

Case ID:M23-068P

Published: 4/16/2024

Inventors

Klaus Lackner

Robert Page

Kacie Niimoto

Matthew Green

Shreyans Kedia

Contact

Physical Sciences Team

Scoop Device for Passive Capture of CO₂

Background

Carbon dioxide (CO₂) capture technology has the potential to alleviate greenhouse gas emissions and mitigate climate change. There are several types of technology that are currently being used to capture and store CO₂ such as Direct Air Capture (DAC), power plants, enhanced rock weathering (ERW), etc. Carbon capture technologies are typically utilized in two different ways, either by using energy to convert CO₂ into fuels or by using CO₂ alone to drive industrial processes such as oil extraction. However, these technologies can have high costs, pose environmental risks, and use massive amounts of energy. Current approaches to CO₂ capture have, in some cases, led to increased emissions, which is counterproductive. There is a current need for a CO₂ capture device with a stationed sorbent that increases directing airflow and extends usage duration.

Invention Description

Researchers at Arizona State University have developed a novel device for CO₂ capture using passive airflow that is delivered to a stationed sorbent, allowing CO₂ to be captured effectively. This system introduces external rigid scoops on the chamber, which enhances airflow and improves capture performance. Additionally, this device contains multiple openings around the vessel making wind direction negligible as air can flow throughout the vessel regardless of the direction. This system proposes a structure with minimal moving parts and takes in increased amounts of airflow. This system is adequate for reducing energy while capturing CO₂ proficiently.

Potential Applications:

- Oil and gas production
- Fertilizer/ethanol production
- Coal gasification/coal-fired power generation

Benefits and Advantages:

- Increases airflow
- Stationary sorbent which results in extended life duration
- Circular exposure with scoops directing airflow more efficiently
- Reduces energy requirements

