

Characteristics of SNG Synthesis over Commercial Catalysts

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The synthesis of SNG (synthetic natural gas, CH₄) from syngas has been widely studied in 1970's. Recently, the coal gasification to produce syngas is of interest because of coal reserves and economic feasibility. Therefore, LNG can be substituted by SNG since they have similar quality, and several projects for the SNG plants are conducting in the world. In the present study, we examined the characteristics of SNG synthesis over commercial catalysts. The thermodynamic analysis has also been performed to understand the characteristics. The conversion of CO was decreased at high temperature above 350 °C due to the thermodynamic barrier. Among the catalysts examined, we found the best catalyst which has 45 and 5 wt.% of Ni and Mg, respectively, on Al₂O₃. The effect of reaction conditions including reactor space velocity, temperature, pressure and H₂/CO ratio has also been examined to understand the SNG synthesis process. When the pressure was set at 20 bar, the CO conversion and the CH₄ yield showed the highest results compared to those at atmospheric pressure. The optimum H₂/CO ratio to maximize the CH₄ production was 3, which were compared with the thermodynamic estimation.