

8th International Conference and Exhibition on

MATERIALS SCIENCE AND ENGINEERING

May 29-31, 2017 Osaka, Japan

Comparison of EMI shielding effectiveness for polymer/carbon fiber composites prepared by different processing methods

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The effects of composite preparation methods on the electrical properties such as electrical conductivities, electromagnetic parameters and EMI shielding effectiveness polymer/carbon fiber(CF)composites were investigated. The composites were prepared using injection molding machine, internal mixer and screw extruder. From the results of electrical properties, the Polymer/CF (70/30, wt%) composites prepared by injection molding showed the highest electrical conductivity and EMI shielding effectiveness. This result seemed mainly due to the increased CF length when the Polymer/CF composite were prepared by injection molding, which was advantageous in forming stable conductive network of the composite. From the results of electromagnetic parameters of the Polymer/CF composites, the increased electrical conductivity of the composite prepared by injection molding was mainly due to the increased dielectric constants (ϵ' and ϵ'') of the Polymer/CF composite. This enhanced dielectric constants seemed related to the percolation at a lower concentration of the CF which was affected by the increased CF length of the composite prepared by injection molding process. From the results of dielectric loss and magnetic loss factors of the Polymer/CF composite, the major electromagnetic absorbing mechanism was dielectric loss such as dipole polarization and interface polarization between filler and matrix, resulting improved EMI absorption values. The total EMI shielding effectiveness of the Polymer/CF composite consisted of 85.1% EMI shielding effectiveness by absorption and 14.9% EMI shielding effectiveness by reflection, suggesting that the EMI shielding was predominant by the absorbing mechanism of the incident electromagnetic wave.

Biography

J.Y.Kim is attending in Master of Engineering course of Department of Chemical and Biological Engineering at Korea university since 2016. I have received B.Eng at Department of Chemical and Biological Engineering at Korea university in 2016. My research field is the studying of mechanical and electrical properties of polymer/conductive filler composites. Also I am interested in improving the compatibility of polymer blends using reactive compatibilizers. I have been studying polymer/conductive filler composites for improving the EMI SE (Electromagnetic interference effectiveness) of the composites. I have been using research equipments such as universal testing machine (UTM), advanced rheological expansion system (ARES), scanning electron microscope (SEM) and vector network analyzer.

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