

ChE-431

Modern methods in polymer chemistry and sustainability

Nguyen Suong

Cursus	Sem.	Type
Ing.-chim.	MA2, MA4	Opt.

Language of teaching	English
Credits	3
Session	Summer
Semester	Spring
Exam	During the semester
Workload	90h
Weeks	14
Hours	3 weekly
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

This course provides an overview of modern developments in polymer chemistry, building on fundamental concepts introduced in MSE-437. Emphasis is placed on recycling and upcycling strategies for the polymer classes discussed.

Content

- Polymer structures, molecular weights, and properties
- Step-growth and chain-growth polymerization
- Industrially relevant cross-link materials
- Ionic and radical ring opening polymerization
- Ring opening metathesis polymerization
- Light-controlled polymerization
- Polymer stereochemistry
- Polymer sustainability

Learning Prerequisites**Required courses**

MSE-437: Polymer chemistry and macromolecular engineering

Recommended courses

Organic chemistry, Inorganic chemistry, Organometallics

Learning Outcomes

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

- Discuss the mechanism and characteristics of different types of polymerization techniques
- Design molecular strategies to tailor macroscopic properties of polymers
- Propose appropriate methods for the synthesis and recycling/upcycling of polymers of interest

Assessment methods

Problem sets (60%), Final project (40%)

Resources

Notes/Handbook

Useful resources (not required):

Odian, G. Principles of Polymerization. Wiley 4th edition. 2004.

Timothy P. Lodge, Paul C. Hiemenz. Polymer Chemistry. 3rd edition.

Moodle Link

- <https://go.epfl.ch/ChE-431>