

ChE-604

Colloidal synthesis of nanoparticles and their energy applications

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Cursus	Sem.	Type
Chemistry and Chemical Engineering		Obl.

Language of teaching	English
Credits	2
Session	
Exam	Oral
Workload	60h
Hours	28
Courses	24
Project	4
Number of positions	20

Frequency

Every 2 years

Remark

Next time: December 2019

Summary

This course aims at giving an overview on the synthesis of nanoparticles, with more focus on colloidal chemistry, and their implementation into devices for energy applications (batteries, solar cells, artificial photosynthesis, light emitting diodes, electrochromic windows).

Content

General properties of nanoparticles and characterization tools
 Introduction to different synthetic approaches to nanoparticles
 Colloidal synthesis
 Classical Nucleation Theory for homogeneous and heterogeneous nucleation
 Control on size, shape and composition of nanoparticles
 General intro to implementation of nanoparticles into devices
 Application of nanoparticles in photoelectrochemical cells
 Application of nanoparticles for CO₂ reduction (electrochemical and thermochemical)
 Application of nanoparticles in batteries
 Application of nanoparticles in electrochromic windows
 Application of nanoparticles in solar cells
 Application of nanoparticles in light emitting diode
 The basic working principles and figure of merit for each energy device will be described.

Keywords

- Colloidal Chemistry
- Nanoparticles
- Energy Devices

Assessment methods

Oral presentation

Resources

Bibliography

Course note and journal papers will be provided during the course.