THE DIELECTRIC CONSTANT (ε') AND LOSS TANGENT (δ) OF MAGNETITE (Fe_3O_4) FILLED THERMOPLASTIC NATURAL RUBBER COMPOSITE

FARAHANIS MARUDIN

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Universiti Teknologi MARA

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ABSTRACT

THE DIELECTRIC CONSTANT (ε') AND LOSS TANGENT (δ) OF MAGNETITE (Fe_3O_4) FILLED THERMOPLASTIC NATURAL RUBBER COMPOSITE

A Thermoplastic Natural Rubber filled with Magnetite Composite was prepared by melt blending. For preparation of Pure TPNR, polypropylene (PP) and natural rubber (NR) in the percentage weight ratio of 70:30 and preparation of TPNR filled with Magnetite, the percentage weight ratio of 70% TPNR and 30% of Magnetite were used by using Rheo internal mixture. Pure TPNR is prepared as a control sample. Then, samples were hot pressed to form pellet samples. Dielectric constant (ε') and tangent loss (δ) are measured by using Network Vector Analyzer (NVA). The homogeneity samples was confirmed by using Thermogravimetric Analyser (TGA) PerkinElmer model in the temperature range of 25°C –700°C at a heating rate of 10°C min^{-1} in a nitrogen gas atmosphere with a purge rate of 20 mL min^{-1}. Dielectric constant and tangent loss were measured using Network Vector Analyzer at frequency range of 8-12GHz. TPNR filled with magnetite showed the higher dielectric constant compared to control sample. The frequency dependent dielectric constant shows the TPNR filled with Magnetite was higher than control sample. The tangent loss of control sample was higher compared to the sample TPNR filled with Magnetite. The value of loss tangent and dielectric constant were consistent with frequency 8-12 GHz. As a conclusion, the introduction of Magnetite into TPNR was increase in dielectric constant and decrease in loss tangent.

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