

Studies on the Fischer-Tropsch Synthesis over Zirconia Modified Co/ γ -Al₂O₃ Catalysts

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The gas to liquid(GTL) process is the most broadly used technology to produce synthetic fuels from natural gas. Fischer-Tropsch Synthesis(FTS) is a key technology for the production of clean fuel from synthesis gas.

In this study promoted Co/ γ -Al₂O₃ catalysts with different zirconia contents were prepared by sequential wetness impregnation method. The catalysts were calcinated under different atmospheres of air and hydrogen, respectively. The physiochemical properties of prepared catalysts were characterized with various analysis techniques such as N₂ physi-sorption, XRD, TEM, SEM and H₂-TPR. The catalytic performance for the FTS reaction were evaluated at 230 °C, 20 bar, and GHSV of 2,300 h⁻¹ with feed ratio of H₂/CO/N₂ = 40/20/20 under fixed bed reactor system. It was found that Zirconia plays an important role to improve the reducibility of Cobalt or well dispersion of Cobalt particles. It was also found that Zr modified Co/ γ -Al₂O₃ catalysts calcined under hydrogen atmosphere showed more enhanced CO conversion and proper diesel selectivity (C₁₂-C₂₀) than the catalyst calcined under air atmosphere.