

Course Title: Inorganic Chemistry-I

Course Code: CH-250

Credit Hours: 3-1

Pre-requisite: Nil

Course Objectives

1. Students will acquire knowledge about the basic coordination chemistry, theory and applications of coordination compounds, solvents classification and detailed study of reaction types in various solvents.

2. Text Books

- a. F.A. Cotton, et al., Advanced Inorganic Chemistry, 6<sup>th</sup> ed., John Wiley, New York(1999).
- b. J.E. Huheey, E.A. Keitlu and R.L. Keitlu, Inorganic Chemistry: Principles of Structure and Reactivity, 4<sup>th</sup> ed., Addison-Wesley, Reading (1997).

3. Recommended Books

- a. G. Miessler and D.A. Torr, Inorganic Chemistry, 5<sup>th</sup> ed., Pearson-Printice Hall, USA (2013).
- b. A.J. Emeleus and A.G. Sharp, Modern Aspects of Inorganic Chemistry, Read K. Paul, London, 3<sup>rd</sup> ed., Addison-WessleyLongmann, Inc., UK (1999).
- c. T. Moeller, The Chemistry of the Lanthanides, Chapman and Hall Ltd. London(1965).
- d. J.D. Lee, Concise Inorganic Chemistry, Chapman and Hall London, 5<sup>th</sup> ed., Wiley-Blackwell, UK (2008).

Detailed Contents

4. Basic coordination chemistry: nomenclature, geometry of complexes, theories of coordination compounds (Werner Theory, V.B.T., C.F.T.), isomerism and stereochemistry, complex stability and factors affecting the stability, applications of coordination compounds. Classification of solvents: types of reactions in solvents, factors affecting physical and chemical properties of solvents, detailed study of liquid NH<sub>3</sub>, liquid SO<sub>2</sub> and BF<sub>3</sub>. Structure and energetics of inorganic molecules. Theory of metals and intermetallic compounds.

Course Outcomes

5. At the end of the course, students will be able to understand basic coordination chemistry, theories of coordination compounds, reaction in various non-aqueous solvents and intermetallic compounds.

Detail of Lab Work

6. Separation and estimation of pair of metal ions by paper chromatography, such as:

- a. Cu<sup>2+</sup>/Ni<sup>2+</sup>
- b. Al<sup>3+</sup>/Fe<sup>3+</sup>
- c. Ca<sup>2+</sup>/Ba<sup>2+</sup>
- d. Zn<sup>2+</sup>/Pb<sup>2+</sup>

- (1) Separation of halide ions by paper ch
- (2) Estimation of Ag<sup>+1</sup> and Cu<sup>2+</sup> in give

- using titration/precipitation method.
- (3) Estimation of  $\text{Cu}^{2+}$  and  $\text{Ni}^{2+}$  in given mixture using titration/precipitation method.
  - (4) Estimation of  $\text{Cu}^{2+}$  and  $\text{Pb}^{2+}$  in given sample gravimetrically.
  - (5) Estimation of  $\text{Ba}^{2+}$  and  $\text{Ca}^{2+}$  in given sample gravimetrically.

Recommended Books

7. A.I. Vogel, A Textbook of Quantitative Inorganic Analysis: Theory and Practice, Greenand Co. Ltd., London (2000).
8. J. Mendham, R.C. Denney, J.D. Barnes, and M. Thomas, 'Vogel s Textbook of Quantitative chemical Analysis, 6<sup>th</sup> ed., Pearson Education Ltd. (2000).