Electronic Supplementary Material (ESI) for Analyst.

Supporting Information

Colorimetric detection of Hg (II) based on the gold amalgam-triggered reductase mimetic activity in aqueous solutions by employing AuNP@Fe-TCPP-MOF nanoparticles

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Table of Contents:

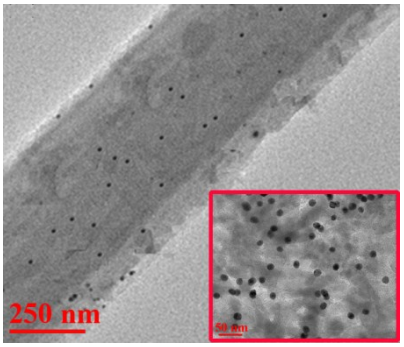

Fig. S1 TEM image of AuNP@MOF after being treated with Hg^{2+} ions

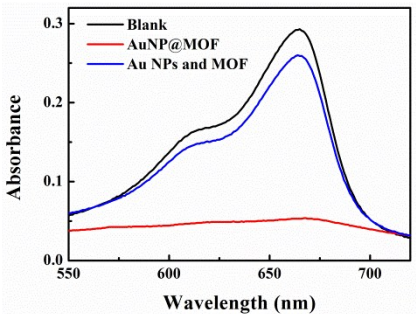

Fig. S2 The UV spectrum of the MB system before (black line) and after incubation with AuNPs@MOF (red line) and the simple mixture of Au NPs and MOF (blue line)

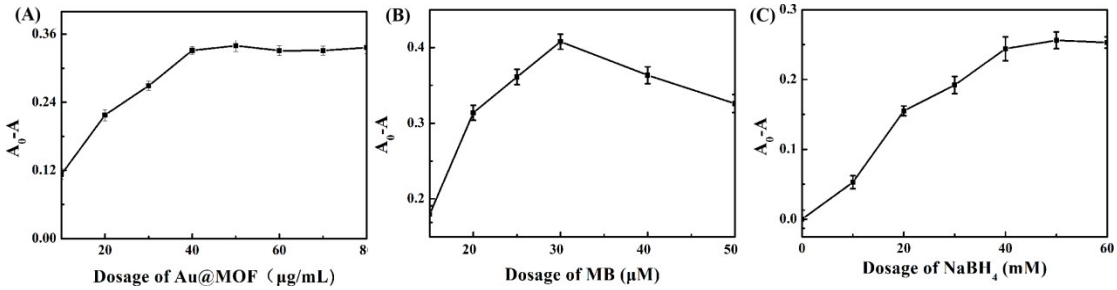

Fig. S3 Optimization of sensing conditions. (A) The effect of amount of AuNP@MOF on the response signal; A_0 represents the absorbance of the original MB in the sensing system at 665 nm, A represents the absorbance of MB in sensing system by adding various dosage of AuNP@MOF wtih Hg^{2+} at 665 nm. (B) The effect of MB concentration on the response signal. A_0 represents the absorbance of the original MB in the sensing system at 665 nm; A represents the absorbance of MB in sensing system by adding certain Hg^{2+} at 665 nm. (C) The effect of $NaBH_4$ concentration on the response signal. A_0 represents the absorbance of the original $NaBH_4$ in the sensing system at 665 nm; A represents the absorbance of $NaBH_4$ in sensing system by adding certain Hg^{2+} at 665 nm

Table S1 Recovery of tap water, Yihe river water samples containing different concentrations of Hg^{2+} measured by UV−Vis spectrometry

Sample	Hg^{2+} spiked (pM)	Hg^{2+} detected (pM) Mean ± SD	Recovery (%)
Tap water 1	200	194.68 ± 0.11	97.34 ± 0.06
Tap water 2	250	253.40 ± 0.05	101.36 ± 0.02
Tap water 3	300	298.68 ± 0.13	99.56 ± 0.04
Yihe river water 1	200	202.92 ± 0.03	101.46 ± 0.02
Yihe river water 2	250	249.65 ± 0.05	99.86 ± 0.02
Yihe river water 3	300	303.90 ± 0.04	101.13 ± 0.01

Table S2 The comparison of different methods for Hg^{2+} detection

Material	Method	Linear range	Detection limit	Time	Ref
Au/Hexanedithiol/ Rhodamine B	Fluorescence	0-19.9 μM	2.49 nM	2 mins	1
Colorimetric Sensor based on G-Quadruplex	Colorimetric method	250-1250 nM	50 nM	240 min	2
Carbon nanodots	Fluorescence	0-3 μM	4.2 nM	5 mins	3
Antibodies/BSA-glutathione	Cold-vapor atomic absorption	2.5-49.9 nM	2.99 nM	few weeks	4
DNA/GO	Fluorescence	0-8 nM	1.5 nM	10 mins	5
AuNP/ Iron-porphyric MOF	UV−vis spectra	200- 400 pM	103 pM	2 s	This work

References

1 K. Daware, R. Shinde, R. S.Kalubarme, M. Kasture, A. Pandey, C. Terashima, and S. W. Gosavi, Sensor. Actuat. B-Chem., 2018, 265, 547-555.

2 L. Tao, S.-J. Dong, and E.-K.Wang, Anal. Chem., 2009, 81(6), 2144-2149.

3 L. Zhou, Y. Lin, Z. Huang, J. Ren, and X. Qu, Chem. Commun. (Camb), 2012, 48(8), 1147-1149.

4 D. E. Wylie, L. D. Carlson, R. Carlson, F. W. Wagner, and S. M. Schuster, Anal, Biochem., 1991, 194(2), 381-387.

5 Y. Feng, X. Shao, K. Huang, J. Tian, X. Mei, Y. Luo, and W. Xu, Chem. Commun., 2018, 54(58), 8036-8039.