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基础研究

制备条件对纳米TiO2/ Al2O3复合载体性能的影响

姜丽丽[1];胡晓丽[1];王海彦[1]

辽宁石油化工大学 石化学院[1]

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摘要 采用改进的溶胶-凝胶法制备了纳米级TiO2/ Al2O3复合载体，并用XRD、BET和TEM等手段对复合载体进行了表征。讨论了模板剂与硝酸铝的比例对TiO2/ Al2O3复合载体物理性质的影响，观察了TiO2/ Al2O3复合载体的形貌，对不同钛含量对复合载体晶型的影响进行了研究，同时考察了以TiO2/ Al2O3为载体催化剂的选择加氢活性。实验结果表明，改进的溶胶-凝胶法制得的TiO2/Al2O3载体具有较大的比表面积、孔容/孔径及较集中的孔分布。复合载体中的TiO2和Al2O3分别以锐钛矿和γ- Al2O3晶型存在。随着模板剂加入量的增多，TiO2/Al2O3复合载体的比表面积、孔容和平均孔径均逐渐增大，当其与Al(NO3)3的比例为0.5时达到最佳点。不同钛铝比合成的样品中TiO2的衍射峰相对较弱，表明TiO2高度均匀分散在Al2O3的表面。从催化活性评价结果可以看出，以TiO2/Al2O3复合体负载MoP的催化剂具有较高的选择加氢活性。

关键词

分类号

Effect of prepared conditions on properties of nanometer TiO2/Al2O3 complex support

Abstract

TiO2/Al2O3 complex support was synthesis by improved sol-gel method and characterized by means of XRD、BET and TEM. Effect of ratio of template and Al(NO3)3·9H2O on physic properties were studied. Surface morphology and different TiO2 content of complex support were also investigated. The selective hydrogenation property of catalysts supported on TiO2/Al2O3 was investigated. The results showed that the combined support was prepared by improved sol-gel method with the largest surface area, appropriate pore volume/diameter and focused pore distribution. Tiatania and alumina in the combined support were anatase and γ- Al2O3 crystal structure, respectively. Increasing of adding template, specific surface area, pore volume and average pore diameter of support gradually augmented. The optimum rate of Al(NO3)3·9H2O and template was 0.5. In the sample of different TiO2 content, diffraction peak of TiO2 was weak. It indicated that TiO2 was uniformity distributed on surface of Al2O3. The result revealed that titania-alumina-supported MoP catalyst had higher the catalytic activity of selective hydrogenation.

Key words

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通讯作者 姜丽丽 jll524@163.com