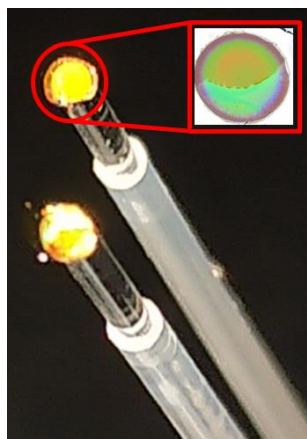


# Optical Fiber Sensors

## Description



© Claudia Pacholski

The FöWiTec-funded project of the Functional Materials group of Dr. Claudia Pacholski deals with the fabrication of tailored optical fiber sensors and investigates both their chemical and optical properties. The work focuses on equipping the fiber tips with nanomaterials, such as porous silicon and stimuli-responsive polymers. The porous silicon is generated by electrochemical or metal-assisted etching, and both the pore size and the optical response of the material are freely adjustable. By combining the porous material with polymers, optical fiber sensors can be produced to precisely fit a targeted application.

## Details

- Design and manufacture of optical fiber sensors
  - Cost-efficient processes
  - Targeted increase of sensitivity
- New generation of optical sensors - combination of porous materials with polymers
  - Porous silicon in combination with polymers
  - Production of porous structures by electrochemical etching
  - Metal assisted chemical etching
- Application of optical fiber sensors
  - Waste water analysis
  - Detection of chemicals and biomolecules
  - Tracking of biofilm formation

## Spectrum of Methods

- Electrochemical etching
- Metal assisted chemical etching
- Interferometry
- Stimuli-responsive microgels

## Literature

- C. Pacholski, Photonic crystal sensors based on porous silicon, *Sensors*, **2013**, 13 (4), 4694-4713
- R. F. Balderas-Valadez, M. Weiler, V. Agarwal, C. Pacholski, Optical characterization of porous silicon monolayers decorated with hydrogel microspheres, *Nanoscale Research Letters*, **2014**, 9, 425
- N. Polley, P. Werner, R. F. Balderas-Valadez, C. Pacholski, Bottom, Top, or in Between: Combining Plasmonic Nanohole Arrays and Hydrogel Microgels for Optical Fiber Sensor Applications, *Adv. Mater. Interfaces*, **2022**, 9 (15), 2102312

## Applications

- Real-time monitoring
- Process control
- Interferometry
- Detection of chemical compounds and biomolecules
- Biofilm growth

## Keywords

- Porous Material
- New Materials
- Surface functionalization
- Optical sensors

## Interest in cooperation

- Research-based collaboration
- Contract research
- Industry-sponsored research

## Contact

Transfer Service  
 Tel: +49 (0)331 / 977 61 71  
 Fax: +49 (0)331 / 977 38 70  
[tech@potsdam-transfer.de](mailto:tech@potsdam-transfer.de)

## Potsdam Transfer

Center for start-ups, innovation & transfer of knowledge and technology  
 Karl-Liebknecht-Straße 24–25,  
 Haus 29  
 14476 Potsdam  
[www.potsdam-transfer.de](http://www.potsdam-transfer.de)

Date Jan. 2023