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Chemoselective Alkylation of Aromatics with Benzyl Alcohol over Mesoporous ZSM-5

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Hierarchical mesoporous ZSM-5 with enhanced mesoporosity was synthesized by microwave through the rapid assembly via ionic interaction between sulfonic acid functionalized ZSM-5 nano particles and cationic surfactant. The catalytic performance of enhanced accessibility due to mesoporosity and acidity were investigated in the alkylation of mesitylene with benzyl alcohol as alkylating agent. The effect of mole ratio of aromatic with benzyl alcohol, reaction time and alkylation agent were also studied. The enhanced mesoporosity and acidity of sulfonic acid functionalized mesoporous ZSM-5 induced activity enhancement compared with non-functionalized mesoporous ZSM-5, sulfonic functionalized mesoporous ZSM-5 synthesized by hydrothermal method and conventional microporous ZSM-5. The sulfonic acid functionalized mesoporous ZSM-5 showed much higher chemoselectivity of benzylated mesitylene than others, whereas the others mainly show dibenzyl ether as product. This significant difference in catalytic selectivity was resulted from the existence of mesopores, which definitely allowed the benzylation in mesopores.

Keywords: Chemoselective, Meso ZSM-5, Alkylation, Aromatic