

MSE-703

**Science and technology of UV-induced polymerization**

Dalle Vacche Sara, Leterrier Yves, Nouzille Eric Jacques, Sangermano Marco

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

Language of teaching	English
Credits	1
Session	
Exam	Term paper
Workload	30h
<b>Hours</b>	<b>14</b>
Lecture	14
<b>Number of positions</b>	

**Frequency**

Every year

**Remark**

Ne sera pas enseigné durant l'année académique 2023-2024

**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>