Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Additive-Driven Assembly of Block Copolymers: A Strategy for Well Ordered Hybrid Nanocomposites JAMES WATKINS, VIKRAM DAGA, YING LIN, Polymer Science and Engineering, University of Massachusetts Amherst — Ordered block copolymer - nanoparticle composite systems are an interesting class of materials in which the block copolymer guides the spatial distribution of nanoparticles. Important considerations for designing these systems include tuning the functionality of the ligands to promote compatibility with the desired block and tuning the size of the particles relative to the size of domains. Often, at high loadings, either the nanoparticles phase separate or the block copolymer morphology is disrupted. Here we discuss how strong interactions between the ligands and the polymer chains can lead to incorporation of high loadings of large molecular additives and nanoparticles to form well-ordered block copolymer morphologies. Block copolymers chosen for this purpose were disordered and selective hydrogen bonding interactions led to disorder to order transitions upon particle addition. Results for molecular additives as well as nanoparticles indicate a variety of routes to functionalization of block copolymer templates.

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Date submitted: 20 Nov 2009 Electronic form version 1.4