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研究论文

CuTAPc-Fe_3O_4纳米复合粒子及其漆酶固定化研究

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摘要 漆酶的固定化研究对基于漆酶催化的光纤生物传感器具有十分重要的意义. 制备了四氨基酞菁铜(CuTAPc)-Fe_3O_4纳米复合粒子, 并用红外(IR)、场发射扫描电镜(FEG-SEM)、X射线衍射(XRD)、能谱、粒径仪等对其进行了表征. 结果表明形成了以CuTAPc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, 且分布均匀, 粒子平均粒径在50 nm左右. 用此纳米复合粒子通过戊二醛交联法固定了漆酶, 固定后的酶比游离酶具有更好的贮存稳定性及操作稳定性. 这为研制高性能的光纤生物传感器打下了较好的基础.

关键词 CuTAPc-Fe_3O_4纳米复合粒子 漆酶 固定 光纤生物传感器

分类号

Study of CuTAPc-Fe_3O_4 Nanoparticles and Their Laccase Immobilization

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Abstract The immobilization of laccase is important for the fiber optic biosensor based on enzyme catalysis. Copper tetraaminophthalocyanine-ferrorerric oxide [(CuTaPc)-Fe_3O_4 nanoparticle composites were prepared and characterized by IR, field emission gun scanning electron microscopy, XRD, X-ray photoelectron spectroscopy and particle size analyzer. It has been proved that the CuTAPc could disperse spontaneously onto the surface of Fe_3O_4 nanoparticles to form molecular dispersion layer and the Fe_3O_4 nanoparticles were encapsulated by CuTAPc. The nanoparticle composites took the shape of roundish spheres with their mean diameter of about 50 nm. The laccase was immobilized on the surface of the composite by crosslinking with glutaraldehyde, and the immobilized laccase has better stabilities in storage and operation than free laccase. This work provided good basis for developing the fiber optic biosensor with excellent properties.

Key words CuTAPc-Fe_3O_4 nanoparticle composite laccase immobilization fiber optic biosensor

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