The Ninth International Meeting on Ferroelectricity

Seoul, Korea
August 24 - 29, 1997

Abstracts

The Korean Physical Society

P-16-TH-188

PECULIARITIES OF STRUCTURE AND PROPERTIES OF $BaTiO_3$ WITH ALIOVALENT SUBSTITUTION AT A-SITE.

BELOUS A.G., VYUNOV O.I., YANCHEVSKY O.Z., KOVALENKO L.L. (Department of Solid State Chemistry, Institute of General and Inorganic Chemistry, 32-34 Palladin avenue, 252680 Kyiv 142, Ukraine)

The aim of the present work was the thermodynamic and experimental investigation of the formation of posistor properties in barium titanate in case of aliovalent substitution in A cation sublattice. Posistor ceramics were prepared by solid state reaction technique. The electro-physical properties of specimens were investigated by thermogravimetric, X-ray diffraction analysis, electron microscopy and resistivity measurements. The influence of ion radius values and concentrations of the aliovalent ions substituted for barium on formation and electro-physical properties of ceramics was investigated. Temperature dependences of specimens' resistivity at various voltages of applied electrical field were examined. The relationship between microstructure and electrical resistivity of the ceramics was also studied. The results of thermodynamic consideration were obtained to be in agreement with experimental data respect to influence of rare-earth ions on electro-physical properties of posistor materials.

P-16-TH-189

SOLID-PHASE EPITAXIAL GROWTH OF ORGANIC MATERIALS,* J. CHOI, M.D. AGGARWAL, W.S. WANG (Dept. of Physics, Alabama A&M Univ., Normal, Al, 35762, USA), BENJAMIN G. PENN, DONALD O. FRAZIER (NASA/Marshall Space Flight Center, Huntsville, Al, 35812, USA)

Solid phase epitaxy has been widely studied in III-V compound semiconductors. However, organic solid phase epitaxial growth is not reported even though there is a lot of interest for research in organic materials for nonlinear optical application. In the present paper, organic solid phase epitaxial growth is proposed to improve optical and mechanical properties of organic materials for device application. Benzil is used as a substrate which is thermally stable and relatively easy to grow in the form of a single crystal. In general, growth of organic single crystals is more difficult because of its lower thermal conductivity and supercooling tendency. Epitaxial growth of 2-methyl-4-nitroaniline(MNA) which has the largest value of the second-order susceptibility and another novel organic material, 2-dicyanovinylanisole (DIVA) is accomplished on the benzil substrate using thermal diffusion. Preliminary results show a lot of promise in this device system when tested with Nd:YAG laser. Details of the growth process and results of epitaxial growth will be presented.

* Work supported under NSF grant HRD9353548 and NASA grant NAGW-4078.

P-16-TH-190

SOLUTION DEPOSITION OF FERROELECTRIC AND ANTIFERROELECTRIC THIN LAYERS AND INTEGRATED DEVICES D. A. PAYNE (Dept. of Mat. Sci. & Engr., University of Illinois at Urbana-Champaign, Urbana, IL 61801, USA).

The solution deposition of ferroelectric and antiferroelectric thin layers (0.01 - 1 μm) from metallo organic precursors on a variety of substrate materials (Al_2O_3, MgO, . . .) including semiconductors (Si) is described. Details are reported for the spin-casting of partially hydrolyzed alkoxide precursors and the fabrication of integrated capacitors with capacitance densities greater than 200fF/μm^2. Characterization data are given for the thermal processing conditions, densification behavior, crystallization and interfacial stress development. Details are reported for a variety of materials including $Pb(Zr,Ti)O_3$, $BaTiO_3$ and $PbZrO_3$. Properties are given for integrated capacitors polarization reversal characteristics, antiferroelectric-ferroelectric switching and field-induced displacements. Differences between bulk values and thin layer characteristics; and the applicability to miniaturized ferroelectric and piezoelectric devices, is discussed.

P-17-TH-191

THE INFLUENCE OF $PbTiO_3$ CONTENT ON THE FIELD INDUCED PIEZOELECTRIC PROPERTIES OF $Pb(Mg_{1/3}Nb_{2/3})O_3$ CERAMICS, **W.R.XUE, P.W.LU (Nanjing University of Chemical Technology, Nanjing Jiangsu 210009 P.R.C.) and W. HUEBNER (University of Missouri at Rolla, Rolla, MO 65401 U. S. A.)** The field-induced electro-mechanical properies of $Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ ceramics were investigated by measuring k_p, k_t at differet induced electric field.The electromachanical coupling factors kt exhibit an increase from 40% to 54% with increasing of $PbTiO_3$ from 7mol% to 15mol%. But, the hysteresis loops show that the ferroelectric behavior of the compositions also increase with increasing of $PbTiO_3$ content.

THURSDAY