

Supporting Information

For

Sensitive and selective sensor for biothiols based on turn-on fluorescence of the Fe-MIL-88 metal-organic frameworks–hydrogen peroxide system

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Synthesis of Fe-MIL-88: Fe-MIL-88 was prepared according to the previous work of our group.¹ Briefly, 0.187g (0.692mmol) of FeCl₃•6H₂O and 0.115g (0.692mmol) of terephthalic acid were dissolved in 15mL of DMF, and 200μL acetic acid was added into this mixture. The mix solution was placed in an oil bath at 120°C for 4 h to crystallize. After cooling to room temperature, the particles were isolated by centrifugation and washed with DMF and ethanol three times to remove the excess reactants, respectively. Finally, the Fe-MIL-88 was dried in a vacuum oven. The powder XRD patterns of the as-prepared Fe-MIL-88 shown in Fig. S1 revealed the high crystalline of the products. Scanning electron microscopy (SEM) images showed that the particles have an octahedron-shaped morphology with an average size of ~200 nm in diameter (Fig. S2).

Additional figures

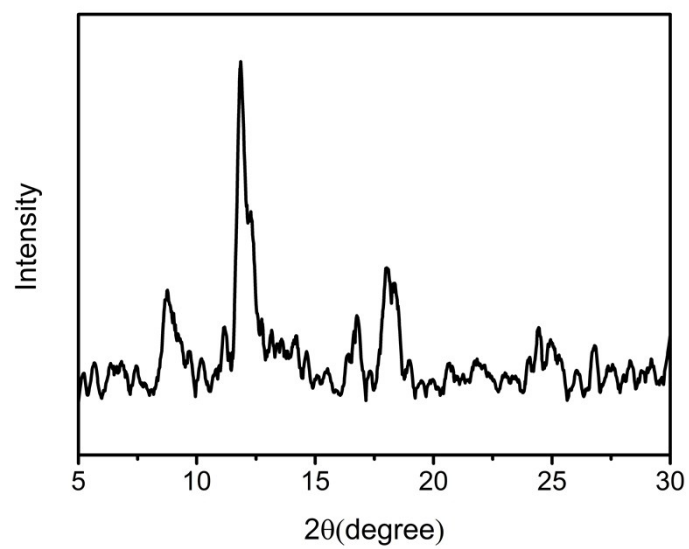


Fig. S1 Powder XRD patterns of the as-prepared Fe-MIL-88

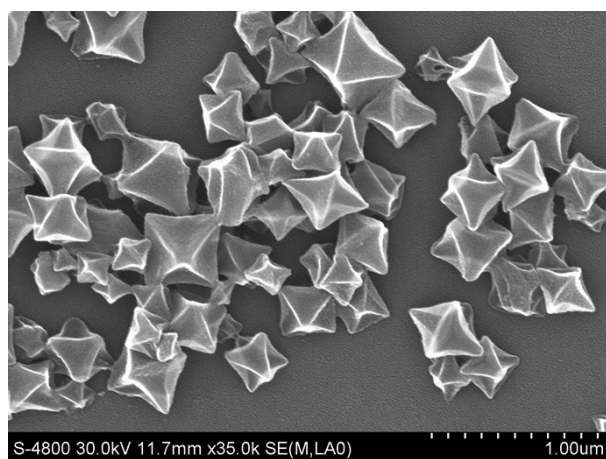


Fig. S2 SEM images of Fe-MIL-88 before recation.

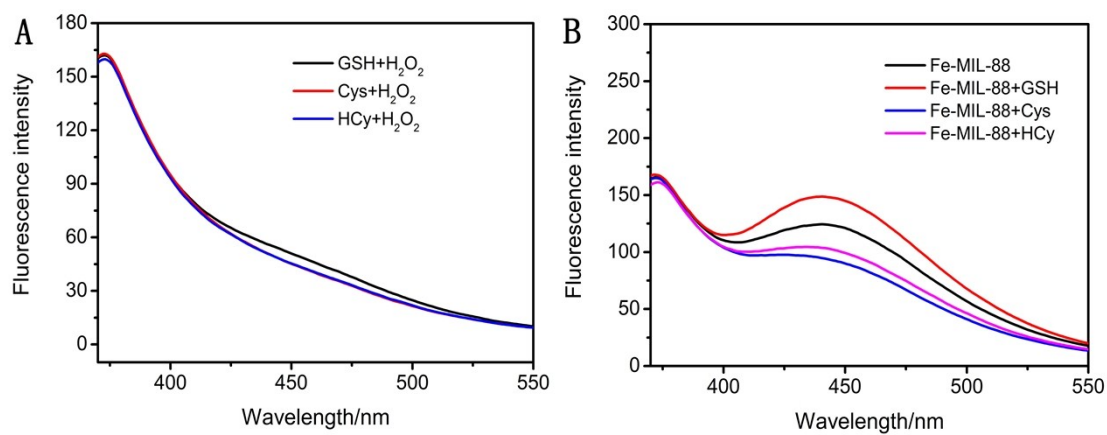


Fig. S3 (A) The fluorescence emission spectra of GSH+H₂O₂ (black), Cys+H₂O₂ (red), Hcy+H₂O₂ (blue). (B) The fluorescence emission spectra of Fe-MIL-88 in the absence and presence of three thiol compounds. λ_{ex} , 326 nm; $c_{\text{Fe-MIL-88}}$, 0.06 mg mL⁻¹; $c_{\text{H}_2\text{O}_2}$, 0.3 mM; $c_{\text{GSH}} = c_{\text{Cys}} = c_{\text{Hcy}} = 10\mu\text{M}$; HAC-NaAC, pH 5.4; Time, 25 min; Temperature, 40°C.

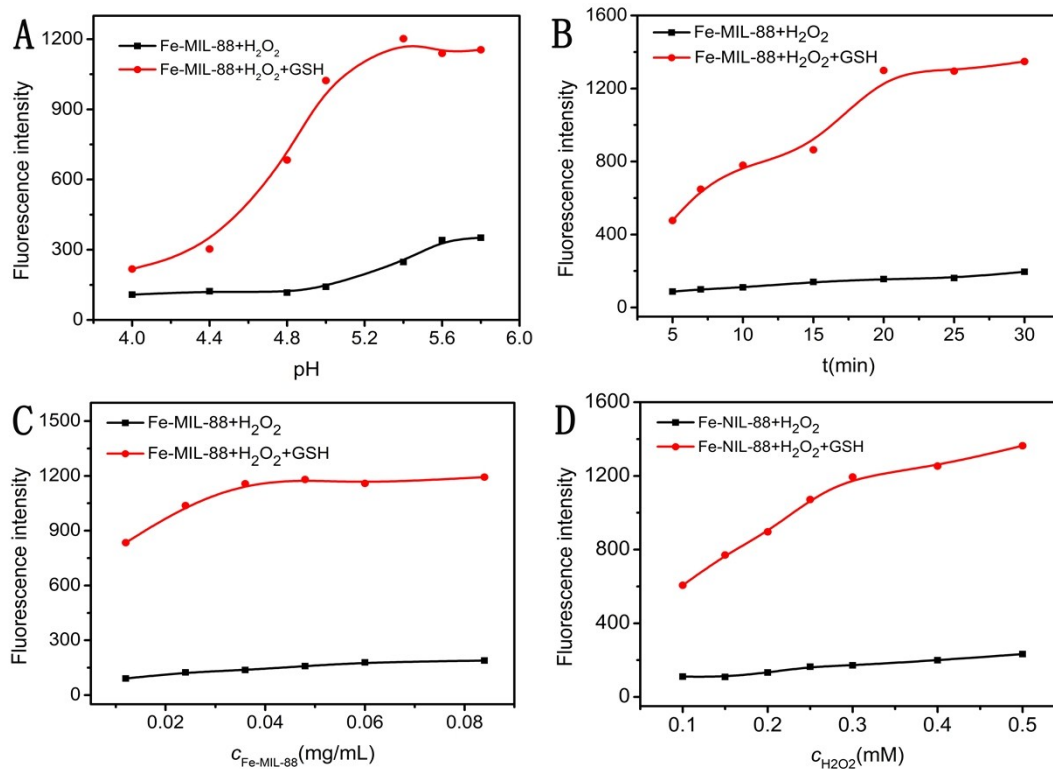


Fig. S4 Effects of (A) pH; (B) time; (C) Fe-MIL-88 concentration and (D) H₂O₂ concentration on the fluorescence intensities of Fe-MIL-88/H₂O₂ system in the absence and presence of GSH. $c_{\text{Fe-MIL-88}}$, 0.06 mg mL⁻¹; c_{GSH} , 5 μM ; $c_{\text{H}_2\text{O}_2}$, 0.3 mM; HAC-NaAC, pH 5.4; Time, 25 min; Temperature, 40°C; λ_{ex} , 326 nm; λ_{em} , 445 nm.

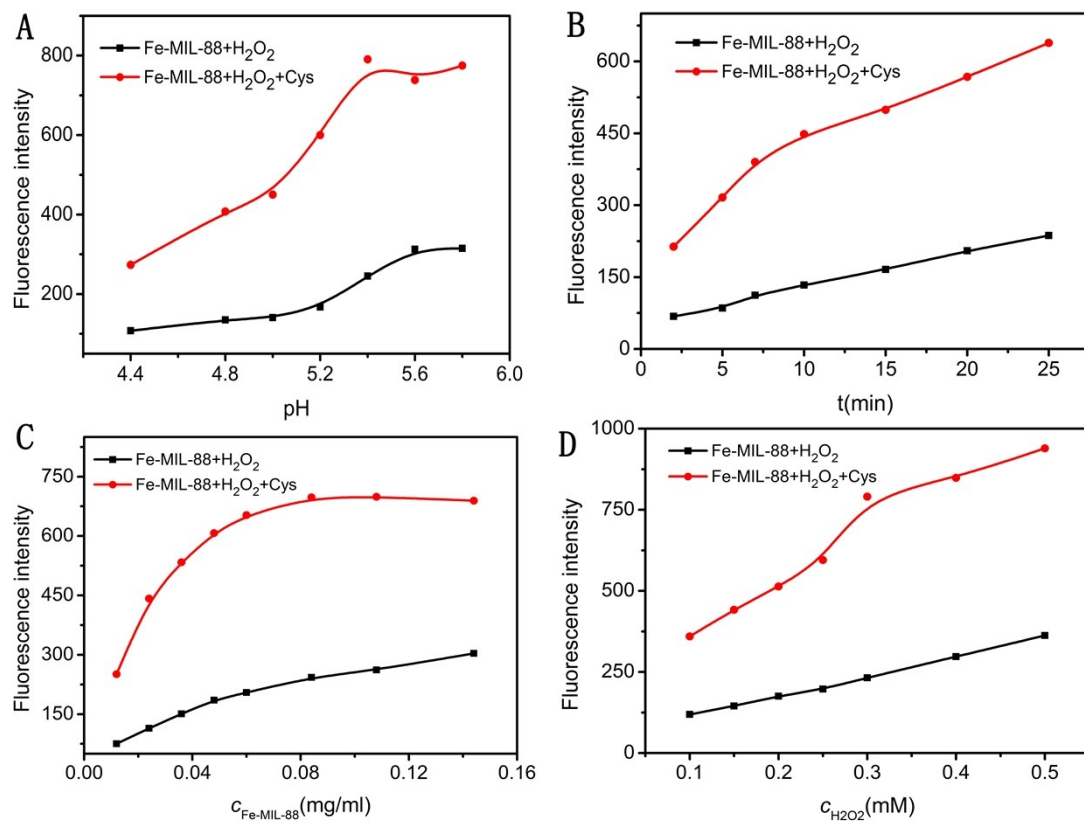


Fig. S5 Effects of (A) pH; (B) time; (C) Fe-MIL-88 concentration and (D) H₂O₂ concentration on the fluorescence intensities of Fe-MIL-88/H₂O₂ system in the absence and presence of Cys.

$c_{\text{Fe-MIL-88}}$, 0.06 mg mL⁻¹; c_{Cys} , 5 μM ; $c_{\text{H}_2\text{O}_2}$, 0.3 mM; HAC-NaAC, pH 5.4; Time, 25 min;

Temperature, 40°C; λ_{ex} , 326 nm; λ_{em} , 445 nm.

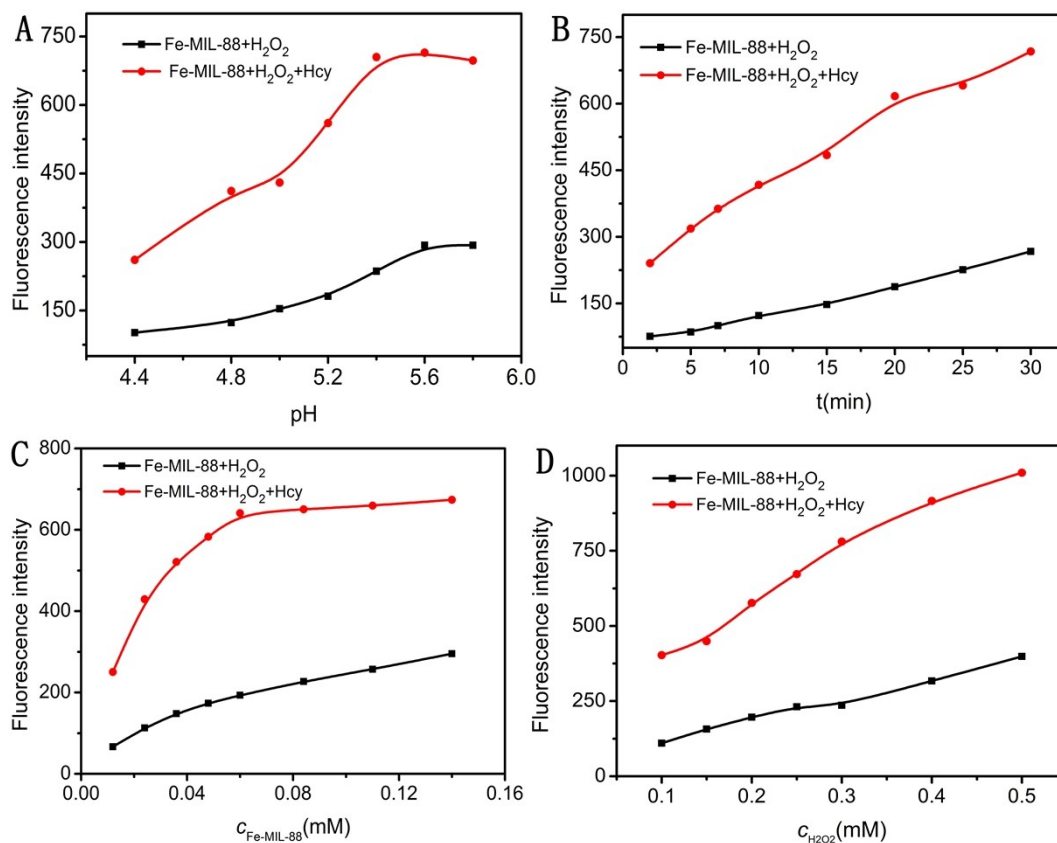


Fig. S6 Effects of (A) pH; (B) time; (C) Fe-MIL-88 concentration and (D) H₂O₂ concentration on the fluorescence intensities of Fe-MIL-88/H₂O₂ system in the absence and presence of Hcy.

$c_{\text{Fe-MIL-88}}$, 0.06 mg mL⁻¹; c_{Hcy} , 5 μM ; $c_{\text{H}_2\text{O}_2}$, 0.3 mM; HAC-NaAC, pH 5.4; Time, 25 min;

Temperature, 40°C; λ_{ex} , 326 nm; λ_{em} , 445 nm.

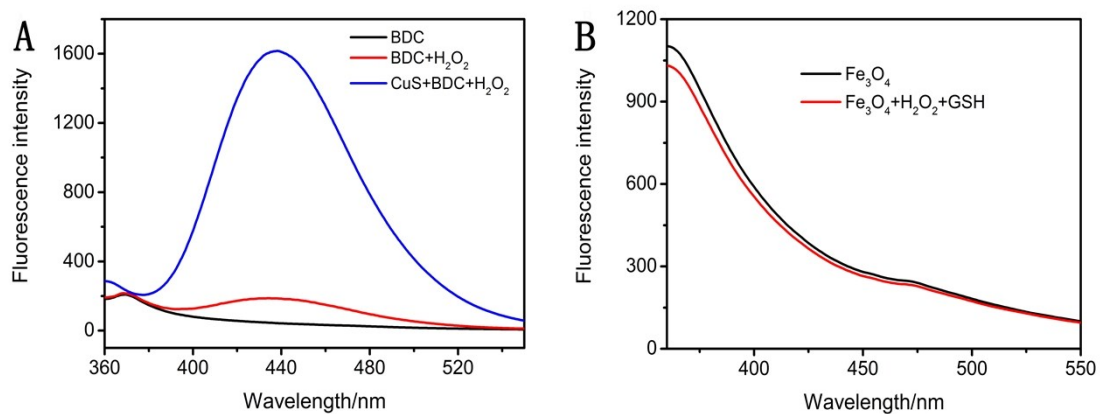


Fig. S7 (A) The fluorescence emission spectra of BDC (black), BDC+H₂O₂ (red), CuS+BDC+H₂O₂ (blue). (B) The fluorescence emission spectra of Fe₃O₄ (black), Fe₃O₄+H₂O₂+GSH (red). c_{CuS} , 0.04 mg mL⁻¹; $c_{\text{Fe}_3\text{O}_4}$, 1 mg mL⁻¹; $c_{\text{H}_2\text{O}_2}$, 0.3 mM; c_{GSH} , 10 μM; HAC-NaAC, pH 5.4; Time, 25 min; Temperature, 40 °C; λ_{ex} , 326 nm.

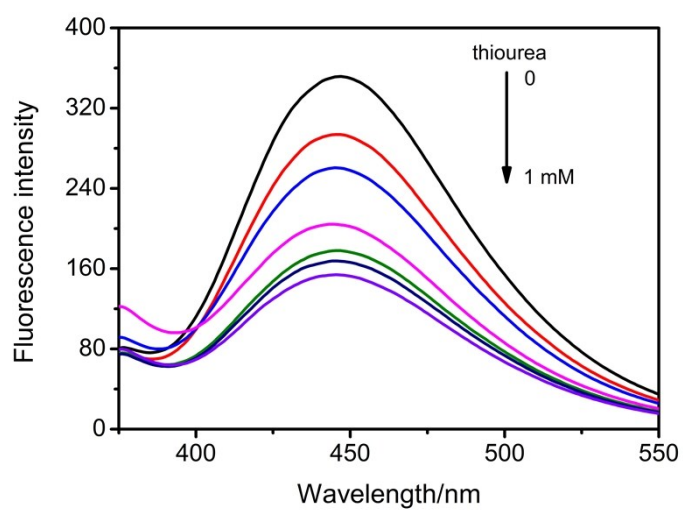


Fig. S8 The fluorescence spectra of Fe-MIL-88/H₂O₂ system upon addition of thiourea.

References

1. Y. L. Liu, W. L. Fu, C. M. Li, C. Z. Huang and Y. F. Li, *Anal. Chim. Acta*, 2015, **861**, 55-61.