



Biomass Program

Mixed Alcohols Production from Syngas

Synthesis (syn) gas, a mixture of carbon monoxide and hydrogen, can be produced from biomass via thermochemical processes such as gasification. It can be catalytically converted to value-added fuels, such as ethanol, and higher-value chemicals, such as propanol and butanol.

Current catalysts for mixed alcohol synthesis were developed for syngas derived from coal or steam methane reforming and few have shown significant promise. The lack of commercial success appears to be due to poor selectivity and conversions and low space-time yields.

This project is developing improved catalysts for converting syngas from biomass gasifiers into mixed alcohol products. The research is being conducted in conjunction with the Syngas Clean-Up and Conditioning project.

R&D Pathway

Researchers have selected the initial catalysts for testing and will work on improving the catalyst efficiency (space-time yield) and the selectivity of products. Catalyst screening studies, including the determination of product yields and catalyst

activities, will be performed using the Pacific Northwest National Laboratory's (PNNL) flow reactor system. The most promising catalysts will be modified to improve performance, particularly by increasing the rate of catalyst turnover.

The Thermochemical Process Design Unit (TCPDU) at the National Renewable Energy Laboratory will be used to test the catalysts with high activity and potential for biomass systems, using actual gasifier syngas from the TCPDU. Additionally, researchers will define the equipment and protocols required for integration of sulfur removal technology with the catalyst evaluation studies.

Thermochemical R&D

Benefits

- Facilitate commercialization of mixed alcohol synthesis

Applications

Mixed alcohol synthesis from biomass syngas will provide a value-added opportunity for thermochemical biorefineries.

Project Participants

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Project Period

FY 2005 – FY 2008

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