Short Communication

Effect of Cl doping on the structural and electrochemical properties of $\text{LiNi}_{0.4}\text{Co}_{0.2}\text{Mn}_{0.4}\text{O}_2$ as cathode materials for Lithium-ion Batteries

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The layered $\text{LiNi}_{0.4}\text{Co}_{0.2}\text{Mn}_{0.4}\text{O}_{2-x}\text{Cl}_x$ ($x=0.00, 0.03, 0.05, 0.10$) samples were prepared by using a sol-gel method. The crystal structure, electrochemical properties are characterized by XRD, charge-discharge tests and CV. The XRD results show that it remains a well-layered structure with single phase of hexagonal after chlorine doping. CV measurements suggest that the reversibility of the cathode materials is enhanced by chlorine doping. Charge-discharge tests show that the best electrochemical performance composition is for $x=0.05$, which has a higher initial discharge capacity of 169.9 mAh g^{-1} between 2.5 and 4.4 V at 0.2C rate and better cycling performance than that of others.

Keywords: Li-ion battery, sol-gel method, $\text{LiNi}_{0.4}\text{Co}_{0.2}\text{Mn}_{0.4}\text{O}_2$ cathode material, Cl doping

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