Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Effect of solvent vapor type on evolution of thin film morphology of block copolymer-nanoparticle composites. DEEPALI PALTA, DAVID BUCKNALL, Georgia Institute of Technology — In this study we report the effect that different solvent vapors have on the resultant phase morphology of thin films of poly(styrene-butadiene-styrene) triblock copolymer (SBS) and the effect this has on the ordering when mixed with nanoparticulate inclusions. When exposed to different saturated solvent vapors, the surface morphology of the film changes depending on both the solvent vapor type and the exposure time. When the SBS film spun cast from cyclohexanone is exposed for 48 hours to vapors of the same solvent, the as made film morphology of in-plane cylinders changes to cylinders that are perpendicular to the substrate. These cylinders possess an almost perfect degree of crystallographic ordering over lateral dimensions of several microns. By contrast solvent annealing in chloroform or toluene which are also both relatively good solvents for both the blocks, the degree of order observed in cyclohexanone is not observed. In this presentation we describe the evolution of the phase morphology of these films as a function of film thickness (<1000 nm), type of solvent vapor, exposure time to the saturated vapors and percentage content of 3 different types of 1-50 nm particles (gold, FePt, and C60).

Deepali Palta
Georgia Institute of Technology

Date submitted: 15 Nov 2006 Electronic form version 1.4