Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Compositional Heterogeneity and the Role of Polystyrene Molecular Weight on the Dynamic Response of Poly(vinyl methyl ether) in Thin Film Polystyrene/Poly(vinyl methyl ether) Blends RAVI SHARMA, BAN DONG, PETER GREEN, Univ of Michigan - Ann Arbor — The segmental dynamics of poly(vinyl methyl ether) (PVME) chains in miscible blends of PVME and polystyrene (PS) exhibits a strong dependence on blend composition as well as dissimilar temperature dependences; this behavior manifests the fact that each component experiences different intramolecular and intermolecular interactions associated with differing local compositional environments. A similar study of thin films of these blends confined between aluminum (Al) substrates reveals a dependence of the PVME segmental relaxations on the host PS molecular weight, M. The dynamics of the PVME chains increase with increasing PS molecular weight in the blend. This enhancement of dynamics is associated with a corresponding decrease in both the dynamic and thermal glass transition temperatures (T_gs) in the same sample geometry. Depth profile measurements indicate that not only is the PVME preferentially segregated at the polymer-Al interfaces, but this segregated layer increases in thickness with increasing molecular weight of the PS component. This behavior is consistent with the overall enhancement of the PVME dynamics with increasing M.

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Date submitted: 09 Nov 2016

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