

Index

a

- N*-acyloxazolidinones 23
- acyl pyridinium salts
 - enolate addition 270
 - hydride reducing agents 266
 - metal nucleophiles including Grignard reagents 269
 - reduction 267
- Alcaligenes eutrophus* 281
- alkaloids
 - *Amaryllidaceae* 308, 309
 - C-20 terpenoid 349
 - diterpenoid 350
 - erythrina 372, 373
 - montanine 307
 - morphine 309
 - (semi)synthesis of furoquinoline 311
- alkoxycarbonyl pyridinium salts
 - cyanide addition 264
 - hydride nucleophiles reduction 254
 - isoquinolinium salts 265
 - enolates 261
 - Grignard reagent 255
 - alkenyl groups 260
 - quinolinium salts 265
 - regioselective reduction 254
- 2-alkoxycarbonylquinolines 85
- alkylative dearomatization
 - indoles with chiral Ni catalyst 382, 383
 - of phenols and naphthols 382, 383
- α -alkylidene- γ -butyrolactones 122
- 2-alkylindolines 75
- 2-alkyl- or 3-methylbenzofurans 78
- alkyl pyridinium salts
 - borohydride reduction 248
 - carbon nucleophiles 252
 - cyanide addition 252
 - nucleophilic addition of Grignard reagents 251
 - preparation 248
 - reduction with $\text{Na}_2\text{S}_2\text{O}_4$ 249
 - sodium hydrogen telluride 250
- 2-alkylquinolines 80, 84, 94
- 2-alkylquinoxalines 90
- 2-alkyl tetrahydroquinolines 38
- alkynyl arenes 108
- C-3 allylation 208, 209, 211
- η^1 -allenyl-palladium(II) complexes 221
- allyl indium 261
- N*-allylindoles 208
- aluminum amalgam 112
- 2,3-aminoquinolines 45
- ammonium iodide 147
- anticancer agents 33
- (–)-Angustureine 35
- arene cis-dihydroxylation, dearomatizing
 - accessing enantiomeric series 326
 - availability 300
 - benzoic acid substrates 297
 - biaryl substrates 294
 - bicyclic carbocyclic substrates 300
 - early development 280
 - mono- and bicyclic heterocycle substrates 298, 300
 - monocyclic substituted benzene substrates 299
 - naphthalene substrates 296
 - production process 328
 - substrate scope 324
 - tricyclic substrates 300
 - types 281
- arenes
 - dearomatization process 69
 - distribution 1

- enzymatic dihydroxylative dearomatization of 348
 - representative 2
 - stereoselective hydrogenation 69
 - synthetic chemistry 2
 - aromatic C-H functionalization 230
 - aromatic compounds 7, 108, 127, 129, 148, 226, 347, 360, 367
 - chemistry 1
 - vs. dearomatization reactions 2
 - discovery of 1–3
 - electron-enriched 369
 - polycyclic 71, 175
 - resonance energies 70
 - substitution reaction 1
 - aromatic rings 229
 - aromaticity 2
 - 2-arylbenzofurans 78
 - 2-aryl π -allyl-palladium(II) 217
 - 2-aryl tetrahydroquinolines 39
 - 2-aryl-3-(trifluoromethyl)tetrahydroquinolines 44
 - asymmetric 1,6-dienyne cyclized reaction 122
 - asymmetric cascade dearomatization
 - 3-nitroindoles 387, 388
 - substituted indoles 387
 - asymmetric dearomatization
 - β -naphthols 384
 - naphthols and phenol 386
 - asymmetric dearomatization of indoles
 - Cu-catalyzed 384
 - Mg-catalyzed cascade 387
 - Mg-catalyzed intermolecular cascade 385, 386
 - by Pd-catalyzed cycloaddition reaction 385, 386
 - asymmetric Diels–Alder reaction 103
 - asymmetric Heck reactions 106
 - asymmetric Michael reaction
 - aza- 112
 - cascade catalysis 113
 - C-C bond forming reaction 108
 - 2,5-cyclohexadienone 108
 - enantioselective 108
 - intramolecular oxo-Michael reaction 109
 - asymmetric relay catalysis (ARC) 62
 - Au-catalyzed asymmetric dearomatization
 - 1-aminonaphthalene 380, 381
 - benzene ring 380
 - cascade of indoles 379, 380
 - gold-catalyzed [2+2]-cycloaddition between indoles and allenamides 381, 382
 - Rautenstrauch rearrangement 381, 382
 - aza-Friedel–Crafts alkylation 45, 46, 56, 183, 191
 - aza-Michael reaction 112, 195, 196
 - azaphilones 133
- b**
- barium alginate beads 328
 - batzelladine 366
 - 5,10b-dihydroindolo[2,3-b]indoles 241
 - benzene
 - carbon atom rings 2
 - history 1
 - structure of 2
 - benzodiazepines
 - anticancer agent 33
 - psychotherapeutic agent 33
 - benzodiazepinones
 - anticancer agents 33
 - psychotherapeutic agent 33
 - benzofurans 77, 78
 - N*-benzoyliminopyridinium ylide 272
 - B9 expresses benzoate dioxygenase (BZDO) 281
 - biaryl coupling reactions 229
 - biaryl cross-coupling reactions 229
 - BINOL-derived phosphoric acid 203
 - BINOL-phosphoric acid 46, 47
 - biocatalytic asymmetric dearomatization
 - advantage 279
 - arene oxides 328
 - arene reduction 330
 - 2,2'-bipyridyl ligands 321
 - Birch reaction 3
 - bisthiourea 165
 - N*-Boc-indolines 73
 - N*-Boc-pyrroles 74
 - 1-bromo-3-chloro-5,5-dimethylhydantoin (BCDMH) 85
 - Brønsted acid 197
 - Büchner reactions
 - early investigations 154
 - Naphthyl and Diaryl Systems 155
 - Bchner ring expansion reaction 2, 3
 - (*R*)-*N*-*tert*-butanesulfinamide 371
 - tert*-Butoxycarbonyl (Boc) 73
- c**
- Calone 1951[®] 321
 - D-camphor-derived NHC (CamphNHC) 119, 120
 - camphor sulfonic acid (CSA) 75, 130
 - carba- β -(L)-fructopyranose 304
 - carbazole 240
 - carbon-carbon bond formation 231

- cascade reactions
 - 1,4 addition/elimination 191, 194
 - chiral tetracyclic compounds 188
 - chlorocyclization of benzamides 191, 192
 - chlorocyclization of indoles 189, 192
 - cycloaddition of 2, 3-disubstituted indoles 188
 - Diels – Alder/cyclization 166
 - Diels – Alder/elimination/conjugate addition 166
 - enantioenriched piperidines 191, 192
 - fluorocyclization reactions 188, 189
 - (-)-hyperibone K, total synthesis 187
 - 3-indolyl enone 190
 - Michael addition/Mannich cyclization 167
 - proposed mechanism 193
 - pyridinium salt generation 191
 - tricyclic substrates formation 189, 191
 - tryptamines 188, 190
- catalytic asymmetric dearomatization (CADA) 7, 103, 175, 185, 379
- catalytic asymmetric hydrogenation
 - carbocyclic arenes 95
 - – benzo-fused heteroarenes 96
 - – naphthalenes 97
 - 5-membered heteroarenes 70
 - – azoles 73
 - – indoles 71, 77
 - 6-membered heteroarenes 79
 - – azines 80
 - – benzo-fused azines 82–94
 - – miscellaneous 92
 - – quinoxalines with reducing agents than H₂ 94
 - oxygen-containing heteroarenes 77
 - sulfur-containing heteroarenes 79
- catalytic C-C bond-forming reactions 229
- cationic *rac*-arene manganese tricarbonyl complexes 27
- C-H activation step 231
- chartelline C, 370chartellines 369
- C-H functionalization processes 230, 247
- chiral π -complexes
 - with chiral ligand 28, 29
 - planar chiral h6-arene complexes 26, 27
 - stereogenic metal centers 29
- chiral 2-(*o*-iodoxyphenyl)oxazolines (CIPO) 180
- chiral amines 16
- chiral dirhodium complex 163
- chiral ethers 16
- chiral Li amides 22
- chiral ligands 71
 - h6-arene complexes 28
 - in enantioselective nucleophilic additions 23
 - structure and numbers 72
- chiral reagents
 - chiral ligands in enantioselective nucleophilic additions 23
 - dearomatizing cyclizations 21
 - nucleophiles 23
- chiral s-bound auxiliaries
 - hydrazones 15
 - imines 15
 - oxazolidines 15
 - oxazolines 9
- meta*-chloroperbenzoic acid (*m*-CPBA) 139, 148
- clitradins A and B 367
- cleroindicin C 112, 113, 196
- cleroindicin D 112, 113, 196
- cleroindicin F 112, 113, 196
- cleroindicines synthesis 196
- communesins A–H 357
- condurotols 303
- cortistatins 355
- Crixivan[®] 325
- cross-coupling/dearomatization processes 245
 - aromatic C–H functionalization 230, 231
 - biaryl 229
 - nitrogen-containing substrates 240–244
 - phenolic substrates, *see* phenolic substrates, dearomatizing cross-coupling 231
- Cu-catalyzed borylation 124, 125
- (+)-cuspareine 35
- (2 + 1) cycloaddition reactions 153
- (3 + 2) cycloaddition reactions 156
 - between 3-nitroindoles and iminoesters 163
 - between indoles and diazodiketoesters 159
 - indoles 162
 - indoles and donor-acceptor cyclopropanes 160
 - Rh-catalyzed of indoles 158
- (3 + 3) cycloaddition reactions 161
- (4 + 2) cycloaddition reactions
 - furans and β -trifluoromethylacrylates. 169
 - furans and β -trifluoromethylacrylates. 169
 - gold-catalyzed intramolecular formal 169
 - indoles and α -halogenated hydrazones 170
 - indoles and nitrosoalkenes 170
- (4 + 3) cycloaddition reactions
 - chiral Lewis acid-catalyzed between furans and alleneamides 172
 - copper-catalyzed asymmetric of furans 172

- furans 172
 - Rh-catalyzed heteroarenes and vinyl diazoesters 171
 - Rh-catalyzed pyrroles and silyoxyvinyl diazoacetates 171
 - cyclohexadienones 198, 313, 329, 382
 - chiral amine-catalyzed Michael reaction 108–110
 - desymmetrization reaction 198
 - 1,6-dienyne cyclized reaction 122, 124
 - Heck reaction 106
 - hydrobenzofuranones synthesis 193, 194
 - intramolecular [4+2] cycloaddition reaction 107
 - 2,5-cyclohexadienone 103, 108, 125, 126
 - cyclohexadienyl Cr(CO)₃ complex 28
 - cyclohexanediones 193
- d**
- dearomatization reactions 1
 - alternative strategies 5
 - vs. aromatic compound 2
 - enantioselective 7
 - history 3
 - hydrogenation process 4
 - indoles 176
 - strategies 5
 - through arene metal complexes 5
 - total synthesis
 - – griseofulvin 6
 - – natural products 5, 7
 - – strychnine 6
 - transition–metal mediated processes 4, 7
 - via photochemical process 4
 - dearomatizing anionic cyclizations
 - *N*-(α -methylbenzyl)phosphinamides 21
 - α -methyl kainic acid synthesis 21
 - Clayden's stereospecific mechanism 20
 - conformer 20
 - development 20
 - stereospecific 20
 - Dess–Martin oxidation 119
 - desymmetrization
 - acetal and hemiaminal ethers 105
 - cyclohexadienones 117, 119, 122, 125
 - 2,5-cyclohexadienones 103, 108
 - DFT calculations 110
 - enantiotopic functional groups 103
 - prochiral dienones 122
 - spirocyclohexadienone oxindoles 113
 - 2,3-dialkylquinolines 85
 - diarylprolinol silyl ether 117
 - 1,8-diazabicyclo[5,4,0]undec-7-ene (DBU) 97
 - diazonium ions 2
 - Diels–Alder reactions
 - anthracene 175, 176
 - with anthracenylacetaldehydes 168
 - asymmetric cycloaddition reaction of furan and silyloxy pentadienals 176
 - bifunctional Brønsted base/Lewis acid organocatalyst 176, 177
 - carbazolespirooxindole synthesis 177, 178
 - heteroaryl enones 167
 - holmium(III) complex 168
 - nitroalkene 175
 - product of 179
 - unreactive vinyl heteroarenes 178
 - 3-vinyl indoles 165, 178
 - difluorophos 80
 - dihalohydroiridium(III) 85
 - dihydrobenzoxazines 33
 - dihydrodiol dehydrogenase enzyme 280, 326
 - 1,4-dihydroisoquinoline 88
 - 9,10-dihydrophenanthridine (DHPD) 61
 - 1,6-dihydropyridine 255
 - 1,4-dihydroxynaphthalene 104
 - dimethylaluminum hydrazide (Me₂AlNHNMe₂) 130
 - 4-dimethylaminopyridine (DMAP) 132
 - 3,3-dimethyldioxirane (DMDO) 146
 - 1,4-dioxane 233
 - 2,5-disubstituted furan 78
 - diterpenoid alkaloids 350
 - double axially chiral phosphoric acid catalysts 37, 42
- e**
- electron-deficient aromatic rings
 - acyl pyridinium salts 266–270
 - alkoxy carbonyl pyridinium salts 253, 254
 - – cyanide addition 264
 - – hydride nucleophiles reduction 254
 - – isoquinolinium salts 265
 - – enolates 261
 - – Grignard reagent 255
 - – alkenyl groups 260
 - – quinolinium salts 265
 - – regioselective reduction 254
 - pyridine dearomatization, *see* pyridine dearomatization
 - other pyridinium cations 270–274
 - electrophilic aromatic substitution reactions 2
 - electrophilic dearomatization reaction 369
 - enamine 36
 - enantioselective oxidative dearomatization process 108
 - enantioselective transformation 103

- enantioselectivity 38, 71, 73, 77, 104–106,
 108–110, 112, 116, 117, 119, 120, 123, 125,
 146, 243
 enantiotopic π -bonds 103
 enzyme-catalyzed processes 7
Epicoccum species 353
 epoxyspirolactone 142
Escherichia coli 282
 – HB101 321
 – JM109(pDTG601) 302
 – JM109(pTrctodNK1) 320
 – JM 109 (pDTG601A) 348
- f**
- five-membered spiroindolenine
 product 214
 flumequine, 38 fluorination/ [4 + 2]-phenol
 dimerization 200
 formate salts 95
 formic acid 370
 Friedel–Crafts reaction 1, 214, 222, 356, 387
 Furaneol[®] 320
- g**
- (+)-Galipinine 35
 gephyrotoxins 33
 gliocladin C 33
- h**
- Hantzsch dihydropyridine (HEH) 34, 36,
 39–41
 Hantzsch ester 94
 Heck reaction 106, 107
 heteroarene
 – cascade reactions
 – – in situ generation 54
 – – one-pot multi-step reactions 54
 – – photocyclization/Brønsted acid catalysis
 57
 – – pyridine dearomatization /asymmetric
 aza-Friedel–Crafts alkylation 56
 – chemistry 2
 – organocatalytic asymmetric transfer
 hydrogenation
 – – asymmetric relay catalysis 62
 – – cooperative metal-Brønsted acid catalysis
 63
 – – in aqueous solution 53
 – – regenerable hydrogen sources 60
 heteroarenes
 – distribution 1
 – representative 2
 – synthetic chemistry 2
 heterocyclic compounds
 – cyclopropanation 155, 156
 – pharmaceutical properties of 153
 1,1,1,3,3,3-hexafluoro-2-propanol (HFIP)
 140, 143, 144
 high-performance liquid chromatography
 (HPLC) 268
 hydride shift (“NIH shift”) 329
 hydrogenation processes 7
 hypervalent iodine reagent 103, 127, 130,
 139–148, 179, 193, 309
- i**
- imidazoles 74, 75
 imidazolidinone 172
N-iminopyridinium ylide 81, 271
 indoles 76
 – asymmetric oxidative dearomatization 136
 – deprotonation of 242
 – rhodium-catalyzed asymmetric
 hydrogenation 71, 73
 – spirocyclization 243
 indoles dearomatization
 – activation of propargyl carbonates with Pd
 catalyst 222
 – transition metal-catalyzed allylic
 substitution reactions 208
 3-indolyl allyl carbonates 212
 inositols 303
 intermolecular sulfa-Michael reaction 113
 intramolecular Diels–Alder (IMDA) reaction
 351
 intramolecular Michael reaction 104, 108
 intramolecular oxo-Michael reaction 109
 intramolecular Stetter reaction 198, 199
 iodine(I) 81–84, 139
 Ir-catalyzed asymmetric intramolecular allylic
 dearomatization reaction 212
 iridium-catalyzed asymmetric hydrogenation
 – isoquinolines 87
 – pyridines 80
 – pyrimidines 81
 – quinazolines 93
 – quinolines 82
 – quinoxalines 89
- k**
- Kopsia* alkaloids 359
 Kornblum – DeLaMare rearrangement 311
- l**
- Larock's *ipso*-iodocyclization reaction 198
 leaving group 324
 Lewis acid 153, 172, 177, 264, 326
 – activated oxazaborolidine catalyst 169
 – ATPH 5

- and Brønsted acids 63
- cyclopropane, activation of 161
- –Lewis base bifunctional chiral catalyst 264, 265
- and phosphoric acids 62, 65
- (+)-lycoricidine 309

m

- maoecrystal V 349
- (-)-melotenine 371
- MeO-Biphep 80
- 2-MeO-substituted ligand 219
- mesembrine 127
- metal–organic framework (MOF)
 - formula 322
 - and ligands 321–324
 - preparation of 322
 - x-ray structure 323
- N*-methyl-4-methoxyaniline 90
- Michael reaction 197
- Moffatt's reagent 315

n

- naphthalene dioxygenase (NDO) 281
- N*-heterocyclic carbene (NHC) 78, 93, 119, 120
- nitrogen-containing substrates
 - benzylic C–H functionalization 241
 - carbazole 240
 - electrophilic dearomatization vs. Heck-like pathway 241, 242
 - indoloindoles 241, 242
 - naphthalene derivatives 240
 - spirocyclization 243, 244
 - spiroindoles 242, 243
- non-racemic cyclohexenone
 - Pearson's synthesis 18
 - *Semmelhack's* synthesis 16, 18
- Nuclear Overhauser Effect (NOE) 142
- nucleophiles 129
 - MeOH 194
 - phase-transfer activation of weak 199
- nucleophilic dearomatization
 - (-)-debromoflustramine B, total synthesis 202
 - 1,4-addition of aldehydes to acridiniums 202, 203
 - acyl-Mannich reaction 201
 - annulation reaction 201
 - asymmetric intermolecular oxygenative phenol dearomatization reaction 204
 - electron-deficient *N*-heteroarenes 204
 - Petasis-type reaction of quinolines 201, 202

o

- O*-methylation 322
- one-pot method 189
- one-pot multi-step reactions 54
- one-pot process 108
- o*-quinone 350
- organocatalytic asymmetric transfer
 - hydrogenation
 - 3*H*-indoles 51
 - benzodiazepines 49
 - benzodiazepinones 49
 - benzothiazines 47
 - benzoxazines 47
 - benzoxazinones 47
 - pyridines 51
 - quinolines
 - – 2,3-disubstituted 42
 - – metal-free reduction 34
 - – proof-of-concept 34
 - – spiro-tetrahydroquinolines 45
 - – 2-substituted 35
 - – 3-substituted 41
 - – 4-substituted tetrahydroquinolines 40
 - quinoxalines and quinoxalinones 52
- organocatalytic methods
 - cascade reactions 186
 - nucleophilic dearomatization 200
- organolithium reagents 15, 261
- ortho*-functionalized spirobiindane catalysts 140
- oxazoles 75
- oxepine tautomer 328, 329
- oxidative dearomatization 194
 - α -naphthols to *o*-spirolactones 180
 - (-)-trigonoliumines A, B, and C, total synthesis 182
 - dearomatization product 184
 - dearomatizing redox cross coupling reaction of ketones with aryl hydrazines 183
 - hydroxyl-indolenines, oxidation of indoles to 181
 - hypervalent iodine (III) catalyst, synthesis of 179
 - indole 357
 - 2-methylnaphthol 181
 - 2-(*o*-iodoxyphenyl)-oxazolines 180
 - of phenol 349
 - organoiodine (III) 180
 - *p*-substituted phenols 195
 - spiro-tetrahydroquinolines synthesis 184
- oxidative dearomatization reaction
 - 2- or 4-substituted phenols 129
 - strategies 129
- oxo-Michael reaction 195, 196

P

- P-Phos ligand 80
- palladium-catalyzed acetoxylation 125
- palladium-catalyzed asymmetric hydrogenation
 - azoles 75–77
 - pyrroles 76
- palladium-catalyzed C-C bond formation 229
- palladium-catalyzed dearomatization
 - 4a-alkyl-4aH-carbazoles 241
 - erythrinane 234
 - indoloindoles 242
 - tethered substrate 231
- palladium-catalyzed diacetoxylation 126
- palladium-catalyzed hydrogenation
 - indoles 76
 - pyrroles 76, 77
- palladium-catalyzed intramolecular Heck reaction 354
- Pd-catalyzed intramolecular *ipso*-Friedel–Crafts allylic alkylation 207, 215, 216, 218, 220–222,
- Pd-trialkylborane catalyst system 208
- Pd – triethylborane catalyst system 208
- phase-transfer catalyst (PTC) 186, 198
- Phellinus* 328
- phenol dearomatization
 - activation of propargyl carbonates with Pd catalyst 221
 - via transition metal-catalyzed allylic substitution reactions 216
- phenolic substrates, dearomatizing cross-coupling
 - alkyne insertion/spirocyclization
 - asymmetric reactions 235, 236
 - catalytic cycle 236, 237
 - enantioselective oxidative 239
 - into metal-aryl bonds 235
 - of naphthol 239
 - competitive intramolecular etherification 232, 233
 - palladium-catalyzed carbon–carbon bond formation 231, 232
 - palladium catalyzed dearomatizing spirocyclization 234
 - Rh-catalyzed spirocyclization 234
 - vs. benzoxepine formation 239
 - ruthenium reoxidation 238
 - salutaridine derivative, synthesis of 231, 232
- phenols
 - catalytic asymmetric dearomatization of 185
 - dearomatization of 193, 198
 - dearomatization/Rauhut–Currier reaction 197, 198
 - diastereoselective oxidative dearomatization using chiral auxiliaries 129
 - electron-deficient 144
 - enantioselective oxidative dearomatization using chiral reagents
 - hypervalent iodines and hypiodites 139
 - transition metal complexes 132
 - fluorinative dearomatization of 198, 200
 - oxidative cycloisomerization reaction 355
 - stepwise asymmetric dearomatization
 - defined 103
 - Diels–Alder reaction 103
 - 1,6-dienyne cyclized reaction 122
 - enantioselective synthesis 103
 - Heck reaction 106
 - Michael reaction, *see* Michael reaction 108
 - Rauhut–Currier reaction 120
 - Stetter reaction 119
- phenoxonium ion 356
- phenyliodine bis(trifluoroacetate) (PIFA) 139
- phenyliodine diacetate (PIDA) 131, 139
- 9-phenylmenthyl ester 130
- PhI(OAc)₂ 104
- phosphorus ligands 217
- photochemical process
 - arenes 7
 - dearomatization reactions 3, 4
- photocyclization-reduction cascade reactions
 - pyrylium ions 58
 - quinolines 57
- piperidine 33
- piperidine alkaloids synthesis 257, 260, 273
- piperidinium chloride 84
- polychlorinated biphenyls (PCBs) 325
- polyprenylated polycyclic acylphloroglucinols (PPAPs) 370
- polyoxygenated cyclohexene 311
- potassium carbonate 233
- η^3 -propargyl-palladium(II) complex 222, 224
- N*-protected indoles 71
- N*-protected pyrroles 70
- Pseudomonas putida*
 - NCIMB8859 326
 - plasmid NAH7 321
 - strain 280–282
- pumiliotoxins 33
- pyridine dearomatization
 - acyl pyridinium salts 266
 - alkoxycarbonyl pyridinium salts 253
 - alkyl pyridinium salts

- borohydrides 248, 249
 - carbon nucleophile 252, 253
 - cyanide 252
 - internal silane 250
 - Na₂S₂O₄ 249, 250
 - Grignard reagents 251, 252
 - preparation 248
 - sodium hydrogen telluride 250
 - other pyridinium cations 270–274
 - pyridines 51
 - N*-pyridinium imidate 272, 273
 - pyrroles 76
 - catalytic spirocyclization 244
 - pyrrolidine iminosugar 304
 - pyrroloindolines 159, 161, 165, 166, 186, 188, 201, 384, 385
 - pyrrolopyrazinium salt 94
- q**
- quinazolines, 93 quinolines
 - asymmetric dearomatization 266
 - 2,3-disubstituted 42
 - enantioselective dearomatization 204
 - metal-free reduction 34
 - proof-of-concept 34
 - protonation 36
 - spiro-tetrahydroquinolines 45
 - 2-substituted 35
 - 3-substituted 41
 - 4-substituted tetrahydroquinolines 40
 - thiourea catalyzed Petasis-type reaction 202
 - quinolinium salt 84
 - quinoxalines 62
 - iridium-catalyzed asymmetric hydrogenation 89
 - iron-catalyzed asymmetric hydrogenation 92
 - and quinoxalinones 52, 53
 - ruthenium-catalyzed asymmetric hydrogenation 90
- r**
- Rauhut–Currier (RC) reaction
 - asymmetric 120, 122
 - and dearomatization of phenols 197
 - proposed mechanism 197, 198
 - reductive dearomatization
 - indole-based substrates 244
 - in natural products synthesis 367–369
 - septicine and verticine, total synthesis 249
 - Reimer–Tiemann reaction 2, 3
 - rhodium 95
 - rhodium-catalyzed tandem arylation 122
 - ring opening reaction 22, 137
 - Ru-catalyzed intramolecular allylic alkylation reaction 212
 - RUCY-type complex 90, 91
 - ruthenium-catalyzed asymmetric hydrogenation
 - azoles 73
 - indolidines 93
 - quinolines 85
 - quinoxalines 90
- s**
- Sandmeyer reaction 1
 - Selectfluor[®] 179
 - 2-(siloxy)vinyl diazoacetate 171
 - sodium hydrogen telluride (NaHTe) 250
 - (+)-solifenacin 89
 - Sphingomonas yanoikuyae* 281
 - spiro[4.5]cyclohexadienones 219
 - spirocyclic oxindole 113
 - spirocyclohexadienones 207
 - spirocyclopropane compounds synthesis 200
 - spiroindolenine 207, 211, 212, 214
 - spiroindoles 243
 - spiroindoline units 211
 - stereogenic metal centers 29
 - stereoselectivity 7, 74
 - Stetter reaction 119
 - 2-substituted *N*-acetylindoles 71
 - sulfonium salts 199
 - Suzuki–Miyaura cross-coupling 322
 - synthesis
 - (-)-clusianone 370, 371
 - flavors and fragrances 320
 - indigo dyes 321
 - ligands and MOFs 321–324
 - pharmaceuticals and agrochemicals 315
 - polymers 317
 - total, *see* total synthesis 302
- t**
- Tamiflu[®] 315
 - tetra-*n*-butylammonium fluoride (TBAF) 250
 - tetrahydrophenanthroline 93
 - tetrahydropyridines 51
 - tetrahydroquinoline 33
 - alkaloids 35, 84
 - synthesis of 45
 - tetrahydroxynaphthalene reductase (T₄HNR) 330
 - tetrahydroquinoxalines 62, 95
 - antimalarial activity 33

- step-economic asymmetric synthesis 54, 65
 - toluene dioxygenase (TDO) 281
 - total synthesis
 - akuammiline alkaloids 358
 - alkaloids 307
 - carbohydrates 303
 - (-)-batzelladine 366
 - citrinadin A and B 368
 - (-)-Communesin F and A 358
 - cylindricine C 252
 - (+)-elaekanine A and C 259
 - epicolactone 354
 - (-)-flustramine 186
 - (-)-flustramine B 187
 - lepenine 352
 - (\pm)-lasubine II 257
 - maoecrystal V 350
 - (-)-maoecrystal V 351
 - (-)-melotenine A 372
 - merochlorin A 357
 - (+)-minfensine 186
 - polyoxygenated cyclohexene 311
 - prostaglandins 304
 - of quinolizidine 2071 268
 - septicine 249
 - steroids 304
 - terpenes 304
 - verticine 249
 - total synthesis of natural products via dearomatization
 - cycloaddition reactions 360
 - electrophilic addition 369
 - intramolecular arylation 371
 - nucleophilic addition 367
 - oxidative dearomatization 348
 - reductive dearomatization 367
 - transition metal-catalyzed allylic substitution reactions
 - indoles dearomatization 208
 - phenols dearomatization 216
 - pyrrole dearomatization 214
 - transition-metal-catalyzed dearomatization 371
 - transition-metal mediated processes 7
 - triazolium salt 198, 199
 - tricyclic octahydroacridine 45
 - triethylsilane 95
 - triflate 84
 - trifluoromethanesulfonic anhydride 271
 - β -trifluoromethylacrylates 169
 - triphenylphosphine 217, 242
 - Trost ligand 217
- u**
- α,β -unsaturated ester 315

