Electronic Supplementary Material (ESI) for Analyst.

Supporting information

Label-free fluorescent detection of mercury ion based on the regulation of Ag autocatalytic reaction

Haichao Dai [a,b], Pengjuan Ni [a,b], Yujing Sun [a], Jingting Hu [a,b], Shu Jiang [a,b], Yilin Wang [a,b], and Zhuang Li [a,*]

[a]*State Key Laboratory of Electroanalytical Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, Jilin 130022, China*

[b]*University of Chinese Academy of Sciences, Beijing 100039, China*

[*] Corresponding author at:
State Key Laboratory of Electroanalytical Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, Jilin 130022, China.
Fax /Tel: +86 431 85262057.
E-mail: zli@ciac.ac.cn

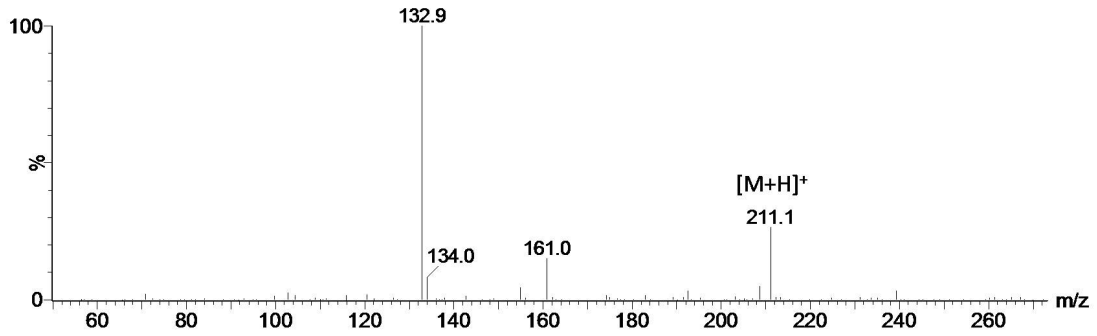

Fig. S1 The mass spectrometry of OPDox.

To prove the formation of OPDox, we first purified the obtained OPDox and the steps were as follows: 15.9 mL of 6 mM OPD were diluted into 500.0 mL of PBS buffer (10 mM, pH 6.5), followed by the addition of 8.5 mL of 6 mM $AgNO_3$. After incubation for 10 min, ethanol and water were removed by rotary evaporation. The crude product was dissolved in ethanol and centrifuged. The final solution was tested by MALDI-TOF-MS and m/z for [M+H]+ was 211.1 and the relative molecular mass was 210.1, which was the same with 2,3-diaminophennazine.

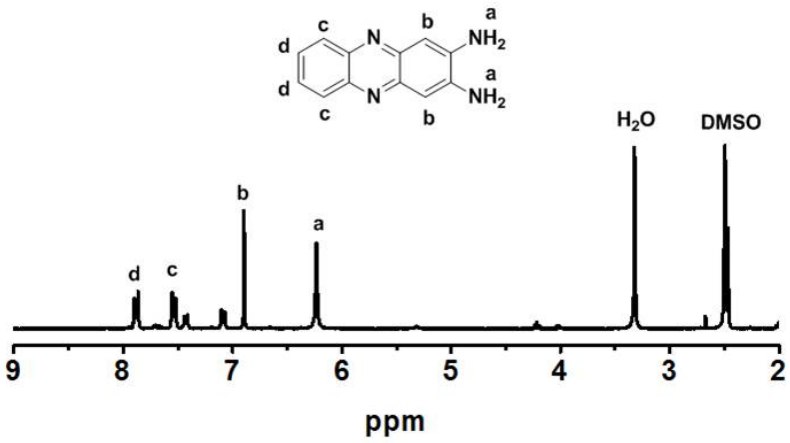

Fig. S2 The ^{1}H NMR spectrometry of OPDox.

Before the NMR measurement, the crude product was purified by flash chromatography with ethyl acetate to afford 2,3-diaminophennazine (OPDox), and the NMR result was as follows:

^{1}H NMR (400 MHz, DMSO-d6) δ=7.87-7.90 (2H), 7.52-7.55 (2H), 6.89 (2H), 6.23 (4H).

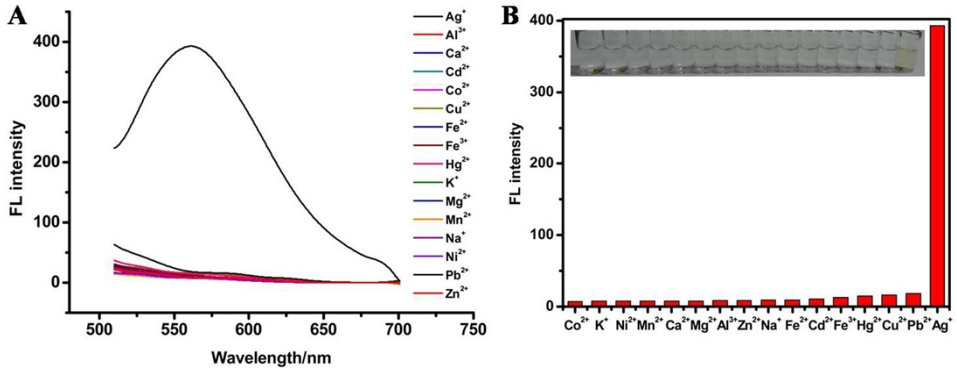

Fig. S3 (A) The fluorescence graphs of OPD with different metal ions. (B) The selectivity of OPD to different metal ions. Inset: The photograph of OPD solutions with different metal ions. The concentrations for OPD and metal ions were 180 μM and 96 μM, respectively.

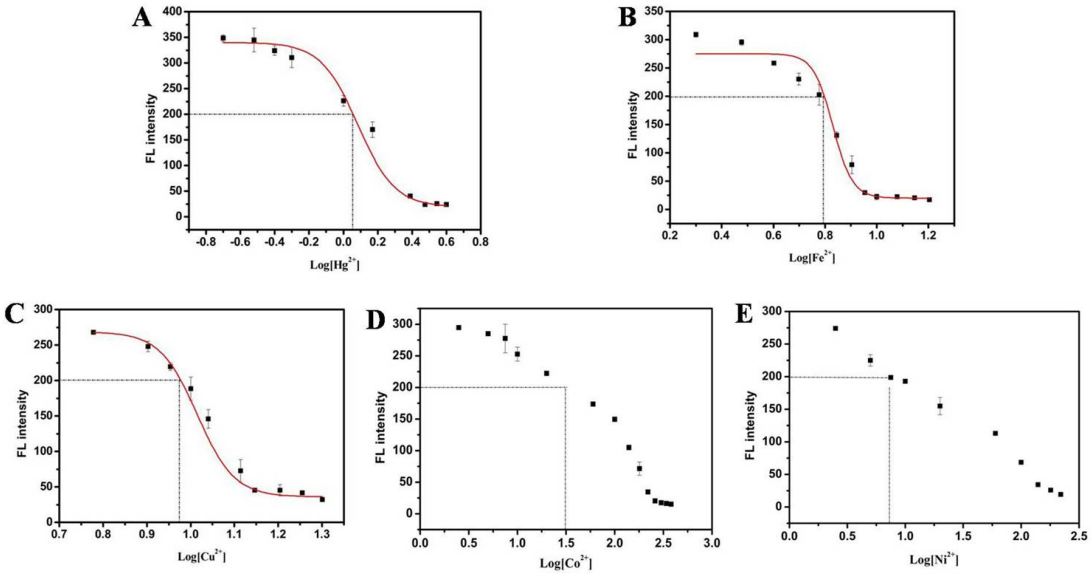

Fig. S4 Inhibitory effect of (A) Hg^{2+}, (B) Fe^{2+}, (C) Cu^{2+}, (D) Co^{2+}, and (E) Ni^{2+} on the Ag autocatalysis.

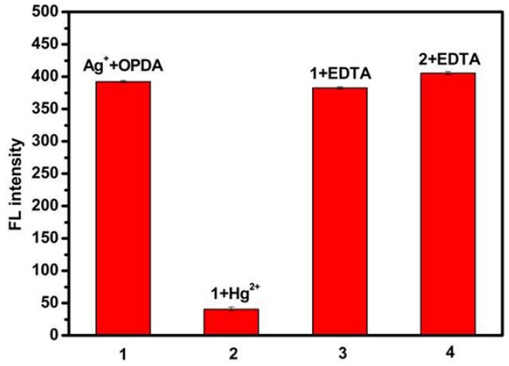

Fig. S5 The fluorescence recovery results of the autocatalytic reaction upon the addition of EDTA: (1) OPD in the presence of 96 μM Ag^{+}, (2) (1) with 2 μM Hg^{2+}, (3) (1) with 6 μM EDTA, and (4) (2) with 6 μM EDTA.

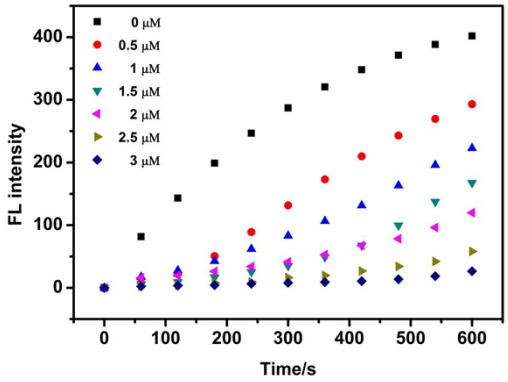

Fig. S6 Time-dependent fluorescence change of the Ag autocatalysis to different concentrations of Hg^{2+} (0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0 μM).