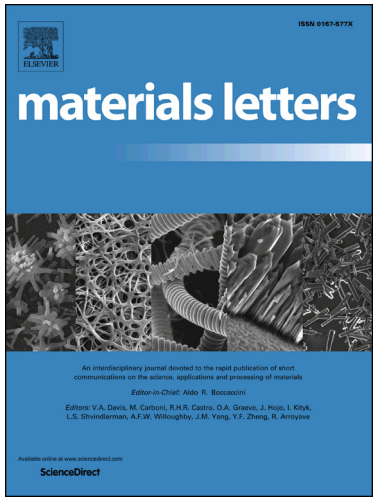

Unary- or binary-plasmonic nanoparticle-assemblies formed within hollow silica particles with a surfactant-assisted method

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Unary- or binary-plasmonic nanoparticle-assemblies formed within hollow silica particles with a surfactant-assisted method

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Abstract

In this study, a surfactant-assisted method was employed to successfully prepare plasmonic nanoparticle assemblies encapsulated in hollow silica particles. In this method, silica was precipitated in the presence of plasmonic nanoparticles with single nanometer sizes and an anionic surfactant, sodium oleate (NaOA). The absorption peak of the composite particles was red-shifted compared with that for the well-dispersed suspension of the plasmonic nanoparticles. The extent of red-shift was easily tuned by changing the concentration of nanoparticles incorporated in the hollow silica particles. A binary-nanoparticle assembly, comprising gold and silver nanoparticles, was also prepared. Hence, this method can be extended to the design of novel multifunctional particles based on different nanoparticle assemblies.

Keywords: Colloidal nanoparticle assembly, Plasmonic nanoparticle, Surfactant-assisted method, Hollow silica particle, Binary nanoparticle assembly