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Qualitative Discrepancy Between Motion on Different Length Scales in Thin Polymer Films ZAHRA FAKHRAAI, GIRJESH DUBEY, JAMES A. FORREST, Department of Physics, University of Waterloo, Waterloo, ON, N2L 3G1, Canada — Ellipsometry is used to measure the interface healing in two- layer polystyrene films at different annealing temperatures. Since the interface healing involves center of mass motion, it serves as a probe of chain diffusion in thin PS films. Using an appropriate model, the time constant of the interface healing can be obtained. The results indicate that at temperatures above the glass transition temperature, as the thickness of layers is decreased, the time constant of interface healing increases, showing slower chain motion. Ellipsometry is also used to measure the glass transition temperature of the same films. Although the chain motion is slower in these films, the Tg reduction indicates enhanced dynamics. This study shows than not all measures of dynamics can be used to determine the Tg.

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