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论文

一维纳米结构MnO_2的微波合成及其电化学性能

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摘要:

以在水热条件下合成的纳米结构γ-MnOOH为前驱物, 以$K_2S_2O_8$为氧化剂, 采用单模式微波加热法制备出一维纳米结构MnO_2. 采用XRD和TEM等手段对样品进行了表征. 以在100 ℃下水热合成的γ-MnOOH纳米纤维为前驱物时, 制得α-MnO_2纳米纤维; 以在150 ℃下水热合成的γ-MnOOH纳米棒为前驱物时, 制得β-MnO_2纳米棒. 分别用α-MnO_2纳米纤维和β-MnO_2纳米棒作为Li/MnO_2电池的正极材料进行恒电流放电实验, 研究结果显示, α-MnO_2纳米纤维的放电容量为270.23 mA·h/g, β-MnO_2纳米棒的放电容量为186.66 mA·h/g.

关键词: 纳米结构 微波加热 MnO_2 电化学性能

Microwave Synthesis and Electrochemical Property of One Dimensional Nanostructured MnO_2

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Abstract:

Based on the hydrothermally-synthesized nanostructured γ-MnOOH precursor and with $K_2S_2O_8$ as an oxidant, nanostructured α/β-MnO_2 samples were prepared by a singel-mode microwave-heating method. The samples were characterized by X-ray diffraction and Transmission Electron Microscopy. The results show that α-MnO_2 nanofibers were prepared when the γ-MnOOH nanofibers synthesized at 100 ℃ were used as the precursors, while β-MnO_2 nanorods were obtained with the γ-MnOOH nanorods synthesized at 150 ℃ as the precursors. The electrochemical performance of α/β-MnO_2 was also investigated by galvanostatic discharge test. When the as-prepared α-MnO_2 nanofiber and β-MnO_2 nanorod samples are used for Li/MnO_2 battery, the discharge capacities are 270.23 and 186.66 mA·h/g, respectively.

Keywords: Nanostructure Microwave-heating MnO_2 Electrochemical property

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