

MICRO-707

Microstructuring of glass

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Cursus	Sem.	Type
Advanced Manufacturing		Opt.
Microsystems and Microelectronics		Opt.

Language of teaching	English
Credits	1
Session	
Exam	Oral
Workload	30h
Hours	16
Courses	16
Number of positions	

Frequency

Every year

Remark

Next time: Spring 2023

Summary

The course will provide fundamental key aspects governing glass as a material and the microstructuring of glass using a variety of techniques, like dry and wet etching, mechanical and laser machining, as well as sol gel technology. Also concrete application examples will be discussed.

Content

1. Glass as a material

Definition, structure, composition, properties and kinds of glasses

2. Techniques for the microstructuring of glass

Wet etching, dry etching, ultrasonic drilling, powder blasting, laser structuring and photosensitive glass

3. Replication of glass microstructures

The sol-gel process (spin-on-glass), photosensitive spin-on-glass, the replication process (moulding, de-moulding, annealing)

4. Bonding of glass

Anodic bonding, fusion bonding, pressure-assisted bonding, chemical bonding

5. Applications of glass microstructures

- a. Optical systems (Wave guides, gratings, lenses)
- b. Bio-chemical systems (Bio-separation and microfluidics, biosensors)
- c. Mechanical systems (Pressure sensors, inkjet printing heads)

Keywords

Glass, microstructuring, replication, sol-gel process, bonding

Learning Prerequisites**Recommended courses**

- Introductory course to materials science or microfabrication technologies
- Basics of chemistry and physics

