

Index

- achiral components
higher order polyhedra, 229–230
multiple diastereomers, 222
tetrahedra, 222–229
tris-chelated octahedral metal centres, 221
- achiral compounds, 190
- achiral molecules, 66, 261–263
- achiral OPV3T monolayers, 280
- achiral substituents
achiral but substituted host chiral, 329
additional functionality, 325–327
additional modes of covalent attachment, 327–328
2-anthracenecarboxylic acid, 325
capped γ -CD, 325
dimeric TIPS- β -CD nanocapsule, 322, 324
enantioselective *N*-acylation, 322
- acyclic hydrogen bond donating receptor, 154
- alcohol dehydrogenases (ADH), 366
- aldehyde reductions, 370
- aldolases, 382–383
- alkanoic acids, 2-and 3-substituted, 360–361
- aluminophosphate framework, 191
- amide hydrolysis, 364–365
- amines, 313–314
- amino acid co-ligands, 195–196
- amino acid dehydrogenases (AADH), 366
- L-amino acid rejection mechanism, 59, 60
- L-amino acids, 44, 58
- anion influenced helicate formation, 101, 102
- 2-anthracenecarboxylic acid, 325, 336
- Archimedean solids, 219
- L-aspartic acid, 384
- asymmetric achiral ligand, for triple-stranded ion-pair helicates, 107
- asymmetric oligomerization
artificial systems, 55–58
homochirality and critical chain length, 50–53
polymerization models, 53–55
- asymmetric transformations, 20
- biocatalytic methodologies, 350–351
- chance mechanisms, 45
- azamacrocycles, 145–146
- Baeyer–Villiger monooxygenases (BVMOs), 377
- Baeyer–Villiger oxidation, 366
- Baeyer–Villiger reaction, 377
- Baker’s yeast, 367
- 5-(benzyloxy)-isophthalic acid, 273
- BINOL-based networks, 203–204
- BINOL-strapped calix[4]pyrrole receptor, 148, 150

- biocatalysis
 advantages and disadvantages, 346–347
 enzyme classes, 345, 347
 enzymes, 344
 importance, 344–345
 methodologies, 345–346
 whole cells/isolated enzymes, 348
- biocatalyst performance, optimization of
 immobilization, 352
 ionic liquids, 352
 organic solvents, 351
- biocatalytic methodologies
 asymmetric transformation, 350–351
 chemoselective desymmetrization, 350–351
 dynamic kinetic resolution, 349–350
 exquisite stereo/chemo/regio-selectivity, 348
 kinetic resolution, 349–350
- biochirality, in active sites, 58–61
- biological or biochemical complexity, 51
- biotic models, 45
- 4,4'-bipyridine, 85, 205
- 2,2'-bis(diphenylphosphino)-1,1'-binaphthyl, 221
- bis-imidazolium receptor, 153–154
- bis-lactate/Cu(110) system
 conglomerate nucleation, 297
 Coulomb repulsion, 296
 cross-enantiomer inhibitions, 297
 diagonal adsorption geometry, 296
 diffusion-limited kinetics, 298
 2D self-assembled system, 293
 growth of chiral crystals, 293
 high-resolution STM images, 298
 mirror enantiomorphous domains, 296
 molecular impurities, 297
 scanning tunnelling microscopy images, 299
 structure, 299
- bis(triazole) ligands, 205
- bis(ethylenedithio)tetrathiafulvalene (BEDT), 172
- Borromean rings, 26
- 1-bromoadamantane, 331
- calcium-cyclen complex, 152
- calix[4]arene-based system, 337
- calix[4]arenes, 13, 14
- calixarene scaffold, 307–308
- D-camphoric acid, 194
- capped γ -CD, 325
- carbamazepine, 84
- carbene-capped β -cyclodextrin AuCl complex, 335
- catalytic resolving machine, 144–145
- C-C bond formation, 380–381
 aldolases, 382–383
 hydroxynitrile lyase, 381–382
- C = C bonds, reduction of, 373–374
- charged bis-guanidinium, 146–147
- chemical level of complexity, 51
- chemoselective desymmetrization, biocatalytic methodologies, 350–351
- chiral amines, resolution of, 363–365
- chiral anions
N-acetylphenylalanine, 146
 azamacrocycles, 145–146
 BINOL-strapped calix[4]pyrrole receptor, 148, 150
 bis-guanidinium macrocycle, 146–147
N-Boc-L-glutamate, 146
 calcium-cyclen complex, 152
 chiral bis-urea functionalized calix[4]arene receptor, 150–151
 chiral ferrocene ureas, 150–151
 chiral Re complex, 150–151
 cholic acid, 146–147
 cyclic sapphyrin, 148–149
 Jurczak's chiral diindolylmethane anion receptor, 148
 L-nipeptic acid-porphyrin anion receptor, 148–149
 terbium-triazacyclonanone complex, 152
- chiral auxiliaries, 269–272
- chiral bis-urea functionalized calix[4]arene receptor, 150–151
- chiral carboxylate co-ligands, 197–199
- chiral carboxylic acids, 155–156
- chiral catalysis, 193–194
- chiral coordination polymers
 chiral induction, templating and symmetry breaking, 192–195
 design and application of chiral ligands, 199–206
 enantioselective catalysis, 207
 enantioselective separations, 208–209
 post-synthetic modification, 206
 small chiral co-ligands, 195–199
- chiral crown ethers
 catalytic resolving machine, 144–145
 Cram's chiral binaphthyl crown ether hosts, 144
 enantiopure samples, 144
 phenylglycine, 144
 polyatomic ammonium salts, 143
- chiral diindolylmethane anion receptor, 148
- chiral encoding, 51
- chiral ferrocene ureas, 150–151
- chiral induction, templating and symmetry breaking, 192–195
- chirality
 amplification, 24
 control by coordination and supramolecular interactions, 19–21

- generating chirality, 4, 5
 geometrical, 2–25
 grid-type tetranuclear metal-ligand assembly, 10, 11
 hierarchical effects, 25
 Le Bel and van't Hoff model, 1
 Louis Pasteur's hypothesis, 1
 specification, 5
 switching, 25
 topological, 25–39
 chiral lanthanide complex, 177–178
 chiral ligands, design and application of
 BINOL-based networks, 203–204
 4,4'-bipyridine, 205
 dipeptides, 199–200
 functionalized amino acids, 200–202
 Mn-salen ligand, 205
 poly-amino acid ligands, 202–203
 tris(4-pyridyl)duryl)borane, 205
 chiral metallo-organic materials, 159–160
 chiral metallo-supramolecular assemblies.
 see metal-based supramolecular
 chiral systems
 chiral molecular components
 achiral diamine, 249
 achiral tripodal amine, 246
 CHIRAGEN ligands, 240
 chiral amine (*S*), 243
 chiral peptides, 241
 chiral tritopic nodes, 239
 circular-dichroism spectra, 247
 cubeoctahedra, 241
 di-acetylacetato ligand, 242
 diastereotopically pure Zn²⁺ tetrahedron, 240
 di-catecholate ligand, 247
 di-pyridylimine bridging ligand, 243
 ditopic linkers, 239
 Δ-TRISPHAT, 246
 enantiomerically pure tri-catecholate
 triangular ligand, 241
 homochiral Fe²⁺ face-capped tetrahedral
 complex, 245
 homochiral gallium tetrahedral complex, 248–249
 minTBP-1 hexapeptide aptamer, 242
 M₄L₆ tetrahedron, 246
 (1*R*,2*R*)-*N,N'*-diethyl-,1,2-
 diaminocyclohexane, 249
 photoaddition reaction, 250
 chiral nitronyl nitroxide (R)-3MLNN, 174
 chiral nucleation and propagation
 chirality at surfaces, 286–287
 cobalt-tetraphenylporphyrin, 288–293
 3D systems, 285
 enantiopure and racemic mixtures, 293,
 295–298
 tartaric acid, 298–303
 tracking, 286, 288
 chiral point groups, symmetry elements
 of, 3, 4
 chiral racemic ester, 362
 chiral recognition, 142–143
 chiral Re complex, 150–151
 chiral resolution, 278–280, 308–311
 chiral silicogermanate, 191
 chiral solids, 190
 chiral solvating agent, 154–155
 chiral solvents, 272–277
 chiral substituents
 1-bromoadamantane, 331
 cyclohexanone, 329
 Michaelis–Menten kinetics, 331
 neat cyclohexanone, 330
 o-nitrobenzaldehyde, 330
 p-nitrobenzaldehyde, 330, 331
 4-phenylbenzaldehyde, 332
 chiral zwitterions and neutral molecules
 acyclic hydrogen bond donating
 receptor, 154
 bis-imidazolium receptor, 153–154
 chiral carboxylic acids, 155–156
 chiral guanidinium crown ether, 153
 chiral solvating agent, 154–155
 chiroptical switching
 carbene–osmium complex, 169
 chiral cyclometallated platinum(II)
 complexes, 169
 chromium(III) complex, 171
 circular dichroic techniques, 168
 helicene-type molecules, 169
 optical activity, 168
 organometallic helicene incorporating
 platinum(II), 169–170
 poly(hexylisocyanate), 171
 poly(isocyanate) chain, 170
 tris(acetylacetonato)ruthenium(III)
 coordination core, 171
 circular dichroism (CD), 160
 circular single-stranded helicates, 97–98
 cis-1,2-difluorocyclohexane, interconversion
 of, 18, 19
 cobalt-tetraphenylporphyrin (Co-TPP)/Cu(110)
 system
 achiral Cu(110) surface, 289–290
 directionality, 293–294
 intermolecular interactions, 291
 manganese-phthalocyanine, 293
 overall energy balance, 291
 periodic DFT calculations, 289

- cobalt-tetraphenylporphyrin (Co-TPP)/Cu(110) system (*cont'd*)
 phenyl-phenyl interactions, 293
 porphyrins, 288
 π - π interactions, 293
 saddle conformation, 289
 saddle-shaped molecule, 291
 tetrapyridyl-porphyrin, 289
 van der Waals forces, 291
- Co^{2+} cluster helicates, 130, 131
 cocrystals, 83–85
 complex crystallization behavior, 71–72
 crystallographically independent molecules, 72
 kryptoracemates, 72–73
 quasiracemates, 73–74
 concave chiral molecules, 13, 14
 conducting materials, 171–173
 conglomerates, 71
 chemical modification, 89–90
 chiral pool, 87–89
 enantiomer resolution, 86–87
 frequency of conglomerate formation, 85–86
 C–O oxidations using oxidases, 376
 copper complexes, bridged imidazole for, 104, 105
 copper phthalocyanine (CuPc), 263
 corannulene derivatives, polymerization of, 57, 59
 crown ether scaffold, 307–308
 crystallization, racemic mixture
 conglomerates, 71
 enantiopure domains, 70–71
 racemic compound, 69
 solid solution, 70
 crystallographically independent molecules, 72
 crystals, 161
 crystal space groups
 data and statistics, 66
 space group listing, 65–69
 space group prediction, 69
- C_3 -symmetric tetrahedra, 224–226
 4-cyano-4'-octylbiphenyl (8CB), 277
 cyclic sapphyrin based dimer, 148–149
 α -cyclodextrin complex, 334
 cyclodextrins, 13, 15, 307–308
 cytochrome P450 enzymes, 377
- D-aminoacyl-tRNA deacylase (DTD), 59–61
 desymmetrization
 by constitution, 10–15
 regular tetrahedron, 5, 7
 by twisting, 16–18
 D-glucose-azacrown ethers, 332–333
 diamino-substituted γ -cyclodextrin, 336
- di-iron(II) triple-stranded helicate, 103, 104
 dimeric TIPS- β -CD nanocapsule, 324
 di-nickel(II) single-stranded helicate, 127
 dinuclear double-stranded helicates, 98–102
 dinuclear SCO active Fe^{2+} triple-stranded helicate, 103
 dipeptides, 199–200
 2,2-disubstituted epoxides, 383–384
 di-, tri-and tetra-nuclear triple-stranded helicates, 108
 DL-camphoric acid, 194
 double-stranded helicates
 anion influenced helicate formation, 101, 102
 metal ion helicate conformation control, 101
 oligo-bipyridyl ligand systems, 102
 tetrapyrrole-based ligands, 99, 100
 thiazole containing ligands, 98, 99
 doubly interlocked [2]catenanes, 32–33
 D-thymidine, 271, 272, 280
 dynamic kinetic resolution (DKR), biocatalytic methodologies, 349–350
- efavirenz, 84
 enantioenriched α -hydroxyesters, 377, 379
 enantiomerically pure amines, 363
 enantiomeric demixing, 47
 enantiomer resolution, 86–87
 enantiopure alcohols, 358–359
 enantiopure amides and carboxylic acids, 383–384
 enantiopure carvone, 194
 enantiopure di-lanthanide triple-stranded helicates, 127, 128
 enantiopure (R)-mandelic acid, 364–365
 enantiopure molecules, 258–259
 enantiopure (R,R)-tartaric acid, 288
 enantiopure tetrานuclear iron(II) tetrahedral cages, 177
 enantiopure Zn^{2+} dinuclear double-stranded helicates, 127, 128
 enantioselective adsorption, 280–281
 enantioselective catalysis, 207
 enantioselective Darzens reaction, 332–333
 enantioselective *N*-acylation, 324
 enantioselective oxidation/reduction cascade reactions, 374–375
 enantioselective separations, 208–209
 enantioselective supramolecular assemblies, 121
 helicates, 127–130
 higher order enantioselective assemblies, 130–133
 mononuclear complexes, 123–126
 enantioselective synthesis, of self-assembled architectures, 121
 enzyme classes, 345, 347
 ephedrine hydrochloride, 311–312

- epoxide hydrolases, 363
 esterification/hydrolysis of esters, 358–363
- Fe^{3+} homochiral tetrahedron, 237–238
 ferrocene containing ditopic-enolate based ligand, 106
 Fe^{2+} triple-stranded helicates, enantioselective synthesis of, 129, 130
 flavin-dependent enzymes, 377
 foldamers, 16, 18
 freezing chirality, principle of, 20
 fullerenes, 11–13
 fumarase biocatalysts, 384–385
 functionalized amino acids, 200–202
 functional molecular materials
 chiral information harvesting, 180
 chiral metallo-organic materials, 159–160
 circular dichroism, 160
 conducting materials, 171–173
 crystals, 161
 gels, 164–168
 liquid crystals, 162–164
 magnetic materials, 173–177
 metal complexes, 159
 metalloorganic structures, 181
 nanomaterials, 160
 peptides, 181
 sensors, 177–180
 supramolecular polymers, 180
 switching, 168–171
 furans, 310
- gallium germanate, 191
 gels
 amino acids, 164
 chiral tetraphenylporphyrin derivatives, 167
 chiroptical effects, 166
 copper(II), 165
 N,N'-hexadecanedioyl-di-L-glutamic acid, 165
 manganese(III) acetate metalloporphyrin, 168
 metallogels, 164
 organometallic gelators, 166
 zinc(II), 167–168
- geometrical chirality
 chirality axis, 8
 dynamic chirality, 18–23
 enantiomorphs, 2
 helically chiral molecules and molecular propellers, 9, 10
 origins and description
 considerations, 3–10
 desymmetrization, 10–18
 planar object conversion, pathways for, 3, 4
 supramolecular chirality, 23–24
- tris(spiroorthocarbonate) cyclophane, 8
 twisted Zn(porphyrin) covalent dimers, self-assembly of, 5, 6
- halohydrin dehalogenases, 382–384
 helically chiral molecules and molecular propellers, 9, 10
 helical structures, 96
 helicates
 description, 16
 double-stranded helicates, 98–102
 single-stranded helicates, 97–98
 triple-stranded helicates, 102–112
 helicity model, 9
 heterobimetallic lanthanide systems, 108
 heteroditopic ligands, for dilanthanide triple-stranded helicates, 108, 109
 2,3,7,8,12,13-hexahexyloxytruxenone (TrO_23), 263
 2,3,6,7,10,11-hexapentyloxytriphenylene (H5T), 265
- higher order polyhedra, 229–230
 higher order self-assemblies, 117, 122
 Dy^{3+} helicates and mesocates, 113, 114
 face capped iron(II) tetrahedral cage, 117, 120
 lanthanide hexanuclear circular helicate, 113, 115
 molecular knots, 117, 120–121
 pyrene based cages, 117, 119
 quadruple-stranded di-palladium helicate, 112, 113
 tetrahedral cages, 114, 116, 117
 tetrานuclear quadruple helical cluster, 113, 115
 highly oriented pyrolytic graphite (HOPG), 259
 homochiral and heterochiral dendritic dipeptide structures, 56, 57
 homochiral bulk solids, 193
 homochiral copolymers, nonenantiomeric pairs of, 55
 homochirality
 asymmetric oligomerization, 49–58
 and critical chain length, 50–53
 deterministic or chance models, 44
 racemic state, 45–49
 homochiral peptides, 53–55
 homochiral RNA fragment, 48
 homochirogenesis, 44, 49, 51. *see also* homochirality
 Hopf link, 26
 host-guest behaviour, supramolecular systems
 chiral anions, 145–152
 chiral crown ethers, 143–145
 chiral recognition, 142–143
 chiral zwitterions and neutral molecules, 153–156
 theory of chiral recognition, 143

- hydrates, 81–82
 hydrolases in biocatalysis, 356–357
 hydrolysis/reverse hydrolysis
 epoxide hydrolases, 363
 esterification/hydrolysis of esters,
 358–363
 hydrolases in biocatalysis, 356–357
 resolution of chiral amines, 363–365
 hydroxynitrile lyase (HNL), 381–382
- imidazole based ligand, 103
 immobilization, 352
 immobilized d-glucose-azacrown ether derivative, 333
 induced circular dichroism (ICD), 22, 24
 inherently chiral compounds, 13, 14
 inorganic network solids, 191–192
 ionic liquids, 352
 ion-pair triple-stranded helicates,
 106, 107
 isolated alcohol dehydrogenase (ADH)
 enzymes, 367
 isotactic peptides, desymmetrization of, 55
- ketones, reduction of, 366–370
 ketoreductases (KREDs), 367
 kinetic resolution, biocatalytic methodologies,
 349–350
 kryptoracetamates, 72–73
- lactate dehydrogenase (LDH), 373
 lactic acid, 198
 lanthanide circular single-stranded helicates, 98
 lipase-catalysed hydrolysis/esterification reactions, 358–359
- liquid crystals
 cholesteric phase, 162
 Cotton effects, 162
 ferroelectric smectic C* phase, 162
 helical stacks, 162–163
 helical supramolecular arrangements, 162
 ionic conductivity, 164
 promesogenic dopants, 163–164
 ruthenium(III) complexes, 163–164
- magnetic fields, 277
 magnetic materials, 173–177
 majority rules, 23, 277
 malic acid, 198
 M and P helicates, schematic illustration, 96
 manganese-salen calix[4]arene complex,
 337–338
 mechanisms of interconversion between diastereomers, 234–235
 memory-of-chirality effects, 21–23
- metal-based supramolecular chiral systems
 double-stranded helicates, 98–102
 higher order self-assemblies, 112–121
 single-stranded helicates, 97–98
 triple-stranded helicates, 102–112
- metal-coordinating ligands
 2-anthracencarboxylic acid, 336
 benzaldehyde, 333
 calix[4]arene-based system, 337
 carbene-capped β -cyclodextrin AuCl complex, 335
 α -cyclodextrin complex, 334
 diamino-substituted γ -cyclodextrin, 336
 enantioselective Darzens reaction,
 332–333
 D-glucose-azacrown ethers, 332–333
 immobilized D-glucose-azacrown ether derivative, 333
 manganese-salen calix[4]arene complex,
 337–338
 rhodium monophosphane- α -cyclodextrin complex, 334
 ruthenium-amino alcohol- β -cyclodextrin complexes, 335–336
 styrene, 334
 4'-*tert*-butylacetophenone, 335
 trigonal bipyramidal complex, 334
- metal-ligand coordination, 96
 metallosupramolecular polyhedra
 achiral components, 221–230
 basic design principles, 219–221
 chiral molecular components (*see* chiral molecular components)
 multiple bridging ligands, 218
 resolution, 236–238
 selective encapsulation, 218
 stereochemical communication, 231–235
 3-methylaspartate ammonia lyase (MAL), 385
 (S)-5-methyl-1-heptanol, 275
 2-methylvaleraldehyde, 370–371
 mineral goosecreekite, 191
 mixed *f-d* triple-stranded helicates, 110–112
 mixed *f-p* triple-stranded helicates, 112
 mixed p-d block triple-stranded helicates, 106
 $M_n L_{2n}$ metallosupramolecular polyhedra, 220
 Mn-salen ligand, 205
 molecular chirality, 1 (*see also* chirality)
 characteristics, 2
 Keggin polyoxometallate α -[$P_2Mo_{18}O_{62}$] $^{6-}$, 3
 molecular graph, 2, 25–26
 molecular knots
 pentafoil knots, 37–39
 trefoil knots, 33–37
 molecular rubber-glove molecules, 19
 monoamine oxidases, 375–376

- mononuclear *d*-block complexes, 126
 multidecker molecules, helicity of, 16
 multiple crystal forms, 74–75
 cocrystals, 82–85
 hydrates, 81–82
 polymorphs, 75–79
 solvates, 79–81
- NAD(P)H cofactors, 366
 NADP-dependent glucose dehydrogenase (GDH), 368
 native and modified cyclodextrins, 313
 native chiral hosts
 covalent catalysis, 321–323
 cyanohydrin, 315
 noncovalent catalysis, 316–321
 naturally occurring polymers, 45
 negative stereochemical coupling, 231
 network solids
 achiral compounds, 190
 chiral coordination polymers (*see* chiral coordination polymers)
 chiral solids, 190
 inorganic network solids, 191–192
 racemic mixtures, 191
 spontaneous resolution, 191
 neutral bis-thiourea, 146–147
 neutral optically active (−)- α -pinene template, 18
 L-nipecotic acid-porphyrin anion receptor, 148–149
 nitrilase-mediated DKR, 364–365
 nitrile hydratases, 383–384
o-nitrobenzaldehyde, 330
p-nitrobenzaldehyde, 330, 331
- (*R*)-2-octanol, 273
 (*S*)-2-octanol, 275
 oligo-bipyridyl ligand systems, 102
 oligonucleotides, homochiral D-and L-libraries of, 51, 52
 oligo-(phenylenevinylene) (OPV), 259
 oligo-(*p*-phenylene vinylene) (OPV4T), 269
 optically active D-glutamate dicarboxylate, 18
 organic hosts
 chiral detection, 311–313
 chiral resolution, 308–311
 hosts modified with achiral substituents, 322, 329–332
 hosts modified with chiral substituents, 329–332
 hosts modified with metal-coordinating ligands, 332–338
 native chiral hosts, 315–323
 organic solvents, 351
- oxalyl retro-peptides, 200
 oxidases, 374–376
 oxidoreductases catalyse, 366
- P-configured quadruple-helicate, 130, 131
 pentafoil knots, 26, 27, 37–39
 peptides, 181
 peroxylated- α -cyclodextrin, 311–312
 pharmaceutically important compounds, 377, 379
 phenylalanine, 311, 313
 L-phenylalanine, 153
 4-phenylbenzaldehyde, 332
 1-phenyloctane, 259
 1-phenyl-1-octanol, 273
 pig-liver esterase (PLE), 351
 Platonic solids, 219
 P450-mediated stereoselective hydroxylation, 377, 380
 point (OD) chirality, 286
 poly-amino acid ligands, 202–203
 polymorphs
 bicyclo[3.3.0]octane diols, 76
 formation, 74
 kryptoracemate, 78
 nucleation and crystal growth, 75
 racemic diol, 76
 tetraester, 76, 78
 positive stereochemical coupling, 231
 post-synthetic modification, 206
 pregabalin, 361
 primary alcohol, esterification of, 360
 prisms and antiprisms, 219
 prochiral bisisophthalic acid (BISA) derivatives, 261
 prostaglandin D2 (DP) receptor, 360
 protein engineering
 directed evolution and semi-rational design, 354–355
 high throughput screening methodologies, 352
 natural enzymes, 352
 rational design, 355–356
 recrystallization, 353
 sitagliptin, 353
 wild-type enzymatic resolutions, 352
 pyridazine ligands, 103, 105
- quasiracemates, 73–74
 quinhydron, 83, 84
- racemates, 259–261
 racemic amines, dynamic kinetic resolution of, 363–365

- racemic amino acid N-carboxyanhydrides,
 oligomerization of, 54
 racemic carboxylic acids, 89
 racemic compound, 69
 racemic keto alcohol, 70
 racemic metallo-supramolecular polyhedra,
 236–238
 racemic mixture
 Cairns-Smith's experiment, 46, 47
 enantiomeric demixing, 47
 statistical distribution of, 46
 racemic state, 45–49
 redox reactions
 aldehyde reductions, 370
 C = C bonds, 373–374
 cofactors, 366–367
 enantioselective oxidation/reduction cascade
 reactions, 374–375
 oxidases, 374–376
 oxidations, 376–381
 oxidoreductases catalyse, 366
 reduction of ketones, 367–370
 reductive aminations, 370–373
 reductive aminations, 370–373
 resorcinarene, 314
 rhodium monophosphane- α -cyclodextrin
 complex, 334
 rim orientation, of achiral concave molecules, 13
 ruffled porphyrin, chiral biasing of, 22
 ruthenium-amino alcohol- β -cyclodextrin
 complexes, 335–336
- Sandars model, 49
 Schlegel diagrams, 12, 13
 self-assembly
 cobalt-tetr phenylporphyrin (Co-TPP)/
 Cu(110) system, 291–292
 definition, 95
 solution/solid-state interface, 257–258
 Zn(porphyrin) covalent dimers, 5, 6
 sensors, 177–180
 sergeant-and-soldiers principle, in
 supramolecular chirality, 23, 24
 sergeants and soldiers, 266–269
 single-stranded helicates
 circular, 97–98
 pyridyl/pyrazolyl ligand systems, 97
 singly interlocked [2]catenanes
 from copper(I) templated synthesis, 30–31
 from hydrogen bond templated synthesis,
 31–32
 sitagliptin, 353
 small chiral co-ligands
 amino acid co-ligands, 195–196
 chiral carboxylate co-ligands, 197–199
- Soai reaction, 47
 solid solution, 70
 solution/solid-state interface
 achiral molecules, 261–263
 chiral auxiliaries, 269–272
 chiral resolution, 278–280
 chiral solvents, 272–277
 enantiopure molecules, 258–259
 enantioselective adsorption, 280–281
 factors, 263–266
 magnetic fields, 277
 majority rules, 277
 racemates, 259–261
 sergeants and soldiers, 266–269
 solvates, 79–81
 3D space, definition and orientation of, 9
 S_4 -symmetric tetrahedra, 226–229
 stereocontrol through ligand modification,
 232–234
 styrene, 334
 D-sugars, 44, 58
 supramolecular chirality, 23–24,
 94–95
 supramolecular chirogenesis, 95
- tartaric acid, 198
 tartaric acid/Cu(110) system
 adsorbed bitartrate species, 299
 chiral bitartrate motifs, 299
 2D chiral systems, 298
 configurational entropy, 303
 crystallization, 302
 entropy-driven effects, 303
 kinetic Monte Carlo simulations, 300
 Monte Carlo simulations, 300, 302
 scanning tunnelling microscopy images,
 300–301
- terbium-triazacyclononane complex, 152
 4'-*tert*-butylacetophenone, 335
 tertiary alcohols, kinetic resolution of, 362
 tetrahedra
 C_3 -symmetric, 224–226
 diastereomers, 223
 organic ligands, 222
 S_4 -symmetric, 226–229
 T-symmetric, 223–224
 tetrahydrothiophene-3-one, 368, 369
 tetra-iron(II) molecular Solomon knot,
 120, 123
 tetranuclear Fe²⁺ complex, diastereoisomers
 of, 16, 17
 tetrapyrrole-based ligands, 99, 100
 thiazole containing ligands, 98, 99
 thio- β -cyclodextrin, 311, 313
 L-thymidine, 280

- topological chirality
doubly interlocked [2]catenanes, 32–33
figure-of-eight knot, 28–31
knots, 26
molecular graph, 25–26
molecular knots, 33–39
molecular rigidity, 25
rubber-glove molecule, 28
singly interlocked [2]catenanes, 30–32
topological rubber-glove molecule, 28
 ω -transaminases, 371–372
trans-1,2-diaminocyclohexane, 178–179
trefoil knots, 26, 27
from double-helical precursors, 33–35
hydrogen bonding interactions, 35–37
triple-stranded helicates
copper complexes, bridged imidazole for, 104, 105
dilanthanide triple-stranded helicates, 108, 109
di-, tri- and tetra-nuclear triple-stranded helicates, 108
heterobimetallic lanthanide systems, 108
ion-pair triple-stranded helicates, 106, 107
mixed f-d triple-stranded helicates, 110–112
mixed f-p triple-stranded helicates, 112
mixed p-d block triple-stranded helicates, 105, 106
 Zn^{2+} triple-stranded helicates, pyridazine ligands for, 104, 105
1,3,5-tris(10-carboxydecyloxy)benzene (TCDB), 263
tris(4-pyridyl)borane, 205
tris(spiroorthocarbonate) cyclophane, 8
tryptophan, 311, 313
L-tryptophan, 153
T-symmetric tetrahedra, 223–224
Tyr-Ala-containing dendritic dipeptides, 56, 58
tyrosine, 311, 313
whole cells/isolated enzymes, 348
zeolites, 191
 Zn (porphyrin) covalent dimers, self-assembly of, 5, 6
 Zn^{2+} homochiral trigonal prism, 236–237
 Zn^{2+} triple-stranded helicates, pyridazine ligands for, 104, 105