

Index

A

Abudinol, 213
Acetylacetone, to nitrostyrene, 12
O-Acyl azlactones, 250
Acyl transfer, catalyzed asymmetric, 236
Acyase, artificial, 261
Acylation, 233
1,2-Addition, 323
Alcohol catalysts, 273
sec-Alcohols, kinetic resolution, 235
Aldehydes, 29
 α -aminations, 61
 asymmetric conjugate addition, 167
 cyanosilylation, 136
 α -halogenations, 58
 α -oxygenations, 62
Aldol reactions, 41
Aldolase enzymes, 31
N-Alkylimidazole-based catalysts, 259
Alpha-functionalization, 29
tert-Amine catalysts, 241
Amines, 29
 primary, 325
Amino acid esters, enantio-enriched
 N-protected, 5
Aminocatalysis, 281
Ammonium ketones, 205
Anions, chiral, amines as catalysts, 330
Asymmetric catalysis, 395
Asymmetric desymmetrisation (ASD),
 233, 237
Asymmetric epoxidation, 201
Asymmetric organocatalysis, 145
Azadecalinones, 433
Azadiene Diels-Alder reaction, 116
Aza-ene-type reaction, 418
Aza-Henry reaction, 419
Aziridines, 436
 ring opening, 133

Aziridinylaldehyde, 109
Aziridomitosane, 261
Azlactones, alcoholytic DKR, 5
 dynamic kinetic resolution (DKR), 5
Azodicarboxylate esters, 60

B

Baclofen, 246, 269
Benzaldehyde lyase (BAL), 85
Benzhydrylium ions, 34
Benzoin, 77
 reaction, 81, 83
Benzopyranone, 137
Benzotetramizole, 258
Benzoylformate decarboxylase (BFD), 85
Benzylidenecyclobutane oxide, 221
Bicyclo[3.2.1]octan-3-ones, 206
Bicycloenediones, 104
Bifunctional catalyst, 145
Binaphthylazepinium-based iminium
 salts, 226
Binaphthyl-based ketones, C2-symmetric, 202
Binaphthyl-derived amine, chiral, 195
BINOL (1,1'-bi-2-naphthol), 5, 395
Biphenylazepinium-based iminium salts, 227
1,3-Bis(cyclohexyl)-imidazol-2-ylidene, 126
Brønsted acids, 3
 catalysis (BBA), 5
 strong chiral, 395
Brønsted base, 3, 145
 catalysts, 194
 γ -Butyrolactones, 118
 NHC promoted synthesis, 130

C

C–C bond formation, Michael-addition, 12
Callipeltoside C, 50

- Carbenes, 77, 79
Carbocation-based catalysts, 372
Carbocyclic ketones, 219
Carbohydrate-based ketones, 207
Carbonyl activation, nucleophilic attack, 2
Carbonyl compounds, 1,3-dienes,
hetero-Diels–Alder (HDA), 15
O-Carboxyloxazlactone, 247
Carboxylic acids, chiral, 450
Catalysis, nucleophilic, 77, 132
Catalysts, design, 81
primary amines, 325
secondary amines, 286
Catalytic solvents, 1
Chiral scaffold, 145
 α -Chloroesters, 114
Cinchona alkaloids, 145, 147, 265
asymmetric transformations, 149
derived amines, 44
Conjugate additions, 54, 188, 281, 295, 328
asymmetric, 173
Cross-benzoin reaction, 84
Cupreidine, 157
Cupreine, 157
Cycloaddition, 281, 286
[3+2]Cycloaddition, 326
[4+2]Cycloaddition, 325
Cyclohexadienones, desymmetrization, 99
Cyclohexane-diamine, 145
catalysts, chiral, 172
Cyclohexylamines, 432
Cyclopentenones, 120
- D**
Danishefsky's diene, benzaldehyde, 22
DFT, 1
(4-Dialkylamino)pyridine-based catalysts, 243
1,3-Diamines, 38
1,2-Di(*tert*-amine)-based catalysts, 263
Diazo substrates, asymmetric conjugate
addition, 155
Diazonamide A, 249
Dicarboxylic acids, 395
Dichloroaldehydes, 115
Diels–Alder reactions, asymmetric, 193
Dihydroimidazole-based catalysts, 256
Dihydroisoquinoline, 224
based iminium salts, 224
Dihydrojasmone, 105
Dihydropyridine, 425, 430
Dihydroquinine (DHQ), 151, 155
1,3-Diketones, desymmetrization, 123
2,2-Dimethyl-6-cyanochromene, 226
- 4-Dimethylaminopyridine (4-DMAP), 238
N,N-Dimethylvinylamine, 30
Dioxiranes, 202
Domino conjugate addition-halogenation, 64
Domino imine aldol-conjugate addition, 64
Domino *O*-nitroso aldol-conjugate addition, 63
Domino processes, 62
Dynamic kinetic resolution (DKR), 5
- E**
Enals, asymmetric conjugate addition, 149
Enamines, catalytic formation, 31
catalysis, 29, 31
synthesis of complex molecules, 62
intermediates, 309
Enaminones, 34
Enecarbamates, 434
Enones, asymmetric conjugate addition,
149, 167
Episulfonium ion precursors, 437
Epothilone A, 245
Epoxidations, asymmetric, 201
chiral ketone-catalyzed, 202
Epoxides, 327
Esterification, 233
- F**
FD-838, 108
Fluorinated alcohols, 15
Formylcyclopropanes, 113
Friedel–Crafts reaction, 404
Fumagillol, 67
- G**
Gelsemine, 249
Glabrescol, 213
Guanidine, 145
catalysts, chiral, 185
- H**
Hajos–Parrish–Eder–Sauer–Wiechert process,
31, 43
Halogenations, 57
Haloperidol, 107
Hartree–Fock, 3
Hetero-Diels–Alder reaction, TADDOL-
promoted enantioselective, 22
Hexafluoro-2-propanol (HFIP), 15
Hirsutic acid C, 106
Hydrazones, 420

- Hydrobenzofuranones, 99
Hydrogen bonds, 1
 activation of reactants by polarization, 4
 catalytic functions, 4
 networks, activation of hydrogen peroxide, 15
 organocatalytic transition states, 3
 spatial arrangement of reactants, 4
 stabilization of charges of transition states, 5
Hydrogen peroxide, 15
Hydrophosphonylation, 421
2-Hydroxy-4-methoxybenzaldehyde, 89
- I**
Imidazoles, 89
Imidazolidinones, 57
 catalysts, 41
Imidazolone-based catalysts, 272
3-(1-Imidazolyl)-(S)-alanine, 260
Imines, 404
 asymmetric conjugate addition, 152, 170
Iminium ion, 281
 catalysis, 283
Iminium salts, acyclic, 228
 catalyzed epoxidations, chiral, 223
 chiral, 201
Iminol–amide, 9
Indolines, 248
Ionic liquids, 379
Isatin, ketone nucleophiles, 31
Isobutyraldehyde-2-d, amino acid-catalyzed dedeuteration, 38
 β -Isocupreidine (β -ICPD), 157
cis-Jasmone, 105
N,O-Ketene acetals, 30
 α -Ketoesters, asymmetric conjugate addition, 161
- K**
Ketone-catalyzed epoxidations, chiral, 202
Ketones, 29
 α -aminations, 61
 chiral, 201
 cyanosilylation, 136
 α -halogenations, 59
 α -oxygenations, 62
Kinetic resolution, 233
- L**
Lewis acid catalysis, 397
Low barrier hydrogen bond (LBHB), 5
- M**
Mannich additions, asymmetric, 180
Mannich-type reactions, 50
Metallophosphites, 102
- N**
Nakorone, 213
NHC, 77
Nicotinamide adenine dinucleotide (NADH), 410
Nigellamine, 212
Nitriles, asymmetric conjugate addition, 160
Nitroalkenes, asymmetric conjugate addition, 157
Nitroolefins, 12
 asymmetric conjugate addition, 164
Nitroso aldol reaction, 38
Nucleophilic catalysis, 233
- O**
Olefin epoxidation, 15
Organocatalysis, 1, 29, 77, 281
 tertiary-amine based, 12
Oxaziridium salts, 202, 223
Oxindole-based alkaloids, 249
Oxodiene Diels–Alder reaction, 117
Oxyanion hole, 1
Oxygenations, 57
- P**
Panepophenantrin, 67
Paracyclophane-derived imine, chiral, 195
Pempidine, 266
4-Phenyl-1,2-dihydronaphthalene, epoxidation, 228
2-Phosphabicyclo[3.3.0]octane (PBO), 239
Phosphine catalysts, 237
Phospholane-based systems, 238
Phosphonate esters, NHC catalyzed transesterification, 127
Phosphonium cation-based catalysts, 368
Phosphoric acids, 395
 chiral, 399
Pictet–Spengler reactions, 408
Piperidine-based catalysts, 273
Platensimycin, 108
Polyoxamic acid, 66
Prelactone B, 66
Proline-catalyzed aldol reactions, 2
Prolinethioamide-catalyzed aldol reaction, 39
Pseudo-ephedrine, 11

Pseudo-Lewis acids, 2
2-Pyrones, cycloaddition reactions, 162
Pyrroles, 34
 based catalysts, 242
Pyrrolidine, 33
4-(Pyrrolidino)pyridine (4-PPY), 243

Q

Quinine/quinidine-based catalysts

R

Redox reactions, 77, 109
Ring opening polymerization, 130
Room temperature ionic liquids (RTIL), 379
Roseophilin, 107
trans-Sabinene hydrate, 105

S

Sappanone B, 89
Serine hydrolases, 5
Silicon-based catalysts, hypervalent, 356
Silyl cation-based catalysts, 351
Silyl enol ethers, 139
Steglich rearrangement, 249
Stetter reactions, 77, 90
 intermolecular, 101
 intramolecular, 92
Strecker reactions, 421
Styrenes, epoxidation, 217
Sulfonamide-based catalysts, 273

Sulfones, asymmetric conjugate
 addition, 157
Sulfonic acids, chiral, 453

T

Tanikolide, 150
Tetrahydro- β -carbolines, 408
Thiamin diphosphate (ThDP), 85
Thiazolylidene carbene, 110
Thiourea catalysis, bifunctional, 1
Thioureas, chiral, bifunctionality, 12
 Cinchona alkaloid-derived, 163
 oxyanion holes, 5
N-Tosyl- β -aminoester, 109
Transesterifications, 77, 125
 NHC catalyzed, 126
Triazolinylidene carbene, 124
Tributylphosphine, 238
Trichloroacetimidates, 437
Trifluoromethyl-*sec*-alcohol-based
 catalysts, 273
N-Triflyl phosphoramides, 395, 441
 BINOL-derived, 442
3-(2,2-Triphenyl-1-acetoxyethyl)-4-
 dimethylamino)pyridine
 (TADMAP), 249

U

Umpolung, 77
Urethane-protected α -amino acid *N*-carboxy
 anhydrides (UNCAs), 267