

An Intensified Reaction/Product Recovery Process for the Continuous Production of Biodiesel

Cooperative Research into Biobased Fuels between ORNL and Nu-Energie

Biodiesel:

This project supports the Administration's initiative to encourage use of environmentally friendly, sustainable, and domestic supplies of transportation fuel by reducing U.S. gasoline usage by 20 percent in the next ten years. Increased use of domestic biofuels will provide a clean and secure source of energy. Biodiesel can be made from a variety of renewable sources, including vegetable oils, animal fats and waste cooking oils. The ORNL-Nu-Energie partnership supports the U.S. Department of Energy's goal of technology transfer and small business development through the commercialization of energy-saving technologies.

Project Background:



The ORNL biodiesel production team

Conventional reaction and separations used in biodiesel production are done in time-consuming batch processes, increases the size and cost of equipment and restricts the rate of production. ORNL researchers have developed a method for continuous production that yields an order-of-magnitude increase in production rates, while decreasing plant size and processing requirements.

Producing Biodiesel:

Research funded by the ORNL Laboratory Directed Research and Development Program, identified the limiting factor in batch biodiesel production, thereby more efficiently converting oil to biodiesel and separating the product biodiesel from byproduct glycerol. Biodiesel synthesis was demonstrated in a continuous-flow couette reactor/separator. This method is faster, more compact, and allows reaction and separation in one process step in the reactor.



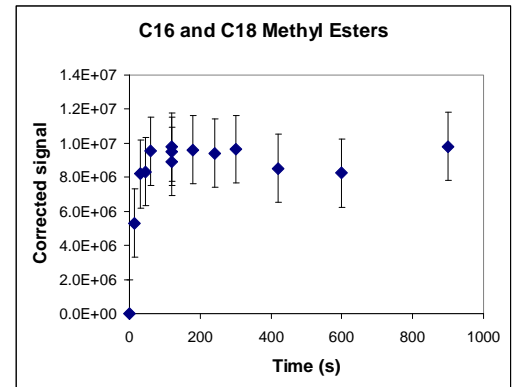
Effective mixing and separation in a laboratory device.

Partnering with Nu-Energie:

The Technology Commercialization and Deployment Fund (TCDF) is a new initiative from the DOE Office of Energy Efficiency and Renewable Energy that leverages a 50/50 DOE/industry cost share to provide the funding necessary for the commercialization of high-impact technologies. Using TCDF funding, ORNL and Nu-Energie are developing a prototype reactor for the continuous production of biodiesel under industrial conditions. The reactor will be used to test processing of the range of feedstocks typically used in commercial biodiesel plants.

About ORNL:

Oak Ridge National Laboratory (ORNL) is a multiprogram science and technology laboratory managed for the U.S. Department of Energy by UT-Battelle, LLC. ORNL has six major mission roles: neutron science, energy, high-performance computing, systems biology, materials science at the nanoscale, and national security. The mission of the DOE Office of Energy Efficiency and Renewable Energy (EERE) is to strengthen America's energy security, environmental quality, and economic vitality in public-private partnerships that enhance energy efficiency and productivity; bring clean, reliable and affordable energy technologies to the marketplace; and make a difference in the everyday lives of Americans by enhancing their energy choices and their quality of life.



Gas chromatography shows rapid production with time

About Nu Energie:



Nu-Energie, headquartered in Blountville, TN promotes the use of alternative fuels through the production of biodiesel, and the education of local and state businesses on the benefits of alternative energy. Nu-Energie supplies high quality biodiesel from its Phipps Bend Plant in Surgoinsville, TN. The company is a catalyst for long-term economic growth in rural East TN. Through research and development, Nu-Energie strives to find new alternative fuel sources for the production of biodiesel in order to remain at the forefront of the biodiesel industry.

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