Improved Olefin Production in Fischer-Tropsch-Synthesis

Description

The 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 special waxes. Fischer-Tropsch synthesis is, however, also known for its capability of producing chemicals such as olefins which are of a much higher value than low value fuels. This development describes a process modification which allows one to dramatically improve the olefin selectivity over a wide range in the Fischer-Tropsch reaction, via co-feeding of suitable gases such as ammonia. Notably this can be achieved by means with no or tolerable loss of catalysts activity.

Advantages

- 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
- Allows the production of chemicals with higher value in a higher yield

Benefit

- Improvement of selectivity of valuable chemicals in Fischer-Tropsch synthesis
- Enables to react quickly on changing market conditions ("demand driven production")
- Enables to operate an existing Fischer-Tropsch plant more efficiently

State of Development

The new process has been tested in bench scale. Integration in existing plants and adaption of process parameters are needed.

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Field of use

There has been increasing interest worldwide in the production of hydrocarbon liquids for the fuel market in recent years. Various Gas-to-liquid (GtL) and Coal-to-liquid (Ctl) plants are in operation and more will come online.

In the near future the conversion of biomass into fuels of the second generation (Biomass to Liquid, BtL) will become increasingly important to be independent from fossil resources. The Fischer-Tropsch-Technology is the key technology for the conversion of the obtained syngas into hydrocarbons and, applying the new technology, into nitrogen containing chemicals.

Target Groups

An ideal commercial partner to use this modified process will be a company that wants to get into the “XtL” business with focus on chemical 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. Moreover, catalysts manufactures who may improve and maximise the performance of catalysts for the modified process will have an interest in this process.