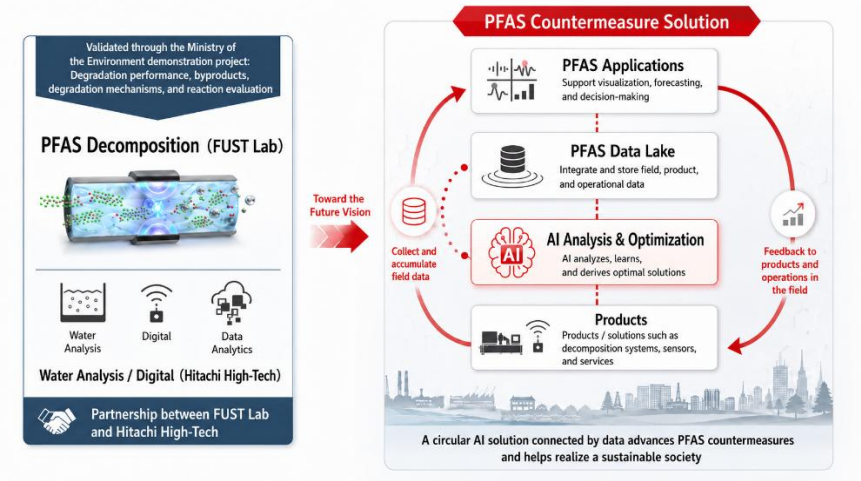
Hitachi High-Tech and FUST Lab demonstrate a reduction in total PFOS and PFOA concentration to 50 ng/L or less

Contributing to a safe and secure society by promoting the social implementation of PFAS decomposition technology and PFAS remediation solutions utilizing physical AI



Tokyo, August 4, 2026 – Hitachi High-Tech Corporation ("Hitachi High-Tech") and FUST Lab Co., Ltd. ("FUST Lab") worked on the Ministry of the Environment of Japan's FY2024 Supplementary Budget Demonstration Project on Technologies to Reduce PFOS and PFOA Concentrations*1 and successfully verified the effectiveness of PFAS (organic fluorinated compounds) decomposition technology using ultrasonic decomposition devices developed by FUST Lab ("this demonstration").

PFAS are a group of chemical substances with properties such as heat resistance and water repellency including representative substances such as PFOS and PFOA. PFAS, also known as "forever chemicals", are substances with an extremely strong carbon-fluorine bond that are difficult to decompose. Due to their decomposition resistance characteristics, the substances remain in the environment for a long time, and the widespread contamination of drinking water, groundwater, and soil has become a global issue. In this demonstration, we achieved the initial target of a total concentration of PFOS and PFOA of 50 ng/L or less and demonstrated that the ultrasonic technology used for PFAS decomposition, which has a proven track record overseas, can function stably at the lab scale in Japan.

Based on the results obtained from this demonstration, Hitachi High-Tech and FUST Lab will accelerate efforts aimed at developing PFAS remediation solutions that combine data obtained from products with advanced AI and implementing these solutions in society.

*1 The Ministry of the Environment of Japan conducted the project to accumulate knowledge on the effectiveness and economic efficiency of countermeasure technologies that contribute to the reduction of concentrations of PFOS and PFOA. Results of the project are published in the form of technical compendium.

Background and social significance

In recent years, regulations on PFAS have been strengthened in many countries against the backdrop of growing concerns about their impact on human health and the environment. In Japan, a total of 50 ng/L of PFOS and PFOA has been specified as the Drinking Water Quality Standard*[2] since April 2026, and water companies and other service providers are required to carry out water quality monitoring and comply with this standard. As actions are expected to continue to be strengthened in the future, there is a pressing need to establish reliable and sustainable technologies for addressing PFAS and to implement them in society. While activated carbon and ion-exchange resin have been used so far to remove PFAS by adsorbing them, the treatment after separation and removal is challenging, and there is growing expectation for technologies that can fundamentally decompose PFAS.

*2 Based on the ministerial ordinance partially amending the ordinance on water quality standards issued by the Ministry of the Environment on June 30, 2025.

Demonstration overview

In this demonstration, FUST Lab's focused ultrasonic technology for cavitation*[3] in the 400 kHz band ("this technology") was used, and based on Hitachi High-Tech's knowledge and technical capabilities of observation, measurement and analysis cultivated over the years, we were able to capture the entire PFAS decomposition process as data and conducted processes from measurement to analysis in an integrated manner. This technology is designed to promote PFAS decomposition by chemically separating the strong carbon-fluorine bond of PFAS through the generation of radical species*[4] in a local high-temperature, high-pressure environment created when the microbubbles generated by ultrasound in water collapse. It features a higher reaction efficiency thanks to the combination of physical and chemical effects independent of pharmaceuticals, and is effective in reducing concentration of mixed contaminated water that contains short-chain PFAS, which are considered to be highly hydrophilic and difficult to break down. We anticipate that processes with a good balance between energy efficiency and environmental impact can be achieved.

In addition, leveraging Hitachi High-Tech's knowledge and technical capabilities, a quantitative analysis of 25 types of PFAS before and after the decomposition process was conducted in collaboration with Chuo University in this demonstration, and through non-targeted analysis*[5], we were able to understand the by-products, reveal the mechanism in which substances are broken down (decomposition mechanism), and conduct reaction evaluation.

*3 Cavitation: A physical phenomenon in which air bubbles are formed in a short period of time due to pressure fluctuations in the flow of liquids and then disappear.
*4 Radical species: Particles that have only one extra electron and are unstable and prone to reaction. Electrons are usually paired and stable, but because radical species are unstable, they are effective in promoting the breakdown of PFAS.
*5 Non-targeted analysis: A method for comprehensively analyzing a wide variety of components without limiting the target materials in advance.

Main results of demonstration

In lab-scale tests targeted at actual contaminated water (mixed contaminated water containing high concentrations of long-chain PFAS bodies and short-chain PFAS), the decomposition process was performed using technology, and the total PFOS and PFOA concentrations were reduced to 50 ng/L or less, achieving results that meet the Drinking Water Quality Standard set

by the Ministry of the Environment of Japan. In high-concentration contaminated water, the concentration reduction rate of up to 99.98% was confirmed under the conditions of this demonstration. A high decomposition performance was also displayed for a wide range of compounds, including both long-chain PFAS and short-chain PFAS, proving that this technology is a comprehensive technology that can handle multiple compounds simultaneously.

Furthermore, the non-targeted analysis showed the progression of decomposition, including the formation of inorganic fluoride ions that are expected to occur as a result of the decomposition of the PFAS, and we were able to scientifically confirm that the technology does not only separate the substances, but also decompose them at the molecular level.

Future outlook

Based on the results obtained from this demonstration, we will further verify the technology's application in the real-world environment by combining Hitachi High-Tech's observation and analytical technologies with FUST Lab's PFAS decomposition technology. We aim to improve technology applicability according to various water quality conditions and usage scenarios, as well as the processing stability and reliability in the detection, removal, decomposition, and disposal processes required for PFAS remediation. In addition, we will contribute to the preservation of a sustainable water environment and the realization of a safe and secure society through efforts aimed at building solutions with a focus on operational support from detection to disposal.

About Hitachi High-Tech

Hitachi High-Tech provides cutting-edge technologies, products and services to society and customers with its corporate vision of "Changing the World and Future with the Power of Knowledge" to contribute to a sustainable global environment, healthy, safe and secure lives, and the sustained development of science and industry. We manufacture and sell clinical analyzers, biotechnology products and radiation therapy systems in the healthcare field, semiconductor manufacturing and inspection equipment in the semiconductor field, as well as analytical systems and electron microscopes used in environmental fields and materials research. We are also engaged in a wide range of business areas globally, providing high added-value solutions in battery, communication infrastructure, railway inspection, digital and other industrial and social infrastructure fields. We provide solutions through a deeper understanding of the issues facing society and our customers to contribute to realizing a sustainable society. The company's consolidated revenues for FY2025 were approx. JPY 821.7 billion.
For further information, visit https://www.hitachi-hightech.com/global/en/

About FUST Lab

FUST Lab Co., Ltd. is a technology-based company founded on an innovative ultrasonic platform that has been researched and developed since 2008 at the Korea Research Institute of Standards and Science (KRISS), a national research institute of the Republic of Korea. Its Japanese subsidiary is headquartered in Toranomon, Minato-ku, Tokyo, and actively conducts business development and research activities, primarily through its research facility located in Tsukuba, Ibaraki Prefecture. By leveraging its proprietary ultrasonic technology, the company is engaged in the development of technologies for the degradation and detoxification of per- and polyfluoroalkyl substances (PFAS). It also provides a range of solutions in the field of nanomaterials, including the production of surfactant-free nano emulsions.

Business Contact

Marketing Strategy Business Group,
Hitachi High-Tech Corporation
contact form

FUST Lab Co., Ltd.
contact form