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Segmental dynamics of thin polymer films probed by dye reorientation. KEEWOOK PAENG, HAU-NAN LEE, STEPHEN SWALLEN, MARK EDIGER, Department of Chemistry, University of Wisconsin-Madison — We have studied the dynamics of both freestanding and supported polymer thin films (down to 25 nm) by probing reorientation of dilute dye molecules. Well below Tg, dye molecules were photobleached using intense linearly polarized light creating an anisotropic distribution. Anisotropy was measured using circularly polarized light and probing fluorescence parallel and perpendicular to the bleaching beam. Temperature was linearly ramped during anisotropy measurement; near Tg, the anisotropy dropped to zero. The dynamics of a 50 nm poly (tert-butyl styrene) film were faster than bulk dynamics by an amount equivalent to a 5 K shift in Tg. Faster dynamics compared to bulk films were also found for polystyrene and these results will be compared to the previous Tg measurements. Four different polymers, polystyrene, poly (tert-butyl styrene), poly (methyl methacrylate), and poly (2-vinyl pyridine) were studied.

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