Special Issue

AI-Powered Battery Management and Grid Integration for Smart Cities

Message from the Guest Editors

This Special Issue invites original research and comprehensive reviews on advanced machine learning (ML), deep learning (DL), and digital twin methodologies that enhance battery diagnostics, predictive maintenance, and grid-aware optimisation. Particular attention is given to solutions that enable seamless Vehicle-to-Grid (V2G) and Grid-to-Vehicle (G2V) integration, improve grid resilience, and support sustainable energy management in urban environments. Contributions demonstrating real-world applications, interdisciplinary innovations, and explainable AI frameworks for battery systems are highly encouraged. This Special Issue aims to advance knowledge at the intersection of battery intelligence, grid dynamics, and smart city mobility, in line with the mission of *Batteries* to foster sustainable and efficient energy storage technologies. **Expected topics:**

- Battery SOH and RUL estimation using AI;
- Predictive maintenance of EV batteries;
- AI-enhanced V2G and G2V frameworks;
- ML/DL for EV fleet energy management;
- Digital twins for smart battery systems;
- Explainable AI for battery health monitoring;
- Grid resilience through intelligent battery control;
- .....

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Message from the Editor-in-Chief

Take the opportunity to publish your original scientific work or a review paper concerning battery materials, battery technology or battery application within this new open access journal. Along with material science, the journal also addresses engineering and multidisciplinary research topics, such as cell and system design or storage system integration. Publishing proffers visibility for the benefit of other experts and facilitates discussion of the research results within the field. You are invited to publish your work, read published papers and to participate in topical discussions.

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