Electronic Supplementary Information

Increasing the ion-exchange capacity of MFI zeolites by introducing Zn to the aluminosilicate frameworks

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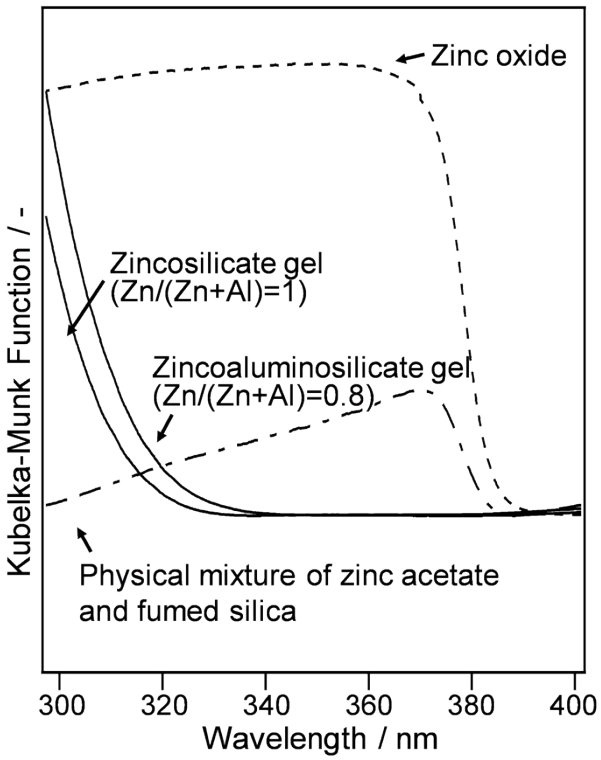

Fig. S1 DR UV-Vis spectra of zincosilicate gel (Zn/(Zn + Al) = 1.0), zincoaluminosilicate gel (Zn/(Zn + Al) = 0.8), and physical mixture of zinc acetate and fumed silica after calcination at 800 °C for 8 h in air. A spectrum of zine oxide is shown for comparison.

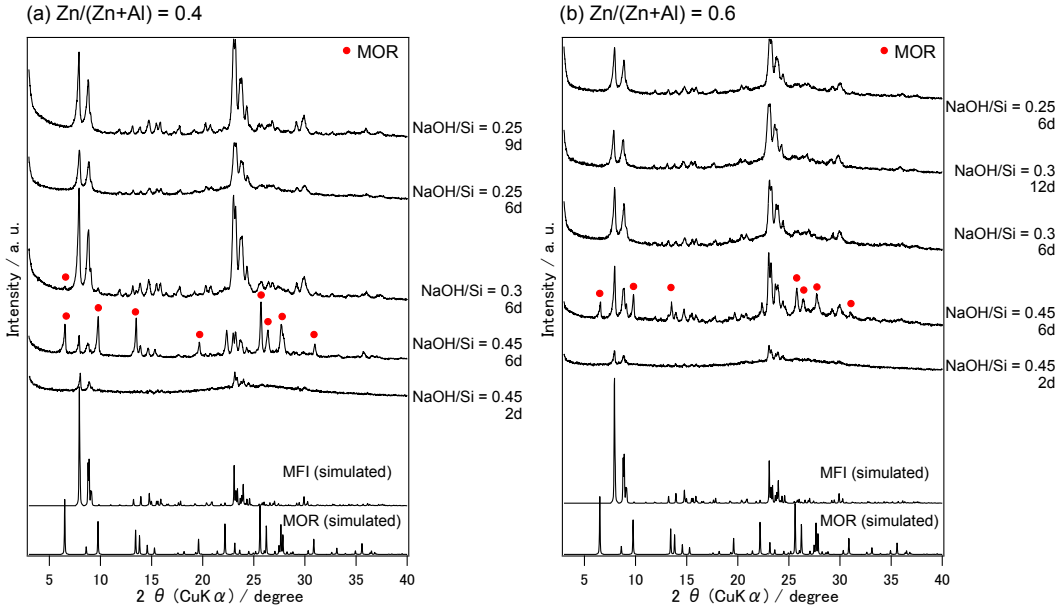

Fig. S2 Powder XRD patterns of products synthesized for different periods of time from co-precipitated gels with Zn/(Zn+Al) of (a) 0.4 and (b) 0.6 by hydrothermal treatment at 170 °C. The ratio of NaOH/Si and duration of hydrothermal treatment time were varied.

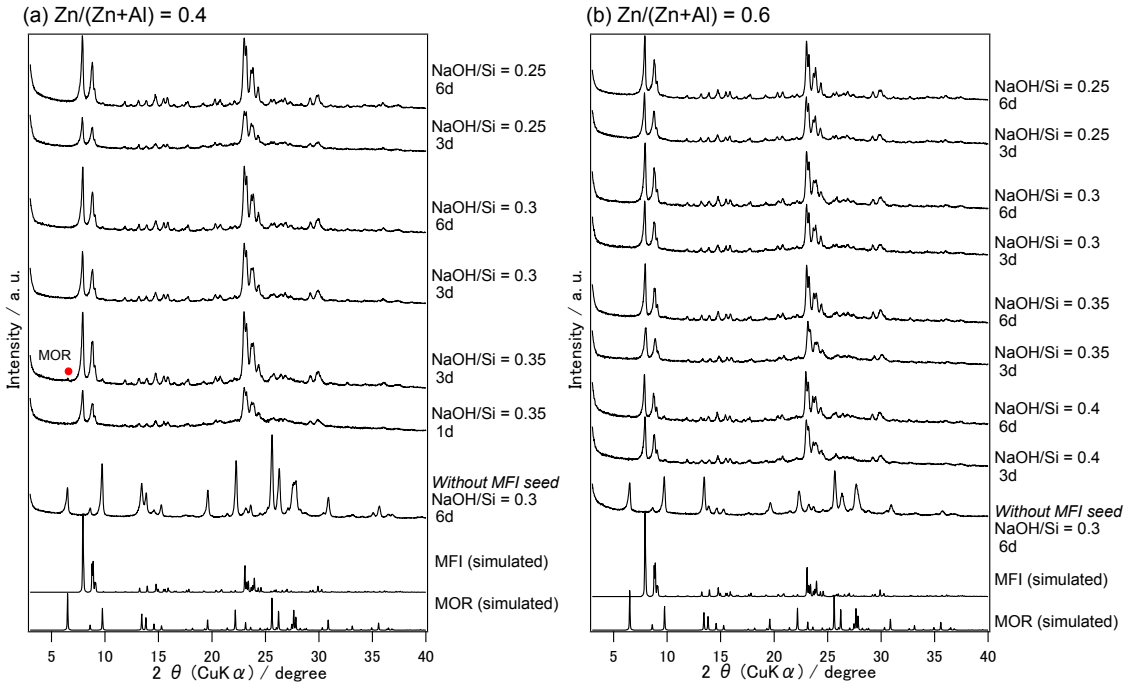

Fig. S3 Powder XRD patterns of products synthesized from co-precipitated zincoaluminosilicate gels with Zn/(Zn+Al) of (a) 0.4 and (b) 0.6 by hydrothermal treatment at 190 °C. The ratio of NaOH/Si and duration of hydrothermal treatment time were varied.

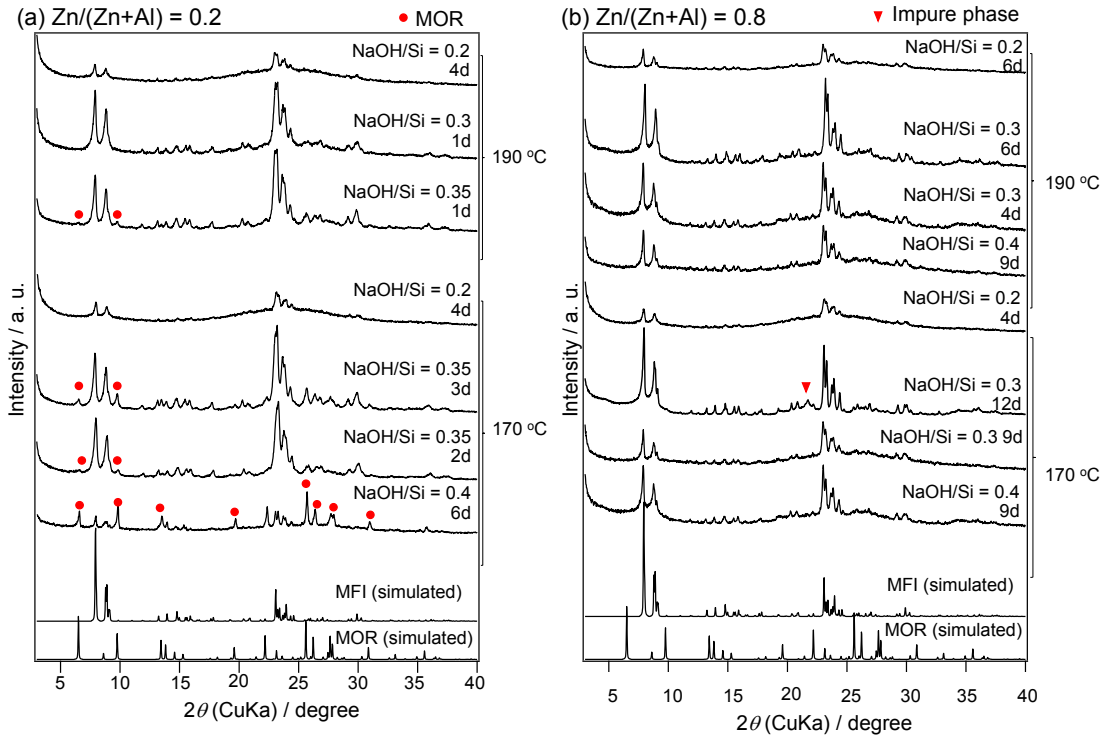

Fig. S4 Powder XRD patterns of products synthesized from co-precipitated zincoaluminosilicate gels with Zn/(Zn+Al) of (a) 0.2 and (b) 0.8 by hydrothermal treatment at 170 °C and 190 °C. The NaOH/Si ratio and duration of hydrothermal treatment time were varied.

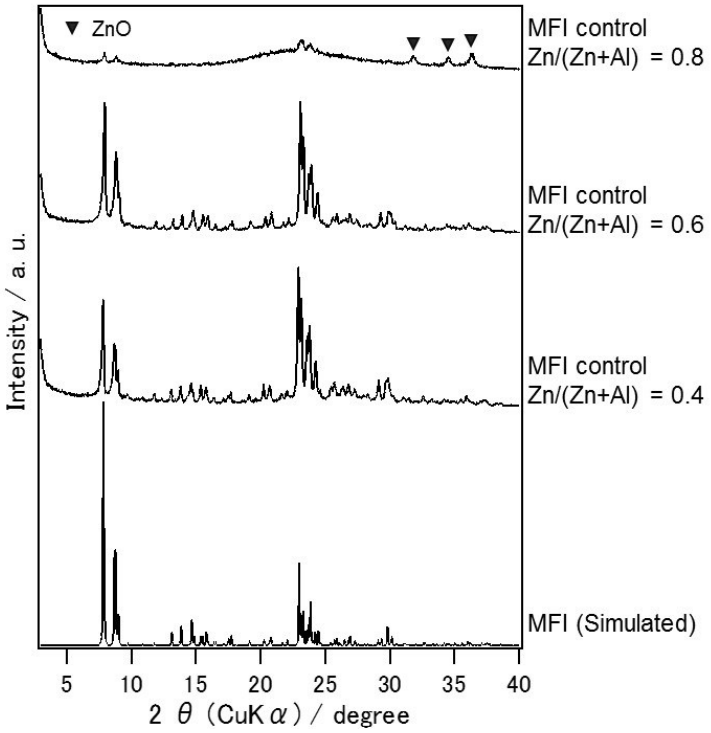

Fig. S5 Powder XRD patterns of products synthesized using fumed silica, sodium aluminate, and zinc acetate at Zn/(Zn+Al) of 0.4, 0.6 and 0.8.

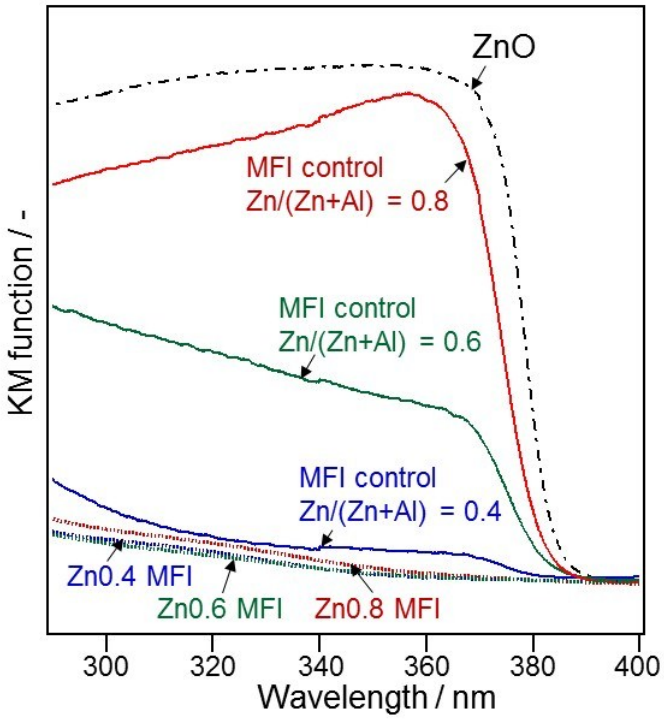

Fig. S6 DR UV-vis spectra of products synthesized at Zn/(Zn+Al) of 0.4, 0.6 and 0.8 using conventional raw materials (fumed silica, sodium aluminate, and zinc acetate) (labeled as MFI control), and Zn0.4 MFI, Zn0.6 MFI and Zn0.8 MFI prepared using co-precipitated zincoaluminosilicate gels.

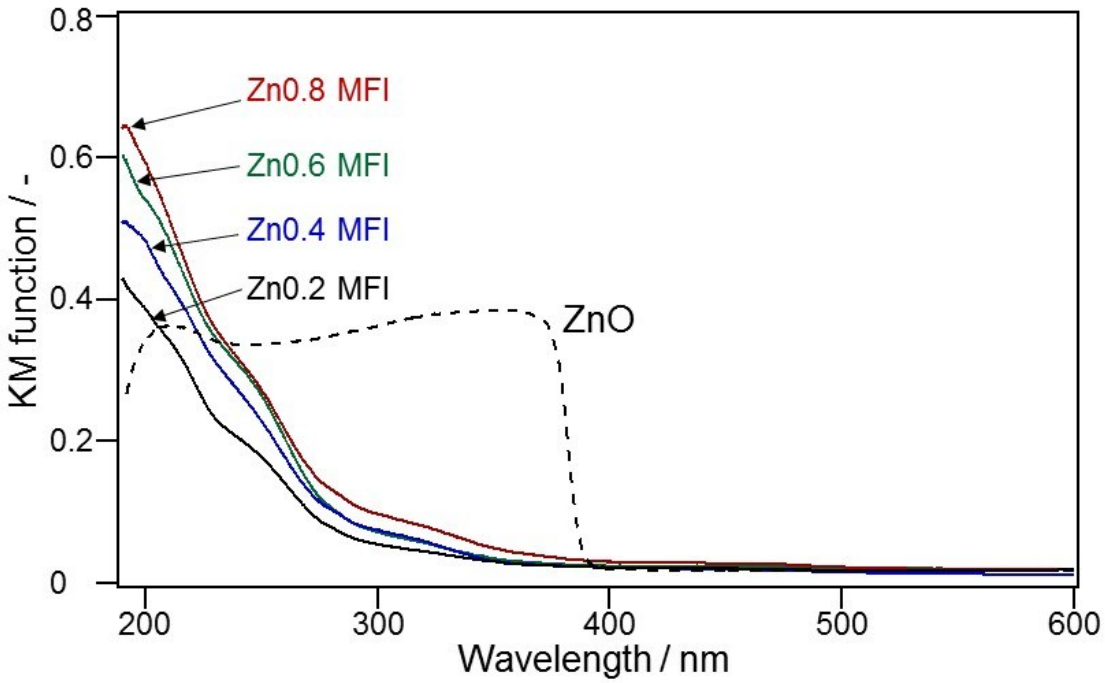

Fig. S7 DR UV-vis spectra of Zn0.2 MFI, Zn0.4 MFI, Zn0.6 MFI and Zn0.8 MFI. A spectrum of ZnO was also shown for comparison.

Table S1 Chemical compositions of the products synthesized using fumed silica, sodium aluminate, and zinc acetate at Zn/(Zn+Al) of 0.4, 0.6 and 0.8 determined by ICP-AES.

Zn/(Zn+Al) (Initial)	Si/(Zn+Al)	Zn/(Zn+Al)
0.4	8.0	0.37
0.6	8.2	0.61
0.8	7.8	0.79