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Improving the Dispersion and Interfaces in Polymer-Carbon Nanotube Nanocomposites by Sample Preparation Choice CHANG-UK LEE, University of Tennessee, Knoxville, MARK DADMUN, University of Tennessee, Oak Ridge National Laboratory — Polymer nanocomposites composed of poly(styrene-*ran*-vinyl phenol) (PSVPh) copolymers and 5 wt % multi-walled carbon nanotubes (MWNTs) were prepared by three different methods, including melt-mixing and solution casting. The MWNTs were either oxidized to incorporate oxygenated defects or utilized as received. The mechanical properties of the nanocomposites were measured by DMA, and the extent of intermolecular hydrogen bonding between MWNTs and PSVPh was quantified by IR. Our DMA results suggest that melt-mixing leads to more stable morphologies of the final nanocomposites than solution casting. Additionally, the IR analysis of the nanocomposites indicates melt-mixing can result in the formation of more intermolecular hydrogen bonding between the MWNTs and PSVPh than solution casting, and thus suggests that melt-mixing leads to nanocomposites with more reproducible mechanical properties than solution casting. Our results thus provide guidelines to realize improved morphologies and properties of polymer carbon nanotube nanocomposites by optimizing intermolecular interactions between MWNTs and polymers using processing.

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