Short Communication

Study on the Properties of $\text{LiMn}_2\text{O}_4/\text{Li}_{1.5}\text{Al}_{0.5}\text{Ge}_{1.5}(\text{PO}_4)_3$ Composite Cathode Materials

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The capacity attenuation of lithium manganate battery is serious in the process of use, which greatly limits the application of LiMn_2O_4 material. In this paper, the properties of LiMn_2O_4 material and $\text{Li}_{1.5}\text{Al}_{0.5}\text{Ge}_{1.5}(\text{PO}_4)_3$ solid electrolyte material combined in a certain proportion could be researched by X-ray diffractometer, electron scanning microscope, charge-discharge cycle test, AC impedance test and cyclic volt-ampere test. The specific discharge capacity of $\text{LiMn}_2\text{O}_{4(9:1)}$ and $\text{LiMn}_2\text{O}_{4(7:3)}$ composite cathode materials at 0.1c rate charge-discharge cycle is $108.5595 \text{ mAh}\cdot\text{g}^{-1}$, $110.013 \text{ mAh}\cdot\text{g}^{-1}$, which is lower than that of LiMn_2O_4 . After 50 cycles, the capacity retention rates of LiMn_2O_4 , $\text{LiMn}_2\text{O}_{4(9:1)}$ and $\text{LiMn}_2\text{O}_{4(7:3)}$ were 63.12%, 83.22% and 94.35%, respectively. It is concluded that adding a certain amount of $\text{Li}_{1.5}\text{Al}_{0.5}\text{Ge}_{1.5}(\text{PO}_4)_3$ can effectively alleviate the problem of LiMn_2O_4 capacity attenuation.

Keywords: LiMn_2O_4 , $\text{Li}_{1.5}\text{Al}_{0.5}\text{Ge}_{1.5}(\text{PO}_4)_3$, $\text{LiMn}_2\text{O}_4/\text{Li}_{1.5}\text{Al}_{0.5}\text{Ge}_{1.5}(\text{PO}_4)_3$ composite cathode materials, performance study

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