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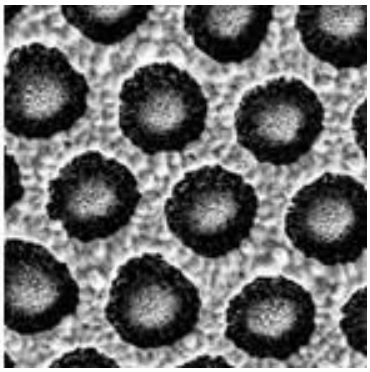
Chemical Strategies for Functional Nano-Structures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Description

The research group *Functional Materials* of Dr Claudia Pacholski aims to fabricate materials with new and exciting properties, that can later be used as optical sensors. The scientists of the group synthesize nanomaterials and investigate their chemistry as well as their optical properties. A special focus is on the preparation and self-assembly of inorganic nanomaterials in combination with polymers.

The team uses various methods and is interested in different areas of application. For example, through the action of energy new nanomaterials or nanostructures with unusual structural, electrical, optical or magnetic properties and functionalities can be generated. These form the basis for the development of new materials and sensors.

Details

- Design and bottom-up fabrication of metallic nanostructures
  - Application of Surface Plasmon Resonance Spectroscopy (SPR)
  - Improvement of SPR-sensitivity
- New generation of optical sensors, combining SPR and interferometry
  - Sensors, based on merged photonic and plasmonic structures
- Optical fiber sensors
  - Functionalisation of optical fibers using molecules and nanomaterials
  - Integration of plasmonic and photonic nanomaterials into optical fibers
  - self-assembly processes

Methodes

- Surface Plasmon Resonance Spectroscopy (SPR)
- Surface Enhanced Spectroscopy
- Interferometry
- Soft colloidal lithography

Scientific literature

- Semenyshyn et. al, **In Vitro Monitoring Conformational Changes of Polypeptide Monolayers Using Infrared Plasmonic Nanoantennas**, Nano Letters, 2019, 19 (1), 1-7
- N. Polley, **Fiber optic plasmonic sensors: Providing sensitive biosensor platforms with minimal lab equipment**, Biosensors and Bioelectronics, 2019, 132, 368-374
- R. F. Balderas-Valadez, **One Spot—Two Sensors: Porous Silicon Interferometers in Combination With Gold Nanostructures Showing Localized Surface Plasmon Resonance**, Frontiers in Chemistry, 2019, 7:593

Applications

- Sensor development
- Process control
- Medical diagnostics
- Therapy
- Detection of biomolecules and chemical compounds
- Investigation of polymer degradation

Keywords

- Synthetic nanomaterials
- New materials
- Self-organization
- Biosensors
- Optical sensors

Interest in cooperation

- Research cooperation
- Research collaboration
- Contract research

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