

Characterization of supercapacitive charge storage device using electrochemical impedance spectroscopy

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ABSTRACT

In combination with an analogous circuit pattern, the electrochemical impedance (EIS) spectra aids in examining the physical origin of the different electrical components involved in the device. In this research, to illustrate the various physical processes taking place in energy-storing electrodes, the EIS spectra in the entire frequency area is divided into specific electrical elements such as resistors and capacitors with the help of Z view software and determined origin of their charge storage properties. The EIS spectra of activated carbon (AC) – TiO₂ or MnO₂ composites containing TiO₂ in the range 5 – 20 wt% and nominal composition of MnO₂ (5 wt% MnO₂) are analyzed using the equivalent circuit fitting technique and the corresponding electrode parameters and performances are correlated.

KEYWORDS: Supercapacitor, Electrochemical impedance spectroscopy, Zview, Circuit fitting, Electrodes

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