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 $LiFePO_4$ in different ways, such as chemically dispersion, insinuation polymerization, and electrochemically polymerization. The EIS results showed that the charge transfer resistance (Rct) of $LiFePO_4$ was decreased by adding 10% PP polymerized in a situation to 153 vs. 1660 for bare $LiFePO_4$. The CV curves show that 10% PP added $LiFePO_4$ had higher electrochemical reactivity for lithium insertion and extraction than the un-doped material. The mean redox potential is E1/2 = 3.45 V vs. Li+/Li. The first discharge curve of the 10% poly pyrrole doped $LiFePO_4$ showed a mainly flat voltage plateau over the 3.45–3.5 V range, indicating the lithium extraction and insertion reactions between $LiFePO_4$ and $FePO_4$. A specific discharge capacity of cells prepared from in-situ 10% PP added LiFePO4to was about 210 vs. 65 mAhg-1 for bare $LiFePO_4$.

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