

钴镁固溶体催化剂在混合导体透氧膜反应器中的应用

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CoO/MgO Solid Solution Catalyst in Mixed Conductor Oxygen Permeable Membrane Reactor

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摘要 考察了CoO/MgO 固溶体催化剂在BaCo_{0.7}Fe_{0.2}Nb_{0.1}O_{3-σ}(BCFNO)透氧膜反应器内, 对焦炉煤气(coke oven gas, COG)中甲烷部分氧化重整(partial oxidation of methane, POM)的催化性能。首先, 研究了CoO/MgO固溶体催化剂合成的工艺条件; 然后, 考察了焦炉煤气流量和空气流量对重整性能的影响, 并对比分析了NiO/MgO固溶体、CoO/MgO 固溶体催化剂和0.5%RuCoO/MgO 催化剂的重整性能。实验结果表明, NiO/MgO 固溶体催化剂的重整性能优于CoO/MgO 固溶体催化剂。但经Ru贵金属修饰后, CoO/MgO 固溶体催化剂的催化活性得到了很大提高。

关键词: 氢气 催化剂 透氧膜 焦炉煤气 甲烷部分氧化重整

Abstract: The catalytic reform performance of CoO/MgO solid solution catalyst for partial oxidation of methane (POM) in a coke oven gas (COG) in BaCo_{0.7}Fe_{0.2}Nb_{0.1}O_{3-σ}(BCFNO) oxygen permeable-membrane reactor was investigated. Synthesis technology of the CoO/MgO solid solution catalyst is analyzed. The effect of COG flow rate and air flow rate on the reform performance is discussed. For comparison, the reform performance of NiO/MgO, CoO/MgO and 0.5% RuCoO/MgO solid solution catalyst were studied. The results indicate that the NiO/MgO catalyst is superior to CoO/MgO solid solution catalyst, and the catalytic activity of CoO/MgO with the addition of Ru is greatly improved.

Keywords: hydrogen, catalyst, oxygen permeation membrane, coke oven gas (COG), partial oxidation of methane (POM)

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