Electronic Supporting Information

for

“Iron-exchanged high-silica LTA zeolite as hydrothermally stable NH₃-SCR catalysts”

Taekyung Ryu, Yonjoo Kang, In-Sik Nam and Suk Bong Hong*

Center for Ordered Nanoporous Materials Synthesis, Division of Environmental Science and Engineering, POSTECH, Pohang 37673, Korea
Fig. S1 NH$_3$ conversion as a function of temperature in the NH$_3$ oxidation reaction over the fresh (a) Fe-SSZ-13 and (b) Fe-LTA catalysts with the same Si/Al ratio but different Fe/Al ratios: Fe-SSZ-13-16-0.19, ○; Fe-SSZ-13-16-0.26, □; Fe-SSZ-13-16-0.35, △; Fe-LTA-16-0.18, ●; Fe-LTA-16-0.29, ■; Fe-LTA-16-0.37, ▲. The feed contains 500 ppm NH$_3$, 5% O$_2$ and 10% H$_2$O, balanced with N$_2$, at 100,000 h$^{-1}$ GHSV. The last two numbers in the catalyst identification indicate the Si/Al and Fe/Al ratios of each catalysts, respectively.
**Fig. S2** NO conversion as a function of temperature in the NH$_3$-SCR reaction over the (left) 750 °C- and (right) 850 °C-aged forms of (a) Fe-SSZ-13 and (b) Fe-LTA catalysts with the same Si/Al ratio but different Fe/Al ratios: Fe-SSZ-13-16-0.19, ○; Fe-SSZ-13-16-0.26, □; Fe-SSZ-13-16-0.35, △; Fe-LTA-16-0.18, ●; Fe-LTA-16-0.29, ■; Fe-LTA-16-0.37, ▲. The feed contains 500 ppm NH$_3$, 500 ppm NO, 5% O$_2$ and 10% H$_2$O, balanced with N$_2$, at 100,000 h$^{-1}$ GHSV. Hydrothermal aging was performed under flowing air containing 10% H$_2$O at 750 and 850 °C for 24 h, respectively.
Fig. S3 N₂O formation as a function of temperature in the NH₃-SCR reaction over the (left) fresh and (right) 900 °C-aged forms of (a) Fe-SSZ-13 and (b) Fe-LTA catalysts with the same Si/Al ratio but different Fe/Al ratios: Fe-SSZ-13-16-0.19, ○; Fe-SSZ-13-16-0.26, □; Fe-SSZ-13-16-0.35, △; Fe-LTA-16-0.18, ●; Fe-LTA-16-0.29, ■; Fe-LTA-16-0.37, ▲. Hydrothermal aging was performed under flowing air containing 10% H₂O at 900 °C for 12 h. The feed composition is the same as that given in Fig. S2.
Fig. S4 Powder X-ray patterns of the (from left to right) fresh, 750 °C-, 850 °C-, and 900 °C-aged forms of (a, from bottom to top) Fe-SSZ-13-16-0 (black), Fe-SSZ-13-16-0.19 (green), Fe-SSZ-13-16-0.26 (navy), and Fe-SSZ-13-16-0.35 (red) and (b, from bottom to top) Fe-LTA-16-0 (black), Fe-LTA-16-0.18 (green), Fe-LTA-16-0.29 (navy), and Fe-LTA-16-0.37 (red) catalysts. Hydrothermal aging was conducted under flowing air containing 10% H₂O at 750 and 850 °C for 24 h and at 900 °C for 12 h, respectively.
**Fig. S5** UV-vis spectra of the (left) fresh and (right) 900 °C-aged forms of (a) Fe-SSZ-13-16-0.35 and (b) Fe-LTA-16-0.37 catalysts: experimental (top); simulated (middle); deconvoluted components (bottom). The hydrothermal aging conditions are the same as that given in Fig. S3.
Fig. S6 Difference IR spectra of adsorbed NO on the (left) fresh and (right) 900 °C-aged forms of (a, from bottom to top) Fe-SSZ-13-16-0.19 (green), Fe-SSZ-13-16-0.26 (navy), and Fe-SSZ-13-16-0.35 (red) and (b, from bottom to top) Fe-LTA-16-0.18 (green), Fe-LTA-16-0.29 (navy), and Fe-LTA-16-0.37 (red) catalysts. All the spectra were collected at room temperature after evacuation under vacuum to a residual pressure of $10^{-4}$ Pa at the same temperature for 1 h.