



# Chemistry

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## **Chemistry** Boundless

The Boundless Chemistry textbook is a college-level, introductory textbook that covers the exciting subject of Chemistry, a discipline foundational to many areas of scientific study. Boundless works with subject matter experts to select the best open educational resources available on the web, review the content for quality, and create introductory, college-level textbooks designed to meet the study needs of university students.

This textbook covers:

**Chemistry** -- Overview of Chemistry, Classification of Matter, Physical and Chemical Properties of Matter, Units of Measurement, Measurement Uncertainty, Dimensional Analysis

**Atoms, Molecules, and Ions** -- History of Atomic Structure, Discoveries Leading to Nuclear Atom Model, The Structure of the Atom, The Periodic Table, Types of Chemical Bonds, Chemical Formulas, Naming Compounds, Organic Compounds

**Mass Relationships and Chemical Equations** -- Atomic Mass, Molar Mass, Compound Composition, Experimental Data and Empirical Formulas, Reaction Stoichiometry

**Aqueous Reactions** -- Types of Aqueous Solutions, Precipitation Reactions, Acid-Base Reactions, Oxidation-Reduction Reactions, Solution Concentration

**Gases** -- Properties of Gases, Gas Laws, The Ideal Gas Law, Gas Stoichiometry, Partial Pressure, Kinetic Molecular Theory, Deviation of Gas from Ideal Behavior

**Thermochemistry** -- Energy, Thermodynamics, Enthalpy, Calorimetry, Standard Enthalpy of Formation and Reaction, Energy Use and the Environment

**Quantum Theory** -- The Nature of Light, Bohr's Theory, Quantum Mechanical Description of the Atomic Orbital, Orbital Shapes

**Periodic Properties** -- The History of the Periodic Table, Electron Configuration, Periodic Trends, Variation in Chemical Properties

**Basic Concepts of Chemical Bonding** -- Lewis Dot Symbols and Lewis Structures, The Ionic Bond, The Covalent Bond, Electronegativity, Formal Charge and Resonance, Exceptions to the Octet Rule, Bond Energy and Enthalpy

**Advanced Concepts of Chemical Bonding** -- VESPR Model, Molecular Geometry, Molecular Shape and Polarity, Valence Bond Theory, Molecular Orbital Theory

**Liquids and Solids** -- Kinetic Molecular Theory of Liquids and Solids, Intermolecular Forces, Liquid Properties, Solid Properties, Types of Crystals, Crystals and Band Theory, Amorphous Solids, Phase Changes, Phase Diagrams

**Solutions** -- Properties of Solutions, Concentration Units, Factors Affecting Solubility, Colligative Properties of Nonelectrolyte Solutions, Colligative Properties of Electrolyte Solutions, Colloids

**Chemical Kinetics** -- Reaction Rates, The Rate Law: Concentration and Time, Activation Energy and Temperature Dependence, Reaction Mechanisms, Catalysis

**Chemical Equilibrium** -- Equilibrium, Writing Equilibrium Constant Expressions, Calculating the Equilibrium Constant, Factors that Affect Chemical Equilibrium

**Acids and Bases** -- Acids and Bases, The pH Scale, Strength of Acids, Strength of Bases, Diprotic and Polyprotic Acids, Acid Strength and Molecular Structure, Acid-Base Properties of Salts, Acid-Base Properties of Oxides, Lewis Acids and Bases

**Acid-Base Equilibria** -- Homogeneous versus Heterogeneous Solution Equilibria, Buffer Solutions, Buffer Effectiveness, Acid-Base Titrations, Solubility Equilibria, Complex Ion Equilibria and Solubility, Qualitative Chemical Analysis

**Thermodynamics** -- The Laws of Thermodynamics, Entropy, Gibbs Free Energy, Free Energy and Chemical Equilibrium

**Electrochemistry** -- Oxidation-Reduction Equations, Electrochemical Cells, Standard Reduction Potentials, Cell Potentials, Batteries, Electrolysis, Corrosion

**Nuclear Chemistry** -- Radioactivity, Nuclear Reactions, Nuclear Transmutation, Nuclear Fission, Nuclear Fusion, Use of Isotopes, Effects of Radiation on Life

**Metals** -- Occurrence and Properties of Metals, Metallurgic Processes, Band Theory of Electrical Conductivity, Alloys, Metals, Some 3d Transition Metals

**Nonmetallic Elements** -- Properties of Nonmetals, Hydrogen, Silicates, Carbon, Nitrogen and Phosphorous, Boron, Oxygen, Sulfur, Halogens

**Transition Metals** -- Properties of Transition Metals, Chemistry of Selected Transition Metals, Coordination Compounds, Bonding in Coordination Compounds: Valence Bond Theory, Bonding in Coordination Compounds: Crystal Field Theory, Reactions and Applications of Coordination Compounds

**Organic Chemistry** -- Classes of Organic Compounds, Aliphatic Hydrocarbons, Alkenes and Alkynes, Aromatic Hydrocarbons, Functional Group Names, Properties, and Reactions

The following chapters are also included:

**Polymers**

**Chemistry and The Real World**

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