TECHNOLOGY

Atomic Layer Deposition Modifications for All Solid State Metal Ion Batteries

OVERVIEW

Background:
Solid-state lithium batteries are considered to be the ultimate solution for an electric vehicle's power supply which require safety, high energy density, and long a lifespan. Currently high ionic conductive solid state electrolytes and an interfacial contact are the two important issues for the practical use of Solid-state lithium batteries. So far many solid-state electrolytes have been investigated. Garnet-type solid-state lithium batteries attract extensive attention recently due to its high ionic conductivity and relative stability to lithium metal. However, the impurity of Li_2CO_3 naturally formed in air on garnet surface leads to a poor contact between garnet electrolytes and electrodes, and thus causes a high interfacial resistance, impeding garnet electrolyte applications in solid-state lithium batteries.

Innovation:
Researchers at the University of Maryland have developed an interfacial structure with an ultrathin oxide that can effectively improve the metal anode in solid state metal ion batteries (Li, Na, Mg, etc.). Such an oxide layer can be applied though atomic layer deposition (ALD). The results of this innovation has remarkably decreased interfacial resistance for Li/garnet, improved the binding of Li metal with a garnet solid electrolyte, and requires less heating time at a lower temperature.

APPLICATIONS

· Electrical vehicles
· Consumer electronics
· Stationary high power energy storage

ADVANTAGES

· No influences on the synthesis process of garnet solid electrolyte
· Decreased Interfacial Resistance
· High efficiency process

CONTACT INFO

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PATENT STATUS

Pending

CATEGORIES

- Microelectronics
- Engineering
- Power Electronics

EXTERNAL RESOURCES

PS-2015-002