

Abstract Submitted
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Dynamically asymmetric polymer blends on nanoparticles: Effects on chain conformation, entanglement and particle mobility in nanocomposites ANTONIO FARAONE, NIST NCNR, ERKAN SENSES, NIST NCNR / Univ of Maryland, PINAR AKCORA, Stevens Institute of Technology, MADHUSUDAN TYAGI, YIMIN MAO, NIST NCNR / Univ of Maryland, SURESH NARAYANAN, Advanced Photon Source, Argonne National Lab — We study polymer nanocomposites with particles adsorbing a high glass-transition temperature (T_g) polymer, uniformly dispersed in a low- T_g miscible matrix, forming a dynamically asymmetric interphase. The collected results clarify the effect of the interfacial polymer on the conformation and entanglement of the matrix chains, as well as on the slow nanoparticle mobility. We found no significant effect of softness of the bound chains on the matrix chain conformation at particle concentrations up to 31 vol percent. A dilation of the reptation tube was observed when the interfacial polymer is glassy; such effect disappearing above T_g . Remarkably, the mobility of the nanoparticles is strongly influenced by the dynamical asymmetry in the interphase, resulting in a diffusive or sub-diffusive particle motion depending on the length-scale experimentally probed.

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