

Extracting fuels and chemicals from plant life

May 21 2012, by Tommy Misiolek

Concerns over increasing global energy demand and the environmental impacts of fossil fuels are motivating the world's researchers to try to develop alternative, renewable sources of energy.

One of those researchers is Qianying (Bonny) Guo, a graduate student in [chemical](#) engineering.

Guo studies how organic compounds derived from cellulose like sugars and hydroxymethylfurfural (HMF) can be converted to liquid fuels and high-value chemicals without producing carbon emissions.

Her goal is to use catalysis to help extract energy and high-value chemicals from plant life at a reasonable cost and with minimal adverse effects on the environment.

“We’re trying to develop new materials for selectively reacting sugar molecules to produce biofuels and chemicals such as HMF,” says Guo.

Guo, whose faculty adviser is Mark A. Snyder '00, assistant professor of chemical engineering, recently tied for first prize at the Spring Symposium of the Catalysis Society of Metropolitan New York.

Her presentation, titled “Template-induced structuring and tunable polymorphism of three-dimensionally ordered mesoporous (3Dom) titania materials,” described the potential for converting simple sugar components into biofuel.

An international competition

The symposium, held at the ExxonMobil Research and Engineering site in Annandale, N.J., attracted 120 graduate students from universities in the United States, France, Spain, Turkey and Thailand.

Guo's accomplishment is one of several prominent honors she has earned as a graduate student at Lehigh.

In April 2011, she took third place at the Annual Review Meeting of Lehigh's Emulsion Polymers Institute for a presentation titled "Design of ordered, hierarchically porous titania structures as hydrothermally stable materials for biomass catalysis."

In December 2011, she won a Student Award at the annual meeting of the Northeast Corridor Zeolite Association (NECZA) in Philadelphia for a presentation titled "Realizing three-dimensionally ordered, hydrothermally stable mesoporous catalysts via assembly and nanotemplating strategies."

In addition to her academic achievements, Guo plays on the women's club basketball team and is a member of the chemical engineering department softball team, which competes in summer intramural competitions.

She also belongs to the Chemical Engineering Graduate Association (CHEGA).

Guo, a native of Jilin province in northeastern China, received her undergraduate degree in chemical engineering from Tsinghua University in Beijing.

After graduating, she hopes to work in industry, preferably on the east

coast of the United States.

“There are lots of [major] [chemical](#) engineering companies with great resources,” she says. “I will try to continue [pursuing] my passion after graduation.”

Provided by Lehigh University

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