

Special Issue

Functional Electrolytes and Advanced Materials for Lithium Metal Batteries

Message from the Guest Editors

Lithium metal batteries (LMBs) are widely regarded as one of the most promising next-generation energy storage technologies due to their exceptionally high theoretical energy density and the low electrochemical potential of lithium metal anodes. These advantages make LMBs attractive for a broad range of applications, including electric vehicles, portable electronics, and large-scale energy storage systems; however, the practical deployment of lithium metal batteries remains limited by critical challenges such as lithium dendrite growth, low Coulombic efficiency, unstable solid–electrolyte interphase (SEI), safety concerns, and limited cycling stability. This Special Issue aims therefore to provide a comprehensive platform presenting and disseminating the latest advances in functional electrolytes and advanced materials for lithium metal batteries. Both fundamental studies and applied research are welcomed, with a particular emphasis on innovative material design, interfacial chemistry, and structure–performance relationships that contribute to safer, more stable, and high-performance LMBs.

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Energies is an international, open access journal in energy engineering and research. The journal publishes original papers, review articles, technical notes, and letters. Authors are encouraged to submit manuscripts which bridge the gaps between research, development and implementation. The journal provides a forum for information on research, innovation, and demonstration in the areas of energy conversion and conservation, the optimal use of energy resources, optimization of energy processes, mitigation of environmental pollutants, and sustainable energy systems.

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