Abstract Submitted
for the 4CF17 Meeting of
The American Physical Society

Switchable wettability on superoleophobic surfaces fabricated with a thermo-responsive shape memory polymer.[1] WEI WANG, Colorado State University, JOSHUA SALAZAR, The University of Texas at Dallas, HAMED VAHABI, Colorado State University, ALEXANDRA JOSHI-IMRE, WALTER E.VOIT, The University of Texas at Dallas, ARUN KOTA, Colorado State University — Superomniphobic surfaces are extremely repellent to virtually all liquids. Prior work have emphasized the importance of low solid surface energy and re-entrant texture (i.e., multi-valued or convex or overhang texture) in the design of superomniphobic surfaces. While superomniphobic surfaces with a wide variety of textures have been reported in literature, to the best of our knowledge, there are no reports of superomniphobic surfaces with metamorphic textures (i.e., textures that transform their morphology in response to an external stimulus). In this work, we present the first-ever metamorphic superomniphobic (MorphS) surfaces fabricated with a thermo-responsive shape memory polymer. Unlike prior work, utilizing our MorphS surfaces, we demonstrate the distinctly different wetting transitions of liquids with different surface tensions and elucidate the underlying physics. The wetting transitions on our MorphS surfaces are solely due to transformations in morphology of the texture. We envision that the rapid and reversible wetting transitions on our MorphS surfaces will have a wide range of applications including controlled drug release systems, liquid-liquid separation membranes, lab-on-a-chip devices, and biosensors. [DOI: 10.1002/adma.201700295]

[1]DARPA Young Faculty Award and DARPA Directors Fellowship (D13AP00049) and Colorado Office of Economic Development and International Trade for financial support under award EDA 14-246.

Hamed Vahabi
Colorado State University

Date submitted: 17 Sep 2017 Electronic form version 1.4