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www.nycsweb.org

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(201) 216-8074  
(201) 482-5424 (fax)  
Simon.Podkolzin@Stevens.edu

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(732) 205-6080  
(732) 205-5300 (fax)  
xiaoming.wang@BASF.com

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(908) 730-2932  
(262) 313-4051 (FAX)  
John.f.brody@exxonmobil.com

**Wednesday, September 19, 2012**  
**Somerset-Bridgewater Hotel, Somerset, New Jersey**  
(Formerly Crowne Plaza Hotel)

**Burwell Award Lecture**

**Johannes A. Lercher**

TU München, Department of Chemistry, Garching, Germany  
Pacific Northwest National Laboratory, Inst. for Integrated Catalysis,  
Richland, WA, USA

### **From Biomass to Tailored Energy Carriers via Selective Catalysis in Aqueous Phase**

Proteinaceous biomass (grown in an aqueous environment) as well as lignocellulose (grown terrestrially) are promising potential raw materials for kerosene and diesel. The lecture describes strategies to catalytically produce such fuels via low temperature processes. At least two different catalytic functions, i.e., acid and metal functions, are needed to convert the biogenic oligomers to fuel components. Simultaneously, bifunctionality, i.e., two sites acting simultaneously on the bond to be transformed, is frequently needed to provide the low temperature activity required. Three steps are discussed, the hydrogenolytic deconstruction of lignin fragments and fatty acids, the hydrodeoxygenation and decarbonylation/decarboxylation and the hydroalkylation to build up larger molecules. Overall the chemistry is characterized by several parallel and partly redundant pathways requiring the knowledge of the elementary steps to be able to control reaction pathways

Hydrolysis and hydrogenolysis can be used to cleave ether bonds in lignin fragments, the latter being not structure sensitive unlike C-C bond hydrogenolysis. For both reaction pathways complete conversions can be achieved. The selective aqueous phase removal also follows two potential routes, the hydrodeoxygenation and the dehydrogenation followed by decarbonylation/decarboxylation. The formed route proceeds only with dual functional catalysts, in which the metal function catalyzes (de)hydrogenation, while the acid function is responsible for dehydration and alkylation reactions. Acid sites in the confines of zeolites can finally be used to form C-C bonds to adjust so the size of the

molecules. The lecture will discuss, how the detailed knowledge of the elementary reaction steps and the surface chemistry of the catalyst components in water allow designing suitable stable catalysts.

Dinner is a buffet, and includes a choice of beef, chicken or fish		Members	\$40
		Non-members	\$50
Social Hour (Cash Bar)	6:00 PM	Students	\$25 ( <i>Student Members = \$10</i> )
Dinner	7:00 PM	Retired/Post-Doc/ Unemp.	\$40 ( <i>Members = \$30</i> )
Presentation	7:45 PM	Annual Dues	\$35 ( <i>Student/Retired = \$15</i> )

**Deadline for dinner reservations** is **2:00 p.m. Friday, September 14, 2012**

Email Xiaoming Wang (xiaoming.wang@basf.com) for reservations. With the exception of extreme circumstances, anyone not canceling reservations by the above deadline will be billed for dinner regardless of attendance.

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