

Study on the Performance of MnFe_2O_4 as Anode Material for Lithium-Ion Batteries Using Spent Alkaline Zn-Mn Batteries as Manganese Source

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In this work, we report the electrochemical properties of MnFe_2O_4 as anode materials for lithium-ion batteries using spent Zn-Mn batteries as raw materials by three different methods: sol-gel method, hydrothermal method in glycol and hydrothermal method in water. The materials were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), particle size analysis and charge-discharge test. The result showed that the material synthesized by hydrothermal in water shows the best cycle performance of all, the initial discharge specific capacity of MnFe_2O_4 prepared by this process was 1096 mA h g^{-1} . Moreover, even after 100 cycles, the MnFe_2O_4 electrode remains 150 mA h g^{-1} . These results of this investigation demonstrate that the process MnFe_2O_4 prepared by using the spent Zn-Mn batteries as manganese source presents an alternative way for spent alkaline Zn-Mn batteries recycling.

Keywords: Zinc-manganese battery, MnFe_2O_4 , lithium-ion batteries.

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