Beitrag ID: **11** Typ: **Talk**

Swelling of a polymer brush up to 100% relative humidity

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Polymers are known to respond to various stimuli, including liquid and gas phases. When partially wetted, they are exposed to both liquid and gas phases. The surrounding gas phase can influence the amount of swelling around the contact line or even change the wetting behavior depending on the gas used. While there are many studies of the brush response in the liquid phase, there are few that examine the response to the gas phase. In a partial wetting scenario with water, the brush is always exposed to a variety of relative humidities up to 100%. While there are studies at low to high relative humidities, there are none that investigate swelling up to 100% relative humidity. We present ellipsometry measurements measuring the thickness of a PNiPAAm brush up to 100% relative humidity until we start to see condensation. We find that the behavior at 100% relative humidity is the same as in water. This was shown by varying the temperature around the LCST and comparing it to the swelling in water. We also present a mean field theory, which allows us to theoretically describe and explain the swelling behavior.

[1] Besford, Q., et al., Mechanofluorescent Polymer Brush Surfaces that Spatially Resolve Surface Solvation, ACS Nano, 2022. 16(2)

[2] Schubotz, S., et al., Influence of the Atmosphere on the Wettability of Polymer Brushes. Langmuir 2023, 39, 14, 4872–4880

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Sitzung Einordnung: Short Talks