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Capillarity-induced phase separation in silicone elastomers and its consequence in droplet sliding dynamics AURELIE HOURLIER-FARGETTE, ARNAUD ANTKOWIAK, SEBASTIEN NEUKIRCH, Institut Jean Le Rond d'Alembert, UPMC — Beyond the importance of understanding the motion of droplets on stiff surfaces, the recent development of soft materials has lead to a growing interest for capillarity problems where soft interfaces and supports come into play. Silicone elastomers are easy-to-make substrates, used in various research fields such as microfluidics, or elastocapillarity where experiments on slender bendable structures or thick soft substrates are performed. Here we focus on the dynamics of water-glycerol mixture droplets sliding down plates of such silicone elastomers, highlighting an unexpected behavior: we observe successively two sliding regimes with different constant speeds, and a sharp transition between them. We show that this behavior is due to the water droplet extracting uncrosslinked oligomers from the silicone elastomer through a capillarity-induced phase separation at the triple line. We further investigate the dynamics of this phase separation and its consequences on the wetting properties of the system.

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