

Fischer-Tropsch synthesis over alumina impregnated mesoporous Co_3O_4 -nano ZSM-5 hybrid catalysts안창일¹, 배종욱², 하경수³, 전종현³, 이진원^{3,1,†}¹서강대학교 C1 가스 리파이너리 사업단; ²성균관대학교 화학공학부; ³서강대학교 화공생명 공학과(jinwonlee@sogang.ac.kr[†])

In this research, the nanoscale ZSM-5 was adopted as a kind of structural promoter. Ordered mesoporous Co_3O_4 s (meso- Co_3O_4) were prepared by hard templating approach with KIT-6. Then a small amount of alumina was impregnated on the surface of the mesoporous Co_3O_4 for enhancing the structural stability. Finally, meso- Co_3O_4 -nano ZSM-5 composite catalyst was synthesized through hydrothermal treatment of meso- Co_3O_4 with nano-ZSM-5 synthetic solution. Slightly enhanced selectivities in C_2 - C_4 hydrocarbons were confirmed in the case of nano ZSM-5 treated meso- Co_3O_4 catalysts, which may be related to the possible cracking of paraffin wax on the ZSM-5 encapsulated mesoporous Co_3O_4 . Increased catalytic stability and C_2 - C_4 yield of Al_2O_3 /meso- Co_3O_4 -nano ZSM-5 can be originated from enhanced structural stability and suppression of hydrocarbon deposition by cracking of heavier paraffin wax products. In order to analyze the surface properties of the catalysts, SEM, TEM, powder XRD, TPR, NH_3 -TPD and N_2 physisorption analysis were carried out.