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A non-invasive strategy to recover the capacity of used batteries by induction heating

Researchers at Stanford have developed an innovative, non-invasive thermal treatment to recover the lost capacity of used lithium-ion batteries (LIBs), offering a scalable and cost-effective solution to the environmental challenges posed by battery waste.

As LIBs become more prevalent, especially in electric vehicles (EVs), global battery demand continues to grow, driving a corresponding rise in battery waste. Current end-of-life treatments, such as remanufacturing, repurposing, and recycling, are often invasive, expensive, and inefficient. These methods typically target only select battery components while neglecting the majority of the cell, leading to high economic and environmental costs.

To combat these issues, Stanford researchers have created a simple thermal treatment to reverse battery degradation. This method effectively recovers decayed battery capacity without the need for disassembly or replacement of battery components. By melting plated and dendritic lithium, the treatment enables more homogeneous lithium stripping during discharge, reduces dead lithium formation, and enhances overall battery performance.

This innovative approach not only extends the life of batteries but also contributes to sustainable battery management practices, offering a viable solution to the impending battery waste crisis.

Applications

- Battery manufacturing: enhances lifecycle and reuse strategies for LIBs
- Automotive industry: extends EV battery lifespan and improves performance

- Consumer electronics: restores device battery capacity, reducing the need for replacements

Advantages

- Non-invasive process: requires no disassembly or part replacement, lowering cost and environmental impact.
- Effective capacity recovery
- Sustainable: supports circular economy goals by reducing battery waste
- Scalable & economical: more cost-efficient than traditional recycling methods

Patents

- Published Application: WO2025175170

Innovators

- Yilong Chang
- Yi Cui
- Renee Zhao
- Yucan Peng

Licensing Contact

Jon Gortat

Licensing & Strategic Alliances Director for Physical Science

Email