

CH 704: Organometallic Strategies in Organic Syntheses (3-0-0: 3)

Basics of organometallic chemistry

Introduction to organometallic chemistry. Structure and bonding of organometallic complexes containing metal-alkyl, metal-carbene, metal-carbyne, metal-alkene, metal-alkyne and metal-allyl moieties.

Fundamental reactions of organometallic chemistry

Fundamental aspects of ligand substitutions, oxidative addition/reductive elimination, intramolecular insertions/eliminations, nucleophilic/ electrophilic addition on coordinated ligands.

Metal carbene complexes and their applications

Brief introduction to Fischer and Schrock carbene complexes, metathesis (concepts and catalysts, RCM, ROM, CM, ene-yne metathesis and their applications).

Miscellaneous reactions

Carbon-carbon and carbon-heteroatom bond formation using various organometallic reagents (monometallic and bimetallic). C-H and C-F bond activation, carbonylation, click chemistry, hydrosilylation, etc. Application of lanthanides in organic reactions.

References

1. J. Tsuji, "Transition metal reagents and catalysts- Innovation in organic synthesis", John Wiley & Sons Ltd.
2. M. Beller and C. Bolm, "Transition metals for organic synthesis- Building blocks and fine chemicals"(Vol. 1 and 2), Wiley-VCH.
3. F. A. Cotton and G. Wilkinson, "Advanced Inorganic Chemistry", Wiley-Eastern Company.
4. R. H. Crabtree, "The organometallic chemistry of the transition metals", John Wiley & Sons Ltd.
5. L. S. Hege, "Transition metals in the synthesis of complex organic molecule", University Science Books.
6. R. H. Grubbs, "Handbook of Metathesis", (Vol. 1, 2 &3), Wiley-VCH.
7. J. H. Hartwig, "Organotransition Metal Chemistry: From Bonding to Catalysis", University Science Books.