

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Rheology and Phase Transitions in Highly Filled Additive/Block Copolymer Composites BENJAMIN M. YAVITT¹, ROHIT KOTHARI², H. HENNING WINTER³, JAMES J. WATKINS⁴, University of Massachusetts Amherst — We have recently demonstrated that strong, segment-specific interactions between multi-functional additives (organics, nanoparticles and nanotubes) and one segment of a block copolymer can yield highly filled, well-ordered composites. In this study we used rheology to determine phase transitions and materials properties in systems containing high volume fractions of nanoparticles that are not accessible in by other means. We utilized well-defined surface functionalized nanoparticle systems by which we can assess the role of the number, strength, and surface density of functional groups on the phase behavior and mechanical properties of the composites. From this study, we developed an understanding of the interactions and structure between nanoparticles and block copolymer, and the mechanisms by which these characteristics are affected by temperature.

¹Polymer Science and Engineering, University of Massachusetts Amherst

²Polymer Science and Engineering, University of Massachusetts Amherst

³Chemical Engineering, University of Massachusetts Amherst

⁴Polymer Science and Engineering, University of Massachusetts Amherst

Benjamin M. Yavitt
University of Massachusetts Amherst

Date submitted: 13 Nov 2014

Electronic form version 1.4