

Abstract Submitted
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Tuning the morphology of polymer nanocomposites: Effect of film thickness and nanoparticle shape¹ SANGAH GAM, AYSEUR CORLU, RUSSELL J. COMPOSTO, University of Pennsylvania — Adding nanoparticles (NPs) to polymer blend films is an attractive route towards enhancing the mechanical, optical, and electronic properties. Previously, we showed that NPs can segregate to the interphase, jam and produce stable bicontinuous structures. In this study, we show how film thickness effects the phase behavior of poly(methyl methacrylate): poly(styrene-ran-acrylonitrile) (PMMA:SAN) blends containing PMMA-modified silica NPs that partition to the PMMA/SAN interface. As NP loading increased and film thickness decreased, the growth of PMMA domains and correlation length was slowed down. As film thickness increased, the critical concentration to achieve jamming decreased suggesting that lower loading can be used to create bicontinuous structures. To investigate NP shape, hydroxyl and methyl-modified silica nanorods (NRs) were added to PMMA:SAN films. These NRs partitioned into the PMMA-rich domains and produced smaller domain size with increased loading. Compared to spherical NPs, NR loading was more effective at slowing down phase evolution.

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