

MSE-703

Science and technology of UV-induced polymerization

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Cursus	Sem.	Type
Advanced Manufacturing		Opt.
Materials Science and Engineering		Opt.

Language of teaching	English
Credits	1
Session	
Exam	Term paper
Workload	30h
Hours	14
Courses	14
Number of positions	

Frequency

Every year

Summary

The course presents the main classes of photopolymers and key factors which control photopolymerization. It explains how to select the right formulation and optimize processes for a given application. Standard and novel characterization methods, new materials and new applications are also presented.

Content

1. Introduction to radiation processing
2. Fundamentals of free-radical systems
3. Components of photocurable formulations: photoinitiators, monomers, additives
4. Analytical methods: state of the art and new developments
5. Structure-property relations in UV curable polymers
6. Advances in UV-induced polymerization research
7. Application to UV inks and coatings, nanostructures and devices

Learning Prerequisites**Recommended courses**

Polymer science, organic chemistry

Assessment methods

The course provides 1 ECTS, based on a written report (maximum 10 pages) on a topic relevant to UV polymers. The report should synthesize three technical papers A, B and C from open scientific literature and develop a short case study (for example using equation from paper A and data from paper B to model results from paper C, or designing a process method (formulation, UV intensity, time) using inputs from the 3 papers).

Resources**Notes/Handbook**

A copy of the course slides is provided at the start of the course.

Moodle Link

- <https://go.epfl.ch/MSE-703>