# Electronic Supplementary Information

# for

# Polymorphism/pseudopolymorphism of metal–organic frameworks composed of zinc(II) and 2-methylimidazole: synthesis, stability, and application in gas storage

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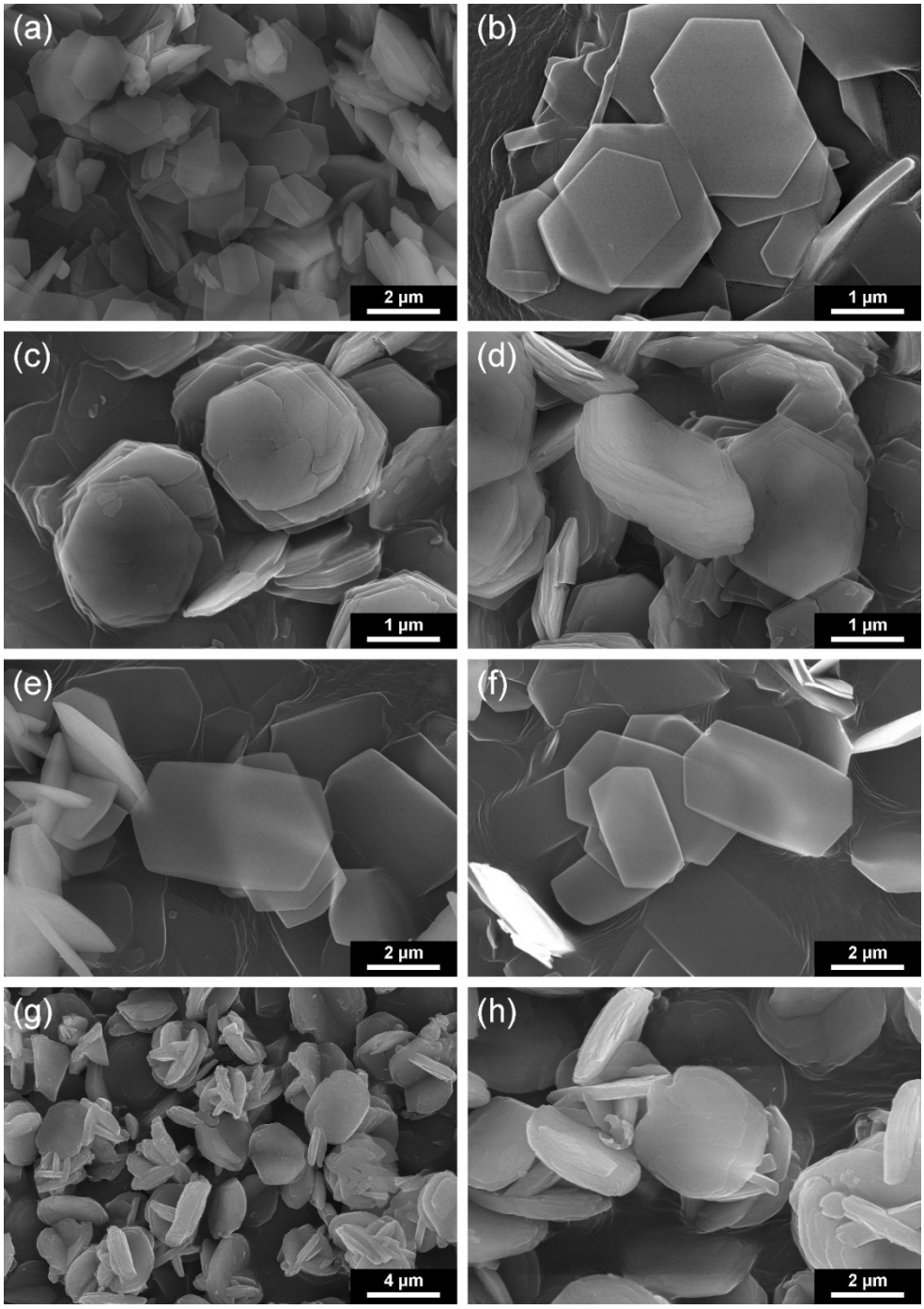


**Fig. S1** Additional SEM images of (a, b) dia(Zn)-HCOONa, (c, d) dia(Zn)-$CH_3COOH$, (e, f) dia(Zn)-$NH_4OH$, and (g, h) dia(Zn)-control.

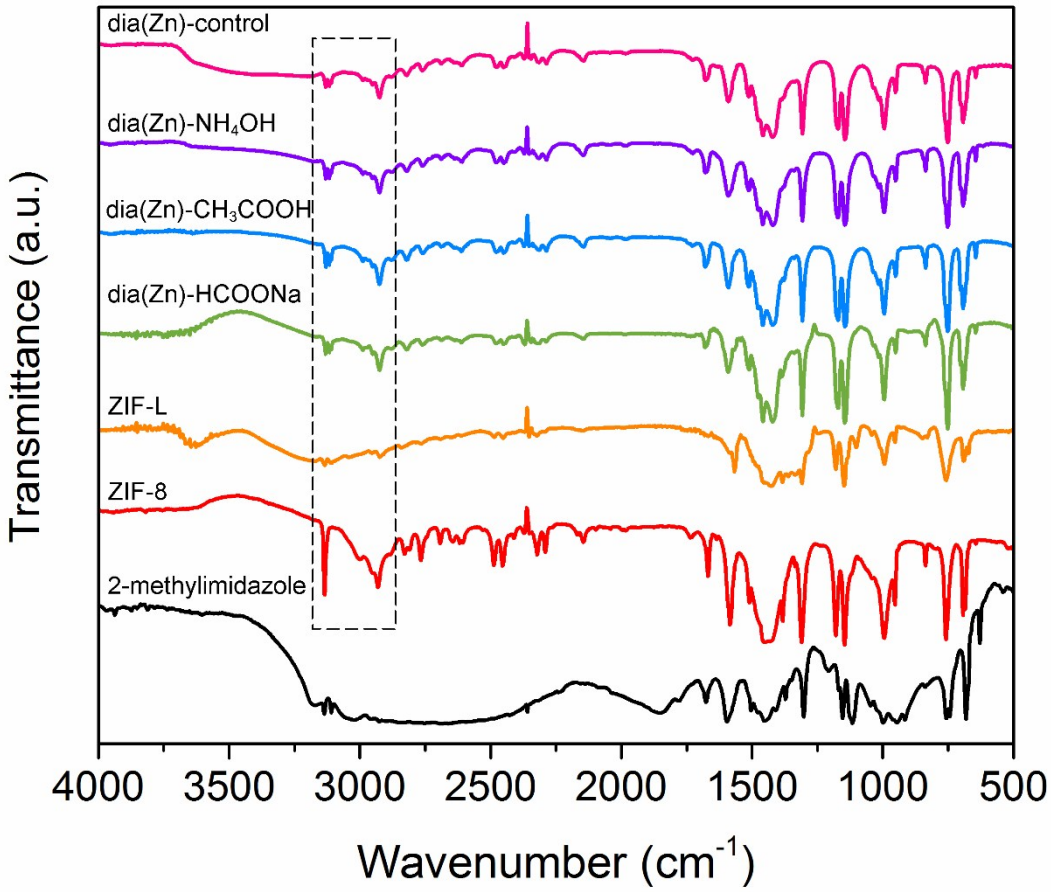


**Fig. S2** FT-IR spectra of the crystals discussed in this work.

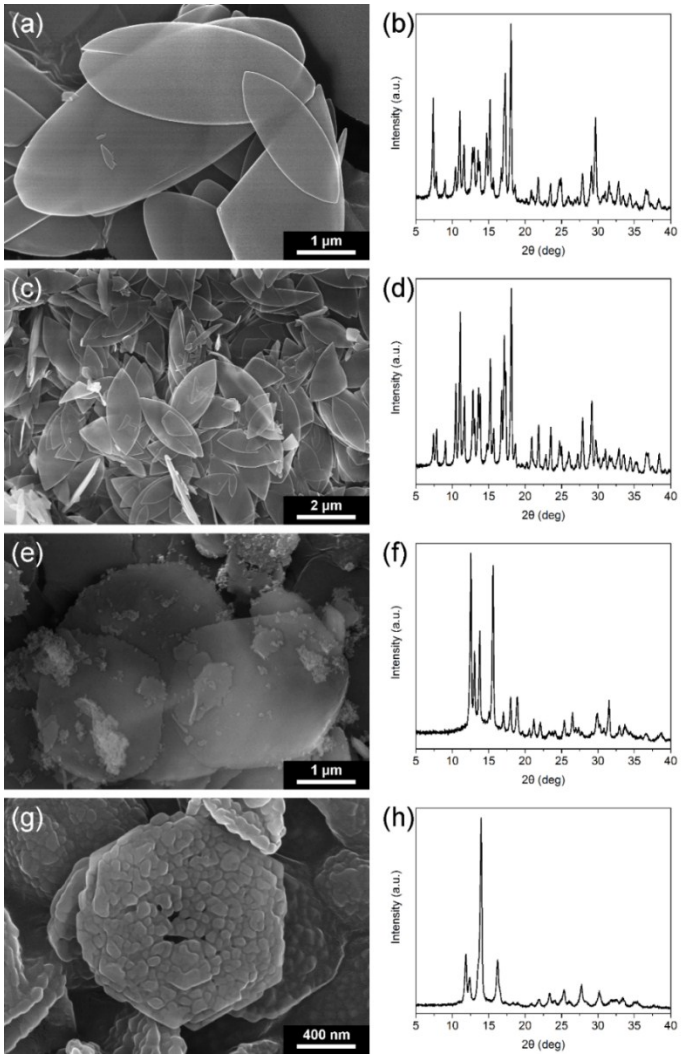


**Fig. S3** (a) SEM image and (b) XRD patterns of the product obtained by seeking to synthesize dia(Zn) with HCOONa at room temperature. The product was ZIF-L. (c) SEM image and (d) XRD patterns of the product obtained by seeking to synthesize dia(Zn) with $CH_3COOH$ at room temperature. The product was ZIF-L. (e) SEM image and (f) XRD patterns of the product obtained by seeking to synthesize dia(Zn) with $NH_4OH$ at room temperature. The product showed an unknown phase. (g) SEM image and (h) XRD patterns of the product obtained by seeking to synthesize dia(Zn) without a catalyst at 60 $^oC$. The product showed an unknown phase.

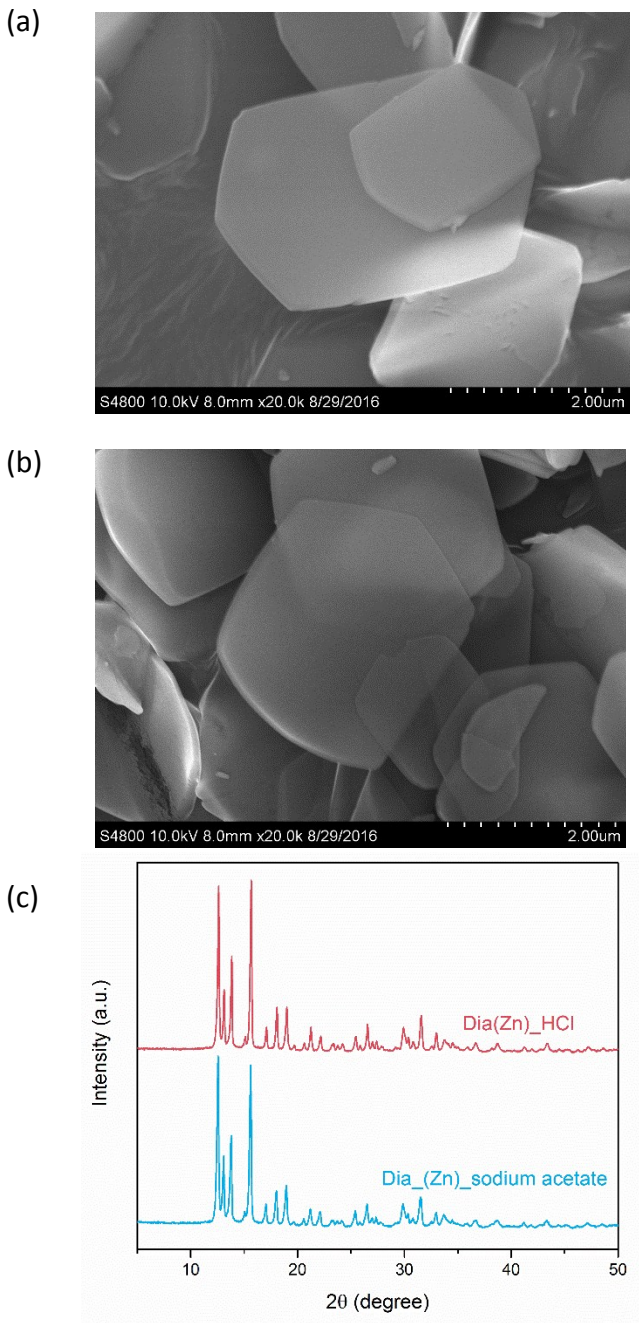


**Fig. S4** SEM images of dia(Zn) synthesized with (a) HCl and (b) $CH_3COONa$. (c) XRD patterns of dia(Zn) synthesized with HCl and $CH_3COONa$ respectively. The synthesis with $CH_3COONa$ resembled that with HCOONa (see Experimental section in the manuscript). The synthesis with HCl resembled that with $CH_3COOH$ (see Experimental section in the manuscript), and the pH values of these two batches were adjusted to be identical.

**Table S1.** BET surface area and micropore volume of samples.

| | BET Surface Area ($m^2/g$) | t-Plot micropore volume ($cm^3$ STP/g) |
|---|---|---|
| ZIF-8 | 1291 | 0.681 |
| ZIF-L | 11.7 | 0.00477 |
| dia(Zn)-HCOONa | 6.25 | 0.00113 |
| dia(Zn) -$CH_3COOH$ | 11.4 | 0.000611 |
| dia(Zn)-$NH_4OH$ | 10.4 | 0.000378 |