March 11, 2026

Taiyo Nippon Sanso and Toho Gas Announce Partnership to Develop CO_2 Capture System Expanding Application to Low-Concentration CO_2 Sources

Taiyo Nippon Sanso Corporation (Head Office: Shinagawa-ku, Tokyo; President: Kenji Nagata; hereinafter "the Company"), a Japanese industrial gas business company within the Nippon Sanso Holdings Group, today announced that it has entered into a partnership with Toho Gas Co., Ltd. (Head Office: Nagoya, Aichi; President: Satoshi Yamazaki; hereinafter "Toho Gas") to develop an integrated CO_2 capture system that combines the CO_2 separation and recovery technologies of both companies. Through this partnership, the companies aim to enable the capture of CO_2 from low-concentration sources that have traditionally been difficult to address, thereby expanding CO_2 capture solutions applicable to a broader range of emission sources.

1. Overview

Under this collaboration, the companies will combine Toho Gas's membrane separation system, which concentrates low-concentration CO_2 to a medium concentration (approximately 20–40%), with the Company's proven PSA (Pressure Swing Adsorption)-based CO_2 capture system, which recovers high-purity CO_2 from medium-concentration CO_2. By integrating these technologies, the companies aim to commercialize a system capable of capturing high-purity CO_2 even from feed gas with lower CO_2 concentrations than previously feasible, specifically in the range of 5% to 20%.

2. Background of the Partnership

The Company has previously commercialized PSA-based CO_2 capture system for emission sources such as lime kilns (CO_2 concentration: 20–40%)[1], and has since expanded the applicable feed CO_2 concentration range to 20–60%[2], thereby providing solutions that support industrial decarbonization efforts. Following these developments, the Company has received numerous inquiries from customers whose emission sources contain less than 20% CO_2, leading to growing demand for new systems capable of handling lower-concentration exhaust gases.

Meanwhile, Toho Gas has been developing membrane separation systems—including membrane modules and associated equipment such as peripheral and pretreatment units—capable of concentrating low-concentration CO_2 contained in sources such as boiler exhaust gas to a medium concentration of 20–40%.

Under this partnership, a two-stage process will be established in which low-concentration CO_2 (approximately 5–20%) is first efficiently concentrated to a medium level (approximately 20–40%) using Toho Gas's membrane separation system, followed by the recovery of high-purity CO_2 from the medium-concentration CO_2 using the Company's PSA-based CO_2 capture system.

Notes:

1. News release dated March 31, 2023: "CO_2 Recovery Equipment with Capacity for 10 Tons Per Day to be Launched in April."
2. News release dated April 17, 2024: "Extended Range of Raw Material CO_2 Concentrations Applicable to CO_2 Recovery Equipment."

3. Future Outlook

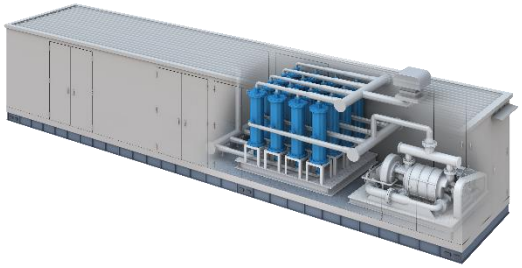
Through its collaboration with Toho Gas, the Company aims to develop a new CO_2 capture system applicable to a wide range of emission sources with CO_2 concentrations from 5% to 60%. In addition, the Company will conduct performance verification under actual operating conditions and collect operational data, with the goal of accelerating the practical implementation of CO_2 capture systems for low-concentration exhaust gases.

Leveraging its long-standing expertise and track record as an industrial gas manufacturer, the Company will continue to propose optimal CO_2 capture systems tailored to customers' emission characteristics and contribute to the realization of a carbon-neutral society.

4. Products

Membrane Separation System (Toho Gas products under development)

A membrane separation system designed to concentrate low-concentration CO_2 to 20–40%.



Notes: This image is for illustrative purposes only.

Membrane Separation System Specifications

CO_2 recovery capacity	Up to 10 tons/day
CO_2 concentration	20–40%
Feed CO_2 concentration	5–20%

PSA CO_2 Capture System (Taiyo Nippon Sanso products released in April 2023)

A system developed by the Company, which separates and captures CO_2 using the PSA (Pressure Swing Adsorption) method.

Small-scale CO_2 capture system (external view)

PSA CO_2 Capture System Specifications

CO_2 recovery capacity	Up to 10 tons/day
CO_2 concentration	98%
Feed CO_2 concentration	20–60%

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