

Elective Paper I (Group A)
Organotransition Metal Chemistry

60 Hrs.

I Compounds of Transition Metal-Carbon Multiple bonds:

12 Hrs.

Alkylidenes, alkylidynes, low valent carbenes and carbinos – synthesis, nature of bonds, structural characteristics, nucleophilic and electrophilic reactions on the ligands.

II Transition Metal π -Complexes

18 Hrs.

Transition metal π -Complexes with unsaturated organic molecules: alkenes, alkynes, allyl, dienes, dienyl and arene complexes – preparations, properties, nature of bonding and structural features. Important reactions related to nucleophilic and electrophilic attack on ligands.

III Transition Metal Compounds with Bonds to Hydrogen:

3 Hrs.

Covalent hydrides : synthesis and important reactions.

IV Transition Metal Compounds with Bonds to Carbon in Catalysis:

14 Hrs.

- a. General idea of important catalytic steps: ligand coordination and dissociation, insertion and elimination, nucleophilic attack on coordinated ligands, oxidative addition and reductive elimination reactions.
- b. Hydrogenation of alkenes using Wilkinson's catalyst, Hydroformylation of alkenes using Co and Rh catalysts, Carbonylation of methanol to acetic acid (Monsanto process), Oxidation of alkenes (Wacker process)

V Fluxional Organometallic Compounds:

8 Hrs.

Fluxionality and dynamic equilibria in compounds such as η^2 -olefine, η^3 -allyl and dienyl complexes.

VI Organometallic Compounds of Lanthanides and Actinides:

5 Hrs.

Methods of preparation, properties and structural features.

Books Suggested:

1. Principles and Application of Organotransition Metal Chemistry: J.P.Collman, L.S.Hegsdus, J.R.Norton and R.G.Finke, University Science Book.
2. Principles of Organometallic Compounds, Edn-II: P.P.Power.
3. Organometallic Chemistry: R.C.Mehrotra and A.Singh, New Age International.