May 26, 2021

Tokyo Gas and SCREEN Agree to Jointly Develop a Water Electrolysis Cell Stack for Low-cost Green Hydrogen Production

Tokyo Gas Co., Ltd.
SCREEN Holdings Co., Ltd.

Tokyo Gas Co., Ltd. (President: UCHIDA Takashi; “Tokyo Gas”) and SCREEN Holdings Co., Ltd. (President: HIROE Toshio; “SCREEN”) have agreed to jointly development (“development project”) a “water electrolysis cell stack*1,” a core component, and “water electrolysis cell stack manufacturing device” to build a water electrolysis system that will contribute to low-cost hydrogen production.

This development project aims to establish in two years, low-cost production technology for a water electrolysis cell stack, which accounts for a large portion of production cost and is a component in a water electrolysis device. Tokyo Gas will study and evaluate the specifications for the water electrolysis cell stack. Meanwhile, SCREEN will be in charge of developing water electrolysis cell stack production technology and production equipment that applies continuous production technology using its proprietary roll-to-roll methodology*2.

Going forward, in conjunction with this development project, the two companies will undertake technological development for the systematization of this water electrolysis device to realize low-cost green hydrogen production. The goal is to further alleviate hydrogen production cost by quickly achieving*3 the hydrogen supply cost goal for 2030 of 30 yen/Nm^3-H_2, which is being promoted by the government. Note that this hydrogen is expected to be used directly and as a raw material for producing synthetic methane.

<Overview of development project>

In 1998, Tokyo Gas embarked on the development of a polymer electrolyte fuel cell (PEFC). In 2009, Tokyo Gas became the world’s first to commence sales of ENEFARM*4, a residential fuel cell. Cumulative sales have risen to above 140,000 units.

SCREEN Finetech Solutions Co., Ltd., which is a part of the SCREEN Group, launched development of mass production technologies for fuel cells starting from 2013. SCREEN Finetech Solutions successfully developed technologies for directly coating and drying the electrode catalysts in electrolyte membranes. In 2016, sales were commenced for the RT series, a fuel cell manufacturing device equipped with the aforementioned technology. *5

This development project will integrate the technologies and knowhow related to fuel cells and manufacturing methods that both companies have developed and cultivated over many years, and aim to quickly establish a technology for mass production of water electrolysis cell stack at low cost.

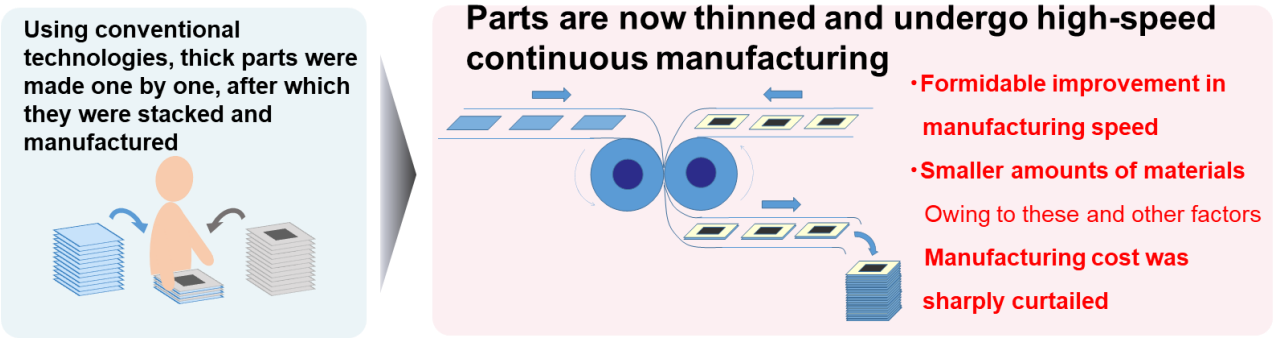

Figure 1: Low-cost production of a water electrolysis cell stack (Image)

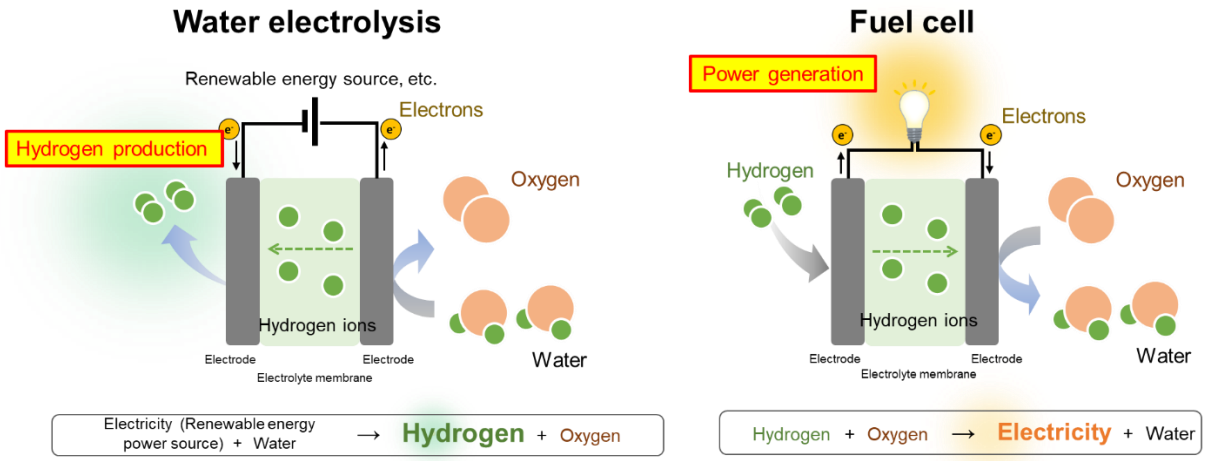

Figure 2: (Reference) Summary of water electrolysis system hydrogen production methods (left) and fuel cell power generation method (right)

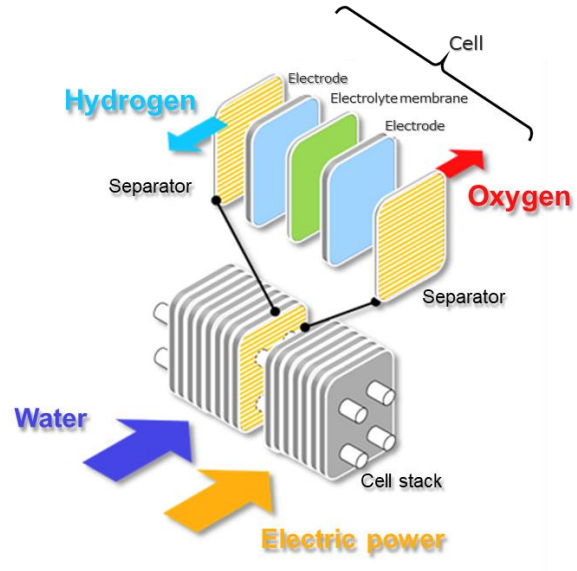

Figure 3: (Reference) Basic composition of a water electrolysis cell stack

In the Tokyo Gas Group Management Vision, Compass2030, Tokyo Gas promotes the challenge of achieving "CO_2 net zero," and is working to reduce hydrogen production cost and strengthening the development of CO_2 management technology (CCUS*6). Through this development project, Tokyo Gas aims for the further early realization of technological development aimed at the decarbonization of gaseous energy. By taking the lead in realizing "CO_2 net zero," Tokyo Gas plans to contribute to the government's scheme to "realize a carbon neutral, decarbonized society in 2050."

SCREEN established Sustainable Value 2030, a long-term guideline to improve social value by 2030, and is undertaking various issues. SCREEN is actively deploying actions, including becoming certified under the Science Based Targets initiative (SBTi)*7, which is an international initiative to combat climate change, as the reduction of CO_2 emissions is but one of the company's environmental goals. Through this development project, SCREEN plans to carry out business development in a new field, the water electrolysis cell stack market, and contribute to the realization of a sustainable society.

*1: Multiple stacks of thin parts (cells) that produce hydrogen and oxygen through water electrolysis (fuel cells have a reverse reaction).
*2: A low-cost manufacturing process for functional films that consists of the continuous processing of film using a coating and other methods during the rewinding process of a long film substrate wound in a roll. This time around, this manufacturing process will be used in the manufacturing of water electrolysis cell stacks.
*3: To achieve this goal, in addition to alleviating hydrogen production system costs through this development project, the realization of low-priced power procurement is also anticipated mainly through the growth of the renewable energy market.
*4: ENEFARM is a registered trademark of Osaka Gas Co., Ltd., Tokyo Gas Co., Ltd. and the ENEOS Corporation.
*5: This achievement is based on results obtained from a project subsidized by the New Energy and Industrial Technology Development Organization (NEDO).
*6: CO_2 Capture, Utilization and Storage
*7: Align with the standards called for in the Paris Agreement (curb the rise in the global average temperature to less than 2 degrees above pre-Industrial Revolution levels, and pursue efforts to limit the increase to 1.5 degrees) and set a goal for 5-15 years in the future for the company to reduces its greenhouse gas emissions. Click here for details

<Corporate profile>

Tokyo Gas Co., Ltd.

Establishment	October 1885
Representative	UCHIDA Takashi, Representative Director, President
Address	1-5-20 Kaigan, Minato-ku, Tokyo
Business	Gas, electric power, overseas, energy-related, real estate and other businesses
U R L	https://www.tokyo-gas.co.jp/

SCREEN Holdings Co., Ltd.

Establishment	October 1943
Representative	HIROE Toshio, President, Member of the Board, Chief Executive Officer
Address	Tenjinkita-machi 1-1, Teranouchi-agaru 4-chome, Horikawa-dori, Kamigyo-ku, Kyoto
Business	As a holding company, mainly engaged in managing the business operations of group companies Semiconductor production equipment, graphic arts equipment, display manufacturing and film deposition equipment, print substrate-related devices, ICT solutions and other businesses.
U R L	https://www.screen.co.jp/