

Facile Route to Metal and Quantum Dot Nanoparticles with Liquid-Like Behavior via Ionic Liquid of Low M_w

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We demonstrate that Ag and QD nanoparticles synthesized using hydrocarbon stabilizers in nonpolar solvent are directly phase-transferred to thiol-functionalized ionic liquids (ILSH) with low molecular weight (M_w) and short chain length. Therefore, we can prepare the Ag and QD nanoparticle fluids with liquid-like behavior based on ILSH showing the notable electrical conductivity and optical energy transfer. These phenomena are mainly caused by the narrow gap between nanoparticles stabilized by ILSH with low M_w and short chain length. Furthermore, in case of ILSH-QDs dispersed in water solvent, positively charged QDs can be acquired due to their cationic imidazolium group and easily controlled their concentration by adding water solvent. Therefore, ILSH-QDs can be electrostatically assembled with anionic polyelectrolytes (PEs) such as poly(sodium, 4-styrene-sulfonate) (PSS) using layer-by-layer (LbL) assembly method.