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Morphological Characteristics and Phase Behavior of Nanoparticle-Modified Block Copolymers MICHELLE BOWMAN, North Carolina State University, MICHAEL BOCKSTALLER, Carnegie Mellon University, KIM RASMUSSEN, Los Alamos National Laboratory, JON SAMSETH, SINTEF, STEVEN SMITH, The Procter & Gamble Company, RUSSELL THOMPSON, University of Waterloo, RICHARD SPONTAK, North Carolina State University — Block copolymers exhibit a wealth of nanoscale morphologies that continue to find use in a diverse variety of emergent (nano)technologies. While numerous studies have explored the effects of molecular confinement on such copolymers, few have examined the use of such objects to modify the morphological characteristics and phase behavior of microphase-ordered block copolymers. In this work, a poly(styrene-*b*-methyl methacrylate) (SM) diblock copolymer has been modified with surface-functionalized fumed silica (FS) and colloidal silica (CS). Dynamic rheological measurements have been conducted on the neat and nanoparticle-modified copolymer to generate a quantitative comparison with SM/FS and SM/CS nanocomposites. Transmission electron microscopy (TEM) and self-consistent field theory (SCFT) calculations have also been performed to further elucidate results obtained via dynamic rheology by establishing the morphological characteristics of the copolymer and the dispersion of the functionalized nanoparticles within the resultant nanocomposites.

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