

## Index

- ab initio* methods 88–89, 93  
activation of small molecules 51–53  
aerosol techniques 22  
aggregation of silver particles 17  
Au–Ag alloy 14  
aluminum particles and reactions 139–140  
analysis of spectral techniques 45  
atomic-force microscopy 41–42, 60, 101, 142, 144
- bimetallic Pd–Rh particles  
  Ag–Pb particles 62  
  Au–Ni particles 19  
  Au–Pd particles 19  
  Fe–Pt particles 130  
  Pd–Au particles 14, 18  
  Pd–Rh particles 14  
biomolecules 13, 124, 130, 193, 203–207  
bismuth particles 12
- calcium particles, reactions 79, 107–108  
carbon nanotubes  
  applications 155  
  filling 85, 151–152, 201–202  
  grafting 152–153, 166  
  intercalation 92, 151, 154–155  
catalysis  
  bimetallic Pt–Au 177  
  gold nanoparticle 204  
  influence of particle size 182  
  nanopens 180  
  palladium nanoparticles 175, 184  
  TiO<sub>2</sub> and Ag–TiO<sub>2</sub>, 179  
CdSe particles 142, 189  
chemical reduction 8–10, 16–18  
chromium particles 120  
cobalt particles 10, 128  
  reactions 10  
co-condensates silver cyanobiphenyl 66  
complex of DNA and CdSe 204  
copper particles 10, 13, 28, 33, 133, 135, 154  
core–ligand complex 103  
core–shell  
  Ag–Au particles 14  
  CdS–ZnS 188  
  Co–CdSe 130  
  FePt–Fe<sub>3</sub>O<sub>4</sub> 131  
  Pd–Pt, Pd–Au, Pd–Rh 14  
core–shell particles, structures 12, 14–15, 35, 129, 143  
critical film thickness 55  
cryochemical synthesis 20–29
- dendrimers 12–15  
destruction of carbon tetrachloride 53  
diffraction techniques 37, 42–43, 144  
drug modification 206  
dynamic light scattering techniques 63
- electric explosion techniques 136  
electrochemical dissolution 10  
electron microscopy 19, 33–34, 36, 38–39, 144  
electronic  
  circuit 191  
  noses 196  
EPR method 66  
EXAFS 38, 43, 101  
exchange reactions, kinetics 169  
explosive reactions 53–56
- fast crystallization 6  
films, conductivity 62–63  
fullerenes 148–151, 154
- GaP nanowires 189  
germanium particles 120  
gold  
  films 143–144  
  nanoshells 136  
  optical properties 198  
  particles 5, 8–9, 14, 17–18, 120, 133, 135–137, 141–144, 159, 170, 173, 176–177, 188–189, 193, 198, 203–204, 206  
Grignard reactions 47–50

- helium nanodroplets 30
- heterodimers 12, 124
- heterogeneous films 35
- hexogen nanoparticles 30
- hollow structures 13
- hybrid nanomaterials 120, 196
- hydrocarbons chlorination 109
  
- indium
  - films 160
  - particles 161
- indium nitride
  - nanowires 140
- ionization potential 106
- iron
  - complexes 127
  - particles 122–123, 127
  - reactions 122–123
  
- kinetic nanoparticles 168–170, 197
- Knudsen cells 21–22
  
- lead clusters 57
- lithium
  - oxide 187
  - particles 93
  
- magnesium
  - atoms 77–79, 82
  - particles 47–56
  - reactions 47–56
- mass spectrometry 44
- matrix-isolation method 80
- metal oxides nanoporous 16
- metal-containing polymers 13
- metal–nonmetal transition 5
- Mg–CO<sub>2</sub> complex, *ab initio* calculations 78
- molybdenum
  - particles 116
  - sulfide particles 180
  
- nanobelts 35, 195
- nanochemistry definition 5
- nanocomposites, definition 2
- nanoparticles classifications 2
- nanorattles 137
  
- nanoribbons 35, 136
- nanorods 187–188, 190
- nanostructure definition 2
- nanotubes
  - AlN, GaN 35
  - FePb, Fe<sub>3</sub>O<sub>4</sub> 35
  - NbSe<sub>2</sub> 190
- nanowires 133
- neutron diffraction 43
- nickel
  - particles 33, 124, 182
  - reaction 128
- niobium particles and reactions 115–118
  
- oxide reactions 184–187
- oxide, magnesium, absorption 104
- oxides 11
  
- palladium
  - nanowires 131
  - particles 18, 33, 121, 184
- particles Au–Hg 18
- photochemical reduction 7, 84
- photoelectron spectroscopy 44
- platinum particles 10, 36
- polycarboxylic acids 17, 84
- poly-*p*-xylylene films 57
- polypyrrole nanowires 13, 192
- porous structure 13, 15
- probe microscopy 39–41
  
- quantum dots, biolabels 205
  
- radiation reduction 7, 17–18
- rare-earth elements, reactions 69–74
- reaction kinetics 12
- reactions
  - in micelles and emulsions 12, 49
  - of magnesium particles 47–56
- rhodium particles 12, 176
- ruthenium particles 10
  
- samarium
  - complexes 74, 79, 83
  - reactions 70, 72, 78, 80
  - spectra 76
- self-organization 157, 196, 198, 205, 207
- semiconductors 188–196

- sensors
  - NO<sub>2</sub> 195
  - SO<sub>2</sub> 192
  - temperature 193
- shape-control 12
- silica, mesoporous 16
- silicon particles 147
- silver clusters 10, 66–67, 84–86, 91, 165
- silver particles 9, 166, 179, 188
- simulation
  - Ag<sub>n</sub>Pb<sub>m</sub> clusters 91
  - heteroclusters 91–93
  - systems 92–93, 95
- size effects
  - definition 5, 157
  - external 4
  - internal 4
  - optical spectra 162–167
- sodium particles 6
- sol-gel synthesis 19
- solvated metal particles 125
- sonochemical method 19
- stabilization
  - by mesogenes 65–68
  - by polymers 57–64
  - by solvent 125
- supercritical solutions 20
- tetrapod particles 136
- theoretical simulation 87, 98, 132
- thermodynamic consequences
  - influence of pH 175, 178, 188, 192
  - melting point 204
  - shift chemical equilibrium 170
- titanium, reactions 112
- tungsten particles 118
- vanadium particles 120
- X-ray fluorescence spectroscopy 43
- zeolite 15
- zinc-nanooxide, reactions 186
- zinc-selenium particles 189