

Hierarchical Mesoporous ZSM-5 Catalysts by Microwave through the Self-Assembly between Surface Charged Zeolite Nanoparticles and Counter Ionic Surfactants

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Microwave synthesis enabled to synthesize hierarchical mesoporous ZSM-5 through the self-assembly via ionic interactions between surface charged zeolite nanoparticles and their counter ionic surfactants. After preparing ZSM-5 nanoparticles having MFI structure, ionic characters were introduced onto the nanoparticle surface by tethering sulfonic acid group. And microwave synthesis facilitated to form mesoporous zeolites through the self-assembly process with the help of ionic surfactant CTAB as template. These mesoporous ZSM-5 possessed both periodic mesoporosity due to the template and crystalline nature of zeolites. However, conventional hydrothermal synthesis resulted in intercrystalline mesoporosity with strong zeolitic crystallinity. And the remaining sulfonic ions played role as Bronsted acid sites together with intrinsic zeolitic active sites. Moreover, due to the periodicity induced by surfactant molecules, these mesoporous zeolite contributed to give bifunctional and acid catalytic behaviors.