Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Influence of Liquid Type on Drop Impingement on Rib and Cavity Superhydrophobic Surfaces JOHN PEARSON, DANIEL MAYNES, BRENT WEBB, Brigham Young University — We report results of an experimental investigation of liquid drops impinging on superhydrophobic surfaces. The surfaces are fabricated in Silicon wafers with micro-ribs and cavities (grooves) that are coated with a fluoropolymer or teflon hydrophobic coating. Liquid droplets of known size were dropped from heights ranging from 0.5 to 50 cm onto the surfaces and the pre-impingement freefall, surface impact, and droplet deformation were imaged at a rate of 6000 frames/second with a digital camera. The droplets were either water, ethanol, or a glycerine/water mixture. The droplet impact speed, maximum droplet spread, horizontal spread speed, vertical speed of the issuing jet, and the time between impact and formation of the issuing jet were all characterized. The results show that the overall impact dynamics are strongly influenced by the different impinging surface conditions and the fluid type. Results were compared with previously proposed analytical models and suggestions for improving those models are made.

John Pearson
Brigham Young University

Date submitted: 05 Aug 2009 Electronic form version 1.4