

Study the Effect of Potassium Promoter on the Fischer-Tropsch Synthesis over Iron based Catalysts

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Fischer tropsch synthesis is promising technology to produce high quality liquid petroleum fuels which converts syngas to long chain of hydrocarbons. Iron is an ideal catalyst for syngas derived from coal. In order to improve the performance of iron catalyst, promoters such as K, Cu, Mn, etc. are needed. In this research, the Fe based catalyst supported on alumina (Fe/Al₂O₃) and potassium promoted iron based catalyst (KFe/Al₂O₃) were prepared by impregnation method, and characterized by different methods including X-ray diffraction (XRD), Temperature Programmed Reduction (TPR), and N₂ physisorption. The catalytic performance for FTS was evaluated in a fixed bed reactor system with the H₂/CO ratio of 2:1, reaction temperature of 300 °C and reaction pressure of 10bar. Potassium promoted catalyst showed high Co conversion, C₅+ selectivity and suppress CH₄ selectivity and CO₂ selectivity in compare to Fe/Al₂O₃ catalyst.