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Shear Thinning in Nanoparticle Suspensions PIETER J. IN 'T VELD, MATT K. PETERSEN, GARY S. GREST, Sandia National Laboratories, Albuquerque, NM — Results of large scale non-equilibrium molecular dynamics (NEMD) simulations are presented for nanoparticles in an explicit solvent. The nanoparticles are modeled as a uniform distribution of Lennard-Jones particles, while the solvent is represented by standard Lennard-Jones particles. Here we present results for the shear rheology of spherical nanoparticles of size 5 to 20 times that of the solvent for a range of nanoparticle volume fractions and interactions. Results from NEMD simulations suggest that for strongly interacting nanoparticle that form a colloidal gel, the shear rheology of the suspension depends only weakly on the size of the nanoparticle, even for nanoparticles as small as 5 times that of the solvent. However for hard sphere-like colloids the size of the nanoparticles strongly affects the shear rheology. The shear rheology for dumbbell nanoparticles made of two fused spheres is also compared to spherical nanoparticles and found to be similar except at very high volume fractions. Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under Contract DE-AC04- 94AL85000.

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