

Highly efficient scalable synthesis of mesoporous VGCF/NFO hybrid nanocomposite as a negative electrode and their potential application in rechargeable lithium batteries

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Transition metal oxides have been considered as a promising class of electrode materials in electrochemical energy storage devices and they possess better capacities than mono-metal oxides. For the development of lithium-ion energy storage systems, the preparation of the electrode material plays a key role. Herein, we report mesoporous VGCF/NFO hybrid nanocomposite using hydrothermal process. In addition, we have also prepared NFO nanoparticles without VGCF for effective comparison. The VGCF/NFO hybrid nanocomposite has improved electrochemical properties such as initial discharge capacity of 1653 mAh g⁻¹ and capacity retention of 72.7 % at current density of 100 mA g⁻¹, in comparison to NFO with initial discharge capacity of 1163 mAh g⁻¹ and capacity retention of 67.9 %. The VGCF/NFO hybrid nanocomposite with interconnected surface provides a greater number of lithium storage sites and also shortens the diffusion path for both the lithium ions and electrons and thereby enhancing the performance of Li-ion batteries.

References:

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