

Aluminum Based Hexaferrite and Reduced Graphene Oxide a Suitable Microwave Absorber for Microwave Application

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Abstract : Extensive use of digital and smart communication creates prolong exposure of unwanted electromagnetic (EM) radiations. This harmful radiation creates not only malfunctioning of nearby electronic gadgets but also severely affects a human being. So, a suitable microwave absorbing material (MAM) becomes a necessary urge in the field of stealth and radar technology. Initially, Aluminum based hexa ferrite was prepared by sol-gel technique and for carbon derived composite was prepared by the simple one port chemical reduction method. Finally, composite films of Poly (Vinylidene) Fluoride (PVDF) are prepared by simple gel casting technique. Present work demands that aluminum-based hexaferrite phase conjugated with graphene in PVDF matrix becomes a suitable candidate both in commercially important X and Ku band. The structural and morphological nature was characterized by X-Ray diffraction (XRD), Field emission-scanning electron microscope (FESEM) and Raman spectra which confirms that 30-40 nm particles are well decorated over graphene sheet. Magnetic force microscopy (MFM) and conducting force microscopy (CFM) study further confirms the magnetic and conducting nature of composite. Finally, shielding effectiveness (SE) of the composite film was studied by using Vector network analyzer (VNA) both in X band and Ku band frequency range and found to be more than 30 dB and 40 dB, respectively. As prepared composite films are excellent microwave absorbers.

Keywords : carbon nanocomposite, microwave absorbing material, electromagnetic shielding, hexaferrite

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