

Novel Indoor Air Purifying (IAP) System to capture carbon dioxide – Improved indoor air quality in air-conditioned spaces

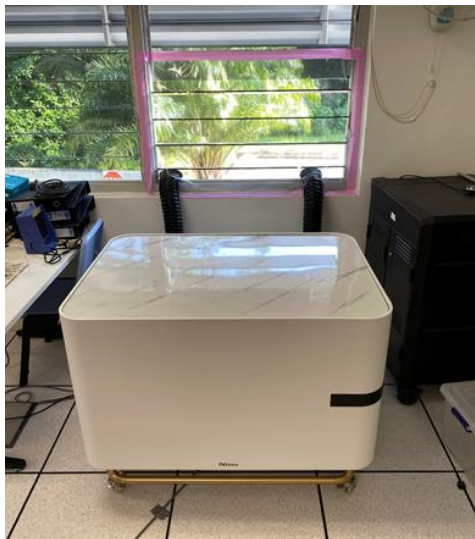
Currently, using outdoor air ventilation to maintain adequate indoor air quality is an essential element and the most common approach adopted by most building owners. This is done at the expense of high energy cost to cool and clean the outside air as well as challenges in maintaining thermal comfort throughout the whole building.

The IAP system uses advanced sorbent to capture the CO₂ from indoor air so that the indoor air can be recycled for use and therefore, reduces outdoor air ventilation requirements. This in turn, reduces ACMV loads required for conditioning outdoor air and provide significant energy savings for buildings.

The IAP system has two main modes of operation. During the adsorption mode, the IAP system is actively performing CO₂ scrubbing. As the indoor air passes through the sorbent in the IAP system, the CO₂ binds with the sorbent. The air free of CO₂ is then recirculated back into the indoor space. Over time, the sorbent material becomes saturated and needs to be regenerated. During the regeneration mode, the sorbent modules are heated to release the CO₂ adsorbed.

The IAP system is suited for use in both new construction and as a retrofit measure. Besides reducing ACMV energy costs, other advantages and potential cost savings include the reduction in the peak cooling load, reduced first costs and reduction in filter replacement costs.

Furthermore, exploring the offtake of CO₂ captured by the IAP system could also help building owners achieve their decarbonisation goals.



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Applications:

- Air cleaning technology that captures CO₂ from indoor air in air-conditioned spaces for commercial buildings

Capabilities:

- Capture of CO₂ in indoor spaces generated from human respiration using advanced sorbent.
- Sorbent undergoes regeneration periodically to maintain their scrubbing efficiency and only need to be replaced annually.

Benefits:

- Reduces outdoor air ventilation and energy consumption of ACMV system
- Improves occupant health and productivity with better indoor air quality
- Offtake of CO₂ captured to meet decarbonisation goals
- Modular, individual or multiple modules can be used depending on the building size

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