# Supporting information

## Self-cascade system based on Ag nanoparticles/single-walled carbon nanotubes nanocomposites as mimic enzyme for ultrasensitive detection of L-cysteine

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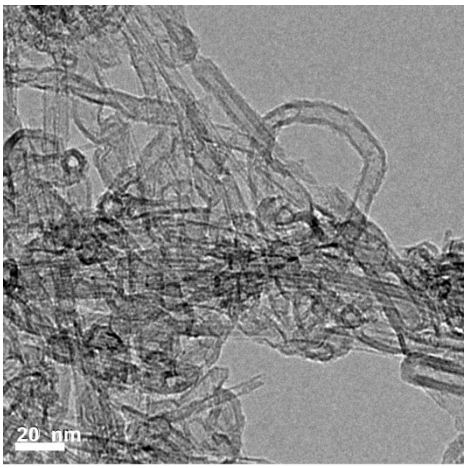


Fig. S1 Transmission electron microscopic (TEM) images of SWCNTs.

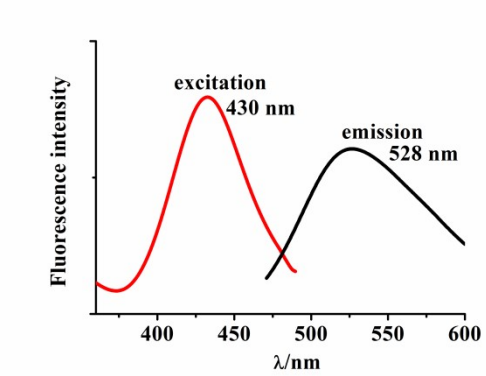


Fig. S2 Fluorescence spectra of DNA-Ag NCs.

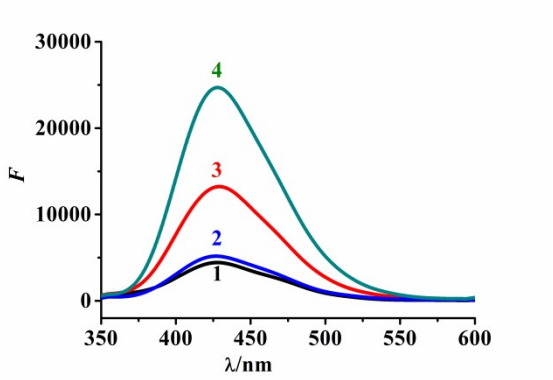


Fig. S3 Fluorescence spectra of (1) TA+$H_2O_2$, (2) TA+$H_2O_2$+AgNP/SWCNTs, (3) TA+$H_2O_2$+$Fe^{2+}$, and (4) TA+$H_2O_2$+AgNP/SWCNTs+$Fe^{2+}$.

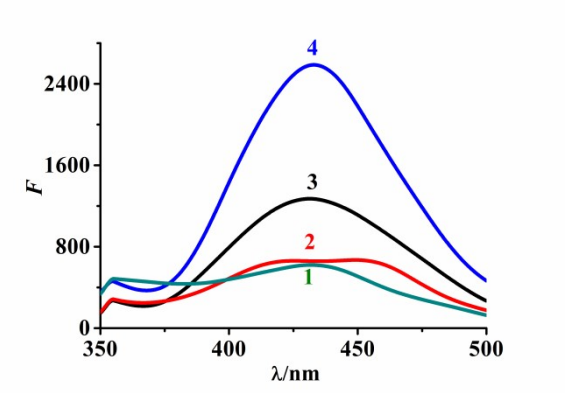


Fig. S4 Fluorescence spectra of TA-L-cysteine system with (1) and without (2) nitrogen gas blowing, and TA+ L-cysteine + AgNP/SWCNTs system with (3) and without (4) nitrogen gas blowing.

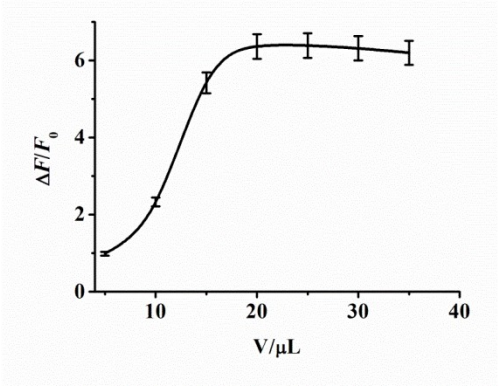


Fig. S5 The effect of the DNA-Ag NCs volume on our system.

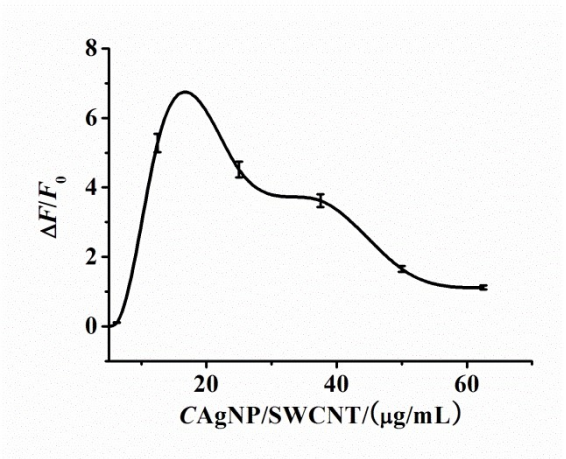


Fig. S6 The effect of the concentration of AgNP/SWCNTs on our system: the reaction was measured under different concentrations of AgNP/SWCNTs.

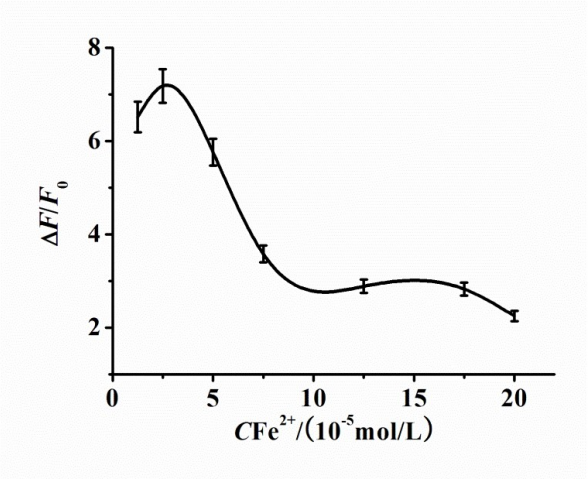


Fig. S7 The effect of the concentration of $Fe^{2+}$ on our system: the reaction was measured under different concentrations of $Fe^{2+}$.

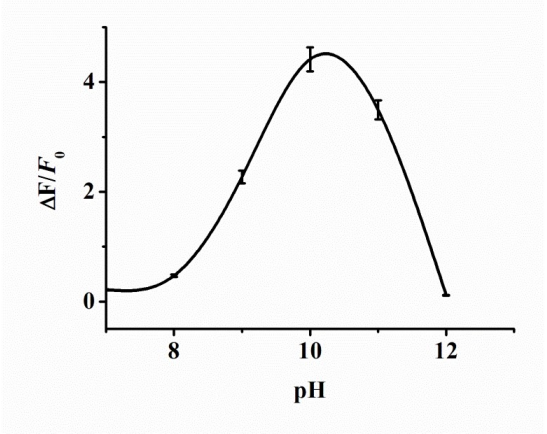


Fig. S8 The effect of pH on our system: the reaction was measured under different pH conditions.

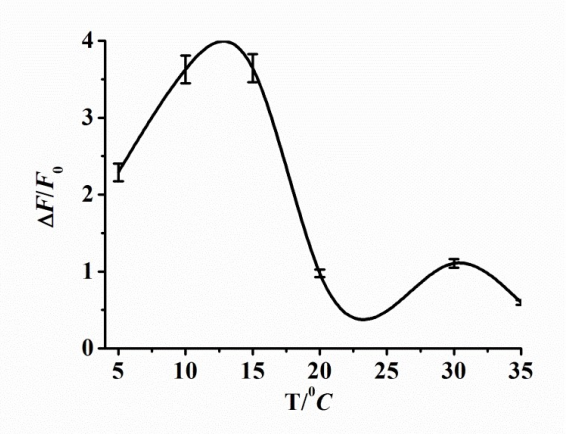


Fig. S9 The effect of temperature on our system: the reaction was measured under temperature conditions.

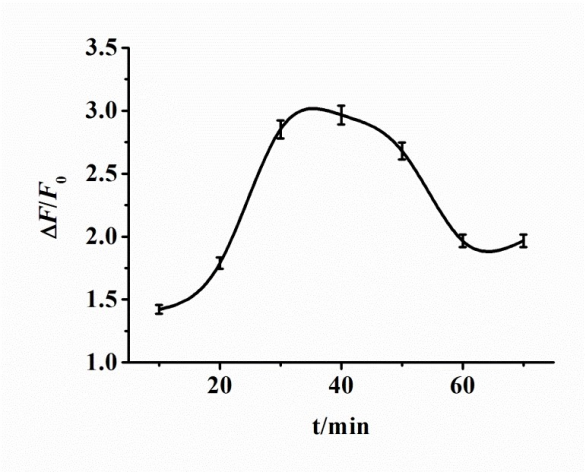


Fig. S10 The effect of incubation time on our system: the reaction was measured under different incubation times conditions.

Table S1 Reported detection limits of L-cysteine in different methods.

| Detection probes | Read out | Linear range(μM) | LOD(μM) | Ref |
|---|---|---|---|---|
| CuO NPs-TA | fluorescence | 0.6-100 | $6.6\times10^{-3}$ | [16] |
| AuNCs-AuNPs | fluorescence | 1.5-35.0 | 1.4 | [25] |
| Si-CDs | fluorescence | 20-100 | 0.41 | [26] |
| Fe-CDs-OPD | fluorescence | 0.25-90 | 0.047 | [27] |
| Cu-MOG | electrochemical | 0.1-6 | 0.04 | [28] |
| rGO-GP-TMB | colorimetric | 2-30 | 0.1 | [29] |
| ILs-AgNPs | colorimetric | 0.082- 0.826 | $4.0\times10^{-3}$ | [30] |
| AgNP/SWCNTs-AgNCs | fluorescence | $0.8\times10^{-3}$-$1.0\times10^{-3}$ | $0.22\times10^{-3}$ | This work |

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