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Wetting and slippage on irregularly nanostructured superhydrophobic surfaces CLARISSA SCHÖNECKER, Technical University of Kaiserslautern, XIN ZHAO, Beijing Institute of Technology, China, ANDREAS BEST, KALOIAN KOYNOV, HANS-JÜRGEN BUTT, Max Planck Institute for Polymer Research, Mainz, Germany — Irregularly nanostructured superhydrophobic surfaces are widely employed for applications such as drag-reduction, control of wetting, ant-biofouling, and many more. While they show a significant drag reduction in applications, this cannot be explained by microscopic models or experiments which are based on regularly structured surfaces. As an example of an application-relevant surface, we investigated wetting and slippage on silicone nanofilaments. For this purpose, we developed an evaluation method for Fluorescence Correlation Spectroscopy that allows us to measure velocity profiles down to about 0.4micrometer close to the surface. We found that the velocity profiles are still nonlinear below 1micrometer close to the surface, which is important for an accurate slip measurement. Additionally, we found that the irregularity of the surface may lead to large air inclusions. These inclusions possess a large slip length and may therefore explain the high drag-reduction observed in applications of irregularly nanostructured superhydrophobic surfaces.

Clarissa Schoenecker
Technical University of Kaiserslautern

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