

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**Thermal Properties**  
**of Poly(allylamine hydrochloride)/Poly(acrylic acid) Layer-by-Layer Assemblies** JODIE LUTKENHAUS, LIN SHAO, Yale University — Layer-by-layer (LbL) assemblies are promising for global energy and health applications, but their materials properties are not well understood. LbL assemblies are created from the alternate adsorption of oppositely charged species from solution to a substrate. Particularly, little is known about the thermal properties of LbL assemblies because the supporting substrate impedes characterization. It is not initially clear if electrostatic LbL assemblies possess a glass transition temperature, if they are rubbery or glassy, or if their heat capacity is comparable to their homopolymer constituents. Here, we isolate large areas of LbL assemblies from a low-energy substrate, which facilitates thermal characterization via modulated differential scanning calorimetry (MDSC) and thermal gravimetric analysis (TGA). LbL assemblies of poly(acrylic acid) (PAA) and poly(allylamine hydrochloride) (PAH) were deposited onto hydrophobic substrates, and subsequently isolated. Results highlight that PAH/PAA LbL films are glassy, and have low mobility because of the high density of ion pair crosslinks. The techniques presented here are general, and can be applied to any LbL film.

Jodie Lutkenhaus  
Yale University

Date submitted: 11 Dec 2009

Electronic form version 1.4