

Effects of additives and sintering time on the microstructure of Ni-Zn ferrite and its electrical and magnetic properties

ABSTRACT

This work aims to investigate the relationship between the microstructure of Ni-Zn ferrite and its electrical and magnetic properties in the presence and absence of as small amounts as 0.12% of $0.4\text{CaO} + 0.8\text{SiO}_2$ over different sintering times. The X-ray diffraction pattern showed a single spinel phase formation in all the samples. The results indicate that grain growth occurred by increasing sintering time from 15 to 270 min in the two types of samples prepared in this study although it was greatly impeded by the additive oxides. Moreover, the oxides increase the resistivity of the ferrite and decrease its zinc loss. Magnetic properties such as induction magnetization (BS) and saturation magnetization (MS) decreased in the presence of the additives while its coercivity (HC) increased. Finally, the density of the samples was observed to increase with increasing sintering time in both types of the samples but with a higher value in the samples with no additives.

Keyword: Ni-Zn ferrites; Sintering time; Electrical and magnetic property; Microstructure; Additives; Ferrite