

Synthesis and Characterization of $\text{Li}[\text{Ni}_{0.8}\text{Co}_{0.15}\text{Al}_{0.05}]\text{O}_2$ Cathode Material for Lithium-Ion Batteries by a Spray-Drying Method

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Recently, a great deal of research has been focused on the preparation methods to enhance the electrochemical properties. The $\text{LiNi}_{0.8}\text{Co}_{0.15}\text{Al}_{0.05}\text{O}_2$ material is generally synthesized by co-precipitation method. This method leads to homogeneous materials with small particle size but these complex synthetic routes based on solution precursors require expensive initial or intermediate reagents, long time to dry the precursor. Moreover, the abundant use of organic acid or hydroxides, which are caustic to the production equipment, makes these methods not fit for the industrial-scale production for the materials. But different from co-precipitation method above, spray drying process uses the insoluble carbonates or oxides as precursor without any caustic reagents. The cost of spray drying method was much lower than the co-precipitation processes. In this work, layered $\text{LiNi}_{0.8}\text{Co}_{0.15}\text{Al}_{0.05}\text{O}_2$ powders are obtained after sintering the precursor prepared by the spray-drying method. Characterization of $\text{LiNi}_{0.8}\text{Co}_{0.15}\text{Al}_{0.05}\text{O}_2$ powders are investigated.