

## Dynamic Wetting and Electro-Dewetting with Photoswitchable Arylazopyrazoles

*Dienstag, 5. Dezember 2023 17:00 (25 Minuten)*

In this contribution, we provide information on photo-switchable self-assembled monolayers (SAMs) with fluorinated arylazopyrazole ( $\text{CF}_3$ -AAP) silanes on silicon oxide [1]. We have studied the molecular kinetics of the photoswitching in the SAMs in detail using both vibrational SFG and dynamic contact angle measurements. For that, we have systematically changed the surface coverage of the AAP photoswitches. The molecular kinetics of the wetted and pristine monolayer are surprisingly slow and the wetting dynamics are even slower when the SAM is closely-packed, which we relate to a coupling between the molecular kinetics and the drop dynamics. As we will show, the packing density of the SAMs and the possibility to incorporate water molecules into the SAM can have drastic influence on the wetting dynamics of  $\text{CF}_3$ -AAP monolayers. In addition, we have now extended our investigations to electro-dewetting (EDeW) experiments where we replace classical DTAB surfactants used in the original experiments (see Ref. [2]) by arylazopyrazole triethylammonium bromide (AAP-TB) which is a cationic amphiphile that can change the surface tension at the air-water interface to a large extent [3]. This offers to finetune the contact angle changes by E/Z photoisomerization of the AAP-TB amphiphile and we find a further increase in contact angle by about  $6^\circ$  when the samples were irradiated by UV light that triggers the photoisomerization from the E to the less surface active Z isomer. In previous work [2], it was suggested that surfactants are deposited on the silicon oxide surface through the EDeW process. In order to study the possible deposition of surfactants and the role of a possible prewetting layer outside of the drop and at some distance from the 3-phase contact line we have done SFG spectroscopy and find that surfactants are deposited even several mm adjacent to the drop and that the structure of this surfactant layer as well as the structure of the accompanying water layer changes drastically close to the 3-phase contact line.

**Acknowledgements:** The authors gratefully acknowledge funding from the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation), Projects 422792175 and 422879009, within the priority program SPP2171 "Dynamic Wetting of Flexible, Adaptive and Switchable Substrates."

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**Sitzung Einordnung:** Short Talks