

Index

- Acetal, 171, 186
Acetate, 168–169
Acetic anhydride, 61
Acetone, 70, 71
Acetonide, 169–171
Acid chloride, 44, 45
Acyclic diene metathesis
 polymerization, 160
ADMET. *See* Acyclic diene metathesis
 polymerization
AIBN, 82, 104, 105
Alane, 86
AlCl₃, 139
Aldol condensations, 111–116
 Crimmins' asymmetric aldol, 116
 Evans' aldol, 112–113
 Masamune aldol, 113–114
 Mukaiyama aldol, 114–115
Aldol reactions. *See* aldol
 condensations
Alkenyllithium, 103
R-Alpine borane, 97
S-Alpine borane, 97
Alternative solvents (drop-in), 9
Ammonium formate, 108–109
Analogix, 22
Anhydrous solvents, 6–9
p-Anisaldehyde stain, 19
Arylsilanols, 128
Aryltrimethoxysilanes, 128
Aspartame, 5
AsPh₃, 144
Asymmetric deprotonation, 116
Asymmetric enolate
 alkylations, 122–123
 with oxazolidinone chiral
 auxillaries, 122
 Myers' alkylation, 122–123
Baeyer–Villiger oxidation, 76, 77
Baker's yeast, 97
Barton deoxygenation, 81–83
Barton–McCombie deoxygenation.
 See Barton deoxygenation
Baylis–Hillman Reaction, 117–118
9-BBN. *See* 9-Borabicyclo[3.3.1]nonane
Benzoin condensation, 118
Benzophenone ketyl radical, 6–7
Benzyl chloride, 171
Benzyl ether, 171–172
(2*R*)-(–)-Benzylxy-2-
 methylpropylbromide, 10

- Benzyl protection of an amine, 177
 BH₃·SMe₂, 86
 BH₃·THF, 86, 87, 96
 BINAP, 98
 (*R*)-(+)-BINOL, 130
 Biotage, 22
 Birch reduction, 107–108
 ((*2R*-*cis*)-2-[[1-[3,5-Bis(trifluoromethyl)phenyl]ethenyl]oxy]-3-(4-fluorophenyl)-4-benzylmorpholine), 158
 Bis(2-bromophenyl)methane, 13
 Bis(tricyclohexylphosphine)benzylidene ruthenium (IV) dichloride, 160, 161
 Bis-dimethyl ether, 173
 Bis-ester, 186
 Bis-ketone, 187
 Bis(pinacolato)diboron, 146–147
 Bis-sulfonamide, 183
 BnPd(PPh₃)₂Cl, 142
 9-Borabicyclo[3.3.1]nonane, 38, 39
 BOC-pyrrolidine, 178
 Borane, 38, 86
 Boron enolates, 111–114
 Boron trifluoride etherate, 88, 101, 103
 4-Bromoanisole, 146
 1-Bromonaphthalene, 149
N-Bromosuccinimide, 71
 Brown asymmetric crotylation, 118–119
 Burgess dehydrating reagent, 32
tert-Butyldiphenylsilyl (TBDPS) ether, 174–175
t-Butyl hydroperoxide, 76
n-Butyllithium, 12, 119, 122, 123, 132, 134, 135, 136, 137, 141, 145, 150, 152, 154, 159, 163, 165
sec-Butyllithium, 12, 116, 134, 151
tert-Butyllithium, 12, 121, 125, 134, 135, 136, 147
t-Butyl sulfonamide, 43
t-Butyloxycarbonyl (BOC) protection of amine, 178
 (η^3 -C₃H₅PdCl)₂, 128
 Camphorsulfonic acid, 170, 176
 CAN. *See* ceric ammonium nitrate
 Carbobenzyloxy (Cbz), 180–181
 Carbodiimide, 46
 Carbon disulfide, 81, 82
 Carbon tetrabromide, 28, 150
 Carbon tetrachloride, 29
 Carbon–carbon double bond forming reactions, 150–166
 Carbon–carbon single bond forming reactions, 111–150
 Carbonyldiimidazole, 46
 Catechol borane, 38
 CBS Reduction. *See* Corey–Bakshi–Shibata reduction
 Ceric ammonium nitrate, 172
 Cerium chloride (CeCl₃), 133, 134
 Cerium molybdate stain, 19
 (*see also* Hanessian stain)
 Cerium sulfate stain, 19, 20
 Cerium trichloride, 92
 Chiral auxillary, 112–113, 116
meta-Chloroperbenzoic acid, 66, 72, 78
 2-Chloro-5-bromonitrobenzene, 125–126
N-Chlorosuccinimide, 62, 63, 66
 Chromatography, 17–24
 Chromium (II) chloride, 164
 Chromium trioxide, 16
 Claisen adapter, 157
 Claisen condensation, 119, 121
 Clemmensen reduction, 102
 CM. *See* Cross-metathesis
 Collins oxidation, 57
 Column volume, 17, 21
 Common crystallization solvents, 25
 Cooling baths, 9
 Corey–Bakshi–Shibata reduction, 96
 Corey–Fuchs reaction, 150–151
 Corey–Kim oxidation, 62
 Corey–Peterson olefination, 151
m-CPBA. *See meta*-Chloroperbenzoic acid
 CrCl₂, 133
 Cross-metathesis, 160
 18-Crown-6 ether, 153
 Crystallization, 22–24
 Crystallization setup, 25
 Crystallization solvents, 25
 CSA. *See* Camphorsulfonic acid
 Cumene hydroperoxide, 79, 80
 Cuprates, 120–121
 CV. *See* Column volume
 Cyanocuprates, 120–121
 Cyclohexylidenecyclohexane, 156

- N*-Cyclohexyl-(2-triethylsilylpropylidene) amine, 151
 Cyclopropanation, 167
- DABCO. *See* 1,4-Diazabicyclo [2.2.2]octane
 Danishefsky's diene, 166
 DAPA. *See* Dipotassium azodicarboxylate
 DDQ. *See* 2,3-Dichloro-5,6-dicyano-*p*-benzoquinone
 Dean–Stark trap, 41, 42, 155
 Decomposition of ethyl ether, 12
 Decomposition of THF, 12
 Dehydrate, 32, 33, 51
 Δ CV, 21
 DEPC. *See* Diethylcyanophosphonate
 Dess–Martin reagent, 15, 16, 63, 64, 65
 Diamine, 183
 1,4-Diazabicyclo[2.2.2] octane, 117, 118
 Diazald. *See* *N*-Methyl-*N*-nitroso-4-toluenesulfonamide
 Diazomethane, preparation, 14–15
 DIBAL–H. *See* Diisobutylaluminum hydride
 Dibromoethane, 10
 Dibromomethane, 157
 2,6-Dibromophenol, 174
 2,3-Dichloro-5,6-dicyano-*p*-benzoquinone, 57, 58
 Dicyclohexylboron triflate, 113
 Dicyclohexylcarbodiimide, 59
 Dieckmann condensation, 121
 Diels–Alder reaction, 166–167
 Diethylazodicarboxylate, 33, 34, 35
 Diethylcyanophosphonate, 48, 49
 Diethylmalonate, 149
 Diethylzinc, 167
 3',4'-Dihydroxyacetophenone, 173
 Dihydroxylation, 73
 Diimide, 106–107
 Diiodomethane, 167
 Diisobutylaluminum hydride, 88–90, 93, 103
 (+)-*B*-Diisopinocampheyl-methoxyborane, 119
 (*R,R*)-Diisopropyltartrate (*E*)-crotylboronate, 138–139
 β -Diketones, 97
 3',4'-Dimethoxyacetophenone, 173
 2,2-Dimethoxypropane, 170
 4-(Dimethylamino)pyridine. *See* DMAP
 Dimethyl dioxirane, 70, 71
 Dimethylketal, 185–186
 Dimethylmercury, 4
 2,2-Dimethyl-1,3-propane diol, 186
 2,5-Dimethylpyrrole protection of amine, 178–180
 2,5-Dimethylpyrrole, 179
 Dimethylsulfoxide based oxidations, 58–63
 Dimethyltitanocene, 157–158
 Di-*n*-butylboron-triflate, 112, 113
 1,2-Diols, 169–170
 1,3-Diols, 169–170
 1,3-Dioxane, 186–187
 1,3-Dioxolane, 187–188
 Diphenylphosphoryl azide, 31, 48
 Dipotassium azodicarboxylate, 107
 1,3-Dithiane, 188–189
 DMAP, 47, 49, 169, 178
 dppf, 144
- EDCI, 46, 47
 EDTA, 109
 EEDQ, 47
 Enamine, 41
 Epoxidation, 71, 72, 75, 76
 EtAlCl₂, 139
 Ethyl 2-(trimethylsilyl) propionate, 163–164
 Ethylene glycol, 187
- Face shields, 3
 Finkelstein reaction, 37, 38
 Fischer esterification, 50
 Flash chromatography, 20–22, 24
 Flash chromatography setup, 21
 Fleming oxidation, 63
 Florisil, 156, 162
 9-Fluorenylmethyl carbamate (Fmoc) protection of an amine, 181–182
 Fluorous solvents, 8
 ((2*R*-*cis*)-3-(4-Fluorophenyl)-4-benzyl-2-morpholinyl 3,5-bis(trifluoromethyl)benzoate), 158
 Flur, fluorescent dye, 17
 Friedel–Crafts reaction, 123–124
 Fukuyama reduction, 90–91
 Functional group manipulations, 28–54
 Fundamental synthetic organic chemistry techniques, 3–27

- 1-(3-Furyl)but-3-yn-1-ol, 176
(+)-(E)-1-(3-Furyl)-4-iodopent-3-en-1-ol, 169
(+)-(E)-1-(3-Furyl)-4-iodopent-3-en-1-yl acetate, 169
- Gabriel reaction, 182
Gloves, 4
Goggles, 3
Green solvents, 7–9
Grignard reaction, 124–125
Grignard reagents, preparation, 10, 11
Grignard reagents, titration, 11
Grubbs' catalysts, 160, 161–163
- Halogen/metal exchange, 13
Halogenation, 71
Halogen–Lithium exchange, 12, 13, 135–136, 147
Hanessian stain, 19
(*see also* Cerium molybdate stain)
Hartwig–Buchwald aromatic amination, 36
Hartwig–Buchwald etherification, 37
Heck coupling, 125–127
Heck reactions of aryl chlorides (Fu Modification), 126–127
Henry reaction, 127–128
Hetero–Diels–Alder reaction, 166–167
Hexamethylditin (Me₃SnSnMe₃), 142, 143
HgCl₂, 102
Hiyama cross-coupling reaction, 128–129
standard, 128
Denmark modification, 129
Fu modification, 129
Horner–Wadsworth–Emmons reaction (HWE), 151–154
Ando Modification, 153–154
Masamune–Roush modification, 152–153
standard HWE, 152
Still–Gennari modification, 153
Hoyveda–Grubbs' Catalyst, 160, 163
HWE. *See* Horner–Wadsworth–Emmons reaction
Hydroboration, 38, 39
 α -Hydroxyaldehydes, 97
 α -Hydroxyketones, 97, 101
 β -Hydroxyketones, 95, 96
syn- β -Hydroxysilanes, 163
Hydrolysis, 52, 53, 54
1-Hydroxy-1,2-benziodoxol-3(1*H*)-one, 15–16
anti- β -Hydroxysilanes, 163
Hydroxylamine hydrochloride, 179
3-Hydroxymethyl-4'-methylbiphenyl, 128
- I₂ or I₂ in silica gel, 19
I₂ stain, 20
IBX, 15, 65 (*see also* 1-Hydroxy-1,2-benziodoxol-3(1*H*)-one)
Imidazole, 30
Imine, 42
Ing–Manske procedure, 182
Internal temperature, 119, 157, 158
Internal thermometer, 132, 135, 136
Iodine, 30
4'-Iodoacetophenone, 129
Iodobenzene diacetate, 66
4-Iodo-2-fluoropyridine, 132
Iodoform, 164
Ionic hydrogenation, 103
Ionic liquids, 8
Isobutylchloroformate, 47, 48, 51
Isobutylene, 135
O,O-Isopropylidene acetal, 169–170
- Jacobsen–Katsuki reaction, 72
Jeffrey's ligandless conditions, 126
Jones reagent, 16, 17, 68
Julia coupling, 154–155
- Kagan asymmetric sulfur oxidation, 79
Katsuki–Sharpless epoxidation, 75
Keck stereoselective allylation, 130
Ketal, 41, 188
 β -Keto esters, 97
KHF₂, 148
KMnO₄, 19
Knoevenagel condensation, 155
Kugelrohr distillation, 129, 131
Kumada coupling, 130–131
- Laboratory coats, 4
Lachrymators, 171
LAH. *See* Lithium aluminum hydride
Lawesson's reagent, 43, 44
LDA. *See* Lithium diisopropylamide

- Lindlar's catalyst, 106
 Lithium aluminum hydride, 84–86, 91
 Lithium borohydride, 87–88
 Lithium chloride, 30
 Lithium diisopropylamide, 16, 119,
 163–164
 Lithium tri-*tert*-butoxyaluminumhydride
 [LiAlH(*Ot*-Bu)₃], 93–94
 Lithium/ammonia, 107–108
 Lombardo–Takai reagent, 156–157
 Lower order cuprates, 120
 Luche reduction, 92

 Magnesium turnings, 10
 Manganese dioxide, 55
 Mannich reaction, 35–36
 Mannich reaction, vinylogous, 35–36
 Martin's sulfurane, 33
 Material Safety Data Sheet
 (MSDS), 5
 McMurry coupling, 155–156
 Meerwein–Pondorf–Verlag, 95
 Menthol, 11
 Mercury (II) perchlorate, 188
 Mercury poisoning, 4
 Mercury salts, 188
 Metallations, 134, 136, 137
ortho-Metallations, 137
 Methanesulfonyl chloride, 29, 30, 31
 4-Methoxybenzyl chloride, 108
para-Methoxybenzyl (PMB)
 ether, 172
 Methoxymethylene (MOM)
 ether, 173–174
 4-Methoxy-2'-methylbiphenyl, 146
 3-Methoxymethylphenyl bromide, 134
N-Methyldicyclohexylamine
 (Cy₂NMe), 126, 127
N-Methyl-*O*-methyl amides. *See*
 Weinreb amides
N-Methylmorpholine-*N*-oxide, 67, 73
N-Methyl-*N*-nitroso-4-
 toluenesulfonamide, 15
 Methyl ether, 173
 Methyl orange indicator, 101
 Methyl xanthate, 81–82
 MgBr₂·OEt₂, 124, 125
 Michael addition, 39
 Midland reduction, 97
 Miscible solvents, 26
 Mitsunobu reaction, 33

 Moffatt oxidation, 59
 MSDS. *See* Material Safety Data Sheet
 MTBE, 103, 104, 105
 Mukaiyama aldol, 114–115
 Mukaiyama esterification, 48
 Multiple carbon–carbon bond
 forming reactions, 166–167
 Myers' asymmetric
 alkylation, 122–123

 Negishi coupling, 131–132
 standard, 132
 Fu modification, 132
 NiBr₂(PPh₃)₂, 131
 Nickel dichloride, 109
 NiCl₂, 133
 Ninhydrin stain, 19–20
 Nitro aldol. *See* Henry reaction.
 Nitroene, 78
 NMO. *See* *N*-Methylmorpholine-*N*-oxide
 NMR. *See* Nuclear magnetic resonance
 Norephedrine-derived
 oxazolidinone, 113, 122
 Noyori asymmetric reduction, 98
 Nozaki–Hiyama–Kishi Reaction, 133
 Nuclear magnetic resonance, 26, 27
 Nucleophilic aromatic substitution, 38
 Nutrasweet®. *See* aspartame

 Olefin metathesis, 160–163
 One-dimensional TLC, 17–18
 Oppenauer oxidation, 65
 Organocerium reagents, 133–134
 Organochromium reagents, 133
 Organolithium reagents, 12–13, 124, 133,
 134–136, 142, 145
 Organolithium reagents,
 preparation, 12, 13
 stability, 12
 titration, 13
 Organomagnesium reagents, 124, 130, 131,
 132, 133
 Organozinc reagents, 13, 14
 Osmium tetroxide, 73, 74
 Oxalyl chloride, 44, 45, 58
 Oxazaborolidine, 96
 Oxazolidinone, 112, 113, 121, 122
 Oxidations, 55–58
 alcohol to ketone oxidation state, 55–68
 alcohol to acid oxidation state, 68–70

- Oxidations, (*cont.*)
 olefin to diol, 70–76
 aldehyde to acid oxidation state, 76–78
 heteroatom oxidations, 78–80
- Oxime, 42
- Oxone, 70, 71, 76, 79
- P(2-furyl)₃, 143
- P(o-tol)₃, 143, 144
- P(*t*-Bu)₃, 144, 146
- P₂O₅, 51, 61
- P₂S₅, 43
- P₄S₁₀, 43
- Parikh–Doering oxidation, 59
- Pd(dba)₂, 129, 143, 144
- Pd(dppf)Cl₂, 144, 145, 146, 147, 148
- Pd(OAc)₂, 125, 126, 143, 144, 149
- Pd(P(*t*-Bu)₃)₂, 126, 127, 132
- Pd(PPh₃)₄, 125, 131, 132, 143, 144, 145, 146, 148, 149
- Pd/C, 90–91, 105, 108–109
- Pd₂(dba)₃, 125, 126, 129, 143, 146
- PdCl₂(MeCN)₂, 142
- PdCl₂(PPh₃)₂, 142, 144, 145
- PdCl₂, 125
- (2*S*)-Pentane-1,2-diol, 175
- Perchloric acid, 40
- Permanganate oxidation, 69
- Personal Protection Equipment, 3–5
- Petasis reagent, 157–158
- Peterson olefination, 151, 163–164
- Phenanthroline, 11
- L*-Phenylalanine methyl ester
 hydrochloride, 177, 180
- 1-Phenylnaphthalene, 149
- Phosphomolybdc acid, 20
- Phosphorous oxychloride, 45
- Phthalic acid anhydride, 182
- Phthalimides, 182
- Phthaloyl protection of an amine, 182
- Pinacolborane, 38
- PMA. *See* Phosphomolybdc acid
- PMB ether, 172
- Potassium 3,5-bis(trifluoromethyl)
 phenyltrifluoroborate, 149
- Potassium ferrocyanide, 73, 74
- Potassium hexamethyldisilazide, 153
- Potassium organotrifluoroborates,
 148–149
- Potassium permanganate stain, 20
- Potassium phenyltrifluoroborate, 149
- Potassium *tert*-butoxide, 119, 121
- PPE. *See* Personal Protection
 Equipment
- PPTS, 170, 185, 186
- Pregna-4,6-diene-3,20-dione, 187
- Propane-1,3-dithiol, 188
- Protecting groups, 168–189
 for alcohols and phenols, 168–176
 for amines and aniline, 176–185
 for aldehydes and ketones, 185–189
- Pseudoephedrine amide, 122–123
- Pummerer rearrangement, 66
- Pyridinium dichromate, 56
- Pyridinium chlorochromate, 56
- Pyridinium
p-toluenesulfonate, 170, 176
- Pyridinium salts, 48
- Quaternary thiazolium salts, 118
- Raney Nickel, 100–101
- Rawal's diene, 166–167
- RCM. *See* Ring-closing metathesis
- ROM. *See* Ring-opening metathesis
- Redal–H. *See* Sodium bis(2-
 methoxyethoxy)(aluminum
 hydride)
- Reductions, 81–110
 alcohols to alkanes, 81–83
 aldehydes, amides, and nitriles to
 amines, 83–84
 carboxylic acids and derivatives
 to alcohols, 85–88
 esters and other carboxylic acid
 derivatives to aldehydes, 88–91
 ketones or aldehydes
 to alcohols, 91–98
 ketones to alkanes or alkenes, 98–104
 reduction of carbon
 double bonds, 105–108
 reduction of heteroatoms, 108–110
 reductive dehalogenation, 104–105
- Reductive amination, 83
- Reformatsky reaction, 137–138
- Residual solvent peaks in NMR,
 24–27
 in CDCl₃, 26
 in *d*₆-DMSO, 27
- Retention factor, 17
- Reverse phase columns (C18), 22
- R_f. *See* Retention factor

- Ring-closing metathesis, 160–162
 Ring-opening metathesis, 160
 Rochelle's salt, 89, 91, 93, 96, 103, 107
 Roush crotylation, 138–139
- Safety glasses, 3–4
 Safety, 3–5
 Sakurai reaction, 139
 traditional, 139–140
 Denmark's modification, 140
 Samarium iodide, 95
 Saponification, 53
 Schlenk flask, 132, 146, 156
 Schotten–Baumann reaction, 51
 Schrock's catalyst, 160, 161
 Schwartz hydrozirconation, 140–141
 Schwartz's reagent,
 $\text{Cp}_2\text{Zr}(\text{H})\text{Cl}$, 140–141
L-Selectride, 94
 Shapiro reaction, 103–104, 141
 Sharpless asymmetric
 aminohydroxylation, 74–75
 Sharpless asymmetric dihydroxylation, 73–74
 Shi epoxidation, 75–76
 Sideshields, 3
 Silica gel:compound ratio, 21
 Simmons–Smith reaction, 167
 Single solvent crystallization, 23
 SnCl_4 , 139
 Sodium amalgam, 155
 Sodium azide, 31
 Sodium bis(2-methoxyethoxy-
 (aluminum hydride), 107
 Sodium bis-trimethylsilylamide, 122
 Sodium borohydride, 87, 88, 91–92
 Sodium bromite, 66
 Sodium chlorite, 69, 70, 77
 Sodium cyanoborohydride, 101
 Sodium hypochlorite, 66, 69, 70
 Sodium iodide, 31
 Sodium potassium tartrate.
 See Rochelle's salt
 Sodium triacetoxyborohydride, 83
 Sodium/benzophenone, 6
 Solvent purification unit, 7–8
 Sonogashira coupling, 141–142
 (–)-Sparteine, 116–117
 Stabilized ylides, 165–166
 Staudinger reaction, 109–110
 Still's flash chromatography
 technique, 20–22
- Stille reaction, 142–143
 Stille–Kelly reaction, 143–144
 Sulfide, 78, 79
 Sulfinimine, 43
 Sulfonamide, 183–184
 Sulfone, 79
 Sulfoxide, 78
 Sulfur trioxide-pyridine, 59
 Supercritical carbon dioxide, 8
 Suzuki coupling, 144–148, 149
 Suzuki–Miyaura coupling.
 See Suzuki coupling
 Swern oxidation, 58, 62
- Takai olefination, 164
 TASF $[(\text{Et}_2\text{N})_3\text{S}^+(\text{Me}_3\text{SiF}_2)^-]$, 128
 TBAF. *See* Tetrabutylammonium
 fluoride
 TBDPS ether, 175
 TCCA, 51, 66
 Tebbe reagent, 157, 159
 Teledyne ISCO, 22
 TEMPO. *See* 2,2,6,6-
 Tetramethylpiperidine 1-oxyl
 Tetrabutylammonium
 fluoride, 128, 129, 142
 Tetrahydropyran, 176
 Tetramethylammonium
 triacetoxyborane, 95–96
 Tetra-*n*-butylammonium
 bromide, 126
 2,2,6,6-Tetramethylpiperidine
 1-oxyl, 66, 67, 69
 Tetrapropylammonium
 perruthenate, 67–68
 Thexyl borane, 38
 Thin layer chromatography, 17–20, 120,
 124, 126, 137, 139, 161
 Thioimidazolyl carbamate, 81, 82
 Thioketone, 43
 Thionyl chloride, 45
 THP. *See* Tetrahydropyran
 $\text{Ti}(\text{O}i\text{-Pr})_4$, 130
 $\text{TiCl}_3(\text{DME})_{1,5}$, 155–156
 TiCl_4 , 116, 139, 145
 Titanocene dichloride, 157–158
 Titanocene–methylidene reagent, 159
 TLC. *see* Thin layer chromatography
 TLC stains, 17–20
 p-anisaldehyde stain, 19
 cerium sulfate stain, 19

TLC stains, (*cont.*)

- Hanessian stain, 19
 - (*see also* Cerium molybdate stain)
- I₂ or I₂ in silica gel, 19
- KMnO₄, 19
- ninhydrin stain, 19–20
- phosphomolybdic acid, 20
 - (*see also* PMA)
- vanillin stain, 20
- TMEDA, 116, 141, 156
- TMSCHN₂. *See* Trimethylsilyldiazomethane
- TPAP. *See* Tetrapropylammonium perruthenate
- p*-Tolualdehyde, 155
- p*-Toluenesulfonic acid
 - monohydrate, 103–104
- p*-Toluenesulfonylhydrazide
 - (TsNHNH₂), 101, 103, 104
- o*-Tolylboronic acid, 146
- o*-Tolylmagnesium chloride, 132
- Tosyl chloride, 51
- Tosylhydrazine, 101–102, 144
- Tosylhydrazones, 101, 103–104
- 1,1,1-Triacetoxy-1,1-dihydro-1,2-benziodoxol-3(*1H*)-one, 15–16
- Trialkylsilanes, 81, 105
- Tribenzoyl chloride, 49
- Tributyltin hydride, 81, 82, 104, 105
- 2,4,6-Trichloro-[1,3,5]-triazine, 61
- Triethylborane, 104, 105
- Triethylsilane, 90–91, 103
- 3-Triethylsilyloxy-1-iodopropene, 151
- Trifluoroacetic anhydride, 60
- Trifluoroacetyl amides, 184
- Trifluoroacetyl protection of an amine, 184–185
- Trimethylphosphonate, 152

- N*¹,*N*¹,2-Trimethylpropane-1,3-diamine, 182
- Trimethylsilyl diazomethane, 14, 50
- Triphenylphosphine, 28, 29, 30, 33, 34, 35, 38, 109, 110, 126, 149, 150, 159
- Triphenylphosphine oxide, 109
- Triphenylphosphonium methyl bromide, 159, 165
- Tsuji–Trost reaction, 149–150
- Two-dimensional TLC, 18–19
- Unstabilized ylides, 159, 165
- α,β -Unsaturated ketones, 39
- (*R*)-Valinol, 171
- Valinol-derived oxazolidinone, 122
- Vanadyl acetoacetate
 - (VO(acac)₂), 76
- Vanillin stain, 20
- Vinylmagnesium bromide, 131
- Vinylsilanols, 128
- Wacker oxidation, 68
- Weinreb amides, 89
- Wittig reaction, 159–160, 164–166
- Wolff–Kishner reduction, 98–100
- Wurtz coupling, 135, 145
- Yamada coupling, 48, 49
- Yamaguchi esterification, 49
- Yb(OTf)₃, 166
- Ynone, 186
- Zimmerman–Traxler
 - transition state, 112
- Zinc amalgam, 102
- Zinc borohydride, 92–93
- Zinc reagent, 13–14
- Zinc–Copper couple, 156