MATERIALS
ENERGY
ENVIRONMENT

Reengineering Lithium Batteries

DISCOVERY

Berkeley Lab has been a world center for battery research since the 1950s, when Charles W. Tobias, often called the father of electrochemical engineering, set up a program here.

In the early 1980s, before the commercialization of lithium-ion batteries, researchers at Berkeley Lab began work on creating a lightweight and environmentally friendly battery. Using funding from a DOE block grant for electric vehicle research, in 1987 they created a lithium/organosulfur polymer battery.

DEVELOPMENT

A group of those researchers founded PolyPlus in 1990.

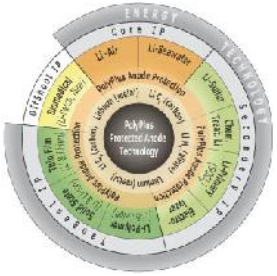
The company developed a lithium-sulfur battery and began further research on a layered ceramic membrane to protect lithium metal cathodes from electrolyte solvents. Since 1996 the company has received funding from federal agencies including the DOE and the Department of Defense.

DEPLOYMENT

In 2012, the company created its protected lithium electrode (PLE) technology, a ceramic water stable membrane that allows lithium ions through but not liquid or gas.

The company is developing rechargeable and non-rechargeable lithium-air, lithium-seawater, and lithium-sulfur batteries. Such batteries potentially offer an energy density rivaling that of hydrocarbon fuel cells and two to 10 times greater than lithium-ion batteries.

PolyPlus was recognized with an Edison Award in 2012. The company has 30 employees and more than 165 patents and pending patent applications, as well as a pilot line for batteries.



DOE-FUNDED BASIC RESEARCH

INDUSTRY

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U.S. DEPARTMENT OF ENERGY