

Synthesis of Zeolite UZM-35 and Catalytic Properties of Copper-Exchanged UZM-35 for Ammonia Selective Catalytic Reduction

이정환, 김영진, 류태경, 김평순¹, 김창환¹, 남인식, 홍석봉[†]

포항공과대학교; ¹Hyundai Motor Group

(sbhong@postech.ac.kr[†])

The synthesis of zeolite UZM-35 with the MSE topology and the catalytic properties of copper-exchanged UZM-35 (Cu-UZM-35) for the selective catalytic reduction of NO_x with NH₃ (NH₃-SCR) are presented. When the simple dimethyldipropylammonium cation is used as an organic structure-directing agent together with Na⁺ and K⁺, crystallization of pure UZM-35 is very sensitive not only to the types of Al and Si sources employed, but also to the SiO₂/Al₂O₃ and K₂O/(Na₂O + K₂O) ratios in the synthesis mixture. In the temperature range studied, fresh Cu-UZM-35 shows comparable deNO_x performance to fresh Cu-SSZ-13, the best NH₃-SCR catalyst known to date. When hydrothermally aged at 750 °C, although the latter catalyst outperforms the former one, the operating temperature window of Cu-UZM-35 is considerably wider than that of Cu-SSZ-13. The overall characterization results of this study demonstrate the highly stable nature of framework Al atoms in the large-pore zeolite UZM-35 and their strong interactions with Cu²⁺ ions. This may lead to a moderate alteration of exchanged Cu²⁺ ions to CuO_x and CuAl₂O₄ phases at high temperatures, thus rendering Cu-UZM-35 hydrothermally stable during NH₃-SCR.