

# Solid Lithium Ion Conducting Electrolytes Suitable for Manufacturing Processes

UT-B ID 200902234



## Technology Summary

The lithium ion battery found in electronics like cell phones uses liquid electrolytes associated with shorter battery life; this material is also a safety hazard if it is overheated or overcharged. Batteries with solid lithium ion conducting electrolytes would overcome these limitations, but they have insufficient power to meet device energy requirements at a reasonable cost. Researchers at ORNL invented a method for synthesizing materials from solid state reactions that resolves some of these problems and improves battery performance.

This method provides control of particle size, shape, and surface area of the lithium ion-conducting solid oxide material. The material's nanosized particles improve battery performance. While other researchers have synthesized a variety of materials from solid state reactions, those methods cannot control particle properties and are not applicable to an assembly line manufacturing process.

The invention is cost-effective and suitable for manufacturing solid electrolyte materials for batteries as thin films and powder. The researchers are continuing to characterize the improved nanostructures.

## Advantages

- Cost-effective, assembly line manufacturing
- Overcomes problems associated with solid state synthesis and provides control on particle size, shape, and surface area
- Improved battery performance through use of nanoparticles

## Potential Applications

- Large scale energy storage devices for mobile and stationary applications

## Patent

Chaitanya K. Narula and Claus Daniel, *Solid Lithium Ion Conducting Electrolytes and Methods of Preparation*, U.S. Patent Application 12/824,350, filed June 28, 2010.

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