

Economical synthesis of high-silica LTA zeolites: toward a new commercial catalyst for NH₃-SCR reaction

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We have recently synthesized LTA zeolites with Si/Al = 8.3-∞ using benzyimidazolium-based cations as an organic structure-directing agent in fluoride media. We found that the Cu-LTA catalysts exhibited remarkable deNO_x activities even after hydrothermal aging at 900 °C, opening up a new direction for the development of advanced NH₃-SCR catalysts.

Unfortunately, however, the use of expensive or toxic ingredients, *i.e.*, tetraethylorthosilicate and HF as Si and F sources, respectively, are required for their synthesis, restricting the industrial applications. Here, we show that high-silica LTA zeolites can be synthesized in a cost-effective and environmentally benign way. The crystallization of LTA zeolites strongly depends on the particle size of silica source in the synthesis mixture, whereas the type of Al and F sources does not significantly affect the phase selectivity. As a catalyst for NH₃-SCR, the Cu-LTA obtained in this work is comparable with that prepared by the conventional route and, of course, is superior to the currently commercialized Cu-SSZ-13.