

Index

a

- acetonitrile 166
- acetophenones 171, 172
- (+)-acoradiene 79, 81
- acrolein 161, 277
- acyclic α -nitro ketones
 - acylthioamides 236
 - from alkenes 212
 - carboxylic acid derivatives 211–212
 - to conjugated enones 221–224
 - denitration-deoxygenation 217–220
 - furoxans 235–236
 - from Henry reaction 209–211
 - α -nitro- α -diazocarbonyl derivatives 236
 - replacement of the nitro group with deuterium 220–221
 - replacement of the nitro group with hydrogen 213–217
 - replacement with phenylthio group 221
 - from silyl enol ethers 212–213
- acyl cation synthon 264
- acyl chloride 211, 227
- acylthioamides 236
- (\pm)-adaline 148
- aldehyde reductive nitromethylation 10
- algicidal cyclopentenone 54
- alkaline metal hydroxides 107
- alkenes 212, 250
- alkyl acrylates 273
- alkyl anion synthon 166
- 5-alkyl-5-aryl-1-pyrroline *N*-oxides 146
- alkyl halides 228
- alkylpyrazines 228
- allylated nitroalkane 230
- allylated nitro ketones 230
- allylic acetates 230, 268
- allylic carbonates 229
- allylrethronone 271
- α , α -dideuterated ketones 220
- α -amino acids 119
- α -amino ketone 228
- α -aminolevulinic acid (5-ALA) 227
- α -aminophosphonate 119
- 1 α ,2 α -(nitromethylene)-3-oxo-4,6-dienes 241
- α -arylation of secondary nitroalkanes 148
- α -bromocyclopentenone 241
- α -cedrene 79
- α -cyano-enones 233
- α -deuterated ketones 220
- α -ketoacids 38, 263
- α -methylene- γ -butyrolactones 179
- α -methylene γ -ketoesters 273
- α -methylene ketones 221
- α -monodeuterated ketones 220
- α -nitroacetate 120
- α -nitro acetophenones 225, 233
- α -nitro- α -diazocarbonyls 236
- α -nitroalcohols 224
- α -nitro cycloalkanones 225, 273
- arylation of
 - benzo- and naphtho-fused bicyclo[n.3.1]structures 204–205

- α -nitro cycloalkanones (*contd.*)
 tertiary α -aryl- α -nitrocycloalkanone
 205–206
 tiletamine 205
 Michael reaction 198–200
 nitroaldol (Henry) reaction 200–201
 ring cleavage of
 methyl ω -oxoalkanoate 192
 organometallic reagents 196–198
 oxidative 193–196
 reductive cleavage 193, 194
 ω -nitro acids 190–192
 ω -nitro esters 190–192
 synthesis of 188, 189
 Zip reactions 201
 α -pyrones 234
 α,β - or α^1,β^1 -unsaturated ketones 222
 α,β -unsaturated aldehydes 108
 α,β -unsaturated carbonyl derivatives
 alkyl anion synthon 166
 chemoselective catalytic procedure
 166
 chemoselective one-pot formation of
 adducts 168
 enediones 170
 esters 169, 170
 examples of 167
 N-ethylsuccinimides 168
 succinate derivatives 168
 synthesis of 165–170
 tetrahydrofurans 168
 triols 168
 α,β -unsaturated esters 126
 α,β -unsaturated hydrazones 232
 α,β -unsaturated ketones 223
 α,β -unsaturated nitriles 109
 α,β -unsaturated ω -ketoesters 274
 α,ω -diiodo structures 3
 α,ω -dinitroalkanes 3
 Al-SBA-15 22
 Amberlyst A21 60, 61, 65, 66, 109, 170,
 175, 217, 223, 235, 270, 282
 Amberlyst A27 110
 amine thiourea 120
 aminoalcohols 225
 9-aminocinchona alkaloid derivatives
 119
 aminopyridines 257
 angiotensin converting enzyme (ACE)
 inhibitor 136
 anion-solvating predilection 107
 α -nitrocyclohexanone 226
 α -nitrodiazoester 253
 α -nitro diazoesters 251
 α -nitro esters 232, 251, 252
 α -nitro ketones 111, 211, 220, 221, 225,
 228, 229, 231, 233, 283
anti- β -nitro alcohols 224
anti diastereoselective Henry reaction
 86
anti-diastereomers 226
 aromatic and aliphatic nitroolefins 248
 aromatic oligomers 227
 arylhydrazine 49
 aryl nitroaldols 38
 arylnitroalkane 270
 arylnitromethane 145
 aryl nitromethanes 2, 12
 asymmetric Henry reaction
 bisoxazoline ligand 90
 [(bisurea-salen)Co].OBz^F 87
 C₁-symmetric chiral aminopyridine
 ligand 83, 84
 CuBr, Py, MeOH and ligand 86
 (*R*)-isoproterenol 89
 Lopinavir 86, 87
 (*1R 2S*)-Methoxamine.HCl 88
 (*2S,5R*)-2-methylaminomethyl-1-
 methyl-5-phenylpyrrolidine 89
 (*S*)-miconazole 83
 (*S*)-moprolol 88
 *N*¹-Alkyl, *N*²-arylmethyl diamine
 ligand 89
 (*R*)-nitroalcohol 84
 (*S*)-nitroalcohol 83
 (*S*)-nitroalkanols 90
 (*S*)-*N-trans*-feruloyl 84, 85
 (*R*)-phenylephrine 84
 phanthroline and quinine 89
 (*S*)-propranolol 88

- Ritonavir* 86, 87
 salalen ligands 91
 (*S*)-toliprolol 88
 unbridged Ligand 90
 asymmetric Michael reaction
 α,β -unsaturated esters 126
 conjugate nitroalkenes 126
 with enals
 Baclofen 123
 (*S*)-diphenylprolinol TMS ether 125
 diphenylprolinol silyl ether 124
 imidazole-containing
 imidazolidinone catalyst 125
 organocatalyst 124
 pregabalin 124, 125
 Rolipram 124
 tetrahydropyrans 126
 triphenylsilyl ether derivative 124
 with enones
 amine thiourea 120
 α -amino acids 119
 9-aminocinchona alkaloid
 derivatives 119
 α -aminophosphonate 119
 (*S*)- and (*R*)-baclofen 123
 diamine 121
 1,2-diaminocyclohexane 119
 γ -nitro ketones 121
 imidazoline-tetrazole 117, 118
 α -nitroacetate 121
 prochiral nitroalkanes to acrylate
 equivalents 121
 5-pyrrolidin-2-yltetrazole 118
 4-*trans*-amino-proline 118, 119
 with vinyl sulphones 128
 aza-Henry reaction
 β -nitroamines 91
 via *N*-protected imines
 AHR under catalysts 99
 aminoalcohol 93
 amino-substituted *g*-lactam 98
 β -aminoacids 97
 bisamide catalyst 101
 cinchona alkaloids 97
 crystallization 95
 dehydrogenative 94
 1,2-diamines 97
 epiquinamide 96
 imidazoline 93
 with indium 93
 (*S*)-levamisole 93
 N-benzotriazole 97
 NBoc imines 92, 95
 (-)-nutlin 101
 rosin-derived thiourea catalyst 96,
 97
 taurine 99
 thiourea-phosphonium salts 98
 trifluoromethyl ketimines 93
 tris(1,2-diphenylethylenediamine
 cobalt 92, 100
 vicinal diamines 95
 1-azaspiro 199
 azetidin-2-one 34
 azides 8
 azobisisobutyronitrile (AIBN) 214
- b**
 Ba(OH)₂ 68
 Baclofen 123
 base-induced elimination of nitrous acid
 166
 Baylis–Hillman procedure 268
 Baylis–Hillman structure 173
 Baylis–Hilman adducts 55, 162
 belactosin A 242, 252
 benzene derivatives
 acetophenones 159–160
 arylamines 161
 methyl benzoates 159–160
 nitrobenzenes 162–163
 polyfunctionalized phenols 161–162
 “Benz-Mo,” 7
 benzo- and naphtho-fused
 bicyclo[*n*.3.1]structures 204–205
 benzofurans 49
 1-benzyl-3-(5'-hydroxymethyl-2'-furyl)-
 indazole 175
 benzylic nitro compounds 2
 benzyl nitrite ester 2

- β -aminoacids 97
 β -amino- α ,nitro- β -(trifluoromethyl) 235
 β , γ -unsaturated α -keto esters 247
 β^3 -homoprolines 183
 β -ketoesters 265, 272
 β -nitroacrylates 169
 β -nitroakanol 229
 β -nitroalcohol 59, 209
 β -nitrocyclopropylphosphonic acid 243
 β -nitroester 265, 272
 β -nitro ketone 265
 β -nitro-*N*-tosylaldamine 94
 β -Nitrostyrenes 212
bicyclic- γ -lactam 27, 133
bicyclo[3.3.1]nonanes 157--159
bis-benzanellated 1,6-dioxaspiro
[4.5]decane structure 281
bis(sulfonamide)-diamine (BSDA) ligands
85
bisoxazoline ligand 90
bis(trimethylsilyl) peroxide (BTSP) 38
4,4'-bis-*t*-buthyldiphenyl disulphide 43
[(bisurea-salen)Co].OBz^F 86
[bmim][BF₄]/DBU 71
BmimNTf₂ 116, 117
[Bmim][PF₆] microemulsion 71
borane dimethyl sulphide 225
(-)-botryodiplodin 55
2-(2-bromoaryl)cyclopropa-1,1-
dicarboxylates 146
1-bromo-5-hexene 280
bromonitromethane 73, 74, 245, 247
bromonitromethane (BrCH₂NO₂) 244
2-bromo-3-oxo-1,4,6-triene steroids 240
^tBuOK 38
buthyllithium 212
butyrolactones ring 177, 178
- C**
- carbazoles 172
carbocycles synthesis
bicyclo[3.3.1]nonanes 157--159
2,4-dinitrocyclohexanols 157
tetrasubstituted cyclohexanols 157
CBB3001 249
C,C coupling nitroalkanes with
arylhaldes
arylation of nitroalkanes 144
Arylation of nitroalkanes in water 145
 α -arylation of secondary nitroalkanes
148
aryl nitromethanes 143
coupling reactions 142
original method 141, 142
synthesis of
of 3-alkyl-2-isoxazolines 146
aryl halides/triflates 144-147
of γ -lactams 147
1*H*-2,3-benzoxazine-3-oxide
(AAPOs) 146
trifluoromethylation of secondary
nitroalkanes 148
ceric ammonium nitrate (CAN) 31
cetyltrimethylammonium bromide
(CTABr) 68, 281
cetyltrimethylammonium chloride
(CTACl) 67, 114
cetyltrimethylammoniumhydroxide
(CTAOH) 68
CF₃-amino acid 246
CF₃-cyclopropanes 245
CF₃-peptide 246
chalcogran 277
chemoselective catalytic procedure
166
chemoselective nitration of alkyl halides
4
chiral bisoxoazolidine (CBOA) 25
chiral tris(1,2-diphenylethylenediamine
cobalt (III) trication 100
chiral 4,4,5-trisubstituted-textit-oxaza-
borolidine 225
cinchona alkaloid 100
cinchona alkaloid-derived-thiourea
catalyst 128
cis-configured trifluoromethyl
nitrocyclopropanes 249
conjugate addition of nitroalkanes
electron-poor alkenes (Michael
reaction) 107

- conjugated aza-alkenes 232
 conjugated enones 221, 277
 conjugated nitroalkenes 247
 aldehyde reductive nitromethylation
 10
 asymmetric Michael reaction 126
 nitroalkenes into nitroalkanes
 reduction of 8
 stereoselective reduction of 10
 copper thiophenecarboxylate
 (CuTC) 57
 Corey–Chaykovsky procedure 249
 Corey–Chaykovsky reaction 248
 crystallization-induced diastereoselective
 transformations (CIDT) 95
 CsNaX (alkaline)zeolite 72
 Cu(I)-bisoxazoline complex
 catalyst 252
 cyclic alkenes 187
 cyclic compounds
 aromatic rings
 benzene ring 171–173
 Furans 174–176
 isoxazoles 176
 pyrrole ring 176
 cyclopentenone ring 179, 181
 heterocyclic (non-aromatic) rings
 butyrolactones 177–178
 dihydropyranols 177
 pyrrolidines 178
 succinic anhydrides 178–179
 polyenes 180, 183, 184
 cyclohexane 4
 cyclohexanols 161
 cyclopentene derivatives 260
 cyclopentenenes 258
 cyclopentenone 270, 272
 cyclopentenone ring 179, 181
 (–)-cyclophellitol 51
 cyclopropanamine 242
 cyclopropanation 243
 cyclopropane 243
 cyclopropane α -amino acids 251
 cyclopropane ring expansion 257
 cyclopropylamine 250
- d**
Daucus carota root enzyme catalysis 70
 DBU [1,8-diazabicyclo(5.4.0)undec-7-ene]
 34
 denitrated tosylhydrazones 215
 denitration-deoxygenation 217
 denopamine 25
 deposition-precipitation (DP) method 22
 deuterium atoms 220
D-glucosamine monosaccharides 77
 2,7-dialkyl-1,6-dioxaspiro[4.4]nonanes
 278
 2,7-dialkyl-1,6-dioxaspiro[4.6]undecanes
 282
 diamine 121, 227
 1,2-diamines 97
 1,3-diamines 156
 diamino alcohols 108
 1,2-diaminocyclohexane 119
 diarylamines 161
 1,8-diazabicyclo [5.4.0]undec-7-ene
 (DBU) 45
 1,2-dibromoethylphosphonate 243
 1,2-dicarbonyl derivatives 263
 1,5-dicarbonyl derivatives 275
 dicarbonyls
 1,2-dicarbonyl derivatives 263–264
 1,5-dicarbonyl derivatives 275–276
 1,3-dicarbonyls 265–266
 1,4-dicarbonyls 266–274
 1,2-dicarbonyls 233, 264
 1,3-dicarbonyls 265
 1,4-dicarbonyls 266, 270
 dichloronitro ketones 212
 di-deuterated molecules 221
 1,4-dienes 231
 1,3-diene-tricarboxylates 180
 dienoic ester 114
 diethyl azodicarboxylate (DEAD) 253
 dihydrofurans 258, 260
 2,3-dihydrofurans 233
 dihydropyranols ring 177
 diimidazole 227
 diisopinocampheyl-chloroborane
 (DIP-CITM) 279

- 1,2-diketones 263
 1,3-diketones 265
 1,4-diketones 116, 266, 269, 271
 2,6-dimethylbenzoquinone (2,6-DMBQ)
 231
 dimethylchloromalonate 248
 dimethyldioxirane (DMD) 38
 2,5-dimethyl furan 174
 dimethyl sulfonium salt 248
 dimethyl-1,3,4,5-tetrahydropyrimidine
 (DMTHP) catalysis 244
 1,3-dinitroalkanes
 synthesis of
 asymmetric 152–154
 benzenes 159–160
 carbocycles 156
 1,3-diamines 156
 symmetric 154–156
 transformations 151
 dinitrocompound 227
 1,3-dinitro compounds 26, 128
 dinitrocyclohexanols 162, 163
 2,4-dinitrocyclohexanols 157
 dinuclear zing catalyst (DZC) 25
 1,3-diones 266
 1,4-diones 268, 270
 2,8-dioxabicyclo[3.2.1]octanes 205
 dioxaspiro[5,6]dodecane 283
 1,7-dioxaspiro[5.6]dodecanes 283–284
 1,6-dioxaspiro[4.4]nonanes 277–279
 1,6-dioxaspiro[4.5]skeleton 279–281
 1,6-dioxaspiro[4.5]undecanes 279
 1,6-dioxaspiro[4.6]undecanes 281–282
 1,7-dioxaspiro[5.5]undecanes 283–284
 dipeptidyl peptidase IV inhibitor 138
 diphenylprolinol silyl ether 124
 δ -ketoesters 275
 (-)- δ -multistriatin pheromone 133
 δ -nitroalkanol 168
 dyazo-substrate 251
- e**
 (*E*)-alkylidene-1,4-diketones 268
 (*E*)-allylidene-1,4-diones 268
 (*E*)-conjugated enediones 223
 electrochemical synthesis of
 1,3-dinitroalkanes 154
 electrogenerated base (EGB) 154
 electron-poor alkenes 183, 184
 enediones 166, 170
 (*E*)-enediones 223, 269
 (*E*)-2-ene-1,4-diones 224, 270
 (*E*)-7-methyl-1,6-dioxaspiro[4.5]decane
 279
 (*E*)-nitroalkenes 75
 enol-acetate 210
 enol acetates 187
 enol silyl ethers 187
 (–)-epibatidine 136
 epiquinamide 96
 ethyl (2-bromomethyl)acrylate 273
 ethyl glyoxalate 265
 exaltolide 190
exo-methylene butyrolactones 108, 273
exo-methylene lactones 273
 6-*exo-trig* intramolecular nitroaldol
 reaction 79
- f**
 fatty nitroalkanes 1, 2
 FeCl₃-piperidine 77
 Felkin-Anh model 79
 Fiedel-Crafts (F-C) process 55
 flavoproteins 43
 free methyl ketones 214
 from carboxylic acid derivatives 211
 functionalized 1,4-diketones 268
 functionalized ketones 214
 Furans ring 174, 175
 furoxans 235
- g**
 γ -keto α,β -unsaturated esters 274
 γ -ketoacids 272–274
 γ -ketoaldehydes 269, 274
 γ -ketodiester 273
 γ -ketoesters 272
 γ -lactams 51, 147, 183
 γ nitro alcohols 253
 γ nitroalkanol 223

γ nitroesters 272
 γ nitro ketones 121, 239
 γ rubromycin 281
 gold nanoparticles 21
 green solvents
 nitroaldol reaction
 in ionic liquids 70–72
 in water 67–70
 Grignard reagents 178, 196, 225–226
 guanidine 64, 65

h

Henry reaction 10, 59–101, 110, 123,
 131–132, 154, 156, 163, 170–171,
 175, 187, 199–201, 209–211, 216,
 218, 222–224, 235, 256–257,
 263–265, 270
 α -nitrocycloalkanones 200
 hexafluoro-2-propanol (HFIP) 20–21
 hexamethylphosphoramide (HMPA)
 214, 228–229, 248
 hexamethylphosphoric triamide (HMPT)
 221
 highly functionalized nitrocyclopropanes
 248
 HOF·CH₃CN complex 6, 8
 hormaomycin A 239
 hydrazine 21, 215
 4-hydroxyheptadecan-7-one 81, 82
 hydroxynitroalkane 283
 14-hydroxyoctadecan-8-one 81, 82
 hyperbranched polyamides 72

i

ibuprofen 56, 57
 imidazole 84, 152, 227
 imidazole-containing imidazolidinone
 catalyst 125
 imidazoline-tetrazole 117, 118
 indane derivatives 201
 indazole-3-carboxylic acid 175
 intramolecular Michael reaction 111,
 114
 IRA-402 nitrite 65, 112
 isolactone 131–132

ISOLUTE® Si-carbonate 62, 110–111
 isoxazoles 176–177, 233–234
 isoxazolines 145

j

Julia–Kocienski olefination 136

k

keto acid 192–194, 274
 ketodiester 273
 keto ester 192, 198
 9-keto esters 216
 ketoprofen 270
 ketoximes 7, 235

l

lactone 54–55, 108, 178, 202–204, 273
 lactonic systems 108
 lanthanum binaphthol complex
 (LBC) 24–25
 levoglucosenone 132
 “Lipase p” cyclization 191
 lithiumhexamethyldisiloxane
 (LiHMDS) 77
Lopinavir 86, 87
 lycoricidine 79, 82

m

macrolactones 202
 (\pm)-manzacidin 136, 138
 manzamine A 52, 53
m-chloroperbenzoic acid 34, 210
 Merrifield Resin-C₆H₄CH₂N₃
 P(MeNCH₂CH₂)₃N 110
 mesylates 4–5, 178
 metal catalysis
 nitroalkylation of
 allylic alcohols 13–15
 allylic esters 13
 of aryl halides 12–13
 two-carbon homologation of vinyl
 triflates and bromides 15, 16
 methyl benzoates 159
 2-methylcyclododecanone 49, 50

- 2-methyl-1,7-dioxaspiro[5.6]dodecane 283
- 2-methyl-1,6-dioxaspiro[4.5]decane 280
- methylene butyrolactones 109
- 2-methylheptadecane 218
- methyl Jasmonate 271–272
- 3-methylnitrobutane 219
- methyl 5-nitropentenoate 275
- methyl propiolate 133, 274
- 2-methyltetrahydrofuran (2-MeTHF) 210
- methyl tri- and tetra-carboxylates 166
- methyl vinyl ketone (MVK) 130, 192, 270, 280, 282
- Mg–Al hydrotalcite 62
- (MH2) nonionic bases 110
- Michael addition 9, 26, 77, 108–109, 111, 122, 124, 136, 151–152, 154, 159, 162, 165–166, 171, 174, 177–179, 181, 183, 192–193, 197–199, 202–203, 232, 234, 241, 245, 247–248, 270, 272–273, 277
- Michael reaction 108, 280
- α-nitrocycloalkanones 198
- asymmetric 117–129
- green solvents
- BmimNTf₂ 116, 117
 - 1,4-difunctionalized molecules 115
 - NaOH/CTACl system 115
 - substituted Δ¹-pyrrolines 116
- heterogeneous procedures
- α-nitro ketones 111
 - Amberlyst A27 110
 - dienoic ester 114
 - haloderivatives 112, 114
 - Isolute® 110
 - PPI 111
 - PS-BEMP 111
- homogeneous procedures
- α,β-unsaturated nitriles 109
 - diamino alcohols 108
 - methylenebutyrolactones 109
- synthesis of
- bicyclic-γ-lactam proteins 133
 - (–)-δ-multistriatin pheromone 133
 - dipeptidyl peptidase IV inhibitor 138
 - (–)-Epibatidine 136
 - isolactone 131
 - (±)-Manzacidin 136, 138
 - (±)-Norsalanadione 130
 - paroxetine 133, 134
 - (R)-Patulolide 133
 - taxol 130, 131
 - trachelanthamidin 131, 132
 - trandolapril 135, 136
- microwaves (MW) 22, 61, 74, 75, 263–264
- monodeuterated nitro ketone 220
- mono-protected 1,3-diketones 265
- monoprotected 1,4-dione 266
- Morita–Baylis–Hillman acetate (MBH) 233
- (±)-muscone 228
- n**
- NaBH₄/SiO₂ reduction of nitroalkenes 9
- N*-acetylimidazole 283
- NaCNBH₃ reduction 10
- N*-acylimidazole 211
- N*-alkyl maleimides 245
- naphthyl derivatives 172–173
- NAPI (*N*-acetoxyphtalimide) catalysis 11
- N*-benzylmaleimide 244
- 1,*n*-dicarbonyls 264
- Nef reaction 280
- basic silica gel 45
 - (–)-Botryodiplodin 55
 - DBU 45–46
 - ibuprofen 56, 57
 - KH/Me₃SiCl 48
 - lactone 54
 - NaNO₂/AcOH 46–47
 - NaNO₂ methods 55
 - original 31
 - oxidative conditions
 - BTSP 38
 - by CAN 31–32
 - Cu(OAc)₂ 38, 39

- DMD 38
 Fe-HCl 39
 IL/SPB 40
 KMnO₄ 34–35, 36
 KMnO₄ oxidative conditions 40–41
 KOH/KMnO₄-MgSO₄ 33, 34
 MCPA 34, 35
 NaH/KMnO₄ 32, 33
 Oxone[®] 37
 via ozonolysis 31
 sodium percarbonate 35
 TPAP/NMO/MS 36, 37
 oxidative methods 51
 reductive conditions
 flavoproteins 43
 PMe₃/additive 43–44
 TiCl₃-NH₄OAc 42
 VCl₂ 42–43
 reductive methods
 algicidal cyclopentenone 54
 manzamine A 52, 53
 pyrenophorin 53
 SiO₂-TBD 48, 49
 solvolytic methods 49
 terpenesolanone 54, 55
 Nef transformation 34, 53, 55, 97–98,
 131, 268, 274
 NHPI (*N*-hydroxyphthalimide) 11
 Ni/Al-SBA-15 22
 nitroacetate 51, 54, 133, 176, 253
 nitroacetone 230–231
 2-nitro acetophenones 225
 nitroalcohols 25, 61, 64, 70–73, 81, 86,
 88, 116, 154, 196, 200, 210,
 216–218, 246
 nitroaldol condensation
 (+)-acoradiene 79, 81
 Al₂O₃ in ScCO₂ 73
 α -cedrene 79, 80
 A-ring of taxane diterpene 77
 BrCH₂NO₂ under SmI catalysis 79, 80
 BrCH₂NO₂ under SmI₂ catalysis 74
 bromonitromethane 73, 74
 D-glucosamine monosaccharides 78
 (*E*)-nitroalkenes 75
 (*E*)-9-nitrooleic acid 78
 FeCl₃-piperidine 77
 FUD-ED catalysis 76
 4-hydroxyheptadecan-7-one 81, 82
 14-hydroxyoctadecan-8-one 81, 82
 hyperbranched polyamides 73
 lycoricidine 79, 82
 microwaves (MW) 74, 75
 NH₄OH/AcOH 74, 75
 nitroaldol reaction vs 72
 nitroaldol reaction vs. 72
 9-nitrooleic acid 79
 radicaldenitration-cyclization 79
 SG-MNP-NH₂ 74
 Stryker's reagent 78
 Swinholide A 81, 82
 nitroaldol reaction 24–26, 59, 60–61,
 63–64, 66–75, 78–79, 81–86, 88,
 90–91, 131, 136, 159, 170–171, 201,
 210, 216, 219, 256, 281
 nitroaldol (Henry) reaction 10
 asymmetric 83
 aza-Henry reaction 91–101
 β -nitro alcohols 59, 60
 carbon-carbon bond 59
 green solvents 67
 heterogeneous catalysts and promoters
 Amberlyst A21 60–61
 Et₃N/SiO₂ 64
 Et₃N/SiO₂ 66
 Fe₃O₄ NPs 66
 Guanidine 65
 ISOLUTE[®] Si-carbonate 63
 K₂CO₃ 65
 KOH 62
 Mg-Al hydrotalcite 62
 nitromethane 62
 N,N-Diethylpropylamine 62
 PS-DMAP 64
 SiO₂/MW 61
 nitroaldol condensation 72
 nitroalkanes 209, 265, 266, 271, 281
 of alkanes 11
 alkyl halides displacement
 aryl nitromethane 2

- nitroalkanes (*contd.*)
- benzylic nitro compounds 2
 - chemoselective 4
 - fatty nitroalkanes 1–2
 - halides under PEG solvent 4
 - halides with silver nitrite 3
 - sodium nitrite in polyethylene glycol 4
- to amines
- heteroaromatic structures 22, 23
 - historical procedures for 20
 - via Michael reaction 26–28
 - via nitroaldol reaction 24–26
 - procedures for 21
- conjugated 8–11
- mesylates 4–5
- metal-catalyzed alkylation/arylation 11–16
- oxidation of
- azides 8
 - oximes 7–8
 - primary amines 5–7
- tosylates 4–5
- nitroalkanols 10, 25, 59, 61–62, 70–72, 74, 79, 81, 85, 90, 131, 136, 175, 200, 210, 219, 221, 224–226, 256, 263–265, 270, 281
- nitroalkenes 8–13, 55, 59–61, 72–75, 77, 79, 81, 126–129, 151–155, 198–199, 201, 212–213, 215–217, 229, 239, 247–250, 255, 264–265, 268, 272, 275, 281, 283, xvii
- nitrocarboxylic acid 243
- nitro compound 2, 6–7, 15, 20–22, 26–27, 31, 36, 42, 45, 176, 193, 233, 239, 250, xvii
- 2-nitrocycloalkanones 200, 268
- 2-nitrocyclododecanone 200
- 1-nitrocyclododecene 49
- nitrocyclohexanols 282
- nitrocyclohexanone 201, 281
- 2-nitrocyclopentadecanone 228
- 2-nitrocyclopentanone 280
- nitrocyclopropane carboxylates 251
- 1-nitrocyclopropanecarboxylates 250
- nitrocyclopropanes
- from alkenes 250–253
 - from bromine derivatives 239
 - from conjugate nitroalkenes 247–250
 - cyclopropane ring expansion 257–261
 - from γ -nitro alcohols 253–256
 - Henry reaction 256–257
 - Hormaomycin A 239–247
 - synthetic applications 239
- nitrodiazo compounds 250
- nitro-dicarbonyl 277
- nitrodiesters 182
- nitro diketones 270
- nitro-diols 170, 223, 270, 277, 280
- nitrodiones 223
- nitro ester 27, 54, 180, 210, 245, 272
- nitro-functionalized cyclopropanes 239
- 1-nitrohexane 222
- nitro ketal 174
- nitro ketone 131, 187, 189–190, 195, 197, 200, 209–210, 212–220, 214, 222, 227, 230, 231, 266, 268, 282
- 2-nitro ketones 211
- nitro-Mannich 91, 100–101, 235
- nitromethane 10, 12–13, 15, 25, 27, 51, 54, 59, 62–63, 70–72, 81, 84, 88–89, 91, 96, 120, 122, 124, 130–132, 134, 143, 154, 240, 243, 255, 263, 277, 278, 281
- nitronate anion 31, 34, 59, 107, 230, 233
- nitroolefins 248–249
- 9-nitrooleic acid 79
- 1-nitropentane 218
- 1-nitropent-4-ene 267
- nitro sugars 79
- nitrous acid elimination 163, 165–185, 171, 204, 232, 264, 270
- N*-methyl piperidine (NMP) 121
- N,N*-diethylpropylamine 62
- N,N,N,N'*-tetramethylethylenediamine 36
- nonsteroidal anti-inflammatory drug (NSAID) 57
- non-symmetric bis-pyrrolidine (NSBP) 55

- (±)-norsalanadione 130
 novel HIV-1 protease inhibitors
 256–257
 1,3-butadienes 181
 (-)-nutlin 101
- O**
- octylviologen 227–228
 octylviologen/ $\text{Na}_2\text{S}_2\text{O}_6/\text{K}_2\text{CO}_3$ 228
 olefins 8, 212
 oleic aldehyde 218
 ω-nitro ester 216
 one-pot diarylation of nitromethane 143
 one-pot formation of imines 22
 one-pot synthesis
 of benzofurans 50
 benzoyl derivatives 160
 of bis-bicyclic compounds 158, 159
 1,4-difunctionalized structures 115,
 116
 of indoles 49, 50
 orcinol 160
 of (*R*)-2-methylcyclododecanone 49,
 50
 O-protonation 2
 optical active cyclopropyl β-amino acids
 247
 optically active nitro diols 279
 orcinol 160
 oxidative cleavage of
 α-nitrocycloalkanes
 α,ω-dicarboxylic acids 193–194
 α,ω-dicarboxylic acids dialkyl esters
 195
 α,ω-dicarboxylic acids monomethyl
 esters 195–196
 Methyl ω,ω-Dihalo-ω-nitroalkanoates
 196
 oxidative Nef reaction
 (-)-Cyclophellitol 51
 γ-lactams 51, 52
 sarkomycin 51, 52
 2-oxoaldehydes 263
 4-oxoalkanoic esters 272
 9-oxodecanoate 192
- Oxone® 37, 195–196
 9-oxo-tridecenoate 216
 ozonization 5
- P**
- paroxetine 133–134
 Patulolide B 193
 pentacyclic polyfunctionalized alkenes
 261
 1-penten-3-one 277
 peroxytrifluoroacetic acid 7
 phase-transfer reaction (PTR) 241
 phenols 161–163
 phenylethanolamine *N*-methyltransferase
 128
 phenylnitromethane 270
 phenylselenyl acetaldehyde 210–211
 phenylthio group 221
 phoracantholide 197
 piperidine system 25, 26
p-methylnitrostyrene 26
 polycyclic aromatic structure 55–56
 poly(propyleneimide) (PPI) dendrimers
 111
 polyenes 180–185
 polyethylenimine (PEI) derivatives 63
 polyfunctionalized nitrocyclopentanes
 257
 polyfunctionalized nitrocyclopropanes
 247, 248
 polymer supported DMAP (PS-DMAP)
 64
 potassium *t*-butoxide 211
 pregabalin 124–125
 primary amines 5–6, 8, 19, 51, 119–121
 P(RNCH_2CH_2)₃N[15] 110
 prolinol-based catalysts 124
 protected ketone 214
 pyrenophorin 53–54
 pyrido[1,2-*a*[-pyrimidin-4-ones]] 257
 pyrrole ring 176
 pyrrolidine ring 178
 pyrrolidinones 27, 133
 5-pyrrolidin-2-yltetrazole 118

q

- quinine-based bifunctional squaramide 247
2-quinolinecarboxaldehyde 170

r

- racemic 2-ethyl-1,6-dioxaspiro[4.4]nonane 277
(*R*)-(+)- α -lipoic acid 197
 R^2 -alkylated α -nitro ketones 228
(3*R*,3*aS*,6*aR*)-hexahydrofuro[2,3-*b*]furan-3-yl (4-nitrophenyl) carbonate 256
(*R*)-(+)- δ -hexadecanolide 275
redox-neutral [3+2] cycloaddition 257
retro-Claisen reaction 280
retro-Nef reaction 7
(*R*)-(+)- γ -caprolactone 272
Rhodium(II) acetate 250
Ritonavir 86, 87
rolipram 27, 124
rosin-derivedthiourea catalyst 96, 97
(*R*)-phenylephrine 84
(*R*)-ptulolide 133
RuCl(*S,S*)-*N*-(*p*-toluenesulfonyl)-1,2-diphenylethylene diamine 225

s

- (*S*)- and (*R*)-baclofen 122
sarkomycin 51–52
sesquiterpene “cuparene,” 270
silica-alumina-supported tertiary amines 111
silyl enol ethers 212–213
silyl nitronates 19, 31, 34, 127, 145–146, 154
(*S*)-levamisole 93
(*S*)-miconazole 83
(*S*)-moprolol 88
(*S*)-nitroalcohol 83
(*S*)-nitroalkanols 90
(*S*)-*N*-*trans*-feruloyl 84, 85
sodium carboxylates 251–252
sodium dithionite 214
solvent-free Henry reaction 222

- spiro[4.5]decane 280
spiro[5.6]dodecanes 283
spiroketal (*E*) 280
spiroketals
 1,7-dioxaspiro[5.6]dodecanes 283–284
 1,6-dioxaspiro[4.4]nonanes 277–279
 1,6-dioxaspiro[4.5]undecanes 279–281
 1,6-dioxaspiro[4.6]undecanes 281–282
 1,7-dioxaspiro[5.5]undecanes 283–284
 most common 278
 representative examples 278
spiro[4.6]undecanes 282
spiro[5.5]undecanes 283
(*S*)-propanolol 24, 88
(2*S*,5*R*)-2-methylaminomethyl-1-methyl-5-phenylpyrrolidine 89
(*S*)-toliprolol 88
Stryker's reagent 77–8
5-styrylisoxazoles 122
succinic anhydrides ring 178–180
sulfonyl ylide-mediated trifluoromethylation reaction 249
swinholid A 81–83
symmetrical 1,4,7-triketones 267
symmetric 2,7-dialkyl-1,6-dioxaspiro[4.4]nonanes 278–279

t

- taurine 99
taxol 130–131
t-butyl 2,3-diobromopropanoate 241
t-butylhydroperoxide (*t*-BuOOH) 212
terephthaloylbis (methylamine) dihydrochloride 227
terephthaloyl chloride 227
terpene isosolanone 54, 55
tert-butyl hydroperoxide (TBHP) 6
2-*tert*-butylimino-2-diethylamino-1,3-dimethylperhydro-1,3,2-diazaphosphorine 111
tertiary β -nitro alcohols 225

- tetrahexylammonium bromine (THBA) 241
 tetrahydrofurans 168–169, 183
 2,3,4-tetrahydroisoquinoline 130
 tetrahydropyrans 126
 1,1,3,3-tetramethyl guanidine (TMG) 70
 tetramethyl guanidine (TMG) 52, 75, 77, 131–132, 170
 tetra-*n*-butylammonium hydrogen sulphate (TBAHS) 34
 tetranitromethane 187, 213
 tetrapropylammonium perruthenate (TPAP) 36–37
 tetrasubstituted benzenes 173–174
 tetrasubstituted cyclohexanols 157
 tetrasubstituted furans 233
 thiourea derivative 26–27, 127, 198
 tiletamine 205–206
 TMG lactate [(TMG)(Lac)] 70
 tosylates 4–5
 tosylazoalkenes 221
 tosylhydrazones 214–215, 217–222
 trachelanthamidin 131–132
 trandolapril 135, 136
 3-(*trans*-2-aminocyclopropyl) alanine (AcP) 242, 252
 4-*trans*-amino-proline 118, 119
trans-configured nitrocyclopropane 256
trans-nitroalcohols 226
trans-nitrocyclopropanes 257
 3-(*trans*-2-nitrocyclopropyl) alanine (NcP)Ala 252, 255
trans-2-(trifluoromethyl)cyclopropan-amine 242
 trialkylphosphine 43
 trialkyl pyrazines 228
 trialkylsilyl chloride 34
 trialkyl-substituted pyrazines 228
 1,5,7-triazabicyclo[4.4.0]dec-5-ene (TBD) 48
 tributyl tin hydride (Bu₃SnH) 214
 trichloronitromethane 211
 tridecanal 219
 tridentate bis(oxazoline) 127
 tridentate bis(oxazoline) (TBO) 26, 127, 152
 tri-deuterated structures 221
 trifluoroacetate [(TMG)(F₃Ac)] 70
 trifluoroacetic acid (TFA) 100, 138
 trifluoroacetic anhydride (TFAA) 7, 187
 2,4,5-trifluorocinnamic aldehyde 138
 trifluoromethyl aldimines 235
 trifluoromethylated nitrocyclopropanes 245
 trifluoromethylation of secondary nitroalkanes 147–148
 trifluoromethylcrotonate 245
 trimethyl phosphine (PMe₃) 43–44
 trimethyl *trans*-aconitate 166
 triphenylsilyl ether derivative 124
 tris(dibenzylideneacetone)dipalladium 12
 trisubstituted β-nitro alcohols 225
 trisubstituted cyclopropanes 243
 trisubstituted isoxazoles 233–234
 trovafloxacin 244, 245
 Tsuji-Trost allylation 230
- U**
- unactivated nitroalkenes 13
 unsaturated nitro ketones 268
 unsymmetrically 1,6-dienes 231
 urea-hydrogen peroxide complex (UHP) 7
- V**
- Victor-Meyer procedure 1–2
 volatile organic solvent (VOS) 40
- W**
- Wacker method 268
 Wacker-type oxidation 280
- Z**
- Zip reactions 200
 bicyclic hemiketals 203, 204
 macrolactones 202
 12-Oxotetradecan-14-lactam 202–203

(*Z*)-heneicos-6-en-11-one 216, 217
(*Z*)-jasmone 271
Zr(O-*t*-Bu) 4, 6–7

(*Z*)-9-tricosene 218
(*Z*)-5-Undecen-2-one 215