

**A COMPARATIVE STUDY OF MAGNETIC COLE-COLE LIKE PLOT AND DIELECTRIC COLE-COLE PLOT IN POLYCRYSTALLINE NICKEL ZINC FERRITE**

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**ABSTRACT**

Polycrystalline nickel zinc ferrite of composition Ni<sub>0.5</sub>Zn<sub>0.5</sub>Fe<sub>2</sub>O<sub>4</sub> has been synthesized by using the conventional ceramic technique. The dielectric constant  $\epsilon'$  and dielectric loss  $\epsilon''$  were found to increase as the sintering temperature increased and to decrease as the frequency increased. Meanwhile, the real part of magnetic permeability  $\mu'$  and the imaginary part  $\mu''$  showed dependence on the microstructure and frequency in a manner very similar to that shown by  $\epsilon'$  and  $\epsilon''$  above. A dielectric cole-cole diagram can be obtained by plotting the dielectric loss  $\epsilon''$  against the dielectric constant  $\epsilon'$ . The colecole diagram is generally used for studying the dielectric polarization characteristics by following the variation of dielectric loss  $\epsilon''$  with dielectric constant  $\epsilon'$ . From this work, it is possible to use magnetic cole-cole like plots to deduce magnetization polarization mechanisms associated with magnetic domain wall movement and magnetic spin rotation as it is possible to deduce interfacial polarization and dipolar polarization from dielectric cole-cole plots.

*Keywords: Zinc ferrite; dielectric*

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