Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Distribution of POSS Nanoparticles in Symmetric Diblock Copolymer Thin Films UMESH SHRESTHA, DILRU RATNAWEERA, Clemson University, STEPHEN CLARSON, University of Cincinnati, DVORA PERAHIA, Clemson University — The distribution of Polyhedral Oligomeric Silsesquioxanes (POSS) nanoparticles) in thin films of symmetric diblock copolymer polystyrene-b-poly dimethyl siloxane (PS-*b*-PDMS) was studied by neutron reflectometry. Blending of nanoparticles (NPs) with polymers provide a pathway to tune properties of the polymer such as conductivity, mechanical strength, optical activity as well as dewetting, where the properties depend on the distribution of the NPs. Controlling the distribution of NPs in polymers thin films however, remains a challenge where entropic contributions drive segregation of the NPs to the interface. Different approaches were taken including modifying the interfacial interactions of the NP. The current study investigates effects of the relative size of the NP with respect to that of the polymer layers following distribution of POSS cages which consist of a silicon cage in a symmetric PS-PDMS. The temperature was varied from room temperature to 150^{o}C, investigating the distribution above and below the glass transition temperature of the styrene blocks. The distribution of the NPs as well as structural changes for two molecular weights of the diblock 10kg/mol and 50kg/mol within the films will be discussed.

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Date submitted: 11 Nov 2011 Electronic form version 1.4