MSE-431

Physical chemistry of polymeric materials

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Cursus	Sem.	Type
Chimiste	MA2, MA4	Opt.
Ing.-chim.	MA2, MA4	Opt.
Materials Science and Engineering	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

The student has a basic understanding of the physical and physicochemical principles which result from the chainlike structure of synthetic macromolecules. The student can predict major characteristics of a polymer from its chemical structure and molecular architecture.

Content

- Introduction
- Dilute solutions
- Concentrated solutions and phase behavior
- The amorphous state
- The crystalline state
- The glass-rubber transition
- Rubber elasticity
- Viscoelastic properties

Keywords

dilution solutions
concentrated solutions
glass transition
rubber elasticity
viscoelastic behaviour

Learning Prerequisites

Recommended courses

General chemistry, Inorganic chemistry, organic and polymer chemistry

Learning Outcomes

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

- Predict polymer characteristics based on chemical structure and molecular architecture
- Discuss dilute and concetrated solution and bulk behaviour of synthetic polymers

- Use insights from physicochemical experiments to discuss the composition and architecture of polymers
- Discuss dilute and concentrated solutions and bulk behaviour of synthetic polymers

Transversal skills

- Use a work methodology appropriate to the task.
- Assess one's own level of skill acquisition, and plan their on-going learning goals.
- Continue to work through difficulties or initial failure to find optimal solutions.

Teaching methods

Lectures and exercises

Assessment methods

written

Resources

Ressources en bibliothèque

- Introduction to Physical Polymer Science / Sperling
- Polymer Chemistry / Hiemenz