Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Dynamics of contact line pinning/depinning of sliding bubble on super-aerophobic surfaces RIDVAN OZBAY, YOUHUA JIANG, Stevens Institute of Technology, ALI KIBAR, Kocaeli University, CHANG-HWAN CHOI, Stevens Institute of Technology — It is a great significance to understand the mechanism of pinning/depinning conditions of a bubble on super-aerophobic surfaces for many applications such as thermal/energy systems and microfluidics. Whereas the effect of surface morphology on droplet pinning/depinning or sliding were studied extensively, that on bubble has been limited. The aim of this study is to explore the effect of surface morphology on the dynamics of contact line pinning/depinning of a sliding bubble on micropatterned (i.e., pillar and pore) super-aerophobic surfaces considering key surface parameters (i.e., solid fraction of wetting and effective contact line). In this work, the effective contact line along a bubble boundary is visualized at receding and advancing sides of a bubble sliding on the micropatterned surfaces with systematically varied dimensions. Results show that the effective maximal three-phase contact line is a more relevant surface parameter than the solid fraction in defining the depinning force of a sliding bubble on inclined super-aerophobic surfaces, similar to the case of droplets.

Ridvan Ozbay
Stevens Institute of Technology

Date submitted: 01 Aug 2017 Electronic form version 1.4