

Surfactant-Directed Mesoporous Sponge of MTW Zeolite as Long-lived Catalyst for Cumene Synthesis

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A mesoporous sponge of crystalline microporous MTW zeolite framework has been synthesized by using multiquaternary ammonium-type organic surfactant as a structure-directing-agent. The mesopore diameters are uniform with the diameter of 4 nm. The mesopore walls are made of crystalline microporous MTW zeolite in the range of 5 ~ 10 nm in thickness. The formation of the zeolite sponge indicates that the zeolite framework has been generated due to the zeolite-structure-directing ability of the multi-ammonium groups while the surfactant molecules self-assemble into a disordered micellar mesophase. Synthesis of cumene, which is a major intermediate for production of phenol and acetone, was tested as a catalytic reaction of this material. According to results, mesoporous sponge of MTW zeolite is highly active and selective as catalyst for the reaction. Moreover, it showed high resistance to deactivation owing to enhanced molecular diffusion through 3-dimensional network of mesopores.