

Battery Separator with Lithium Ion Conductor Coating

This technology offers high energy density lithium metal batteries coated in LLZO or LATP to improve cycling stability and lifetime.

What is the Problem?

Lithium-ion is one of the primary types of batteries in widespread global use. Li-ion batteries have widespread usage because of their high energy/power density, long cycle life, and low self-discharge. To meet the growing needs of energy storage for growing applications such as electric vehicles and solar energy storage, advancements in Lithium-ion technology are key to meet these demands. A Lithium metal electrode is considered an ideal material to replace the common graphite electrode, however, Lithium metal rapidly degrades and has a short life cycle. This leads to device overheating and even fire, which is caused by Li dendrite growth. To retain the original Li anode structure, the best current solution is physical separation of anode by a solid interface, which suppresses unwanted reactions and minimizes dendrite growth. Separators play an important role that limits dendrite growth which prevents electrical shortage, enables ion transport and contributes to overall battery performance, including safety. There is a need for a better separator to limit dendrite growth and increase battery performance.

What is the Solution?

The solution is a separator for high energy density Lithium metal batteries and includes the design and fabrication methods. The novelty of this innovation lies in the modification of a separator (polypropylene or polyethylene) in Li metal batteries by coating it with a Lithium-ion conductor comprised of LLZO or (LATP). The coating has been tested as a separator in Li/Li symmetric cells, Li/Cu cells, and Li/NMC cells. This technology been demonstrated to improve cycling stability and lifetime in Lithium metal batteries.

What Differentiates it from Solutions Available Today?

Lithium metal rapidly degrades and has a short life cycle, which can lead to device overheating and even fire, which is caused by Li dendrite growth. The benefits of the Li-ion conductor coating are up-taking electrolytes, forming solid electrolyte interphases on the Li metal surface, mitigating Li/electrolyte reactions, mitigating Li dendrite growth, and prolonging the cycle life of the Li metal batteries.

Technology ID

BDP 7935

Category

Selection of Available
Technologies
Cleantech/Energy
Storage/Batteries

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Patent Information:

[WO2019246263A1](#)

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