

Synthesis of Three-dimensional Core/Shell Structure of MnO₂@Polyaniline/Carbon Fiber Paper for High Performance of Supercapacitor

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In this work, we developed a straightforward and simple method for preparation of three-dimensional core/shell structure of MnO₂@polyaniline(PANI)/carbon fiber paper(CFP) electrodes. MnO₂ nanosheet deposited on carbon fiber paper (CFP) was synthesized using a simple redox reactive reaction, and then PANI was directly deposited on the surface of MnO₂ nanosheet by electrochemical coating method. The MnO₂@PANI/CFP can be applied as a binder- and carbon-free electrode for supercapacitors. The MnO₂@PANI/CFP material is characterized by scanning electron microscopy, transmission electron microscopy, X-ray photoelectron spectroscopy, and X-ray diffraction. Electrochemical performance of the MnO₂@PANI/CFP electrode was studied by cyclic voltammetry, galvanostatic charge/discharge, and electrochemical impedance spectroscopy. The MnO₂@PANI/CFP electrode shows a high specific capacitance of 437 F g⁻¹ at 1A g⁻¹, a good rate capability, and an excellent cycling stability.

Keywords : Nanosheet, Pseudocapacitor, Carbon Fiber Paper, Conductivity, Composite electrode.