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Improved Electrochemical Properties of Activated Biomass/FeOx/MnOx Composite Prepared by Hydrothermal method for Supercapacitor Electrode Materials

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Activated biomass carbon from coconut shell was composited with FeOx and MnOx by hydrothermal method at 160 oC for 18 h. The phase structure, morphology and chemical composition of samples were characterized by X-ray diffraction (XRD), Scanning electron microscopy (SEM), Transmission electron microscopy (TEM) and Energy dispersive X-ray spectroscopy (EDX). The electrochemical properties of samples were studied by cyclic voltammetry (CV) and galvanostatic charge-discharge (GCD) technique in a three-electrode electrochemical cell with 6 M of KOH electrolyte solution at different scan rates (2-200 mV/s) and constant current densities (1-30 A/g), respectively. The activated biomass composite with FeOx show the highest specific capacitances of 141.8 F/g at 2 mV/s scan rate while the activated biomass composite with FeOx and MnOx show the highest specific capacitances of 146.3 F/g at 1 A/g current density. These results show that the specific capacitances of activated biomass electrode can be improved by composite with FeOx and MnOx. Moreover, all samples also exhibit charge-discharge reversibility efficiency more than 87% after 500 cycles.

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