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Obtaining Reproducible Slip Measurements on Smooth Hydrophobic Surfaces SEAN P. MCBRIDE, B.M. LAW, Kansas State University — Over the past decade, the world market for microfluidic technologies and applications of such devices has soared. The slip length parameter at the liquid-surface interface of these devices describes how easily a fluid flows over the surface. As microfluidic devices decrease in size, slip becomes very important. Despite the undeniable success of these devices in recent years, the literature illustrates that numerous discrepancies exist for the slip magnitude measured using different experimental methods. As the need for smaller microfluidic devices approaches a consistent experimental method is needed to obtain reproducible slip results. The method employed to study slip, in this research, uses an Atomic Force Microscope (AFM) to obtain the hydrodynamic force exerted on a colloidal cantilever which is immersed in a homologous series of test liquids and driven toward a smooth hydrophobic surface. The surfaces are prepared using silicon wafers with 0.4nm RMS over a 5x5um area and coated with hexadecyltricholorsilane (HTS) via cold liquid deposition. This method provides reliable and reproducible slip measurements that are consistent with a constant slip length over a wide shear rate range. This research was supported by NSF grant DMR-0603144.

Sean P. McBride
Kansas State University

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