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The Viscoelastic Behavior of Polymer/Oligomer Blends WEI ZHENG, GREGORY MCKENNA, SINDEE SIMON, Texas Tech University — The dynamics in athermal blends of poly(α-methyl styrene) (PaMS) and its short chain oligomer are investigated using rheometry and differential scanning calorimetry (DSC). Master curves for the dynamic shear responses, G' and G", are successfully constructed for both the pure materials and the blends, indicating the validity of the time-temperature superposition principle. The temperature dependence of the shift factor follows the WLF (Williams-Landel-Ferry) behavior over the temperature range studied, and for the blends, the dependence is dominated by the high mobility oligomer. The discrete relaxation spectra of the materials are calculated and are found to be broader for the blends than for the pure materials. A similar domination of the dynamics by the oligomer is observed in DSC enthalpy recovery studies and in the broadened glass transition from DSC. The ability to predict the dynamic responses of the blends from the responses of the neat materials is examined, and whether this prediction needs to incorporate the self-concentration idea as described in Colmenero's model will be discussed.

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