Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Polyelectrolyte adsorption at a conducting surface MARIA SAMMALKORPI, PAUL R. VAN TASSEL, Department of Chemical Engineering, Yale University — Polyelectrolyte films are useful as separation membranes and sensor substrates, and are usually grown as multilayer assemblies of oppositely charged layers because single layer adsorption quickly saturates due to interfacial charge build-up. In recent experiments, we have observed polyelectrolyte adsorption to a conducting surface to become continuous, i.e., linear with time over hours. This discovery offers an enticing possibility of nanoscale thin film growth in a single step process, but also opens questions of the underlying mechanisms. Three key features to the process may be polymer charge regulation, the dielectric discontinuity at the adsorption surface, and short-range attractive interactions of the polymers. Here we present a molecular simulation study aimed at understanding the continuous adsorption process in terms of these features, and reveal conditions where they together lead to stable polymer-polymer binding and continuous adsorption on a conducting surface. Additionally, we discuss the effects of ion-ion correlations in light of recent experimental observations.

Maria Sammalkorpi
Yale University

Date submitted: 23 Nov 2009 Electronic form version 1.4