NEXT-GENERATION METAL-ORGANIC FRAMEWORKS WITH HIGH DELIVERABLE CAPACITIES FOR GAS STORAGE APPLICATIONS

Tech ID: 24251 / UC Case 2014-209-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,702,850	07/07/2020	2014-209

BRIEF DESCRIPTION

There are many applications that require the storage of a high density of gas molecules. The driving range of vehicles powered by natural gas or hydrogen, for instance, is determined by the maximum density of gas that can be stored inside a fuel tank and delivered to the engine or fuel cell. In certain situations, it is desirable to lower the pressure or raise the temperature needed to store a given amount of gas through the use of an adsorbent. Developments in next-generation adsorbents, such as metal-organic frameworks and activated carbons, have shown certain weaknesses in terms of the amount of gas that can be delivered when an application has a minimum desorption pressure greater than zero and when a significant amount of heat is released during adsorption or cooling occurs during desorption. To help solve these problems, researchers at the University of California, Berkeley, have developed a next generation of materials using novel porous metal-organic frameworks that demonstrate unprecedented deliverable gas capacities. These engineered adsorbents maximize the amount of gas delivered during each adsorption/desorption cycle. This shows promise in developing next generation gas storage materials for applications with a wide range of operating conditions.

SUGGESTED USES

- Natural gas storage for vehicles
- Hydrogen gas storage for vehicles
- Natural gas transport and storage

ADVANTAGES

- High performance in the presence of heat and pressure change
- Robust range of vehicular and stationary power environments
- Leverages industry standard chemical processing platforms

RELATED MATERIALS

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INVENTORS

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OTHER INFORMATION

KEYWORDS

gas, adsorbent, hydrogen, natural gas, storage, metal-organic framework, MOF, desorption, activated carbon, adsorption, natural gas vehicle, NGV, carbon dioxide, fuel storage, natural gas compression, vehicle

CATEGORIZED AS

- **Energy**
  - Hydrocarbon
  - Hydrogen
  - Storage/Battery
- **Materials & Chemicals**
  - Chemicals
  - Composites
- **Transportation**
  - Automotive
  - Other

RELATED CASES

2014-209-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Porous Polymer Networks For Per- And Poly-Fluoroalkyl Substance Separations
- Selective Carbon Monoxide Uptake via Metal Carbanion Functionalized Metal-Organic Frameworks
- Structures and Apparatus using Three-Dimensional Linked Networks
- Gas Separations With Redox-Active Metal-Organic Frameworks
- Metal-Organic Frameworks For Aromatic Hydrocarbon Separations
- Novel Porous Organic Polymers for Ammonia Adsorption
- Isothermal Carbon Capture And Release Of Carbon Dioxide With Molecular Polyamines
- Selective Nitrogen Adsorption Using a Vanadium Metal-Organic Framework
- Metal-Organic Frameworks for H2 Adsorption and Drug Delivery
- Separation Of 1-Butene From 2-Butene Using Framework Open Metal Sites
- Redox-Active Metal-Organic Frameworks for the Catalytic Oxidation of Hydrocarbons
- Phase Change Adsorbents For Storage And Separation Applications

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