

Study The Role Effect of Poly Pyrrole on LiFePO₄ as Positive Electrode

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Abstract : The effects of poly pyrrole (PP) addition on LiFePO₄ have been studied by electrochemical impedance spectroscopy (EIS), cyclic voltammetry (CV), and galvanostatic measurements. PP was prepared with LiFePO₄ in different ways, such as chemically dispersion, insinuation polymerization, and electrochemically polymerization. The EIS results showed that the charge transfer resistance (R_{ct}) of LiFePO₄ was decreased by adding 10% PP polymerized in a situation to 153 vs. 1660 Ω for bare LiFePO₄. The CV curves show that 10% PP added LiFePO₄ had higher electrochemical reactivity for lithium insertion and extraction than the un-doped material. The mean redox potential is $E_{1/2} = 3.45$ V vs. Li⁺/Li. The first discharge curve of the 10% poly pyrrole doped LiFePO₄ showed a mainly flat voltage plateau over the 3.45-3.5 V range, indicating the lithium extraction and insertion reactions between LiFePO₄ and FePO₄. A specific discharge capacity of cells prepared from in-situ 10% PP added LiFePO₄to was about 210 vs. 65 mAhg⁻¹ for bare LiFePO₄.

Keywords : liFePO₄, poly pyrrole addition, positive electrode, lithium battery

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