Supporting Information

Impact of Crystal Orientation on the Adsorption Kinetics of a Porous Coordination Polymer/Quartz Crystal Microbalance Hybrid Sensor

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S1. Effect of Temperature on Synthesis of Zn-CID-5

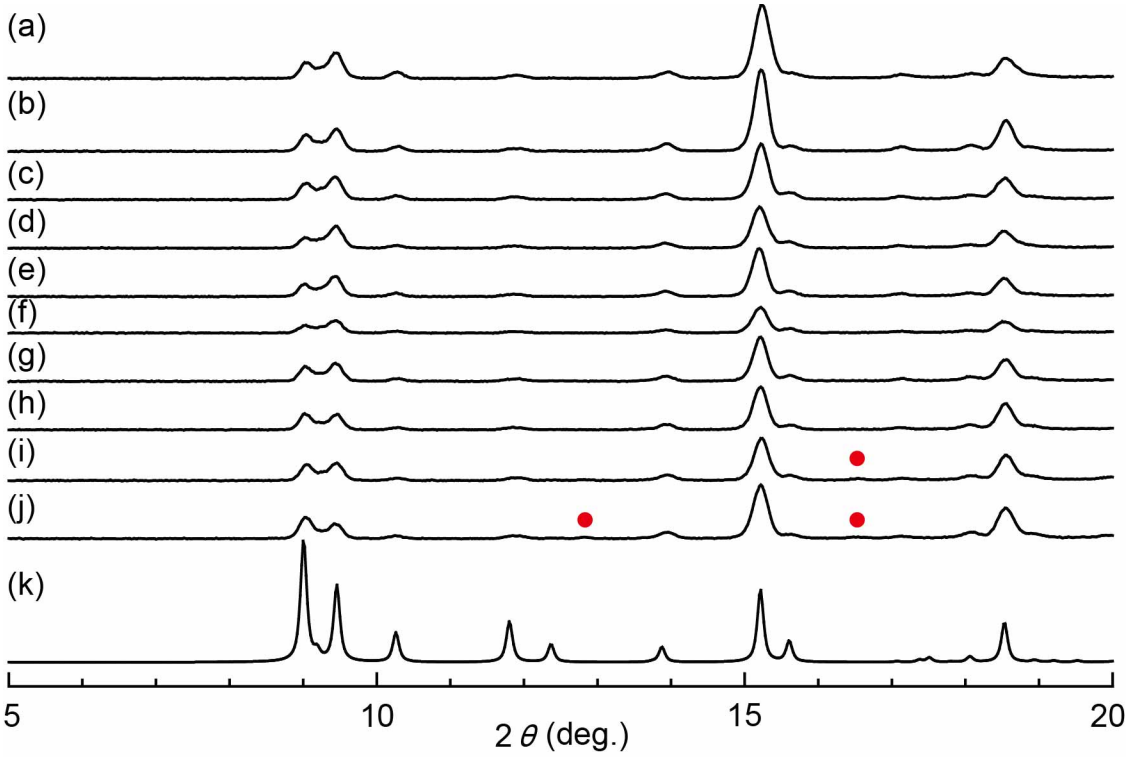

Fig. S1 XRD patterns of compounds under various temperatures: (a) 120, (b) 110, (c) 100, (d) 90, (e) 80, (f) 70, (g) 60, (h) 50, (i) 40, (j) 30 °C and simulation of **Zn-CID-5** (open form). The red circles indicate the unknown peaks**.**

S2. Effect of Temperature on the Yield of Zn-CID-5

Table S1 The yield of **Zn-CID-5** at various temperatures.

Temperature	Time	Yield		Product
30 °C	5 min	9.81 mg	-	**Zn-CID-5** + X
40 °C	5 min	17.7 mg	-	**Zn-CID-5** + X
50 °C	5 min	12.0 mg	15.0 %	**Zn-CID-5**
60 °C	5 min	11.7 mg	14.6 %	**Zn-CID-5**
70 °C	5 min	10.4 mg	13.0 %	**Zn-CID-5**
80 °C	5 min	10.2 mg	12.7 %	**Zn-CID-5**
90 °C	5 min	10.4 mg	13.0 %	**Zn-CID-5**
100 °C	5 min	17.3 mg	21.2 %	**Zn-CID-5**
110 °C	5 min	18.4 mg	23.0 %	**Zn-CID-5**
120 °C	5 min	30.2 mg	37.6 %	**Zn-CID-5**

S3. Effect of Reaction Time on Synthesis of Zn-CID-5

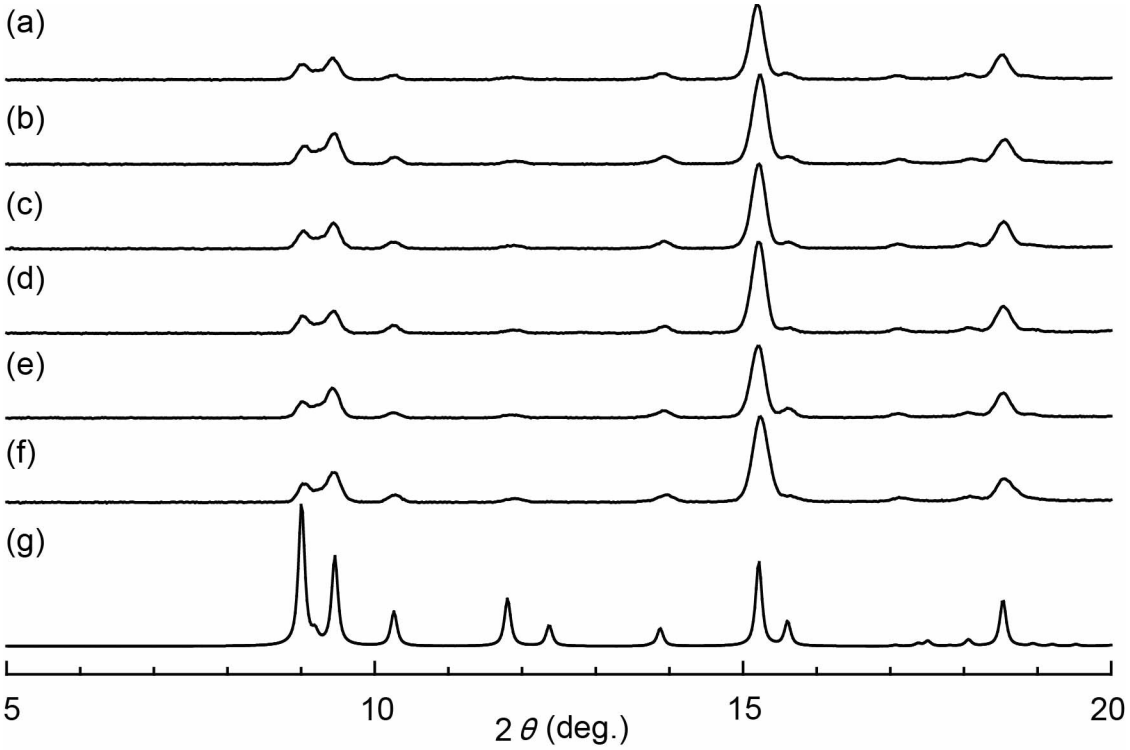

Fig. S2 XRD patterns of compounds under various reaction time: (a) 30, (b) 25, (c) 20, (d) 15, (e) 10, (f) 5 min, (g) and simulation of **Zn-CID-5** (open form).

S4. Effect of Reaction Time on the Yield of Zn-CID-5

Table S2 The yield of **Zn-CID-5** at various reaction time

Temperature	Time	Yield		Product
120 °C	5 min	30.19 mg	37.6 %	**Zn-CID-5**
120 °C	10 min	43.80 mg	54.6 %	**Zn-CID-5**
120 °C	15 min	46.23 mg	57.6 %	**Zn-CID-5**
120 °C	20 min	54.18 mg	67.5 %	**Zn-CID-5**
120 °C	25 min	55.09 mg	68.7 %	**Zn-CID-5**
120 °C	30 min	57.56 mg	71.7 %	**Zn-CID-5**

S5. Size Distribution of Zn-CID-5

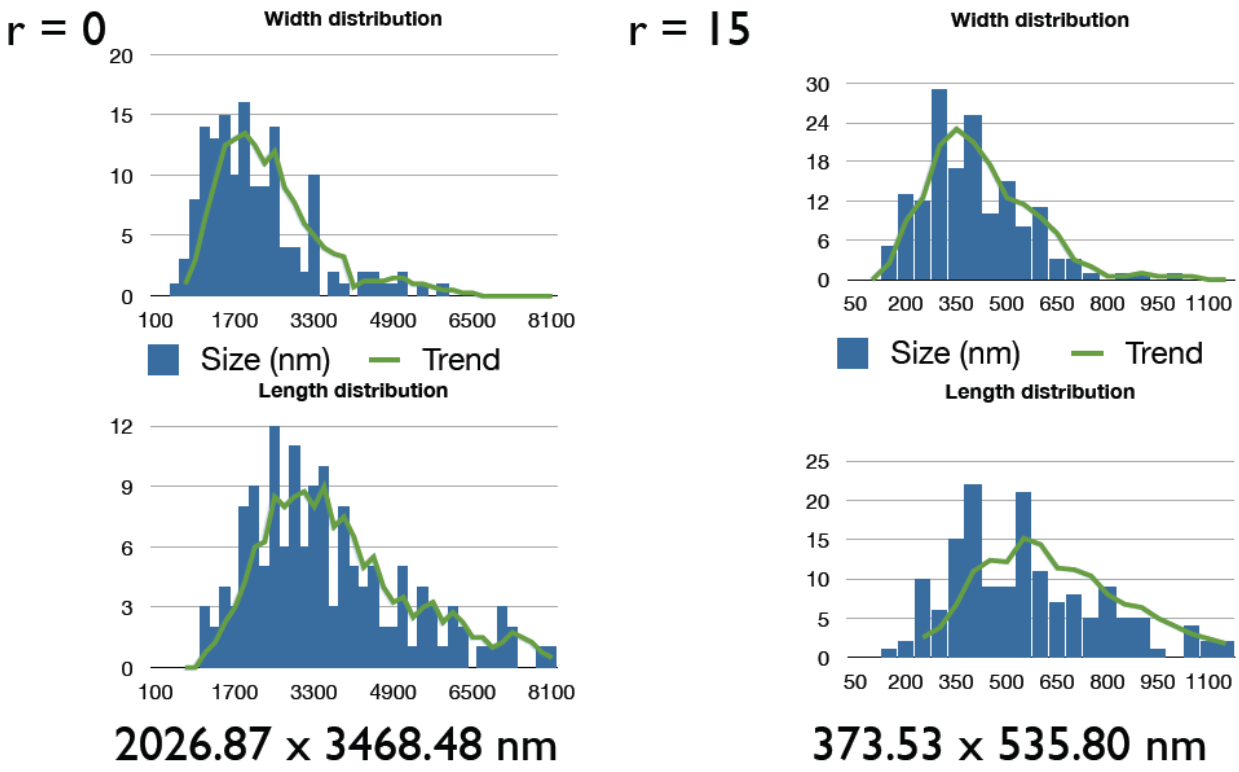

Fig. S3 Size distribution of **Zn-CID-5** obtained at r = 0 and 15.

S6. Zn-CID-5 Prepared by Coordination Modulation Method

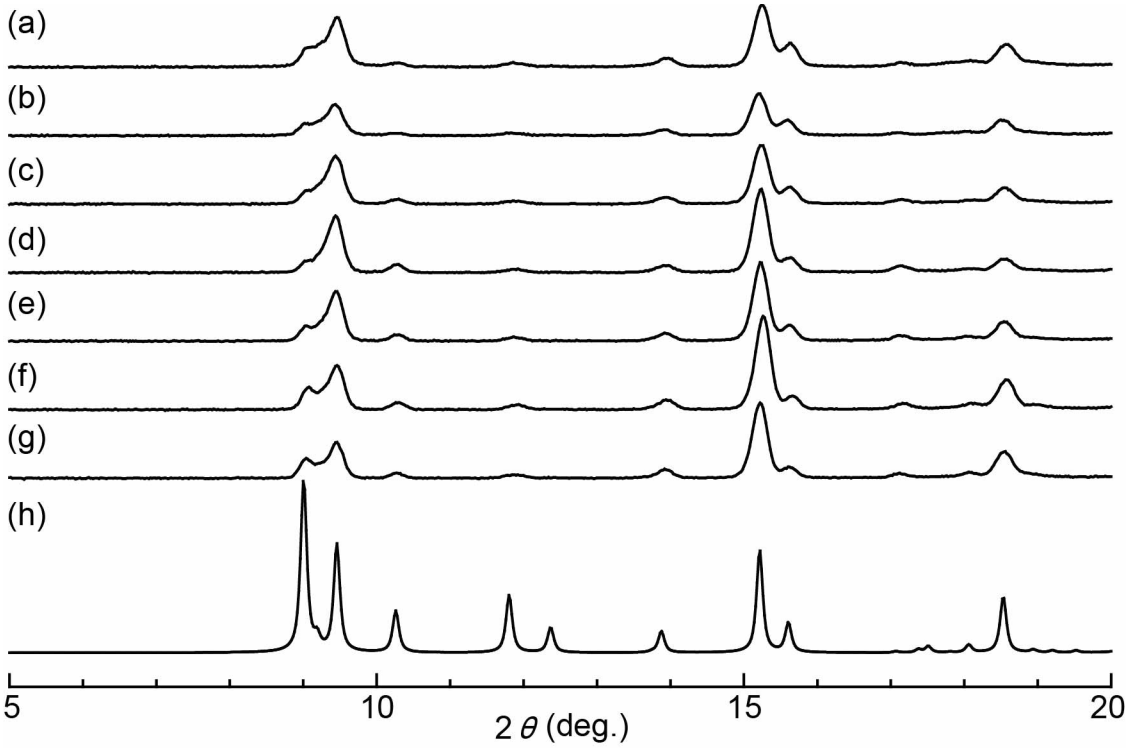

Fig. S4 XRD patterns of compounds under various reaction conditions: (a) r =15, (b) r = 12.5, (c) r = 10, (d) r = 7.5, (e) r = 5, (f) r = 1, (g) r = 0, (h) and simulation of **Zn-CID-5** (open form).

S7. Environmentally-Controlled XRD

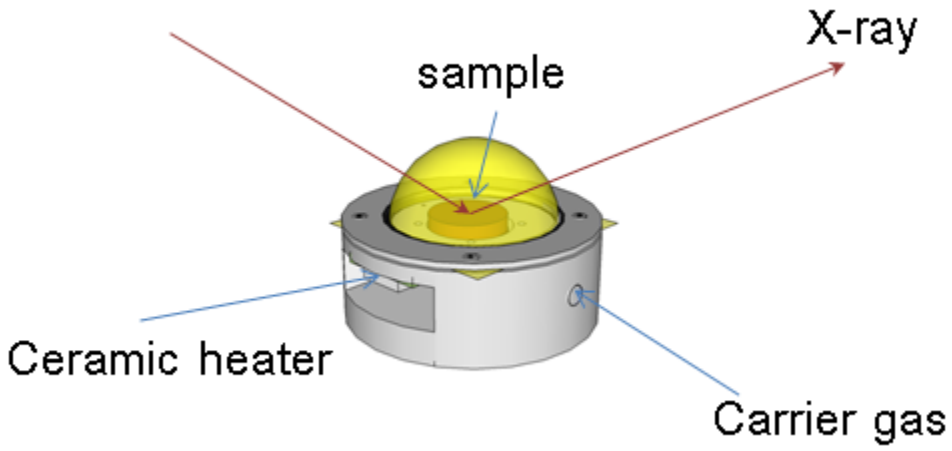

Fig. S5 Experimental apparatus of XRD measurement under methanol humidity control

S8. XRD under MeOH Atmosphere (r = 0)

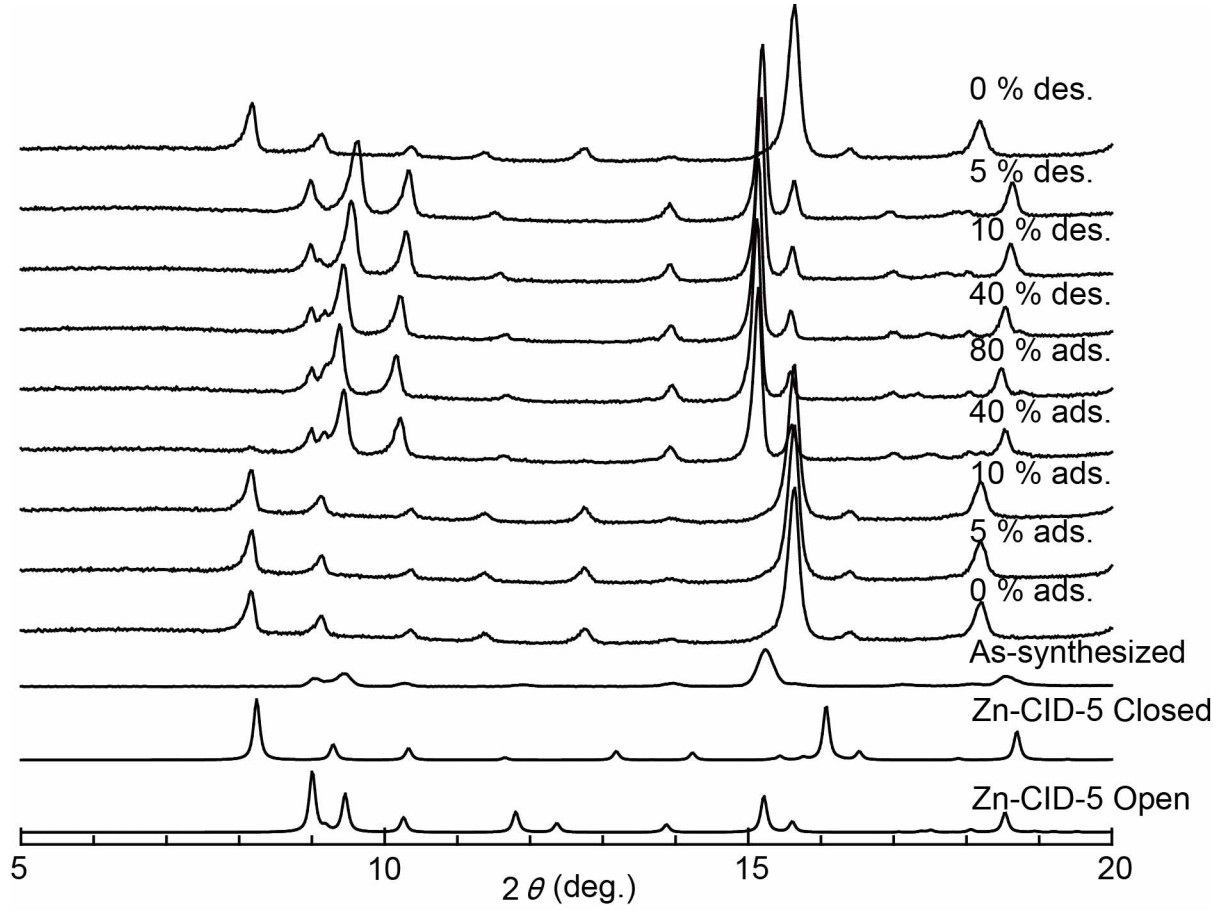

Fig. S6 XRD patterns of **Zn-CID-5** (r = 0) under various methanol humidity in adsorption and desorption process.

S9. XRD under MeOH Atmosphere (r = 15)

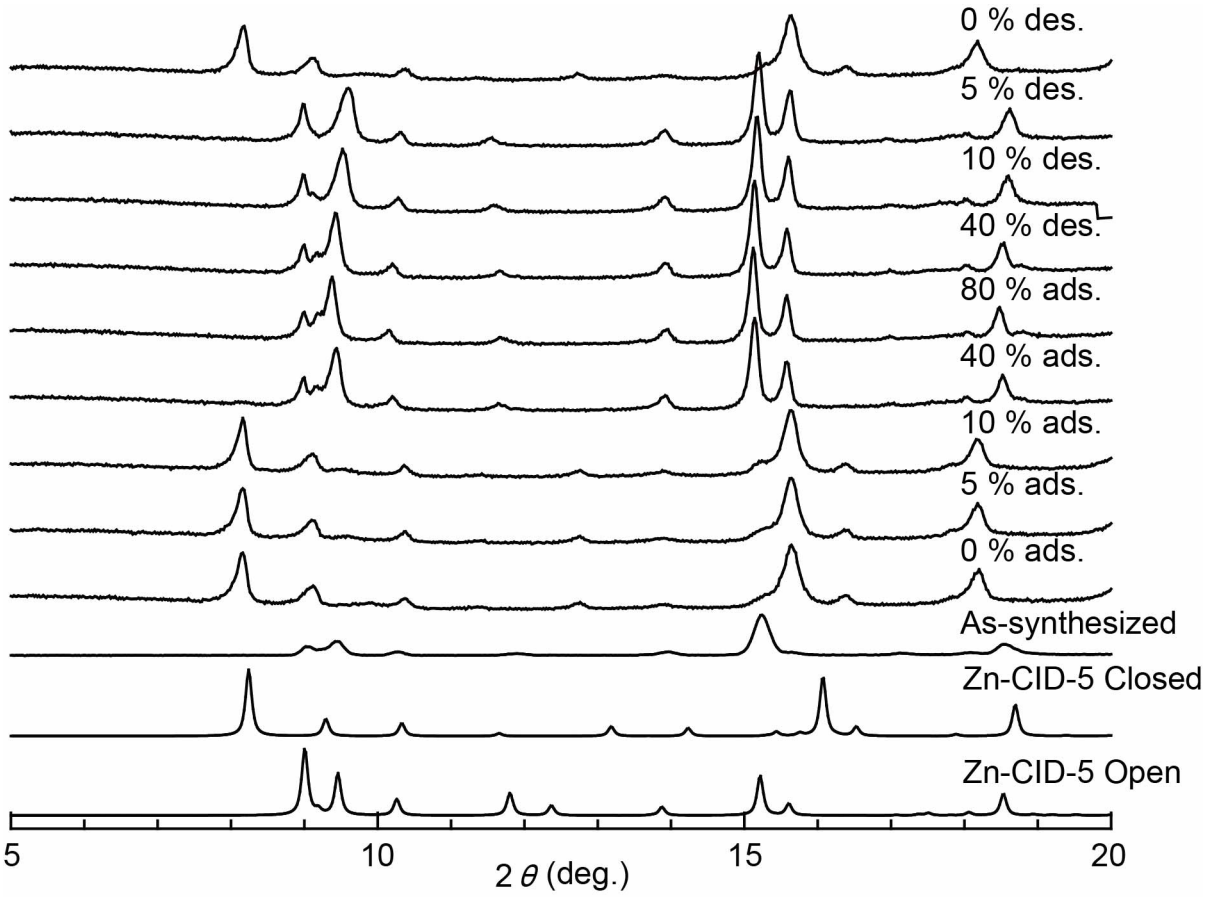

Fig. S7 XRD patterns of **Zn-CID-5** (r = 15) under various methanol humidity in adsorption and desorption process.

S10. Adsorption Isotherms for Chloroform

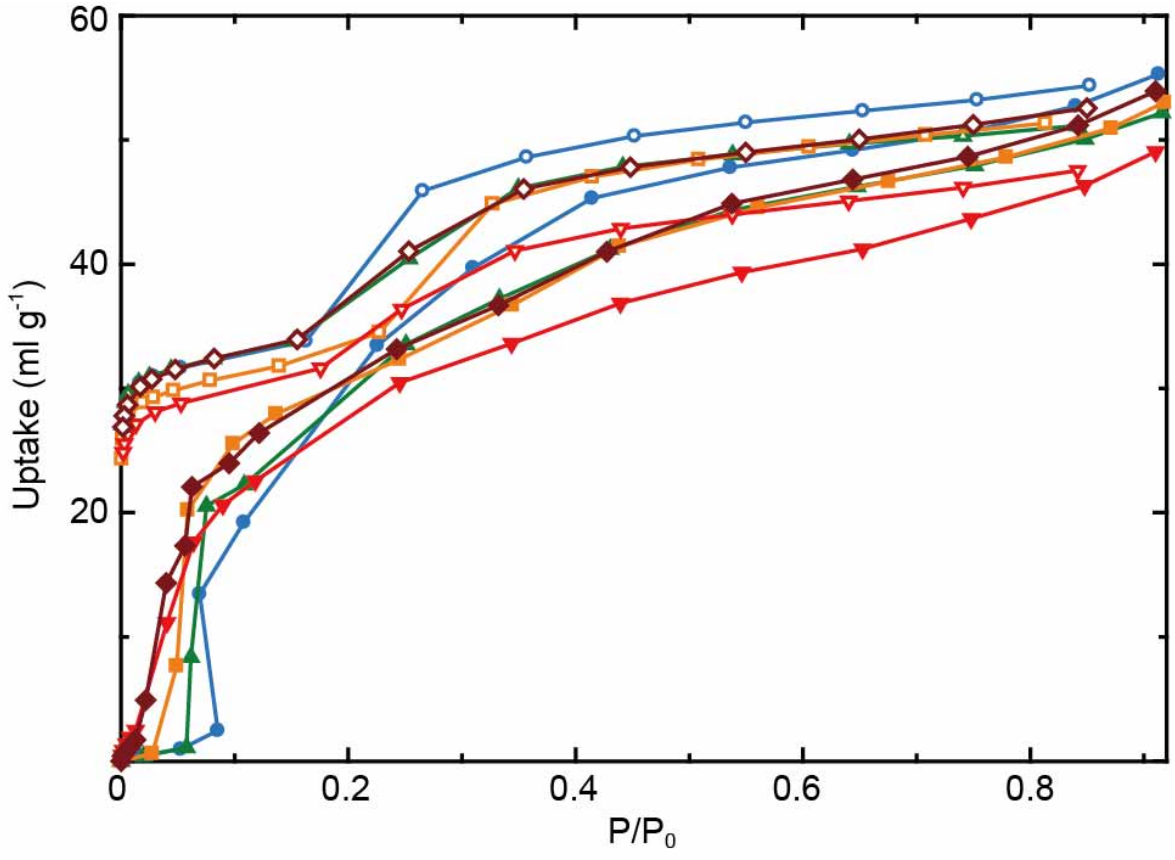

Fig. S8 Adsorption isotherms of **Zn-CID-5** obtained under various conditions for chloroform: r = 0 (blue), r = 1 (green), r = 5 (orange), r = 12.5 (brown) and r = 15 (red). Closed and open symbols show adsorption and desorption, respectively.

S11. Crystal Structure of Zn-CID-5 along 1D Sheet

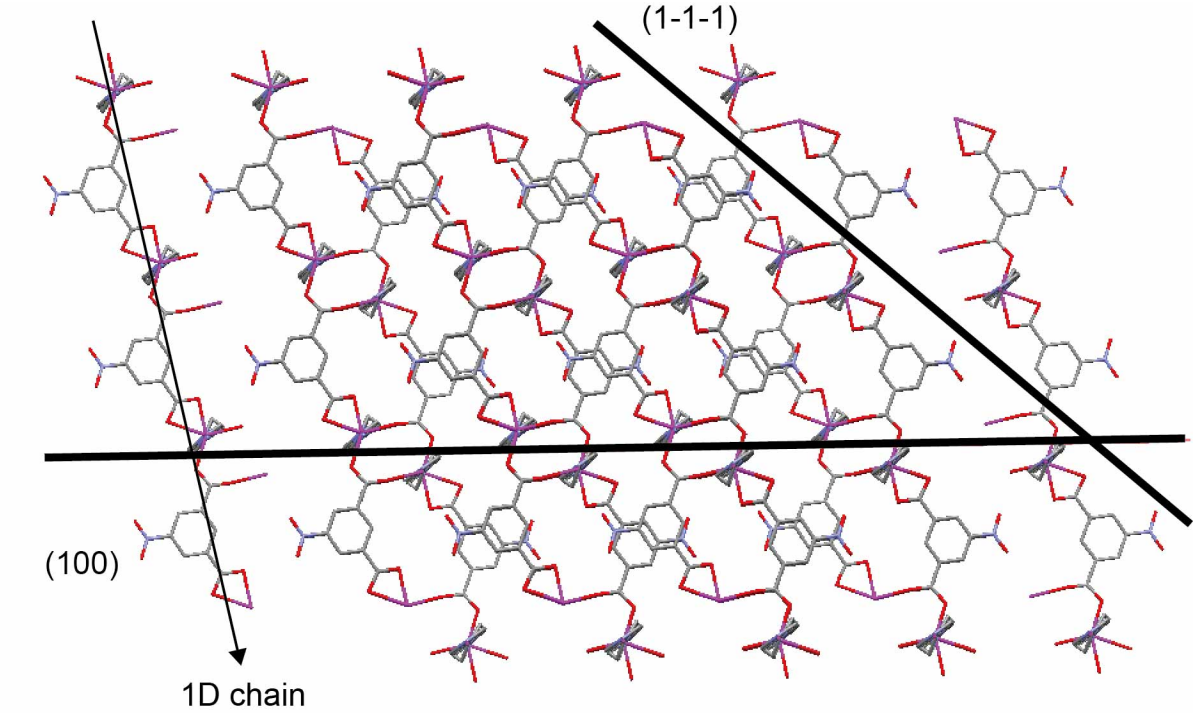

Fig. S9 The crystal structures of **Zn-CID-5** along 1D sheet. 1 D chain is nearly perpendicular to (100), but tilted to (1-1-1).

S12. Crystal Structure of Zn-CID-5 along Pillar Ligand

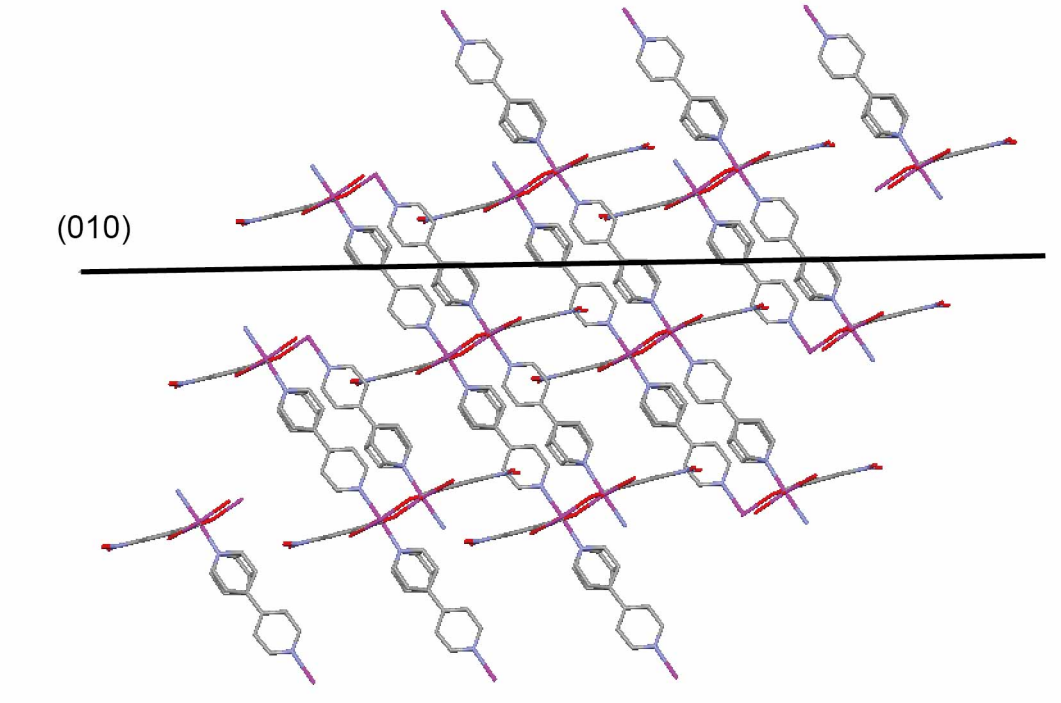

Fig. S10 The crystal structures of **Zn-CID-5** along pillar ligand.

S13. DE Model Fitting of the [100] Oriented Sample

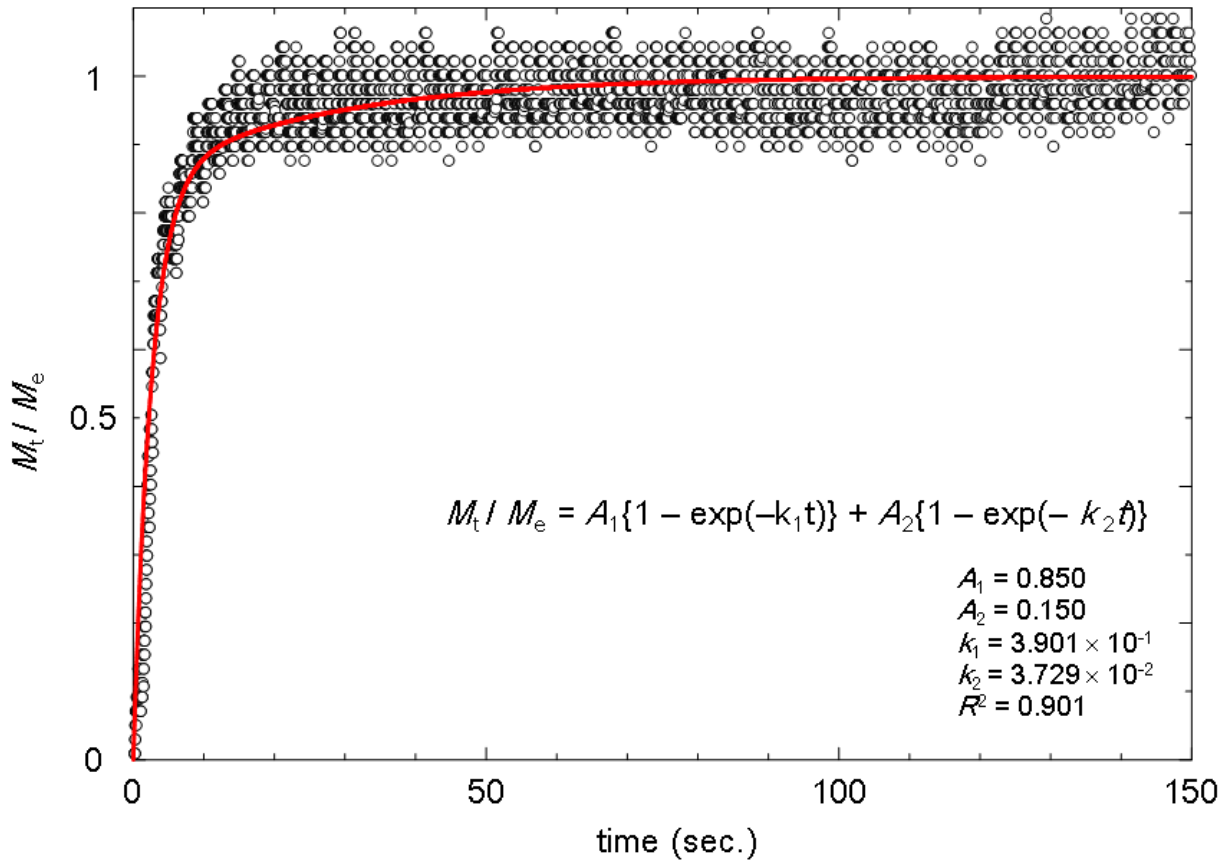

Fig. S11 Time dependent mass uptake of the [100] oriented sample at P/P_0 = 40 % for MeOH. The red line represents the fitting curve by a double exponential function.

S14. DE Model Fitting of the [1-1-1] Oriented Sample

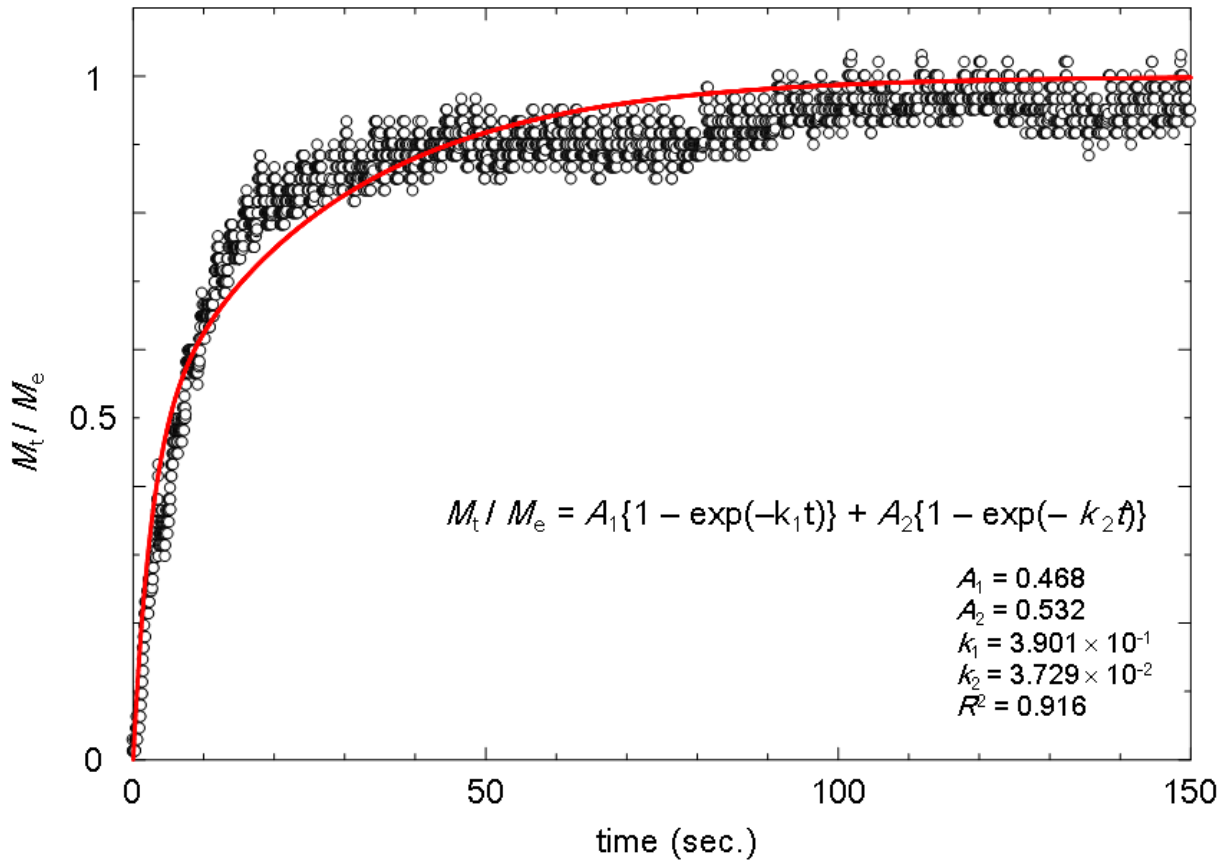

Fig. S12 Time dependent mass uptake of the [1-1-1] oriented sample at P/P_0 = 40 % for MeOH. The red line represents the fitting curve by a double exponential function.

S15. DE Model Fitting of the Non-Oriented Sample

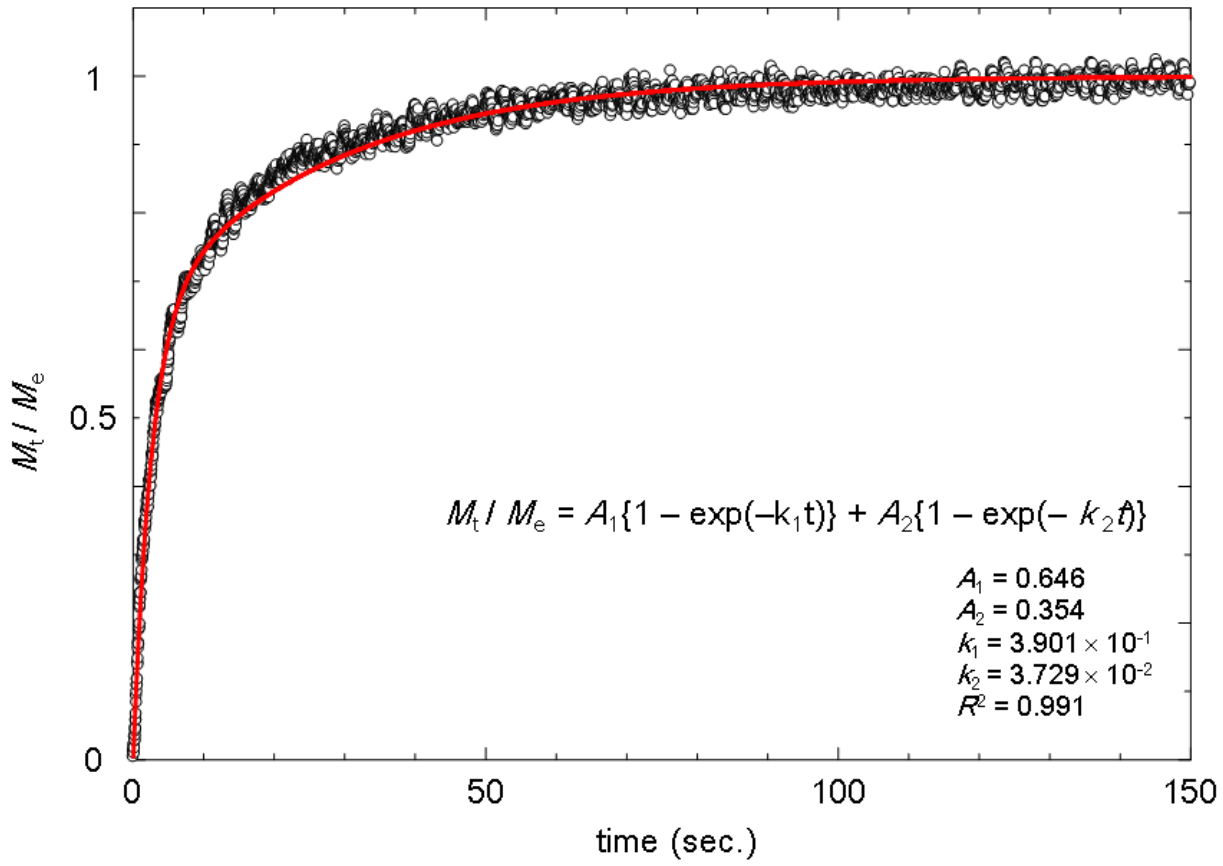

Fig. S13 Time dependent mass uptake of the non-oriented sample at P/P_0 = 40 % for MeOH. The red line represents the fitting curve by a double exponential function.

S16. DE Model Fitting of the [010] Oriented Sample

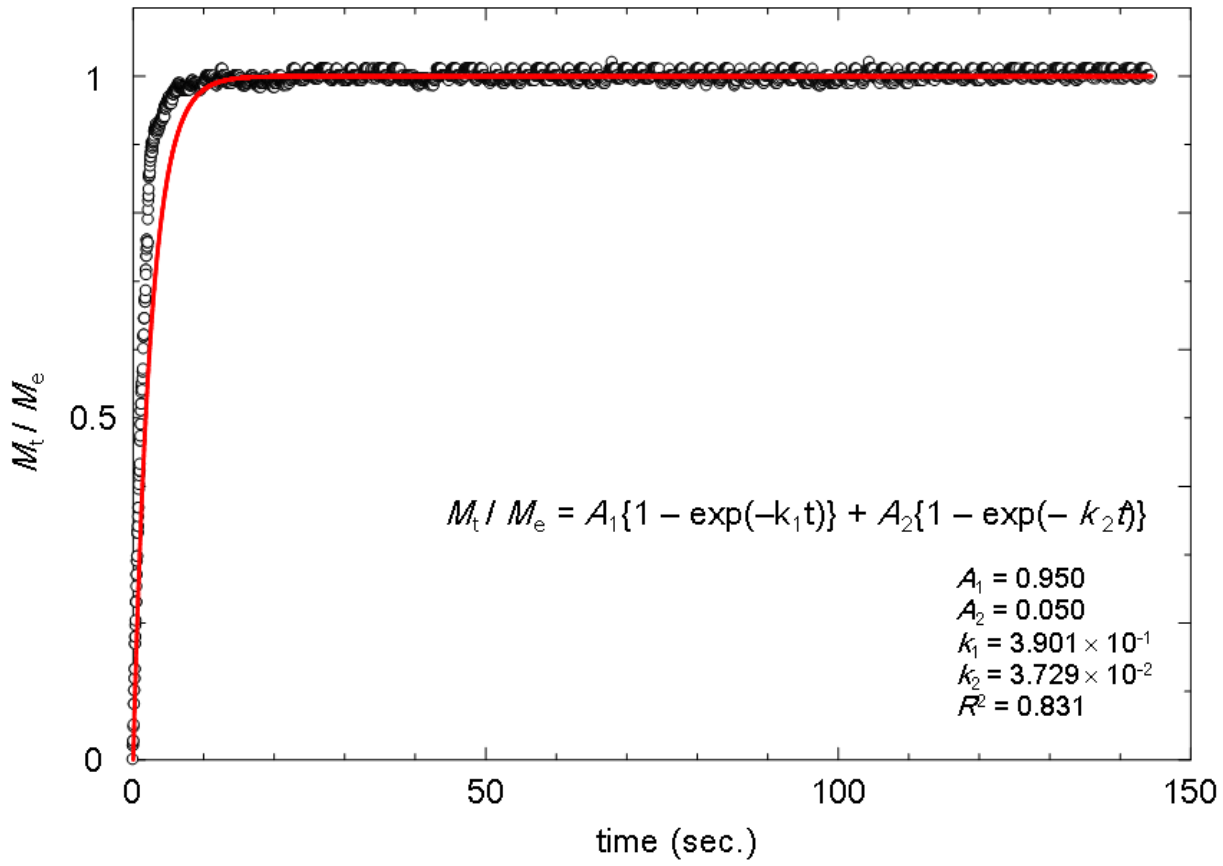

Fig. S14 Time dependent mass uptake of the [010] oriented sample at P/P_0 = 40 % for MeOH. The red line represents the fitting curve by a double exponential function.