Sym. F : Ferroelectric Thin Films

CHEMICAL VAPOR DEPOSITION

A-TUE-19

CHARACTERIZATION OF SBT THIN FILMS DEPOSITED AT LOW TEMPERATURES BY PLASMA ENHANCED METALORGANIC CHEMCIAL VAPOR DEPOSITION Woong-Chul Shin, Nak-Jin Seong and Soon-Gil Yoon (Department of Materials Engineerin Chungnam National University g Daeduk Science Town, Taejon, 305-764 Korea.)

Ferroelectric bismuth-layer $SrBi_2Ta_2O_9$(SBT) thin films were prepared on 5"-Pt/Ti/SiO_2/Si and Si wafers by plasma-enhanced metalorganic chemcial vapor deposition. The films were crystallized at temperatures between 500 and 600℃. The dielectric constant and dissipation factor of SBT films were 320 and 0.04 at an applied frequency of 1Mhz, respectively. The remanent polarization(Pr) and the coercive field(Ec) obtained for a 200 nm thick $Sr_{0.9}Bi_{2.3}Ta_{2.0}O_9$ films deposited at 550℃ were 15 μC/cm^2 and 50 kV/cm at an applied voltage of 3V, repectively. The leakage current density was about 5.0×10^{-8} A/cm^2 at 300 kV/cm. The films showed fatigue-free characteristics up to 1.0×10^{11} switching cycles under 6V bipolar pulse.

A-TUE-20

STRUCTURAL AND FERROELECTRIC PROPERTIES OF $SrBi_2Ta_2O_9$ THIN FILMS BY MOCVD, HOON-SANG CHOI, DONG-SUK SHIN, IN-HOON CHOI (Dept. of Materials Science, Korea Univ., Seoul, 136-701, Korea)

$SrBi_2Ta_2O_9$(SBT) thin films were prepared on Pt/SiO_2/Si, SiO_2/Si and CeO_2/Si by metalorganic chemical vapor deposition(MOCVD), and their structural and electrical properties were investigated. The strontium tantalum ethoxide ($Sr(Ta(OC_2H_5)_6)_2$) and triphenylbismuth ($Bi(C_6H_5)_3$) were used as precursors to form SBT thin films. The $Sr(Ta(OC_2H_5)_6)_2$ and $Bi(C_6H_5)_3$ have a melting point of 130 ℃ and 78 ℃, respectively. SBT thin films were deposited at the range of 300~700 ℃ with the carrier gas of Ar. The crystallinities of SBT thin films were characterized by x-ray diffraction(XRD). The compositions of SBT thin films were analyzed by wavelength dispersive spectrometry(WDS). The results indicate that $Sr(Ta(OC_2H_5)_6)_2$ and $Bi(C_6H_5)_3$ precursors are suitable for preparing SBT thin films by MOCVD.

A-TUE-21

CHARACTERIZATION OF $Pb(Zr,Ti)O_3$ THIN FILM DEPOSITED BY MOCVD USING SOLID DELIVERY SYSTEM, J. C. SHIN, E. K. HONG, J. M. LEE, C. S. HWANG and H. J. KIM (School of Mat. Sci. Eng, Seoul Nat'l Univ., Seoul 151-742, Korea)

$Pb(Zr,Ti)O_3$(PZT) thin films have been widely applied for DRAM, FRAM and various sensors due to their high dielectric and ferroelectric properties. The solid delivery system, in which the mixture of the solid metal organic precursors was flash-sublimed into MOCVD growth chamber to obtain a reproducible transport of metal components to film growth surface, was used to deposit PZT thin films and to control their composition precisely. $Pb(TMHD)_2$, $Ti(OiPr)_2(TMHD)_2$, and $Zr(TMHD)_4$ solid precursors were chosen to deposit PZT thin films because it was found from differential scanning calorimetry and thermal gravimetric analysis that they did not produce any residue and were not deteriorated during deposition. The electrical properties of PZT thin films were strongly dependent on the substrate temperature, the mixing ratio of metal organic solid precursors, and the input rate of mixture, because the composition, microstructure, and preferred orientation of PZT thin films were changed with those process parameters.

Sym. D : Display Materials

ORGANIC ELD TECHNOLOGIES

B-TUE-01

TRANSIENT ELECTROLUMINESCENCE IN RUBRENE LIGHT-EMITTING DIODES: CHARGE ACCUMULATION, A. CHOWDHURY and A. J. PAL (Indian Association for the Cultivation of Science, Department of Solid State Physics, Jadavpur, Calcutta 700 032, India)

Light-emitting diodes have been fabricated using Langmuir-Blodgett (LB) films of organic dye Rubrene. Transient electroluminescence (EL) characteristics of the LEDs have been measured to study the transport mechanism in the LEDs. The transient measurements were performed by applying two subsequent rectangular voltage pulse. Both the pulses were separated by 30 microsec and had a width of 60 microsec. Each measurements were performed after a 5 minute interval. Application two consecutive pulses enabled us to study the effect of accumulated charges during the first pulse. On the other hand, the effect of injected charges from the electrodes was predominant during the second pulse. The EL from the LEDs were detected by a photomultiplier coupled with a storage oscilloscope.

During the first voltage pulse, the EL had two parts: an immediate high EL peak which decays exponentially and constant EL during rest of the first pulse. Only the constant EL part was observable without any sharp peak during the second voltage pulse

We will explain the sharp EL peak as due to accumulated charge carriers in the metal-semiconductor interfaces, which are exhausted during the second voltage pulse.