

MSE-478

Organic semiconductors

Nüesch Frank

| Cursus | Sem. | Type |
|-----------------------------------|----------|------|
| Advanced Manufacturing | | Obl. |
| Materials Science and Engineering | MA2, MA4 | Opt. |
| Photonics | | Obl. |

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|----------------------------|-----------------|
| Language of teaching | English |
| Credits | 3 |
| Session | Summer |
| Semester | Spring |
| Exam | Oral |
| Workload | 90h |
| Weeks | 14 |
| Hours | 3 weekly |
| Courses | 2 weekly |
| Exercises | 1 weekly |
| Number of positions | |

Summary

This course provides an introduction to organic semiconducting materials starting from fundamental optical and electronic properties of conjugated small molecules and polymers. Furthermore, electronic and optical properties in the solid state and applications in optoelectronic devices are studied.

Content

1. Conjugated molecules interacting with light (electronic orbitals, optical and electronic properties, photochemical reactions), biological systems
2. Structure and properties of conjugated molecular materials (crystalline materials, polymers, liquid crystals)
3. Applications in electronics and optoelectronics (LCD displays, solar cells, light-emitting diodes, transistors)

Learning Outcomes

By the end of the course, the student must be able to:

- Elaborate a topic in the field of organic optoelectronic devices
- Interpret organic thin film device performance in terms of fundamental processes
- Solve a physical problem in the field of organic semiconductors quantitatively
- Estimate order of magnitude of physical effects occurring in organic semiconductors
- Differentiate between organic and inorganic semiconductors
- Analyze fundamental processes in organic semiconductors
- Model molecular orbitals and organic thin film device properties
- Report on a scientific publication

Assessment methods

oral exam