

o n e

The science of chemistry 1

The nature of chemistry

Units of measure used in chemistry

Chemical arithmetic

t w o

Some fundamental concepts 20

Chemical behavior of substances

A general classification of matter

The ultimate particles of matter

How chemical changes are expressed

Subatomic particles

t h r e e

Atoms and molecules 38

The structure of atoms

The relative masses of atoms

four

**A systematic classification
of the elements 61**

Recurring properties among the elements
The periodic classification of the elements

five

**The physical states of matter:
the gaseous state 76**

The behavior of gaseous molecules
General gas laws
Gas laws relating to chemical changes

six

**The physical states of matter:
liquids and solids 105**

Properties of the liquid and solid states
Change of state
Structure of solids

seven

Bonding between atoms 123

The nature of the chemical bond
Oxidation states of the elements

e i g h t

Classification of compounds 147

The behavior of compounds in solution

Acids and bases

The formation of salts

Nomenclature

n i n e

Hydrogen 166

History and occurrence

Physical and chemical properties

Preparation and uses

Reduction of ions in solution

t e n

**Quantitative relationships
involving mass 183**

Combining proportions of the elements

The quantitative significance of chemical formulas

The quantitative significance of chemical equations

e l e v e n

**Quantitative relationships
involving energy 201**

Energy and chemical change

Heats of reaction

Calorimetry

twelve

**The inert gases:
Group VIIIA. The atmosphere 215**

The inert gases

The atmosphere

thirteen

Solutions - Part I 226

Types of solutions

Solid-liquid solutions

Liquid-liquid solutions

Gas-liquid solutions

fourteen

Solutions - Part II 245

Concentrations of solutions

Volumetric analysis

*Effect of nonvolatile, nonionizable solutes
on the physical properties of the solvent*

Determination of molecular weights

fifteen

Oxidation-reduction 264

Conventions in writing chemical equations

Writing oxidation-reduction reactions

Oxidation-reduction titrations

s i x t e e n

The halogens: Group VIIA 277

The halogens

Hydrogen halides

Oxygen compounds

s e v e n t e e n

Ionic dissociation in solution 303

Properties of electrolytes

Effect of nonvolatile electrolytes on the properties of water

Theories that account for the properties of electrolytes

e i g h t e e n

Molecular equilibrium 315

Factors that influence the rate of reaction

Quantitative applications of chemical equilibria

n i n e t e e n

Ionic equilibrium in solution 330

Factors favoring the completion of reactions

Ionization constants

Hydrogen and hydroxide ion concentrations

Hydrolysis

The solubility product principle

Further applications of ionic equilibria

twenty

Water 357

The chemistry of water

Natural waters

twenty - one

The sulfur family: Group VIA 376

Oxygen, sulfur, selenium, tellurium, and polonium

Oxygen

Peroxides

Sulfur

Selenium, tellurium, and polonium

twenty - two

The nitrogen family: Group VA 408

Nitrogen, phosphorus, arsenic, antimony, and bismuth

Nitrogen

Phosphorus

Arsenic, antimony, and bismuth

twenty - three

Electrochemistry 440

Electrical units

Electrolysis

Electrochemical cells

twenty - four

Metallurgy 461

Metals

Metallurgical processes

Alloys

twenty - five

Group IVA 472

Carbon, silicon, germanium, tin, and lead

Carbon

Silicon

Germanium, tin, and lead

twenty - six

Organic chemistry - Part I 501

Compounds of carbon

The hydrocarbons

Fuels

Explosives

twenty - seven

Organic chemistry - Part II 526

Derivatives of the hydrocarbons

Plant and animal products

Detergents

Polymers

twenty - eight

Colloids 551

The colloidal state
Preparation of colloids
Properties of colloids

twenty - nine

Group IIIA 564

Boron, aluminum, gallium, indium, and thallium
Boron
Aluminum
Gallium, indium, thallium

thirty

The alkaline-earth metals: Group IIA 580

Beryllium, magnesium, calcium, strontium, barium, and radium
Compounds of the alkaline-earth metals

thirty - one

The alkali metals: Group IA 594

Lithium, sodium, potassium, rubidium, cesium, and francium
Compounds of the alkali metals

thirty - two

The transition elements - I:

**Groups: IIIB, IVB, VB,
VIB, and VIIB 613**

The transition elements

*The IIIB Group—scandium, yttrium, lanthanum, actinium,
the lanthanide series, and the actinide series*

The IVB Group—titanium, zirconium, and hafnium

The VB Group—vanadium, niobium, and tantalum

The VIB Group—chromium, molybdenum, and tungsten

Chromium

Molybdenum and tungsten

The VII Group—manganese, technetium, and rhenium

thirty - three

The transition elements - II:

Group VIIB 631

*Iron, cobalt, nickel, ruthenium, rhodium, palladium,
osmium, iridium, and platinum*

Iron, cobalt, and nickel

Iron

Compounds of iron

Cobalt and nickel

Ruthenium, rhodium, palladium, osmium, iridium, and platinum

thirty - four

The transition elements - III:

Group IB 651

Copper, silver, and gold

Copper

Silver

Gold

thirty - five

The zinc family: Group IIB 670

Zinc, cadmium, and mercury

Zinc

Cadmium

Mercury

thirty - six

Nuclear chemistry 684

The nucleus

Natural radioactivity

Artificial radioactivity

Applications of radioactivity

Appendix 707

Index 729