CH-223

Organometallic chemistry

Dyson Paul Joseph

Cursus	Sem.	Type
Chemistry and chemical engineering	BA4	Obl.

Language of teaching	English
Credits	2
Session	Summer
Semester	Spring
Exam	Written
Workload	60h
Weeks	14
Hours	**2 weekly**
Lecture	2 weekly
Number of positions	

Summary

Basic organometallic chemistry will be covered in this course. 1. Structure and bonding in organometallic compounds. 2. reactivity of organometallic compounds, stoichiometric reactions, catalyzed reactions and reaction mechanisms.

Content

Organometallic compounds will be defined and their applications and uses surveyed.

Ligands will be classified and electron counting and oxidation states of their subsequent complexes will be described.

Structure and bonding in various organometallic ligands, e.g. carbonyls, alkyls, alkenes, alkynes, cyclobutadiene, cyclopentadienyl, arenes, carbenes and carbynes, will be described. With an understanding of how coordinating an organic molecule to a metal centre modifies the structural and spectroscopic properties of the organic molecule, we will see how the reactivity is also modified so that new chemistry can be done.

The synthesis of organometallic compounds will be described and key reaction types and reagents identified.

Transition metal hydrides, agostic hydrogen atoms and their relevance to reactivity will be explored.

The reactions of organometallic compounds, e.g. association, dissociation, oxidative addition, reductive elimination, alkene insertion and *beta*-elimination, will be described and combined, the prediction of organometallic reactions, with an emphasis on examples in organic synthesis will be given.

Learning Outcomes

By the end of the course, the student must be able to:

- Define an organometalic compound
- Categorize ligands and bonding in organometallic compounds
- Categorize the different reactions of organometallic compounds
- Construct catalytic pathways
- Predict reaction pathways
- Predict rational improvement to catalytic processes

Teaching methods

lecture course

Assessment methods

written exam

Supervision

Office hours	Yes

Resources

Ressources en bibliothèque

- Chimie Organométallique / Astruc
- Chimie Organique / Vogel

Websites

- http://scgc.epfl.ch/telechargement_cours_chimie