

positrons, 685*t*, 686–687
potassium
 in electrolyte balance, 789–790, 789*t*, 790*f*
 electron configuration, 118, 118*t*
 fertilizers, 831, 831*t*
 properties, 786–787, 786*f*, 787*f*, 788*t*
 reactivity of, 142*f*
potential difference, 662–664, 676
potential energy, 179, 179*f*
pounds per square inch (psi), 364*t*
precipitates
 from chemical reactions, 262, 262*f*, 602, 602*f*
 from double-displacement reactions, 282, 282*f*, 438–440, 438*f*
 precipitation calculations, 618–620
 precipitation reactions, 437–439, 437*t*, 438*f*
precision, 44–46, 44*f*
preenzymes, 765
prefixes
 acids, 231
 carbon-atom chain, 718*t*
 molecular compounds, 227–229, 228*t*, 229*t*
 oxyanions, 226
 Stock system and, 235
 units, 34, 35*t*, 854*t*
pressure, 361, 361*f*
 atmospheric, 362–363, 362*f*, 363*f*, 365
 Boyle's law, 369–370, 369*f*, 370*f*
 combined gas law, 374–375
 critical, 347*f*, 348
 effect on chemical equilibrium, 598–599
 force and, 361–362, 361*f*, 362*f*
 Gay-Lussac's law, 373–374, 373*f*
 measuring, 363, 363*f*, 398–399
 osmotic, 452–453, 452*f*
 partial, 365–368, 366*f*, 599
 solubility and, 413
 units of, 37, 364–365, 364*t*
 vapor, 343–344, 343*f*, 344*f*, 366, 446–447
 water-vapor, 859*f*
Priestley, Joseph, 279, 302
primary standards, 517

primary structure, 759
principal quantum number, 107, 107*f*
products, 9, 261
propane, 382, 716, 717*t*
properties, chemical and physical, 7–10, 9*f*
proportionality, 55–57, 55*f*, 55*t*, 56*t*, 57*f*, 57*t*
proteins, 757–765
 amino acids in, 757, 761, 761*f*
 biological functions, 760, 760*t*
 denaturation, 764, 764*f*
 digestion of, 765, 768
 as enzymes, 550, 760*t*, 763–765, 763*f*, 764*f*
 pH and, 765, 782–783, 821
 as polypeptides, 756
 shape and structure, 759, 759*f*
 side-chain reactions, 758, 758*f*
 synthesis, 736, 773–774, 780
protium, 78, 78*f*, 79*t*
proton-exchange membrane (PEM fuel cells), 666
protons, 72
 atomic number and, 77
 nuclear binding energy and, 682–683, 683*f*
 properties, 75, 76*t*, 855*t*
p-type semiconductors, 827, 827*f*
pure substances, 11*f*, 13–14, 13*f*, 14*f*, 14*t*
purine bases, 770
purity of reagents, 14, 14*f*, 14*t*
pyrimidine bases, 770

Q

qualitative analysis, 800, 800*f*
qualitative information, 29
quantitative information, 29
quantity, 33
quantum, 99
quantum numbers, 107–110, 107*f*, 108*f*, 108*t*, 109*f*, 110*t*.
See also electron configurations
quantum theory, 100–101, 105
quarks, 682
quaternary structure, 759

R

radiation, 685, 693–696, 693*f*, 694*f*, 695*f*

radiation exposure, 693–694, 694*f*
radioactive dating, 695
radioactive decay, 685–692
 decay series, 690–691, 690*f*
 half-life, 688–689, 688*f*, 688*t*, 706, 708–709
 simulation of, 708–709
 types of, 685–687, 685*t*, 686*f*, 687*f*
radioactive tracers, 695, 695*f*
radioactive wastes, 695–696
radium, 685, 688, 688*f*, 792–793, 792*f*, 794*t*
radon, 115, 136, 694
Ramsay, William, 114–115, 115*f*, 135–136
rate-determining steps, 576–577
rate laws for reactions, 571–578, 584
Rayleigh, Lord (John William Strutt), 114, 114*f*, 135
reactants, 9, 261, 312–316, 312*f*
reaction mechanisms, 561–562, 561*f*
reaction rates, 568, 591, 591*f*.
See also kinetics of reactions
reaction stoichiometry, 299–301. *See also stoichiometry*
reaction waves, 288, 288*f*
real gases, 332, 332*f*
rechargeable cells, 669, 669*f*
recombinant DNA technology, 775
redox reactions, 633–635, 644.
See also oxidation-reduction reactions
reducing agents, 642–645, 642*t*, 643*t*
reduction, 633. *See also oxidation-reduction reactions*
reduction potential, 662
relative atomic masses, 80–81
rems, 693
resonance structures, 189, 729, 729*f*
respiration, 816–817, 816*f*, 817*f*
reverse osmosis, 453
reversible reactions, 266–267, 270, 589–590
ribosomal RNA (rRNA), 773
RNA (ribonucleic acid), 773–774, 773*f*
roentgens, 693

rounding numbers, 48, 48*t*
rubber, 748–749
rubidium, 120*t*, 122, 786–787, 786*f*, 787*f*, 788*t*
Rutherford, Ernest, 74, 75*f*

S

sacrificial anodes, 662
salt bridges, 656–657, 656*f*
salts, 489
 as electrolytes, 405–406, 406*f*
 on freezing roads, 456*f*
 hydrates, 243–244, 411, 411*f*
 hydrolysis of, 608–612, 608*f*, 610*f*, 611*f*
 from neutralization reactions, 468, 472, 488–489, 488*f*
 nomenclature, 231
 solubility product constants, 613–620, 615*t*, 620
sample problems approach, 52–54
saponification, 754
saturated hydrocarbons, 716.
See also alkanes
saturated solutions, 409, 409*f*
scanning electron microscope (SEM), 3–4, 3*f*
scanning tunneling microscope (STM), 3*f*, 70, 772*f*, 773*f*
Schrödinger wave equation, 105–106, 107*f*
scientific method, 29–31, 31*f*
scientific notation, 50–52, 62
scintillation counters, 694
scuba diving, 368
secondary structure, 759
second ionization energy, 155–156, 155*t*
second-period elements, 116–117, 116*t*
self-ionization of water, 499–500, 499*f*, 500*t*, 599
self-oxidation, 645
self-reduction, 645
semiconductors, 340–341, 826–827, 826*f*, 827*f*
semipermeable membranes, 452–453, 452*f*
shielding, 698
significant figures, 24, 46–50, 47*t*, 48*t*, 505
silicon, 117*t*, 230, 812–813, 812*f*, 813*t*
silver
 alloys, 803*t*, 804*f*