# Special Issue

# Advances in Lithium-Ion Batteries: Electrode Materials and Their Applications

## Message from the Guest Editor

Li-ion batteries (LIBs) are widely utilized to power portable electronic devices and they are expected to play a pivotal role in the emerging markets of battery electric vehicles (BEVs) and grid-scale energy storage systems. In particular, the rapidly growing BEV market requires LIBs with a lifetime comparable to that of a vehicle. The success of LIBs stems from their high energy density, long cycle life, and relatively low capital cost. However, as the global demand for efficient and sustainable energy storage continues to rise, the need for next-generation LIBs with enhanced performance—such as a higher energy density, faster charging capabilities, improved safety, and reduced capital costs—has become more pressing than ever. This Special Issue aims to consolidate recent breakthroughs in electrode material development, provide fundamental insights into failure mechanisms, and highlight innovative approaches to improving battery performance. By bringing together state-of-the-art research, this Special Issue seeks to drive the evolution of next-generation LIBs, bridging the gap between fundamental material science and practical applications.

## Guest Editor

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## Deadline for manuscript submissions

20 June 2026

Materials

an Open Access Journal by MDPI

Impact Factor 3.2
CiteScore 6.4
Indexed in PubMed

mdpi.com/si/233953

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### Message from the Editorial Board

*Materials* (ISSN 1996-1944) was launched in 2008. The journal covers twenty-five comprehensive topics: biomaterials, energy materials, advanced composites, advanced materials characterization, porous materials, manufacturing processes and systems, advanced nanomaterials and nanotechnology, smart materials, thin films and interfaces, catalytic materials, carbon materials, materials chemistry, materials physics, optics and photonics, corrosion, construction and building materials, materials simulation and design, electronic materials, advanced and functional ceramics and glasses, metals and alloys, soft matter, polymeric materials, quantum materials, mechanics of materials, green materials, general. *Materials* provides a unique opportunity to contribute high quality articles and to take advantage of its large readership.

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