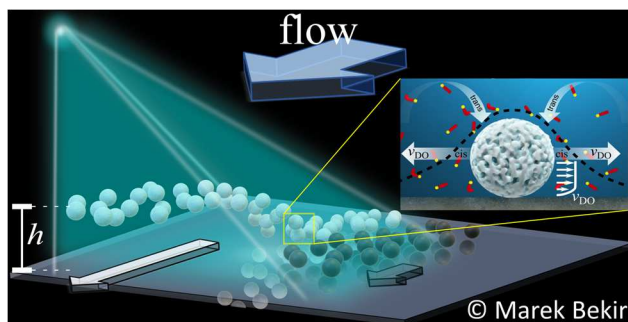


Surface Sensitive Filtration of Microparticles

Description



Under the project management of Dr. Marek Bekir, a new technology for chromatography is being developed that is suitable for particles in the micrometer range. A light-responsive surfactant is used for this process. Depending on the material and surface morphology (roughness, porosity) of the particles, different amounts of surfactant are absorbed. During illumination a light-induced concentration gradient hovers particles from a glass-liquid interface to a higher focal plane, where the height depends on the material. This results in a change in the shear stress and velocity of the particles along a lamellar flow. Thus, particles of the same size but different material can be separated over different retention times. This opens new promising possibilities for designing a technology for separation and analysis of microplastics from wastewater.

The team uses a variety of interdisciplinary methods in physical chemistry, adsorption phenomena, materials engineering, and microfluidics. The focus of the work is on understanding hovering ability of suspended solids in cross-correlation with hydrodynamic phenomena, and the combination of the two is the key component for the new filtration technology.

Details

- **Design of suitable microfluidic channels for high performance separation**
 - Hydrodynamic geometry investigation of microfluidic channels
 - Filtration sensitivity improvement
 - Flow-path length investigation
- **Hovering effect investigation**
 - Light induced motion manipulation
 - Material, shape and size of microparticles investigation
- **Interface analysis**
 - Kinetics at interfaces (adsorption, desorption, photo-isomerization)
 - Interaction of photo sensitive surfactants with interfaces

Spectrum of Methods

- Optical microscopy
- Quartz-Crystal-Microbalance with Dissipation
- Atomic Force Microscopy

Literature

- How to Make a Surface act as a Micropump, Marek Bekir, Anjali Sharma, Maren Umlandt, Nino Lomadze, Svetlana Santer, *Adv. Mater. Interfaces* **2022**, 2102395
- Adsorption of Photoresponsive Surfactants at Solid-Liquid Interface, M. Umlandt, D. Feldmann, E. Schneck, S. Santer, M. Bekir, *Langmuir* **2020**, 36, 14009.
- Kinetics of photo-isomerization of azobenzene containing surfactants, P. Arya, J. Jelken, N. Lomadze, S. Santer, M. Bekir *J. Chem. Phys.* **2020**, 152, 024904.

Applications

- Purification method
- Surface sensitive filtration
- Microplastic filtration
- Microplastic analysis

Keywords

- Microfluidics
- Filtration
- Surface selectivity
- Light induced motion
- Photo-sensitive surfactants

Interest in cooperation

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

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