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PRESS RELEASE（2017/10/11）

New Catalyst Developed: the combination of Solar Cells and Fuel Cells

A catalyst that can combine fuel cells and solar cells has been successfully developed by a research group headed by Professor Seiji Ogo, the International Institute for Carbon-Neutral Energy Research (I^2CNER)/ Faculty of Engineering, Kyushu University, in collaboration with Tanaka Kikinzoku Kogyo Co., Ltd.

Previously, next-generation fuel cells and solar cells were developed separately. Today, the researchers have succeeded in developing a novel catalyst that combines the mechanisms of photosynthesis with natural hydrogenases. By using this catalyst, fuel cells could be powered with hydrogen as an energy source while solar cells could be powered with water and light. The results of this research may trigger significant developments and have significant knock-on effects on the field of energy research.

This joint research project (the Ministry of Education, Culture, Sports, Science and Technology (MEXT) KAKENHI Grant No. 26000008: New Energy Sources from Hydrogenase-Photosynthesis Models) was carried out by a research group headed by Kyushu University Professor Seiji Ogo with Kyushu University Faculty of Engineering, the Center for Small Molecule Energy (Head of the center: Seiji Ogo), I^2CNER (Director: Petros Sofronis), Tanaka Kikinzoku Kogyo Co., Ltd., and Fukuoka industry-academia Symphonicity.

This research achievement was published in the German online journal *ChemCatChem* on Oct 5, 2017 (Japan local time).

Message from the researcher

Drawing our inspiration from nature, we had the idea to develop a catalyst and a fuel cell that could be run using hydrogen as an electron source when there is no light (during the night) in the same way as a hydrogenase, and run using water as an electron source when there is light (during the day) in the same way as photosynthesis. I hope that this development will open the door to a new era where hydrogen can be used as a fuel for cars at night and water-powered cars can run during the day.

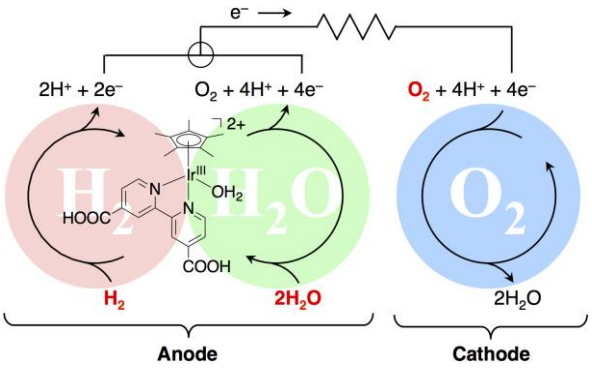

Figure: The red circle (H_2) represents a fuel cell anode patterned after hydrogenase, an electrode where electrons (e-) flow out to an external circuit. The green circle (H_2O) shows a solar cell anode patterned after photosynthesis (photosystem II). The blue circle (O_2) depicts a common cathode patterned after respiration (cytochrome c oxidase), an electrode where electrons flow from an external circuit.

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