Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

The Effect of Nanoparticles on the Thermal Transitions of Hydrated Layer-by-Layer Assemblies JOSEPH PUHR, JODIE LUTKENHAUS, Texas A&M Univ — The incorporation of nanoparticles into layer-by-layer (LbL) assemblies has been shown to impart functionalities that are useful in a number of applications. However very little is known regarding the effect of nanoparticles on an LbL film's properties. In a previous study involving nanoparticle-free LbL films of the strong polyelectrolytes, poly(diallyldimethylammonium chloride)/poly(styrene sulfonate) (PDAC/PSS), we observed a thermal transition akin to a glass transition using quartz crystal microblance with dissipation (QCM-D) and modulated differential scanning calorimetry (MDSC). In the work presented here, layers of negatively charged nanoparticles of either spherical or platelet morphology have been inserted at varying locations throughout PDAC/PSS LbL films assembled. QCM-D and MDSC were used to determine the effect that these nanoparticles have on the previously measured thermal transitions as a function of placement within the film and particle shape. Additionally, the Sauerbrey and the Voigt models were utilized to gain an insight into the film properties during both the assembly and the thermal analysis experiments.

Joseph Puhr
Texas A&M Univ

Date submitted: 12 Nov 2013 Electronic form version 1.4