Research sets new record for generation of fuels from sunlight

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Credit: Marina Shemesh/public domain

Researchers at Monash University have designed a solar fuel generating device that has established a new record in energy efficiency for the production of solar fuels.

The new device can produce hydrogen fuel at 22 per cent energy efficiency, breaking the previous record of 18 per cent.

Lead researcher Professor Leone Spiccia in the School of Chemistry at Monash explained that the process of splitting water generates hydrogen and oxygen by passing an electric current through water.

"Electrochemical splitting of water could provide a cheap, clean and renewable source of hydrogen as the ultimately sustainable fuel. This latest breakthrough is significant in that it takes us one step further towards this becoming a reality," Professor Spiccia said.

Co-author, Professor Doug MacFarlane, ARC Laureate Fellow and leader of the Energy Program of the ARC Centre of Excellence for Electromaterials Science at Monash, attributed the breakthrough to the advanced expertise of the research team in water splitting and how to tune the process to work most effectively with high-efficiency commercial solar cells.

Professor MacFarlane explained how hydrogen is the ultimate in clean fuels since it contains no carbon and produces no carbon dioxide.

"Hydrogen can be used to generate electricity directly in fuel cells. Cars driven by fuel cell electric engines are becoming available from a number of car manufacturers. Hydrogen could even be used as an inexpensive energy storage technology at the household level to store energy from roof-top solar cells," Professor MacFarlane said.

The ARC Centre of Excellence for Electromaterials Science is a group of more than 100 researchers across six locations in Australia, whose goal is to make sustainable energy sources cheaper and more accessible, to help society cope with the increasingly serious climate change and ocean acidification issues stemming from fossil fuel use.

The research was published in the leading journal *Energy and Environmental Science*.

More information: "Renewable Fuels from Concentrated Solar Power: Towards Practical Artificial Photosynthesis." *Energy Environ. Sci.*, 2015, DOI: 10.1039/C5EE02214B

Provided by Monash University

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