LiNi_{0.5}Mn_{1.5}O₄ Porous Micro-cubes Synthesized by a Facile Oxalic Acid Co-precipitation Method as Cathode Materials for Lithium-Ion Batteries

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Porous LiNi_{0.5}Mn_{1.5}O₄ (LNMO) micro-cubes have been synthesized via oxalic acid co-precipitation and sintering process. The sintering temperature has significant influence on the morphology and electrochemical performance of LNMO samples. The LNMO porous micro-cubes prepared by sintering at 770 °C are composed of the primary nanoparticles, and show the outstanding electrochemical properties. The discharge capacity of 116 mAh g⁻¹ can be obtained at 1 C-rate after 200 charge-discharge cycles. Even at 5 C, the porous micro-cubes exhibit a discharge capacity of 90.2 mAh g⁻¹, corresponding to a capacity retention of 88.4% over 500 cycles. The excellent electrochemical performance may be ascribed to the porous cubic structure and the primary nanoparticles, which provide stable structure and short distance for lithium-ion diffusion.

Keywords: Lithium-ion batteries; Cathode; LiNi_{0.5}Mn_{1.5}O₄; Porous micro-cubes; Co-precipitation method.

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