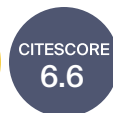




**batteries**



*Special Issue Reprint*

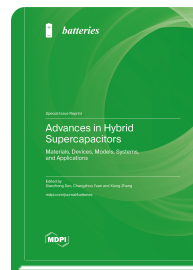
## Advances in Hybrid Supercapacitors

[www.mdpi.com/books/reprint/12043](http://www.mdpi.com/books/reprint/12043)

Edited by  
Xianzhong Sun  
Changzhou Yuan  
Xiong Zhang

ISBN 978-3-7258-6256-6 (Hardback)

ISBN 978-3-7258-6257-3 (PDF)



Hybrid supercapacitors (HSCs) are an emerging class of energy storage devices that combine the high power density of supercapacitors with the high energy density of batteries, offering a unique set of advantages that make them ideal for a wide range of applications. By pairing a faradaic electrode—where charges are stored through reversible redox, intercalation, or conversion reactions—with a non-faradaic or pseudocapacitive electrode that relies on surface ion adsorption, HSCs can provide higher energy density while still maintaining a high level of power output in short bursts, making them well-suited for applications that require rapid charging and discharging, such as in electric vehicles during acceleration, regenerative braking, or start–stop events; cordless power tools that must drive screws or drill masonry without voltage sag; grid-tied buffers that smooth short-term fluctuations from renewables; and even wearable or IoT devices that harvest intermittent energy and must transmit data bursts. This preprint features eleven research and review papers that focus on the recent advances in the field of hybrid supercapacitors, covering topics such as carbon-based and transition metal oxides electrode materials, electrolytes and additives, Zn-ion hybrid capacitors, hybrid energy storage systems, and control algorithms for supercapacitors. Research from over 40 authors from China, the United States, the United Kingdom, Romania, the Republic of Korea, Greece, and other countries and regions contributed to this preprint.



Order Your Print Copy  
You can order print copies at  
[www.mdpi.com/books/reprint/12043](http://www.mdpi.com/books/reprint/12043)

MDPI Books offers quality open access book publishing to promote the exchange of ideas and knowledge in a globalized world. MDPI Books encompasses all the benefits of open access – high availability and visibility, as well as wide and rapid dissemination. With MDPI Books, you can complement the digital version of your work with a high quality printed counterpart.



## Open Access

Your scholarly work is accessible worldwide without any restrictions. All authors retain the copyright for their work distributed under the terms of the Creative Commons Attribution License.



## Author Focus

Authors and editors profit from MDPI's over two decades of experience in open access publishing, our customized personal support throughout the entire publication process, and competitive processing charges as well as unique contributor discounts on book purchases.



## High Quality & Rapid Publication

MDPI ensures a thorough review for all published items and provides a fast publication procedure. State-of-the-art research and time-sensitive topics are released with a minimum amount of delay.



## High Visibility

Due to our global network and well-known channel partners, we ensure maximum visibility and broad dissemination. Title information of books is sent to international indexing databases and archives, such as the Directory of Open Access Books (DOAB), and the Verzeichnis Lieferbarer Bücher (VLB).



## Print on Demand and Multiple Formats

MDPI Books are available for purchase and to read online at any time. Our print-on-demand service offers a sustainable, cost-effective and fast way to publish MDPI Books printed versions.