

Performance of modified iron based catalysts for Fischer-Tropsch synthesis

쇼버나아와테, 김대현, 강정식, 나기풍, 문동주*
한국과학기술연구원
(djmoon@kist.re.kr*)

In the present study, we have prepared different modified iron based catalysts by different methods. Precipitated iron catalyst was prepared with magnesia, ceria, copper oxide as promoters by precipitation method using $\text{NH}_4(\text{CO}_3)_2$, followed by drying and calcination at 300 °C for 2h. Mixture of iron-cobalt in different ratios, impregnated on silica gel support was prepared by incipient wetness impregnation method, followed by drying and calcining at 300 °C for 2 h. All calcined samples were impregnated with aqueous solution of potassium carbonate. The catalysts were characterized by different analytical techniques such as XRD, N_2 -physisorption, FTIR, TEM. From XRD, the presence of hematite (Fe_2O_3) phase was detected in the precipitated iron catalyst whereas all supported Co-Fe catalysts showed typical spinel phase in their XRD spectra. The introduction of Fe, develops the bimodal pore size distribution in the silica supported samples around 40 Å and 60 Å. The performance of these catalysts have been studied for the Fischer-Tropsch synthesis (FTS) in a fixed bed reactor by varying reaction parameters. Co/SiO₂ catalyst showed 85% CO conversion at 240 °C, 22 bar and H₂/CO mole ratio 2 after 5h.