## **Supporting Information**

## Highly sensitive luminescent probe of aniline and trace water in organic solvents based on covalently modified lanthanide metal-organic frameworks

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Figure S1 SEM images of the as-prepared UiO-66-NH<sub>2</sub> (a), UiO-66-NH<sub>2</sub>-IM (b), and  $Eu^{3+}@UiO-66-NH_2-IM$  (c), and TEM images of the as-prepared UiO-66-NH<sub>2</sub> (d), UiO-66-NH<sub>2</sub>-IM (e), and  $Eu^{3+}@UiO-66-NH_2-IM$  (f).



Figure S2. Excitation and emission spectra of free ligand NH<sub>2</sub>-BDC in solid state at room temperature.



Decay Times / µs

Figure S3 Fluorescence lifetime of Eu<sup>3+</sup>@UiO-66-NH<sub>2</sub>-IM of solid state sample and ethenol suspension.



**Figure S4** CIE chromaticity coordinates of the initial UiO-66-NH<sub>2</sub>-IM. Corresponding photographs of UiO-66- NH<sub>2</sub>-IM under irradiation by UV light at 365 nm.



Figrue S5 Emission spectrum of Eu<sup>3+</sup>@UiO-66-NH<sub>2</sub>-IM thin film. Inset: CIE diagram of thin film.



**Figure S6** Emission spectra of Eu<sup>3+</sup>@UiO-66-NH<sub>2</sub>-IM in water and ethanol. Inset: Corresponding photographs of Eu<sup>3+</sup>@UiO-66-NH<sub>2</sub>-IM in water and ethanol under irradiation by UV light at 365 nm.



Figure S7 PXRD pattern of Eu<sup>3+</sup>@UiO-66-NH<sub>2</sub>-IM after dispersed in water.



**Figure S8** Emission of  $Eu^{3+}@UiO-66-NH_2-IM$  when dispersed in different concentrations of water-DMF solvents. Inset: The linear correlation between the luminescence of  $Eu^{3+}@UiO-66-NH_2-IM$  and the concentration of  $H_2O$ .



Figure S9 Luminescence intensity of  $Eu^{3+}@UiO-66-NH_2-IM$  with and without aniline in the presence of other small molecules.