

论文

嗅蛋白对铈纳米颗粒荧光增强效应的研究

于江<sup>1</sup>, 李宁<sup>1</sup>, 吴霞<sup>2</sup>, 高希宝<sup>1</sup>

1. 山东大学公共卫生学院 卫生检验研究所, 山东 济南 250012; 2. 山东大学化学与化工学院, 山东 济南 250100

摘要:

以单宁酸做还原剂, 在表面活性剂十二烷基苯磺酸钠(sodium dodecylbenzene sulfonate, SDBS)形成的微乳环境中将硝酸铈还原成铈(europium, Eu)纳米颗粒, 通过修饰剂硫辛酸与嗅蛋白结合, 分析铈纳米颗粒结合嗅蛋白前后的荧光变化与嗅蛋白含量的关系及机制。结果发现铈纳米颗粒与嗅蛋白结合后荧光强度明显增强, 在优化条件下, 荧光强度与嗅蛋白的浓度在0.020~8.0mg/L范围内呈良好的线性关系, 检出限为0.012mg/L, 对5.0mg/L 嗅蛋白进行11次平行测定, 其相对标准偏差为2.4%。嗅蛋白主要通过分子间能量转移使铈纳米颗粒的荧光强度增强, 利用该变化测定嗅蛋白含量, 结果灵敏、准确, 令人满意。

关键词: 铈纳米颗粒 十二烷基苯磺酸钠 硫辛酸 嗅蛋白 荧光

Influence of an olfactory marker protein on the fluorescence enhancement of europium nanoparticles

YU Jiang<sup>1</sup>, LI Ning<sup>1</sup>, WU Xia<sup>2</sup>, GAO Xi-bao<sup>1</sup>

1. Department of Chemistry and Microbacteria Detection of School of Public Health, Shandong University, Jinan 250012, Shandong, China; 2. School of Chemistry and Chemical Engineering, Shandong University, Jinan 250100, Shandong, China

Abstract:

Europium nanoparticles were prepared using tannic acid as the reductive agent in sodium dodecylbenzene sulfonate solution searching for a novel fluorimetric method of proteins determination. Nano europium OMP conjugates were synthesized by the method of lipoic acid modification on the nanoparticles surface. The fluorescence changes, mechanisms of europium nanoparticles and the conjugates of europium nanoparticles with OMP were analyzed by fluorophotometer. The relationship between fluorescence changes and the concentration of OMP was also studied. The fluorescence intensity of nano europium OMP conjugates was significantly increased compared with that of europium nanoparticles, which was linearly proportional to the concentration of OMP in the range of 0.020~8.0mg/L, and the detection limit was 0.012mg/L under optimum conditions. The relative standard deviation (n=11) was 2.4% for 5.0mg/L OMP. The effect of an olfactory marker protein on the fluorescence enhancement of europium nanoparticles can be attributed to the result of the energy transfer of OMP among molecules. This method can be used to determine the concentration of OMP.

Keywords: europium nanoparticles sodium dodecylbenzene sulfonate lipoic acid olfactory marker protein fluorescence

收稿日期 1900-01-01 修回日期 1900-01-01 网络版发布日期 2006-10-24

DOI:

基金项目:

通讯作者: 于江

作者简介:

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