

NEWS From GEORGIA TECH'S ENGINEERING EXPERIMENT STATION

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SOLAR ENERGY PROVIDES HEAT

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FOR SYNTHETIC FUEL PRODUCTION

For Immediate Release

ATLANTA, GA....Researchers from Georgia Tech and Princeton University have successfully demonstrated a process for high-grade synthetic fuels with solar thermal energy.

Engineers involved in a program sponsored by the Department of Energy and managed by the Solar Energy Research Institute view their technique as a breakthrough in pyrolysis, an established process for producing liquid and gaseous fuels from biomass materials.

"Industries now get the heat necessary for pyrolysis reactions by burning a portion of the biomass," said Dr. Tom Brown, a solar engineer at Georgia Tech's Engineering Experiment Station. "With our approach, highly concentrated solar energy provides the heat, and the biomass material is heated directly by passing it through the intense solar beam."

The use of solar energy to promote the reaction has two significant advantages. First, the biomass feedstock is conserved, in that the feed material is not used to provide heat for the process; and second, the solar process gives a higher quality fuel, according to Prof. Mike Antal, the head of the Princeton research team.

To accomplish the desired results, the biomass was heated very rapidly by the solar beam -- from less than 100 degrees F. to greater than 1,500 degrees F. in less than a second. "The process results in production of an unusually high grade of gaseous synthetic fuel," said Antal.

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The effectiveness of the solar pyrolysis approach was confirmed in a month of experiments ending in late August at the DOE solar test facility on the Georgia Tech campus. Researchers from Georgia Tech and Princeton jointly administered field tests using a special quartz reactor developed at Princeton.

Experiments were performed with feedstocks consisting of wood, corn cobs, cellulose and lignin. Concentrated solar energy was reflected from a field of mirrors into a transparent pyrolysis reactor. The intensity of sunlight on the reactor was equivalent to that of 1,000 suns converting the biomass materials into both liquid and gaseous fuels. The process effectively stored the sun's energy in the chemicals of the feedstocks.

"We got high gas yields with every feedstock except the lignin," said Antal. "With the other feedstocks we produced a hydrocarbon rich synthesis gas, which can be used for a number of energy-related operations."

"The issue," Brown added, "is how to convert unused wood materials into energy more effectively. This process has the potential for using abundant sunlight and plentiful waste biomass materials such as tree tops, waste paper, etc., to create much needed liquid and gaseous fuels."

The Georgia Tech Advanced Components Test Facility, the location of the experiment, is actively involved in a broad range of U.S. Department of Energy sponsored experiments designed to produce synthetic fuels from solar energy. They include thermochemical hydrogen production and fluidized bed reactor development as well as near term activities directed toward utilization of solar thermal energy.

The operation of this facility is managed for DOE by the Solar Energy Research Institute (SERI) as part of the Solar Thermal Research and Advanced

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Development Program. The SERI Solar Thermal Program Branch considers this experiment important in demonstrating the technical feasibility of using solar thermal energy in fuels and chemical processes.

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