

Electronic Supporting Information

Anionic metal-organic framework hybrids: functionalization with lanthanide ions or cationic dyes and fluorescent sensing small molecules

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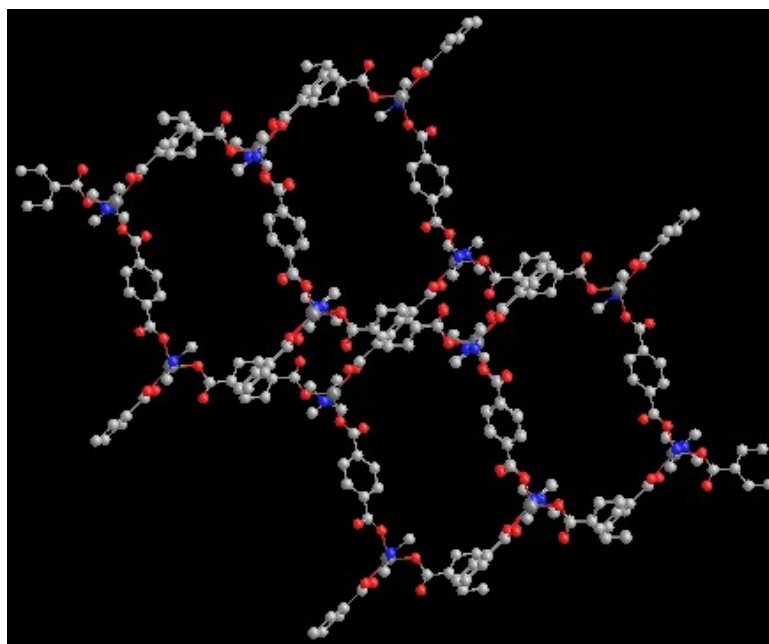


Figure S1 The structure picture of Zn^{II}-MOF.

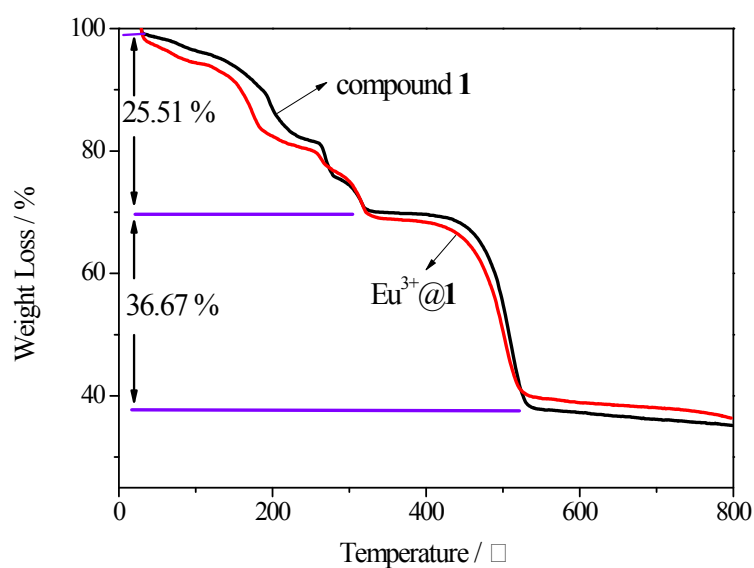


Figure S2 TG diagram of compound **1** and Eu³⁺@**1** in a static atmosphere of nitrogen.

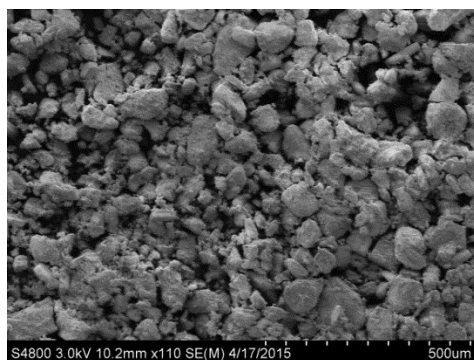


Figure S3 SEM image of compound **1**.

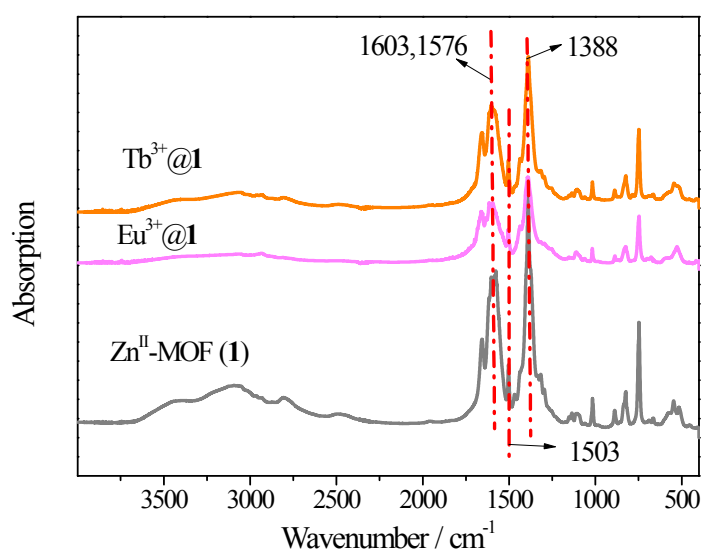
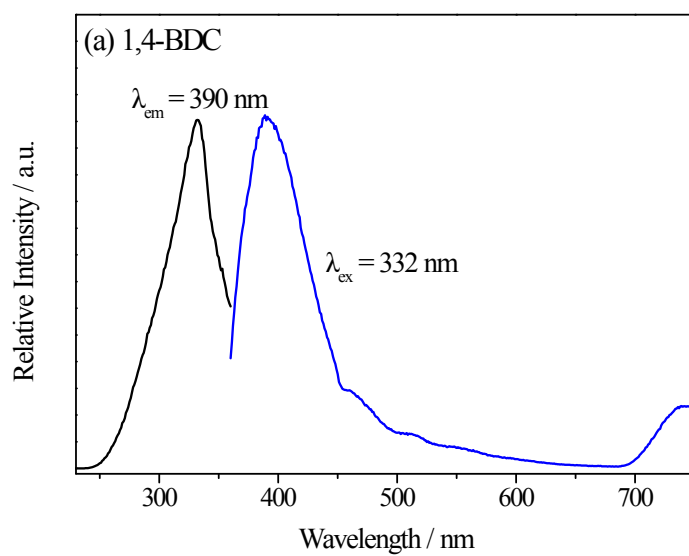


Figure S4 FT-IR spectrum compared $\text{Zn}^{\text{II}}\text{-MOF (1)}$ with $\text{Eu}^{3+}@1$ and $\text{Tb}^{3+}@1$.



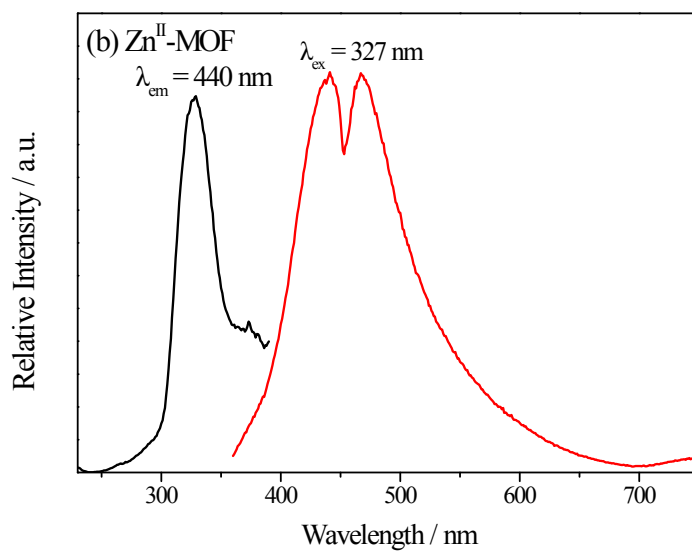


Figure S5 The excitation and emission spectra of terephthalic acid (1,4-BDC) (a) ($\lambda_{\text{ex}} = 332 \text{ nm}$, $\lambda_{\text{em}} = 398 \text{ nm}$) and Zn^{II} -MOF (b) ($\lambda_{\text{ex}} = 327 \text{ nm}$, $\lambda_{\text{em}} = 440 \text{ nm}$).

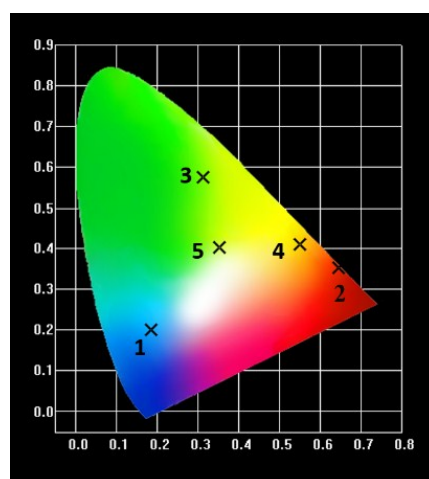


Figure S6 The CIE chromaticity diagram of $\text{Ln}^{3+}@\mathbf{1}$, 1 represents Zn^{II} -MOF (**1**), 2 represents $\text{Eu}^{3+}@\mathbf{1}$, 3 represents $\text{Tb}^{3+}@\mathbf{1}$, 4 represents $\text{Sm}^{3+}@\mathbf{1}$, 5 represents $\text{Dy}^{3+}@\mathbf{1}$. The detailed coordinate data are shown in Table S1.

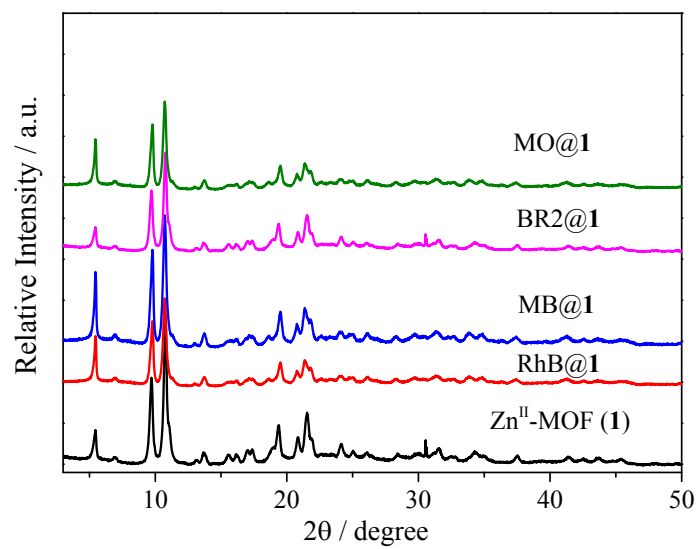
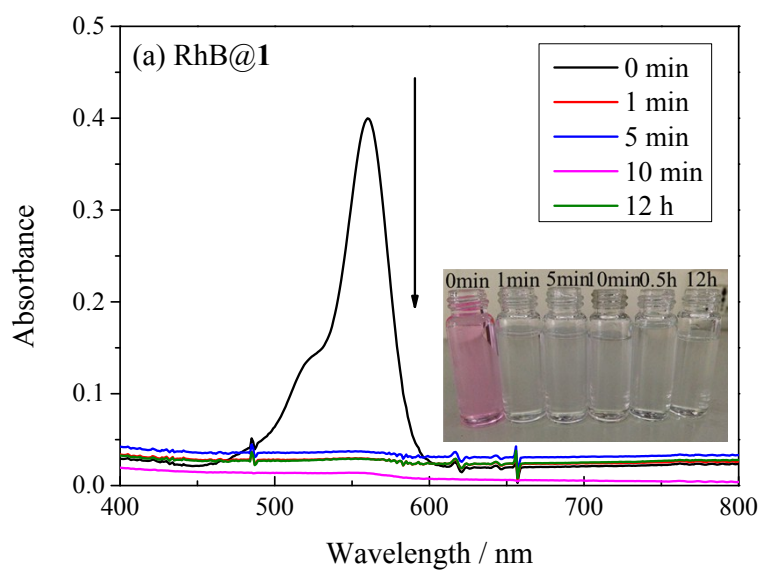
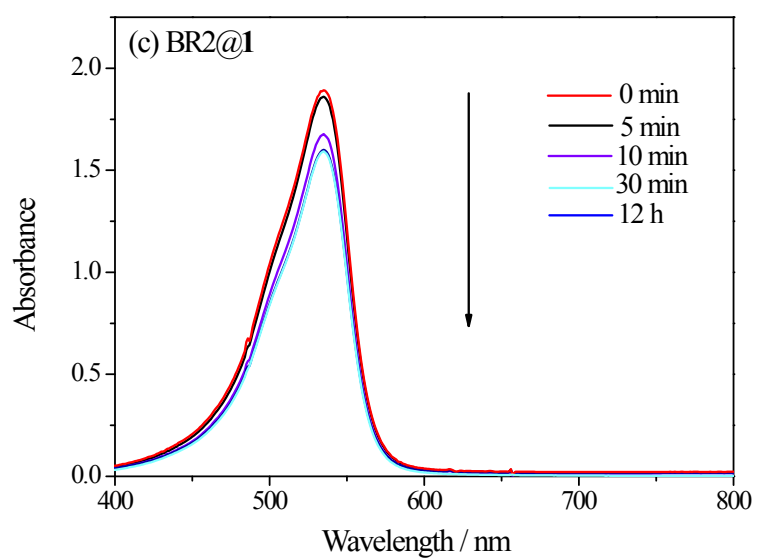
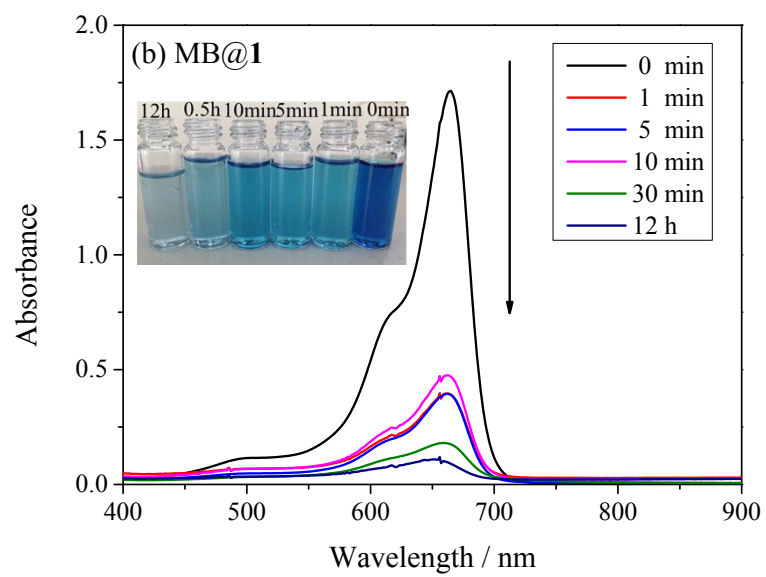


Figure S7 PXRD patterns of **1** and dye-adsorbed materials after 12 h (RhB@**1**, MB@**1** and BR₂@**1** and MO@**1**).





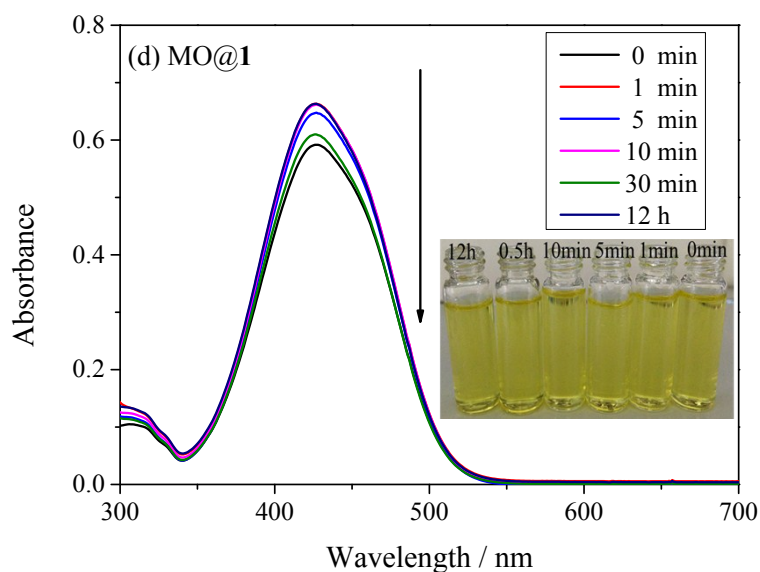


Figure S8 UV/Vis spectra of DMF solutions of dye molecules with freshly prepared compound **1**, including RhB@**1** (a), MB@**1** (b), BR2@**1** (c) and MO@**1** (d) respectively. The insert photographs on centrifugal supernatant fluid highlight the sorption effects, ranging from 0 min to 12 h.

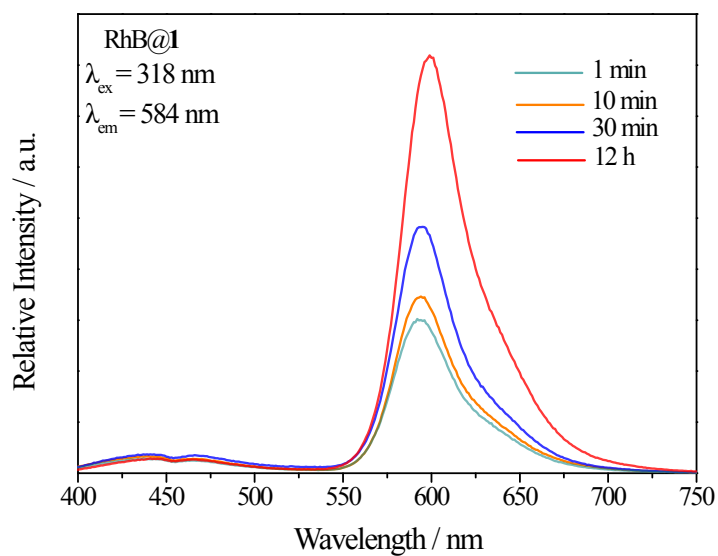


Figure S9 The photoluminescent (PL) spectrum of RhB@**1** based on various time under the excitation at 318 nm.

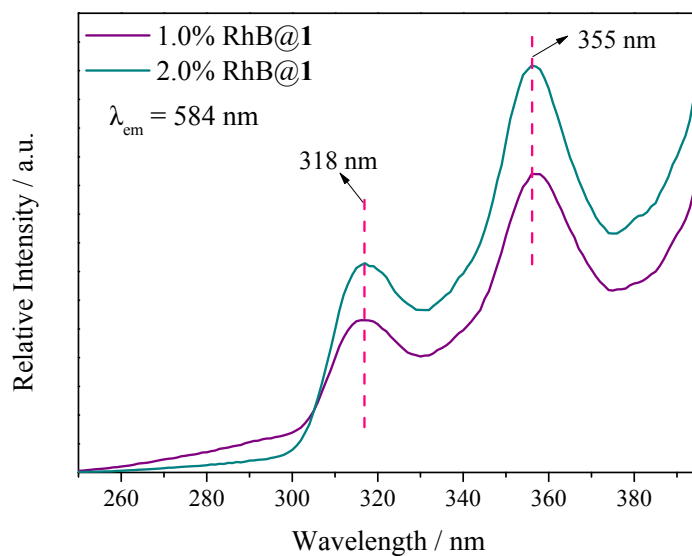


Figure S10 The excitation spectrum of 1.0%RhB@1 and 2.0%RhB@1 which are detected at the emission band of Rhodamine B at 584 nm.

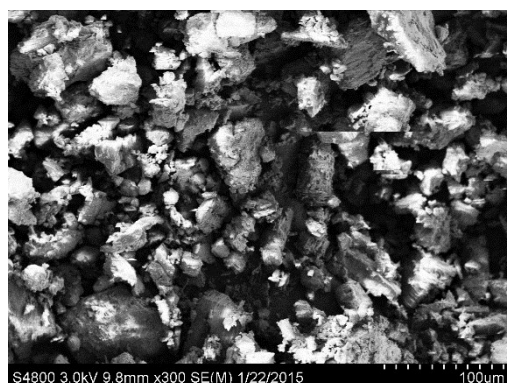


Figure S11 SEM image of 2.0% RhB@1.

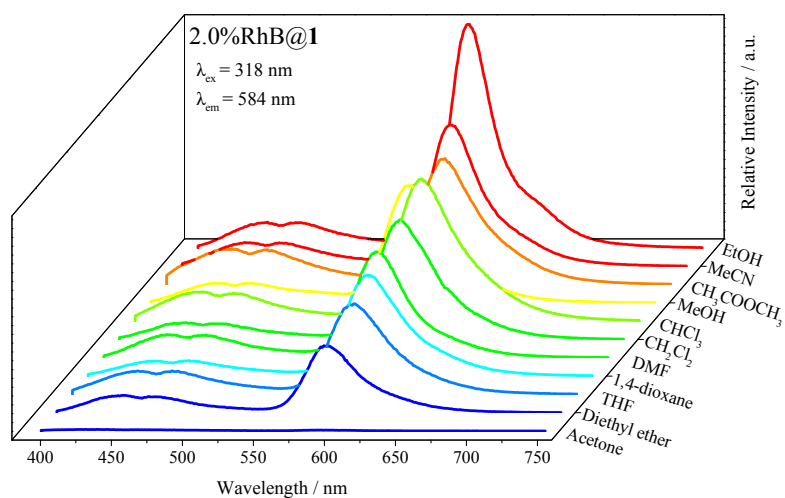


Figure S12 The PL spectrum of 2.0%RhB@1 detected at 584 nm after dispersed into various small solvent molecules at the excitation of 318 nm.

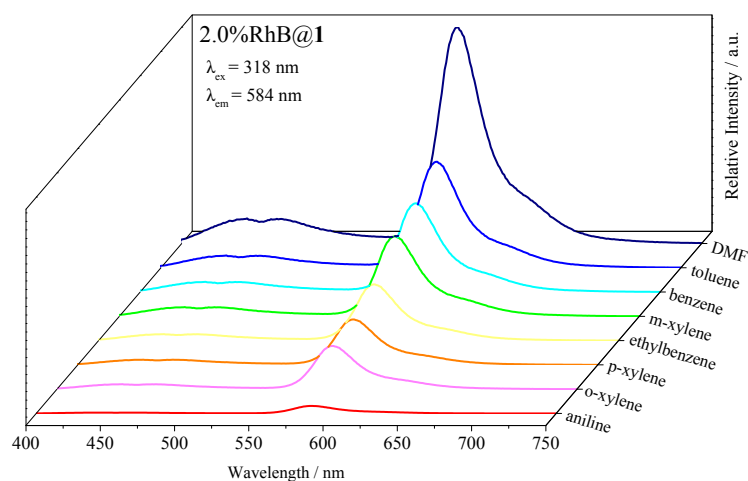


Figure S13 The PL spectrum of 2.0%RhB@1 detected at 584 nm after dispersed into different volatile organic benzenes at the excitation of 318 nm.

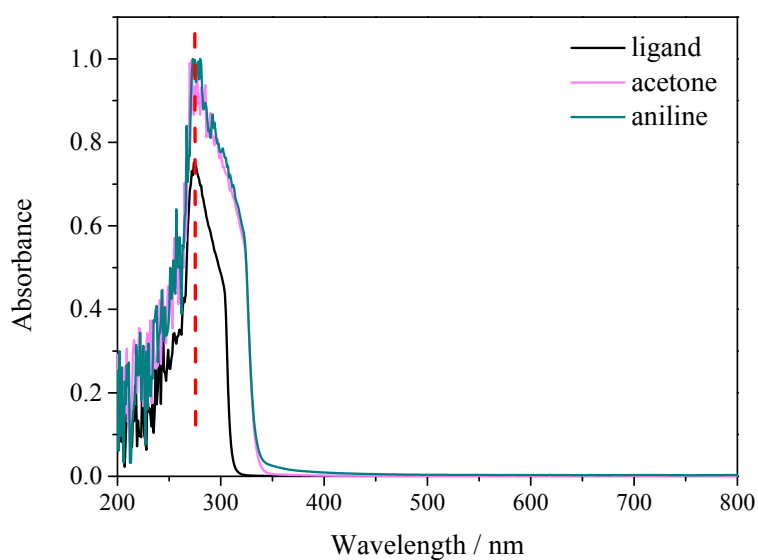


Figure S14 UV-Vis absorption spectrum of ligand in DMF solution, acetone and aniline.

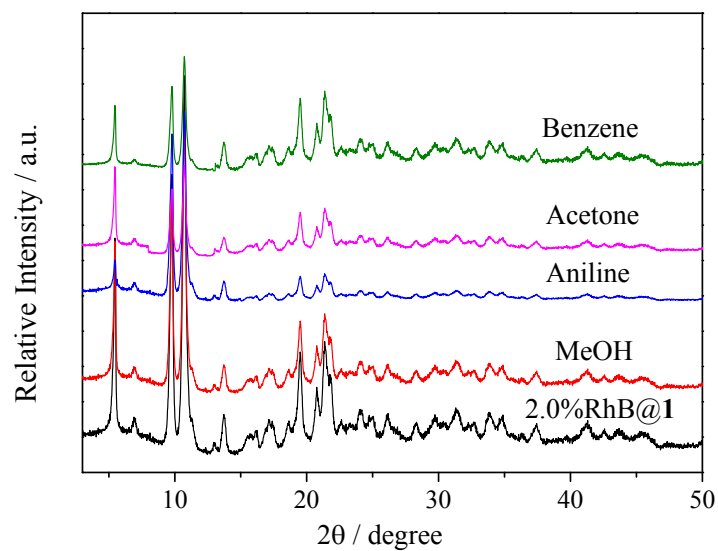


Figure S15 PXRD patterns of 2.0%RhB@1 in several organic solvents.

Table S1 The luminescence data of lanthanide encapsulated MOFs

Materials	$\lambda_{\text{ex}}(\text{nm})$	$\lambda_{\text{em}}(\text{nm})$	Color (CIE-X,Y)	$\eta(\%)$	$\tau(\mu\text{s})$
$\text{Eu}^{3+}_{0.1}\text{@1}$	298	614	(0.6442,0.3521)	80.56	1542.82
$\text{Tb}^{3+}_{0.1}\text{@1}$	298	545	(0.3123,0.5744)	83.78	1673.98
$\text{Sm}^{3+}_{0.1}\text{@1}$	298	598	(0.5511,0.4092)	34.55	7.92
$\text{Dy}^{3+}_{0.1}\text{@1}$	298	576	(0.3533, 0.403)	46.07	49.65

η - the emission quantum efficiency

τ - luminescent lifetime