Short Communication

Pulsed Laser Deposited SnS-SnSe Nanocomposite as a New Anode Material for Lithium Ion Batteries

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doi: 10.20964/2017.08.62

Received: 10 May 2017 / Accepted: 14 June 2017 / Published: 12 July 2017

SnS-SnSe nanocomposite thin films are successfully fabricated by pulsed laser deposition (PLD) method and their electrochemical properties are investigated by cyclic voltammetry (CV) and discharge/charge measurements. SnS-SnSe composite electrode delivers an initial discharge capacity of 1225 mAh/g, which is 1.8 and 2.6 times of SnS and SnSe thin film electrodes, respectively. The high capacity of composite electrode is speculated to be related to its large amounts of grain boundaries which can store more Li. Mechanistic study based on CV and *ex situ* X-ray diffraction (XRD) results imply that SnS-SnSe composite decomposes to generate nano-sized Li_xSn , Li_2S and Li_2Se during initial discharge process, which then form Sn_2SSe single phase instead of composite phase upon charge process. The subsequent cycles are based on reversible electrochemical reaction between Sn_2SSe phase and metallic Li.

Keywords: SnS-SnSe nanocomposite; Anode; Lithium ion batteries

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