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# PROTECTIVE GROUPS IN ORGANIC SYNTHESIS

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THIRD EDITION

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and

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Pharmacia and Upjohn Company



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## PREFACE TO THE THIRD EDITION

Organic synthesis has not yet matured to the point where protective groups are not needed for the synthesis of natural and unnatural products; thus, the development of new methods for functional group protection and deprotection continues. The new methods added to this edition come from both electronic searches and a manual examination of all the primary journals through the end of 1997. We have found that electronic searches of *Chemical Abstracts* fail to find many new methods that are developed during the course of a synthesis, and issues of selectivity are often not addressed. As with the second edition, we have attempted to highlight unusual and potentially useful examples of selectivity for both protection and deprotection. In some areas the methods listed may seem rather redundant, such as the numerous methods for THP protection and deprotection, but we have included them in an effort to be exhaustive in coverage. For comparison, the first edition of this book contains about 1500 references and 500 protective groups, the second edition introduces an additional 1500 references and 206 new protective groups, and the third edition adds 2349 new citations and 348 new protective groups.

Two new sections on the protection of phosphates and the alkyne-CH are included. All other sections of the book have been expanded, some more than others. The section on the protection of alcohols has increased substantially, reflecting the trend of the nineties to synthesize acetate- and propionate-derived natural products. An effort was made to include many more enzymatic methods of protection and deprotection. Most of these are associated with the protection of alcohols as esters and the protection of carboxylic acids. Here we have not attempted to be exhaustive, but hopefully, a sufficient number of cases are provided that illustrate the true power of this technology, so that the reader will examine some of the excellent monographs and review articles cited in the references. The Reactivity Charts in Chapter 10 are identical to those in the first edition. The chart number appears beside the name of each protective group when it is first introduced. No attempt was made to update these Charts, not only because of the sheer magnitude of the task, but because it is nearly impossible in

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HOAt, 7-aza-1-hydroxybenzotriazole; HATU (CAS Registry No. 148893-10-1), *N*-[[dimethylamino](3*H*-1,2,3-triazolo(4,5-*b*)pyridin-3-yl)oxy)methylene]-*N*-methylnethanaminium hexafluorophosphate, previously known as *O*-(7-azabenzotriazol-1-yl)-1,1,3,3-tetramethyluronium hexafluorophosphate. [Note: Assignment of structure to HATU as a guanidinium species rather than as a uronium species, i.e., attachment of the (Me<sub>2</sub>NC=NMe<sub>2</sub>)<sup>+</sup> unit to N<sub>3</sub> of 7-azabenzotriazole 1-*N*-oxide instead of to the *O*, is based on X-ray analysis (ref. 33b)].

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## PROTECTION FOR THE HYDROXYL GROUP, INCLUDING 1,2- AND 1,3-DIOLS

<b>ETHERS</b>	<b>23</b>
Methyl, 23	
<b>Substituted Methyl Ethers</b>	<b>27</b>
Methoxymethyl, 27	
Methylthiomethyl, 33	
(Phenyldimethylsilyl)methoxymethyl, 35	
Benzoyloxymethyl, 36	
<i>p</i> -Methoxybenzoyloxymethyl, 37	
<i>p</i> -Nitrobenzoyloxymethyl, 38	
<i>o</i> -Nitrobenzoyloxymethyl, 38	
(4-Methoxyphenoxy)methyl, 38	
Guaiacolmethyl, 39	
<i>t</i> -Butoxymethyl, 39	
4-Pentenylloxymethyl, 40	
Siloxymethyl, 41	
2-Methoxyethoxymethyl, 41	
2,2,2-Trichloroethoxymethyl, 44	
Bis(2-chloroethoxy)methyl, 44	
2-(Trimethylsilyl)ethoxymethyl, 45	
Menthoxymethyl, 48	
Tetrahydropyranyl, 49	
3-Bromotetrahydropyranyl, 54	
Tetrahydrothiopyranyl, 54	
1-Methoxycyclohexyl, 54	
4-Methoxytetrahydropyranyl, 54	
4-Methoxytetrahydrothiopyranyl, 55	

## PROTECTION FOR THE HYDROXYL GROUP, INCLUDING 1,2- AND 1,3-DIOLS

4-Methoxytetrahydrothiopyranyl *S,S*-Dioxide, 55  
[(2-Chloro-4-methyl)phenyl]-4-methoxypiperidin-4-yl, 55  
(2-Fluorophenyl)-4-methoxypiperidin-4-yl, 56  
4-Dioxan-2-yl, 57  
3,4-Dihydrofuranyl, 57  
Tetrahydrothiofuranyl, 58  
3,3a,4,5,6,7,7a-Octahydro-7,8,8-trimethyl-4,7-methanobenzofuran-2-yl, 58

**stituted Ethyl Ethers**

59

Ethoxyethyl, 59  
(2-Chloroethoxy)ethyl, 60  
[2-(Trimethylsilyl)ethoxy]ethyl, 61  
Methyl-1-methoxyethyl, 61  
Methyl-1-benzyloxyethyl, 62  
Methyl-1-benzyloxy-2-fluoroethyl, 62  
Methyl-1-phenoxyethyl, 63  
2,2-Trichloroethyl, 63  
1-Dianisyl-2,2,2-trichloroethyl, 63  
1,1,3,3,3-Hexafluoro-2-phenylisopropyl, 64  
Trimethylsilylethyl, 64  
(Benzylthio)ethyl, 65  
(Phenylselenyl)ethyl, 65  
yl, 65  
67  
argy, 74  
lorophenyl, 74  
ethoxyphenyl, 75  
rophenyl, 76  
Dinitrophenyl, 76  
i,6-Tetrafluoro-4-(trifluoromethyl)phenyl, 76  
yl, 76

**stituted Benzyl Ethers**

86

Methoxybenzyl, 86  
4-Dimethoxybenzyl, 91  
Nitrobenzyl, 93  
Nitrobenzyl, 93  
Halobenzyl, 95  
3-Dichlorobenzyl, 95  
Cyanobenzyl, 96  
Phenylbenzyl, 96  
3-Difluorobenzyl, 97  
Acylaminobenzyl, 97  
Azidobenzyl, 97  
Azido-3-chlorobenzyl, 98  
Trifluoromethylbenzyl, 98  
(Methylsulfinyl)benzyl, 98  
and 4-Picolyl, 99  
ethyl-2-picolyl *N*-Oxido, 99  
vinolinylmethyl, 100

1-Pyrenylmethyl, 100  
Diphenylmethyl, 100  
*p,p'*-Dinitrobenzhydryl, 101  
5-Dibenzosuberyl, 102  
Triphenylmethyl, 102  
 $\alpha$ -Naphthylidiphenylmethyl, 104  
*p*-Methoxyphenyldiphenylmethyl, 105  
Di(*p*-methoxyphenyl)phenylmethyl, 105  
Tri(*p*-methoxyphenyl)methyl, 105  
4-(4'-Bromophenoxy)phenyldiphenylmethyl, 106  
4,4',4''-Tris(4,5-dichlorophthalimidophenyl)methyl, 106  
4,4',4''-Tris(levulinoyloxyphenyl)methyl, 107  
4,4',4''-Tris(benzoyloxyphenyl)methyl, 107  
4,4'-Dimethoxy-3''-[*N*-(imidazolylmethyl)]trityl, 107  
4,4'-Dimethoxy-3''-[*N*-(imidazolylethyl)carbamoyl]trityl, 107  
1,1-Bis(4-methoxyphenyl)-1'-pyrenylmethyl, 108  
4-(17-Tetrabenzo[*a,c,g,i*]fluorenylmethyl)-4,4''-dimethoxytrityl, 108  
9-Anthryl, 109  
9-(9-Phenyl)xanthenyl, 109  
9-(9-Phenyl-10-oxo)anthryl, 110  
1,3-Benzodithiolan-2-yl, 112  
Benzisothiazolyl *S,S*-Dioxido, 113

**Silyl Ethers**

113

Migration of Silyl Groups, 114  
Trimethylsilyl, 116  
Triethylsilyl, 121  
Triisopropylsilyl, 123  
Dimethylisopropylsilyl, 125  
Diethylisopropylsilyl, 126  
Dimethylhexylsilyl, 127  
*t*-Butyldimethylsilyl, 127  
*t*-Butyldiphenylsilyl, 141  
Tribenzylsilyl, 144  
Tri-*p*-xylylsilyl, 144  
Triphenylsilyl, 144  
Diphenylmethylsilyl, 145  
Di-*t*-butylmethylsilyl, 146  
Tris(trimethylsilyl)silyl: Sisyl, 146  
(2-Hydroxystyryl)dimethylsilyl, 147  
(2-Hydroxystyryl)diisopropylsilyl, 147  
*t*-Butylmethoxyphenylsilyl, 147  
*t*-Butoxydiphenylsilyl, 148

**Conversion of Silyl Ethers to other Functional Groups**

148

**ESTERS**

149

Formate, 149  
Benzoylformate, 149

ate, 150  
 chloroacetate, 160  
 chloroacetate, 163  
 chloroacetate, 163  
 fluoroacetate, 164  
 methoxyacetate, 165  
 phenylmethoxyacetate, 165  
 p-enoxyacetate, 165  
 p-Chlorophenoxyacetate, 166  
 phenylacetate, 166  
 phenylacetate, 167  
 propionate, 167  
 pentanoate, 167  
 pentanoate (Levulinate), 168  
 Ethylenedithiopentanoate, 168  
 Bis(4-methoxyphenyl)hydroxymethylphenoxy]levulinate, 169  
 benzoate, 170  
 camantoate, 172  
 crotonate, 173  
 Methoxycrotonate, 173  
 crotonate, 173  
 Phenylbenzoate, 178  
 1,3,5-Trimethylbenzoate (Mesitoate), 178

**Benzoates**

179

1,1,1-Trichloroethyl, 179  
 Dimethylthoxymethyl, 180  
 Fluorenylmethyl, 180  
 181  
 1,2-Trichloroethyl, 181  
 1,1-Dimethyl-2,2,2-trichloroethyl, 181  
 Trimethylsilyl)ethyl, 182  
 Phenylsulfonyl)ethyl, 182  
 Triphenylphosphonio)ethyl, 183  
 183  
 184  
 p-phenyl, 185  
 1,186  
 Methoxybenzyl, 186  
 -Dimethoxybenzyl, 186  
 Nitrobenzyl, 186  
 Nitrobenzyl, 186

**Benzoates Cleaved by  $\beta$ -Elimination**

187

2-Dansylethyl, 187  
 2-(4-Nitrophenyl)ethyl, 187

2-(2,4-Dinitrophenyl)ethyl, 187  
 2-Cyano-1-phenylethyl, 188  
 S-Benzyl Thiocarbonate, 188  
 4-Ethoxy-1-naphthyl, 188  
 Methyl Dithiocarbonate, 189

**Assisted Cleavage**

189

2-Iodobenzoate, 189  
 4-Azidobutyrate, 190  
 4-Nitro-4-methylpentanoate, 190  
 o-(Dibromomethyl)benzoate, 190  
 2-Formylbenzenesulfonate, 190  
 2-(Methylthiomethoxy)ethyl Carbonate, 191  
 4-(Methylthiomethoxy)butyrate, 191  
 2-(Methylthiomethoxymethyl)benzoate, 191  
 2-(Chloroacetoxymethyl)benzoate, 191  
 2-[(2-Chloroacetoxy)ethyl]benzoate, 192  
 2-[2-(Benzyloxy)ethyl]benzoate, 192  
 2-[2-(4-Methoxybenzyloxy)ethyl]benzoate, 192

**Miscellaneous Esters**

193

2,6-Dichloro-4-methylphenoxyacetate, 193  
 2,6-Dichloro-4-(1,1,3,3-tetramethylbutyl)phenoxyacetate, 193  
 2,4-Bis(1,1-dimethylpropyl)phenoxyacetate, 193  
 Chlorodiphenylacetate, 193  
 Isobutyrate, 193  
 Monosuccinoate, 193  
 (E)-2-Methyl-2-butenoate (Tigloate), 193  
 o-(Methoxycarbonyl)benzoate, 193  
 p-P-Benzoate, 193  
 $\alpha$ -Naphthoate, 193  
 Nitrate, 193  
 Alkyl N,N,N',N'-Tetramethylphosphorodiamidate, 193  
 2-Chlorobenzoate, 193  
 4-Bromobenzoate, 193  
 4-Nitrobenzoate, 193  
 3'5'-Dimethoxybenzoate, 194  
 A Wild and Woolly Photolabile Fluorescent Ester, 195  
 N-Phenylcarbamate, 195  
 Borate, 196  
 Dimethylphosphinothioyl, 196  
 2,4-Dinitrophenylsulfonate, 196

**Sulfonates**

197

Sulfate, 197  
 Allylsulfonate, 198  
 Methanesulfonate (Mesylate), 198  
 Benzylsulfonate, 198  
 Tosylate, 199  
 2-[(4-Nitrophenyl)ethyl]sulfonate, 199

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