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Surface Energy Characterization of Superhydrophobic Surfaces under Varying Ambient Temperatures ARNAV CHHABRA, RAVITEJ KANAPURAM, TAE JIN KIM, CARLOS HIDROVO, University of Texas at Austin — A Cassie state is a state where a liquid droplet sits on top of a rough surface while maintaining a gas layer under the liquid interface. This state decreases the solid surface energy, and the contact angle is consequently increased. The contact angle of liquid droplets formed under the Cassie state is a function of the surface roughness and surface energies, dependent primarily on temperature, involved. We studied the surface energy variation of polymeric surfaces under different ambient temperatures, including surfaces that induce Cassie state. A highly rough PDMS (poly-dimethylsiloxane) pillar arrayed surface was used as the substrate. To study these properties, we employed Zisman plots for a number of liquids at different temperatures. A Zisman plot displays variation in contact angles of droplets with different surface energies, thus allowing us to determine the surface energies involved. Such experiments required a methodology that calculated each surface property independently and the subsequent use of image decomposition analyses. We computed the contact angle using similar analyses. These two parameters allowed for the successful construction of the Zisman plot.

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