

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

**Droplet Manipulation to Detect Surface Tension** SANLI MOVAFAGHI, WEI WANG, ARI METZGER, DESIREE WILLIAMS, JOHN WILLIAMS, ARUN KOTA, Colorado State University — Droplet manipulation on super-repellent surfaces has been widely studied using different methods because droplets exhibit high mobility, minimal contamination and minimal sample loss on such surfaces. However, to the best of our knowledge, there are no studies that employ super-repellent surfaces to sort droplets based on surface tension. In this work, we synthesized tunable superomniphobic surfaces with fluorinated, flower-like TiO<sub>2</sub> nanostructures. We demonstrate that the surface chemistry of our superomniphobic surfaces can be tuned using UV irradiation. This allows us to systematically tune the mobility of droplets with different surface tensions on our superomniphobic surfaces. Each of these surfaces with same surface texture, but different solid surface energy allows certain high surface tension liquid droplets to freely roll past the surface while “trapping” other low surface tension liquid droplets due to adhesion. Leveraging this selective mobility of droplets based on their surface tension, we fabricated a simple device with precisely tailored discrete surface energy domains that, for the first time, can sort droplets by their surface tension. The novelty of our work lies in the design of discrete and tunable superomniphobic domains as well as the ability of the device to sort droplets by surface tension. We envision that our droplet sorting device will enable inexpensive and analytical devices for personalized point-of-care diagnostic platforms.

Sanli Movafaghi  
Colorado State University

Date submitted: 21 Sep 2017

Electronic form version 1.4