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Enhancing capillary rise on a rough surface[1] MELISSA CHOW, JASON WEXLER, IAN JACOBI, HOWARD STONE, Princeton University — Liquid-infused surfaces have been proposed as a robust alternative to traditional air-cushioned superhydrophobic surfaces. However, if these surfaces are held vertically the lubricating oil can drain from the surface, and cause the surface to lose its novel properties. To examine this failure mode, we measure the drainage from a surface with model roughness that is scaled-up to allow for detailed measurements. We confirm that the bulk fluid drains from the surface until it reaches the level of the capillary rise height, although the detailed dynamics vary even in simple surface geometries. We then test different substrate architectures to explore how the roughness can be designed to retain greater amounts of oil.

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