Supplementary Information for

Rational design of a functionalized metal-organic framework for ratiometric fluorimetric sensing Hg^{2+} in environmental water

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Characterization

Scanning electron microscope (SEM, Hitachi-SU1510) and transmission electron microscope (TEM, FEI Talos F200X) were used to characterized the structural and morphological information of Eu-MOF/BA. X-ray diffraction (XRD) patterns were carried out with an X-ray diffractometer (Bruker, D8 Advance, Germany) with Cu Ka radiation (λ=1.542Å). The Fourier transform spectra (FI-TR) were measured using in situ diffuse reflectance infrared Fourier transform spectroscopy (Nicolet IS50, Thermo fisher). The thermogravimetric analysis (TGA) was conducted on the Mettler Toledo TGA / DSC-1 system. UV-Vis-IR spectra were recorded by spectrophotometer (UV-3600 plus). Fluorescence spectra were collected using a fluorescence spectrometer (Hitachi, F4500) under a 270 nm excitation. Parameter setting: scanning speed of 240 nm/min, excitation and emission slit of 5 nm, the voltage of 950 V.

Additional figures

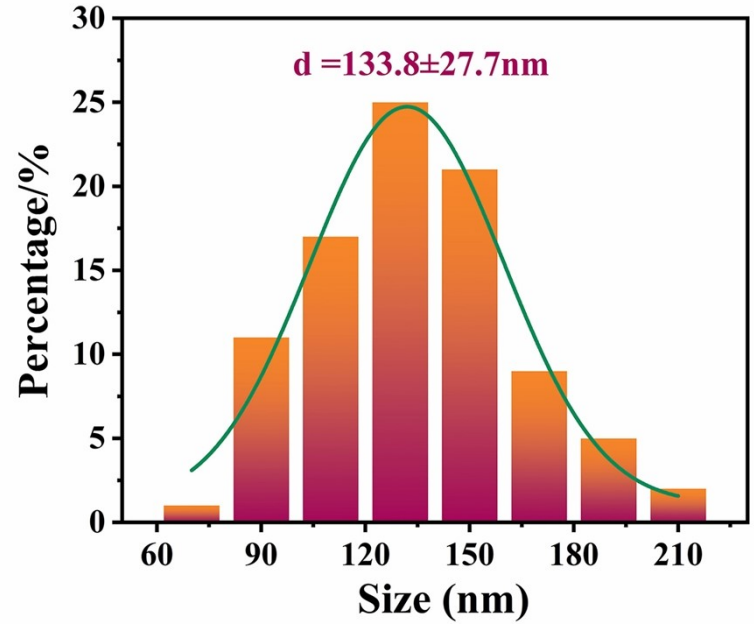

Fig.S1. Size distribution of Eu-MOF/BA.

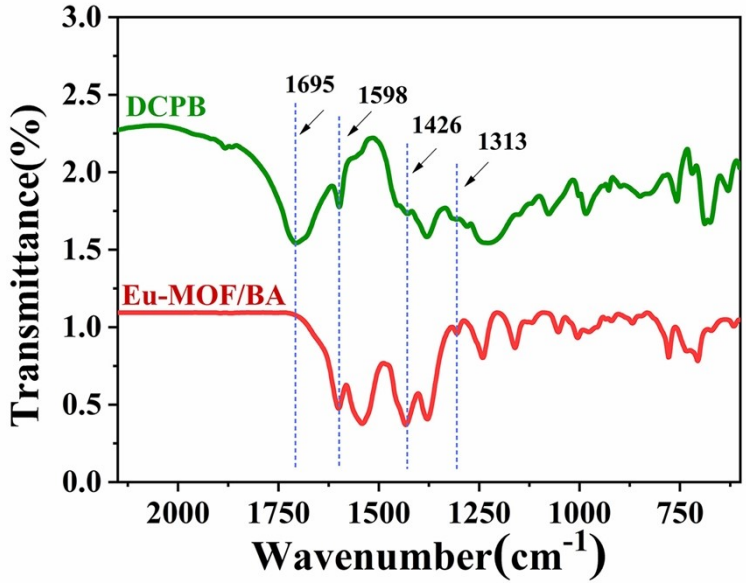

Fig.S2. Infrared spectra of DCPB and Eu-MOF/BA.

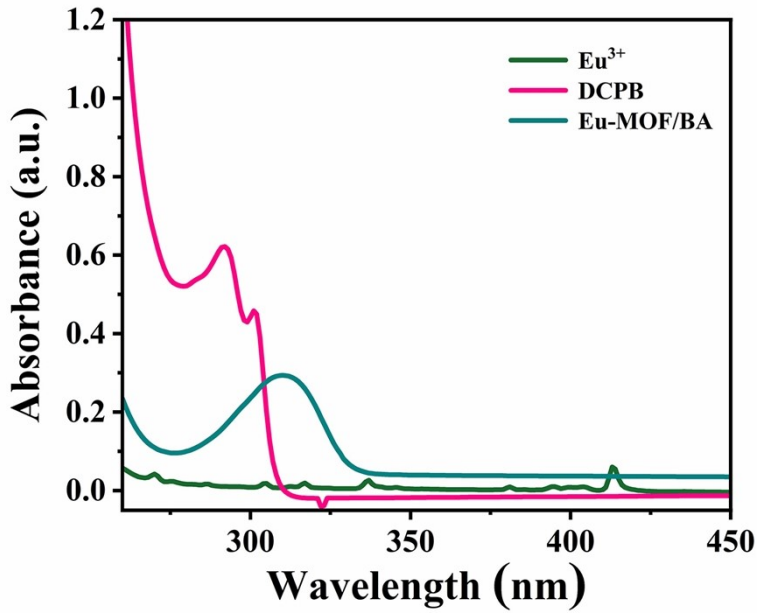

Fig.S3. UV-vis spectra of Eu^{3+}, DCPB, Eu-MOF/BA.

Fig.S4. Images of Eu-MOF/BA in the solution of different pH under the UV lamp at 265 nm.

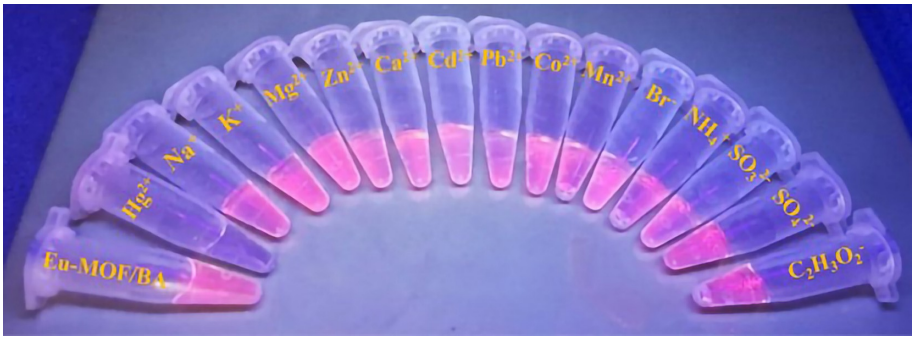

Fig.S5. Images of Eu-MOF/BA in the solution containing various interferents under UV lamp at 265 nm.

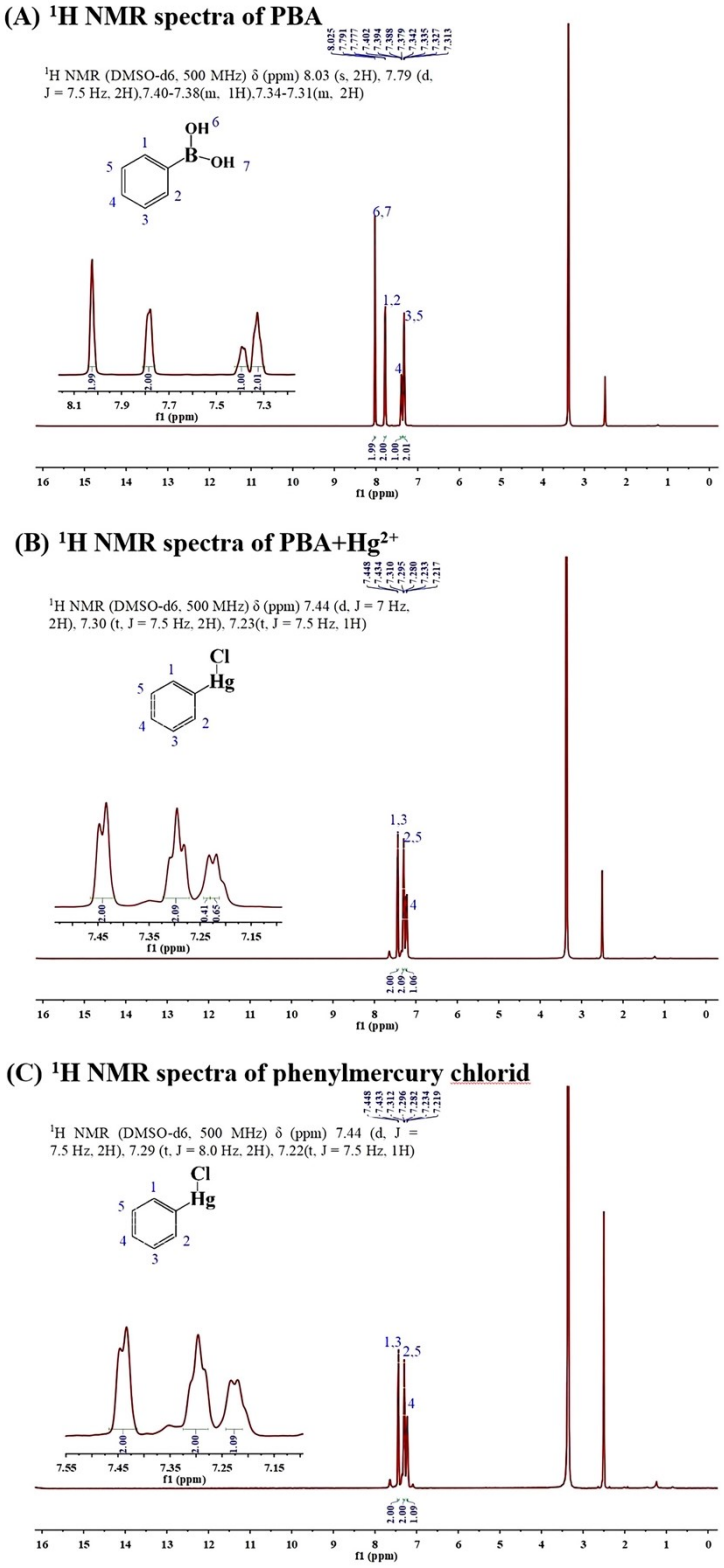

Fig. S6. ^{1}H NMR spectra of (A) PBA, (B) PBA+Hg^{2+}, (C) phenylmercury chloride.

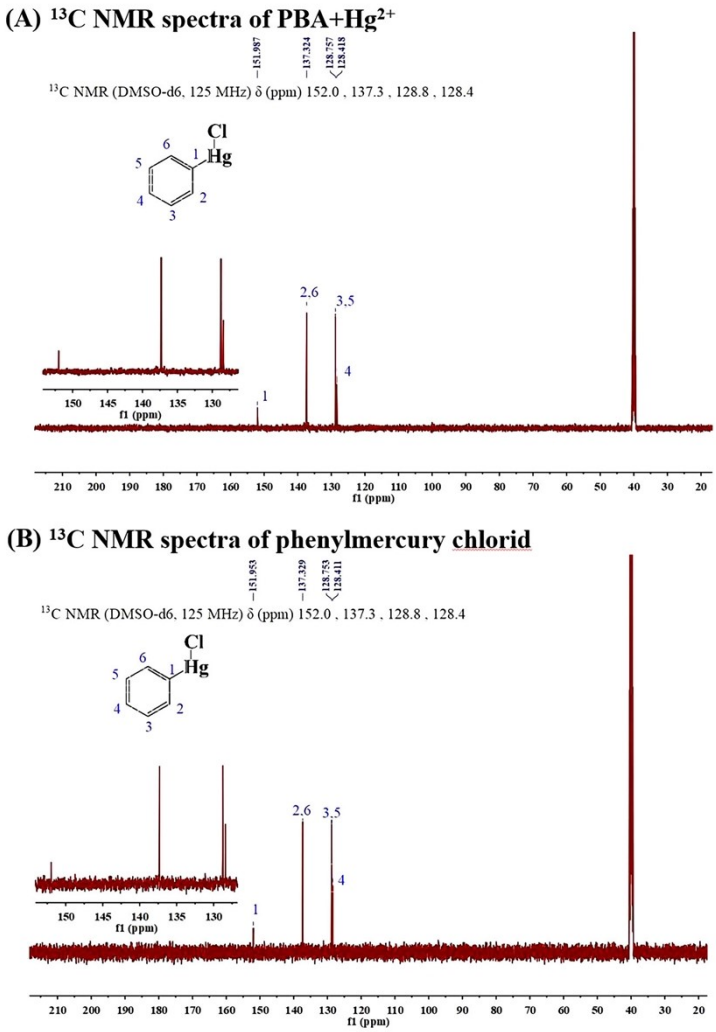

Fig. S7. ^{13}C NMR spectra of (A) PBA+Hg^{2+}, (B) phenylmercury chloride.

Table S1. Comparison of the detection performance among different methods for Hg^{2+} assay.

Methods	Linear range (μM)	LOD (nM)	Refs
Electrochemical	0.5-50	2	[1]
SERS	0.005-0.5	0.5	[2]
Colorimetric	0.085-4.7	5.88	[3]
Fluorescent	0.1-50	1.6	[4]
Fluorescent	0.01-1	3.65	[5]
Fluorescent	0.0005-50	0.5	[6]
This work	0-50.0	0.0890	-

Reference

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