

Index

- absorption, 209
- ABS, 118, 123
- activation energy, 61
- addition polymerization, 115
- additives, 120
- age hardening, 87
- alnico, 220
- aluminum, 85
 - designations, 88
 - precipitation hardening, 87
- amorphous carbon, 180
- amorphous materials, 2
- anions, 2
- anode reactions, 224
- aramids, 123
- Arrhenius equation, 61
- austempering, 79
- austenite, 68
- average molecular weight, 266
- Avrami kinetics, 258

- bainite, 79
- bakelite, 118, 123
- beach markings, 51
- blow molding, 128
- blown films, 128
- body-centered cubic, 4
- bond
 - angle, 262
 - covalent, 2
 - energy, 262
 - hydrogen, 2
 - ionic, 263
 - length, 263
 - metallic, 2
 - Van der Waals, 2
- Bragg's law, 247
- branching, 113
- brass, 90
- bridging oxygens, 131
- bronze, 90

- bulk forming, 105
- Burgers vector, 254

- carbon, 178
- carbon fibers, 180
- carburizing, 79
- carrier, charge, 189
- casting, 95
- casting processes, 100
- cathode reactions, 224
- cations, 2
- cell, corrosion, 224
- cellulose, 112
- cement, 224
- cementite, 68
- ceramics, 142
 - hardness, 143
 - ionic bonding, 143
 - porosity, 144
 - slip systems, 142
 - strength variability, 146
 - toughening, 149
- charge carriers, 189
- charge mobility, 189
- Charpy, 53
- clamshell markings, 51
- clay, 160
- cleavage, 44
- coatings, 233
- cold work, 36
- columnar crystals, 95
- common polymers, 117
- composites, 166
 - fiber-reinforced, 166
 - lamellar, 175
 - particulate, 173
 - properties, 173
- compression molding, 126
- concrete, 163
- condensation polymerization, 117

- conduction, 189
 - extrinsic semiconduction, 197
 - group II-IV, 198
 - intrinsic semiconduction, 194
 - ionic, 192
 - metallic, 190
 - thermal, 212
- coordination, 268
- copolymers, 114
- copper, 90
- covalent bonding, 2
- creep, 44
- cross linking, 113
- crystal growth, 149
- crystalline materials, 2

- damage, radiation, 121
- deformation, elastic, 28
 - plastic, 31
- decarburization, 23
- degradation, 121
- degree of polymerization, 110
- delayed fracture, 56
- dendrites, 96
- devitrification, 136
- diamond, 178
- die-casting, 100
- dielectric properties, 199
- diffusion, 18
- dislocations, 254

- elastic limit, 32
- elasticity, 28
- electric discharge machining, 233
- electrical conductivity, 90
- electrode potentials, 225
- electron beams, 233
- electron gas, 2
- end-quench test, 72
- endurance limit, 46
- energy bands, 193
- energy gap, 193
- epoxies, 123
- error function, 19
- eutectic, 9
- eutectoid, 10
- expansion coefficient, 212
- extrinsic semiconduction, 197
- extrusion, 106, 127

- face-centered cubic, 3
- failure, 42
- fatigue, 46
- ferrites, 218
- ferromagnetism, 211
- fiber, 124
 - optics, 211
 - production, 128
- reinforcement, 172
 - pull out, 160
- Fick's laws, 18
- fillers, 120
- fluorescence, 210
- fluorite, 3
- foaming, 129
- foams, 184
- fracture, 42
- fracture mechanics, 54
- Frenkel pairs, 13
- fullerenes, 181

- galvanic series, 225
- galvanizing, 227
- gas evolution, 100
- glass, 130
 - compositions, 131
 - metallic, 139
 - nonsilicate, 136
 - photosensitive, 136
 - shaping, 138
 - silicate, 130
 - strength, 138
 - tempering, 137
 - viscosity, 132
 - Vycor®, 135
- glass transition, 118
- glazes, 162
- Goodman diagram, 48
- grain boundaries, 249
- grain size, 14
- graphite, 178

- Hall-Petch relation, 35
- hardenability, 72
- hardness, 37
- hexagonal close-packed, 4
- honeycombs, 187
- hot isostatic pressing, 158
- hot shortness, 44
- hot working, 106
- hydration reactions, 162
- hydrogen bonds, 5

- ice
- index of refraction, 206
- indices
 - direction, 224
 - planes, 224
- injection molding, 125
- insulators, 189
- intergranular fracture, 43
- interstitial solutions, 13
- intrinsic semiconductors, 189
- intrusions, 51
- invariant reactions, 12
- ion implantation, 234
- ionic bonding, 5

Index

277

- ionic radii, 270
- iron, 68
- isothermal transformation, 72
- Jominy test, 72
- kevlar, 112, 118
- laser beams, 232
- lasers, 211
- latent heats of transformation, 214
- lever law, 9
- light-emitting diodes, 210
- lost wax, 100
- luminescence, 210
- magnesium, 91
- magnetic domains, 216
- magnetism, 71
- martensite, 71
 - hardness, 72
 - formation, 71
 - structure, 72
 - tempering, 76
- Miller indices, 242
- molecular configuration, 114
- nylon, 112, 122
- offset yield strength, 32
- opacity, 210
- optical fibers
- optical spectrum, 206
- over-aging, 87
- oxidation, 227
- passivity, 226
- pearlite, 68
- percent elongation, 34
- percent reduction of area, 35
- periodic table, 5
- peritectic, 10
- peritectoid, 12
- phase, 8
- phase diagrams, 9
 - Al-Cu, 86
 - Al-Si, 89
 - Cu-Ag, 9
 - Cu-Al, 26
 - Cu-Be, 91
 - Cu-Ni, 10
 - Cu-Sn, 99
 - Cu-Zn, 11, 90
 - Fe-C, 11, 69
 - Pb-Sn, 10
 - polybutadiene-polystyrene, 16
 - SiO₂-Al₂O₃
- phenol formaldehyde, 116, 123
- photolithography, 231
- photovoltaic cells, 211
- piezoelectric behavior, 202
- planes, 244
- plasma coating, 233
- plastic deformation, 31
- plasticizers, 121
- Poisson's ratio, 29
- polarization, 201
- polycarbonate, 112, 122
- polyester, 112
- polyethylene, 111, 121
- polyethylene terephthalate, 118, 121
- polymers, 115
 - addition, 120
 - additives, 117
 - common polymers, 117
 - condensation, 117
 - copolymers, 114
 - degradation, 121
 - glass transition, 118
 - properties, 121
 - thermoplastics, 110
 - thermosetting, 115
 - uses, 121
- polymethylmethacrylate, 111, 122
- polypropylene, 111, 122
- polystyrene, 111, 122
- polytetrafluoroethylene, 111, 123
- polyurethanes, 123
- polyvinylacetate, 111, 114
- polyvinylchloride, 111, 114, 122
- portland cement, 163
- porosity, 144
- pottery, 160
- powder processing, 151
 - liquid phase sintering, 157
 - pressing, 151
 - sintering mechanisms, 151
- precipitation hardening, 87
- proportional limit, 32
- quenching, 75
- radiation damage, 121
- radii of elements, 234
- recovery, 60
- recrystallization, 60
- rectifiers, 199
- recycling, 234
- reflectivity, 234
- residual stresses, 137
- risers, 95
- rubber, 112
- rust, 227
- Schottky defects, 13
- segregation, 98
- sheet forming, 107
- shrinkage, 96

- silicones, 124
- single crystal growth, 149
- sintering, 151
- slip, 37
- sodium chloride, 5
- solid solution strengthening, 36
- solid solutions, 13
- specific heat, 214
- stainless steel, 81
- steel, 68
 - classification system, 80
 - effect of alloying elements, 70
 - low carbon, 80
 - stainless, 81
- stereoisomerism, 113
- strain, 28
- stress, 28
- striations, 51
- substitutional solutions, 13
- surface energy, 249
- surfaces, 249

- tempering, steel, 76
- tempering glass, 137
- tensile strength, 34
- thermal conductivity, 212
- thermal expansion, 212

- thermal shock, 55
- thermally induced stresses, 133
- thermocouples, 214
- thermoforming, 128
- thermosetting polymers, 115
- titanium, 91
- toughness, 42, 53
- transfer molding, 126
- transistors, 199

- ultimate strength, 34
- urea formaldehyde, 117, 123

- vacancies, 13
- Van der Waals bonds, 5

- Weibull analysis, 272
- welding, 101
- Wiedemann-Franz ratio, 212
- wood, 239

- x-ray diffraction, 247

- yield strength, 32
- Young's modulus, 29

- zinc, 93