

## Supplementary Data

### **Fabrication of copper sulfide using a Cu-based metal organic framework for colorimetric determination and efficient removal of Hg<sup>2+</sup> in aqueous solutions**

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Table S1. Michaelis-Menten constant ( $K_m$ ) and maximum reaction rate ( $V_{max}$ ) of the oxidation reaction catalyzed by the PCuS.

Catalyst	Substance	$K_m$ /mM	$V_{max}/10^{-8} \text{ M s}^{-1}$
PCuS	TMB	0.029	29
	H <sub>2</sub> O <sub>2</sub>	0.15	16

Table S2. Determination results of Hg<sup>2+</sup> in pond water sample.

Target added ( $\mu\text{M}$ )	Found ( $\mu\text{M}$ )	Recovery (%)	RSD (%)
5	5.4	108	5.4
15	14.8	93.6	2.8
30	30.2	100.7	4.2

Table S3. The comparison of the adsorption capacity of PCuS with other adsorbents.

Adsorbents	Maximum adsorption capacity (mg g <sup>-1</sup> )	Reference
Thiol-functionalization of HKUST-1	714.29	[22]
Porphyrin-functionalized Fe <sub>3</sub> O <sub>4</sub> @SiO <sub>2</sub>	<10	[30]
Mesoporous silica spheres	<100	[31]
SBA-15-Ag	0.06	[32]
ZnS	2000	[33]
PCuS	2105	This work

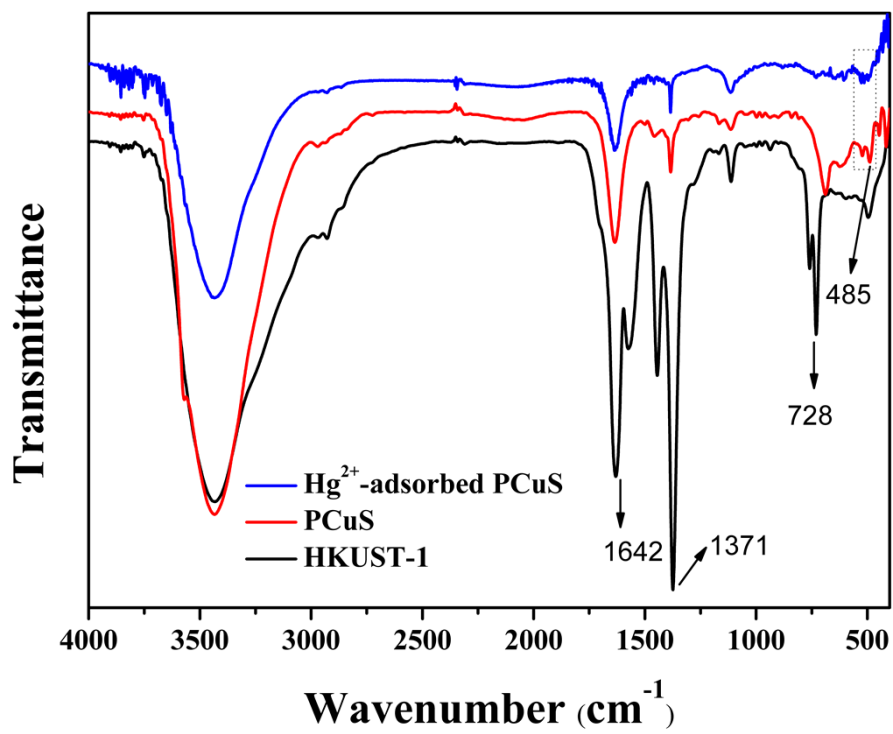
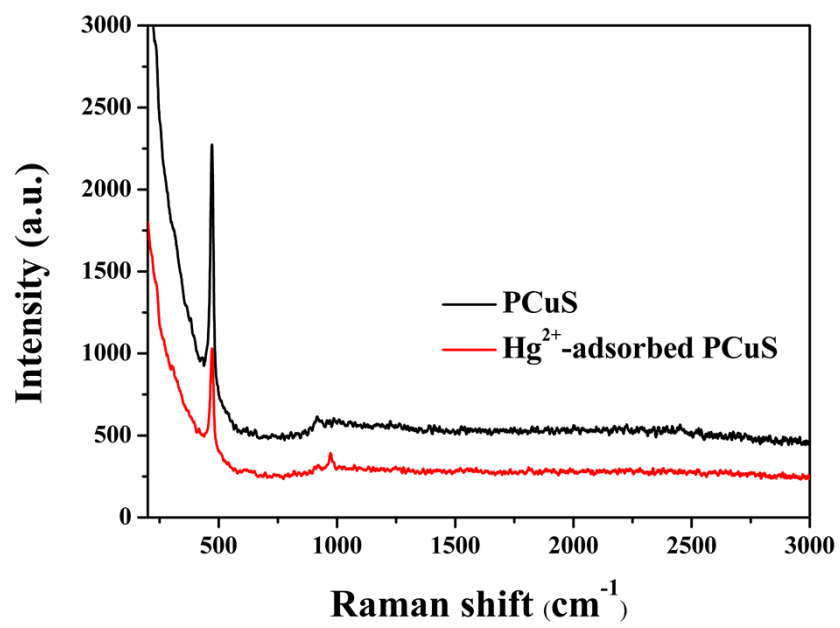
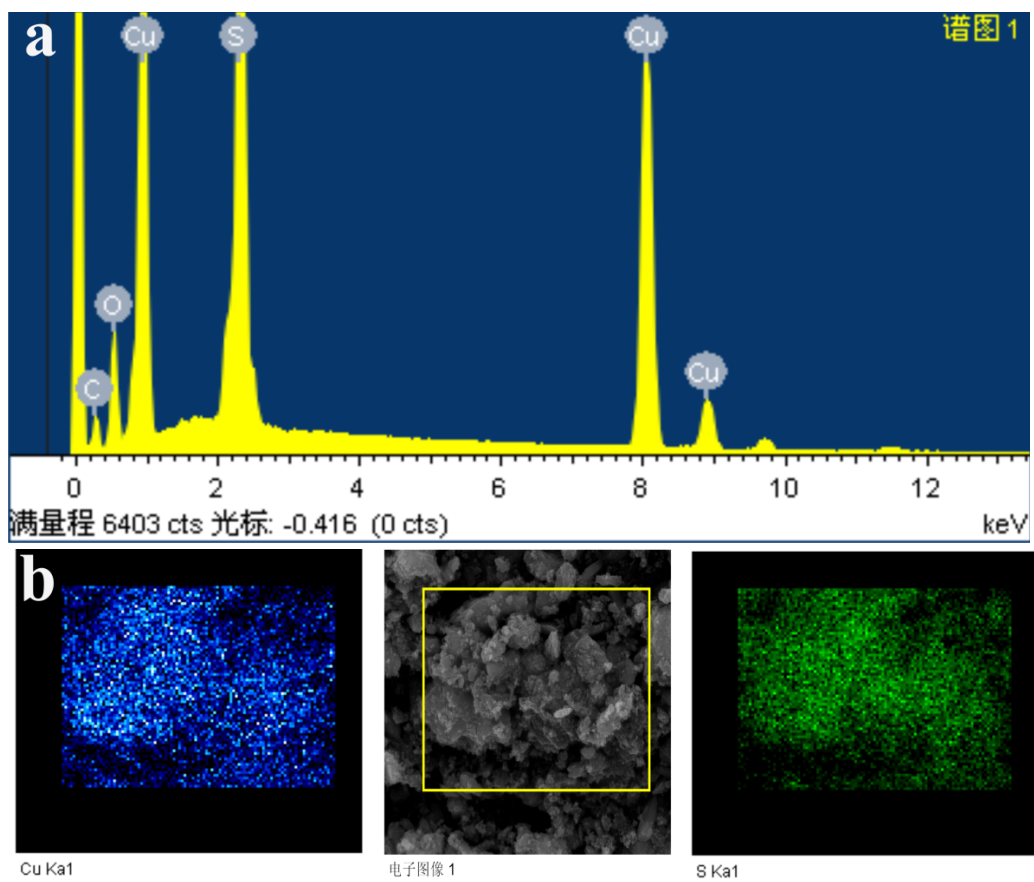


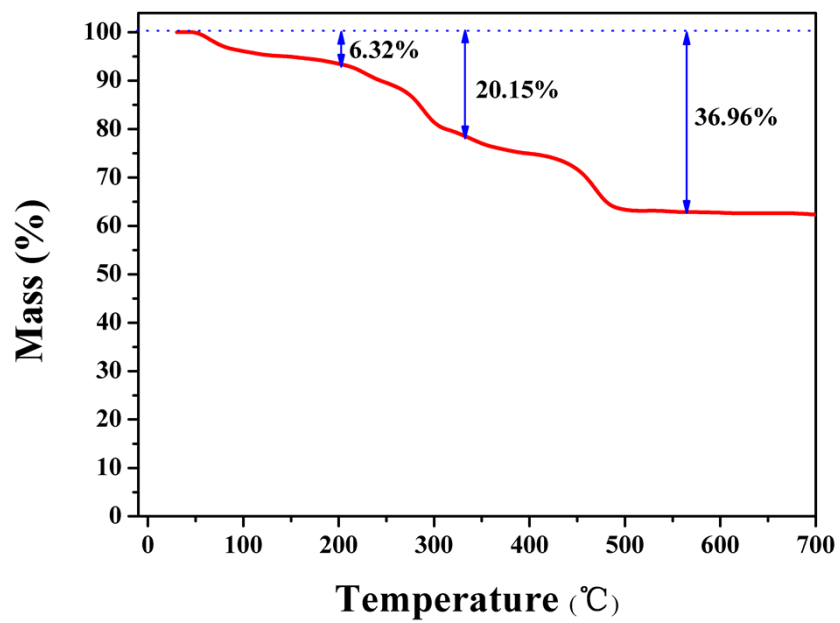
Fig. S1 FT-IR spectra of HKUST-1 and PCuS



**Fig. S2** Raman spectra for PCuS before and after Hg<sup>2+</sup> sorption

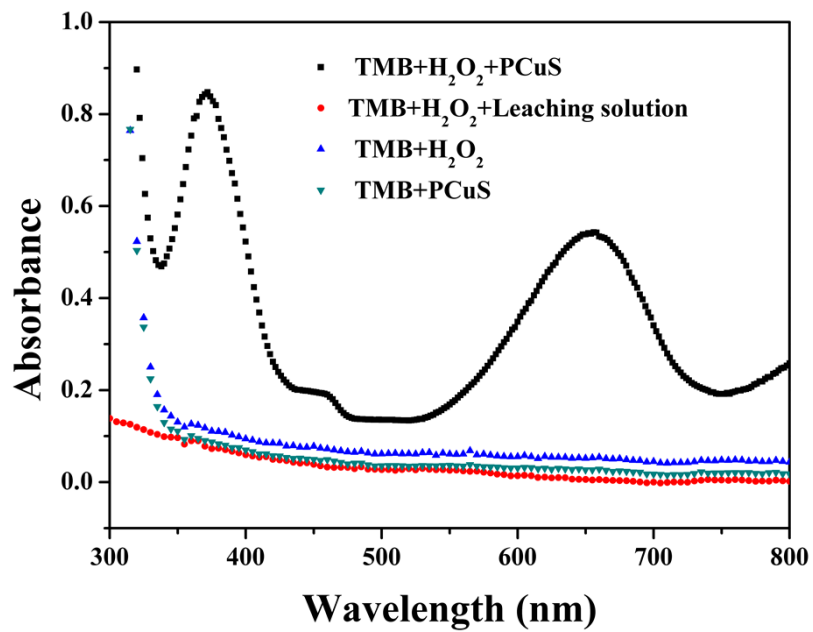


**Fig. S3** The EDS spectrum (a) and elemental mapping (b) of the PCuS.

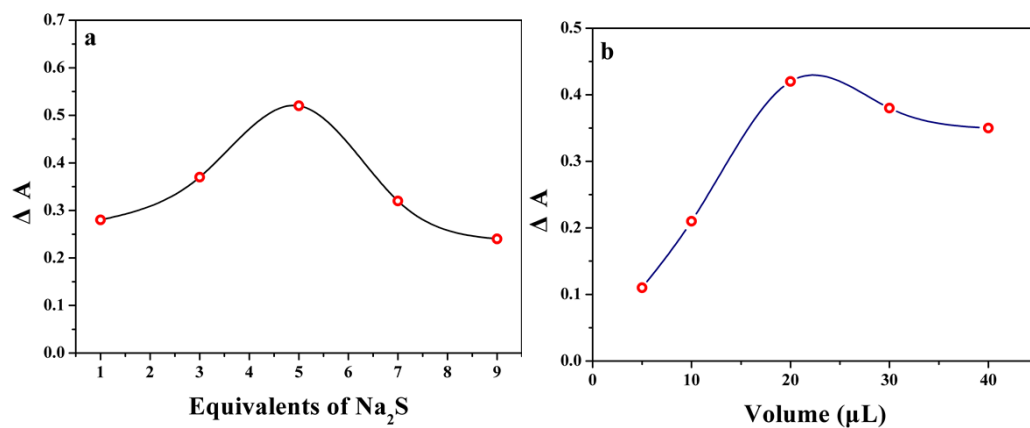


**Fig. S4** TGA curve of the PCuS





**Fig. S5** UV-Vis spectra of TMB buffer solution containing H<sub>2</sub>O<sub>2</sub>/PCuS, H<sub>2</sub>O<sub>2</sub>/leaching solution, H<sub>2</sub>O<sub>2</sub> and PCuS



**Fig. S6** Effects of the amounts of Na<sub>2</sub>S used in the PCuS fabrication (a) and dosage of PCuS (b)

for Hg<sup>2+</sup> detection

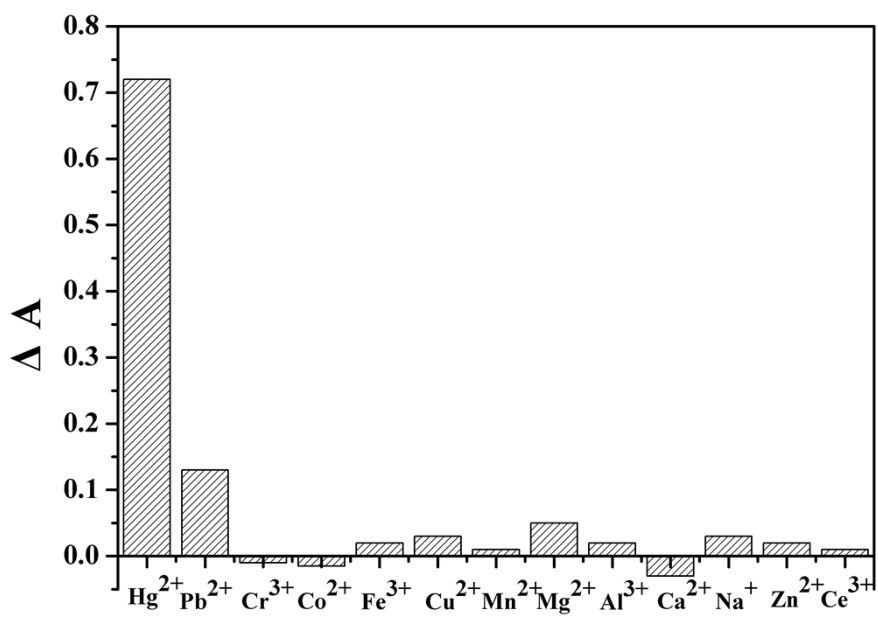
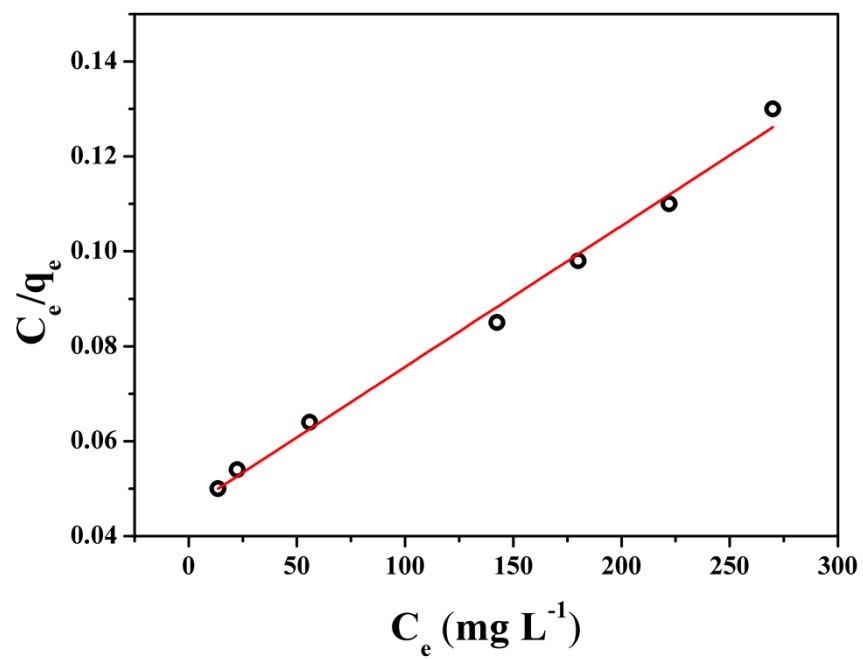
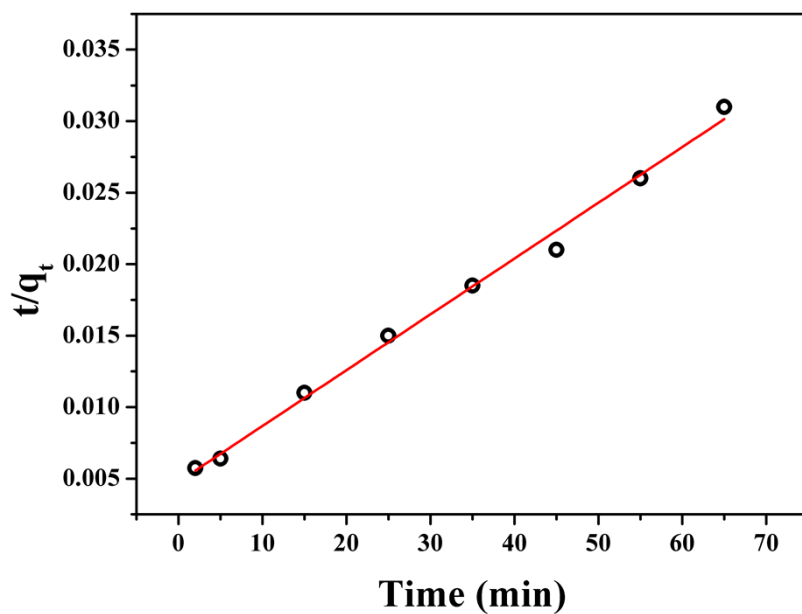


Fig. S7 Determination of the selectivity of Hg<sup>2+</sup> detection



**Fig. S8** The fitted adsorption isotherms of Hg<sup>2+</sup> on PCuS by the Langmuir equation



**Fig. S9** Plots of pseudo-second-order kinetics for the adsorption of  $\text{Hg}^{2+}$  on PCuS