



Beitrag ID: 11

Typ: Talk

Dynamic wetting phenomena and contact angle hysteresis on polymer brushes and gels

Dienstag, 9. November 2021 11:00 (20 Minuten)

Droplet mobility on surfaces is achieved by polymeric coatings, in form of gels or brushes, both holding some mobile (free, i.e., un-crosslinked or un-grafted) polymer chains. In the presence of droplets, these free chains accumulate around the three-phase contact line, leading to contact lubrication and wetting ridge formation. The investigation of free chains and understanding their influence on the wetting behaviour is challenging: time and length scales are small (<1 nm, milliseconds) for free chains but huge for droplets (>1 mm, seconds). To bridge the gap between scales, we combine experimental and computational methods and tackle the problem from both ends; Dissipative Particle Dynamics simulations provide insights into the migration of free chains. Confocal laser scanning microscopy and interferometry enable wetting experiments with resolution around 0.1 μm and extensive time resolutions for dynamic measurements. We match simulation and experiments by comparing interfacial energies, wetting ridges, and friction force measurement. The latter is facilitated experimentally by a novel, optical force sensor with a resolution of one micro-Newton. Friction forces can be tuned by droplet speed and surface lubrication (i.e., number of free chains). Finally, we discuss some open questions.

Primary authors: HAUER, Lukas (Max Planck Institute for Polymer Research); BADR, Rodrique (Institut für Physik, Johannes Gutenberg-Universität Mainz); Prof. VOLLMER, Doris (Max Planck Institute for Polymer Research); Prof. SCHMID, Friederike (Institut für Physik, Johannes Gutenberg-Universität Mainz)

Vortragende: HAUER, Lukas (Max Planck Institute for Polymer Research); BADR, Rodrique (Institut für Physik, Johannes Gutenberg-Universität Mainz)

Sitzung Einordnung: Short talks