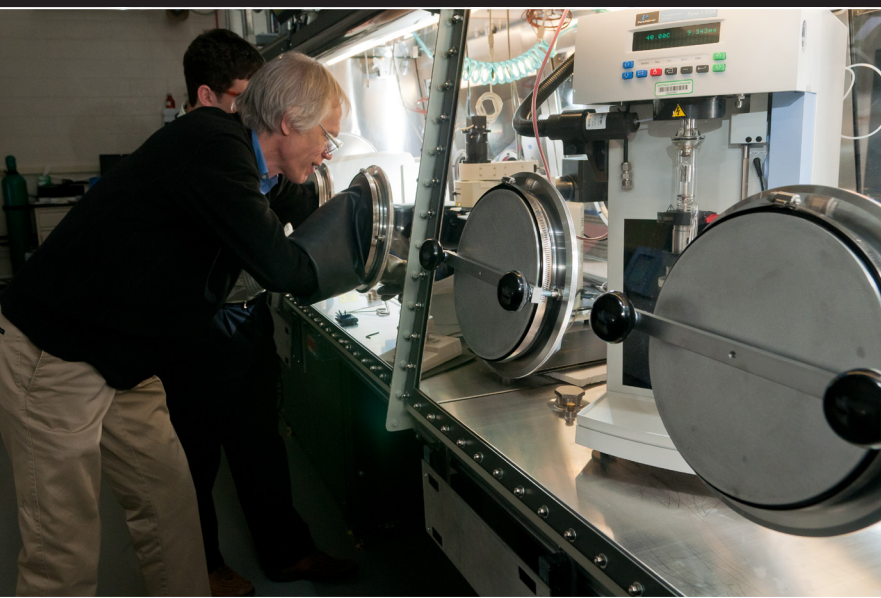

Increasing the **LIFE** of batteries

ARGONNE'S BATTERY POST-TEST FACILITY



What happens to batteries as they age?
How do the chemistries and materials change and degrade?
How can we lengthen battery life?
How can we ensure safe use of battery materials?

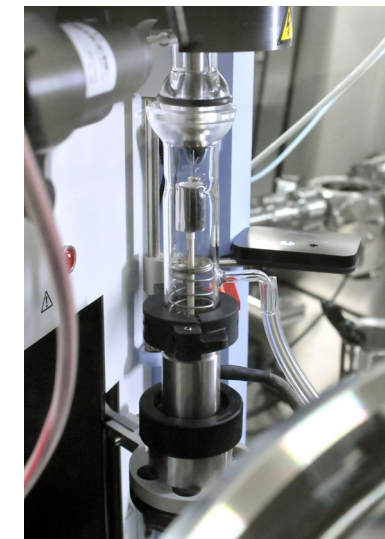
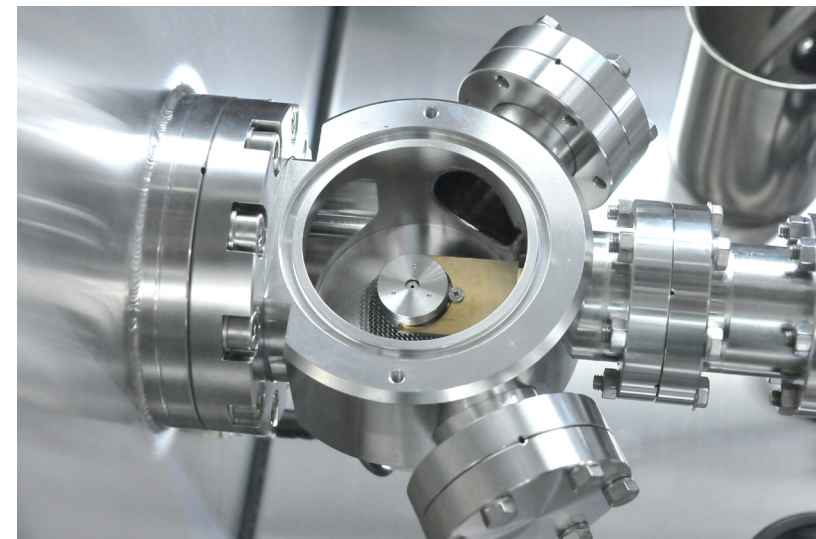


In an age where everything from heart valves to smart phones to automobiles rely on battery power, the answers to these questions are vitally important.

Argonne National Laboratory's new Post-Test Facility can answer these questions

Argonne's new Battery Post-Test Facility (PTF) allows the laboratory's renowned researchers to dissect, harvest and analyze battery materials from used and previously tested battery cells in order to identify for developers and manufacturers the exact mechanisms that limit the life of their battery cells. In the past, the cause of performance degradation could only be inferred.

The PTF is one of the few known facilities in the world capable of conducting this research, and the only one doing work at this scale. The new Argonne lab can handle cells up to 300 Ah, while other facilities like this are typically limited to about 1-2 Ah.

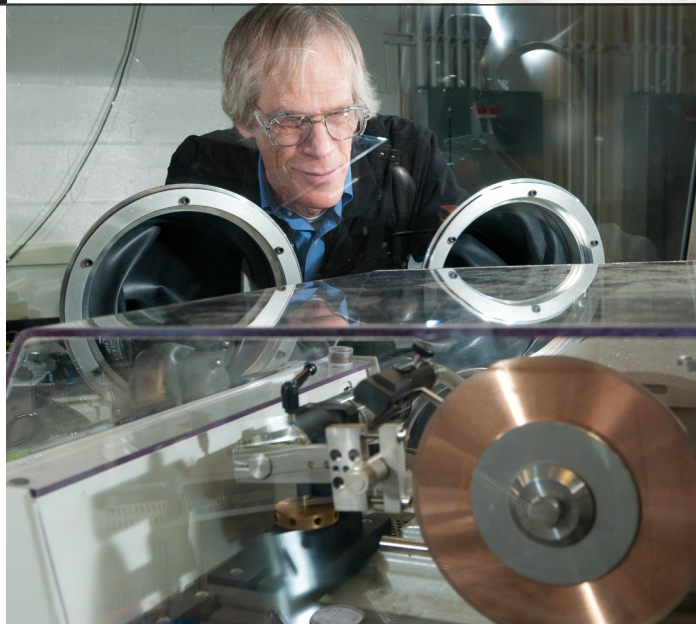


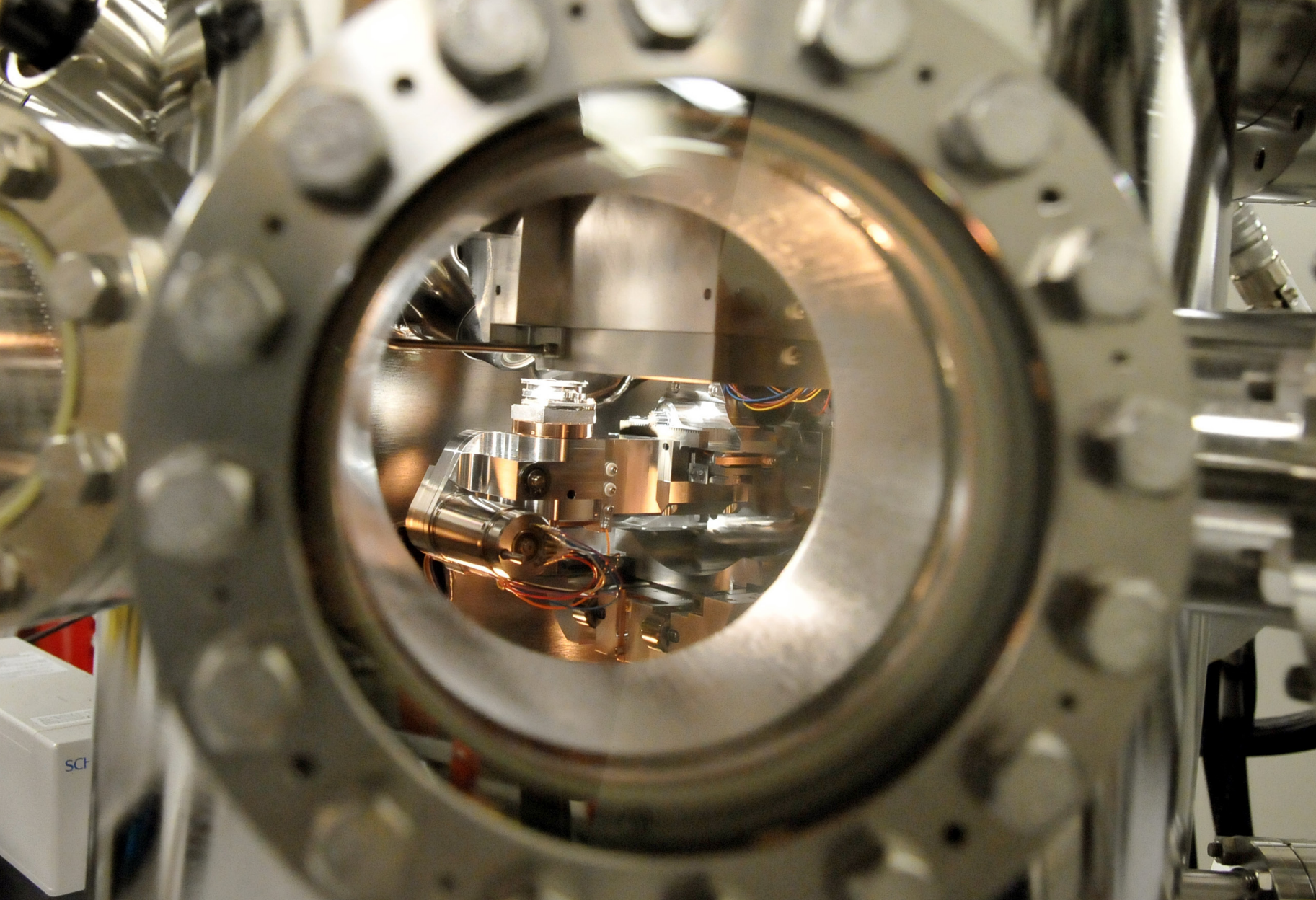
ARGONNE'S BATTERY POST-TEST FACILITY



The PTF is unique in that all its work, from dismantling the cell to harvesting and analyzing its components, is performed in one glove box. This keeps the air-sensitive battery materials pristine and intact, yielding more information about what's really going on in the later stages of characterization and analysis.

Performing this work under an inert-atmosphere also guarantees that observed changes in battery chemistries or materials are due to electrochemical operation, rather than sample manipulation.





An X-ray photoelectron spectrometer (XPS) is integrated into the PTF's large, central glove box. The XPS is used to gather information on the electronic structure of materials, which helps researchers learn what chemical and physical changes have occurred during the aging of battery materials.

The PTF complements Argonne's Electrochemical Analysis and Diagnostics Laboratory, where batteries from both private and government-funded initiatives have been tested for more than three decades.

While its current focus is lithium-ion batteries, the PTF is highly flexible; its equipment can characterize materials from any type of battery, from lead-acid (found in most of today's cars) to cutting-edge technologies, such as lithium-air.

Argonne's Energy Storage Research

Argonne's broad basic and applied energy storage research program, along with the many state-of-the-art research tools and facilities it employs, is unique in the world. Argonne's program spans the entire continuum of energy storage research, with collaboration and communication between all areas to improve the creativity, effectiveness and quality of the work. From basic materials design and synthesis to end-of-life recycling, the laboratory has the unique ability to look at batteries and energy storage devices from the cradle to the grave.



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