

双组元Y / MCM-41中微孔复合分子筛的合成和表征

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摘要 通过原位处理分步晶化、水热合成的方法,首次从NaY凝胶出发制备了含有Y和 MCM-41两种分子筛成分的Y/MCM-41中微孔复合分子筛新材料,考察了合成条件对复合分子筛晶化的影响。利用层厚法和相对结晶度工作曲线法确定了复合材料中两种分子筛的相对含量。通过XRD, MAS NMR, SEM, XPS, IR, N₂吸附脱附、热处理等手段对复合材料进行了表征,并与MCM-41和Y型分子筛的有关性能进行了对比研究。结果表明,复合分子筛材料的热和水热稳定性高于相同分子筛比例的机械混合样品。与机械混合物样品相比,其中孔表现出孔径缩小、通道规整性变差、孔壁增厚和部发结晶化的特点,复合材料中两种分子筛之间存在界面效应,推测Y/MCM-41复合分子筛材具有“包覆式”结构特征。以模型化合物物理学, 3, 5-三异丙基为进料考察了其催化裂化活性,中微孔复合分子筛的催化裂化活性优于机械混合样品。

关键词 [分子筛](#) [水热反应](#) [催化裂解](#) [催化活性](#) [X射线衍射分析](#) [质谱法](#) [核磁共振谱法](#) [X射线光电子谱法](#) [红外分光光度法](#)

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Synthesis and Characterization of Y/MCM-41 Composite Molecular Sieve

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Abstract A novel binary-molecular sieve composite, namely Y/MCM-41, was synthesized from NaY gel by an in-situ two-step hydrothermal crystallization process, and the crystallization parameters were optimized. Fa-J curve and relative crystallinity methods were employed to determine the amounts of the constituent parts of Y and MCM-41 in the composite. The product was characterized by XRD, MAS-NMR, SEM, XPS, IR, N₂ adsorption/desorption and thermal treatment methods. It indicated that Y/MCM-41 was different from the mechanical mixture of MCM-41 and Y. The composite has a narrow, relatively disordered pore structure, a thicker and partially crystalline wall, and a higher stability. And it showed that the Y zeolite was enwrapped by the MCM-41. 1, 3,5-triisopropylbenzene was employed as a model compound to detect the cracking activity of the composite molecular sieve, and a higher conversion was observed by using Y/MCM-41 catalyst than that of the mechanical mixture catalyst.

Key words [MOLECULAR SIEVE](#) [HYDRO-THERMAL REACTION](#) [CATAROLE PROCESS](#) [CATALYTIC ACTIVITY](#) [XRD](#) [MS](#) [NMR](#) [XRD](#) [IR](#)

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