

### Hydrocarbon production of middle distillates range from syngas on the cobalt-based hybrid catalysts; effect of Cobalt/ZSM-5 ratio

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Fischer-Tropsch synthesis, using syngas derived from coal, natural gas, bio-mass or other carbon-containing materials, has recently received considerable attention as an alternative method for synthesizing clean fuels and chemicals due to the fast depletion of crude oil. In general, the selectivity towards gasoline range products is known to be limited to a maximum value of 48 mol%. To obtain branched hydrocarbons selectively through FTS reaction directly without any upgradation, especially for high-octane gasoline production, many intensive efforts have been made by modifying cobalt-based catalysts with the addition of acidic components.

In this work, FTS reaction for the direct production of middle distillates range hydrocarbons from syngas was investigated on cobalt-based catalysts with promoter as Pt. The hybrid catalysts were synthesized by co-precipitation method in an aqueous solution containing Co and Al metal precursors (with the weight ratio of Co/Al<sub>2</sub>O<sub>3</sub>=20/100) and Na<sub>2</sub>CO<sub>3</sub> solution as a precipitating agent at 70°C in a slurry of ZSM-5(Si/Al=25).