

### N<sub>2</sub>O decomposition over FeZSM5 catalyst

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The N<sub>2</sub>O decomposition activity of FeZSM5 is known to be strongly dependent on the iron content and the preparation methods including wet ion exchange (WIE), and solid state ion exchange (SSIE). However, the peculiar characteristics of FeZSM5 for N<sub>2</sub>O decomposition have not been clearly identified yet from the view of the active reaction site on the catalyst surface. The present study has been investigated to correlate the state of Fe species based upon the preparation method with their role for N<sub>2</sub>O decomposition activity. The decomposition activity of FeZSM5-SSIE mostly appears to be higher than that of FeZSM5-WIE, indicating the formation of a distinctive local structure of Fe, which is confirmed by EXAFS and XANES spectra. The neighbor shells in Fourier transformed Fe k-edge EXAFS spectra for FeZSM5-SSIE and WIE catalysts are estimated to be ca. 4×Fe-O / 1×Fe-Fe, and 6×Fe-O / 6×Fe-Fe respectively. It reveals that the most of Fe species of FeZSM5-SSIE are well dispersed in the form of oxygen-bridged binuclear Fe species. It can be concluded that the high performance of FeZSM5-SSIE is mainly due to the fine dispersion of Fe species onto its surface during the preparation of the catalyst.