



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 $0.1 \mu\text{m}$ 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.

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Sitzung Einordnung: Short talks