

CH-422

**Catalyst design for synthesis**

Hu Xile

Cursus	Sem.	Type
Chimiste	MA1, MA3	Opt.

Language of teaching	English
Credits	2
Session	Winter
Semester	Fall
Exam	During the semester
Workload	60h
Weeks	14
<b>Hours</b>	<b>2 weekly</b>
Lecture	2 weekly
<b>Number of positions</b>	

**Summary**

This course on homogeneous catalysis provide a detailed understanding of how these catalysts work at a mechanistic level and give examples of catalyst design for important reactions (hydrogenation, olefin metathesis, cross-coupling).

**Content**

- Organometallic chemistry: revision of basic ideas including structure and bonding and the implications this has on reactivity of an organic ligand coordinated to a metal centre.
- A description of the reactions involved in homogeneous catalysis, with an emphasis on the essential features required to predict which type of reactions can take place.
- Hydrogenation
- Olefin metathesis
- Cross-coupling

**Keywords**

homogeneous catalysis, reaction mechanism, catalyst design, synthesis

**Learning Prerequisites****Required courses**

inorganic chemistry  
organic chemistry  
organometallic chemistry

**Recommended courses**

homogeneous catalysis

**Learning Outcomes**

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

- Classify catalysts and different catalysed reactions
- Explore the molecular mechanisms of catalytic processes
- Assess / Evaluate the ways that catalysts can be improved

- Design superior catalysts (in theory)

### Teaching methods

Lecture course

### Assessment methods

Written exams; one mid term and one final exam during the semester

### Resources

#### Ressources en bibliothèque

- [Encyclopedia of catalysis / Horváth](#)

#### Notes/Handbook

*Notes in Moodle*

#### Moodle Link

- <https://go.epfl.ch/CH-422>