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Yield stresses and stress relaxation in latex dispersions SURESH AHUJA, Xerox Corporation — Static and dynamic yield stress as functions of temperature and time are used to study dynamics of jammed systems. Similar to hard spheres, inter-particle bonds which are function of volume fraction, crowding of clusters and aggregates can be used to and modulus is a powerful tool. Particle to particle interaction dominate in concentrated dispersions resulting in a complex microstructure due to ordering of particles. Extent of ordered and disordered regions in a microstructure depends on the magnitude of shear rate (Peclet number). Flow fields influence particle to particle collisions which are subject to Brownian, hydrodynamic, electrostatic and van der Waal forces moving a dispersion from having a dominant ordered structure to a disordered structure and then eventually into a dominant ordered region in the dispersion. Polydispersed particles of acrylic latexes were treated to both steady and oscillatory shear and their shear response was analyzed to determine shear rate dependence, dynamic and steady yield stress. The aggregate particles stemming from primary particle form fractal-like structures, which coupled with volume fraction of particles, relate to correlation length of the network. By considering chains from a bundle of primary particles in a network undergoing creation, evolution and annihilation, stress and relaxation modulus can be calculated with relaxation time constant as dependent on fractal size and volume concentration. The shear modulus and relaxation time constant from dynamic experiments are calculated and their dependence on aggregate size is determined and compared to network models.

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