Solar Hydrogen Fuel Dream Will Soon Be a Reality

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Australian scientists predict that a revolutionary new way to harness the power of the sun to extract clean and almost unlimited energy supplies from water will be a reality within seven years.
Using **special titanium oxide ceramics that harvest sunlight and split water to produce hydrogen fuel**, the researchers say it will then be a simple engineering exercise to make an energy-harvesting device with no moving parts and emitting no greenhouse gases or pollutants.

It would be the cheapest, cleanest and most abundant energy source ever developed: the main by-products would be oxygen and water.

"This is potentially huge, with a market the size of all the existing markets for coal, oil and gas combined," says Professor Janusz Nowotny, who with Professor Chris Sorrell is leading a solar hydrogen research project at the University of New South Wales (UNSW) Centre for Materials and Energy Conversion. The team is thought to be the most advanced in developing the cheap, light-sensitive materials that will be the basis of the technology.

"Based on our research results, we know we are on the right track and with the right support we now estimate that we can deliver a new material within seven years," says Nowotny.

Sorrell says Australia is ideally placed to take advantage of the enormous potential of this new technology: "We have abundant sunlight, huge reserves of titanium and we're close to the burgeoning energy markets of the Asia-Pacific region. But this technology could be used anywhere in the world. It's been the dream of many people for a long time to develop it and it's exciting to know that it is now within such close reach."

The results of the team's work will be presented in Sydney on 27 August to delegates from Japan, Germany, the United States and Australia at a one-day International Conference on Materials for Hydrogen Energy at UNSW.

Among them will be the inventors of the solar hydrogen process, Professors Akira Fujishima and Kenichi Honda. Both are frontrunners for the Nobel Prize in chemistry and are the laureates of the 2004 Japan Prize.

Since the Japanese researchers' 1971 discoveries, science has made major advances in achieving one of the ultimate goals of science and technology – the design of materials required to split water using solar light.

The UNSW team opted to use titania ceramic photoelectrodes because they have the right semiconducting properties and the highest resistance to water corrosion.

Solar hydrogen, Professor Sorrell argues, is not incompatible with coal. It can be used to produce solar methanol, which produces less carbon dioxide than conventional methods. "As a mid-term energy carrier it has a lot to say for it," he says.

Source: University of New South Wales