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Structural and electrochemical behavior of $\text{Li}_{1.2}\text{Mn}_{0.54}\text{Ni}_{0.13}\text{Co}_{0.13-x}\text{Al}_x\text{O}_2$ ($x = 0.05$) positive electrode material for lithium ion battery

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Abstract

A cathode material of $\text{Li}_{1.2}\text{Mn}_{0.54}\text{Ni}_{0.13}\text{Co}_{0.13}\text{O}_2$ doped with 5 wt% molar ratio of Al^{3+} in expense of Co^{3+} ions was prepared by combustion method for lithium ion batteries. The improvement of discharge capacity and rate performance as properties of the formed cathode system are shown therein. The crystal structure, particle morphology, and particle size of the materials were examined by X-ray diffraction, Scanning electron microscopy, and Transmission electron microscopy respectively. The obtained results reflect as a promising factor for cheaper and safer lithium ion batteries that can sustain the everyday life of mobile and stationery electronic devices.