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MDPI

Supplementary Materials

Facile Morphology and Porosity Regulation of Zeolite ZSM-5 Mesocrystals with Synergistically Enhanced Catalytic Activity and Shape Selectivity

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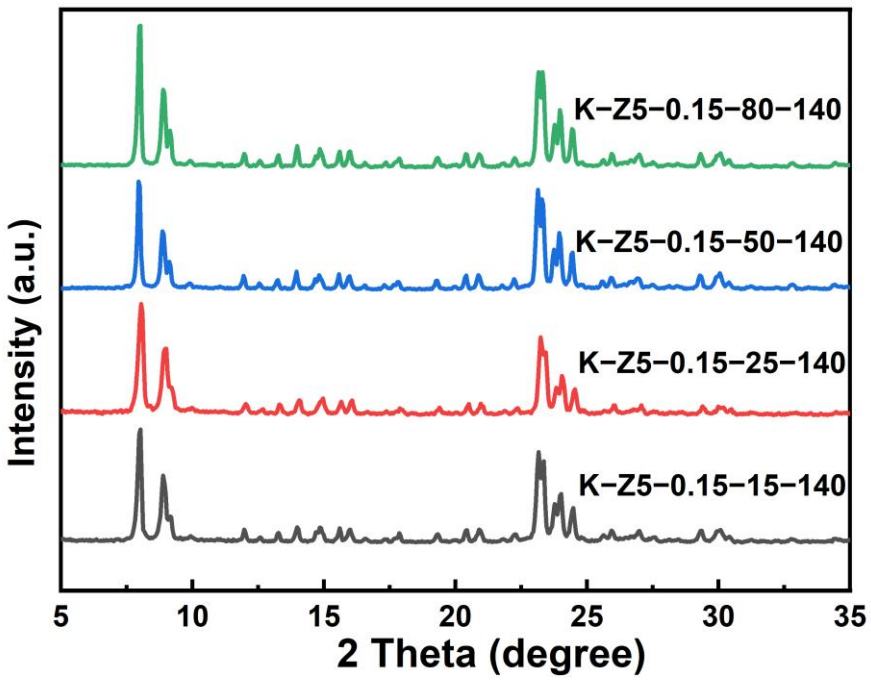


Figure S1. XRD patterns of K-Z5-0.15-y-140 (y = 15/25/50/80) samples.

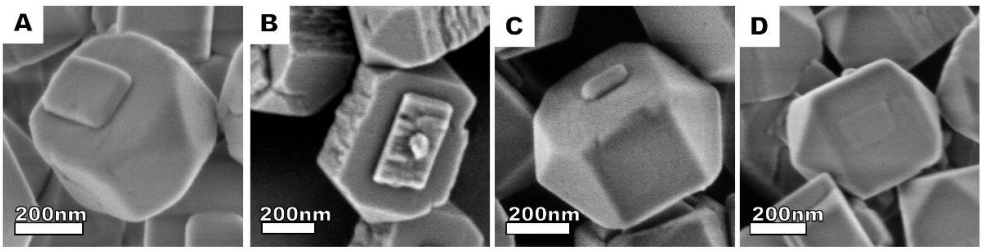


Figure S2. The SEM images of the products synthesized in the K^+ system with H_2O/SiO_2 = (**A**) 15, (**B**) 25, (**C**) 50 and (**D**) 80.

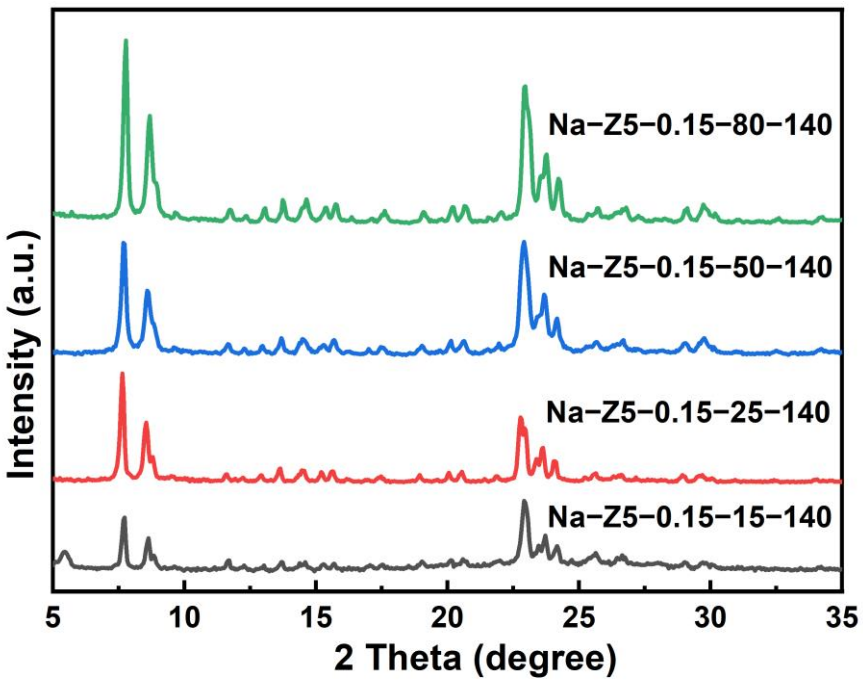


Figure S3. XRD patterns of Na-Z5-0.15-y-140 (y = 15/25/50/80) samples.

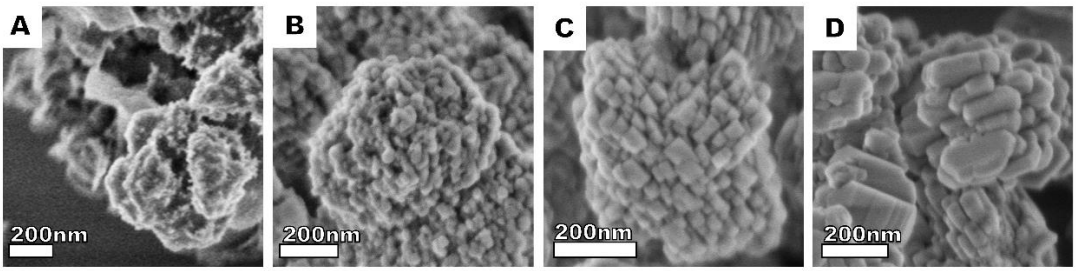
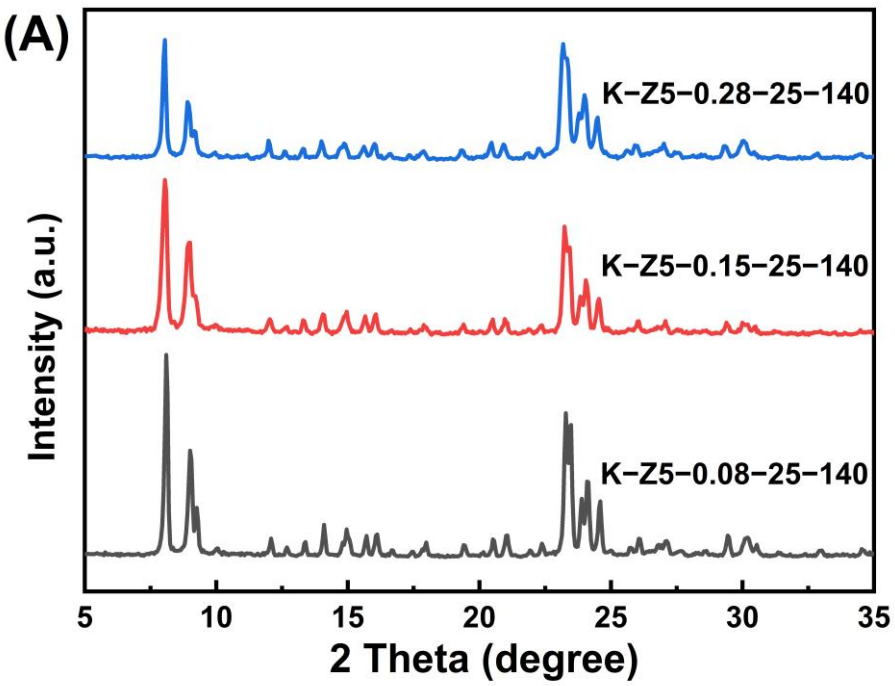


Figure S4. The SEM images of the products synthesized in the Na^+ system with H_2O/SiO_2 = (**A**) 15, (**B**) 25, (**C**) 50 and (**D**) 80.



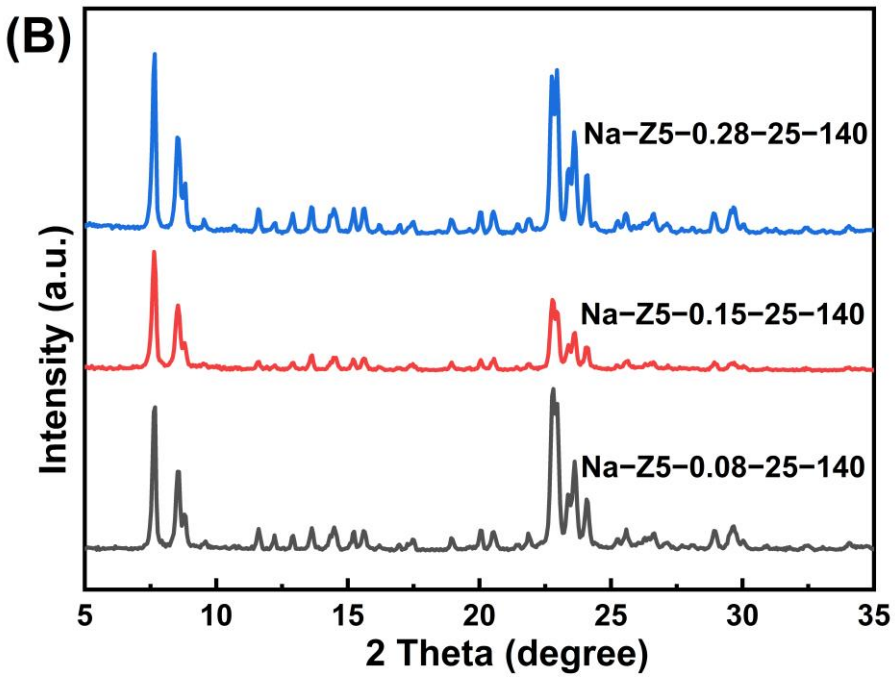


Figure S5. XRD patterns of (**A**)K-Z5-x-25-140 (x = 0.08/0.15/0.28) and (**B**)Na-Z5-x-25-140 (x = 0.08/0.15/0.28) samples.

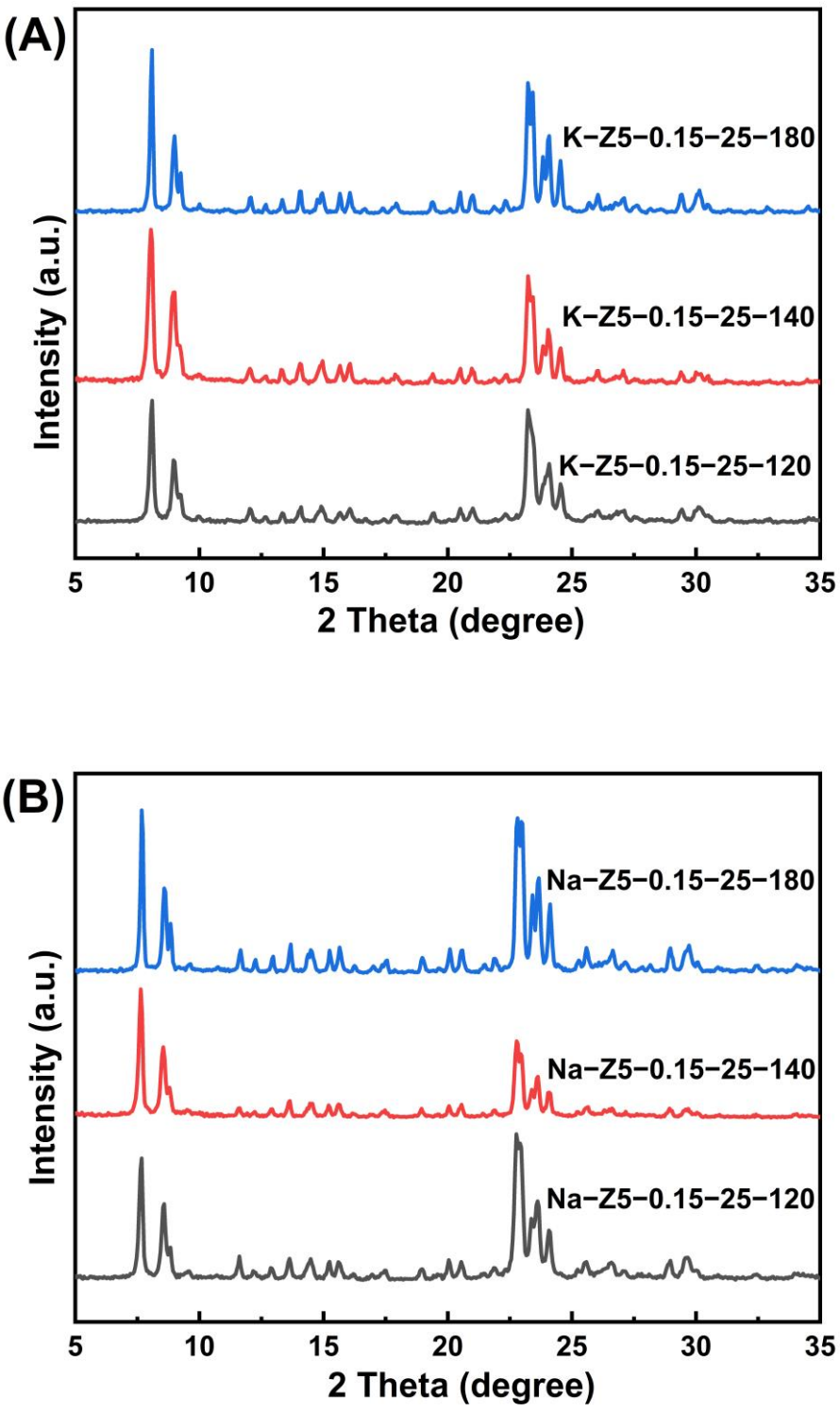


Figure S6. XRD patterns of (**A**)K-Z5-0.15-25-*T* (*T* = 120/140/180) and (**B**) Na-Z5-0.15-25-*T* (*T* = 120/140/180) samples.

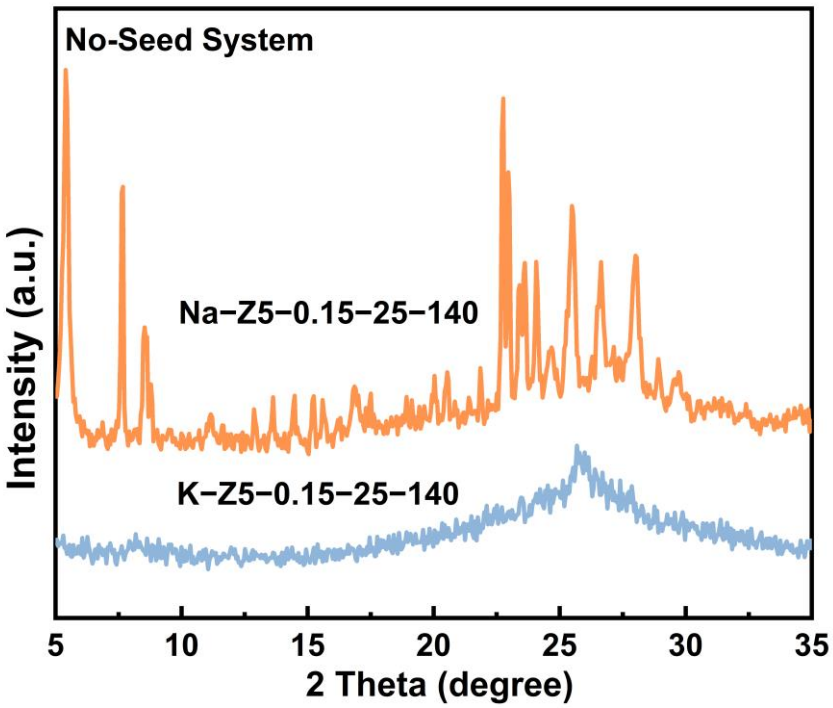


Figure S7. XRD patterns of K-Z5-0.15-25-140 and Na-Z5-0.15-25-140 samples synthesized without seeds after 72 hours of hydrothermal treatment.

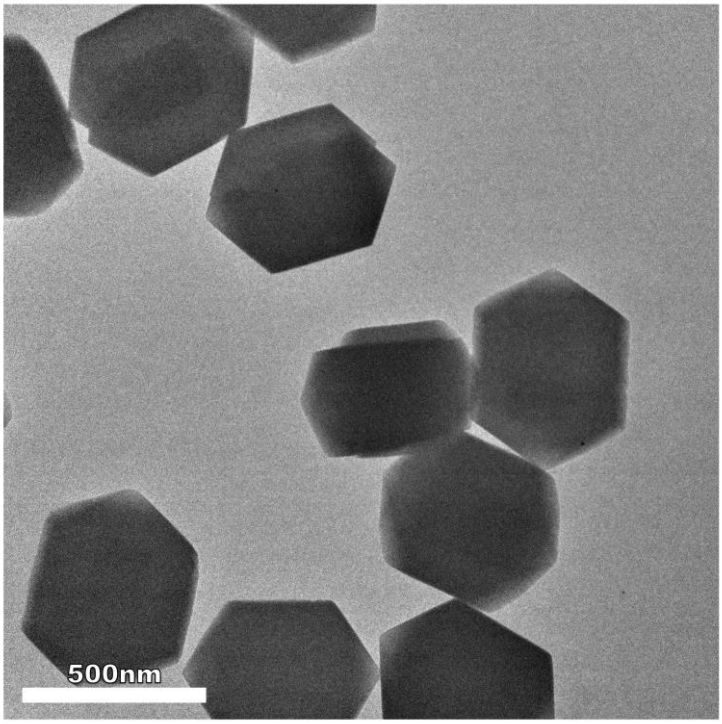


Figure S8. The TEM image of the SC-Na-Z5.

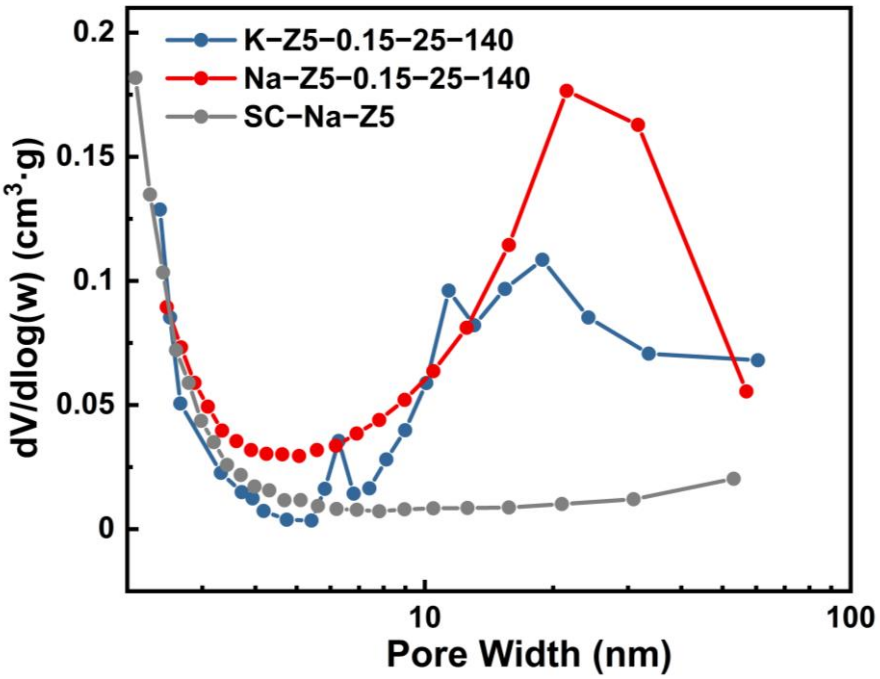


Figure S9. The pore size distribution of the SC-Na-Z5, K-Z5-0.15-25-140 and Na-Z5-0.15-25-140 samples.

Table S1. The textural properties of calcined Na-Z5-0.15-25-140, K-Z5-0.15-25-140 and SC-Na-Z5 products.

Samples	S_{BET} [a] ($m^2 \cdot g^{-1}$)	S_{micro} [b] ($m^2 \cdot g^{-1}$)	S_{ext} [b] ($m^2 \cdot g^{-1}$)	V_{micro} [b] ($cm^3 \cdot g^{-1}$)	V_{meso} [c] ($cm^3 \cdot g^{-1}$)
Na-Z5-0.15-25-140	407	309	98	0.120	0.180
K-Z5-0.15-25-140	399	336	63	0.138	0.149
SC-Na-Z5	387	348	39	0.141	0.043

[a] determined by the relative pressure P/P_0 from 0.005 to 0.035. [b] by t-plot method. [c] using BJH method.

Table S2. The acid amounts measured by NH_3-TPD of H^+-form Na-Z5-0.15-25-140, K-Z5-0.15-25-140 and SC-Na-Z5 products.

Samples	Weak acid ($\mu mol \cdot g^{-1}$) [a]	Strong acid ($\mu mol \cdot g^{-1}$) [b]
Na-Z5-0.15-25-140	459	303
K-Z5-0.15-25-140	430	281
SC-Na-Z5	479	303

[a] The amounts of weak acid sites were measured by the amounts of NH_3 desorbed at 80–280 °C.

[b] The amounts of strong acid sites were measured by the amounts of NH_3 desorbed at 280–550 °C.