American Institute of Physics Reveals us More Cost-effective Selenium Photovoltaic Cells

Did you know that many scientists would like to find light-catching components in order to convert more of the sun's power into carbon-free electric power?

A new research described in the magazine Applied Physics Letters in August 2010 (published by the American Institute of Physics), describes how solar energy could potentially be harvested by using oxide elements that include the element selenium. A team at the Lawrence Berkeley National Laboratory in Berkeley, California, embedded selenium in zinc oxide, a relatively affordable component that could make more productive use of the sun's energy.

The team found that even a relatively small quantity of selenium, just 9 % of the mostly zinc-oxide base, drastically enhanced the material's performance in absorbing light.

The primary author of this analysis, Marie Mayer (a fourth-year College of California, Berkeley doctoral student) says that photo-electrochemical water splitting, that signifies using energy from the sun to cleave water into hydrogen and oxygen gases, could probably be the most exciting future application for her labor. Managing this reaction is key to the eventual production of zero-emission hydrogen powered cars, which hypothetically will run only on water and sunlight.

Journal Research: Marie A. Mayer et all. Applied Physics Letters, 2010 [link: http://link.aip.org/link/APPLAB/v97/i2/p022104/s1]

The conversion productivity of a PV cell is the percentage of sunlight energy that the photo voltaic cell converts to electricity. This is very important when discussing Photo voltaic units, because enhancing this efficiency is vital to making Photovoltaic energy competitive with more standard sources of energy (e.g., fossil fuels).

For comparison, the earliest Photovoltaic units converted about 1%-2% of sunlight energy into electric energy. Today's Pv units convert 7%-17% of light energy into electric energy. Of course, the other side of the equation is the money it costs to make the PV devices. This has been enhanced over the years as well. In fact, today's PV systems make electricity at a fraction of the cost of first PV systems.

In the 1990s, when silicon cells were 2 times as thick, efficiencies were much lower than nowadays and lifetimes were shorter, it may well have cost more energy to make a cell than it could generate in a lifetime. In the meantime, the technological innovation has moved on substantially, and the energy repayment time (defined as the recovery time necessary for generating the energy spent to produce the respective technical energy systems) of a modern photovoltaic module is typically from 1 to 4 years depending on the module type and location.

Normally, thin-film technologies - despite having comparatively low conversion efficiencies - reach significantly shorter energy repayment times than standard systems (often < 1 year). With a typical lifetime of 20 to 30 years, this signifies that contemporary solar cells are net energy producers, i.e. they create significantly more energy over their lifetime than the energy expended in producing them.

About the author - Rosalind Sanders writes for the solar pool cover ratings blog, her personal hobby web log centered on recommendations to help home owners to spend less energy with solar power.