

Low-temperature N₂O reduction using ammonia reductant over Fe/BEA zeolite catalysts

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It has been reported that N₂O causes various environmental problems such as global warming and depletion of the stratospheric ozone layer. It is known that 25 % of N₂O emissions comes from stationary sources in industry in an O₂-rich atmosphere. Recently, it was reported that 80 % of N₂O was converted around 400 °C of reaction temperature using hydrocarbon reductant. Generally, high N₂O conversion with ammonia reductant is difficult to achieve at the reaction temperature below 400 °C. When using ammonia reductant, N₂O conversion was shown to be about 40 % at the reaction temperature. This study attempts to improve N₂O conversion over Fe/BEA catalysts at 350 °C of reaction temperature using ammonia. Pre-treatment of the catalysts could achieve 90 % of N₂O conversion at 350 °C. The catalysts were characterized with solid-state NMR and XPS to find out the origin of the low-temperature N₂O reduction with ammonia reductant.