

International Conference on PROCESSING & MANUFACTURING OF ADVANCED MATERIALS Processing, Fabrication, Properties, Applications, THERMEC 2023

Fabrication of electrochemical double layer capacitor using surface modified MWCNTs as an electrode materials

*Amrita Jain*¹, Monika Michalska², Sai Rashmi Manippady¹

¹Institute of Fundamental Technological Research, Polish Academy of Sciences, Pawińskiego 5B, 02-106 Warsaw, Poland

Email: ajain@ippt.pan.pl

²Department of Chemistry and Physico-Chemical Processes, Faculty of Materials Science and Technology, VŠB-Technical University of Ostrava, 17. listopadu 2172/15, 708 00 Ostrava-Poruba, Czech Republic

Email: monika.kinga.michalska@gmail.com

Storing energy has always been an important need for the development and advancement of technology. One of the ways to address this issue is supercapacitors. Supercapacitors are 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 MWCNTs with metallic nanoparticles (NPs). The surface of MWCNTs was modified by using a silver 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, MWCNTs, Polymer gel electrolyte; Surface modification