Supporting Information

for

Visual Trace Copper(II) Detection Based on Its Catalytic Action to the Disassociation of Thiosulfate

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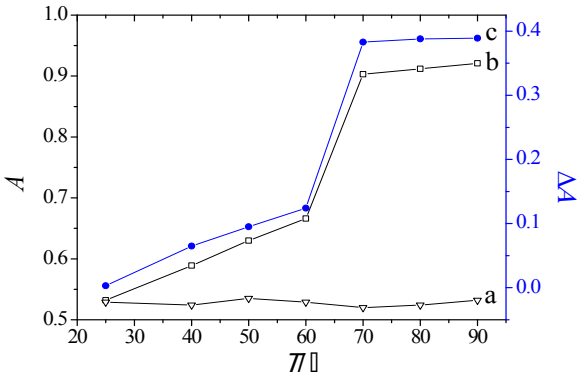

Fig. S1. The relationship of the absorbance at the position of maximum absorption peak and corresponding ΔA of TAg-NPs with the different concentrations of heating temperature. TAg-NPs-Vc-Cu^{2+}-$Na_2S_2O_3$ not be heated (Curve a), TAg-NPs-Vc-Cu^{2+}-$Na_2S_2O_3$ be heated (Curve b), ΔA (Curve c). Different heating temperature (90, 80, 70, 60, 50, 40, 25 ^{o}C), $c_{Cu^{2+}}$ (0.75 μM), $c_{Na_2S_2O_3}$ (5.0 μM), pH 6.8.

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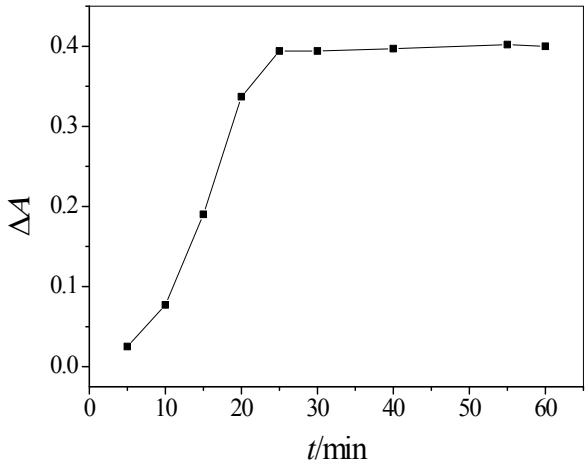

Fig. S2.The relationship of the Δ*A* at the position of maximum absorption peak of TAg-NPs and different heating time of mixture of $Na_2S_2O_3$ and Cu^{2+}, c_{Cu}^{2+} (0.75 μM), $c_{Na_2S_2O_3}$ (5.0 μM), pH 6.8, heating at 80 °C, reacted 40 min at room temperature.

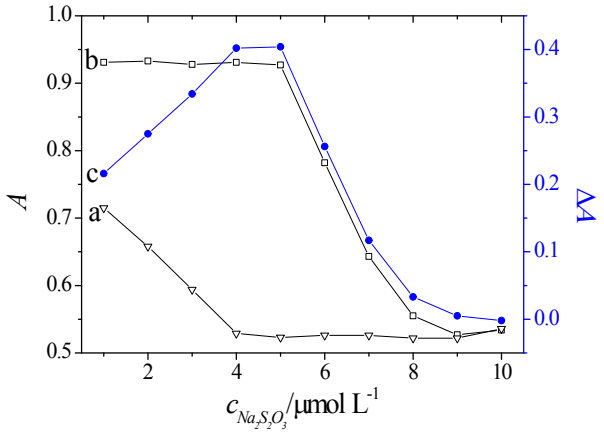

Fig. S3. The relationship of the absorbance at the position of maximum absorption peak of TAg-NPs and corresponding Δ*A* with the different concentrations of $Na_2S_2O_3$. TAg-NPs/$Na_2S_2O_3$ (Curve a), TAg-NPs/Cu^{2+}/$Na_2S_2O_3$ (Curve b), Δ*A* (Curve c). Different concentrations of $Na_2S_2O_3$ (10.0, 9.0, 8.0, 7.0, 6.0, 5.0, 4.0, 3.0, 2.0, 1.0 μM), c_{Cu}^{2+} (0.75 μM), pH 6.8, heating temperature 80 °C, heating 30 min and then reacted with TAg-NPs for 40 min at room temperature.

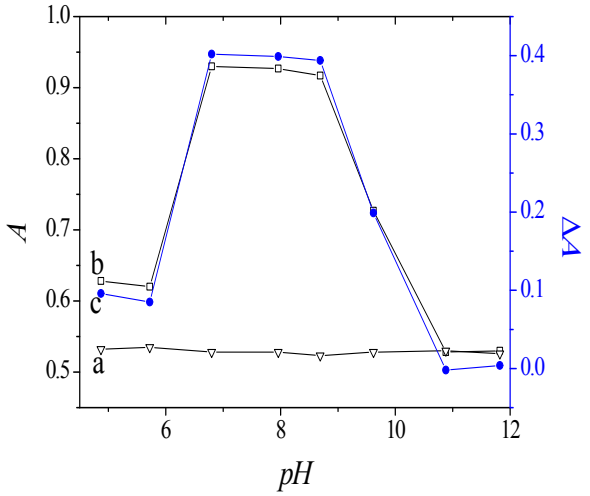

Fig. S4. The relationship of the absorbance at the position of maximum absorption peak of TAg-NPs, and corresponding ΔA with the different pH. TAg-NPs-$Na_2S_2O_3$ (Curve a), TAg-NPs-Cu^{2+}-$Na_2S_2O_3$ (Curve b), ΔA (Curve c). Britton–Robinson buffer solutions with pH were individually 1.81, 2.87, 3.78, 4.35, 5.72, 6.8, 7.96, 8.69, 9.62, 10.88, and 11.82, $c_{Cu^{2+}}$(0.75 μM), $c_{Na_2S_2O_3}$ (5.0 μM), heating temperature 80 °C, heating time 30 min and then reacted with TAg-NPs for 40 min at room temperature.

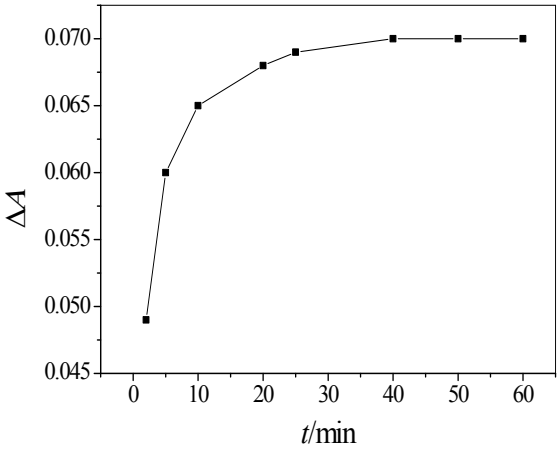

Fig. S5. The relationship of the ΔA at the position of maximum absorption peak of TAg-NPs and different reaction time, $c_{Cu^{2+}}$ (0.1 μM), $c_{Na_2S_2O_3}$ (5.0 μM), pH 6.8, heating temperature 80 °C, heating time 25 min, then reacted with TAg-NPs for different time at room temperature.

Table S1 Comparison of the sensitivity for copper ion detection in recent spectral methods.

Method	probe	Linear range(μM)	Detection limit(μM)	Ref.
Fluorescence	Copper/Silver Nanoclusters	0.005-0.2	0.0027	[1]
Absorption/ colorimetry	Gold nanorods	0.05-1000	0.05	[2]
Absorption/ colorimetry	Gold nanorods	0.01-0.3	0.00496	[3]
Absorption	Chromotrope 2R complex	0.005-1.0	0.0015	[4]
Absorption/ colorimetry	TAg-NPs	0.0025-0.75/ 0.025-0.75	0.001	This work

Reference:

[1] Y.-T. Su, G.-Y. Lan, W.-Y. Chen and H.-T. Chang, *Anal. Chem.*, 2010, **82**, 8566.

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[3] Z. Zhang, Z. Chen, C. Qu, and L. Chen, Langmuir, 2014, 30, 3625–3630.

[4] L. Fu, Y. Xiong, S. Chen and Y. Long, Anal. methods, 2015, 7, 266–270.