Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Droplet growth and coalescence on nanostructured surfaces during condensation RYAN ENRIGHT, Massachusetts Institute of Technology, MATTHEW MCCARTHY, Drexel University, BENJAMIN HATTON, Harvard University, EVELYN WANG, Massachusetts Institue of Technology — In this work, we investigated the condensation behavior of water on nanostructured surfaces fabricated using a self-assembled virus template resulting in typical feature dimensions of 40 nm. These surfaces were first functionalized with a hydrophobic silane coating and, subsequently, some of the surfaces were selectively coated with hydrophilic PVA to create a chemically heterogeneous surface. The condensation process of water on these surfaces was characterized by microscopic imaging of the droplet growth behavior. The dynamics of energetic droplet coalescence events were obtained using high-speed imaging. Condensation on both the chemically homogenous and heterogeneous surfaces showed a preference for the unpinned Cassie droplet wetting mode. However, observed differences between the chemically homogenous and heterogeneous surfaces in both droplet growth and coalescence behavior demonstrate the effects of locally lowered nucleation energy barriers and increased droplet adhesion.

Ryan Enright
Massachusetts Institute of Technology

Date submitted: 10 Aug 2010 Electronic form version 1.4