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o-Terphenyl Self-Diffusion Near the Glass Transition Temperature MARIE K. MAPES, STEPHEN F. SWALLEN, M.D. EDIGER, University of Wisconsin, Madison — Self-diffusion coefficients (D_T) have been obtained for the fragile glassformer o-terphenyl from the glass transition temperature (T_g= 243 K) to T_g+ 32 K. Compared to the predictions of the Stokes-Einstein equation, we observe substantially enhanced translational diffusion ($>$ 2 decades), which is a strong indicator of spatially heterogeneous dynamics. The values of D_T are measured by isothermally annealing deuterio and protio o-terphenyl thin films. Samples are prepared as vapor-deposited glassy bilayers (100 - 1000 nm) with an initially sharp interface. When a sample is annealed, diffusion blurs the interface while supercooled o-terphenyl vaporizes at the film's surface. A mass spectrometer records deuterio and protio o-terphenyl concentrations over time, providing a profile of the diffusion that has occurred in the film. Isotope and thermal history effects on D_T have also been investigated. Our results qualitatively agree with dynamic facilitation models and random first order transition theory.

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