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Full Paper

银包覆金纳米粒子膜的制备、表征及其**SERS**效应

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摘要 本文研究了通过液相微波高压技术和自组装方法相结合制备的复合纳米粒子膜。首先, 将利用微波加热制备的金纳米粒子组装到石英片上,然后, 再通过微波加热方法在石英片上的金颗粒表面沉积生长银包裹层, 用UV-Vis吸收光谱和原子力显微镜对该结构的复合纳米粒子膜进行表征。研究表明：通过在微波高压反应中调节银的沉积量可以有效控制包覆层的厚度和复合粒子的尺度。相对金纳米粒子膜, 制备的复合粒子膜能显著的提高SERS能力,而较大的复合粒子的银壳层和粒子之间的耦合作用对复合粒子膜的SERS活性的显著增强起主要作用。

关键词 组装,微波加热, UV-Vis吸收光谱, 表面形貌, 表面增强拉曼散射
分类号

Fabrication, Characterization, and Surface-Enhanced Raman Activity Study of Silver Coated Gold Nanoparticulate Films

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Abstract This paper reports a study on the preparation of Ag-clad Au colloidal monolayer films by a combination of colloid self-assembly and liquid phase microwave high-pressure technique. Firstly, monodisperse Au nanoparticles prepared by microwave heating method were assembled onto a quartz slide. Then, these Au colloidal particles on the quartz surface acted as seeds for growing the Ag-clad Au composite particulate films. The obtained particulate films were characterized by UV-Vis spectra and atomic force microscopy. It was found that the thickness of the shell and thus the size of particles in the composite colloidal films could be controlled by deposition of Ag on the preformed Au colloidal particle film in the microwave reaction system, and such films significantly increased the surface-enhanced Raman scattering enhancement (SERS) ability compared with Au colloidal particle films. Their strong enhancement ability may mainly stem from relatively large particle consisting of Ag cladding as well as effective coupling among particles in the Ag-clad Au particle films.

Key words assembly microwave heating UV-Vis spectrum surface morphology SERS

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