



## Novel Bio-oil Pretreatment Methods and Catalysts to Increase Biofuel Yield and Energy Density

For more information  
contact:

Office of Technology  
Management

[www.otm.msstate.edu](http://www.otm.msstate.edu)

p: 662-325-9263

OTM #: 0853

This invention provides a system, composition and process for the production of both boiler and transportation fuels.

### Technology

The technology is a method for upgrading bio-oil so it can be used as a commercial fuel. A first phase of the method may include oxidation and/or hyper-acidification of bio-oil to produce an intermediate product. A second phase of the method may include catalytic deoxygenation, esterification, or olefination/esterification of the intermediate product under pressurized syngas.

### Advantage

The commercial value of the invention is that the oxidation and acid anhydride pretreatments produce an intermediate that is suitable to be converted to a number of fuels such as decarboxylated bio-oil, cellulosic biodiesel and hydrocarbons similar to petroleum fuels. In each case the pretreatments reduce the cost of the inputs to produce these fuels and the energy density is significantly increased. Two stage hydroprocessing of pretreated bio-oil can produce a hydrocarbon mix, which can be further distilled to yield transportation fuels – gasoline, jet and diesel.

### IP Protection

**Issued U.S. Patent:** 9,222,032; *Composition and Methods for Improved Fuel Production*

### Inventors

**Philip H. Steele, Sathishkumar Tanneru, and Sanjeev K. Gajjela** from the Department of Sustainable Bioproducts, College of Forest Resources

