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Raney Ni催化二亚糠基丙酮加氢制取长链烷烃前驱体的特性研究

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Catalytic performance of Raney Ni in the hydrogenation of di-furfural-acetone for pro alkane precursors

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摘要 采用Raney Ni为催化剂,考察了反应温度、压力、时间和溶剂对二亚糠基丙酮加氢制取长链烷烃前驱体催化性能的影响。结果表明,Raney Ni对二亚糠基丙酮具有很好的低温加氢性能,升高反应温度和压力均有利于加氢反应的进行,但过高的温度反而不利于加氢反应。在50℃和2.5 MPa下反应2 h,二亚糠基丙酮转化率达99.5%以上,饱和加氢产物的总选择性达到80.8%。此外,加氢中间产物的变化结果表明,二亚糠基丙酮的双键加氢容易程度为,烯键>呋喃环双键>C=O双键。Raney Ni 在甲醇溶剂中的加氢性能明显高于在四氢呋喃、环己烷或水溶剂中的加氢性能。

关键词： 二亚糠基丙酮　Raney Ni　加氢　长链烷烃

Abstract： The hydrogenation of di-furfural-acetone for producing long-chain alkane precursors was carried out over Raney Ni catalyst; the effects of reaction temperature, pressure and time on the product distribution were investigated. The results indicated that Raney Ni exhibits excellent catalytic performance at low temperature. The hydrogenation can be enhanced by increasing temperature and pressure; at 50℃, 2.5 MPa and after 2 h reaction, the di-furfural-acetone is completely converted with 80.8% of the selectivity to the saturated hydrogenated products. However, excessive high temperature may be harmful to the hydrogenation. It was found that the hydrogenation activity towards three double bonds in di-furfural-acetone follows the order of ethylenic bond > furan ring double bond > C=O. Various solvents (water, methanol, tetrahydrofuran and cyclohexane) are also different in their effects on the catalytic performance; Raney Ni exhibits much higher hydrogenation activity in methanol than in other solvents.

Key words： di-furfural-acetone　Raney Ni　hydrogenation　long-chain alkane

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