

February 20, 2025

Kawasaki Kisen Kaisha, Ltd.

"K" LINE endowed research project with Rikkyo Educational Corporation
on the on-board CO2 capturing system

Kawasaki Kisen Kaisha, Ltd. ("K" LINE) is pleased to announce that it has signed an agreement with Rikkyo Educational Corporation on an endowment type research project (the research project) entitled "Social Implementation of Future Marine Environmentally Harmonious Materials".

For the research project, the "K" LINE Advanced Technology Future Environment Project Laboratory was established within Rikkyo University to capitalize on the industry-academia collaboration. The project involves the development of an on-board CO2 capturing system that utilizes the molecular technology of MOF*1, a porous material. This research project is being conducted in collaboration with a research group led by Professor Mao Minoura at the Department of Chemistry, College of Science, Rikkyo University.

"K" LINE is advancing different initiatives, such as the operation of liquefied CO2 carriers, to decarbonize the society. One of the initiatives is the discussion on the OCCS*2 technology to separate, capture and store on-board the CO2 emitted from the vessel and to land it. In 2021, we conducted the "CC-OCEAN" project, the world's first-ever demonstrative experiment of an on-board CO2 capturing device at the time, and succeeded in separating and capturing CO2 from vessel engine exhaust gas*3. The research project is aimed at clarifying the applicability of MOF to the on-board CO2 capturing system through the evaluation of MOF's absorption-desorption performance under the presence of CO2 contained in exhaust gas from a vessel, for the purpose of expanding the technology part of "K" LINE's OCCS domain. In this way, we proceed with discussion aimed for technological development and implementation of MOF.

"K" LINE will remain committed to the research project and other initiatives to support the decarbonization for both itself and society based on "K" LINE Environmental Vision 2050, its long-term environmental guideline.

*1 MOF (metal-organic frameworks): Collectively refers to coordination polymers, also known as metal-organic frameworks, consisting of organic ligands and metal ions. It has very fine pores known as micropores and can adsorb and separate any gas depending on the combination of organic ligands that comprise MOF and metal ions. As such, MOF is expected to become applicable to materials for the adsorption and storage of many different gases.

*2 OCCS (onboard carbon capture and storage): This is a technology to, on the vessel, capture and store CO2 from the vessel's exhaust gas. The landed CO2 is stored or put to industrial use.

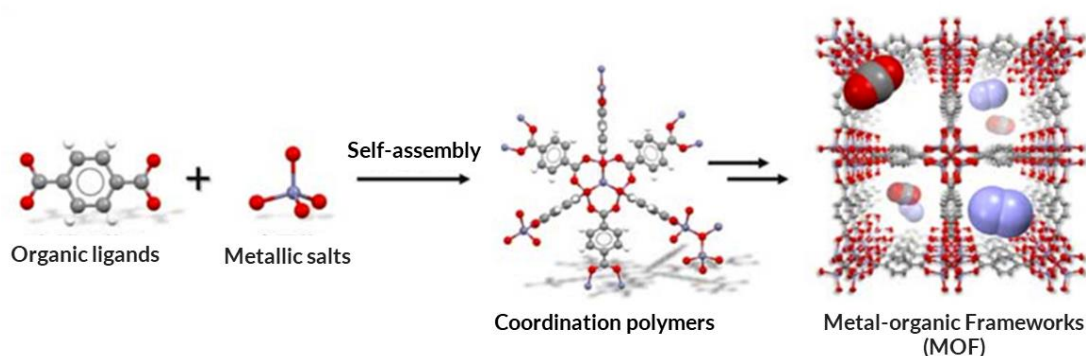
*3 News release dated October 20, 2021:

“K” LINE successfully separated and captured CO₂ from exhaust gas in World’s First CO₂ Capture Plant on Vessel

~Captured CO₂ has Purity greater than 99.9%, Demonstrating performance in line with Plan~

<https://www.kline.co.jp/en/news/csr/csr-20211020.html>

[MOF diagram]



(Source: Rikkyo University’s website)

[Related Press Release]

February 6, 2024: “K” LINE enters into charter contracts with Northern Lights for third liquefied CO₂ vessels:

<https://www.kline.co.jp/en/news/carbon-neutral/carbon-neutral-20240206.html>

January 30, 2025: Delivery of Liquefied CO₂ Carrier “NORTHERN PATHFINDER” to Northern Lights

<https://www.kline.co.jp/en/news/carbon-neutral/carbon-neutral-20250130.html>