The Science and Economics of
Photoelectrochemical Hydrogen Production

Solar energy has the capacity to replace worldwide fossil fuel consumption, but is intermittent when compared to the daily energy demands of society. To address this intermittency, we are developing a technology that, reminiscent of plants, directly converts sunlight and water into hydrogen and oxygen, effectively storing solar energy in molecular hydrogen bonds for on-demand energy production.

Our approach consists of a single integrated unit that contains all active elements necessary for efficient operation including semiconductors, catalysts, an aqueous electrolyte and a product separating membrane. The device architecture assumes a microwire array structure chosen to optimize the semiconductor physics and system inefficiencies involved.

In concert with addressing scientific and technical challenges, for any resulting technologic solution to impact the applied problems of society it must necessarily be competitive within the economic realities of the marketplace. Accordingly, techno-economic analysis and comparison to potential competitors is critical to a technologies future and can guide further resource allocation and research trajectories.

This presentation will cover the design, fabrication and characterization of an integrated solar water splitting device and the techno-economic landscape that it lies within.

3:00 pm - 4:00 pm | WEDNESDAY, FEB. 18, 2015
Guggenheim 101 - Lees-Kubota Lecture Hall

THE RESNICK SUSTAINABILITY INSTITUTE AT CALTECH
RESNICK.CALTECH.EDU