Paramaribo battery research and development

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Using focused ion-beam milling and electron backscatter diffraction, lithium and sodium metal anode microstructures in all-solid-state batteries are found to possess large grains that coarsen during electrodeposition.

Although regulation within the European Union requires manufacturers of battery storage systems to provide state-of-health estimates to customers, no standardized methods for such estimates exist. Now, a large open-access dataset from eight years of field measurements of home storage systems is presented, enabling the development of a capacity estimation method.

Aqueous solutions that can enter glassy state have excellent anti-freezing property. Here the authors propose a glass-forming liquid by tailoring tetrahedral and pair-correlation entropies to achieve ultralow temperature energy applications.

The unclear understanding of the interphase has limited advancements in battery performance. To address this, the authors designed sulfoximide salts with distinctive interphasial chemistry, enabling high-performance lithium metal batteries even under extreme conditions.

A cost-based method to assess lithium-ion battery carbon footprints was developed, finding that sourcing nickel and lithium influences emissions more than production location. This aids in designing green industrial policy.

Severe Ni/Li antisite disorder in nickel-rich layered oxides leads to structural degradation and performance decay in Li-ion batteries. Here, authors report a noninvasive strategy of magnetoelectrochemical synergistic activation to realize ordered cation rearrangement and recovery battery capacity.

Batteries equipped with sensors are promising to optimize usage and lifetime. Here, the authors show that an internal optical fiber induces delayed graphite reaction kinetics and conclude that a bulky intrusive sensor might measure a local disrupted behavior rather than the true battery state.

The authors have demonstrated a method for real-time imaging of the interior of a battery using ultrasound imaging. This approach reveals effects that hinder fast charging, enabling researchers to develop new batteries

and optimize their utilization.

An article in Communications Engineering presents a method for recovering 99% of valuable metals (Li, Ni, Co, and Mn) from LiNixCoyMnzO2 battery cathodes using synergistic pyrolysis.

Operational data of lithium-ion batteries from battery electric vehicles can be logged and used to model lithium-ion battery aging, i.e., the state of health. Here, we discuss future State of Health definitions, the use of data from battery production beyond production, the logging & aggregation of operational data and challenges of the State of Health in automotive applications. Our suggestions could improve data transfer efficiency and data storage costs.

Research on the Li7La3Zr2O12 (LLZO)/Li interface is essential for improving the performance of LLZO-based solid-state batteries. In this comment, the authors present an analysis of the key interfacial phenomena at the LLZO/Li interface, highlighting recent developments and unresolved issues.