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Glass Transition Temperature of Isolated Polymer-A Chains Dispersed within a Bulk Polymer-B Phase: Novel Characterization by Fluorescence ROBERT SANDOVAL, JOHN TORKELSON, Northwestern University — Since the publication of "Self-concentrations and effective glass transitions in polymer blends" (Macromolecules 2000) by Lodge and McLeish, many studies have focused on characterizing the glass transition temperature (Tg) of particular components in miscible blends. However, the lack of sensitivity via conventional techniques to a minor component in asymmetric blends has hindered direct characterization of Tgs associated with trace levels of one polymer dispersed in a second polymer. We have developed an intrinsic fluorescence technique to determine the Tg of styrene-containing components dispersed at trace levels in a polymer blend where the blend is miscible and the minor component is dissolved in the bulk phase. The bulk phase dramatically affects the Tg of the dispersed PS chains; a 62 K PS Tg reduction is observed when PS is dispersed within poly(n-butyl methacrylate) at trace levels. This study is the first to allow direct Tg measurements of isolated chains dispersed in a bulk phase and allows for a critical test of the Lodge-McLeish model at highly asymmetric blend ratios.

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