

Combined Steam CO₂ Reforming of methane over Bimetallic Nickel based Catalysts on Calcium Aluminate

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Combined Steam CO₂ reforming of methane (CSCRM) was investigated to produce the syngas for applications in GTL-FPSO process. Nickel(Ni) is well-known active metal to reforming reaction. However, the coke formation and sintering are still considered as the major issues for the commercial applications of these catalysts. Bimetallic catalysts, with distinct electronic and chemical properties can enhance the catalytic performances and coke resistance. In our research we aimed to develop granule type Nickel based bimetallic/calcium aluminate catalysts. All catalysts were prepared by an incipient wetness impregnation method. Various promoters for Nickel-based bimetal species have been used including non-noble and transition metal. The catalysts were characterized by TEM, SEM, XPS, XRD, TPR, and N₂-physisorption techniques. The catalytic performance in the CSCRM was investigated at 800~850 °C, 1 bar with GHSV of 35,000 h⁻¹. It was found that the Ni-Co/CA_x catalyst shows higher catalytic activity with the resistance toward the carbon formation in SCR.