

Supporting information

## Understanding of the dissolution-crystallization fabrication strategy towards macro/microporous ZSM-5 single crystals

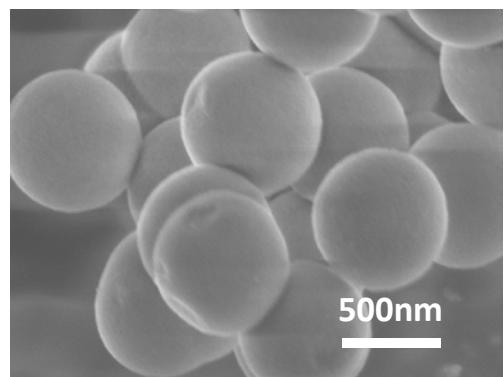
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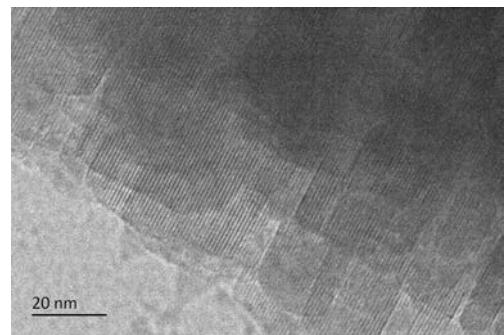
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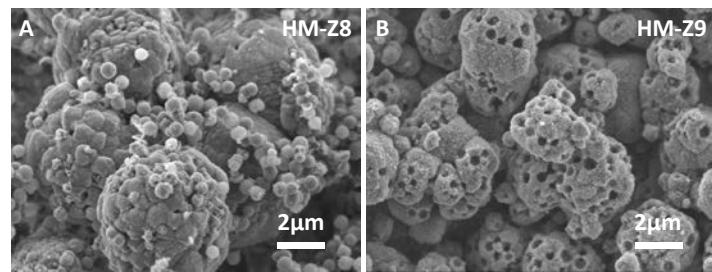
Email: [hongchenquo@dlut.edu.cn](mailto:hongchenquo@dlut.edu.cn), [xulei808@dicp.ac.cn](mailto:xulei808@dicp.ac.cn)



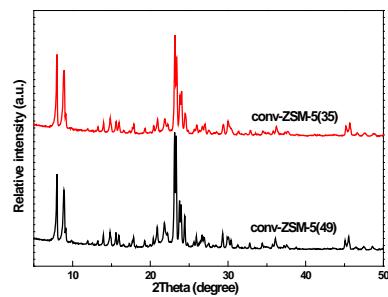
**Figure S1.** SEM image of MASS.



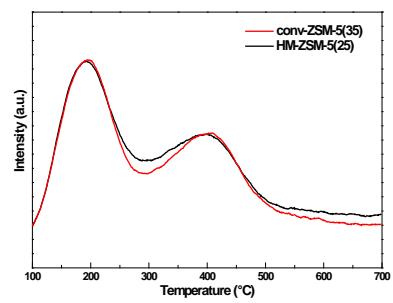
**Figure S2.** High-resolution TEM (HRTEM) image of HM-ZSM-5(50).



**Figure S3.** SEM images of samples produced with theoretical Si/Al ratios of 25 (A) and 150 (B) with OH<sup>-</sup>/SiO<sub>2</sub> ratio of 0.155 and crystallization temperature of 383 K.



**Figure S4.** XRD patterns of the conventional microporous samples conv-ZSM-5(49) and conv-ZSM-5(35).



**Figure S5.** NH<sub>3</sub> temperature-programmed desorption profiles of hierarchically macro/microporous sample HM-ZSM-5(25) and conventional microporous sample conv-ZSM-5(35).

**Table S1.** Compositions of synthesis mixtures and synthesis conditions of the ZSM-5 samples

Sample	Starting gel composition			Crystallization temperature/K
	OH <sup>-</sup> /SiO <sub>2</sub>	Si/Al	TPA <sup>+</sup> /SiO <sub>2</sub>	
HM-ZSM-5(50)	0.155	50	0.18	383
HM-Z1	0.08	50	0.18	383
HM-Z2	0.13	50	0.18	383
HM-Z3	0.20	50	0.18	383
HM-Z4	0.155	50	0.18	403
HM-Z5	0.155	50	0.18	423
HM-Z6	0.155	50	0.21	423
HM-Z7	0.155	50	0.25	423
HM-Z8	0.155	25	0.18	383
HM-Z9	0.155	150	0.18	383
HM-ZSM-5(25)	0.20	25	0.18	383
HM-ZSM-5(150)	0.15	150	0.18	383

**Table S2.** Textural and acidic properties of the samples

Sample	Surface area ( $\text{m}^2 \text{ g}^{-1}$ )		Pore volume		Acidity by		
	$S_{\text{BET}}^{\text{a}}$	$S_{\text{micro}}^{\text{b}}$	$S_{\text{ext}}^{\text{b}}$	$V_{\text{mic}}^{\text{b}}$	$V_{\text{total}}^{\text{c}}$	Weak <sup>d</sup>	Strong <sup>d</sup>
HM-ZSM-5(25) <sup>[1]</sup>	380	285	95	0.13	0.23	342	229
HM-ZSM-5(50) <sup>[1]</sup>	359	238	121	0.11	0.20	216	165
HM-ZSM-5(150) <sup>[1]</sup>	355	233	122	0.11	0.20	69	73
conv-ZSM-5(35)	325	275	50	0.13	0.17	339	247

<sup>a</sup> Surface area determined by BET method.

<sup>b</sup> Micropore and external surface areas and micropore volumes determined by *t*-plot method.

<sup>c</sup> Total pore volume at  $p/p_0 = 0.99$ .

<sup>d</sup> The quantities of weak an strong acid sites determined by NH<sub>3</sub>-TPD profiles.

[1] Zhang Y, Lu P, Yuan Y, et al. One pot synthesis of hierarchically macro/microporous ZSM-5 single crystals . CrystEngComm . 2017 , 19(32):4713-4719.