

Course Title: Inorganic Chemistry-II

Course Code: CH-351

Credit Hours: 3-1

Pre-requisite: Nil

Course Objectives:

1. Students will acquire knowledge about the physical and chemical properties of f-block elements on the basis of their electronic configurations and magnetochemistry. Electron transfer reactions and balancing of chemical equations.

2. Text Books

a. F.A. Cotton, et al., Advanced Inorganic Chemistry, 6th ed., John Wiley, New York (1999).

b. J.E. Huheey, Inorganic Chemistry: Principles of Structure and Reactivity, 4th ed., Addison-Wesley, Reading (1993).

Recommended Books

3. M.C. Day Jr. and JodSelbin, Theoretical Inorganic Chemistry, 2nd ed., Reinhold Publishing Corporation, New York (1969).

4. A.J. Emeleus and A.G. Sharp, Modern Aspects of Inorganic Chemistry, Read K. Paul, London (1983).

5. T. Moeller, The Chemistry of the Lanthanides, Chapman and Hall Ltd. London (1965).

6. T. Moeller, The Chemistry of the Lanthanides: Pergamon Texts in Inorganic Chemistry, Elsevier Science (2013).

7. J.D. Lee, Concise Inorganic Chemistry, Chapman and Hall London (1996).

Detailed Contents

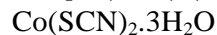
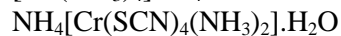
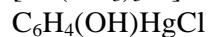
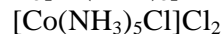
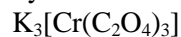
8. Chemistry of f-block elements (lanthanides, actinides): spectral and magnetic properties, oxidation states, electronic structure, lanthanide contraction, occurrence and extraction, major uses of lanthanides and actinides. Magnetochemistry: theory of magnetism, diamagnetism, paramagnetism, ferro-, ferri- and antiferromagnetism, magnetic susceptibility, measurement and instrumentation, magnetic moments. Spin cross over complexes: principle, types and applications. Effect of temperature on: magnetic properties of complexes, redox reactions, mechanisms of electron transfer reactions (outer sphere and inner sphere mechanisms). Balancing of chemical equations.

Course Outcomes

9. At the end of the course, students will be able to understand the chemistry of f-block elements, magnetochemistry, spin cross over complexes, mechanisms of electron transfer reactions and balancing of chemical equations.

Detail of Lab Work, workshop practice

10. Synthesis of selected coordination compounds such as:



11. Spectrophotometric determination of divalent metal ions in complexes using titration method. Spectrophotometric determination of trivalent metal ions in complexes using titration method. Separation of Fe^{2+}/Fe^{3+} and Zn^{2+} in a given sample by precipitation method.

Determination of Fe^{2+} by chloride extraction method. Kinetic studies of inorganic chemical reactions such as iodine reaction with persulphate ion.

12. Recommended Books

- a. A.I. Vogel, A Textbook of Quantitative Inorganic Analysis: Theory and Practice, Green and Co. Ltd., London (2000).
- b. W.J. Jolly, The Synthesis and Characterization of Inorganic Compounds, Prentice Hall, Englewood Cliffs, New York (1970).
- c. J. Mendham, R.C. Denney, J.D. Barnes, and M. Thomas, ' Vogel s Textbook of Quantitative Chemical Analysis, 6th ed., Pearson Education Ltd. (2000).