

晶化时间对ZSM-5/MCM-48复合分子筛结构及MTG反应性能的影响

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Effects of crystallization time on structure and reaction performance of ZSM-5/MCM-48 composite catalyst for MTG

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摘要 采用两步晶化法制备ZSM-5/MCM-48微介孔复合分子筛, 通过调变前驱体溶胶的晶化时间获得不同结构的ZSM-5/MCM-48基分子筛催化剂。采用XRD、N₂-吸附、SEM、TEM、FT-IR和Py-FTIR等手段进行表征, 结果表明, 前驱体溶胶的晶化时间对ZSM-5/MCM-48复合分子筛的结构和表面酸性产生重要的影响, 而特定结构的复合分子筛基催化剂可以显著改变甲醇制汽油(MTG)反应的产物分布, 与ZSM-5基催化剂相比显著降低了油品中芳烃和均四甲苯的含量。阐明了其催化作用机制是由于介孔结构的MCM-48对微孔结构的ZSM-5界面或表面的修饰作用。

关键词: ZSM-5/MCM-48 晶化时间 MTG 汽油 芳烃

Abstract: ZSM-5/MCM-48 micro/mesoporous composite materials were successfully prepared by using a two-step synthesis route. XRD, N₂ adsorption SEM, TEM, FT-IR, and Py-FTIR were used to characterize the effects of the different crystallization time on the structure, surface acidity and reaction performance of methanol to gasoline. The results indicated that, the catalytic mechanism is the surface modification of mesoporous MCM-48 to microporous ZSM-5. Compared with the conventional ZSM-5 based catalyst, it was found that ZSM-5/MCM-48 composite catalyst had excellent low temperature activity and selectivity of gasoline fraction in MTG reaction, and significantly reduced the yield of total aromatic and durene in the oil.

Key words: ZSM-5/MCM-48 crystallization time MTG gasoline aromatics

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