Supporting Information

Template-induced Al distribution in MOR and enhanced activity in dimethyl ether carbonylation

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Fig. S1 SEM images of HM-*x* samples



Fig. S2 FTIR spectra of NH₃ adsorption and (b) FTIR spectra of O–H stretching region of HM-*x* samples.

The number of B_{total} was calculated based on the intensity of band at 1430 cm⁻¹ and the molar extinction coefficient (reported in the literature of 0.11 cm²·µmol⁻¹ (*Chem. Eng. J.*, **2014**, 237, 372-379).



Fig. S3 Optimized configurations of Na⁺ and OSDAs interacted with $[AlO_4]^-$. (a) Na⁺ in 12-MR, (b) Na⁺ in 8-MR, (c) CHA, (d) HPZ, (e) HMI, (f) 4-MPD, (g) Na⁺(H₂O), and (h) Na⁺(H₂O)₂.



Fig. S4 DME conversion on samples versus time on stream. Reaction conditions: 200 $^{\circ}$ C, 1.5 MPa, DME/CO = 1/49, 6000 h⁻¹

Model	E _{int} (kJ/mol)
Na ⁺	-440.5
Na ⁺ (H ₂ O)	-400.3
$Na^{+}(H_2O)_2$	-360.7

Table S1 E_{int} of $Na^{\scriptscriptstyle +}$ and hydrated $Na^{\scriptscriptstyle +}$ cations interacted with $[AlO_4]^{\scriptscriptstyle -}$ in 12-MR