Electrochemical Performance of co-doped $Li_{1.2}Mn_{0.6}Ni_{0.2}O_2$ Cathode Materials

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The composite material has a $xLi_2MnO_3 \cdot (1-x)LiMO_2$ (M = Mn, Co, Ni) structure has been considered as one of the most promising cathode materials for advanced lithium-ion batteries due to their low-cost and high capacity (> 200 mAh g−1) between 4.8 V and 2 V [1, 2].

However, these Li_2MnO_3-like composite cathode materials have three major disadvantages: high initial irreversible capacity, poor cycling stability and poor high rate capability. The development of the Li_2MnO_3-like composite cathode materials for lithium ion battery still is a challenge for meeting current and future energy storage requirements.

The cation doping is considered as an effective way to modify the intrinsic properties of electrode materials [3]. The magnesium-doping can be an effective way to improve the performance of this Li_2MnO_3 like materials. Sun et al reported that by magnesium substitution for Ni, the structural stability and cycling behavior of $Li[Li_{0.15}Ni_{0.235}Mg._{0.04}Mn_{0.575}]O_2$ material was better than that of non-doped material [4].

In this study, the $xLi_2MnO_3 \bullet (1-x)LiMO_2$ cathode materials were prepared by a co-magnesium-doping. It was found that the co-doping can further improve the structural stability and the electrochemical properties of $xLi_2MnO_3 \cdot (1-x)LiMO_2$. The influence of co-doping on the electrochemical properties of $xLi_2MnO_3 \cdot (1-x)LiMO_2$ was investigated in detail.

References

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