Abstract Submitted
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Sub-nanometric substrate structural changes enhance the solid/liquid slip boundary condition[1] JOSHUA MCGRAW, ANTOINE BRIDET, SAMUEL GRANDTHYLL, HENDRIK HÄHL, FRANK MÜLLER, KARIN JACOBS, Saarland University, Experimental Physics, 66041 Saarbrücken — Alkylsilane self-assembled monolayers (SAMs) have long been used as model substrates for their ease of preparation and hydrophobic properties. We have long observed that these monolayers also provide a slip boundary condition for dewetting polymer films, and that the slip condition is switchable if the alkyl chain length is changed (from 12 to 18 backbone carbons, for example). Typically, this change is affected in a quantized way, using one or the other chain length, thus obtaining one or the other slip condition. It has been suggested that the specific structure of the resulting SAM controls the slip condition. Here, we present results in which this structure is changed in two continuous ways. First, we prepare SAMs containing bidisperse mixtures of alkyl silanes, with the composition as a control parameter. Second, we thermally anneal the SAMs, resulting in an irreversible loss of carbon from the monolayer. In both cases, we find an enhanced slip condition which is tuneable over a certain range.

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