

Formation of Gold Nanoparticle with Fluorescent Molecule in Lipid Bilayer Vesicle

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Fluorescence imaging and sensing using metal nanoparticles have attracted considerable interest in a variety of biomedical application owing to the fluorescence enhancement and increased photostability. In order to utilize gold nanoparticles in fluorescence-based biomedical application, fluorescent molecules should be positioned close to the surface of metal nanoparticles. For this purpose, fluorescent molecules are attached to the surface of metal nanoparticles by electrostatic interaction. However, electrostatic interaction is unstable under the conditions with high concentration of electrolytes. To overcome this limitation, few research groups attached fluorescent molecules onto the metal nanoparticle surface and successively coated with silica or metal. Here we propose the method to synthesize gold nanoparticle in lipid bilayer vesicle containing fluorescent molecules. Fluorescent molecules and reducing agents are simultaneously encapsulated within the vesicle. Gold nanoparticle is formed through the reduction of diffused gold precursor in the vesicle. The formation of gold nanoparticle is systematically characterized by TEM and UV-vis spectrophotometer. To investigate the coexistence of gold nanoparticles and fluorescent molecules, Raman spectroscopy and fluorescence imaging is carried out.