

TECH OFFER

Adsorbent for Low Concentration & Room Temperature Adsorption of Carbon Dioxide



KEY INFORMATION

TECHNOLOGY CATEGORY:

Environment, Clean Air & Water - Filter Membrane & Absorption Material
Green Building - Heating, Ventilation & Air-conditioning Materials - Plastics & Elastomers

TECHNOLOGY READINESS LEVEL (TRL): **TRL4**

COUNTRY: **SINGAPORE**

ID NUMBER: **TO174739**

OVERVIEW

In recent years, there has been an increasing demand for carbon dioxide (CO₂) adsorbents due to climate change. These materials can be used for CO₂ capture in both flue gas and directly from the air which can mitigate and reduce greenhouse gas (GHG) emissions. The current conventional CO₂ adsorbents includes alkaline salts, aqueous amine solution and metal organic frameworks (MOF). However, these materials are expensive (MOF) and suffers from problems such as heat generation (alkaline salt) to energy intensive post-adsorption recovery (aqueous amine solution) which severely limits its wide scale adoption.

This technology offer is an amino-based resin adsorbent for low concentration and ambient temperature CO₂ adsorption and desorption. This adsorbent is capable of adsorbing low concentrations of CO₂ in air at room temperature and generates little heat when adsorbing CO₂. It is also possible to capture CO₂ from flue gas in the same manner as well. In addition, the regeneration (release of CO₂) of the adsorbent can be performed at low temperature with significantly less energy consumption than existing

materials.

TECHNOLOGY FEATURES & SPECIFICATIONS

This technology offer is an amino-based resin adsorbent for low concentration and room temperature capture of CO₂. The technical features and specifications are as follows:

- Porous amino-based resin
- Easy to handle granules
- High affinity CO₂ chemisorption
- Low concentration and temperature CO₂ adsorption (as low as 400 ppm and at room temperature)
- Desorption is possible at lower temperatures than existing materials (30 °C or higher)
- Environmentally friendly (non-toxic, non-volatile)
- Flexible implementation design (filter parts, filling columns etc.)

POTENTIAL APPLICATIONS

The use of this technology is for industries who are interested in CO₂ capture and/or utilisation. The potential applications are:

- Scenarios for CO₂ Capture

- Air conditioners (passive CO₂ capture and indoor CO₂ concentration control)
- Manufacturing and other CO₂ emitting industries (removal of CO₂ from pre-combustion or flue gas)

- Scenarios for CO₂ Utilisation

- Beauty applications (promotion of blood circulation by use of CO₂)
- Agriculture application (promotion of growth by use of CO₂)

UNIQUE VALUE PROPOSITION

- Low concentration and room temperature CO₂ capture
- Desorption is possible at lower temperatures than existing materials (30 °C or higher)
- Environmentally friendly adsorbent (non-toxic, non-volatile)
- Flexible use case (direct air capture, flue gas capture)

This technology owner is keen to out-license this patented technology, or to do R&D collaboration utilising the adsorbent material with partners who are interested in CO₂ capture and/or utilisation.