

ChE-604

**Colloidal synthesis of nanoparticles and their energy applications**

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<b>Cursus</b>	<b>Sem.</b>	<b>Type</b>
Chemistry and Chemical Engineering		Obl.

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

**Frequency**

Every year

**Remark**

Next time: December 2018

**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 CO<sub>2</sub> 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.

**Note**

Next time: December 2017

**Keywords**

- Colloidal Chemistry
- Nanoparticles

- Energy Devices

### **Assessment methods**

Oral presentation

### **Resources**

#### **Bibliography**

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