

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Velocity Dependence of the Kinetic Friction of Nanoparticles

DIRK DIETZEL, MICHAEL FELDMANN, ANDRE SCHIRMEISEN, Institute of Physics and Center for Nanotechnology, University of Muenster, Germany — The velocity dependence of interfacial friction is of high interest to unveil the fundamental processes in nanoscopic friction. So far, different forms of velocity dependence have been observed for contacts between friction force microscope (FFM) tips and a substrate surface. In this work we present velocity-dependent friction measurements performed by nanoparticle manipulation of antimony nanoparticles on atomically flat HOPG substrates under UHV conditions. This allows to analyze interfacial friction for very well defined and clean surface contacts. A novel approach to nanoparticle manipulation, the so called 'tip-on-top' technique [1], made it possible to manipulate the same particle many times while varying the velocity. The antimony particles exhibit a qualitatively different velocity dependence on friction in comparison to direct tip-HOPG contacts. A characteristic change in velocity dependence was observed when comparing freshly prepared particles to contaminated specimen, which were exposed to air before the manipulation experiments. [1] Dietzel et al., Appl. Phys. Lett. 95, 53104 (2009)

Dirk Dietzel
Institute of Physics and Center for Nanotechnology,
University of Muenster, Germany

Date submitted: 30 Nov 2009

Electronic form version 1.4