

Low temperature Fischer-Tropsch synthesis using iron-based catalysts

김학주*, 천동현, 양정훈, 양정일, 이호태, 정 현
한국에너지기술연구원
(hakjukim@kier.re.kr*)

Recently, the high oil price above 80\$/barrel results in the deep interest of developing alternative technology for manufacturing clean and economic synthesis fuel for transportation. Coal-to-liquid (CTL) process can be one promising and effective route of producing synthesis fuel in mass production. Development of Fischer-Tropsch synthesis (FTS) catalyst and reactor system is one of core technologies of the CTL process. In this work, modified iron-based catalysts were developed with enhanced reducibility at low temperatures. Fischer-Tropsch synthesis (FTS) was carried out using modified SiO₂ supported Fe catalyst prepared by conventional co-precipitation method. The reaction was carried out in a slurry bubble column with 2 inch of diameter and 1.5m of height. Simulated distillation (SIMDIS) analysis method was used to determine the products distribution. Addition of small amount of precious metal and transition metal was effective for increasing the reducibility of iron-based catalysts at low temperature of 250°C. In the reaction condition without mass transfer limitation, modified iron-based catalyst with enhanced reducibility was effective for producing higher waxy hydrocarbons.