

compounds (*continued*)
 oxidation numbers, 232–235, 235*t*, 634–635
 percentage composition, 242–244, 256
 polyatomic ions in, 225–226, 226*t*
 solubility of, 861*t*
compressibility, 331, 334, 338, 376
concentration, 418–424
 chemical equilibrium and, 599–600, 599*f*
 molality, 422–424, 422*f*, 454
 molarity, 418–421, 419*f*, 430, 499, 517–521, 518*f*–519*f*
 notation, 499
 reaction rates and, 569–570, 569*f*, 570*f*, 584
 titration and, 517–521, 518*f*–519*f*, 528–529
condensation, 342, 342*t*
condensation polymers, 739
condensation reactions, 736, 752–753, 752*f*, 756
conduction bands, 826, 826*f*
conductivity, electrical, 7, 18, 628–629
conjugate acids and bases, 483–485, 485*t*, 608–609
conservation of mass, 68–69, 69*f*, 94–95, 303
contact theory, 444
continuous spectrum, 100
control rods, 698, 698*f*
conversion factors
 molar mass, 240–242, 240*f*, 301
 mole ratios, 245–247, 300–301, 304–310, 324
 SI units, 40–42, 50, 92
 using, 40–42, 50, 92
copolymers, 737, 739
copper
 in the body, 807*t*
 in electrochemical cells, 655–660, 655*f*, 656*f*, 657*f*, 658*f*
 electron configuration, 118*t*, 119
 ionization energy, 164
 isotopes, 82, 82*t*
 oxidation and reduction of, 643, 643*t*
 in photochromic lenses, 634
 properties, 18*f*, 19, 798–800, 799*f*, 800*f*, 801*t*
 reactivity, 799, 799*f*
 in tap water, 477

corrosion, 545, 661–662, 661*f*, 662*f*
cosmic rays, 694
covalent bonding, 178–189
 compared to ionic, 193, 193*f*
 electron-dot notation, 184–186, 184*f*
 electronegativity and, 175–177, 176*f*, 177*f*
 hybridization, 201–203, 202*f*, 203*t*
 intermolecular forces, 203–207, 204*t*, 205*f*, 206*f*, 207*f*
 Lewis structures, 184–188, 214
 nomenclature, 227–229, 228*t*, 229*t*
 octet rule, 182–183, 183*f*
 polyatomic ions, 194, 199–200, 230, 230*f*, 294
 redox reactions and, 634–635
 resonance structures, 189
 VSEPR theory, 197–201, 198*f*, 199*f*, 200*t*
covalent molecular crystals, 340*t*, 341
covalent-network bonding, 189, 230, 340, 341*f*
covalent network crystals, 340, 340*t*, 341*f*
Crick, Francis, 771
critical mass, 698
critical point, 347, 347*f*
critical temperature, 347, 347*f*
Crookes, William, 596
crystalline solids, 338
 binding forces in, 339–341, 340*t*, 341*f*
 breakage and, 32, 32*f*, 193, 193*f*
 hydrates, 411, 411*f*
 ionic bonding in, 191–192, 191*f*, 192*f*
 substitutions in, 804, 804*f*
 types of, 339–341, 339*f*, 340*t*
Curie, Marie and Pierre, 685
cycloalkanes, 718
cysteine, 756*f*, 758, 758*f*
cytosine, 770, 770*f*, 824*f*

D

Dalton's atomic theory, 68–69
Dalton's law of partial pressures, 365–368, 366*f*
Daniell Cells, 656*f*, 657, 657*f*

data collection, 29–30
daughter nuclides, 690
Davy, Humphry, 444
d-block elements, 144–146, 144*f*, 163–164
de Broglie, Louis, 104
Debye, Peter, 456
decanting procedure, 844
decay series, 690–691, 690*f*
decomposition reactions, 279–280, 280*f*
decompression sickness, 368
delocalized electrons, 195, 340, 729, 729*f*
Democritus, 43, 67
denaturation, 764–765, 764*f*, 821
density
 calculation of, 39
 of familiar materials, 38*t*, 39
 of gases, 38, 331, 398–399, 859*t*
 of liquids, 334, 334*f*
 of organic compounds, 730*t*
 of solids, 338
 units of, 36*t*, 38–39, 38*t*
 of water, 351, 859*t*
deposition, 342*t*, 346
derived units, 36–39, 36*t*, 38*t*
deuterium, 78, 78*f*, 79*t*
diamonds, 542, 725
diatomic molecules, 178, 197–198, 197*f*, 263*t*, 380
diffraction, 104, 105*f*
diffusion
 of gases, 331, 331*f*, 336*f*, 386–388, 386*f*
 of liquids, 334, 334*f*
 of solids, 339
digestion, 765, 768–769, 768*f*
dimensional analysis, 40–41
dipeptides, 756
dipoles, 204–206, 205*f*, 206*f*
diprotic acids, 480, 480*f*
directly proportional quantities, 55–56, 55*f*, 55*t*
disaccharides, 752, 752*f*, 821, 821*f*
dispersed phase, 403
displacement reactions, 281–283, 281*f*, 282*f*
disproportionation, 644–645, 645*f*
dissociation, 435–439, 435*f*, 438*f*
dissolution, 407–408, 407*f*, 547–548, 548*f*. *See also* solubility
disulfide bridges, 758, 758*f*

DNA (deoxyribonucleic acid), 771–772, 771*f*, 772*f*
DNA fingerprinting, 774, 774*f*
DNA replication, 772, 772*f*
doping, 826–827
Dorn, Ernst, 115, 136
double bonds, 186–188, 187*f*, 187*t*, 724–725
double-displacement reactions, 282–283, 282*f*, 438–439, 438*f*, 440
Downs Cells, 671
Drew, Charles, 762
dry cells, 659–660, 659*f*, 660*f*
dry ice, 358–359, 500*f*
ductility, 18, 196

E

effervescence, 413, 413*f*
effusion, 332, 386–388, 386*f*
Einstein, Albert, 99–100, 681–682
Einstein's equation, 681–682
elastic collisions, 329
elastins, 760, 760*t*
electrical potential, 662–665, 663*f*, 664*t*, 676
electric charge, 73, 75
electric circuits, 656
electric current, 34*t*, 405–406, 406*f*, 468, 472
electrochemical cells, 655–657, 655*f*, 656*f*, 657*f*
electrochemistry, 654–671
 corrosion, 661–662, 661*f*, 662*f*
 definition, 655
 electrical potentials, 662–665, 663*f*, 664*t*, 676
 electrochemical cells, 655–657, 655*f*, 656*f*, 657*f*
 electrolysis, 279, 670–671, 670*f*
 electrolytic cells, 667–671, 667*f*, 668*f*, 669*f*, 670*f*
 rechargeable cells, 669, 669*f*
 voltaic cells, 658–666, 658*f*, 659*f*, 660*f*, 661*f*
electrode potentials, 662–665, 663*f*, 664*t*, 676
electrodes, 656, 656*f*, 663, 663*f*
electrolysis, 279, 444–445, 444*f*, 445*f*, 670–671, 670*f*
electrolytes, 405–406, 406*f*
 balance of, 789, 789*f*
 colligative properties and, 453–456, 453*f*, 455*t*