

A comparative study of the thermal properties and electrochemical characteristics of $\text{LiNi}_{0.80}\text{CoAl}_{0.15}\text{Al}_{0.05}\text{O}_2$ and $\text{LiNi}_{0.85}\text{CoAl}_{0.10}\text{Al}_{0.05}\text{O}_2$ electrode in lithium ion secondary batteries

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Due to the increased production and use of portable devices, lithium secondary batteries with extended lives and higher capacity are in demand. Since the performance of the lithium secondary batteries is limited by the properties of cathode, a significant amount of research has been focused on the synthesis, processing or electrochemical identification of cathode materials for use in these batteries. Among those cathode materials LiNiO_2 has been considered as the most attractive one to substitute for commercially used LiCoO_2 because of its high specific capacity. LiNiO_2 , however, has few problems such as capacity fading during cycling and difficulty in synthesis. In order to overcome these problems, promising method is the small substitution with other elements such as Co, Al, for nickel [1-3]. The substitution of Co, Al had a beneficial effect on the electrochemical properties of LiNiO_2 . However, it has been reported that the lithium batteries of $\text{LiNi}_{0.8}\text{Co}_{0.15}\text{Al}_{0.05}\text{O}_2$ still show capacity fading.

In this study, the $\text{LiNi}_{0.8}\text{Co}_{0.15}\text{Al}_{0.05}\text{O}_2$ and $\text{LiNi}_{0.85}\text{Co}_{0.10}\text{Al}_{0.05}\text{O}_2$ materials were synthesized using co-precipitation and calcination process. The effects of difference in content of Ni, Co on the structural and electrochemical properties were investigated and compared in detail.

Reference

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