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催化、动力学与反应器

含双金属的超稳Y沸石负载SO^{2-}_4/ZrO_2强酸性催化剂上正庚烷临氢异构化

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摘要 用超稳Y沸石（USY）负载SO2-4/ZrO2固体超强酸，并以此为载体制备含Pt双金属催化剂，用XRD和H2-TPR表征了催化剂的物化性质，并在常压固定床反应器上考察催化剂的正庚烷临氢异构化反应性能。结果表明， USY负载了SO2-4/ZrO2和双金属以后仍能保持沸石原有结构；贵金属Pt、金属助剂以及ZrO2等在USY载体上能够高度分散。在含Pt的催化剂中掺杂了Cr或Al金属助剂以后，正庚烷异构化产物选择性有了明显的提高，且具有更好的稳定性和低温活性；在USY负载SO2-4/ZrO2和0.4%Pt的催化剂上，正庚烷的转化率为42.1%时，异构化产物的选择性只有69.6%，而在掺杂了与Pt摩尔比为5∶1的Cr或Al后，正庚烷的转化率分别为44.3%和42.1%时，异构化产物的选择性分别可提高到88.9%和89.5%。

关键词 正庚烷临氢异构化 双金属催化剂 SO2-4/ZrO2 超稳Y沸石 Pt

分类号

Hydroisomerization of n-heptane over bimetal-bearing SO^{2-}_4/ZrO_2 catalysts supported on USY zeolite

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Abstract

The bimetal-bearing SO2-4/ZrO2 superacid catalysts supported on ultra stable Y(USY) zeolite were prepared by impregnation and characterized with XRD and H2-TPR.Their catalytic activities were evaluated in the hydroisomerization of n-heptane with an atmospheric fixed-bed reactor.The USY support well kept its pore structure in catalysts and the metal species were highly dispersed on the support.The Pt-bearing catalysts doped with Cr or Al were catalytically much more stable and exhibited higher catalytic activity and selectivity than the catalysts without dopants.Over the catalyst with a Pt loading of 0.4%(mass) and ZrO2 loading of 10%(mass), the conversion of n-heptane was 42.1% with a selectivity of only 69.6% for isomerization products, while over the catalysts doped with Cr or Al with a molar ratio of Cr(Al) to Pt 5∶1, the conversion of n-heptane was 44.3% and 42.1% with the selectivity for isomerization products as high as 88.9% and 89.5% respectively.

Key words hydroisomerization of n-heptane bimetal catalyst SO2-4/ZrO2 USY platinum

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