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Drag reduction on liquid infused superhydrophobic surfaces<sup>1</sup> JEONG-HYUN KIM, JONATHAN ROTHSTEIN, Univ of Mass - Amherst — The drag reduction on liquid infused superhydrophobic surfaces was measured through a microchannel. The microfluidic device consisted of two halves, a superhydrophobic surface and a microchannel, respectively. The superhydrophobic surface was created from a silicon wafer with ridge patterns 30 to 60 microns in width and spacing generated by a standard photolithography. A low viscosity, immiscible, incompressible silicone oil was filled to the gaps of the superhydrophobic surfaces. Several microchannels varying in size from 100 to 200 microns were fabricated from PDMS with an inlet, outlet and two pressure ports. After flow coating the superhydrophobic surface with a uniform film of oil, the two halves were aligned and clamped together and the pressure drop measured. A systematic study on drag reduction and slip length was performed by varying the viscosity ratio between the water and oil phase between 0 to 50. Several aqueous glycerin solutions with different viscosity were prepared. The slip length, pressure drop, and longevity of the oil phase were studied as a function of surface geometry, capillary number and the dispense volume.

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