Fault Sensing in Operating Batteries

Battelle

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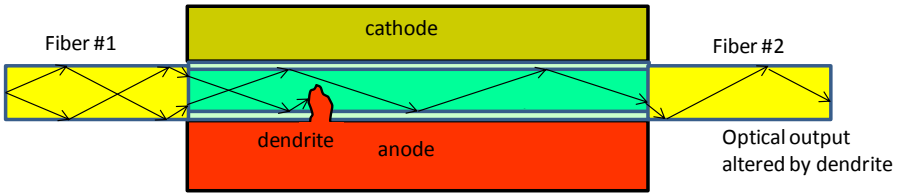
Technology

Battery failures due to internal faults are a major concern in electric vehicles and grid storage. These faults, which affect both safety and performance, are often local in behavior and difficult to detect with global measurements such as voltage, current and temperature.

Battelle and its team member, the University of Akron, will modify the internal structure of a battery cell to function as an optical waveguide. Changes in light scattering as dendrites grow or local shorting currents develop will be measured by an optical detector.

The operating cell will be monitored continuously for impending faults, providing sufficient early warning to the control system.



Technology Impact

Early detection of faults: allows time for corrective action, reduces need for overdesign and conservative operation.

Applicable to a wide class of battery chemistries.

The measurement technique leverages cost reductions in telecommunications and medical devices.

Performance Targets

Metric	State of the Art	Battelle Target
•Measurement of fault signatures in a special fixture. •Measurement in a visual cell •Measurement in a Li-ion battery	Global monitoring of cell voltage, pack current, selected temperature locations	Determine early warning time of incipient, local faults before they become a global event. Demonstrate calibrated signal above background in a test fixture, a visual cell, and a battery.

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