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Supporting Information

Al-ZSM-5 nanocrystal catalysts grown from silicalite-1 seeds for methane conversion

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Zeolite size and number density calculation

The average particle size (nm) of each sample was determined by calculating the average size value of the nano-sized ZSM-5 crystals (SEM images shown in Figure 2). The particle volume (nm^3) of each sample was determined by assuming different particle shapes depending on the SARs based on the average particle size. At SAR = ∞ and 140, hexagonal columnar particles were obtained. At SAR = 70 cylindrical particles were obtained. The volume of twinning was ignored. The samples with SAR = 40, 35, and 25 consisted of spherical particles. The number of particles (counts) was counted by dividing the weight of one zeolite particle (g) from the total weight of the formed zeolites (g). The total weight of the formed zeolites (g) was determined by measuring the overall weight of the calcined (550 °C for 6 h at the ramp rate of 1 °C/min) nano-sized ZSM-5 crystals (SEM images shown in Figure 2). The weight of one zeolite particle (g) was obtained by multiplying the previously calculated particle volume (nm^3) by the ZSM-5 density (1.785 g/cm^3 or 17.9 T/1000 $Å^3$).

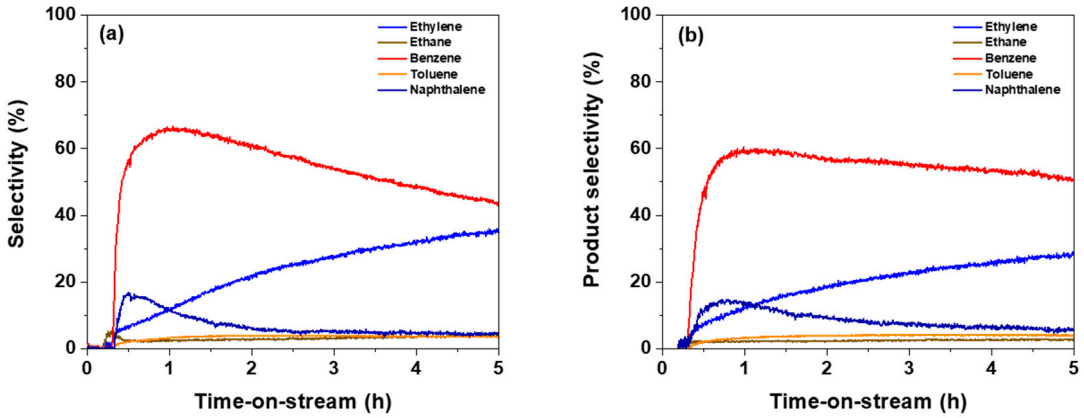

Figure S1. Aromatic selectivities obtained using zeolite catalyst: **(a)** commercial zeolite with SAR 140 and **(b)** 100 nm SAR 140.