Supporting Information

Direct synthesis of hollow single-crystalline zeolite Beta using a small organic lactam as a recyclable hollow-directing agent

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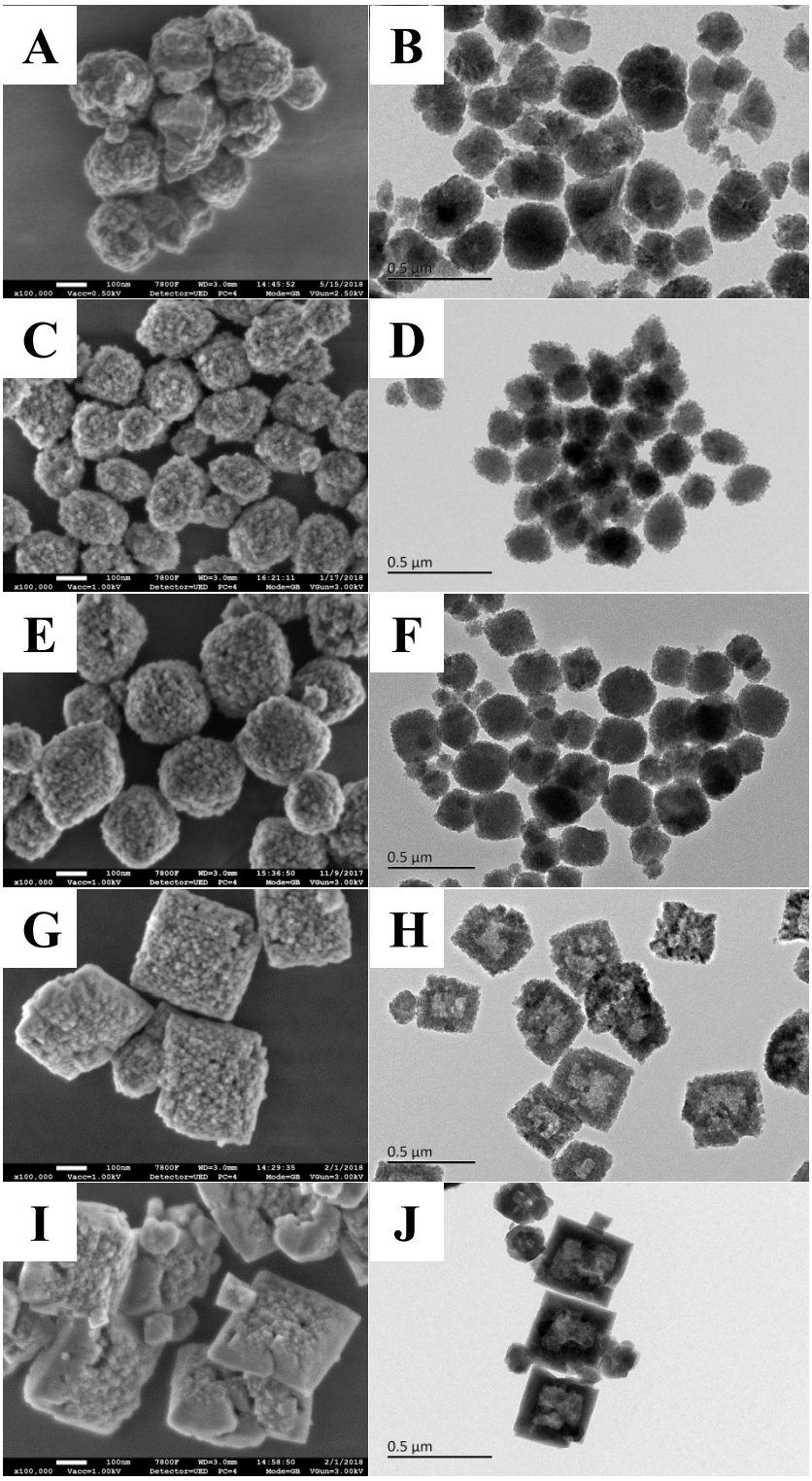

Fig. S1 FESEM and TEM images of zeolites Beta synthesized with NMP/SiO_2 molar ratios of 0.0 (A and B), 1.0 (C and D), 2.0 (E and F), 3.0 (G and H) and 4.0 (I and J).

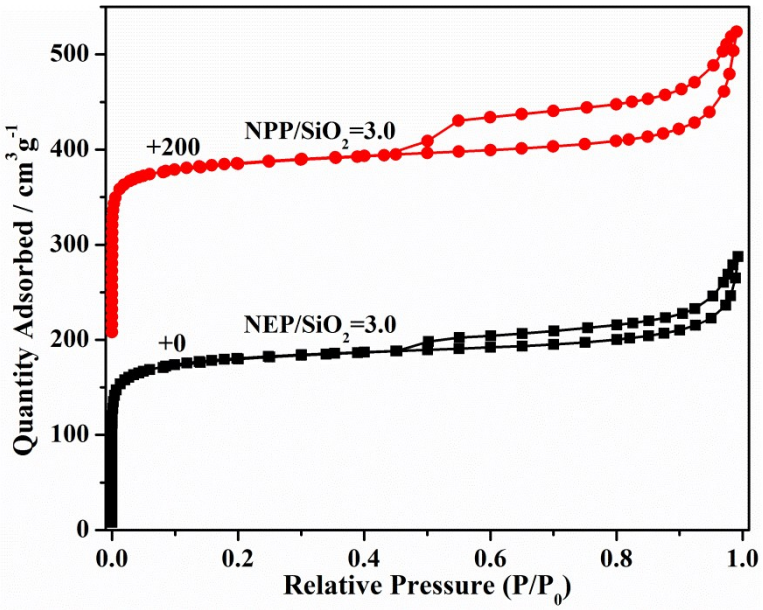

Fig. S2 Nitrogen sorption isotherms of the hollow zeolites Beta synthesized with NEP/SiO_2 = 3.0 and NPP/SiO_2 = 3.0.

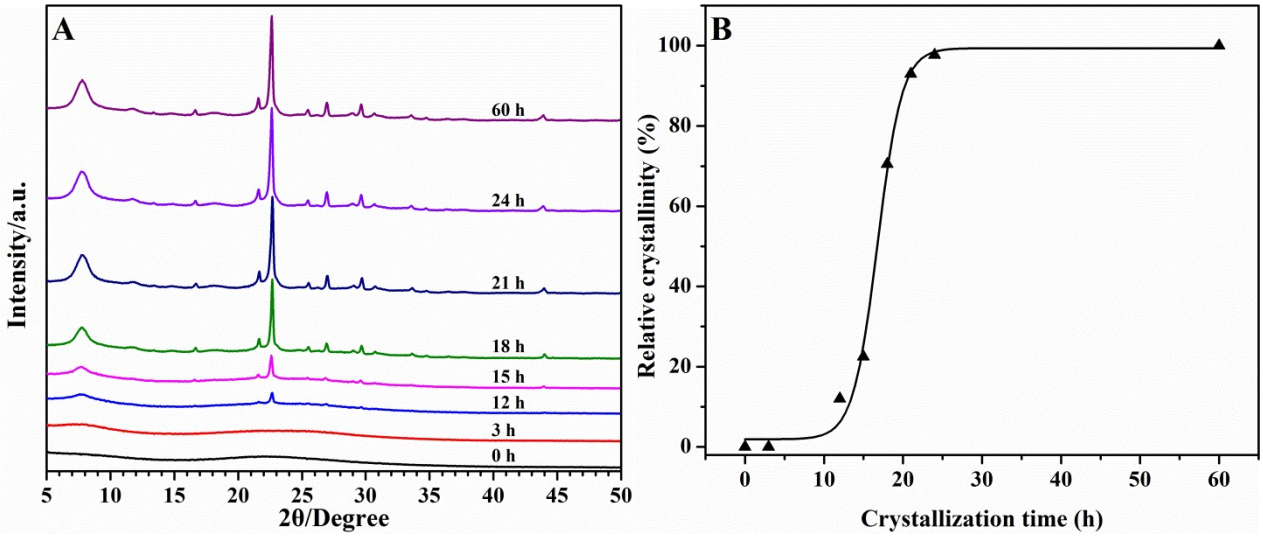

Fig. S3 (A) XRD patterns of as-synthesized Ho-Beta samples crystallized at 140 °C for different periods of time. (B) The crystallization curve based on the XRD results.

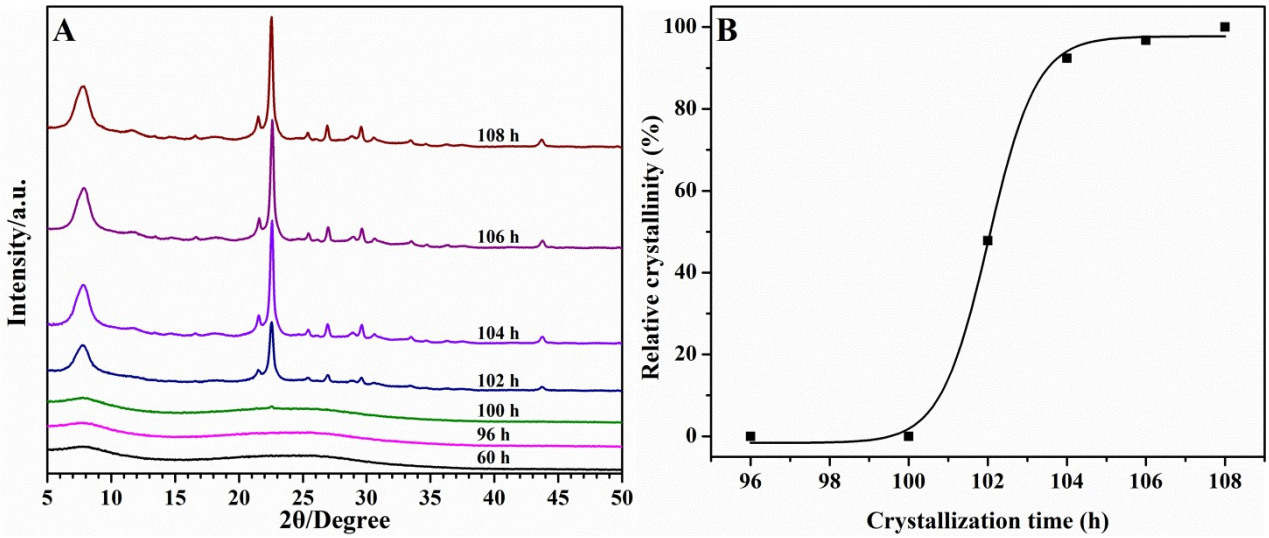

Fig. S4 (A) XRD patterns of as-synthesized C-Beta samples crystallized at 140 °C for different periods of time. (B) The crystallization curve based on the XRD results.

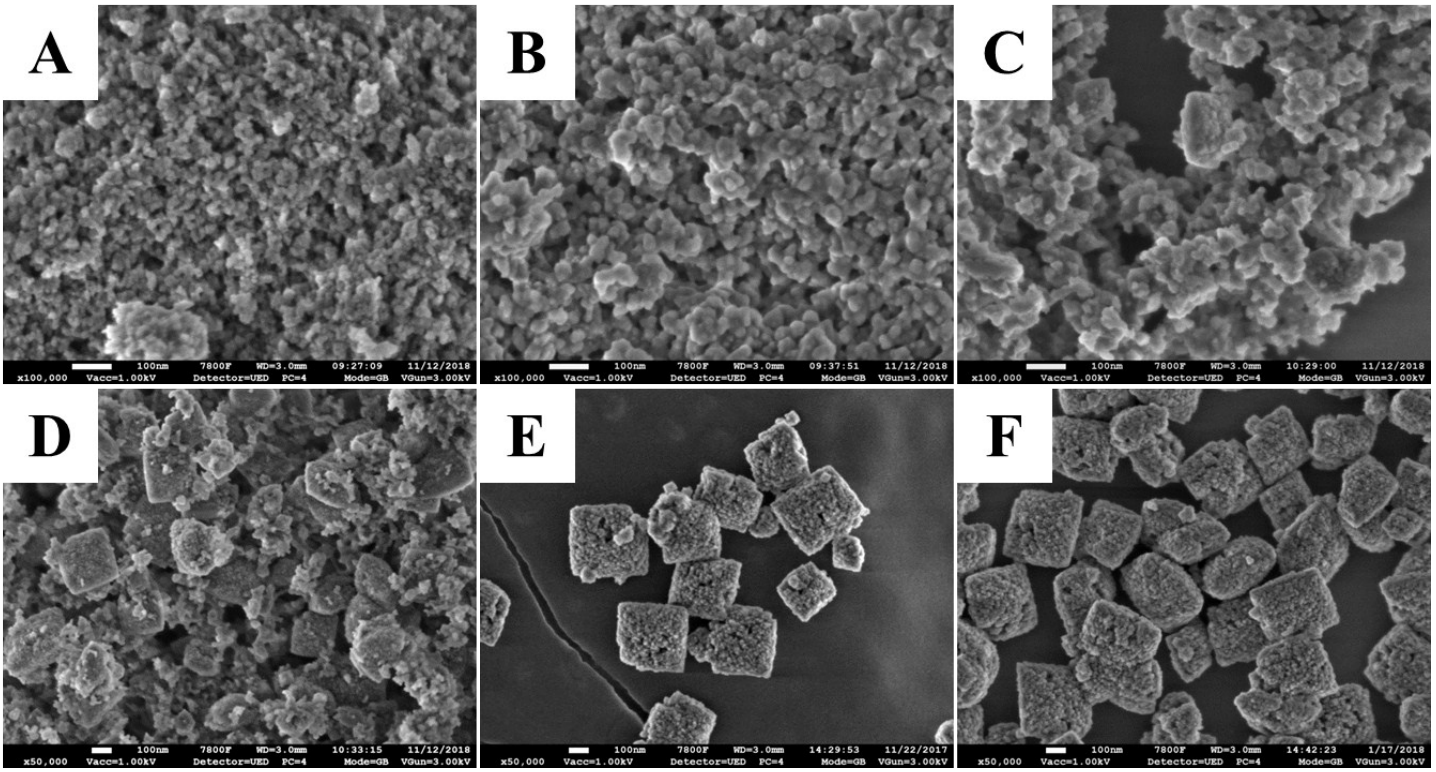

Fig. S5 FESEM images of the products (with NMP/SiO_2 molar ratio of 3.0) synthesized at 140 °C for different periods of time: (A) 0 h, (B) 3 h, (C) 12 h, (D) 18 h, (E) 21 h, and (F) 24 h.

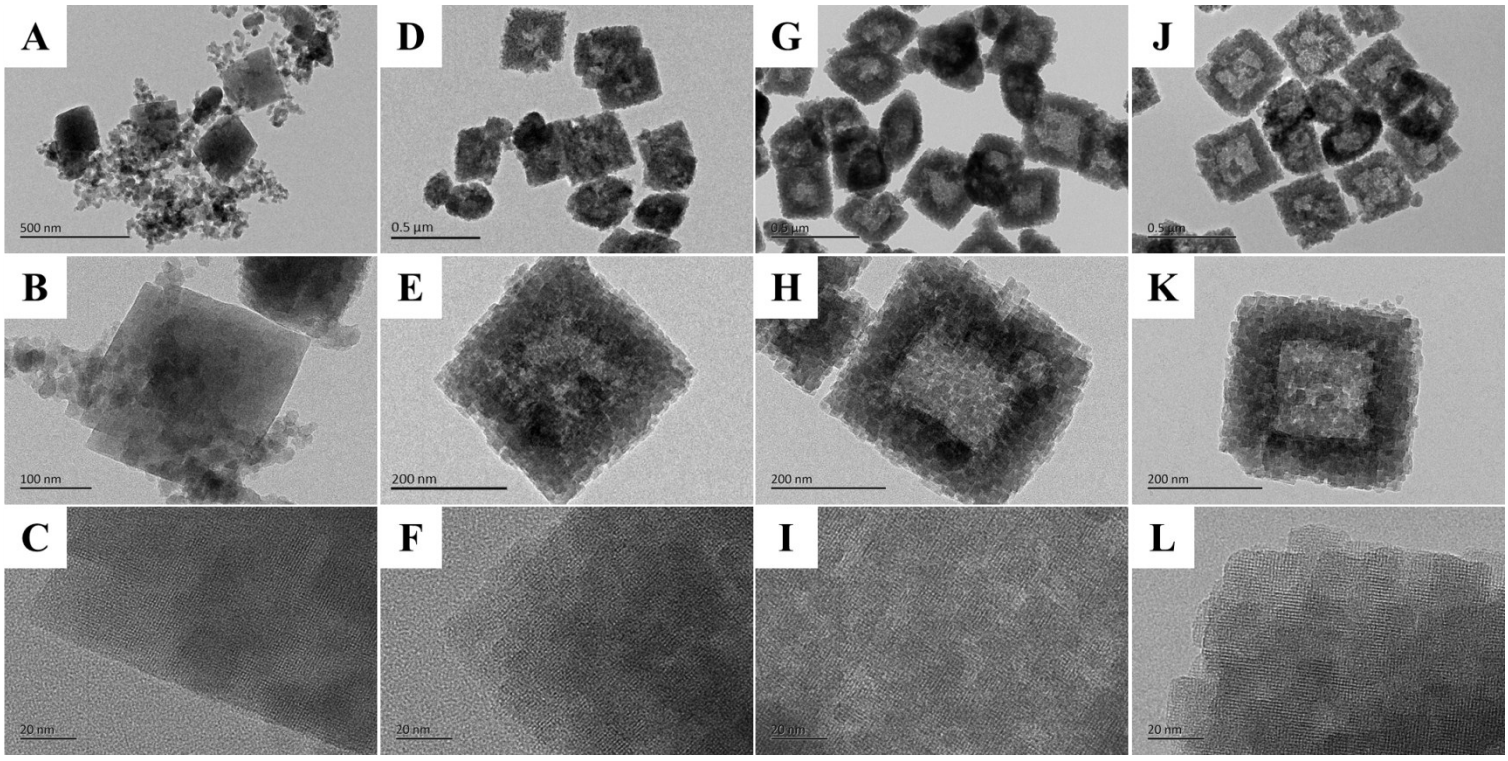

Fig. S6 TEM and HRTEM images of the products (with NMP/SiO_2 molar ratio of 3.0) synthesized at 140 °C for different periods of time: (A, B and C) 18 h, (D, E and F) 21 h, (G, H and I) 24 h, (J, K and L) 60 h.

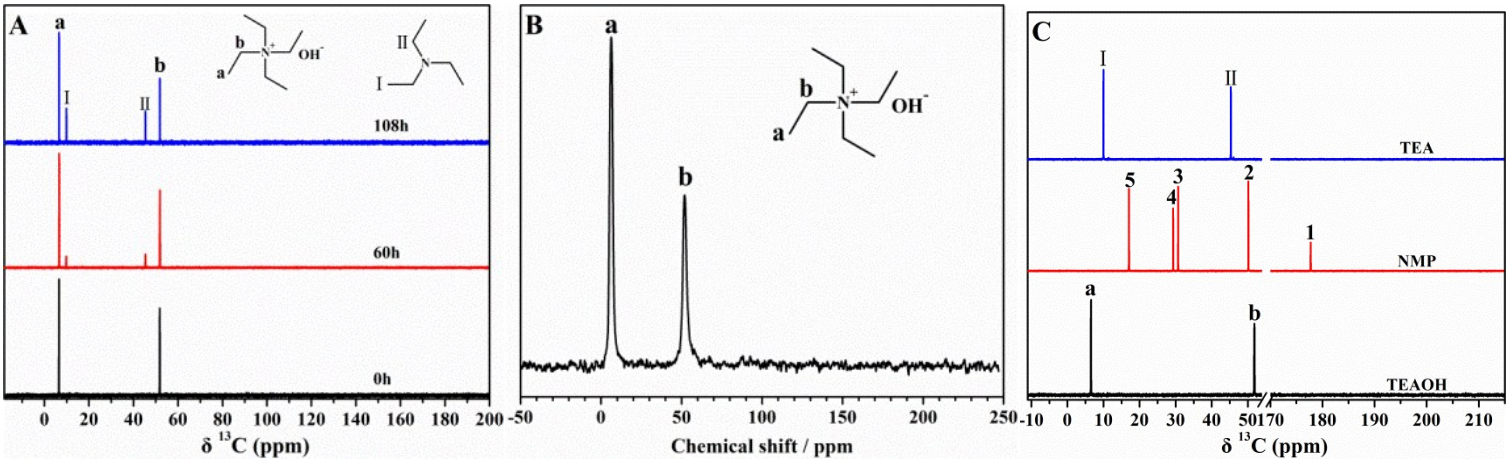

Fig. S7 (A) Liquid-state ^{13}C NMR spectra of the supernatants synthesized without NMP. (B) Solid-state ^{13}C NMR spectrum of the final product (synthesized at 140 °C for 108 h). (C) Liquid-state ^{13}C NMR spectra of aqueous TEAOH, NMP and TEA.

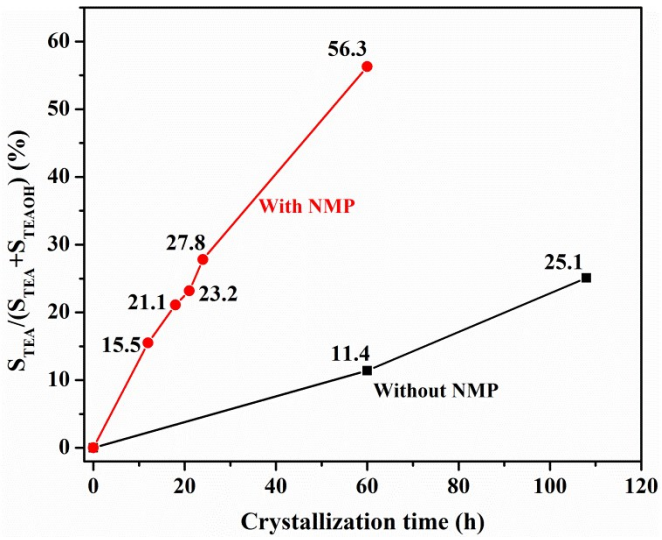

Fig. S8 Thermal decomposition curves of TEAOH with time for the samples synthesized with and without NMP at 140 °C.

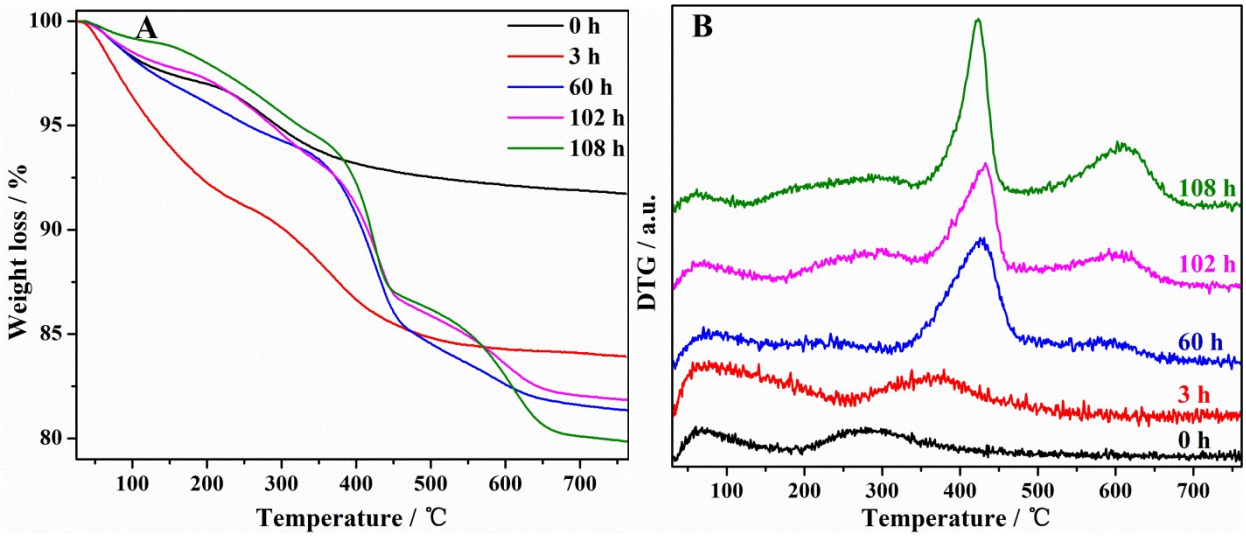

Fig. S9 (A) TG and (B) DTG curves of the products synthesized without NMP for different periods of time.

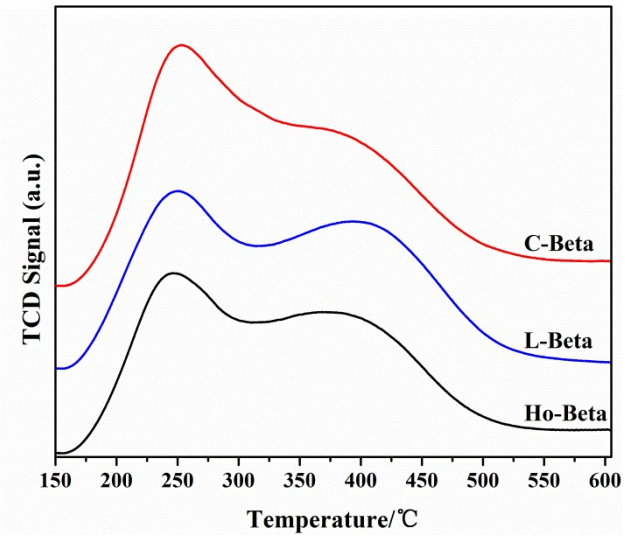

Fig. S10 NH_3-TPD profiles of Ho-Beta, C-Beta and L-Beta catalysts.

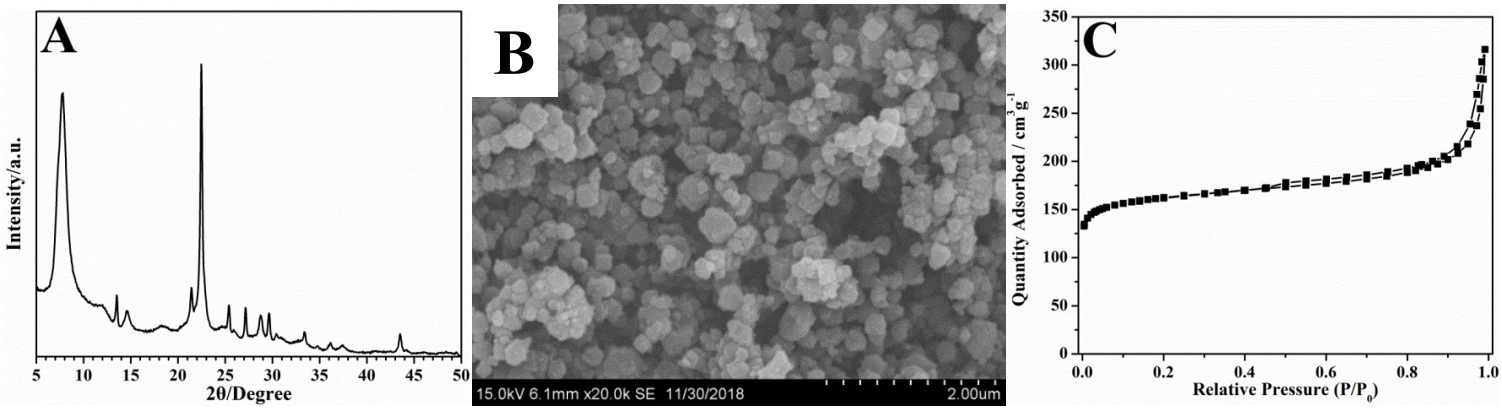

Fig. S11 (A) XRD pattern, (B) SEM image and (C) nitrogen sorption isotherm of L-Beta catalyst (H-form).