

Size-Controlled and Electro-Sterically Stabilized Au Nanoparticles

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This poster describes the gram-scale synthesis of size-controlled hydrophobic gold nanoparticles and a phase transfer for water soluble particles by electro-sterically stability. The hydrophobic gold nanoparticles were generated by via reduction reaction of tetrachloroaurate hydrate as gold precursor in the mixture of 1,2-dichlorobenzene as solvent and oleylamine and oleic acid as surfactant and a mild reducing agent at 190 °C. Size of the hydrophobic Au nanoparticles is possible to a change of 440 % from 10 nm to 54 nm by adjusting volume ratio of the co-surfactant in the synthetic procedure of the particles. The size change in wide range is attributed to high controllability on a particles growth by a surfactant, compared to a reaction temperature and time. When the proportion of oleic acid of the used surfactants increased, Au nanoparticle size was increased by the low binding ability on a growing particle surface. It is a very important to size change of gold nanoparticles in one synthetic system, because optical and thermal properties of gold nanoparticles considerably depend on the size. The as-prepared hydrophobic Au nanoparticles could be transferred into water phase. In detail, the Au particles were dispersed in chloroform and then added to a cetyl trimethylammonium bromide aqueous solution at room temperature. The resultant solution was centrifuged at 3,000 rpm, and the precipitation was washed with ethanol. The hydrophilic AuNPs were well dispersed in water, methanol, and ethanol.