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论文

纳米锡锌复合氧化物贮锂材料的合成和性质

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摘要:

用液相沉淀-热解法合成了一系列结构和组成不同的锂离子电池纳米锡锌复合氧化物贮锂材料, 通过XRD、TEM和电化学测试对材料进行了表征. 测试结果表明, 非晶态ZnSnO3负极材料的初始可逆贮锂容量为844 mA·h/g, $ZnO·SnO_2$负极材料的初始可逆贮锂容量为845 mA·h/g, $SnO_2·Zn_2SnO_4$复合物负极材料初始可逆贮锂容量为758 mA·h/g, 循环10周后, 三者的充电容量分别为695, 508和455 mA·h/g, 表明非晶态结构的锡锌复合氧化物具有较好的电化学性质, 随着样品中晶体的形成, 该类型负极材料的贮锂性能下降.

关键词: 锡锌复合氧化物 锂离子电池 贮锂材料

Synthesis and Properties of Nanosized Tin-zinc Composite Oxides as Lithium Storage Materials

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Abstract:

The precursor was prepared with liquid precipitation method. A series of tin-zinc composite oxides with different components and structures were synthesized as the anode materials for lithium ion batteries when the precursor was pyrolyzed at different temperatures. The products were characterized by XRD, TEM and electrochemical measurements. The reversible capacity of amorphous $ZnSnO_3$ is 844 mA·h/g in the first cycle and the charge capacity is 695 mA·h/g in the 10th cycle. The reversible capacity of $ZnO·SnO_2$ is 845 mA·h/g in the first cycle and the charge capacity is 508 mA·h/g in the 10th cycle. The reversible capacity of $SnO_2·Zn2SnO_4$ is 758 mA·h/g in the first cycle and the charge capacity is 455 mA·h/g in the 10th cycle. The results show that amorphous $ZnSnO_3$ exhibits the best electrochemical property among all of the tin-zinc composite oxides. With the formation of crystallites in the samples, the electrochemical property of tin-zinc composite oxides decreases.

Keywords: Tin-zinc composite oxides Lithium ion battery Lithium storage materials

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