Short Communication

CePO₄ Coated LiNi_{0.6}Co_{0.2}Mn_{0.2}O₂ as Cathode Material and its Electrochemical Performance

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doi: 10.20964/2019.08.54

Received: 18 March 2019 / Accepted: 23 May 2019 / Published: 30 June 2019

A facile hydrothermal method is successfully developed for the synthesis of CePO₄ coated LiNi_{0.6}Co_{0.2}Mn_{0.2}O₂ (NCM 622) cathodes. The as-prepared samples are characterized by X-ray diffraction (XRD), scanning electron microscope (SEM), transmission electron microscopy (TEM), electrochemical workstation, electrochemical impedance spectroscopy (EIS) and inductively coupled plasma emission spectrometry (ICP). Compared to the pristine NCM 622 cathode, the rate capacity and cyclic performance are significantly improved after coating. Even under a 10 C charge/discharge rate, the initial discharge capacity of the 3.0-NCM sample is up to 95.2 mAh·g⁻¹. Furthermore, the as-prepared 3.0-NCM sample exhibits excellent cyclic performance with 96.8% capacity retention at 1 C under 55°C after 100 cycles, while the pure NCM 622 only delivers poor capacity retention of 71.4%. The above conclusions can be characterized that CePO₄ coating layer can effectively avert the secondary reaction between electrolyte and cathode material. In addition, the CePO₄ coating layer can significantly suppress the dissolution of cathodes in the electrolyte, which contributes to the excellent rate performance and cycle stability.

Keywords: Lithium-ion batteries; LiNi_{0.6}Co_{0.2}Mn_{0.2}O₂; CePO₄ coating; Cycling performance

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