



TECHNOLOGY

Health Monitoring of Energy Storage Device

OVERVIEW

Background

Throughout the last decade the adoption of Lithium-ion batteries has grown beyond the consumer electronics market. Lithium-ion based batteries are increasingly being used in applications such as plug-in hybrid and electric vehicles, unmanned aerial vehicles, uninterrupted power supplies, and storage of excess energy created through renewable energy technologies such as wind turbines and solar cells. Despite lithium-ion batteries favorable characteristics they must be monitored and managed very closely if not the battery's end of life could be expedited or even worst an immediate failure may occur which has major safety implications due to Lithium-ion batteries flammable electrolytes attribute. Current battery management systems use electrical measurements that are then plugged into an algorithm or derived models that calculates the estimate of the batteries state of health.

Innovation

Researchers at the University of Maryland College Park have developed a technique for health monitoring of lithium-ion batteries. By combining ultrasonic acoustic transducer based sensors attached to the outer casing of a battery, the Researchers are non-destructively inspecting the internal condition of vital interfaces inside the battery pack. These interfaces can include the interface between the anode current collector and anode active material, and the cathode current collector and cathode material. The sensors are also used to monitor battery degradation including swelling, electrode expansion, gas generation and electrode ruffling. These measurements can be used to provide a real-time degradation assessment and to model in a battery management system. This sensor based technique is also applicable for screening of as-manufactured cells for inherent defects and for use in a return depot where incoming warranty returns are required to be inspected prior to further analysis.

Advantages

- Real Time Analysis
- True representation of Internal Structure
- Non- Destructive and non-intrusive

Applications

- Battery Management Systems
- Change of state analysis
- Screening of as-manufactured cells
- Incoming screening of warranty returns

CONTACT INFO

UM Ventures
0134 Lee Building
7809 Regents Drive
College Park, MD 20742
Email: umdtechtransfer@umd.edu
Phone: (301) 405-3947 | Fax: (301) 314-9502

Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Pending

LICENSE STATUS

Available for exclusive license

EXTERNAL RESOURCES

- [US Patent 10,014,561](#)

PS-2012-089