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**Understanding Dynamics of Multicomponent Polymer Systems Using Homopolymer/Copolymer Blends** CALEB DYER, Department of Chemistry, Univ. of TN, DIAS LINTON, Dept. of Chemistry, Univ. of TN, MARK DADMUN, Oak Ridge National Lab, Oak Ridge TN and Dept. of Chemistry, Univ. of TN — Blending two polymers is a cost-effective method to produce new materials with tailored properties, although the effect of the presence of one component on the dynamics of the second component is not well understood. Recent studies on miscible polymer blends show that the local environment in a polymer blend has a critical impact on the dynamics of each component in the blend. To this end we have utilized neutron reflectivity (NR), quasi-elastic neutron scattering (QENS), and rheology to study the dynamics of a polystyrene-*ran*-poly(methyl methacrylate) (PS-*ran*-PMMA) copolymer in a PMMA matrix. The system consists of a miscible blend that is 90% PMMA/10% random copolymer. The copolymer composition varies from 60% to 90% MMA in the blend, effectively tuning the thermodynamic interactions in the system. We will present these results to provide insight into the role of thermodynamic interactions on the dynamics of this miscible polymer blend.

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