Supporting Information

Sonochemical synthesis of microscale Zn(II)-MOF with dual Lewis basic sites for fluorescent turn-on detection of Al^{3+} and methanol with low detection limits

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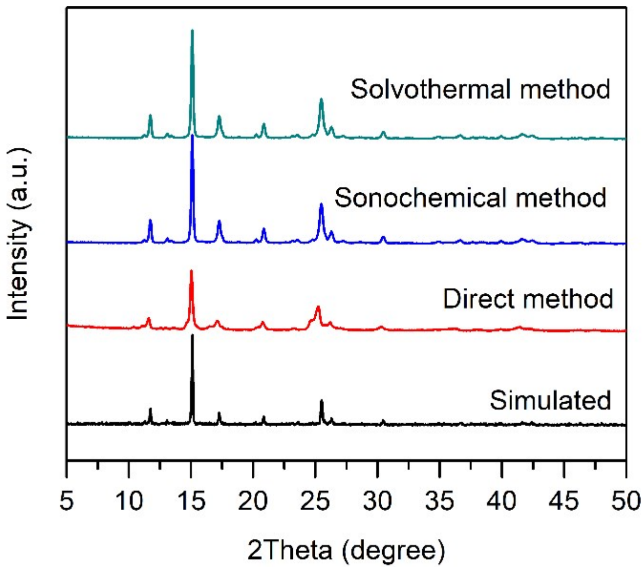

Fig. S1 PXRD patterns of the simulated, and as-synthesized **Zn-MOF** prepared by direct method, solvothermal method, and sonochemical method using soduim acetate as a modulator.

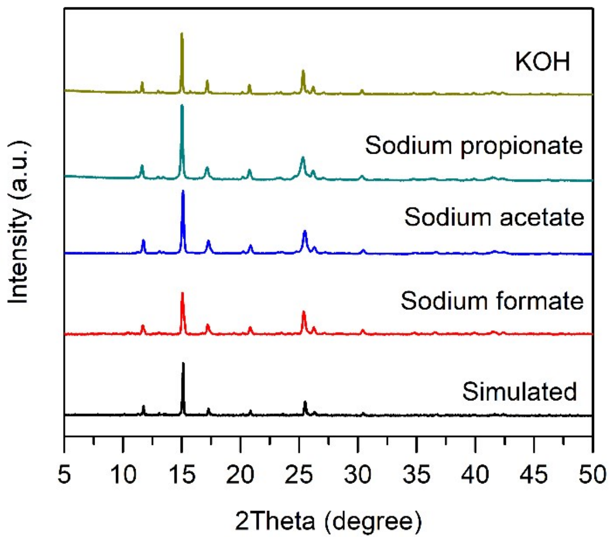

Fig. S2 PXRD patterns of **Zn-MOF** prepared under sonochemical method with the addition of various modulators.

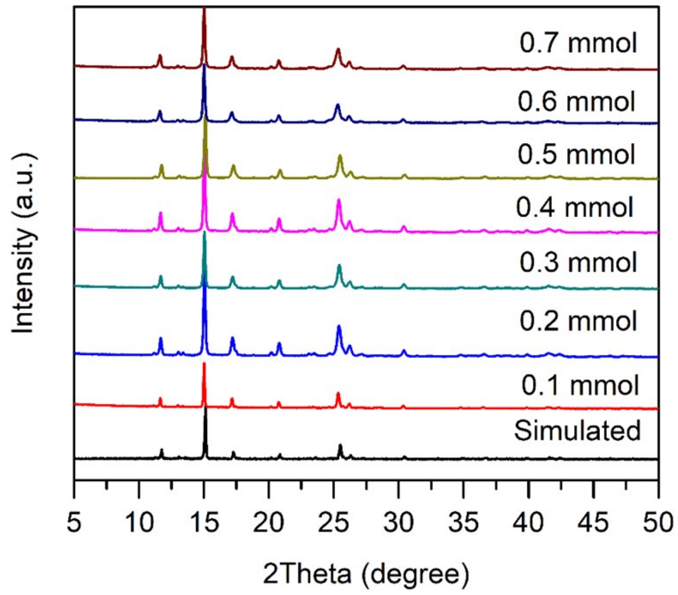

Fig. S3 PXRD patterns of **Zn-MOF** prepared under sonochemical method with various contents of sodium acetate (a) 0.1 (b) 0.2 (c) 0.3 (d) 0.4 (e) 0.5 (f) 0.6 and (g) 0.7 mmol.

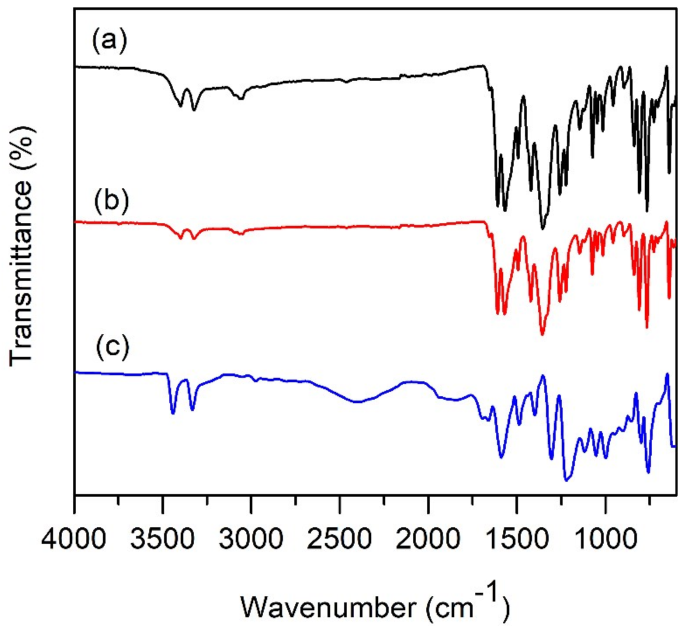

Fig. S4 FTIR spectra of **Zn-MOF** obtained from solvothermal method in the absence of sodium acetate (a) sonochemical method in the presence of sodium acetate (b) and acetic acid (c).

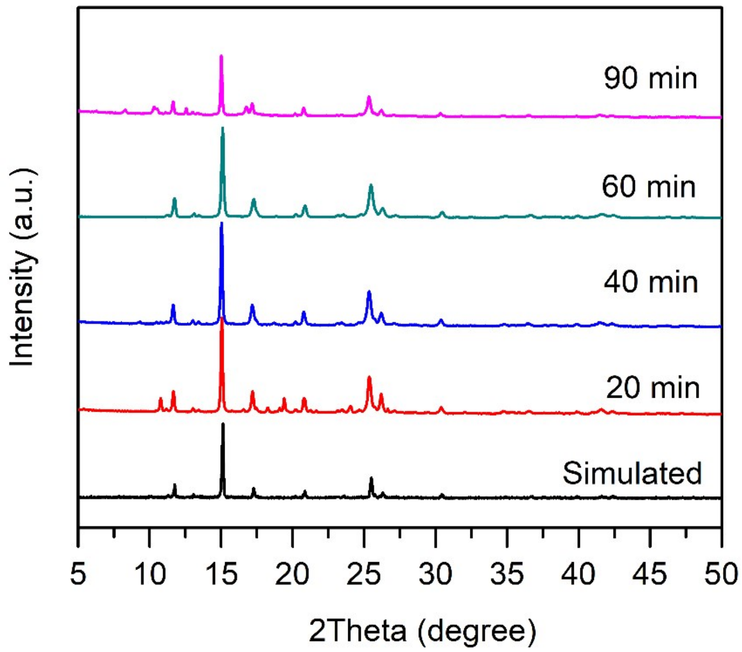

Fig. S5 PXRD patterns of **Zn-MOF** prepared under sonochemical method with various sonication times of (a) 20 (b) 40 (c) 60 and (d) 90 min.

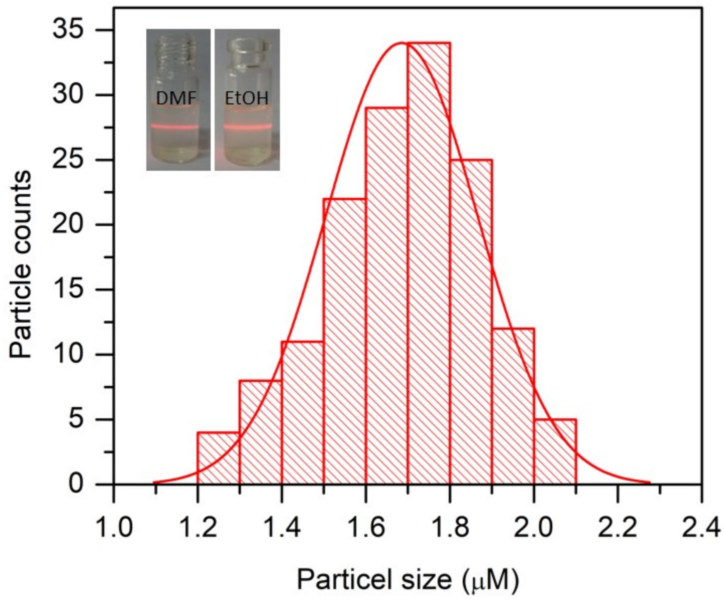

Fig. S6 The particle size distribution of **Zn-MOF** particles from the optimized condition (inset is Tyndall effect of a colloidal suspension of **Zn-MOF** in DMF and ethanol).

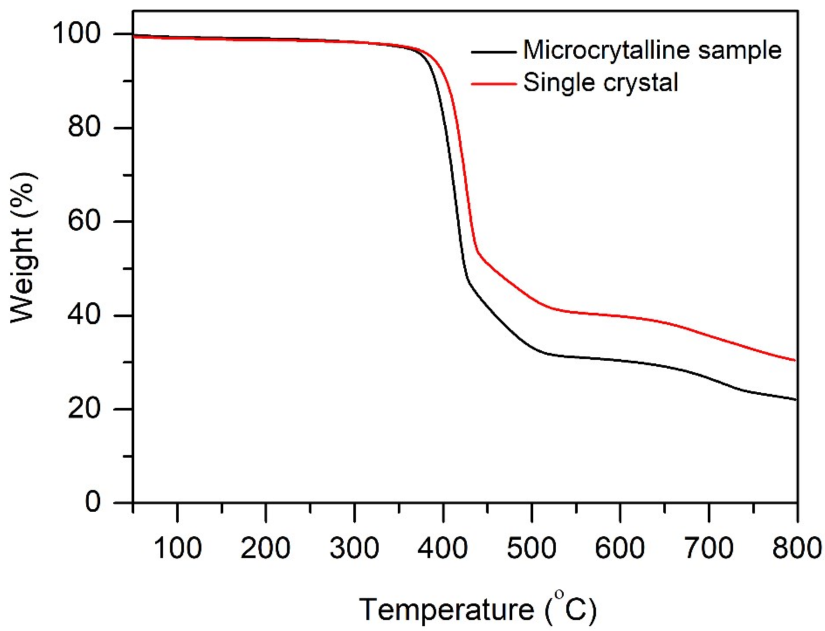

Fig. S7 TGA of microcrystalline sample and single crystal of **Zn-MOF**.

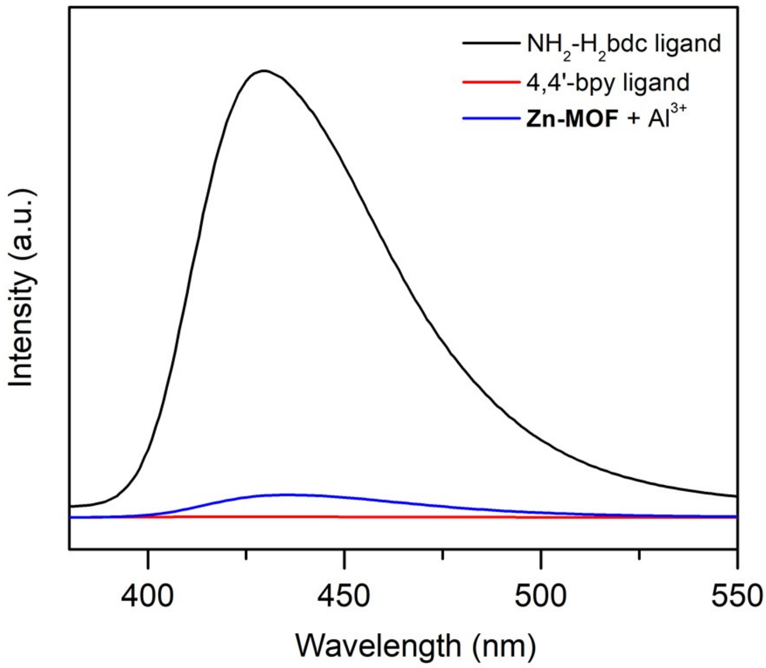

Fig. S8 Fluorescent spectra of free NH_2-H_2bdc, 4,4’-bpy and **Zn-MOF** treated with Al^{3+} in DMF.

Table S1. Calculation of LOD for Al^{3+}

Blank	Fluorescent intensity
1	1084.871
2	1106.897
3	1055.158
4	1127.844
5	1083.121
6	1092.382
7	1110.127
8	1076.111
9	1121.212
10	1061.028
Standard deviation (σ)	24.4662
Slope (S)	2452.37
Limit of detection (LOD) (3σ/S)	30.00 nM

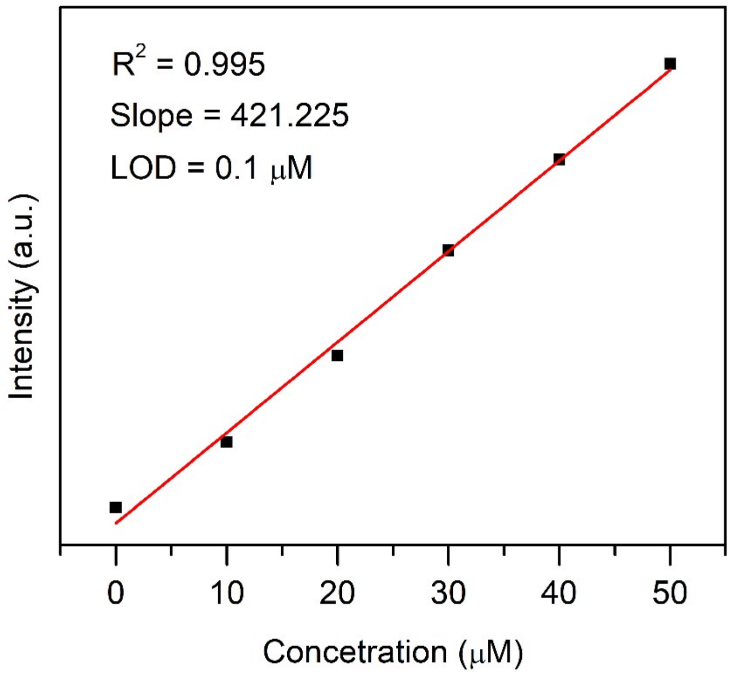

Fig. S9 The linear enhancement response of bulk crystals **Zn-MOF** toward Al^{3+}.

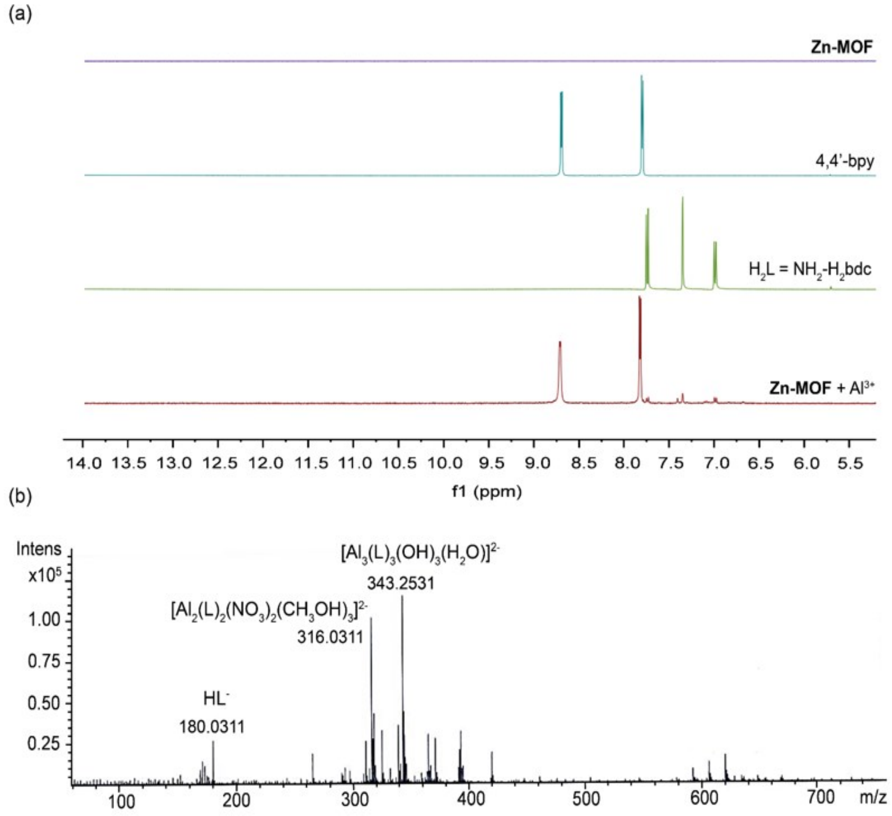

Fig. S10 (a) ^{1}H NMR spectra of **Zn-MOF**, 4,4'-bpy, NH_2-H_2bdc, and **Zn-MOF** in the presence of Al^{3+}. (b) ESI-MS spectra of **Zn-MOF** in the presence of Al^{3+}.

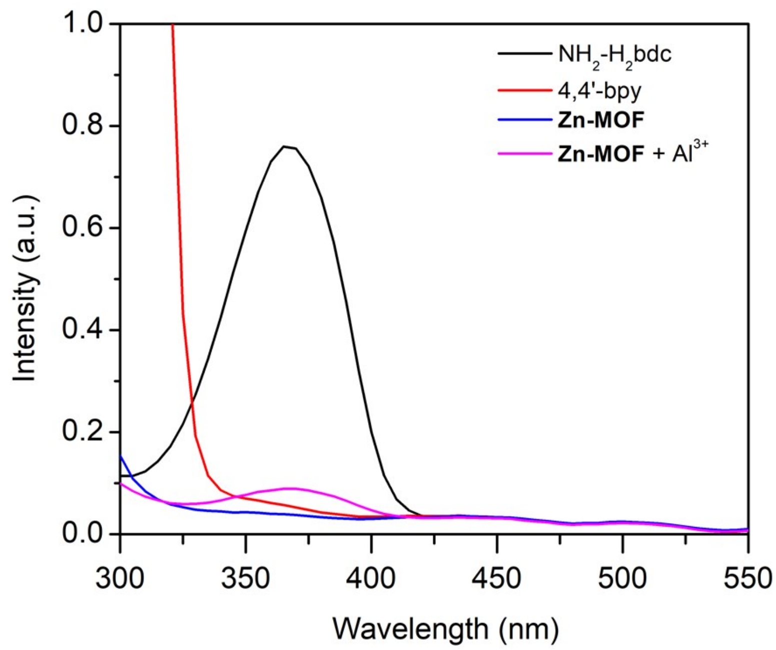

Fig. S11 UV-vis spectra of free NH_2-H_2bdc, 4,4'-bpy and **Zn-MOF** with and without Al^{3+} in DMF.

Blank	Fluorescent intensity
1	2361.525
2	2321.925
3	2312.565
4	2371.134
5	2265.447
6	2391.375
7	2333.263
8	2456.372
9	2372.212
10	2299.29
Standard deviation (σ)	54.0246
Slope (S)	2314.943
Limit of detection (LOD) (3σ/S)	0.07 % (V/V)

Table S2 Calculation of LOD for methanol

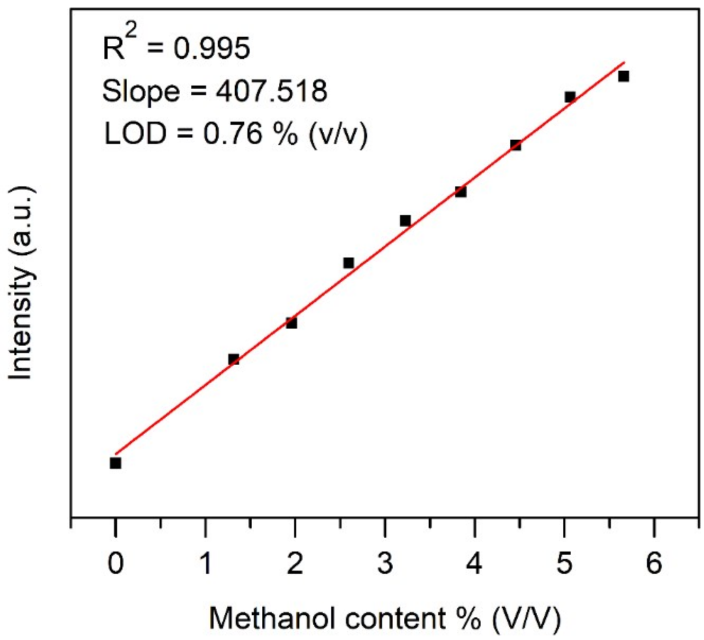

Fig. S12 The linear enhancement response of bulk phase **Zn-MOF** toward methanol.

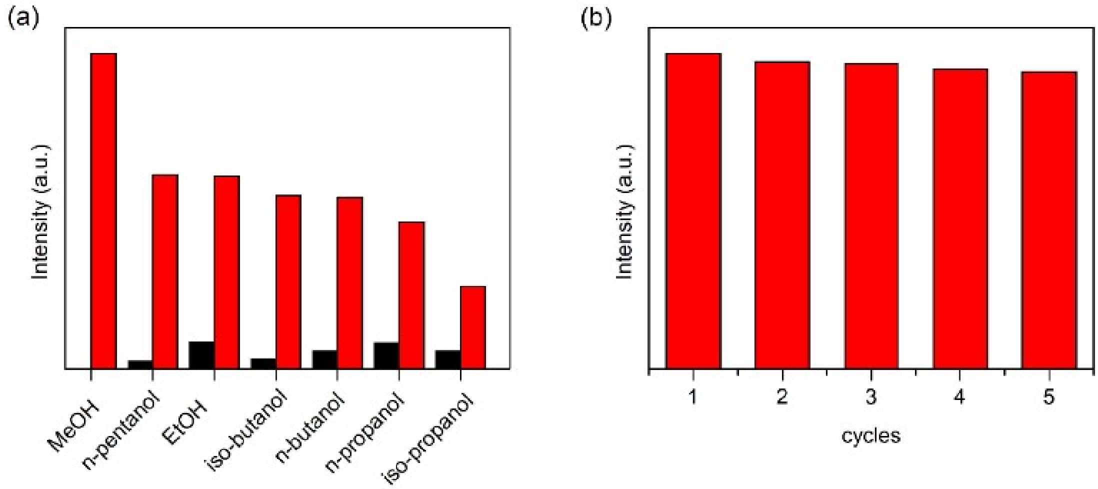

Fig. S13 (a) Fluorescent responses of **Zn-MOF** toward various alcohols. The black bar denotes the fluorescent intensities of **Zn-MOF** in various alcohols, and red bar denotes the fluorescent intensities of **Zn-MOF** upon addition of mixture methanol and other alcohols with the ratio of 1:1 (b) Recycle test for methanol sensing by **Zn-MOF**.

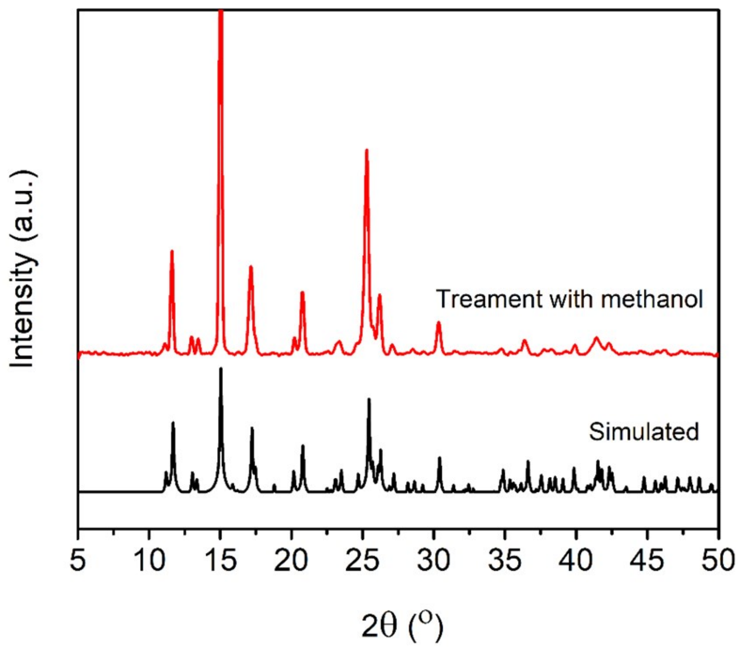

Fig. S14 PXRD patterns of the as-synthesized **Zn-MOF** and **Zn-MOF** immersed in pure methanol for 1 day.

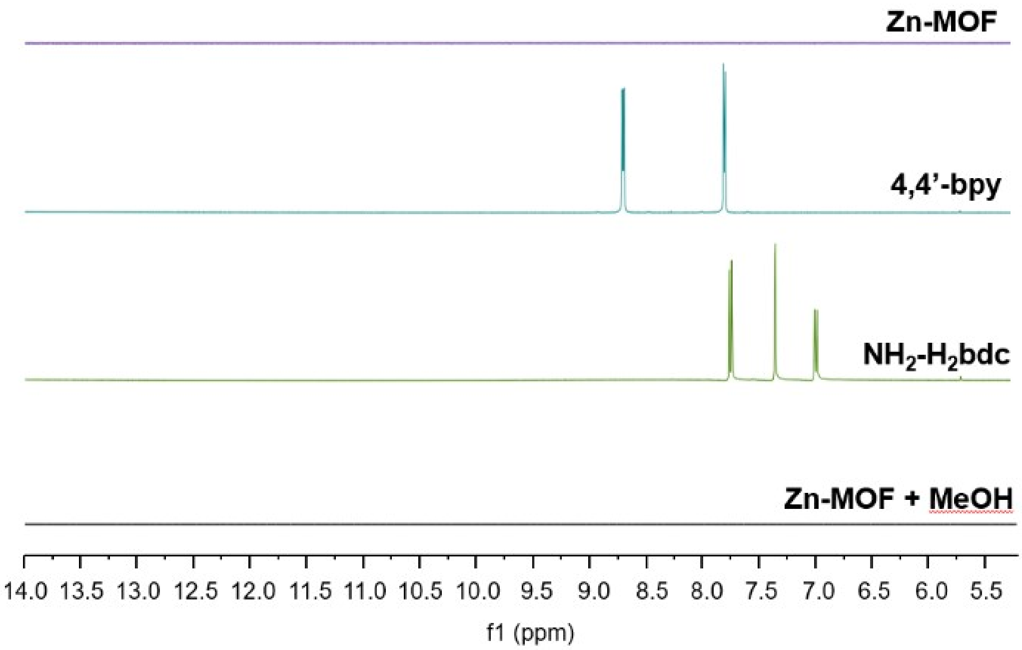

Fig. S15 ^{1}H NMR spectra of **Zn-MOF**, 4,4'-bpy, NH_2-H_2bdc, and **Zn-MOF** in the presence of MeOH.