

Abstract Submitted
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Synthesis and Characterization of Fluorescently Labeled Diblock Copolymers for Location-Specific Measurements of The Glass Transition Temperature¹ DANE CHRISTIE, RICHARD REGISTER, RODNEY PRIESTLEY, Princeton University

— Interfaces play a determinant role in the size dependence of the glass transition temperature (T_g) of polymers confined to nanometric length scales. Interfaces are intrinsic in diblock copolymers, which, depending on their molecular weight and composition, are periodically nanostructured in the bulk. As a result diblock copolymers are model systems for characterizing the effect of interfaces on T_g in bulk nanostructured materials. Investigating the effect of intrinsic interfaces on T_g in diblock copolymers has remained unexplored due to their small periodic length scale. By selectively incorporating trace amounts of a fluorescent probe into a diblock copolymer, T_g can be characterized relative to the diblock copolymer's intrinsic interface using fluorescence spectroscopy. Here, pyrene is selectively incorporated into the poly(methyl methacrylate) (PMMA) block of lamellar forming diblock copolymers of poly(butyl-*b*-methyl methacrylate) (PBMA-PMMA). Preliminary results show a correlation of T_g as measured by fluorescence with the onset of T_g as measured by calorimetry in labeled homopolymers of PMMA. This result is consistent with previous characterizations of T_g using fluorescence spectroscopy. In selectively labeled diblock copolymers T_g is found to vary systematically depending on the distance of the probe from the PBMA-PMMA interface.

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