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Battery Manufacturing Facility

ORNL is giving US manufacturers a boost by operating the country's largest open-access battery manufacturing research and development center. The Battery Manufacturing Facility complements the capabilities of the laboratory's existing energy storage material processing facility, providing scientists the ability to analyze every aspect of battery production, from raw materials to finished product.

Open to any US battery manufacturer, material supplier, or battery user, the center offers the ability to integrate any component into a complete battery and analyze how well it works and how it can be improved. Users can "plug-and-play" individual processes and steps, and laboratory staff can provide help and guidance every step of the way. The idea is to showcase the user's material or process improvements and quantify the advantage they provide.

Unique and complementary to other DOE cell assembly facilities

- Pouch cells of up to 66x99x12mm and 6Ah
- Focus on manufacturing R&D, drying, alternative heating technologies, solvent less processing, alternative assembly methods, new cutting, materials handling, and filling methods
- Production yield issues
- 700 square feet dry space with <0.5% R.H.
- 700 square feet adjustable 1-15% R.H.



Goals

- Build a domestic supply chain and create domestic jobs to compete for an international battery supply from U.S.
- Advance manufacturing science and production yield while dramatically reducing costs of battery production to meet mass market needs.

Capabilities

- Produce batteries with capacities up to seven amp-hours—small enough that a company can affordably demonstrate the impact of their innovations, yet large enough to make manufacturing decisions about making larger devices.
- Allow industry to keep control of their intellectual property, demonstrate their technology in a complete battery, and benchmark its performance against other commercially available materials.
- Resource for chemical and materials suppliers, battery manufacturers and their customers, system integrators, original equipment manufacturers

INNOVATIONS IN TRANSPORTATION

Manufacturing Achievements

- Photonic cathode processing for large scale all solid state batteries reduce minutes in 700 degree Celsius furnace to 1 second photon exposure. Joint invention disclosure filed with Planar Energy Devices.
- Aqueous electrode processing for lithium ion batteries reduces electrode processing cost by 75%. Provisional patent filed.
- In-line performance test for reliable production of batteries decreases scrap, adding value of up to 50%. Joint invention disclosure filed with A123 Systems.
- In-situ characterization of degradation and performance of batteries, with reduction in the development cycle of up to 50%.
- Low cost anode raw material production for lithium ion batteries. With temperature reduction of 1500 degrees Celsius, capacity fade reduced by 43% through 750 cycles. Joint invention disclosure filed with A123 Systems.
- ORNL electrodes in Dow Kokam test cells enabling domestic supply chain 93% capacity retention after 50 cycles.

The Battery Manufacturing Facility is strategically co-located with the Manufacturing Demonstration Facility and National Transportation Research Center. Its establishment was funded through the DOE Energy Efficiency & Renewable Energy Vehicle Technologies Program, Advanced Manufacturing Office, and ORNL.