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Two isostructural Ln^{3+}-based heterometallic MOFs for the detection of nitro-aromatic and $Cr_2O_7^{2-}$

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Calculation procedures of fluorescence quenching efficiency

The fluorescence quenching efficiency of **In/Eu-CBDA and In/Tb-CBDA** can be evaluated by the Stern-Volmer constant (Ksv), which is calculated by using the Stern-Volmer equation:

$$I_0/I = 1 + Ksv[M]$$

(I_0 = the initial luminescence intensity, I = the luminescence intensity after the addition of the analytes, [M] = the concentration of the analytes and K_{SV} = the Stern–Volmer constant).

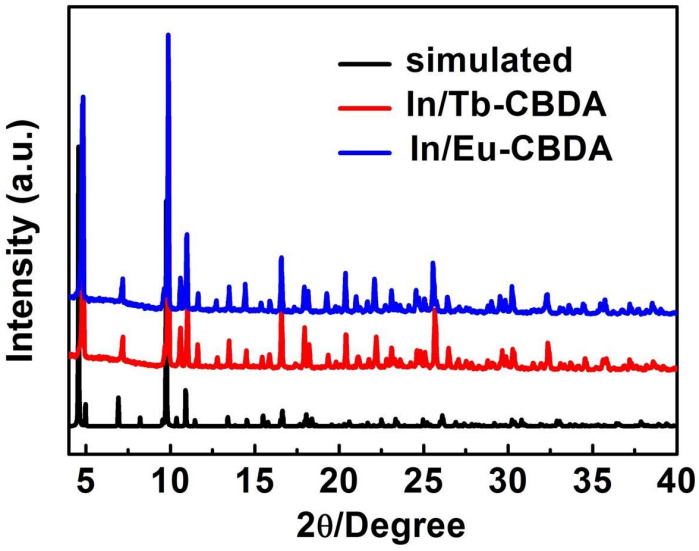

Fig. S1 Powder XRD spectra of **In/Tb-CBDA**, **In/Eu-CBDA** and single crystal structures.

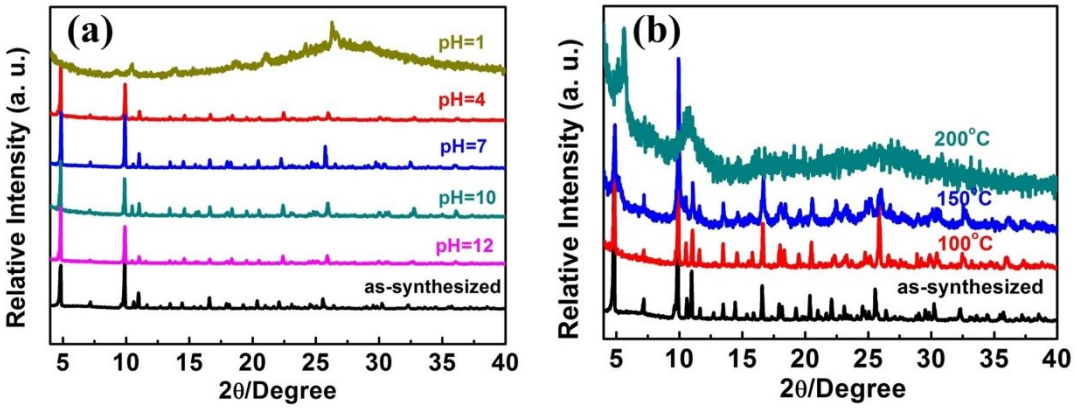

Fig. S2 PXRD patterns for **In/Eu-CBDA** samples (a) at different pH and (b) at variable temperatures.

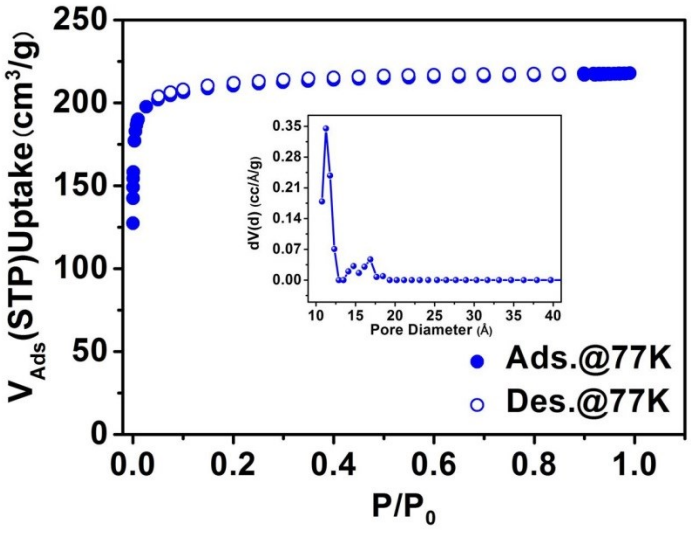

Fig. S3 Sorption isotherm and pore size distribution of **In/Eu-CBDA** at 77 K.

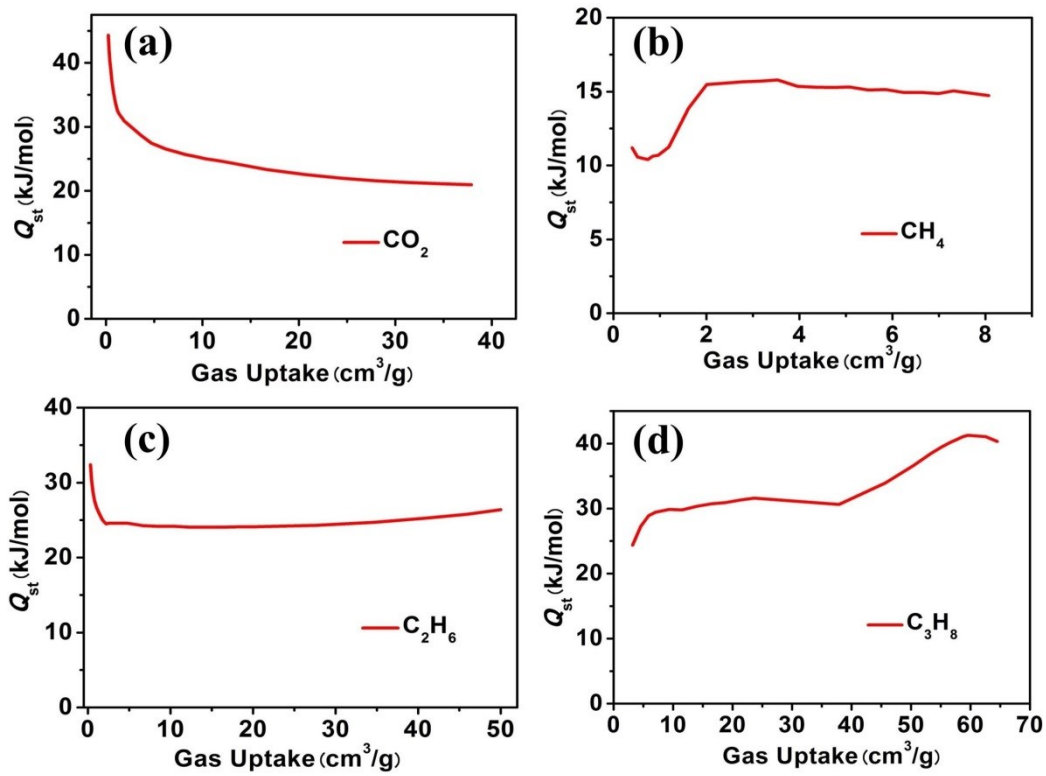

Fig. S4 Isosteric heat of CO_2 (a), CH_4 (b), C_2H_6 (c), and C_3H_8 (d) for **In/Eu-CBDA**.

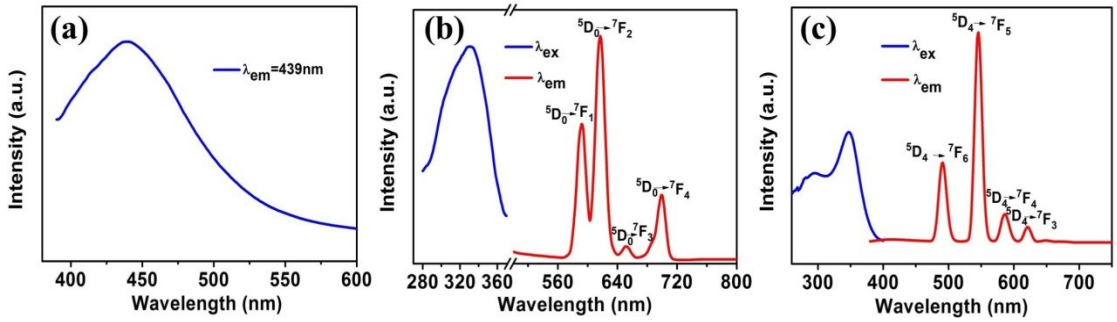

Fig. S5 Excitation and emission spectra of (a) CBDA (b) **In/Eu-CBDA** and (c) **In/Tb-CBDA**.

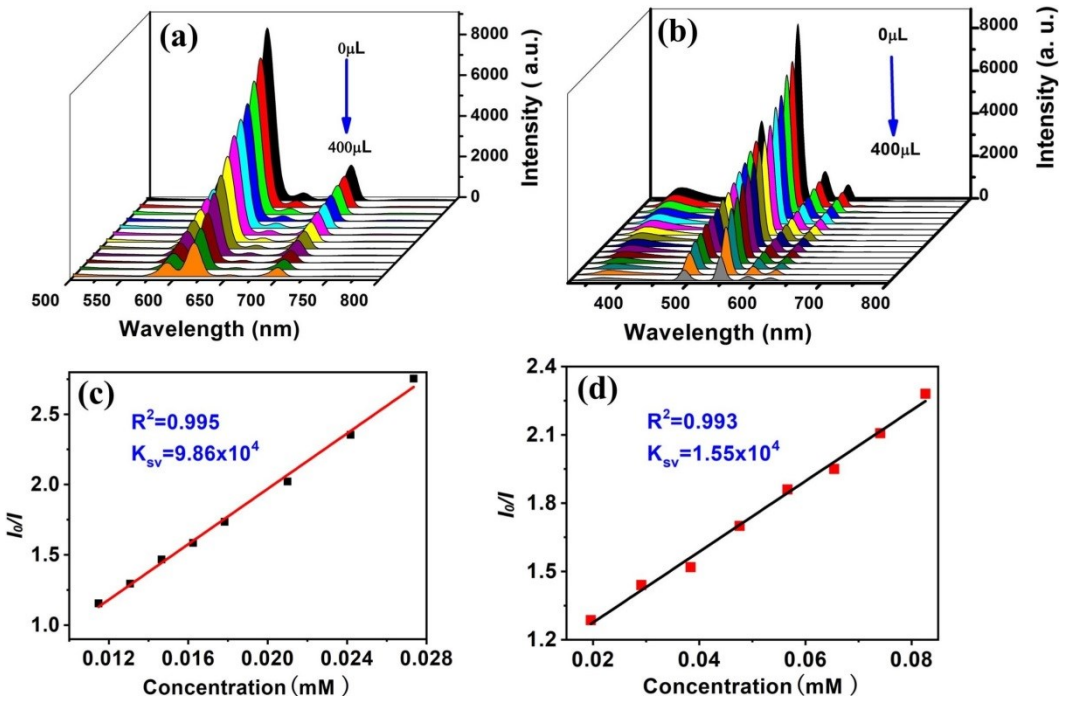

Fig. S6 (a) and (b) are the fluorescence spectra of 1,4-dinitrobenzene for **In/Eu-CBDA** and **In/Tb-CBDA** at different concentrations; (c) and (d) are the Stern-Volmer (SV) spectrum of 1,4-dinitrobenzene for **In/Eu-CBDA** and **In/Tb-CBDA**.

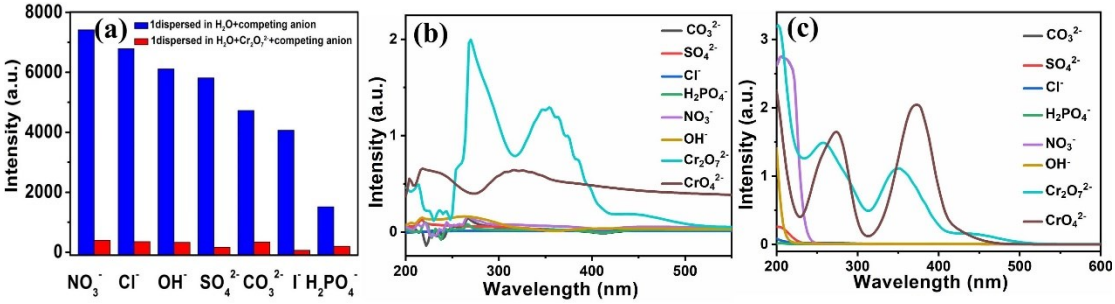

Fig. S7 (a) Fluorescence intensity spectrogram of **In/Tb-CBDA** in aqueous solution containing different competing ions and fluorescence intensity spectrum after adding $Cr_2O_7^{2-}$. UV-Vis absorption spectra of (b) **In/Eu-CBDA** and (c) **In/Tb-CBDA** in DMF solutions with different potassium anions.

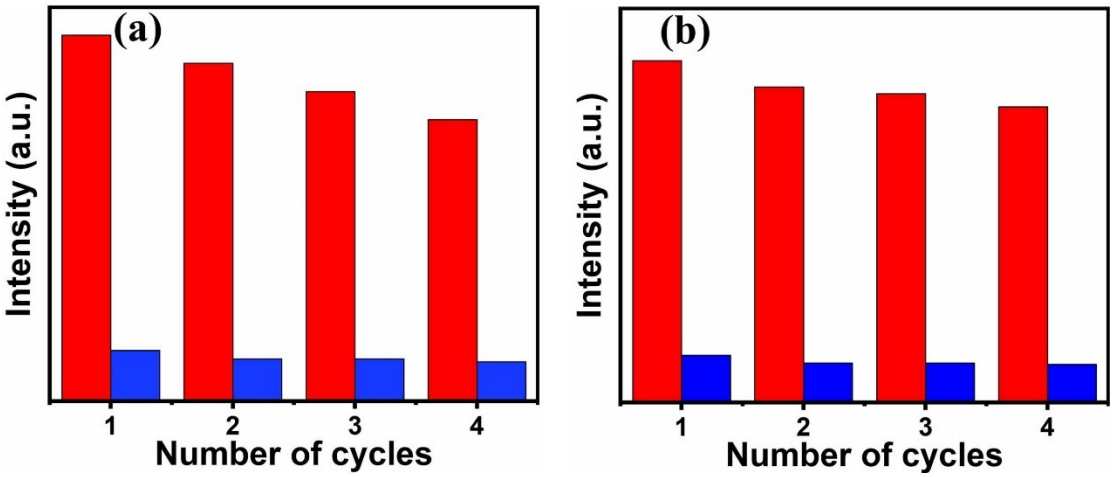

Fig. S8 The reproducibility of the quenching ability of (a) **In/Eu-CBDA** and (b) **In/Tb-CBDA** on $Cr_2O_7^{2-}$.

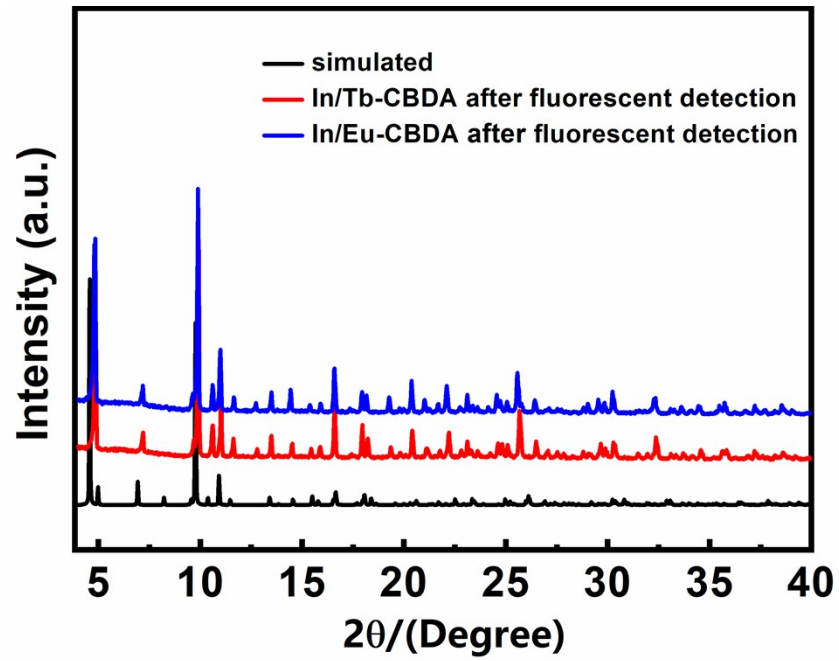

Fig. S9 The powder XRD patterns for **In/Eu-CBDA** and **In/Tb-CBDA** after fluorescent detection.

Table S1 Comparison of detection ability on representative MOFs towards $Cr_2O_7^{2-}$.

Materials	Ksv (M^{-1})	Detection limit (ppb)	Solvent	Reference
In/Eu-CBDA	1.08×10^4	2.15×10^8	DMF	This work
In/Tb-CBDA	1.72×10^4	8.72×10^6	water	This work
Zn-MOF-1	2.07×10^4	3.53×10^6	water	[1]
$[Zn_2(TPOM)(NH_2\text{-}BDC)_2]\cdot4H_2O$	7.59×10^3	3.90×10^6	DMF	[2]
$[Cd(L)(TPOM)_{0.75}]\cdot xS$	1.35×10^4		water	[3]
$[Zn(L)(BBI)\cdot(H_2O)_2]$	1.17×10^4		water	[3]
$[Eu(Hpzbc)_2(NO_3)]\cdot H_2O$		2.20×10^7	ethanol	[4]
$[Zn_2(TPOM)(NDC)_2]\cdot3.5H_2O$	9.21×10^3	2.35×10^6	water	[5]
534-MOF-Tb	1.37×10^4	1.40×10^8	water	[6]
Eu^{3+}@MIL-121	4.34×10^3	5.40×10^4	water	[7]
$[Zn_7(TPPE)_2(SO_4^{2-})_7](DMF\cdot H_2O)$	1.09×10^4	26.98	water	[8]
$[Tb(TATAB)(H_2O)_2]\cdot NMP$	1.11×10^4		water	[9]
$[Zn_3(tza)_2(\mu_2\text{-}OH)_2(H_2O)_2]H_2O$	5.02×10^3	1.00×10^6	water	[10]
[Zn(btz)]n	3.19×10^3	5.20×10^2	water	[11]
$[Zn_2(ttz)H_2O]_n$	2.19×10^3	1.04×10^3	water	[11]
$[Eu(ipbp)_2(H_2O)_3]Br\cdot6H_2O$	8.98×10^3	5.16×10^9	water	[12]
$[Eu_7(mtb)_5(H_2O)_{16}]\cdot NO_3\cdot8DMA\cdot18H_2O$	3.34×10^4	0.56	water	[13]
$[Zn_3(bpanth)(oba)_3]\cdot2DMF$	9.40×10^4	7.00×10^2	water	[14]
$Zr_6O_4(OH)_7(H2O)_3(BTBA)_3$	1.57×10^4	1.50×10^6	water	[15]

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