Tunable size fractionation of ligand capped metal nanoparticle using gas-expanded liquids (GXLs) and ionic liquids

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Metal nanoparticles are known to exhibit a number of unique optical properties. It is well known that the plasmon resonant peaks and line widths are sensitive to the size and shape of the nanoparticle. Gas expanded liquids (GXLs) process have been developed over the last decade for selective size fractionation of poly-dispersed and ligand capped nanoparticles using n-hexane as a dispersion media. and carbon dioxide (CO_2) was used as an antisolvent in gas-expanded liquids (GXLs) process for controlling the size distribution of ligand stabilized metallic nanoparticles. The size distribution mainly depended on the tunable physicochemical properties of carbon dioxide. In this study, we controlled the concentration of both ionic liquid and carbon dioxide for tunable nanoparticle dispersability in a GXLs system. and we investigated the solvent-ligand interaction based on the total interaction energy model for developing a method of predicting the maximum nanoparticle size.