Nanotechnology and lithium-ion batteries

By considering the interplay between nanostructured electrodes, electrolytes, and separators, new insights can be gained into optimized implementation of nanotechnology for next-generation lithium-ion batteries. Therefore, the cross-component perspective of this review offers a contribution compared to prior targeted analyses of individual ...

The size control of active materials among porous carbon architecture remains crucial for the performance of "guest/substrate" nanohybrids anodes among lithium ion batteries. Herein, we prove...

In-depth mechanistic insights inform the fabrication of an all-solid-state, Co-free lithium battery with good performance and cyclability. Three-dimensional optical imaging ...

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The incorporation of nanomaterials in Li-ion batteries through nanostructured electrodes, nanocomposite separators, and nanoparticle-based electrolytes can significantly enhance their performance by improving Li-ion ...

In this article, the stable Li metal batteries boosted by nano-technology and nano-materials are comprehensively reviewed. Two emerging strategies, including nanostructured lithium metal frameworks and nano ...

Nanoscience has opened up new possibilities for Li rechargeable battery research, enhancing materials" properties and enabling new chemistries. Morphological control is the key to the rich toolbox of nanotechnology. It has had a major impact on the properties and performance of the nanomaterials designed for Li rechargeable batteries.

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Lithium-ion batteries (LIBs) have potential to revolutionize energy storage if technical issues like capacity loss, material stability, safety and cost can be properly resolved. ...

This book combines two areas of intense interest: nanotechnology, and energy conversion and storage devices. In particular, Li-ion batteries have enjoyed conspicuous success in many consumer electronic devices and their projected ...

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Here we discuss in detail several key issues in batteries, such as electrode volume change, solid-electrolyte interphase formation, electron and ion transport, and electrode atom/molecule...

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Nature Nanotechnology - This Review discusses how nanostructured materials are used to enhance the performances and safety requirements of Li batteries for hybrid and long-range electric vehicles...

The incorporation of nanomaterials in Li-ion batteries through nanostructured electrodes, nanocomposite separators, and nanoparticle-based electrolytes can significantly enhance their performance by improving Li-ion diffusion, electrochemical performance, cycle life, and lithium storage capacity [84,85].

This book combines two areas of intense interest: nanotechnology, and energy conversion and storage devices. In particular, Li-ion batteries have enjoyed conspicuous success in many consumer electronic devices and their projected use in vehicles that will revolutionize the way we travel in the near future. For many applications, Li-ion ...

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