



Biomass Program

Biomass Gas Clean-Up Using a Therminator

Clean-up and conditioning of syngas is a key technical barrier to the commercialization of biomass gasification systems. Current technologies do not meet the necessary performance, cost, and environmental criteria to achieve commercialization of biomass gasification technologies. Researchers are addressing this barrier by developing and demonstrating a novel “therminator” process that will destroy, reform, and/or remove tar, ammonia, and hydrogen sulfide from raw biomass gasifier syngas. Using a triple function catalyst circulating between two fluidized bed reactors, researchers hope to achieve the following goals:

- Tar concentration of less than 0.1 gram per cubic meter
- Greater than 90% decomposition of ammonia
- Hydrogen sulfide concentration of less than 20 parts per million, volume

R&D Pathway

This project is composed of four tasks.

- Task 1 is focused on laboratory testing and scale-up of catalysts. Selected catalysts will be characterized (e.g., surface area, surface morphology, reducibility, oxidizability) and their

effectiveness for tar removal, ammonia decomposition, and sulfur removal measured. An optimum catalyst combination for the three processes above will be developed.

- Task 2 involves development, construction, and bench-scale testing of the therminator process module and the necessary sampling/analysis systems.
- Task 3 centers on demonstration of the therminator with the Cratech gasifier. Researchers will design and implement a syngas slip-stream and interconnections between the two systems. System improvements will also be implemented.
- In Task 4, researchers will perform an engineering evaluation and commercialization assessment on the therminator module coupled to a biomass gasification system that is processing wood and cotton gin.

Thermochemical R&D

Benefits

- **Development of a syngas clean-up technology that meets performance, cost, and environmental criteria.**

Applications

An improved and cost-effective syngas clean-up technology will lower the cost of clean syngas and help accelerate the commercialization of biomass gasification technologies.

Project Participants

**Clemson University
Cratech Development AG
Research Triangle Institute
Sud Chemie**

Project Period

FY 2004 – FY 2008

For more information contact:

**John Scahill
DOE Golden Field Office
John.Scahill@go.doe.gov**

**EERE Information Center
1-877-EERE-INF (1-877-337-3463)
www.eere.energy.gov**

**Visit the Web site for the Office of the
Biomass Program (OBP) at
www.eere.energy.gov/biomass**

April 2006