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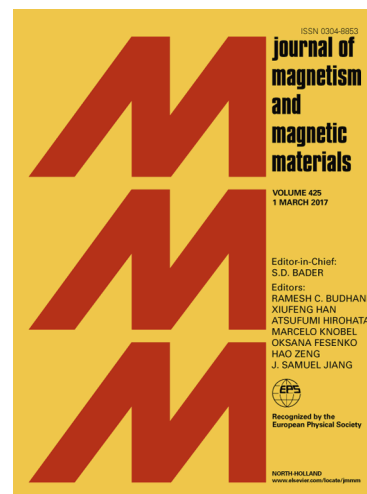
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# Broad-Band Microwave absorption of $\text{Sr}_{0.85}\text{La}_{0.15}(\text{MnZr})_x\text{Fe}_{12-2x}\text{O}_{19}$ Hexagonal Ferrite in 18-40 GHz frequency range

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## ABSTRACT

In this research, electro-magnetic (EM) absorption was investigated for M-type strontium hexaferrite with chemical composition,  $\text{Sr}_{0.85}\text{La}_{0.15}(\text{MnZr})_x\text{Fe}_{12-2x}\text{O}_{19}$  ( $x = 0, 0.25, 0.50, 0.75, 1.0$ ) at microwave frequencies. Complex permittivity ( $\epsilon' - j\epsilon''$ ) and complex permeability ( $\mu' - j\mu''$ ) was measured using transmission and reflection (T/R) based waveguide method in the K-band (18-26.5 GHz) and Ka-band (26.5-40GHz) frequency range. The variation of reflection loss (RL) with sample thickness, frequency and substitution has been analyzed. The matching thickness of the synthesized ferrite was successfully predicted from quarter-wavelength ( $\lambda/4$ ) mechanism which helps to optimize the minimum reflection loss (RL) in the material. In K-band, the minimum reflection loss (RL) of -47.8 dB was obtained for composition  $x = 1.0$  with -10 dB (90 %) bandwidth of 7.97 GHz and -20 dB (99 %) bandwidth of 5.6 GHz at sample thickness 1.1 mm. In Ka-band, the maximum absorption with minimum RL of -29.9 dB with -10 dB bandwidth of 8.72 GHz was obtained for composition  $x = 0.50$  at 0.85 mm sample thickness. These synthesized ferrites find application as thin sheet of microwave absorber with broad bandwidth for EMI (electromagnetic interference) shielding and radar camouflaging.

Keywords: K-Band; Ka-band; Millimeter wavelength; Strontium hexaferrite; Microwave absorption; back metal plate.

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