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Calcination - Assisted Hydrothermal Synthesis and Electrochemical Performance of Fe_3O_4/HSFC Nanocomposites as Li-ion Batteries Anodes

Zilin Mo[1], Jianwu Sun[1], Aimiao Qin[1], Shuoping Chen[1], Lei Liao[2*], Rui Du[1], Kaiyou Zhang[1]*

[1] Guangxi Key Laboratory in Universities of Clean Metallurgy and Comprehensive Utilization for Non-ferrous Metals Resources, Key Lab New Processing Technology for Nonferrous Metals & Materials Ministry of Education, College of Materials science & engineering, Guilin University of Technology, Guilin, China
[2] Guangxi Key Laboratory of Environment Pollution Control Theory and Technology, College of Environmental Science and Engineering, Guilin University of Technology
Guilin, China
[*]E-mail: 2005032@glut.edu.cn, fangqiu2001@163.com

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Hydrothermal sisal fiber carbon (HSFC) was synthesized by a two-step hydrothermal modification with sisal fiber as raw material. Then Fe_3O_4/HSFC nanocomposites were prepared by combining HSFC with nanostructures of Fe_3O_4 via a hydrothermal process assisted by calcinating. The structure and morphology of Fe_3O_4/HSFC nanocomposites were characterized by powder X-ray diffraction and scanning electron microscopy(SEM), and their electrochemical performances were tested by constant current charge-discharge tests. The first coulomb efficiency of resulted Fe_3O_4/HSFC nanocomposite is 64% at the current density of 50mAg^{-1} and the calcination temperature of 600°C. The reversible capacity can maintain 610mAhg^{-1}and 480mAhg^{-1} at the current densities of 50 and 500mAg^{-1} after 50 cycles, respectively. The results show that modification with Fe_3O_4 nanoparticles is an effective method to improve the electrochemical performances of the HSFC-based materials.

Keywords: sisal fiber carbon; hydrothermal treatment; Fe_3O_4 nanoparticles; calcination; electrochemical performance

FULL TEXT