



# Biomass Program

## New Catalysts for In-Process Elimination of Tars

Effective and low-cost clean-up and conditioning of biomass-derived syngas is a key barrier to the commercialization of biomass gasification technologies. Biomass syngas contains tars that must be removed from syngas prior to processing to fuels, chemicals, or power because they can condense and cause fouling in downstream processes.

This project is developing optimized, attrition-resistant catalysts for the reduction or elimination of tars in biomass gasification-derived syngas. Researchers will also determine if waste materials of little (or negative) value that contain potential catalysts can be converted into attrition-resistant refractory catalysts substrates and tar-cracking catalysts.

### R&D Pathway

Researchers are developing new, attrition-resistant catalysts that will meet or exceed the performance of existing nickel oxide-olivine (magnesium iron silicate) catalysts for cracking tar. New catalysts will be optimized as researchers conduct fundamental studies to understand the catalyst surface properties, deactivation mechanisms, and the correlation of the catalytic properties with

reaction performance in hydrocarbon reforming. Naphthalene is being used as a surrogate tar in the fundamental studies, but later tests in the catalyst optimization process will utilize syngas obtained from a laboratory gasifier.

Alternate glass and mineral substrate formulations will be investigated and the incorporation of waste-based substrates into catalyst formulations will also be pursued.

The optimized catalysts will be tested at Gas Technology Institute's Flex-Fuel Facility for their tar-cracking capabilities and attrition resistance.

## Thermochemical R&D

### Benefits

- **Catalysts with enhanced tar-cracking capabilities and greater attrition resistance**

### Applications

**Improved catalysts for tar removal in biomass syngas will enable the commercialization of biomass gasification technologies.**

### Project Participants

**Alfred University  
Gas Technology Institute  
NexTech Materials Ltd.  
Ohio State University**

### Project Period

**FY 2005 – FY 2008**

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