World Academy of Science, Engineering and Technology
International Journal of Materials and Metallurgical Engineering
Vol:10, No:04, 2016

BaFe12O19/Polythiophene Nanocomposite as Electrochemical Supercapacitor Electrode

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Abstract : This paper is focused on the absorbance and magnetic properties of a novel nanocomposite based on conducting polymer, carbon black and barium hexaferrite in epoxy resin on the E-glass fibre substrate. The highly conductive nanocomposite was provided by in-situ polymerization of aniline in the presence of carbon black (C) and barium hexaferrite (BaFe12O19) as electromagnetic absorbance material. The structure, morphology, and magnetic properties of samples were characterized by powder X-ray diffraction (XRD), scanning electron microscopy (SEM) and vibrating sample magnetometer (VSM). SEM images showed the uniformly coated PAni on the surface of carbon black and barium hexaferrite. XRD peaks also verified the presence of carbon black and barium hexaferrite in the nanocomposite. The microwave characteristics determined from the magnetic and dielectric properties of the elastomeric composites obtained from scattering data by fitting the samples in a waveguide, where measured in the frequency in X-band frequency range, the range of 8 to 12 GHz. The reflection losses were evaluated to be less than −5dB over the whole X-band frequency (8–12 GHz) for the thickness of 1.4mm.

Keywords : conductive polymer, magnetic materials,capacitance, electrochemical cell
Conference Title : ICEMA 2016 : International Conference on Engineering Materials and Applications
Conference Location : Istanbul, Türkiye
Conference Dates : April 19-20, 2016