ChE-430  Nanomaterials for chemical engineering application  
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Summary
This course aims at understanding classical and non-classical nucleation theory, at reviewing different techniques for the synthesis of nanomaterials (mainly nanoparticles and thin films) and at learning about some key applications of these nanomaterials in chemical engineering.

Content

Keywords
nanomaterials, classical nucleation theory, photovoltaics, light emitting diodes, solar fuels, electrocatalysis

Learning Outcomes
By the end of the course, the student must be able to:
• Describe the differences between properties of bulk and properties of nanomaterials
• Discuss classical and non-classical nucleation theory
• Identify the most suitable synthesis technique to prepare the nanomaterial of choice
• Elaborate the benefits of nanomaterials in energy applications and catalysis.

Teaching methods
slides, videos, inverted classroom, laboratory at the end of the semester (at EPFL Valais in Sion)

Expected student activities
inverted classroom, 2 days in the laboratory (at EPFL Valais in Sion)
Note: We combine together the 14 practical work hours at the end of the semester so to have 2 full days in the laboratory where students will synthesize nanocrystals, characterize them and test them as electrocatalysts for CO2 reduction

Assessment methods
Oral exam (60%), lab report (20%), Inverted classroom (20%)

Resources
Moodle Link
• https://moodle.epfl.ch/course/view.php?id=15549