

Abstract Submitted
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Chain Expansion in Polymer-Nanoparticle Melts A. L. FRISCHKNECHT, Sandia National Laboratories, E. S. MCGARRITY, Michigan State University, M. E. MACKAY, University of Delaware — We apply a self-consistent version of the polymer reference interaction site model (PRISM) theory to a model of spherical nanoparticles in a polymer melt. The average radius of gyration of the chains in the blend clearly increases (over that from chains in a neat melt at the same density) with increasing nanoparticle volume fraction. The amount of chain expansion also depends on the magnitudes of the attractive interactions in the system. The bulk modulus of the blend decreases with increasing nanoparticle volume fraction. We compare our theoretical results to experimental scattering data from polystyrene blended with various nanoparticles and to previous simulation results. (This work was performed, in part, at the Center for Integrated Nanotechnologies, a U.S. Department of Energy, Office of Basic Energy Sciences user facility. Sandia National Laboratories is a multi-program laboratory operated by Sandia Corporation, a Lockheed-Martin Company, for the U. S. Department of Energy under Contract No. DE-AC04-94AL85000.)

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