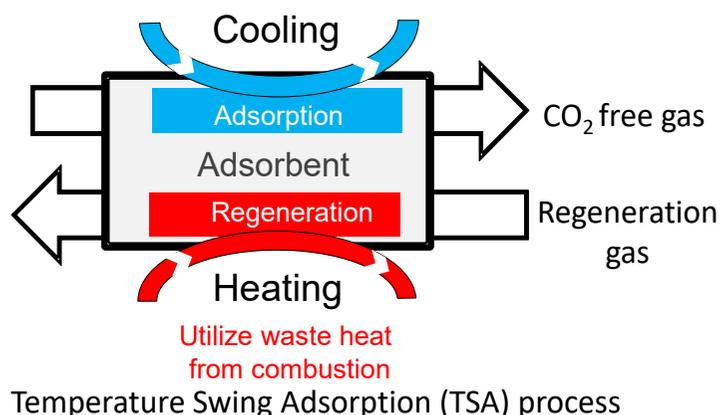
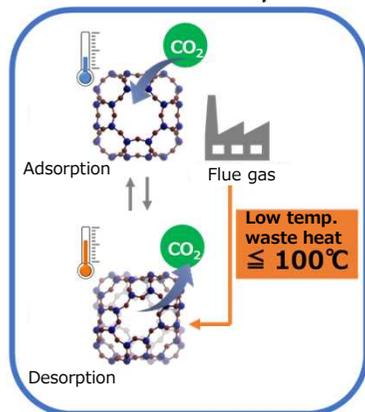
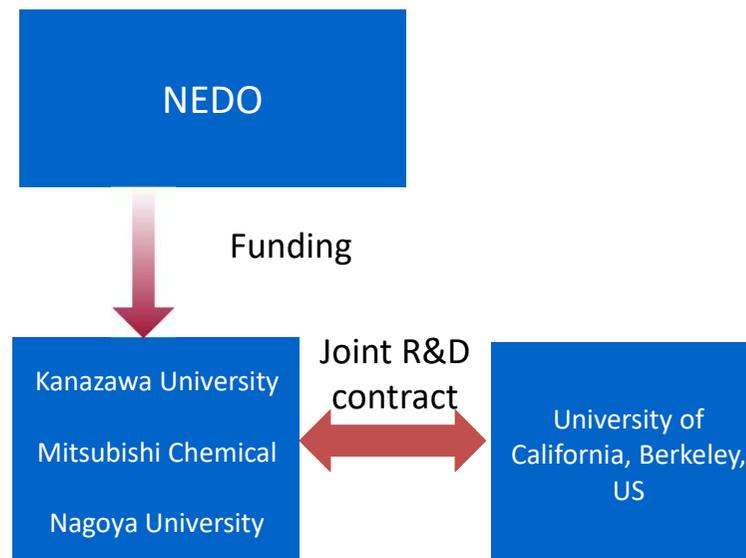


Outline of the project

- CO₂ capture from flue gases is crucial. Low-pressure flue gases from power, steel, cement plants and so on account for 62% of total amount of CO₂ emissions in Japan.
- Combining expertise of adsorbent materials and adsorption processes will accelerate the development of new processes and resolve challenges to realize carbon recycling at industrial scales.
- Novel zeolite will be developed that maintains adsorption capacity and selectivity under the presence of water, which will be used in a unique heat-exchanging module for the temperature swing adsorption process, and its economical efficiency will be assessed.



Project scheme



Expected outcomes

- CO₂ working capacity maintained at 90% after 1,000 adsorption-desorption cycles. Working capacity (equilibrium capacity at 14% CO₂) – (equilibrium capacity at 100% CO₂) ≥ 0.1 mmol/g at 5% RH, CO₂ concentration from 10% to 80% and recovery 75%.
- Identify a process that achieves CO₂ capture at 2,000–3,000 yen/ton-CO₂
- Expected market 900 billion yen/year in 2050, expected reduction of CO₂ 750 million tons/year, assuming market share of 30%

Significance of international R&D

University of California, Berkeley

A research group at the University of California, Berkeley, has expertise in zeolite adsorption under the presence of water. The group will carry out experiments and analyze adsorption and desorption of CO₂ in humid gas. Their findings will be utilized in designing and analyzing the TSA process.