

## Electronic Supplementary Information (ESI)

### A Europium-Organic Framework with Activation-Induced Open Metal Sites for Water Adsorption

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#### 1. Supplementary figures

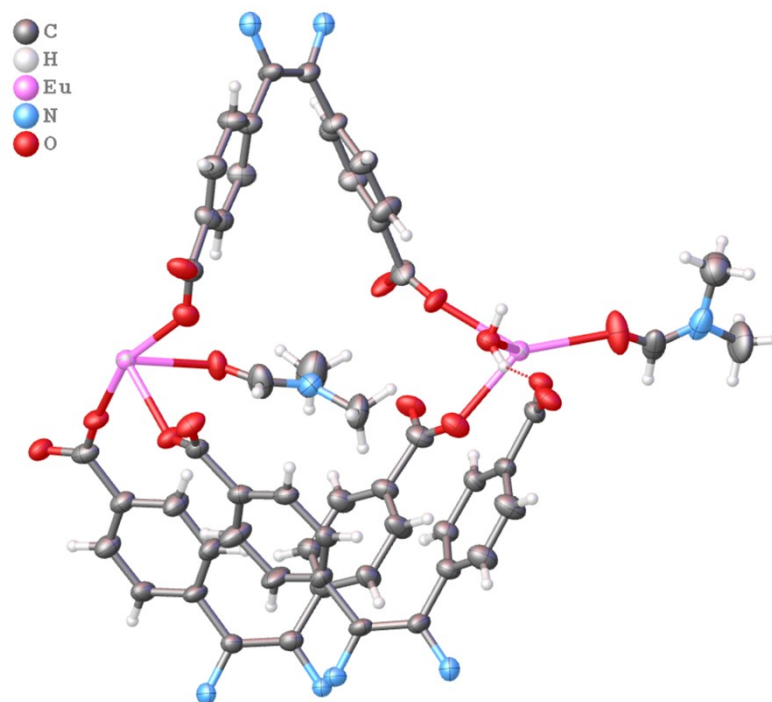


Figure S1. Thermal ellipsoids drawn at the 50% probability level for the asymmetric unit of Eu-H<sub>4</sub>TCPP.

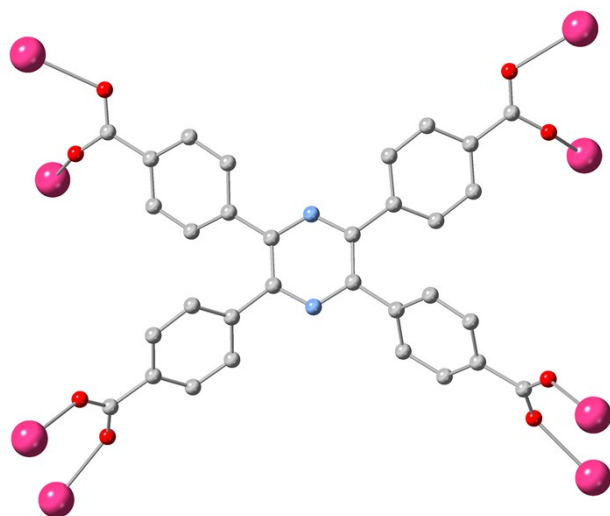


Figure S2. The coordination environment of H<sub>4</sub>TCPP.

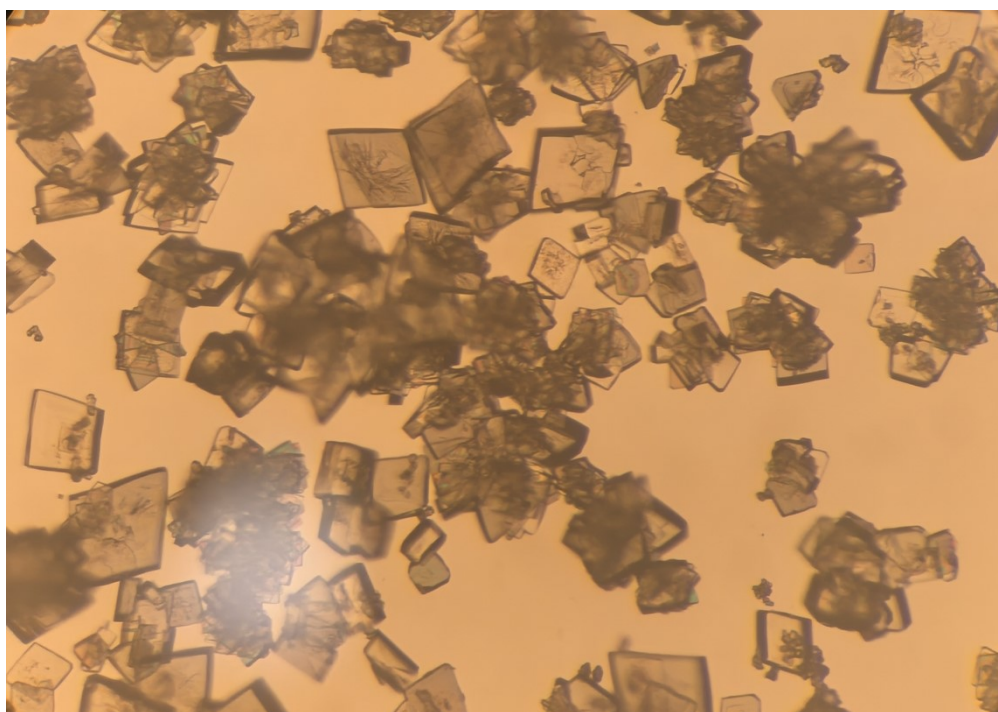


Figure S3. Microscopy images of Eu-H<sub>4</sub>TCPP.

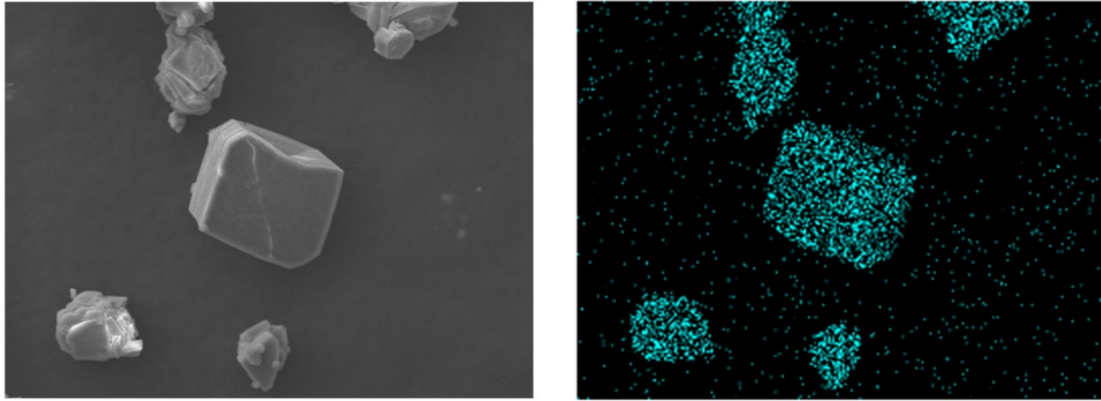


Figure S4. SEM of Eu-H<sub>4</sub>TCPP and relevant elemental mapping of Eu elements in Eu-H<sub>4</sub>TCPP.

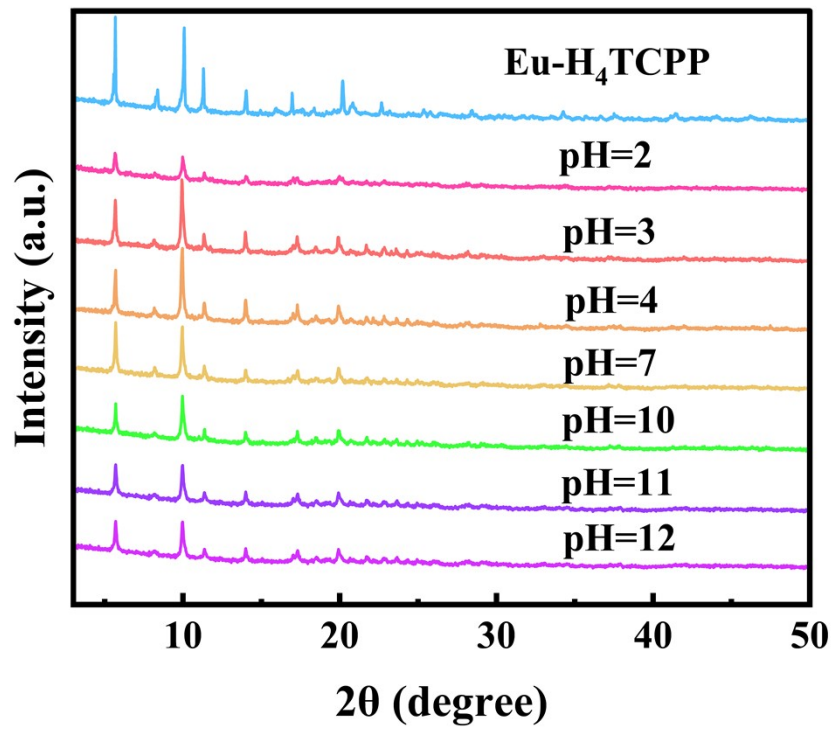


Figure S5. The PXRD patterns of Eu-H<sub>4</sub>TCPP after filtration from different pH solutions.

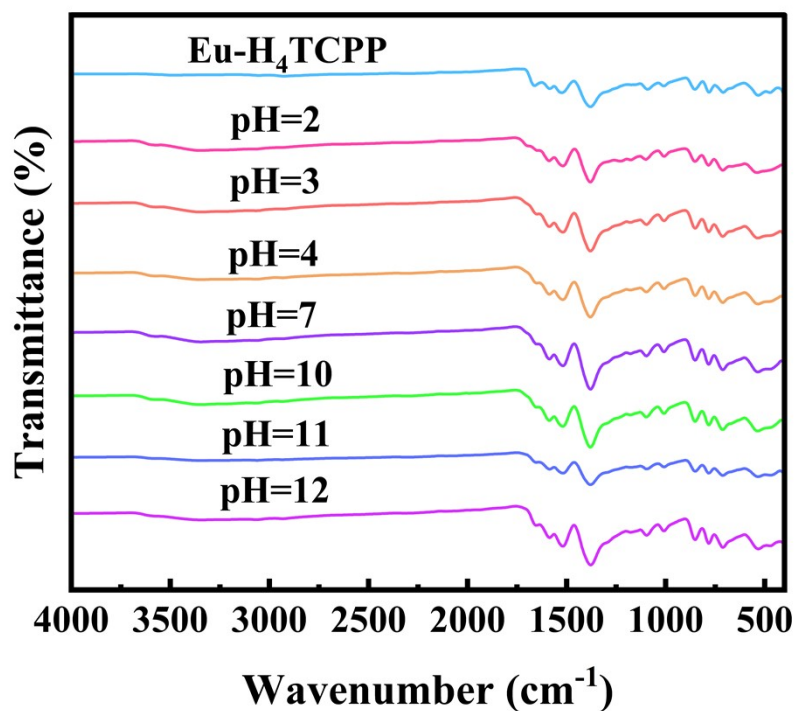


Figure S6. FTIR spectra of Eu-H<sub>4</sub>TCPP after filtration from different pH solutions.

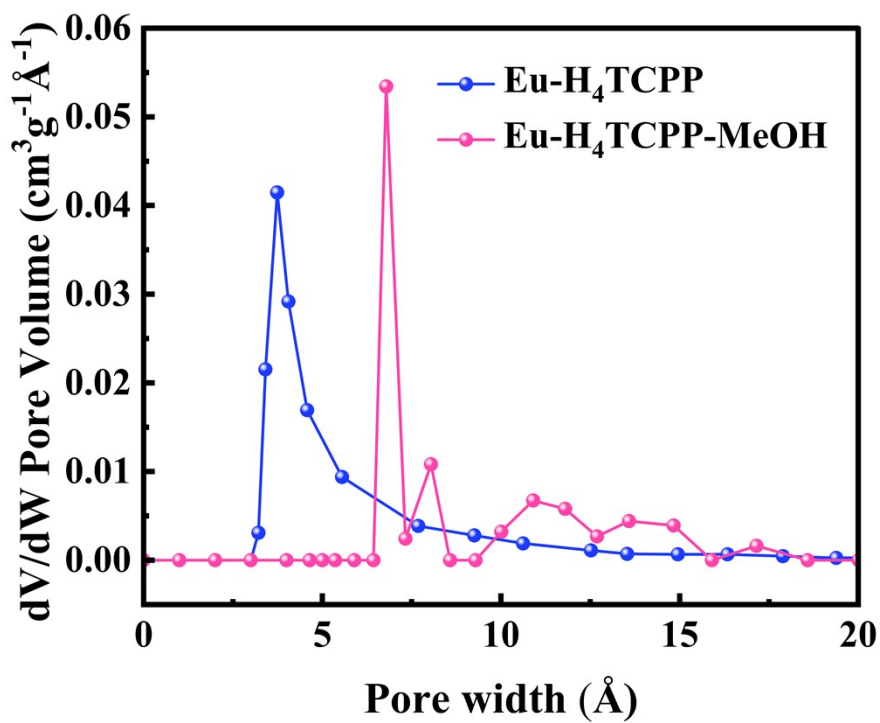


Figure S7. Comparison of pore size distributions between Eu-H<sub>4</sub>TCPP and Eu-H<sub>4</sub>TCPP-MeOH.

## 2. Supplementary tables

Table S1. Crystal data and structure refinements for Eu-H<sub>4</sub>TCPP.

Compound	EU-H <sub>4</sub> TCPP
Chemical formula	[Eu <sub>2</sub> (TCPP) <sub>1.5</sub> (DMF) <sub>2</sub> (H <sub>2</sub> O)]·DMF·H <sub>2</sub> O
Molecular formula	C <sub>57</sub> H <sub>49</sub> Eu <sub>2</sub> N <sub>6</sub> O <sub>17</sub>
Formula weight	1393.94 g mol <sup>-1</sup>
Temperature,	296.15 K
Crystal system	orthorhombic
Space group	<i>Pnma</i>
<i>a</i>	21.1302(18) Å
<i>b</i>	31.469(3) Å
<i>c</i>	17.4141(17) Å
<i>α</i>	90°
<i>β</i>	90°
<i>γ</i>	90°
Cell volume	11579.4(19) Å <sup>3</sup>
<i>Z</i>	8
$\rho_{\text{calc}}$	1.599 g cm <sup>-3</sup>
$\mu$	2.222 mm <sup>-1</sup>
F (000)	5560
Reflections collected	156574
Independent reflections	10837 [ $R_{\text{int}} = 0.0665$ , $R_{\text{sigma}} = 0.02$ ]
Goodness-of-fit on F <sup>2</sup>	1.176
Final R indexes [ $I \geq 2\sigma(I)$ ]	$R_1 = 0.0625$ , $wR_2 = 0.1195$
Final R indexes [all data]	$R_1 = 0.0798$ , $wR_2 = 0.1293$

Table S2. Selected Bond Lengths (Å) of Eu-H<sub>4</sub>TCPP.

Atom-Atom	Length, Å
Eu01-O004	2.330 (5)
Eu01-O005	2.325 (5)
Eu01-O007 <sup>2</sup>	2.345 (4)
Eu01-O008 <sup>3</sup>	2.378 (5)
Eu01-O00A <sup>1</sup>	2.442 (5)
Eu01-O00B	2.271 (5)
Eu01-O00E	2.455 (5)
Eu02-O003	2.581 (5)
Eu02-O006	2.330 (5)
Eu02-O009 <sup>4</sup>	2.419 (5)
Eu02-O00C <sup>4</sup>	2.348 (5)
Eu02-O00D <sup>5</sup>	2.345 (5)
Eu02-O00H	2.387 (5)
Eu02-O00I <sup>5</sup>	2.460 (5)
Eu02-O00M	2.475 (6)

Symmetry Codes: <sup>1</sup> = 2-X, 1-Y, 1-Z; <sup>2</sup> = 3/2-X, 1-Y, 1/2+Z; <sup>3</sup> = 1/2+X, +Y, 1/2-Z; <sup>4</sup> = 1-X, 1-Y, 1-Z;  
<sup>5</sup> = -1/2+X,+Y,1/2-Z.

Table S3. The parameters of porous structure of Eu-H<sub>4</sub>TCPP.

Specific surface area, m <sup>2</sup> g <sup>-1</sup>		$V_{\text{pore}}$ , cm <sup>3</sup> g <sup>-1</sup>		$V_{\text{ads}}(\text{N}_2)^a$ , cm <sup>3</sup> (STP) g <sup>-1</sup>
Langmuir	BET	Total <sup>a</sup>	T-Plot	
210.8996	181.3377	0.0792	0.0700	53.3151

Table S4. The parameters of porous structure of Eu-H<sub>4</sub>TCPP-MeOH.

Specific surface area, m <sup>2</sup> g <sup>-1</sup>		$V_{\text{pore}}$ , cm <sup>3</sup> g <sup>-1</sup>		$V_{\text{ads}}(\text{N}_2)^a$ , cm <sup>3</sup> (STP) g <sup>-1</sup>
Langmuir	BET	Total <sup>a</sup>	T-Plot	
484.4810	331.5275	0.1695	0.1540	110.0862