

Abstract Submitted
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Host polymer influence on dilute polystyrene segmental dynamics

T.R. LUTZ, Y.Y. HE, M.D. EDIGER, University of Wisconsin-Madison — We have utilized deuterium NMR to investigate the segmental dynamics of dilute (2%) d_3 -polystyrene (PS) chains in miscible polymer blends with polybutadiene, poly(vinyl ethylene), polyisoprene, poly(vinyl methylether) and poly(methyl methacrylate). In the dilute limit, we find qualitative differences depending upon whether the host polymer has dynamics that are faster or slower than that of pure PS. In blends where PS is the fast (low T_g) component, segmental dynamics are slowed upon blending and can be fit by the Lodge-McLeish model. When PS is the slow (high T_g) component, PS segmental dynamics speed up upon blending, but cannot be fit by the Lodge-McLeish model unless a temperature dependent self-concentration is employed. These results are qualitatively consistent with a recent suggestion by Kant, Kumar and Colby (Macromolecules, 2003, 10087), based upon data at higher concentrations. Furthermore, as the slow component, we find the segmental dynamics of PS has a temperature dependence similar to that of its host. This suggests viewing the high T_g component dynamics in a miscible blend as similar to a polymer in a low molecular weight solvent.

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