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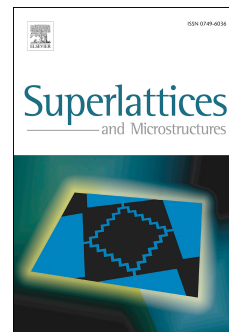
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## Stable silica-coated self-assembly of gold nanorods: synthesis and plasmonic properties

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**Abstract:** Assembled gold nanorods (GNRs) attract much attention for their distinctive plasmon-coupled properties, but it remains challenging to realize practical use for their instability of the structure and the toxicity of the surfactant. We herein present a simple and effective protocol to coat mesoporous silica on the end-to-end and side-by-side assemblies, which are induced by different amount of the dithiol poly(ethylene glycol). The finite-difference time-domain (FDTD) simulations are also utilized to study the plasmonic properties of the nanostructures. Experimental and calculated results indicated that the as-prepared core-shell nanostructure possesses not only the optical stability, but also the fascinating and tunable optical response through changing the organized modes of assemblies. The result is promising in investigating near field plasmonic property, and biomedical application for *in vivo* bioimaging and photothermal cancer therapy.

**Key words:** Gold nanorods; Surface plasmon; Self-assembly; Core-shell nanostructure; FDTD solutions

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