Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Novel Method to Characterize Superhydrophobic Coatings GARY C. TEPPER, MOHAMED A. SAMAHA[1], HOOMAN VAHEDI TAFRESHI, MOHAMED GAD-EL-HAK, Virginia Commonwealth University — Superhydrophobic surfaces possess strong water-repellent characteristic, which, among several other potential applications, enhances the mobility of water droplets over the coatings. The surface entraps air within its micropores. When a coated body is submerged and in relative motion with water, shear-free and no-slip regions alternate over, respectively, the air pockets and the solid surface. The coating maintains its hydrophobicity as long as the air remains entrapped. It is therefore of great interest to precisely measure the amount of trapped air, which is particularly difficult to estimate for coatings with disordered microstructures. A novel method to measure the gas volume fraction of superhydrophobic coatings with either ordered or random microroughness is advanced. The technique is applied to both aerogel and electrospun-fibrous coatings. The experiments utilize a very sensitive weighing scale (down to 10^{-4} gm) and height gauge (down to 10 micron) to determine the buoyancy force on an immersed, coated glass-slide substrate. The measured force is used to calculate the volume fraction of entrapped air. *Effective* coating's thickness also follows from the same calculations.

[1]Presently at Princeton University

Mohamed Gad-el-Hak
Virginia Commonwealth University

Date submitted: 24 Jul 2012 Electronic form version 1.4