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小晶粒 ZSM-5 沸石的绿色、经济性合成

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Green and Cost-Effective Preparation of Small-Sized ZSM-5

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Preparation of the reference sample (Ref-Z5)

Molar composition of SiO_2: $^1/_{120}$ Al_2O_3: 0.05Na_2O: 0.05TEABr: 30H_2O: 0.75% of seed was used for the preparation of the Ref-Z5.

Water glass (SiO_2, 27.10% (*w*); Na_2O, 8.39% (*w*)) and $Al_2(SO_4)_3 \cdot 18H_2O$(≥ 99.0% (*w*)) were used as silica and aluminum source, respectively. H_2SO_4 (98% (*w*)) was used to adjust the OH^-/SiO_2 ratio. Tetraethylammonuim bromide (TEABr, 98% (*w*)) was used as template H_2SO_4 to adjust the OH^-/SiO_2 ratio. $Al_2(SO_4)_3$ and H_2SO_4 solution was dropped into water glass under vigorous stirring. Active seeds and template were added and then the mixtures were transferred into teflon-lined stainless steel autoclaves and heated at 175 °C for 24 h. The product was separated by filtration, washed, dried at 100 °C and calcined at 550 °C for 6 h to remove the template. The sample was then ion-exchanged in aqueous solution of NH_4NO_3 (1.0 $mol \cdot L^{-1}$) at 80 °C for 2 h and the H-form Ref-Z5 was obtained after calcination at 550 °C for 6 h.

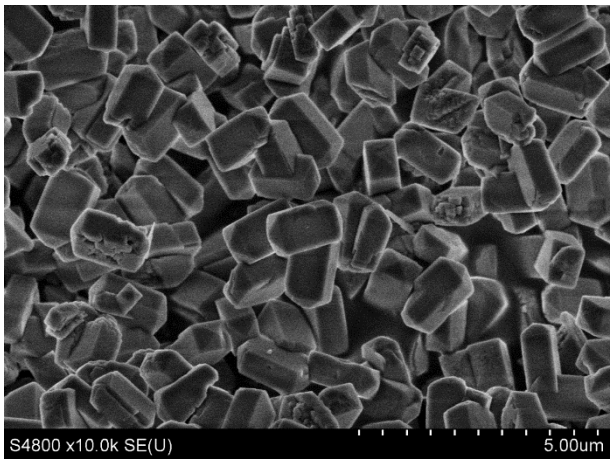

Fig. S1 SEM image of Ref-Z5.

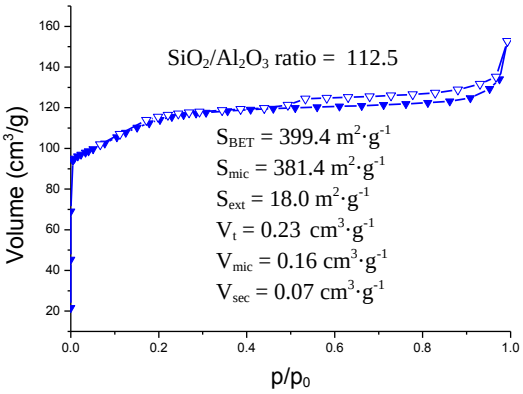

Fig. S2 Nitrogen adsorption-desorption isotherm at −196 °C and textural properties of Ref-Z5.

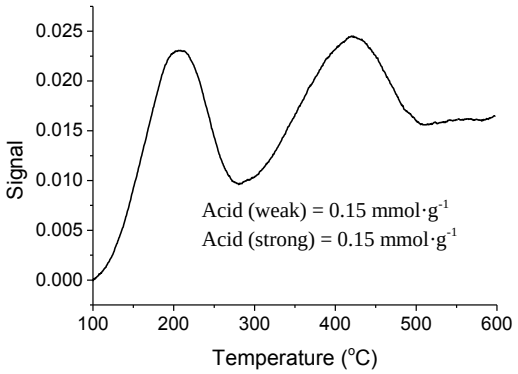

Fig. S3 NH_3-TPD and acid properties of Ref-Z5.