Concentration dependent absorption and scattering characteristics of silica-gold core-shell nanoparticles embedded in liquid phantoms

이호섭, 이강택*
연세대학교 화학공학과
(ktlee@yonsei.ac.kr*)

We prepare silica-gold core-shell nanoparticles and investigate their optical properties. To synthesize silica nanoparticles, we use Stöber process. After silica nanoparticles were formed, 3-aminopropyltriethoxysilane was employed to modify the surface of silica nanoparticles. Finally, surface-modified silica nanoparticles were coated by gold. Reduction of hydrogen tetrachloroaurate with tetrakis(hydroxymethyl)phosphonium chloride yields gold colloid. Small gold colloid is adsorbed onto the APTES- functionalized silica nanoparticle surface. Gold shells were grown using potassium carbonate and hydrogen tetrachloroaurate in the presence of formaldehyde. Various experimental techniques were used to characterize the properties of silica-gold core-shell nanoparticles such as TEM, UV-vis spectroscopy and QELS. We find that the optical properties of gold-silica core-shell nanoparticles depend on shell thickness and concentration. We investigate the scattering and absorbing properties of silica-gold core-shell nanoparticles of varying size and different concentration in absorbing liquid phantoms of silica colloid, based on diffuse photometry.