

Bead-Milling and Post-Milling Recrystallization: An Organic Template-Free Methodology for the Production of Nano-Zeolite Catalyst

Toru Wakihara[†]

The University of Tokyo

(wakihara@chemsys.t.u-tokyo.ac.jp[†])

A new method for the production of nanosized zeolite powder by a top-down approach has been performed. In this study, ZSM-5 (MFI type structure) was first milled to produce a nanopowder. This technique can destroy the outer portion of the zeolite framework, which lowers the micropore volume of ZSM-5 zeolite. To remedy this, the damaged part was recrystallized using a dilute aluminosilicate solution after bead milling. From the combined bead milling and post-milling recrystallization, nanosized ZSM-5 zeolite approximately 50 nm in size with high crystallinity was obtained successfully. Obtained samples were evaluated as acid-catalysts for cumene cracking. As a result, ZSM-5 zeolite powder showed a higher catalytic activity in cumene cracking in comparison with the raw ZSM-5 zeolite.