

Index

a

- (+)-angelichalcone 526–528
- acetalization reactions 272
- acyclic product formation
 - aromatic and aliphatic sulfinimines 223
 - chiral N-sulfinimines 223
 - Dieckmann reaction 223
 - enantiopure amino-thiols 221
 - imidazolidinone catalysts 221
- aldol reaction
 - acetalization reactions 267, 272
 - aldol/lactonization reactions 267
 - cycloaddition 290
 - isomerization 289
 - Prins reactions 270
 - vinylogous aldol/Michael reactions 276
 - Wittig rearrangement 290
- aldol/lactonization reaction
 - aldehydes and thiopyridyl silyl S,O-ketene acetals 267
 - isotetronic acids 269
 - γ -keto aldehydes 268
 - sterically highly congested spirooxindoles 269, 270
 - triethylsilyl thiopyridyl ketene acetal 268
 - α -unbranched aldehydes 268
 - ZnCl₂-mediated reaction 268
- aldol–Tishchenko reaction
 - aldehyde as hydride donor 273
 - Brønsted basic and Lewis acidic zirconium alkoxide 275
 - chiral heterobimetallic lanthanide-based catalyst 273
 - pinacolone-derived ketone aldol product 275
 - (TADDOL) and 1,1-bi-2-naphthol (BINOL) ligands 275
 - ytterbium-catalyzed enantio- and diastereoselective reactions 274
- alkylpalladium reactions 69, 71
- amino-thiols 221
- amine thiourea 339
 - Michael/aldol reaction 339
 - Michael/oxa-Michael/tautomerization reaction 331
- 9-amino-9-deoxyepiquinine 226, 227, 345, 347, 351
- anionic domino reactions
 - *Aspidosperma* alkaloids 539, 540
 - cannabinoids 537–538
 - centrocountins 548–549
 - *Daphniphyllum* alkaloids 541
 - deoxyaminosugars 538–539
 - enamine-iminium cyclization 540
 - guaianolide sesquiterpene lactones 543
 - (+/–)-incarvilleatone 547
 - intramolecular Diels-Alder cyclization 533
 - intramolecular hetero-Diels-Alder cycloaddition 533
 - lycoposerramine Z 544, 545
 - (+)-malbrancheamide B 533, 534
 - marine alkaloid manzamine A 534, 536
 - nitro-Mannich adduct 534
 - olefination/isomerization/Claisen (OIC) rearrangement 535
 - (–)-oseltamivir 543, 544
 - phytenal 545
 - prenylated indole alkaloids 534
 - pyrrolidinone 534
 - (+)-(R)-pinnatolide 540, 541
 - sesquiterpene merrilactone A 547, 548
 - stephacidin A 534, 535
 - tetrahydroxanthones 545–546
 - (–)-tocopherol 545, 546
 - Ugi reaction 541–542

- anionic domino reactions (*contd.*)
 - Wittig-Horner/Diels-Alder cycloaddition reaction 534
- anionic processes 105
- aqueous domino reactions
 - multicomponent
 - aryl boronic acid with internal alkynes 484
 - aza–Morita–Baylis–Hillman/reduction sequence 485
 - benzo[*f*]azulen-1-ones 488
 - 2,6-diaminopyrimidine-4-one 487
 - dihydrothiophene ureidoformamides 485
 - fused pyrimidine derivatives 486
 - fused thiopyran derivatives 486
 - pentacyclic isoindazole-fused benzo[*b,e*][1,4]diazepines 489
 - pyrazolopyridinyl spirooxindoles 486
 - regioselective [4+2+1] domino cyclization 487
 - two-component
 - bridged bicyclic lactones 483
 - 1,3-dicarbonyl compounds 482
 - enaminones 482
 - fused pyrans 481
 - Knoevenagel/hetero-Diels-Alder Reaction 483
 - 3-phenylnaphtho[2,3-*b*]furan-4,9-diones 483
 - trans-4,5-dihydrofuran-3-carbonitriles 481
- Aspidosperma* alkaloids 539, 540, 551
- asymmetric radical domino processes
 - chiral auxiliary-directed 174
 - chiral catalyst-driven 176
- Aza–Morita–Baylis–Hillman (aza-MBH) reaction 254
- azanorbornene 36, 37, 39
- aziridines. *See also* nucleophilic substitution
 - initiated domino reactions
 - aziridine lactone 122
 - 2-(bromomethyl)aziridine 118
 - chiral monosubstituted 122
 - Cu-catalyzed S_N2-type ring opening 123
 - cyclic and acyclic 120
 - indene-fused 115
 - multifold domino reactions 121
 - N-tosylaziridines 115, 120
 - stereoselective ring opening 115
- b**
 - Barbier-type reaction 150
 - (+)-barekoxide 559
 - (–)-barekol 559
 - benzoxepinones 113
 - bicyclo[3.3.1]nonane ring system 109
 - bisabosquals 154, 156
 - biscarbocyclization 76
 - biyouyanagin A 565, 566
 - borrowing hydrogen approach 315
 - Brønsted acid 330
 - Buchwald–Hartwig amidation 553, 555
 - build-couple-pair approach, scaffold diversity
 - description 515
 - gold-catalyzed cyclization, alkyne 515
 - Staudinger/aza-Wittig/6 π -disrotatory ring-closing reaction 516
- c**
 - cannabinoids 518, 519, 537
 - carbene 166
 - carbocycle formation
 - bromoacetoacetates and α,β -unsaturated aldehydes 225
 - pentane-1,5-dial and nitroalkene 228
 - bi- and tricyclic octenes(anes) 236
 - bicyclo[3.2.1]octan-8-ones 236
 - cyclopentane 227
 - cyclopentenones 227
 - Darzens condensation reaction 231
 - hexahydronaphthalenone preparation 235
 - hexasubstituted cyclohexanes 228
 - indane 233
 - influenza neuraminidase inhibitor 231
 - organocatalyzed domino reactions 232–234
 - pentasubstituted cyclohexanes 227
 - rhodium-assisted Michael/aldol processes 226
 - Tamiflu synthesis 230–231
 - tetrasubstituted cyclohexene carbaldehydes 229
 - trisubstituted cyclohexene carbaldehydes 230
 - α,β -unsaturated aldehydes 236
 - carbon nucleophiles, aldol reactions
 - 1,2-cyclohexadione 277
 - 5,5-diphenyl-substituted 1,3-dioxane 279
 - functionalized cyclohexanones 278
 - in situ epimerization 278
 - intramolecular domino Michael/aldol reaction 280
 - organometallic reagents 278
 - rhodium-catalyzed conjugate addition 279
 - vinyl ketones with aldehydes 281
 - Zimmerman–Traxler type transition state 280

- carbonyl olefination 62
 - carbonylative domino reactions
 - iron-, copper-, nickel-, and cobalt-catalyzed 24
 - palladium-catalyzed. *See* palladium catalyzed carbonylative domino reactions
 - rhodium-catalyzed 13
 - ruthenium-catalyzed 8–9
 - carbopalladation and aminopalladation
 - biscarbocyclization, alkynes and benzynes 76
 - 1,6-diynes 74
 - five-membered palladacycle 78
 - helical tetrasubstituted alkenes 75
 - isochromenone and oxepine 76
 - oxidative addition, acyloxime 78
 - regioselective syn carbopalladation 72
 - unsymmetrically substituted 3-indolinones 72
 - unsymmetrically substituted oxindoles 73
 - vinylpalladium species formation 78
 - carboxylic acids 304–305
 - Catellani reaction 80–82, 88
 - cationic domino reactions
 - (+)-angelichalcone 526–528
 - (–)-cribrostatin 4 529, 530
 - cyclohexene 528
 - Dieckmann condensation 529
 - diptoinonesin G 529, 531
 - erythrina alkaloids 532
 - hirsutellone B synthesis 524, 525
 - Lewis acid activation, TMS 525
 - Lewis acid-induced epoxide ring opening 525
 - linear aminoalkenes 529
 - (±)-2-O-methylneovibsanin H 528
 - (+)-omaezakianol 526, 527
 - pentacycles 529
 - physalins 523–524
 - (+)-stachyflin synthesis 525, 526
 - Tamao–Fleming oxidation 532
 - tetracyclic 6H-anthra[1,9-bc]furan-6-one 531
 - centrocountins 503, 548, 549
 - CH activation reactions, domino processes
 - Heck reactions 67
 - carbopalladations and aminopalladations 72
 - heteroatom-directed 96
 - palladium catalyzed norbornene-mediated
 - See* palladium catalyzed norbornene-mediated domino reactions
 - chromanes 211–213, 334, 364, 565
 - chromenes 245, 283, 329, 335, 348
 - coinage metal-catalyzed domino synthesis
 - exo-dig cyclization 500
 - fascaplysin-inspired alkaloids 498
 - indoloisoquinolines 499
 - tetracyclic spiroindoline 499
 - Ugi reaction 499, 500
 - conjugate addition 59, 435
 - C–H bond formation
 - aluminum enolates 423
 - carbon nucleophiles. *See* carbon nucleophiles, aldol reactions
 - chiral Pd complexes 430
 - Cu complex taniaphos-type ligand 427, 428
 - Cu-catalyzed dual Michael addition reaction 429
 - diphenylphosphorane 427
 - β,β-disubstituted enones 425
 - FC reaction 430
 - Grignard reagents, Cu-catalyzed 422
 - Henry reaction 430–433
 - iodo-aldol reaction 285
 - Josiphos-type ligand 422, 423
 - magnesium enolates 422, 425
 - metal-catalyzed reactions 419
 - Michael/aldol reaction 420
 - oxygen and nitrogen nucleophiles 283
 - phosphoramidite 424
 - pyrrolidines 433
 - reductive aldol reactions 287
 - sulfur nucleophiles 281–282
 - trapping reactions 423
 - zinc enolates 426
 - Cope rearrangement 194, 196
 - copper-catalyzed carbonylative reaction 25
 - (+)-cortistatin 151, 568, 569
 - cyanthiwigin U 35, 561
 - cycloadditions
 - C–C bond formation 433
 - C–N bond formation 443
 - C–O bond formation 452
 - cycloreversion 185–188
 - description 184, 185
 - electrocyclization 189
 - hydrometallative intramolecular 439
 - imino esters 433
 - mixed transformations 191
 - sigmatropic rearrangement 188
 - cycloheptene oxides 114
 - cyclopentanes 106
- d**
- Daphniphyllum* alkaloids 541
 - dendralenes 49
 - deoxyaminosugars 538

- diastereoselectivity 302–305, 308–315, 318
 - (+/-)-1-desoxyhydnophyllin 560
 - diaz-cope rearrangement 183
 - Dieckmann condensation 111, 529, 531
 - Dieckmann reaction 223, 224
 - Diels–Alder reaction 296–297, 309
 - dienophile
 - hexasubstituted benzene, five-component synthesis 595
 - pyrrolopyridines, four-component synthesis 593
 - diversity-oriented synthesis (DOS) 506
 - (–)-diversonol 246, 366, 455, 545, 563
 - domino metathesis reactions
 - alkenes
 - – azanorbornene, RRM/CM transformation 39
 - – bicyclic 1,3-dienes 48
 - – bicyclic dihydro-1,2-oxazine 40
 - – bisdihydrofuran substrate 37
 - – bridged bicyclic dienes 48
 - – C_2 -symmetric trienes 31
 - – cyclopentenes 43
 - – dendralenes 49
 - – functionalized sultam scaffolds 39
 - – Grubbs catalyst 31–33, 35, 36, 38–41
 - – macrocycles 31
 - – nonstrained heterocyclic systems 37
 - – norbornene derivative 34, 36
 - – oxanorbornenes 36, 38
 - – ring-rearrangement metathesis 33
 - – strained small ring olefins 50
 - – tricyclic sultams 39
 - – Zhan catalyst 32
 - alkenes and alkynes
 - – α -amino acid derivative 42
 - – cyclopropene-derived propargyl ether 51
 - – dienyne 46
 - – enyne 41, 43
 - – fused bicyclic product structures 44
 - – oxanorbornene propargyl ethers 50
 - – phosphine-free ruthenium catalyst 41
 - – relay dienyne metathesis transformation 47
 - – siloxy-tethered dienyne 48
 - – tetracyclic kempene skeleton 46
 - and non-metathesis events
 - – carbonyl olefination 62
 - – conjugate addition 59
 - – cycloaddition 56
 - – isomerization 53
 - – redox transformation 52
 - – substitution 58
 - bicyclo[2.2.2]octene double bond 35
 - domino process
 - definition 579
 - domino reactions
 - anionic. *See* anionic domino reactions
 - cationic. *See* cationic domino reactions
 - definition 105
 - high-pressure-promoted. *See* high-pressure-promoted domino reactions
 - initiated by
 - – oxidation. *See* oxidation initiated domino reactions
 - – reduction. *See* reduction initiated domino reactions
 - nucleophilic substitution. *See* nucleophilic substituted domino reactions
 - oxidation/reduction 568
 - oxidation in middle of sequence 312
 - pericyclic. *See* pericyclic domino reactions
 - radical 549
 - transition-metal-catalyzed. *See* Transition-metal-catalyzed domino reactions
- e**
- electrocyclization
 - π -bond 201
 - conjugated oligoenes 201
 - cycloaddition 202
 - kingianins 201, 202
 - mixed transformations 208
 - ocellapyrone 201, 202
 - pyrone derivatives 201, 202
 - sigmatropic rearrangement 205
 - electrophilic center 105
 - enantio- and diastereoselective domino reactions
 - C–B and C–Si bond formation 455
 - C–C bond formation
 - – carbometalation 435
 - – conjugate addition. *See* conjugate addition initiated domino reaction
 - C–H bond formation
 - – aldol reaction 435
 - – azaarenes 442
 - – bipyridine/2,6-lutidine 441
 - – click-ferrophos 440
 - – functionalized α,β -unsaturated esters 440
 - – hydrometallative intramolecular reductive cycloaddition 439
 - – Rh-catalyzed hydrogenative aldol coupling 439
 - – Taniaphos-based ligands 438, 439, 441

- C–O bond formation
- – carbonyl ylide formation. *See* carbonyl ylide formation
- – Wacker oxidation 454–455
- C–H bond formation
- ketimines 438
- cycloaddition
- endiandric acids A 311
- (+)-8-epi-xanthatin 42, 561, 562

f

- Fisher's indole synthesis 183, 198
- (±)-fredericamycin A 301
- Friedel–Crafts (FC) reaction 146, 284, 430
- frondosine B 560
- (–)-fructigenine A 307, 537
- 3-(2H)-furanones 18, 247, 352
- furans 16–19, 52, 185
- Fusarisetin 155

g

- (–)-galanthamine 556, 557
- Groebke–Blackburn–Bienaymé reaction 601
- guaianolides 543

h

- Heck cross-coupling 309
- Heck cyclization 69
- Heck–Mizoroki reaction
 - aryl bromides 70
 - fused polycycles 71
 - Pd-catalyzed reactions
 - spirocyclic amides 69
 - spirocyclic dihydroquinolinones 69
 - spirocyclic oxindoles 69
 - tri- and tetracyclic [7] fused n-heterocycles 69
- helical alkenes 89, 91–97
- Henry reaction 430
- Hetero–Pauson–Khand reaction 8
- heteroatom-directed C–H activations
 - benzosultams 98, 99
 - chiral indenylamines 100
 - diaryl ketimines 101
 - phthalides synthesis, Rh(III)-catalyzed 96, 97
 - sulfonamides 99
- hexasubstituted benzene
 - dienophile-containing inputs 597
 - five-component reaction 596
 - oxazole cycloaddition 595
 - pyrrolofuran 596
- high-pressure-promoted domino reactions
 - description 489

- 4,6-diphenyl-[1,2]oxathiine-2,2-dioxide with dimethyl but-2-ynedioate reaction 490
- endo/exo selectivity 490
- four-component transformation, 2-methoxybuta-1,3-diene 490
- multicomponent domino [4+2]/[3+2] cycloaddition 491
- hirsutene 292, 559, 560, 561
- hydrindanone 568
- hydroxyproline-catalyzed aldol reactions 272
- hyperolactone C 565, 566

i

- imine formation 442
- indanones 13, 14
- indenones 13, 14, 52
- (–)incarviditone 547
- (–)-indicol 565, 567
- indoles 144
- intermolecular carbonylative cycloaddition reactions 8
- iodo-aldol reaction 285
- Ireland–Claisen rearrangement 304
- iron-catalyzed reactions
 - carbonylative domino reactions 24
- isochromans 72, 211, 213
- isomerization/aldol reaction 289
- isotetronic acids 269

k

- kingianins 201, 203
- Knoevenagel/Diels–Alder reaction 214
- Knoevenagel reaction 355, 385

l

- lactonization 524
- library synthesis
 - natural-product-inspired centrocountins 503–504
 - scaffold diversity
 - – build-couple-pair approach 515
 - – substrate-based approach 507–508
 - solid-phase domino syntheses 516
- linoxepin 558, 559
- liquid death 26
- long range anionic relay chemistry (LR-ARC) 137
- lycoposerramine Z 544, 545

m

- (–)-malbrancheamide B 533, 534
- manzamine A 534, 536
- martinellic acid 149, 150

- MCC process. *See* Multicatalytic domino (MCC) process
- MCR. *See* multicomponent reaction (MCR)
- merrilactone A 547, 548
- metal-free iodine-promoted oxidative cyclization 300
- metathesis/metathesis reaction
- multicomponent reactions 509
 - ROM/RCM/CM reaction 508
 - sulfonamide 507
- methyl radicals 154
- α -methylene- β -hydroxy carbonyl derivatives 285
- Michael addition reaction
- acyclic product formation 221
 - carbocycles formation. *See* carbocycles formation
 - description 219
 - iminium-enamine and enamine-iminium activation 220
 - N-heterocycles. *See* N-heterocycles
 - nitrogen and oxygen containing heterocycles
 - – chiral bicyclic phosphinate ring system 260
 - – enantioselective phase-transfer catalysts 261
 - – S_N sequence 262
 - – solid-phase-supported carbonate reagent 261
 - organocatalysts 219
 - organocatalyzed domino Michael/aldol reaction 221
 - S-heterocycles 258
- Michael reaction initiated one- and two-component domino reactions
- aldol reactions
 - – asymmetric domino oxa-Michael/aldol reactions 336
 - – chiral 1,2-dihydroquinolidines 335
 - – chiral 1,2-dihydroquinolines 335
 - – chiral 3-substituted 3H-pyrrolo[1,2-a]indoles 336–337
 - – chiral chromenes 335
 - – chiral cyclopentenones 336
 - – chiral diarylprolinol trimethylsilyl ether 337
 - – chiral spiro[cyclohex-2-enone-oxindole] derivatives 338–339
 - – chiral thiochromene synthesis 334
 - – diastereo- and enantioselective domino Michael/aldol/dehydration reaction 336
 - – hetero-Michael/aldol reaction 335
 - – hydrogen-bonding-mediated catalysis 339
 - – iminium–enamine activation mode 336–337
 - – Michael acceptor components 334
 - – Michael donors 334
 - – nitroalkanes 337
 - – oxygenated analogous compounds 334
 - – tetrahydrothioxanthenones and tetrahydroxanthenones 338
 - – α,β -unsaturated aldehydes 337
 - – α,β -unsaturated ketones 338
 - carbon–carbon and carbon–heteroatom bonds formation 327
 - chiral chromanes 334, 339, 364
 - chiral cyclohexanedicarbaldehydes synthesis 330
 - chiral cyclohexanes 333
 - chiral cyclohexanones 331
 - chiral thiochromenes 332, 334, 335
 - chiral thiourea-based and phosphoric acid derivatives 330
 - cyclopentanes 328, 332, 353, 354, 367
 - enantioselective domino Michael/oxa-Michael/tautomerization reaction 331
 - enones 330
 - iminium–enamine activation mode 328, 329
 - iminium–enamine approach 328, 329
 - Michael addition 327
 - N-heterocyclic carbenes 331
 - tetrasubstituted chiral five-membered carbocycles 328
 - thia-Michael addition 329
 - trisubstituted tetrahydrothiophenes 333
 - α,β -unsaturated cyclic ketones 333
- Michael/aldol/retro-Dieckmann (MARDi) approach 249, 543
- minfiensine 367, 552, 553, 555, 556
- mixed transformations followed by pericyclic reactions
- carbopalladations
 - – chroman-like structures preparation 211
 - – bromoglycal 213
 - – carbometalation cascades 211
 - – complex oligocyclic structures 212
 - – isochromans 211, 213
 - – tetraynes 214
 - domino Knoevenagel/hetero Diels–Alder reaction 214
 - pericyclic reactions
 - – aromatic congeners 209
 - – Danheiser's pericyclic cascade 210

- – ene reaction 209, 210
- pyridines 209
- α -spiro- δ -lactams 210
- spiro lactam 211
- multicatalytic domino (MCC) process
 - description 500
 - TCRA 500
- multicomponent coupling 130
- multicomponent reaction (MCR)
 - electron-withdrawing group 582
 - isonitrile-based MCRs 582
 - Noyori three-component reaction 582
 - poly-functionalized substrates 583
 - substrate design approach 583
 - – oxazoles. *See* oxazoles
 - – serendipity. *See* serendipity
 - thermodynamic factors 582
- mycoticin 130, 131

n

- N-heterocycles
 - multifunctionalized piperidines 252
 - aza-Michael/aldol reaction 256–257
 - bispirooxindole ring system 255
 - chromenones 255
 - double Michael addition 250
 - Heck/aza-Michael reaction 254
 - LBBA organocatalysts 254
 - Lewis acid-mediated allylation/cyanation 252
 - Mannich/aza-Michael reaction 251
 - N-hydroxypyrrole 250
 - pyrrolidine-3-carboxylic acid (β -proline) 251
 - spiro[4H-pyran-3,3'-oxindole] core 255
 - N-hydroxypyrrole 250
- nonstrained heterocyclic systems 37
- norbornene 34
- nucleophilic substitution initiated domino reactions
 - S_N /Brook rearrangement. *See* S_N /Brook rearrangement
 - aziridines, epoxides, and activated cyclopropanes
 - – aziridine lactone 122
 - – 2,3-annulated, 2,3-dihydro-2H-1,4-benzoxazines 115, 116
 - – benzothiazepines 118, 119
 - – bicyclic cyclopropyl ketone 126
 - – carboxamidation of N-tosylaziridines carboxamidation 115
 - – cyclic and acyclic aziridines 120
 - – 2,3-dihydro-1,4-benzodioxins 124, 125
 - – lactonization of epoxides 124

- – multifold domino reactions 121
- – racemic and nonracemic
 - 4,5-dihydropyrroles 123
- – retro-aldol/semiactalization process 126
- – substituted tetrahydrotriazines 120, 121
- – tetracyclic benzoxazine 115
- S_N /Michael addition. *See* S_N /michael addition domino reactions

o

- (+)-omaezakianol 526, 527
- O-heterocycles
 - chromenones 243
 - tetrahydropyrano[2,3-c]pyrazoles 237
 - Balyis-Hillman like zwitterion 240
 - benzopyrano[3,4-c]pyrrolidine 237
 - bicyclic 4H-chromenes 244
 - chiral asymmetric domino Michael addition 237
 - 3,4-dihydropyran-2-ones 241, 242
 - dihydroxyacetone dimer 249
 - domino nitro-Michael/Henry reaction 240
 - domino oxa-Michael/aldol condensation reaction 244
 - ene-yne coupling/Michael reaction 240
 - 3-(2H)-furanones 247
 - Knoevenagel process 245
 - Michael/acetallization reaction 237
 - NHC-catalyzed Michael-based spirocyclization 248
 - oxa-Michael/Tsuji–Trost reaction 248
 - pyranochromenes 244
 - spirocyclohexene compounds 246
 - tetrahydro-2H-chromenes 242
 - tetrahydropyranol ring system 248
 - tetronasin 238
 - tricyclic lactols 245
 - vinylogous aldol/oxa-Michael domino reaction 245
- ocellapyrone 201
- one- and two-component domino reactions
 - chiral secondary amines 327
 - Michael reaction initiated. *See* Michael reaction initiated one- and two-component reactions
- O-methylneovibsanin H 528
- organo-SOMO catalysis 176
- organocatalysis
 - enantioselective organocatalytic processes 325
 - one- and two-component. *See* one- and two-component domino reactions

- organocatalysts
 - acrolein 231
 - bifunctional amine-thiourea organocatalysts 258
 - bifunctional thiourea 247
 - cinchona-derived 9-amino-9-deoxyepiquinine 227
 - cupreine 255, 360
 - LBBA 254
 - NHCs 242–249
 - proline 219
 - (S)-2-diphenylphosphanyl-[1,1']binaphthalenyl-2-ol 256
 - trans-perhydroindolic acid isomers 236
 - (–)-oseltamivir 543, 544
 - oxanorbornenes 36
 - 1,2-oxazine 40, 164
 - oseltamivir 543, 544
 - oxazoles
 - aza-diene system, of 5-alkoxyoxazoles 593
 - dienophile. *See* dienophile
 - oxidation initiated domino reactions
 - 3-substituted 4-piperidinones 296
 - ABC spiroacetal synthesis 297
 - bicyclic dihydropyran 296
 - (+)-cis-sylvaticin and (+)-sylvaticin 297, 298
 - 2,5-disubstituted oxazoles 300
 - EI-1941-2 synthesis 296
 - laccase-catalyzed oxidation 299
 - metal-free iodine-promoted oxidative cyclization 300
 - Oxidation/reduction initiated domino reactions in natural product synthesis
 - α -bromo ketone 568
 - cortistatin A 568, 569
 - FR182877 571
 - indole alkaloid strychnine 569, 570
 - oxime 569
 - oxindoles 67, 69–74, 255, 307, 309, 330, 338, 340, 351, 373, 375, 386, 399, 403, 537
- p**
 - palladium catalyzed/norbornene-mediated domino reactions
 - alkynes 152 and with 2-iodotoluene 93
 - aryl iodide 80–81
 - aryl iodides with 2-bromobenzyl alcohols 89
 - benzo[c]phenanthridine alkaloids nitidine and NK109 85, 86
 - catalytic cycle 81
 - Catellani reaction 80–82, 88
 - diastereoselectivity 93
 - domino annulation, of indoles 83
 - enantiomerically pure alkyne precursors 94
 - enantiomerically pure tetrasubstituted helical alkenes 93
 - indole 83, 87–89, 93
 - intramolecular and intermolecular carbopalladation 92
 - multisubstituted o-teraryls 82
 - phenanthridines 83–87
 - seven-membered ring-fused indoles 83
 - Sonagashira coupling 93
 - sterically crowded tetrasubstituted alkene structures 91
 - tetrasubstituted helical alkenes 89, 91–96
 - vinylpalladium 94
 - palladium-catalyzed carbonylative domino reactions
 - alkoxycarbonylation 17
 - 2-alkyl-2-propargylcyclohexane-1,3-diones 19
 - 2-aryloindoles 22
 - 1,4-benzo- and pyrido-oxazepinones synthesis 23
 - carbonylative coupling 18
 - 3(2H)-furanone derivatives 18
 - isoindolinones 20, 21
 - lactones 17
 - pyrroles 21
 - sequential homobimetallic catalysis 20
 - substituted furans 16
 - thiochromanones 23
 - pericyclic domino reactions 172
 - (+)-chamaecyparone C 552
 - intramolecular hetero-Diels-Alder reaction 551
 - minfiensine 552, 553
 - retro-Diels-Alder reaction 552
 - Stemonia alkaloids 553
 - stenine 553, 554
 - Strychnos alkaloids 552
 - pericyclic reactions
 - conservation of orbital symmetry 183
 - cycloadditions. *See* cycloadditions
 - diaza-cope rearrangement 183
 - electrocyclization
 - – cycloaddition 202, 204
 - – kingianins 201–203
 - – mixed transformations 208
 - – ocellapyrone 201
 - – oligocyclic skeletons 201
 - – pericyclic shift, electrons 201
 - – sigmatropic rearrangement 205
 - – tetraene 201

- mixed transformations. *See* mixed transformations
- sigmatropic rearrangements. *See* sigmatropic rearrangements
- phenanthridines 74, 75, 78–80, 83, 86–87
- (+)-(R)-pinnatolide 540, 541
- polysubstituted maleimides 11
- Povarov reaction 145
- Prins reactions 270
- prostaglandines 224
- pyrrolidines 429, 433–435, 593
- pyrrolizidinones 305
- pyrrolopyridines four-component synthesis 593–595

- q**
- quaternary carbon centers 178
- quinazolinones 314
- quinolines 143, 284, 309, 397

- r**
- radical domino reactions
 - asymmetric radical domino processes 174
 - triterpene (+)-seco-C-oleanane 549, 550
 - yingzhaosu A 550, 551
- radical reactions, domino processes
 - anionic
 - acyloxymethyl radicals 153
 - barbier-type reaction 150
 - (+)-cortistatin A synthesis 151
 - diastereoselectivity 149
 - lactone radical cyclization 151
 - lanthanides 151
 - samarium(II) iodide 148
 - stereoselective synthesis, monocyclic and bicyclic products 152
 - cationic
 - α -alkylation, imines 145
 - bicyclo[5.3.0]decan-3-ones preparation 146
 - definition 143
 - dihydro-4H-1,3-oxazines 143
 - indoles 144
 - iron-catalyzed oxidative coupling, alkylamides and arenes 145
 - quinoline-2-carboxylates 145
 - pericyclic domino processes 172
 - radical/radical domino processes
 - allenes 164
 - bicyclic ring systems 162
 - C-glycosides 169–170
 - Co(III)-carbene radical-initiated reaction 166
 - cross-coupling reaction 163
 - 6-exo-trig cyclization 155
 - fortucine 158, 159
 - (+)-fusarisetin A 155, 156, 158
 - fused polycyclic vinylcyclopropanes 167, 168
 - garcibracteaton 159, 161
 - marcfortine B synthesis 160, 162
 - oroidin alkaloids 159
 - polyfluoroalkyl radical 164
 - quinoxaline 169
 - Smiles rearrangement process 167
 - spirocyclic lactones 170
 - stachybotrys metabolites bisabosquals 154, 156
 - titanium-radical-initiated radical substitution 167
 - tricyclic amide 155
 - triquinanes 160, 163
 - Ugi postcondensation reactions 169
 - reagent-based domino approach
 - alkynoic acids 512
 - domino double annulations 510
 - electrophilic ketoester 510
 - scaffold structures 510
 - two-directional synthesis 513
 - redox transformation 52–53
 - reduction initiated domino reactions
 - methyl methacrylate with acetone and trimethyl silane 301
 - anthranils preparation 309
 - aromatic nitro compounds 309
 - azides with triphenylphosphine 308
 - domino Heck/reduction/cyclization sequence 309
 - endiandric acid A 311
 - enolates generation 303
 - ($\pm$)-fredericamycin A 301
 - (–)-fructigenine A 307
 - in situ formation, metal hydrides 303
 - indole nucleus 309
 - Ireland–Claisen rearrangement 304
 - β -lactams 305
 - 1,5-methanoazocino[4,3-b]indole 309, 311
 - metal complexes catalyzed 302
 - organocatalytic asymmetric conjugate reduction 303
 - pericyclic reaction 311
 - pyrrolizidinones 305, 306
 - quinolines 309, 310
 - scholarisine A 306
 - SmI₂ 307
 - spiro-oxindole moiety 307
 - relay diyne metathesis 47
 - retro-Diels–Alder reaction 552

- rhodium-catalyzed carbonylative domino reactions
 - 5-aryl-2(5*H*)-furanones 13
 - asymmetrical ring-opening reaction 15
 - imino alkynes 14
 - indanones 13, 14
 - indenones 13, 14
 - 3-methylcyclopent-2-enones 15
 - regioselectivity 14
 - α,β -unsaturated ketones 13
- ring-rearrangement metathesis (rrm)
 - azanorbornene 39, 40
 - bicyclic dihydro-1,2-oxazine 40, 41
 - oxanorbornenes 34–36
 - tetraenes 37
- (+)-(R)-pinnatolide 540, 541
- ruthenium-catalyzed carbonylative domino reactions
 - allenyl aldehydes and ketones 8
 - bicyclic α,β -unsaturated γ -butyrolactones 8
 - cyclopentenones 12
 - cyclopropyl imines cycloaddition 11
 - hydroquinones 12
 - ketones 8
 - Pauson–Khand reaction 11
 - pyranopyrandiones 10
 - α -pyrones 10
 - yne-imines 10
- S**
 - (+)-stachyflin 525, 526
 - samarium(II) iodide
 - bromoketone 151
 - (+)-cortistatin 151
 - ketyl radicals 149
 - lactone radical cyclization 151
 - Martinell acid 149, 150
 - mediated radical/anionic domino processes 149
 - organo-samarium species 150
 - scaffold diversity
 - build-couple-pair approach 515
 - reagent-based. *See* reagent-based domino approach
 - substrate-based approach 507
 - scholarisine A 306
 - securinega alkaloids synthesis 47
 - sequential homobimetallic catalysis 20
 - serendipity
 - Groebke-Blackburn-Bienaymé reaction 601
 - Sharpless dihydroxylation 297
 - Sharpless epoxidation 341
 - shimalactones 557
 - (+)-sieboldine A 567, 568
 - sigmatropic rearrangements
 - acyclic substrates 193
 - Cope rearrangement 194, 196–197
 - cycloaddition 195
 - domino aryl-Claisen rearrangement 193
 - electrocyclization
 - – electron-withdrawing tosyl substituent, indol 198
 - – Fisher's indole synthesis 198–199
 - – highly substituted fused cyclobutane moieties 196
 - – hydrolysis 196
 - – pyrrolidinyl-substituted indol derivatives 198
 - – transition states 196
 - ene reaction 193
 - mixed transformations
 - – acetals 199
 - – oxy-cope/carbonyl-ene/claisen sequence 199
 - – persubstituted furans 201
 - transannular carbonyl-ene reaction 194, 199
 - siloxo-tethered dienynes 48
 - (+)-sylvaticin 297, 298
 - Smiles rearrangement process 167
 - S_N /Brook rearrangement
 - achiral and chiral linchpins 135
 - alkaloids 130
 - diastereoselectivity 136
 - enantiopure diol adducts 129
 - functionalized cyclopentanols 129
 - linchpin coupling 130
 - LR-ARC 137
 - mycoticin 130, 131
 - type I ARC and type II ARC 130
 - S_N /Michael addition reactions
 - 1-deoxythioglyconojirimycins 114, 115
 - 2,3,3,5-tetrasubstituted tetrahydrofurans 109
 - 2,3,3,6-tetrasubstituted tetrahydropyrans 108
 - 1,2,2-trisubstituted indane derivatives 106
 - benzyltriethylammonium tetrathiomolybdate 114
 - bicyclo[3.3.1]nonane ring system 109
 - cycloheptene oxides 113, 114
 - cyclopentanes 106, 107
 - S_N/S_N cycloalkylation, of stabilized carbanions 109
 - S_NAr /copper-catalyzed coupling 115

- spiroannulation reaction 106
- substituted benzoxepinones 113
- trans-decalin core synthesis 108
- twofold domino alkylation process 112
- twofold S_N type domino organocatalytic reaction 111
- solid-phase peptide synthesis (SPPS) 141
- Sonogashira reaction 554, 555
- spirocyclic amides 67, 69
- spirooxindoles 269, 359, 373, 399, 486, 487
- SPPS. *See* solid-phase peptide synthesis
- stenine 554
- stephacidin A 534, 535
- Stille reaction 557, 558
- Strecker synthesis 582
- Suzuki reaction 7

t

- Tamao–Fleming oxidation 532
- tandem-domino reactions 214
- Taniaphos-based ligands 438
- Taniaphos-type ligand 427, 439, 441
- tetrahydro- β -carbolines 254, 368, 565, 566
- tetrahydroxanones 545–546, 563
- titanium alkylidenes 62
- (–)-tocopherol 545, 546
- α -tocopherol 564
- transition-metal-catalyzed reactions
 - alkaloid (+)-sieboldine A 567, 568
 - biyouyanagin A 565, 565
 - cis-hydrindanone 567, 568
 - copper-catalyzed domino Buchwald–Hartwig amidation 555, 556
 - cyanthiwigin U 561
 - cyclooctatrienes 557
 - (–)-diversonol 563
 - $8\pi/6\pi$ -electrocyclization process
 - enyne ring-closing metathesis 562
 - (+)-8-epi-xanthatin 561, 562
 - functionalized seven-membered carbocycles 559

- (–)-galanthamine 556
- hirsutene 559, 560, 561
- hyperolactone C 565, 566
- linoxepin 558, 559
- minfiensine 555, 556
- palladium-catalyzed cross coupling, pyrone 556
- rhodium-catalyzed domino cyclization/cycloaddition reaction 567
- secodolastane diterpenoid (–)-indicol 565, 567
- shimalactones 557
- Sonogashira reaction 554
- tetrahydro- β -carbolines 565, 566
- tetrahydroxanones 563
- α -tocopherol 564, 565
- Wacker oxidation 563, 564
- transmetalation 430–440
- triphenylphosphine 308
- triquinanes 160, 163, 292, 559
- tris(4-bromophenyl)aminium hexachloroantimonate (TBPA) 145

u

- Ugi reaction 499, 509, 537, 541, 599, 601, 606

v

- vinylcyclopropanes 167, 292, 559
- vinylous Aldol Michael reactions
 - stereoisomer 276
 - synthesis of α -tocopherol synthesis 277
 - α,β -unsaturated carbonyl compound 276

w

- Wacker oxidation 454, 564
- Wittig reaction 314
- Wittig rearrangement 290

y

- Yingzhaosu A 550, 551

