

Effect of Catalyst Aging on the Production of Synthetic Natural Gas (SNG)

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Synthetic natural gas (SNG) has been recognized as an alternative energy source since its economical and environmental advantages. SNG can be synthesized over the Ni-based catalysts by the hydrogenation of carbon monoxide from the coal gasification. The stability of catalysts is important to produce SNG in a long operation period, which catalysts can be deactivated by thermal sintering, sulfur poisoning, and formation of carbonyl species. In the present study, we've examined the sintering effect on the SNG production over the various Ni-based catalysts with different promoting metal contents. The effect of hydrothermal treatment of catalyst could be verified by monitoring the methane production rate and the temperature in the catalyst bed. The difference in the temperature could not be detected over the catalyst with high content of Mg, which means the stability can be maximized. In addition, the catalyst characterizations including XRD, TPR and BET have been performed to see the change of Ni after the hydrothermal treatment.