MSE SEMINAR

Materials Science and Engineering
Michigan Technological University

Tuesday, October 29, 2013
11:00 am – 12:00 pm
Room 610, M&M Building

Fuel Reforming Using Lanthanum Zirconate ($La_2Zr_2O_7$) Pyrochlores

John & Virginia Towers Distinguished Lecture Series

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Abstract

Reforming of hydrocarbon fuels to produce syngas ($CO + H_2$) is widely practiced industrially. These reactions invariably require temperatures approaching 900°C and are accompanied by deactivation by thermal processes and carbon deposition. Catalysts based on supported metal clusters deactivate rapidly at these harsh conditions. Here, we discuss the use of pyrochlores, a class of crystalline metal oxides into which catalytically active metals can be isomorphically substituted. The result is a catalyst that is stable at these conditions. We will look specifically at CH_4/CO_2 reforming on these materials as an example of how they are prepared and how the mechanism can be probed at working conditions.

Bio: Dr. James J. Spivey is the J. M. Shivers and C.M. Eidt,Jr. Professor of Chemical Engineering at Louisiana State University. He is Editor-in-Chief of *Catalysis Today*, and Editor of the Royal Society of Chemistry's *Catalysis* book series. He has written/edited a total of 17 books, authored more than 100 peer-reviewed journal publications, and organized 18 symposia at ACS and other national meetings. His research focuses on the development and characterization of heterogeneous catalysts for applications such as environmental catalysis and synthesis of chemical intermediates from simple carbon feedstocks such as methane. Other research activities include the application of the principles of heterogeneous catalysis to catalytic combustion, control of sulfur and nitrogen oxides from combustion processes, acid/base catalysis (e.g., for condensation reactions), hydrocarbon synthesis, and the study of catalyst deactivation. He has managed over $30 million in sponsored projects over the past 20 years. He currently is Director of the Center for Atomic-level Catalyst Design at LSU, which is one of 46 DOE Energy Frontier Research Centers. He is a fellow of Royal Society of Chemistry.

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