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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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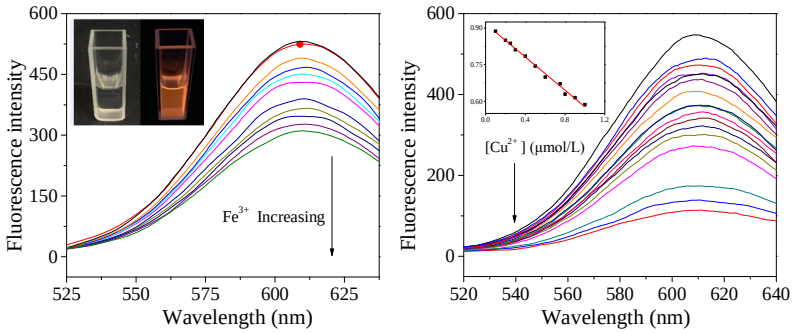

A facile synthetic fluorescent 11-MUA-Au NCs apply to rapid and quantitative detection of Cu^{2+} and Fe^{3+} ions.

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-mercaptoundecanoic 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 μmol/L (R^2 = 0.992) and 4.5-11.0 μmol/L (R^2 = 0.997). And Cu^{2+} has a lower linear range (0.1-1.0 μmol/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

Keywords: