

Electronic Supplementary Information

Covalent organic frameworks loaded silver nanoparticles as robust mimetic oxidase for highly sensitive and selective colorimetric detection of mercury in blood

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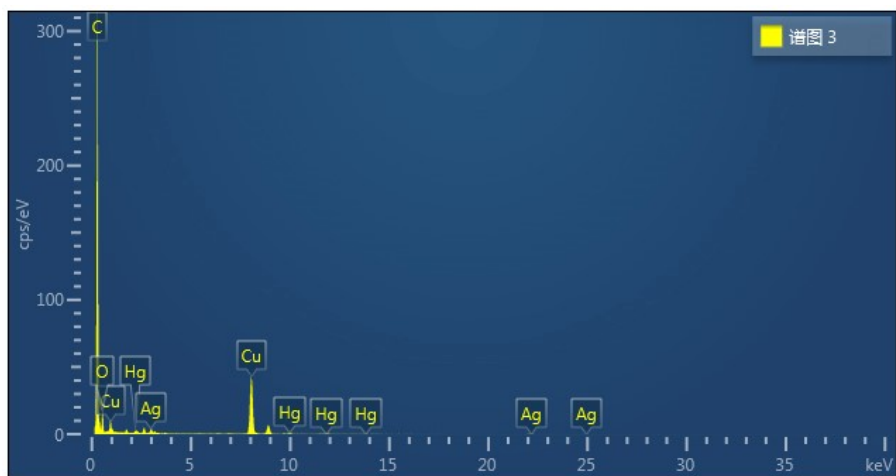


Fig. S1. EDS spectra of elemental analysis of COF-Ag nanozymes with Hg^{2+} ions.

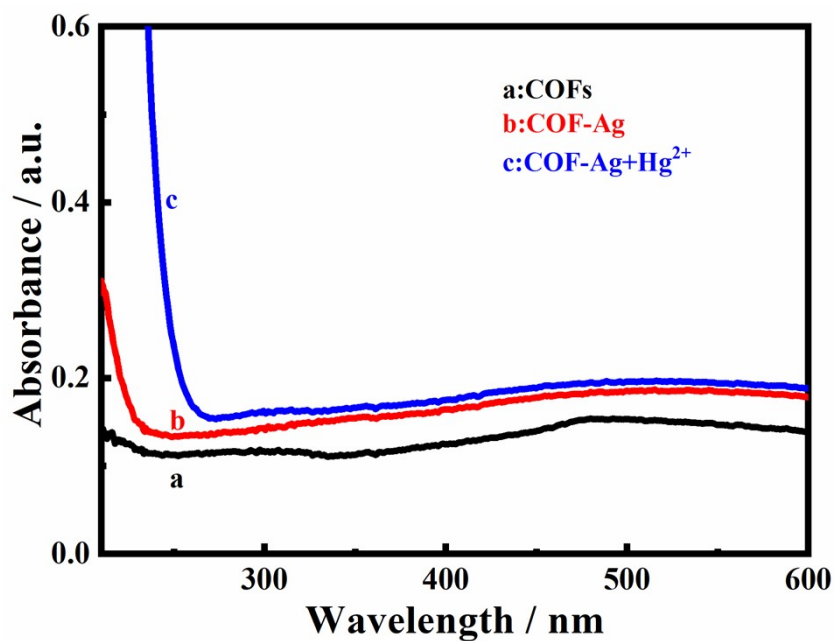


Fig. S2. UV-vis spectra of (a) COFs, (b) COF-Ag nanozymes, and (c) COF-Ag nanozymes with Hg^{2+} ions.

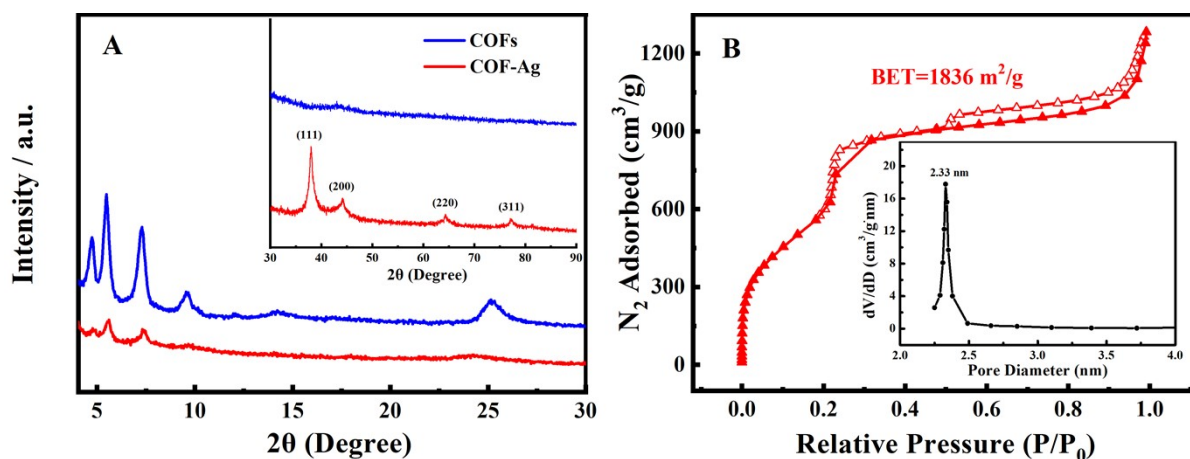


Fig. S3. (A) XRD spectra of COFs and COF-Ag nanozymes; (B) N₂ adsorption-desorption isotherms of COFs with the inset of pore distribution curve.

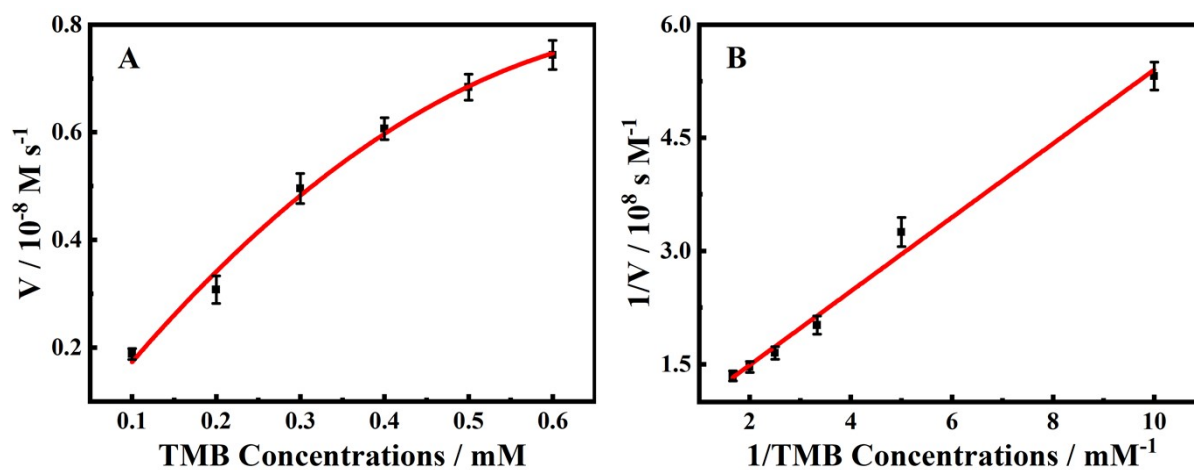


Fig. S4. (A) Steady-state kinetic assays for different TMB concentrations of COFs in the presence of Hg²⁺ ions, with (B) the corresponding double-reciprocal (Lineweaver-Burk) plotting.

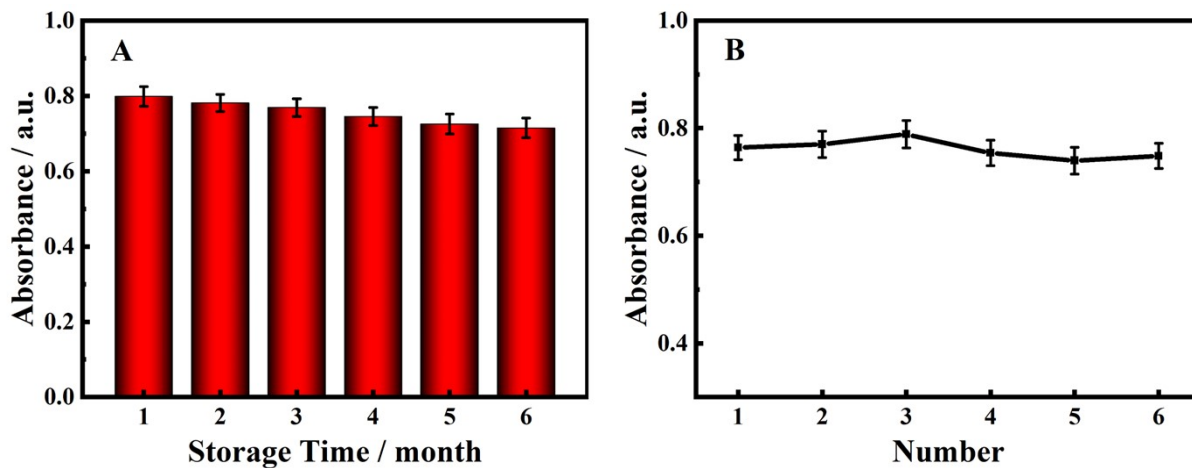


Fig. S5. (A) Storage stability of COF-Ag nanozymes stored in the dark for different time intervals for Hg^{2+} ions detection; (B) the reproducibility of colorimetric analysis for Hg^{2+} ions based on COF-Ag nanozymes.

Table. S1. Comparable results of the kinetic parameters of COF-Ag nanozymes with and without Hg²⁺ ions, and COFs with Hg²⁺ ions (K_m is the Michaelis-Menten constant, and V_{max} is the maximal reaction velocity).

	Substrate	K_m (mM)	V_{max} (10^{-9} M s⁻¹)
COF-Ag	TMB	2.91	3.69
COF-Ag with Hg ²⁺	TMB	0.324	51.02
COFs with Hg ²⁺	TMB	0.962	19.64

Table. S2. Results of recovery tests by the developed colorimetric method for the analysis of Hg²⁺ ions spiked in blood samples.

Samples	1	2	3	4	5
Added (μ M)	0.05	0.20	0.80	2.0	4.0
Detected (μ M)	0.054 \pm 0.008	0.21 \pm 0.02	0.78 \pm 0.02	2.04 \pm 0.16	3.93 \pm 0.13
Recovery (%)	108.0	105.0	97.5	102.0	98.3

Table. S3. Comparison of the analytical performances for Hg²⁺ ions among different colorimetric methods based on enzyme catalysis

Colorimetric methods with different nanozymes	Linear ranges (μM)	LODs (μM)	References
Ag ₂ S@GO	0.05-1.2	0.0098	1
Cit-AgNPs	0.1-10	0.028	2
Ag ₃ PO ₄	0.1-7.0	0.020	3
Au/WO ₃ HNFs	0-180	0.078	4
CoS	0.25-3.0	0.1	5
Au@NH ₂ -MIL-125(Ti)	1-5	0.1	6
COF-Ag	0.05-10.0	0.0037	This work

References

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