News Release

AGC and AIST Initiate Collaborative Research on High-Pressure Water Electrolysis Fundamental Evaluation Tests for Cost Reduction in Green Hydrogen Production

Tokyo, February 29, 2024—AGC Inc. (AGC)and AIST Group (National Institute of Advanced Industrial Science and Technology (AIST) and AIST Solutions Corporation) will begin a collaborative research project starting from April 2024 aimed at understanding the characteristics of Proton Exchange Membrane (PEM) water electrolysis technology in high-pressure environments. Hydrogen produced in high-pressure environments has lower moisture content, which can lead to a reduction in investment costs such as downsizing of drying equipment and reduction of boosting equipment. This research is expected to contribute to the widespread adoption of hydrogen and achieve carbon neutrality.

PEM water electrolysis is a technology suitable for utilizing renewable energy sources with large fluctuations in power generation, such as solar power, and has garnered attention as a necessary technology for producing green hydrogen[*1]. The production and supply of green hydrogen are planned in various countries worldwide, and reducing the cost of hydrogen production is a challenge for expanding the use of green hydrogen in social infrastructure such as fuel cell vehicles. One solution is electrolysis technology that produces hydrogen at high pressures, which has become mainstream in Europe and the United States, operating water electrolysis systems under high-pressure environments (3-5 MPa). On the other hand, in Japan, there is a challenge of not having public facilities capable of evaluating the performance of hydrogen production equipment at pressures of 1 MPa or higher, partly due to stringent safety standards under the High-pressure Gas Safety Act.

This collaborative research involves Fukushima Renewable Energy Institute, AIST (FREA) establishing experimental evaluation facilities and conducting experiments starting from April 2024. With the cooperation of both parties, we will advance the research to accumulate knowledge on hydrogen production in high-pressure environments. AGC has been engaged in business related to electrolyte membranes, including FORBLUE™ S-SERIES, a fluorine-based ion exchange membrane used for hydrogen production, since 1975, and will utilize the extensive knowledge accumulated so far to understand the fundamental membrane material properties under high-pressure environments and establish high-pressure water electrolysis membrane design technology. AIST aims to establish membrane material evaluation technology for high-pressure water electrolysis based on fundamental and evaluation technologies related to water electrolysis developed at FREA[*2].

AGC and AIST will progress with this collaborative research project, aiming to achieve a sustainable society by promoting the adoption of clean energy through the utilization of green hydrogen.

[*1] Hydrogen produced by electrolyzing water using electricity derived from renewable energy sources.
[*2] AIST has expertise in electrolysis based on projects funded by the Green Innovation (GI) Fund program by the New Energy and Industrial Technology Development Organization (NEDO), as well as previous related research aimed at establishing electrolysis performance evaluation technology. This collaborative research is based on this expertise. However, while the GI Fund program focuses on developing common evaluation methods using readily available materials and equipment in the market, this collaborative research by AGC aims to test and evaluate novel membrane materials in a competitive field. These projects are in different development phases and will be conducted using separate facilities from those established in the GI Fund program. The development themes in the GI Fund program include the following: “Hydrogen Production through Water Electrolysis Using Power from Renewables/ Establishment of performance evaluation technologies for water electrolysers/ Construction of technology platform for evaluation of water electrolysis under a renewable energy system environment” (August 2021 to March 2026).

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