Supercapacitors materials systems and applications

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Supercapacitors are a relatively new energy storage system that provides higher energy density than dielectric capacitors and higher power density than batteries.

They are particularly suited to applications that require energy pulses during short periods of time, e.g., seconds or tens of seconds. They are recommended for automobiles, tramways, buses, cranes, fork-lifts, wind turbines, electricity load leveling in stationary and transportation systems, etc.

Despite the technological maturity of supercapacitors, there is a lack of comprehensive literature on the topic. Many high performance materials have been developed and new scientific concepts have been introduced.

Taking into account the commercial interest in these systems and the new scientific and technological developments now is the ideal time to publish this book, capturing all this new knowledge. The book starts by giving an introduction to the general principles of electrochemistry, the properties of electrochemical capacitors, and electrochemical characterization techniques.

Electrical double layer capacitors and pseudocapacitors are then discussed, followed by the various electrolyte systems. Modelling, manufacture of industrial capacitors, constraints, testing, and reliability as well as applications are also covered.

"Supercapacitors - Materials, Systems, and Applications" is part of the series on Materials for Sustainable Energy and Development edited by Prof. G.Q. Max Lu. The series covers advances in materials science and innovation for renewable energy, clean use of fossil energy, and greenhouse gas mitigation and associated environmental technologies.

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