TECHNOLOGY

Novel Polymer Solid Electrolyte for Flexible Batteries

OVERVIEW

Batteries used in medical equipment and implants are part of a one billion dollar worldwide market in which supply has not yet reached demand. Lithium ion polymer batteries, due to their superior energy density, small size, and low toxicity, are well-suited as medical implant power sources. These batteries circumvent the use of corrosive and flammable liquid-based electrolytes and provide for the creation of safe and flexible energy sources. Despite these advantages, lithium polymer batteries have had limited success due to their relatively short service life and decreased performance over time.

To address these limitations, researchers at the University of Maryland have improved polymer ionic conductivity by two orders of magnitude over conventional PEO-based polymer electrolytes. The improved conductivity of the invention is attributed to a reduction of crystallinity and the introduction of secondary lithium domains in the conductive polymer matrix. When integrated with existing commercial lithium electrode chemistries, this technology is expected to provide for high-performance, cost-effective energy sources with an electrolyte electro-chemical stability window over 4.5 volts. The enhanced compatibility of the novel polymer electrolytes with lithium electrodes will provide for batteries with recharging durability over 500 cycles.

Advantages
- Minimum capacity fade over 500 cycles
- Does not form corrosive material when exposed to moisture and air
- Conductivity increases by two orders of magnitude beyond unmodified PEO electrolytes
- Electro-chemical stability window over 4.5 volts
- Higher temperature performance stability than LiPF6

Applications
- Medical devices
- Small personal electronics
- Hybrid and electric vehicles
- Stand-alone sensors

CONTACT INFO

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Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Patent(s) pending

LICENSE STATUS

Contact OTC for licensing information

CATEGORIES

- Clean Technology
- Engineering
- Chemical
- Power Electronics

EXTERNAL RESOURCES

- US Patent 9,252,456

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