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Interconnected network of ultrafine MnO_2 nanowires on carbon cloth with weed-like morphology for high-performance supercapacitor electrodes

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Abstract

A binder-free electrode of ultrafine MnO_2 nanowires grown on the carbon cloth (CC) were fabricated by simple hydrothermal method, exhibiting the interconnected network with weed-like morphological feature. The unique pore structure has a large interface surface area, and allows rapid electrolyte diffusion through its hollow/open framework and fast electron transfer though the carbon skeleton. As an electrode for supercapacitors, the ultrafine MnO_2 nanowires grown on the CC (ultrafine MnO_2 nanowires@CC) exhibit a high specific capacitance (1174.3 F g^{-1} at the moderate current density of 2 A g^{-1}), excellent rate property (stabilize at 927 F g^{-1} as the current density increases to 40 A g^{-1}), and good cycling stability (a negligible 0.1% decay in specific capacitances after 10,000 cycles).

Keywords: MnO_2, Supercapacitor, Electrode, Nanowire, Ultrafine structure