Electronic Supporting Information for *Soft Matter*

Drag Reduction for Viscous Laminar Flow on Spray-Coated Non-Wetting Surfaces

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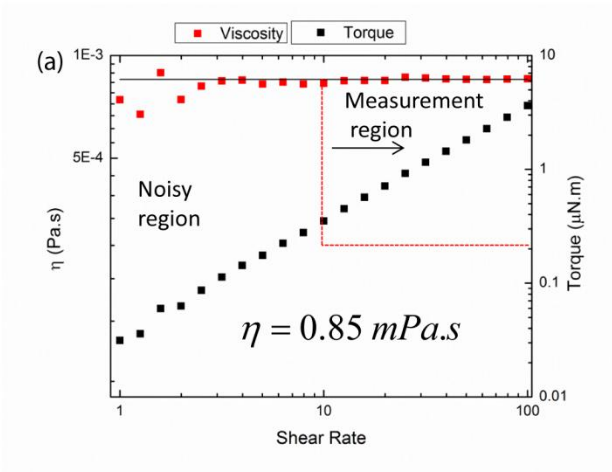

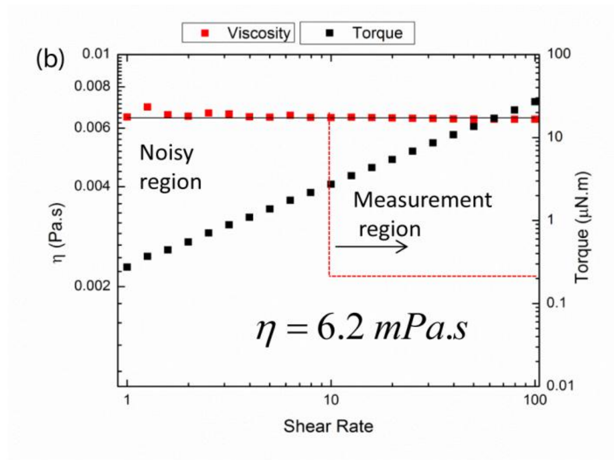

Figure S1. Measured values of the viscosity (η; red squares) and torque (black squares) plotted against the nominal shear rate $\dot{\gamma}$ at 25° C of: (a) n-Decane, a reference Newtonian oil with $\eta = 0.85$ mPa.s, and (b) the 50 vol% Glycerol/Water probe liquid with $\eta = 6.2$ mPa.s. The data clearly indicates noise in measured values of viscosity and torque for shear rates $\dot{\gamma} < 10\ \text{s}^{-1}$. Therefore, the values of measured torques used in this study range from 3-30 μN for shear rates of $10\ \text{s}^{-1} < \dot{\gamma} < 100\ \text{s}^{-1}$.

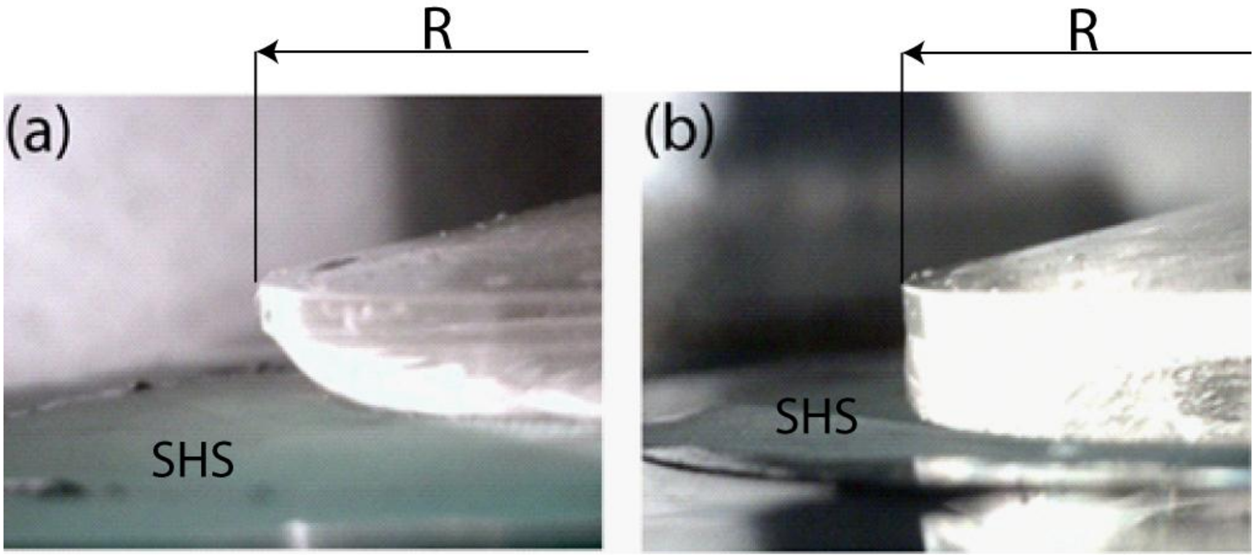

Figure S2. A side view of the liquid meniscus resting on the spray-coated superhydrophobic substrate (SHS) at the edge of the parallel-plate rheometer (at a radius R=30 mm) with the meniscus shown to be: (a) freely deformed due to the large apparent contact angle on the 'as-sprayed' SHS (b) pinned at the edge of the parallel plate (at R=30 mm) by introduction of a thin hydrophilic strip at the edge of the SHS (of width ~ 200 μm) by indentation with a graphite tip.

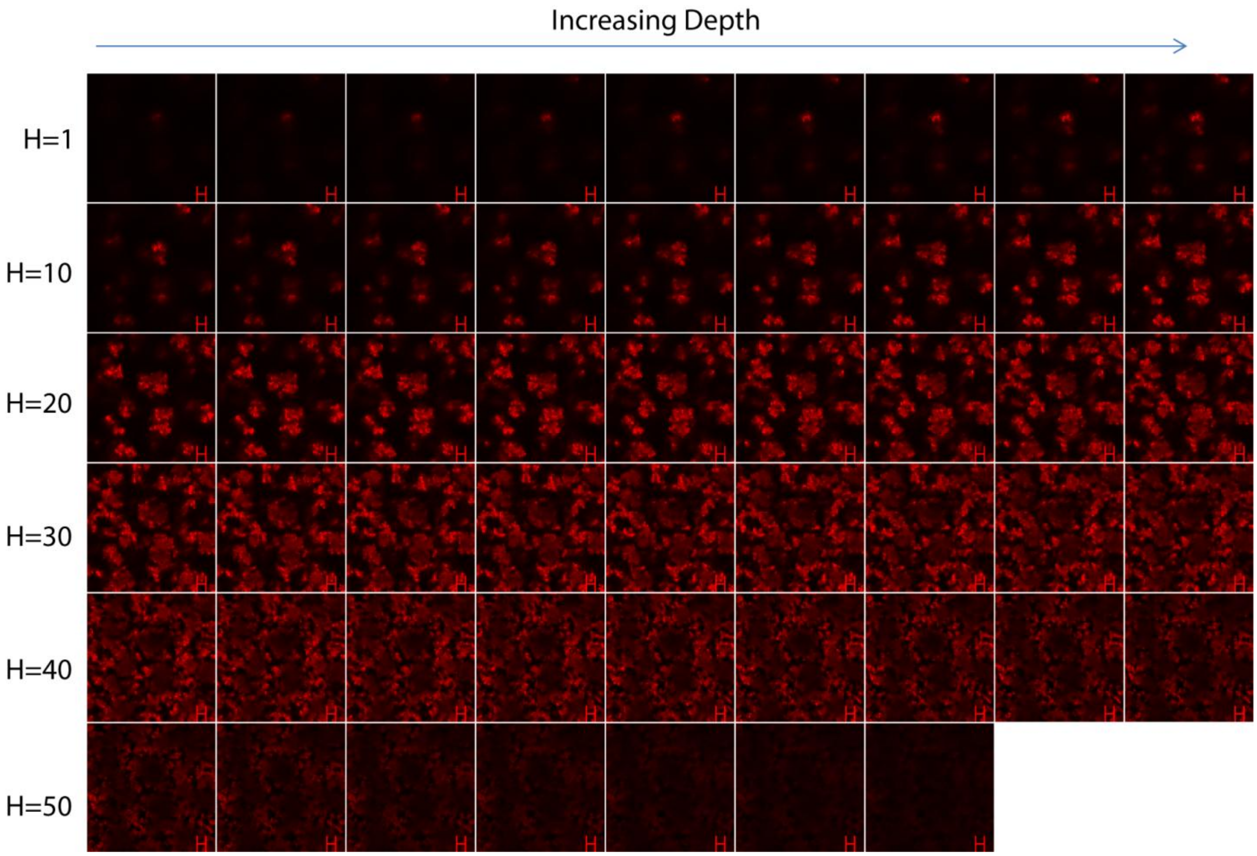

Figure S3. Array of confocal microscopy images of the spray-coated corpuscular structure infused with a Nile red fluorescent dye. Each image is of dimensions $143\mu m \times 143\mu m$ and the total height of the stacked images is 56 μm. The images in each row are sequentially ordered from left to right, with the image slice at the top-left corresponding to an imaging plane located at the top of the spray-coated microstructures. Subsequent slices correspond to successively lowering the imaging plane by a height $\Delta H \sim 1\ \mu m$.

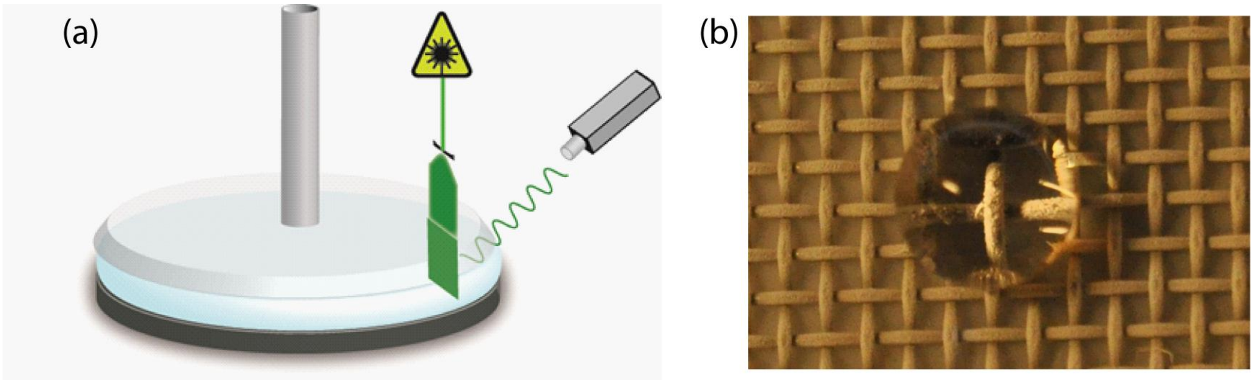

Figure S4. (a) Schematic of the imaging setup used to capture the composite solid-liquid-vapor interface (as shown in Fig. 6c in the main text) resting on the spray-coated superhydrophobic mesh in the parallel-plate rheometer. The image is captured at an oblique angle looking through a beveled edge of the transparent upper plate of the rheometer; (b) A liquid drop of volume $V \sim 10\,\mu L$ sitting in the Cassie-Baxter state on a superhydrophobic spray-coated Mesh

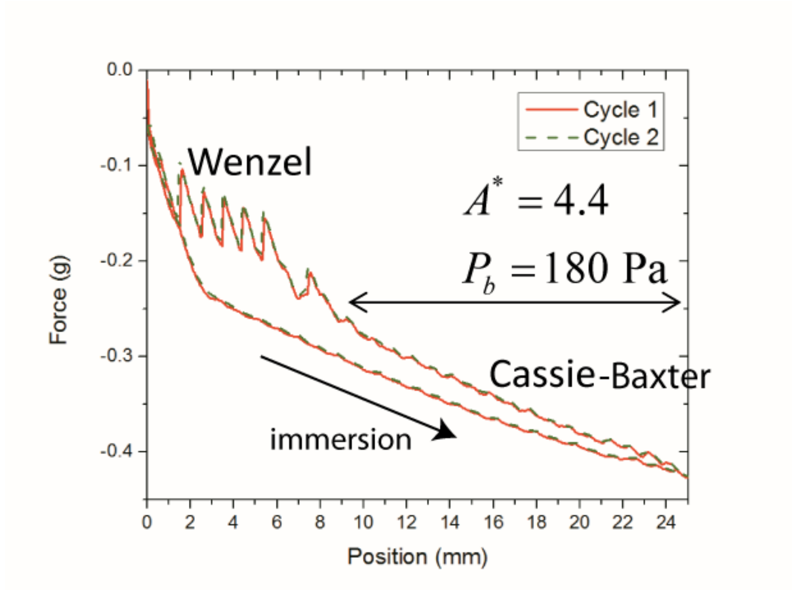

Figure S5. Plot of the force trace of the spray-coated Mesh III (*R* = 127 μm; *D* = 326 μm; *L* = 2(*R*+*D*) = 906 μm) vertically immersed in a 50 vol% glycerol/water solution using a dymanic tensiometer (DataPhysics Instruments, DCAT 11). The transition from a Cassie-Baxter state to a Wenzel state in the large pockets of air trapped in between the woven features of the spray-coated mesh is evident from the large hysteresis seen in the force curves at a vertical immersion depth of $z = 9\,mm$, corresponding to a hydrostatic breakthrough pressure of approximately 180 Pa. The value of the dimensionless breakthrough pressure A* (calculated from Eqn. 5) is 4.4. The spray-coated mesh dewets completely when the hydrostatic pressure loading is removed and the second immersion cycle is identical to the first.