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Segmental dynamics of supported and freestanding polystyrene thin films probed by dye reorientation. KEEWOOK PAENG, HAU-NAN LEE, STEPHEN SWALLEN, MARK EDIGER, University of Wisconsin-Madison — The dynamics of both freestanding and supported polystyrene thin films (down to 15 nm) were studied by measuring the reorientation of dilute dye molecules. Well below T_g , dye molecules were photobleached using intense linearly polarized light creating an anisotropic distribution. The anisotropy decay was measured using circularly polarized light and probing fluorescence parallel and perpendicular to the bleaching beam during linear temperature ramping. Temperature ramping anisotropy measurements allow us to compare both dynamics and the distribution of relaxation times in thin and thick films. Both freestanding and supported thin films show faster and more broadly distributed dynamics than thick films. For 17.5 nm supported films, temperature ramping experiments show up to 14K shift in dynamics. The corresponding shift for 16.5nm freestanding films was 22K.

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