

Electronic Supplementary Information (ESI)

Organic-free synthesis of zincoaluminosilicate zeolites from homogeneous gels prepared by a co-precipitation method

Natsume Koike,^a Watcharop Chaikittisilp,^a Kenta Iyoki,^a Yutaka Yanaba,^b Takeshi
Yoshikawa,^b Shanmugam Palani Elangovan,^c Keiji Itabashi^c and Tatsuya Okubo^{a*}

^aDepartment of Chemical System Engineering, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo
113-8656, Japan

^bInstitute of Industrial Science, The University of Tokyo, 4-6-1 Komaba, Meguro-ku, Tokyo, 153-8505,
Japan

^cUniZeo Co., Ltd., The University of Tokyo Entrepreneur Plaza, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033,
Japan

*E-mail: okubo@chemsys.t.u-tokyo.ac.jp

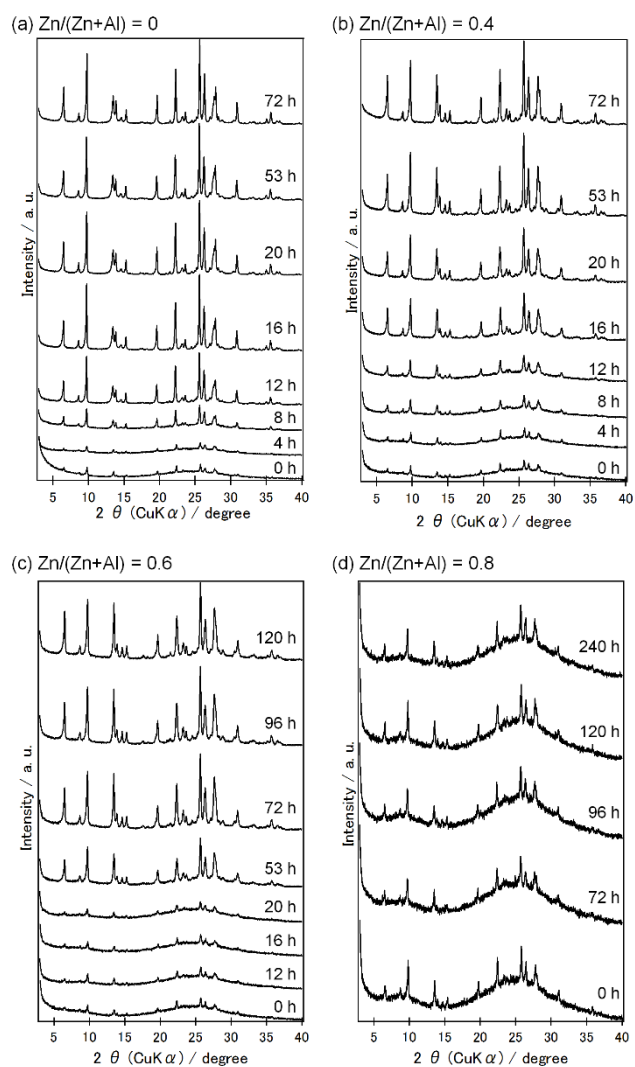


Fig. S1 Powder XRD patterns of products synthesized for different periods of time from co-precipitated gels with Zn/(Zn+Al) of (a) 0, (b) 0.4, (c) 0.6, and (d) 0.8.

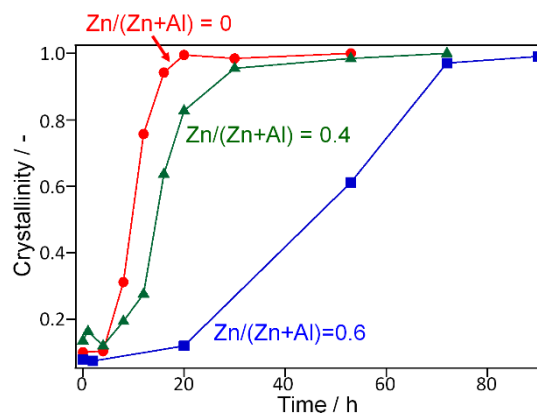


Fig. S2 Crystallization curves of products synthesized from co-precipitated gels with Zn/(Zn+Al) of 0, 0.4, and 0.6. The crystallinity was calculated from the total areas of XRD peaks at around 19.7°, 22.4°, 25.8°, and 26.4°.

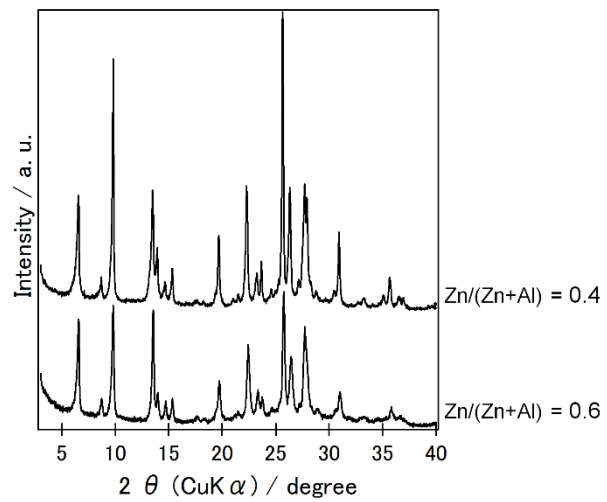


Fig. S3 Powder XRD patterns of products synthesized using fumed silica, sodium aluminate, and zinc acetate at Zn/(Zn+Al) of 0.4 and 0.6.

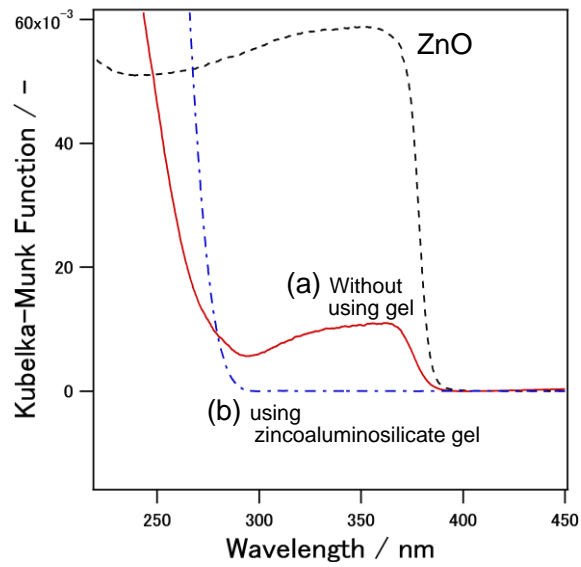


Fig. S4 DR UV-vis spectra of products synthesized at Zn/(Zn+Al) of 0.6 using (a) conventional raw materials (fumed silica, sodium aluminate, and zinc acetate) and (b) co-precipitated zincoaluminosilicate gel.

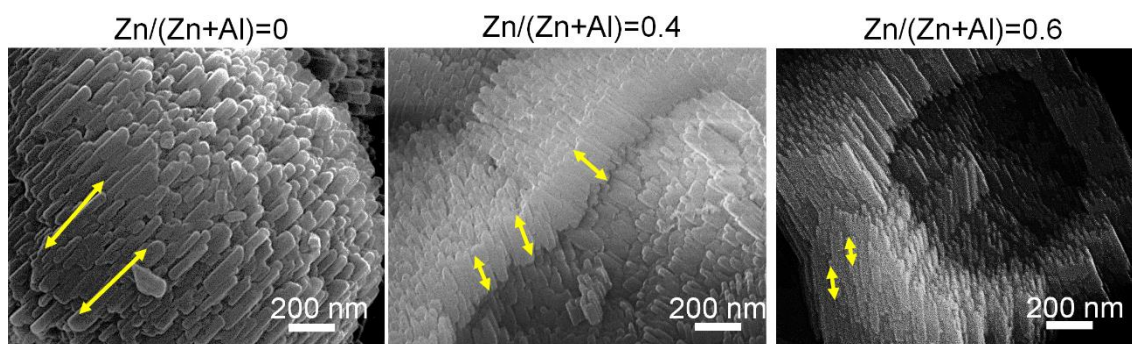


Fig. S5 Additional FE-SEM images of products synthesized from co-precipitated gels with $Zn/(Zn+Al)$ of 0, 0.4, and 0.6.

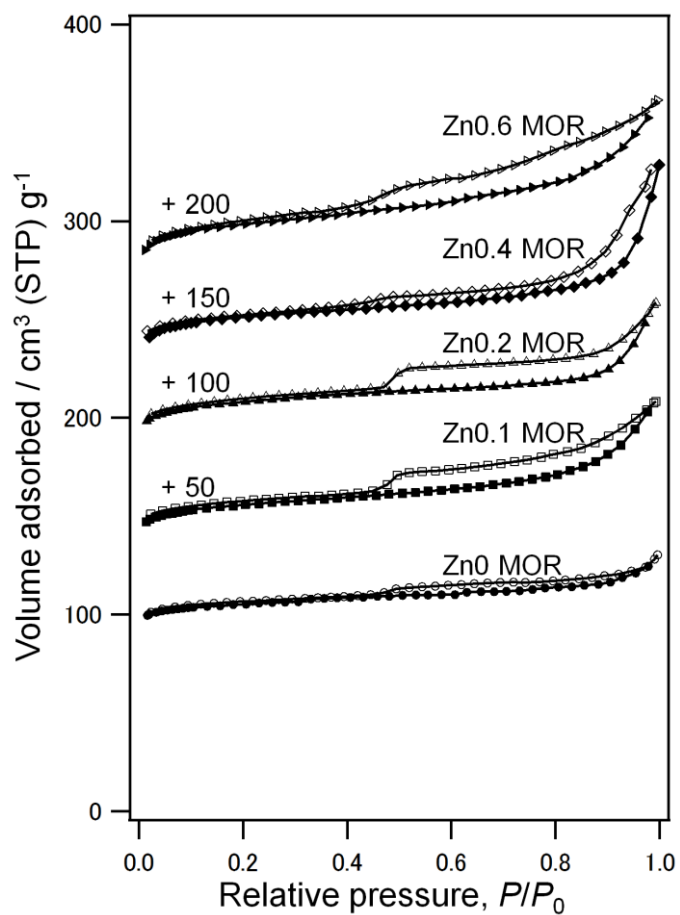


Fig. S6 Nitrogen adsorption–desorption isotherms of Zn0 MOR, Zn0.1 MOR, Zn0.2 MOR, Zn0.4 MOR, and Zn0.6 MOR. The isotherms of Zn0.4 MOR and Zn0.6 MOR were obtained after ion-exchange with NH_4NO_3 and subsequent calcination.

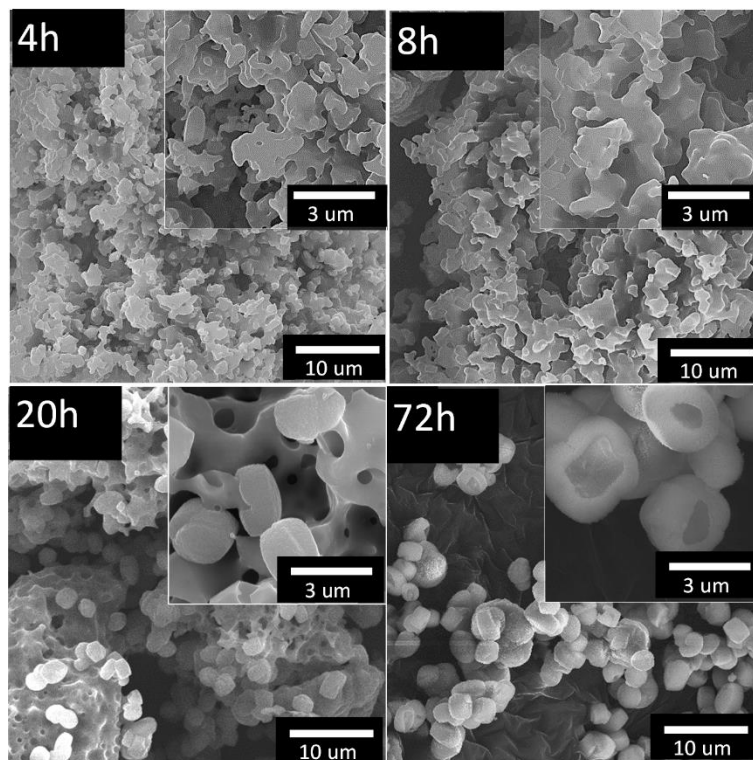


Fig. S7 FE-SEM images of products synthesized from co-precipitated gels with Zn/(Zn+Al) of 0.4 at 150 °C for 4, 8, 20, and 72 h.