OMICS International
conferenceseries.com

J Pet Environ Biotechnol 2015, 6:5
http://dx.doi.org/10.4172/2157-7463.C1.011

3rd World Congress on

Petrochemistry and Chemical Engineering

November 30-December 02, 2015 Atlanta, USA

Power-to-liquids: Synthetic fuels from a sustainable pathway

Daniel H König
German Aerospace Center, Germany

Liquid fuels will be the fuel of choice for aviation, shipping and heavy load transportation for the coming decades. Synthetic fuels produced by the power-to-liquid route together with CO_2 from industrial processes or air are a promising alternative to biofuels and can contribute significantly to future sustainable transport. Different process routes using electrolysis-based hydrogen from renewable power sources combined with the Fischer-Tropsch (FT) process are analyzed by process simulation and cost estimation. One route is the combination of a proton exchange membrane electrolyzer with reverse water-gas shift reaction. This concept is advantageous for fluctuating power sources. In comparison, integration of solid oxide electrolyzer cells (SOEC) with FT synthesis offers higher process efficiency, because high pressure steam from FT reactor cooling can be used as input for the SOEC. The total system efficiency calculated for Power-to-Liquid is about 45% for the PEM-concept and can be more than 60% for the SOEC-concept.

Daniel.Koenig@dlr.de

The effect of rapeseed oil on the SRGO hydrotreating and ULSD production: Comparative study of $CoMoS/Al_2O_3$ and $NiMoS/Al_2O_3$ catalysts

Galina A Bukhtiyarova[1], Evgenia N Vlasova[1,2], Pavel V Aleksandrov[1] and Irina Deliy[1,2]
[1]Boreskov Institute of Catalysis, Russia
[2]Novosibirsk State University, Russia

One of the promising strategies for the production of fuels from the renewable is the co-processing of biomass-derived oil and petroleum fractions in the existing hydrotreating units. The scope of the present work is the comprehensive investigation of the $CoMo/Al_2O_3$ and $NiMo/Al_2O_3$ catalysts in the hydrotreating of the straight-run gasoil (SRGO) and their mixtures with rapeseed oil (RSO). The hydroprocessing of SRGO and blended feeds (5-15 wt.% of RSO) was carried out in the trickle-bed reactor. The quality of produced fuels (sulfur and nitrogen content, boiling range distribution, density and CI) was determined.The oxygen-containing compoundswereconverted completely in all experiments. Comparing HDS rate constants for the feed with different RSO content showed that RSO addition (up to 15 wt.%) decreased the activity of $CoMoS/Al_2O_3$ catalysts but had no effect on the activity of $NiMoS/Al_2O_3$ one. The same dependencies were observed in HDN reaction. In accordance, over $NiMoS/Al_2O_3$ catalyst ULSD can be produced from SRGO and RSO-SRGO blend at the same conditions, while the temperature increase is needed if the $CoMoS/Al_2O_3$ catalyst is used for ULSD production from RSO-SRGO blends. The hydrodeoxygenation of RSO over sulfide catalysts gave paraffins, propane, water, CO, and CO_2. It was observed in the special experiments that addition of CO to the hydrogen flow had the same effect on the HDS activity of the $CoMo/Al_2O_3$ and $NiMo/Al_2O_3$ catalysts as the addition of RSO to the SRGO. The feasible reasons of the observed differences between $CoMo/Al_2O_3$ and $NiMo/Al_2O_3$ catalyst behavior will be discussed.

gab@catalysis.ru