Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Correlation of Bulk Viscosity and Liquid Slip on Smooth Hydrophobic Surfaces[1] SEAN MCBRIDE, BRUCE LAW, Kansas State University — In this study we examine the slip behavior of eighteen Newtonian liquids from the two homologous series, the n-alcohols and n-alkanes, with viscosities covering the range $\sim 0.4 - 11.0$ mPa s. Colloidal probe atomic force microscopy (AFM) is used to extract the slip length from experiments, which were conducted against molecularly smooth n-hexadecyltrichlorosilane (HTS) coated surfaces. The primary feature of this work is that the slip length b is found to be a function of the bulk viscosity η with $b \sim \eta^x$ where $x \sim 0.33$. The slip length is also shown to be independent of the shear rate, therefore, validating the use of Vinogradova's slip theory. An important aspect of this study is that the same surfaces are used for each liquid, allowing any relative trends in slip behavior to be attributed to the properties of the liquid.

[1]This research was supported by the National Science Foundation under grant DMR-0603144.

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Date submitted: 12 Oct 2009 Electronic form version 1.4