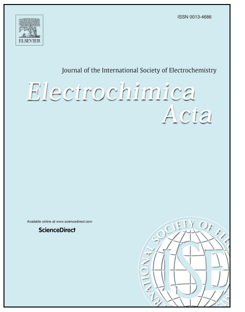

Hierarchical multidimensional MnO_2 via hydrothermal synthesis for high performance supercapacitors

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Hierarchical multidimensional MnO_2 via hydrothermal synthesis for high performance supercapacitors

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Abstract: Manganese dioxide (MnO_2) is an ideal electrode material for supercapacitors due to its low cost and large theoretical specific capacity. We reported the hydrothermal synthesis MnO_2 nanostructures with different morphologies through the variation of hydrothermal temperature and dwell time. It was found that cauliflower-like δ-MnO_2 particles are prepared at a lower temperature while the needle-like α-MnO_2 nanorods are formed at a higher temperature. The morphologies of MnO_2 were also affected by the hydrothermal dwell time. The needle-like α-MnO_2 nanorods have the higher specific surface (114 m^2 g^{-1}) than that of the cauliflower-like δ-MnO_2 particles. Electrochemical properties were evaluated using cyclic voltammetry (CV) and galvanostatic charge/discharge (GCD) and electrochemical impedance spectroscopy (EIS). The hierarchical multidimensional MnO_2 architecture nanostructured surface with particles and nanorods, shows a maximum specific capacity (311.52 F g^{-1} at 0.3 A g^{-1}). These results provided a generic guideline in developing different nanostructured electrode materials for electrochemical energy storage.

Keywords: Hydrothermal, MnO_2, Supercapacitor

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