Course Program

1. Introduction

Definition and Scope History Fundamentals

2. Metal alkyls, aryls and related sigma-bonded ligands

Introduction Synthesis M-C bond properties Reactivity of metal alkyls

3. Metal-carbon multiple bonding. Carbene and carbyne complexes

- Introduction Metal carbenes Synthesis Bonding and structure Properties Reactivity Metal carbynes
 - Synthesis Bonding and structure Reactivity

4. Complexes of pi-bound ligands. Alkene and alkyne complexes

Alkene complexes

Introduction Synthesis Structure and bonding Reactivity Alkyne complexes Synthesis Structure and bonding Reactivity

5. Complexes of pi-bound ligands. Allyl and enyl complexes

Introduction Allyl complexes Synthesis Structure and bonding Reactivity Dienyl and trienyl complexes Synthesis Structure and bonding Reactivity

6. Complexes of pi-bound ligands. Cyclopentadienyl complexes

- Introduction
- Cyclopentadienyl complexes
- Sandwich complexes
 - Synthesis of metallocenes
 - Structure and bonding
- Reactivity
- Bent metallocenes
 - Cyclopentadienyl metal halides
 - Cyclopentadienyl metal hidrides
- Monocyclopentadienyl (half sandwich) complexes
 - Cyclopentadienyl metal carbonyls

7. Complexes of pi-bound ligands. Arene complexes

- Introduction
- Bis(arene) metal complexes
 - Synthesis
 - Electronic structure and bonding
 - Reactivity
- Arene metal carbonyls Synthesis Structural features Reactivity

8. Homogeneous catalysis

Introduction Definitions History Concepts Fundamental reactions Catalytic processes Hydrogenation of alkenes Hydroformlylation. Oxo process Acetic acid. Monsanto process Wacker-Smidt process