

Effects of Cobalt Structure on Co/ γ -Al₂O₃ for Fischer-Tropsch Synthesis정재선^{1,2}, 이재석³, 최가람³, 문동주^{3,2,*}¹한국과학기술연구원; ²UST; ³KIST

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Fischer-Tropsch Synthesis (FTS) has been suggested as a key process of gas-to-liquid (GTL) technology, having the solution for the increasing demands for high-quality and environmentally friendly fuels. In this work, the catalytic performance of cobalt catalyst supported on spherical type γ -Al₂O₃ was investigated. Co/ γ -Al₂O₃ catalysts were prepared by a slurry impregnation method. The prepared catalysts were characterized by N₂ physisorption, TPR, XPS, XRD, SEM/EDX, TEM, FT-IR and XPS techniques. The catalytic activity for Fischer-Tropsch Synthesis was investigated under reaction conditions of H₂/CO=2, GHSV=3000 h⁻¹, 230 oC and 20 bars in a fixed-bed reactor system. The different calcination temperature leads variation of cobalt species which are related to form Face centered cubic (FCC) structure. It was found that the catalytic activity of the catalysts was affected by the cobalt loading and calcination temperature. It was also found that 30wt%Co/ γ -Al₂O₃ catalyst has showed higher FTS performance than the others catalysts. The results suggest that the catalytic performance of spherical Co/ γ -Al₂O₃ depends on the density and the reducibility of cobalt.