

عنوان مقاله:

Dry Reforming of CH₄ over Sol-Gel Synthesized Ni-Co/Al₂O₃-MgO Nanocatalyst Promoted with Different Amount of ZrO₂ Using Zirconyl Nitrate Solution

محل انتشار:

اولین همایش ملی کاتالیستهای صنعتی (سال: 1391)

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خلاصه مقاله:

The industrial application of dry reforming of CH₄ is limited by coke formation and efficient catalyst design. To this aim, a series of Ni-Co/Al₂O₃-MgO-ZrO₂ nanocatalysts with various ZrO₂ loadings (0, 5 and 10 wt %) and employing of zirconyl nitrate solution were synthesized via sol-gel method and tested toward dry reforming of CH₄. The prepared samples characterized by XRD, FESEM and FTIR analysis. The XRD patterns represented that by adding ZrO₂ to Ni-Co/Al₂O₃-MgO nanocatalyst, the crystallinity declined and amorphous behaviour became intensified. According to the FESEM images addition of 5wt% zirconia led to smaller particle size and improved particle size distribution. Furthermore, promoting the basicity and the adsorption rate of CO₂, attributed to the higher amount of OH groups for zirconia contented nanocatalysts proved by FTIR. All of the nanocatalysts exhibited acceptable catalytic performance and remarkably, deactivation was not observed throughout the 1440 min and at 850°C. Among the prepared nanocatalysts, sample which contained 5 wt% ZrO₂ exhibited the best catalytic performance since possessing of higher reactant conversion and superior product yield and production of synthesis gas with a ratio close to unity throughout the 1440 min and at 850°C. Generally, based on the superior properties evidenced by characterizations techniques and improved catalytic performance of Ni-Co/Al₂O₃-MgO-ZrO₂ with 5wt% ZrO₂, this nanocatalyst presented as a highly efficient catalyst for dry reforming of CH₄

کلمات کلیدی:

Dry reforming, Synthesis gas, Ni-Co/Al₂O₃-MgO-ZrO₂, Nanocatalysts, Sol-Gel

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