Electronic Supplementary Material (ESI) for Dalton Transactions.

Decoupling nucleation with crystal-growth for the syntheses of nanocrystalline zeolites

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FIGURES AND TABLES

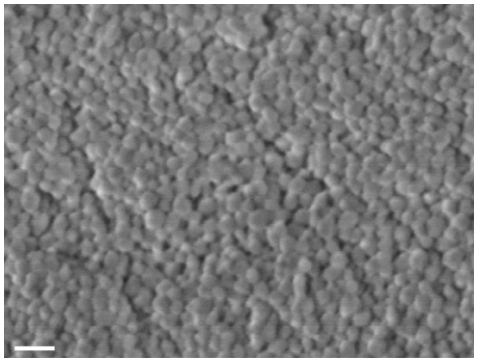

Figure S1. SEM images of N-Silicalite-1 zeolite, white scale bar is 100 nm.

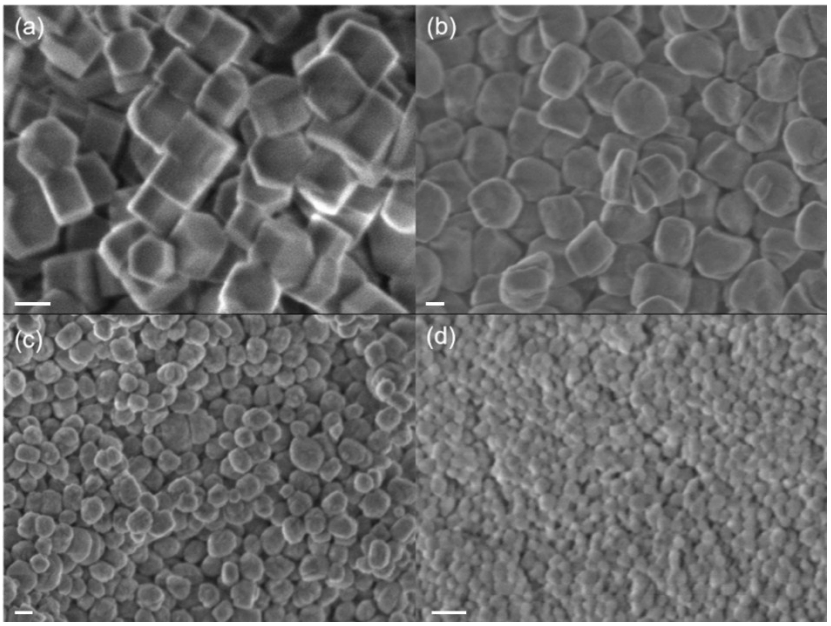

Figure S2. SEM images of N-Silicalite-1 prepared from the gel composition of 0.15TPAOH: 1.0SiO_2: xH_2O and after direct crystallization. The H_2O/Si ratio is (a) 25, (b) 10, (C) 3 and (d) 1 for each sample, white scale bar is 100 nm.

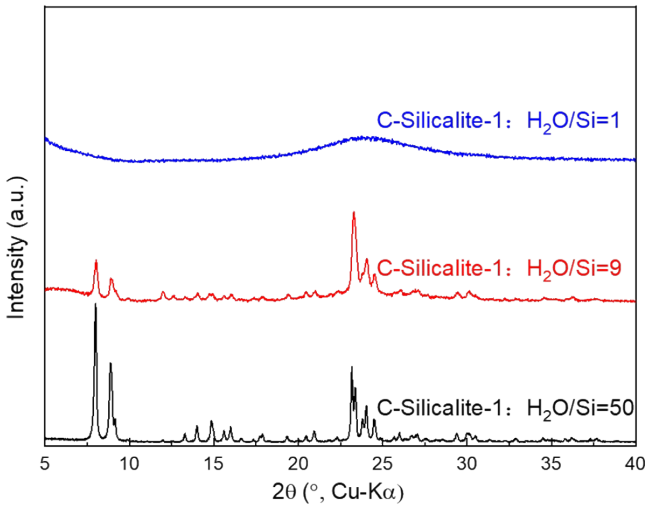

Figure S3. Powder XRD patterns of Silicalite-1 aged at 80oC for 48 h with different H2O contents in the media.

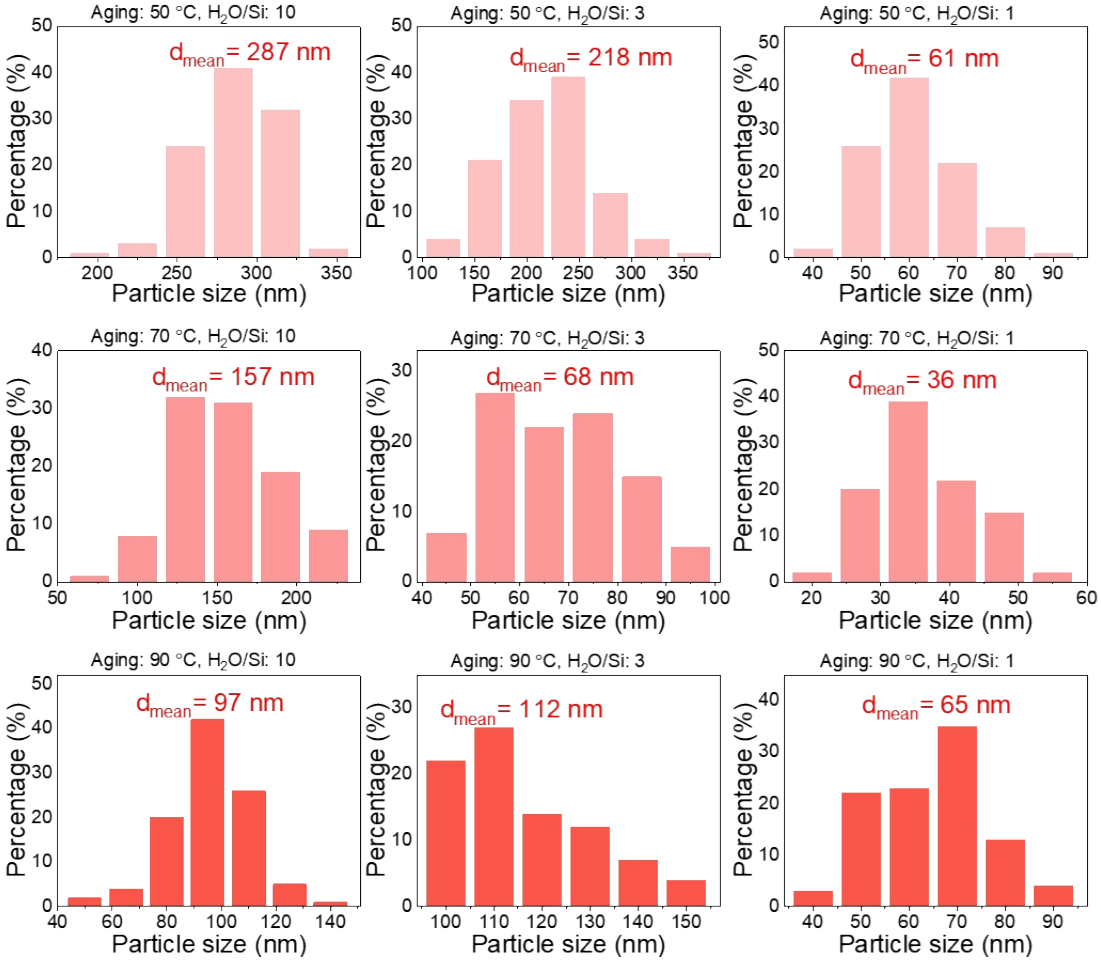

Figure S4. (a) SEM images and (b) crystal size distribution of Silicalite-1 prepared from different H_2O/Si ratios and aging temperatures. All samples were then subject to crystallization at 150 ºC for 4h. Data of each graph acquired by counting 100 zeolite particles from SEM images.

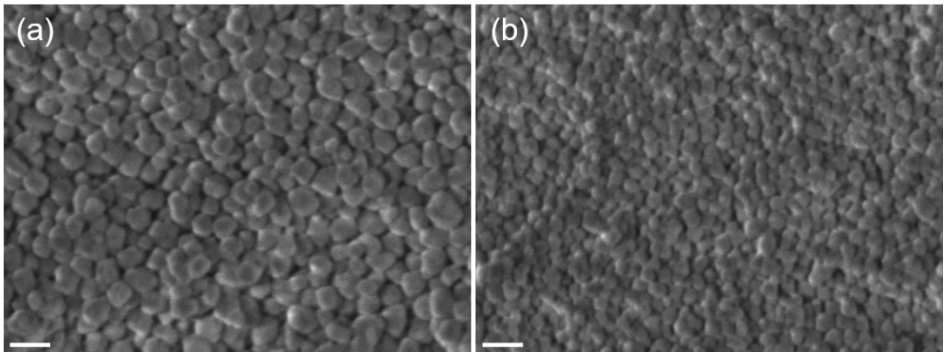

Figure S5. SEM image of N-Silicalite-1 (a) after crystallization at 170 °C and (b) after crystallization at 150 °C for 24h, white scale bar is 100 nm.

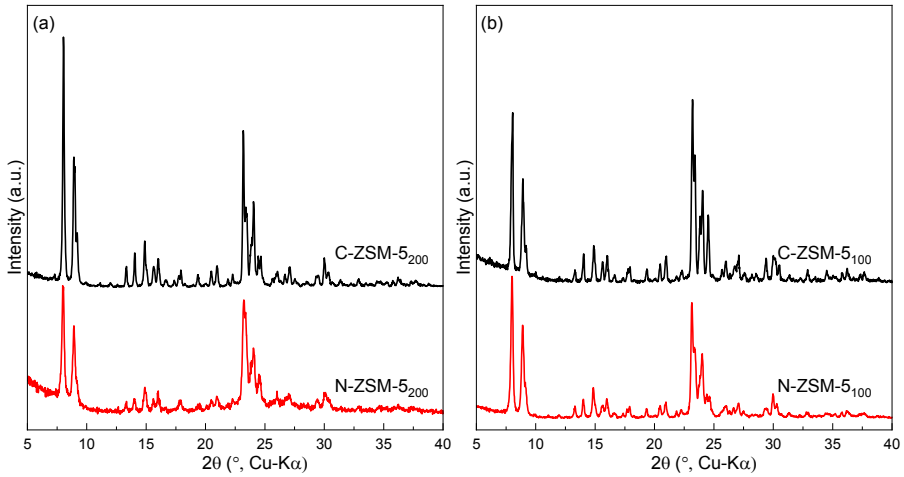

Figure S6. Powder XRD profiles of N-ZSM-5 zeolites in comparison with C-ZSM-5 zeolites.

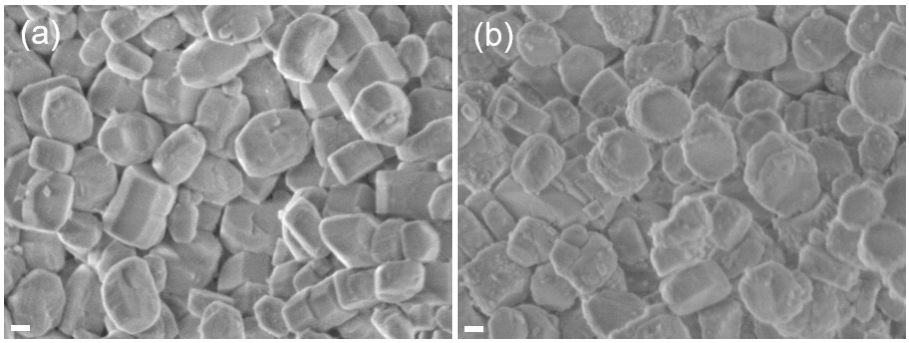

Figure S7. SEM images of (a) C-ZSM-5_{200} and (b) C-ZSM-5_{100}, white scale bar is 100 nm.

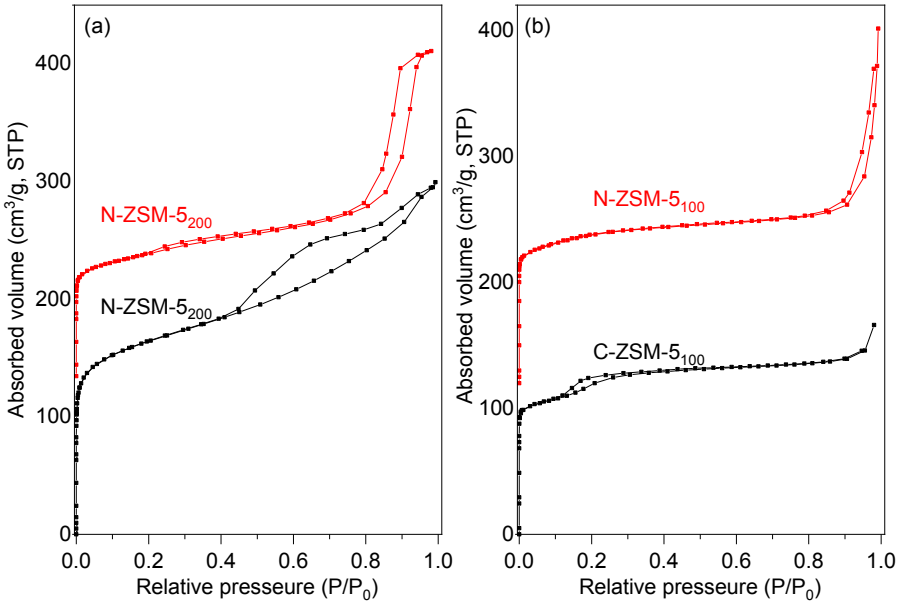

Figure S8. N_2 ad/desorption isotherm of (a) N-ZSM-5_{200}, C-ZSM-5_{200} and (b) N-ZSM-5_{100}, C-ZSM-5_{100}. The isotherm plots are vertically shifted by 120 cm^3/g from each other to avoid overlapping.

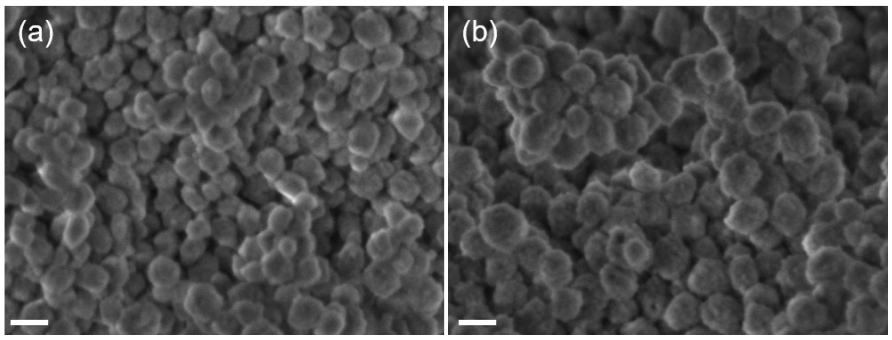

Figure S9. SEM images of (a) N-ZSM-5_{200} and (b) N-ZSM-5_{100} prepared with a H_2O/Si=2 in the HG system, white scale bar is 100 nm.

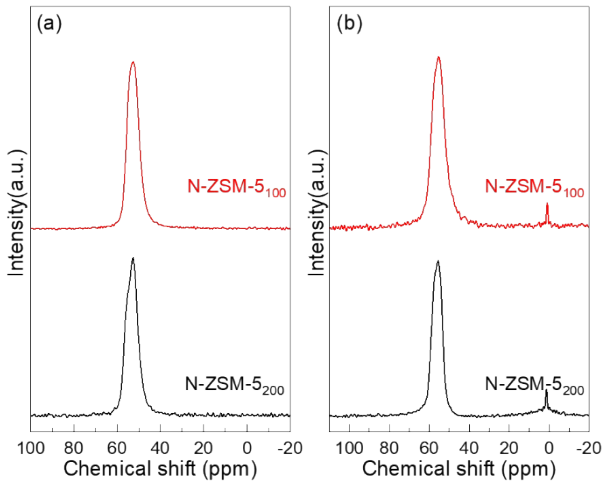

Figure S10. ^{27}Al MAS NMR spectra of (a) as-synthesized and (b) calcined N-ZSM-5 zeolites.

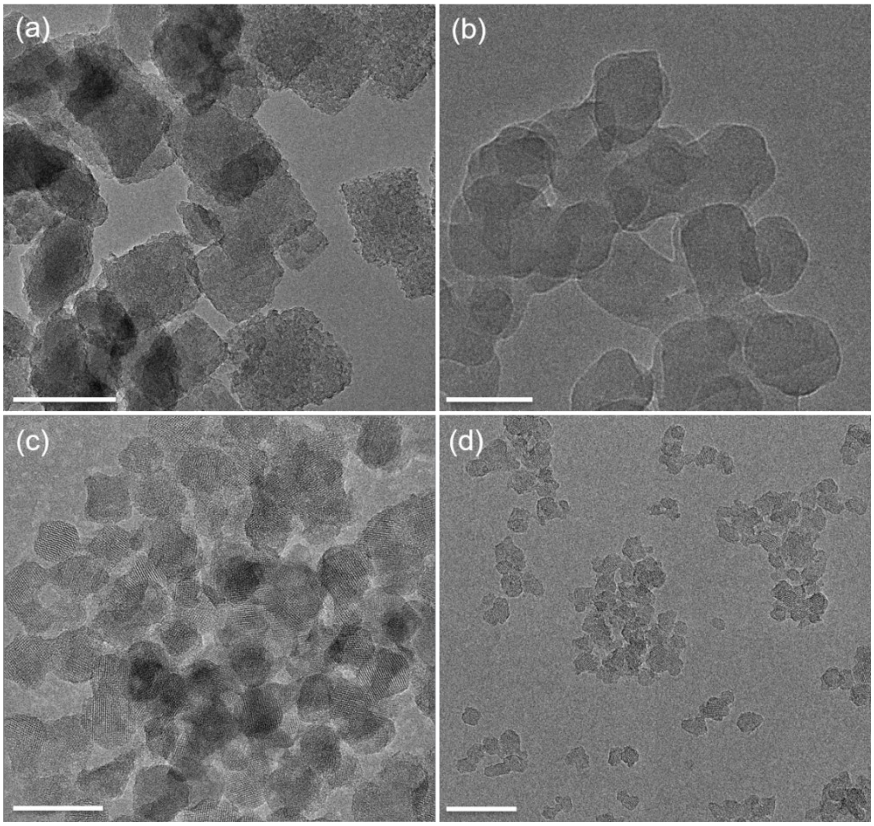

Figure S11. TEM images of (a) N-Beta$_{200}$, N-Beta$_{100}$, (c) N-Beta$_{50}$ and (d) N-Beta$_{25}$.

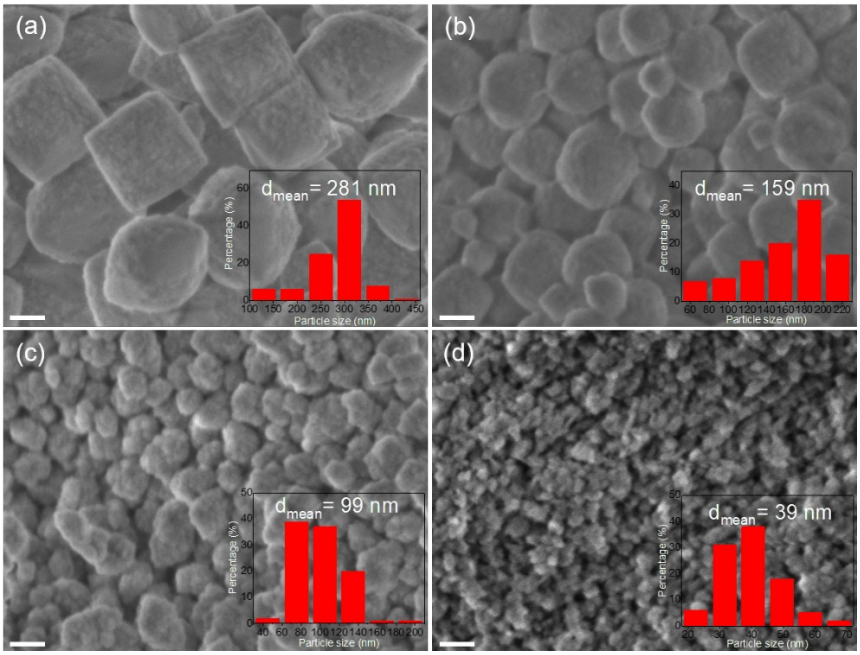

Figure S12. SEM images of (a) C-Beta$_{200}$, (b) C-Beta$_{100}$, (c) C-Beta$_{50}$ and (d) C-Beta$_{25}$ zeolites, white scale bar is 100 nm. Insets are the size distributions by counting 150 particles.

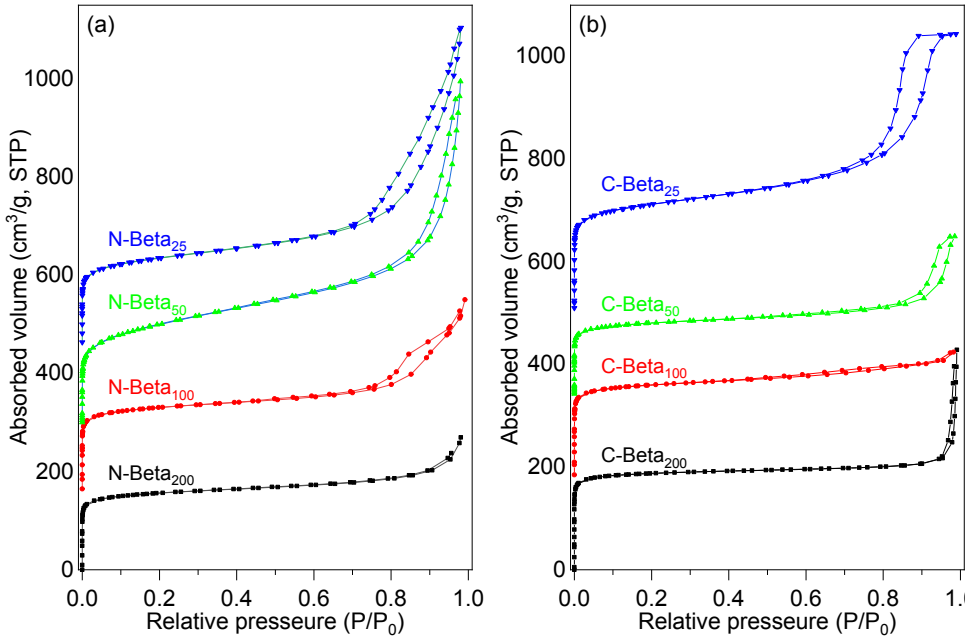

Figure S13. N_2 ad/desorption isotherm of (a) N-Beta and (b) C-Beta zeolites. Isotherm plots are vertically shifted one-by-one by 150 cm^3/g in (a) and 170 cm^3/g in (b) from each other to avoid overlapping.

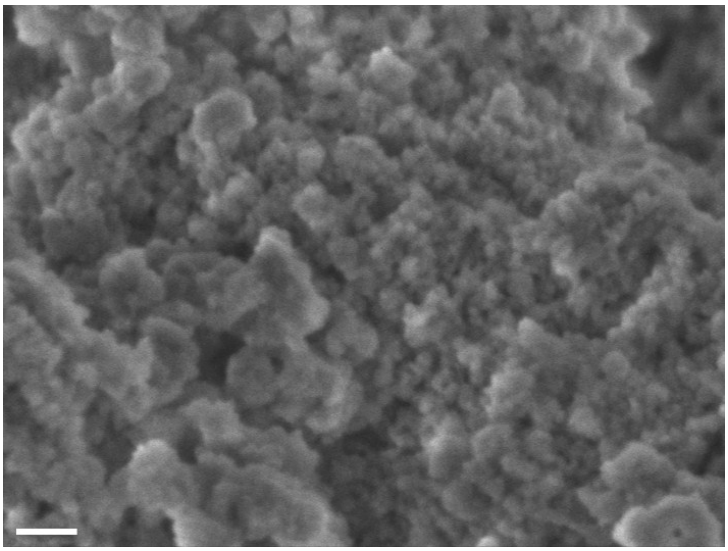

Figure S14. SEM images of N-$Beta_{50}$ prepared from direct crystallization, white scale bar is 100 nm.

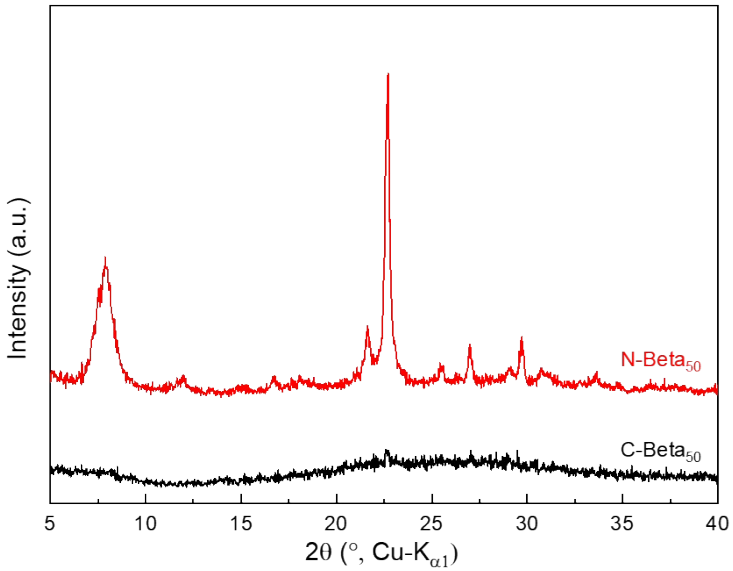

Figure S15. Powder XRD of C-Beta$_{50}$ and N-Beta$_{50}$ after aging for 48 h and crystallized for 24 h.

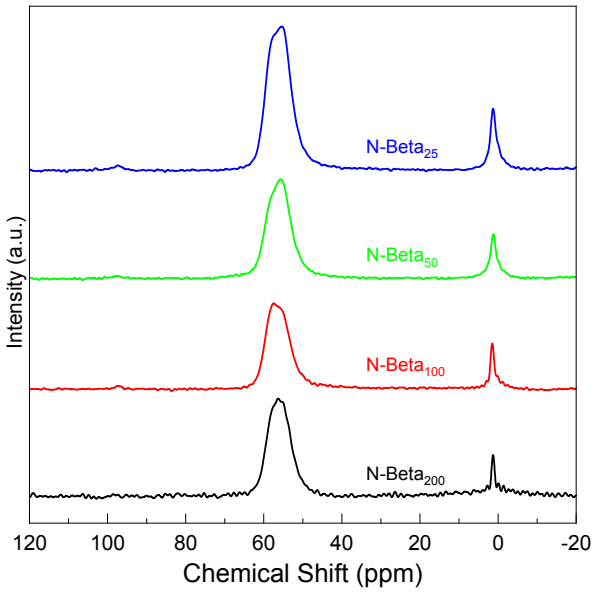

Figure S16. ^{27}Al MAS NMR spectra of calcined N-Beta zeolites.

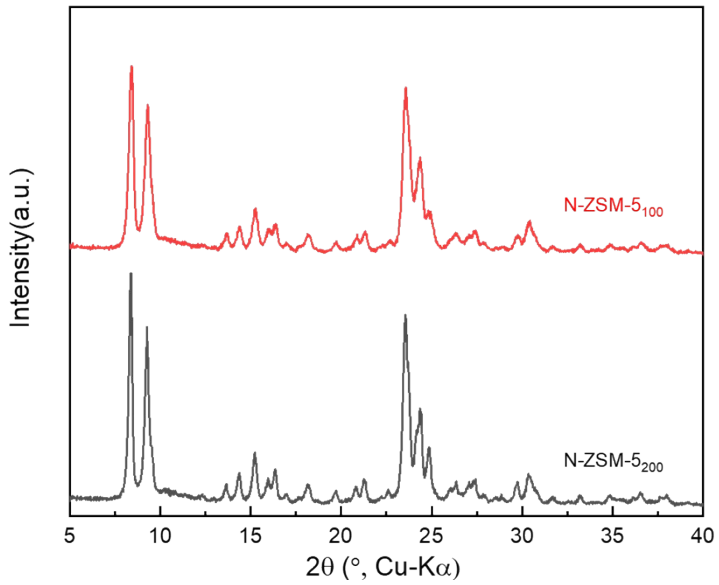

Figure S17. Power XRD patterns of regenerated N-ZSM-5 zeolites.

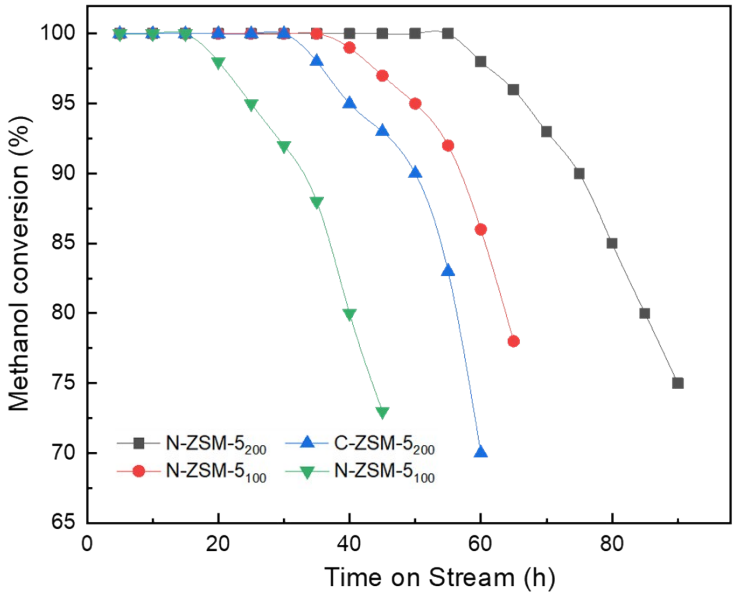

Figure S18. Methanol conversion over N-ZSM-5 and C-ZSM-5 zeolites. Experimental conditions: T = 470 °C, 1 atm, WHSV = 5 h^{-1}, catalyst weight = 100 mg.