Contribution ID: **179** Type: **Poster presentation**

Synthesis and Electrochemical Properties of SnO_2 Nanostructures via a Hydrothermal Method for Li-ion Batteries.

Thursday, 21 May 2015 13:00 (3h 30m)

Tin oxide (SnO_2) is one of the promising high capacity anode materials for next generation lithium ion batteries due to its ability to uptake a large amount of Li-ion. SnO_2 can provide twice as high specific capacity as graphite electrode currently used in commercial Li-ion batteries today. Therefore, using SnO_2 will reduce the amount of materials used to make the electrodes and reduces the production cost of the materials. In addition, the batteries made by using SnO_2 as the anode will be lightweight and have small size. In this project, SnO_2 was synthesized into three structures: nanoparticle, nanosphere and hollow nanosphere via hydrothermal method. The electrochemical properties were measurement using a galvanostatic mode. We found that the SnO2 nanoparticles provided the highest storage capacity due to its compacted structure with capsule-like nanostructure. The specific capacity at C/5 of the first cycle was around 2200 mAh/g and the average capacity at 1C over 20 cycles was around 660 mAh/g. These results indicate that SnO_2 nanostructures synthesized in this work have a more superior performance than graphite and can be used to replace graphite electrode in lithium-ion batteries.

Summary

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Session Classification: Poster-3

Track Classification: Material Physics, Nanoscale Physics and Nanotechnology