

Slurry-phase Fischer-Tropsch synthesis using
Co/ γ -Al₂O₃, Co/SiO₂ and Co/TiO₂: effect of support on
catalyst aggregation

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The activity of Fischer-Tropsch Synthesis (FTS) was investigated in a slurry-phase reaction with cobalt-based catalysts such as Co/ γ -Al₂O₃, Co/SiO₂ and Co/TiO₂. Although Co/SiO₂ catalyst showed higher CO conversion than the other catalysts, intrinsic activity is much higher on Co/TiO₂ having a large pore size and cobalt particle size. Catalyst deactivation with the formation of catalyst aggregation was observed on Co/ γ -Al₂O₃ which is characterized to show low formation rate of oxygenates. The alcohols derived FTS reaction and large pore size of catalyst possibly inhibit catalyst aggregation. Although the intrinsic activity (turn-over frequency; TOF) of cobalt-based catalyst is generally affected by cobalt particle size with different reducibility, the intrinsic activity is simultaneously affected by the average pore size of catalyst in a slurry-phase FTS reaction.