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Reducing Sliding Friction with Liquid-Impregnated Surfaces MOHAMMAD HABIBI, Virginia Tech, C. PATRICK COLLIER, Oak Ridge National Laboratory, JONATHAN BOREYKO, Virginia Tech, NATURE INSPIRED FLUIDS AND INTERFACES TEAM, CENTER FOR NANOPHASE MATERIALS SCIENCES TEAM — Liquid-impregnated surfaces are fabricated by infusing a lubricating liquid into the micro/nano roughness of a textured substrate, such that the surface is slippery for any deposited liquid immiscible with the lubricant. To date, liquid-impregnated surfaces have almost exclusively focused on repelling liquids by minimizing the contact angle hysteresis. Here, we demonstrate that liquid-impregnated surfaces are also capable of reducing sliding friction for solid objects. Ordered arrays of silicon micropillars were infused with lubricating liquids varying in viscosity by two orders of magnitude. Five test surfaces were used: two different micropillared surfaces with and without liquid infusion and a smooth, dry control surface. The static and kinetic coefficients of friction were measured using a polished aluminum cube as the sliding object. Compared to the smooth control surface, the sliding friction was reduced by at least a factor of two on the liquid-impregnated surfaces.

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