Electrochemistry characteristics of SmF\(_3\)-coated lithium-rich cathode material

\[ \text{Li}_{1.2}\text{Ni}_{0.2}\text{Co}_{0.08}\text{Mn}_{0.52}\text{O}_2 \]

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Abstract: Carbonate co-precipitation method was used to synthesize lithium-rich cathode material \( \text{Li}_{1.2}\text{Ni}_{0.2}\text{Co}_{0.08}\text{Mn}_{0.52}\text{O}_2 \), and SmF\(_3\) film with a thickness of 50~60 nm was coated on its surface by liquid deposition technique. X-ray diffractometer (XRD), scanning electron microscope (SEM), transmission electron microscope (TEM) and battery testing system (BTS) were employed to investigate the effects of SmF\(_3\) coating on crystalline structure, micro morphology and electrochemical properties of cathode material. The results showed that phase composition, particle size and distribution of cathode were not obviously changed after SmF\(_3\) coating. However, the initial coulombic efficiency was enhanced from 72.1\% to 74.2\% by surface coating, the capacity retention of SmF\(_3\)-coated sample maintained 93.3\% in comparison with 84.4\% of uncoated electrode after 50 cycles.

Key words: lithium ion batteries; lithium-rich cathode materials; SmF\(_3\); surface coating; electrochemical performance