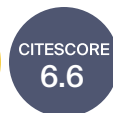




**batteries**



*Special Issue Reprint*

## **Modeling, Reliability and Health Management of Lithium-Ion Batteries**

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Edited by

Fei Feng

Rui Ling

Yi Xie

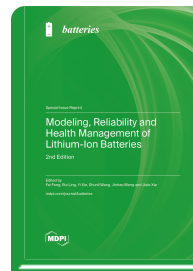
Shunli Wang

Jinhao Meng

Jiale Xie

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As the global transition toward carbon neutrality accelerates, Lithium-ion batteries (LIBs) have become the cornerstone of electric mobility and renewable energy storage. However, ensuring their safety and maximizing their lifespan requires precise solutions for complex electrochemical and thermal challenges. This Reprint, representing the second edition of the Special Issue "Modeling, Reliability, and Health Management of Lithium-Ion Batteries," compiles eight significant research contributions and a comprehensive editorial that define the current state of the art in this field. The collected works address three interconnected themes. In the domain of modeling, authors introduce efficient parameter extraction methods for equivalent circuit models and solid-phase diffusion models for high-power LTO batteries. Reliability and safety are addressed through novel investigations into thermal runaway mechanisms, including pressure dynamics in prismatic cells and environmental impact evaluations, alongside robust fault diagnosis techniques utilizing relative entropy. Finally, the Reprint showcases breakthroughs in health management, featuring physics-guided machine learning for capacity fading prediction, autoencoder-based SOH estimation for small data samples.



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