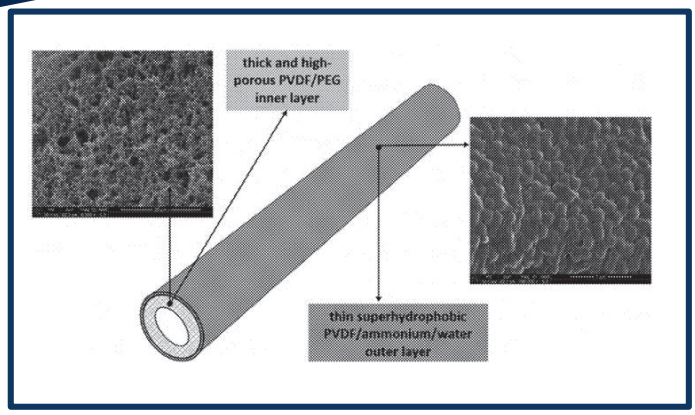
NEW MEXICO TECH
OFFICE OF INNOVATION COMMERCIALIZATION

Dual-Layered Carbon Capture Using Hollow Fiber Membranes (HFMs)



Challenge

In recent years, energy transition and global warming has prompted concerns that the oil and gas industry will have to resolve. Research to capture carbon dioxide (CO2) from the air to balance emissions that are unavoidable or technically difficult to abate is necessary for the sustainability of the industry and the convenience of the general public. The industry is also keen to develop effective methods to remove water from oil wells.

Solution

HFMs are a class of artificial membranes containing a semi - permeable barrier in the form of a hollow fiber. HFMs can be used in water treatment, desalination, cell culture, medicine, or tissue engineering. The properties of the membrane can be finely tuned by changing processes and compositions of the materials used to produce the membranes. This invention proposes methods of designing dual-layer systems made up of hollow fiber membranes for the purpose of water desalination in underground formation and/or to capture carbon dioxide from a gaseous sample.

Benefits and Features

- Use of polyvinylidene fiber outer layering for the tube membranes
- Use of polyethylene glycol (PEG) hollow fiber membrane for the inner layer
- Use of direct air capture (DAC) technology to reduce climate change impact by capturing emitted carbon dioxide molecules (CO2) from the atmosphere

Market Potential / Applications

This invention has applications in water treatment, health care (medicine of tissue engineering), salt rejection in hypersalination water, chemistry (cell culture), and water desalination.

Developments and Licensing Status

Status: Available

Commercial sponsor sought? Yes

Patent Status

US, Europe, China, and India patents pending

PCT/US2021/042016

Inventors

Jianjia Yu; Lusi Zou; Pri Gusnawan; Leonard Garcia; Guoyin Zhang; and Robert Balch

Keywords: desalination, hollow fiber membrane, CO2 capture, water treatment, dual-layer polyvinylidene

To inquire about this technology call (575) 835-5390 or email us at OIC@nmt.edu

https://www.nmt.edu/oic/