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快报

Rh/γ-Al_2O_3催化剂上甲烷-氘化氢间的氢氘交换性能

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摘要 采用Rh/γ-Al_2O_3催化剂，在固定床微型反应器上实验考察进料组成、反应温度和反应物总流量对甲烷氢氘交换的催化性能的影响。结果表明：在进料组成不变的条件下，当温度低于642 K时，甲烷的转化率随温度的升高而快速增加，当温度高于642 K时，甲烷的转化率不随温度的升高而变化；在反应温度为524～792 K、进料组成不变的条件下，当温度低于642 K时，甲烷的转化率随反应物流量的增加而明显减小，当温度高于642 K时，甲烷的转化率基本不随温度的升高而变化；在反应温度为524～792 K、反应物总流量不变的条件下，当HD/CH_4流量比在1.1～2.5间变化时，甲烷的转化率随HD/CH_4流量比的增加而减小。

关键词 铑催化剂 甲烷 氢氘交换

分类号

Catalytic Properties of Hydrogen-Deuterium Exchange of Methane on Rh/γ-Al_2O_3 Catalyst

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Abstract The catalytic properties of the Rh/γ-Al_2O_3 catalysts for the hydrogen-deuterium exchange of methane were tested with the fixed-bed micro-reactor. The conversion of methane is increased by increased reaction temperature when the temperature is less than 642 K, the conversion of methane is not changed with increasing temperature when the temperature is higher than 642 K at the same feed composition conditions. The conversion of methane is reduced with increasing the flow of reactants when the temperature is less than 642 K, the conversion of methane is not changed with increasing temperature when the temperature is higher than 642 K at the same feed composition conditions and the temperature 524-792 K. The conversion of methane is significantly reduced with increasing the HD/CH_4 flowrate ratio at HD/CH_4 flowrate ratio of 1.1-2.5, and the feed composition is changed in the range of total flow of reactants under the same conditions and the temperature of 524-792 K.

Key words Rh/γ-Al_2O_3 catalyst _ methane _ hydrogen-deuterium exchange

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