TOYO and the University of Toyama start joint research on artificial photosynthesis for the soonest realization of a H_2 society

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Toyo Engineering Corporation
University of Toyama

Toyo Engineering Corporation (TOYO, President & CEO, Haruo Nagamatsu) and the University of Toyama (President of the University of Toyama, Shigeru Saito), have concluded a joint research agreement on artificial photosynthesis which is expected to contribute to the soonest realization of a hydrogen society.

To achieve the Japanese government's goal of carbon neutrality by 2050, which substantially eliminates CO2 emissions, the development of social infrastructure to build a "hydrogen society" based on the utilization of hydrogen has become an urgent mission. Among these, technology that uses sunlight and photocatalysts to split water into hydrogen and oxygen is called "artificial photosynthesis," and is attracting attention as a method for producing CO2-free hydrogen. To ensure a stable supply of large quantities of CO2-free hydrogen at low cost using this artificial photosynthesis technology, it is essential to reduce the cost of hydrogen production equipment including photocatalysts. In addition, establishing a safe method for separating hydrogen and oxygen generated by artificial photosynthesis is also an important issue.

In the hydrogen generation method using carbon nanotube-based particulate photocatalysts developed by Professor Yutaka Takaguchi of the Faculty of Sustainable Design, University of Toyama, these photocatalyst particles are not fixed to electrodes but are dispersed in water and used for the reaction. This is a simple equipment configuration and can be expected to reduce manufacturing costs. In addition, it has the nature to absorb near-infrared light, a wavelength range that is difficult to absorb by conventional photocatalysts. This nature enables the effective use of parts of the energy of sunlight that had previously been difficult to utilize, and it is expected to improve a solar-to-hydrogen energy conversion efficiency.

By combining the University of Toyama's photocatalytic technology with TOYO's hydrogen and oxygen separation technology, we believe that we can establish highly efficient and safe technology. Through this joint research on artificial photosynthesis, we aim for the soonest realization of a hydrogen society.

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