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Communication

11-Mercaptoundecanoic acid functionalized gold nanoclusters as fluorescent probes for the sensitive detection of Cu^{2+} and Fe^{3+} ions

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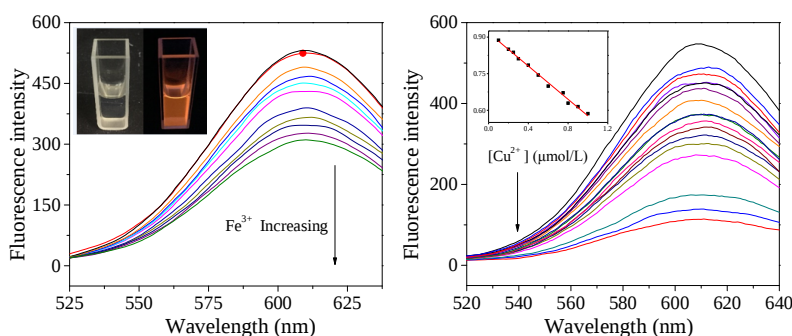
Graphical Abstract

11-Mercaptoundecanoic acid functionalized gold nanoclusters as fluorescent probes for the sensitive detection of Cu^{2+} and Fe^{3+} ions

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A facile synthetic fluorescent 11-MUA-Au NCs apply to rapid and quantitative detection of Cu^{2+} and Fe^{3+} ions.

ABSTRACT

Metal ions are physiologically essential, but excessive metal ions may cause severe risk to plants and animals. Here, we prepared gold nanoclusters (Au NCs) protected by 11-mercaptopundecanoic acid (11-MUA), which have excellent fluorescence properties for the detection of metal ions. The results showed that the copper ions (Cu^{2+}) and iron ions (Fe^{3+}) in the solution have obvious quenching effect on the fluorescence intensity of Au NCs. The detection range of Fe^{3+} was 0.8–4.5 $\mu\text{mol/L}$ ($R^2 = 0.992$) and 4.5–11.0 $\mu\text{mol/L}$ ($R^2 = 0.997$). And Cu^{2+} has a lower linear range (0.1–1.0 $\mu\text{mol/L}$, $R^2 = 0.993$). When EDTA was added into the reaction system, it was observed that the quenching effect of Cu^{2+} and Fe^{3+} on Au NCs showed different phenomenon. Then, the effect of metal ions on the fluorescence of Au NCs was investigated. The selective detection of Cu^{2+} was achieved by EDTA masking of Fe^{3+} . In addition, we realized the metal ions detection application of Au NCs in the serum

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