

Iodide-enhanced Cu-MOF Nanomaterials for the Amplified Colorimetric Detection of Fe³⁺

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Supplementary Figures

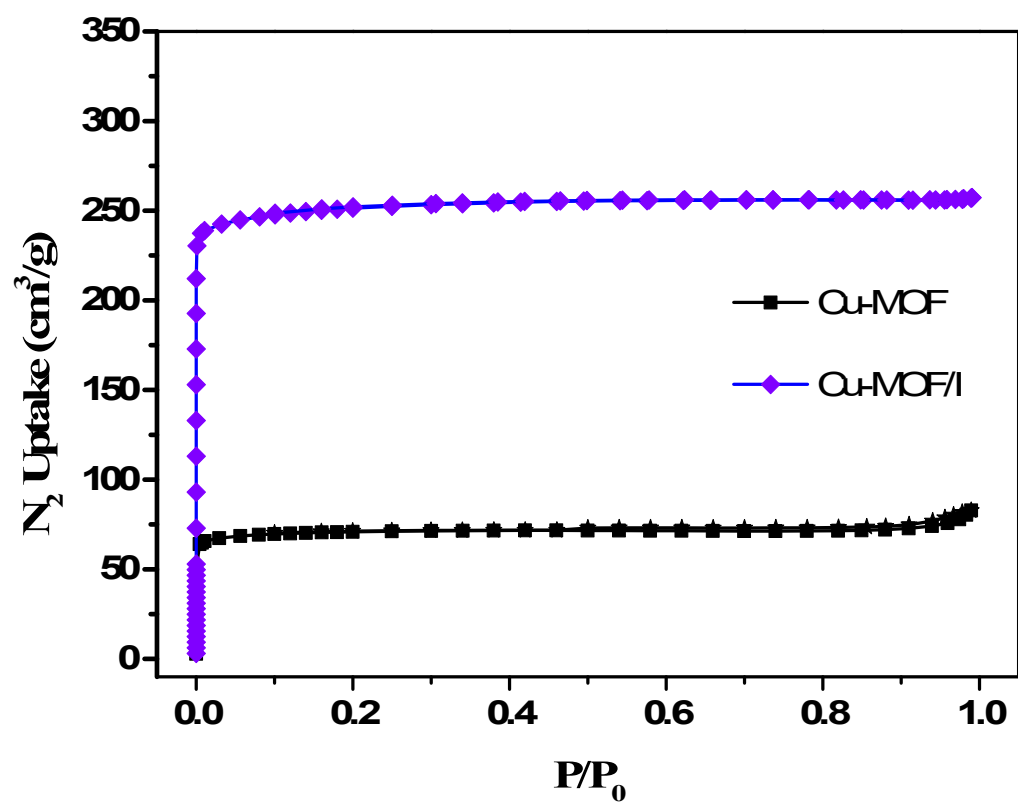


Fig.S1 Nitrogen adsorption and desorption isotherms for the MOF and MOF/I.

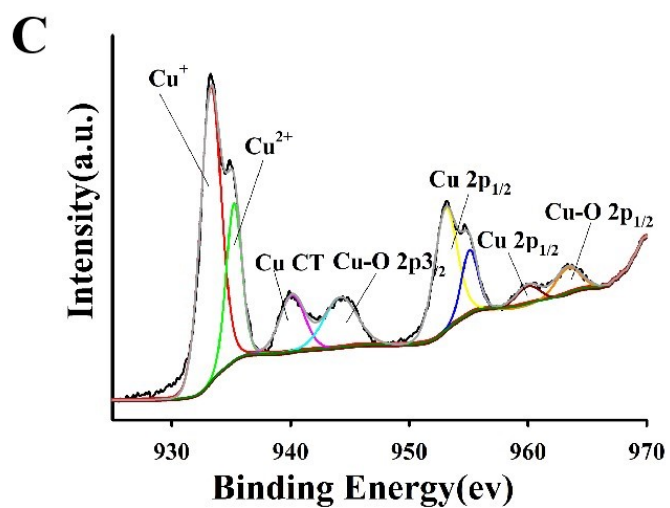
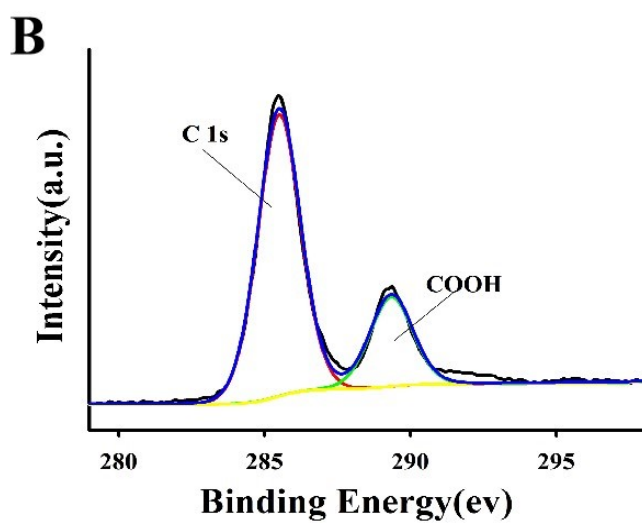
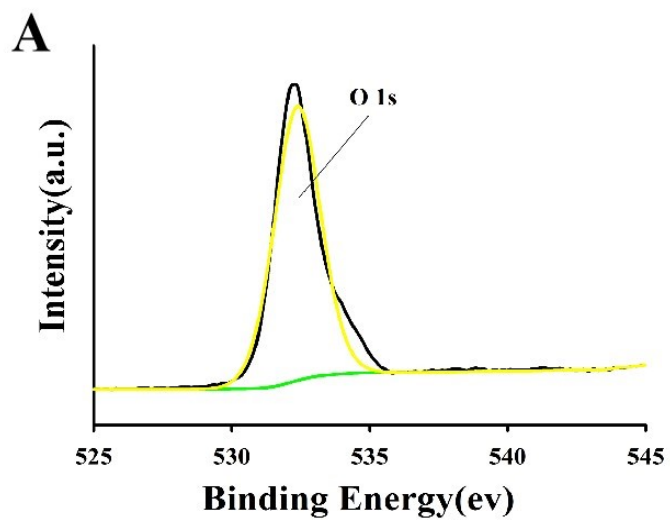


Fig.S2 The XPS of O 1s, C 1s and Cu 2p₃.

Table S1 The energy spectrum (EDS) of Cu-MOF (A) and Cu-MOF/I(B)

A	Element	PEAK AREA	ABS CORM	WEIGHT%
	C K	10219	1.000	43.44
O K	3819	1.000	13.31	
Ni K	3414	1.000	8.18	
Cu K	13338	1.000	35.07	
Totals			100.00	

B	Element	PEAK AREA	ABS CORM	WEIGHT%
	C K	988	1.000	4.88
O K	1086	1.000	7.32	
K K	4	1.000	0.01	
Ni K	17456	1.000	48.64	
Cu K	9024	1.000	27.58	
I L	2756	1.000	11.58	
Totals			100.00	

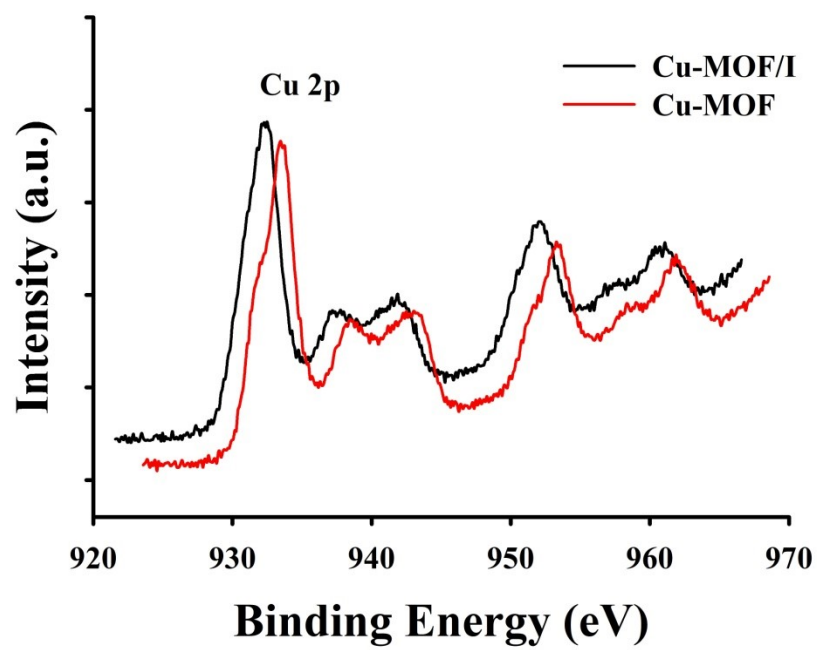


Fig. S3 The XPS of Cu 2p3 before and after adsorption of I⁻

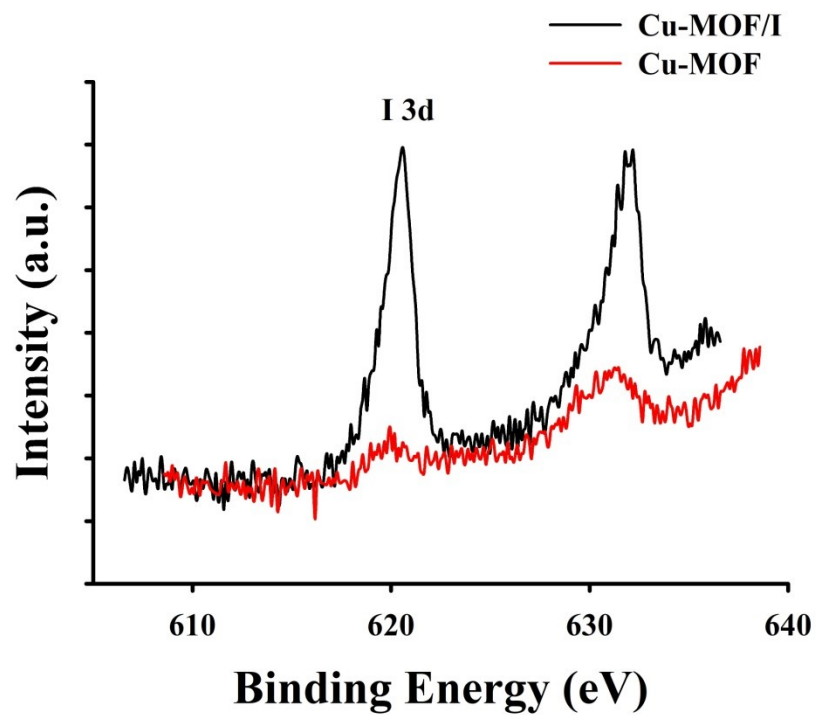


Fig. S4 The XPS of I 3d before and after adsorption of I⁻

Sample: Micropore analysis
Operator: zkbc
Submitter:
File: E:\RESULT\190427-65.1\CU-MOF\CU-MOF.SMP

Started: 5/15/2019 7:31:43 PM
Completed: 5/17/2019 9:16:30 AM
Report Time: 5/17/2019 8:06:33 PM
Sample Mass: 0.0721 g
Cold Free Space: 87.1974 cm³
Low Pressure Dose: 20.0000 cm³/g STP
Automatic Degas: No
Analysis Adsorptive: N2
Analysis Bath Temp.: -195.800 °C
Thermal Correction: Yes
Warm Free Space: 28.5407 cm³ Entered
Equilibration Interval: 30 s
Sample Density: 1.000 g/cm³

Summary Report

Surface Area

Single point surface area at $p/p^{\circ} = 0.300000000$: 217.2765 m²/g

BET Surface Area: 238.6704 m²/g

Langmuir Surface Area: 300.1052 m²/g

t-Plot Micropore Area: 228.7431 m²/g

t-Plot External Surface Area: 9.9273 m²/g

BJH Adsorption cumulative surface area of pores
between 1.0000 nm and 300.0000 nm diameter: 23.879 m²/g

BJH Desorption cumulative surface area of pores
between 1.0000 nm and 300.0000 nm diameter: 16.0203 m²/g

D-H Adsorption cumulative surface area of pores
between 1.7000 nm and 300.0000 nm diameter: 12.737 m²/g

D-H Desorption cumulative surface area of pores
between 1.7000 nm and 300.0000 nm diameter: 14.9811 m²/g

Pore Volume

Single point adsorption total pore volume of pores
less than 186.5677 nm diameter at $p/p^{\circ} = 0.989625024$: 0.128046 cm³/g

t-Plot micropore volume: 0.105247 cm³/g

BJH Adsorption cumulative volume of pores
between 1.0000 nm and 300.0000 nm diameter: 0.025814 cm³/g

BJH Desorption cumulative volume of pores
between 1.0000 nm and 300.0000 nm diameter: 0.024469 cm³/g

Pore Size

Adsorption average pore diameter (4V/A by BET): 2.14599 nm

BJH Adsorption average pore diameter (4V/A): 4.3241 nm

BJH Desorption average pore diameter (4V/A): 6.1096 nm

Fig. S5 The surface area and pore size for Cu MOF.

Sample: Micropore analysis
Operator: zkbc
Submitter:
File: E:\RESULT\190427-65.1\CU-MOF I\CU-MOF I.SMP

Started: 5/15/2019 7:31:43 PM	Analysis Adsorptive: N2
Completed: 5/17/2019 9:16:30 AM	Analysis Bath Temp.: -195.800 °C
Report Time: 5/17/2019 8:09:55 PM	Thermal Correction: Yes
Sample Mass: 0.0663 g	Warm Free Space: 28.3873 cm ³ Entered
Cold Free Space: 85.2517 cm ³	Equilibration Interval: 30 s
Low Pressure Dose: 20.0000 cm ³ /g STP	Sample Density: 1.000 g/cm ³
Automatic Degas: No	

Summary Report

Surface Area

Single point surface area at $p/p^\circ = 0.300000000$: 771.6219 m²/g

BET Surface Area: 844.6516 m²/g

Langmuir Surface Area: 1,069.5418 m²/g

t-Plot Micropore Area: 803.6673 m²/g

t-Plot External Surface Area: 40.9843 m²/g

BJH Adsorption cumulative surface area of pores
between 1.0000 nm and 300.0000 nm diameter: 69.647 m²/g

BJH Desorption cumulative surface area of pores
between 1.0000 nm and 300.0000 nm diameter: 49.9485 m²/g

D-H Adsorption cumulative surface area of pores
between 1.7000 nm and 300.0000 nm diameter: 41.852 m²/g

D-H Desorption cumulative surface area of pores
between 1.7000 nm and 300.0000 nm diameter: 46.0950 m²/g

Pore Volume

Single point adsorption total pore volume of pores
less than 201.2477 nm diameter at $p/p^\circ = 0.990391909$: 0.397940 cm³/g

t-Plot micropore volume: 0.370825 cm³/g

BJH Adsorption cumulative volume of pores
between 1.0000 nm and 300.0000 nm diameter: 0.030631 cm³/g

BJH Desorption cumulative volume of pores
between 1.0000 nm and 300.0000 nm diameter: 0.028468 cm³/g

Pore Size

Adsorption average pore diameter (4V/A by BET): 1.88452 nm

BJH Adsorption average pore diameter (4V/A): 1.7592 nm

BJH Desorption average pore diameter (4V/A): 2.2798 nm

Fig. S6 The surface area and pore size for Cu MOF/I.

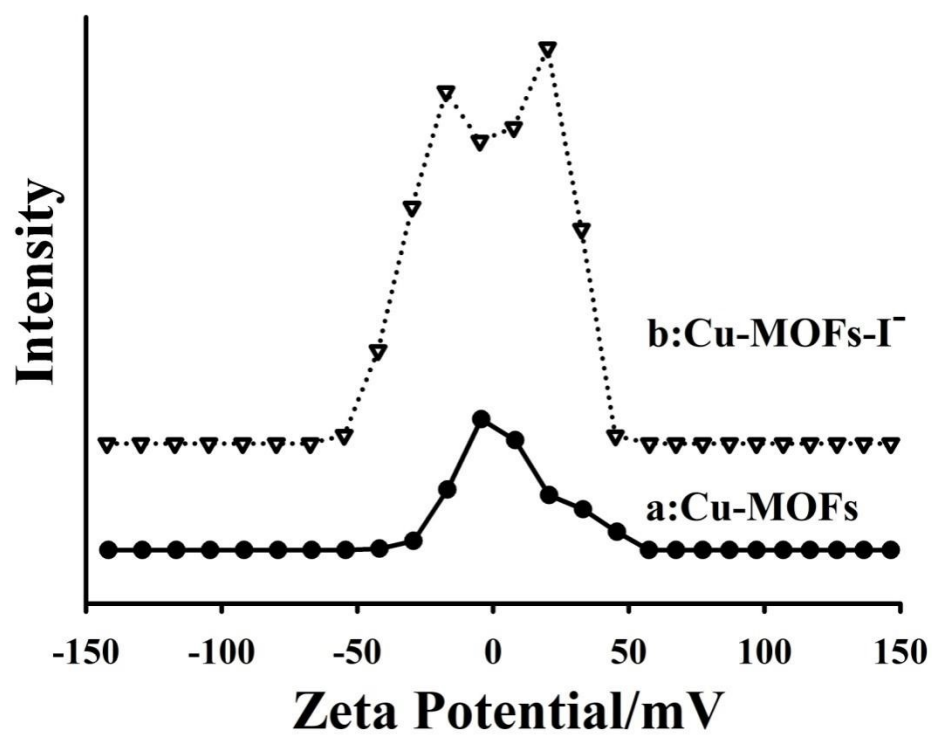


Fig. S7 ZETA potential analysis: (a) Cu-MOF and (b) Cu-MOF/I



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Video 1. The system upon the addition of KSCN or $K_3[Fe(CN)_6]$.



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Video 2. The incubation time of sensing system upon the addition of Fe^{3+} or Fe^{2+} .

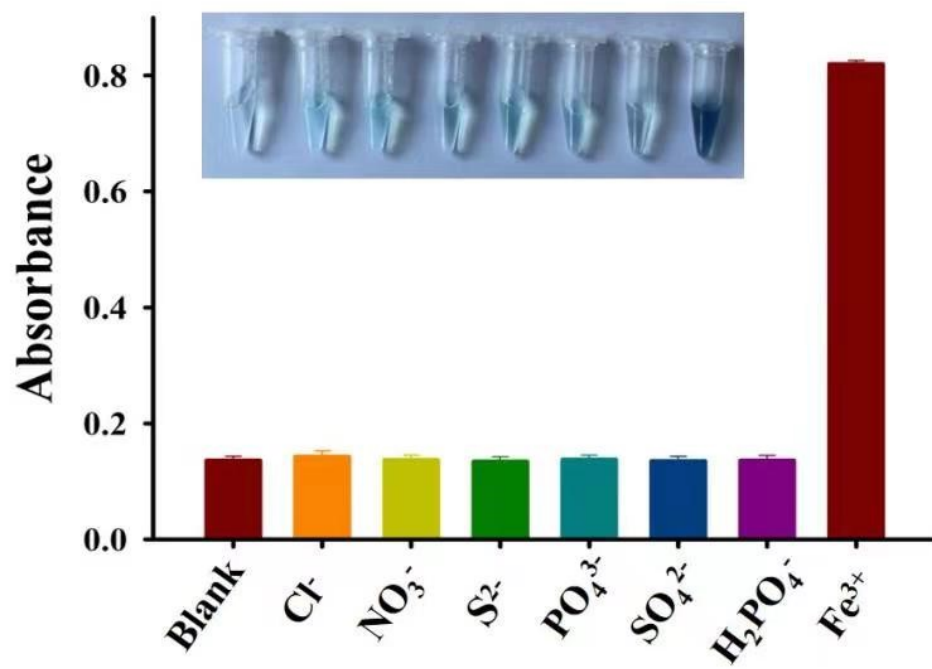


Fig. S8 The UV-vis intensity of the system under different kinds of anions. Concentration: 50 μ M.

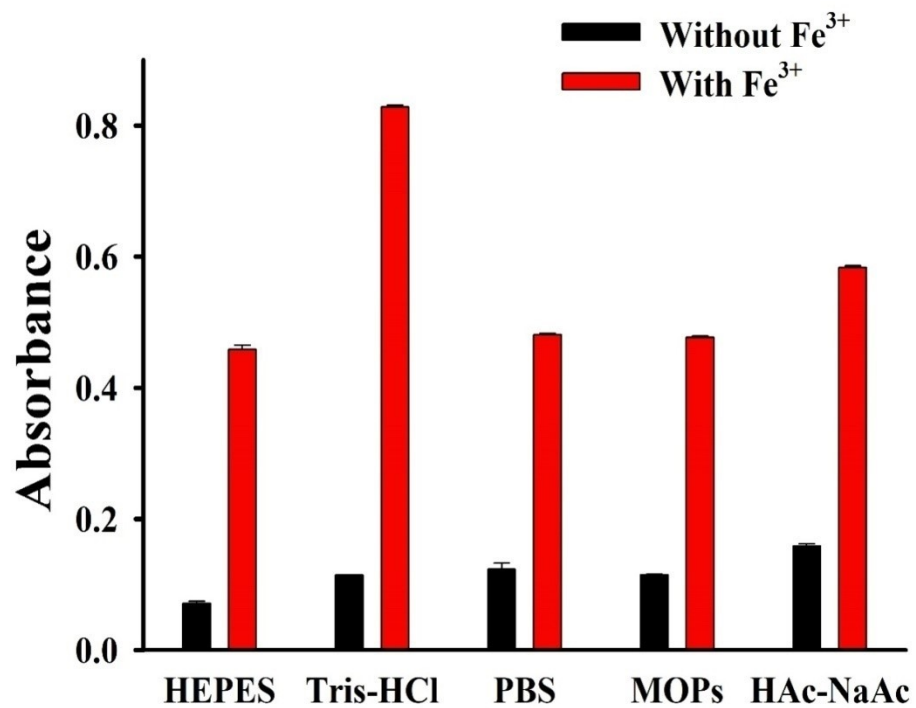


Fig. S9 Effect of the Types of buffer solutions ([Cu-MOF] = 0.2 mg/mL, [Fe³⁺] = 50 μ M, [I⁻] = 2 mM).