## DR02

# Effect of Lamination on Complex Permeability of Mn-Zn Ferrites in a Wide Frequency Range and its Application to Improvement of HFCT

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This paper studies the influence of different lamination configurations on the effective permeability for Mn-Zn ferrites, based on an analytical model. This model predicts that for an Mn-Zn ferrite core with small dimensions, the conventional two-layer lamination configuration as shown in Fig. 1(c) results in a permeability spectrum different from that of un-laminated core, but further increment of lamination number brings no pronounced change to the measurable complex permeability, no matter the number of lamination is four or ten. This prediction is in good agreement with the experimentally observed phenomenon [1-4]. Then, this model is adopted to study the effect of the conventional lamination configuration on permeability spectrum of larger cores, and the effect brought by a newly proposed lamination configuration as shown in Fig. 1(d). It is found that both the conventional and newly proposed lamination configurations produce significant change to permeability spectra, especially they can increase the effective permeability in the high frequency region where the core becomes more dissipative. The newly-proposed configuration has the advantage over traditional lamination configuration in low loss frequency region that it can retain relatively high permeability. It will show that if adopting the lamination techniques for the Mn-Zn ferrite cores, the sensitivity of high-frequency current transformer (HFCT) based on them can be effectively increased.

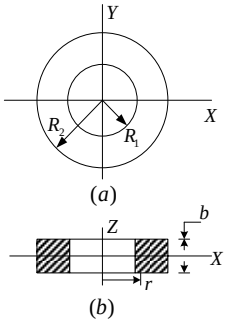


**Fig. 1.** Lamination technique.

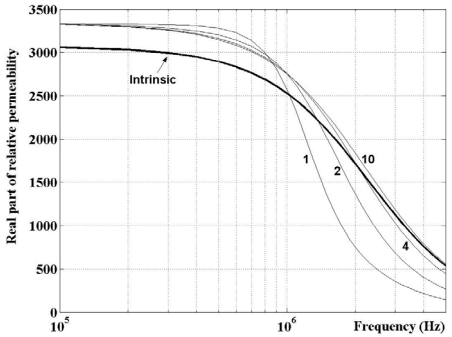


**Fig. 2.** Effect of lamination by technique Fig. 1(c).

Fig. 2 shows lamination effect on real part of complex permeability by conventional lamination technique as shown in Fig. 1(c). Figures about lamination technique as shown in Fig. 1(d) will be shown in detailed paper.

**REFERENCES**

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## DR03

# Preparation and Microwave Absorption Properties of M-type Ferrite Nanoparticles Composites

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Sol-gel method was used to prepare M-type $BaFe_{12}O_{19}$ ferrite nanoparticles. Result shows rod-like and flake-like ferrite nanoparticles can be successfully obtained by different heating process of dry gel. Electromagnetic parameters of the flake-like ferrite nanoparticles composites were measured at Ku waveband. In the meantime, composite filled with short carbon fiber was prepared in order to increase dielectric loss of ferrite nanoparticles composite. Reflectivity of these ferrite composites was calculated according to the measured complex permittivity and permeability, respectively. The result of prediction shows microwave absorption properties of ferrite nano-composites can be effectively improved by filling with short carbon fiber. Absorption bandwidth less than -10.0 dB of the composite is 1.4 GHz, which is from 12.7 GHz to 14.1 GHz. The method of preparation and design has potential impact on obtaining light weight and high performance absorption materials.

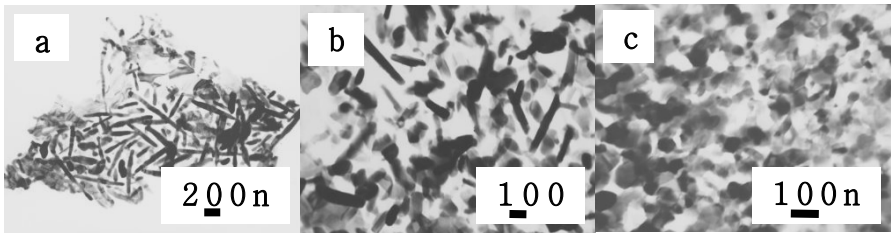


**Fig. 1.** TEM images of the sample.

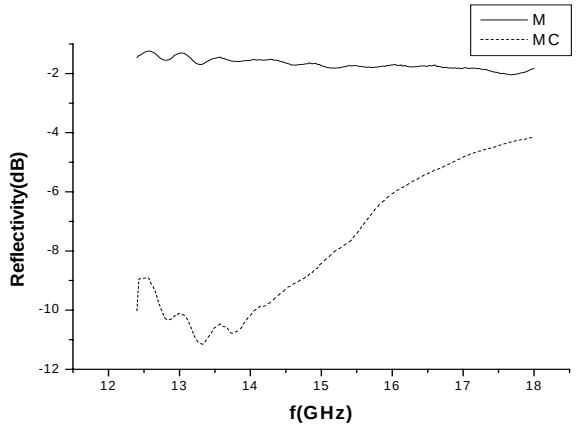


**Fig. 2.** Absorption curves of ferrite composite coatings.