GAS SEPARATIONS WITH REDOX-ACTIVE METAL-ORGANIC FRAMEWORKS

Tech ID: 21885 / UC Case 2012-013-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,675,923	06/13/2017	2012-013

BRIEF DESCRIPTION

With over 100 million tons produced annually, oxygen (O2) is among the most widely used commodity chemicals in the world -- and the demand for pure O2 could grow enormously due to its potential use in processes associated with the reduction of carbon dioxide emissions from fossil fuel-burning plants.

The separation of O2 from air is currently done on a large scale using an energy-intensive cyrogenic distillation process. Zeolites are also used for O2 / N2 separation, however this process is inherently inefficient as the materials used adsorb N2 over O2 with poor selectivity.

To address this situation, researchers at UC Berkeley have developed novel redox-active metal-organic frameworks for gas separation. In comparison to conventional materials, the Berkeley material displays incredible separation properties at temperatures that are much more favorable to those currently used in numerous gas separaton and storage applications.

SUGGESTED USES

This material has promise in numerous gas separation and storage applications, including parrafin/olefin separations, oxygen/nitrogen separation, and nitric oxide/nitrous oxide separation. More specifically, potential application include:

» Separation of oxygen from air via vacuum swing adsorption;

» Separation of hydrocarbons such as ethane/ethylene, ethylene/acetylene, propane/propylene and others via pressure, temperature or vacuum swing adsorption processes; and

» Separation of gases based on preferential electron transfer reactions (i.e. nitric oxide/nitrous oxide).

ADVANTAGES

Lower operating and capital costs via improved efficiency, decreased energy usage, and lower (near ambient) operating temperatures.

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Next-Generation Metal-Organic Frameworks With High Deliverable Capacities For Gas Storage Applications
- Porous Polymer Networks For Per- And Poly-Fluoroalkyl Substance Separations
- Structures and Apparatus using Three-Dimensional Linked Networks
- Metal-Organic Frameworks For Aromatic Hydrocarbon Separations
- Novel Porous Organic Polymers for Ammonia Adsorption

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OTHER INFORMATION

KEYWORDS

Gas Separation, Metal-Organic Framework

CATEGORIZED AS

» **Energy**

» Hydrocarbon

» Other

» **Environment**

» Other

RELATED CASES

2012-013-0, 2012-009-1

- Isothermal Carbon Capture And Release Of Carbon Dioxide With Molecular Polyamines
- Metal-Organic Frameworks for H2 Adsorption and Drug Delivery
- Redox-Active Metal-Organic Frameworks for the Catalytic Oxidation of Hydrocarbons

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