Graphene Oxide Modified $\text{LiNi}_{1/3}\text{Co}_{1/3}\text{Mn}_{1/3}\text{O}_2$ as Cathode Material for Lithium Ion Batteries and Its Electrochemical Performances

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doi: 10.20964/2018.11.17

Received: 7 July 2018 / Accepted: 30 August 2018 / Published: 1 October 2018

$\text{LiNi}_{1/3}\text{Co}_{1/3}\text{Mn}_{1/3}\text{O}_2$ (NCM) was coated with graphene oxide (GO) by a simple chemical approach. The prepared materials were characterised using various techniques such as X-ray diffraction (XRD), thermogravimetric analysis, scanning electron microscopy, energy dispersive spectroscopy, transmission electron microscopy and X-ray photoelectron spectroscopy. XRD revealed that the crystal structure and crystallinity do not change after surface modification with GO. The 2.5 wt% GO-coated NCM exhibits stable cycling stability with a capacity retention of 84.2% at 1 C after 100 cycles, which is higher than the corresponding value of 74.3% for the pristine sample. The rate performance results show that the GO coating increases the discharge capacity from 87.1 to 100.9 mAh g⁻¹ at a high rate of 5 C. Therefore, GO-coated NCM is a highly promising cathode material for lithium-ion batteries because it provides good cycling stability and high rate performance.

Keywords: Lithium-ion battery; $\text{LiNi}_{1/3}\text{Co}_{1/3}\text{Mn}_{1/3}\text{O}_2$; GO; Electrochemical properties

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