Special Issue

Advances in Electrochemical Energy Storage Materials and Devices

Message from the Guest Editors

The most promising technology for balancing the electric grid and more effectively shifting from fossil fuels to renewable energy from the wind or sun are batteries and supercapacitors (electrochemical energy storage devices). Furthermore, because of its high energy density, batteries are employed to power portable electronics and hybrid cars. Due to decreased power density, significant capacity fading at high charge/discharge rates, and restricted cyclability, battery technology is severely hampered (lifespan). Supercapacitors, unlike batteries, offer good power rates and cyclability but have lower energy densities. Because of these flaws in batteries and supercapacitors, they are ineffective when used independently, especially when great power and energy density are desired at the same time. Using them together also limits the size of electrical gadgets. The concept of fully integrated rechargeable hybrid battery–supercapacitor (supercapbattery) electrical energy storage devices is a promising approach to developing next-generation energy-storage systems.

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Deadline for manuscript submissions

30 October 2025

Processes

an Open Access Journal by MDPI

Impact Factor 2.8
CiteScore 5.5

mdpi.com/si/232369

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