Short Communication

Synthesis and Electrochemical Characteristics of $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ Coatings Prepared by Atmospheric Plasma Spray as Cathode Material for Lithium-Ion Batteries

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The development of electric vehicles and portable electronic devices demands lighter and thinner batteries with appropriate rate capabilities, energy density and safety. In this work, we prepared $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ (LNMO) coatings as a cathode electrode for lithium-ion batteries using an atmospheric plasma spray (APS) method. The surface morphologies and structures of the coatings, as well as the powder, were characterized by scanning electron microscopy (SEM) and X-ray diffraction (XRD) analysis. The structural results show that the LNMO coatings have an ordered cubic structure (space group $P4_332$) and demonstrate better electrochemical performance at 55°C than that at 25°C. With increasing discharge rates, the specific capacities of LNMO coatings decrease steadily. Electrochemical studies demonstrate that the LNMO coatings also have an acceptable discharge capacity (27 mAh/g) and excellent cycling stability at 55°C. These characteristics are due to the fact that the atmospheric plasma spray method can provide the cathode electrode with a cubic spinel structure and good electrochemical performance for lithium-ion batteries.

Keywords: atmospheric plasma spray; $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$; coatings; lithium-ion batteries

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