

Fluorescent Analysis of Gold Nanoclusters-Wool Keratin Addition to Copper Ions

Authors : Yao Xing, Hong Ling Liu, Wei Dong Yu

Abstract : With the increase of global population, it is of importance for the safe water supply, while, the water-monitoring method with the capability of rapidness, low-cost, green and robustness remains unsolved. In this paper, gold nanoclusters-wool keratin is added into copper ions measured by fluorescent method in order to probe copper ions in aqueous solution. The fluorescent results show that gold nanoclusters-wool keratin exhibits high stability of pHs, while it is sensitive to temperature and time. Based on Gauss fitting method, the results exhibit that the slope of gold nanoclusters-wool keratin with pH resolution under acidic condition is higher compared to it under alkaline solutions. Besides, gold nanoclusters-wool keratin added into copper ions shows a fluorescence turn-off response transferring from red to blue under UV light, leading to the dramatically decreased fluorescent intensity of gold nanoclusters-wool keratin solution located at 690 nm. Moreover, the limited concentration of copper ions tested by gold nanoclusters-wool keratin system is around 1 $\mu\text{mol/L}$, which meets the need of detection standards. The fitting slope of Stern-Volmer plot at low concentration of copper ions is larger than it at high concentrations, which indicates that aggregated gold nanoclusters are from small amounts to large numbers with the increasing concentration of copper ions. It is expected to provide novel method and materials for copper ions testing with low cost, high efficiency, and easy operability.

Keywords : gold nanoclusters, copper ions, wool keratin, fluorescence

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