

论文

静电自组装制备 $\text{Fe}_2\text{O}_3$ -PANI复合粒子的结构与性能

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摘要:

以十六烷基三甲基溴化铵对 $\alpha\text{-Fe}_2\text{O}_3$ 纳米颗粒进行表面修饰, 控制体系pH值, 将聚苯乙烯磺酸钠(PSS)掺杂的纳米聚苯胺(PANI)静电自组装在 $\alpha\text{-Fe}_2\text{O}_3$ 粒子表面, 形成结构均匀的 $\text{Fe}_2\text{O}_3$ -PANI复合粒子. 系统研究了体系的pH值、反应温度、反应时间等因素对复合粒子结构的影响, 确定了形成结构均匀复合粒子的最佳工艺条件. 应用TEM, XRD, FTIR和电化学工作站对复合粒子进行了结构和性能表征. 循环伏安曲线和FTIR光谱分析结果表明, 与PANI相比,  $\text{Fe}_2\text{O}_3$ -PANI复合粒子保持了PANI良好的电化学活性, 红外吸收能力增强.

关键词: 静电自组装  $\alpha\text{-Fe}_2\text{O}_3$  聚苯胺(PANI) 红外吸收

STRUCTURE AND PERFORMANCE OF  $\text{Fe}_2\text{O}_3$ -PANI COMPOSITE NANOPARTICLES SYNTHESIZED BY ELECTROSTATIC SELF-ASSEMBLY

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Abstract:

Sodium polystyrene sulfonate (PSS) doped polyaniline (PANI) nanoparticles were self-assembled on  $\alpha\text{-Fe}_2\text{O}_3$  nanoparticles, of which the surfaces have been modified by hexadecyl trimethyl ammonium bromide (CTAB), through controlling the pH value. The effects of pH value, temperature and reaction time on the structure of composite particles were systematically studied, and the optimum conditions were determined. TEM, XRD, FTIR and cyclic voltammetry (CV) were used to characterize the composite particles. The analyses of CV curve and FTIR spectrum showed that compared with PANI nanoparticles, the  $\text{Fe}_2\text{O}_3$ -PANI composite particles present enhanced infrared absorption and well electrochemical property.

Keywords: electrostatic self-assembly  $\alpha\text{-Fe}_2\text{O}_3$  polyaniline (PANI) infrared absorption

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- 聚苯胺(PANI)
- 红外吸收

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