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Force response of actively deformed polymer microdroplets: dependence on the solid/liquid boundary condition JONAS HEPPE, INM - Leibniz Institute for New Materials and Saarland University, Experimental Physics, D-66123, Saarbruecken, Germany, JOSHUA D. MCGRAW, Saarland University, Experimental Physics, D-66123, Saarbruecken, Germany, ROLAND BENNEWITZ, INM - Leibniz Institute for New Materials, D-66123, Saarbruecken, Germany, KARIN JACOBS, Saarland University, Experimental Physics and INM, D-66123, Saarbruecken, Germany — In fluid dynamics, the solid/liquid boundary condition can play a major role in the flow behavior of a liquid. For example, in the dewetting of identical polymer films on weak slip or strong slip substrates, large qualitative and quantitative differences are observed. Therefore, when applying an external load to a liquid resting on such substrates, the measured reaction forces and the ensuing flow should also depend on the boundary condition. We present atomic force microscopy measurements in which the reaction force of a cantilever is measured as the tip pierces liquid polymer micron sized droplets and films. These indentations are done on substrates with tuned slip. Accessing the size, depth and rate dependence of the resulting force distance curves, we show an influence of the slip condition on the dissipated energy and adhesion.

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