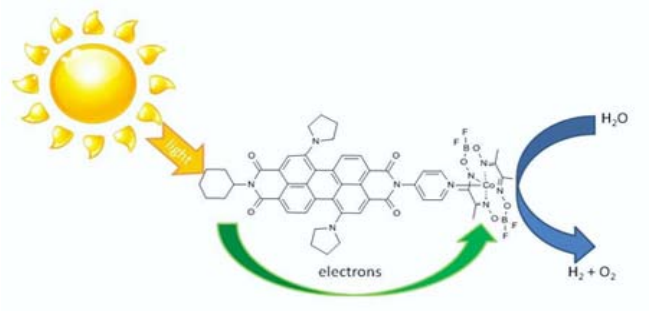
http://www.csu.edu/news/solarfuel.htm

Chicago State University Students Collaborate in Research to Help Produce Artificial Solar "Fuel" Energy



Plants use sunlight to convert water and carbon dioxide to oxygen. Scientists are striving to create artificial photosynthetic systems that can do the same thing. One promising class of molecules is cobalt complexes with diglyoxime ligands (cobaloximes). These molecules are being designed to produce "solar fuels", such as hydrogen gas by splitting water. Chicago State University (CSU) Assistant Professor of Chemistry, Dr. Kristy Mardis, and three CSU students will travel this summer to Argonne National Laboratory, the nation's first national laboratory and one of the largest, to explore the possibility via computational research.

As a computational chemist, Dr. Mardis applies existing computer programs and methodologies to specific chemical problems in order to explore the process of electron transfer that is not easily studied by experiments alone. Ultimately, they hope to uncover how engineers can use this molecule in the production of artificial solar energy storage devices.

The growing concern about global warming has created more interest in the development of these devices. Solar energy does not cause any pollution to the atmosphere as gases are not emitted when using it. Due to this reasoning, solar energy is a preferred source of energy because it does not worsen global warming. It is expected that the focus on solar energy will become rather significant in the future years as more devices are developed for converting solar energy to electricity.

With these advancements made in solar technology, soon consumers will be able to buy products that run on solar energy, for example, cell phones, automobiles, computers, office buildings and homes.

Each summer, Dr. Mardis works with students at Argonne National Laboratory. This exposure gives her students a hands-on experience and a practical view of a chemist. She selects two or three CSU students to collaborate with her colleague Dr. David Tiede, an experimental Argonne chemist.

Dr. Tiede is interested in developing new solar energy resources through his work in photosynthesis. Specifically, he is studying organisms containing cytochrome c that live at the bottom of the ocean, in an effort to better understand how they convert sulfur into energy. “To help Dr. Tiede determine what to test, my team takes a good guess at what we would expect the test results to be.” Dr. Tiede’s group then runs the molecular testing to see if their results agree with the CSU guess. “If not, we come up with new guesses,” explained Dr. Mardis. “Our job is to try and understand the process. We then pass along that knowledge to those who can utilize it.”

Several of Dr. Mardis’s former students have moved on to work in the field of chemistry. Quiana Moore, a former student, is currently employed by Dr. LeSuer in developing new dye molecules for solar cells. Another former student, Adrienne Eastland, is a graduate student at Northwestern University. Robert Wright, another former student, teaches chemistry at the high school level.

“When I talk to associates from other universities, they’re amazed by the idea of using undergraduates in advance research studies,” stated Dr. Mardis. “The students I’ve worked with at CSU are extremely capable of assisting me in my research. The key is to find the right projects.”

Dr. Mardis earned her Ph.D at the University of Wisconsin. She continued her studies at the National Institute of Standards and Technology, and she taught at Pacific Lutheran University before joining the CSU faculty.

According to the Bureau of Labor Statistics website, and according to the National Association of Colleges and Employers, beginning salary offers in July 2009 for graduates with a bachelor's degree in chemistry averaged $39,897 a year. In March 2009, annual earnings of chemists in nonsupervisory, supervisory, and managerial positions in the Federal Government averaged $101,687.