ASU Economic Development
Arizona State University

Battery technology

Groundbreaking research to extend battery life and improve safety

- At ASU, researchers are developing new materials for high conductivity solid-state electrolytes and solid-state batteries, lithium-sulfur batteries, and high energy and power density batteries.
- Researchers conduct evaluation of lithium-ion batteries under wide-temperature range and repeated mechanical flexing/bending.
- Researchers work to develop a smart way to utilize the phenomenon to extend the life of lithium-metal batteries while maintaining their high energy density.

ASU core facilities

- **John M. Cowley Center for High-Resolution Electron Microscopy.**
- **Life Science Electron Microscopy.**
- **Goldwater Materials Science Facility.**
- **Metals, Environmental and Terrestrial Analytical Laboratory.**

The ASU advantage

The Advanced Materials, Processes and Energy Devices (AMPED) Science and Technology Center (STC) is an ASU research and development center supported by the Arizona New Economy Initiative.

STCs are responsible for leveraging ASU-industry partnerships to enable research innovation, entrepreneurship and tech transfer in areas key to the future of Arizona's economy.

The AMPED STC seeks to create the materials and devices needed for broad electrification of the energy sector and has three thrust areas: photovoltaics, batteries and power-electronic devices.

ASU partners with private industry to commercialize new battery technology

Teams of skilled researchers focus on battery technology innovation in labs such as the Battery ELectric & Intelligent Vehicle (BELIV) Lab, the Combustion and Electrochemical Power Systems (CEPS) Lab, and the Renewable Energy Materials and Devices Lab

MacroTechnology Works

This state-of-the-art semiconductor processing facility is home to the **Advanced Electronics and Photonics (AEP)** core facility for materials and device fabrication. This research facility provides access to clean rooms, wet labs, dry labs, high bay space and office accommodations for ASU to advance research in partnership with private industry.

ASU battery research

- Next generation Si, Ge and Sn anodes.
- Mechanics modeling.
- Electrochemical surface science.
- Advanced carbon materials.
- Flexible and stretchable batteries.
- Solid-state electrolytes.
- Electrolytes for Mg and Ca batteries.
- Ceramic separators.
- Novel liquid and plastic electrolytes.

Select ASU intellectual property

- Method for Preparing Advanced Lithium-Ion Battery Composite Cathodes.
- A New Class of Fast Alkali Ion Conductor: Inorganic Plastic Crystals.
- Framework Substituted Clathrates for Lithium-Ion Battery Anodes.
- Low Operating Temperature Na-Fe Redox Battery for High Efficiency, Low-Cost Energy Storage.
- Cathodic Aluminum Batteries for Grid-Scale Energy Storage Solutions.
- Method to Synthesize Conformal Thin Films of $Li_7La_3Zr_2O_{12}$ on Surfaces and Three-Dimensional Substrates.
- Calcium Salt for High-Performance Electrolytes in Rechargeable Calcium Batteries.
- Chelating Ionic Liquid Family for Magnesium Battery.
- 3D-Soft Electrode for Li-Chalcogen Batteries.

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#1 in the U.S. for innovation
ASU ahead of MIT and Stanford
– U.S. News & World Report, 8 years, 2016–2023

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