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Development of surface modified carbon material electrode for EDLC application

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Energy storage has always been an important need for the development and advancement of technology. One of the possible ways to address this issue are supercapacitors. Supercapacitors are the energy storage devices with high capacitance, high power density and sufficiently accepted energy density. Depending upon the electrode material used, supercapacitors are classified into two types; pseudocapacitors and electrochemical double layer capacitors (EDLCs). In the present study, an electrochemical double-layer capacitor (EDLC) was fabricated using surface-modified activated carbon materials with metallic nanoparticles (NPs). The surface of the carbon materials were modified by using copper NPs in different weight ratios using a low-temperature chemical method. The as-modified materials were used as electrode materials for supercapacitor application. The prepared materials were characterized by using scanning electron microscopy, X-ray diffraction analysis and N₂ adsorption-desorption studies. To fabricate the cell, a magnesium ion- based polymer gel electrolyte was used. The cell was characterized by using electrochemical impedance spectroscopy, cyclic voltammetry and charge-discharge techniques. The results of the measurements will be presented at the conference.

Keywords: Supercapacitors; Activated Carbon; Polymer gel electrolyte; Surface modification