Special Issue

Advancements in Multiscale Multiphysics Chemomechanical Modeling of Lithium-Ion Batteries

Message from the Guest Editors

Lithium-ion batteries are regarded as one of the most suitable energy storage devices because of their high energy density and long cyclability. However, the capacity of Li-ion batteries severely decreases as the number of charge–discharge cycles increases. The lithium concentration gradient contributes to diffusion-induced stress (DIS) inside the particles during charging and discharging. The multiscale nature of the battery requires an understanding of the coupling mechanism between the electrode behavior at microscale and the overall cell behavior at macroscale. The current Special Issue focuses on new developments and improvements in multiscale multiphysics chemomechanical models to understand the possible mechanical failure mechanisms and mitigate the capacity fade. Lithium-ion battery;
Diffusion-induced stress;
Heterogeneous SEI layer;
Chemomechanical 2D/3D multiparticle modeling;
Multiscale modeling;
Stress–potential coupling;
Core–shell;
Particle–binder debonding;
Abaqus;
Mechanical failure analysis of lithium-ion batteries;
Capacity fading;
Finite element analysis;
COMSOL Multiphysics.

Guest Editors

Dr. Yasir Ali

Dr. Noman Iqbal

Prof. Dr. Seung Jun Lee

Deadline for manuscript submissions

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Energies
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
energies@mdpi.com

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Message from the Editor-in-Chief

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.

Editor-in-Chief

Prof. Dr. Enrico Sciubba
Department of Mechanical and Industrial Engineering, University Niccolò Cusano, 00166 Roma, Italy

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