

## **SYNTHESIS, MICROSTRUCTURE AND AC ELECTRICAL CONDUCTIVITY OF COPPER SUBSTITUTED NICKEL-ZINC FERRITES.**

Khe Cheng Seong, Jumiah Hassan, Mansor Hashim, W. Mohd. Daud W. Yusoff

*Department of Physics, Faculty of Science,*

*Universiti Putra Malaysia,*

*43400 UPM, Serdang, Selangor.*

### **ABSTRACT**

A series of nickel-zinc ferrites with composition  $\text{Cu}_x\text{Ni}_{0.3-x}\text{Zn}_{0.7}\text{Fe}_2\text{O}_4$ , with  $x=0.00, 0.05, 0.15$  and  $0.25$  have been synthesized via the solid state ceramic route in order to carry out ac electrical measurement. Formation of single phase spinel structure have been confirmed by using X-ray diffraction. Microstructural features of sintered samples were obtained with scanning electron microscope. The micrographs showed that increasing copper substitution in nickel-zinc ferrite increased grain growth. The bulk density of these samples also increased as the copper content increased. AC conductivity,  $\sigma_{ac}$  has been measured in the temperature range  $300\text{K} - 473\text{K}$  and frequency range  $10^3\text{Hz}$  to  $1\text{MHz}$  and discussed as a function of frequency and temperature. Analysis of the results shows that ac conductivity increases as the temperature of the sample and frequency of the applied ac electric field increase, but the dispersion of ac conductivity decreases with increasing the temperature for all the samples.

<http://journal.masshp.net/wp-content/uploads/Journal/2006/Khe%20Cheng%20Seong%20134-140.pdf>

### **REFERENCE**

- [1]. Abdeen A M (1998) *J. Magn. Magn. Mater.* **185**: 199
- [2]. A.K Joncher (1983) *Dielectric relaxation of solid*, Chelsea Dielectric Press Limited, London, pp 89.
- [3]. Elhiti M A (1996) *J. Magn. Magn. Mater.* **164**: 187
- [4]. Koops C G (1951) *Phys. Rev.* **83**: 121
- [5]. Pal M, Brahma P and Chakravorty D (1996) *J. Magn. Magn. Mater.* **152**: 367