

Abstract Submitted
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Improving the Compatibility between Polystyrene and Polybutadiene by Adding Silica Nanoparticles YUPING XIE, Columbia University, DAMIEN MAILLARD, National Research Council Canada, SANAT KUMAR, Columbia University, BRANDON CASH, Bluestar Silicones USA Corp., BRIAN BENICEWICZ, University of South Carolina — The compatibility between polystyrene (PS) and polybutadiene (PB) was improved by adding bare silica or PS-grafted silica nanoparticles. The grafting density varies from 0.01 chains/nm² to 0.10 chains/nm². Thin sections are obtained by cryomicrotome at -140 °C for TEM analysis. Without adding nanoparticles, bulk phase separation occurs for the PS-PB blend, although a few droplets of PS are found presumably due to the viscoelastic phase separation. When the grafting density is less than 0.05 chains/nm², the particles are found to partition between the PS-PB interface and the continuous PS phase. However, when the grafting density is greater than or equal to 0.05 chains/nm², the particles are found to locate only in the dispersed PS phase, and the size of the PS phases decreases with increasing grafting density. Phase inversion also occurs at 70 wt% of PS when the grafting density is fixed at 0.10 chains/nm².

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