STRUCTURES AND APPARATUS USING THREE-DIMENSIONAL LINKED NETWORKS

Tech ID: 24724 / UC Case 2015-088-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,665,896	05/26/2020	2015-088

BRIEF DESCRIPTION

As the most reducing and lightest metal, lithium is a desirable battery anode material due to its abilities to yield a high cell voltage and a high specific energy capacity. Lithium ion (Li-ion) battery technology is expected to grow to a $30B industry in the next 5 to 10 years. This growth is largely driven by the introduction of electric vehicles which reached one million plug-in electric vehicles globally in 2015. Problems with Li electrodes have been investigated and challenges remain, including dendrite growth, flammability of organic solvents, and decomposition of the anions at the electrode. To address these challenges, researchers at UC Berkeley are developing single-ion, solid polymer electrolytes as replacements for liquid electrolytes. The investigators have demonstrated a solid-state battery system which uses single-ion conduction and leverages three-dimensional connectivity of polymer networks to provide superior mechanical strength and flexibility which affects bulk conductivity.

SUGGESTED USES

- Rechargeable batteries

ADVANTAGES

- Expected improvements in cycle life as compared to traditional Li-ion
- Leverages commercially available materials and components (scaling the reaction to larger quantities may be done at lower cost)
- Reduces or eliminates the need for flammable solvents
- Offers the potential to replace Li with other metals
- No precious metal catalysts are required to synthesize the material

RELATED MATERIALS

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
- Selective Carbon Monoxide Uptake via Metal Carbanion Functionalized Metal-Organic Frameworks
- 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

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

- **Energy**
  - Storage/Battery
- **Materials & Chemicals**
  - Chemicals
  - Polymers

RELATED CASES

2015-088-0

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