



## Process control to select for valuable olefins

This technology is a process modification, which allows one to dramatically improve the olefin selectivity over a wide carbon number range in the Fischer-Tropsch reaction via co-feeding of suitable gases such as ammonia. Notably this is achieved with no or tolerable loss of catalyst activity.

Fischer-Tropsch synthesis is an important process to convert coal, natural gas and biomass to a variety of hydrocarbon products of different chain length. These products mainly find use as transportation fuels including petrol jet fuel and diesel as well as speciality waxes. Fischer-Tropsch synthesis is however, also known for its capability of producing chemicals such olefins, which are of a much higher value than low value fuels.

The techno-economics of feeding ammonia versus the improved 'higher value' olefin profile, achieved using this process, have been assessed and found to be positive.

### Benefits

- Improvement of selectivity of valuable chemicals in Fischer-Tropsch synthesis
- Can be incorporated in existing Fischer-Tropsch plants/units without catalyst modification (both cobalt and iron based catalysts can be used)
- Allows flexible operation of Fischer-Tropsch plants/units in either 'fuels' or 'chemicals' mode

### Market

An ideal commercial partner to use this modified process will be a company that is in the the feed-to-liquid (XTL) business with focus on chemicals production or a company that is already in the XTL business, but with an interest in making use of the potential of the Fischer-Tropsch synthesis to produce highly valuable olefins.

### Technical description

The process involves the production of hydrocarbons from synthesis gas during hydrogenation of a carbonaceous gas component in a synthesis gas in a feed to a reactor in which a catalyst acts on the feed at a temperature of between 160°C and 400°C and under a pressure of between 1 bar and 50 bar, the process being characterised in that at least one compound containing one or both of nitrogen and phosphorous is fed to the reactor together with the synthesis gas and in that the catalyst and process conditions are selected to favour the productions of olefins.

#### Keywords:

Fischer-Tropsch synthesis, selectivity, co-feeding, olefins, ammonia

#### Intellectual Property Rights:

**Contact:**  
Dr. Revel Iyer,  
Business Development  
Manager,  
Research Contracts &  
IP Services,  
University of Cape Town,

revel.iyer@uct.ac.za  
www.rcips.uct.ac.za



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National Phase	China	200980115993.4	03-Nov-10		16-Apr-08
National Phase	Europe	09732501.3	04-Nov-10		16-Apr-08
National Phase	GCC	13301/2009	16-Apr-09		16-Apr-08
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The inventors are Michael Claeys, Eric van Steen, Frank Rößner and Andreas Rausch.

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