

CARBON CAPTURE AND SEPARATION MEMBRANES



INVENTION

The invention is a method of preparing a Bisallyloxy-UiO-66 metal-oxide framework using certain easy to achieve experimental conditions. This metal-oxide framework was used for CO₂ removal.

MARKET NEED

Increasing level of CO₂ emission is considered one of the major environmental challenges that our planet is facing today. The concentration of greenhouse gases in the atmosphere reached a new record in 2017 with CO₂ at 405.5 ppm which represents 146% of the concentration of the pre-industrial era¹.

In 2018, the global Carbon Capture and Storage market size was 3300 million US\$ and it is expected to reach 4980 million US\$ by the end of 2025, with a CAGR of 6.1% during 2019-2025²

APPLICATIONS

- Removal of CO₂ from a mixture of methane and nitrogen
- CO₂ capture from flue gas
- Separation and purification of gases

ADVANTAGES

- Selectivities of 63 for CO₂/N₂ and 16 for CO₂/CH₄ mixtures
- Metal-oxide frameworks are stable upto 280°C
- Stable in different solvents like water, methanol, ethyl acetate and dicholormethane
- Pore size of absorbent can be tailored according to application

PROJECT STATUS

- A small-scale lab prototype was tested by designing fluidized bed reactors.
- Single stage process tested using a batch method.
- 50cc/g of CO₂ uptake capacity at 298 K and 1 bar pressure

PATENT PROTECTION

- US patent application is currently under process for filing

ABOUT KFUPM

King Fahd University of Petroleum & Minerals, located in Saudi Arabia, is a leading educational organization for science and technology. KFUPM Innovation & Technology Transfer office is tasked with taking innovation from lab to market place.

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¹ World Meteorological Institute

² Markets and Markets, Carbon Capture and Sequestration Market