

Electronic Supplementary Information (ESI)

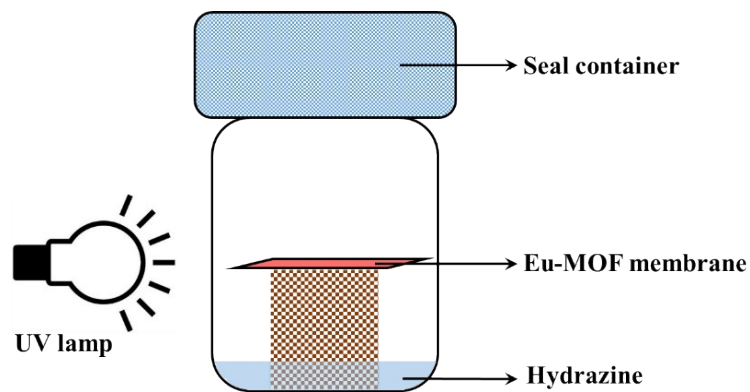
Europium ion post-functionalized zirconium metal-organic frameworks as a luminescent probe for effectively sensing hydrazine hydrate

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Scheme S1 Diagram of gas-sensing measurements for hydrazine vapors

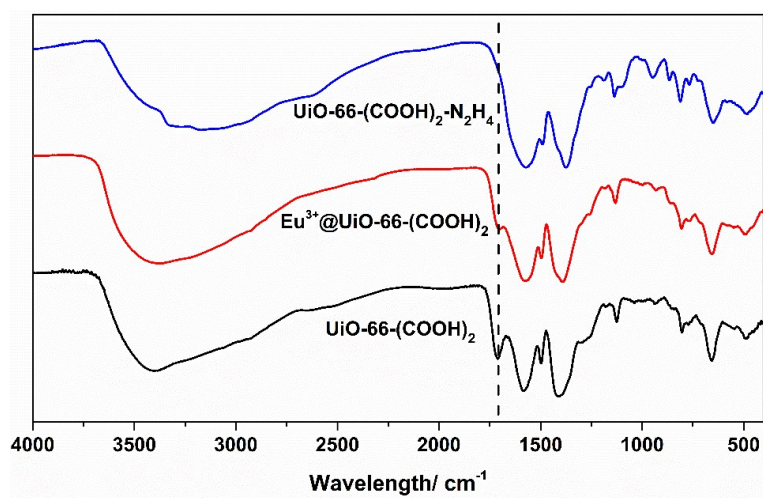


Fig. S1 FT-IR spectra of UiO-66-(COOH)_2 , $\text{Eu}^{3+}\text{@UiO-66-(COOH)}_2$ and $\text{Eu}^{3+}\text{@UiO-66-(COOH)}_2$ under hydrazine treatment.

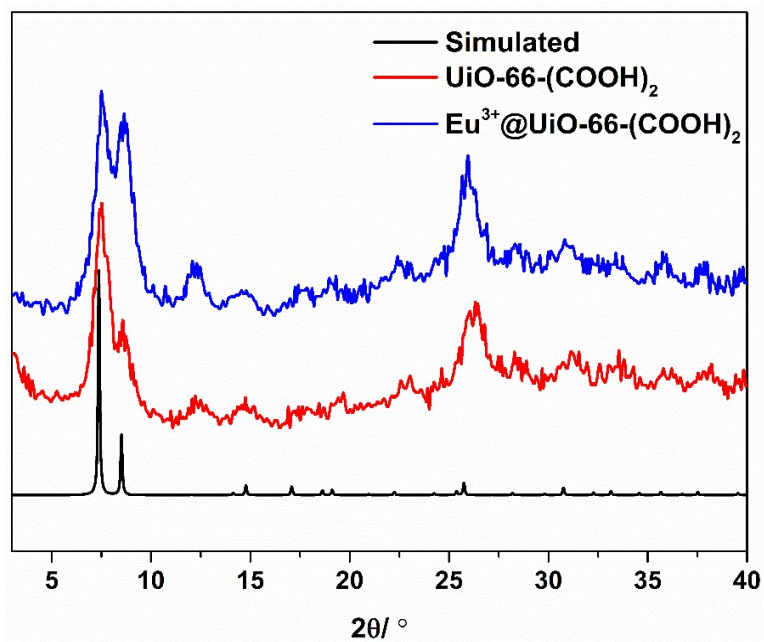


Fig. S2 PXR D patterns of the simulated UiO-66, the as-synthesized UiO-66-(COOH)₂ and Eu³⁺@UiO-66-(COOH)₂.

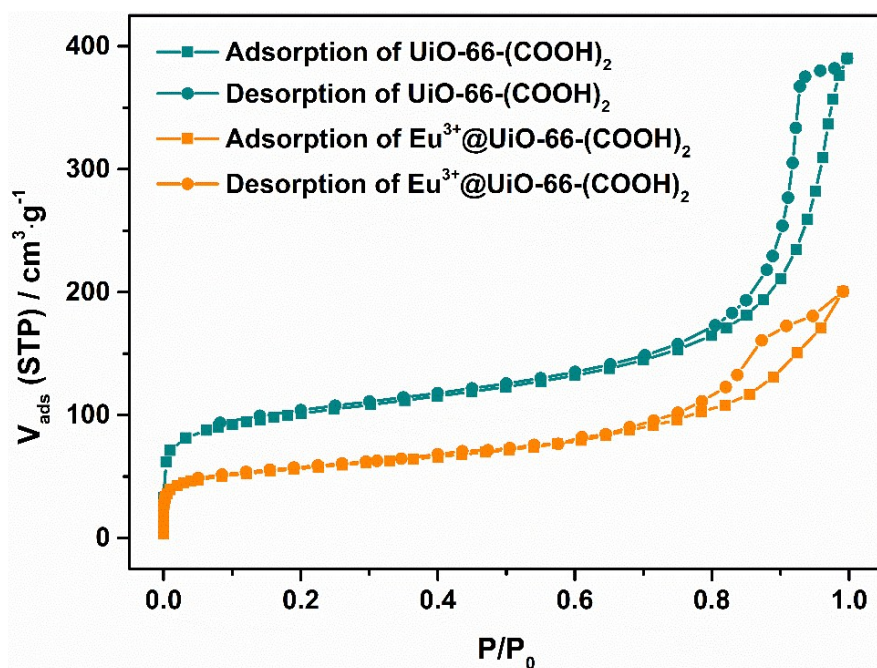


Fig. S3 N₂ adsorption-desorption isotherms of UiO-66-(COOH)₂ and Eu³⁺@UiO-66-(COOH)₂

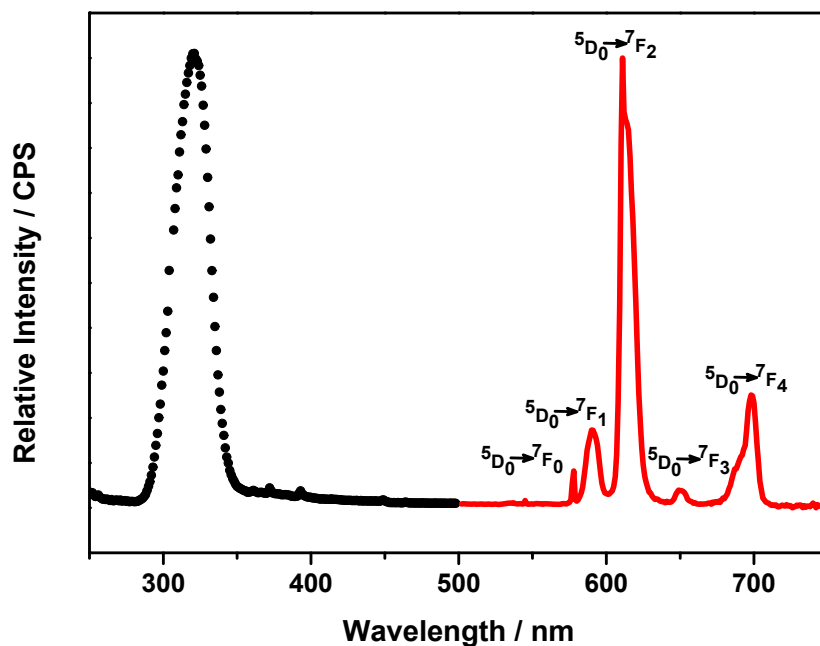


Fig. S4 The excitation ($\lambda_{\text{ex}}=321$ nm, black dotted line) and emission ($\lambda_{\text{em}}=611$ nm, red solid line) spectra of $\text{Eu}^{3+}@\text{UiO-66}-(\text{COOH})_2$.

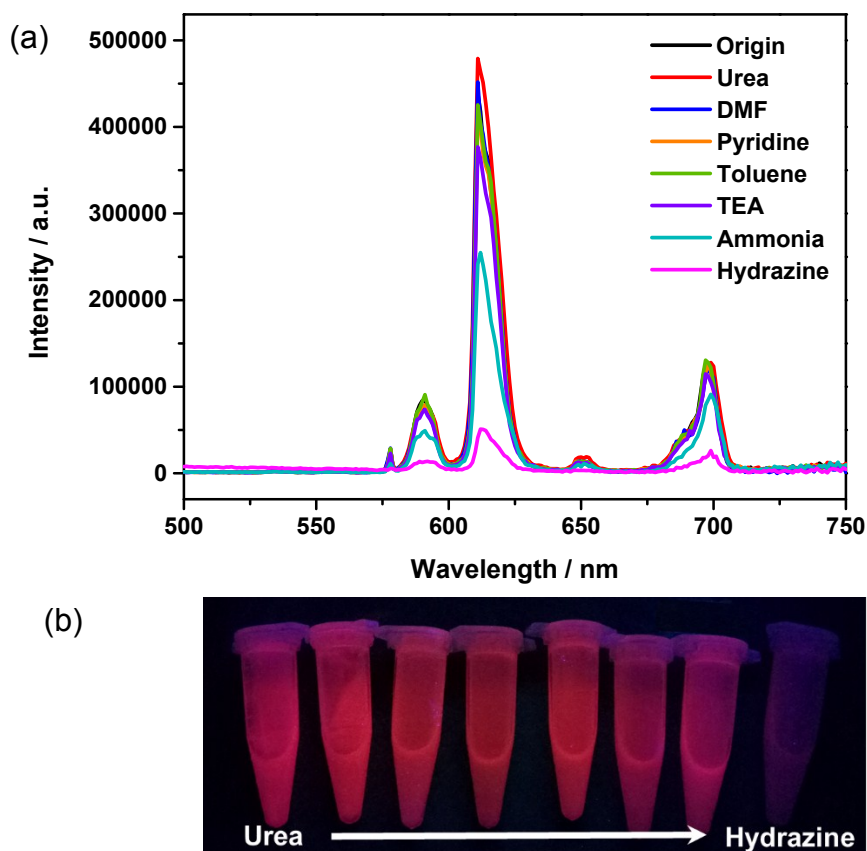


Fig. S5 (a) The emission intensity of $\text{Eu}^{3+}@\text{UiO-66}-(\text{COOH})_2$ at 611 nm under various components. (100 mM, $\lambda_{\text{ex}} = 321$ nm) (b) Photography of the $\text{Eu}^{3+}@\text{UiO-66}-(\text{COOH})_2$ in various components.

(COOH)₂ in various components under 365 nm UV irradiation.

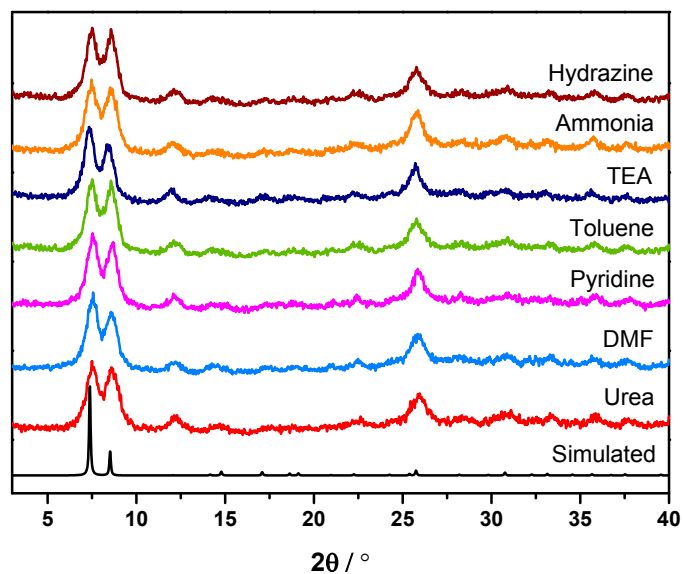


Fig. S6 PXRD patterns of $\text{Eu}^{3+}@\text{UiO-66}-(\text{COOH})_2$ towards various analytes in ethanol solution.

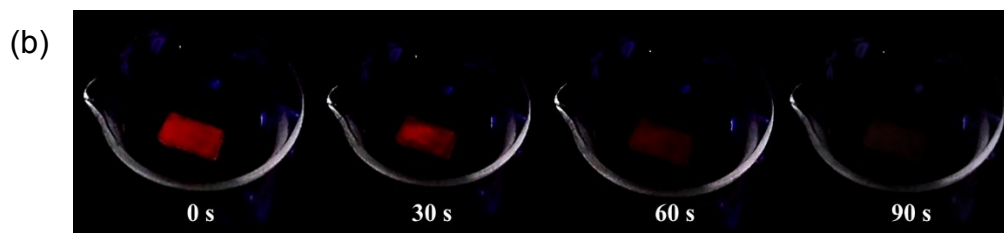
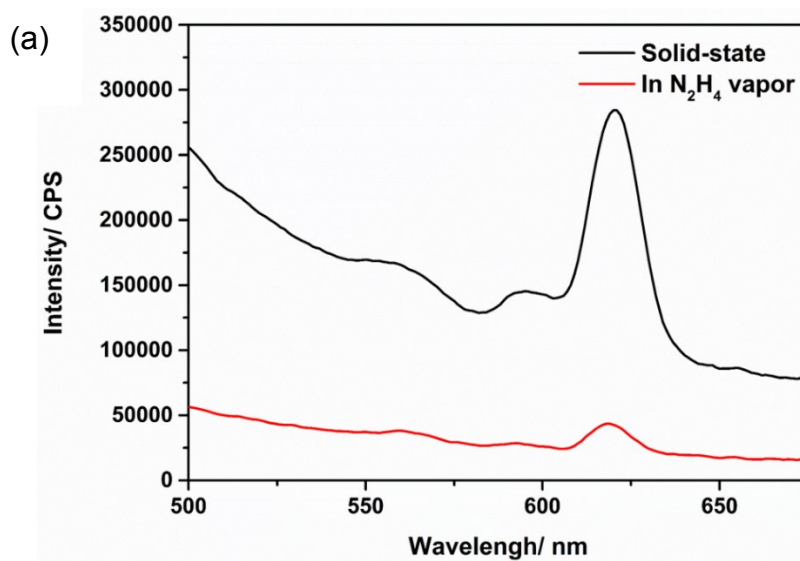


Fig. S7 (a) The emission intensity of $\text{Eu}^{3+}@\text{UiO-66}-(\text{COOH})_2$ before and after hydrazine introduction. (b) Photographs of the $\text{Eu}^{3+}@\text{UiO-66}-(\text{COOH})_2$ in different

hydrazine exposure time under 365 nm UV irradiation.

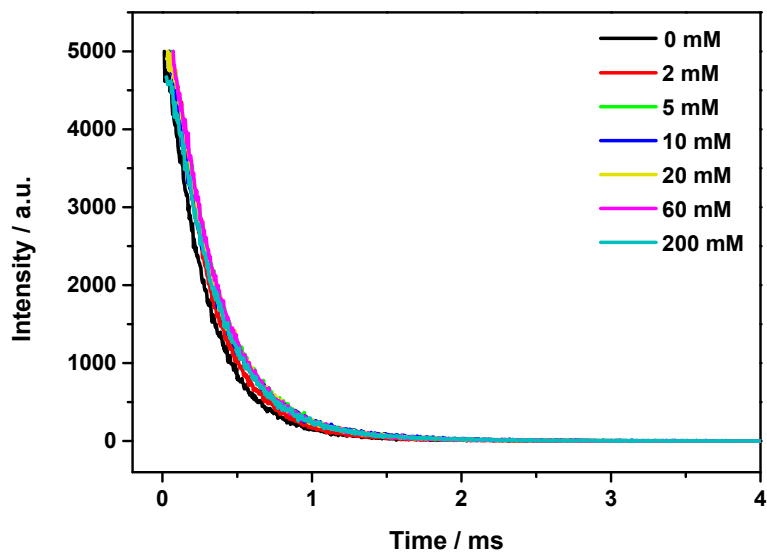


Fig. S8 Fluorescent lifetime of $\text{Eu}^{3+}@\text{UiO-66}-(\text{COOH})_2$ and under different concentrations of hydrazine hydrate.

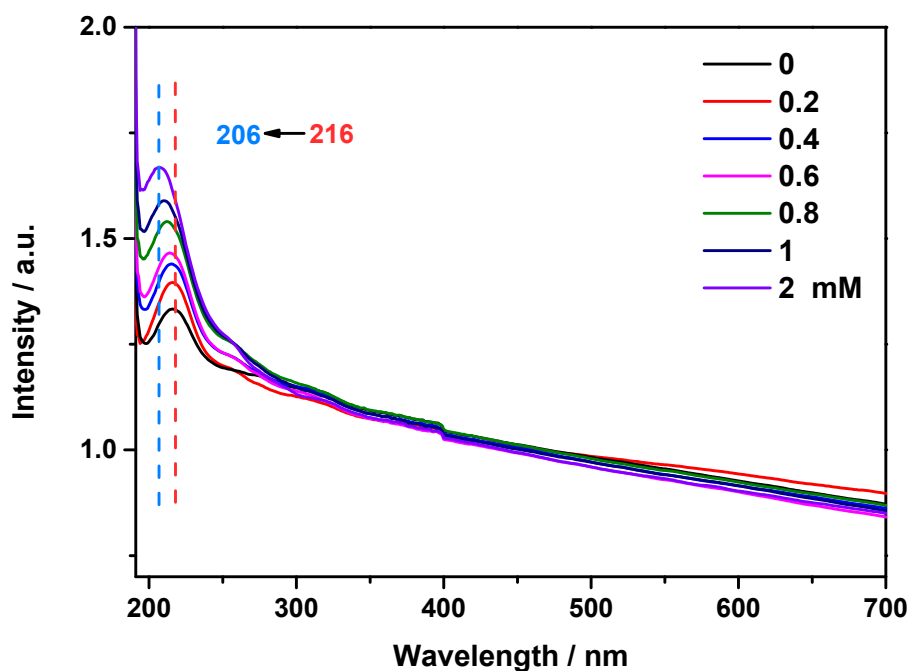


Fig. S9 UV-vis adsorption spectra of $\text{Eu}^{3+}@\text{UiO-66}-(\text{COOH})_2$ before and after hydrazine treatment.

Table S1 The ICP-MS results of $\text{Eu}^{3+}@\text{UiO-66-(COOH)}_2$.

Material	Zr⁴⁺	Eu³⁺	Molecular ratio Zr : Eu
Eu³⁺@UiO-66-(COOH)₂	7.532 ppb	27.600 ppb	1:2.20
	82.57 nM	181.62 nM	
Eu³⁺@UiO-66-(COOH)₂ after N₂H₄ treatment	6.610 ppb	24.336 ppb	1:2.21
	72.46 nM	160.14 nM	