

## 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

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