March 15, 2019

JXTG Nippon oil & Energy Corporation
Chiyoda Corporation
The University of Tokyo
Queensland University of Technology

Succeeded in the world's first technical verification to produce "CO_2-free hydrogen" at low cost

-Trial of hydrogen supply chain establishment and hydrogen based society-

JXTG Nippon Oil & Energy Corporation (President: Katsuyuki Ota), Chiyoda Corporation (President: Masaji Santo), the University of Tokyo (President: Makoto Gonokami) and Queensland University of Technology (President: Margaret Sheil) announced the successful testing of production of an organic hydride[*1] at low cost in Australia and getting hydrogen to Japan. It is a first technical verification in the world.

This technical verification is based on technology of JXTG (organic hydride electrolytic synthesis technology), QUT (high efficiency tracking solar photovoltaic power generation system), and Chiyoda (dehydrogenation technology). This verification was conducted in a social collaborative research aimed at building the hydrogen supply chain in the University of Tokyo.

The characteristics of this technical verification simply the production process for an organic hydride called methylcyclohexane (MCH) in order to reduce the cost of hydrogen which is the biggest issue for expanding utilization. When we store and transport hydrogen in a conventional method, it is necessary to produce hydrogen via water electrolysis and store it in a large tank and convert hydrogen to MCH before transport. However, our technology greatly simplifies this process and reduces the cost of MCH production. This method called "Electrochemical synthesis of organic hydride" has a potential of cutting 50% cost of MCH production equipment.[*2]

Furthermore, we succeeded in producing ca. 0.2 kg of "CO_2 free hydrogen" that does not emit CO_2 at the production process because all MCH was produced from solar power.

We continue to develop and scale up this method, in order to realize a hydrogen society and prevent global warming.

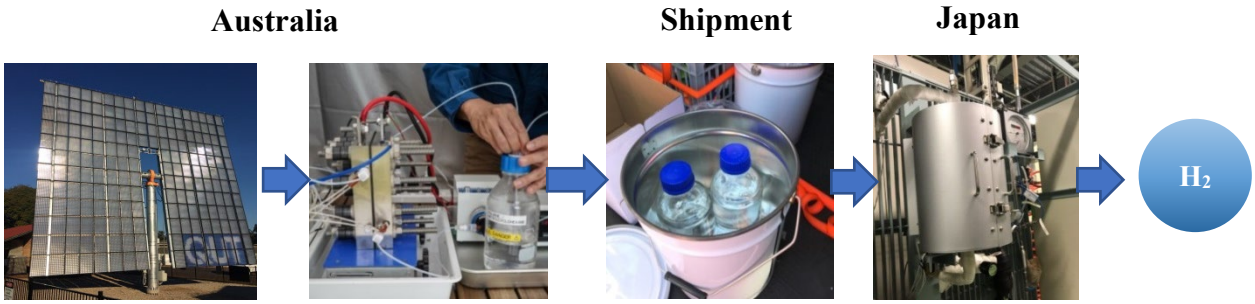
*1 One of the hydrogen carrier. It is easy to handle and liquid under a normal temperature and pressure.

*2 JXTG's estimated cost, when this technology will be completed in the future.

<Overview>

Period	From Dec. 5, 2018 to Mar. 14, 2019
Collaboration scheme	Renewable fuel global network (RE-Global) , Social Cooperation Research Departments, the University of Tokyo
Purpose	Technical verification of producing low cost hydrogen using electrochemical synthesis method and solar power
Participating organization	JXTG Nippon oil & Energy Co, Chiyoda Corporation, The University of Tokyo, Queensland University of Technology
Expense	Private expense of each organization

<Procedure and role>



QUT
Electricity generation using solar power

JXTG
MCH production via electrochemical synthesis of toluene

Shipment

Chiyoda
Dehydrogenation from MCH

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