

研究论文

Zn对Pt-Sn/ γ -Al₂O₃催化剂中Sn的活性状态及丙烷脱氢反应的影响

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收稿日期 2005-9-2 修回日期 网络版发布日期 2007-3-28 接受日期

摘要 将少量Zn添加到催化剂Pt-Sn/ γ -Al₂O₃中, 可显著提高催化剂的丙烷脱氢稳定性和丙烯的选择性. 程序升温还原(H₂-TPR)和程序升温电导(TPEC)测试结果表明, Zn的存在使Sn在强还原气氛中不易被还原, Sn的氧化态的稳定存在是Sn发挥助剂作用和保持催化剂稳定性的重要条件.

关键词 [丙烷](#) [脱氢](#) [锌](#) [铂锡](#) [程序升温还原](#) [程序升温电导](#)

分类号 [0643](#)

Influences of Zn on Active State of Sn in Pt-Sn/ γ -Al₂O₃ Catalysts and Propane Dehydrogenation

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Abstract The effect of Zn addition to Pt-Sn/ γ -Al₂O₃ catalyst on the activity and selectivity in the reaction of propane dehydrogenation was studied. The results show that the addition of Zn to Pt-Sn/ γ -Al₂O₃ catalyst can greatly improve the performance of Pt-Sn/ γ -Al₂O₃ for propane dehydrogenation. The initial conversion of propane increased from 34% to 42% and initial selectivity to propene increased from 80% to 98%. At the same time, the presence of Zn greatly reduced the deactivation rate. The studies of temperature-programmed reduction of hydrogen (H₂-TPR) and temperature-programmed electronic conductivity (TPEC) show that the addition of Zn to Pt-Sn/ γ -Al₂O₃ made the reduction of Sn become more difficult. This may suggest that the presence of Zn can stabilize tin promoter in an active oxidation state and prevent the formation of PtSn alloy in strong reduction atmosphere, which may be responsible for the high stability and selectivity for Pt-Zn-Sn/ γ -Al₂O₃ catalyst in dehydrogenation.

Key words [Propane](#) [Dehydrogenation](#) [Zinc](#) [Platinum and tin](#) [Temperature-programmed reduction](#) [Temperature-programmed electronic conductivity](#)

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