Structure and Electrochemical Performance of LiNi_{1/3}Co_{1/3}Mn_{1/3}O₂ Cathode Materials Fabricated by Different Synthesis Methods

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LiNi_{1/3}Co_{1/3}Mn_{1/3}O₂ cathode materials were synthesized by the solid-state method, Pechini method and co-precipitation method, respectively. The sample prepared by the co-precipitation method had the lowest cation mixing degree of Li⁺/Ni²⁺ and the best electrochemical properties among the materials prepared by these methods. Its maximum discharge capacity was 165.9 mAh g⁻¹ at the rate of 1 C, and the capacity retention rate was 75.4 % after 50 charge/discharge cycles. In addition, it demonstrated the best rate capacity of 116.7 mAh g⁻¹ at 5 C. The excellent cyclic stability and rate performance can be attributed to the stable crystal structure and minimal electrode polarization during the deintercalation/intercalation process of lithium ions.

Keywords: lithium-ion battery, cathode material, co-precipitation method, electrochemical performance

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