
Ferroelectricity Newsletter

A quarterly update on what's happening in the field of ferroelectricity

Volume 11, Number 1

Winter 2003

CONFERENCE ORGANIZERS REALIZE THE IMPORTANCE OF A SOLID EDUCATION FOR THE NEXT GENERATION OF SCIENTISTS AND ENGINEERS

The state of education in a given community is often seen as the barometer of its current strength and vitality, as well as of the long-term outlook for its continuous health.

Therefore it comes as no surprise that the brightest people in the ferroelectrics community use quite a bit of their time and influence to make sure that the next generation of scientists and engineers in this field is well prepared to follow in the footsteps of today's innovators.

In this context we want to refer you to Prof. L. Eric Cross's article "Changing conditions for younger scientists entering the ferroelectric field," published in *Ferroelectricity Newsletter*, Vol. 7, No. 1, Winter 1999, p. 2f., which analyzes conditions and suggests solutions.

The **Fifth European Conference on Applications of Polar Dielectrics** (ECAPD-V) was held in August 2000 in Jurmala, Latvia. Of the 80 participants, the European Commission sponsored the attendance of 21 young European researchers. For a list of papers presented at ECAPD-V, please turn to page 2 of this issue.

The other meeting highlighted in this issue is the **Second Ferroelectric Workshop in Puerto Rico** (FWPR-2001) in June 2001. As with the first workshop in 1999, covered in the Spring 2001 issue of *Ferroelectricity Newsletter*, the purpose was to provide a forum for exchange of scientific ideas and technological information on processing and applications of ferroelectric materials. The guest editors of the proceedings noted in their editorial that participants, other than presenters, included a group of local graduate students. Please see pages 6 and 7 for more information about FWPR-2001.

One of the key ferroelectrics meetings of the year is the **10th European Meeting on Ferroelectricity (EMF2003)**, to be held 3-8 August in Cambridge, UK. Announcing EMF2003, Prof. Jim Scott says, "We especially hope that the low cost of student registration, together with the availability of cheap airline fares to London Stansted will enable a large number of students to be part of this important meeting."

Rudolf Panholzer
Editor-in-Chief

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Ferroelectricity Newsletter

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Please visit our website:
<http://www.sp.nps.navy.mil/projects/ferro/ferro.html>

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ECAPD-V PAPERS

THE FIFTH EUROPEAN CONFERENCE ON APPLICATIONS OF POLAR DIELECTRICS (ECAPD-V)

The Fifth European Conference on Applications of Polar Dielectrics was held in Jurmala, Latvia, from 28-30 August, 2000. The proceedings of this conference are published in Volumes 257 and 258 (2001) of the international journal *Ferroelectrics*. In their editorial the guest editors, **Andris Krumins**, **Inta Muzikante**, and **Vismants Zauls**, state that the purpose of the conference is to support exchange of scientific information on device properties of polar dielectrics and to discuss advancements made in the preparation and application of polar dielectric materials.

Eighty participants from Europe (Germany, France, Finland, Italy, Portugal, the Czech Republic, Estonia, Hungary, Israel, Latvia, Lithuania, Poland, and Slovenia), Japan, Korea, USA, and Brazil presented their newest research in oral and poster sessions.

The backbone of ECAPD-V was a series of plenary lectures focusing on areas of strong and emerging interest: Compact piezoelectric ultrasonic motors (K. Uchino), fabrication of nonlinear optical waveguide (T. Kaino), and high density optical storage (L. Hesselink). Compared to previous ECAPD meetings, this one showed increasing interest in organic and polymer materials (Ch. Bosshard, I. Muzikante, V. Bystrov, B. Stiller) and in nonstoichiometry and defects in LiNbO₃ crystals (G. Malovichko, K. Kitamura, K. Lengyel, and M. Fontana). New methods like SFM (piezoresponse used for domain switching study) were discussed by M. Abpanalp and C. Harnagea. V.Ya. Shur focused on domain engineering. A. Pignolet, A. Kholkin, I. Stolichnov, and V. Levoska comprehensively discussed thin films and size effects both on the academic level and for device realizations.

Prof. K. Uchino chaired a round table discussion on the commercialization of polar dielectrics. The audience heard different viewpoints on the problem in Japan (K. Uchino), USA (L. Hesselink), and Europe (A. Pignolet and M. Ozolins). The European Commission sponsored the attendance of 21 young European researchers at ECAPD-V.

Other sponsors of ECAPD-V were Gordon & Breach Science Publishers and the Latvian Council of Science.

The following is a list of authors and titles of ECAPD-V presentations.

PLENARY

Compact ultrasonic rotary motors
K. Uchino, B. Koc, and S. Dong

Fabrication of nonlinear optical waveguide
Toshikuni Kaino, Kazuya Takayama, Bin Cai, and Kyoji Komatsu

FERROELECTRIC RELAXORS AND APPLICATIONS

Glassy properties of 9/65/35 PLZT ceramics
Z. Kutnjak, V. Bobnar, C. Filipic, and A. Levstik

Study on the phonon spectra of lanthanum modified lead zirconate titanate ceramics

V. Efimov, A. Kalmikov, E. Klotins, V. Minashkin, A. Sternberg, and S. Tiutiunnikov

Manifestation of freezing in the nonlinear dielectric response on PMN relaxor system

V. Bobnar, Z. Kutnjak, R. Pirc, and A. Levstik

Static and dynamic contributions to the nonlinear dielectric response in relaxor materials

Z. Kutnjak, V. Bobnar, C. Filipic, and A. Levstik

Analytical behavior of dielectric nonlinearity in PbMg_{1/3}Nb_{2/3}O₃ relaxor ferroelectrics

C. Filipic, A. Levstik, and Z. Kutnjak

Dielectric dispersion and distribution of the relaxation times of relaxor PLZT ceramics

A. Kajokas, A. Matulis, J. Banys, R. Mizaras, A. Brilingas, and J. Grigas

Thermal behavior of polarization in relaxor ferroelectrics

Pb(Mg_{1/2}W_{1/2})_{1-x}Ti_xO₃
V.V. Shvartsman and E.D. Politova

ECAPD-V PAPERS

Polarization and depolarization currents in $\text{Pb}_{1-x}\text{Ba}_x\text{Sc}_{0.5}\text{Nb}_{0.5}\text{O}_3$ ferroelectric ceramics

A.I. Burkhanov, A.V. Shil'nikov, Yu.N. Mamakov, A.A. Zavjalova, A. Sternberg, and K. Bormanis

Dependence of dielectric permittivity on bias field in

$\text{Pb}_{1-x}\text{Ba}_x\text{Sc}_{0.5}\text{Nb}_{0.5}\text{O}_3$

A.I. Burkhanov, A.V. Shil'nikov, A.A. Zavjalova, A. Sternberg, and K. Bormanis

Dielectric nonlinearity of ferroelectric solid solutions in PMN-PZN and PMN-PNN

K. Bormanis, M. Dambekalne, A. Sternberg, A. Kalvane, and G. Grinvald

Pyroelectric properties of rare earth doped strontium barium niobate ceramics from 20K to 450K

I.A. Santos, D. Garcia, and J.A. Eiras

FERROELECTRICS-SEMI-CONDUCTORS AND MICRO-WAVE DIELECTRICS

Elastic and electromechanical properties of new ferroelectric-semiconductor materials of the $\text{Sn}_2\text{P}_2\text{S}_6$ family

V. Samulionis, J. Banys, Yu. Vysochanskii, and V. Cajipe

Microwave dielectric properties of $(\text{Zr}_{0.8}\text{Sn}_{0.2})\text{TiO}_4$ ceramics doped with WO_3

Yil Seok Ahn, Ki Hyun Yoon, and Eung Soo Kim

Microwave properties of the system for TiO_2 sandwiched by Bi-based oxide superconductor

Sunao Sugihara, Yukio Yutoh, and Nobuyuki Kimura

Ultrasonic investigation of photostimulated phenomena in ferroelectric semiconductors

V. Samulionis, J. Banys, and Yu. Vysochanskii

Relaxation phenomena in lithium iodate crystals

Y. Mugnier, C. Galez, J.M. Crettez, P. Bourson, and J. Bouillot

Phase transitions in $\text{CuInP}_2(\text{Se}_x\text{S}_{1-x})_6$ layered crystals

Yu.M. Vysochanskii, A.A. Molnar, M.I. Gurzan, and V.B. Cajipe

Composite on basis of $\text{Sn}_2\text{P}_2\text{S}_6$ for hydrophone applications

M.M. Maior, I.P. Prits, and Yu.M. Vysochanskii

Dielectric properties of ferroelectrics $\text{CuInP}_2\text{Se}_6$ and CuCrP_2S_6

J. Banys, V. Samulionis, V.B. Cajipe, and Yu. Vysochanskii

Dielectric properties of $\text{Pb}_{0.4}\text{Ca}_{0.6}(\text{Fe}_{0.5}\text{Nb}_{0.5})_{1-x}\text{Ti}_x\text{O}_3$ ceramics at microwave frequencies

Eung Soo Kim, Woong Choi, Ki Hyun Yoon, and Yootaek Kim

Microwave dielectric properties of $(1-x)\text{BiNbO}_4-x\text{CaNb}_2\text{O}_6$ ceramics with CuV_2O_6

Eung Soo Kim, Jae Ho Ryu, Myoung Sik Park, Dong Won Kim, and Hyung Sig Chang

Effect of $\text{Cu}_2\text{V}_2\text{O}_7$ on the microwave dielectric properties of BiTaO_4 ceramics

Eung Soo Kim, Seung Hyun Noh, Seuk Buom Kim, Seung Gu Kang, and Pyung Kyu Kim

DOMAINS AND APPLICATIONS

Recent achievements in domain engineering in lithium niobate and lithium tantalate

V.Ya. Shur, E.L. Rumyantsev, E.V. Nikolaeva, E.I. Shishkin, R.G. Batchko, M.m. Fejer, and R.L. Byer

Fatigue properties of bismuth titanate annealed in the reduced atmosphere

Hajime Nagata, Hiroyuki Uemastu, Isao Sakaguchi, Hajime Haneda, and Tadashi Takenaka

Extrinsic contributions in a nonuniform ferroic sample: Dielectric, piezoelectric, and elastic

P. Mokry, A. Kopal, and J. Fousek

Ferroelectric emission stimulated AC field in the mode of temperature auto-stabilization

P.V. Loginov, A.M. Savvinov, and N.Yu. Ponomareva

Frequency dependence of the switching polarization in PZT ceramics

M.H. Lente and J.A. Eiras

PHOTOREFRACTION AND RELATED PHENOMENA

Non-stoichiometric control of LiNbO_3 and LiTaO_3 in ferroelectric domain engineering for optical devices

K. Kitamura, Y. Furukawa, S. Takekawa, T. Hatanaka, H. Ito, and V. Gopalan

Optical properties and applications of photorefractive $\text{Sn}_2\text{P}_2\text{S}_6$

A.A. Grabar, M.I.

ECAPD-V PAPERS

*Gurzan, L.V. Kedyk, I.M. Stoika,
and Yu.M. Vysochanskii*

Kinetics of OH ions in nearly
stoichiometric LiNbO₃ crystals
*Krisztián Lengyel, László
Kovács, Gábor Mandula, and
Romano Rupp*

New approach of beam fanning in
BaTiO₃ to improve a DPCM
*Catherine Mailhan, Michel
Goetz, Nicolas Fressengeas, and
Godefroy Kugel*

Temperature dependence of the
refractive index in BaTiO₃ and
photorefractive in perovskite
oxides
Peet Konsin and Boris Sorkin

Characterization of waveguides
obtained by proton exchange on a
LiNbO₃ substrate
*P. Galinetto, E. Giulotto, F.
Caccavale, C. Sada, and F.
Segado*

Relaxation of electronic excitation
in LiNbO₃ crystals
*L. Grigorjeva, V. Pankratov, D.
Millers, G. Corradi, and K.
Polgár*

SURFACE AND STRUC- TURE

Influence of stress on the domain
formation in barium-titanate films
M. Abplanalp and P. Günter

Phase relations and ferroelectric
properties of Pb(Zr,Sn,Ti)O₃
ceramics
*V.V. Shvartsman, S.E. Aksenov,
and E.D. Politova*

Local structure and vibrational
dynamics in NiWO₄

*A. Kuzmin, J. Purans, and R.
Kalendarev*

Preparation and pyroelectric proper-
ties of Bi₄Ti₃O₁₂ based ceramics
N. Ichinose and Y. Takahashi

Antiferroelectric phase transition
and order parameters of PbZrO₃
*Hideshi Fujishita and Sounosuke
Tanaka*

Piezoresonance driver for position-
ing scanning probe in a wide
temperature range
*R. Raamat, R. Lohmus, A.
Lohmus, P. Liblik, M. Lobjakas,
L. Montelius, J. Lindahl, D. Erts,
and H. Olin*

Low-temperature sintering of PZT
with LiBiO₂ as a sintering aid
*Takashi Hayashi, Takayuki
Inoue, Yoshikazu Nagashima,
Jun Tomizawa, and Yoshikazu
Akiyama*

Phase transitions of
Pb_{0.99}Nb_{0.02}(Zr_{0.75}Sn_{0.20}Ti_{0.05})O₃
ceramics
*Heinz Kabelka, Armin Fuith,
Eriks Birks, and Andris
Sternberg*

Surface morphology of ferroelectric
and high temperature superconduc-
tor ceramics
*K. Bormanis, M. Kalnberga, A.
Patmalnieks, A. Sternberg, and
M. Livinsh*

ORGANIC MATERIALS, POLAR POLYMERS AND MOLECULAR CRYSTALS

Bioferroelectricity and related
problems: Hydrogen bonded ferro-
electric-like systems
V.S. Bystrov, G.I. Ovtchinnikova,

*T.R. Tazieva, A.N. Soloshenko,
Yu.A. Pirogov, and V.K. Novik*

Electro-absorption and fast electro-
optics in highly polar molecular
crystals
*Ch. Bosshard, R. Spreiter, and P.
Günter*

Reversible optical storage utilizing
photoinduced reorientation of
azobenzene derivatives in organized
films
*I. Muzikante, E. Markava, D.
Gustina, L. Gerca, M. Rutkis, E.
Fonavs, B. Stiller, and L.
Brehmer*

Spontaneous polarization in the
mixed ferroelectric DBP_x DBPI_{1-x}
crystals
*J. Banys, A. Kajokas, A.
Brilingas, J. Grigas, G. Völkel,
and C. Klimm*

Dielectric spectroscopy of PAR-
PMMA films
*N.D. Gavrilova, L.G. Bradulina,
Ya.S. Vygodskii, and A.M.
Matieva*

DEFECTS IN POLAR DI- ELECTRICS

Optimization of lithium niobate for
advanced applications by variation
of extrinsic and intrinsic defect
subsystems
*V. Grachev, G. Malovichko, and
E. Kokanyan*

Dipole-type local configuration
instability and charge transfer
control as a theoretical background
of a new long-memory effect for
germanium-related centers in α-
quartz
*Valentin S. Vikhnin and
Alexander Leyderman*

ECAPD-V PAPERS

Photostrictive actuators: New perspective

K. Uchino, P. Poosanaas, and K. Tonooka

The influence of fields on low- and infralow frequency dielectric response of barium doped PSN ferroelectric ceramics

A.A. Zavjalova, A.V. Shil'nikov, A.I. Burkhanov, A. Sternberg, and K. Bormanis

Photosensitive centers and charge transfer processes in barium calcium titanate

G. Malovichko, V. Grachev, R. Pankrath, and O. Schirmer

One- and two-magnon contributions in optical spectra of KNiF₃ single crystal

N. Mironova-Ulmane, V. Skvortsova, A. Kuzmin, and I. Sildos

Charge transfer vibronic state formation of localized intermediate Jahn-Teller exciton: Germanium-related centers in α -quartz

Valentin S. Vikhnin, and Alexander Leyderman

Possible IR-laser effect, Tera-Herz phonon generation, and long-term memory model for Ge-Li local centers in α -quartz

Valentin S. Vikhnin, and Alexander Leyderman

THIN FILMS AND APPLICATIONS

Ferroelectricity in epitaxial pulsed laser deposited bismuth-layered perovskite thin films of different crystallographic orientations

A. Pignolet, C. Harnagea, H.N. Lee, A. Visinoiu, S. Senz, and D.

Hesse

Electromechanical properties of ferroelectric films for MEMS

Andrei Kholkin

Charge relaxation at the interfaces of low-voltage ferroelectric film capacitors: Fatigue endurance and size effects

Igor Stolichnov, Alexander Tagantsev, Enrico Colla, and Nava Setter

Structure and properties of epitaxial ferroelectric PbLu_{0.5}Nb_{0.5}O₃ thin films

J. Levoska, M. Tyunina, A. Sternberg, and S. Leppävuori

Effect of thermal treatment on dielectric and acoustic properties of P(VDF/TrFE) film

Bozena Hilczer, Jan Kulek, and Ewa Markiewics

Processing and properties of nanocrystalline Pb(Sc_{0.5}Ta_{0.5})O₃, Pb(Sc_{0.5}Nb_{0.5})O₃, Pb(Mg_{1/3}Nb_{2/3})O₃ and Pb_{0.76}Ca_{0.24}TiO₃ films and ferroelectric/relaxor superlattices

C. Ziebert, A. Sternberg, H. Schmitt, K.-H. Ehses, and J.K. Krüger

Phase transitions in epitaxial films of relaxor ferroelectric binary systems near the morphotropic phase boundary

M. Tyunina, J. Levoska, A. Sternberg, and S. Leppävuori

Ellipsometry investigation of perovskite/pyrochlore PZT thin film stacks

A. Deineka, M.D. Glinchuk, L. Jastrabik, G. Suchanek, and G.

Gerlach

Effects of lead concentration on dielectric properties of ferroelectric Ni/PZT/Pt thin films at low and infralow frequencies

A.V. Shil'nikov, A.I. Burkhanov, R.A. Laletin, V.N. Nesterov, A.S. Sigov, and K.A. Vorotilov

Neutron irradiation effects on sol-gel PZT thin films

K. Kundzins, V. Zauls, M. Kundzins, A. Sternberg, L. Cakare, R. Bittner, K. Humer, and H.W. Weber

Relaxor-like behavior of P(VDF/TrFE) film irradiated with 1 MeV electrons

Hilary Smogór, Bozena Hilczer, and Stanislaw Warchol

Two-dimensional thermal analysis of thin film pyroelectric infrared detectors

Sidney B. Lang

Effect of compositional modification in xPb(Mg_{1/3}Nb_{2/3})O₃-(1-x)Pb(Zr_{0.5}Ti_{0.5})O₃ thin films by chemical solution deposition

Jeong Hwan Park, Ki Hyun Yoon, Dong Heon Kang, and Eung Soo Kim

Electric fatigue properties of Pb-based ferroelectric and antiferroelectric thin films

Jae Hyuk Jang, Jihoon Park, Ki Hyun Yoon, and Eung Soo Kim

Preparation and properties of antiferroelectric lead zirconate thin films by chemical solution deposition

Hiroshi Maiwa and Noboru Ichinose

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FWPR-2001 PAPERS

SECOND FERROELECTRIC WORKSHOP IN PUERTO RICO (FWPR-2001)

Supported by the Puerto Rico EPSCoR Program, the College of Natural Sciences of the University of Puerto Rico, the NASA-funded Tropical Center for Earth and Space Studies at the University of Puerto Rico, the NASA Glenn Research Center, the Defense Advanced Research Projects Agency, and the Taylor and Francis Publishers, the **Second Ferroelectric Workshop in Puerto Rico (FWPR-2001)** was held from 31 May to 2 June 2001 in San Juan, Puerto Rico.

As with the first workshop, held in 1999, the purpose was to provide a forum for exchange of scientific ideas and technological information in the areas of processing and applications of ferroelectric materials. There were two days of oral presentations offered in single sessions, 14 invited talks and 7 contributed talks. A poster session was held one evening, with 22 posters presented. Participants, other than presenters, included a group of local graduate students.

A panel discussion on current trends and challenges in relation to ferroelectric materials development and applications was held on the last day. Panelists were Professors J.F. Scott, R. Ramesh, R. Newnham, A.S. Bhalla, and S.B. Desu, and Doctors L.A. Boatner and J. Horwitz. The discussion was spirited, the atmosphere informal, causing the tea break, originally planned as a separate activity, to be spontaneously combined by participants with the panel discussion.

Organizing Committee

Ram S. Katiyar, General Chair (University of Puerto Rico)

F.A. Miranda (NASA Glenn Research Center)

F.E. Fernandez (University of Puerto Rico)

The FWPR-2001 proceedings, guest edited by Ram S. Katiyar, Felix A. Miranda and Felix E. Fernández, were published in *Integrated Ferroelectrics* (Vol. 42, 2002)

Questions of effective masses in ferroelectric FETs

J.F. Scott

Properties of platinum films by liquid source MOCVD in H₂ and O₂

J. Goswami, P. Majhi, C.G. Wang and S.K. Dey

Sol-gel PZT for MEMS applications

B. Polcawich, D. Devoe and D. Wickenden

Frequency agile materials for electronics (FAME)—Progress in the DARPA program

S.A. Wolf and D. Treger

Dielectric properties of

Ba_{1-x}Sr_xTiO₃ single crystal fibers grown by laser heated pedestal growth techniques

D. Garcia, R. Guo and A.S. Bhalla

Monolithic integration of superconducting YBCO and dielectric SrTiO₃ films on polycrystalline ferrites

Q.X. Jia, J.R. Groves, P.N. Arndt, P. Lu and F.A. Miranda

Ferroelectric capacitors made by a laser forward transfer technique

R. Modi, H.D. Wu, R.C.Y. Auyeung, J.E.S. Wollmers and D.B. Chrisey

Improved temperature stability of microwave properties in tunable

devices using substituted

Ba_{1-x}Sr_xTiO₃

D.M. Potrepka, S.C. Tidrow and A. Tauber

BaTiO₃ on YBa₂Cu₃O₇ high T_C superconductors—microwave properties

A. Corrales, Y.A. Vlasov and B.L. Larkins, Jr.

Ferroelectric thin films based technology for frequency- and phase-agile microwave communication applications

F.A. Miranda, F.W. van Keuls, R.R. Romanofsky, C.H. Mueller, S. Alterovitz and G. Subramanyyam

Design and development of ferro-

FWPR-2001 PAPERS

electric tunable coplanar waveguide components for Ku- and K-band applications

G. Subramanyam, N. Mohsina, A. Zaman, F.W. van Keuls, F.A. Miranda, R.R. Romanofsky, J.D. Warner and C. Chen

Interface structures and epitaxial behavior of ferroelectric (Ba,Sr)TiO₃ thin films

C.L. Chen, T. Garrett, Y. Lin, J.C. Jiang, E.I. Meletis, F.A. Miranda, Z. Zhang and W.K. Chu

Nanoscale phenomena in ferroelectric thin films

V. Nagarajan, C.S. Ganpule, A. Roytburd and R. Ramesh

Structural and ferroelectric properties of aurivillius phase materials

M.S. Tomar

Evaluation of chemical solution deposited Ba_xSr_{1-x}TiO₃ thin films on LaAlO₃ in tunable microwave devices

F.W. van Keuls, C.H. Mueller, R.R. Romanofsky, J.D. Warner, F.A. Miranda, S.B. Majumder, M. Jain, A. Martinex, R.S. Katiyar and H. Jiang

Structure, morphology, and properties of strontium barium niobate thin films grown by pulsed laser deposition

F.E. Fernandez, Y. Gonzalez, H. Liu, A. Martinez, V. Rogriguez and W. Jia

Processing of miniature hollow sphere transducers

R.E. Newnham, J. Zhang, R. J. Meyer, Jr., S. Alkoy, J. Cochran and D.C. Markley

Critical issues in sol-gel derived ferroelectric thin films: A review

S.B. Majumder, S. Bhaskar and R.S. Katiyar

Diffuse phase transition characteristics and relaxor behavior of lanthanum doped lead titanate thin films

S. Bhaskar, S.B. Majumder and R.S. Katiyar

Studies on laser ablated SrBi₂Ta₂O₉ and Sr_{0.8}Ca_{0.2}Bi₂Ta₂O₉ ferroelectric thin films

R.R. Das, P. Bhattacharya, W. Perez, A. Morales Cruz, R.S. Katiyar and S. B. Desu

Design and simulation of a tunable multilayer Lange coupler

J.G. Colom, R.A. Rodriguez-Solis, J. Almodovar and M. Castaneda

Comparison of the electrical characteristics of PZT and SBT thin films

R.R. Das, S.B. Majumder and R.S. Katiyar

Synthesis and ferroelectric response of Bi_{4-x}Nd_xTi₃O₁₂ thin films

A. Hidalgo, R. Melgarejo, M.S. Tomar and R.S. Katiyar

Highly textured chemical solution deposited Ba_{0.5}Sr_{0.5}Ti_{1-x}Mn_xO₃ (x=0 to 5 at %) thin films for microwave dielectric applications

M. Jain, S.B. Jamumder, A. Martinez, R.S. Katiyar, F.W. van Keuls, R.R. Romanofsky and F.A. Miranda

Spectroscopy of pure and Eu³⁺ doped ZnO

W. Jia, K. Monge, W. Xu and R.

Katiyar

Synthesis and structural characterization of (Sr,CA)Bi₂Ta₂O₉ ceramics

W. Perez, R.R. Das, P. Bhattacharya and R.S. Katiyar

Investigation of the dielectric and polarization behavior of sol-gel derived erbium doped

Pb(Zr_{0.53}Ti_{0.47})O₃ thin films
B. Roy, S.B. Majumder and R.S. Katiyar

Monte Carlo results for the ferroelectric phase transitions of TGS, NaNO₂ and DKDP ultra thin films

J.D. Romero and L.F. Fonseca

Micro-RAMAN characterization of the phase transition behavior in lanthanum doped lead titanate thin films

A. Savvinov, S. Bhaskar, S.B. Majumder and R.S. Katiyar

Growth and dielectric behavior of Nb₂O₅(1-X):XTiO₂ single crystals

H. Choosuwan, R. Guo, A.S. Bhalla and U. Balachandran

Dielectric relaxation behavior and high tunability in Cd₂Nb₂O₇

C. Ang, R. Ouo, A.S. Bhalla and L.E. Cross

Round Table discussion FWPR, 2001: Future trends in ferroelectric materials research and applications

J.F. Scott, J. Harwitz, A.S. Bhalla, S.B. Desu, F.A. Miranda, L.A. Boatner and R. Ramesh



UPCOMING MEETINGS

**International Conference on Metallurgical Coatings and Thin Films
(ICMCTF 2003)
28 April - 2 May 2003
San Diego, California, USA**

The ICMCTF is internationally recognized as a vibrant technical conference that integrates fundamental and applied research focused on thin film deposition, characterization, and advanced surface modification techniques. ICMCTF is the premier international meeting in the field, promoting global exchange of information among scientists, technologists, and manufacturers.

The conference draws more than 700 attendees each year with 50 or more technical sessions. The poster sessions are well attended and are an important component of the technical program. Additional elements of the conference program include a two-day exhibition of the latest equipment, materials, and services used for the deposition, monitoring, and characterization of coatings and thin films.

Short courses, tutorials, and a vendor session are offered. Symposia have been organized to address experimental, theoretical, and manufacturing issues associated with development of new coating materials and processes, dynamics of film growth, development of functional coatings, and evolving approaches to scale-up for commercial applications.

The environs of the Town and Country Hotel adjacent to the Conference Center provide a relaxed atmosphere that promotes informal discussions and networking among the attendees.

Topics

Eight concurrent symposia on processing and characterization of coatings for use at high temperature, wear protection, optical and decorative purposes, magnetic and electronic, applications, as well as in biotechnology.

Special focus sessions on pulsed plasmas, coatings in biotech and biomedical applications, self-assembled coatings, and computational materials science.

CVD and PVD deposition technology and modified vacuum processing techniques are augmented by other film deposition methods that include thermal spray, electroless and electrolytic deposition, and solution processing.

Transfer of laboratory-developed coating technology into manufacturing processes and equipment development is a topic that pervades many symposia.

A Quo Vadimus evening session which this year focuses on a hot surface engineering topic is expected to draw an enthusiastic attendance.

Symposia

- A. Coatings for Use at High Temperature
- B. Hard Coatings and Vapor Deposition Technology
- C. Optical Thin Films
- D. Carbon and Related Materials
- E. Tribology of Coatings and Thin Films
- F. Coating and Thin Film Characterization
- G. Applications, Manufacturing and Equipment
- H. New Horizons in Coatings and Thin Films

UPCOMING MEETINGS

TS-1. Principles of Pulsed Plasmas
TS-2. Self-Organization & Surface Response Effects in Thin Film Technology
TS-3. Computational Studies in Thin Film Research
TS-4. Coatings and Thin Films for Biomedical Applications
Quo Vadimus Forum

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Third Asian Meeting on Electroceramics (AMEC-3)

29 June - 4 July 2003

Singapore

The 3rd Asian Meeting on Electroceramics (AMEC-3), which is the co-symposium E: Electronic and Advanced Ceramics of the International Conference of Materials for Advanced Technology 2003 (ICMAT-2003), will be held on 29 June – 4 July 2003 in Singapore, a beautiful and sunny garden city surrounded by sea.

The AMEC-3 international conference will continue the great initiative and momentum of AMEC-1 and 2, strengthen R & D activities on electroceramics in Asia and in the world, connect academic scholars with industrial researchers, and promote AMEC as a true international forum in this increasingly important area. Scientists, engineers, research staff and students from universities, research institutes and related industrial companies are cordially invited to attend the meeting. The scientific program will include invited and contributed presentations on theoretical, experimental and applications of electroceramics.

Topics

- [A]. Microwave Dielectrics and Applications
- [B]. Thin Film and Tunable Ceramics and Devices
- [C]. Multilayer Electronic Ceramics and Devices
- [D]. Dielectric Ceramics for Electronic Devices
- [E]. Ferroelectric, Pyroelectric and Piezoelectric Ceramics and Applications

UPCOMING MEETINGS

- [F]. Ferroelectric Thin Films for Memories and Devices
- [G]. High-k Dielectrics for Si Electronics
- [H]. Ceramic Superconductors and Applications
- [I]. Magnetic Ceramic Materials and Applications
- [J]. Conductive Ceramics, NTC & PTC Varistors, Battery, and Full Cell
- [K]. Optical Ceramics, Single Crystals and Applications
- [L]. Nanostructured Ceramics and Nanotechnology
- [M]. Glass, Ceramic Polymer Composites and Devices
- [N]. Porous Ceramic Materials
- [O]. Crystal Chemistry of Functional Materials
- [P]. Sensor, Actuator and Transducer Applications
- [Q]. Advanced Ceramic MEMS and in Microtechnology
- [R]. Electronic and Optical Packaging
- [S]. Processing, Sintering, Microstructures & Interfaces
- [T]. Phase Diagram, Non-equilibrium & Metastable State
- [U]. Theory, Modeling, and Design of Ceramics
- [V]. Measurement and Characterization

Partial List of Invited Speakers and Their Tentative Topics

- AKBAR, S. A., Ceramic Oxides and Nano-structures for Chemical Sensing and Catalysis
- ALEXE, M., Nanoscale Ferroelectrics
- BHALLA, A., Frequency Agile Materials for Microwaves
- CAO, W. W., Simulation and Ultrasonic Study on Domain Processes in Ferroelectrics
- CHAN, H., Study of 1-3 Composite Transducers for Ultrasonic Wire Bounding Applications
- CHEN, H. D., Synchrotron X-ray Studies of Nano-Domains in Lead Containing Perovskite Relaxor Ferroelectrics
- CHEN, X. M., New Candidates of Low-Loss Microwave Dielectric Ceramics with ABCO₄ Structure
- CHEN, Z. H., Growth and Electric-Properties of Silicon-based High-k Oxide Thin Films by Laser MBE
- CROSS, L. E., Composite Applications in High Strain Electro-Active Actuator and Transducer Materials for Smart Systems
- DOUGHERTY, J., Integrated Passive Components: History and Projections
- EGASHIRA, M., Nanostructure Control of Semiconductive Metal Oxides
- GUO, R. Y., Electric Field Effects on Local Symmetry and Ferroelectric Properties of MPB Composites
- HONG, C. W., Modern LTCC Technology in Microelectronic Applications
- ISHIBASHI, Y., Theoretical Considerations of Ferroelectric Thin Films and Domains
- KIMURA, T., Preparation of Grain Oriented Piezoelectric Ceramics by Reactive Templated Grain Growth Method
- KOSEK, M., Low Temperature Processing of Perovskite Thin Films by Chemical Solution Deposition
- KOUMOTO, K., Bio-inspired Processing of Electroceramic Thin Films and Micropatterning
- ↑ NAN, C. W., Magnetoelectricity of Multiferroic Composites

UPCOMING MEETINGS

- LANG, S., Calcite Crystals in the Pineal Gland of the Human Brain: Possible Electromechanical and Electrooptic Behavior
- MAGLIONE, M., New Heterostructures Including a Ferroelectric Phase
- MIURA, N., Development of Gas Sensing Devices Based on Solid Electrolyte
- NEWNHAM, R. E., Piezoelectric Transducer Arrays
- SCOTT, J. F., Models of Conduction and Switching in Ferroelectric Thin Film Memories
- SHROUT, T., New High Temperature, High Performance Piezoelectrics
- XIAO, D. Q., Lead-Free Piezoelectric Ceramics: Present and Prospects
- TAKATA, M., Hot spot phenomenon in ceramic rod and its application
- TAN, O. K., Nano-structured oxide semiconductor materials for gas sensing applications
- TANDON, R. Smart Materials and Their Applications in Biomedical, Oceanography and Aerospace
- TSENG, T. Y., Electrical Properties of Metal-Ferroelectric-Insulator- Silicon Structure
- TSURUMI, T., Oxide Artificial Superlattices
- UCHINO, K., Ultrasonic Micro Motors
- WASER, R., Extended Defects in the Near-Surface Region of Perovskite-Structured Oxides
- XU, J. B., Ferroelectric Thin Film Preparation and Characterization, Particularly, on SBT and PCT
- XU, Y. H., Electronic and Optical Packaging
- YAMAZOE, N., Control of Microporous Structure for Semiconductor Gas Sensors
- YAO, X., Bismuth Based Dielectric Ceramics for Microwave Applications
- YIN, Q. R., Microanalysis of Ferroelectric Properties and Defects on Ferroic Materials Using Near-Field Acoustic Microscope
- YOON, H. Y., Interpretation of Microwave Dielectric Properties of $(1-x)\text{Al}_{0.5}\text{Ta}_{0.5}\text{O}_2-x\text{Mg}_{0.33}\text{Ta}_{0.67}\text{O}_2$ Ceramics via Bond Valence
- ZHU, W., Enhanced Si Tip Field Emission by BST Coating of BST Thin Films

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UPCOMING MEETINGS

10th European Meeting on Ferroelectricity (EMF2003)**3 - 8 August 2003****Cambridge, UK**

This is an exciting time for ferroelectricity research and next summer's conference in Cambridge will provide an ideal opportunity to present recent results and discuss all the latest developments in ferroelectrics research.

The conference will build on the success of the 10th International Meeting on Ferroelectricity (IMF-10) held in Madrid in 2001, and will include plenary, oral, and poster sessions. The plenary lectures on Monday, 4 August, will be given by Robert Blinc, Sven Lagerwall, Kinam Kim, and David Vanderbilt. The oral and poster sessions will take place from 5 - 8 August and will be organized into three or four parallel sessions.

Topics

00: Open Sessions	12: Domains
01: Theory	13: Vacancies
02: Ab initio Calculations	14: Phase Transitions
03: Piezoelectrics	15: AFM/Nanoscale
04: Low-T Perovskites	16: NMR/Hydrogen Bonded
05: Relaxors	17: Optics
06: Ceramics	18: Spectroscopy
07: Thin Films	19: Neutrons
08: Precursors and Photonics	20: Memories
09: Artificial Superlattices	21: MEMS
10: Polymers	22: Instrumentation
11: Fatigue and Noise	23: Medical Applications

These sessions have already raised considerable interest, and forty keynote speakers for these symposia have already confirmed their attendance. Abstracts are now invited for these symposia, and can be submitted through the conference website. The deadline for abstract submission will be 1 February 2003. Details of the draft programme and the names of the invited keynote speakers can be seen by clicking the programme button on the conference website. The authors of accepted oral and poster presentations will be invited to contribute a paper to the proceedings volume which will be published in the journal *Ferroelectrics*.

Every effort has been made to keep the registration fees for EMF2003 to a minimum. The full registration fee of £220 pounds (\$350, 350Euros, 45,000Yen) and student fee of £60 (\$100, 100Euros or 12,000Yen) will include access to all the conference facilities and a simple lunch each day.

Cambridge is an ideal place for an international science meeting. Not only does it have a scientific tradition that stretches from Newton to Maxwell, Bragg, Josephson and Mott, but it is attractive enough to be a major tourist venue in its own right. It is conveniently served by several international airports. London Stansted airport is the closest and it is less than an hour from Cambridge (there are hourly bus and train connections to Cambridge costing less than £10.00). There are also regular connections to London's Heathrow, Gatwick and Luton airports. These airports have excellent intercontinental links as well as a multitude of connections with European cities, and are well served by low cost airlines (including EasyJet, RyanAir, Go and Buzz) making it both cheap and easy to reach Cambridge from anywhere in the world.

UPCOMING MEETINGS

Conference accommodation has been booked with two of the Cambridge colleges. Rooms have been reserved at both St John's College and at Fitzwilliam College to provide a range of styles (and prices) for delegates, and may be booked through the conference website. The deadline for booking accommodation is 1 April, though delegates are advised to book early as space is limited. Alternatively, delegates may make their own arrangements for accommodation at one of the hotels or guest houses in Cambridge, though these are usually much more expensive than the college accommodation and early booking is strongly recommended as these are frequently fully booked in August with tourists visiting the city.

Do join us for what should be the key ferroelectrics meeting of the year. We especially hope that the low cost of student registration, together with the availability of cheap airline fares to London Stansted will enable a large number of students to be part of this important meeting. We look forward to seeing you in Cambridge for EMF2003.

Jim Scott
Ekhard Salje
EMF2003
10th European Meeting on Ferroelectricity 2003 Helpdesk

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Tutorial and RUMP Sessions at ISIF 2003 (9-12 March 2003, Colorado Springs)

Tutorial Sessions:

- Thin film materials and processing (B. Tuttle, Sandia National Laboratory)
- Fundamentals of electroceramic materials (Susan Trolier-McKinstry, Pennsylvania State Univ.)
- Process integration (Tom Davenport, Ramtron International Corporation, USA)
- Characterization and testing (Joe T. Evans, Jr., Radiant Technologies, USA)

Two parallel RUMP Sessions (10 March 2003, 7-10 pm):

- Solid state nonvolatile memory technologies: The future (O. Auciello and C. Schiebe)
- Nanoscale science (M. Alexe and D.G. Schlom)

UPCOMING MEETINGS**9th International Conference on Ferroelectric Liquid Crystals (FLC2003)
24 - 29 August 2003
Trinity College Dublin, Ireland**

This conference is the ninth in a series of biennial international meetings. The previous FLC meetings were held in Arcachon, France (1987); Göteborg, Sweden (1989); Boulder, USA (1991); Tokyo, Japan (1993); Cambridge, UK (1995); Brest, France (1997); Darmstadt, Germany (1999); and Washington, USA (2001).

The principal objective of these conferences is to bring together scientists and students working in chemistry, physics, and engineering of ferroelectric liquid crystals and related materials and to present and discuss recent and interesting developments in this area.

Topics

- Synthesis, design, and properties of new materials
- Banana-shaped and achiral switchable systems
- Novel tilted smectic phases (ferro-, antiferro-, TGB and de Vries SmA)
- V-shaped
- Surface interactions and alignments
- Theory and modeling of the chiral smectic phases
- Linear, nonlinear, and electrooptical properties
- Display technology: Addressing, switching, alignment
- Nondisplay applications: Switching, data processing, telecommunication

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www.mee.tcd.ie/flc2003***Ferroelectricity Newsletter***

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UPCOMING MEETINGS**4th (9th) International Seminar on Ferroelastics Physics****15 - 18 September 2003****Voronezh, Russia**

The seminar is designed to bring together the international community of scientists interested in recent developments in all branches of ferroelastics investigations.

Topics

- Phase transitions
- Lattice dynamics and soft modes
- Structure and crystal growth
- Domains and domain boundaries and their dynamics
- Mechanical and acoustic properties
- Optical properties
- Superionic conductivity
- Ferroelasticity and superconductivity
- Incommensurate phases
- Disordered and glassy systems
- Applications

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Winter 2003

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CALENDAR OF EVENTS 2003

Mar 9-12 • 15th International Symposium on Integrated Ferroelectrics (ISIF 2003), Colorado Springs, Colorado, USA (see *Ferroelectricity Newsletter*, Vol. 10, No. 3, p. 20)

Apr 28-
May 2 • International Conference on Metallurgical Coatings and Thin Films (ICMCTF 2003), San Diego, USA (see p. 8)

Jun 8-11 • Polar Oxides: Properties, Characterization and Imaging, Capri, Italy (see *Ferroelectricity Newsletter*, Vol. 10, No. 3, p. 22)

Jun 29-
Jul 4 • 3rd Asian Meeting on Electroceramics (AMEC-3), Singapore (see p. 9)

Jul 20-24 • 15th American Conference on Crystal Growth & Epitaxy, 11th Biennial Workshop on OMVPE, and 3rd International Symposium on Laser and NLO Materials, Keystone, Colorado, USA
<http://www.crystalgrowth.org/ACCGE15>

Aug 3-8 • 10th European Meeting on Ferroelectricity (EMF2003), Cambridge, UK (see p. 12)

Aug 24-29 • 9th International Conference on Ferroelectric Liquid Crystals (FLC2003), Dublin, Ireland (see p. 14)

Sep 15-18 • 4th (9th) International Seminar on Ferroelectrics Physics, Voronezh, Russia (see p. 15)

Dec 14-17 • 4th Asian Meeting on Ferroelectrics 2003, Bangalore, India (see *Ferroelectricity Newsletter*, Vol. 10, No. 3, p. 22)