

Mesoporous/Microporous Hierarchical MFI Zeolites for Retardation of Catalyst Deactivation in Organic Reactions

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We developed a new synthesis strategy for direct, hydrothermal crystallization of zeolites having mesoporous/microporous hierarchical structure. Despite the disordered mesopores, the pore diameters were uniformly tailorable. The zeolite frameworks were highly crystalline and exhibited strong acidity. The hierarchical zeolites showed remarkably enhanced catalytic activity for bulky molecular transformation. The hierarchical MFI zeolite exhibited remarkably high resistance to deactivation in catalytic activity of various reactions, such as gas phase isomerization of 1,2,4 trimenthylbenzene & cumene cracking, and liquid phase esterification of benzyl alcohol with hexanoic acid. Such slow deactivation seems to be generalized to a phenomenon corresponding to the zeolite structures with mesoporous/microporous hierarchical nature.