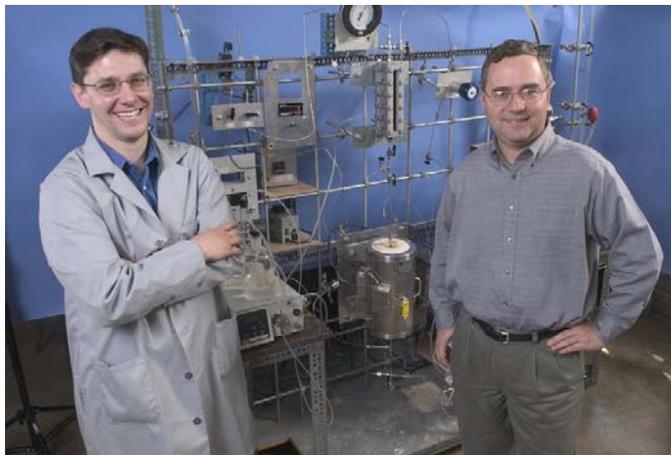


A Breakthrough in the Development of “Green Gasoline”

“Green gasoline” is a liquid identical to standard gasoline yet created from sustainable biomass sources such as switchgrass and poplar trees. Chemical engineer George Huber of the University of Massachusetts-Amherst (UMass) and his graduate students have achieved the first direct conversion of plant cellulose into gasoline components. Huber’s former advisor James Dumesic and colleagues from the University of Wisconsin-Madison have designed an integrated process for creating chemical components of jet fuel using a green gasoline approach. While Dumesic's group had previously demonstrated the production of jet-fuel components using separate steps, their current work shows that the steps can be integrated and run sequentially, without complex separation and purification processes between reactors.

For their new approach, the UMass researchers rapidly heated cellulose in the presence of solid catalysts, materials that speed up reactions without sacrificing themselves in the process. Rapidly cooling the products creates a liquid that contains many of the compounds found in gasoline. The entire process takes less than two minutes using relatively moderate amounts of heat. The compounds that formed in this single step, such as naphthalene and toluene, make up one fourth of the suite of chemicals found in gasoline. The liquid can be further treated to form the remaining fuel components or can be used “as is” for a high octane gasoline blend.



Not only does the method promise a compact way to quickly transform a great deal of biomass, but the process, in principle, does not require any external energy. If the heat released by the process is recovered, it may even generate electricity.

James Dumesic (left) of the University of Wisconsin-Madison and his former student George Huber (far left), now at the University of Massachusetts-Amherst, are

breaking new ground in the development of “green gasoline.” Credit: University of Wisconsin-Madison.

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Patents and other steps toward commercialization:

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