Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

**Controlling Nanoparticle Location and Morphology in Polymer Blend and Copolymer Films.** RUSSELL COMPOSTO, AYSENUR CORLU, RANJAN DESHMUKH, University of Pennsylvania, HYUN-JOONG CHUNG, Samsung, SDI, Korea, KOHJI OHNO, Kyoto University, Japan — Polymer blends and block copolymers containing nanoparticles (NP) have potential as optoelectronic devices, chemical sensors and nanoreactors. Because structure governs device performance, self-regulating, stable structures ranging from the micro to nanoscale are highly desirable. This presentation shows how silica nanoparticles (NP) modified with polymer brushes partition in polymer blends. If NP partition into only one phase, phase separation slows down, whereas NP that jam the interface produce a bi-continuous metastable structure. As film thickness increases, jamming occurs at lower NP concentration. In symmetric block copolymer films, the addition of NP also slows down phase evolution and can even produce a metastable perpendicular morphology containing surface segregated NP. However, the mechanism differs from the polymer blend case and the resulting length scale is in the nanometer range. These studies demonstrate the interplay between NP distribution and phase morphology in both blends and copolymer systems that span the micro to nano length scales.

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Date submitted: 20 Nov 2006 Electronic form version 1.4