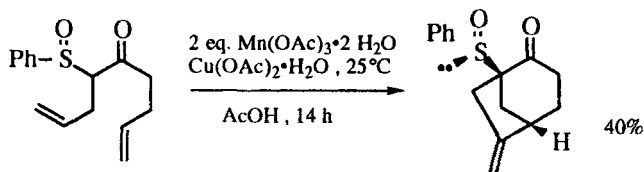


Jäger, V.; Seidel, B.; Guntrum, E. *Synthesis*, **1991**, 629.

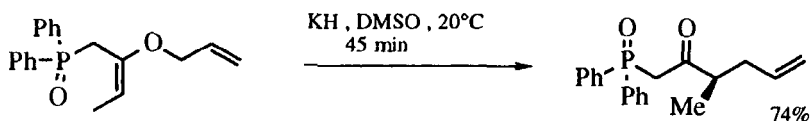


$\text{Mn}(\text{pic})_3$ = manganese (III) 2-pyridinecarboxylate

Narasaka, K.; Iwakura, K.; Okauchi, T. *Chem. Lett.*, **1991**, 423.

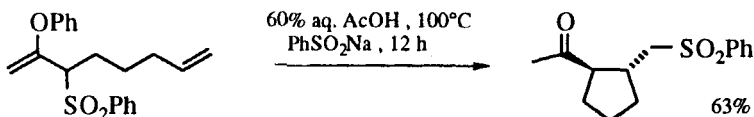


Snider, B.B.; Wan, B.Y-F.; Buckman, B.O.; Foxman, B.M. *J. Org. Chem.*, **1991**, 56, 328.



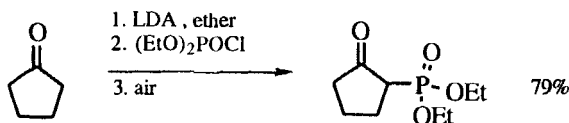
carbanion accelerated Claisen rearrangement

Denmark, S.E.; Marlin, J.E. *J. Org. Chem.*, **1991**, 56, 1003.

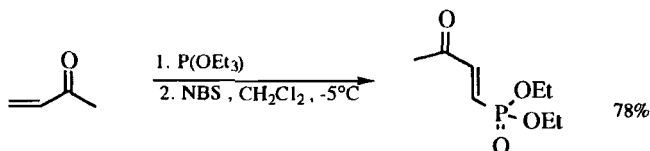


Padwa, A.; Bullock, W.H.; Dyszlewski, A.D.; McCombie, S.W.; Shankar, B.B.; Ganguly, A.K. *J. Org. Chem.*, **1991**, 56, 3556.

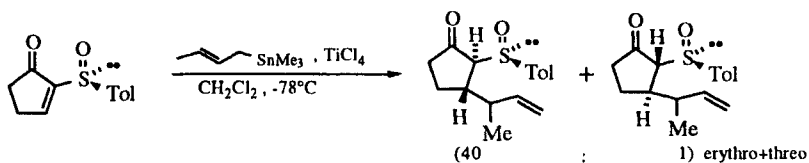
Padwa, A.; Bullock, W.H.; Dyszlewski, A.D. *J. Org. Chem.*, **1990**, 55, 955 [with vinyl sulfides].



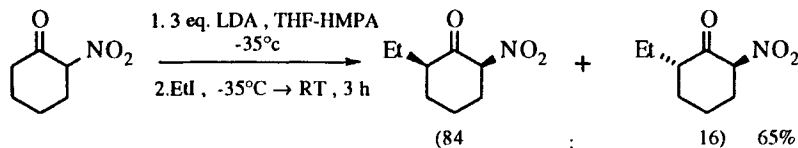
Lee, K.; Wiemer, D.E. *J. Org. Chem.*, **1991**, 56, 5556.



McClure, C.K.; Grote, C.W. *Tetrahedron Lett.*, **1991**, 32, 5313.



Pan, L-R.; Tokoroyama, T. *Tetrahedron Lett.*, **1992**, 33, 1469.



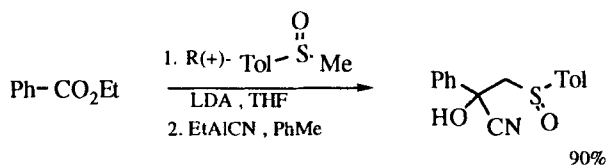
Ballini, R.; Bartoli, G.; Castagnani, R.; Marcantoni, E.; Petrini, M. *SynLett*, **1992**, 64.

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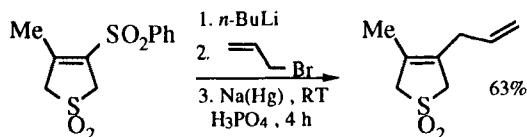
Rosini, G.; Ballini, R.; Petrini, M.; Marotta, E.; Righi, P. *Org. Prep. Proceed. Int.*, **1990**, 22, 707.

SECTION 388: OXIDES - NITRILES

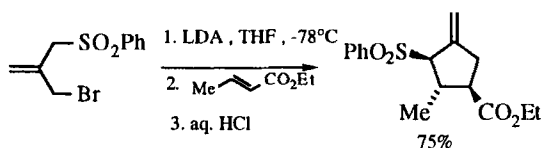


García Ruano, J.C.; Martín Castro, A.M.; Rodríguez, J.H. *Tetrahedron Lett.*, **1991**, 32, 3195.

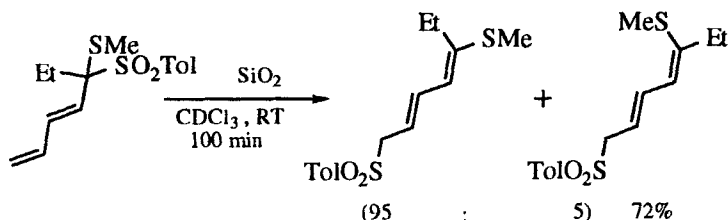
SECTION 389: OXIDES - ALKENES



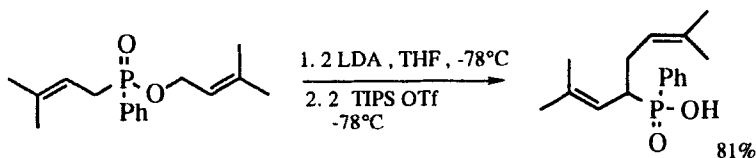
Chou, S-S.P.; Sun, C-M. *Tetrahedron Lett.*, **1990**, 31, 1035.



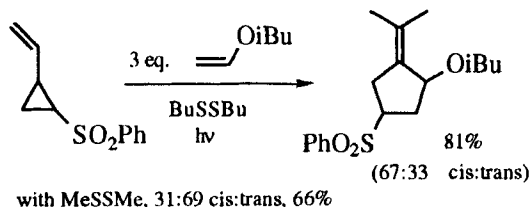
Ghera, E.; Yechezkel, T.; Hassner, A. *Tetrahedron Lett.*, **1990**, 31, 3653.



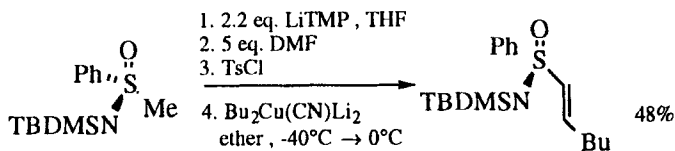
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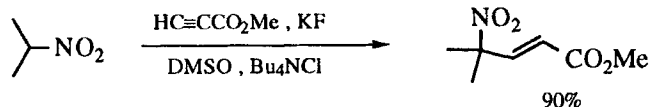
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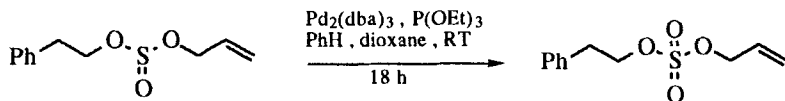
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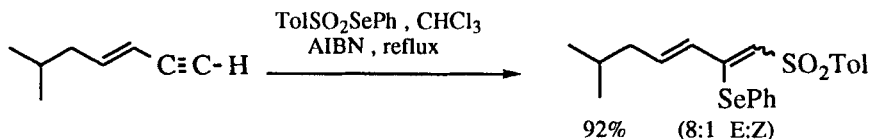
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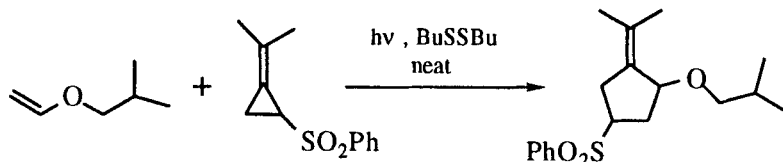
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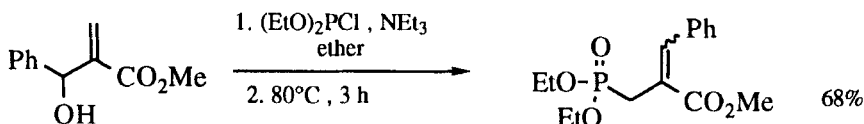
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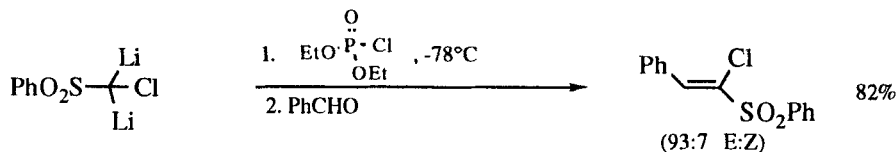
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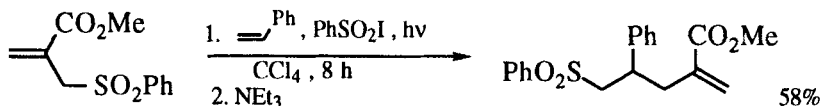
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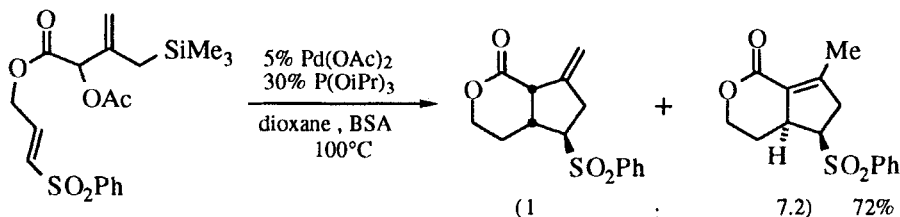
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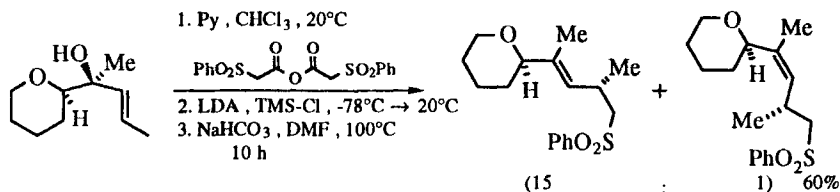
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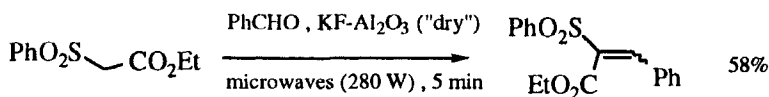
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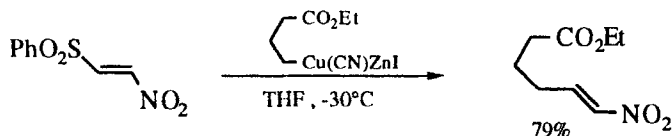
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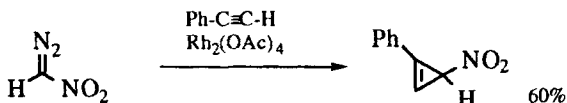
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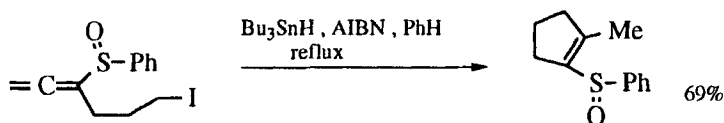
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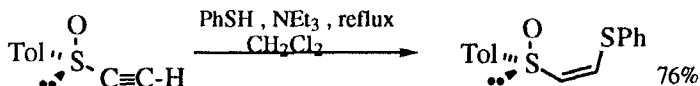
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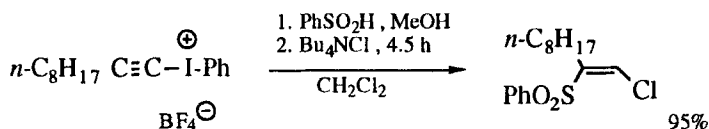
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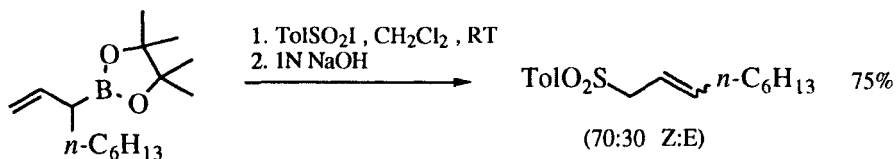
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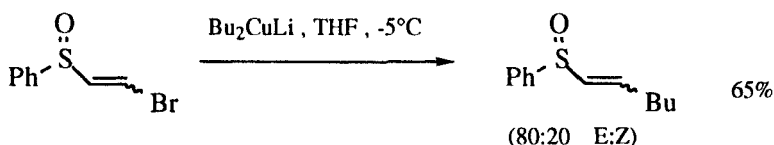
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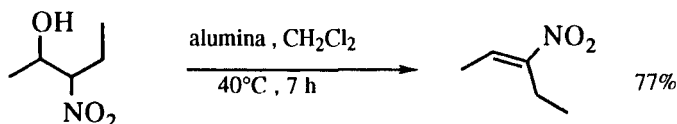
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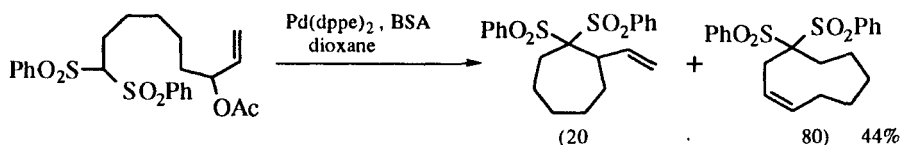
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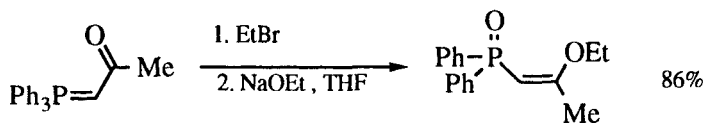
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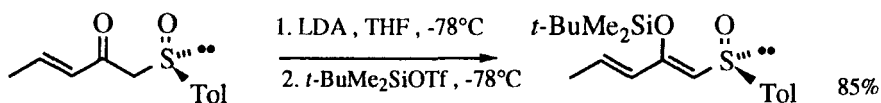
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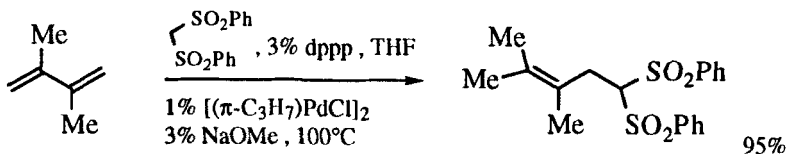


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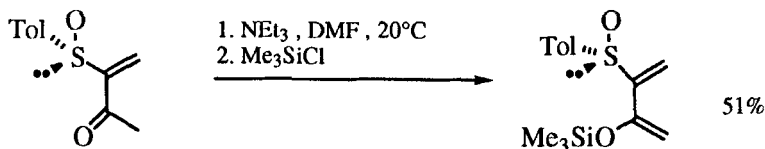


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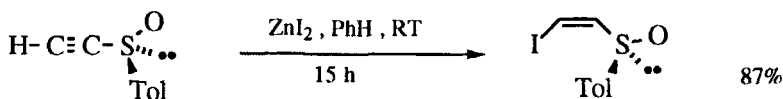
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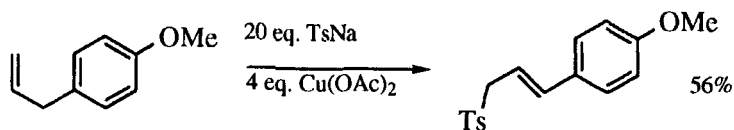
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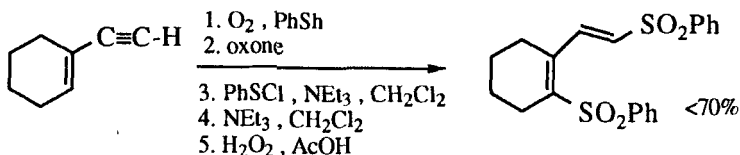
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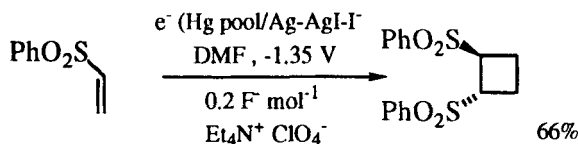
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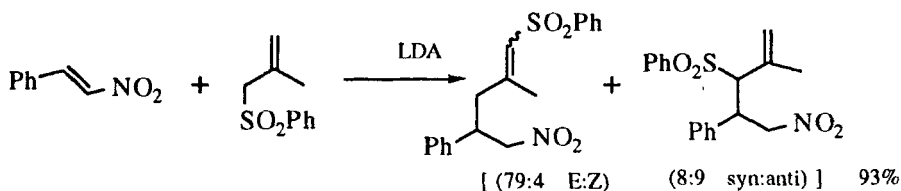
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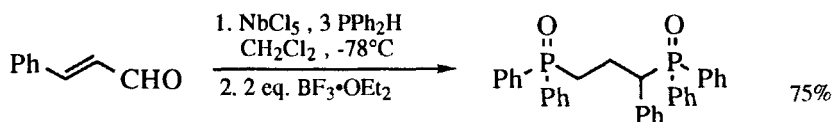
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