

Index

A

Acylphosphonium borates, 154
Alkynylsilanes, 145
Alkylbromosilanes, 77
Alkyne metathesis, 20
Aminodichloroborane, 185
Aminoaligosilanes, 190
3-Aminopropylsilatrane, 71
Arenium ions, 137, 144, 149
Arylfluorosilane, phosphane-
functionalized, 89
Arylhalonium ions, silylated, 112
Aryloxyiminoquinones, 44
Au-particles, 6
3-Azidopropylsilatrane, 71

B

Barbituric acid, 65
Bartlett–Condon–Schneider (BCS) hydride-
transfer, 114
Benzamidates, 62
Benzimidazoline, Si-bound, 46
Benzoic acid, 150
Benzoxazolinone, organosilicon-substituted, 67
Benzyltrifluorides, 151
Bicyclosilanes, 179, 181
Bis(pentamethylphenyl)methylsilane, 120
Bissilylhydronium ions, 110, 138
Bis(trimethylsilyl)hydronium, 129
Bis(trimethylsilyl)
octamethylcyclopentasilane, 177
Bis[tris(trimethylsilyl)silylated] dilithium
diamide, 190
Bis[tris(trimethylsilyl)silyl]diphosphene, 191
Bis[tris(trimethylsilyl)silyl]lead, 188
Bond activation, 63, 107, 151

Bond dissociation energies (BDE), 151
Boryl-2-methoxydisilane, 194

C

Carbasilatrane, 71
Carbenes, *N*-heterocyclic (NHCs), 38, 79, 143, 156
Carbon dioxide, reduction by silanes, 150
Catalyst, 150, 152–153
Catalyst, heterogeneous, 19
C–F bond activation, 151
Chalcogens, 30, 47, 49, 80–85, 147, 182, 194
Chelate ligands, 29, 34–35, 39–46, 54–57,
60–67, 71, 77–80, 82–85, 93, 197
Chloro(chloromethyl)dimethylsilane, 64
(Chloromethyl)silanes, 42
Chloronium ion, 110, 132, 150
Chlorosilanes, 6, 7, 33, 38, 40, 43, 50, 51, 57,
62, 191
Chlorosilathionium cation, 157
Cyanatosilanes, 40
Cyclodisiloxane, 46
Cyclohexasilanes, 177
Cyclohexasilanyl nickel complex, 201
Cyclopentasilanes, 176
Cyclosilanes, 155, 163, 165, 169, 189, 197
Cyclotetrasiladienes, silylated, 200
Cyclotetrasilanes, 173
Cyclotetrasibine, tetrasilylated, 192
Cyclotrisilanes, 170
Cyclotrisilanium, 125

D

Decamethylpentasila-1,4-diarsabicyclo[2.2.1]
heptane, 192
Decamethylsilococene, 119, 145

Dendrimers, 163, 169
 Diarylmethyl silylium ions, 116
 Dibenzosilafluorene, 149
 Dichlorodimethylsilane, 56
 Dichlorodiphenylsilane, 165
 Dicyclopentadiene norbornenyl-based copolymers, 14
 Diels–Alder cyclizations, 154
 1,4-Difluorooctamethyltetrasilane, 177
 Dihydridosilafluorene, 201
 Diketopiperazine, 52
 2,3-Dimethylbuta-1,3-diene, 153
 2-Dimethylsilylpentamethyl-tetra-*tert*-butyl-1,2,3-trisila-4,5-distannacyclopentane, 187
 1,3-Diphenyl-tetrahydroxy-disiloxane, 8
 Diphosphanyldisilanes, 191
 Dipotassiotetrakis(trimethylsilyl)disilane, 174
 Disilacyclopropenylum borate, 124
 Disilahexanes, 137
 Disilanes, 87
 Disilaquinodimethane, 194
 Disilastannirane, 188
 Disilene iron complexes, halogenated, 199
 Disilenyl cation, N-heterocyclic, carbene-stabilized, 34
 Disilenyl triflate, 143
 Disilylarenium ions, 116, 149
 Disilyne, disilylated, 190
 Dodecachloro-closo-borate dianion, 120
 Dodecamethylcyclohexasilane, 177
 Dodecamethylheptasila-1,5-diarsatricyclo[3.3.1.0]nonane, 192
 Donor atoms, 29–30, 45, 57, 60, 73, 93–94

E

Electroluminescence, 18
 Electron delocalization, 128, 163, 166, 179
 Electronic devices, silsesquioxanes, 14
 E-1-methyl-2,3,3-tris[methylbis(trimethylsilyl)silyl]-1,2-bis(trimethylsilyl)cyclotrisilane, 170
 Epoxycyclohexyl-functionalized POSS cage, 16

F

Ferrocenyl group, 145, 150, 153
 Flame retardants, 22
 Flammability, 22
 Fluoranthene, 152

Fluoroquasisilatrane, 51
 Fluorosilanes, 33
 Frustrated Lewis pairs (FLP), 147
 Functional materials, 1

G

Germasilene, 186
 Glycidylisobutyl POSS, 4
 Guanidates, 62

H

Hafnocene, 196
 Heavy donor atoms, 73
 Heterocyclosilanes, 181ff.
 Hexa(2,6-dimethylphenyl)cyclotrisilane, 170
 Hexaiodocyclopentasilane, 177
 Hexakis(trimethylsilyl)cyclotrisilane, 170
 Hexamethyldisilane, 165
 Hexamethylphosphoramidate (HMPA), 56
 Hexamethyltetrasila-1-phosphanido-3,5-diphosphabicyclo[3.2.1]octane, 191
 Hexa-*tert*-butylsilane, oxidation, 118
 Hydridosilanes, 36, 41
 Hydrodefluorination (HDF), silylium-catalyzed, 151
 Hydrosilylation, 107, 149
 Hypercoordination, 29

I

Iridium bis(4,6-difluorophenyl)pyridinato-N, C2-picolinate, 19
 3-Isothiocyanatopropylsilatrane 70

K

Keggin-type polyoxometalates, 54

L

Lactones, 155
 Ladder, 3, 8
 Lewis acids, 107, 153
 Low coordinated compounds, 107

M

Main group chemistry, 107
 Mesoporous materials, 11
 Metallaheterocyclosilanes, 196

- Metallophenane, silicon, 75
Metathesis, 40
Methacrylate cyclohexyl POSS, 4
Methacrylcyclopentyl-POSS (MA-POSS), 15
Methoxytris(trimethylsilyl)silane, 174
Methyldichlorosilane, 1,10-phenanthroline, 43
1-(2-Methyl-2,3-dihydrobenzothiazol-2-yl)propan-2-one, 45
Molybdenum catalyst, 20
Molybdenum trisamide alkylidyne, 20
Mukaiyama aldol condensations, 154
- N**
Nanocomposites, 12
Nanoparticles, 6
N-Heterocyclic carbenes (NHCs), 38
NiTi stent alloys, 21
Nitridosilicates, 32
N-(1-silatranyl)methylsuccinimide, 71
Nuclear magnetic resonance (NMR), 107
Nucleus-independent chemical shift (NICS), 124
- O**
Octa(hydrido)-silsesquioxane, 5
Octaphenylcyclotetrasilane, 175
Octavinylsilsesquioxane-based organorhodium heterogeneous chiral catalyst, bifunctional, 20
Oligosilanes, 87, 163, 165
 heterosubstituted, 184
Oligosilanyl halides, 184
Oligosilanyl ligands, transition metals, 196
Oligosilanyl phosphines, 190
Oligosilanyl selenides, 194
Oligosilanyl sulfides, 194
Oligosilanyl tellurides, 194
Onium ions, 147
Organic light emitting diodes (OLEDs), 16
Oxacyclosilanes, 181
Oxonium ion, 111, 112, 150
8-Oxyquinolate, 55, 62
Oxysilanes, 34
- P**
Palladium, 200
Pentafluorosilicates, 33
Pentaorganosilicates, 32
Persila-adamantane, 180
Persilapropellane, 177
1,4-Phenylenediamine (PDA), 8
Phosphazene cyclotrimers, 155
Phosphorescent excimer white-emitting devices, 19
Phosphoryldithioacetates, 195
Photoluminescence, 17
Phthalocyanines, 72
Platinacyclopentasilane, 201
Platinum, 200
Plumbylene, 188
Polycarbonates, 14
Polydimethylsiloxane (PDMS), 14
Poly(9,9'-dioctylfluorene) (POF), 17
Polyhedral oligomeric silsesquioxane (POSS), 1
 chromophores, 18
 core conjugated-polymer (CP) shell structures, 21
Polyimides (PIs), 15
Poly(lactic-co-glycolic-acid) (PLGA), 21
Poly[2-methoxy-5-(2-ethylhexyloxy)-1,4-phenylenevinylene] (MEH-PPV), 17, 18
Polyoctaphenylsilsesquioxane, 12
Polyphenylsilsesquioxane, ladder, 8
Polypropylene (PP), 14
Polysiloxanes, ladder, 8
Polysilsesquioxanes, bridged, 10
 ladder, 8
Porous materials, 11
POSS/poly(carbonate-urea)urethane nanocomposites, 21
Propylsilatranes, 71
- Q**
Quadruple-chain, polysiloxane, 9
- R**
Rearrangement, 43
Rhodamine-silicon(IV)-phthalocyanine, 72
- S**
Salen-silicon, 71
Schrock-type hafnocene silylene complex, 196
Sialons, 32
Si-H/F-C metathesis, 151
Si-hypercoordination, 53
Silafluorenes, 149
Silaimidazolium, 147

- Silaimidazolium (*cont.*)
 borate, 119
 tetraarylborates, 125
 Silanorbornane, 150
 Silanorbornyl cations, 144, 145
 Silaphosphine, cyclic, 191
 Silatetrahedrane, 171
 Silatranes, osmium-substituted, 90
 triethanolamines, 70
 Silatropylium cation, 125
 Silicon, 107
 cations, 107
 complexes, 29
 compounds, hypercoordinated/hypervalent,
 32, 33
 nitride, 31
 oxide, 1
 Siliconium ion, 109, 111
 Silsesquioxane–chromophore, 18
 Silsesquioxanes, 1
 polyhedral, monofunctional, 6
 multifunctional, 7
 Silylarenium tetraarylborates, 113
 Silylenes, amidinate-functionalized, 46
 Silylenes, *N*-heterocyclic (NHSis), 47, 118
 Silyl halides, 184
 Silyl hydrides, 183
 Silylium borates, 139
 Silylium ions, 107
 anion-stabilized, 141
 arene-stabilized, 129
 aromatic/homoaromatic, 124
 aryl-substituted, 120
 ferrocenyl-substituted, 150
 intramolecular π -stabilized, 144
 phosphane Lewis pairs, 154
 silane-stabilized, 138
 Silyliumylidenes, 107, 155
 Silylnitrilium ions, 118
 Silyloxy oligosilanes, 193
 Silyl radicals, 195
 Silyl trifluoromethanesulfonimides, 153
 β -Silyl vinyl cation borate, 148
 Small-molecule activation, 107
 Spherosilicate, 3
 Stannacyclosilanes, 187
 Stannylum borates, 148
 Stepwise coupling polymerization (SCP), 8
 Stishovite, 31
 Superacid, 127, 148
 Surfaces, POSS-based molecules, 10
- T**
 Tetraaminodisilane, 195
 Tetrabutylammonium fluoride (TBAF), 5
 Tetrachlorosilane, 56
 Tetrahalocycloctetrasilanes, 175
 Tetrakisdimethylsiloxysilane (TDSS), 14
 Tetrakis(trimethylsilyl)cycloctetrasilane, 175
 Tetrakis(trimethylsilyl)disilene, 174
 Tetrakis(trimethylsilyl)
 octamethylcyclohexasilane, 179
 Tetrakis(trimethylsilyl)
 tetramethylcycloctetrasilane, 174
 Tetramesityldisilene, 194
 Tetramethylethylenediamine (tmeda), 39
 Tetraorganosilanes, 35
 Tetrasilacyclobutadiene dication, 127
 Tetrasilacyclobutenyl cations, 118, 126
 Tetrasila-1-phosphanido-3,5-di-
 phosphabicyclo[3.2.1]octane, 191
 Tetrasilatetrahedrane iodolysis, 172
 Tetrasilylcyclotrisilene, halogenation, 172
 Thaumaside, 31, 34
 Thiacyclocloctetrasilene, 195
 Thiocyanato ligands, 72
 Thiocyanatosilanes, 40
 Titanaheterocyclosilanes, 197
 Titanium, 196
 Titanocene, 196
 Transition metals, 6, 10, 29, 32, 52, 70, 75–77,
 90, 152, 196ff.
 Triarylsilylium ions, 154
 Trichloro[2-(dialkylphosphanyl)imidazol-1-yl]
 silanes, 58
 Tricyclosilanes, 180
 Triethylsilylium dodecachloro-closo-
 dodecaborate, 142
 Triethylsilyl toluenium borate, 153
 Trigonal bipyramid (TBP), 52
 Tri-*iso*-propylsilylium tetrakis
 (pentafluorophenyl)borate, 142
 Trimesitylsilylium borate, 117
 Trimethylsilatranes, 71
 Trimethylsilylium carba-closo-borate, 142
 (1-Trimethylsilyl-2-propenyl)bis
 (trimethylsilyl)silanols, 194
 Triphenylcarbenium tetrakis
 (pentafluorophenyl)borate, 138
 Triphenylene, 153
 Trisilacyclopropenylium cation, 117
 Trisilasumanene, 149
 Tris(pentamethylphenyl)silane, 120

Tris(pentafluorophenyl)silanes, 51
Tris(trimethylsilyl)silyl, 167, 177, 194
Trithiaheptasilaadamantane, 195
Trityl tetrakis(pentafluorophenyl)borate,
114, 133
Turnstile rotamers, 68

U

Undecamethylcyclohexasilanyl complexes,
177, 201
Uracil, 65
4-Uracilbutyl-1-methylpyrene ether
(U-PY)/octakis(dimethyl
(N-(6-acetamidopyridin-2-yl))
siloxy] silsesquioxane
(ODAP-POSS), 18

V

Vinylsilanes, 183

W

Wiberg's silatetrahedrane, 194

X

X-ray, 4, 11, 36, 52, 54, 57–58, 64, 66, 70, 92,
119, 165

Z

Zirconocene, 196