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Advancing the Arizona State University Knowledge Enterprise

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Nanowire Based Solid electrolyte for Lithium-Ion Batteries

The demand for rechargeable batteries is rapidly rising due to increased sales of consumer electronics, electric and hybrid automobiles, and the need for grid-based energy storage systems. Currently, the most widely used rechargeable batteries are manufactured with lithium-ion and liquid electrolyte materials. Unfortunately, as these batteries are charged and discharged the lithium-ion materials expand and contract, causing internal damage. The batteries are large, leaving voids where the material can expand. The liquid electrolytes are heavy and flammable, which cause an unsafe fire hazard. There is a need in the marketplace for smaller, lighter, and more durable rechargeable batteries.

Researchers at Arizona State University have developed a solid electrolyte for lithium-ion batteries based on nanowires. This innovation eliminates liquid electrolytes that are flammable, providing a safer battery with less risk of fire. By eliminating liquid, the battery is lighter and requires less volume, so that the battery is smaller. The process for manufacturing this electrolyte is simple and inexpensive in comparison to processes required to manufacture other solid electrolytes. In addition, this material offers much higher conductivity than existing products currently available on the market. This material is a new product that will reduce costs while improving battery durability.

Potential Applications

- Automotive
- Air and aerospace
- Consumer electronics
- Grid-based energy storage systems

Benefits and Advantages

- Lower Costs – Simple, inexpensive manufacturing process
- More Power – High conductivity
- Retrofit – Replaces liquid electrolytes

For more information about the inventor(s) and their research, please see Dr. Candace Chan's directory webpage