

FLORIDA STATE UNIVERSITY

Biofuels Through Thermochemical Processes: Approach to Produce Bio-jet Fuel

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Project Description:

The program addresses the emerging needs for aviation industry to have cost effective alternative liquid transportation biofuels. The main objectives are to produce bio-jet and bio-diesel fuels from cellulosic biomass and nonedible bio-oils and demonstrate that they have cost structure and product quality comparable to petroleum based fuels. Novel processing concepts, reactor design and catalyst systems are employed in this integrated approach to convert any cellulosic biomass and any nonedible bio-oils into bio-jet fuel. Feedstock flexibility offers significant cost and logistic advantages to this approach. Unlike other processes which use only the oil derived from a plant, the entire plant can be used as feedstock source. The proposed approach can also convert the more challenging lignocellulosic component. Through molecular manipulations, the proposed approach allows the production of “designer” biofuels. The technology offers a means to tailor product properties through saturation of double bonds to give better shelf life, cleaving long chain hydrocarbons to maximize the yield of the jet cut, controlling aromatics content of the jet cut for better combustion characteristics, and isomerization to improve ignition characteristics and for better cold flow properties of the fuel. Successful deployment of research program in biofuels can mean billions of dollars per year in fuel cost savings for aviation industry. It also opens the door for energy independence and distributed fuel generation capability.

Budget: \$420,567

Progress Summary

An 11 kw Downdraft gasifier is installed and began its operation in April 2010. A prototype steam gasification with external heating module has been designed and built. The hydrodynamic testing of the proof of concept dual fluidized bed steam gasification process has been successfully tested.