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Fischer-Tropsch synthesis of biomass-based transportation fuels

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The transportation sector constitutes a major part of the world energy consumption and currently the core of this system is made of carbon-based fuels that are mainly produced from fossil fuels, such as crude oil, coal and natural gas. Since all the fossil fuels are non-renewable energy sources, the current situation is changing towards an increase in the production of transportation fuels from renewable carbon sources. Most importantly the current environmental situation motivates the transition from fossil fuels to renewable energy sources. From this point of view, biomass is considered as one of the most attractive renewable sources. The FT is a process of the production of broad range hydrocarbons from a gas mixture of H_2 and CO that is called synthesis gas (syngas) and can be obtained from coal, natural gas or biomass. In the case of biomass feedstock the gas mixture is called bio-syngas and is obtained via gasification technology. BTL-FT is known as multi-step process that starts with the gasification of biomass. Subsequently, the bio-syngas must be purified to remove undesired components, such as hydrogen sulfide, ammonia, carbonyl sulfide, tar, hydrogen cyanide, alkali and dust particles. Since purified syngas is utilized in the synthesis, the fuels produced have very meager amount of sulfur, nitrogen and aromatics. Eventually, Fischer-Tropsch synthesis is conducted after bio-syngas conditioning to maximize the selectivity of desired products. The process have gained an essential interest most recently and have been investigated in lab-scale experiments and pilot-plants. An evaluation of the feasibility of Fischer-Tropsch synthesis (FTS) of biomass-based transportation fuels is briefly reviewed in this paper. The overall process is shown schematically in Figure 1.

Biography

Nurlan Amirov is a chemical engineering student at Baku Higher Oil School, the most prestigious university in the region specialized in oil and gas industry. His research area includes mainly the evaluation of the feasibility of the application of Fischer-Tropsch synthesis to the production of bio-mass-based transportation fuels.

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