

Effect of Fe: methane steam-carbon dioxide reforming over Ni-based catalyst

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The present study was conducted to figure out the resistance of carbon deposit by adding Fe over Ni-Mg-Ce/ γ -Al₂O₃ catalyst in steam-CO₂ reforming of methane (CSCRM) to produce synthesis gas(H₂/CO = 2) for gas to liquid(GTL). The catalytic reaction was conducted at 800 °C, 1 atm with feed ratio of CH₄ : CO₂ : H₂O : Ar = 1 : 1 : 0.7 : 1 and GHSV = 40,000 h⁻¹. Alumina was supported 10 wt% Ni and 1 wt% Mg, Ce by the impregnation method. The catalyst was modified with various weight percent of Iron(0-7 wt%) over Ni-Mg-Ce/ γ -Al₂O₃ in the same method. As a result, addition of Fe on Ni-Mg-Ce / γ - Al₂O₃ had an effect on the strong resistance toward carbon formation and improved the catalytic activity. Among the catalysts investigated, the optimal catalytic activity and stability was achieved over the sample with 5 wt% of Iron.