

Synthesis of Nanocrystalline Ferrierite Zeolite and its Physicochemical and Catalytic Properties

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The synthesis of zeolites using a choline (2-hydroxy-N,N,N-trimethylethanaminium) ion as an organic structure-directing agent (SDA) and their characterization results are described. Finally, nanocrystalline ferrierite (framework type FER), UZM-12 (ERI), and ZSM-34 were synthesized, as well as a lamellar silicate composed of ferrierite layers, by varying the Al content and/or the type of inorganic cations. The physicochemical properties of these materials have been characterized by different analytical tools. Especially, catalytic properties of ferrierite zeolite nanoneedles are described. Ferrierite which is a medium-pore, high-silica zeolite is well known for the exceptional selectivity in the skeletal isomerization of n-butenes to isobutene and active for the selective reduction of NOx. Therefore, the catalytic properties of nanocrystalline ferrierite for the skeletal isomerization of 1-butene to isobutene and the selective reduction of NO with methane in the presence of water have been compared with those obtained from the corresponding cation forms of the commercial, microcrystalline ferrierite, respectively.