Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Polymeric Fluid Flow Over Superhydrophobic Surfaces LUCAS LANDHERR, STEVEN HUDSON, KALMAN MIGLER, National Institute of Standards and Technology — Superhydrophobic (SHP) surfaces are characterized by their exceptionally low surface energies and distinct surface roughnesses that create a vapor layer between the fluid and the surface. The reduced contact area at the interface can create a dewetted state resulting in slip, drag reduction, and improved flow of fluids. Most previous superhydrophobic studies have utilized simple liquids (e.g. water) in focusing on characterization of the quiescent interface and on drag reduction or slip modifications of fluid flow. As polymeric fluid flows have exhibited similar slip and drag reduction phenomena, this study attempts to utilize SHP surfaces to improve the flow behavior of more complex multi-component fluids, such as polymer solutions. By merging the research fields of SHP surfaces and polymer fluids, we investigate the potential to enhance slip and drag reduction effects as a result of surface interactions. Microfluidic channels, interfacial rheometry and goniometry are used to evaluate slip length and fluid flow.

Lucas Landherr
National Institute of Standards and Technology

Date submitted: 11 Nov 2011 Electronic form version 1.4