

Course Title: Coordination Chemistry

Semester: VIII

Course Code: CH-455

Credit Hours: 3-0

Pre-requisite: Nil

Course Objectives

1. Students will acquire knowledge about preparation and reactions of coordination compounds, Kinetics and mechanisms, substitution reactions, chelating effect, intermetallic compounds.

Text Books

2. F. Basolo and R.C. Johnson, *Coordination Chemistry*, NBF Pakistan (1988).

Recommended Books

3. G.L. Miessler and D.A. Tarr, *Inorganic Chemistry*, 5th ed., Pearson Education International (2013).

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

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

6. P.L. Soni and V. Soni, *Coordination Chemistry: Metal Complexes*, CRC Press, Taylor & Francis (2013).

Detailed Contents

7. Overview: Historical developments, preparation and reactions of coordination compounds in aqueous and non-aqueous solvents, thermal dissociation of solid complexes. Complex stability: factors, thermodynamics and stability constant. Kinetics and mechanisms: basic kinetic parameters, inert and labile complexes of coordination compounds. Mechanisms of substitution reactions: Dissociation, association and interchange reaction pathways. Octahedral substitution reactions: Dissociation, associative, the conjugate base mechanisms. Kinetic chelating effect. Square planar substitution reaction: Stereochemistry, trans effect. Oxidation-reduction reactions: Inner and outer sphere reaction mechanisms. Organometallics and their role in catalysis, comparative studies of coordination compounds belonging to main group and transition elements with reference to synthesis and stability. Intermetallic compounds.

Course Outcomes

9. At the end of the course, students will be able to understand the chemistry of coordination compounds, stability of complexes, substitution reactions and redox reactions.