

## Production of linear alpha olefins via Fischer-Tropsch synthesis with Fe-based catalysts

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Fischer-Tropsch synthesis (FTS) has received much attention as one of the most practical indirect methods to convert natural gas, coal and biomass for production of hydrocarbons and oxygenates. Synthesis gas (CO and H<sub>2</sub>) can undergo multiple reactions based on the FTS chemistry to synthesize linear alpha olefins ( $\alpha$ -olefins), which are one of the most valuable chemicals for polymers, detergents, lubricants and other specialties. Substantial economic benefits could be achieved by adjusting product distribution with high selectivity towards  $\alpha$ -olefins in the FTS process. Design of efficient catalytic active sites will lead to maximum the  $\alpha$ -olefin selectivity during the FTS process.

In this presentation, we will try to elucidate how different metal-support interactions influence the product selectivity during the FTS. We have chosen SiO<sub>2</sub> supports for Fe-based active sites for better catalyst stability. The combination of iron catalytic sites, including oxides, metals and carbides under the reaction conditions, has an effect on the reaction chemistry. We have further tried to optimize the SiO<sub>2</sub> based Fe catalyst with Na to maximize the yield of  $\alpha$ -olefins.