

Advanced Energy Storage Technologies and Safety Management for E-Mobility

In the face of green-house-gasses emission and resource scarcity, modern transportation is on the verge of a major paradigm shift, witnessed by the proactive penetration of electrified vehicles, vessels, and aircraft. Following this trend, the energy storage systems (ESSs) like batteries and fuel cells have been experiencing a booming advancement in last decade. Furthermore, grid-technologies related to ESS, such as Fast Charging (FC), Extreme Fast Charging (XFC), Wireless Power Transfer (WPT) and vehicle-to-grid (V2G) systems, have also received significant interests. However, the pursuit of utmost user experience risks violating critical physical limits accompanied by unexpected side reactions within the ESS, resulting in efficiency reduction, quick degradation, and even catastrophic safety hazards in the most severe case. Particularly, onboard battery systems have been identified as one of the major contributors to recent-reported electric vehicle fire accidents. Moreover, risks can accumulate over the life cycle and eventually spread to the second-life use.

Within this scope, innovations in battery/fuel cell/supercapacitor technology and their grid applications are critical from a material and physical point of view. High-fidelity modeling, new integration architectures, and fault-tolerant management of ESS are also vital for the future electrified transportation with upgraded safety. This vision can be facilitated by emerging technologies like new batteries (solid-state, lithium-titanate-oxide, lithium-air, sodium-based, etc.), fuel cells, advanced power electronics, intelligent management, environment-adaptive control, and second-life evaluation. This special issue seeks to highlight original research on these advancements with special applications in electric transportation. Topics of interest include, but not limited to:

- Modeling, analysis, control and management of batteries and supercapacitors
- Emerging fuel cell technologies and application
- Smart manufacturing and integration of ESS
- Advanced power electronics for ESS
- Grid tied ESS: FC, XFC, WPT and V2G systems
- Application of batteries and fuel cells in extreme environment
- Smart/reconfigurable ESS and networked control
- Failure prediction, thermal management, risk warning and safety control of batteries and fuel cells
- Life cycle degradation of ESS and second-life batteries

Submission of Manuscripts to the Transactions:

All manuscripts must be submitted through Manuscript Central at <http://mc.manuscriptcentral.com/tte-ieee>. Submissions must be clearly marked “Advanced Energy Storage Technologies and Safety Management for E-Mobility” on the cover page. When uploading your paper, please also select the “Advanced Energy Storage Technologies and Safety Management for E-Mobility”. Refer to <https://www.ieee-pels.org/publications/ieeetransactions-on-transportation-electrification> for general information about electronic submission through Manuscript Central.

Important Dates:

- Full Paper Submission Deadline: July 30, 2022
- Expected Publication Date: March 2023

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