中国化学工程学报 2007 15 (6): 791-794 ISSN: 1004-616x CN: 44-1063/R

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碲化镉量子点与金纳米粒子用于DNA检测

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收稿日期 2007-1-8 修回日期 网络版发布日期 接受日期 2007-8-11

摘要 A DNA fluorescence probe system based on fluorescence resonance energy transfer (FRET) from CdTe quantum dot (QD) donors to Au nanoparticle (AuNP) acceptors is presented. CdTe QDs, 2.5nm in diameter, as energy donors, were prepared in water. Au nanoparticles, 16nm in diameter, as energy acceptors, were prepared from gold chloride by reduction. CdTe QDs were linked to 5′-NH2-DNA through 1-ethyl-3-(dimethylaminopropyl)carbodiimide hydrochloride (EDC) as a linker, and the 3′-SH-DNA was self-assembled onto the surface of AuNPs. The hy-bridization of complementary double stranded DNA (dsDNA) bound to the QDs and AuNPs (CdTe-dsDNA-Au) determined the FRET distance of CdTe QDs and Au nanoparticles. Compared to the fluorescence of CdTe-DNA, the fluorescence of CdTe-DNA-Au conjugates decreased extremely, which indicated that the FRET occurred be-tween CdTe QDs and Au nanoparticles. The fluorescence change of this conjugate depended on the ratio of Au-DNA to CdTe-DNA. When the AuNPs-DNA to QD-DNA ratio was 10:1, the FRET efficiency reached a maxi-mum. The probe system would have a certain degree of fluorescence recovery when a complementary single stranded DNA was introduced into this system, which showed that the distance between CdTe QDs and Au nanoparticles was increased.

关键词 CdTe, quantum dots Au nanoparticle fluorescence resonance energy transfer DNA

分类号

DOI:

Adaption of Au nanoparticles and CdTe quantum dots in DNA detection

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Received 2007-1-8 Revised Online Accepted 2007-8-11

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Key words CdTe quantum dots; Au nanoparticle; fluorescence resonance energy transfer; DNA

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