Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.


***Supplementary Information (SI) for***

# Color Tunable Long-Lasting Phosphorescence in $Mn^{2+}$-Doped Anionic Metal-Organic Framework

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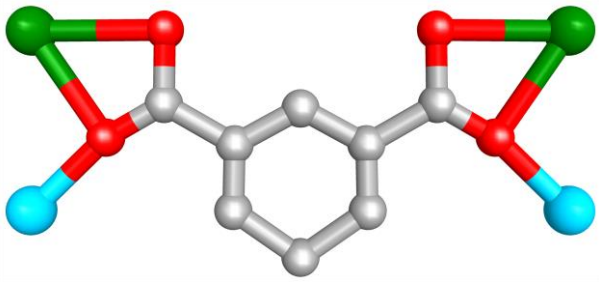
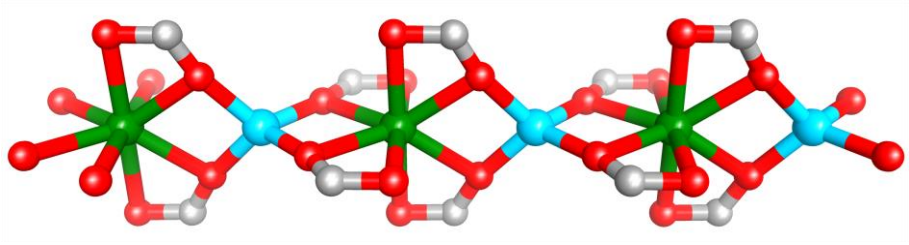
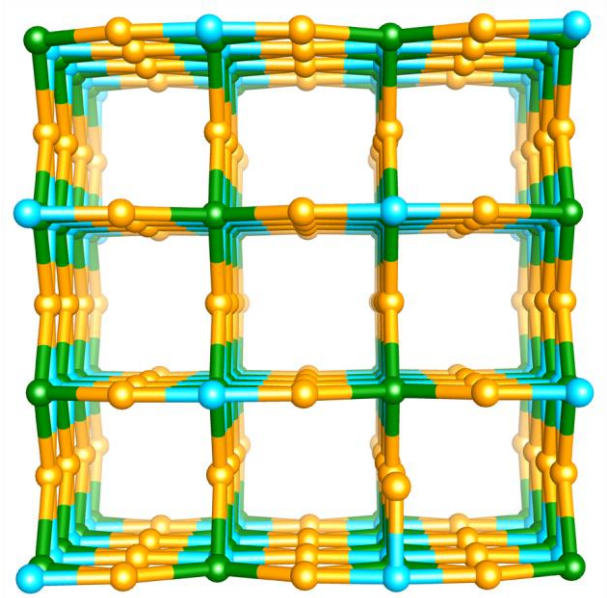
## Supporting Figures



(a)



(b)



(c)

**Figure S1.** (a) The binding fashion of IPA ligand. (b) Ball-and-stick view of the 1D heterometallic polymeric chain running along *c* axis. (c) Schematic representation of the 3D network of AMOF-1. All hydrogen atoms are omitted for clarity. (O: red; C: gray; Cd: green; Li: cyan).

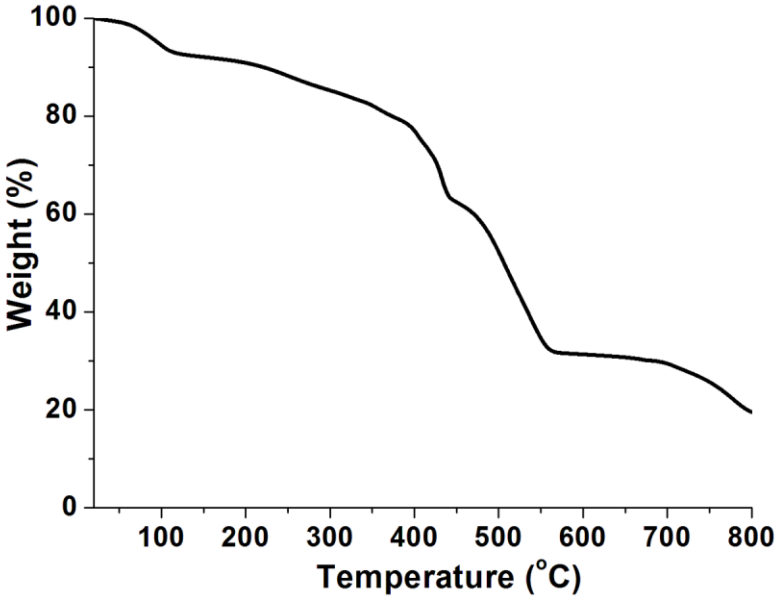



**Figure S2.** TGA curves for AMOF-1.

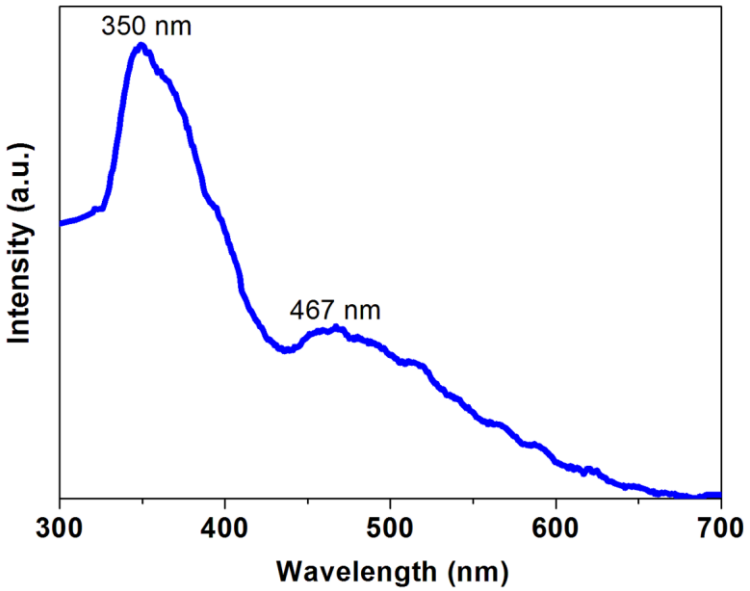



**Figure S3.** Fluorescence spectra of AMOF-1 at room temperature.

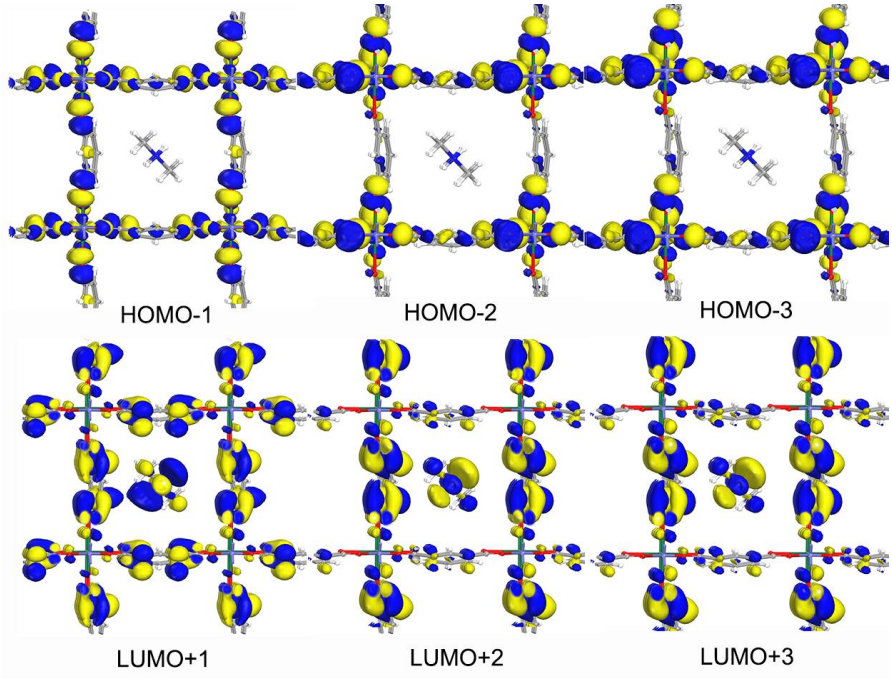



**Figure S4.** The electron-density distribution of various orbitals in AMOF-1.

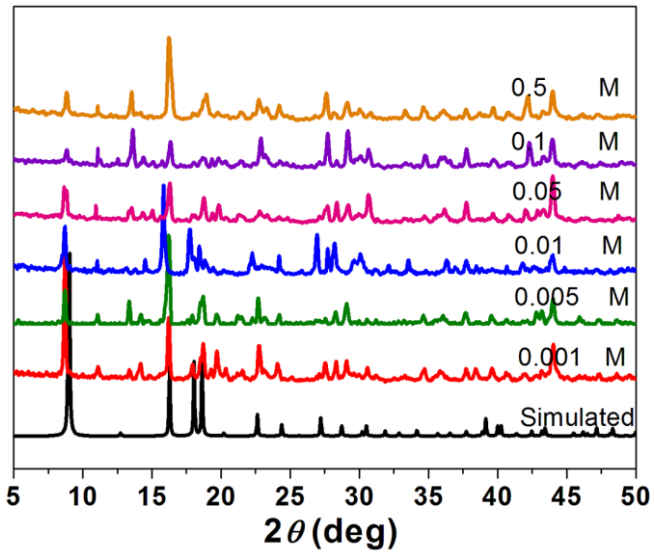



**Figure S5.** PXRD patterns of $Mn^{2+}$@AMOF-1 with different concentrations of $Mn^{2+}$ ions.

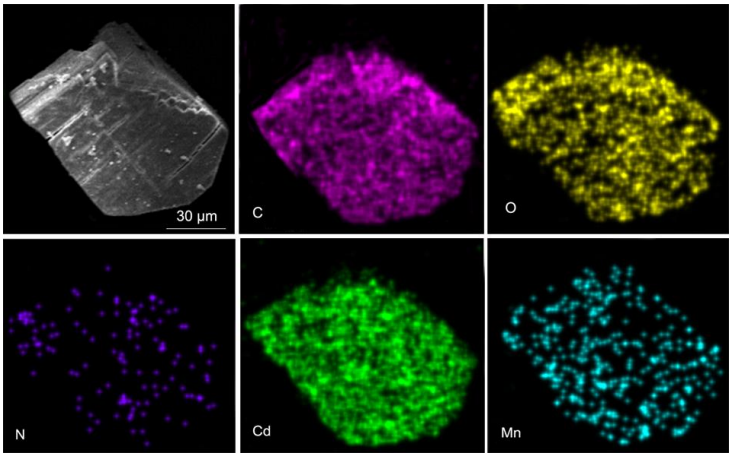



**Figure S6.** Energy-dispersive X-ray spectrometry (EDX) mapping for corresponding elemental distributions in $Mn^{2+}$ ions doped AMOF-1.

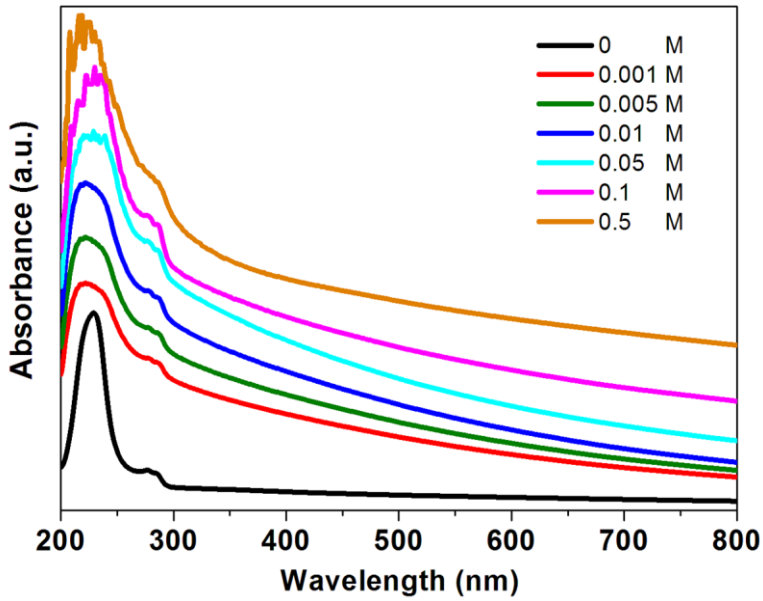



**Figure S7.** UV-visible absorption spectra of $Mn^{2+}$@AMOF-1 with different concentrations of $Mn^{2+}$ ions.

**Table S1.** The content of $Mn^{2+}$ (wt%) and phosphorescence quantum yields (%) of different $Mn^{2+}$ doping AMOF-1 samples.

| Samples | 0 M | 0.001 M | 0.005 M | 0.01 M | 0.05 M | 0.1 M | 0.5 M |
|---|---|---|---|---|---|---|---|
| Content of $Mn^{2+}$ | 0 | 0.28 | 0.36 | 0.85 | 1.43 | 2.11 | 3.87 |
| Phosphorescence quantum yields | 3.68 | 3.01 | 1.56 | 0.17 | 0.58 | 2.86 | 1.35 |

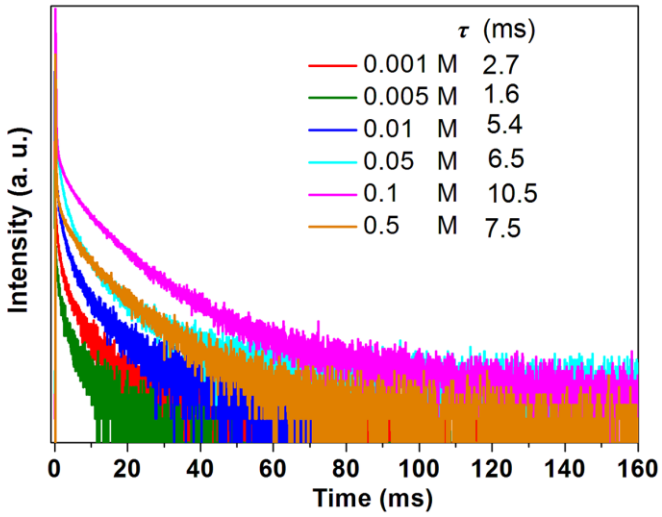



**Figure S8.** Time-resolved phosphorescence decay curves of $Mn^{2+}$@AMOF-1 with different concentration of $Mn^{2+}$ ions.

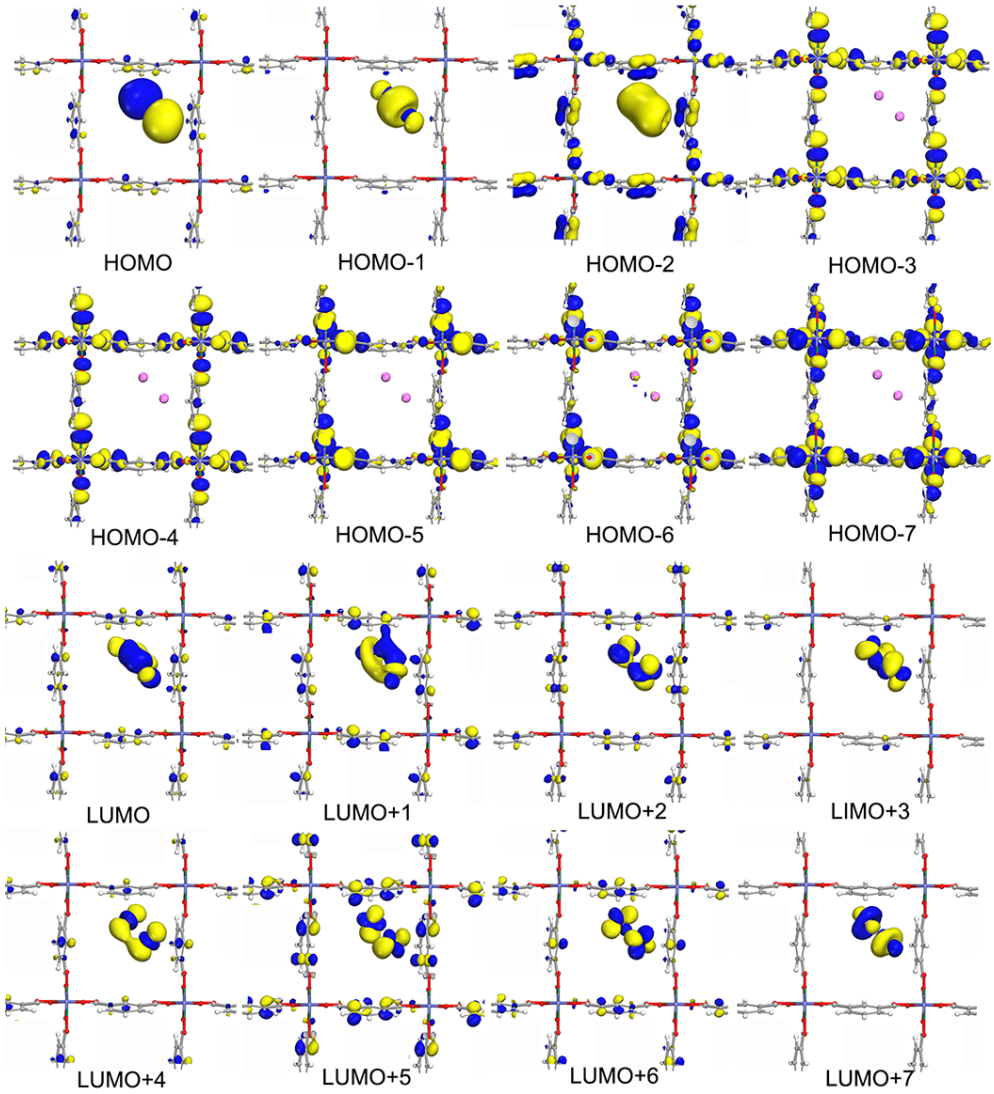



**Figure S9.** The electron-density distributions of various orbitals in $Mn^{2+}$@AMOF-1. (O: red; C: gray; Cd: green; Li: cyan; Mn: pink).

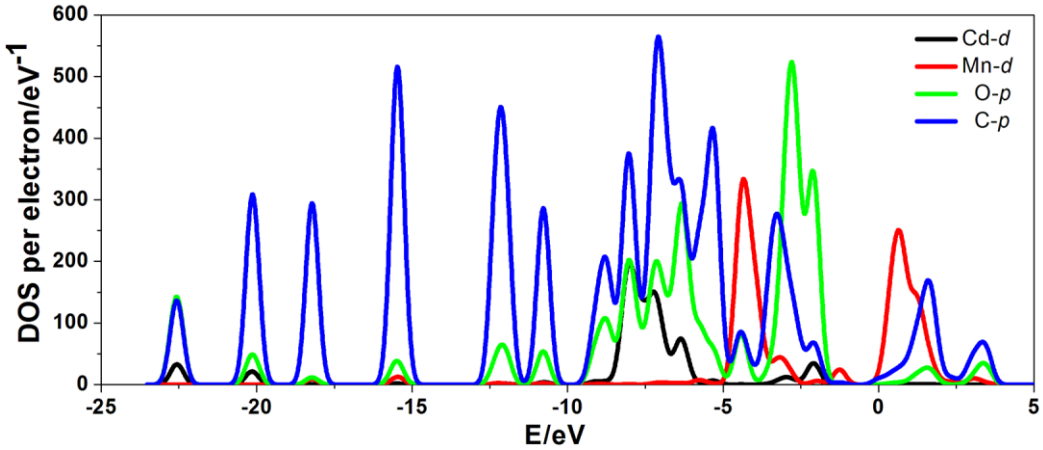



**Figure S10.** The partial electronic density of state (PDOS) for the *p*, *d* electrons from C, O, Cd and Mn atoms in $Mn^{2+}$@AMOF-1.

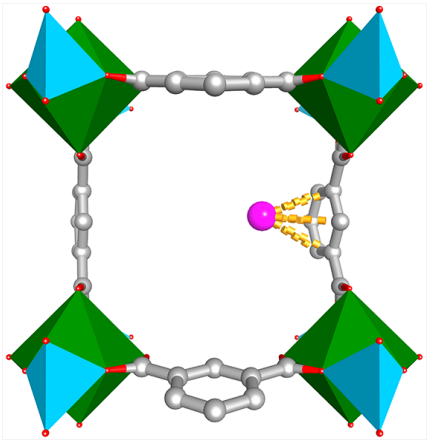


**Figure S11.** The relaxed configuration of $Mn^{2+}$@AMOF-1.

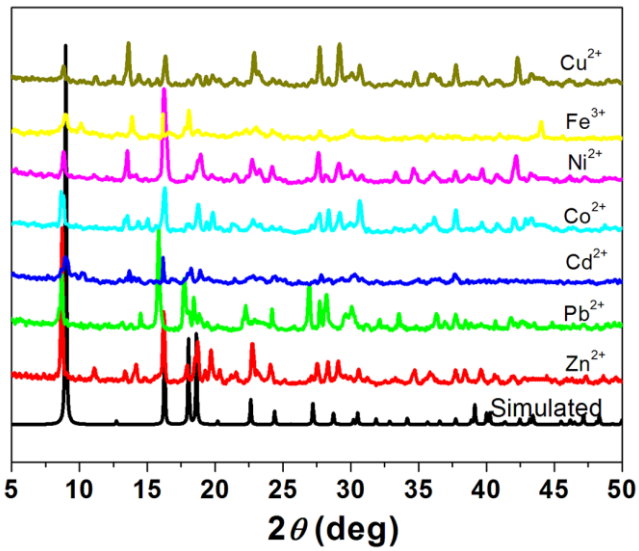



**Figure S12.** PXRD patterns of AMOF-1 incorporating different metal ions.

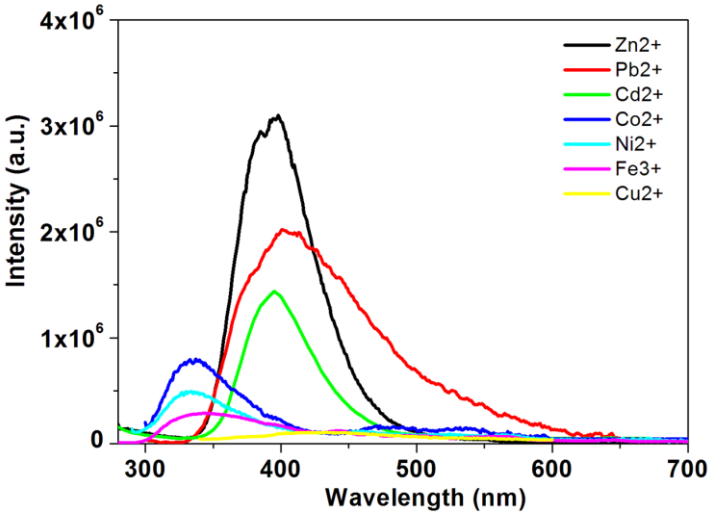
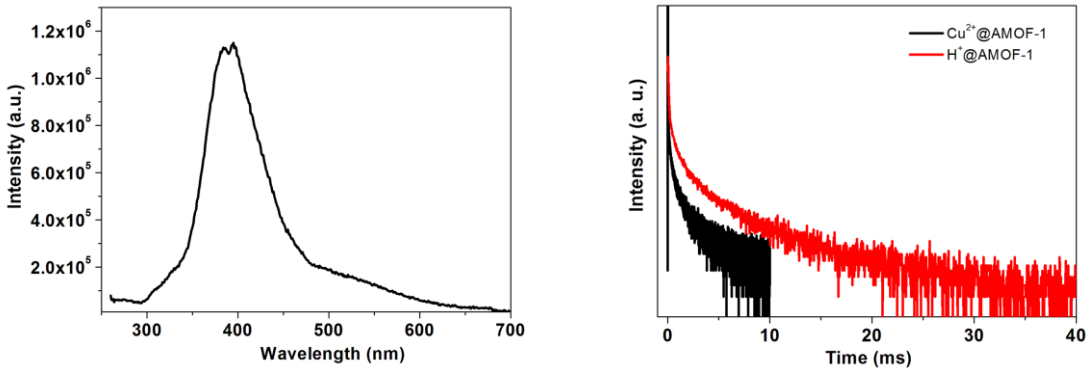



**Figure S13.** LLP spectra of AMOF-1 incorporating different metal ions.




(a) (b)

**Figure S14.** (a) LLP spectra of $H^+$@AMOF-1. (b) Time-resolved phosphorescence decay curves of $Cu^{2+}$@AMOF-1 and $H^+$@AMOF-1.

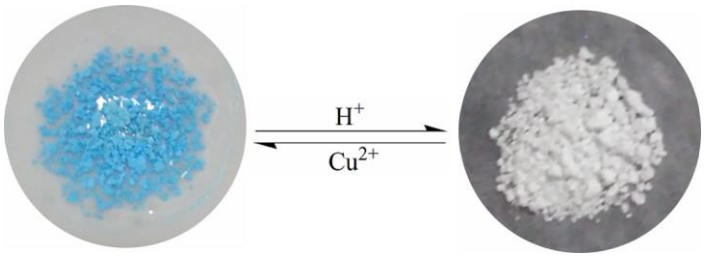



**Figure S15.** Photographs of the reversible changes between $Cu^{2+}$@AMOF-1 and $H^+$@AMOF-1.

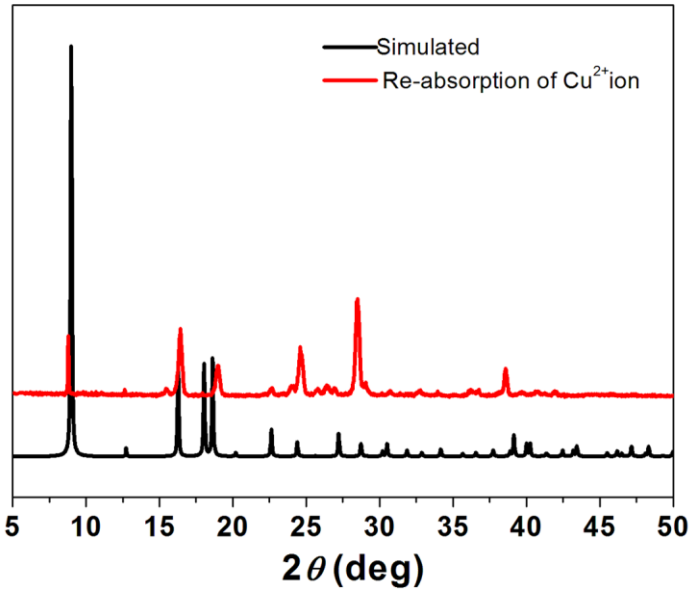



**Figure S16.** PXRD patterns of the final product after re-absorption of $Cu^{2+}$ ion.