

Process Control to Select for Valuable Olefins

This process modification improves the olefin selectivity over a wide carbon number range in the Fischer-Tropsch reaction.

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Please note, header image is purely illustrative. Source: Life-Of-Pix, Pixabay, CCO

Technology Overview

Researchers at UCT and University of Oldenburg have developed 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.

The process involves the production of hydrocarbons from synthesis gas during catalytic hydrogenation of the carbonaceous gas component at a temperature of between 160°C and 400°C and co-feeding of pressure of between 1 bar and 50 bar. At least one compound containing one or both nitrogen and phosphorous (e.g. ammonia) is fed to the reactor together with the synthesis gas. Process conditions are selected to favour the production of olefins.

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.

Applications

An ideal commercial partner to use this modified process will be a company that is in the feed-to-liquid (XTL) business with a 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.

Further Details

Technology Readiness Level 3 - Proof of Concept

Patents

- China: 200980115993.4
- Europe: 09732501.3
- GCC: 13301/2009
- South Africa: 2010/07627
- United States: 12/937,694

IP Status

- Patented

Seeking

- Development partner
- Commercial partner
- Licensing