May 26 (Wed.)

Opening Remarks **Chair: T. Shiosaki (NAIST)** **10:25--10:30**

Ferroelectric Materials (I) **Chair: H. Osato (Nagoya Inst. of Tech.)** **10:30--12:00**

(26-F-1) Dynamic Behavior of Helical Structure in Ferroelectric Liquid Crystal

T. Katayama, H. Uehara*, H. Furue and J. Hatano (Tokyo Univ. and *Hachinohe Nat'l College of Tech.)

(26-F-2) Growth and Characterization of Lithium Niobate Films by LPE Method

T. Yagi, A. Kato, H. Umezawa, T. Shiraishi* and T. Nakazawa* (FDK Co. and *OITDA ·Fujitsu Ltd.)

(26-F-3) Appearance of ferroelectricity in $SrZrO_3/SrTiO_3$ artificial superlattices

T. Harigai, D. Tanaka, S. M. Nam, H. Kakemoto, S. Wada, T. Tsurumi and K. Saito* (T. I. Tech *Bruker AXS)

(26-F-4) Crystal Orientation Dependence on Electrical Properties of $Pb(Zr,Ti)O_3$ Thick Films Grown on Si Substrates by MOCVD

S. Okamoto, S. Yokoyama, Y. Honda, G. Asano, H. Funakubo and K. Saito* (Tokyo Inst. of Tech. and *Bruker AXS)

(26-F-5) Relationship Between Microstructural Evolution and Electrical Properties in $Ba(Ti,Zr)O_3$-Based Y5V Materials for Ni-MLCC

Y. Mizuno, K. Morita, T. Hagiwara, H. Kishi, K. Ohnuma and H. Ohsato* (TAIYO YUDEN Co., Ltd. and Nagoya Inst. of Tech.*)

(26-F-6) Elasticity Evaluation of Ferroelectric Domain Structure by UAFM

T. Tsuji*,**, H. Ogiso*, J. Akedo*, Y. Kawakami***, S. Saito**, K. Fukuda** and K. Yamanaka** (*AIST, **Tohoku Univ. and ***NEC Tokin)

Thin Films (I) **Chair: M. Noda (Osaka Univ.)** **13:15--14:45**

(26-T-1) Electrical Properties and Microstructure of PZT Films in situ Grown by Hybrid Processing: sol-gel Method and PLD

Z. J. Wang, R. Maeda*, H. Kokawa and M. Ichiki* (Tohoku Univ. and *AIST)

(26-T-2) Preparation and Properties of $Pb(Zn_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ Thin Films

H. Maiwa and N. Ichinose (Shonan I. T. and *Waseda Univ.)

(26-T-3) Fabrications of $Pb(Sc_{1/2}Nb_{1/2})O_3/xPbTiO_3$ Thin Films and Their Structural Characterizations

S. Asanuma, M. Fukunaga, Y. Uesu, R. Haumont*, B. Dkhil*, C. Malibert* and J.-M. Kiat* (Waseda Univ. and *SPMS, Ecole Centrale Paris)

(26-T-4) Structural Control of Self-assembled $PbTiO_3$ Islnads Prepared on $SrTiO_3$ and MgO by MOCVD

H. Nonomura, H. Fujisawa, M. Shimizu, H. Niu, K. Saito* and K. Honda** (Univ. of Hyogo, *Bruker AXS and **Fujitsu Lab. Ltd.)

(26-T-5) Electrical Properties and Structure Changes of CO_2 Laser Annealed $Pb(Zr,Ti)O_3$ Thick Films Directly Deposited on Stainless Steel Sheet by Aerosol Deposition Method

S. Baba and J. Akedo (AIST)

(26-T-6) Dielectric Characteristics of PLZT Films on Base-metal Foils for Embedded Power Electronic Systems

S.-H. Kim, J.-H. Yeom, D. Y. Kaufman*, S. K. Streiffer*, C. Y. Koo, J.-H. Cheon, and J. Ha (INOSTEK Inc. and *Argonne National Lab.)

Piezoelectric Materials (I) **Chair: T. Tsurumi (Tokyo Inst. of Tech.)** **15:00--16:15**

(26-P-1) Pressure Dependence of Piezoelectric Properties of $Pb(Zn_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ Binary System Single Crystal near a Morphotropic Phase Boundary

N. Yasuda, Y. Itoh, H. Ohwa, M. Masushita*, Y. Yamashita**, M. Iwata*** and Y. Ishibashi**** (Gifu Univ., Kawatetukougyou*, Toshiba**, Nagoya Inst. Tech. and ***Aichishukutoku Univ.****)

(26-P-2) High Dielectric Constant and Large Electromechanical Coupling Factor Relaxor-Based Piezoelectric Ceramics

Y. Yamashita and Y. Hosono (Toshiba Corp.)

(26-P-3) Processing and Properties of Low-Temperature Fabricated $Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbZrO_3$-$PbTiO_3$ Ceramics with $LiBiO_2$

T. Hayashi, T. Hasegawa, Y. Ootake and Y. Akiyama* (Shonan Inst. of Tech. and *R&D center, Ricoh Co., Ltd.)

(26-P-4) Piezoelectric PZT ceramics for High Power Electromechanical Application

S. Hayano, S. Takahashi*, M. Umeda**, Y.M atuo*** and T. Wada*** (Lead Techno, *Waseda Univ., **Nagaoka Nat'l Coll. of Tech. and ***Ryukoku Univ.)

(26-P-5) Bonding of PZT Ceramics with Si Single Crystals for Micro-Devices

K.Tanaka, M. Katsuda, T. Konishi, W. Kuze and S. Sugiyama (Ritsumeikan Univ.)

Thin Films (II) **Chair: S. Horita (JAIST)** **16:30--18:00**

(26-T-7) Analysis of PZT Thin Films for FRAM at Low and High Temperatures

N. Kin and K. Honda (Fujitsu Laboratories Ltd.)

(26-T-8) An Epitaxial Lead Titanate ($PbTiO_3$) Thin Film Deposited by a Hydrothermal Method

T. Morita and Y. Cho (RIEC Tohoku Univ..)

(26-T-9) Evaluation of electrical properties of PZT films substituted by rare earth ions

H. Nakaki*, H. Uchida*, S. Yokoyma**, H. Funakubo** and S.Koda* (Sophia Univ. and *Tokyo I. Tech.)

(26-T-10) Interface Effects of PZT Thin Films on Electrical Conduction Mechanisms

T. Nozaka and Y. Masuda (Hachinohe Inst. of Tech.)

(26-T-11) Electro-optical Properties and Structures of PLZT and PT films Prepared by Aerosol Deposition Method

M. Nakada, K. Ohashi and J. Akedo* (NEC Corp. and AIST.*)

(26-T-12) Ferroelectric Characteristics of $Pb(Zr,Ti)O_3$ Capacitor by Various Methods of PZT Thin Film Formation

K.-M. Lee, J.-E. Lim, B.-J. Bae, S.-D. Nam, K.-S. Park, C.-M. Lee, S.-O. Park, U.-I.. Chung, and J.-T. Moon (Samsung Electronics)

May 27 (Thu.)

Thin Films (III) **Chair: N. Fujimura (Osaka Pref. Univ.)** **9:00--10:15**

(27-T-13) PFM Observations of Switching Behavior in PZT Capacitors

H. Fujisawa, T. Yagi, M. Shimizu and H. Niu (Univ. of Hyogo)

(27-T-14) Fabrication of Ferroelectric Single-crystal Recording Media Using Polarization Controlled Wet Etching Method and Evaluation of Recording Characteristics

Y. Hiranaga and Y. Cho (Tohoku Univ.)

(27-T-15) Improvement in Homogeneity and Ferroelectric Property of Mist Deposition Derived PZT Thin Films by Substrate Surface-treatment

S. Kawasaki, S. Okamura, T. Shiosaki, S. Motoyama*, T. Tatsuta* and O. Tsuji* (NAIST and *SAMCO)

(27-T-16) Study of Polarization Properties in Random Oriented $Bi_{3.35}La_{0.85}Ti_3O_{12}$ Ferroelectric Thin Film Utilizing Piezoresponse Force Microscope(PFM)

S. Choi, I. Chung, S.-K. Hong*, S.-H. Oh*, K.-N. Lee*, and Y.-J. Park* (SungKyunKwan Univ. and *Hynix semiconductor Inc)

(27-T-17) Polarization Switching Mechanisms for Epitaxial and Polycrystalline Ferroelectric PZT Films

Y. W. So, T. W. Noh, Jong-Gul Yoon* and T. K. Song** (Seoul Nat'l Univ., *Suwon Univ. and **Changwon Nat'l Univ.)

Thin Films (IV) **Chair: K. Kato (NIMS)** **10:30--12:00**

(27-T-18) Selective Deposition Technique of Ferroelectric Thin Films Using Liquid Source Misted Chemical Deposition

A.Takakuwa and T,Shimoda (SEIKO EPSON CORPORATION)

(27-T-19) Fabrication and Characterization of $(Bi,Nd)_4(Ti,Ge)_3O_{12}$ Thin Films by Chemical Solution Deposition Process

W. Sakamoto, Y. Mizutani, N. Iizawa*, T. Yogo, T. Hayashi* and S. Hirano (Nagoya Univ. and *Shonan Inst. of Tech.)

(27-T-20) Fabrication of Silicon Doped Bismuth Titanate Thin Films

M. Yamaguchi and Y. Masuda* (Shibaura Inst. of Tech. and *Hachinohe Inst. of Tech.)

(27-T-21) Preparation of m=1-2 series natural-superlattice-structured BLSF Thin films

A. Shibuya, M. Noda, M. Okuyama and K. Saito (Osaka Univ. and *BRUKER AXS)

(27-T-22) Synthesis and Evaluation of $Bi(Fe_xAl_{1-x})O_3$ Thin Films by Pulsed Laser Deposition Method

M. Okada, T. Yoshimura and N. Fujimura (Osaka Pref. Univ.)

(27-T-23) Heteroepitaxial Growth and Ferroelectricity of $Bi_{3.25}La_{0.75}Ti_3O_{12}$ Films on n-GaN/Al_2O_3(0001) Substrates Prepared by Pulsed Laser Deposition

C.-R. Cho, J.-P. Kim, J.-Y. Hwang, S.-Y. Jeong* and B.-H. Park** (Korea Basic Science Inst., *Pusan Nat'l Univ. and **Konkuk Univ.)

Ferroelectric Materials (II) **Chair: T. Shiosaki (NAIST)** **13:15--14:45**

(27-F-7) Polarization properties of $Bi_4Ti_3O_{12}$-$BaBi_4Ti_4O_{15}$ single crystals

T. Kobayashi*, Y. Noguchi*,** and M. Miyayama* (*IIS, The Univ. of Tokyo and **PRESTO, JST)

(27-F-8) Dielectric Properties and Aging of CaO-Doped $0.9Pb(Mg_{1/3}Nb_{2/3})O_3$-$0.1PbTiO_3$

C. Feng and W. Yoo (Chinese Academy of Sci.)

(27-F-9) High Dielectric Tunability of (Ba, Sr)TiO_3 Thin Films and Their CPW Phase Shifter Applications

S.-J. Lee, S. E. Moon, M.-H. Kwak, H.-C. Ryu, Y.-T. Kim and K.-Y. Kang (ETRI)

(27-F-10) Substitution Mechanism of ZnO-doped Lithium Niobate Crystal Determined by Power x-ray Diffraction and Coercive Field

C.-T. Chia, M. L. Hu*, L. J. Hu**, J. Y. Chang*** and W. S. Tse**** (Nat'l Taiwan Normal Univ., *Tera Xtal Technology Corp., **Nat'l Central Univ. ***Chung-Shan Inst. of Sci. and Tech. and ****Academia Sinica)

(27-F-11) Structure and Electrical Properties of Lead-Free $(Na_{0.5}K_{0.5})NbO_3$ -$BaTiO_3$ Ceramics

Y. Guo, K. Kakimoto and H. Ohsato (Nagoya Inst. of Tech.)

(27-F-12) Optical and Electrical Studies on Trivalent Ions (Cr,Fe) Doped KTP Single Crystals

C. V. Kannan, H. Kimura, A. Miyazaki and P. Ramasamy* (Nims and *Anna Univ.)

Thin Films (V) **Chair: H. Maiwa (Shonan Inst. of Tech.)** **15:00--16:00**

(27-T-24) Grain Size Effect on Dielectric and Piezoelectric Properties of Alkoxy-derived $BaTiO_3$-based Thin Films

K. Tanaka, K. Suzuki, D. Fu, K. Nishizawa, T. Miki and K. Kato (AIST)

(27-T-25) Structural and Ferroelectric Properties of $Ba_2NaNb_5O_{15}$ Thin Films on La-doped $SrTiO_3$ Substrate

T. Kamei, T. Higuchi, M. Sogawa, T. Tsukamoto and Y. Masuda* (Tokyo Univ. of Sci. and *Hachinohe Inst. of Tech.)

(27-T-26) Fabrication of $KNbO_3$ Epitaxial Thin Films on Sapphire Substrates

T. Higuchi, T. Aoyama, S. Iwashita and T. Shimoda (SEIKO EPSON)

(27-T-27) Preparation of high-density (K,Na)NbO_3 ceramics by SPS and deposition of their thin films by PLD

T. Saito, T. Wada, H. Adachi* and I. Kanno** (Ryukoku Univ., *Matsushita Electric Ind. Co. Ltd. and **Kyoto Univ.)

Invited Lecture **Chair: M. Shimizu (Himeji Inst. of Tech.)** **16:15--16:45**

(27-I-1) Scanning Probe Microscopy Progress Nanoscale Ferroelectrics

A. Gruverman (North Carolina State Univ.)

Special Lecture **Chair: Y. Ishibashi (Aichi Syukutoku Univ.)** **16:45--17:45**

(27-S-1) The Present Condition of Multi Layer Ceramic Capacitor Development, and a Future View

T. Nomura (TDK)

May 28 (Fri.) Parallel session (Room 202)

Piezoelectric Materials (II) **Chair: T. Takenaka (Tokyo Univ. of Sci.)** **9:00--10:15**

(28-P-6) Growth and Characterization of Transparent SrB_4O_7 Single Crystal

H. Kawano, R. Komatsu and K. Ikeda (Yamaguchi Univ.)

(28-P-7) Evaluation of Material Constants in Lanthanum Calcium Oxoborate $LaCa_4O(BO_3)_3$ crystals

H. Shimizu, K. Kodama, H. Takeda, T. Nishida, T. Shikita*, S. Okamura and T. Shiosaki (NAIST and *Sakai Chemical Industry Co.,Ltd.)

(28-P-8) Piezoelectric Properties of $Ca_3NbGa_3Si_2O_{14}$ Single Crystals

T. Karaki, R. Sato and M. Adachi (Toyama Pref. Univ.)

(28-P-9) Effect of Electric Field on Piezoelectric Properties of $KNbO_3$ Single Crystal Grown by Vertical Bridgman Method

K. Kudo, K. Kakiuchi, K. Mizutani*, Y. Aoki*, K. Hoshikawa* and T. Fukami* (Precision Tech. Research Inst. of Nagano Prefecture and *Shinshu Univ.)

(28-P-10) Crystal Growth and Characterization of $Pb_2KNb_5O_{15}$

H. Kimura, K. Maiwa, A. MIiyazaki, H. Nakamura, Z. X. Cheng and C. V. Kannan (MEL and NIMS)

Piezoelectric Materials (III) **Chair: Y. Yamashita (Toshiba)** **10:30--12:00**

(28-P-11) Solid-Solution Structure and Piezoelectric Property of $KNbO_3$ Ceramics Doped with Small Amounts of Elements

K. Kakimoto, I. Masuda and H. Ohsato (Nagoya Inst. of Tech.)

(28-P-12) Piezoelectric properties of $BaTiO_3$-$(Bi_{1/2}K_{1/2})TiO_3$ ferroelectric ceramics

Y. Hiruma, K. Terada, H. Nagata and T. Takenaka (Tokyo Univ. of Sci.)

(28-P-13) Effects of Bi Deficiency on Piezoelectric Properties of $(Bi_{0.5-x}Na_{0.5}TiO_3)_{0.94}(BaTiO_3)_{0.06}$ Ceramics

J. Abe, M. Kobune, T. Yazawa, Y. Nakai* and S. Osaka* (Univ. of Hyogo and *Kyocera Co.)

(28-P-14) Enhanced Piezoelectric Properties of Potassium Niobate Single Crystals by Domain Engineering

S. Wada, K. Muraoka, H. Kakemoto, T. Tsurumi and H. Kumagai* (Tokyo Tech. and *Asahi Techno Glass)

(28-P-15) Influence of A/B Site Ratio on Pizoelectric Properties of (K, Na, Pb)NbO_3 Ceramics

S. Tashiro and K. Nagata (Nat'l Defense Academy)

(28-P-16) Electric Field-induced Strain in Piezoelectric Ceramics $(Na_{0.5K0.5})NbO_3$-$PbTiO_3$

R. Wang, T. Sekiya*, R.-J. Xie*, M. Uchida* and M. Itoh** (AIST, *NIMS and **TIT)

Microwave Materials **Chair: A. Ando (Murata Mfg. Co.)** **13:15--14:45**

(28-M-1) Preparation of Decoupling Thin Film Multilayer and Single Layer High-Frequency $(Ba,Sr)TiO_3$ Capacitors on Al_2O_3 Ceramic Substrates

I.. P. Koutsaroff, A. C.-Lawry, T. Bernacki, M. Zelner, P. Woo, A. Patel, A. Kassam, L. Woodward, T. Jimbo* and K. Suu* (Gennum Co. and *ULVAC Inc.)

(28-M-2) Effect of Stacking Layers on the Microwave Dielectric Properties of $CaTiO_3/(Li_{1/2}Sm_{1/2})TiO_3$ Multilayered Thin Films

B. D. Lee, H. R. Lee and K. H. Yoon (Yonsei Univ.)

(28-M-3) A K-band Distributed Analog Phase Shifter Using Etched $Ba_{0.6}Sr_{0.4}TiO_3$ Thin Films

H.-C. Ryu, S. E. Moon, S.-J. Lee, M.-H. Kwak, Y.-T. Kim and K.-Y. Kang (ETRI)

(28-M-4) Microwave Dielectric Anisotropy of Textured $Ba_4Nd_{9.33}Ti_{18}O_{54}$ Ceramics Fabricated by TGG

K. Wada, K. Kakimoto and H. Ohsato (Nagoya Inst. of Tech.)

(28-M-5) Microwave Absorber Properties of Dielectric and Magnetic Composite Material

Y. J .An, T. Miura, H. Okino and T. Yamamoto (Nat'l Defense Academy)

(28-M-6) On the Dielectric Property of High Permittivity Material in Microwave Region

K. Wakino, S. Kumagai, T. Shiraishi, T. Kitazawa, F. Takashi and A. Andoh (Ritsumeikann Univ. and Murata Mfg. Co., Ltd.)

Thin Films (VI) **Chair: H. Nozawa (Kyoto Univ.)** **15:00--16:00**

(28-T-28) Effect of Back-Etching on Residua Stress in Lead Titanate Thin Films on Si wafer deposited by Chemical Solution Deposition

T. Ohno, Y. Hoshi, H. Suzuki, H. Masui* and K. Isikawa** (Shizuoka Univ., *Shizuoka Industrial Res. Inst. of Shizuoka Pref. and **Yokkaichi Univ.)

(28-T-29) Dielectric Properties of $BaTiO_3$ Thin Films Derived from the Clear Solution of Well-dispersed Nano-sized $BaTiO_3$ Particles

Y. Yamashita, H. Yamamoto and Y. Sakabe (Murata Manufacturing Co., Ltd.)

(28-T-30) Low Temperature Growth of PLD-$YMnO_3$ with Squre Hysteresis Loop

N. Shigemitu, H. Sakata, T. Yoshimura and N. Fujimura (Osaka Pref. Univ.)

(28-T-31) Investigation of Ru/TiN Bottom Electrodes Prepared by Chemical Vapor Deposition

S. Y. Kang, C. S. Hwang and H. J. Kim (Seoul Nat'l Univ.)

Thin Films (VII) **Chair: H. Tabata (Osaka Univ.)** **16:15--17:15**

(28-T-32) Fabrication and Electric Properties of $Pt/SrBi_2Ta_2O_9/Hf$-Al-O/Si MFIS-FETs

S. Sakai, R. Ilangovan. and M. Takahashi (AIST)

(28-T-33) Investigation of AlO_xN_y Thin Films Prepared By UV Assisted Atomic Layer Deposition

D. Eom, S. Y. No, C. S. Hwang and H. J. Kim (Seoul Nat'l Univ.)

(28-T-34) Improvement of Dielectric Properties through the Laser Treatment in Ultra-Thin TiO_2 Films Grown by Plasma-Enhanced Atomic Layer Deposition

J.-H. Kim, K.-J. Choi, W.-J. Lee* and S.-G. Yoon (Chungnam Nat'l Univ. and *Dong-Eui Univ.)

(28-T-35) The Effect of Substrate Bias Voltage on the Electrical Properties of ZnO:Al Thin Film

D. J. Kwak, K. I. Park, B. S. Kim, M. W Park*, S. J. Lee* and S. H Lee (Kyungsung Univ. and *Kyungsung Univ.)

May 28 (Fri.) Parallel session (Room 201)

Fundamentals (I) **Chair: M. Iwata (Nagoya Inst. of Tech.)** **9:00--10:15**

(28-B-1) Relaxor-like Properties and Anomalous Phase Boundaries in KDP-Type Mixed Crystals

Gifu Univ. (E. Matsushita and Y. Shinkai)

(28-B-2) Relaxor Superlattices and Monte-Carlo study for Simulation of Phase Transition on $A(B'^{4+}{}_{x}B''^{4+}{}_{1-x})O_3$

Y. Hotta, A. Doi, T. Kawai and H. Tabata (Osaka Univ.)

(28-B-3) Anomalous Photoconductivity in Bismuth-layer-structured Ferrelectrics

M. Osada and M. Kakihana* (AML, NIMS and *TIT)

(28-B-4) Theoretical Study of Atomic Relaxation in 90^0 Domain Walls of Ferroelectric Perovskite Films

Y. Ishibashi, D. Ricinschi* and M. Okuyama* (Aichi Shukutoku Univ. and *Osaka Univ.)

(28-B-5) Dielectric Characteristics of Ferroelectric Materials in Sub-millimeter Regions

T. Fujii and A. Ando (Murata Mfg. Co.,Ltd.)

Fundamentals (II) **Chair: Y. Uesu (Waseda Univ.)** **10:30--12:00**

(28-B-6) Total Energy Surfaces of Ferroelectric Perovskites $BaTiO_3$, $KNbO_3$, $PbTiO_3$

T. Hashimoto*,**, T. Nishimatsu*, H. Mizuseki*, Y. Kawazoe*, A. Sasaki** and Y. Ikeda** (*IMR Tohoku Univ. and **NEC TOKIN)

(28-B-7) Distinctive Charge Density Distributions of Perovskite-Type Antiferroelectric Oxides Containing Pb Atoms

Y. Kuroiwa, H. Fujiwara, A. Sawada, S. Aoyagi*, E. Nishibori*, M. Sakata*, M. Takata**, H. Kawaji*** and T. Atake*** (Okayama Univ., *Nagoya Univ., **JASRI and ***Tokyo Inst. of Tech.)

(28-B-8) Domain Observation in $Pb(Zn_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ Mixed Crystals by Scanning Probe Microscopy II

M. Iwata, S. Tachizaki, K. Katsuraya, J. Hlinka*, M. Maeda, S. Suzuki, N. Yasuda** and Y. Ishibashi*** (Nagoya Inst., *Inst. Phys. ASCR, **Gifu Univ. and ***Aichi Shukutoku Univ.)

(28-B-9) Cooling-Rate-Dependent Domain Structures of $Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$ Single Crystals Observed by Contact Resonance Piezoresponse Force Microscopy

H. Okino, J. Sakamoto and T. Yamamoto (National Defense Academy)

(28-B-10) X-ray Topography on $BaTiO_3$ Crystals

Y. Yoneda, J. Mizuki, Y. Kohmura*, Y. Suzuki**, S. Hamazaki*** and M. Takashige**** (JAERI, *RIKEN, **JASRI, ***Fukushima National College of Technology and ****Iwaki-Meisei Univ.)

(28-B-11) Order-disorder Nature of Ferroelectric $BaTi_2O_5$ Single Crystals

A. Hushur, H. Shigematsu*, Y. Akishige* and S. Kojima (Tsukuba Univ. and *Shimane Univ.)

Fundamentals and Optical Applications **Chair: S. Kojima (Tsukuba Univ.)** **13:15--14:45**

(28-E-1) Ozone Generation and Electrical Characteristic of a Silent Discharge Chamber According to the Kind of a Dielectric Materials

S. H. Lee, B. S. Kim, K. I. Park, S. W. Lee, J. Y. Seok* and D. J. Kwak (Kyungsung Univ. and *Kyungpook Univ.)

(28-E-2) A Simple Analytical Approach for Ferroelectric Hysteresis under Arbitrary Electric Field History

C. H. Tsang, C. K. Wong and F. G. Shin (The Hong Kong Polytechnic Univ.)

(28-E-3) Maximum Transient Diffraction Efficiency from a Steady-State Grating in a $BaTiO_3$ Crystal

S. M. Sharif and K. Ogusu (Shizuoka Univ.)

(28-E-4) Pump-probe Study of E(TO) Polariton of Zn-doped $LiNbO_3$

C.-C. Lee, Y.-M. Chang*, M. L. Sun and C.-T. Chia (Nat'l Taiwan Normal Univ. and *Nat'l Taiwan Univ.)

(28-E-5) Estimation of Formation Energy of Point Defects in $NaNbO_3$ by First Principles Calculation

A. Shigemi and T. Wada (Ryukoku Univ.)

(28-E-6) Electronic Band Structures of Bismuth Titanate Based Ferroelectrics

T. Goto*, M. Takahashi*, M. Soga*, Y. Noguchi*,** and M. Miyayama* (*IIS, The Univ. of Tokyo and **PRESTO, JST)

Piezoelectric Materials (IV) **Chair: M. Adachi (Toyama Pref. Univ.)** **15:00--16:00**

(28-P-17) Study about thickness extensional vibration mode of Bi Layer Structured Feroelectrics

Y.Sugaya, E.Okuno*, K.Shoji* and K.Sakata** (Toko Inc., *Ashikaga Inst. of Tech. and **Tokyo Univ. of Sci.)

(28-P-18) Crysatal Oriented $Bi_4Ti_3O_{12}$ Ceramics Made by High Magnetic Field Method

Y. Y. Doshida, K. Tsuzuku, H. Kishi, A. Makiya*, S. Tanaka*, K. Uematsu* and T. Kimura** (Taiyo Yuden Co.,Ltd., *Nagaoka U. Tech. and **Tokyo Met.Univ.)

(28-P-19) The Piezoelectric Characteristics of Polymer Film Oriented under a Strong Magnetic Field

T. Nakiri*,**, M. Ishizuka***, T. Okamoto****, M. Date*****, T. Uematsu*, E. Fukada***** and Y. Tajitsu* (*Kansai Univ., **Kansai Tech., ***Sumitomo Heavy Ind., ****Sumitomo Chem. and *****Kobayashi Phys. Inst.)

(28-P-20) Preparation of Optically Transparent Strontium Calcium Sodium Niobate Piezoelectric Ceramics

R.-J. Xie, N. Hirosaki, R.-P. Wang* and Y. Akimune* (NIMS and *AIST)

Piezoelectric Applications **Chair: Y. Tomikawa (Yamagata Univ.)** **16:15--17:15**

(28-A-1) Director Orientation Measurement of Nematic Liquid Crystal Using Propagation Velocity Change of Shear Horizontal Wave

H. Moritake, J. Kim, K. Toda and K. Yoshino* (Nat'l Defense Academy and *Osaka Univ.)

(28-A-2) Preparation of $Ba(Ti,Zr)O_3$ Thick Film Micro Actuator on Silicon Substrates by Screen Printing

Y. Sakai, T. Futakuchi, T. Iijima* and M. Adachi** (Toyama Industrial Technology Center, *AIST and **Toyama Prefectural Univ.)

(28-A-3) Electromechanical Property Map of Pb-based Films for Microsystems

S.-H. Kim, C. Y. Koo, J.-H. Cheon, J.-H. Yeom and J. Ha (INOSTEK Inc.)

(28-A-4) Fabrication of Piezoelectric and Ferroelectric Single Crystals without Melting Step

J.-B. Lee, T.-M. Heo, D.-H. Kim and H.-Y. Lee* (Ceracomp Co., Ltd. and *Sunmoon Univ.)

Tutorial **Chair: M. Okuyama (Osaka Univ.)** **17:30--18:30**

(28-TU-1) Photonics Crystal and Fractal

M. Takeda (Sinshu Univ.)

May 29 (Sat.)

Piezoelectric Applications (II) **Chair: S. Takahashi (Waseda Univ.)** **9:00--10:15**

(29-A-5) Designing a Radial Mode Laminated Piezoelectric Transformer for High Power Applications

P. Laoratanakul, S. Manuspiya* and K. Uchino* (MTEC and *ICAT Pennsylvania State Univ.)

(29-A-6) Ultra Sonic Motor by two Independnt Vibrations with each other

T. Muneishi*,** and Y. Tomikawa** (*Kyocera corp. and **Yamagata Univ.)

(29-A-7) Piezoelectric Microactuators for Magnetic Disc Drives

K. Kurihara, M. Hida, S. Umemiya and S. Koganezawa* (Fujitsu Labo. Ltd. and *Fujitsu Ltd.)

(29-A-8) Vibration Analysis and Experimental Study of Tactile Sensor with Longitudinal Resonator integrated with Force Sensor of Frequency Change Type

S. Kudo (Ishinomaki Senshu Univ.)

(29-A-9) Dielectric Barrier Discharge Type Plasma Reactor Using a Piezoelectric Transformer

K. Teranishi, S. Suzuki and H. Itoh (Chiba Inst. of Tech.)

Thin Films (VIII) **Chair: T. Nakamura (Rohm)** **10:30--12:00**

(29-T-36) Structural Analyses of SBT and BLT Annealed in Vacuum by Raman Spectroscopy and XRD

N. tatsumi, S. Tamai, Y. Maeda and H. Nozawa (Kyoto Univ. Dept. of Energy Sci. & Tech.)

(29-T-37) Structural Phase Transformation and Grain Growth in $SrBi_2Ta_2O_9$ Thin Film

A. Kohno, H. Sakamoto and K. Matuo (Fukuoka Univ.)

(29-T-38) Ferroelectric Properties of $Bi_4Ti_3O_{12}$ Thin Films Prepared on TiO_2 Anataze

T.Higuchi, M. Nakamura, Y. Hachisu and T. Tsukamoto (Tokyo Univ. of Sci.)

(29-T-39) Piezoelectric Property Investigation on Polar-axis-oriented Ferroelectric $Bi_{4-x}Pr_xTi_3O_{12}$ Thick Films

H. Matsuda, S. Ito, T. Iijima, T. Mashimo*, H. Okino* and T. Yamamoto* (AIST and *Nat'l Defense Academy)

(29-T-40) Phase Formations and Electrical Properties of $Bi_{0.85}La_{3.15}Ti_3O_{12}$ and Sm-Doped $Bi_{0.85}La_{3.15}Ti_3O_{12}$ Thin Films With Annealing Temperature

S.-O. Ryu, N.-Y.l Lee, W.-J. Lee* and S.-G. Yoon** (ETRI, *Dong-Eui Univ. and **Chungnam Nat'l Univ.)

(29-T-41) Ferroelectric Properties of Mn-doped $Bi_{3.6}La_{0.4}Ti_3O_{12}$ Thin Films with Annealing Conditions

J.-P. Kim, J.-Y. Hwang, C.-R. Cho, M.-K. Ryu*, M.-S. Jang*, and S.-Y. Jeong* (Korea Basic Sci. Inst. and *Pusan Nat'l Univ.)

Closing Remarks **Chair: T. Shiosaki (NAIST)** **12:00--12:05**