

## Supporting information

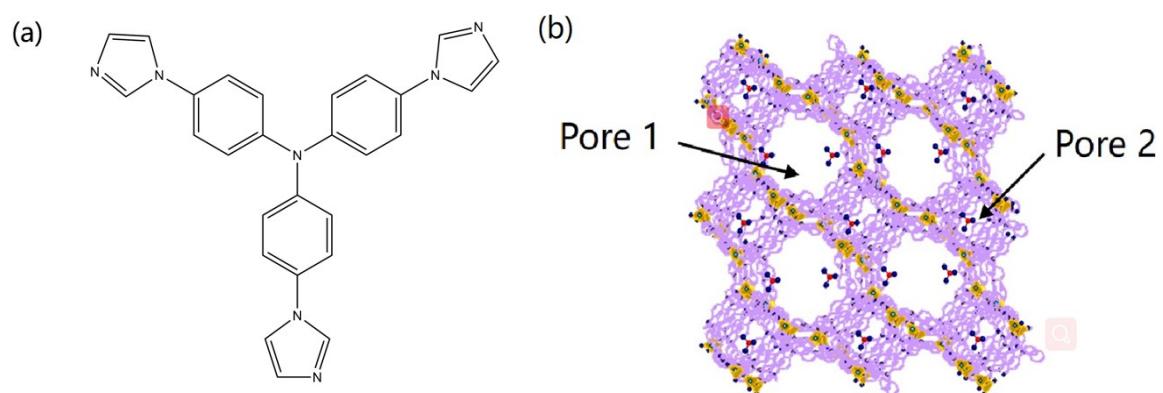
### A dye@MOF crystalline probe serving as a platform for ratiometric sensing of trichloroacetic acid (TCA), a carcinogen metabolite in human urine

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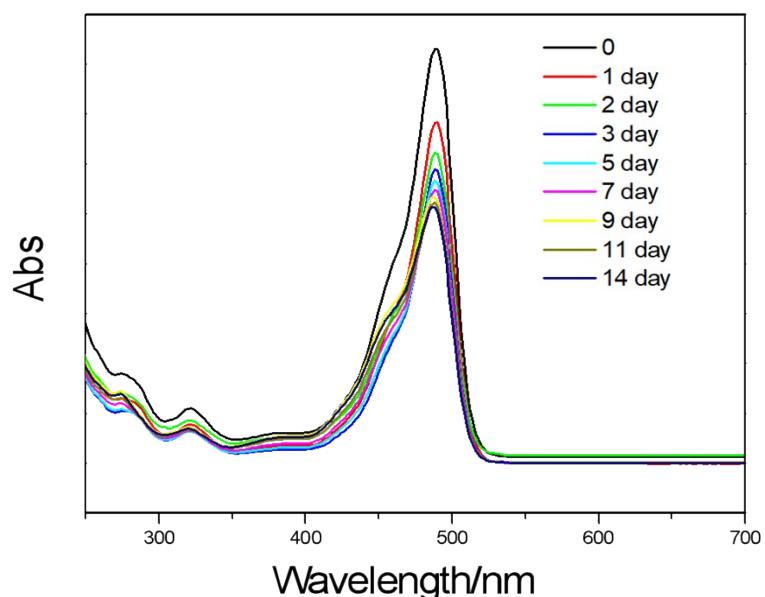
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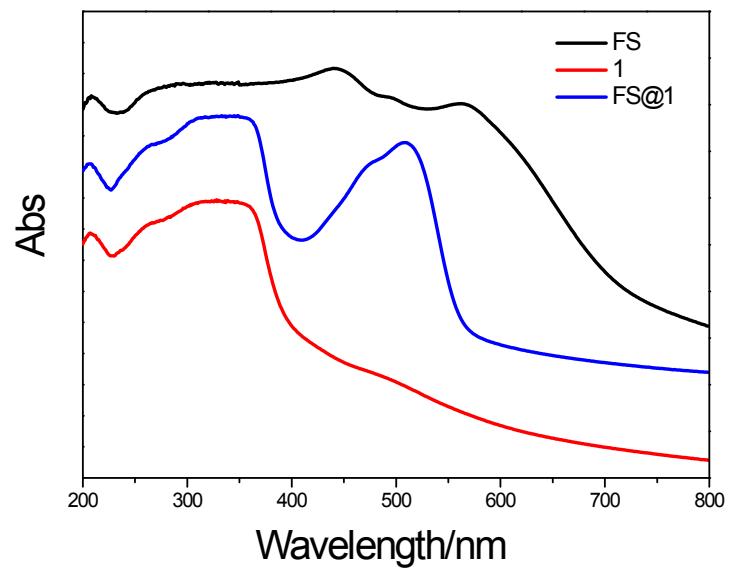
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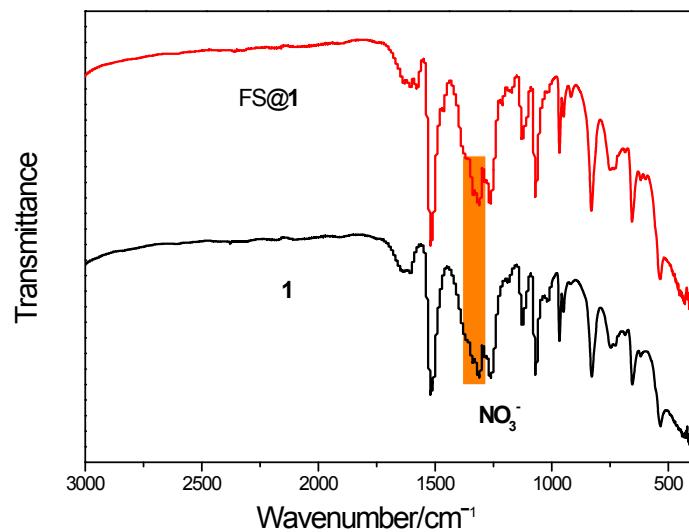
**Fig. S1** (a) The structure of Tipa ligand; (b) the framework of compound **1**. Green, red, purple, blue spheres represent Zn, O, C, N atoms, respectively.



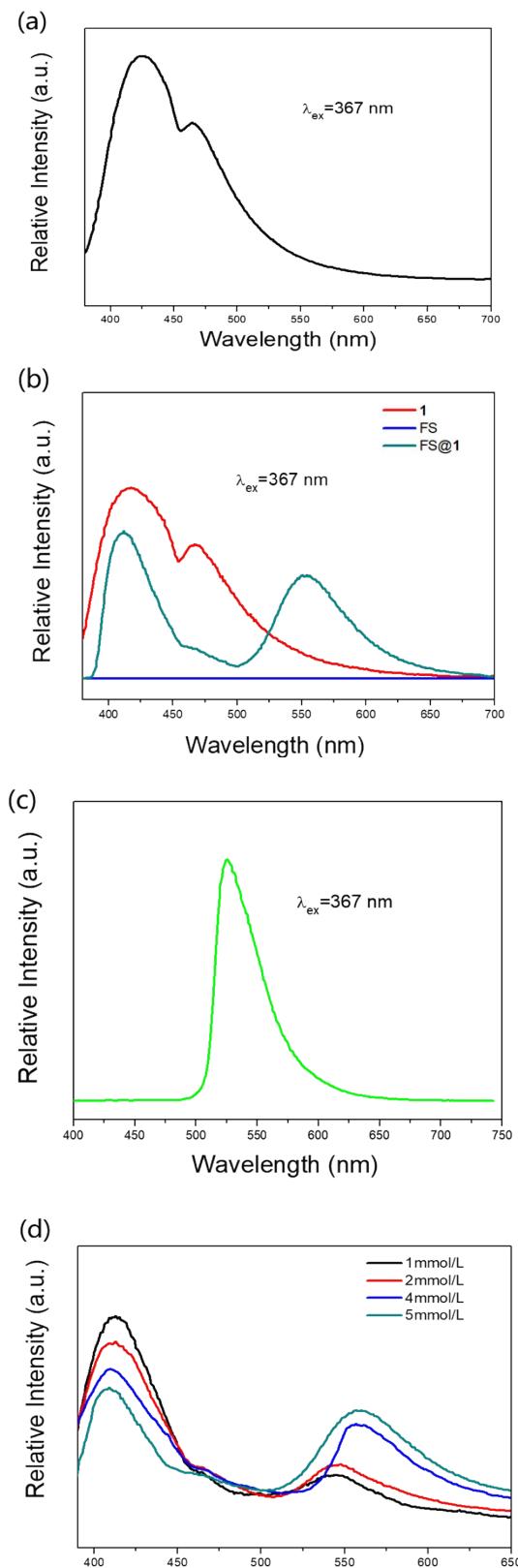
**Fig. S2** UV-vis absorption spectra of FS exchange solution.



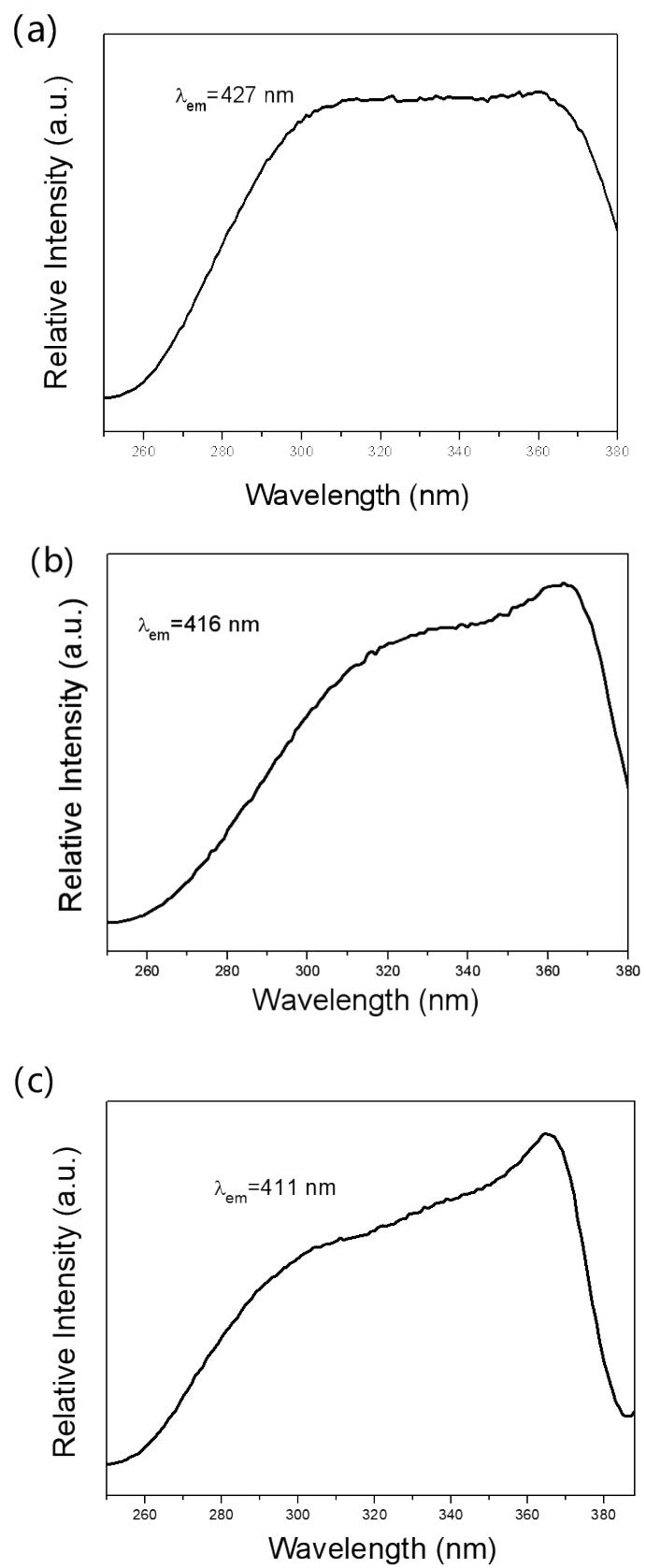
**Fig. S3** UV-vis diffuse reflectance spectra of FS, **1** and FS@**1**.



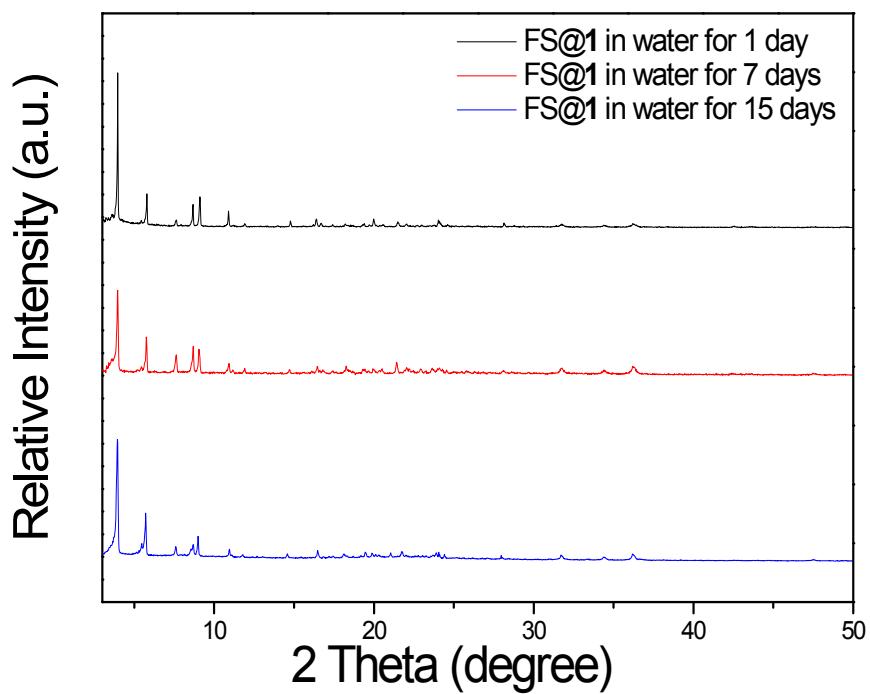
**Fig. S4** FTIR spectra analysis of compound **1** and FS@**1**.



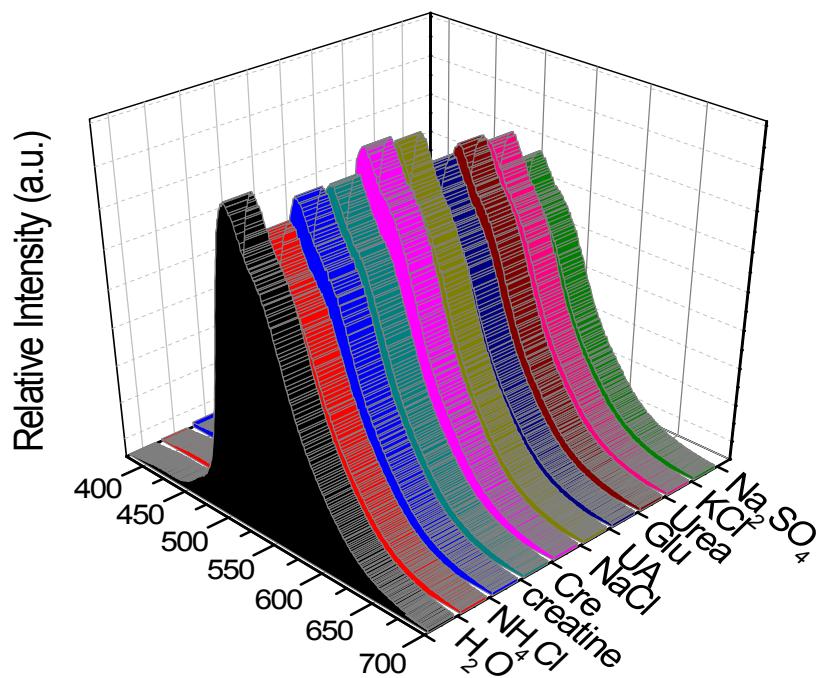
**Fig. S5** (a) emission spectra of free ligand Tipa in the solid state; (b) compound **1**, FS and FS@**1** in the solid state ; (c) FS in aqueous solution state; FS@**1** prepared by immersing in FS solution with different concentrations.



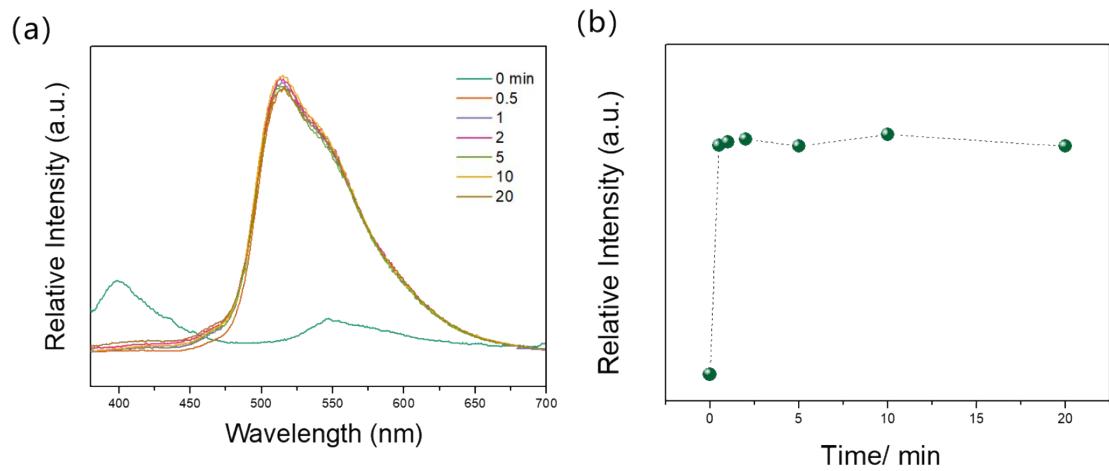
**Fig. S6** Excitation spectra of Tipa(a), compound **1**(b) and FS@**1**(c).



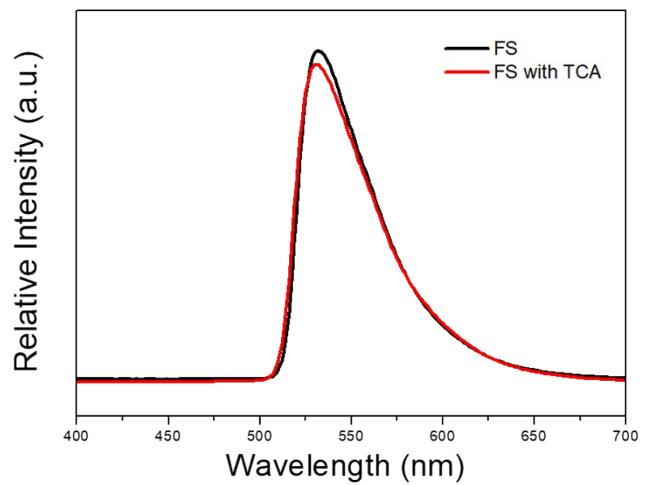
**Fig. S7** PXRD pattern of FS@1 after immersing in water for 1 day, 7days, 15 days, respectively.



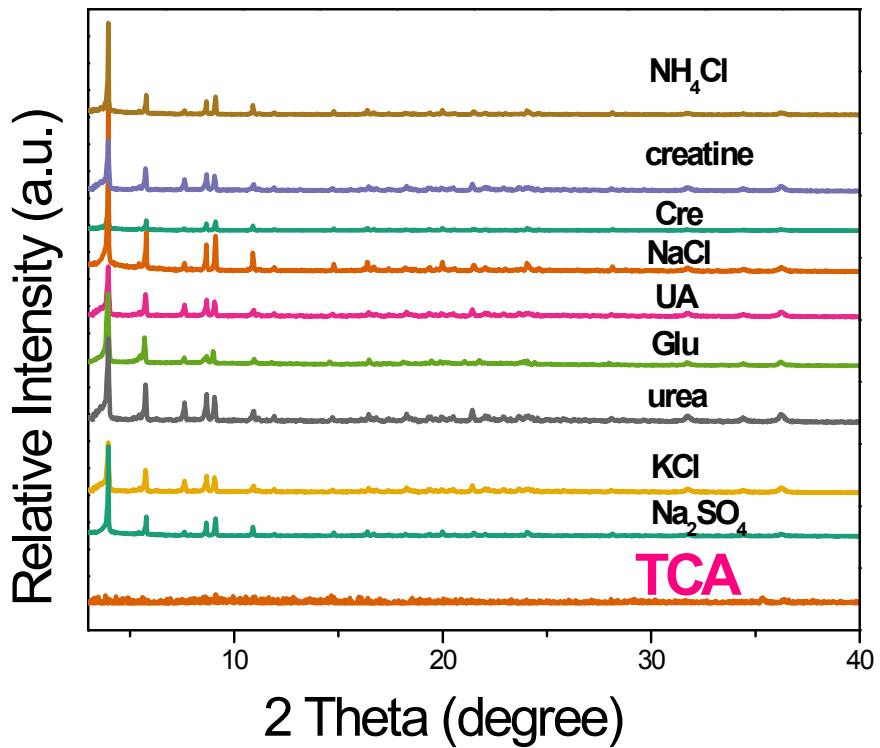
**Fig. S8** Emission spectra of FS@1 toward TCA in the presence of background of other various urine components ( $\lambda_{\text{ex}} = 367\text{nm}$ ).



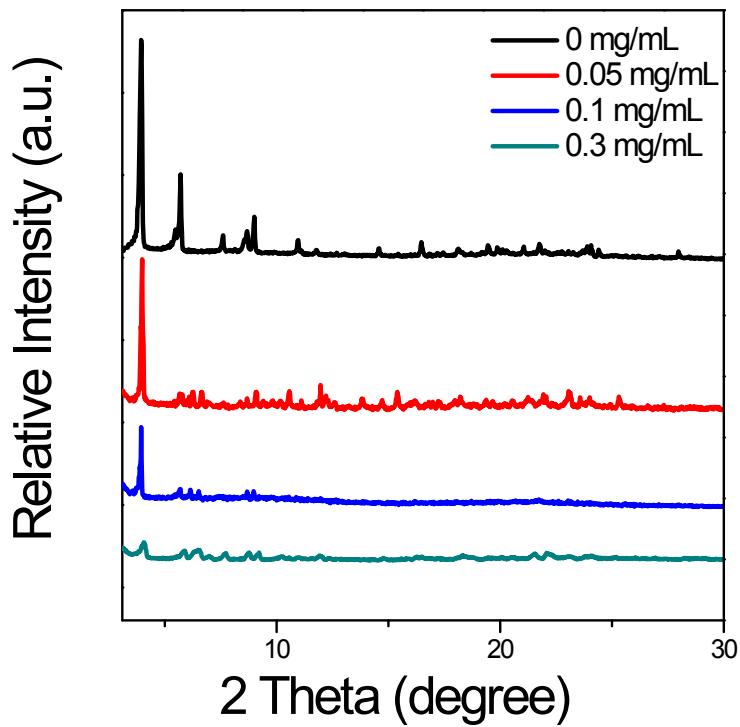
**Fig. S9** Time-dependent emission spectra(a) and intensities(b) at 518 nm of the FS@1 to the TCA solution.



**Fig. S10** Emission spectra of FS solution and FS (in the same concentration) with TCA (10 mM).



**Fig. S11** PXRD patterns of the FS@1 after immersing in different constituents(10 mM).



**Fig. S12** PXRD patterns of the FS@1 after immersing in TCA solution with different concentrations.