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研究论文

新型有机-无机纳米复合粒子的制备及其固定化漆酶研究

黄俊, 王军涛, 李斌, 肖海燕, 刘诚, 丁莉芸, 姜德生

武汉理工大学光纤传感技术研究中心, 光纤传感技术与信息处理教育部重点实验室, 武汉 430070

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摘要 制备了四氨基酞菁钴(CoTAPc)-Fe_3O_4纳米复合粒子, 用红外光谱(IR)、X射线衍射(XRD)、X射线能谱(EDS)、场发射扫描电镜(FEG-SEM)及振动样品磁强计等对其进行了表征. 结果表明, 形成了CoTAPc包覆在Fe_3O_4纳米粒子表面的纳米复合粒子. 粒子呈现不规则球形, 平均粒径为70 nm, 矫顽力为316.4 A/m, 接近超顺磁性. 以此纳米复合粒子作为载体, 通过交联法固定漆酶, 固定化酶最适反应温度为45 ℃, 最适pH为3; 固定化酶比游离酶具有更好的热稳定性、贮存稳定性及操作稳定性, 且易于分离.

关键词 CoTAPc-Fe_3O_4纳米复合粒子 漆酶 固定化

分类号 O629.8 O814.2

Preparation of Organic inorganic Nanoparticles Composite and Their Laccase Immobilization

HUANG Jun, WANG Jun-Tao, LI Bin, XIAO Hai-Yan, LIU Cheng, DING Li-Yun, JIANG De-Sheng

Key Laboratory of Fiber Optic Sensing Technology and Information Processing, Ministry of Education, Fiber Optic Sensing Technology Research Center, Wuhan University of Technology, Wuhan 430070, China

Abstract CoTAPc-Fe_3O_4 nanoparticle composites were prepared by organic-inorganic nanoparticles complex technology and characterized by IR, XRD, EDS, field emission gun scanning electron microscopy and magnetometer. It is proved that the CoTAPc could disperse randomly onto the surface of Fe_3O_4 nanoparticles. The nanoparticles composites had the shape of spheres with the mean diameter about 70 nm. They had the coercive force of 316.4 A/m and were approximately superparamagnetic. The laccase was immobilized on the surface of the composite by crosslinking method. The optimal temperature and pH forthe laccase immobilization were 45 ℃ and pH 3.0, respectively. The immobilized laccase had better thermal, storage and operation stabilities than free laccase. This work provide a good basis for developing the fiber optic biosensor with excellent properties.

Key words CoTAPc-Fe_3O_4 nanoparticles composite Lac case Immobilization

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通讯作者 黄俊 hjun@mail.whut.edu.cn