Understanding the Mechanism of MgF_2 Modification on the Electrochemical Performance of Lithium-Rich Layered Oxides

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In this paper, lithium rich manganese based cathode materials were successfully modified by MgF_2 and the corresponding function mechanism was studied in detail. The MgF_2 coating inhibits the activation of Li_2MnO_3 and induces the formation of spinel phase. The MgF_2 -3 shows an enhanced initial discharge capacity of $282.6 \text{ m Ah g}^{-1}$ and an improved coulombic efficiency of 87.15% compared to $267.8 \text{ m Ah g}^{-1}$ and 74.41% for the pristine sample, respectively. The MgF_2 modification can effectively inhibit HF corrosion, reduce side effects and improve cycle performance. The MgF_2 -3 shows a discharge capacity of $205.6 \text{ m Ah g}^{-1}$ with a retention of 80.03% and a voltage of 442.2mV after 200 cycles, while for the pristine is only $147.9 \text{ m Ah g}^{-1}$, 66.71%, 672.3 mV, respectively.

Keywords: lithium rich cathode material, MgF_2 coating, cycling performance

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