

水热一步法合成Ti-SBA-15分子筛及其催化性能研究

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摘要 采用钛酸丁酯和乙酰丙酮作用后的产物作为钛的前驱体,水热法一步合成出了 Ti-SBA-15 分子筛。通过X射线衍射、N₂气吸附脱附、紫外—可见漫反射等表征手段,证明在Si/Ti=50, 25, 20时,钛原子成功地取代了SBA-15中的硅原子而没有改变SBA-15高度有序的介孔二维六角结构,其中钛全部以四配位状态存在,而且高度分散。当Si/Ti=12.5时,钛的分散度降低,部分钛聚集生成二氧化钛。与用两步法合成的Ti-SBA-15比较,一步法合成的Ti-SBA-15中钛分散度好,添加量高,对催化氧化环己烯有较高的催化活性。对一步法和两步法合成Ti-SBA-15的机理以及相应产物在结构以及催化活性上的差异进行了探讨。

关键词 [水热反应](#) [分子筛](#) [催化活性](#) [硅](#) [钛](#) [X射线衍射分析](#) [环己烯](#) [紫外分光光度法](#)

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Direct Synthesis of Titanium Substituted SBA-15 under Conventional Hydrothermal Conditions and Their Catalysis Characterization

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Abstract Titanium-substituted mesoporous molecular sieve SBA-15 have been first successfully synthesized by a new direct approach under conventional hydrothermal conditions. The products obtained by reacting titanium butoxide with acetylacetone were used as the titanium precursor. By means of X-ray diffraction, nitrogen adsorption, UV-Vis diffuse reflectance, a successful isomorphous substitution of titanium in the silica framework of SBA-15 samples with Si/Ti = 50, 25, 20 has been proved, the substitution of Ti for Si does not change the highly ordered two-dimensional hexagonal mesostructure of SBA-15. Titanium is totally tetrahedral and highly dispersed. Higher titanium loading leads to the formation of titanium dioxide. Comparing with two-step preparation method, it shows that under the direct synthesis method, or one-step preparation method, titanium and silicon precursor hydrolyze harmoniously. Ti-SBA-15 demonstrates relatively high catalytic ability on the oxidation of cyclohexene. The differences of structure and catalytic ability between Ti-SBA-15 synthesized by one-step method and two-step method are explained

Key words [HYDRO-THERMAL REACTION](#) [MOLECULAR SIEVE](#) [CATALYST](#) [SILICON](#) [TITANIUM](#) [XRD](#) [CYCLOHEXENE](#) [UV](#)

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