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Novel Mn-based Li-rich layered oxide $0.3\text{Li}_2\text{MnO}_3 \cdot 0.7\text{LiNi}_{1/3}\text{Co}_{1/3}\text{Mn}_{1/3}\text{O}_2$ as Anode Material for Lithium-Ion Batteries

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**Novel Mn-based Li-rich layered oxide $0.3\text{Li}_2\text{MnO}_3 \cdot 0.7\text{LiNi}_{1/3}\text{Co}_{1/3}\text{Mn}_{1/3}\text{O}_2$ as
Anode Material for Lithium-Ion Batteries**

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Abstract: The possibility of Mn-based Li-rich layered oxides $0.3\text{Li}_2\text{MnO}_3 \cdot 0.7\text{LiNi}_{1/3}\text{Co}_{1/3}\text{Mn}_{1/3}\text{O}_2$ as anode material for Li-ion batteries is explored. Ex-situ XRD patterns show that the layered structure remained when discharged to 1.2 V and the emergence of the phase of Li_2O and transition metal (Ni, Mn and Co) emerged when discharged to 0.05 V, indicating that there exists conversion reaction mechanism like transition-metal oxides anode material. The reversible capacities reach 574.2 and 449.8 mAh g^{-1} at the current density of 50 mA g^{-1} and 200 mA g^{-1} respectively after 80 cycles. This study suggests that further optimizing Mn-based Li-rich layered oxides is a promising alternative anode material for Li-ion batteries.

Keywords: Mn-based Li-rich layered oxides; crystal structure; energy storage and conversion; anode material; conversion reaction; Li-ion batteries

1. Introduction

Li-ion batteries (LIBs) dominate the rechargeable battery market segment for various electronic devices

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