

Index

a

- absolute stereochemistry 309
- ABT-341 1307, 1308
 - one-pot synthesis 1308
- β -ACC (cis- β -aminocyclopropylcarboxylic acid) 101
- ACDC (asymmetric counteranion-directed catalysis) 226, 742, 979, 982, 983
 - multifarious co-catalysts 1343
- acetaldehydes 59, 1031
 - aldol reaction donors 798, 799
 - Mannich reactions 809, 810
- acetals 810
 - Lewis acids 459
 - silyl ketene 163, 399
 - O-silyl-N,O-ketene 248
 - trichlorosilyl ketene 403
- trans-1,2-acetamidocyclohexanol 1245
- O-acetates 1198
 - indolyl 1198
- acetones 59, 588, 674
 - acetyl- 292, 321
 - direct aldol reaction 688
- acetonitrile 867
 - β -sulfonyl 867
- α -acetoxy- β -ketosulfides 1207
 - racemic 1207
- α -acetoxythioesters 1207
- N-acetylaminomalonate 602
- acetylenes 1207
 - addition 395
 - triethoxysilyl 396
- 5-acetylhex-2-enedionate 1101
 - diethyl 1101
- O-acetylquinine 133
- achiral counterions 277
- achiral gold complexes 951
- achiral phenethyl amines 299
- achiral substrates 1070
 - achiral tellurides 573
 - acid–acid bifunctional organocatalysis 327
 - acid–base organocatalysts 922
 - acidic activation 1026
 - acidic C–H bonds 984, 997
 - acidic functionalities 3
 - acidic ILs 913
 - acidity 496
 - azolium salts 496
 - acids 496
 - β -ACC 101
 - alkenylboronic 1002
 - amino 51
 - – *see* amino acids 51
 - arginine/p-toluenesulfonic 621
 - aspartate-derived peracid catalysis 536
 - binaphthyl phosphoric 300
 - bis-phosphoric 1144
 - boronic 211, 1004, 1317
 - Brønsted 38
 - – *see* Brønsted acid 38
 - carboxylic 63
 - – *see* carboxylic acids 63
 - (R)-CSA 622
 - DBSA 693
 - “designer” 1333
 - dicarboxylic 183, 280, 281
 - dichloroacetic 71
 - α -keto 1210
 - kojic 1212
 - Lewis 211
 - – *see* Lewis acids 211
 - malonic 263, 348
 - mandelic 329, 1062
 - Meldrum’s 1029
 - ortho-mercaptobenzoic 936
 - p-nitrobenzoic 72
 - 2-nitrocyclopropanecarboxylic 1119
 - phosphonic 860

- phosphoric 289
- – *see* phosphoric acids 289
- phthalic 639
- pipercolinic 410
- (R)-3-pyrrolidinecarboxylic 806
- trichloroacetic 78, 681
- trifluoroacetic 65, 638, 680
- vinyl boronic 1315
- acridinium carbocations 454
- acridinium bromide 232, 233
- acroleins 588, 1134
- α -substituted 1140
- acrylates 358
- dimerization 515
- hexafluoroisopropyl 132
- methyl 436, 902
- acrylic networks 653
- acrylic proline derivatives 657
- acrylonitrile 563
- activated benzaldehydes 148
- activated benzenes 1059
- activated methylene compounds 1305
- activated olefins 910
- umpolung 514
- activated substrates 465
- activation modes 794
- cyclopropanation 565
- Mannich reaction 794
- organocatalysis 730
- activations 381
- acidic 1026
- asymmetric 346, 350
- basic 1026
- Brønsted acids 1142
- α -carbon 757
- catalytic double 850
- covalent 465
- – *see* covalent activations 465
- dienamine 42, 43, 1017
- electrophile 135
- enamine 34, 53, 1013, 1032, 1137
- enamine–enamine 1294
- HOMO- 90
- hydrogen bond 432, 457, 1019, 1044
- imines 1132
- iminium 37, 43, 750, 978, 979
- iminium ion–enamine strategy 1295, 1297
- in vivo 360
- LUMO-lowering 979, 1046
- “non-classical” 1
- non-covalent 241
- – *see* non-covalent activations 241
- orthogonal modes 1292
- pronucleophile 344
- SOMO- 471
- SOMO 1168
- sonochemical 605
- trienamine 46
- active methylene/methine compounds 366
- active pharmaceutical ingredients 1307
- acyclic azomethine imines 281
- acyclic enones 997
- acyclic imines 185
- protonated 185
- acyclic ketones 293
- acyclic N-methyl amino acids 411
- acyclic β -substituted enones 1001
- acyclic systems 942
- acyclic α,β -unsaturated ketones 1136
- N-acyl enamides 946
- acyl enolates 227
- acyl equivalents 497
- acyl groups 59
- N-acyl imines 862
- acyl migration 1199
- asymmetric 1199
- acyl phosphonates 248
- α,β -unsaturated 259
- acyl-Strecker reaction 884, 885
- acylase 1248
- “minimal artificial” 1248
- N-acylated β -amino enones 170
- O-acylated azlactones 1192
- N-acylated oxazolidinones 260
- acylations 1341
- asymmetric 108
- chiral amines 1263
- DFT calculations 1229
- enantioselective 1225
- hydro- 1341
- – *see* hydroacylations 1341
- kinetic resolution of alcohols 1225
- regioselective 1243
- side-reactions 1341
- acylbenzotriazoles 227, 279
- acyliminium 743
- N-acyliminium ion 743, 749, 1052
- α -acyloxyacroleins 176, 1114
- 4-acyloxyprolines 684
- IL-tagged 685
- acylpyridinium ion 1240
- additions 685
- acetylenes 395
- allylstannane 451
- asymmetric conjugate 63, 123
- aza-Michael 990
- boryl/silyl conjugate 517

- carbonyl compounds 639
- conjugate 346, 353, 357, 583
- cyclo- 43
- - see cycloadditions 43
- direct 44
- syn-/anti-face 476, 478
- fluoromethyl 988
- isonitrile 404
- Mannich 705
- Michael 7
- - see Michael addition 7
- nitroalkanes 851
- nitroalkyls to C=X bonds 841
- nucleophilic 381
- - see nucleophilic addition 381
- organocatalytic 841, 846
- phenol-assisted 468
- sequential 1038
- sulfones to C=X bonds 864
- synergic organocatalytic 741
- TMSCN 446
- to alkynes 1169
- to olefins 1169
- triazole 992
- vinylogous 44
- 1,2-addition 864
- sulfone-containing nucleophiles 864
- air sensitivity 496
- alanine 56, 485, 873
- L-alanine 97
- alcohols 873
- allylic 79, 523, 739
- amino 60, 769
- 1,2-amino 806
- anti-1,2-amino 61
- syn-1,2-amino 1289
- α -amino 1
- aryl alkyl 1231, 1245
- asymmetric oxidation 541
- chiral 245, 769
- chiral secondary 1225
- homoallylic 392, 438
- kinetic resolution 1225
- MacMillan catalyst 735
- nucleophilic substitution 738
- oxidative kinetic resolution 541
- 2-oxo-allylic 1217
- propargylic 740, 1231, 1232
- racemic 1227
- resolution 540
- secondary 541, 744
- tertiary 1246
- alcoholysis 141, 265
- aldehydes 265
- acetylene addition 395
- aldol reactions 399, 401
- aliphatic 57, 169, 274, 392, 1107
- alkyl 559
- α -alkylation 734, 735, 1072, 1182
- α -allylation 1076
- α -amination 596, 762
- aromatic 56, 588
- α -arylation 472
- asymmetric allylation 1170
- asymmetric nitroalkylation 1180
- α -benzylation 1184
- branched 64
- α -branched 736
- C-C bond formation 103
- catalytic allylation 382
- α -chloro- β -branched 87
- cinnamic 934
- conjugate addition 153
- cyanation 404
- β,β -dialkyl α,β -unsaturated 773
- α,α -disubstituted 1016
- enamine activation 1032
- enantioselective epoxidation 549, 553
- enolizable 72, 78, 640, 1031
- α -fluorination 71
- α -fluoro- α,β -unsaturated 511
- α -functionalization 35
- H-bond interaction 551
- α -halo 507
- α -hetero-substituted 1034
- heteroaromatic 553
- hydrocyanation 107, 874
- hydroxyamination 175
- iodination 175
- MBH reaction 330
- Michael addition 480, 491
- multifunctional 1071
- α -nitro- 987
- γ -nitro- 643
- organocatalytic addition 841
- propargyl 1212
- α -reducible 506
- solid 607
- stoichiometric allylation 393
- α -trifluoromethylation 76, 1185
- α,β -unsaturated 37, 40, 711, 977, 1046
- Alder 18
- - see Diels-Alder . . . 18
- aldimines 394, 880, 896
- aromatic 1324
- N-Boc 304
- nitrogen 488
- α -unbranched 891

- aldol condensation 477
 - ultrasonic conditions 602
- aldol cyclization 484
- aldol reactions 398, 678, 793
 - acetaldehydes 798, 799
 - aldehydes 399, 401
 - aldolases 795
 - asymmetric 9
 - bifunctional catalysts 818
 - Brønsted acids 811
 - Brønsted bases 818
 - “by water” 800
 - C–C bond formation 98
 - C=X bonds 793
 - chiral Lewis bases 396
 - cross- 57, 59, 162, 619
 - direct 56, 673, 688, 814
 - domino Michael/aldol reaction 1103
 - enantioselective 476
 - glycolate 164
 - high-pressure conditions 586, 587
 - intermolecular 52, 57, 796, 811
 - intramolecular 309, 799, 800, 814
 - isatins 819
 - L-proline-catalyzed 1071
 - Michael–aldol–dehydration 64
 - Mukaiyama 247, 248, 812, 813
 - MW irradiation 595
 - nitroso 250
 - O-nitroso 12
 - non-proline catalysts 56
 - “on water” 633, 800
 - polymer-supported catalysts 657
 - proline-catalyzed 469
 - PTC 824
 - syn-selective 796, 798
 - solvent-free 606
 - threonine 485
 - transannular 800, 1072
 - vinylogous 165, 262
 - water 675, 677
- 6-endo aldol reaction 799, 800
- syn-aldol reactions 637
- aldolases 99, 676, 795
- aldols 682
 - structure 682
- aliphatic aldehydes 57, 274
 - allylation 392
 - enolization 169
 - heterocyclizations 1107
- aliphatic Claisen rearrangement 1209
- aliphatic enals 1098
- aliphatic hydrazones 894
- aliphatic-substituted nitroalkenes 254
 - aliphatic substrates 502
- alkaloids 502
 - asymmetric reactions 624
 - bis-cinchona 152, 346
 - indole 306
 - indole-derived 90
 - lycopodium 82
 - marine 1058
 - pseudo-enantiomeric 345
 - Strecker reaction 892
 - total synthesis 1365
 - tryptamine-derived 1362
- alkanethiols 140
- alkenes 140
 - cyclic 111
 - electron-deficient 532, 566, 771
 - epoxidation 523, 524, 535
 - hydroacylation 506
 - α -nitro 639
 - terminal 528
- cis-alkenes 528
 - non-conjugated 529
- alkenylboronic acid 1002
- alkoxides 1202
 - onium 1202
- p-alkoxy anilines 1326
- alkoxycarbonylation 1197
- alkyl aldehydes 559
- alkyl halides 1116
 - “non-stabilized” 724
- N-alkylated histidine residues 108
- alkylations 559
 - asymmetric 369
 - F-C 65
 - – see Friedel–Crafts alkylation 65
 - intermolecular 737, 739
 - intramolecular 1107
 - ketones 737
 - Michael–alkylation reaction 1116
 - phase-transfer 602
 - proline-catalyzed 734
 - N-protected glycine ester 611
 - reductive 747
 - stereoselective 739
 - sulfide 549
- α -alkylations 729
 - aldehydes 734, 735, 1182
 - formyl group 80
 - intermolecular 726
 - intramolecular 1072
 - SN2-type 726
- γ -alkylations 736
 - asymmetric 1347
 - direct asymmetric 1346

- alkylene-indolinone 569
- alkylidene-indolinone 569
- N-alkylimidazole 912
 - amphiphilic derivative 912
- alkylimidazolium cations 638
- 2-alkynals 936
- alkynes 1169
 - additions 1169
 - 3-alkynoates 271, 1205
 - alkynyl borates 1001, 1002
- allenes 172
- allenoates 1099, 1205
 - chiral 271, 1205
 - ethyl 1100
- allenones 1100
- allenylation 395
- allyl amines 1272
- allyl vinyl ethers 1210
- allylations 1210
 - asymmetric 168, 1170, 1172
 - benzaldehydes 385
 - benzoyl hydrazone 440
 - catalytic 382
 - imines 394
 - Sakurai 449
 - stoichiometric 393
- α -allylations 746, 1076
- allylic alcohols 79, 523
 - stereoselective alkylation 739
- allylic alkylation 1266
- α -allylic alkylation 739
- allylic amines 1204
- allylic bromides 567, 568
- O-allylic carbamates 1204
- allylic carbenium ions 740
- allylic substitution 1084
 - metal-free 744
- allylic trichloroacetimidates 1204
- allylic ylides 566
 - [3+2]-annulation 566
- allylidene 554
- allylides 552
- α -allyloxy methyl ketones 1209
- allylstannane addition 451
- allyltrichlorosilane 393
- amides 568, 636
 - Weinreb 172
- amidine-based catalysts 1230
- amidinium ion 269
- α -amido sulfones 863, 892
- aminals 763, 1039
- aminations 892
 - asymmetric 349
 - carbonyl compounds 758
 - di- 1297
 - electrophilic 766, 768
 - enantioselective 180
 - enones 1003
 - reductive 298, 299, 944, 959, 1317
- α -aminations 478, 479, 762, 776
 - α -branched aldehydes 596
 - direct 761
 - proline-catalyzed 762
- amine groups 145
 - primary 145
- amines 145
 - achiral phenethyl 299
 - allylic 1204
 - aromatic 410
 - α -branched 944
 - catalysts 467, 1167
 - chiral 1044, 1135, 1155
 - chiral primary 1140
 - chiral secondary 1044, 1132, 1288
 - cyclic 1276
 - di- 1135
 - – see diamines 1135
 - glycosyl 895
 - kinetic resolution 1263
 - MacMillan's chiral 475
 - MBH reaction 900
 - β -nitro 863
 - non-aromatic 411
 - primary 330
 - – see primary amines 330
 - primary–tertiary 680
 - propargylic 1270
 - secondary 3
 - – see secondary amines 3
 - C2-symmetric 174
 - tertiary 571
 - – see tertiary amines 571
 - tertiary conjugates 8
- amino acids 8
 - acyclic N-methyl 411
 - carbonyl hydrocyanation 873
 - derivatives 140
 - α, α -disubstituted 111, 112, 985
 - hydrophobicity 679
 - natural 929
 - non-proline catalysts 51, 54, 485
 - primary 51–53
 - N-protected 1343
 - unmodified 55
 - unnatural 882
- α -amino acids 1, 631
 - bicyclic analogues 489
 - chiral 945

- derivatives 414
- α -deuterated 265
- IL media 618
- β -amino acids 62, 860
- derivatives 415
- designed 491
- amino alcohols 60
- chiral 769
- 1,2-amino alcohols 806
- anti-1,2-amino alcohols 61
- syn-1,2-amino alcohols 1289
- α -amino alcohols 1
- α -amino amide units 636
- β -amino carbonyl compounds 60, 934, 1310
- 4-amino-4H-chromenes 936
- 9-amino-9-deoxyepicinchonine 702
- amino derivatives 146
- C9 146
- β -amino enones 960
- N-acylated 170
- α -amino esters 300
- β -amino esters 446
- amino-fluorination 1297
- α -amino- δ -lactone 180
- derivatives 180
- α -amino nitriles 892
- 3-amino-2-oxindole compounds 766
- amino-siloxy dienes 245
- δ -amino- α,β -unsaturated carboxylic ester 1310
- aminoalkylation 183, 1325
- aminoallylation 1214
- aminobenzoxazoles 1313
- β -aminocarbonyl compounds 793, 806
- aminocatalysis 1, 1073, 1359
- asymmetric 1287
- cooperative 1343
- industrial applications 1373
- aminocatalysts 1291
- aminocyclohexanone 596
- 4-N-protected 596
- cis- β -aminocyclopropylcarboxylic acid (β -ACC) 101
- aminoindanol-derived triazolium salts 510
- aminophosphonium ion 189, 227
- 4-trans-aminoproline 102
- aminopyridinium 275
- β -aminosulfur compounds 312
- aminoxylation 774, 775
- α -aminoxylation 633, 634
- ammonium betaines 375
- chiral 822, 823, 856, 1202, 1203
- ammonium bromides 371
- ammonium fluorides 373
- chiral 374
- ammonium nitrate 72
- ceric 72, 1167, 1175
- ammonium salts 150
- quaternary 150, 824–826, 890
- ammonium ylides 572
- amphiphilic N-alkylimidazole derivatives 912
- anhydrides 912
- meso-glutaric 265
- isobutyric 1267
- pivalic 1236
- PMBA 1234
- meso-succinic 265
- meso-anhydrides 612
- cyclic 611
- anhydrous chloral 682
- anilines 593, 1313
- p-alkoxy 1326
- anions 682
- acyl 497
- bis(triflyl)amide 633
- counter- 437
- – see counteranions 437
- DBS 697
- metathesis 750
- onium carbanions 366, 367
- oxazolone 1199
- PTC 370
- zzz 437
- – see also ions 437
- p-anisaldehyde 247
- 4-anisidine 588
- p-anisidine 706, 1288
- annulations 706
- asymmetric 128
- Claisen rearrangement 1213
- enals 1111
- Hajos–Parrish–Eder–Sauer–Wiechert 1374
- Kröhnke 391
- phosphine-catalyzed 567
- Robinson 309, 310, 1334, 1335
- [3+2]-annulations 566
- allylic ylides 566
- [4+2]-annulations 172
- allenes 172
- anthrones 256, 360, 1144, 1145
- 9-anthryl groups 1157
- anti-HIV drugs 855
- anti-inflammatory drugs 1236
- non-steroidal 1236

- antibiotics 643
 - β -lactam 643
- aqueous intermolecular aldol reactions 57
- aqueous media 632
 - zzz 802
 - – *see* also water, “in water” reactions 802
- arenes 1051
 - F-C alkylation 1051
- arginine/p-toluenesulfonic acid 621
- (–)-aromadendranediol 1365
 - sesquiterpene 90
- aromatic aldehydes 56
 - HSBM 610
- aromatic aldimines 1324
- aromatic allenones 1100
- aromatic amines 410
- aromatic compounds 1111
 - optically active 1111
- aromatic electron-rich aldehydes 588
- aromatic enals 1103
- aromatic groups 152
- aromatic nucleophiles 1043
 - F-C reactions 1043, 1045
- aromatic-substituted nitroalkenes 254
- aromatic systems 1043
 - functionalization 1043
- aromatic thiols 1006
- arsenic ylides 566
- arsonium ylides 570, 1117
- artificial systems 222
- aryl alkyl alcohols 1231
 - secondary 1231, 1245
- 2-aryl-4-alkyloxazolones 1192
- aryl N-Boc imines 854
- γ -aryl- γ -butyrolactones 530
- aryl/chlorination domino sequence 1296
- aryl imines 923
- aryl-linked N,N'-dioxide 887
- β -aryl nitroolefins 1016
- α -aryl-propionaldehydes 596
- aryl substituents 38
- β -aryl-substituted nitroalkenes 266
- aryl sulfonamide 1299
 - proline 1299
- aryl sulfonyl indoles 734
- arylaldehydes 687
- arylamination 1054
 - olefins 1054
- arylamino-phosphonium ions 189
 - α -arylations 78, 472
 - intramolecular 1176
 - ortho-selective 1177
- 2-arylcyclopentanones 531
- N-arylhydroxylamines 1093
- arylideneiminomalonates 1096
- N-arylsulfonyl-substituted prolinamides 6
- arylsulfonylacetates 866
- aspartate derivatives 536, 537
- asymmetric activations 346, 350
 - conjugate addition 346
- asymmetric acyl migration 1199
- asymmetric acylation 108
- asymmetric aldol reactions 9
- asymmetric alkylation 369
- asymmetric γ -alkylation 1347
 - direct 1346
- asymmetric allylations 168
 - aldehydes 1170
 - intramolecular 1172
- asymmetric amination 349
- asymmetric aminocatalysis 1287
- asymmetric annulation 128
- asymmetric aza-MBH reaction 914
- asymmetric cascade reactions 356
- asymmetric conjugate addition 63, 123, 353
- asymmetric cooperative catalysis 1333
- asymmetric counteranion directed catalysis (ACDC) 226, 742, 979, 982, 983
 - multifarious co-catalysts 1343
- asymmetric cyanation 405
 - catalytic 405
- asymmetric cyclopropanation 563, 565
- asymmetric dearomatization 537, 538
- asymmetric desymmetrization (ASD) 1225, 1254
- asymmetric Diels–Alder reaction 351, 360
- asymmetric enamine catalysis 585
- asymmetric epoxidation 19
 - Ti/tartrate-catalyzed 523
- asymmetric Friedel–Crafts (F–C) reaction 1043
- asymmetric functionalization 33
- asymmetric α -functionalization 35
- asymmetric β -functionalization 37
- asymmetric Henry reaction 847
 - cinchona alkaloids 847
 - α -ketophosphonates 848
 - phosphonium salts 845
- asymmetric hydrogenation 1
- asymmetric induction 914
- asymmetric Knoevenagel condensation 149
- asymmetric MBH-reaction 914
- asymmetric Michael additions 611
 - squaramides 611
- asymmetric nitroalkylation 1180
 - aldehydes 1180

- asymmetric organocatalysis 1
 - high-pressure conditions 581
 - ILs 618
 - open shell 1165
 - total synthesis 1359
- asymmetric oxidation 541
- asymmetric phosphorylation 110
- asymmetric protonation 301
- asymmetric PTC 370
- asymmetric reactions 471
 - SOMO-activation 471
- asymmetric reduction 644, 955
 - C=O bonds 963
 - imines 410, 411
 - ketones 412
- asymmetric ring-opening 311
- asymmetric α -sulfenylation 37
- asymmetric sulfonylation 1257
- asymmetric synthesis 1, 289
 - photochemical 1186
- asymmetric transformations 345
 - cinchona alkaloids 345
- atom economic reagents 952
- atropisomers 1061
 - non-biaryl 1061
- atroposelective reactions 742
- Au . . . 1058
 - – see gold . . . 1058
- axial stereogenic guanidines 771
- axially chiral dicarboxylic acids 280
- axially chiral quaternary ammonium salt 824
- axially chiral C₂-symmetric catalysts 161
- axially chiral thiourea derivatives 329
- aza-adamantane catalysts 542
- aza-benzoin reactions 501
- 2-aza-Cope rearrangement 1213
- aza-crown ether 771
- aza-Darzens reaction 1122, 1123
- aza-Diels–Alder reaction 435
 - one-pot 630
 - zzz 1324
 - – see also Povarov reaction 1324
- aza-enamine reaction 185
 - imino 185
- aza-Friedel–Crafts (F–C) alkylation 1061
- aza-Friedel–Crafts (F–C) reaction 1050
- aza-Henry reactions 276, 851
 - Brønsted bases 852
 - hydrogen bond catalyzed 857
 - PTC 862
- aza-hetero-Diels–Alder reaction 1155
- aza-MBH reaction 1, 899
 - asymmetric 914
 - domino 926
 - five-membered cycles 1110
 - oxa-Michael/aza-MBH tandem reaction 935
 - stereoselectivity 908
- aza-Michael addition 990, 1023
- aza-Michael reaction 280, 993
 - enantioselective 1003
 - intramolecular 1074
 - organocatalytic 990
- aza-Petasis–Ferrier rearrangement 1215
- 2-azadamantane-N-oxyls 541
 - chiral 541
- azadicarboxylates 45
- azaferrocenes 199
 - chiral derivatives 199
- azaheterocycles 1023
- 7-azaindolum salts 277
- azepine 534
- azepinium 535
- azepinium salts 534
 - biaryl 534
- azides 228, 761
- azido-modified Merrifield resins 660
- aziridinations 1, 560
 - diazoacetamides 184
 - imines 560, 573
 - three-membered cycles 1120, 1122
 - α,β -unsaturated carbonyl compounds 758
 - α,β -unsaturated ketones 1345
- aziridines 1122
 - chiral 1122
 - synthesis 1120
 - vinyl 560
- meso-aziridines 311
- aziridinium intermediates 749
- aziridomitosane 1246
- 2H-azirines 760
- azlactones 272, 274, 278, 811, 812
 - O-acylated 1192
 - O-carbonylated 1193, 1196
 - Mannich reaction 279
 - racemic 264, 1149
- azodicarboxylates 180, 263, 350, 596, 1061
 - α -amination 762
 - diethyl 478
 - α -heteroatom functionalization 761, 763
- azolium-catalyzed redox reaction 1211
- azolium enolate 512
- azolium salts 496
- azomethine imines 185, 186
 - acyclic 281

- azomethine ylides 1096, 1097
 – spirooxindole synthesis 1323
- b**
- backbone 281
 – binaphthalene 282
 – binaphthol 360
 – binaphthyl 177
 – chiral 888
 – chiral oxazoline 1151
 – poly(methacrylate) 417
 – spiro[cyclohexanone-oxindole] 600
 – zzz 360
 – – see also scaffolds 360
- Baeyer–Villiger oxidation 537
 Baeyer–Villiger reaction 525, 531
 bakkenolides 513
 Bakshi 966
 – – see Corey–Bakshi–Shibata catalyst 966
- ball milling (BM) 581, 605, 610
 Bamford–Stevens reaction 558
 BAMOLs 249
 Barbas 586
 – – see List–Barbas–Mannich reaction 586
- bases 249
 – base effect 564
 – base-free neutral PTC 371
 – Brønsted 203
 – – see Brønsted bases 203
 – chiral 1148
 – inorganic 366
 – Lewis 198
 – – see Lewis bases 198
 – pairing 241
 – Schiff 181, 367, 369, 878, 1096
 – solvent-dependent 822
- basic activation 1026
 basicity 374
 Baylis–Hillman reaction 584, 1228
 – zzz 124
 – – see also Morita–Baylis–Hillman . . .
 124
- benzaldehydes 119, 249
 – activated 148
 – allylation 385, 393
 – Henry reaction 844
 – MBH reaction 902
 – substituted 387
 – p-substituted 388
 – ylidic methylene-transfer 559
- benzaldimine 561
 benzenes 1059
 – activated 1059
 benzhydrylic cations 748
- benzimidazoles 440
 1,3-benzodithiol group 735
 benzodithiolylium ion 735
 benzofuranones 1194
 – O-carbonylated 1194, 1196
 benzofuran-2(3H)-ones 767
 benzoin 1
 – reactions 497, 1077
 benzoquinone 1131
 o-benzoquinone 1156
 – diimide 1156
 p-benzoquinone 229
 benzotetramisole (BTM) 1230, 1266
 benzothiazolines 302, 303, 964
 1H-benzotriazole 1003
 O-benzoyl esters 134
 benzoyl hydrazones 440
 N-benzoyl hydrazones 394
 benzoyl peroxide 72
 benzoylmethyl sulfonium ylides 1115
 benzyl bromide 645
 O-benzyl hydroxyacetone 706
 N-benzyl ketimines 958
 benzyl protecting groups 568
 benzyl thiols 62
 α -benzylation 1184
 – aldehydes 1184
 O-benzylhydroxyamines 1003
 benzylideneacetone 591
 benzylthiol 257
 betaines 257
 – ammonium 375
 – chiral ammonium 822, 823, 856, 1202,
 1203
 – intermediates 564
- bi-spirooxindoles 1104
 biaryls 1
 – azepinium salts 534
 bicyclic guanidines 1145
 – catalysts 358
 – chiral 886
 – C2-symmetric 876
 bicyclic oxazolidines 1094
 bicyclic 2-oxo-allylic alcohols 1217
 bicyclic pyrrolidine catalysts 489
 [4.1.0]bicycloalkanones 571
 bicyclo[3.2.1]octan-8-ones 1109
 bicyclo[3.2.1]octane-6-carbaldehydes 1104
 bidentate catalysts 386
 bidentate mode 317
 bifluoride 374
 – ammonium 374
 bifunctional ammonium bromides 371
 bifunctional catalysis 1085

- bifunctional catalysts 16, 250, 326, 882, 906
 - acid–acid organo- 327
 - Brønsted bases 344, 817, 822
 - chiral 1144
 - homo- 326
 - Mannich reaction 822
 - phosphine-sulfonamide 928, 929
 - phosphonium iodide/chloride salts 447
 - sulfonamide primary amine 702
 - thiourea 853, 1146
- bifunctional Lewis bases 709
- bifunctional thiourea 765
- bifunctional thiourea-amine 853
- Biginelli reactions 630, 1321
 - condensation 8
 - non-covalent catalysis 1321
 - three-component 630
- BINAP 644
- binaphthalene backbone 282
- binaphthol 1321
 - backbone 360
 - derivatives 181
- binaphthyl backbone 177
- binaphthyl-based diamine catalysts 1141
- binaphthyl phosphoric acid 300
- binaphthyl scaffolds 554
- binaphthylamine scaffolds 329
- BINAPO 169, 398
- BINOL 405, 953
 - (S)-BINOL-derived N,N'-dioxide 888
 - BINOL-derived phosphoramides 1095
 - derivatives 181, 290
 - Michael reactions 1001
 - Petasis–Ferrier rearrangement 1215
 - phosphates 893
 - phosphoric acid 860
- (S)-BINOL 1335
- BINSA 182
- biocatalysis 805, 806
- biomimetic hydrogen sources 298, 964
- biphasic conditions 891
- biphasic non-covalent immobilization 626
- biphenol 181
 - derivatives 181
- biphenylene-diols 244
- 1,8-biphenylenediol derivatives 316
- bipyridine N-monoxides 386
- bipyridine N,N'-dioxide 167
- 2,2'-bipyrrolidine catalysts 10
- bis-acetate catalysts 532
- bis-allylic systems 389
- bis-amidine salts 275
 - chiral 275
- bis-cinchona alkaloids 152, 346
- bis-formamides 886
 - chiral 889
- bis-phosphonium salts 446
- bis-phosphoramides 163, 386
- bis-phosphoric acid 1144
 - chiral 1144
- bis-sulfonamide intermediate 903
- bis-thioureas 188
- bis(arylthiourea) 843
- 1,1-bis(benzenesulfonyl)ethylene 1032, 1037
- bis(phenol) 1247
- bis-phosphine dioxides 169, 171
- (Z)-1,2-bis(sulfone)vinylene 1033
- 3,5-bis(trifluoromethyl)phenyl group 318
- bis(triflyl)amide anion 633
- bisulfite salts 1153
 - α -chloroaldehyde 1153
- (–)-bitungolide F 1362
- BM (ball milling) 581, 605, 610
- [bmim][BF₄] 456, 622, 634
- [Bmim][Tf₂N] 686
- N-Boc aldimines 304
- N-Boc imines 183, 276, 854, 866, 910
 - ethyl trifluoropyruvate 1051
- Boc-protected imines 275
- N-Boc-protected imines 292
- Boltzmann distribution 473
- bond rotation 45
 - single 45, 46
- bonding 46
 - covalent 625
 - hydrogen 224
 - – see hydrogen bonding 224
- bonds 224
 - acidic C–H 984
 - C–C bond formation 98, 306, 508
 - C–O bond formation 770
 - C=X 793, 941
 - heteroatom σ 517
 - reversible formation 221
 - stereoselective formation 487
- boranes 966
- borates 1214
 - alkynyl 1001, 1002
- borohydride 1193
 - sodium 1193
- boronic acids 211, 1317
 - hemiesters 1004
 - vinyl 1315
- borono-Mannich reaction 1316
 - – see Petasis reaction 1316
- boryl conjugate addition 517

- (-)-botryodiplodin 1027
- branched aldehydes 64
- α -branched aldehydes 736
 - α -amination 596
- α -branched amines 944
- α -branched enals 1347
- Brassard's diene 248, 249, 296, 1157
- Breslow intermediates 496, 513
- bromides 513
 - acridizinium 232, 233
 - allylic 567, 568
 - benzyl 645
 - bifunctional ammonium 371
 - cinnamyl 561, 563
 - hydrophilic 636
 - quinidinium 1000
- α -bromo carbonyl compounds 782
- bromo-[2.2]paracyclophane 196
- α -bromoaldehydes 176
- cis- γ -bromoallyltrichlorosilane 169
- 4-bromobenzaldehyde 588
- bromocycloetherification 1338
- bromolactonization 1086
- bromomalonates 1118
 - diethyl 704, 1117
- 2-(bromomethyl)acrylates 726
- Brønsted acids 211, 243, 811
 - asymmetric induction 930
 - asymmetric synthesis 289
 - bifunctional strategies 907
 - C=X bonds 810
 - catalyst design 290
 - cationic 189
 - chiral 745, 1142, 1150, 1157
 - co-catalysts 38
 - dual use 1334
 - F-C reactions 1062
 - hydrocyanation 893
 - Lewis bases and 1335
 - Mannich reaction 815
 - natural products synthesis 1366
 - nitro groups 1354
 - non-covalent activations 241
 - non-covalent catalysis 1309
 - nucleophilic substitution 1367
 - pinacol rearrangement 1219
 - ring-forming reactions 1081
 - SN1-type reactions 741, 746
 - C2-symmetric 181
 - TRIP 1326
- Brønsted bases 203
 - aldol reactions 818
 - aza-Henry reaction 852
 - bifunctional catalysts 817
 - Henry reactions 820
 - nitrogens 344
 - non-covalent activations 343
 - onium phenoxides 375
 - organic 817
 - protonated 343
 - C2-symmetric 177
 - thiourea catalysts 352
 - vinylogous aldol reaction 819
 - brucine N-oxide 907
 - BTM (benzotetramisole) 1230, 1266
 - t-Bu esters 400
 - O-But-L-threonine 59, 61
 - butenolides 1206
 - γ -butenolides 986
 - (S)-4-trans-tert-butoxyproline 762
 - n-butyl groups 681
 - N-tert-butyl-2-hydroxy-2-(2-naphthyl)acetamide 406
 - tert-butyl-diphenylsilyl ether 622
 - L-serine 622
 - γ -butyrolactam 1348
 - α,β -unsaturated 1348
 - "by water" aldol reaction 800
- c**
- C9 amino derivatives 146
- C8-C9 configuration 323
- C9 esters 133
- C9 ethers 127, 129
- C6'-OH cinchona alkaloids 847
- "C2-trick" 326
- cages 793
 - charged 229
 - tetrahedral 229
- Cahn-Ingold-Prelog (CIP) system 195, 196
- calcium phosphate 817
 - chiral 817
- calculations 817
 - DFT 306
 - - see DFT calculations 306
 - enantiomeric excess 487
 - MC/EM 104
 - ONIOM 311
 - quantum mechanical 686
- calomel electrode 1182
 - saturated 1182
- Calvin cycle 795
- camphor 552
- camphor sulfonyl chloride 557
- camphor sulfonyl hydrazine 1141

- camphorsulfonic acid (CSA) 1346
- (R)-camphorsulfonic acid ((R)-CSA) 622
- CAN (ceric ammonium nitrate) 72, 1167, 1175
- capsules 622
 - molecular 1
 - “softball” 228
- capture 234
 - dynamic covalent 234
- carba-Michael additions 83, 85
- carbaldehydes 483
 - cyclohexene 1304
- carbamates 483
 - O-allylic 1204
 - N-chloro-N-sodio 1120
 - enantio-enriched 1264
 - homoallylic 536
- carbanions 536
 - “carbanion”-type reactivity 44
 - onium 366, 367
- carbenes 367
 - carbene transfer 556, 557, 561, 562
 - chiral 1154
 - dual organocatalysis 1338
 - NHC 209
 - – *see* N-heterocyclic carbenes 209
 - precursors 209
 - ring-forming reactions 1077, 1078
- carbenium ions 431, 729
 - allylic 740
 - isolated 731
 - oxidative behavior 454
 - transient formation 733
- carbenium salts 448
- carbinamines 440
- carbinolamines 467
- carbo-oxidation 1175
 - styrenes 1175
- carbocations 730
 - acridinium 454
 - catalysts 448
 - α -ferrocenyl 453
 - heteroatom-stabilized 748
 - stabilized 77
- carbohydrate-derived ketones 531
- carbon–carbon bond-forming reactions 306, 508
- carbon-centered nucleophiles 1019
- carbonates 508
 - enol 1195, 1197
 - furanyl 1200
 - MBH 124
 - oxazolyl 1201
- carbonyl compounds 1201
 - addition 639
 - amination 758
 - β -amino 60, 934, 1310
 - aminoxylation 774
 - α -bromo 782
 - enantioselective α -halogenation 779
 - enolizable 1360
 - F-C reactions 1049
 - ω -formyl- α,β -unsaturated 931
 - α -functionalization 1361
 - β -functionalization 1364
 - heterofunctionalization 621, 757
 - non-enolizable 911
 - phosphination 769
 - α -pnictogenation 758
 - sterically demanding 53
 - α,β -unsaturated 758
- β -carbonyl esters 132
- O-carbonylated azlactones 1193, 1196
- O-carbonylated benzofuranones 1194, 1196
- O-carbonylated oxindoles 1194, 1196
- carbonyls 1196
 - asymmetric conjugate addition 353
 - hydrocyanation 873
 - saturated 1295
 - α,β -unsaturated 572
- carboxylates 376
 - trans- β -lactone 1112
- carboxylic acids 225
 - cooperative hydrogen bonding 482
 - deprotonated 479
 - functionalities 63
 - groups 475
 - proton transfer 488
 - pyrrolidine 489
- carboxylic ester 1310
- carboxyl/imidazole 491
 - catalytic dyad 491
- (R)-carvone 555
- cascade catalysis 1365
 - organocascade transformations 1053
- cascade reactions 41, 42, 149
 - asymmetric 356, 950
 - cycloaddition 1094, 1177
 - diversity-oriented 1056
 - dual organocatalysis 1353
 - F-C alkylation/cyclization 1055
 - imidazolidin-4-one 74, 86
 - Michael 484
 - Michael alkylation 723
 - MW irradiation 598
 - non-covalent activations 266

- quadruple 1055, 1303, 1304
- relay 1352
- stereoselectivity 482
- triple organocascade 1300, 1302
- “catalophore” 111
- minimal 111
- catalysis 482
- ACDC 226, 742, 979
- amino- 1073, 1287, 1359, 1373
- aspartate-derived peracid 536
- bifunctional 1085
- – *see* bifunctional catalysts 1085
- carbene 1077, 1078
- cooperative 1158, 1333, 1334, 1343
- covalent 1070
- dienamine 1138, 1363
- dual-catalysis approach 1203
- dual organocascade 1053
- emulsion 677
- enamine 1360
- – *see* enamine catalysis 1360
- enzymatic 465
- HBD 747
- iminium 1363
- – *see* iminium catalysis 1363
- metal-free 269
- NHC 829, 830
- non-covalent 1081
- nucleophilic 515
- organo-photoredox 77
- photoredox 1180
- PTC 1
- – *see* phase-transfer catalysis 1
- SOMO- 71, 75, 1047, 1075
- sulfur ylide 548
- supramolecular 1
- synergistic 732, 805, 1276
- transition metal 805
- trienamine 1138, 1139
- tripeptide 1029
- catalysts 1138
- activity 581
- amidine-based 1230
- amines 900, 1167
- amino- 1291
- aza-adamantane 542
- azepinium 535
- bicyclic 489
- bicyclic guanidine 358
- bidentate 386
- bifunctional 16
- – *see* bifunctional catalysts 16
- binaphthyl-based diamine 1141
- BINOL-phosphates 893
- 2,2'-bipyrrolidine 10
- bis-acetate 532
- bis-phosphoramides 163
- carboxyl/imidazole dyad 491
- “catalyst–substrate co-immobilization” 100
- catalyst–substrate interactions 243
- CBS 966
- chiral 1131
- – *see* chiral catalysts 1131
- cinchona-thiourea 821
- co- 38
- – *see* co-catalysts 38
- “conformation-switch” 1241
- conformationally flexible 712
- Curran's 316
- cycle-specific 1300
- cyclic hydrazide 708
- design 290
- diamine 55, 801
- diarylprolinol 33, 41, 703, 992
- α,α -diaryl-prolinol 779
- diarylprolinol trimethylsilyl ether 39
- diketopiperazines 877
- discovery 221
- epoxide opening 419
- flavin-cyclodextrin 540
- FLPs 967, 969
- fructose-derived ketone 524
- gold 951, 1056, 1324
- guanidinium thiourea 825, 827
- guanidinyl 16
- Hayashi 735
- homogeneous 331
- hybrid 706
- hypervalent silicon based 438
- IIs conjugate 13
- imidazolidinone 1172
- iminium salts 532
- immobilization 416
- in silico design 486, 491
- incompatible 1054
- Inoue's 874
- Jacobsen's 317, 330, 332
- Johannsen's 203
- L-threonine-derived 58, 60
- lactam 529, 530
- Lewis bases 956
- MacMillan 735, 981
- N-Mes 513
- multifunctionalized 6, 12, 906, 907
- Nagasawa's 326
- nitroxyl radical 541
- non-proline amino acid 51, 54, 485

- nicotine 674
- Ooi's 280
- oxazolidinone 528, 530
- peptide 537, 678
- phosphine 570, 899, 905, 1099
- phosphonium cation based 444
- phosphoric acid 289, 290
- planar-chiral 195
- primary amine 330, 701, 982
- prolinamide 3, 8, 623
- prolinamine 8, 13
- proline aryl sulfonamide 1299
- pseudo-enantiomeric 323, 848
- pyridinyl 883
- pyrrolidine 10, 19
- pyrrolidine-based 256, 697
- quinidine 571
- rational design 34, 486
- recycling 693, 962
- resin-bound 879
- rhodium 952
- Ricci's thiourea 328
- Richard's 203
- Schreiner's 317
- secondary amine 3, 347, 466, 980
- selectivity 581
- self-selected 232
- silyl cation based 433
- soluble 879
- squaramide 254, 268
- Strecker reaction 895
- structure optimization 331
- α -substituted pyrrolidine 480
- sugar-derived 531, 895
- sulfide 550
- sulfinamide 958
- N-sulfinyl (thio)urea 335
- supported 694, 700
- C2-symmetric 161
- TADDOL 246, 247, 249
- Takemoto's 317, 318, 330
- tertiary phosphine 922
- tetramisole-based 1235
- thiourea 352, 353, 853
- threonine 485
- Ti/tartrate 523
- turnover 45
- zzz 4
- – see also organocatalysts 4
- cis-catalysts 686
- catalytic allylation 382
- catalytic asymmetric cyanation 405
- catalytic desymmetrization 420
- catalytic double activation 850
- catalytic hydrosilylation 417
- catechol moiety 445
- cationic Brønsted acids 189
- cationic dimers 164
- cationic polycyclization 1082, 1083
- cations 445
 - alkylimidazolium 638
 - benzhydrylic 748
 - carbo- 448
 - – see carbocations 448
 - enamine radical 471
 - imidazolium 455
 - Lewis acids 431
 - N-phenoxy-carbonyl 1197
 - phosphonium cation-based catalysts 444
 - silyl 433, 434
 - zzz 431
 - – see also ions 431
- cavitands 228
- CBS (Corey–Bakshi–Shibata) catalyst 966
- N-Cbz imines 866
- centrifugal separation 802
- ceric ammonium nitrate (CAN) 72, 1167, 1175
- α -chalcogenation 770
 - enantioselective 770
- chalcogenazines 705
- chalcogenide MBH reaction 444
- chalcone 137, 142, 258, 628, 1149
 - Michael reactions 1003
 - “non-classical” activation 582
- trans-chalcone 257
- charge transfer 1182
 - metal-to-ligand 1182
- charged cages 229
- Chaykovsky 318
 - – see Corey–Chaykovsky reaction 318
- chemical reactions 7
 - – see reactions 7
- chemically induced oxidative ET reactions 1166
- chemoselectivity 38
- chiral allenolates 271, 1205
- chiral amines 1135, 1155
 - catalysts 1167
 - kinetic resolution 1263
 - MacMillan's 475
 - natural products synthesis 1360
 - primary 1044
- chiral α -amino acids 945
- chiral amino alcohols 769
- chiral ammonium betaines 822, 823, 856, 1202, 1203
- chiral 2-azadamantane-N-oxyls 541

- chiral azaferrocene derivatives 199
- chiral aziridines 1122
- chiral backbone 888
- chiral bases 1148
- chiral bicyclic guanidine 886
- chiral bifunctional catalysts 1144
- chiral bis-amidine salts 275
- chiral bis-formamides 889
- chiral bis-phosphoric acid 1144
- chiral Brønsted acids 745, 1142, 1150, 1157
- chiral calcium phosphate 817
- chiral carbenes 1154
- chiral catalysts 1154
 - alcohol 245
 - amines 1155
 - ammonium (bi)fluoride 374
 - Brønsted acid 290
 - calcium phosphate 817
 - carbene 1154
 - “chiral proton catalysts” 243
 - guanidine 356, 357
 - imidazolidinone 1168
 - imidazolidin-4-one 69, 70
 - immobilized 953
 - ketone 524, 531
 - Lewis base 161, 381, 383, 384
 - non-covalent interactions 757
 - phosphoric acid 289, 290
 - planar- 195
 - pyrrolidine 18, 480
 - C₂-symmetric 161
 - tertiary amine 916
 - tertiary phosphine 922
 - thiourea-amide 1268
- chiral centers 246
 - quaternary 246
- chiral counteranions 746
- chiral counterions 1309
- chiral cyclohexenones 64
- chiral diamine salts 1135
- chiral diamines 1135
- chiral diols 182
- chiral 1,2-diols 796
- chiral disulfonimides 186
- chiral drugs 774
 - α,β -unsaturated aldehydes 774
- chiral enamine intermediates 757
- chiral formyl cyclopropanes 507
- chiral guanidinium salts 432
- chiral hydrophobes 112
- chiral ILs (CILs) 455, 617, 631
 - heterocyclizations 1106
 - proline-derived 631
- sulfur-functionalized 645
- chiral imidazolines 980
- chiral isothioureas 1199
- chiral Lewis bases 161, 381, 383, 384
- chiral ligands 431
- chiral NHCs 1152
- chiral onium salts 365
- chiral oxazoline backbone 1151
- chiral N-oxides 397, 398
- chiral phosphoramides 397
- chiral phosphoric acids 644, 742, 817, 943, 1052, 1324
 - design 289
- chiral precatalysts 539
- chiral primary amines 1140
- “chiral proton” catalysts 243
- chiral pyridinoferrocene derivatives 201
- chiral quaternary ammonium salts 824
 - Strecker reaction 890
- chiral scaffolds 322
- chiral secondary alcohols 1225
- chiral secondary amines 1044, 1132
 - asymmetric aminocatalysis 1288
 - imidazolidin-4-one 69
- chiral sensitizer 1187
- chiral silane 441
 - pseudoephedrine-based 441
- chiral P-spiro salts 844
- chiral squaramides 252
- chiral thiolanes 555
- chiral thiols 936
- chiral (thio)ureas 936, 1095
 - asymmetric induction 930
 - derivatives 315, 329
 - S_N1-type reactions 747
- chiral triazolium salts 497, 1113
- chiral vicinal diamines 311
- chiral xanthone 1114
- chloral monohydrate 682
- chlorides 557
 - camphorsulfonyl 557
- chlorinations 781
 - aryl/chlorination domino sequence 1296
 - ketones 781
- α -chloro- β -branched aldehydes 87
- N-chloro-N-sodio carbamates 1120
- α -chloroacetophenones 413
- α -chloroaldehydes 1035, 1153
 - bisulfite salts 1153
- 4-chlorobenzaldehyde 552, 674
- chlorolactonization 1086
- chlorosilanes 417
- N-chlorosuccinimide (NCS) 19, 780
- chromanones 502, 1085

- chromenes 993
- 2H-chromenes 744
- cinchona alkaloids 322
 - asymmetric Henry reaction 847
 - asymmetric transformations 345
 - bis- 152, 346
 - Brønsted bases 344
 - C6'-OH 847
 - cinchona-thiourea catalysts 821
 - cycloaddition 352
 - [3+2]-cycloaddition 1095
 - derivatives 120, 134, 653
 - dihydro 125
 - F-C reactions 1049
 - hydroxyalkylation 1049
 - industrial applications 1375
 - magnetite-supported 667
 - Michael reactions 1003
 - natural 120, 122
 - natural products synthesis 1370
 - “non-classical” activation 582
 - polymer-supported 653, 655
 - scaffolds 345
 - sulfonamide catalysts 667
 - thiourea-based derivatives 600
 - total synthesis 1370
- cinchona primary amines 1298
- cinchonidine 119
- cinchonine 119, 1006
- cinnamaldehydes 599, 1135
- trans-cinnamaldehydes 643
 - substituted 643
- cinnamic aldehyde 934
- cinnamyl bromide 561, 563
- CIP (Cahn–Ingold–Prelog) system 195, 196
- Claisen rearrangements 275
 - aliphatic 1209
 - annulation 1213
 - Coates–Claisen rearrangement 1212
 - guanidinium-catalyzed 1211
 - NHC catalysts 512
- clay-supported organocatalysts 832, 833
- “click reactions” 13, 634
- C=N bonds 865
- C=NR bonds 851
- C=O bonds 841, 864
- co-catalysts 906
 - (S)-BINOL 1335
 - Brønsted acid 38
 - Lewis acids 443
 - multifarious 1343
 - nucleophilic 1269
- co-immobilization 100
- co-solvents 695
- cobaltacene 203
- cobaltocene 1194
- cofactors 996
 - reduction 942, 996
- combinatorial chemistry 1
- combinatorial libraries 100
 - parallel 878
- combined hydrogenation 969
- competitive coupling 1295
- complementary hydrogen bonding 224
- complexation effect 333
- complexes 333
 - copper 741
 - host–guest 687
 - iridium 76
 - metal 431
 - ruthenium 741
 - transition metal 223
- condensations 223
 - aldol 602
 - Biginelli 8
 - Knoevenagel 149, 978
 - MBH reaction 899
 - – *see* MBH reactions 899
 - self aldol 477
 - tryptamine 1050
- configuration 323
 - C8–C9 323
- confined self-assembled space 227
- conformation 227
 - conformational restriction 43
 - conformational stiffness 196
 - conformationally flexible catalysts 712
 - gauche open 130
 - β -hairpin 1247
 - synclinal exo 39
- “conformation-switch” catalyst 1241
- conformational switch 101
- conformers 47
 - anti-open 121
- (+)-conicol 1365
- conjugate addition 346
 - asymmetric 63, 123, 353, 357
 - boryl/silyl 517
 - high-pressure conditions 583
 - organocatalyzed 1013
- 1,4-conjugate addition 1015
- conjugate Friedel–Crafts (F–C) alkylation 983, 997
- conjugate imines 1342
- conjugated nitroalkenes 922
- conjugated ynones 1323
- continuous flow systems 653

- cooperative catalysis 1158
 - amino catalyst-based 1343
 - asymmetric 1333
 - isoquinuclidines 1334
 - organo-photoredox 77
- cooperative hydrogen bonding
 - interaction 482
- Cope rearrangement 1213
 - 2-aza- 1213
- [3,3]-Cope rearrangement 561
- copolymerization 658
- copolymers 654
 - quinine-acrylonitrile 654
- copper complexes 741
- Corey–Bakshi–Shibata (CBS) catalyst, 966
- Corey–Chaykovsky reaction 318
- Coriolus consors 800
- counteranions 437
 - ACDC catalysis 226, 742, 979, 982, 983, 1343
 - chiral 746
- counterions 746
 - achiral 277
 - chiral 1309
 - proton transfer 923
- coupling 1185
 - competitive 1295
 - radical 1185
 - syn- 629
- covalent activations 465, 1287
 - (ep)oxides 523
 - ylides 547
- covalent bonding 625
- covalent capture 234
 - dynamic 234
- covalent catalysis 1070
 - asymmetric amino- 1287
- covalently-supported organocatalysts 831
- Crafts 65
 - – see Friedel–Crafts . . . 65
- cross-aldol reactions 57, 59
 - cycloalkanones 619
 - stereoselective 162
- cross-benzoin reaction 498, 1077
- cross-coupling 500
 - intramolecular 500
- crotonate 165
 - dienol ether 165
 - methyl 563
- γ -crotonolactone 262
- crotylation 388
- CSA (camphorsulfonic acid) 1346
- (R)-CSA ((R)-camphorsulfonic acid) 622
- Cu . . . 741
 - – see copper . . . 741
- cupreine/cupreidine 121, 125, 1321
 - C9 ethers 129
 - Hantzsch reaction 1321
 - structure 120
- (S)-(+)-curcuphenol 1059
- Curran's catalyst 316
- Currier 138
 - – see Rauhut–Currier reaction 138
- Curtin–Hammett principle 40, 47
- C=X bonds 793, 841
- cyanations 47
 - aldehydes 404
 - catalytic asymmetric 405
 - imines 407
- α -cyanoacetates 132
- cyanoacrylates 1302
- α -cyanoesters 1038
- cyanohydrins 167
 - protected 167
 - TMS- 404
- cyanosilylation 334
- α -cyanothioacetates 273
- cyclase 748
- cycle-specific catalysts 1300
- cyclic alkenes 111
- cyclic amines 1276
- cyclic amino acids 111
 - α, α -disubstituted 111, 112
- cyclic meso-anhydrides 611
- cyclic dienes 176
- cyclic dipeptides 107
- cyclic hemiaminals 1241
- cyclic hydrazide catalysts 708
- cyclic imines 1051
 - reduction 948
- cyclic β -ketoesters 765
- cyclic ketones 56, 621, 623, 1173
- cyclic nitroolefins 1028
- cyclic secondary amines 1317
- cyclic trialkylethenes 1114
- cyclic trifluoromethyl ketimines 855
- cyclic . . . 1091
 - zzz 1091
 - – see also ring . . . 1091
- cyclizations 623
 - aminooxylation–cyclization tandem reaction 775
 - cationic polycyclization 1082, 1083
 - desymmetrization 1070
 - electro- 1083
 - – see electrocyclizations 1083

- Hajos–Parrish–Eder–Sauer–Wiechert 799
 - hetero- 1105
 - intramolecular aldol 484
 - macro- 498
 - PET 1187
 - Pictet–Spengler-type 749, 1050, 1060, 1082
 - polyene 1076, 1175
 - radical-mediated 74
 - reductive Michael 87
 - ylides 547
 - cycloadditions 43
 - cascade processes 1094, 1177
 - cinchona alkaloids 352
 - Diels–Alder 627
 - 1,3-dipolar 228, 1293
 - enantioselective 245
 - Huisgen 1092, 1322
 - photochemical 251, 252
 - [2+2]-photocycloaddition 1188
 - Staudinger 1112
 - [2+2]-cycloadditions 266
 - ketenes 1112
 - [3+2]-cycloadditions 1092
 - five-membered cycles 1092
 - nitrones 1093
 - pyrrolidines 1096
 - [4+2]-cycloadditions 1131
 - chiral phosphoric acids 1324
 - [5+2]-cycloadditions 1086, 1348, 1349
 - [6+2]-cycloadditions 1073
 - fulvenes 1072
 - cycloadducts 235
 - diastereomeric 235
 - cycloalkanols 1232
 - cycloalkanones 619, 629
 - cycloalkylsilyl triflimides 436
 - cyclobutyl ketol 1217
 - cyclodextrin 540
 - per-6-ABCD 846
 - β-cyclodextrin 687
 - cyclohexadiene 229
 - cyclohexadienones 503, 1005
 - cyclohexane 1303
 - spiro-cyclohexane architecture 1303
 - cyclohexane-1,2-diones 1109
 - cyclohexanones 256, 593, 687, 1172
 - ball milling 606
 - derivatives 169
 - α-enolation 1174
 - cyclohexenes 1300
 - aldehydes 1300
 - carbaldehyde 483
 - trisubstituted carbaldehydes 1304
 - cyclohexenones 64
 - chiral 64
 - MBH reaction 330
 - MCRs 1299
 - cyclohexenyl rings 1306
 - cyclohexylamines 1325
 - 3-substituted 1325
 - N-cyclohexylmaleimide 230
 - 1,4-cyclooctanediones 1071
 - cyclopent-2-enones 1341
 - cyclopentadienes 232, 233, 244, 599, 1131
 - silyl cation based catalysts 436
 - cyclopentadienyl rings 198
 - cyclopentane 724
 - derivatives 724
 - cyclopentanones 1102
 - functionalized 1340
 - polysubstituted 1102
 - cyclopentenes 510
 - synthesis 1103
 - cyclophanes 1
 - cyclopropanations 1, 562
 - activation model 565
 - asymmetric 563, 565
 - intramolecular 572
 - tertiary amines 571
 - cyclopropanes 128, 1038, 1115, 1119
 - formyl 507
 - cysteine derivatives 994
- d**
- DABCO 584
 - derivatives 584, 592
 - “dark reaction” 1183
 - Darwinian evolution 222, 234
 - Darzens reaction 770
 - aza- 1122, 1123
 - DBS (p-dodecyl benzene-sulfate) anion 697
 - DBSA (p-dodecyl benzenesulfonic acid) 693
 - DBU 479, 1153
 - DCA (dichloroacetic acid) 71
 - DCC (dynamic combinatorial chemistry) 232
 - DDQ
 - (2,3-dichloro-5,6-dicyano-1,4-benzoquinone) 736
 - DEAD (diethyl azodicarboxylate) 478
 - dearomatization 537, 538
 - n-decanal 585
 - decarboxylation 1085
 - dehydration barrier 467

- Deng reaction 985, 1004
- 3-deoxy sugars 914
- deprotonated carboxylic acid 479
- deprotonations 43
- sulfide 549
- design 549
- β -amino acids 491
 - chiral Brønsted acid catalysts 290
 - chiral phosphoric acids 289
 - in silico 486, 491 - peptide catalysts 100
 - rational 34, 486
- “designer acids” 1333
- desymmetrizations 141, 263
- asymmetric 1225, 1254
 - cyclization 1070
 - cyclohexadienones 503
 - meso-diamines 1273, 1337
 - 1,3-diketones 1078
 - 1,3-diones 310
 - IL media 639
 - meso-inositol derivatives 110
 - meso-epoxides 420
 - methanolytic 265
 - organocatalytic 1376
 - silylation-based 1260
- α -deuterated α -amino acids 265
- DFT calculations 265
- catalyst design 491
 - enantioselective acylation 1229
 - F-C alkylation 306
 - α -halogenation 783
 - α -heteroatom functionalization 762
 - 1,3-sigmatropic rearrangement 1205
 - stereoselectivity 483, 485
 - transition state models 475
- DHIP
(2,3-dihydroimidazo[1,2-a]pyridine) 1229
- DHPD (9,10-dihydrophenanthridine) 970
- [DHQ]2PYR 867
- di-amination 1297
- diacylation 1243
- dialdehydes 498
- macrocyclization 498
- α,ω -dialdehydes 498
- β,β -dialkyl α,β -unsaturated aldehydes 773
- N,N-dialkylhydrazones 184
- dialkylketones 876
- dialkylmaleates 1097
- dialkylmalonates 643
- diamines 145
- catalysts 55, 801, 1141
 - chiral 311, 1135
 - MBH-reaction 920
 - primary–secondary 55, 63, 65
 - primary–tertiary 60
- meso-diamines 1337
- desymmetrization 1273, 1337
- anti- α,β -diamino phosphonic acids 860
- α -substituted 860
- 1,2-diaryl-1,2-diaminoethanes 1272
- α,α -diaryl-prolinol catalysts 779
- 1,3-diaryl α,β -unsaturated ketones 308
- diarylmethanols 44
- diarylprolinols 699, 772
- catalysts 33, 41, 703
 - derivatives 992
 - silyl ether 484, 659, 1033, 1104, 1351
 - trimethylsilyl ether 39, 483
- α,α -diarylprolinols 736
- diastereomeric cycloadducts 235
- diastereomeric transition states 472
- diazo compounds 558
- diazoacetamides 184
- dibenzosuberone-derived salts 450
- 1,3-dicarbonyl compounds 263
- 1,3-dicarbonylic carbon nucleophiles 984
- 1,3-dicarbonylic compounds 764
- dicarboxylic acids 281
- axially chiral 280
 - C2-symmetric 183
- 1,3-dichlorides 781
- 2,3-dichloro-5,6-dicyano-1,4-benzoquinone (DDQ) 736
- dichloroacetic acid (DCA) 71
- α,α -dicyanoalkenes 1336
- dicyanoketene acetals 459
- dicyanoolefins 998, 999
- Diels–Alder cycloaddition 627
- Diels–Alder reactions 65, 295
- asymmetric 351, 360
 - aza- 435, 630
 - aza-hetero- 1155
 - catalysts structure 708
 - chiral alcohol catalysts 245
 - exo-selective 1133, 1136
 - hetero- 18
 - – see hetero-Diels–Alder reactions 18
 - high-pressure conditions 588
 - intramolecular 82, 1073
 - inverse electron demand 710, 1138
 - macrocycles 233
 - MW irradiation 599
 - nanoreactors 228, 229
 - non-covalent catalysis 1324
 - one-pot 630
 - organocatalytic 1132
 - oxa-hetero- 1147

- polymer-supported catalysts 666
- ring-forming 1131
- silyl cation based catalysts 435
- stereoselective 327
- trienamine-mediated 47
- water 707
- dienamine activation 42, 43, 1017
- dienamine catalysis 1138, 1363
- dienes 1363
 - amino-siloxy 245
 - Brassard's 248, 249, 296, 1157
 - cyclic 176
 - “diene”-type reactivity 46
 - 2-pyrones 351
- dienol ethers 165, 517
- dienophiles 45, 457
- diester 1217
 - phosphoric acid 1214, 1217
- diethyl 5-acetylhex-2-enedionate 1101
- diethyl azodicarboxylate (DEAD) 478
- diethyl bromomalonate 704, 1117
- diethyl malonate 319, 320, 599
- differential stabilization 473
- α,β -difunctionalization 1054
- dihedral angles 480
- dihydro cinchona alkaloids 125
- 2,3-dihydrobenzofurans 1056
- dihydrocinamaldehyde 1169
- 2,3-dihydrofurans 1108
- 2,3-dihydroimidazo[1,2-a]-pyridine (DHIP) 1229
- dihydroindoles 307
 - 4,7-dihydroindoles 278, 307, 1047
 - (S)-(+)-dihydrokawain 1150
 - 9,10-dihydrophenanthridine (DHPD) 970
- dihydropyran 1321
 - 3,4-dihydropyran 267
- dihydropyranone 514, 516
- dihydropyridine 1305, 1319, 1320
 - 1,2-dihydropyridine 1134
 - 1,4-dihydropyridine 941
 - – *see* Hantzsch ester 941
- dihydroquinine (DHQ) 349, 353
 - epi- 146
- diimides 1156
 - o-benzoquinone 1156
- N,N'-diisopropylcarbodiimide (DIC) 536
- diisopropylethylamine (DIPEA) 858
 - 1,3-diketones 1078
 - desymmetrization 1078
- diketopiperazines (DKP) 103, 874, 877
 - catalysts 877
- dimerization 515
 - acrylates 515
 - dimers 164
 - ether bridged 151
 - neutral/cationic 164
- 2,4-dimethoxyaniline 280
- dimethyl groups 530
- dimethyl 2-oxoethylmalonate 1103
- dimethyl sulfoxide (DMSO) 135, 136, 673
- 2,2-dimethyl- $\alpha,\alpha,\alpha',\alpha'$ -tetraphenyl-1,3-dioxolane-4,5-dimethanol 895
 - – *see* TADDOL 895
- dimethylamine 467, 468
- dimethylamine-enamine 466
- dimethylamino functionalities 740
- 4-(dimethylamino)pyridine (DMAP) 199, 912, 1192
 - chiral derivatives 1195, 1240
 - multi-organocatalyst systems 1336
- trans-4,5-dimethylpiperazine 11
- 5,5-dimethylthiazolidinium-4-carboxylate 1291
 - chiral 182
 - indolyl 744
 - racemic 1261
- 1,2-diols 796
 - chiral 796
- meso-1,2-diols 1250
- syn-1,2-diols 796
- 1,3-diones 310
- meso-1,3-diones 814
- DIOP 1099
- dioxane 690
- (R)-(+)-dioxibrassinin 849, 1371
- dioxides 169
 - bisphosphine 169, 171
 - N,N'-dioxides 168, 876, 886, 888
 - aryl linked 887
 - (S)-BINOL-derived 888
 - bipyridine 167
 - three-component Strecker reaction 889
- dioxiranes 527, 528
- DIPEA (diisopropylethylamine) 858
- dipeptides 59, 690, 701
 - ball milling 608
 - cyclic 107
 - proline-based 607
- diphenyliodonium salts 77
- diphenylphosphine oxide 1007
- N-diphenylphosphinoyl imines 1100
- diphenylphosphite 178, 254
- diphenylprolinols 1293
 - silyl enamines 724
 - silyl ether 641, 1293
 - trimethylsilyl ether 483, 1035
 - (S)- α,α -diphenylprolinols 1096

- diphenylpyrrolidine 19, 780
diphenylsilyloxymethyl groups 1014
N,N'-diphenylureas 316
1,3-dipolar cycloaddition 228, 1293
dipolarophiles 1092, 1100
1,3-dipoles 1096
– planar 1096
direct aldol reactions 56, 673
– acetone 688
– Brønsted acids 814
– vinylogous 819
direct α -amination 761
direct asymmetric γ -alkylation 1346
direct fluorination 780
direct Mannich reaction 61, 292
direct substitution 729
 α,α -disubstituted aldehydes 1016
 α,α -disubstituted amino acids 985
– cyclic 111, 112
 β,β -disubstituted enones 592
4,5-disubstituted isoxazoline N-oxides 1351
 α,β -disubstituted nitroolefins 1027, 1029
1,3-disubstituted 2-vinylcyclopropanes 574
disulfides 539, 540
disulfonates 182
– pyridinium 182
disulfones 1034
disulfonimides 813
– chiral 186
diversity-oriented cascade reactions 1056
DKP 103
– – see diketopiperazine 103
DKR (dynamic kinetic resolution) 263, 264
– achiral phenethyl amines 299
DMAP (4-(dimethylamino)pyridine) 199, 912, 1192
– chiral derivatives 1195, 1240
– multi-organocatalyst systems 1336
DMF 408
DNA 241
– base pairing 241
p-dodecyl benzene-sulfate (DBS) anion 697
p-dodecyl benzenesulfonic acid (DBSA) 693
domino reactions 1365
– aminocatalytic 1294
– aryl/chlorination 1296
– aza-MBH 926
– five-membered cycles 1101
– Mannich/aza-Michael 1110
– Michael/aldol 1103
– Michael/Henry 642, 1109
– Michael/Michael 1102
– multicomponent 1285, 1349
– SN2-type 722, 725
double activation 850
– catalytic 850
double hydrogen bonding interactions 315, 316
drugs 1236
– anti-HIV 855
– anti-inflammatory 1236
– chiral 774
dual Brønsted acids 1334
dual-catalysis approach 1203
– organocascade 1053
dual organocatalysis 1349
– carbene-based 1338
– cascade reactions 1353
DUPHOS 1100
dynamic approaches 221
– catalyst discovery 221
dynamic combinatorial chemistry (DCC) 232
dynamic covalent capture 234
dynamic kinetic resolution (DKR) 263, 264
– achiral phenethyl amines 299
- e**
Eder 51
– – see Hajos–Parrish–Eder–Sauer–Wiechert ... 51
eicosanoid 1119
electrocyclization 1083
 6π electrocyclization 829
electrode 1182
– saturated calomel 1182
electron-deficient alkenes 532, 566, 771
electron-deficient enones 1101
electron-deficient olefins 1120
electron-deficient radicals 1168
electron-rich aldehydes 588
– aromatic 588
electron-rich olefins 1168
electron-transfer (ET) reactions 1165
– chemically induced 1166
electron-withdrawing group (EWG) 444, 987
electronegative groups 20
electrophiles 20
– activation 135
– F-C reactions 1045, 1051
– hydrogen bonding 244
electrophilic amination 766, 768
electrophilic heteroatoms 757

- electrophilicity 730
 - parameters 38
 - relative 38
- electrostatic interactions 225, 625
- [emim][Pro] 628
- Emmons 1309
 - – see Horner–Wadsworth–Emmons sequence 1309
- emulsions 684, 804
 - catalysis 677
- enals 38
 - aliphatic 1098
 - annulations 1111
 - aromatic 1103
 - aza-Michael addition 990
 - α -branched 1347
 - F-C reaction 983
 - iminium ion–enamine activation strategy 1297
 - γ -monosubstituted 44
 - nucleophilic addition 979, 983
 - oxidation 513
 - reactions 508
 - transfer hydrogenation 981
- α,β -enals 644
- enamides 946
 - N-acyl 946
- enamine activation 34, 53, 1137
 - aldehydes and ketones 1032
 - enamine–enamine activation 1294
 - organocatalyzed conjugate addition 1013
- enamine catalysis 146, 795, 1360
 - aldol reaction 796
 - asymmetric 585, 1290
 - cascade reactions 86
 - high-pressure conditions 585
 - imidazolidin-4-one 69
 - Mannich reaction 806
 - organocascade catalysis 1365
 - polymer-supported 656
 - reactions 465
 - ring-forming reactions 1070
- enamines 467, 732
 - chiral intermediates 757
 - diphenylprolinol silyl 724
 - experimental identification 469
 - syn-face addition 476
 - formation 468
 - iminium ion–enamine activation strategy 1295, 1297
 - intermediates 35, 52, 53
 - β -nitro- γ 933
 - nitroso aldol reactions 250
 - oxidation 1167, 1169
 - phosphonium–enamine zwitterion 905
 - radical cation 471
 - reduction 415, 960
 - SN1-type reactions 733, 738
 - structurally characterized 470
 - transition model 474
- anti-enamines 475
- (E)-enamines 721
- (Z)-enamines 798, 1016
- β -enamino esters 961
- enaminones 470
- enantiocontrol 38
- enantioenrichment 40
 - carbamates 1264
 - indolines 961
- enantiomeric excess 487
- enantiomeric ratio (er) 1256
- enantiomers 145
 - pseudo- 145
- enantiopure phosphoramides 438
- enantiopure trityl salts 451
- enantioselective acylation 1225
- enantioselective alcoholysis 141
- enantioselective aldol reaction 476
- enantioselective amination 180
 - α -ketoesters 180
- enantioselective ylide catalysis 566
- enantioselective aza-Michael reaction 1003
- enantioselective α -chalcogenation 770
- enantioselective cycloadditions 245
- enantioselective epoxidation 549, 553
- enantioselective α -halogenation 779
- enantioselective Henry reaction 849
- enantioselective oxidations 111
- enantioselective α -oxysulfonylation 538
- enantioselective protonation 710
- enantioselective ring-opening 420
- enantioselective vinylation 73
- enantioselective ylide catalysis 548, 573
- enantioselectivity 58
 - F-C reaction 441
- encapsulation 227, 230
- ene-carbamates 816, 817, 1367
- “ene” fragments 43
- “ene”-type reactivity 45
- enecarbamates 1313
 - substituted 1313
- enoates 532
 - epoxidation 532
- enol carbonates 1197
 - oxindole-derived 1195
- enol ethers 162
 - trichlorosilyl 162

- enolates 1195
 - acyl 227
 - azolium 512
 - equivalents 262
 - preformed metal 721
- α -enolation 1173, 1174
- enolizable aldehydes 72, 640, 1031
 - α -arylation 78
- enolizable carbonyl compounds 1360
- enolizable enones 1000
- γ -enolizable enones 1017
- enolizable ketones 640
- enolization 100, 169
- enones 62, 565, 1000
 - acyclic 997, 1001
 - N-acylated β -amino 170
 - amination 1003
 - β -amino 960
 - conjugate addition 346, 357
 - β,β -disubstituted 592
 - electron-deficient 1101
 - γ -hydroxy 1004
 - α,β -unsaturated 65, 1047
- (Z)-enones 772
 - epoxidation 772
- cis-enynes 1086
- enzymes 1047
 - aldolases 99, 676, 795
 - chiral catalysts 97
 - enzymatic catalysis 465
 - Henry reactions 846
 - hydrolysis 114
 - hydroxynitrile lyase 846
 - oxidosqualene cyclase 748
- eosin Y 1184
- ephedrines 1318
- (-)-epibatidine 1025
- epidihydroquinine 146
- epoxidations 1
 - alkene 523, 524
 - asymmetric 19
 - enantioselective 549, 553
 - enoate 532
 - (Z)-enones 772
 - iminium salt-catalyzed 532
 - Juliá-Colonna 111
 - ketone-mediated 524
 - primary–secondary diamine 64
 - semipinacol rearrangement 1219
 - Shi 525, 526
 - sulfur ylide catalysis 549
 - α,β -unsaturated aldehydes 711, 774
 - α,β -unsaturated carbonyl compounds 771
- epoxides 711
 - covalent activation 523
 - opening 417, 419, 420
 - terminal 559
- meso-epoxides 420
 - ring-opening 163, 169
- epoxyaldehyde 506
- equations 40
 - – see laws and equations 40
- equilibrium 470
 - “parasitic” 470
- er (enantiomeric ratio) 1256
- erythromycin 978
- Eschenmoser 476
 - – see Seebach–Eschenmoser transition state model 476
- esterifications 1254
 - redox 507, 511
 - Steglich 1250
 - “trans-” 1254
- esters 511
 - δ -amino- α,β -unsaturated carboxylic 1310
 - α -amino- 300
 - β -amino- 446
 - O-benzoyl 134
 - boronic acid hemiesters 1004
 - t-Bu 400
 - C9 133
 - β -enamino 961
 - β -functionalized 1339
 - groups 127
 - α -guanidino- 921
 - Hantzsch 214
 - – see Hantzsch ester (HEH) 214
 - γ -hydroxyamino 510
 - α -imino 413, 861
 - isocyano- 1098
 - keto- 180
 - – see ketoesters 180
 - α -methylene- β -hydroxy 131
 - Mosher 421
 - phosphoric acid diester 1214, 1217
 - N-protected glycine 611
 - thio- 263
 - – see thioesters 263
- ET (electron-transfer) reactions 1165
 - chemically induced 1166
- ethers 263
 - allyl vinyl 1210
 - aza-crown 771
 - bridged dimers 151
 - C9 127, 129
 - crotonate-derived dienol 165
 - diarylprolinol 483, 484

- diarylprolinol silyl 659, 1033, 1351
 - diphenylprolinol 483, 641
 - diphenylprolinol silyl 1293
 - diphenylprolinol trimethylsilyl 1035
 - groups 127
 - L-serine tert-butylidiphenylsilyl 622
 - silyl dienol 517
 - silyl enol 396, 399
 - spiro- 1217
 - thio- 539
 - – see thioethers 539
 - trichlorosilyl enol 162
 - trimethylsilyl 39
 - vinyl 296
 - 2-ethoxycarbonylvinylation 863
 - ethyl allenolate 1100
 - ethyl 4-oxobut-2-enoate 1342
 - ethyl trifluoropyruvate 597
 - imine 1051
 - ethyl vinyl ketone (EVK) 913
 - 2-ethylphosphoxybenzaldehyde 233
 - eunicellin 83
 - EWG (electron-withdrawing group) 444, 987
 - exo-bicyclic isoxazolidinones 1092
 - exocyclic chirality 532
 - exocyclic stereocenter 534
 - “extended umpolung” 506
 - extracoordinate silicon compounds 402
 - extraction 402
 - fluorous 693, 803
 - zzz 803
 - – see also separation 803
 - (E/Z)-ratio 40
- f**
- F-C 1043
 - – see Friedel–Crafts . . . 1043
 - anti-face addition 478
 - syn-face addition 476
 - Si-face attack 34
 - facial selectivity 309
 - facial shielding 43
 - FBSM (1-fluorobis(phenylsulfonyl) methane) 865
 - Ferrier 1215
 - – see Petasis–Ferrier rearrangement 1215
 - ferrocene (Fc) 196, 197
 - azaferrocenes 199
 - derivatives 1194
 - pyridinoferrocenes 200, 201
 - structure 197
 - α -ferrocenyl carbocations 453
 - Fields 293
 - – see Kabachnik–Fields reaction 293
 - five-membered cycles 1091, 1092
 - asymmetric aminocatalysis 1292
 - domino reactions 1101
 - flavin-cyclodextrin catalysts 540
 - flavin derivatives 213
 - FLPs (frustrated Lewis pairs) 967, 969
 - fluorides 372
 - ammonium 373, 374
 - ions 382
 - α -fluorinated β -ketoesters 144
 - fluorinations 88
 - direct 780
 - ketones 780
 - reductive 88
 - selective 36
 - α -fluorinations 71
 - α -fluoro enals 511
 - trans-4-fluoro-proline 1071
 - α -fluoro- α,β -unsaturated aldehydes 511
 - N-fluorobenzenesulfonimide (NFSI) 70, 88, 779
 - asymmetric aminocatalysis 1297
 - 1-fluorobis(phenylsulfonyl)methane (FBSM) 865
 - fluoromethyl addition 988
 - fluoromethyl ketones 851
 - fluoromethylation 988
 - β -fluoromethylation 999
 - fluorous extraction 803
 - fluorous pyrrolidine sulfonamide 698
 - fluorous solid-phase extraction 693
 - flustramine B 1058
 - (–)-flustraminol B 263
 - (+)-folicanthine 1367
 - formal CH oxidation 736
 - formal [2+2]-cycloaddition 266
 - formaldehyde 593
 - formalidine 1315
 - formamides 386, 416, 1274
 - bis- 886, 889
 - N-formamide-based Lewis bases 956
 - formyl cyclopropanes 507
 - formyl groups 80
 - α -alkylation 80
 - N-formyl groups 955
 - ω -formyl- α,β -unsaturated carbonyl compounds 931
 - 2-formylaziridines 1121
 - 2-formylcyclopropane 1116
 - derivatives 1116
 - four-component reaction 1317
 - Ugi 1317

- four-membered cycles 1091, 1112
 - free energy difference 473
 - free energy profiles 478
 - freezing water 587, 588
 - Friedel–Crafts (F–C) alkylations 65, 305
 - aza- 1061
 - dual catalysis 1344
 - high-pressure conditions 590, 592
 - indole 147
 - intramolecular 83
 - MacMillan’s 1046
 - MW irradiation 600
 - nucleophilic addition 983, 997
 - Friedel–Crafts (F–C) aminoalkylation 183, 1325
 - Friedel–Crafts (F–C) reactions 304
 - asymmetric 1043
 - aza- 1050
 - enal 983
 - enantioselectivity 441
 - iminium catalysis 1364
 - indole 261, 328
 - intramolecular 1074
 - organocascade transformations 1053
 - phosphoric acid catalysts 304
 - transition state model 306, 309
 - (+)-frondosin B 1363, 1364
 - fructose-derived ketone catalysts 524
 - frustrated Lewis pairs (FLPs) 967, 969
 - fulvenes 1072
 - functional monomers 658
 - functionalities 969
 - acidic 3
 - asymmetric 33
 - carboxylic acid 63
 - cinchona alkaloid derivatives 134
 - dimethylamino 740
 - phosphoryl oxygen 289
 - quinone 151
 - tertiary amine basic 324
 - zzz 20
 - – see also groups 20
 - functionalizations 757, 1043
 - α -functionalizations 34, 36
 - aldehydes 35
 - asymmetric 35
 - carbonyl compounds 1361
 - β -functionalizations 37, 41
 - carbonyl compounds 1364
 - functionalized cyclopentanones 1340
 - β -functionalized esters 1339
 - functionalized nitroalkane substrates 863
 - functionalized nitrocyclopropanes 1118
 - functionalized pyrrolidines 1293
 - functionalized tetrahydrothiophenes 1104
 - furan 588
 - furanones 273
 - derivatives 273
 - halogenated 178
 - furanyl carbonates 1200
- g**
- (+)-galbulin 1365
 - gauche open conformation 130
 - gem-diphenyl groups 679
 - (+)-geniposide 1100
 - Gibbs free energy profiles 478
 - D-glucosamine 883, 884
 - D-glucosamine-L-prolinamide 690
 - glutaconates 1095
 - glutaraldehyde 1156
 - meso-glutaric anhydrides 265
 - glycinate Schiff bases 181
 - glycines 265
 - imines 150, 358
 - Michael addition 359
 - N-protected ester 611
 - Schiff bases 367, 369
 - glycolate aldol reaction 164
 - glycolysis 795
 - glycosyl amines 895
 - glyoxylate imine 1051
 - [GND][I] 619
 - gold catalysts 1056, 1324
 - achiral complexes 951
 - green chemistry 612
 - green solvents 673
 - “greenest oxidant” 778
 - Grignard reagent 154
 - groups 154
 - acyl 59
 - 9-anthryl 1157
 - aromatic 152
 - 1,3-benzodithiol 735
 - 3,5-bis(trifluoromethyl)phenyl 318
 - n-butyl 681
 - carboxylic acid 475
 - dimethyl 530
 - diphenylsilyloxymethyl 1014
 - electron-withdrawing 444, 987
 - electronegative 20
 - ester 127
 - ether 127
 - formyl 80
 - N-formyl 955
 - gem-diphenyl 679
 - hydrogen-bond-directing 981
 - hydroxy 677

- ortho-hydroxy 946
 - hydroxyl 244
 - ionic 644
 - nitro 482, 1353
 - N-oxide 206
 - phenyl 135
 - primary amine 145
 - protecting 568
 - pyrroline-1-carbonyl 1249
 - quinuclidine 322
 - spacer 625, 640
 - sulfonamide 412
 - thioether 210
 - trifluorinated methyl 885
 - trifluoromethyl 1107
 - zzz 20
 - – see also functionalities 20
 - guanidines 269, 1027
 - axial stereogenic 771
 - bicyclic 876, 886, 1145
 - bicyclic catalysts 358
 - C9 derivatives 141
 - chiral catalysts 356, 357
 - functionalities 134
 - Mannich reaction 822
 - Strecker reaction 886
 - C2-symmetric 177, 178
 - guanidinium ion 269, 1211
 - Claisen rearrangement 1211
 - guanidinium salts 270, 275, 432
 - chiral 432
 - guanidinium thiourea catalysts 825, 827
 - α -guanidino-ester 921
 - guanidinyl catalysts 16
- h**
- β -hairpin conformation 1247
 - β -hairpin structure 109
 - Hajos–Parrish–Eder–Sauer–Wiechert cyclization 799
 - Hajos–Parrish–Eder–Sauer–Wiechert reaction 51, 1373, 1374
 - half-thioesters 263
 - malonic acid 263
 - halides 1116
 - alkyl 1116
 - “non-stabilized” alkyl 724
 - haloaldehydes 722
 - α -haloaldehydes 507
 - redox esterification 507
 - halogenated furanones 178
 - halogenation 152
 - α -halogenation 779, 1085
 - Hammett 47
 - – see Curtin–Hammett principle 47
 - Hantzsch dihydropyridine 1305, 1319, 1320
 - Hantzsch ester (HEH) 214, 298, 299, 302
 - derivatives 1318
 - hydride source 941
 - iminium catalysis 88
 - Michael reactions 1007
 - regenerable 304
 - SN1-type reactions 747
 - sulfa-Michael reaction 996
 - Hayashi catalysts 735
 - HBD (hydrogen bond donating) catalysis 747
 - HBTM (homobenzotetramisole) 1233
 - helicenes 389
 - hemiaminals 1241
 - cyclic 1241
 - formation 1106
 - hemiesters 1004
 - boronic acid 1004
 - Henry reactions 138, 270, 274
 - asymmetric 845, 847, 848
 - aza- 276, 851, 852, 857, 862
 - biologically active compounds 845
 - Brønsted bases 818, 820
 - domino Michael–Henry reactions 1109
 - domino Michael/Henry reaction 642
 - enantioselective 849
 - enzymes 846
 - guanidinium thiourea catalysts 825
 - high-pressure conditions 585
 - ketones 846
 - nitroalkanes 841
 - hetero-Diels–Alder reactions 245, 251, 295
 - aza- 1155
 - high-pressure conditions 588
 - inverse electron demand 18, 45, 296
 - oxa- 1147
 - ring-forming 1131
 - TADDOL 246, 247
 - hetero-MBH reaction 899
 - α -hetero-substituted aldehydes 1034
 - heteroarenes 947
 - heteroaromatic aldehydes 553
 - heteroaryl N-Boc imines 854
 - heteroaryl-sulfones 1340
 - β -keto 868, 1340
 - heteroatom σ bonds 517
 - heteroatom-centered dienophiles 45
 - α -heteroatom functionalization 757
 - heteroatom-stabilized carbocations 748

- heteroatoms 757
 - electrophilic 757
- heterocycles 1120
 - nitrogenated 992, 1120
 - sulfones 989
- N-heterocyclic carbenes (NHCs) 209, 829, 830, 1201
 - multi-organocatalyst systems 1339
 - organocatalysis 495
 - ring-forming reactions 1152, 1154
- heterocyclic proline-based organocatalysts 13
- heterocyclization 1105
- heterofunctionalization 621
 - carbonyl compounds 621
- hexaalkylguanidinium salts 619
- hexafluoroisopropyl acrylate 132
- hexafluorophosphates 636
- high-pressure (HP) conditions 581
- high-speed ball milling (HSBM) 608
- high-throughput synthesis 221
- Hillman 124
 - – see Morita–Baylis–Hillman . . . 124
- histidine 57, 486
 - N-alkylated residues 108
 - derivatives 102
 - Pmh 105, 109
- (S)-histidine 486
- HIV 855
 - drugs against 855
- Hoffman 472
 - – see Woodward–Hoffman rules 472
- HOMO-activation 90
- homo-benzoin reaction 497
- homo-bifunctional catalysts 326
- HOMO raising principle 43, 46
- homoallylic alcohols 392, 438
- homoallylic carbamates 536
- homobenzotetramisole (HBTM) 1233
- homoenolates 1, 508
 - imidazolium-derived 509
 - β -protonation 511
- homogeneous catalysts 331
- homogenous α -alkylation/allylation 726
- homoproline tetrazole 1015
- Horeau principle 1286, 1294
- Horner–Wadsworth–Emmons (HWE) sequence 1309
- host–guest complexes 687
- Houk–List transition state model 475, 477, 478
- HP 582
 - – see high-pressure 582
- HSBM (high-speed ball milling) 608
- Huisgen cycloaddition 1092, 1322
- hybrid catalysts 706
 - siloxy-tetrazole 706
- hybrid supports 664
 - inorganic–organic 664
- hydrazines 706
 - camphor sulfonyl 1141
 - cyclic hydrazide catalysts 708
- β -hydrazinyl- α -ketoesters 180
- hydrazones 558
 - aliphatic 894
 - N-benzoyl 394
 - benzoyl 440
- hydride sources 941
 - Hantzsch ester (HEH) 941
- hydride transfer 941, 946
 - organocatalyzed 86
 - ring-closing reactions 1075
- hydroacylations 505, 506
 - olefins 1079
- hydrocyanations 357, 873
 - aldehydes 107
 - Brønsted acids 893
 - carbonyls 873, 875
 - imines 881, 884
 - Lewis acids 894
 - PTC 892
- hydrogen 892
 - biomimetic sources 298, 964
 - “chiral proton” catalysts 243
 - peroxide 539
- hydrogen bond activation 432, 457, 1019, 1044
- hydrogen bond catalyzed aza-Henry reaction 857
- hydrogen-bond-directing groups, 981
- hydrogen bond donating (HBD) catalysis 747
- hydrogen bonding 241, 243, 811
 - Brønsted acids 815
 - C=X bonds 810
 - chiral guanidine catalysts 356
 - complementary 224
 - cooperative 482
 - double hydrogen bonding interactions 315, 316
 - electrophiles 244
 - intermolecular 324, 811
 - ring-forming reactions 1142
 - stabilization 474
 - thiourea catalysts 352, 1368
 - total synthesis 1365

- hydrogenations 1365
 - asymmetric 1
 - combined 969
 - transfer 297, 298, 951, 981
- hydrolysis 114
 - C–C bond formation 114
 - orthoformate 231
- hydrophilic bromides 636
- hydrophilic ketones 688
- hydrophobes 112
 - chiral 112
- hydrophobic interface 677
- hydrophobicity 679
 - primary amino acids 679
- hydrophosphonylation 278, 293, 294
- hydrosilylation 958
- hydrosilylation 417
- 3-hydroxyindoles 1367
- hydroxy groups 677
- ortho-hydroxy groups 946
- (S)-(-)-4-hydroxy-4-phenyl-2-butanone, 403
- hydroxyacetones 100, 148, 603, 690
 - O-benzyl 706
- hydroxyalkylation 1049, 1050
- hydroxyalkynoates 1081
- N-hydroxy- α -amido sulfones 1095
- hydroxyamination 175, 768
- γ -hydroxyamino esters 510
- hydroxybenzylic alcohols 744
 - secondary 744
- hydroxycarbamates 1122
 - tosylated 1122
- β -hydroxycarbonyl 98, 793
- 4-hydroxycoumarin 143, 998
- (R)-4-hydroxycyclohex-2-enone 775
- α -hydroxycyclopentanones 1339
- hydroxydiketones 1218
 - spirocyclic 1218
- α' -hydroxyenones 1341
- γ -hydroxyenones 1004
- 3-hydroxy-3-indolyloxindole 745
- 3-hydroxyisoindolin-1-ones 1053
- hydroxyketones 1289
- hydroxyl groups 244
- β -hydroxyl-sulfonium ylide 563
- hydroxylactams 1082
- 4-hydroxyl(thio)coumarins 1108
- 9-hydroxymethylanthracene 230
- 2-hydroxy-1,4-naphthoquinones 255
- hydroxynitrile lyase 846
- 3-hydroxy-2-oxindoles 126
 - 3-substituted 919
- 4-hydroxyprolines 683
- hypervalent iodine-catalyzed oxidation 537, 538
- hypervalent iodine oxidant 773
- hypervalent silicon 438
- hypochlorite 370
 - sodium 370
- i**
- β -ICD (β -isocupreidines) 127, 131, 916
- ILs 13
 - – see ionic liquids 13
- IMDA (intramolecular Diels–Alder reaction) 82
- imidazoles 204, 440, 491, 1201
 - co-catalysts 906
- imidazolidinones 627
 - catalysts 1168, 1172
 - MacMillan 661
- imidazolidin-4-ones 69, 70
 - cascade reactions 86
- imidazolines 980, 981
- imidazolium-based ILs 456
- imidazolium catalysts 513
- imidazolium cations 455
- imidazolium-derived homoenolates 509
- imidazolium salts 209
 - molten 621
 - saturated 457
- imidazolium unit 640
- imidazolyl 883
- imides 354
 - α,β -unsaturated 354
- imines 205, 235, 261
 - acetylene addition 395
 - activation 1132
 - acyclic azomethine 281
 - N-acyl 862
 - allylation 394
 - aryl 923
 - asymmetric conjugate addition 353, 357
 - asymmetric reduction 410, 411
 - aza-Henry reaction 851
 - aziridination 560, 573
 - azomethine 185, 186
 - N-Boc- 275
 - N-Boc- 276
 - N-Boc- 183, 292, 854, 866, 910
 - catalytic hydrosilylation 417
 - N-Cbz 866
 - conjugate 1342
 - conjugate addition 347
 - cyanation 407
 - cyclic 948, 1051
 - N-diphenylphosphinoyl 1100

- double Mannich reaction 810
- ethyl trifluoropyruvate 1051
- F-C reactions 305, 1050
- FLP hydrogenation 968
- glycine 150, 358
- glyoxylate 1051
- hydrocyanation 881, 884
- hydrosilation 958
- Mannich reaction 333, 603, 794
- N-para-nosyl 1113
- N-protected 917
- protonated acyclic 185
- prototypical substrates 851
- reactions 291
- reduction 415
- salicylaldehyde 244
- silyl ketene 166
- N-silyl oxyketene 167
- Strecker reaction 333
- sulfonyl 261, 272, 278, 279
- N-sulfonyl 187, 862
- iminium 882, 1217
- N-acyliminium ions 1052
- protio-iminium ions 1158
- SN1-type reactions 749
- iminium activation 37, 43, 750, 978, 979
- secondary amines 980
- iminium catalysis 146, 147, 465, 1363
- cascade reactions 86
- imidazolidin-4-one 81
- organocascade catalysis 1365
- polymer-supported 656
- ring-forming reactions 1073
- iminium ion–enamine activation strategy 1295, 1297
- iminium salts 82, 532, 533
- epoxidation 532
- imino aza-enamine reaction 185
- α -imino esters 413, 861
- immiscible phases 365
- immobilization 617
- catalysts 416, 953
- cinchona derivatives 654
- co- 100
- mesoporous supports 663
- organocatalysts 626
- polymer resins 652
- in silico catalyst design 486, 491
- in vivo activation 360
- “in water” reactions 676
- aldol reaction 800, 802
- incompatible catalytic systems 1054
- (+)-indacrinone 1376
- indirect Mannich reaction 1110
- indium salts 739
- Indoles 260
- indoles 261, 306, 537
- alkaloids 90, 306
- aryl sulfonyl 734
- derivatives 645
- F-C alkylation 147, 1048
- F-C reaction 328
- high-pressure conditions 591, 592
- tetrahydropyrano[3,4-b]- 1074
- tricyclic pyrrolo-indole core 1104
- indolines 1266
- enantioenriched 961
- indolinone 569
- indolin-3-one 63
- indolyl O-acetates 1198
- indolyl diol 744
- induction 744
- asymmetric 914
- stereochemical 43, 343, 1197
- industrial applications 1373
- organocatalysis 1373
- informative chemical systems 234
- Ingold 195
- – see CIP system 195
- inorganic bases 366
- methylene/methine compounds 366
- inorganic–organic hybrid supports 664
- meso-inositol 110
- derivatives 110
- D-myo-inositol-1-phosphate 1253
- Inoue’s catalyst 874
- intermolecular aldol reactions 52, 57, 796, 811
- intermolecular alkylation 737
- α -allylic 739
- intermolecular α -alkylation 726
- intermolecular allylation 1170
- asymmetric 1170
- intermolecular H-bonding 324
- intermolecular reactions 1091
- intermolecular Stetter reaction 503
- intersystem crossing (ISC) 1180
- intramolecular aldol cyclization 484
- intramolecular aldol reactions 309, 799, 800
- Brønsted acids 814
- intramolecular alkylation 1107
- intramolecular α -alkylation 1072
- aldehydes 1072
- intramolecular allylations 1172
- asymmetric 1172
- intramolecular α -arylation 1176
- intramolecular aza-Michael reactions 1074

- intramolecular cross-coupling 500
- intramolecular cyclopropanation 572
- intramolecular Diels–Alder reactions (IMDA) 82, 1073
- intramolecular F-C alkylation 83
- intramolecular F-C reaction 1074
- intramolecular heterocyclization 1105
- intramolecular interactions 233
- intramolecular MBH reaction 262
- intramolecular ring-forming reactions 1069
- intramolecular Stetter reaction 501, 1077
- inverse electron demand Diels–Alder reaction 710, 1138
- inverse electron demand hetero-Diels–Alder reaction 18, 45, 296
- iodides 929
 - trimethylsilyl 929
- iodination 175
- α -iodination 782
- iodine 929
 - hypervalent 537, 538, 773
 - Lewis acids 458
- iodoarene 539
- iodolactonization 277
- 5-iodonitroalkenes 1107
- ion-pair immobilization 628
- ion pairing 852
- ion-tagged prolines 762
- ionic fragments 626
- ionic groups 644
- ionic layer 626
- ionic liquids (ILs) 626
 - acidic 913
 - chiral 455
 - – see chiral ILs 455
 - conjugate catalysts 13
 - IL-tagged organocatalysts 625
 - imidazolium-based 456
 - Lewis acids 455
 - “non-solvent” applications 625
 - organocatalysts 617
 - organocatalyzed conjugate addition, 1038
 - PTC 624
 - RTILs 455
 - supports 834, 835
 - task specific 455
 - water aldol reaction 685
- ionic organocatalysts 638
- ionic polymers 626
- ionic radius 365
- ionicity 629
- ionisation potential (IP) 1166
- ions 629
 - N-acyliminium 743, 749, 1052
 - acylpyridinium 1240
 - amidinium 269
 - aminophosphonium 189, 227
 - arylaminophosphonium 189
 - benzodithiolylium 735
 - carbenium 454
 - – see carbenium ions 454
 - counter- 1309
 - – see counterions 1309
 - fluoride 382
 - guanidinium 269, 1211
 - iminium 882
 - – see iminium 882
 - protio-iminium 1158
 - tetraalkylonium 366
 - zinc(II) 99
 - zwitterions 632
 - zzz 437
 - – see also anions, cations 437
- iridium-complexes 76
- isatins 262, 263, 821, 849
 - aldol reaction 819
 - Brønsted bases 819
 - F-C alkylation 1052
 - 3-hydroxy-3-indoloxindole 745
 - MBH-reaction 917
 - N-protected 589
- isatylidene malononitriles 1347
- ISC (intersystem crossing) 1180
- isobutyric anhydride 1267
- O-isobutyrylation 1242
- β -isocupreidines (β -ICD) 127, 131, 916, 1112
- isocyanides 167, 1317
- isocyano-esters 1098
- isocynoacetates 350
- isolated carbenium ions 731
- isomerization 1206
 - olefins 1206
- (E)-isomers 39, 43
- syn-isomers 229
- (Z)-isomers 39, 43
- isonitrile addition 404
- N-isopropyl-bipyrrolidine 598
- isoquinuclidines 1334
- isothiocineole 556
- α -isothiocyanato imide 272
- isothiouras 1200
 - chiral 1199
- isotopic effect 901
 - kinetic 901
- isovaline 56

- isoxazolidinones 1092
 – exo-bicyclic 1092
 isoxazoline N-oxides 1351
 – 4,5-disubstituted 1351
 2-isoxazolines 1107
 – trifluoromethyl-substituted 1107
- j**
 Jacobsen's catalyst 317, 330, 332
 Johannsen's catalyst 203
 Juliá–Colonna epoxidation 111
 julolidine 1324
 – derivatives 1324
- k**
 Kabachnik–Fields reaction 293, 294, 1314
 – three-component 1315
 ketenes 202, 248
 – acetals 163, 399, 403
 – [2+2]-cycloadditions 1112
 – imines 166
 – silyl 401
 ketimines 298, 855
 – asymmetric reduction 955, 957
 – N-benzyl 958
 – phosphinoyl 888
 – trifluoromethyl 855
 α -keto acids 1210
 β -keto-benzothiazole-sulfones 867
 β -keto heteroaryl-sulfones 1340
 β -keto heterocyclic sulfones 989
 keto-imines 880, 887, 894
 α -ketoamides 1020
 α -ketoesters 59, 274, 850
 – enantioselective amination 180
 – β -hydrazinyl- 180
 – β,γ -unsaturated 259, 504, 1048, 1115
 β -ketoesters 272, 1020
 – cyclic 765
 – α -fluorinated 144
 ketol 1217
 – cyclobutyl 1217
 α -ketol rearrangement 1217
 ketones 224, 225
 – acyclic 293, 1136
 – alkylation 737
 – α -allyloxy methyl 1209
 – aminoxylations 775
 – asymmetric allylation 1172
 – asymmetric Henry reaction 847
 – asymmetric reduction 412, 963
 – carbohydrate-derived 531
 – chiral catalysts 524, 531
 – chlorination 781
 – cyanosilylation 334
 – cyclic 56, 621, 623, 1173
 – dialkyl substrates 876
 – 1,3-diaryl α,β -unsaturated 308
 – direct fluorination 780
 – enamine activation 1032
 – enantioselective α -oxysulfonylation 538
 – enolizable 640
 – EVKs 913
 – fluorination 780
 – fluoromethyl 851
 – fructose-derived catalysts 524
 – hydrocyanation 875
 – hydrophilic 688
 – hydroxy 1289
 – ketone-mediated epoxidation 524
 – Mannich addition 705
 – methyl vinyl 584
 – Michael addition 256
 – MVKs 106, 468, 480, 481, 908
 – α -nitro- 139
 – nucleophilic addition 979
 – organocatalytic addition 846
 – prochiral 644, 967
 – reduction 412
 – reductive amination 959
 – SN1-type α -alkylation 737
 – solid 607
 – stoichiometric allylation 393
 – trifluoromethyl 500, 964
 – α,β -unsaturated 308, 977, 997, 1345
 – vinyl 907
 – Wieland–Miescher 622, 997
 α -ketophosphonates 848, 850
 β -ketosulfides 1207
 β -ketosulfones 868
 – heteroaryl 868
 (+)-(3'S,4'R)-trans-khellactone 533
 kinetic isotopic effect (KIE) 901
 kinetic resolution 901
 – alcohols 1225
 – amines 1263
 – dynamic 263
 – – *see* dynamic kinetic resolution, 263
 – enantioselective acylation 1225
 – oxidative 541
 kinetics 880
 – Michaelis–Menten 880
 Knoevenagel condensation 978
 – asymmetric 149
 Knoevenagel/Michael reaction sequence 1290
 kojic acids 1212

- Kröhnke annulation 391
kurasoin 1372, 1373
- I**
- lactams 529, 530
β-lactams 515
– antibiotics 643
γ-lactams 509
trans-γ-lactams 1342
trans-β-lactone carboxylates 1112
lactones 508
β-lactones 1112
– [2+2]-cycloadditions 1112
lactonization 517, 1079, 1080
laws and equations 517
– Curtin–Hammett principle 40, 47
– HOMO raising principle 43, 46
– Horeau principle 1286, 1294
– SN1-type nucleophilic reactions, 730
– transition states free energy difference 473
– Woodward–Hoffman rules 472
leucine 112
– poly- 112
L-tert-leucine 56
Lewis acids 211, 382
– asymmetric induction 929
– hydrocyanation 894
– iodine 458
– non-covalent activations 431
– SN1-type reactions 738
Lewis bases 1, 198
– asymmetric induction 916
– bifunctional 709, 907
– Brønsted acids and 1335
– catalysts 161, 956
– chiral 161, 381, 383, 384
– N-formamide-based 956
– onium phenoxides 375
– oxygen 206
– recoverable catalysts 962
– tertiary amines 1079
– tertiary phosphines 1079
Lewis pairs 967
– frustrated 967, 969
libraries 969
– combinatorial 100, 878
– DCLs 232
– drug discovery 1307
– self-replication processes 234
ligands 431
– chiral 431
limonene 556
linkers 556
– sulfur-containing 640
– 1,2,3-triazole 694
lipophilicity 365
List–Barbas–Mannich reaction 586
List 475
– zzz 475
– – see also Houk–List transition state model 475
(–)-lobeline 1233
(–)-(3′S)-lomatin 533
lone pair-selectivity 551
luciduline 82
LUMO-lowering activation 979, 1046
lyase 846
– hydroxynitrile 846
lycopodium alkaloids 82
Lyrica 336
lysine derivatives 636
- m**
- MacMillan catalyst 735, 981
MacMillan imidazolidinones 627, 661
– polymer-supported 661
MacMillan's chiral amines 475
macrocycles 233
macrocyclization 498
– dialdehydes 498
magnetic nanoparticles 665, 667
magnetically-supported organocatalysts 831, 832
maleates 1097
– dialkyl 1097
maleimides 235, 1144
– N-substituted 360
malonates 62, 984, 985, 997
– dialkyl 643
– diethyl 319, 320, 599
malonic acid 263, 348
malonitrile 354
malononitriles 258
– isatylidene 1347
mandelic acid 329, 1062
Mannich addition 705
Mannich reactions 60, 793
– acetaldehyde 809, 810
– activation modes 794
– bifunctional catalysts 822
– borono- 1316
– – see Petasis reaction 1316
– Brønsted acid 815
– Brønsted base 822
– C=X bonds 793
– catalysts structure 706

- direct 61, 292
- double 810
- enamine catalysis 806
- guanidinium thiourea catalysts 827
- high-pressure conditions 587
- IL media 620
- imine 291, 333
- indirect 1110
- List-Barbas- 586
- multicomponent 1288
- MW irradiation 595
- NHC catalysis 829, 830
- nitro- 151, 851
- non-covalent catalysis 1310
- phospho- 271
- PTC 826
- anti-selective 61, 806–809
- syn-selective 488
- self- 604
- sulfonyl imine 279
- three-component 293, 629, 1289, 1312
- ultrasonic conditions 603
- vinylogous 1310
- vinylogous Mukaiyama 815, 816
- water 705
- MAOS (microwave-assisted organic synthesis) 593
- marine alkaloids 1058
- Mayr nucleophilicity scale 396
- Mayr reactivity scale 730, 731
- MBH (Morita–Baylis–Hillman) adducts 1204
- MBH (Morita–Baylis–Hillman) carbonates 124
- MBH (Morita–Baylis–Hillman) reactions 131, 208, 250, 251, 261
- asymmetric 914
- C–C bond formation 105
- chalcogenide 444
- intramolecular 262
- Lewis acids 443
- nucleophilic addition 899
- ring-forming reactions 1080
- stereoselectivity 908
- thiourea catalysts 330
- vinylogous 1080
- - see Rauhut–Currier reaction 1080
- zzz 1228
- - see also Baylis–Hillman reactions 1228
- MCA (methyl cation affinity) 1226
- MC/EM (Monte Carlo/energy minimization) 104
- MCM-41 664
- MCRs (multicomponent reactions) 1285
- non-covalent organocatalysis 1311
- zzz 1285
- - see also three-component reactions 1285
- Meldrum's acid 1029
- Menten 880
- - see Michaelis–Menten kinetics 880
- 2-mercaptobenzaldehydes 355
- ortho-mercaptobenzoic acid 936
- Merrifield resins 660, 775
- N-Mes catalysts 513
- (-)-mesembrine 1369
- mesoporous materials 651
- supports 651, 663
- metal catalysis 805
- metal complexes 431
- metal enolates 721
- preformed 721
- metal-free allylic substitution 744
- metal-free catalysis 269
- metal-mediated carbene transfer 557
- metal salts 370
- metal-to-ligand charge transfer (MLCT) 1182
- metallocarbenes 557
- metallocenes 1
- metallocene-pyrrolidinopyridine scaffold 1243
- metallotropic interconversion 395
- metals 746
- SN1-type reactions 746
- metathesis 750
- anion 750
- methanol 482
- methanolytic desymmetrization 265
- methine compounds 366
- METHOX 387, 391
- para-methoxybenzoic anhydride (PMBA) 1234
- 2-methoxyfuran 304, 305
- p-methoxyphenyl (PMP) 705
- N-p-methoxyphenyl (PMP) 488
- methyl acrylate 436, 902
- N-methyl amino acids 411
- acyclic 411
- methyl cation affinity (MCA) 1226
- methyl crotonate 563
- 3-methyl-2-cyclopenten-1-one 599
- methyl groups 885
- trifluorinated 885
- π -methyl histidine (Pmh) 105, 109
- (S)-(-)-methyl 3-hydroxy-3-phenylbutanoate 403

- methyl (R)-3-hydroxy-3-phenylpropanoate 403
- methyl ketones 1209
 - α -allyloxy 1209
- methyl vinyl ketone (MVK) 468, 480, 481
 - C–C bond formation 106
 - high-pressure conditions 584
 - MBH-reaction 908
- methylation 1376
- 3-methylcyclohexenone 590
- methylene compounds 366
 - activated 1305
- α -methylene- β -hydroxy esters 131
- methylene-indolinones 1322, 1323
- methylene transfer 559
- N-methylimidazole (NMI) 1255
- N-methylindole 188, 741
- N-methylmorpholine 1119
- N-methylprolinol 908
- Michael acceptors 259
- Michael additions 7, 9, 62
 - aldehyde 480, 491
 - aza- 1023
 - (-)-bitungolide F 1362
 - carba- 83, 85
 - trans-chalcone 257
 - enantiopure ILs 458
 - glycine 359
 - high-pressure conditions 582
 - HSBM 610
 - ketone 256
 - lactonization 1079, 1080
 - nitro- 224–226
 - nitroalkane 253, 1001
 - nitroolefin 491
 - oxa- 1021
 - oxo- 123
 - phospho- 994, 1027
 - reaction routes 321
 - squaramides 611
 - sulfa- 260, 1023, 1345
 - thio- 62
 - vinylogous 1348
- Michael-alkylation reaction 1116
- Michael cyclization 87
 - reductive 87
- Michael reactions 257
 - acidic C–H bonds 984, 997
 - aza- 280, 993, 1003
 - C–C bond formation 101
 - cascade 484
 - domino 642, 1101, 1103, 1109
 - high-pressure conditions 591
 - IL media 620, 621
 - intramolecular aza- 1074
 - Knoevenagel/Michael reaction sequence 1290
 - Michael-aldol-dehydration 64
 - Michael–Michael tandem reaction, 326
 - Mukaiyama– 984
 - nitro- 103, 624
 - organocatalytic aza- 990
 - oxa- 993, 994
 - oxo- 1004, 1005
 - SN2-type 723, 724
 - sulfa- 994, 995, 1005
 - thio- 1006
 - water 696
- Michael-type acceptors 598
- Michaelis–Menten kinetics 880
- microwave-assisted organic synthesis (MAOS) 593
- microwave (MW) irradiation 581, 593
- Miescher 622
 - – *see* Wieland–Miescher . . . 622
- milling 581
 - ball 581, 605, 610
- (+)-minfiensine 750, 1111
- “minimal artificial acylase” 1248
- “minimal catalophore” 111
- Mitsunobu reaction 145
- MLCT (metal-to-ligand charge transfer) 1182
- modular organocatalytic scaffolds 97
- molecular capsules 1
- molecular modeling (MM) 121
- molecular sieves 764
- molten imidazolium salts 621
- monastrol 1321
- mono-nosylate 1258
- monoacetylation 1247
- monoacylation 1243
- monomers 658
 - functional 658
- 1-monosubstituted 1,3-diamines 816
- γ -monosubstituted enals 44
- Monte Carlo/energy minimization (MC/EM) 104
- Morita–Baylis–Hillman (MBH) adducts 1204
- Morita–Baylis–Hillman (MBH) carbonates 124
- Morita–Baylis–Hillman (MBH) reactions 131
 - – *see* MBH reactions 131
- Mosher ester 421

- Mukaiyama aldol reactions 813
 – Brønsted acids 812
 – vinylogous 814
 Mukaiyama Mannich reaction 815, 816
 Mukaiyama–Michael reaction 984
 Mukaiyama reaction 247, 248, 449
 multi-organocatalyst systems 1333
 multicomponent reactions 1365
 – – *see* MCRs 1365
 multidentate mode 317
 multifarious co-catalysts 1343
 multifunctional aldehydes 1071
 multifunctional catalysts 6, 12, 906, 907
 multifunctional organocatalysts 324
 multifunctional piperidine derivatives 1156
 multiphasic systems 834
 multisubstituted bi-spirocyclooxindole 1104
 MVK (methyl vinyl ketone) 468, 480, 481
 – C–C bond formation 106
 – high-pressure conditions 584
 – MBH-reaction 908
 MW 593
 – – *see* microwave 593
 D-myo-inositol-1-phosphate 1253
- n**
 Na . . . 1193
 – – *see* sodium . . . 1193
 NADH/NADPH 941, 942
 Nagasawa's catalysts 326
 nakadomarin 1025
 (–)-nakadomarin A 1369
 nanoparticles 665
 – magnetic 665, 667
 nanoreactors 229
 naphthols 1049
 – dearomatization 537, 538
 – derivatives 1051
 naphthopyran derivatives 1055
 naphthoquinones 255
 natural amino acids 929
 natural cinchona alkaloids 120, 122
 natural products synthesis 1057, 1060
 – aminocatalysis 1359
 – SOMO-catalysis 1061
 – Stetter reaction 505
 Nazarov reaction 1083
 NBA (p-nitrobenzoic acid) 72
 neutral dimers 164
 NHCs 209
 – – *see* N-heterocyclic carbenes 209
- nitrate 72
 – ceric ammonium 72, 1167, 1175
 nitriles 892
 – α -amino 892
 γ -nitro aldehydes 643
 α -nitro alkenes 639
 β -nitro- γ -enamines 933
 nitro groups 482, 1353
 α -nitro-ketones 139
 nitro-Mannich reaction 151, 851
 nitro-Michael addition 224–226
 nitro-Michael reaction 103, 624
 nitroacrylates 1022
 – trisubstituted 1022
 β -nitroalcohol derivatives 841
 α -nitroaldehydes 987
 nitroaldol reaction 818
 – – *see* Henry reactions 818
 nitroalkanes 257, 258, 643, 1002, 1021
 – addition 851
 – functionalized substrates 863
 – Michael addition 1001
 – organocatalytic addition 841, 846
 – prochiral 1001
 nitroalkenes 130, 153, 253, 255, 278, 1021
 – β -aryl-substituted 266
 – conjugated 922
 – F-C reaction 306, 307, 328
 – Michael addition 253
 α -nitroalkenes 638
 nitroalkylation 1180
 – asymmetric 1180
 nitroalkyls 841
 – addition to C=X bonds 841
 β -nitroamines 863
 nitrobenzaldehyde 476
 2-nitrobenzaldehyde 106
 3-nitrobenzaldehyde 606
 4-nitrobenzaldehyde 688
 p-nitrobenzaldehyde 608
 para-nitrobenzaldehyde 485
 p-nitrobenzoic acid (NBA) 72
 2-nitrocyclopropanecarboxylic acid 1119
 nitrocyclopropanes 1119
 – functionalized 1118
 α -nitroesters 276
 (2-nitroethyl)cyclopropane 855
 nitrogen 276
 – aldimine 488
 – Brønsted bases 344
 – heterocycles 992
 – Lewis bases 198, 409
 – nitrogenated heterocycles 1120
 – nucleophiles 991

- quinoline 1228
 - ylides 570
 - γ -nitroketones 590
 - nitromethane 137, 142, 257, 582, 585, 843, 844, 987
 - asymmetric Henry reaction 848
 - enantioselective Henry reaction 849
 - nitronate 818
 - nitrones 235
 - [3+2]-cycloadditions 1093
 - nitroolefins 44, 272, 1048
 - β -aryl 1016
 - C–C bond formation 103
 - cyclic 1028
 - cycloadditions 1098
 - α,β -disubstituted 1027, 1029
 - F-C alkylation 1048
 - Michael addition 491
 - organocatalyzed conjugate addition 1013
 - terminally unsubstituted 1030
 - 5-nitropentenoate 1349
 - nitroso aldol reaction 250
 - O-nitroso aldol reaction 12
 - nitrosobenzene 175, 769
 - nitrostyrenes 224, 225, 319, 320
 - domino Michael reactions 1101
 - β -nitrostyrenes 598
 - derivatives 623
 - MW irradiation 598
 - trans- β -nitrostyrenes 638
 - substituted 638
 - nitroxide-mediated polymerization (NMP) 659
 - nitroxyl radical catalysts 541
 - NMP (nitroxide-mediated polymerization) 659
 - NOE contacts 324
 - NOE interactions 442
 - non-aromatic amines 411
 - non-biaryl atropisomers 1061
 - non-carbon nucleophiles 1103
 - “non-classical” activation 1
 - non-conjugated cis-alkenes 529
 - non-covalent activations 241, 1037, 1287, 1312
 - Brønsted bases 343
 - Lewis acids 431
 - non-covalent catalysis 1081
 - multicomponent reactions 1309
 - non-covalent immobilization 626
 - non-covalent interactions 758
 - chiral catalysts 757
 - non-covalent organocatalysis 1311
 - non-covalently supported organocatalysts 832
 - non-enolizable carbonyl compounds 911
 - “non-stabilized” alkyl halides 724
 - non-steroidal drugs 1236
 - anti-inflammatory 1236
 - nonchemical methods 846
 - nicotine 674
 - N-para-nosyl imines 1113
 - nosylate 1258
 - mono- 1258
 - nucleophiles 674
 - aromatic 1043, 1045
 - carbon-centered 1019
 - 1,3-dicarbonyl carbon 984
 - nitrogen 991
 - non-carbon 1103
 - silyl 166, 374
 - substitution reactions 721
 - sulfone-containing 864
 - nucleophilic additions 368, 381
 - C=C bonds 977
 - C=X bonds 793, 941
 - enals 979, 983
 - ketones 979, 997
 - MBH reactions 899
 - nucleophilic catalysis 515
 - nucleophilic co-catalysts 1269
 - nucleophilic reactions 730
 - SN1-type 730
 - nucleophilic substitution 367, 1367
 - alcohols 738
 - nucleophilicity 730
 - Mayr scale 396
 - (–)-nutlin-3 857
- o**
- octyl- β -D-glucopyranoside 1242, 1243
 - oil/water (O/W) emulsions 684
 - olefination 547
 - olefins 547
 - activated 910
 - additions to 1169
 - arylation 1054
 - electron-deficient 1120
 - electron-rich 1168
 - geometry 1173
 - α -halogenation 1085
 - hydroacylation 1079
 - isomerization 1206
 - umpolung 514
 - cis-olefins 529
 - oligomeric silsesquioxanes 665

- oligonucleotide synthesis 651
 - solid-phase 651
- oligopeptides 97
- (+)-omaezakinol 526
- “on water” reactions 676, 704, 804
 - aldol 633, 800
- one-pot aza-Diels–Alder reactions 630
- one-pot synthesis 1308
 - ABT-341 1308
- ONIOM calculations 311
- onium alkoxides 1202
- onium carbanions 366, 367
- onium fluorides 372
- onium phenoxides 374
- onium salts 365
 - chiral 365
- Ooi’s catalyst 280
- anti-open conformer 121
- open shell reactions 1165
 - organocatalytic 1165
- optical purity 685
- optically active aromatic compounds 1111
- optimized geometries 490
 - transition states 490
- organic Brønsted bases 817
- organic reactions 582
- organic synthesis 593
 - microwave-assisted 593
- organo-photoredox catalysis 77
- organo-SOMO catalysis 1076
- organocascade catalysis 1365
 - stereoselectivity 482
 - triple 1300, 1302
 - zzz 1300
 - – see also cascade reactions 1300
- organocascade transformations 1053
- organocatalysis 465
 - activation modes 730
 - asymmetric 1, 581, 1043, 1359
 - biocatalysis 805
 - carbene-based dual 1338, 1353
 - conjugate addition 1013
 - desymmetrization 1376
 - Diels–Alder reaction 1132
 - high-pressure conditions 581
 - “Holy Grail” 735
 - hydride transfer 86
 - industrial applications 1373
 - intermolecular reactions 1091
 - metal catalysis 805
 - NHCs 495
 - open shell 1165
 - spiro-lactonization 1039
 - supported 831
- organocatalysts 831
 - acid–acid bifunctional 327
 - acid–base 922
 - chiral 651
 - – see chiral catalysts 651
 - chiral phosphoric acids 943
 - clay-supported 832, 833
 - covalently-supported 831
 - F–C reactions 1043
 - heterocyclic 13
 - IIs 617, 625
 - immobilization 626
 - magnetically-supported 831, 832
 - mesoporous material-supported 651, 663
 - modular scaffolds 97
 - multi-organocatalyst systems 1333
 - multifunctional 324
 - multiphasic systems 834
 - non-covalently supported 832
 - polymer-supported 651, 656
 - primary amino acids 635
 - prolines 4, 17, 631
 - prolinol-derived 759
 - pyrrolidines 638
 - self-assembly 223
 - silica-supported 626
 - supported 831
 - tagged 834
 - (thio)urea 315
 - xanthone-based 1188
 - zzz 4
 - – see also catalysts 4
- organocatalytic addition 841
 - nitroalkanes 841
 - nitroalkanes to aldehydes 841
 - nitroalkanes to ketones 846
 - sulfones 864
 - synergic 741
- organocatalytic aza-Michael reaction 990
- organophosphorus compounds 769
- orthoformates 230
 - hydrolysis 231
- orthogonal activation modes 1292
- oseltamivir 82
 - (–)-oseltamivir 1018, 1307, 1308
- Overman rearrangement 1203
- O/W (oil/water) emulsions 684
- oxa-hetero-Diels–Alder reaction 1147
- oxa-Michael addition 1021
- oxa-Michael reaction 993, 994
- oxa-Michael/aza-MBH tandem reaction 935
- oxamination reactions 1169
- 5H-oxazol-4-ones 274, 275, 821

- oxazolidines 774
 - bi-/tricyclic 1094
 - oxazolidinones 470, 476
 - N-acylated 260
 - catalysts 528, 530
 - generation 470
 - off-side 635
 - 2-oxazolidinones 1266
 - oxazolidin-2-ones 140
 - oxazoline backbone 1151
 - oxazolone 986, 1199
 - oxazolyl carbonates 1201
 - oxidants 778
 - “greenest” 778
 - hypervalent iodine 773
 - oxidation reactions 523
 - alcohol resolution 540
 - asymmetric 541
 - Baeyer–Villiger 537
 - C–C bond formation 111
 - carbo- 1175
 - disulfides 539, 540
 - enals 513
 - enamines 1169
 - enantioselective 111
 - formal CH 736
 - α -heteroatom functionalization 777
 - hypervalent iodine-catalyzed 537, 538
 - preferential 1167
 - thioethers 539, 540
 - oxidative ET reactions 1166
 - chemically induced 1166
 - oxidative kinetic resolution 541
 - oxides 541
 - covalent activations 523
 - diphenylphosphine 1007
 - phosphine 389
 - N-oxides 389
 - brucine 907
 - chiral 397, 398
 - 4,5-disubstituted isoxazoline 1351
 - groups 206
 - pyridine 386–388
 - oxidopyrylium-based
 - [5+2]-cycloaddition 1086, 1348, 1349
 - oxidosqualene cyclase 748
 - oximes 1022
 - oxindoles 260, 986
 - O-carbonylated 1194, 1196
 - enol carbonates 1195
 - oxiranes 549
 - 2-oxo-allylic alcohols 1217
 - oxo-Michael addition 123
 - oxo-Michael reaction 1004, 1005
 - 4-oxobut-2-enoate 1342
 - ethyl 1342
 - 2-oxoethylmalonate 1103
 - dimethyl 1103
 - 7-oxohept-2-enoates 1093
 - oxoisindolium salts 452
 - Oxone® 523, 527
 - α -oxonitriles 884
 - oxonium intermediates 749
 - α -oxyamination 113
 - α -oxybenzoylation 72
 - oxygen 749
 - Lewis bases 206
 - phosphoryl 289, 743
 - oxyketene imines 167
 - N-silyl 167
 - α -oxysulfonylation 538
- p**
- P-spiro salts 844
 - chiral 844
 - pairing 852
 - ion 852
 - Pal (3-pyridylalanine) 106
 - palladium-catalyzed allylic alkylation, 1266
 - palladium salts 747
 - paracyclophane-2,3-dihydroimidazo[1,2-a]pyridine (PIP) bases 204
 - paracyclophanediols (PHANOLs) 250
 - paracyclophanes 196, 197, 389
 - [2.2]paracyclophanes 195, 196
 - parallel combinatorial libraries 878
 - “parasitic equilibrium” 470
 - parasitic species 675
 - (-)-paroxetine 643
 - Parrish 51
 - – see Hajos–Parrish–Eder–Sauer–Wiechert ... 51
 - Pauling, Linus 241
 - PEG (poly(ethylene glycol)) 656
 - pentaalkylguanidinium salts 619
 - peptides 619
 - catalyst design 100
 - catalysts 537, 678
 - di- 107
 - – see dipeptides 107
 - organocatalytic scaffolds 1
 - peptidomimetics 104
 - poly- 111
 - poly-L-alanine 97
 - prolyl 102
 - pyridylalanine 903
 - small 662

- N-terminal prolyl 710
- tripeptide catalysis 1029
- per-6-amino- β -cyclodextrin (per-6-ABCD) 846
- peracid catalysis 536
- perchlorates 448
 - trityl 448
- pericyclic patterns 1291
- anti-/syn-periplanar rotamers 534
- PET (photoelectron transfer) cyclization 1187
- Petasis–Ferrier rearrangement 1215
 - aza- 1215
- Petasis reaction 1315, 1316
- pH 525
- PHANOLs (paracyclophanediols), 250
- pharmaceutical ingredients 1307
 - active 1307
 - zzz 1307
 - – *see also* drugs 1307
- phase-transfer alkylation 602
- phase-transfer catalysis (PTC) 1, 149
 - aldol reaction 824
 - asymmetric 370
 - aza-Henry reaction 862
 - base-free neutral 371
 - C=X bonds 824
 - hydrocyanation 892
 - IL media 624
 - industrial applications 1376
 - Mannich reaction 826
 - Strecker reaction 890, 891
 - target molecule synthesis 1371
 - total synthesis 1372
- phenanthryl derivatives 130
- phenethyl amines 299
 - achiral 299
- phenol-assisted addition 468
- phenols 212
 - hydroxyalkylation 1050
- phenoxides 374
 - onium 374
- N-phenoxy carbonyl cation 1197
- phenyl azides 228
- phenyl groups 135
 - 3,5-bis(trifluoromethyl)- 318
- phenyl rings 317
- phenylalanine 51
- L-phenylalanine 602
- (R)-phenylalanine 622
- phenylboration 601
- L-phenylglycine 226
- 3-phenylpropanal 481
- 2-(phenylsulfanyl)-2-cycloalkenoneses 1120
- 5-phenyltriazoles 992
- phospha-Mannich reaction 271
- phospha-Michael addition 994, 1027
- phosphane 1099
 - tertiary 1099
- phosphates 1253
 - BINOL- 893
- phosphatidylinositols 1254
- phosphination 769, 995, 1007
- phosphines 207, 208
 - annulations 567
 - catalysts 570, 1099
 - oxides 389
 - phosphine-sulfonamide catalysts 928, 929
 - reactions 899, 905
 - spiro- 173, 174, 568
 - C₂-symmetric catalysts 172
 - tertiary 172, 922
- phosphinoyl ketimines 888
- phosphites 996
 - diphenyl 178, 254
- phosphitylation 1252, 1256
- phosponates 248
 - acyl 248
- phosphonic acids 860
 - anti- α,β -diamino 860
- phosphonium cation 431, 444
- phosphonium–enamine zwitterion 905
- phosphonium salts 224, 445
 - asymmetric Henry reaction 845
 - bis- 446
 - iodide/chloride 447
 - phosphonium-inner salts 1098
 - quaternary 823, 828
- β -phosphonylation 995
- phosphoramides 162, 385
 - BINOL-derived 1095
 - bis- 386
 - chiral 397
 - enantiopure 438
 - N-triflyl 1143
- phosphoramidite 1256
- phosphoric acids 814, 815, 1158
 - binaphthyl 300
 - BINOL 860
 - catalysts 289, 290
 - chiral 289, 644, 742, 817, 943, 1052, 1324
 - diester 1214, 1217
 - sterically congested 943
 - total synthesis 1366

- phosphorus ylides 566, 1345, 1346
 phosphoryl oxygen 743
 – functionalities 289
 phosphorylation 1251
 – asymmetric 110
 photochemical asymmetric synthesis 1186
 photochemical [3+2]-cycloaddition 251, 252
 “photochirogenesis” 1186
 [2+2]-photocycloaddition 1188
 photoelectron transfer (PET)
 cyclization 1187
 photoredox catalysis 1180
 photosensitizers 1184
 – eosin Y 1184
 phthalic acid 639
 picolinamides 1318, 1319
 Pictet–Spengler-type cyclization 749, 1050, 1060
 – natural products synthesis 1060
 – non-covalent catalysis 1082
 pinacol rearrangement 1216
 PINDOX 386
 pinocarbonyl 391
 PIP (paracyclophane-2,3-dihydroimidazo[1,2-a]pyridine) bases 204
 piperidines 410
 piperidines 989
 – multifunctional derivatives 1156
 – substituted 855
 pivalic anhydride 1236
 planar-chiral catalysts 195
 planar 1,3-dipoles 1096
 planar transition states 527
 PMBA (para-methoxybenzoic anhydride) 1234
 Pmh (π -methyl histidine) 105, 109
 α -pnicogenation 758
 polar interactions 674
 polar protic reaction medium 481
 polar reagents 618
 poly-L-alanine peptides 97
 poly-leucine 112
 polycyclization 1082
 – cationic 1082, 1083
 polyelectrolytes 628
 – solid 627
 polyenals 1138
 polyene cyclization 1076, 1175
 polyetheral networks 653
 poly(ethylene glycol) (PEG) 656
 polyhedral oligomeric silsesquioxanes (POSS) 665
 polyketides 1362
 polymerization 658
 – co- 658
 – NMP/RAFT 659
 polymers 1362
 – co- 654
 – – *see* copolymers 654
 – ionic 626
 – polymeric matrix 640
 – resins 652
 – “star” 1054
 – supports 651, 661
 poly(methacrylate) backbone 417
 polyols 637
 polyoxometalate (POM) 832, 833
 polypeptides 111
 polystyrene (PS) 627, 628
 – supports 694
 polysubstituted cyclopentanones 1102
 porogens 659
 postfunctionalizations 1034
 Povarov reaction 297, 743, 1159, 1324, 1325
 PPY (pyrrolidinopyridine) 202, 1192, 1193
 – chiral derivatives 1195
 4-PPY (4-pyrrolidinopyridine) 1242
 prebiotic conditions 676
 precatalysts 539
 – iodoarene 539
 preferential oxidation 1167
 – enamines 1167
 preformed metal enolates 721
 (S)-pregabalin 336
 Prelog 195
 – – *see* CIP system 195
 primary amines 195, 1015
 – catalysts 330, 982
 – chiral 1044, 1140
 – cinchona 1298
 – groups 145
 – C2-symmetric 174
 – water aldol reactions 678
 – water Michael reactions 701
 primary amino acids 51–53
 – hydrophobicity 679
 – organocatalysts 635
 – protected 55
 primary–secondary diamines 55, 63, 65
 primary–tertiary amines 680
 primary–tertiary diamines 60
 prochiral ketones 644, 967
 prochiral nitroalkanes 1001

- prolinamides 3, 5, 623
 - N-arylsulfonyl-substituted 6
 - derivatives 623
 - IL-supported 636
 - substituted 688
 - sulfonylated 623
 - water aldol reaction 687
- L-prolinamides 687
 - chiral backbone 888
 - D-glucosamine- 690
- prolinamines 3, 8
 - sulfonamides 13
 - thiourea 15
- prolines 15
 - acrylic derivatives 657
 - aldol reactions 469
 - α -amination 762
 - aryl sulfonamide 1299
 - asymmetric induction 933
 - derivatives 683, 694
 - enamine 466
 - enamionone 470
 - trans-4-fluoro- 1071
 - ion-tagged 762
 - MBH-reactions 906
 - organocatalysts 4, 13, 17, 631
 - oxa-Michael/aza-MBH tandem reactions 936
 - oxazolidinone 675
 - polymer-supported 656
 - proline-based dipeptides 607
 - proline-catalyzed alkylation 734
 - proline-derived CILs 631
 - secondary amine catalysts 3, 4
 - stereoselectivity 472
 - substituted 683
 - sulfonamide 6, 14
 - supported 694
 - tetrazole 10, 682, 1001
 - water aldol reaction 682
- L-prolines 3
 - aldol reactions 1071
 - high-pressure conditions 593
 - pyrrolidine-(thio)urea catalysis 325
- (S)-prolines 762
 - α -amination 762
- prolinium sulfate 630
- prolinols 778
 - derivatives 778
 - organocatalysts 759
 - sulfonamide unit 644
- prolyl peptides 102, 710
- pronucleophiles 343
 - activation 344
- propanals 105, 467, 499, 1034
 - enamine formation 468
- propargyl aldehydes 1212
- propargyl amines 1271
- propargylation 395
- propargylic alcohols 740, 1231, 1232
- propargylic amines 1270
- propiophenone 538
- N-protected amino acids 1343
- 4-N-protected aminocyclohexanone 596
- protected cyanohydrins 167
- N-protected glycine ester 611
- N-protected imines 917
- N-protected isatins 589
- protected primary amino acids 55
- protected threonine 58
- protecting groups 568
- protio-iminium ions 1158
- α -proton-exchange 264
- proton transfer 488
 - counterion-facilitated 923
 - MBH reaction 902
- protonated acyclic imines 185
- protonations 43
 - asymmetric 301
 - Brønsted bases 343
 - enantioselective 710
 - water 711
- β -protonations 511
 - homoenolates 511
- PS 627
 - – see polystyrene 627
- pseudo-enantiomeric catalysts 848
- pseudo-enantiomers 145
 - alkaloids 345
 - catalysts 323
- pseudoephedrine-based chiral silane 441
- PTC 149
 - – see phase-transfer catalysis 149
- Pummerer rearrangement 1207
- 2-pyrazolin-5-ones 1004
- pyridines 386, 387
 - asymmetric hydrogenation 948
 - DMAP 199
 - – see DMAP 199
 - N-oxides 388
 - PIP 204
- pyridinium disulfonates 182
- pyridinoferrrocenes 200
 - chiral derivatives 201
- pyridinyl catalysts 883
- 2-pyridones 1147
- pyridylalanine 903
- 3-pyridylalanine (Pal) 106

- 2-pyrones 351, 1146
 - pyrrolidines 270, 989
 - bicyclic catalysts 489
 - carboxylic acid 489, 806
 - catalysts 10, 18, 19, 697
 - chiral catalysts 480
 - cinchonine-squaramide 256
 - [3+2]-cycloadditions 1096
 - enamine formation 467
 - fluorosulfonamide 698
 - functionalized 1293
 - IL-tagged 639
 - ionic organocatalysts 638
 - phosphite 624
 - pyrrolidine ring 470, 638, 642
 - α -substituted catalysts 480
 - tertiary amine conjugates 8
 - (thio)urea catalysis 325
 - triazole 697
 - trifluoromethanesulfonamide 13
 - units 639
 - pyrrolidinopyridine (PPY) 202, 1192, 1193
 - chiral derivatives 1195
 - 4-pyrrolidinopyridine (4-PPY) 1242
 - pyrrolidinyl tetrazole 777
 - (R)- α -pyrrolidinyl tetrazole 1119
 - pyrroline-1-carbonyl group 1249
 - pyrrolo-indole core 1104
 - tricyclic 1104
 - pyrroloindoline 750
- q**
- QDN (quinidine-1-naphthoate) 1257
 - quadruple cascade reactions 1055, 1303, 1304
 - quantum mechanical calculations 686
 - quaternary ammonium betaines 822
 - quaternary ammonium salts 150, 826
 - axially chiral 824, 825
 - chiral 890
 - two-center 827
 - quaternary chiral centers 246
 - quaternary onium fluorides 372
 - quaternary phosphonium salts 823, 828
 - quaternary stereocenters 590, 879, 1058
 - quinazolidines 1106
 - quinidines 119, 122, 226
 - catalysts 571
 - QDN 1257
 - quinidinium bromide 1000
 - quinine 119, 142
 - quinine-acrylonitrile copolymer 654
 - ortho-quinodimethanes (oQDMS) 1139, 1140
 - quinolines 123, 300
 - asymmetric hydrogenation 948
 - derivatives 301
 - nitrogens 1228
 - vinylation 1316
 - quinolone ring 137
 - quinolones 1188
 - 4-substituted 1188
 - quinones 255
 - functionalities 151
 - quinuclidines 346, 1228
 - group 322
 - ring 121
- r**
- racemic α -acetoxy- β -ketosulfides 1207
 - racemic alcohols 1227
 - racemic azlactones 264, 1149
 - racemic diols 1261
 - radicals 1149
 - coupling 1185
 - electron-deficient 1168
 - enamine 471
 - nitroso 541
 - radical-mediated cyclizations 74
 - RAFT polymerization 659
 - rate-determining step (RDS) 901
 - rational catalyst design 34, 486
 - Rauhut–Currier reaction 138, 1080, 1081
 - reactions 138
 - acylation 108
 - – see acylations 108
 - addition 7
 - – see additions 7
 - alcoholysis 141, 265
 - aldol 9
 - – see aldol reactions 9
 - alkaloid-induced asymmetric 624
 - alkoxycarbonylation 1197
 - alkylation 147
 - – see alkylations 147
 - allylation 382
 - – see allylations 382
 - amination 1003
 - – see aminations 1003
 - α -amination 478, 479
 - aminoalkylation 183
 - aminoallylation 1214
 - aminofluorination 1297
 - α -aminooxylation 633, 634
 - aminooxylation 774
 - annulation 128
 - – see annulations 128
 - arylamination 1054

- α -arylation 78, 472, 1176, 1177
- asymmetric amination 349
- asymmetric cyclopropanation 563, 565
- asymmetric organocatalytic 618
- atroposelective 742
- aza-benzoin 501
- aza-Darzens 1122, 1123
- aziridinations 1, 184, 560, 573, 758, 1120, 1122, 1345
- Baeyer–Villiger 525, 531
- Bamford–Stevens 558
- Baylis–Hillman 584, 1228
- benzoin 497
- α -benzoylation 1184
- Biginelli 630, 1321
- bromocycloetherification 1338
- bromolactonization 1086
- C–C bond formation 98, 306, 508
- carbene transfer 556, 557, 561, 562
- carbonyl hydrocyanation 873, 875
- cascade 41
 - - see cascade reactions 41
- α -chalcogenation 770
- chlorination 781
- chlorolactonization 1086
- “click” 13, 634
- combined hydrogenation 969
- competitive coupling 1295
- condensation 8
 - - see condensations 8
- conditions 581
- Corey–Chaykovsky 318
- syn-coupling 629
- cross-benzoin 498, 1077
- cross-coupling 500
- crotylation 388
- cyanation 404
- cyanosilylation 334
- cyclization 484
 - - see cyclizations 484
- cycloaddition 43
 - - see cycloadditions 43
- cyclopropanation 1, 562
- “dark” 1183
- Darzens 770
- dearomatization 537, 538
- decarboxylation 1085
- Deng 985, 1004
- deprotonation 710
 - - see deprotonations 710
- desymmetrization 141
 - - see desymmetrizations 141
- di-amination 1297
- Diels–Alder 45
 - - see Diels–Alder reactions 45
- dimerization 515
- direct substitution 729
- domino 642, 926, 1101, 1109, 1285, 1294, 1296, 1349, 1365
- dynamic kinetic resolution 263
 - - see dynamic kinetic resolution 263
- electrocyclization 1083
- 6π electrocyclization 829
- electron-transfer 1165
- enals 508
- enantioselective vinylation 73
- α -enolation 1173, 1174
- enolization 100, 169
- epoxidation 19
 - - see epoxidations 19
- esterification 507, 511
- 2-ethoxycarbonylvinylation 863
- F–C 261
 - - see Friedel–Crafts . . . 261
- fluorination 36
 - - see fluorinations 36, 780
- α -fluorination 71
- fluoromethylation 988
- β -fluoromethylation 999
- green 673
- Hajos–Parrish–Eder–Sauer–Wiechert 51, 1373, 1374
- halogenation 152
- α -halogenation 779
- Hantzsch dihydropyridine 1319
- Henry 138
 - - see Henry reactions 138
- heterocyclization 1105
- heterofunctionalization 621
- homo-benzoin 497
- hydroacylation 505, 506, 1079
- hydrocyanation 357, 873, 893
- hydrogenation 297
 - - see hydrogenations 297
- hydrolysis 114, 231
- hydrophosphonylation 278, 293, 294
- hydrosilation 958
- hydrosilylation 417
- hydroxyalkylation 1049
- hydroxyamination 175, 768
- imines 291
- iminium/enamine-catalyzed 465
- imino aza-enamine 185
- “in water” 676, 800, 802
- intermolecular 1091
 - - see intermolecular . . . 1091
- intramolecular 572
 - - see intramolecular . . . 572

- iodination 175
- α -iodination 782
- iodolactonization 277
- O-isobutyrylation 1242
- Kabachnik–Fields 293, 294, 1314
- Knoevenagel/Michael 1290
- lactonization 517, 1079, 1080
- List–Barbas–Mannich 586
- Mannich 60
- – *see* Mannich reactions 60
- MBH 131
- – *see* MBH reactions 131
- medium 581
- metal-free allylic substitution 744
- methylation 1376
- methylene transfer 559
- Michael 984
- – *see* Michael reactions 984
- Michael–aldol–dehydration 64
- Michael–alkylation 1116
- Michael–Michael tandem 326
- Mitsunobu 145
- monoacetylation 1247
- Mukaiyama 247, 248, 449
- Mukaiyama–Michael 984
- multicomponent 1365
- – *see* MCRs 1365
- MVRs 1285
- Nazarov 1083
- nitroaldol 818
- – *see* Henry reactions 818
- nitroalkylation 1180, 1181
- nucleophilic substitution 367, 738, 1367
- olefination 547
- “on water” 676, 704, 804
- open shell 1165
- organic 582
- oxa-Michael/aza-MBH tandem 935
- oxamination 1169
- oxidation 523
- – *see* oxidation reactions 523
- α -oxyamination 113
- α -oxybenzoylation 72
- α -oxysulfonylation 538
- Petasis 1315, 1316
- phenylboration 601
- phosphination 769, 995, 1007
- phosphine-catalyzed 899, 905
- phosphitylation 1252, 1256
- β -phosphonylation 995
- phosphorylation 110, 1251
- α -pnictogenation 758
- polar protic media 481
- Povarov 297, 743, 1159, 1324, 1325
- proline-catalyzed 472
- α -proton-exchange 264
- protonation 43
- – *see* protonations 43
- PTC hydrocyanation 892
- Rauhut–Currier 138, 1080, 1081
- rearrangement 203
- – *see* rearrangements 203
- redox 213, 507, 511, 1211
- α -reducible aldehydes 506
- reduction 408
- – *see* reduction reactions 408
- reductive amination 298, 299, 944, 959
- reductive fluorination 88
- regiodivergent 1262
- ring-closing 514, 1075
- ring expansion 508
- ring-forming 1069, 1091, 1131
- ring-opening 223, 311, 417, 420
- selenenylation 778
- self aldol condensation 477
- SET 1165
- sigmatropic 1191
- silylation 1258
- silylcyanation 877
- SN1-type 729, 730
- SOMO-activation 471
- spirolactonization 1039
- Steglich esterification 1250
- Stetter 1, 501, 505, 1077
- Stork 469
- Strecker 271
- – *see* Strecker reactions 271
- α -sulfonylation 37
- sulfonylation 778
- sulfinylation 1256
- sulfonylation 1256
- tautomerization 52
- three-component 1285
- – *see* three-component reactions 1285
- tosylation 538, 539
- trans-acetalization 1084
- α -trifluoromethylation 76, 1185
- Ugi-type 1317
- vinylation 1316
- α -vinylation 1174
- water 673
- Wittig 547, 566
- yield base effect 564
- reactivity 564
- chemo-differentiating 1306
- iminium/enamine-catalyzed reactions 465
- Mayr scale 730, 731

- structure–reactivity–selectivity relations 319
 - reagents 319
 - atom economic 952
 - Grignard 154
 - polar 618
 - reducing 955
 - SET 778
 - silicon 381
 - SOMOphile 1166
 - Wittig 818
 - rearrangements 1191
 - (Z)-1,2-bis(sulfone)vinylene 1033
 - Claisen 275
 - see Claisen rearrangements 275
 - Coates–Claisen 1212
 - [3,3]-Cope 561
 - Overman 1203
 - Petasis–Ferrier 1215
 - Pummerer 1207
 - (semi)pinacol 1216, 1218
 - 1,3-sigmatropic 1203
 - 1,4-sigmatropic 1207
 - [2,3]-sigmatropic 552
 - Steglich 203, 1192, 1200, 1337
 - vinylogous α -ketol 1217
 - 2,3-Wittig 1208, 1209
 - recycling 1209
 - catalysts 657, 693, 962
 - solvents 618
 - supports 617
 - redox reactions 213
 - azolium-catalyzed 1211
 - esterification 507
 - α -fluoro- α,β -unsaturated aldehydes 511
 - α -reducible aldehydes 506
 - reducing reagents 955
 - reduction reactions 408
 - asymmetric 410–412, 955
 - C=N/C=O bonds 941, 942, 947
 - cofactors 942, 996
 - cyclic imines 948
 - enamines 415, 960
 - imines 410, 411, 415
 - ketones 412, 644
 - reductive alkylation 747
 - reductive aminations 298, 299, 944, 1317
 - ketones 959
 - reductive fluorination 88
 - reductive Michael cyclization 87
 - regenerable Hantzsch ester (HEH) 304
 - regiodivergent reactions 1262
 - regioselective acylation 1243
 - relative electrophilicity 38
 - relay cascade 1352
 - resins 696
 - Merrifield 660, 775
 - polymer 652
 - resin-bound catalysts 879
 - resolution 540
 - alcohols 540, 541
 - restriction 43
 - conformational 43
 - retrosynthetic analysis 1369, 1375
 - reversible addition–fragmentation chain transfer (RAFT) polymerization 659
 - reversible bond formation 221
 - rhodium carbenes 952
 - Ricci's thiourea catalyst 328
 - Richard's catalyst 203
 - ring-closing reactions 514
 - HWE sequence 1309
 - hydride transfer 1075
 - ring-expansion reactions 508
 - ring-forming reactions 1091, 1131
 - intramolecular 1069
 - ring-opening reactions 223
 - meso-anhydrides 612
 - meso-aziridines 311
 - epoxides 417, 420
 - meso-epoxides 163, 169
 - rings 420
 - cyclohexenyl 1306
 - cyclopentadienyl 198
 - phenyl 317
 - pyrrolidine 470, 638, 642
 - quinolone 137
 - quinuclidine 121
 - RNA 241
 - base pairing 241
 - Robinson annulation 309, 310, 1334, 1335
 - room temperature ILs (RTIL) 455
 - rotamers 534
 - syn-/anti-periplanar 534
 - rotation 45
 - single bond 45, 46
 - ruthenium complexes 741
 - ruthenocene 202
- s**
- Sakurai allylation 449
 - salicylaldehydes 1317
 - salicylaldehyde imines 244
 - “salting out effect” 688
 - salts 688
 - 7-azaindolum 277
 - azolium 496
 - biaryl azepinium 534

- bis-amidine 275
- carbenium 448
- chiral 432, 1135
- chiral P-spiro 844
- α -chloroaldehyde bisulfite 1153
- dibenzosuberone-derived 450
- diphenyliodonium 77
- enantiopure trityl 451
- [GND][I] 619
- guanidinium 270, 275, 432
- imidazolium 209, 621
- iminium 82, 532, 533
- indium 739
- metal 370
- molten 621
- onium 365
- oxoisindolium 452
- palladium 747
- phosphonium 224, 445, 828, 845
- phosphonium-inner 1098
- quaternary ammonium 150, 824–826, 890
- quaternary phosphonium 823, 828
- saturated imidazolium 457
- sulfonium 564
- telluronium 574
- tetraaminophosphonium 823, 824, 844
- thiazolium 498
- TMS triflate 449
- triazolium 497, 500, 510, 1113
- triflate 1095
- saturated calomel electrode (SCE) 1182
- saturated carbonyls 1295
- Sauer 51
- – *see* Hajos–Parrish–Eder–Sauer–Wiechert
... 51
- SBA-15 663
- scaffolds 51
- bicyclic guanidine catalysts 358
- binaphthyl 554
- binaphthylamine 329
- chiral 322, 357
- cinchona alkaloids 345
- metallocene-pyrrolidinopyridine 1243
- modular organocatalytic 97
- thiourea catalysts 353
- zzz 360
- – *see also* backbone 360
- Schiff bases 878
- cycloadditions 1096
- glycinate 181
- glycine 367, 369
- Schreiner's catalyst 317
- secondary alcohols 541
- aryl alkyl 1231, 1245
- chiral 1225
- hydroxybenzylic 744
- secondary amines 682, 980, 1132
- catalysts 3, 4, 347, 466
- chiral 1044, 1132, 1288
- cyclic 1317
- iminium activation 980
- organocatalyzed conjugate addition, 1013
- C2-symmetric 174
- secondary structure 98, 101
- Seebach–Eschenmoser transition state model 476–478
- selective ET reactions 1167
- selective fluorination 36
- anti-selective Mannich reaction 61, 488, 806–808
- substrate-controlled 809
- exo-selective Diels–Alder reaction 1133, 1136
- ortho-selective α -arylation 1177
- syn-selective aldol reaction 796
- transition state model 798
- syn-selective Mannich reaction 488
- selectivity 488
- catalysts 581
- facial 309
- iminium/enamine-catalyzed reactions 465
- lone pair- 551
- selectivity factor 1226
- structure–reactivity–selectivity relations 319
- syn/anti 609
- syn/anti selectivity 1015
- primary amines 1015
- selenenylation 778
- selenides 573
- selenium ylides 573
- α -selenocarbonyl compounds 255
- α -selenoindanones 255
- selenones 1037
- vinyl 1037
- self aldol condensation 477
- self-assembly 1, 222
- confined spaces 227
- organocatalysts 223
- self-Mannich reaction 604
- self-replication processes 222, 234
- self-selected catalysts 232
- semipinacol rearrangement 1216, 1218
- epoxidation 1219

- sensitizers 1187
 - chiral 1187
- separation 1219
 - centrifugal 802
 - zzz 803
 - – *see* also extraction 803
- sequential addition 1038
- serine derivatives 636
- L-serine 58, 59
 - tert-butylidiphenylsilyl ether 622
- sesamol 1049
- sesquiterpene (–)-aromadendranediol 90
- SET (single-electron transfer)
 - reactions 1165
- SET (single-electron transfer) reagent 778
- Shi epoxidation 525, 526
- Shibata 966
 - – *see* Corey–Bakshi–Shibata catalyst 966
- shielding 39
 - facial 43
 - steric 33
- Si-Re mode 477
- sieves 764
 - molecular 764
- sigmatropic reactions 1191
 - 1,3-sigmatropic rearrangement 1203
 - 1,4-sigmatropic rearrangement 1207
 - [2,3]-sigmatropic rearrangement 552
- signal transduction pathways 1251
- silacycles 440
 - strained 440
- silanes 408, 441
 - stereogenic 1259
- silica-gel surface 626
- silica-supported organocatalysts 626
- silicon 626
 - extracoordinate compounds 402
 - hypervalent 438
 - reagents 381
 - tetrachloride 162, 402
- siloxy-tetrazole hybrid catalysts 706
- siloxydienes 295
- silsesquioxanes 665
 - POSS 665
- silyl cations 431, 434
 - catalysts 433
- silyl conjugate addition 517
- silyl dienol ethers 517
- silyl enamines 724
 - diphenylprolinol 724
- silyl enol ethers 396, 399
- silyl ethers 484, 641
 - diarylprolinol 659, 1033, 1104, 1351
 - diphenylprolinol 1293
- silyl ketenes 401
 - acetals 163, 399
 - imines 166
 - O-silyl-N,O-ketene acetals 248
 - vinyllogous 401
- silyl nucleophiles 374
- N-silyl oxyketene imines 167
- silyl-protected diarylprolinol catalysts 33
- silylation 1258
 - cyano- 1258
 - – *see* cyanosilylation 1258
 - hydro- 1258
 - – *see* hydrosilylation 1258
 - silylation-based desymmetrization 1260
- silylcyanation 877
- N-silyloxycarbamates 85, 990
- silyloxyprolines 763
- single bond rotation 45, 46
- single-electron transfer (SET)
 - reactions 1165
- single-electron transfer (SET) reagent 778
- slope 730
- SN1-type reactions 729
 - α -alkylation 737
 - intermediates 749
 - nucleophilic 730
 - stereoselective 733
- sodium borohydride 1193
- sodium hypochlorite 370
- “softball” capsule 228
- solid aldehydes 607
- solid ketones 607
- solid-phase extraction 693
 - fluorous 693
- solid-phase oligonucleotide synthesis 651
- solid polyelectrolytes 627
- soluble catalysts 879
- solvent-free aldol reaction 606
- solvents 879
 - co- 695
 - green 673
 - IIs 617
 - recyclable 618
 - solvent-dependent bases 822
 - structured domains 632
- SOMO-activation 471, 1168
 - asymmetric reactions 471
- SOMO-catalysis 71, 75, 1047
 - ET reactions 1166
 - organo- 1076
 - ring-forming reactions 1075
- SOMO-nitroalkylation 1181
- SOMophile reagent 1166

- sonication 602
- – *see* ultrasound 602
- spacer groups 625, 640
- specific solvation 618
- Spengler 749
- – *see* Pictet–Spengler-type cyclization 749
- spiro-cyclohexane architecture 1303
- spiro[cyclohexanone-oxindole]
 - backbone 600
- spiro-3,4-dihydropyrans 268
- spiro-ethers 1217
- spiro-oxindoles 1322, 1323
- bi- 1104
- spiro-phosphines 173, 174, 568
- spiro transition state 527, 529, 535
- (S)-(–)-spirobrassinin 849
- spirocyclic hydroxy-diketones 1218
- spirolactone 1039
- spirolactonization 1039
- organocatalyzed 1039
- split-mix methodology 100
- squaramides 1218
- asymmetric Michael additions 611
- C9 derivatives 141
- catalysts 254, 268
- chiral 252
- functionalities 134
- SSR 241586 848
- stabilization 134
- carbocations 77
- differential 473
- hydrogen bonding 474
- π -stacking interactions 38, 324
- “star polymers” 1054
- Staudinger cycloaddition 1112
- Steglich esterification 1250
- Steglich rearrangement 203, 1192, 1337
- transition state model 1200
- stereocenters 130, 483, 484
- exocyclic 534
- quaternary 879, 1058
- stereochemical induction 43, 343, 1197
- stereochemistry 309
- absolute 309
- stereocontrol 33, 36
- stereogenic centers 329, 729
- quaternary 590
- stereogenic silanes 1259
- stereoisomer selection 1351
- stereoselectivity 729
- alkylations 739
- bond formation 487
- cross-aldol reactions 162
- DFT calculations 483, 485
- Diels–Alder reactions 327
- MBH-reactions 908
- organocatalytic cascade reactions 482
- proline-catalyzed reactions 472
- reversal 478
- SN1-type reactions 733
- stereospecific ring-opening 417
- steric shielding 33
- sterically congested phosphoric acid 943
- sterically demanding carbonyl compounds 53
- steroids 1374
- Stetter reactions 1, 501, 505
- intramolecular 1077
- natural products synthesis 505
- Stevens 558
- – *see* Bamford–Stevens reaction 558
- stiffness 196
- conformational 196
- stoichiometric allylation 393
- Stork enamine reactions 469
- strained formyl cyclopropanes 507
- strained silacycles 440
- Strecker reactions 271, 333, 873, 886
- acyl- 884, 885
- diketopiperazine catalysts 877
- guanidine 886
- imine 333, 407
- industrial applications 1374
- large-scale application 881
- non-covalent catalysis 1309, 1314
- PTC 890, 891
- (thio)urea 878
- three-component 889
- structure 109
- optimization 331
- β -hairpin 109
- mesoporous materials 663
- secondary 98, 101
- structurally characterized enamines 470
- structure–reactivity–selectivity relations 319
- β -turn 103
- styrenes 1175
- carbo-oxidation 1175
- styrenic networks 653
- α -substituted acroleins 1140
- α -substituted anti- α,β -diamino phosphonic acids 860
- substituted benzaldehydes 387
- p-substituted benzaldehydes 388
- substituted trans-cinnamaldehydes 643
- 3-substituted cyclohexylamines 1325
- substituted enecarbamates 1313

- β-substituted enones 1001
- acyclic 1001
- 3-substituted
 - 3-hydroxyisoindolin-1-ones 1053
- 3-substituted 3-hydroxy-2-oxindoles 919
- 2-substituted indolin-3-ones 63
- α-substituted isocyano-esters 1098
- N-substituted maleimides 360
- substituted trans-β-nitrostyrene 638
- substituted piperidines 855
- substituted prolinamides 688
- substituted prolines 683
- α-substituted pyrrolidine catalysts 480
- 4-substituted quinolones 1188
- 3-substituted tetrahydroquinolines 301
- substitutions 301
 - allylic 1084
 - direct 729
 - metal-free allylic 744
 - nucleophilic 367, 721, 738, 1367
- substrates 100
 - achiral 1070
 - catalyst–substrate co-immobilization 100
 - control 808, 809
 - functionalized nitroalkane 863
 - imine 851
 - meso-succinic anhydride 265
 - sugar-derived catalysts 531, 895
 - sugars 914
 - 3-deoxy 914
 - (R)-sulconazole 335, 1023
 - sulfa-Michael addition 260, 1023, 1345
 - sulfa-Michael reaction 994, 995, 1005
 - sulfate 630
 - prolinium 630
 - sulfenylation 778
 - α-sulfenylation 37
 - asymmetric 37
 - sulfides 210
 - alkylation 549
 - carbene transfer 556
 - catalysts 550
 - deprotonation 549
 - C2-symmetric 551, 553
 - synthetic 555
 - sulfenamides 1256
 - catalysts 958
 - groups 412
 - N-sulfinyl (thio)urea catalysts 335
 - N-sulfinyl ureas 1029
 - sulfinylation 1256
 - sulfonamides 335
 - aryl 1299
 - C9 derivatives 141
 - cinchona 667
 - fluorous pyrrolidine 698
 - functionalities 134
 - phosphine-sulfonamide catalysts 928, 929
 - prolinamine 13
 - proline 6, 14
 - prolinol 644
 - sulfones 644
 - addition to C=X bonds 864
 - α-amido 863, 892
 - N-hydroxy-α-amido 1095
 - β-keto-benzothiazole- 867
 - β-keto heteroaryl- 1340
 - β-keto heterocyclic 989
 - vinyl 260, 1032
 - sulfonium salts 564
 - sulfonium ylides 1115
 - benzoylmethyl 1115
 - precursors 210
 - sulfonyl azides 761
 - sulfonyl hydrazine 1141
 - camphor 1141
 - sulfonyl imines 261, 272, 278
 - Mannich reaction 279
 - N-sulfonyl imines 187
 - sulfonylated prolinamide 623
 - sulfonylation 1256
 - asymmetric 1257
 - β-sulfonyl acetonitrile 867
 - N-sulfonyl imines 862
 - sulfoxides 389, 1256
 - dimethyl 673
 - – see DMSO 673
 - sulfur-containing linkers 640
 - sulfur-functionalized CILs 645
 - sulfur ylides 1116
 - catalysis 548
 - β-sultams 1113
 - supported catalysts 694, 700
 - organo- 831
 - supported proline 694
 - supports 694
 - clay- 832, 833
 - covalent 831
 - IIs 834, 835
 - inorganic–organic hybrid 664
 - magnetic 831, 832
 - mesoporous materials 651, 663
 - multiphasic systems 834
 - non-covalent 832
 - polymers 651, 661
 - recyclable 617
 - silica 626

- supramolecular cages 229
 supramolecular catalysis 1
 surfactants 693
 C2-symmetric bicyclic guanidines 876
 C2-symmetric catalysts 161
 C2-symmetric diphenylpyrrolidine 19
 C2-symmetric sulfides 551, 553
 C2-symmetric urea 1115
 synclinal exo conformation 39
 synergistic catalysis 732, 805
 – organocatalytic addition 741
 synergistic catalytic cycles 1276
 synthesis 741
 – asymmetric 1
 – aziridines 1120
 – brassinins 849
 – high-throughput 221
 – MAOS 593
 – photochemical asymmetric 1186
 – solid-phase oligonucleotide 651
 – target molecule 1371
 – total 221
 – – see total synthesis 221
 synthetic sulfides 555
- t**
- TADDOL 289, 293
 – hetero-Diels–Alder reaction 246, 247, 1151
 – Mannich reaction 292
 – ring-forming reactions 1142
 – Strecker reaction 895
 tagged organocatalysts 834
 Takemoto's catalyst 317, 318, 330
 Tamiflu 1307, 1308
 tandem reactions 326, 935
 – aminoxylation–cyclization 775
 task specific ILs 455
 tautomerization 52
 TBS (tributyltrimethylsilyl) 1238
 BTU 1308
 TCA (trichloroacetic acid) 78, 681
 TEA (triethylamine) 721
 tellurides 574
 – achiral 573
 tellurium ylides 573
 telluronium salt 574
 TEMPO 71, 176, 541
 – ET reactions 1169
 terminal alkenes 528
 terminal epoxides 559
 – aziridination 560
 N-terminal prolyl peptide 710
 terminally unsubstituted nitroolefins 1030
 tertiary alcohols 1246
 tertiary amines 710
 – aziridination 1120
 – basic functionality 324
 – chiral catalysts 916
 – conjugates 8
 – cyclopropanation 571
 – Lewis bases 1079
 tertiary phosphane 1099
 tertiary phosphines 172, 922
 – Lewis bases 1079
 tetraalkylonium ions 366
 tetraaminophosphonium 278
 – carboxylates 376
 – salt 823, 824, 844
 tetrachlorosilane 418
 tetracyanoethylene acetals 459
 tetracyclic structures 149
 tetrafluoroborate 635, 735
 tetrahedral cages 229
 tetrahydro- β -carboline 1074
 tetrahydroisoquinolines 965, 1276
 tetrahydropyrano[3,4-b]indoles 1074
 tetrahydropyrans 993
 tetrahydropyridines 705
 tetrahydroquinolines 301
 1,2,3,4-tetrahydroquinolines 947
 tetrahydroquinoxalines 948
 tetrahydrothiophenes 267
 – functionalized 1104
 – trisubstituted 267
 tetrakis[3,5-bis(trifluoromethyl)phenyl]borate (TFPB) 434
 tetramethylethylenediamine (TMEDA) 912
 tetramisole-based catalysts 1235
 tetrasubstituted cyclohexene
 carbaldehyde 483
 tetrazoles 777
 – homoproline 1015
 – proline 10, 682, 1001
 – pyrrolidinyl 777
 – (R)- α -pyrrolidinyl 1119
 TFA (trifluoroacetic acid) 65, 638, 680
 TFAA (trifluoroacetic anhydride) 879
 TFE (trifluoroethanol) 593
 TFPB (tetrakis[3,5-bis(trifluoromethyl)phenyl]borate) 434
 Theonella cf. swinhoei 1362
 thermal effect 581, 593
 thiazolium salts 498
 thio-Michael addition 62
 thio-Michael reaction 1006
 α -thio-substituted furanones 178
 thioamides 109

- thioesters 1006
 - α -acetoxy- 1207
 - malonic acid 263, 348
- thioethers 263
 - groups 210
 - oxidation 539, 540
- thioformamides 1274
- thiolanes 552
 - chiral 555
- thiols 143, 257, 261
 - aromatic 1006
 - benzyl 62
 - chiral 936
 - thiol-ene chemistry 655
- thioxotetrahydropyrimidinone 737
- thiourea 253
 - asymmetric induction 930
 - axial chiral derivatives 329
 - basic scaffolds 353
 - bifunctional 765, 853
 - bifunctional catalysts 1146
 - binaphthylamine scaffolds 329
 - bis- 188
 - bis(arylthiourea) 843
 - Brønsted bases 352
 - carbonyl hydrocyanation 875
 - chiral 747, 1095
 - chiral derivatives 315
 - cinchona- 821
 - derivatives 136
 - functionalities 134
 - gold catalysts 1056
 - guanidinium 825, 827
 - hydrogen bonding 1368
 - industrial applications 1374
 - iso- 1199, 1200
 - natural products synthesis 1368
 - planar-chiral catalysts 212
 - polymer-supported 662
 - prolinamine 15
 - pyrrolidine-(thio)urea catalysis 325
 - Ricci's catalyst 328
 - Strecker reaction 878
 - N-sulfinyl catalysts 335
 - thiourea-amide catalysts 1268
 - thiourea-based cinchona derivatives, 600
- thiourea-amine 853
 - bifunctional 853
- three-component reactions 335
 - Biginelli 630
 - 1,3-dipolar cycloaddition 1293
 - Kabachnik–Fields 1315
 - Mannich 293, 629, 1289, 1312
 - single catalyst systems 1285
 - Strecker 889
- three-membered cycles 1091, 1115
- threonines 485
 - aldol reactions 485
 - derivatives 636
 - protected 58
 - L-threonine-derived catalysts 58, 60
 - (S)-threoniness 796
 - (1R,2S)-thysanone 776
- Ti/tartrate-catalyzed asymmetric epoxidation 523
- TMEDA (tetramethylethylenediamine) 912
- TMS-cyanohydrins 404
- TMS triflate salt 449
- O-TMS- α,α -diarylprolinol 641
- O-TMS-diphenylprolinol 642
- TMSCN addition 446
- TMSI (trimethylsilyl iodide) 929
- (R)-tolterodine 1059
- tosylated hydroxycarbamates 1122
- tosylation 538, 539
- tosylimines 936
 - N-tosylimines 395, 561
 - N-tosyliminoenoates 733
- total synthesis 1359
 - bakkenolides 513
 - cinchona alkaloids 1370
 - hydrogen bonding 1365
 - organocatalyzed conjugate addition 1018, 1025
- transacetalization reaction 1084
- transannular aldol reaction 800, 801, 1072
- transesterification 1254
- transfer hydrogenation 297, 951
 - enals 981
 - ketimine 298
- transition metal catalysis 805
 - carbene transfer 556
- transition metal complexes 223
- transition state analog (TSA) 233
- transition state models 473, 474
 - DFT calculations 475
 - F-C reaction 306, 309
 - Houk–List 475, 477, 478
 - Seebach–Eschenmoser 476–478
 - Steglich rearrangement 1200
 - syn-selective aldol reaction 798
- transition states 798
 - diastereomeric 472
 - free energy difference 473
 - planar 527
 - spiro 527, 529, 535
 - structures 226

- Traxler 57
 – – *see* Zimmerman–Traxler transition state 57
 trialkoxysilanes 417
 trialkylethenes 1114
 – cyclic 1114
 triamines 65
 triazole addition 992
 1,2,3-triazole linker 694
 triazolium 694
 – N-Mes catalysts 513
 – salts 497, 500, 510, 1113
 1,2,3-triazolium 497
 – tetrafluoroborate 635
 – units 634
 triazolyl fragment 640
 tributyltrimethylsilyl (TBS) 1238
 tributylphosphine 172
 trichloro[(1-methylethenyl)oxy]silane 403
 trichloro[(1-phenylethenyl)oxy]silane, 402
 trichloroacetic acid (TCA) 78, 681
 trichloroacetimidates 1203
 – allylic 1204
 trichlorosilanes 410, 412, 955, 957, 963, 1319
 trichlorosilyl enol ethers 162
 trichlorosilyl ketene acetal 403
 1-trichlorosilyl-4-trimethylsilyl-2-butene 389
 tricyclic oxazolidines 1094
 tricyclic pyrrolo-indole core 1104
 trienamines 389
 – activation 46
 – catalysis 1138, 1139
 – Diels–Alder reactions 47
 triethoxysilyl acetylene 396
 triethylamine (TEA) 721
 triflate salts 1095
 triflimides 436
 trifluorinated methyl groups 885
 2,2,2-trifluoro-1-aryl-ethanol 1234
 trifluoroacetic acid (TFA) 65, 638, 680
 trifluoroacetic anhydride (TFAA) 879
 trifluoroethanol (TFE) 593
 trifluoromethanesulfonamide 13
 – pyrrolidine 13
 trifluoromethyl group 1107
 trifluoromethyl ketimines 855
 – cyclic 855
 trifluoromethyl ketones 500, 964
 trifluoromethyl-substituted
 2-isoxazolines 1107
 trifluoromethylacetophenone 303
 α -trifluoromethylation 76
 – aldehydes 1185
 o-trifluoromethylbenzaldehyde 499
 trifluoropyruvate 597
 – ethyl 597
 trifluoropyruvate imine 1051
 N-triflylphosphoramidate 741, 1143
 trimethylsilyl ethers 483
 – catalysts 39
 – diphenylproline 1035
 trimethylsilyl iodide (TMSI) 929
 α -trimethylsilyl-substituted aromatic
 allenones 1100
 TRIP 943, 1326
 tripeptide catalysis 1029
 tripeptides 678
 triphenylphosphine 567, 921
 triple organocascade 1300, 1302
 trisubstituted cyclohexene
 carbaldehydes 1304
 trisubstituted nitroacrylates 1022
 trisubstituted tetrahydrothiophenes 267
 trityl perchlorate 448
 trityl salts 451
 – enantiopure 451
 2-tritylpyrrolidine 777
 tropylium tetrafluoroborate 735
 tryptamines 1050
 – alkaloids 1362
 tryptophan 485
 L-tryptophan 57, 60, 679
 TSA (transition state analog) 233
 Tsuji–Trost type α -allylation 746
 β -turn structure 103
 two-center quaternary ammonium
 salts 827
- u**
 Ugi-type reaction 1317
 ultrasound 581, 601
 umpolung 1
 – activated olefins 514
 – extended 506
 α -unbranched aldimines 891
 unmodified amino acids 55
 unnatural amino acids 882
 α,β -unsaturated acylbenzotriazoles 227,
 279
 α,β -unsaturated acylphosphonates 259
 α,β -unsaturated aldehydes 37, 40, 977,
 1046
 – chiral drugs 774
 – β,β -dialkyl 773
 – epoxidation 711

- α,β -unsaturated γ -butyrolactam 1348
 α,β -unsaturated carbonyl compounds 758, 771
 α,β -unsaturated carbonyls 572
 α,β -unsaturated enones 65, 1047
 α,β -unsaturated imides 354
 β,γ -unsaturated α -ketoesters 259, 504, 1048, 1115
 α,β -unsaturated ketones 977
 – acyclic 1136
 – aziridination 1345
 – 1,3-diaryl 308
 – F-C reaction 308
 – nucleophilic addition 997
 unsubstituted nitroolefins 1030
 – terminally 1030
 urea 997
 – Biginelli reaction 1321
 – chiral derivatives 315
 – functionalities 134
 – hydrogen bonding 1368
 – industrial applications 1374
 – natural products synthesis 1368
 – pyrrolidine-urea catalysis 325
 – Strecker reaction 878
 – N-sulfinyl catalysts 335, 1029
 – C2-symmetric 1115
 – thio- 1115
 – – see thiourea 1115
- v**
- valine 485
 van der Waals radius 242
 VANOL 1214
 VAPOL 300, 312
 vicinal diamines 311
 – chiral 311
 Villiger 531
 – – see Baeyer–Villiger . . . 531
 vinyl aziridines 560
 vinyl boronic acid 1315
 vinyl ethers 296
 – allyl 1210
 vinyl ketones 907
 – EVK 913
 – methyl 584
 – MVKs 106, 468, 480, 481, 908
 vinyl selenones 1037
 vinyl sulfones 260, 1032
 vinylation 73, 1316
 α -vinylation 1174
 2-vinylcyclopropanes 574
 – 1,3-disubstituted 574
 vinylindoles 297
 2-vinylindoles 1134
 3-vinylindoles 1146, 1147
 vinylogous addition 44
 vinylogous aldol reactions 262, 273, 401
 – Brønsted bases 818
 – direct 819
 – Mukaiyama 813, 814
 – C2-symmetric catalysts 165
 vinylogous donors 166
 vinylogous α -ketol rearrangement 1217
 vinylogous Mannich reactions 1310
 – Mukaiyama 815, 816
 – non-covalent catalysis 1310
 vinylogous MBH reaction 1080
 – – see Rauhut–Currier reaction 1080
 vinylogous Michael addition 1348
 – multifunctional catalysis 1348
 vinylogous silyl ketenes 401
 vinyloxiranes 552
- w**
- Waals 242
 – van der 242
 – – see van der Waals 242
 Wadsworth 1309
 – – see Horner–Wadsworth–Emmons sequence 1309
 warfarin 604, 703
 water 703
 – aldol reactions 675, 677, 678
 – Diels–Alder reactions 707
 – freezing 587, 588
 – Mannich reactions 705
 – Michael reactions 696
 – organocatalytic reactions 673
 – protonations 711
 water/oil (W/O) emulsions 684
 Weinreb amides 172
 Wiechert 51
 – – see Hajos–Parrish–Eder–Sauer–Wiechert . . . 51
 Wieland–Miescher ketone 997
 – analogues 622
 Wittig reaction 547, 566
 Wittig reagent 818
 2,3-Wittig rearrangement 1208, 1209
 W/O (water/oil) emulsions 684
 Woodward–Hoffman rules 472
- x**
- xanthenes 1114
 – organocatalysts 1188
 xylenones 1341
 – α' -hydro- 1341

y

- yields 564
- base effect 564
- ylides 564
- allylic 566
- ammonium 572
- arsenic 566
- arsonium 570, 1117
- azomethine 1096, 1097, 1323
- benzoylmethyl sulfonium 1115
- covalent activations 547
- β -hydroxyl-sulfonium 563
- methylene transfer 559
- nitrogen 570
- phosphorus 566, 1345, 1346

- selenium 573
- sulfonium 210
- sulfur 548, 1116
- tellurium 573
- ynals 508
- nitroalkane addition 845
- ynones 278
- conjugated 1323
- (+)-yohimbine 1060

z

- Zimmerman–Traxler transition state 57
- zinc(II) ions 99
- zwitterions 632, 905
- phosphonium–enamine 905