Effects on Wet-coated $0.5Li_2MnO_3 \cdot 0.5LiNi_{1/3}Co_{1/3}Mn_{1/3}O_2$ Cathode Material for Li-ion Batteries

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The serial of Li-excess solid solution cathode materials $xLi_2MnO_3 \cdot (1-x)LiNi_{1/3}Co_{1/3}Mn_{1/3}O_2$ deliver the capacity of ~280 $mAh \cdot g^{-1}$ when charged above 4.5 V at a low current density. However, there are some drawbacks such as the poor cycle performance and rate capacity to be overcome for their further application. Surface coating of cathode materials has been proved to be an effective method to enhance the property of electrode/electrolyte interface and reduce the interfacial impedance of charge transfer. The disability of forming uniform and compact coating of traditional dry-coating method generates the exposing of part of the active materials. While a wet coating method avoids the disadvantage properly.

In this study, $(NH_4)_3AlF_6$ was chosen to coat the solid solution cathode material $0.5Li_2MnO_3 \cdot 0.5LiNi_{1/3}Co_{1/3}Mn_{1/3}O_2$ through the wet coating process. The 1 wt.% $(NH_4)_3AlF_6$ coated electrode exhibits elevated capacity and cycle performance, which is displayed in Fig. 1. Subsequent EIS tests indicate that $(NH_4)_3AlF_6$ coating reduces the impedance of interfacial charge transfer and electrochemical reaction.

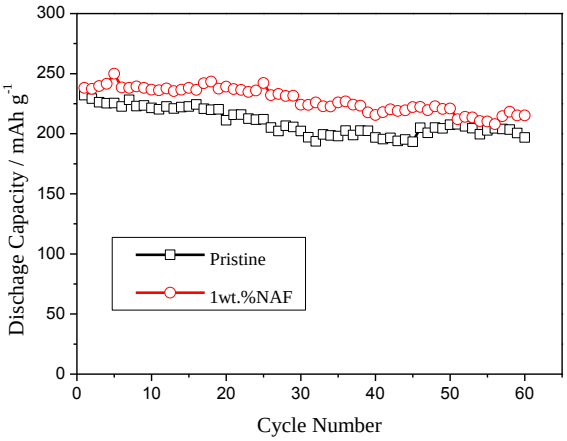

Figure 1. Cycle performance of pristine and wet-coated electrodes

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