Electronic supplementary information (ESI)

Novel synthesis and catalytic performance of hierarchical MOR

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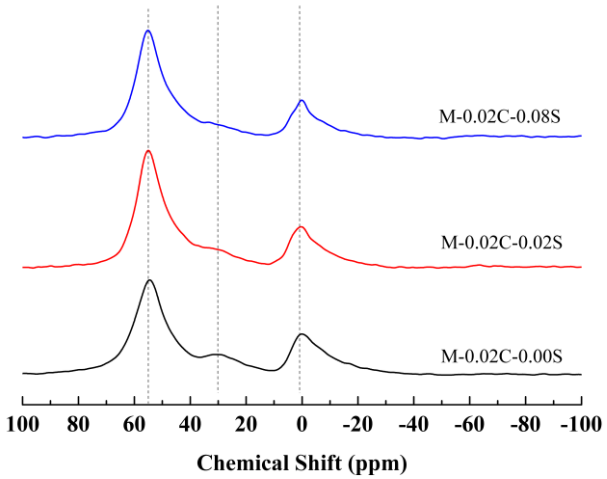

Fig. S1 [27] Al MAS NMR spectra of samples.

Table S1 The content of framework and extra-framework Al.

Catalysts	Al_{ef} (%)	Al_f (%)
M-0.02C-0.00S	38.1	61.9
M-0.02C-0.02S	30.6	69.4
M-0.02C-0.08S	22.9	77.1

Preparation of M-0.00C-0.00S, M-0.02C-0.00S and M-0.02C-0.08S samples crystallized for different time

In order to study the formation mechanism of hierarchical MOR, a series of samples were prepared under the same synthesis process of the M-0.02C-0.00S and M-0.02C-0.08S samples except for the crystallization time. After the crystallization, the products were recovered by centrifugation and washed with deionized water until the pH reached about 7. Then the samples were dried overnight at 120 °C and calcined at 550 °C in air for 6 h. The synthesized samples are denoted as M-0.02C-0.00S-zh and M-0.02C-0.08S-zh respectively, z represents the crystallization time (z=8, 16, 24, 32,40 and 48).

For comparison, a series of M-0.00C-0.00S-zh samples were prepared with the gel compositions of SiO_2: $0.0333Al_2O_3$: $0.3167Na_2O$: $27.5H_2O$ and the synthesis

process was the same as M-0.02C-0.08S-zh.

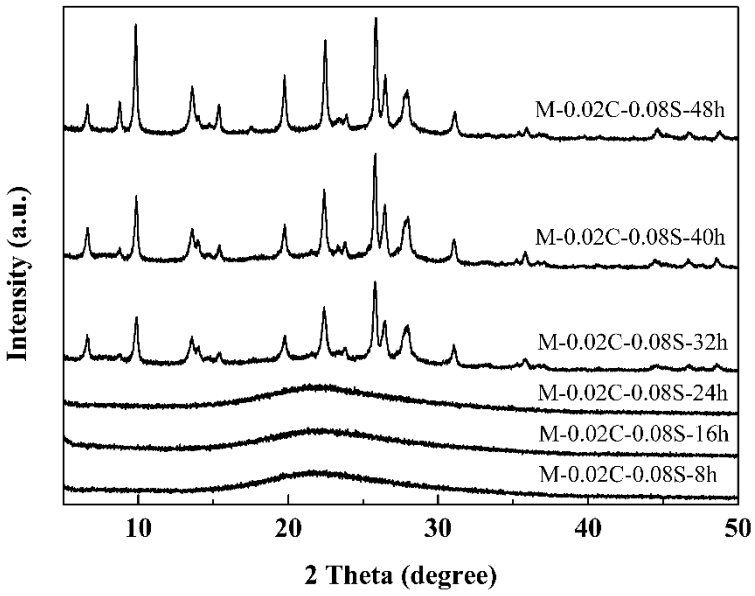

Fig. S2 XRD patterns of M-0.02C-0.08S-zh samples.

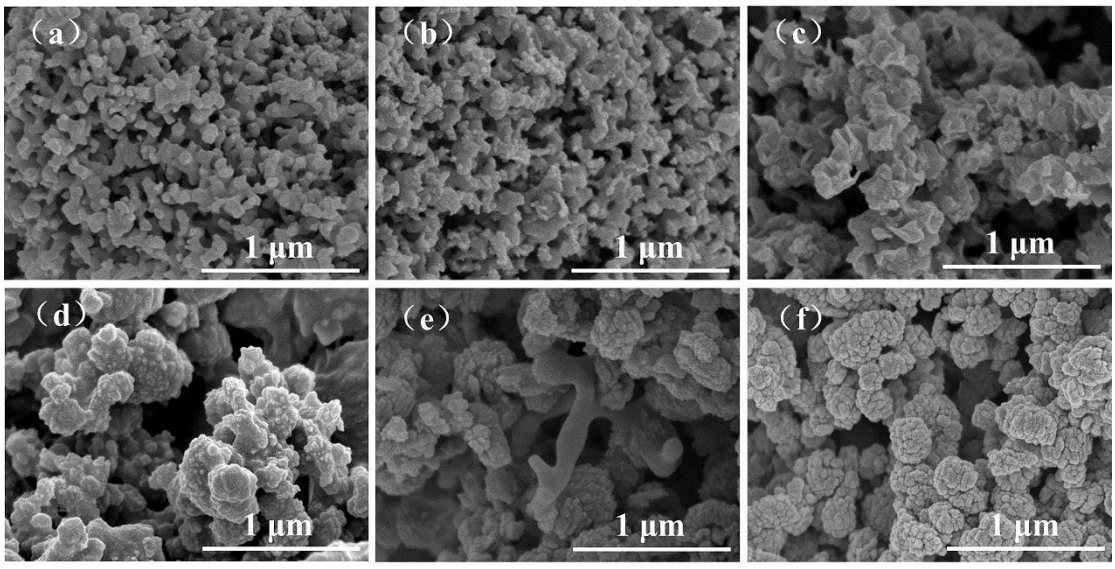

Fig. S3 SEM images of (a) M-0.02C-0.08S-8h; (b) M-0.02C-0.08S-16h; (c) M-0.02C-0.08S-24h; (d) M-0.02C-0.08S-32h; (e) M-0.02C-0.08S-40h and (f) M-0.02C-0.08S-48h.

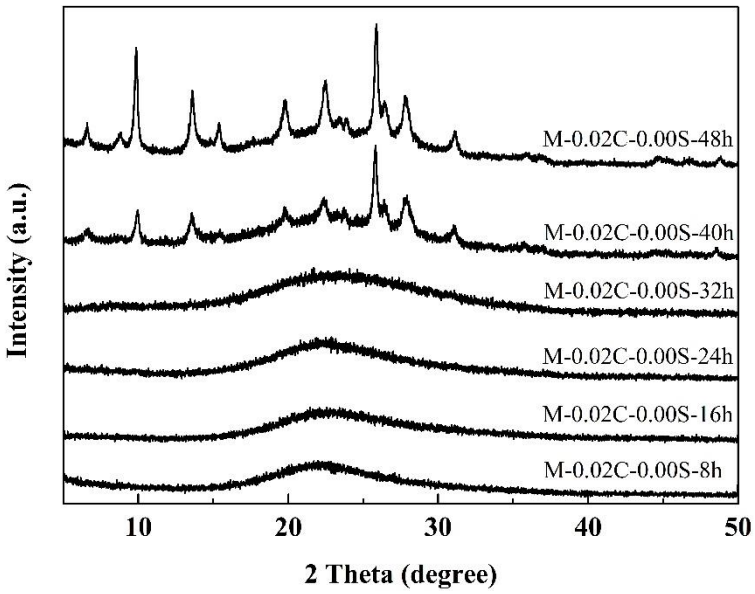

Fig. S4 XRD patterns of M-0.02C-0.00S-zh samples.

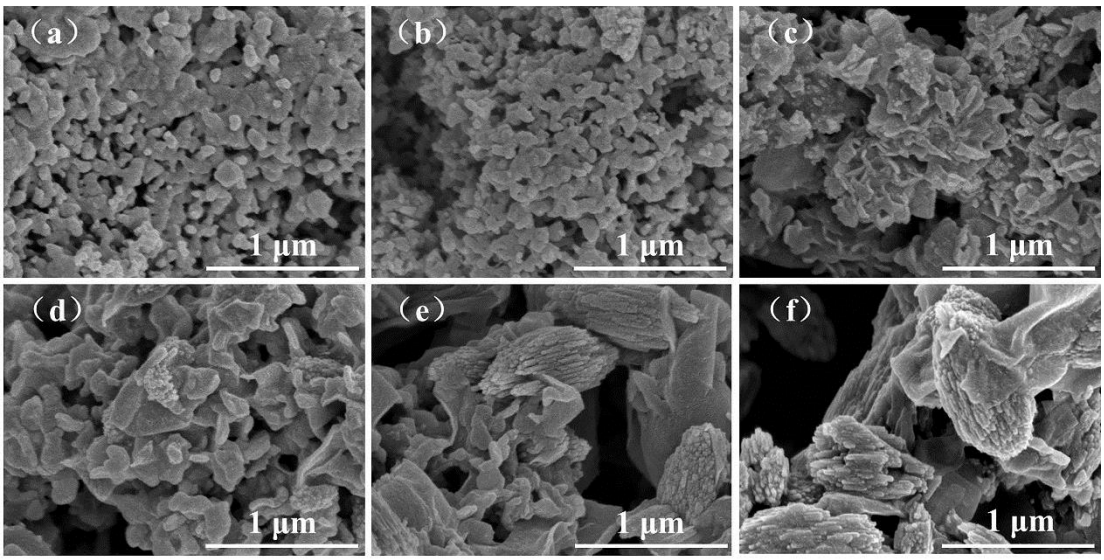

Fig. S5 SEM images of (a) M-0.02C-0.00S-8h; (b) M-0.02C-0.00S-16h; (c) M-0.02C-0.00S-24h; (d) M-0.02C-0.00S-32h; (e) M-0.02C-0.00S-40h and (f) M-0.02C-0.00S-48h.

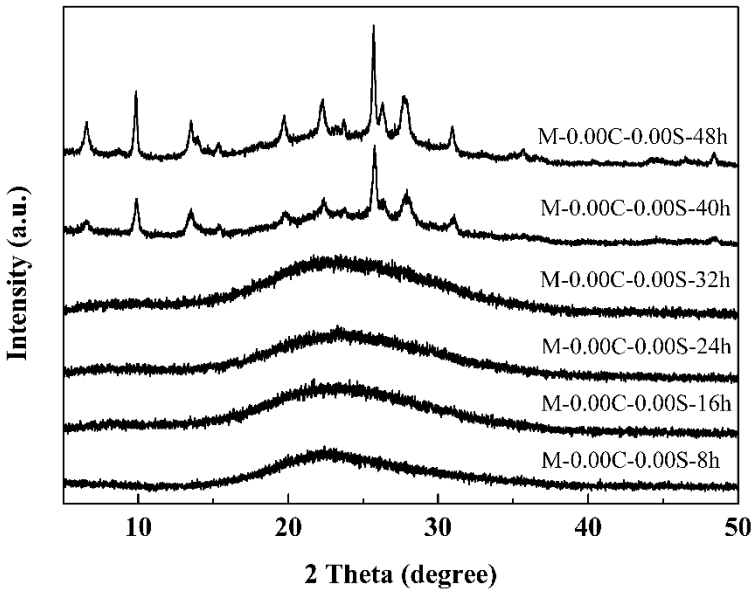

Fig. S6 XRD patterns of M-0.00C-0.00S-zh samples.

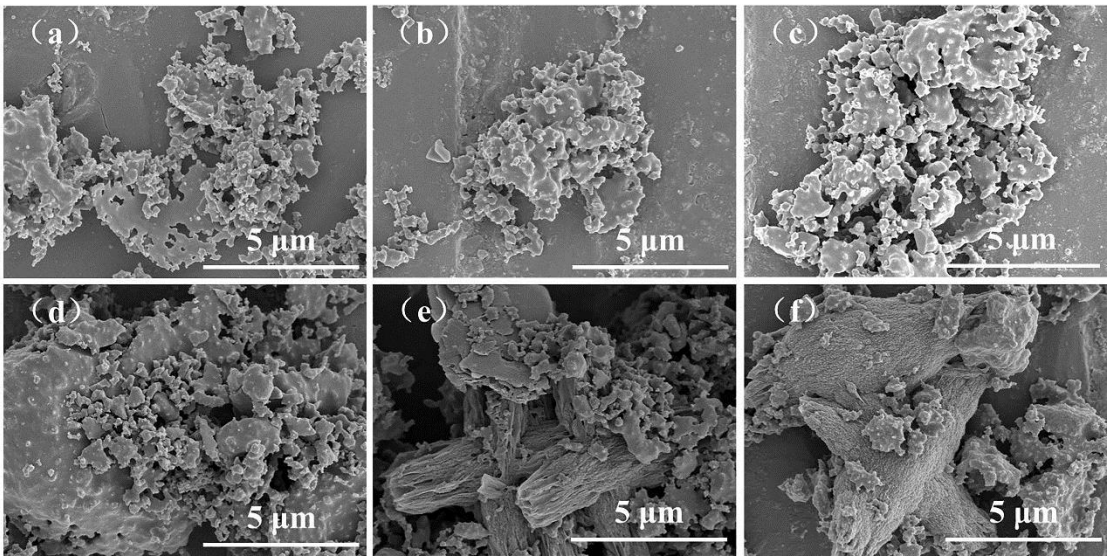

Fig. S7 SEM images of (a) M-0.00C-0.00S-8h; (b) M-0.00C-0.00S-16h; (c) M-0.00C-0.00S-24h;

(d) M-0.00C-0.00S-32h; (e) M-0.00C-0.00S-40h and (f) M-0.00C-0.00S-48h.

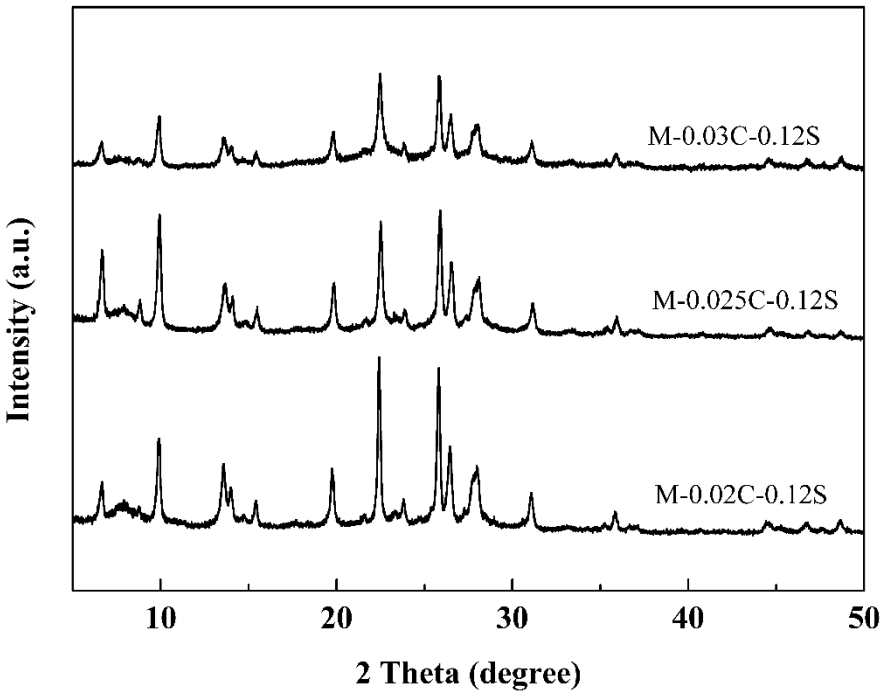

Fig. S8 XRD patterns of M-0.02C-0.12S, M-0.025C-0.12S and M-0.03C-0.12S samples

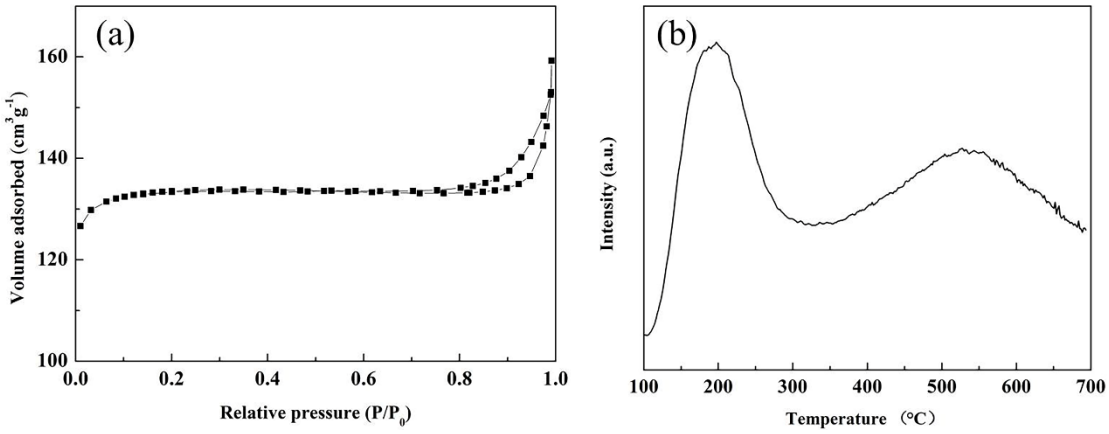

Fig. S9 (a) N_2 adsorption-desportion isotherms of C-MOR and (b) NH_3-TPD profiles of C-MOR

Table S2 Textural properties of C-MOR.

Catalysts	SiO_2/Al_2O_3	Surface area ($m^2\ g^{-1}$)			Pore volume ($cm^3\ g^{-1}$)		
		S_{BET}	S_{ext}	S_{mico}	V_{total}	V_{micro}	V_{meso}
C-MOR	15	521	99	422	0.220	0.196	0.024

Table S3 Acid amounts determined by NH_3-TPD of C-MOR.

Catalysts	Total acidity (mmol g^{-1})	Weak acidity (mmol g^{-1})	Strong acidity (mmol g^{-1})
C-MOR	1.093	0.912	0.181