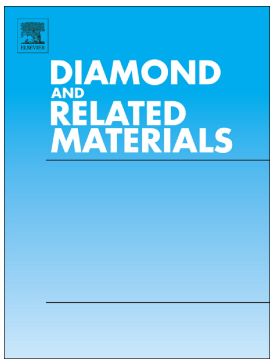

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High-capacity activated carbon anode material for lithium-ion batteries prepared from rice husk by a facile method

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Abstract

In this paper, rice husk was selected as raw materials to prepare activated carbon via an effective and facile method. NaOH, as an activator, plays a crucial role in forming the hierarchical porous structure in this method. These materials were characterized through X-ray diffraction (XRD), Raman spectroscopy, Nitrogen adsorption-desorption analyses, Scanning electron microscopy (SEM) and Transmission electron microscopy (TEM). The electrochemical properties have varied with the changes of morphology and structure after the activation process. After 100 cycles at a rate of 0.2 C, the reversible specific capacity of rice husk-derived activated carbon (denoted as RHAC) stabilized at 448 $mAhg^{-1}$. In addition, the RHAC electrode delivers an excellent rate capability with the discharge capacities of 652, 477, 363, 242 and 197 $mAhg^{-1}$ at 0.2 C, 0.5 C, 1 C, 2 C, 5 C, respectively. Compared with the non-activated materials (denoted as RHC), the significantly improved electrochemical performance of the RHAC could be attributed to the hierarchical porous structure with more edges, defects and the enlarged surface area.

Keywords: Rice husk, Porous activated carbon, Anode material, Lithium ion batteries