

PROMOTED IRON CATALYSTS SUPPORTED ON PELLETIZED CARBON NANOTUBES FOR FISCHER-TROPSCH SYNTHESIS

Opportunity

Researchers at the University of Saskatchewan have developed a process for the preparation and use of novel, high surface area, promoted iron catalysts supported on multi-walled carbon nanotubes in a fixed-bed Fischer-Tropsch (FT) process.

Benefits

The invented catalyst can result in the following improvements compared to commercial catalysts:

- At least 10 % reduction in reactor size and corresponding capital costs
- At least 5% reduction in capital and operating costs of gas treatment and CO₂ removal
- At least 10% reduction in capital and operating costs of syngas production

Publications

Iron catalyst supported on carbon nanotubes for Fischer–Tropsch synthesis: Effects of Mo promotion; Fuel, vol. 90, no. 3, pp. 1139-1144, 2011.

Background

By the end of 2015, Europe and North America are expected to have approximately a 30% to 60% share in second-generation biofuel production. Cellulosic biofuel production has key conversion technologies, and their technological development is crucial in producing cost-competitive second-generation biofuels.

The FT conversion process uses chemical reactions to convert synthesis gas ($\text{CO} + \text{H}_2$) into liquid hydrocarbons. The FT process requires energy and high capital costs, however, fuel produced by FT process can reach 150% of gasoline selling price.

Development of methods which can significantly reduce the cost of FT process is important for the biofuel industry. Availability and use of efficient low cost iron based catalyst systems can result in cost effective production of synthetic fuels in both lab scale and industrial facilities.

Patent status

US patent application # 13/667333 was filed on November 2, 2012 and Canadian patent application # 2757012 was filed on November 3, 2012.

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