# Effect of oxidation time and iron electroless deposition on carbon felt for supercapacitor applications

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The industrialization and growth population are responsible by both global energy demand and major concerns with the environment. Thus, the interest in new sources of clean energy grows, such as alternatives to generation systems and energy storage. Scientific and technological concern for improvements, associated to supercapacitors are based on the functionality of these devices as simple configuration, high power and energy density. Among the used materials, those based on carbon, whose microporosity influence has been studied for application as electrode, aimed to increase energy density devices. Therefore, this work shows the electrochemical behavior of activated carbon fiber felt electrodes oxidized at three different times at 250 °C. The materials have been exposed to iron electroless deposition and the electrochemistry was performed in aqueous acid electrolyte. Results showed change on morphological characteristics and in the capacitive effect as a function of the different oxidation times and the deposition of iron on felt, respectively. The fraction of incorporated metal was about 1.0% by mass of Fe. Structural characterization showed lower crystallinity of felt as a function of increasing oxidation time. The electrical double-layer and pseudocapacitance interactions of the felt based electrodes are identified from both galvanostatic charge/discharge curves, and cyclic voltammetry. The difference between cations and anions was higher for electrodes treated with longer oxidation time.

Keywords: Supercapacitors. Electrodes. Carbon Materials. Activated Carbon Fiber. Oxidation.