Electronic Supplementary Material (ESI) for Dalton Transactions.

Supporting information

A novel sensitive fluorescent probe of $S_2O_8^{2-}$ and Fe^{3+} based on covalent post-functionalization of zirconium (IV) metal-organic framework

Shu-Yin Zhu and Bing Yan*

School of Chemical Science and Engineering, Tongji University, Siping Road 1239, Shanghai 200092, China.

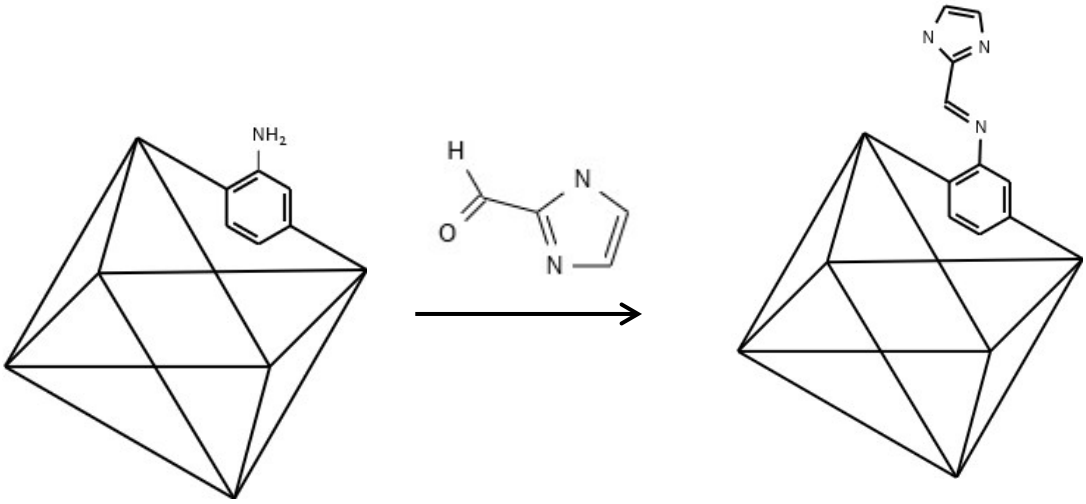
E-mail: byan@tongji.edu.cn.

The limit of detection was evaluated on the ratio of signal-to-noise of 3 by the following equations,

$$S_b = \sqrt{\frac{\sum (F_0 - F_1)^2}{N - 1}} \quad (1)$$

$$LOD = 3S_b / S \quad (2)$$

where Sb is the standard deviation for replicating detections of blank solutions (N=30); F0 is the emission intensity of UiO-66-NH_2-IM in water; F1 is the average of F0; and S is the slope of the liner relationship. We hope we have provided the detailed information about the calculation of the detection limit.



Scheme S1 Synthetic route of UiO-66-NH_2-IM via a covalent PSM method based on Schiff base reaction.

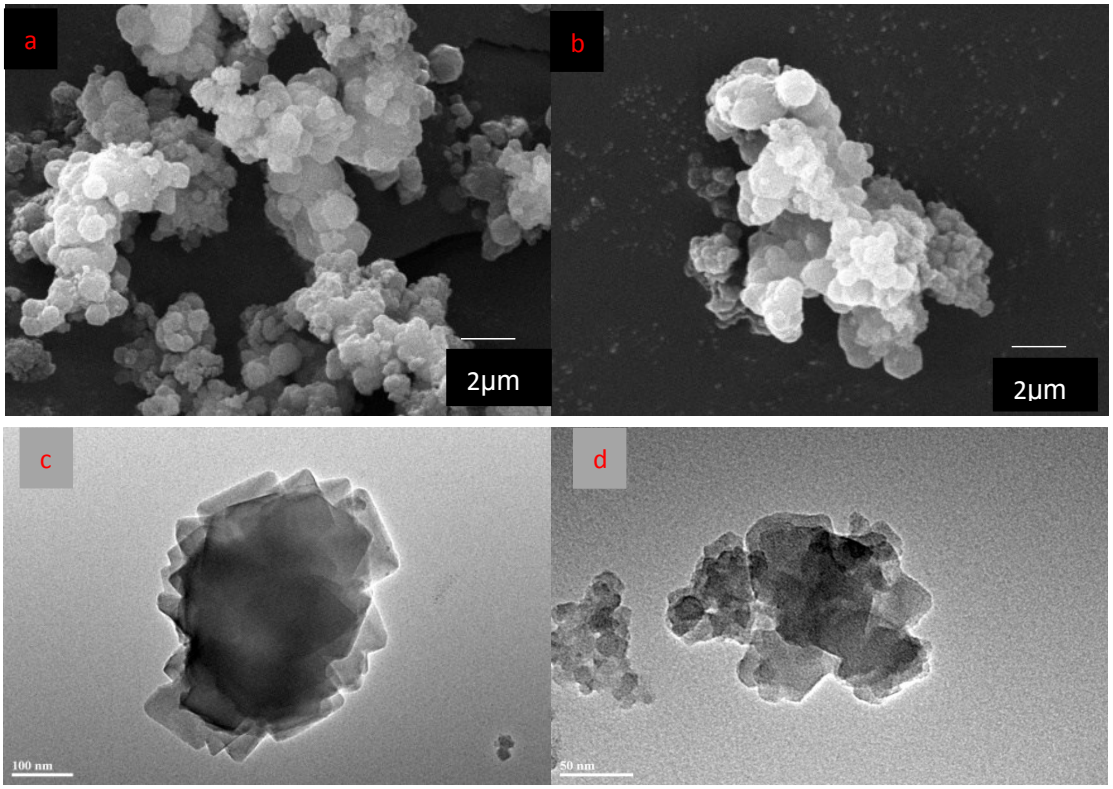


Fig. S1 SEM images of the as-prepared UiO-66-NH_2 (a), UiO-66-NH_2-IM (b) and TEM images of the as-prepared UiO-66-NH_2 (c), UiO-66-NH_2-IM (d).

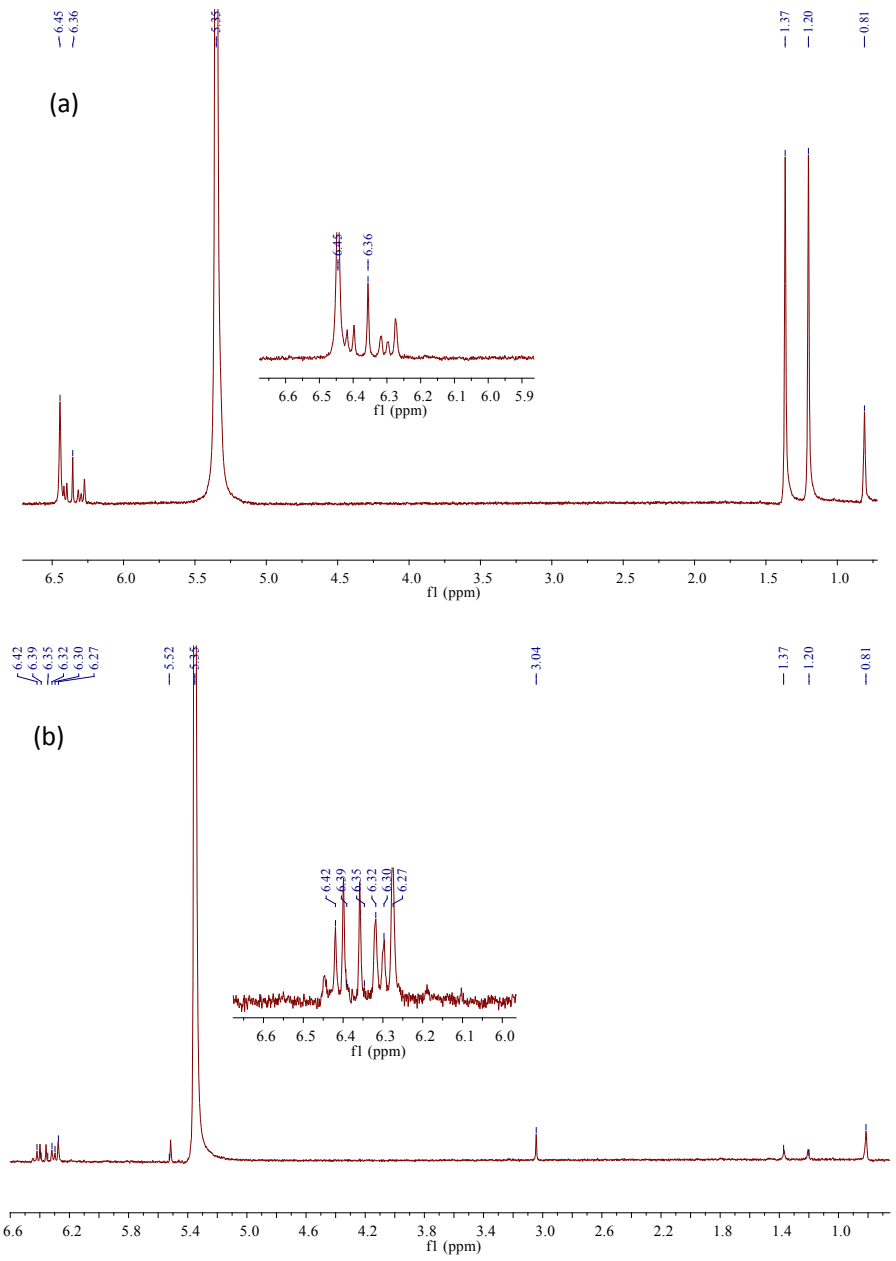


Fig. S2 ^{1}H NMR spectra of digested UiO-66-NH_2 (a) and UiO-66-NH_2-IM (b).

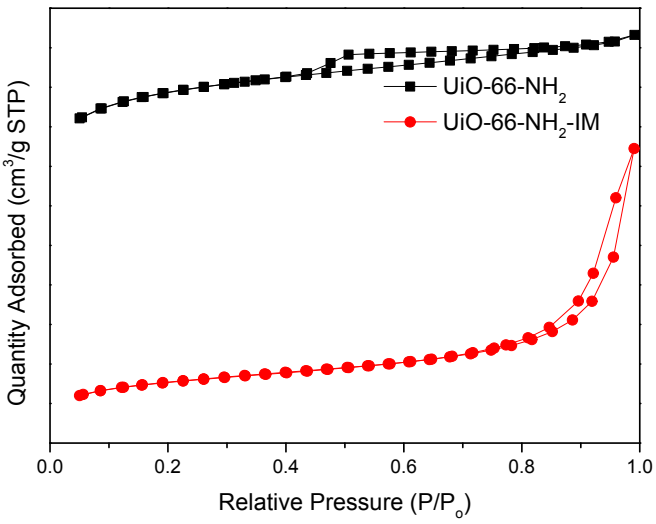


Fig. S3 N_2 adsorption−desorption isotherms of UiO-66-NH_2 and UiO-66-NH_2-IM.

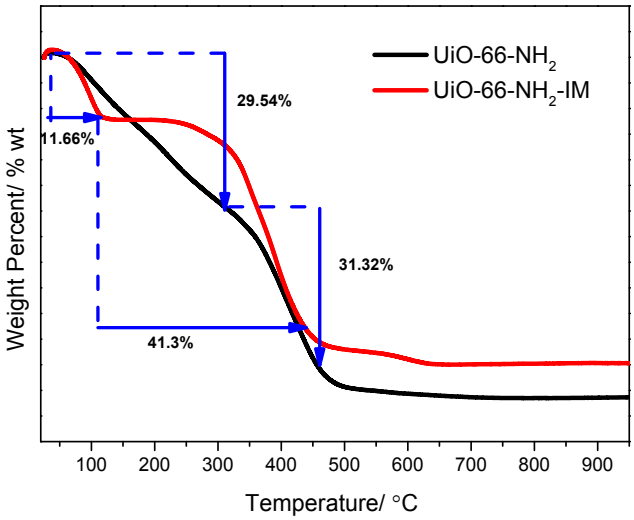


Fig. S4 TGA traces of compound UiO-66-NH_2 and UiO-66-NH_2-IM.

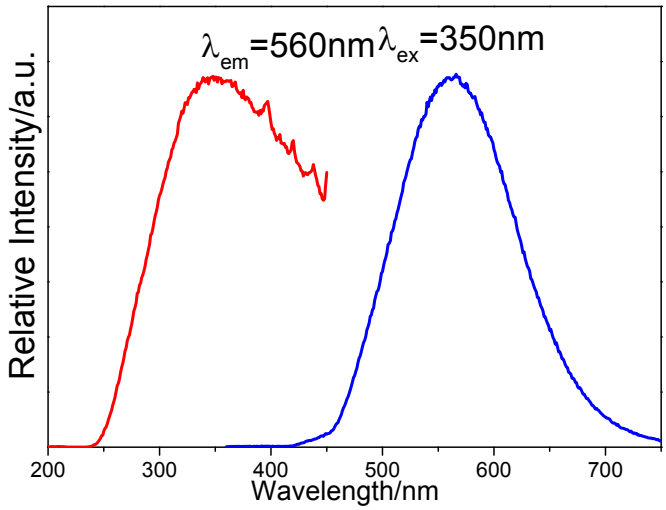


Fig. S5 Room temperature excitation and emission spectra of free ligand NH_2-BDC in solid state.

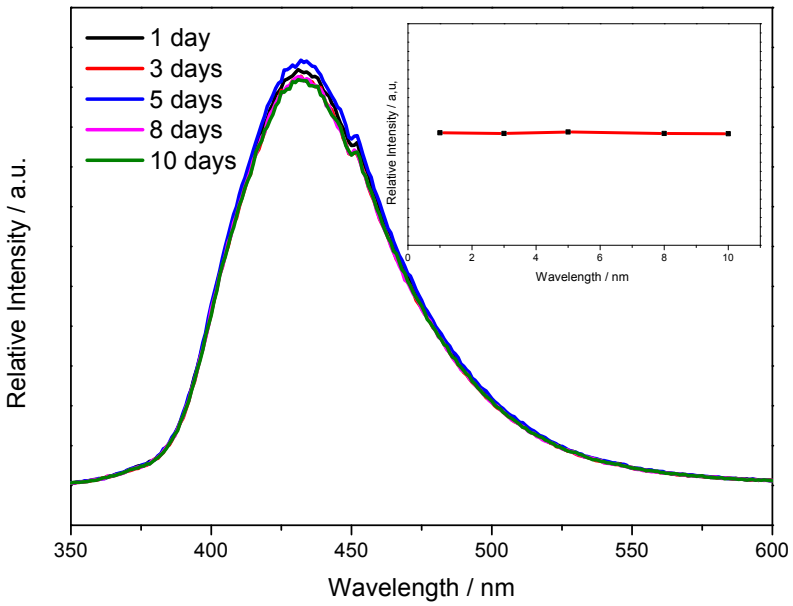


Fig. S6 Day-to-day fluorescence stability of UiO-66-NH_2-IM in aqueous solution under excitation at 330nm.

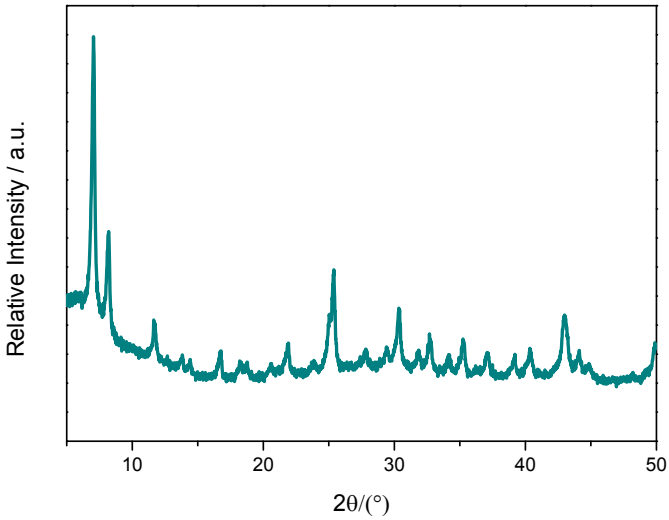


Fig. S7 PXRD pattern of UiO-66-NH_2-IM after dispersed in water.

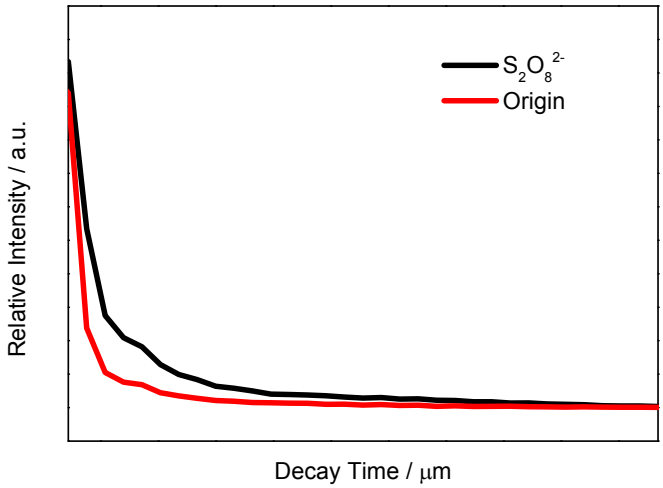


Fig. S8 Fluorescence lifetime of UiO-66-NH_2-IM in the absence and presence of $S_2O_8^{2-}$ in aqueous solution.

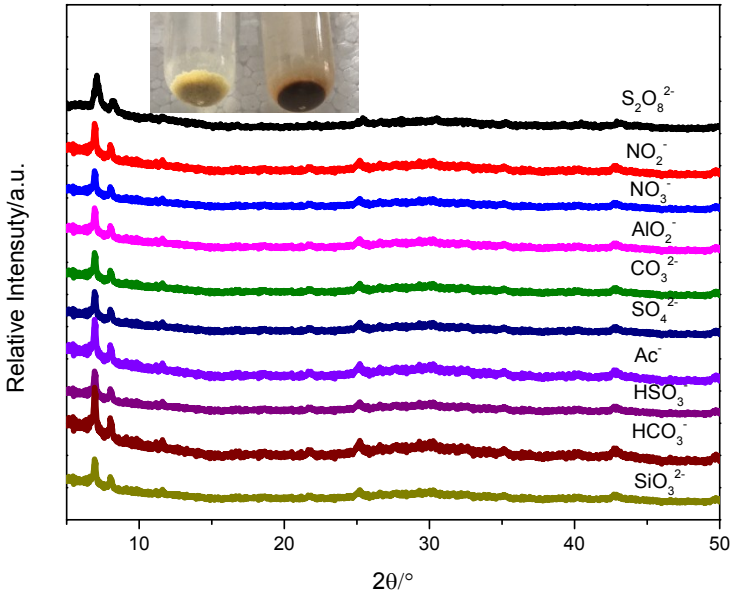


Fig. S9 Fluorescence PXRD patterns of the UiO-66-NH_2-IM after immersing in different anions.

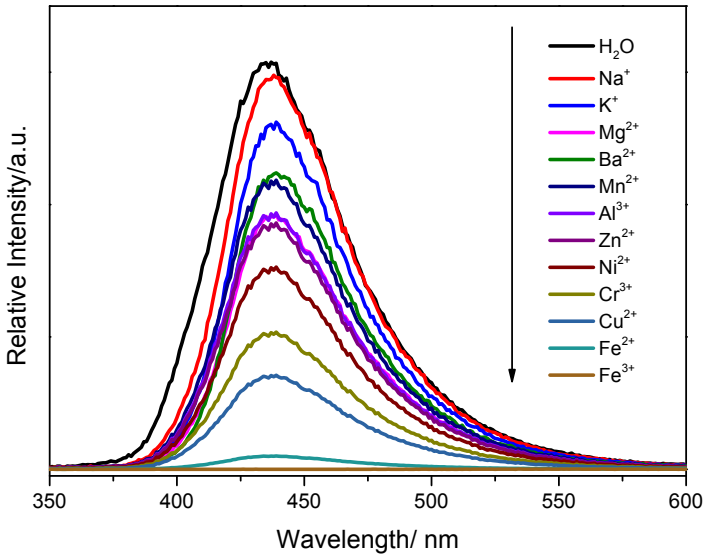
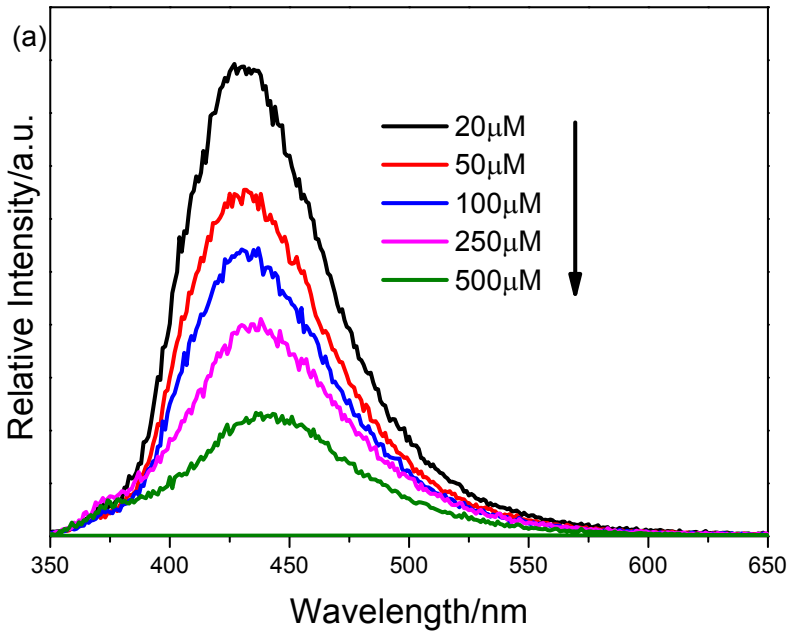


Fig. S10 PL spectra of UiO-66-NH_2-IM (2 mg) after dispersed into different aqueous solution of various metal ions (10 mM).



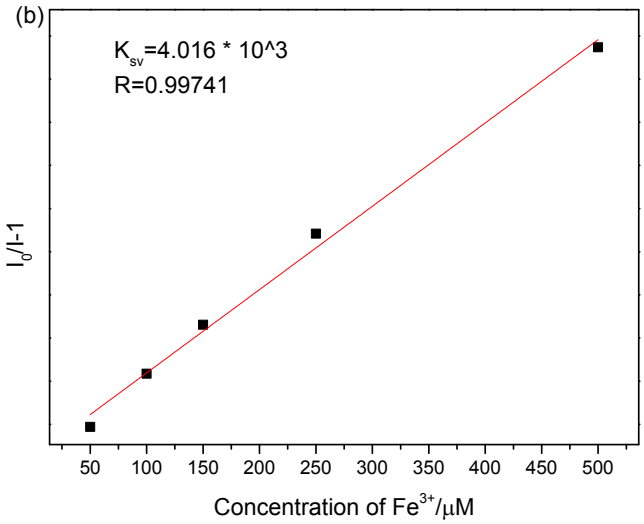


Fig. S11 Emission spectra (a) and K_{sv} curve (b) of UiO-66-NH_2-IMin aqueous solutions in the presence of various concentrations of Fe^{3+} when excited at 330 nm.

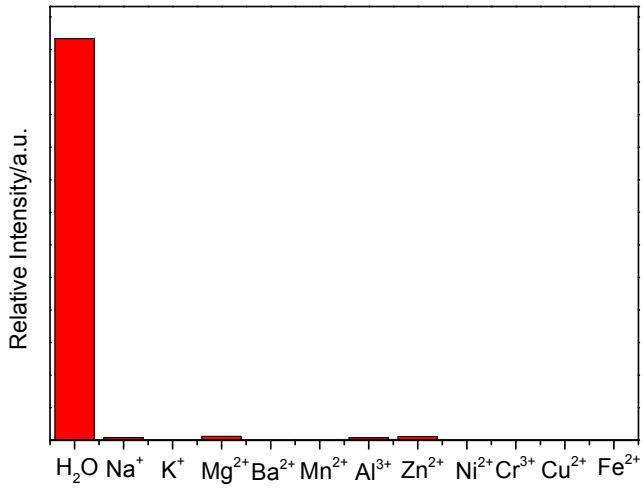


Fig. S12 Luminescence intensity of UiO-66-NH_2-IM when Fe^{3+} is added in the background of metal cations in aqueous solution when excited at 330 nm.

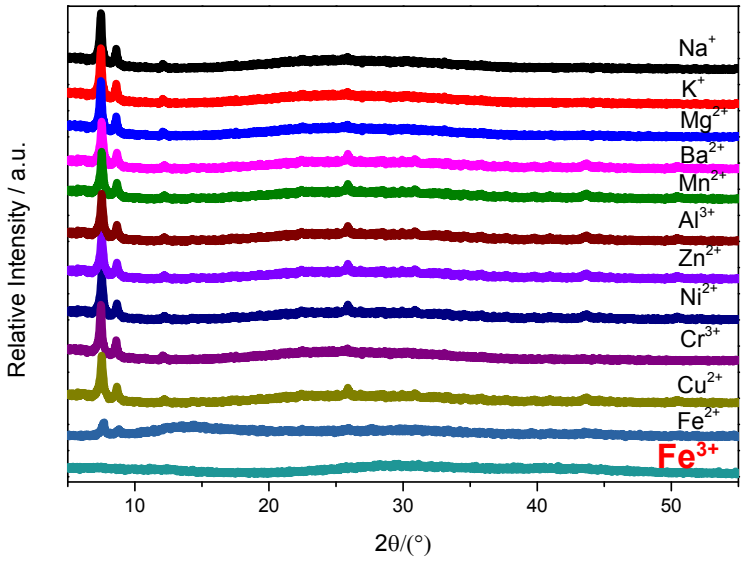


Fig. S13 PXRD patterns of the UiO-66-NH2-IM after immersing in different metal ions.