Synthesis, Characterization and Electrochemical Properties of α -MnO₂ Nanowires as Electrode Material for Supercapacitors

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High purity α -MnO₂ rectangular nanowires are synthesized by a facile one-step hydrothermal method. The morphology and composition of α -MnO₂ nanowires are characterized by X-ray diffraction, energy-dispersive X-ray spectroscopy (EDX), Field emission scanning electron microscopy (FESEM), X-ray photoelectron spectroscopy (XPS) and Fourier transform infrared (FTIR) spectral techniques. The electrochemical properties of α -MnO₂ nanowires have been studied as electrode material for supercapacitors. The α -MnO₂ nanowires exhibit a high specific capacitance of 362 Fg⁻¹ at a current density of 1.0 Ag⁻¹ with a good cycling stability (maintained 83% after 5000 cycles). These results indicate its promising applications as a high-performance electrode material for electrochemical energy storage.

Keywords: Hydrothermal; MnO₂; Nanowires; Supercapacitors; Electrodes

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