Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

DNA monolayers: Charging behavior and capacitance response RASTISLAV LEVICKY, GANG SHEN, YOULEI WENG, Columbia University — Surface-immobilized DNA films present versatile experimental models for investigating organization and properties of charged polymers at solid-liquid interfaces. In this work, end-tethered layers of DNA chains are prepared on metal (gold) supports and the response of the modified surface to a sinusoidal voltage applied between the surface and bulk solution is monitored using electrochemical impedance spectroscopy (EIS). The current- voltage behavior, expressed as an interfacial impedance, is determined as a function of ionic strength, counterion valency, and chain surface density. The response is found to reflect local conditions within the DNA brush. At lower ionic strengths, the response is insensitive to bulk salt conditions, but at higher ionic strengths brush behavior is increasingly influenced by added salt. Relative to monovalent salt, presence of higher valency counterions further suppresses brush response to solution conditions. In order to independently determine DNA surface coverage, a quantitative X-ray photoelectron spectroscopy method has been developed.

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Date submitted: 02 Dec 2004 Electronic form version 1.4