Short Communication

Improved Electrochemical Performance of $\text{LiNi}_{0.5}\text{Co}_{0.2}\text{Mn}_{0.3}\text{O}_2$ Cathode with Different Carbon Additives for Lithium-ion Batteries

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Four types of commercial carbon additives (Super P, 350G, carbon nanotubes (CNTs) and graphene) are adopted to form effective conducting network in $\text{LiNi}_{0.5}\text{Co}_{0.2}\text{Mn}_{0.3}\text{O}_2$ (NCM523) cathode for lithium-ion battery. The results suggested that cathode with multi-carbon additives exhibited great improvement in capacity and rate capability. Morphology difference of carbon additives is found to have significant influence on the improvement of electrochemical performance. The use of CNTs and graphene makes up the shortage of commercial carbon black (Super P and 350G). When all the carbon additives worked together, NCM523 particles were well wrapped by paper-like graphene, with Super P and 350G particles coating onto the surface, and the whole sheet was connected by the network of CNTs, providing electrons both “short range” and “long range” highway to transport, contributing to the improvement of electrochemical performance of NCM523 for lithium ion battery.

Keywords: lithium ion battery, cathode, carbon additives, electrochemical performance

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