

High-Voltage Electrolyte for High-Capacity of Nickel-Rich Cathode

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Nickel (Ni)-rich layered structured materials, $\text{LiNi}_x\text{Co}_y\text{Mn}_z\text{O}_2$ ($x \geq 0.5$) have been attracting great attention as the most promising high-capacity cathode active materials for an increase in the driving range of electric vehicles. To increase the capacity of Ni-rich cathode further, the increase in the charge cut-off voltage is a promising approach. However, upon the charge to higher voltage than conventional 4.2 V, conventional electrolyte undergoes electrochemical oxidative decomposition at the surface of highly charged state of cathode, destabilizing the surface of cathode. As a consequence, cathode degradation problems occur. In order to mitigate the electrochemical instability of electrolyte and cathode-electrolyte interface, recently we have designed a new electrolyte system. Herein, we report the improvement of high-voltage cycling performance of Ni-rich cathode using our designed electrolyte. Cathode-electrolyte interfacial chemistry, structural analysis results of cathode and their relation to cycling performance would be presented.