

Abstract Submitted
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Dynamics of anchored polymer chains in a tunable micelle confinement system HENGXI YANG, CHELSEA CHEN, GARAM JUN, PETER GREEN, University of Michigan — We investigated the dynamics of the polyisoprene (PI) component confined within micelles in the blends of polystyrene-*b*-polyisoprene (PS-*b*-PI) diblock copolymers and polystyrene (PS) homopolymers, using broadband dielectric spectroscopy (BDS). In these blend, the diameter of the PS-*b*-PI micelle cores, composed of the PI component, increased with increasing molecular weight of the PS host, P , and reached a plateau at high P regime. The BDS results show that the dynamics of the PI component were fastest within the smallest micelle cores. Additionally, the relaxation intensities were weakest within smallest micelle cores. The local glass transition temperature (T_g) of the PI component was 201 K when its core diameter is ~ 29 nm, while the T_g dropped to 193 K with a core diameter of ~ 21 nm. Although faster dynamics with confinement has been previously observed in several systems, few have examined confinement at length scales much greater than that of the typical cooperative rearranging region, which is normally a few nanometers. Therefore, our study may shed new light on understanding the dynamical behavior of confinement, especially in domains formed in microphase separated block copolymer structures.

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