Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Dynamics of condensation on lubricant impregnated surfaces SUSHANT ANAND, ADAM PAXSON, KONRAD RYKACZEWSKI, Massachusetts Institute of Technology, DANIEL BEYSENS, UMR CNRS-ESPCI ParisTech, KRIPA VARANASI, Massachusetts Institute of Technology — Replacing the filmwise condensation mode with dropwise condensation promises large improvements in heat transfer that will lead to large cost savings in material, water consumption and decreased size of the systems. In this regards, use of superhydrophobic surfaces fabricated by texturing surfaces with nano/microstructures has been shown to lead decrease in contact line pinning of millimetric drops resulting in fast shedding. However, these useful properties are lost during condensation where droplets that nucleate within texture grow by virtue of condensation to large sized droplets while still adhering to the surface. Recently we have shown that liquid impregnated surfaces can overcome many limitations of conventional superhydrophobic surfaces during condensation. Here we discuss aspects related to condensation on lubricant surfaces, such as behavior of growing droplets. We compare the characteristics of droplets condensing on these surfaces with their behavior on conventional unimpregnated superhydrophobic surfaces and show how use of lubricant impregnated surfaces may lead to large enhancement in heat transfer and energy efficiencies.

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Date submitted: 28 Nov 2012 Electronic form version 1.4