

Characteristics of Co-based Fisher-Tropsch Catalyst in GTL(gas to liquid) Process

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The Co/SiO₂ catalyst was prepared by the conventional incipient wetness impregnation method using cobalt nitrate and silica gel. The samples were monitored by using the techniques of powder X-ray diffraction (XRD), Fourier transform infra red spectroscopy (FTIR), transmission electron microscopy (TEM), N₂-adsorption and by temperature programmed reduction (TPR) method.

The average particle size of the catalyst was calculated using the full width at half maximum (FWHM) of the most intense peak (311) of its X-ray diffraction pattern using Debye-Scherrer equation and was found to be in nanometer (5.47 nm) range. The diameter of metallic Co crystallite in Co/SiO₂ sample was calculated from the diameter of a given Co₃O₄ particle and was found to be 4.3 nm. TEM micrographs of the samples showed round shape particles with size less than 5 nm.

The catalytic activity of Co/SiO₂ catalyst in a slurry bed Fischer-Tropsch (FT) reactor has been investigated at a various experimental conditions. Using those experimental results the kinetic study of the FT synthesis using Co/SiO₂ catalyst in slurry bed reactor was carried out.