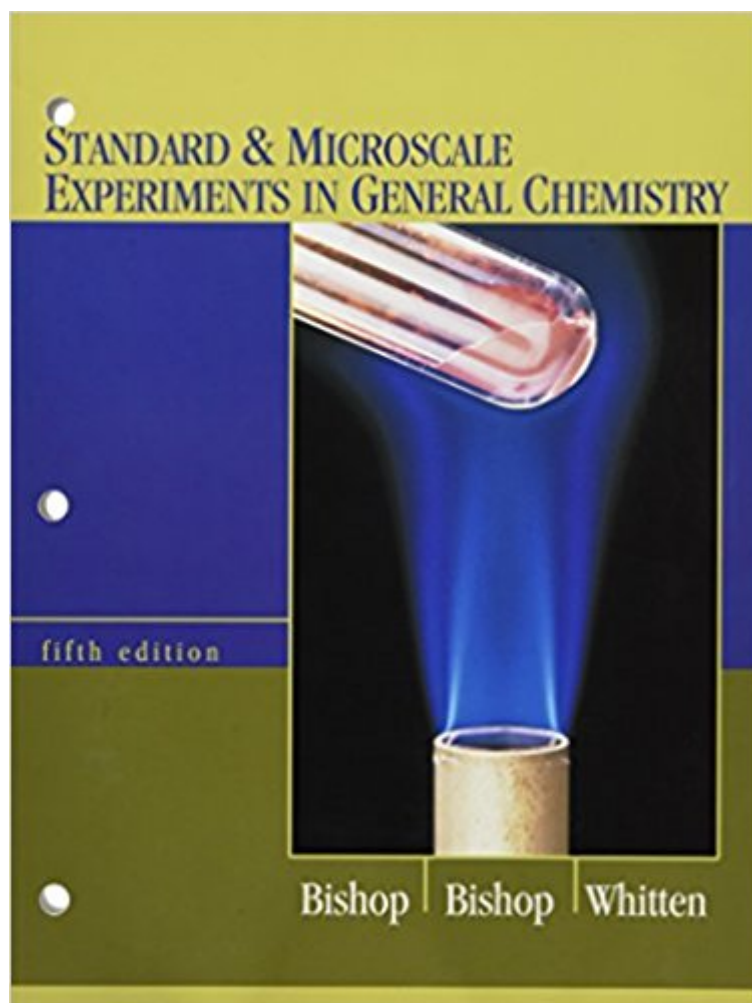


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# Standard And Microscale Experiments In General Chemistry



## Synopsis

This comprehensive lab manual contains a wide array of experiments without sacrificing organizational clarity and includes categories on Energy, Kinetics, and Equilibrium. All experiments have undergone significant testing before being finalized, and many microscale experiments have been added to allow for more efficient and cost-effective means of conducting experiments.

## Book Information

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Part 3: EXPERIMENTS (\* MICRO EXPERIMENTS). 1.\* Background: Review of Simple Mathematics (Experiment 1\*). Experiment 2. Density of Solids and Liquids: Mass/Volume Measurements. Experiment 3. Indirect Gravimetric Determination of a Hydrated Compound in a Mixture. Experiment 4. Percent Copper and Formula Weight of a Copper Compound 65. 2. Background: Solutions, Solubility and Separation Techniques. Experiment 5.\* Solubilities. Experiment 6. Separation of the Components of a Mixture. Experiment 7. Chromatography. 3. Background: Chemical Reactions in Aqueous Solutions and Syntheses. Experiment 8.\* Hydrogen Ions, pH, and Indicators. Experiment 9.\* Identify Eight Metal Ions by Reactions with Anions. Experiment 10.\* Identify Ten Inorganic Compounds by Their Inter-Chemical Reactions. Experiment 11.\* The Formula of a Precipitated Compound. Experiment 12. A Sequence of Chemical Reactions. Experiment 13. Synthesis of a Compound (Alum) from Scrap Aluminum. 4. Background: Periodic Table and Periodicity. Experiment 14. Molecular Models: Lewis Dot Formulas, VSEPR Theory, and Valence Bond Theory. Experiment 15.\* Chemical Periodicity of the Halide Ions. Experiment 16.\* Relative Reactivity of Metals and the Activity Series. 5. Background: Mole, Molecular Weight and Gas Laws. Experiment 17. Indirect Determination of the Masses of Pieces of Magnesium. Experiment 18. Density of Gases. Experiment 19. The Molecular Weight of a Volatile Compound. Experiment 20. Standard Molar Volume of a Gas. 6. Colligative Properties. Experiment 21. The Molecular Weight of a Compound by Freezing Point Depression Measurement. 7. Backgrounds: Acids-Bases. Experiment 22.\* Acid Base Titration Curves Using: I. An Indicator Color-Reference II. Micro-pH Meter (micro-scale). Experiment 23. Acid Base Titrations: Analysis of Acid Solutions of Unknown Concentrations (macro-scale). Experiment 24. Action of Antacid Tablets. 8. Background: Reduction-Oxidation Reactions. Experiment 25.\* Voltaic and Electrolytic Cells. Experiment 26.\* Reduction-Oxidation Titrations (both micro and macro). 9. Background: Energy. Experiment 27. Heat Energy Associated with Chemical and Physical Changes. Experiment 28. Heats of Neutralization and Hess' Law. 10. Background: Kinetics. Experiment 29.\* Factors that Influence the Rates of Reaction. Experiment 30.\* Rates of Chemical Reactions. 11. Background: Equilibrium. Experiment 31.\* Chemical Equilibrium--An Introduction. Experiment 32. Spectrophotometric Determination of an Equilibrium Constant. Experiment 33. The Spectrophotometric Determination of the Formula for a Complex Species. Experiment 34.\* Solubility Products of Insoluble Salts. Experiment 35. Determination of  $K_a$  from Measurements of pH. 12. Background: Descriptive Chemistry. Experiment 36. Oxygen and Some Oxides. Experiment 37. Nitrogen and Its Compounds. Experiment 38.\* The Anions of Sulfur. 13. Background: Introduction to Organic Chemistry. Experiment 39.\* Organic Qualitative Analysis. Experiment 40. Commercial Esters--Aspirin and Oil of

Wintergreen. Experiment 41. Polymers. Experiment 42. Preparation and Properties of Soaps: Properties of Detergents. Appendix A: Logarithms and pH. Appendix B: Formulas, Ionic Charges and Names for Some Common Ions. Appendix C: Classification of Acids. Appendix D: Classification of Bases. Appendix E: Solubility Rules for Common Inorganic Compounds. Appendix F: Vapor Pressure of Water Near Room Temperature. Appendix G: Molecular and Ionic Chemical Equations. Appendix H: Concentrations and Primary Standards. Appendix I: Units of Measurement.

Kenneth Whitten is professor emeritus at the University of Georgia (UGA). Dr. Whitten received his A.B. at Berry College, M.S. at the University of Mississippi, and Ph.D. at the University of Illinois. He taught at Tulane, the University of Southwestern Louisiana, the Mississippi State College of Women, and the University of Alabama before joining the UGA faculty as assistant professor and coordinator of general chemistry in 1967. He remained coordinator of general chemistry throughout his UGA career until his retirement in 1998. His numerous awards include the G.E. Philbrook Chemistry Teacher of the Year Award, the Outstanding Honors Professor, the Franklin College Outstanding Teacher of the Year, the General Sandy Beaver Teaching Award, and a Senior Teaching Fellowship. An award was established in Dr. Whitten's honor in 1998 celebrating outstanding teaching assistants in UGA's department of chemistry.

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