Low temperature molten salt synthesis of Y2Sn2O7 anode material for lithium ion batteries

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Abstract

For the first time, yttrium tin oxide (Y\textsubscript{2}Sn\textsubscript{2}O\textsubscript{7}) compound is prepared at low temperature (400 \textdegree C) with cubic pyrochlore structure via molten salt method using KOH as a flux for their electrochemical applications. The final product is reheated at three different temperatures of 600, 800 and 1000 \textdegree C for 6 h in air, are physically and chemically characterized by various techniques such as X-ray diffraction (XRD), scanning electron microscope (SEM) and electrochemical studies of galvanostatic cycling (GC), cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). Galvanostatic cycling of Y\textsubscript{2}Sn\textsubscript{2}O\textsubscript{7} compounds are carried out with three different current densities of 60, 100 and 250 mA g\textsuperscript{-1} and the potential range of 0.005–1.0 V vs. Li. The EIS is carried out to study the electrode kinetics during discharge and charge at various voltages and corresponding variation of resistance and capacitance values are discussed.