



Biomass Program

Catalytic Hydrothermal Gasification of Wet Biomass Feedstocks

Industries and municipalities generate substantial amounts of biomass as high-moisture waste streams, such as animal manure, food processing sludge, stillage from ethanol production, and municipal wastewater sludge. Due to the high moisture content, current thermochemical processes are not cost-effective at converting these streams to valuable fuels, chemicals, and power.

This project is developing a low-temperature, catalytic hydrothermal gasification (LTCHG) process to convert the high-moisture waste streams to syngas which can be further refined and converted to value-added products.

R&D Pathway

Researchers have collected wet biosludge samples from the wastewater facility at Eastman Chemical's Kingsport Plant and analyzed them for dry solids content, carbon/hydrogen/nitrogen content, and mineral composition.

Initial tests using a bench-scale LTCHG batch reactor indicated that the biosludge is comparable to other biomass feedstocks tested in the LTCHG process. The bench-scale continuous flow reactor will

be operated with the biosludge to test mineral matter and sulfur trapping. A particular separator will be added to the continuous reactor and the ability to control feedstock pH (to aid in mineral precipitation) will be explored.

Researchers will develop a system design of the LTCHG process to be used in modeling the process and performing an economic analysis. A pilot plant design will be developed for Eastman Chemical's Kingsport Chemical Plant.

Thermochemical R&D

Benefits

- Enable the conversion of low-value, high-moisture industrial and municipal wastes to value-added products
- Addresses disposal issue of organic waste streams

Applications

This technology provides a value-added opportunity for wet industrial and municipal wastes that generators must currently pay to dispose of.

Project Participants

Antares Group, Inc.
Eastman Chemical Company
Galleon Engineering, Inc.
Pacific Northwest National Laboratory

Project Period

FY 2005 – FY 2008

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