Effect of Sintering Conditions on Electrochemical Properties of $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$ as Cathode Material

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Many works of literature have reported the drastic effects of synthesis methods on the electrochemical performances of Ni-rich cathode materials $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$ (NCM811). In this research, a two-step sol-gel method was successfully employed to synthesize pure NCM811 and the process of preparation is discussed in detail. The electrochemical properties depending on the structures and morphologies were verified by the multichannel galvanostatic system, EIS, XRD, and SEM. The results clarified that when the precursor was sintered at 750 °C for 15 h, the sample exhibited dominant electrochemical properties with initial discharge capacities of 230.8 and 176.3 mAh/g at 0.1 and 1 C, respectively. Moreover, the capacity retention rate is as high as 79% after 100 cycles at 1 C. These excellent electrochemical properties were considered to be arriving from the well-developed layered structure and low charge transfer resistance.

Keywords: Cathode materials; $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$ (NCM811); Electrochemical properties; Sol-gel method

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