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Effect of interfacial entanglement density on the melt and glassy properties of attractive polymer nanocomposites ERKAN SENSES, PINAR AKCORA, Stevens Inst of Tech — Individual dispersion of silica nanoparticles of 13 nm and 56 nm sizes in poly(methyl methacrylate) is achieved by the right choice of a solvent.By using this well-defined model attractive system, it was shown in our previous work that the conformation of PMMA on attractive silica surfaces can be dynamically altered by applying large amplitude oscillatory shear (LAOS) well above the Tg of the polymer[1].Correspondingly, the entanglement density of polymer is increased due to dynamic heterogeneities between the matrix and the adsorbed polymer. Here, we investigate, on the same system, the effect of different interfacial entanglement densities on the melt and glassy properties (Tg, fragility and physical aging).Instead of surface modification of particles, which leads to poor control over the dispersion, we tuned the interfaces by applying LAOS above Tg of the composites and by using binary blends of short (Mw¡¡Me) and long (Mw¿Me) PMMA chains.With various nanoparticle concentrations and polymer blend ratios, we systematically study the effect of the confinement parameter (ID/2Rg) on the glass transition and dynamic fragility obtained from DSC and rheometry.Our results suggest that unlike Tg, the fragility presents strong dependence on ID/2Rg.[1]doi:10.1021/ma302275f

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