Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

Supplementary Information

Novel ordered hierarchical ZSM-5 zeolite with interconnected macro-meso-miscroporosity for enhanced methanol to aromatics

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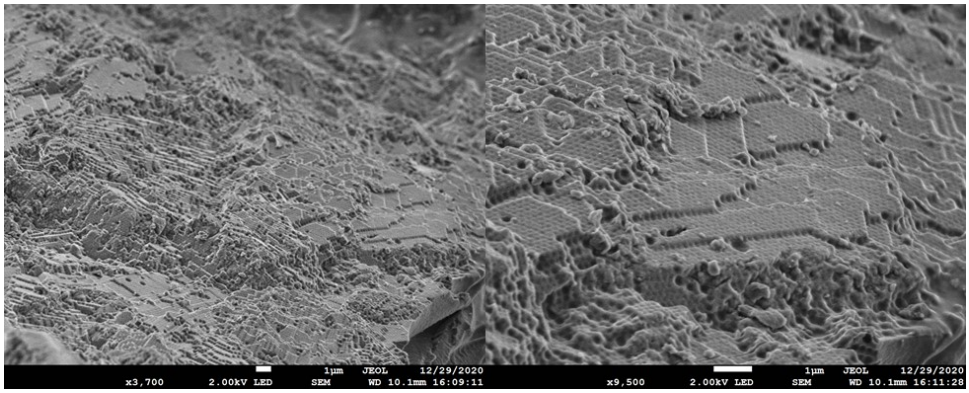

Fig. S1. SEM images of PMMA/P123/SiO_2 composite after initial carbonization.

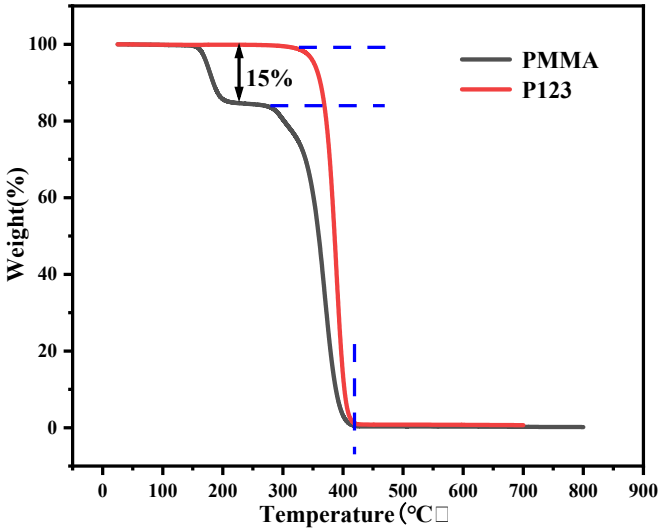

Fig. S2. TGA curve of PMMA and P123.

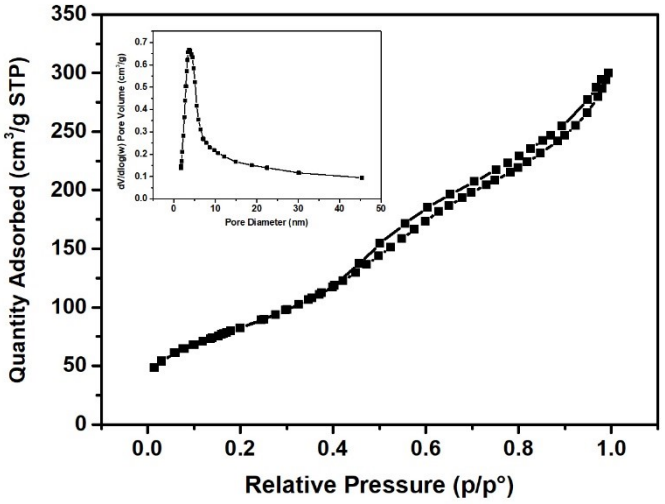

Fig. S3. N_2 adsorption/desorption isotherms (c), and BJH pore size distribution (b) of 3DOMmC.

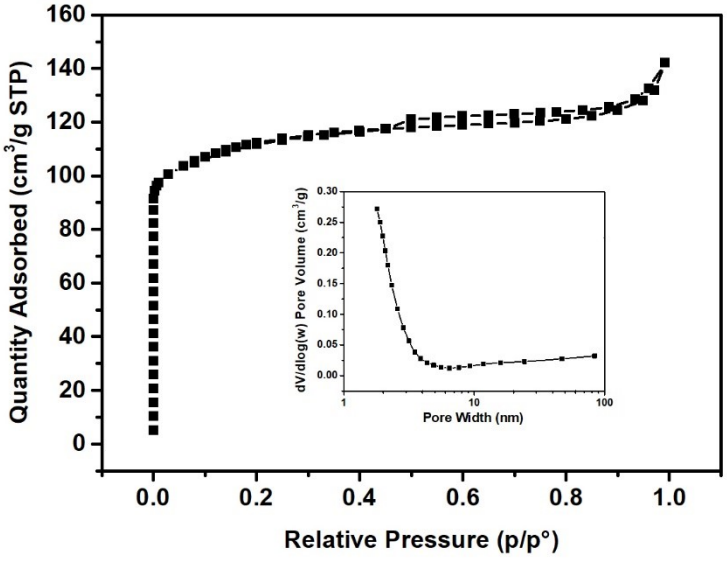

Fig. S4. N_2 adsorption/desorption isotherms (c), and BJH pore size distribution (b) of nano-ZSM-5.

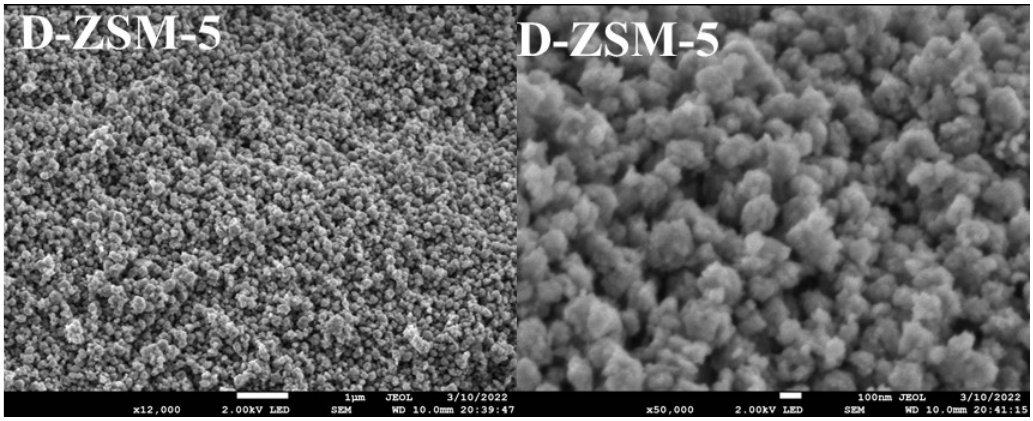

Fig. S5. SEM images of D-ZSM-5.

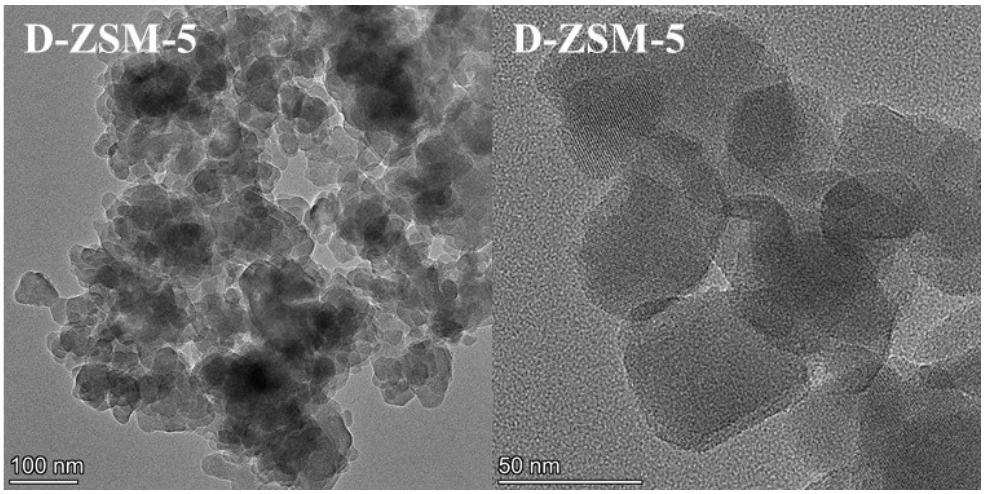

Fig. S6. TEM images of D-ZSM-5

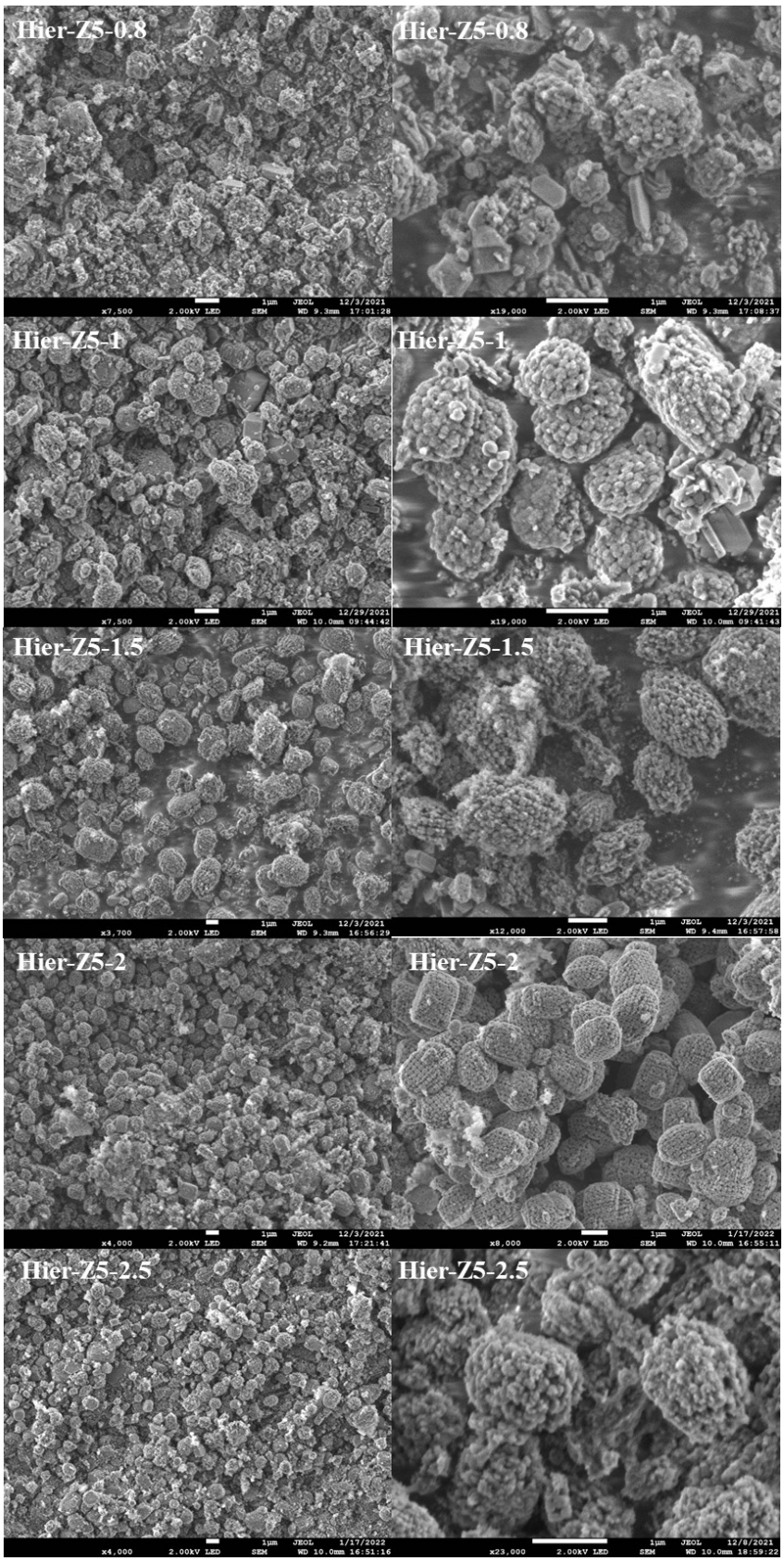

Fig. S7. SEM images of 3DOMmC-Z5 with different m(3DOMmC)/m(TEOS).

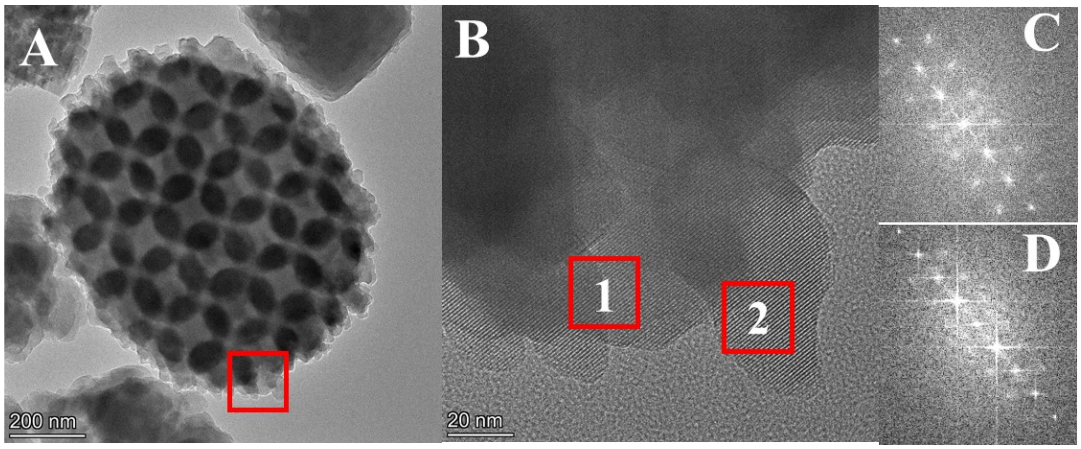

Fig. S8. (A)TEM image of 3DOMmC-Z5-1.5, (B) HRTEM image of the area indicated by the red box in (A), (C-D) Corresponding FFT patterns from zone 1-Cand zone 2-D

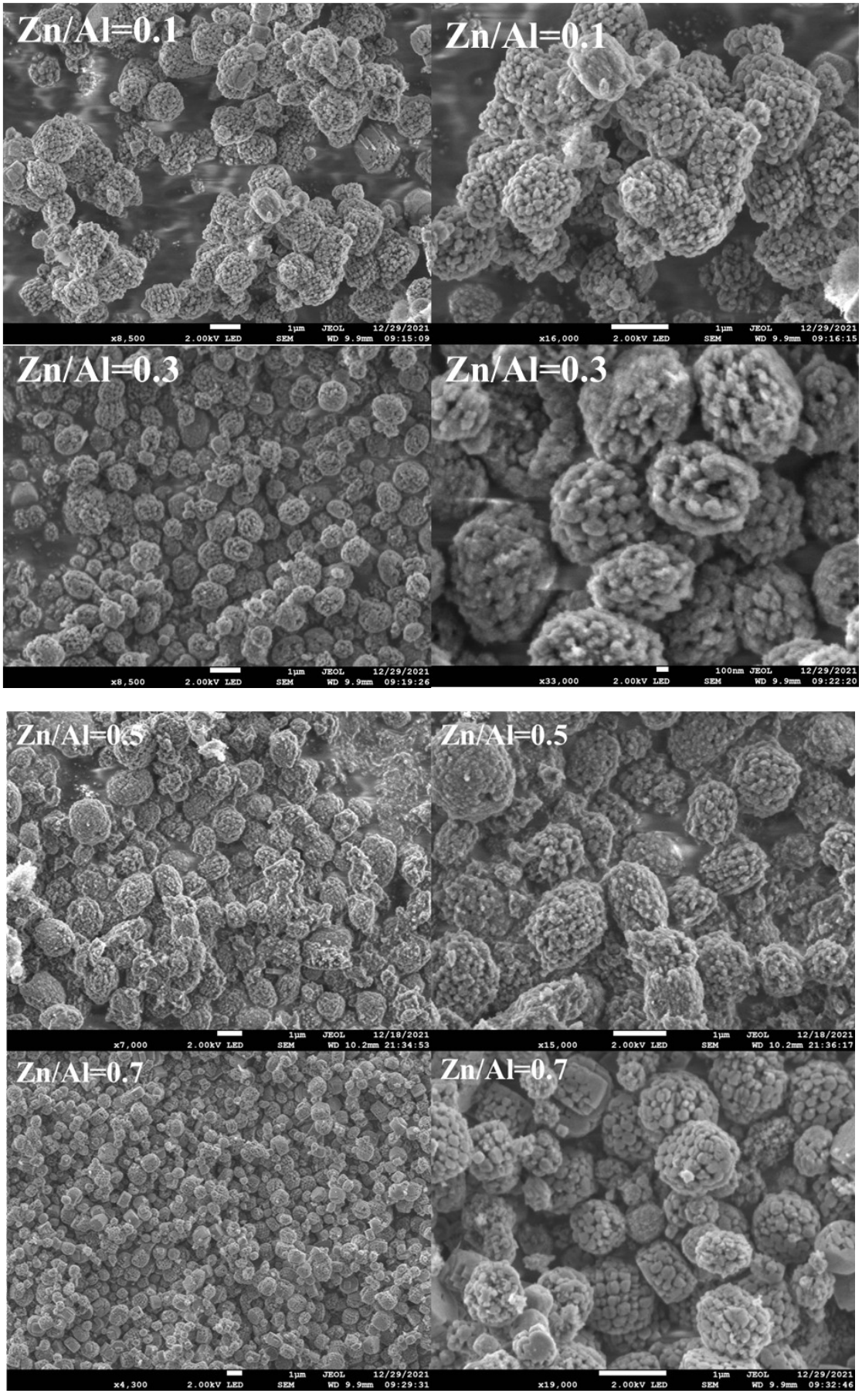

Fig. S9. SEM images of 3DOMmC-Zn-Z5.

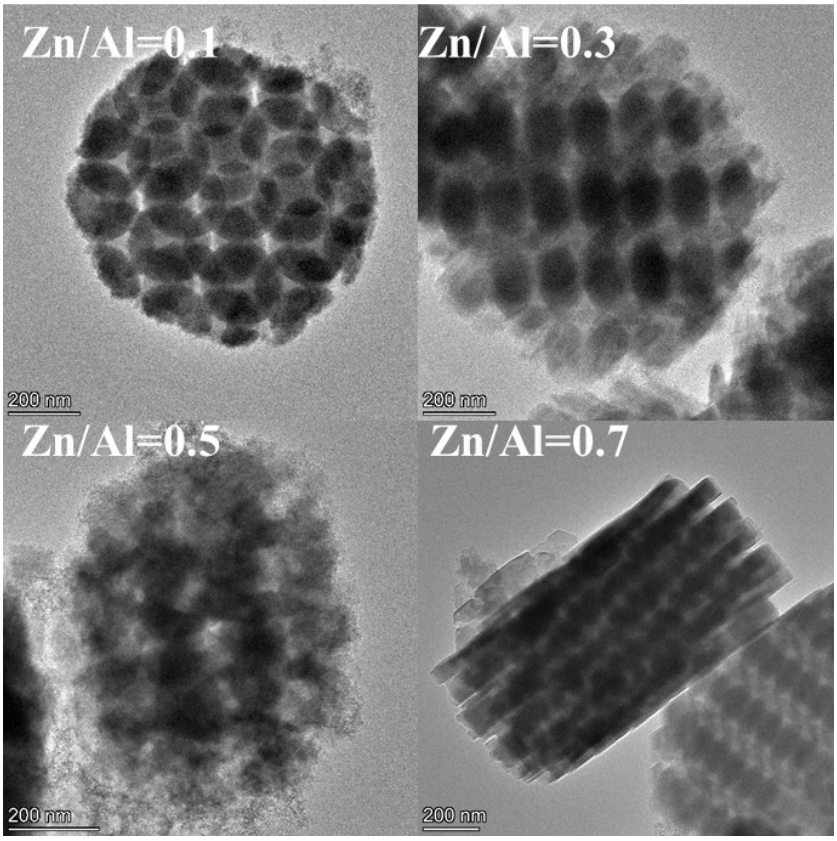

Fig. S10. TEM images of 3DOMmC-Zn-Z5.

Table S1 Pore structure parameters of 3DOMmC.

Samples	S_{BET}/ (m^2/g)	S_{micro}/ (m^2/g)	S_{meso}/ (m^2/g)	V_t/ (cm^3/g)	V_{micro}/ (cm^3/g)	V_{meso}/ (cm^3/g)
3DOMmC	352	35	307	0.441	0.021	0.420

[a] S_{BET} (total surface area) calculated by applying the BET equation using the linear part ($0.05<P/P^0<0.30$) of the adsorption isotherm.

[b] V_{total} (total pore volume) calculated by single point adsorption total pore volume of pores at $P/P^0 = 0.99$.

[c] S_{micro} (micropore area) and V_{micro} (micropore volume) calculated using the t-plot method.

Table S2 Pore structure parameters of samples.

Sample	S_{BET}/ (m^2/g)	S_{micro}/ (m^2/g)	S_{meso}/ (m^2/g)	V_t/ (cm^3/g)	V_{micro}/ (cm^3/g)	V_{meso}/ (cm^3/g)
3DOMmC-Z5-0.8	395	183	212	0.325	0.098	0.227
3DOMmC-Z5-1.0	362	186	176	0.277	0.100	0.170
3DOMmC-Z5-1.5	372	170	202	0.319	0.091	0.228
3DOMmC-Z5-2.0	395	161	235	0.378	0.086	0.292
3DOMmC-Z5-2.5	422	147	275	0.424	0.079	0.345
3DOMmC-Zn-Z5-0.1	411	167	244	0.358	0.090	0.268
3DOMmC-Zn-Z5-0.3	399	182	217	0.315	0.097	0.218
3DOMmC-Zn-Z5-0.5	396	138	258	0.326	0.076	0.250
3DOMmC-Zn-Z5-0.7	373	199	173	0.244	0.107	0.137

[a] S_{BET} (total surface area) calculated by applying the BET equation using the linear part ($0.05<P/P^0<0.30$) of the adsorption isotherm.

[b] V_{total} (total pore volume) calculated by single point adsorption total pore volume of pores at $P/P^0 = 0.99$.

[c] S_{micro} (micropore area) and V_{micro} (micropore volume) calculated using the t-plot method.

Table S3 Products Distribution of MTA reactions.

Samples	B	T	X	BTX	C_{9+}	Aromatics
Zn/nano-Z5	0.87%	5.04%	17.50%	23.41%	11.85%	35.26%
JZ-3DOMmC-Z5	0.83%	4.83%	20.65%	26.31%	12.43%	38.74%
3DOMmC-Z5	0.97%	4.67%	18.37%	24.01%	12.18%	36.19%
3DOMmC-Zn-Z50.3	0.99%	4.73%	18.41%	24.13%	12.56%	37.69%
3DOMmC-Zn-Z5-0.5	1.17%	5.82%	22.91%	29.90%	13.65%	43.55%
3DOMmC-Zn-0.7	0.99%	4.96%	20.59%	26.54%	12.98%	39.52%