

CHEMICAL, BIOLOGICAL & MATERIALS ENGINEERING

100 E. Boyd, Sarkeys Energy Center, T-301

405-325-5811

The University of Oklahoma

Norman, Oklahoma

2014 – 2015 Seminar Series

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POSTDOCTORAL SCHOLAR, DR. MARK DAVIS GROUP

CHEMICAL ENGINEERING

CALIFORNIA INSTITUTE OF TECHNOLOGY, CALIFORNIA, USA

AFFILIATED WITH THE CENTER FOR SURFACE CHEMISTRY AND CATALYSIS

KU LEUVEN, LEUVEN, BELGIUM

Will present a seminar on

“CONVERTING BIOMASS TO CHEMICALS: COMBINING INSIGHTS FROM HETEROGENEOUS, HOMOGENEOUS AND ENZYME CATALYSIS”

The future development of bio-derived chemicals will depend on multiple technological, economic, and environmental factors. In order for biomass-derived feedstock to become competitive with petrochemical resources for producing chemicals, making the right choice of target and platform intermediates is of crucial importance. New ways are put forward to evaluate the competitiveness and sustainability of the use of carbohydrates, ideally from lignocellulosic feedstocks, to produce chemicals. The proposed assessment is based on the preservation of functionality and a high atom economy in the process. The outcome is a list of 25 top chemical opportunities. The proposed methodology presented here is easily adapted to other feedstocks, such as lignin for example, but does not take into account the usefulness and potential market demand of the products, which in the end determines their real value. While a chemical equation to a target product may predict high efficiency (in terms of thermodynamics and atom economy), in practice, lower performances due to kinetic (selectivity) issues or process challenges are often seen. In there lies a major role for catalysis. Three case studies will be discussed in the seminar, demonstrating how catalytic and reaction engineering are of utmost importance in the conversion of biomass. Combining insights from heterogeneous, homogeneous and enzyme (bio) catalysis is crucial in most of these studies. A first case will focus on the synthesis of lactic acid with, among other catalysts, Al-containing Sn-beta zeolites. The second part will focus on the synthesis of ethylene glycol from concentrated sugar syrups. A final topic will deal with the direct catalytic conversion of cellulose to liquid straight-chain alkanes.

THURSDAY, NOVEMBER 6, 2014

COOKIES AND COFFEE -- 1:45 P.M.

SEMINAR -- 2:00 P.M.

SARKEYS ENERGY CENTER, ROOM M-204

THIS IS A REQUIRED SEMINAR FOR CHE 5971

Accommodations on the basis of disability are available by contacting the office.