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Insights on the Design of a Novel Multicomponent Microwave Absorber Based on $\text{SrFe}_{10}\text{Al}_2\text{O}_{19}$ and $\text{Ni}_{0.5}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4/\text{MWCNTs/polypyrrole}$

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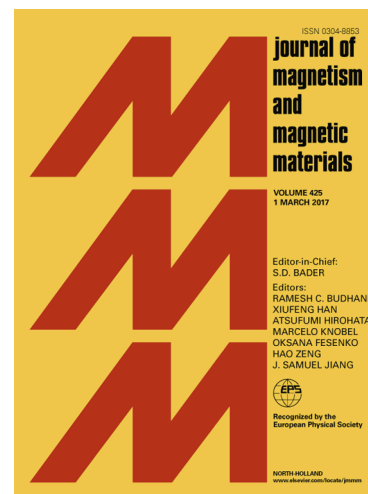
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Abstract

We present the preparation of a novel microwave absorber based on a combination of two ternary composites of $\text{SrFe}_{10}\text{Al}_2\text{O}_{19}$ /MWCNTs/polypyrrole and $\text{Ni}_{0.5}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$ /MWCNTs/polypyrrole. The hard and soft ferrites are prepared using the combustion method, while the polymer is deposited by in-situ polymerization method on the ferritic core. X-ray diffractometer (XRD), scanning electron microscopy (SEM), vibrating sample magnetometer (VSM) and vector network analysis (VNA) are used to perform microstructural, magnetic and electromagnetic characterization of the nanocomposite. The composite sown in polyester resin exhibits a minimum reflection loss of -34.5 dB at a matching thickness of 3 mm and with a bandwidth of 3.05 GHz. The results also indicate that the total EMI shielding SE_T in the current composite is mainly due to the contribution of the absorption component (SE_A) rather than the reflection one (SE_R).

Keywords: doped Sr-hexaferrite, MWCNTs, Lightweight microwave absorber, Spinel ferrite, Polypyrrole.

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