

Abstract Submitted
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The impact of fragility on the properties of the glass formation of polymer nanoparticle composites¹ BEATRIZ A. PAZMINO BETANCOURT, Physics Dept., Wesleyan University, Middletown, CT, JACK F. DOUGLAS, Polymer Division, NIST, Gaithersburg, MD, FRANCIS W. STARR, Physics Dept., Wesleyan University, Middletown, CT — We investigate the effects of nanoparticles on glass formation in a model polymer melt by molecular dynamics simulations. The addition of nanoparticles allows us to change the relaxation time, glass transition temperature T_g , the fragility of glass formation in a controlled fashion. We show that the structural relaxation for different temperatures, concentrations, and polymer-NP concentrations can be expressed in terms of a simple universal function of the short-time Debye-Waller factor. We further examine how the stretching exponent β and the degree of the breakdown of the Stokes-Einstein relation depend upon fragility, which we relate to the extent of cooperative motion.

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