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**Phase Separation Dynamics of Polymer Blend Films Containing Polymer-Grafted Nanoparticles** H.-J. CHUNG, R.J. COMPOSTO, Mat.Sci.&Eng., U. of Pennsylvania, K. OHNO, T. FUKUDA, Inst.Chem.Res., Kyoto U. — Polymer blends containing nanoparticles (NP) are important in advanced technologies including opto-electronic and biosensor devices. Upon adding methyl-terminated silica NP's [22nm (NP<sub>A</sub>)] at dilute concentrations, PMMA:SAN (50:50) films (650nm) undergo early, intermediate and late stages of morphology development, similar to a PMMA:SAN film (Wang & Composto, JCP (2000)). NP's partition into the PMMA-rich phase, and slow down the kinetics of domain growth. This result is consistent with a coalescence model that predicts  $\xi \sim (1 / \eta)^{1/3} t^{1/3}$ , where  $\xi$  and  $\eta$  are the correlation length and PMMA viscosity, respectively (Chung *et al.*, EPL (2004)). Although the bulk  $\eta$  agrees with this model, a microscopic understanding of the phase separation mechanism requires knowledge of polymer-NP and NP-NP interactions. To address this issue, well-characterized silica NP's (15 nm) with densely grafted PMMA [ $M_w = 1.8K$  (NP<sub>B</sub>) and 21K (NP<sub>C</sub>)] are employed as non-interacting fillers in the PMMA-rich phase. The impact of PMMA-grafted NP on the phase separation dynamics in films, as well as the rheology of PMMA/NP composites, is investigated. Specifically, phase separation was slowest for NP<sub>B</sub> relative to films containing NP<sub>A</sub> and NP<sub>C</sub>. These studies show that wetting and domain coarsening in polymer blend films can be controlled by the judicious addition of surface modified NP.

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