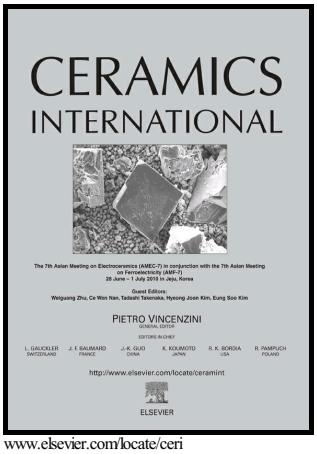

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MULTIFERROIC BEHAVIOR OF HETEROSTRUCTURES COMPOSED OF LANTHANUM AND BISMUTH FERRITE

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Abstract

Heterostructured thin films of lanthanum ferrite (LFO) and bismuth ferrite (BFO) with different thicknesses were successfully obtained by a soft chemical method. The films were deposited by spin-coating and annealed at 500°C for 2 h. The XRD pattern confirmed the purity of the thin films, where no additional peaks associated with impurity phases were present. The morphology analysis showed spherical grains with a random size distribution. The grain sizes increased with the number of BFO layers. The average grain size varied from 43 nm to 68 nm. The best dielectric results were obtained for the film with 6 LFO sublayers and 4 BFO top layers, in which the dielectric constant showed low dispersion. Since the capacitance-voltage curve for the film 6-LFO/4-BFO is symmetrical around null voltage, it can be inferred that this heterostructure has few mobile ions and accumulated charges on the film-substrate interface. In this film, polarization remains almost constant during 10^{12} cycles before the onset of degradation, which shows the very high resistance of the films to fatigue. Magnetoelectric coefficient measurements of the films revealed the formation of hysteresis loops, and a maximum value of 12V/cmOe was obtained for the magnetoelectric coefficient in the longitudinal direction; this value is much higher than that previously reported for pure BFO thin films.

Keywords: A. Films, C. Electrical properties, C. Magnetic properties, E. Functional applications.