

Detailed Licensing

Overview

Title: [Map: Physical Chemistry for the Biosciences \(Chang\)](#)

Webpages: 160

Applicable Restrictions: Noncommercial

All licenses found:

- [CC BY-NC-SA 4.0](#): 94.4% (151 pages)
- [Undeclared](#): 4.4% (7 pages)
- [CC BY 4.0](#): 0.6% (1 page)
- [CC BY-SA 4.0](#): 0.6% (1 page)

By Page

- [Map: Physical Chemistry for the Biosciences \(Chang\) - CC BY-NC-SA 4.0](#)
 - [Front Matter - CC BY-NC-SA 4.0](#)
 - [TitlePage - Undeclared](#)
 - [InfoPage - Undeclared](#)
 - [Table of Contents - Undeclared](#)
 - [Licensing - Undeclared](#)
 - [1: Introduction to Physical Chemistry - CC BY-NC-SA 4.0](#)
 - [1.1: Nature of Physical Chemistry - CC BY-NC-SA 4.0](#)
 - [1.2: Units - CC BY-NC-SA 4.0](#)
 - [1.3: Atomic Mass, Molecular Mass, and the Chemical Mole - CC BY-NC-SA 4.0](#)
 - [2: Properties of Gases - CC BY-NC-SA 4.0](#)
 - [2.1: Some Definitions - CC BY-NC-SA 4.0](#)
 - [2.2: An Operational Definition of Temperature - CC BY-NC-SA 4.0](#)
 - [2.3: Ideal Gases - CC BY-NC-SA 4.0](#)
 - [2.4: Real Gases - CC BY-NC-SA 4.0](#)
 - [2.5: Condensation of Gases and the Critical State - CC BY-NC-SA 4.0](#)
 - [2.6: Kinetic Theory of Gases - CC BY-NC-SA 4.0](#)
 - [2.7: The Maxwell Distribution Laws - CC BY-NC-SA 4.0](#)
 - [2.8: Molecular Collisions and the Mean Free Path - CC BY-NC-SA 4.0](#)
 - [2.9: Graham's Laws of Diffusion and Effusion - CC BY-NC-SA 4.0](#)
 - [2.E: Properties of Gases \(Exercises\) - CC BY-NC-SA 4.0](#)
 - [3: The First Law of Thermodynamics - CC BY-NC-SA 4.0](#)
 - [3.1: Work and Heat - CC BY-NC-SA 4.0](#)
 - [3.2: The First Law of Thermodynamics - CC BY-NC-SA 4.0](#)
 - [3.3: Heat Capacities - CC BY-NC-SA 4.0](#)
 - [3.4: Gas Expansion - CC BY-NC-SA 4.0](#)
 - [3.5: Calorimetry - CC BY-NC-SA 4.0](#)
 - [3.6: Thermochemistry - CC BY-NC-SA 4.0](#)
 - [3.7: Bond Energies and Enthalpies - CC BY-NC-SA 4.0](#)
 - [3.E: Exercises - CC BY-NC-SA 4.0](#)
 - [4: The Second Law of Thermodynamics - CC BY-NC-SA 4.0](#)
 - [4.1: Spontaneous Processes - CC BY-NC-SA 4.0](#)
 - [4.2: Entropy - CC BY-NC-SA 4.0](#)
 - [4.3: The Second Law of Thermodynamics - CC BY-NC-SA 4.0](#)
 - [4.4: The Third Law of Thermodynamics - CC BY 4.0](#)
 - [4.5: Evaluating Entropy and Entropy Changes - CC BY-NC-SA 4.0](#)
 - [4.6: Gibbs Energy - CC BY-NC-SA 4.0](#)
 - [4.7: Standard Molar Gibbs Energy of Formation - CC BY-NC-SA 4.0](#)
 - [4.8: Dependence of Gibbs Energy on Temperature and Pressure - CC BY-NC-SA 4.0](#)
 - [4.9: Phase Equilibria - CC BY-NC-SA 4.0](#)
 - [4.10: Thermodynamics of Rubber Elasticity - CC BY-NC-SA 4.0](#)
 - [4.E: Exercises - CC BY-NC-SA 4.0](#)
 - [5: Solutions - CC BY-NC-SA 4.0](#)
 - [5.1: Concentration Units - CC BY-NC-SA 4.0](#)
 - [5.2: Partial Molar Quantities - CC BY-NC-SA 4.0](#)
 - [5.3: The Thermodynamics of Mixing - CC BY-NC-SA 4.0](#)
 - [5.4: Binary Mixtures of Volatile Liquids - CC BY-NC-SA 4.0](#)
 - [5.5: Real Solutions - CC BY-NC-SA 4.0](#)
 - [5.6: Colligative Properties - CC BY-NC-SA 4.0](#)

- 5.7: Electrolyte Solutions - *CC BY-NC-SA 4.0*
- 5.8: Ionic Activity - *CC BY-NC-SA 4.0*
- 5.9: Colligative Properties of Electrolyte Solutions - *CC BY-NC-SA 4.0*
- 5.10: Biological Membranes - *CC BY-NC-SA 4.0*
- 5.E: Solutions (Exercises) - *CC BY-NC-SA 4.0*
- 6: Chemical Equilibrium - *CC BY-NC-SA 4.0*
 - 6.1: Chemical Equilibrium in Gaseous Systems - *CC BY-NC-SA 4.0*
 - 6.2: Reactions in Solutions - *CC BY-NC-SA 4.0*
 - 6.3: Heterogeneous Equilibria - *CC BY-NC-SA 4.0*
 - 6.4: The Influence of Temperature, Pressure, and Catalysts on the Equilibrium Constant - *CC BY-NC-SA 4.0*
 - 6.5: Binding of Ligands and Metal Ions to Macromolecules - *CC BY-NC-SA 4.0*
 - 6.6: Bioenergetics - *CC BY-NC-SA 4.0*
 - 6.E: Chemical Equilibrium (Exercises) - *CC BY-NC-SA 4.0*
- 7: Electrochemistry - *CC BY-NC-SA 4.0*
 - 7.1: Electrochemical Cells - *CC BY-NC-SA 4.0*
 - 7.2: Single Electrode Potentials - *CC BY-NC-SA 4.0*
 - 7.3: Thermodynamics of Electrochemical Cells - *CC BY-NC-SA 4.0*
 - 7.4: Types of Electrochemical Cells - *CC BY-NC-SA 4.0*
 - 7.5: Applications of EMF Measurements - *CC BY-NC-SA 4.0*
 - 7.6: Biological Oxidation - *CC BY-NC-SA 4.0*
 - 7.7: Membrane Potential - *CC BY-NC-SA 4.0*
 - 7.E: Electrochemistry (Exercises) - *CC BY-NC-SA 4.0*
- 8: Acids and Bases - *CC BY-NC-SA 4.0*
 - 8.1: Definitions of Acids and Bases - *CC BY-NC-SA 4.0*
 - 8.2: Acid-Base Properties of Water - *CC BY-NC-SA 4.0*
 - 8.3: Dissociation of Acids and Bases - *CC BY-NC-SA 4.0*
 - 8.4: Diprotic and Polyprotic Acids - *CC BY-NC-SA 4.0*
 - 8.5: Buffer Solutions - *CC BY-NC-SA 4.0*
 - 8.6: Acid-Base Titrations - *CC BY-NC-SA 4.0*
 - 8.7: Amino Acids - *CC BY-NC-SA 4.0*
 - 8.8: Maintaining the pH of Blood - *CC BY-NC-SA 4.0*
- 9: Chemical Kinetics - *CC BY-NC-SA 4.0*
 - 9.1: Reaction Rates - *CC BY-NC-SA 4.0*
 - 9.2: Reaction Order - *CC BY-NC-SA 4.0*
 - 9.3: Molecularity of a Reaction - *CC BY-NC-SA 4.0*
 - 9.4: More Complex Reactions - *CC BY-NC-SA 4.0*
 - 9.5: The Effect of Temperature on Reaction Rates - *CC BY-NC-SA 4.0*
 - 9.6: Potential Energy Surfaces - *CC BY-NC-SA 4.0*
 - 9.7: Theories of Reaction Rates - *CC BY-NC-SA 4.0*
 - 9.8: Isotope Effects in Chemical Reactions - *CC BY-NC-SA 4.0*
 - 9.9: Reactions in Solution - *CC BY-NC-SA 4.0*
 - 9.10: Fast Reactions in Solution - *CC BY-NC-SA 4.0*
 - 9.11: Oscillating Reactions - *CC BY-NC-SA 4.0*
 - 9.E: Chemical Kinetics (Exercises) - *CC BY-NC-SA 4.0*
- 10: Enzyme Kinetics - *CC BY-NC-SA 4.0*
 - 10.1: General Principles of Catalysis - *CC BY-NC-SA 4.0*
 - 10.2: The Equations of Enzyme Kinetics - *CC BY-NC-SA 4.0*
 - 10.3: Chymotrypsin- A Case Study - *CC BY-NC-SA 4.0*
 - 10.4: Multisubstrate Systems - *CC BY-NC-SA 4.0*
 - 10.5: Enzyme Inhibition - *CC BY-NC-SA 4.0*
 - 10.6: Allosteric Interactions - *CC BY-NC-SA 4.0*
 - 10.7: The Effect of pH on Enzyme Kinetics - *CC BY-NC-SA 4.0*
 - 10.8: The Effect of Temperature on Enzyme Kinetics - *CC BY-NC-SA 4.0*
 - 10.E: Exercises - *CC BY-NC-SA 4.0*
- 11: Quantum Mechanics and Atomic Structure - *CC BY-NC-SA 4.0*
 - 11.1: The Wave Theory of Light - *CC BY-NC-SA 4.0*
 - 11.2: Planck's Quantum Theory - *CC BY-NC-SA 4.0*
 - 11.3: The Photoelectric Effect - *CC BY-NC-SA 4.0*
 - 11.4: Bohr's Theory of the Hydrogen Emission Spectrum - *CC BY-NC-SA 4.0*
 - 11.5: de Broglie's Postulate - *CC BY-NC-SA 4.0*
 - 11.6: The Heisenberg Uncertainty Principle - *CC BY-NC-SA 4.0*
 - 11.7: The Schrödinger Wave Equation - *CC BY-NC-SA 4.0*
 - 11.8: Particle in a One-Dimensional Box - *CC BY-NC-SA 4.0*
 - 11.9: Quantum-Mechanical Tunneling - *CC BY-NC-SA 4.0*
 - 11.10: The Schrödinger Wave Equation for the Hydrogen Atom - *CC BY-NC-SA 4.0*
 - 11.11: Many-Electron Atoms and the Periodic Table - *CC BY-NC-SA 4.0*
 - 11.E: Quantum Mechanics and Atomic Structure (Exercises) - *CC BY-NC-SA 4.0*
- 12: The Chemical Bond - *CC BY-NC-SA 4.0*
 - 12.1: Lewis Structures - *CC BY-NC-SA 4.0*
 - 12.2: Valence Bond Theory - *CC BY-NC-SA 4.0*
 - 12.3: Hybridization of Atomic Orbitals - *CC BY-NC-SA 4.0*

- 12.4: Electronegativity and Dipole Moment - *CC BY-NC-SA 4.0*
- 12.5: Molecular Orbital Theory - *CC BY-NC-SA 4.0*
- 12.6: Diatomic Molecules - *CC BY-NC-SA 4.0*
- 12.7: Resonance and Electron Delocalization - *CC BY-NC-SA 4.0*
- 12.8: Coordination Compounds - *CC BY-NC-SA 4.0*
- 12.9: Coordination Compounds in Biological Systems - *CC BY-NC-SA 4.0*
- 12.E: The Chemical Bond (Exercises) - *CC BY-NC-SA 4.0*
- 13: Intermolecular Forces - *CC BY-NC-SA 4.0*
 - 13.1: Intermolecular Interactions - *CC BY-NC-SA 4.0*
 - 13.2: The Ionic Bond - *CC BY-NC-SA 4.0*
 - 13.3: Types of Intermolecular Forces - *CC BY-NC-SA 4.0*
 - 13.4: Hydrogen Bonding - *CC BY-NC-SA 4.0*
 - 13.5: The Structure and Properties of Water - *CC BY-NC-SA 4.0*
 - 13.6: Hydrophobic Interaction - *CC BY-NC-SA 4.0*
 - 13.E: Intermolecular Forces (Exercises) - *CC BY-NC-SA 4.0*
- 14: Spectroscopy - *CC BY-NC-SA 4.0*
 - 14.1: Vocabulary - *CC BY-NC-SA 4.0*
 - 14.2: Microwave Spectroscopy - *CC BY-NC-SA 4.0*
 - 14.3: Infrared Spectroscopy - *CC BY-NC-SA 4.0*
 - 14.4: Electronic Spectroscopy - *CC BY-NC-SA 4.0*
 - 14.5: Nuclear Magnetic Resonance - *CC BY-NC-SA 4.0*
 - 14.6: Electron Spin Resonance - *CC BY-NC-SA 4.0*
 - 14.7: Fluorescence and Phosphorescence - *CC BY-NC-SA 4.0*
 - 14.8: Lasers - *CC BY-NC-SA 4.0*
 - 14.9: Optical Rotatory Dispersion and Circular Dichroism - *CC BY-NC-SA 4.0*
 - 14.E: Spectroscopy (Exercises) - *CC BY-NC-SA 4.0*
- 15: Photochemistry and Photobiology - *CC BY-NC-SA 4.0*
 - 15.1: Introduction to Photochemistry - *CC BY-NC-SA 4.0*
 - 15.2: Photosynthesis - *CC BY-NC-SA 4.0*
 - 15.3: Vision - *CC BY-NC-SA 4.0*
 - 15.4: Biological Effects of Radiation - *CC BY-NC-SA 4.0*
- 16: Macromolecules - *CC BY-NC-SA 4.0*
 - 16.1: Size, Shape, and Molar Mass of Macromolecules - *CC BY-NC-SA 4.0*
 - 16.2: Structure of Synthetic Polymers - *CC BY-NC-SA 4.0*
 - 16.3: Structure of Proteins and DNA - *CC BY-NC-SA 4.0*
 - 16.4: Protein Stability - *CC BY-NC-SA 4.0*
- Back Matter - *CC BY-NC-SA 4.0*
 - Index - *Undeclared*
 - Glossary - *Undeclared*
 - Detailed Licensing - *Undeclared*