

Abstract Submitted
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Mechanical Properties of Polymer Nanocomposites under Large Amplitude Deformation ERKAN SENSES, PINAR AK-CORA, Stevens Institute of Technology — Bare silica nanoparticle dispersion in polystyrene and poly(methyl methacrylate) homopolymers are found to be controlled upon changing the evaporation condition. In this study, we deformed the polymer nanocomposites at different states of particle dispersion under large amplitude oscillatory shearing (LAOS). As the structure evolved during LAOS, the TEM images and small-angle X-ray scattering results obtained for different states of deformation together with the measured moduli allowed us to relate the mechanical reinforcement and nonlinearities such as strain stiffening/softening or shear thinning/thickening to the particle-polymer and particle-particle interactions effective at nanometer dimensions. Our results show that well-dispersed system with attractive interactions between particle and polymer becomes more elastic under large shear and behaves as attractive gels.

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