

Iron-Exchanged High-Silica LTA Zeolites as Hydrothermally Stable  $\text{NH}_3$ -SCR Catalysts

류태경, 강연주, 남인식, 홍석봉<sup>†</sup>  
포항공과대학교  
(sbhong@postech.ac.kr<sup>†</sup>)

The catalytic properties of iron-exchanged LTA and SSZ-13 zeolites with different Si/Al (11-23) and Fe/Al (0.18-0.37) ratios hydrothermally aged at 750-900 °C have been investigated in the selective catalytic reduction of  $\text{NO}_x$  by  $\text{NH}_3$  ( $\text{NH}_3$ -SCR). When the zeolite support possesses the same bulk ratio (16), each fresh Fe-LTA catalyst always exhibits a higher NO conversion than the corresponding Fe-SSZ-13 catalyst with a similar Fe/Al ratio in the reaction temperature range studied. Hydrothermal aging at 900 °C led to a noticeable decrease in  $\text{NH}_3$ -SCR performance of both series of catalysts. However, the extent of the decrease was found to be considerably smaller in the Fe-LTA series. This allows each of the Fe-LTA series to outperform even Fe-beta, which is known as the most hydrothermally stable among the iron-exchanged zeolite catalysts tested so far. The overall characterization results of this study reveal that the active iron species (e.g., isolated  $\text{Fe}^{3+}$  ions and small oligomeric  $\text{Fe}_x\text{O}_y$  species) in Fe-LTA are more stable than those in Fe-SSZ-13, mainly due to notable differences in their iron ion sites.