

Abstract

Present work has been carried out to synthesize inverse spinel lithium nickel vanadium oxide (LiNiVO_4) by the solution evaporation method and polymer modified solution evaporation method. Chitosan was chosen as polymer candidate in this work to prepare the product. Product obtained by these two methods were structurally characterized by XRD, SEM and TEM and followed by electrochemical performance by cyclic voltammetry and charge-discharge characteristics. Both methods successfully produced LiNiVO_4 as confirmed using JCPDS data 73-1636. NiO impurity was present at sintering temperatures of 500 °C and 600 °C in both synthesis processes. However no impurities were found at sintering temperatures of 700 °C and 800 °C. Scherrer equation was used to calculate the crystallite size. Crystallite size for the samples obtained from the chitosan modified solution evaporation method are in the range from 52.5 nm to 78.1 nm when sintered from 500 °C and 800 °C. Calculation using Scherrer equation reveals that the crystallites obtained by the solution evaporation method are in the range from 48.6 nm to 132.6 nm when the product was heated in the same temperature range. Product sintered at 700 °C showed no impurities and smaller crystallites was coated with ZnO. The cell fabricated with coated samples in the cathode showed better electrochemical stability.