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edited by Philip M. Weintraub, Kenneth Turnbull,
Daniel M. Ketcha, and Raymond Gross

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Philip M. Weintraub

*Merrell Dow Research Institute
Cincinnati, Ohio*

Kenneth Turnbull

*Wright State University
Dayton, Ohio*

Daniel M. Ketcha

*Wright State University
Dayton, Ohio*

Raymond Gross

*Merrell Dow Research Institute
Cincinnati, Ohio*



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PREFACE

One of the most difficult problems facing chemists today is that of "keeping up with the literature." For several reasons, the problem is particularly severe for the synthetic organic chemist. Bits of information of potential use are scattered throughout common chemistry journals and can be found in any paper, not just those dealing strictly with synthesis. Thus, synthetic chemists must read a large number of journals and must organize and index what they read to make the information available for future reference. All synthetic chemists do this, but the task is becoming more difficult each year as the flow of information increases.

The problem, however, is shared to some extent by all. Most organic chemists are at some time faced with the problem of synthesizing a desired material, and for many the problems are formidable. Non specialists faced with the synthetic problem are not likely to have kept pace with the developments in synthetic chemistry that may well solve their problems, and they will not have the necessary information in their files.

Thus, we felt that an organized annual review of synthetically useful information would prove beneficial to nearly all organic chemists, both specialists and non specialists in synthesis. It should help relieve some of the information storage burden of the specialist and should enable the non specialist who is seeking help with a specific problem to rapidly become aware of recent synthetic advances. Ideally also, it should appear as promptly as possible after the close of the abstracting period. As in the past years, we have placed particular emphasis on keeping the abstracts as concise as possible, while indicating the generality of the reactions involved. We have tried to combine similar publications into inclusive abstracts, particularly in Chapters I and IV. This practice has allowed us to include a larger number of references without a substantial increase in the book's length. It should be noted that where multiple references are included in the abstract, the first mentioned refers to the equation presented. The

remaining references are similar but not identical. To further aid the readers, we have tried to separate less similar references from those represented by the graphic by the phrase "see also:". We have allowed for two such separations per graphic. One more change was instituted this year: we have omitted the year from each reference as they are presumably all 1991. The references from 1990 (from journals received our cutoff date) are noted appropriately.

In producing *Annual Reports in Organic Chemistry-1992* we have abstracted 47 primary chemistry journals, selecting useful synthetic advances. We have tried to present the information in an organized manner, emphasizing rapid visual retrieval. Only the common journals received by our libraries have been abstracted. Any journal received after February 1, 1991 will be covered in the next volume. We have also exercised selectivity in choosing which papers to abstract. Our general guidelines have been to include all reactions and methods that are new, synthetically useful, and reasonably general. The purpose of this emphasis is to aid the reader in scanning the book. The mind is capable of absorbing a whole picture in an instant, but is considerably slowed by having to read sentences. If the pictures presented catch the reader's interest, he or she should then seek details from the original paper.

We have included an author index based on the name of the senior author or sometimes the first author. No subject index is included because we feel the Table of Contents serves that function. Chapters I-III are organized by reaction type and, hopefully, the organization is self-explanatory; thus, there should be no difficulty in locating a new method of oxidation or a new cyclopropanation procedure. We have split away from Section I.B.3, Other Carbon-Carbon Double Bond Forming Reactions, those reactions in which a vinyl group is transferred. The new Section is I.B.4. Vinylations. Chapter IV deals with methods of synthesizing heterocyclic systems. Where fused ring systems bearing multiple heterocyclic rings are synthesized, we have chosen to categorize the heterocyclic system by the ring formed in the reaction. Chapter V covers the use of new protecting groups. Chapter VI covers those synthetically useful transformations that do not fit easily into the first three chapters. Chapter VII has been divided into sections in order to help the reader to quickly find a review on a specific topic. Heterocyclic reviews may be found in Chapter IV.

Any undertaking of this type involves a series of compromises. We have chosen to emphasize reasonable cost and rapid visual retrieval of information at the admitted expense of detail and beauty.

The task of typing and preparing the graphics was done by Marcia Ketcha and the editors. We hope the readers will forgive the inevitable typos and other minor "glitches"

Senior and Contributing Editor
Philip M. Weintraub

Contributing Editors
Kenneth Turnbull
Daniel M. Ketcha
Raymond S. Gross

JOURNALS ABSTRACTED

Accounts of Chemical Research	Journal of the Chemical Society
Acta Chemica Scandinavia	(Perkin I)
Aldrichimica Acta	Journal of the Chemical Society
Angewandte Chemie	(Perkin II)
International Edition in	Journal of Heterocyclic
English	Chemistry
Australian Journal of Chemistry	Journal of Medicinal Chemistry
Bulletin of the Chemical Society	Journal of Organic Chemistry
of Japan	Journal of Organic Chemistry
Bulletin de Societies Chimiques	(USSR)
Belges	Journal of Organometallic
Bulletin de la Societie Chimique	Chemistry
de France	Journal fur Practische Chemie
Canadian Journal of Chemistry	Liebigs Annalen der Chemie
Chemical and Pharmaceutical	Monatshefte fur Chemie
Bulletin	Organic Preparations and
Chemical Reviews	Procedures International
Chemical Society Reviews	Organic Synthesis
Chemische Berichte	Organometallics
Chemistry and Industry	Pure and Applied Chemistry
Chemistry Letters	Recueil des Traveaux Chimiques
Collection of Czechoslovakian	des Pays-bas
Chemical Communications	Russian Chemical Reviews
Gazzetta Chimica Italiana	Synlett
Helvetica Chimica Acta	Synthesis
Heterocycles	Synthetic Communications
Indian Journal of Chemistry	Tetrahedron
Journal of the American	Tetrahedron Letters
Chemical Society	Topics in Current Chemistry
Journal of Chemical Research	Zeitschrift fur Chemie
(S)	Zeitschrift fur Naturforschung,
Journal of the Chemical Society	Teil B
Chemical Communications	

GLOSSARY OF ABBREVIATIONS

9-BBN 9-borabicyclo[3.3.1]-nonane	CTAB cetyl trimethyl-ammonium bromide
18-Cr-6 8-C-6 18-crown-6	D heat
AA amino acid	d day
Ac acetyl	DABCO 1,4-diazabicyclo[2.2.2]-octane
acac acetonylacetone	DAST diethylaminosulfur trifluoride
ad adamantanyl	dba dibenzylidene acetone
AIBN azobisisobutyronitrile	DBU 1,5-diazabicyclo[5.4.0]-undec-5-ene
An <i>p</i> -anisyl	DCA 9,10-dicyanoanthracene
aq aqueous	DCB dichlorobenzene
Ar aryl	DCC dicyclohexylcarbodiimide
BDPP (2 <i>R</i> , 4 <i>R</i>) or (2 <i>S</i> , 4 <i>S</i>) 2,4-bis(diphenylphosphino)-pentane	DCE 1,2-dichloroethane
BINAP = α DINAP 2,2'-bis-(diphenyl-phosphino)-1,1'-binaphthyl	DDQ 2,3-dichloro-5,6-dicyano-benzoquinone
Bn benzyl	de d.e. diastereomeric excess
Boc <i>t</i> -butyloxycarbonyl	DEAD diethyl azodicarboxylate
BOM benzyloxymethyl	DET diethyl tartrate
BPPM <i>t</i> -butoxycarbonyl-4-(diphenylphosphino)-2-[(diphenyl-phosphino)-methyl]pyrrolidine	DIBAH DIBAL diisobutyl-aluminum hydride
bpy bipyridyl	DIOP 2,3- <i>O</i> -isopropylidene-2,3-dihydroxy-1,4-bis-(diphenyl-phosphino)-butane
BQ benzoquinone	DMAD dimethyl acetylene dicarboxylate
BSA bovine serum albumin	DMAP dimethylamino-pyridine
BSA <i>N,O</i> -bis-silylacetamide	DME dimethoxyethane
Bt 1- or 2-benzotriazolyl	DMF dimethylformamide
BTMA benzyltrimethyl ammonium	DMPS dimethylphenylsilyl
Bu butyl	DMPU <i>N,N'</i> -dimethyl-propyleneurea
Bz benzoyl	DMSO dimethylsulfoxide
CAN ceric ammonium nitrate	dppb bis(1,4-diphenyl-phosphino)butane
cat. catalyst	DPPE dppe diphenyl-phosphinoethane
Cbz benzyloxycarbonyl	
cod 1,5-cyclooctadiene	
cot cyclooctatriene	
Cp cyclopentadienyl	
CRA complex reducing agent	
CSA camphor sulfonic acid	

- dppf dichloro[1,1'-bis-(diphenylphosphino)ferrocene]
 DPPP 1,3-(diphenylphosphino)propane
 dr diastereomeric ratio
 ds diastereoselectivity
 E general electrophile
 ee e.e. enantiomeric excess
 Et ethyl
 Et₂O diethyl ether
 Et₃N triethylamine
 EWG electron withdrawing group
 F_C ferrocenyl
 fl flavin
 fod 6,6,7,7,8,8,8-heptafluoro-2,2-dimethyl-3,5-octanedione
 FVP flash vapor pyrolysis
 Gr graphite
 h hours
 Hap hydroxyapatite
 HDMS 1,1,1,3,3,3-hexamethyldisilazane
 HMPA HMPT hexamethylphosphoramide
 hn irradiation with light
 ipc isopinocampheyl
 L.R. Lawesson's reagent
 LAH lithium aluminum hydride
 LDA lithium diisopropylamide
 liq. liquid
 MABR methyl aluminum bis(4-bromo-2,6-di-*t* butylphenoxide)
 MCPBA *m*-chloroperbenzoic acid
 Me methyl
 Mek methyl ethyl ketone
 MEM *b*-methoxyethoxymethyl
 Mes mesityl
 MMPP magnesium mono-peroxyphthalate
 MOM methoxymethyl
 MPM methoxy(phenylthio)methyl
 MS molecular sieves
 Ms methanesulfonyl
 MSA methanesulfonic acid
 MV²⁺ methyl viologen
 Naph Np naphthyl
 NBS *N*-bromosuccinimide
 NCS *N*-chlorosuccinimide
 NIS *N*-iodosuccinimide
 NMO *N*-methylmorpholine-*N*-oxide
 NR no reaction
 [O] general oxidation
 PCC pyridinium chlorochromate
 PDC pyridium dichromate
 PEG polyethylene glycol
 Ph phenyl
 Ph-H benzene
 Ph-Me toluene
 PLAP porcine liver acetone powder
 PMB *p*-methoxybenzyl
 PMP *p*-methoxyphenyl
 PPA polyphosphoric acid
 Pr propyl
 psi pounds per square inch
 PTC phase transfer catalysis
 PTSA *p*-toluenesulfonic acid
 pyr pyridine
 rac racemic
 RaNi Raney nickel
 Rf perfluorinated alkyl
 rt room temperature
 Salen *N,N'*-ethylenebis(salicylideneiminato)
 SEM TEOC *b*-trimethylsilyl-ethoxymethyl
 Sia Siamyl

TBAB tetrabutyl ammonium
bromide
TBAF tetrabutylammonium
fluoride
TBDMS TBS *t*-butyldimethyl-
silyl
TBME *t*-butyl methyl ether
TCNE tetracyanoethylene
TEA triethylamine
TEOC SEM *b*-trimethylsilyl-
ethoxymethyl
Tf trifluoromethanesulfonate
TFA trifluoroacetic acid
TFAA trifluoroacetic
anhydride
THF tetrahydrofuran
THP tetrahydropyranyl
TIPS tri-*i*-propylsilyl
TMAO trimethylamin N-oxide

TMEDA tetramethylethylene-
diamine
TMS trimethylsilyl
TMU tetramethylurea
Tol tolyl
Tos Ts *p*-toluenesulfonyl
TPP Tetraphenylporphyrin
Tr trityl
TT Co(II) Pc tetrabutyl-
ammonium cobalt(II)
phthalocyanine-5,12,19,26-
tetrasulfate
wk week
Z benzyloxycarbonyl
Ⓟ polymeric support
ⒸⒸⒸ• US ultrasound

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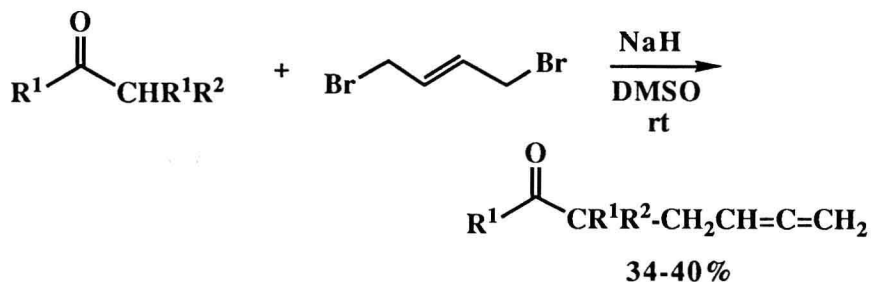
I CARBON-CARBON BOND FORMING REACTIONS

I.A. Carbon - Carbon Single Bonds

(see also: I.E., I.F., I.G., I.H.)

I.A.1. Alkylations of Aldehydes, Ketones and Their Derivatives

I.A.1-1 Z. Cekovic and R. Matovic, *J. Chem. Soc., Chem. Commun.*, 294; see also: P.H. Nelson and J.T. Nelson, *Synthesis*, 192; G. Prasad and P.E. Hanna, *J. Org. Chem.*, **56**, 7188; E.M. Abele et al., *J. Org. Chem. (USSR)*, **26**, 1545 (1990); P. Crotti et al., *Tetrahedron Lett.*, **32**, 7583.



I.A.1-2 G. Bartoli et al., *Synlett*, 229.

