Voltage-Responsive Coating for Lithium-Sulfur Battery

Tech ID: 31826 / UC Case 2013-764-0

SUMMARY

Researchers in the UCLA Department of Chemical and Biomolecular Engineering have developed a lithium-sulfur battery that overcomes the poor recharging and short lifespan problems common among other lithium-sulfur battery configurations.

BACKGROUND

Lithium ion batteries are widely used in applications ranging from portable electronics to electric cars but offer only limited charge capacity and contain relatively expensive materials. Lithium-sulfur (Li-S) batteries have been considered an attractive alternative because they present superior energy density with lower raw material cost. Current Li-S batteries, however, suffer from self-discharge, fast capacity fading, poor cycling life, and rapid reduction in efficiency. There is a need for improved Li-S technologies to advance rechargeable battery performance and use.

INNOVATION

UCLA researchers have developed a battery with a sulfur-containing cathode that provides improved capacity retention with repeated charge-discharge cycles. The key to the invention is applying a voltage-responsive metal compound to the cathode to inhibit outward diffusion of polysulfide compounds, while allowing transport of lithium ions. Devising a means of controlling these mechanisms has limited other attempts to develop practical Li-S battery designs.

APPLICATIONS

- Li-S batteries for high energy applications
- Electric vehicles
- Portable electronics
- Portable tools

ADVANTAGES

- High specific density
- Low cost
- Long cycling life

PATENT STATUS

Country	Type	Number	Dated	Case
China	Published Application	WO2014182281	11/13/2014	2013-764

Additional Patent Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Highly-Stablized Nanocapsules for siRNA Delivery
- Hierarchially Porous Carbon Particles for Electrochemical Applications
- Making Nanostructured Porous Hollow Spheres with Tunable Structure
- Hyperbranched Polyglycerol Encapsulated Proteins for Oral Protein Delivery

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OTHER INFORMATION

KEYWORDS

Lithium, sulfur, battery, renewable, green, electric vehicle, polymer, silicone, solid electrolyte, metal oxide, cathode, coating

CATEGORIZED AS

- **Energy**
  - Storage/Battery

RELATED CASES

2013-764-0

- A Method Of Making Carbon Coated Oxides As High-Performance Anode Materials
- Viral Vector Nanocapsule for Targeting Gene Therapy

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