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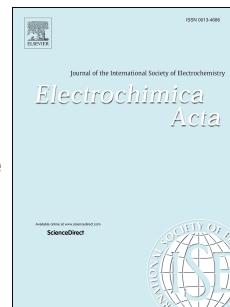
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Hierarchical multidimensional MnO₂ via hydrothermal synthesis for high performance supercapacitors

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Abstract: Manganese dioxide (MnO₂) is an ideal electrode material for supercapacitors due to its low cost and large theoretical specific capacity. We reported the hydrothermal synthesis MnO₂ nanostructures with different morphologies through the variation of hydrothermal temperature and dwell time. It was found that cauliflower-like δ -MnO₂ particles are prepared at a lower temperature while the needle-like α -MnO₂ nanorods are formed at a higher temperature. The morphologies of MnO₂ were also affected by the hydrothermal dwell time. The needle-like α -MnO₂ nanorods have the higher specific surface (114 m² g⁻¹) than that of the cauliflower-like δ -MnO₂ particles. Electrochemical properties were evaluated using cyclic voltammetry (CV) and galvanostatic charge/discharge (GCD) and electrochemical impedance spectroscopy (EIS). The hierarchical multidimensional MnO₂ 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, MnO₂, Supercapacitor

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