

Author's Accepted Manuscript

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PII: S0039-9140(18)30634-9
DOI: <https://doi.org/10.1016/j.talanta.2018.06.028>
Reference: TAL18770

To appear in: *Talanta*

Received date: 5 April 2018
Revised date: 4 June 2018
Accepted date: 9 June 2018

Cite this article as: Jie Zhou, Yan Xiao, Xiuhua Zhang and Shengfu Wang, A novel ratiometric fluorescence nanoprobe based on aggregation-induced emission of silver nanoclusters for the label-free detection of biothiols, *Talanta*, <https://doi.org/10.1016/j.talanta.2018.06.028>

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A novel ratiometric fluorescence nanoprobe based on aggregation-induced emission of silver nanoclusters for the label-free detection of biothiols

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Abstract

In this work, a novel ratiometric fluorescence nanoprobe based on Au³⁺-triggered aggregation-induced emission (AIE) behavior of silver nanoclusters (Ag NCs) was designed for the label-free detection of biothiols. The probe was constructed by loading of Au³⁺ on g-C₃N₄ nanosheets surface and subsequently aggregating Ag NCs via ion binding. As Au³⁺ could conversely regulate the emission of g-C₃N₄ nanosheets and Ag NCs, the remove of Au³⁺ from nanoprobe by coordination with biothiols would change the emission ratio of nanoprobe that could be used for biothiols detection. The probe provided high sensitivity for glutathione (GSH) determination with the limit of detection as low as 0.8 μM and showed satisfying performance in human serum samples. This report may offer a new sight for the construction of ratiometric probe based on the AIE behavior of Ag NCs and broaden its application in biosensing.

Graphical abstract

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