سامية محمد مصطفى

شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

سامية محمد مصطفى

شبكة المعلومات الجامعية

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

سامية محمد مصطفى

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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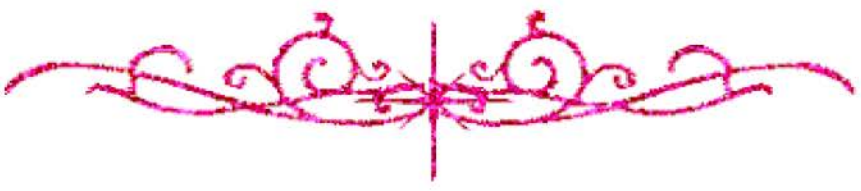

سامية محمد مصطفى

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بالرسالة صفحات لم ترد بالأصل

EFFECT OF ADDITIVES ON ELECTRIC PROPERTIES OF ZnO-VARISTORS

Presented By

Osama Amine Desouky

(M.Sc. 1994)

To

Chemistry Department
Faculty of Science
Cairo University

For the Degree of Ph.D of Science (Chemistry)

Faculty of Science
Cairo University
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APPROVAL SHEET FOR SUBMISSION

Title of (Ph.D.) Thesis:

Effect Of Additives On Electric Properties Of ZnO-Varistors

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ABSTRACT

ABSTRACT

Name: Osama Amine Mohamed Desouky
Title of thesis: Effect of additives on electric properties of ZnO-varistors
Degree: (Ph.D) Thesis, Faculty of Science, Cairo, University, 1999/2000

This work has been carried out to investigate the effect of additives on the electric properties of ZnO-varistors. ZnO-varistors are characterized by excellent non-linear properties in the voltage (V)-current (I) relationship, a major applications of ZnO varistors is for the protection of electric power distribution and transmission systems. The microstructure of Ce-doped ZnO ceramics, revealed the presence of a liquid phase between cerium oxide and ZnO. An interganular phase rich in cerium is made from this liquid, occurs at grain corners. The addition of 0.25 mol% of each CoO and Cr_2O_3 and/or 0.5 mol% Bi_2O_3 participated and increased the formation of this liquid phase as indicated by EDAX. Cerium was detected partly with in the ZnO grains and mainly in this intergranular phase together with ZnO alone and Cr_2O_3 and or Bi_2O_3. The liquid phase enhanced the preferential grain growth of the ZnO grains.

The study comprised the following:

1. Preparation of ZnO-bodies from the respective oxide.
2. Study of the effect of addition of cerium oxide in the range of (0.03-0.4) mol% to ZnO.
3. Study of the addition of Bi_2O_3, MnO_2, Al_2O_3, CoO, Cr_2O_3 to selected mix from the above, in order to improve the electrical properties of ZnO-varistors.
4. Determination of electrical properties.
5. Determination of micro-structure of some mixes.

Key words: Ceramics, electronic ceramics, semiconductors, varistors, electronic power distribution, transmission systems, non-linearity, breakdown voltage, dielectric constant, resistivity and conductivity.

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