

CH-118 Principles of Inorganic Chemistry

Credit Hours 2-1

Pre-requisite Nil

Course Objectives

Students will acquire knowledge about the key introductory concepts of periodic law and periodicity, acid-base chemistry, and properties of p-block elements as well as using this knowledge for qualitative and quantitative analysis of inorganic compounds during laboratory work.

Detailed Contents

The Periodic Law and Periodicity: Development of Periodic Table; Classification of elements based on s, p, d and f orbitals, group trends and periodic properties in s, p, d and f block elements, i.e., atomic radii, ionic radii, ionization potential, electron affinities, electronegativities and redox potential.

Acids and Bases: Concepts of acids and bases including SHAB concept, relative strength of acids and bases, significance of pH, pKa, pKb and buffer solutions. Theory of indicators, solubility, solubility product, common ion effect and their industrial applications.

Chemistry of p-block Elements: Introduction to chemistry and structure of p-block elements, interhalogens and pseudohalogens.

Course Outcomes

At the end of the course, students will be able to understand the concept of periodic law and periodicity, principles of chemical bonding, acid-base chemistry, p-block elements, and deal with qualitative and quantitative analysis of inorganic compounds during laboratory work.

Relevant Experiments:

Laboratory Ethics and Safety Measures: Awareness about the toxic nature of chemicals and their handling, cleaning of glassware, safe laboratory operations.

Qualitative Analysis: Analysis of four ions (two anions and two cations) from mixture of salts.

Quantitative Analysis: Volumetric Analysis: Practical exercises will be based on Redox, Iodometric and Iodimetric, Precipitation and Complexometric Reactions.

Gravimetric Analysis: Estimation of Ni^{2+} , Ba^{2+} . Determine percent of P and P_2O_5 in a sample of ammonium phosphomolybdate.

Recommended Book

Cotton, F. A., Wilkinson, G. and Gaus, P. L., "Basic Inorganic Chemistry", 3rd Ed., Wiley, New York, 1995.

Huheey, J. E., Keiter, E. A. and Keiter, R. L., "Inorganic Chemistry: Principles of Structure and Reactivity", 4th Ed., Harper and Row, New York, 2001.

Vogel, A. I., "A Textbook of Micro and Semi-micro Qualitative Inorganic Analysis" Longman Green & Co., 1995.

Clyde Day, M. & Selbin, J., "Theoretical Inorganic Chemistry", 2ndEd., Van Nustrand Reinhold, 1969.

Lee, J.D., "Concise Inorganic Chemistry", Chapman and Hall, 5thEd., 1996.

Shriver, D. F., Atkins, P. W. and Langford, C. H., "Inorganic Chemistry", Oxford University Press, 2ndEd., 1994.

Bassette, J., Denney, G. H. and Mendham, J., "Vogel's Textbook of Quantitative Inorganic Analysis Including Elementary Instrumental Analysis" English Language Book Society, 4thEd., 1981.