

Abstract Submitted
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Nanoparticle Salts: Structure, Rheology and Ion Transport YU

H. WEN, LYNDEN A. ARCHER, Cornell Univ — Above a critical volume fraction associated with nanoscale particle spacing, interactions between tethered molecules (charged or uncharged) significantly affect particle-particle interactions and hence suspension rheology. We report on the structure, rheology, and ion transport of nanoparticles cofunctionalized with tethered salts and neutral molecules. Contrary to uncharged counterparts, charged particles in a low dielectric medium are shown to exhibit soft glassy rheology behaviors at low particle loadings, due to electrostatic bridging of salts. In addition, tethered molecules in a nanochannel created by particle crowding are conceptually similar to entangled polymers in a tube and, as a result, concentrated particle suspensions share a similar plateau modulus with entangled polymer melts. Our findings suggest that particle interactions can be fine-tuned using tethered salts of different charge densities, and geometrical confinement on tethered molecules produces topological constraints analogous to those in entangled polymers.

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