

Combined H<sub>2</sub>O and CO<sub>2</sub> reforming of CH<sub>4</sub> over Ce and Fe promoted Ni/Al<sub>2</sub>O<sub>3</sub> catalyst for gas to liquid (GTL) process

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The present studies have been investigated to suppress the carbon deposition by various promoters (Ce, Fe, Cu) over Ni-based catalysts in steam-CO<sub>2</sub> reforming of methane (CSCRM) to produce synthesis gas(H<sub>2</sub>/CO = 2) for gas to liquid(GTL). The catalytic reaction was evaluated at 900 °C and 20 bar with a reactant feed ratio CH<sub>4</sub>:CO<sub>2</sub>:H<sub>2</sub>O:Ar = 1:0.8:1.3:1 and gas hourly space velocity GHSV = 25,000 h<sup>-1</sup>. The Ce and Fe modified Ni/γ-Al<sub>2</sub>O<sub>3</sub> catalyst was characterized by BET surface area analysis, X-ray diffraction (XRD), H<sub>2</sub> temperature-programmed reduction (TPR), H<sub>2</sub> chemisorption, CO<sub>2</sub> temperature-programmed desorption (TPD) and SEM.