

Combined H₂O and CO₂ Reforming of CH₄ over
Ni-Ce/Al₂O₃ catalysts to Produce Syngas for Gas
to Liquid (GTL) Process

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Ce-promoted Ni/Al₂O₃ catalysts were applied for the combined steam and carbon dioxide reforming of methane (CSCRM) to produce the syngas for gas to liquid (GTL) process. Ni-Ce/Al₂O₃ catalysts with various Ce content have been prepared by co-impregnation and characterized by XRD, BET and H₂-TPR. The reaction was performed with the ratio of (H₂O+ CO₂)/CH₄ of 1.2 and H₂/CO ratio of 2 was achieved in CSCRM. Coke formation in used catalysts was examined by SEM and TEM. It has been found that catalytic activity and stability depends on the Ce content over Ni/Al₂O₃ catalyst and the interaction between Ce and Ni on the surface. The Ni/Al₂O₃ catalyst with 6wt% Ce shows the highest activity as well as high coke resistance due to the improvement of Ni dispersion and high oxygen storage capacity of ceria.