

Effect of the Support Shape on Fischer-Tropsch Cobalt Catalyst Performance

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Abstract : Cobalt catalysts were supported on extruded silica carrier and different-type (SiO_2 , $\gamma\text{-Al}_2\text{O}_3$) commercial supports with different shapes and sizes to produce heavy hydrocarbons for Fischer-Tropsch synthesis. The catalysts were characterized by N_2 physisorption and H_2 -TPR. The catalytic performance of the catalysts was tested in a fixed bed reactor. The results of Fischer-Tropsch synthesis performance showed that the cobalt catalyst supported on spherical silica supports displayed a higher activity and a higher selectivity to C_5^+ products, due to the fact that the active components were only distributed in the surface layer of spherical carrier, and the influence of gas diffusion restriction on catalytic performance was weakened. Therefore, it can be concluded that the eggshell cobalt catalyst was superior to precious metals modified catalysts in the synthesis of heavy hydrocarbons.

Keywords : fischer-tropsch synthesis, cobalt catalyst, support shape, heavy hydrocarbons

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