

Microstructure and rheology of bimodal  
suspensions composed of submicron PS latex  
and nanosized alumina-coated silica particles

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Some coating fluids such as cathode slurries used in manufacturing Li-ion batteries and Ni pastes in multi-layer ceramic capacitors include different types of particles to improve the performance of the product. In these liquids, the size of particles is very different; one is micron and the other is nano-meter scale. Due to different sized particles, these bi-modal suspensions show different fluid behavior compared to colloids of a single size. Especially, nanoparticles tend to aggregate and form a network structure due to their high surface energy. These aggregated nanoparticles can change the stability of whole dispersion with just small amount even if large portions of micron sized particles are well dispersed. In this study, we tried to describe this industrial situation to investigate the effect of attractive nanoparticles on the microstructure and fluid behavior of bimodal suspension. Scaling analysis of bimodal suspensions was performed to investigate the nature of particle bonds between two different sizes and surfaces of the particles.