3D Porous $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ with Improved Rate Capability and Cycle Stability

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A 3D porous $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ (3D-LNMO) was prepared by an easy cotton assisted solution combustion synthesis method. X-ray diffraction (XRD), infrared spectroscopy (FT-IR) and scanning electron microscopy (SEM) were used to characterize the phase structures and micro-morphologies of the products. Cyclic voltammetry (CV), electrochemical impedance spectroscopy (EIS) and galvanostatic charge-discharge testing were used to investigate the electrochemical performances. The results revealed that the as-synthesized $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ exhibited a 3D porous structure and ordered $P4_332$ space group. It showed significantly improved rate capability and cycle stability compared with the pristine $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ (P-LNMO) prepared without cotton under the same condition. The excellent electrochemical performances of 3D-LNMO might be attributed to its higher crystallinity and lower polarization.

Keywords: Porous $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$; Lithium ion batteries; rate capability; cotton

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