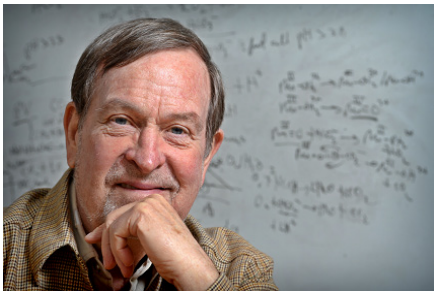
SEMINAR SERIES

International Institute for Carbon-Neutral Energy Research
Kyushu University

Title Making Oxygen from Sunlight and Water

Speaker Prof. Thomas J. Meyer

Arey Distinguished Professor of Chemistry
Solar Fuels Energy Frontier Research Center
University of North Carolina at Chapel Hill
USA



Date & Time Monday, December 1, 2014 4:30 p.m.

Place I²CNER Hall, Ito campus, Kyushu University

Abstract

The sun could be our ultimate renewable energy source but as an energy source suffers from its low intensity and the massive collection areas required to meet the needs of powering the world's growing economies. The sun is also intermittent, going down at night, which creates a need for energy storage on massive scales. Inspired by natural photosynthesis, a way to meet the energy storage challenge is by using the energy of the sun to produce "solar fuels" by "Artificial Photosynthesis" with energy stored in the chemical bonds of high energy molecules - hydrogen from water splitting or carbon-based fuels from reduction of CO_2.

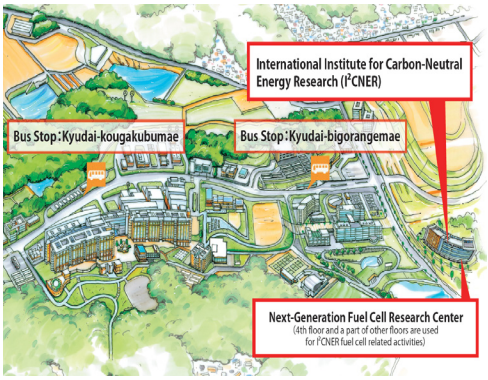
In this presentation, a hybrid approach to solar fuels is described. It is based on the integration of molecular assemblies for light absorption and catalysis with the band gap and surface properties of mesoscopic, nanoparticle films of inert metal oxides – TiO_2, SnO_2, NiO. In the resulting Dye Sensitized Photoelectrosynthesis Cells (DSPEC), light absorption by the chromophore and excited state injection into the conduction band of TiO_2 initiates a series of electron transfer events. Transfer of the injected electron transfer to a cathode results in H_2 evolution. With appropriate design features built in, including surface stabilization of the assembly and use of core/shell structured oxide films, relatively high per photon-absorbed efficiencies for visible light water splitting into hydrogen and oxygen has been achieved.

About the Speaker

Prof. Thomas J. Meyer first identified proton-coupled electron transfer and designed the first molecular water catalyst. He was an early pioneer in the field of artificial photosynthesis and solar fuels beginning with research published in the 1970s. He has gained an international reputation in photochemistry, mechanisms, and chemical reactivity and catalysis. He is currently Arey Professor of Chemistry at UNC Chapel Hill and Director of the UNC Energy Frontier Research Center where the focus is on water oxidation, carbon dioxide reduction, chromophore-catalyst assemblies, and dye sensitized photoelectrosynthesis cells for water splitting and reduction of carbon dioxide.

Host: Professor Ken Sakai

For registration, please visit our website:
http://i2cner.kyushu-u.ac.jp/



CONTACT: Research Support and International Affairs Division
International Institute for Carbon-Neutral Energy Research
TEL:092-802-6934 email:wpikenkyu@jimu.kyushu-u.ac.jp