Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Investigation of Molecular Interactions between AFM-Tip and Thiol Films[1] AHMED TOUHAMI, JUSTIN MOORE, University of Texas Rio Grande Valley, T. RANDALL LEE, University of Houston — Among various self-assembly processes, the formation of a self-assembled monolayer (SAM) is one of the most elegant ways for making an organic film with specific surface properties. Recently, much effort has been devoted in using AFM-based single-molecule force spectroscopy (SMFS) to understanding the formation of alkanethiol SAMs on gold surfaces. Investigating the factors that affect the AFM tip-SAMs interactions is necessary to clarify the controversial results of these studies. Here, we investigated the interactions between bare AFM-tips and several SAMs thiols-gold surfaces under controlled humidity conditions. Our results demonstrate that the Tip-SAM interactions can be used to precisely determine the length of the thiol chains, the adhesion force between thiols head groups and the AFM tip, and the strength of the thiol-gold contact. Our findings on the dynamics and the structure of the SAMs of alkanethiols on gold are useful for detail understanding of the thermodynamics, kinetics and mechanisms of SAM technology assembly.

[1]NSF

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Date submitted: 25 Nov 2015 Electronic form version 1.4