

## Electromagnetic shielding effectiveness of epoxy/lanthanum iron garnet (LIG) nanocomposites at Ku-band frequency

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### ABSTRACT

The effect of shielding materials on electromagnetic (EM) waves has been studied. This research was carried out to investigate the shielding effectiveness of Epoxy/ Lanthanum Iron Garnet (LIG) nanocomposite. Lanthanum (III) Oxide (La<sub>2</sub>O<sub>3</sub>) and Iron (III) Oxide (Fe<sub>2</sub>O<sub>3</sub>) was used to form Lanthanum Iron Garnet (LIG) as a shielding material. The Lanthanum Iron Garnet nanoparticle as a filler was prepared using solid-state reaction methods and was sintered at 900 °C. The X-ray diffraction (XRD) pattern of Lanthanum Iron Garnet was observed using an X-ray diffractometer (Rigaku Miniflex) at a diffraction angle of 20° to 80°. The functional group was obtained by using Fourier Transform Infrared Spectroscopy (FTIR). Different compositions of Lanthanum Iron Garnet fillers (5 wt% and 10 wt%) were prepared and dispersed in epoxy resin to form Epoxy/ Lanthanum Iron Garnet nanocomposites. The morphology of the composites was determined using Field Emission Scanning Electron Microscopy (FESEM) and the samples were found inhomogeneous and homogeneous with filler particle size are about 15.95 nm and 15.45 nm for 5 wt% and 10 wt%, respectively. The Vector Network Analyzer (VNA) was utilized to measure a transmission coefficient and reflection at Ku-band frequency (12 to 18 GHz) to determine the shielding effectiveness of composites. From the result, the total shielding effectiveness of Epoxy/Lanthanum Iron Garnet (epoxy/LIG) nanocomposite was increased as the percentage of filler increases.

### KEYWORDS

Electromagnetic; Lanthanum Iron garnet; Nanocomposite; Shielding effectiveness; Solid state method

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