

论文

PMMA纳米球的制备及其银膜包覆技术

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摘要:

采用无皂乳液聚合法制备了单分散、直径为170 nm左右的聚甲基丙烯酸甲酯(PMMA)纳米球, 然后利用3-甲基丙烯酰氧基丙基三甲氧基硅烷(MATS)和3-巯丙基三甲氧基硅烷(MPTMS)对PMMA纳米球进行表面改性, 在其表面包覆一层均匀的巯基, 通过巯基与银离子之间的相互作用, 使银在PMMA纳米球表面成核长大, 从而合成PMMA/Ag纳米球壳粒子. 通过扫描电子显微镜、投射电子显微镜和紫外-可见吸收光谱测试技术对产物性能进行了表征, 研究表明, 制备的PMMA/Ag纳米球壳粒子的分散性好、包覆均匀.

关键词: 无皂乳液聚合法 表面改性 纳米PMMA/Ag球壳结构

Preparation of Polymethyl Methacrylate(PMMA) Nanosphere and Technique of Coating Ag Layer

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Abstract:

In this paper, we reported a two-step technique for fabrication of PMMA/Ag nano coreshell structure with well-established processing parameters and an ease control. Firstly, we fabricated the monodisperse PMMA nanospheres with a diameter of about 170 nm by emulsifier-free emulsion polymerization. Then, we modified the PMMA nanospheres surface with (3-methacryloxypropyl) trimethoxysilane(MATS) and (3-mercaptopropyl) trimethoxysilane(MPTMS), resulting in a uniform sulfhydryl (SH)-group modified outlayer and Ag nanoparticles further grew on the modified surface of PMMA nanospheres with an effective interaction between sulfhydryl(SH) groups and Ag⁺. In doing so, finally we synthesized PMMA/Ag core-shell composited nanoparticles. The structure of the synthesized sample was investigated by scanning electron microscopy(SEM), transmission electron microscopy(TEM) and UV-Vis extinction spectra. The results indicate that the well-dispersed PMMA/Ag core-shell nanoparticles with uniform particle size distribution were successfully fabricated using this improved technique.

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收稿日期 2007-12-27 修回日期 1900-01-01 网络版发布日期

DOI:

基金项目:

通讯作者: 朱贤方

作者简介:

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