



News Release (July 12, 2023)

Toyo Glass's research study "Research and Development of the Utilization of an Oxygen and Hydrogen Combustion Flame as the Heat Source for Melting Soda-Lime Glass" adopted by NEDO

Toyo Glass Co., Ltd. (hereinafter referred to as "Toyo Glass"), a consolidated subsidiary of Toyo Seikan Group Holdings Ltd., has submitted an application for the "Technology Development Project for the Construction of a Competitive Hydrogen Supply Chain/ Comprehensive Survey and Research/ Survey and Research on the Application of Oxygen and Hydrogen Combustion Technology to Heat Demand". This project was publicly announced by the New Energy and Industrial Technology Development Organization ("NEDO"), and our research study, the "Research and Development of the Utilization of an Oxygen and Hydrogen Combustion Flame as the Heat Source for Melting Soda-Lime Glass" was selected.

The use of oxygen–hydrogen combustion offers the potential for clean and energy-efficient glass melting, as it generates only water vapor in the exhaust gas and operates at a higher flame temperature compared to conventional air combustion. Through this research study initiative, Toyo Glass aims to achieve a decarbonizing technology for "high-temperature heat demand", which has posed challenges for achieving carbon neutrality due to the energy conversion hurdle.

Currently, most hydrogen used in society, known as "gray hydrogen," is derived from fossil fuels and emits CO₂ during the production process. One method for producing hydrogen without emitting CO₂ is through the electrolysis of water using electric power from renewable energy. However, the electrolysis process also generates oxygen as a byproduct. Toyo Glass has identified this oxygen byproduct as an opportunity.

By producing hydrogen and oxygen using water and electricity within a glass manufacturing plant, it becomes feasible to realize oxygen and hydrogen combustion in a glass melting furnace by simply installing a pipeline. Such a configuration is considered to minimize energy loss when using hydrogen for combustion.

Given the significant differences in heat transfer conditions to glass and the furnace atmosphere compared to conventional oxygen–hydrogen combustion technology, there are numerous research subjects to explore. As a leading company in the glass bottle industry, Toyo Glass is committed to achieving glass melting technology using oxygen–hydrogen combustion to deliver glass bottles with low environmental impact while maintaining the same high quality as conventional glass bottles.

About Toyo Seikan Group Holdings, Ltd.

Toyo Seikan Group Holdings, Ltd. is a world-class comprehensive packaging manufacturer, delivering a variety of packaging containers using materials such as metal, plastic, paper, and glass. In the Long-Term Management Vision 2050, "The Future, Wrapped for All," we set the goal to go beyond our traditional field of packaging, aiming to become a corporate group that creates new value that changes society. Founded in 1917, Toyo Seikan Group Holdings, Ltd. conducts business on a global scale, with 45 group companies in Japan and 49 overseas, and currently employs a multinational workforce of 20,000 people. For more information, please visit <https://www.tskg-hd.com/en>

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