3RD BRAZIL MRS MEETING

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SYMPOSIUM E:

PROGRESS ON DEVELOPMENT OF ELECTROCERAMIC MATERIAIS (Joint Symposium: IV Brazilian Symposium on Electroceramics)

Symposium Organizers:

Antonio Eduardo Martinelli (DEME-UFRN)

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responsible for the increase in the electrical conductivity observed in the LSM – Yttria Doped Ceria composites prepared previously. Samples were characterized by XRD, SEM and electrical conductivity measurements were carried out using four probe dc technique and impedance spectroscopy.

E - O007 INFLUENCE OF GRAIN SIZE OF POWDERS ON THE ELECTRICAL PROPERTIES OF SNO2 VARISTORS

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Varistors are polycrystalline ceramics of high density with no-ohmic properties that depend on typical grain boundary phenomena. The electrical properties are highly dependent on the resultant microstructure that is dependent on chemical composition, initial characteristic of the powder, sintering conditions and grain size of the powder. By means of seed grain method, calcined powders were prepared at 950°C for 3 and 10 h in order to optimize the electrical properties. In this way, the powders obtained presented grain size over 100μm. These powders were added in concentrations ranging from 10 to 30 weigh percent to the precursor composition with grain size under 6 μm, conformed and calcined at 1300°C for 3 h with heating rate of 10°C/min. The results demonstrate reduction in the breakdown voltage up to 650V for the sample with 10 weight percent of seed grains and lower reductions for other samples. The α values underwent strong reduction resulting in data between 8 and 11 and densities of 94.1 to 89.5%, respectively. The crystalline phases were characterized by XRD and quantified by Rietveld method. In this way was found that cassiterite is the primary phase with 97% and cobalt stannate is the secondary phase with 3%.

E - O008 INFLUENCE OF THE MECHANICAL AND ELECTRICAL STRESS ON THE MICROWAVE DIELECTRIC PROPERTIES IN FERROELECTRIC MATERIALS

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Electronic devices are always shrinking in space and time. For wireless communication applications, for example, new radar systems, broadcasting and television via satellites and multi-channel means of communication at microwave wavelength are at the present in great demand and are going to increase in the near future. In this work the microwave dielectric response of the lanthanum modified lead titanate (Pb1-xLaxTiO3) ferroelectric ceramics was investigated in the frequency range of 50MHz-2GHz at room temperature. The dielectric dispersion was obtained on unpoled and poled samples in the parallel and perpendicular direction to the dielectric measurement direction. The influence of the mechanical and electrical stress on the microwave dielectric properties was studied in the whole frequency range. The results revealed two dielectric anomalies, originated from apparently different but equal physical phenomena, which were related to an over-damped resonance mechanism.

E - O009 SYNTESIS AND CARACTERIZATION OF NANOCRYSTALLINE IN2O3 PRODUCED BY A MODIFIED SOL-GEL ROUTE

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In2O3 has attracted considerable attention over the last few years due to its high electrical conductivity and good optical transparency. It has been widely used in optoelectronic devices such as solar cells, liquid crystal displays and gas sensors. In particular, this oxide has shown remarkable potential applications in the upcoming nanoelectronic building blocks and nanosensors. Recently many reports have focused on semiconductor type CO sensors, and In2O3 was identified as a base semi-conducting oxide. Among the factors affecting the properties of In2O3 gas sensors, the microstructure of the sensitivity layer is one of the most important. It has been recognized that when the size of the In2O3 particles is very small, the sensitivity and selectivity to CO is significantly improved. On the other hand, nanosized In2O3 powder is difficult to obtain and often has a high degree of agglomeration. In this work In2O3 was synthesized by a modified sol-gel route. The gel obtained was studied by thermal analysis and Fourier transformed infrared spectroscopy to investigate the thermal decomposition and constitution of the gel. Calcined materials (from 440 to 900 0C for 30 min) were studied by small angle x ray scattering and X-ray powder diffraction to study the evolution of the particle size distribution and