

Effects of electrolyte additives on the electrochemical properties of $\text{Li}[\text{Ni}_x\text{Co}_y\text{Mn}_z]\text{O}_2/\text{graphite}$ cells

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As the R&D trend of large-format lithium secondary batteries moves from hybrid electric vehicles (HEVs) to pure electric vehicles (EVs) or energy storage systems (ESSs), the energy density becomes the more important factor than the power density. As a result, Ni-rich $\text{Li}(\text{Ni}_x\text{Co}_y\text{Mn}_z)\text{O}_2$ (NCM) cathode materials have been extensively tested to achieve 200Wh/kg without severe capacity and power fading. However, the operation voltage can be increased and the electrode thickness and density also become higher, which can lead to poor reliability of lithium secondary batteries. Therefore, electrolytes with various additives should also be optimized for both cathode and anode materials.

In this work, we want to evaluate effect of electrolyte additive acting on unit cells composited NMC cathode consisted of different Ni contents and graphite anode to investigate optimum systems in the lithium secondary batteries for EVs. 1.15M in EC(Ethylene Carbonate)/DEC(Diethyl Carbonate) = 1/2(v/v) is used as a reference electrolyte. And VC(Vinylene Carbonate), FEC(Fluoroethylene Carbonate), DFEC(Difluoroethylene Carbonate), LiDFOB(Lithium difluoro(oxalate)borate are used as a electrolyte additive. And then, their capacity retention and impedance increase behaviors are monitored and analyzed to get the severity

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