

Effect of Heat Control on the Production of Synthetic Natural Gas (SNG) from the Fluidized Bed Reactor

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Generally, synthetic natural gas (SNG) has been produced by using conventional packed-bed flow reactor, which is operated at the adiabatic condition. Since the CO methanation reaction is severe exothermic reaction, the heat control of the reactor must be considered to produce high quality of SNG. To control the heat during the reaction, the new types of the reactors have been developed; fluidized-bed reactor, micro-channel reactor, etc. In the present study, we examined the effect of cooling on the synthesis of SNG using a fluidized-bed reactor.

When the reactor was operated with cooling system, the temperature of catalyst bed was decreased from 620 to 510 oC. The CO conversion and methane selectivity could be increased from 73 and 62% to 96 and 73%, respectively, by cooling the catalyst bed. The thermodynamic calculation supports the cooling effect on the SNG production. Therefore, the production of SNG can be maximized by controlling the heat from the fluidized-bed reactor, which can provide useful information to optimize the SNG production.