Electronic Supplementary information

for

Water-Based Synthesis of Zeolitic Imidazolate Framework-8 for CO_2 Capture

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Table S1 Synthesize ZIF-8 with different metal resources

Sample	Zinc source	H_2O/ Hmim	Temperature /℃	Time /min	pH
A1	$Zn(NO_3)_2·6H_2O$	15：1	25	5	11.4
B1	$Zn(OAc)_2·2H_2O$	15：1	25	5	11.4
C1	$ZnSO_4·7H_2O$	15：1	25	5	11.4
D1	$ZnCl_2$	15：1	25	5	11.4

Table S2 Synthesize ZIF-8 with different pH value

Sample	pH	H_2O/ Hmim	Temperature /℃	Time /min	Zinc source
A2	11.4	15：1	25	5	$Zn(NO_3)_2·6H_2O$
B2	13.2	15：1	25	5	$Zn(NO_3)_2·6H_2O$
C2	12.5	15：1	25	5	$Zn(NO_3)_2·6H_2O$
D2	10.1	15：1	25	5	$Zn(NO_3)_2·6H_2O$
E2	9.4	15：1	25	5	$Zn(NO_3)_2·6H_2O$
F2	11.1	15：1	25	5	$Zn(NO_3)_2·6H_2O$
G2	11.9	15：1	25	5	$Zn(NO_3)_2·6H_2O$

Table S3 Synthesize ZIF-8 with different temperature

Sample	Temperature /℃	H_2O/ Hmim	Time /min	pH	Zinc source
A3	25	15：1	5	11.4	$Zn(NO_3)_2·6H_2O$
B3	45	15：1	5	11.4	$Zn(NO_3)_2·6H_2O$
C3	65	15：1	5	11.4	$Zn(NO_3)_2·6H_2O$
D3	85	15：1	5	11.4	$Zn(NO_3)_2·6H_2O$
E3	95	15：1	5	11.4	$Zn(NO_3)_2·6H_2O$

Table S4 Synthesize ZIF-8 with different reaction time

Sample	Time /min	H_2O/ Hmim	Temperature /℃	pH	Zinc source
A4	5	15：1	25	11.4	$Zn(NO_3)_2·6H_2O$
B4	10	15：1	25	11.4	$Zn(NO_3)_2·6H_2O$
C4	30	15：1	25	11.4	$Zn(NO_3)_2·6H_2O$
D4	60	15：1	25	11.4	$Zn(NO_3)_2·6H_2O$
E4	360	15：1	25	11.4	$Zn(NO_3)_2·6H_2O$
F4	720	15：1	25	11.4	$Zn(NO_3)_2·6H_2O$
G4	1440	15：1	25	11.4	$Zn(NO_3)_2·6H_2O$

Table S5 Synthesize ZIF-8 with different molar ratio of Zn/Hmm/H_2O

Sample	H_2O/ Hmim	Temperature /℃	Time /min	pH	Zinc source
A5	15：1	25	5	11.4	$Zn(NO_3)_2·6H_2O$
B5	25：1	25	5	11.4	$Zn(NO_3)_2·6H_2O$
C5	40：1	25	5	11.4	$Zn(NO_3)_2·6H_2O$
D5	50：1	25	5	11.4	$Zn(NO_3)_2·6H_2O$
E5	100：1	25	5	11.4	$Zn(NO_3)_2·6H_2O$

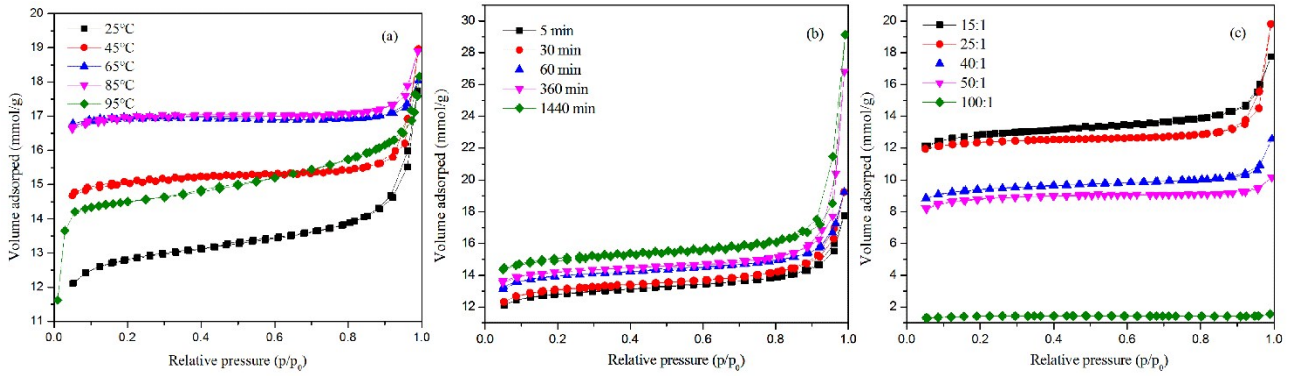

Figure. S1. BET of ZIF-8 synthesized under different reaction condition: a) temperature: 25℃, 45℃, 65℃, 85℃, 95℃; b) time: 5 min, 30 min, 60 min, 360 min, 1440 min; c) the concentration of water in the ligand (H_2O / Hmim).

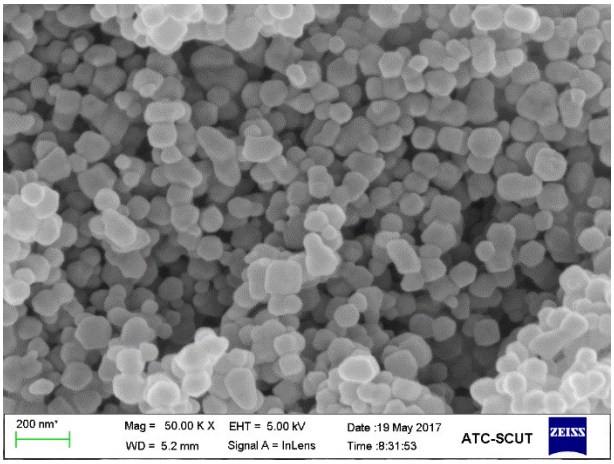

Figure. S2 SEM images of ZIF-8 synthesized 95 °C

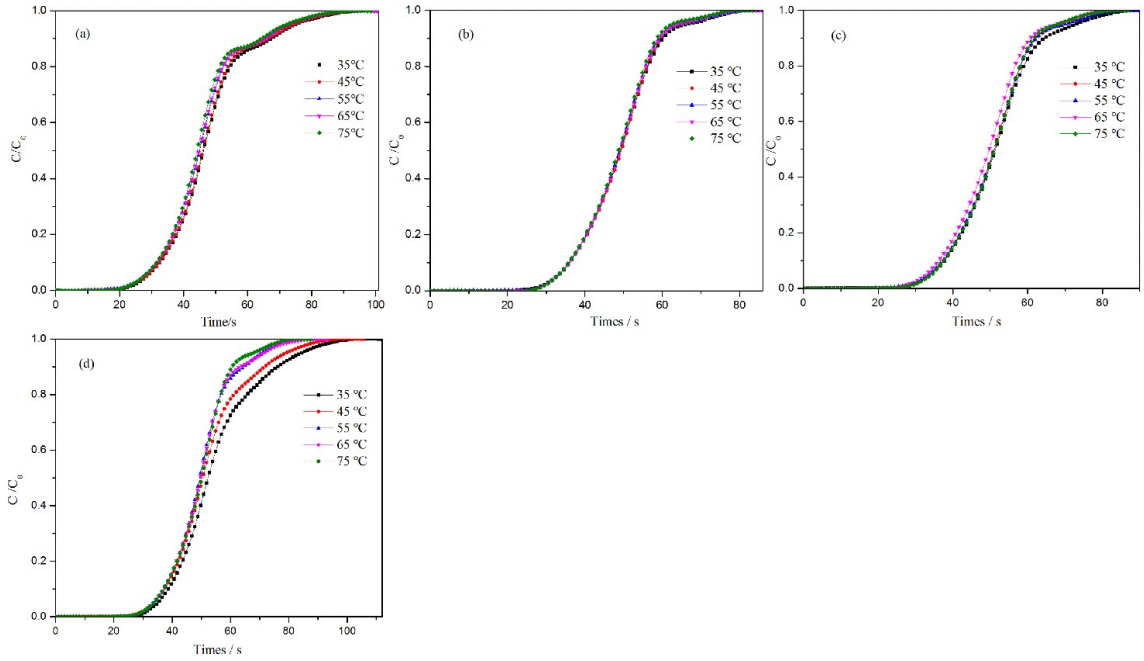

Figure. S3. Breakthrough curves from 35 °C to 75 °C of ZIF-8 synthesized under different temperature (a: 45 °C, b: 65 °C, c: 85 °C, d: 95 °C).

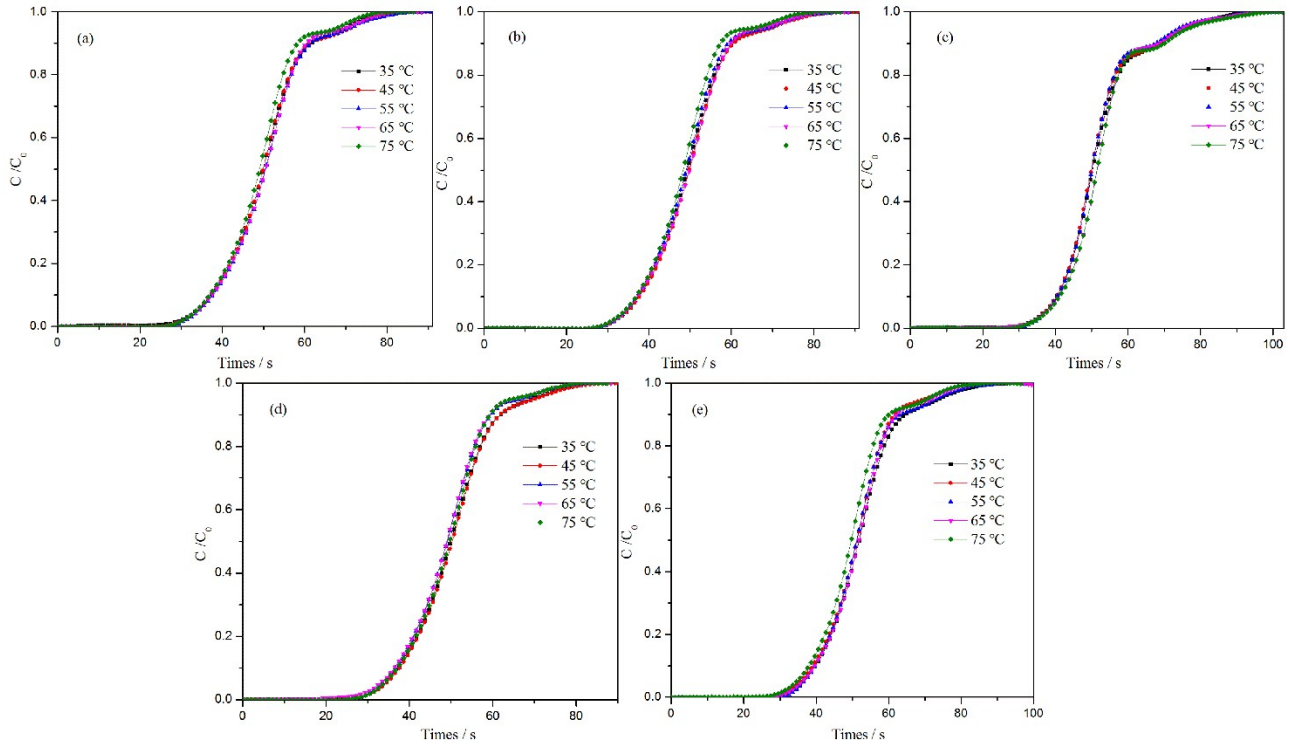

Figure. S4. Breakthrough curves from 35 °C to 75 °C of ZIF-8 synthesized with different time (a: 5 min, b: 30 min, c: 60 min, d: 360 min, e: 1440 min).

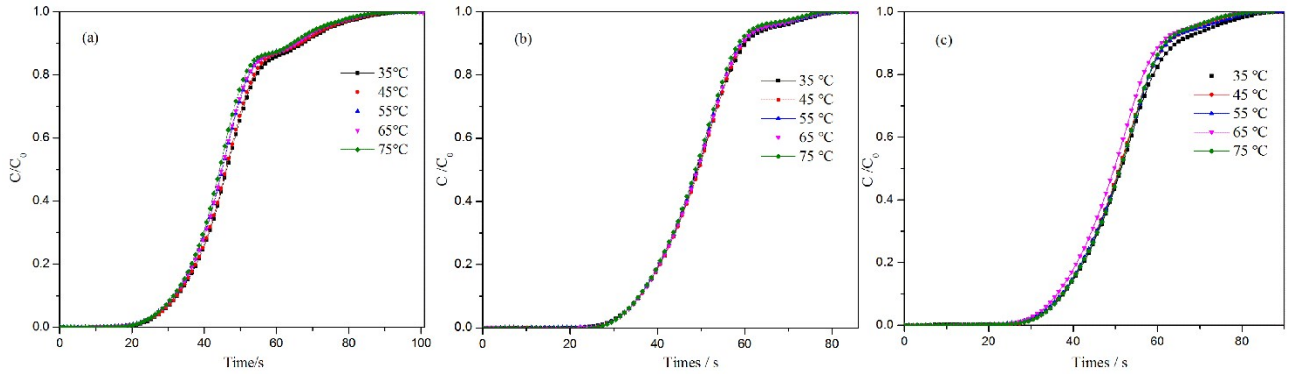

Figure. S5. Breakthrough curves from 35 °C to 75 °C of ZIF-8 synthesized with different concentration of water in the ligand (H_2O / Hmim) (a. 15:1, b. 40:1, c. 50:1).