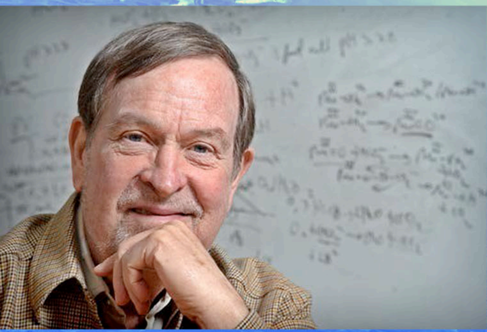
Charles Edison Lecture Series

College of Engineering and College of Science



Thomas J. Meyer

Arey Professor of Chemistry
Director of the Energy Frontier Research Center on Solar Fuels
University of North Carolina

Thomas J. Meyer rejoined the faculty of the University of North Carolina at Chapel Hill as Arey Professor of Chemistry on July 1, 2005. He is Director of the UNC Energy Frontier Research Center on Solar Fuels.

After receiving a BS from Ohio University in 1963, Meyer received a Ph.D. from Stanford in 1966 with Henry Taube, who won the Nobel Prize for Chemistry in 1983, as his research mentor. He was a NATO postdoctoral fellow at University College, London in 1967 with Sir Ronald Nyholm. He joined the faculty at UNC in 1968 and held several positions until 2000 when he was named the Associate Director for Strategic Research at the Los Alamos National Laboratory in New Mexico.

Dr. Meyer is a member of the National Academy of Sciences and the American Academy of Arts and Sciences and has won many prizes for chemical research. His research has been notable for pioneering, innovative discoveries in chemical reactivity and applications to important problems in chemistry and energy conversion.

ND Energy

CENTER FOR SUSTAINABLE ENERGY AT NOTRE DAME

Making Oxygen from Sunlight and Water

Thursday, April 16, 4:00 p.m.

107 Carey Auditorium, Hesburgh Library

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.

Sponsored by the Center for Sustainable Energy at Notre Dame (ND Energy) and the Colleges of Engineering and Science at the University of Notre Dame

UNIVERSITY OF NOTRE DAME