

عنوان مقاله:

Electromagnetic Wave Absorption Properties of Barium Ferrite/Reduced Graphene Oxide Nanocomposites

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خلاصه مقاله:

Reduced graphene oxide (rGO) and M-type hexagonal ferrites such as $BaFe_{12}O_{19}$ have attracted great attention as electromagnetic (EM) wave absorbing materials in recent years. In this research, different weight percents of $BaFe_{12}O_{19}/rGO$ nanocomposites were incorporated into the microwave absorbing layers and their EM wave absorption was investigated. Barium ferrite was synthesized through the co-precipitation method. Graphene oxide (GO) was synthesized through the modified Hummers' method. The synthesized GO was reduced to rGO nanosheets using a reducing agent. The synthesized barium ferrite and rGO were then mechanically milled to form $BaFe_{12}O_{19}/rGO$ nanocomposite. The chemical bondings, phase analysis, magnetic properties, particle morphology, and EM wave absorbing properties were investigated using FTIR, XRD, Vibration Sample Magnetometer (VSM), FESEM, and Vector Network Analyzer (VNA), respectively. The saturation magnetization (M_s) and the coercivity (H_c) of the synthesized $BaFe_{12}O_{19}/rGO$ nanocomposite were 31 emu/g and 1.5 kOe , respectively. The EM absorption properties in the X-band ($8.2-12.4 \text{ GHz}$) showed that the maximum reflection loss (RL) of -7.39 dB could be obtained for the nanocomposite containing only 10 wt. \% of $BaFe_{12}O_{19}/rGO$ nanocomposite in a resin matrix with a thickness of 2 mm .

کلمات کلیدی:

Barium ferrite, Reduced graphene Oxide, Magnetic properties, electromagnetic wave absorption

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