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شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم



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شبكة المعلومات الجامعية



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



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بالرسالة صفحات لم ترد بالأصل



EFFECT OF ADDITIVES ON ELECTRIC PROPERTIES OF ZnO-VARISTORS

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To

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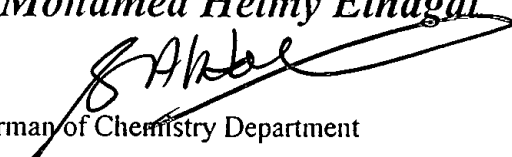
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ABSTRACT

ABSTRACT

Name: Osama Amine Mohamed Desouky

Title of thesis: Effect of additives on electric properties of ZnO-varistors

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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 intergranular phase rich in cerium is made from this liquid, occurs at grain corners. The addition of 0.25 mol% of each CoO and Cr₂O₃ and/or 0.5 mol% Bi₂O₃ 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 Cr₂O₃ and or Bi₂O₃. 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 Bi₂O₃, MnO₂, Al₂O₃, CoO, Cr₂O₃ 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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