SUPPORTING INFORMATION

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A Water-Stable 3D Eu(III)-Organic Framework as a Bi-Functional Ratiometric Luminescent Sensor for Fast, Sensitive and Selective Detection of ODZ and Hg^{2+} in Aqueous Media

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Synthesis of the H_2L ligand. The synthesis of 4,4'-((naphthalene-1,4-dicarbonyl)bis(azanediyl))dibenzoic acid (*H_2L*) was achieved by using a modified version of a previously reported procedure.[S1] The sample of 4-aminobenzoic acid (1.09 g, 7.95 mmol) is added to the toluene solution of 1,4-naphthalenedicarbonylchloride (1.04 g, 4.11 mmol), and the resulting solution was refluxed for 8 h. After cooling to room temperature, the precipitate was filtrated and washed with chloroform to give *H_2L* as a white powder. Yield: 82%. H-NMR (DMSO-d_6, ppm): δ 10.90 (s, 2H, -OH), 8.96 (s, 2H, -CONH-), 8.30 (2H, Ar-H), 8.17 (2H, Ar-H), 7.97 (2H, Ar-H), 7.95 (2H, Ar-H), 7.84 (2H, Ar-H), 7.66 (2H, Ar-H).

n SUPPLEMENTARY FIGURES

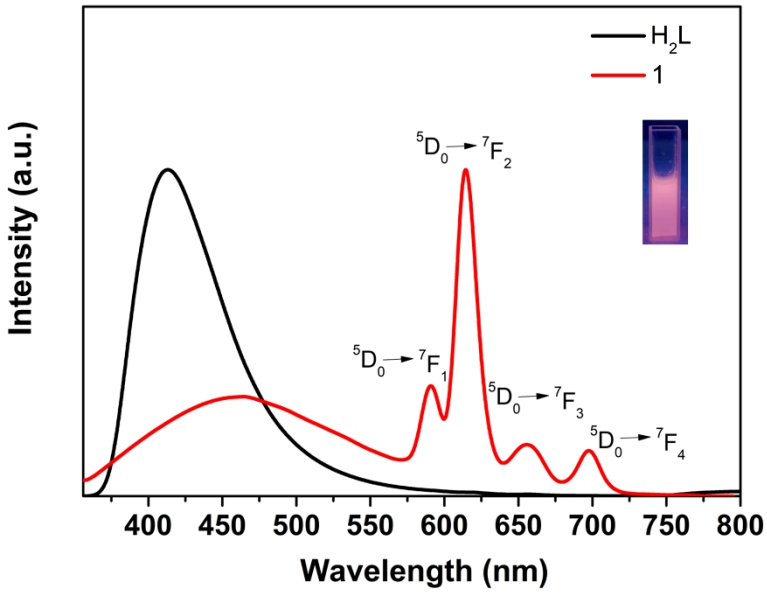

Figure S1. The emission spectra of H_2L ligand and **1** upon excitation at 326 nm. The inset shows the corresponding luminescence picture under UV-light irradiation of 254 nm.

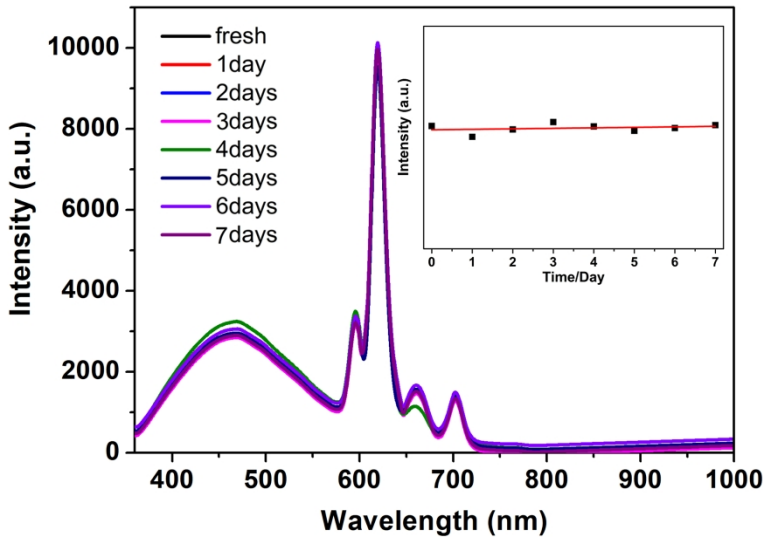

Figure S2. Day-to-day fluorescence stability of **1** in water.

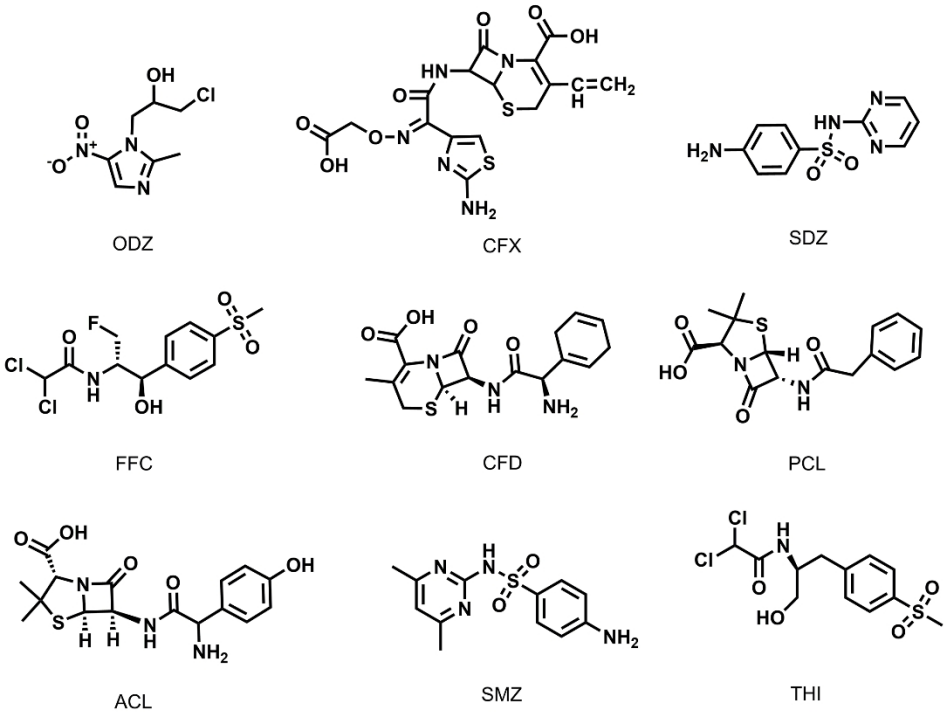

Figure S3. Molecular structures of the antibiotics.

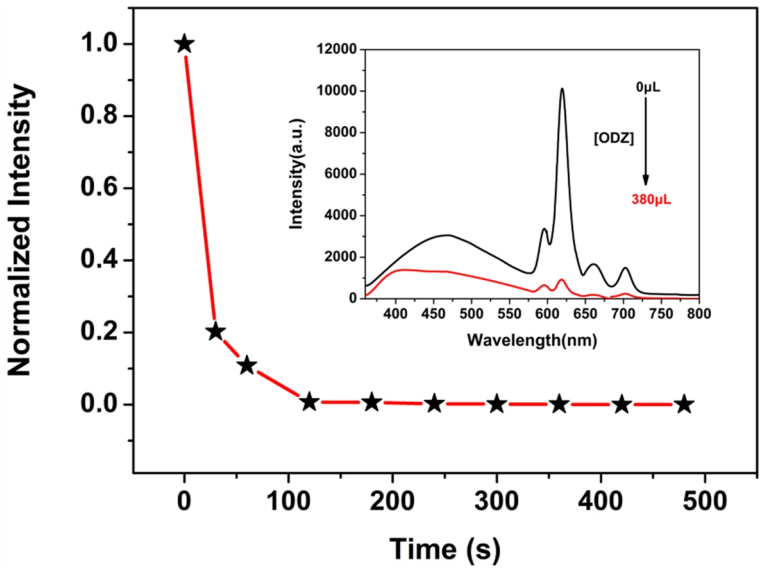

Figure S4. Luminescent response time of **1** toward ODZ (the inset shows the luminescence spectra of **1** before (0 s) and after (30 s) the addition of 380 μL of ODZ).

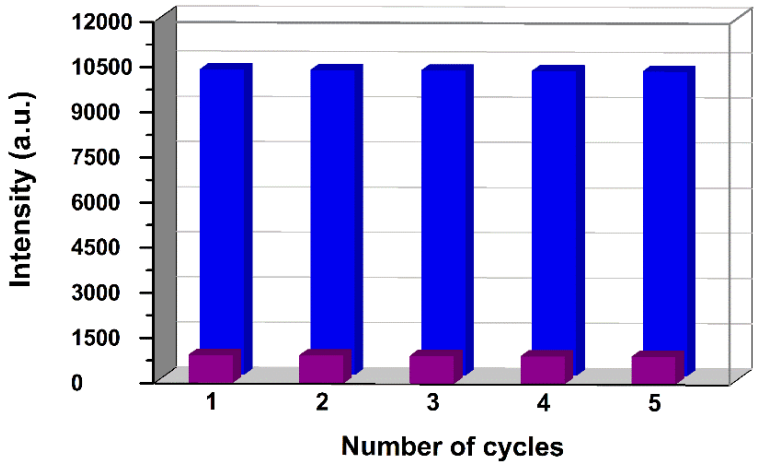

Figure S5. Recyclability experiments of **1** implemented with ODZ.

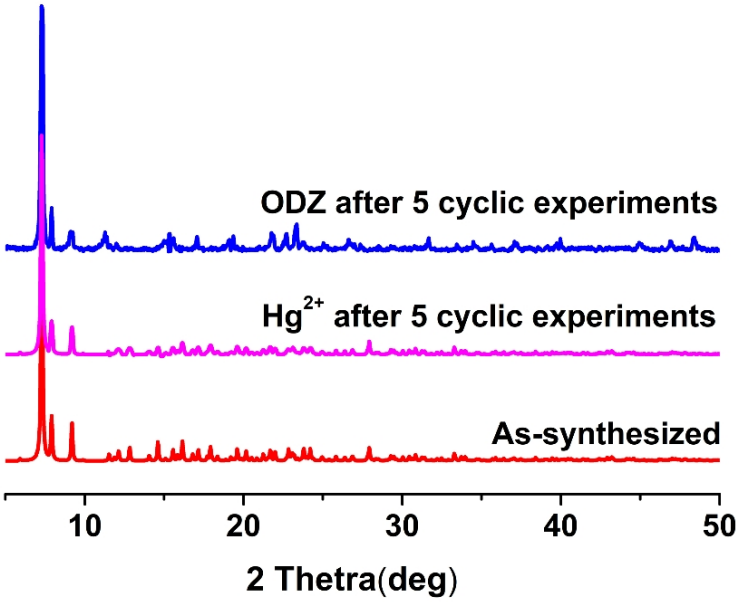

Figure S6. The PXRD patterns for **1** after 5 cyclic experiments.

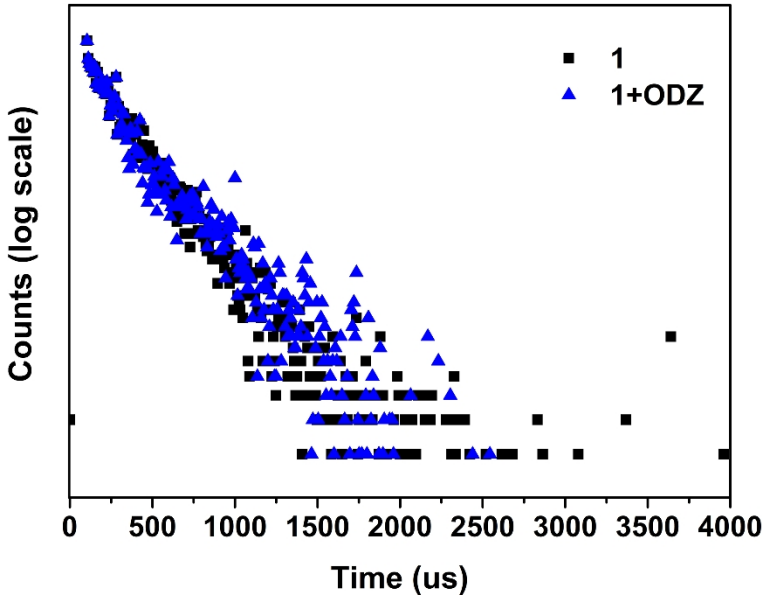

Figure S7. Time-resolved fluorescence decay of **1** in 619 nm before and after the addition of ODZ under excitation at 326 nm.

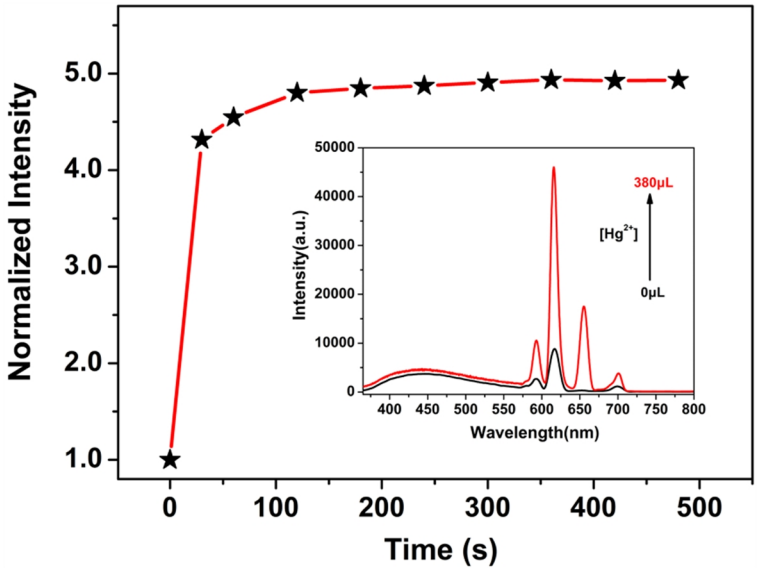

Figure S8. Luminescent response time of **1** toward Hg^{2+} (The inset shows the luminescence spectra of **1** before (0 s) and after (30 s) the addition of 380 μL of Hg^{2+}).

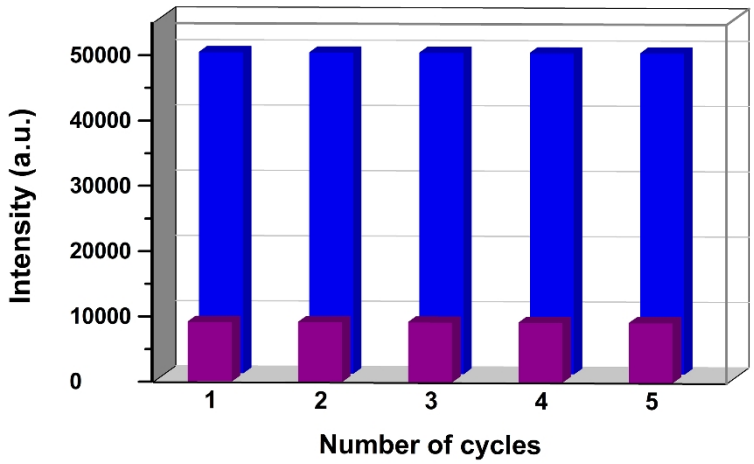

Figure S9. Recyclability experiments of **1** implemented with Hg^{2+}.

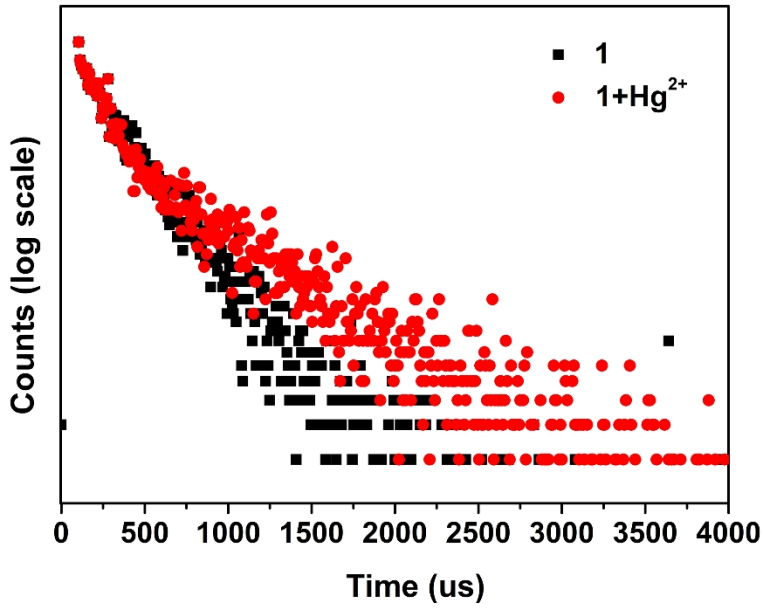

Figure S10. Time-resolved fluorescence decay of **1** in 619 nm before and after addition of Hg^{2+} under excitation at 326 nm.

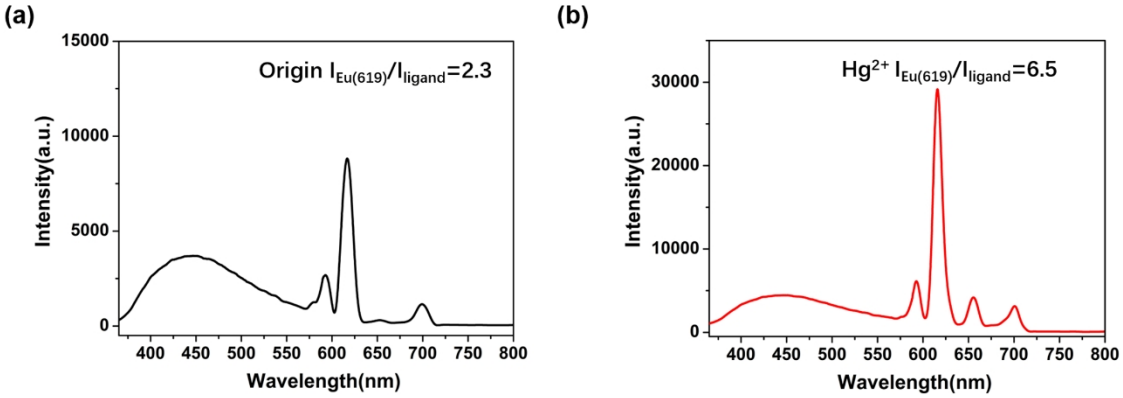

Figure S11. The emission spectra of **1** in the absence (black) and presence of Hg^{2+} (red) in aqueous solution upon excitation at 326 nm.

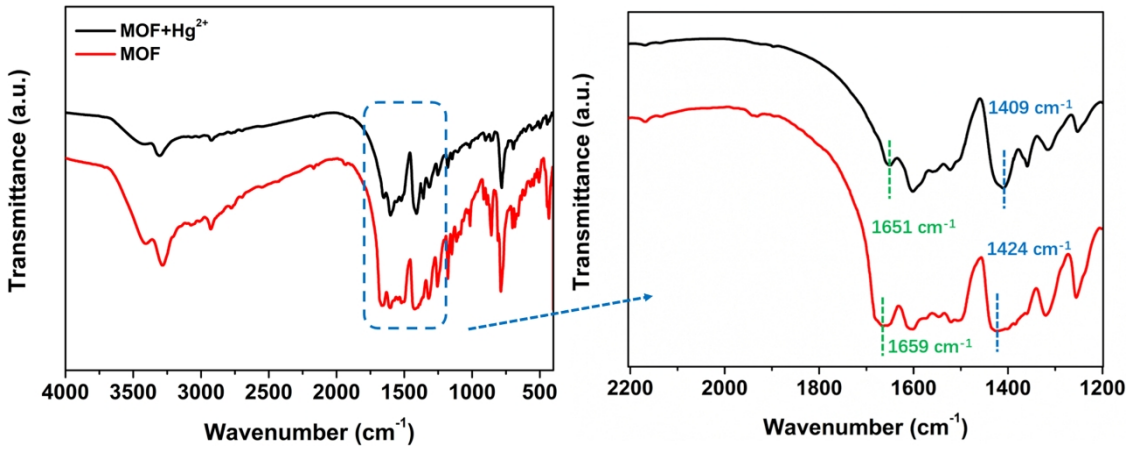

Figure S12. IR spectra of MOF and MOF+Hg^{2+}.

Table S1. Crystal Data and Structure Refinement Parameters for **1**

Empirical formula	$C_{52}H_{36}EuN_4O_{14}$
Formula weight	M_r = 1092.81
Crystal system	Orthorhombic
Space group	*Pcc*2
a (Å)	12.587(6)
b (Å)	44.67(2)
c (Å)	9.895(5)
V (Å^3)	5563(4)
Z	4
ρ_{calcd} (g·cm^{-3})	1.305
μ (mm^{-1})	1.19
F(000)	2204
θ range (°)	2.66 to 28.051
Index ranges	-14≤*h*≤12, -48≤*k*≤53, -11≤*l*≤11
Data/restraints/parameters	9184/2161/567
GOF on F^2	1.093
R_1[a], wR_2[b] [$I > 2\sigma(I)$]	0.0637, 0.1748

Table S2. Selected Bond Lengths (Å) and Bond Angles (°) for **1**

Bond lengths			
Eu1-O4A	2.325(9)	Eu2-O6D	2.304(9)
Eu1-O4B	2.325(9)	Eu2-O6E	2.304(9)
Eu1-O3	2.353(9)	Eu2-O5	2.385(9)
Eu1-O3C	2.354(9)	Eu2-O5F	2.385(9)
Eu1-O13C	2.500(11)	Eu2-O14F	2.478(11)
Eu1-O13	2.500(11)	Eu2-O14	2.478(11)
Eu1-O9C	2.526(10)	Eu2-O11F	2.493(10)
Eu1-O9	2.526(10)	Eu2-O11	2.493(10)
Bond angles			
O4A-Eu1-O4B	94.4(4)	O6D-Eu2-O6E	92.9(4)
O4A-Eu1-O3	141.9(4)	O6D-Eu2-O5	87.5(3)
O4B-Eu1-O3	88.1(3)	O6E-Eu2-O5	141.8(4)
O4A-Eu1-O3C	88.1(3)	O6D-Eu2-O5F	141.8(4)
O4B-Eu1-O3C	141.9(4)	O6E-Eu2-O5F	87.5(3)
O3-Eu1-O3C	112.5(5)	O5-Eu2-O5F	114.9(5)
O4A-Eu1-O13C	147.0(3)	O6D-Eu2-O14F	79.8(3)
O4B-Eu1-O13C	78.9(3)	O6E-Eu2-O14F	148.3(4)
O3-Eu1-O13C	70.7(4)	O5-Eu2-O14F	69.2(4)
O3C-Eu1-O13C	78.6(3)	O5F-Eu2-O14F	80.1(3)
O4A-Eu1-O13	78.9(3)	O6D-Eu2-O14	148.3(4)
O4B-Eu1-O13	147.0(3)	O6E-Eu2-O14	79.8(3)
O3-Eu1-O13	78.6(3)	O5-Eu2-O14	80.1(3)
O3C-Eu1-O13	70.7(4)	O5F-Eu2-O14	69.2(4)
O13C-Eu1-O13	123.3(5)	O14F-Eu2-O14	121.4(5)
O4A-Eu1-O9C	75.2(3)	O6D-Eu2-O11F	71.1(3)
O4B-Eu1-O9C	73.4(3)	O6E-Eu2-O11F	76.5(3)
O3-Eu1-O9C	140.8(4)	O5-Eu2-O11F	138.3(3)
O3C-Eu1-O9C	70.6(3)	O5F-Eu2-O11F	71.9(3)
O13C-Eu1-O9C	71.9(3)	O14F-Eu2-O11F	72.0(3)
O13-Eu1-O9C	133.5(3)	O14-Eu2-O11F	134.8(3)
O4A-Eu1-O9	73.4(3)	O6D-Eu2-O11	76.5(3)
O4B-Eu1-O9	75.1(3)	O6E-Eu2-O11	71.1(3)
O3-Eu1-O9	70.6(3)	O5-Eu2-O11	71.9(3)
O3C-Eu1-O9	140.8(4)	O5F-Eu2-O11	138.3(3)
O13C-Eu1-O9	133.5(3)	O14F-Eu2-O11	134.8(3)
O13-Eu1-O9	71.9(3)	O14-Eu2-O11	72.0(3)
O9C-Eu1-O9	133.0(5)	O11F-Eu2-O11	132.2(4)

Symmetry codes: A: x, -y+1, z+1/2; B: -x+1, y, z+1/2; C: -x+1, -y+1, z; D: -x, y, z+1/2; E: x, -y, z+1/2; F: -x, -y, z

Table S3. Comparison of Detection Capacities of **1** toward ODZ with Other Reported MOF Materials

MOFs	Analyte	LOD (μM)	Ref.
$[Cd_3(DBPT)_2(H_2O)_4]\cdot 5H_2O$	ODZ	5.0	S2
[Eu(cppa)(OH)]·xS	ODZ	0.52	S3
$C_{23}H_{19}EuN_4O_9S_2\cdot 0.5H_2O$	ODZ	0.319	S4
[Tb(TATAB)(H₂O)]ž2H₂O	ODZ	0.171	S5
MOF **1**	ODZ	0.15	This work

Table S4. HOMO and LUMO Energies for the Selected Antibiotics Calculated by DFT B3LYP/6-31G*

Analytes	HOMO (ev)	LUMO (ev)
ODZ	-6.283	-3.268
THI	-6.206	-2.661
FFC	-6.620	-2.560
SDZ	-5.538	-2.260
CFX	-5.938	-2.186
PCL	-5.558	-1.777
CFD	-6.217	-1.467
SMZ	-6.467	-1.092
ACL	-6.001	-0.526

Table S5. Comparison of Detection Capacities of **1** toward Hg^{2+} with Other Reported MOF Materials

MOFs	Analyte	LOD (μM)	Ref.
[Co(NPDC)(bpee)]·DMF·$2H_2O$	Hg^{2+}	4.1	S6
$[(CH_3)_2NH_2]^+[Co(HCOO)_3]^-_n$	Hg^{2+}	0.783	S7
$[Zn(tpbpc)_2]$·solvent	Hg^{2+}	0.32	S8
BA-Eu-MOF	Hg^{2+}	0.22	S9
MOF **1**	Hg^{2+}	0.094	This work

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