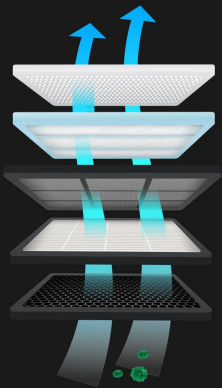


Direct Air Capture Technology for HVAC Systems in Homes, Offices, Transportation Systems

IMPROVING CARBON CAPTURE EFFICIENCY

Carbon capture technologies are gaining traction as a way to remove carbon dioxide (CO₂) from the atmosphere. However, operating costs for these direct air capture (DAC) systems are high due to the energy required for regeneration processes.

There is a need for highly efficient DAC technologies that will lower operating costs and incentivize their use.



A SCALABLE SOLUTION

HBKU has developed a method for capturing CO₂ from the atmosphere using air conditioning units.

The approach uses swing surface-modified filters to adsorb CO₂ after the A/C unit has filtered out dust particles and lowered air temperature. As a filter becomes saturated, it is regenerated via temperature or pressure-swing adsorption to release the absorbed CO₂ to a storage container for disposal or industrial use.

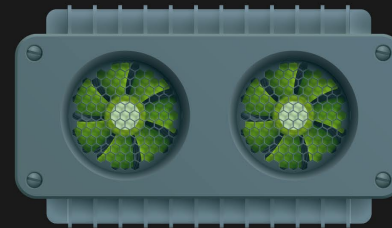
This carbon capture technology can be adapted for use in DAC systems that not only reduce CO₂ concentration but also filter harmful microbial agents from office buildings, aircraft cabins, ships, and municipal transportation systems.

Further modification could enable its use in creating protective air barriers around the seats of passengers in aircraft cabins, office workstations, and meeting rooms.

APPLICATIONS

This technology can be incorporated into a wide variety of HVAC systems used in:

- Residential homes
- Office buildings and Schools
- Municipal transportation systems, Airplanes and Ships



VALUE PROPOSITIONS

Deactivates contagions: improves air quality, and reduces the spread of infectious diseases in various buildings.

Reduces greenhouse gasses: reducing CO₂ emissions

High performance: Adsorbs CO₂ at 400 ppm from ambient air

Efficient: Utilizes existing infrastructure to produce CO₂ for industrial use, such as greenhouse farming by agricultural firms.

Advanced: Uses nanomaterials like metal-organic frameworks or faujasite to enhance CO₂ uptake in adsorption filters.

Scalable: Offers potential for use in various spaces

Flexible: Works with adsorption filters of polymer, carbon, fabric, or silicate-based materials.



PATENT STATUS

Patent US2023/0256378A1
has published



LICENSING OPPORTUNITIES

Hamad Bin Khalifa University is offering this technology for license.
For more information, please contact: innovation@hbku.edu.qa