

## Supporting information

### **Synthesis of hierarchical beta zeolite by using a bifunctional cationic polymer and the improved catalytic performance**

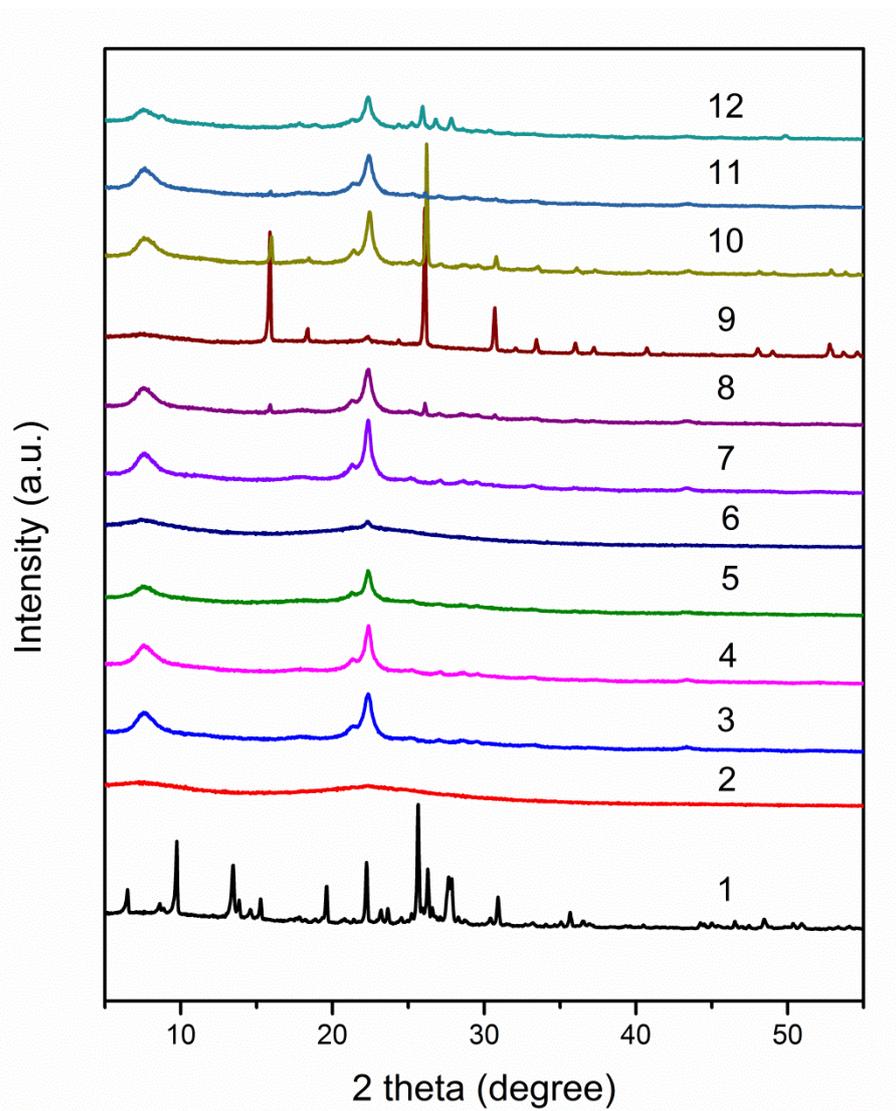
**Yangyang Yuan,<sup>a,b</sup> Peng Tian,<sup>a</sup> Miao Yang,<sup>a</sup> Dong Fan,<sup>a,b</sup> Linying Wang,<sup>a</sup> Shutao Xu,<sup>a</sup> Chan Wang,<sup>a,b</sup> Dehua Wang,<sup>a,b</sup> Yue Yang,<sup>a</sup> Zhongmin Liu<sup>\*a</sup>**

*<sup>a</sup> National Engineering Laboratory for Methanol to Olefins, Dalian National Laboratory for Clean Energy, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian 116023, P. R. China;*

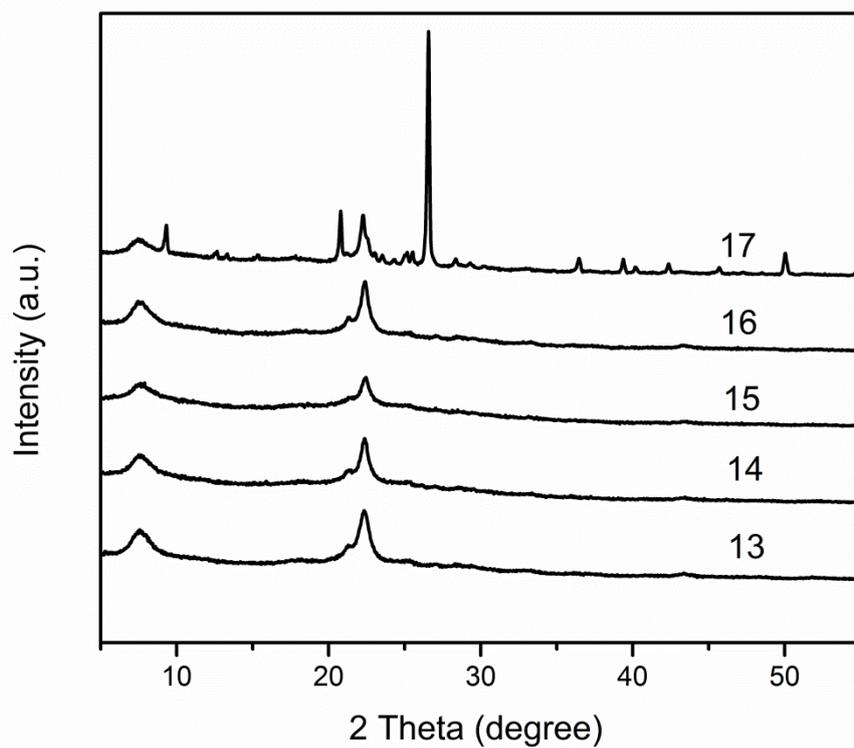
*\* E-mail: liuzm@dicp.ac.cn*

*<sup>b</sup> University of Chinese Academy of Sciences, Beijing, P. R. China*

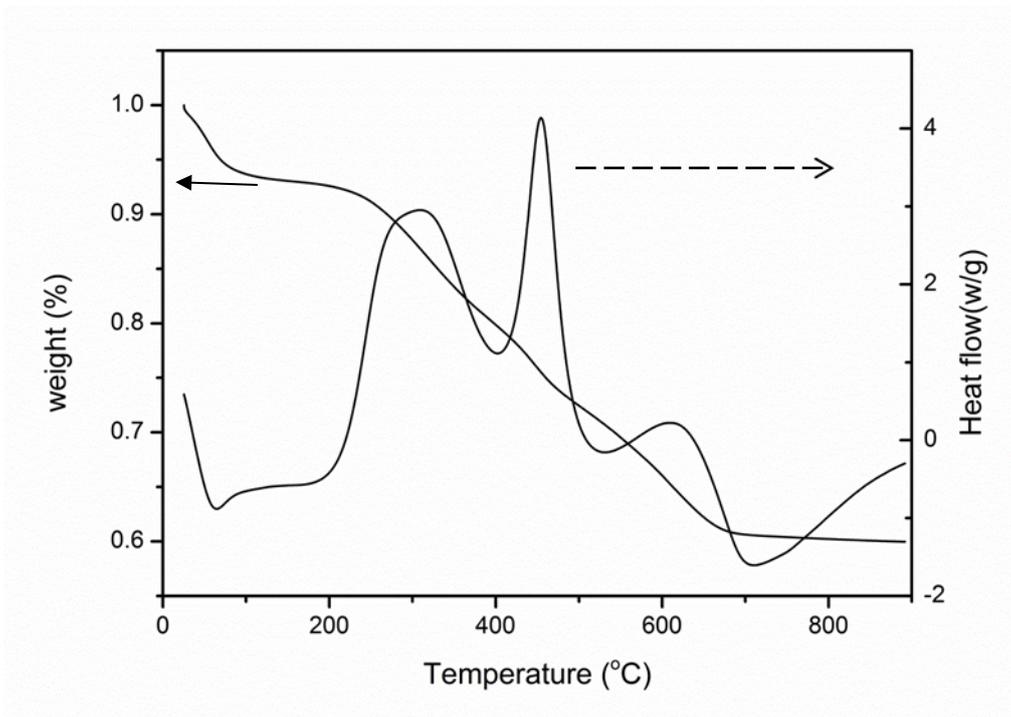
Submitted to *RSC advances*



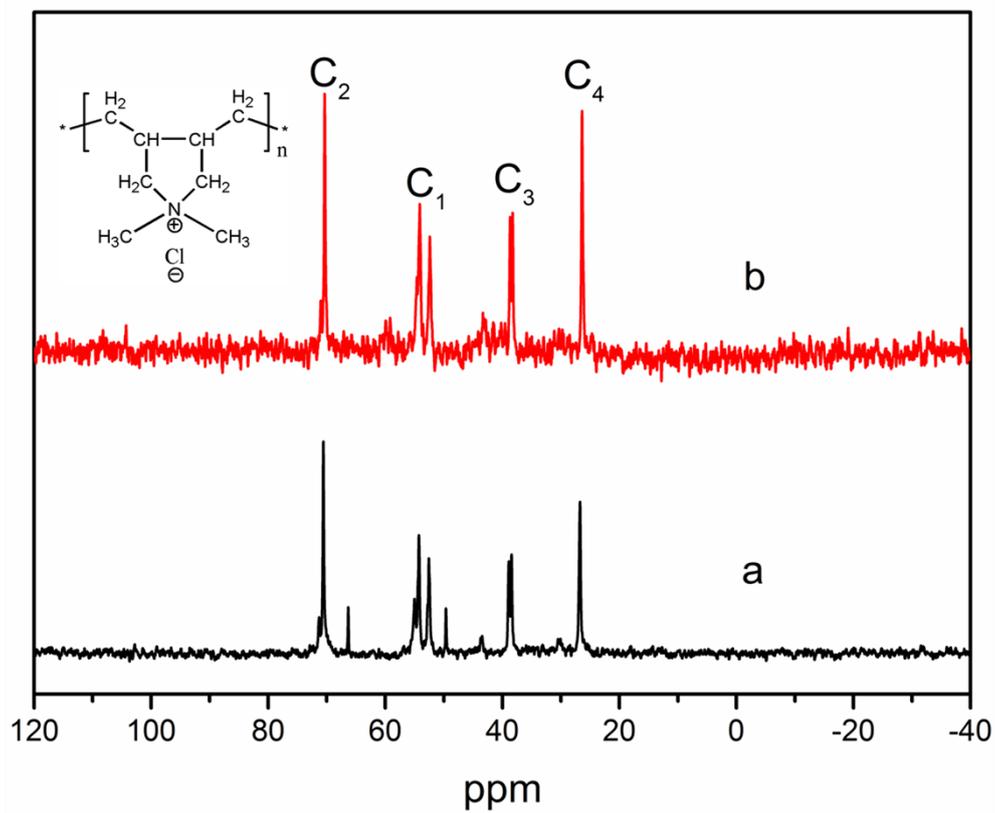
**Fig . S1** XRD patterns of the as-synthesized samples obtained under static condition. The number shown in the figure refers to the sample name given in Table 1.



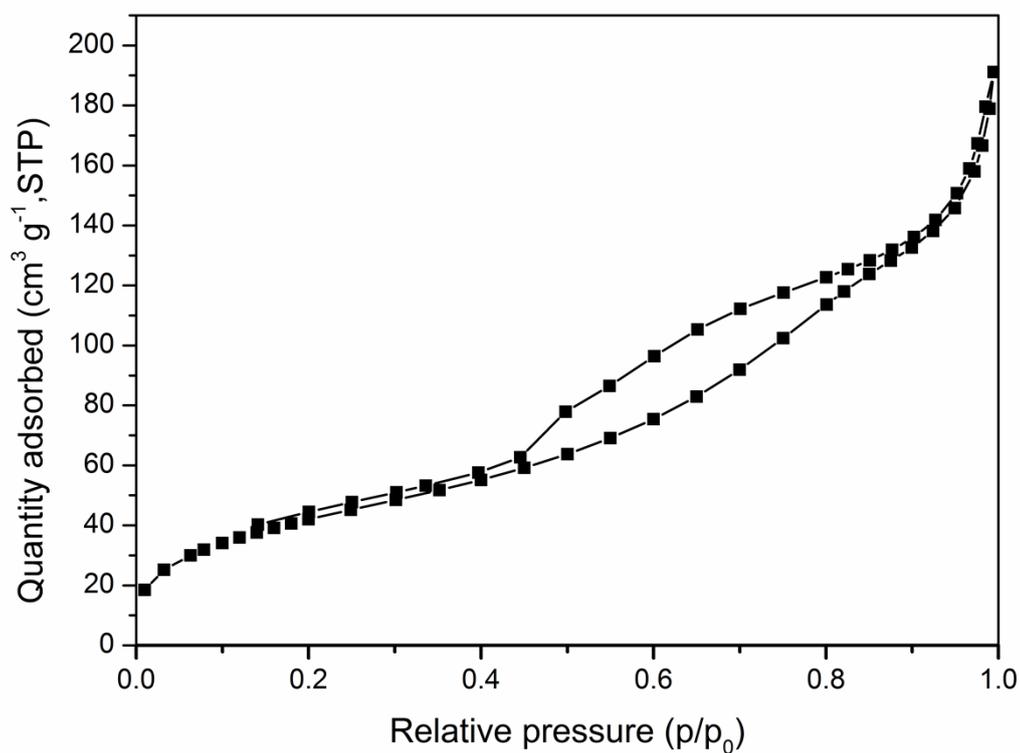
**Fig . S2** XRD patterns of the as-synthesized samples obtained by the assistance of seeds under rotational condition. The number shown in the figure refers to the sample name given in Table 2.



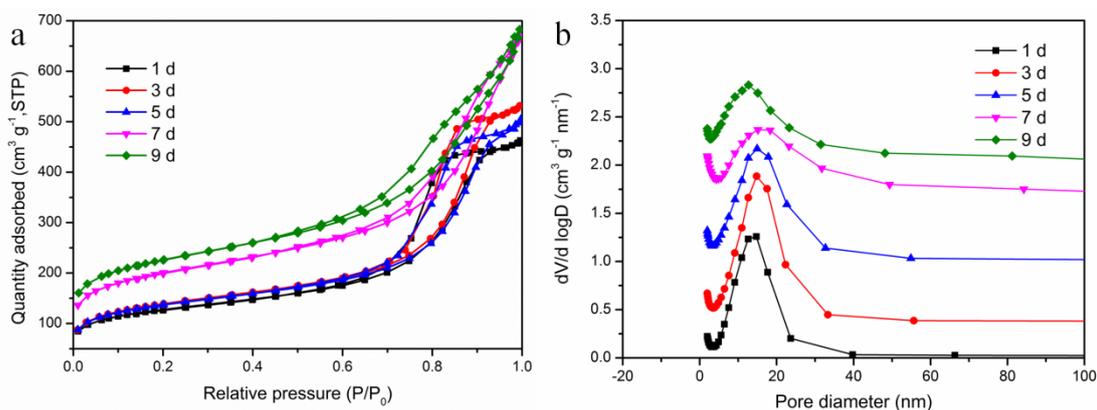
**Fig. S3** Thermogravimetric (TG) and differential scanning calorimetry (DSC) curves of the as-synthesized sample 3.



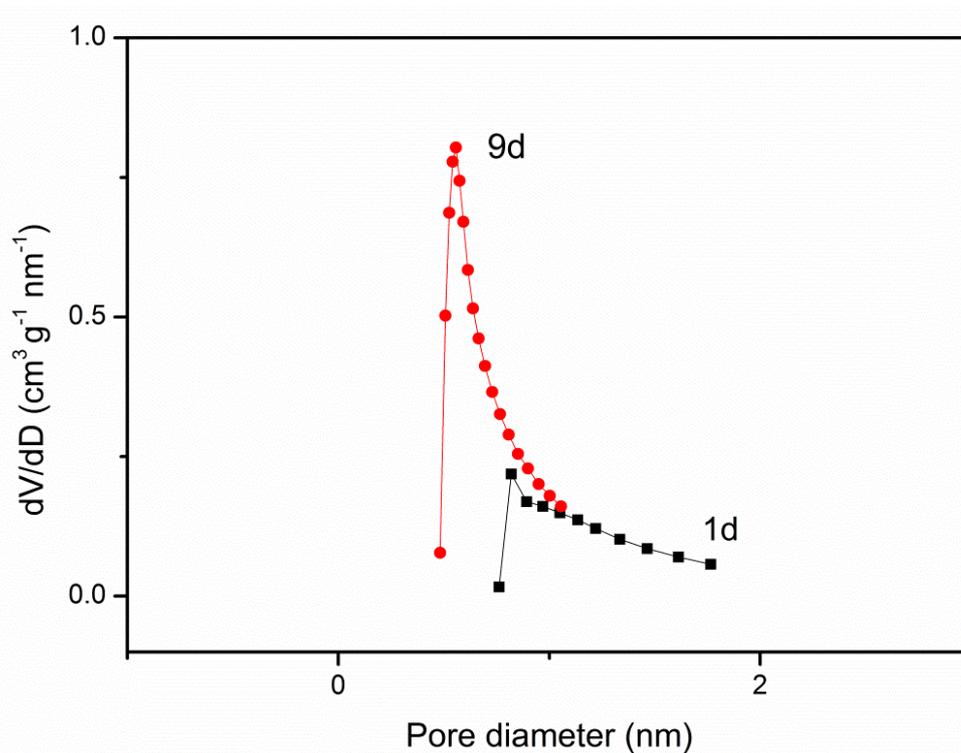
**Fig. S4**  $^{13}\text{C}$  NMR spectra of PDADMA solution (a) and the liquid by dissolving the as-synthesized beta product in HF solution (b).



**Fig. S5** N<sub>2</sub> adsorption-desorption isotherms of the as-synthesized beta (sample 13 was degassed at 160 °C under vacuum for 10 h prior to the measurement).



**Fig. S6** N<sub>2</sub> adsorption-desorption isotherms (a) and pore size distribution curves (b) of the samples crystallized for different times (The initial gel has the same molar composition as that of sample 3).



**Fig. S7** Micropore size distribution curves of the samples crystallized for 1d and 9d (The initial gel has the same molar composition as that of sample 3).