Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Electromechanical Recognition of Molecules Adsorbed on Microcantilevers SANGMIN JEON, DONGKYU LEE, POSTECH, THOMAS THUNDAT, ORNL — An alternating current was applied to gold-coated silicon microcantilevers in sodium chloride solution. The cantilever is coated on one side with a thin layer of gold. Since the applied electric field through the cantilever attracts oppositely charged ions onto the gold layer, the variation of surface charges induces the oscillation of the cantilever. The larger the applied voltage is, the more the cantilever oscillates. When the experiment was repeated with self-assembled monolayer coated cantilever, the amplitude of the oscillation is decreased because the monolayer hinders the ions from approaching to the cantilever. In-situ measurements of the adsorption of mercaptohexanol molecules under the electric field clearly showed that the decrease of the oscillation resulted from the formation of the layer. When a square electric field was applied to 1-mercaptoethanol, 1-mercaptopropanol, and 1-mercaptohexanol coated cantilever, the bending profile of the cantilever depended on the kinds of the monolayer. This method can be used to study the diffusion of small ions through thin films as well as the structure of self-assembled monolayer.

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Date submitted: 12 Jan 2006 Electronic form version 1.4