



Electrolytes for Lithium Ion Batteries

AzTE Case #595

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Intellectual Property Status

U.S. Patents:
5,506,073
5,786,110
5,962,169

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Background

As mobile electronics continue to evolve, the need for high-output, long-lasting rechargeable batteries has grown tremendously. In the search for suitable materials from which to construct high energy density batteries, one of the principal obstacles has been the provision of a suitable electrolyte that exhibits the right combination of conductivity and ion mobility, stability, and wide electrochemical window. Very few electrolytes have been developed thus far that exhibit the above combination of performance parameters. Despite significant research in the area, there remains a need for improved electrolytes that can be easily incorporated into voltaic cells without significant extra cost.

Invention Description

Researchers at Arizona State University have developed a new class of 'rubbery' electrolytes which comprise lithium salts in combination with long-chain polymers. The resulting electrolytes are stable, highly conductive, and have a wide electrochemical window. As such, they are excellent targets for use in rechargeable electrochemical devices such as batteries.

Development

This technology part of a large suite of electrolyte and battery technologies developed at Arizona State University. Significant testing has been completed, and the results have been published. At this time, AzTE is seeking potential partners and licensees for these issued patents and related technologies.

Potential Applications

- **Rechargeable Batteries**
- **Photovoltaic Cells**
- **Photochromic Displays**
- **Other Electrochemical Applications**

Benefits and Advantages

- **High Conductivity** – exceptionally high conductivity at temperatures of 100 degrees or lower (including room temperature).
- **Solid Consistency** – elastic or rubbery solid.
- **Longer Cycle Life** – The solvents remain highly effective even after hundreds of charge / discharge cycles.
- **Lithium Compatible** – These solvents work well with alkali metal anodes in general, and with lithium and lithium-ion anodes in particular.
- **Wider Electrochemical Window** - The solvents have a wide electrochemical window of 4+ volts.