Supplementary Information

Synthesis of high-silica AEI zeolite with enhanced thermal stability by hydrothermal conversion of FAU zeolite, and its activity in the selective catalytic reduction of NOx with NH₃

Takushi Sonoda, a Toshihiro Maruo, a Yoshitaka Yamasaki, a Nao Tsunoji, a Yasuyuki Takamitsu, b Masahiro Sadakane, a Tsuneji Sano* a

a Department of Applied Chemistry, Graduate School of Engineering, Hiroshima University, Higashi-Hiroshima 739-8527, Japan, E-mail: tsano@hiroshima-u.ac.jp
b Nanyo Research Laboratory, Tosoh Corporation, Shunan, Yamaguchi 746-8501, Japan
Figure S1. $^{27}$Al MAS NMR spectra of AEI zeolites. (a) Sample 20 and (b) Sample 25.

Figure S2. XRD spectra of (a) as-synthesized AEI zeolite and (b) AEI zeolite after thermal treatment at 700 °C for 6 h under vacuum, followed by calcination in air at 600 °C for 6 h.
Figure S3. $^{13}$C CP/MAS NMR spectrum of AEI zeolite synthesized with the $N,N$-diethyl-2,6-dimethylpiperidinium cation.

Figure S4. TG/DTA curves of AEI zeolite synthesized with the $N,N$-diethyl-2,6-dimethylpiperidinium cation.
**Figure S5.** $^{27}$Al MAS NMR spectrum of AEI zeolite synthesized with the $N,N$-diethyl-2,6-dimethylpiperidinium cation.

**Figure S6.** $N_2$ adsorption isotherm of AEI zeolite synthesized with the $N,N$-diethyl-2,6-dimethylpiperidinium cation.
Figure S7. XRD spectra of various AEI zeolites after calcination for 1 h at (a) 600 ºC, (b) 700 ºC, (c) 800 ºC, (d) 900 ºC, (e) 1000 ºC, and (f) 1100 ºC. (A) Sample 17 (P/Al = 1.21), (B) Sample 18 (P/Al = 0.65), (C) Sample 23 (P/Al = 0.59), (D) Sample 20 (P/Al = 0.33), (E) Sample 25 (P/Al = 0.25), (F) Sample 28 (P/Al = 0), and (G) P-modified Sample 28 (P/Al = 0.19).
Figure S8. XRD spectra of Cu-loaded AEI catalysts (hydrothermally treated at 900 °C for 4 h) after the NH₃-SCR of NOx reaction. (a) Modified with P-containing SDA (Catalyst 4), (b) non-phosphorus-modified (Catalyst 6), and (c) modified by impregnation with (NH₄)₂HPO₄ (Catalyst 7).