

Surface Coating of Colloidal Metal Nanoparticles with Phospholipid bilayers by Exploiting Phase Transfer

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Phospholipids have been one of ideal ligands for surface coating of colloidal metal nanoparticles for in vivo applications because the phospholipid molecule can enhance biocompatibility and colloidal stability of the nanoparticles. Mechanical disruption of liposomes is widely used to introduce phospholipid bilayers on the surface of colloidal metal nanoparticles. However, this method suffers from low yield and poor selectivity. Here we propose the phase transfer-mediated surface coating of colloidal metal nanoparticles with phospholipid bilayers. In a typical procedure, first, aqueous gold nanoparticles which are modified with polyethylene glycol beforehand are transferred to chloroform where thiolated lipid is dissolved. Then, the nanoparticles are selectively separated by centrifugation, and are re-dispersed in acetone. By adding to water, another lipid is assembled onto the surface of the nanoparticles through hydrophobic interaction. As-synthesized nanoparticles are characterized by UV-vis spectroscopy, transmission electron microscopy, and surface-enhanced Raman spectroscopy, respectively.