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# Ferroelectricity Newsletter

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

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Volume 12, Number 4

Fall 2004

## **REVIEWS OF STATE OF THE ART EMBEDDED IN SPECTACULAR NATURAL BEAUTY**

This issue contains the titles and authors of the presentations given at the Tenth European Meeting of Ferroelectricity, held from 3-8 August 2003 at the University of Cambridge, UK. The proceedings just appeared concurrently in two periodicals. Parts I, II, III, and IV are published in Volumes 301, 302, 303, and 304 of FERROELECTRICS, and Parts V, VI, and VII in Volumes 61, 62, and 63 of INTEGRATED FERROELECTRICS.

As guest editor Professor Jim Scott mentioned, getting the proceedings out in such a timely fashion required the best efforts of authors and referees, for which he was very grateful.

Only a few manuscripts required substantial revisions and did not meet the deadline of the proceedings. Those papers will be published in later issues of FERROELECTRICS and INTEGRATED FERROELECTRICS.

There are additions to our Calendar of Events, discussed in more details under UPCOMING MEETINGS. Each February since 1990 a workshop on **Fundamental Physics of Ferroelectrics** is being held at Williamsburg, Virginia. Next year's meeting is discussed on page 16.

The Everbright Convention and Exhibition Center in Shanghai will be the venue of the **2nd International Piezoelectric Quartz Crystal and Technology Exposition** in June of next year. The first meeting of this kind, held last July in Shanghai, proved to be very successful.

The **11th International Meeting on Ferroelectricity** will take place at the beginning of next September at the border of Argentina and Brazil, at the famous Cataratas del Iguazú or Faz do Iguazu. These waterfalls, over two miles wide, are composed of numerous cataracts averaging 200 feet in height. See ferroelectric details on page 18.

Last but not least we want to draw your attention to a book mentioned on page 19 under PUBLICATIONS: *Piezoelectric Materials in Devices*, edited by N. Setter. The topics are cutting-edge and the list of contributors is a veritable Who's Who of the ferroelectric community. We hope to bring you a more detailed book review of this important publication in the near future.

Rudolf Panholzer  
Editor-in-Chief

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## **Ferroelectricity Newsletter**

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Prof. Rudolf Panholzer  
Editor-in-Chief  
email: rpanholzer@nps.navy.mil

Dr. Hannah Liebmann  
Managing Editor  
liebmann@redshift.com

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

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<b>EMF-10 PAPERS</b>
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***THE TENTH EUROPEAN MEETING ON FERROELECTRICITY (EMF-10)***

The 10th European Meeting on Ferroelectricity, attended by approximately six hundred participants from forty countries, was held at the University of Cambridge from 3-8 August 2003. In his guest editorial Professor Jim Scott mentioned that EMF-10 differed from its predecessors in two important ways. One was that focussed sessions of all-invited talks were given on such popular topics as *ab initio* theory and nanophase ferroelectrics. The other was a very well attended session on new instrumentation, which brought many more participants in direct contact with equipment manufacturers.

The publication of the proceedings also followed a new format. The first half of the presentations, dealing with fundamental theory, phase transitions, single crystals or bulk ceramics, are published in Volumes 301, 302, 303, and 304 of FERROELECTRICS. The second half, dealing with thin films, memory devices, and related matters of ferroelectrics integrated into semiconductor devices (generally Si) are concurrently published in Volumes 61, 62, and 63 of INTEGRATED FERROELECTRICS.

Professor Jim Scott said, "It was a pleasure to co-chair this conference and to edit the proceedings. My thanks are extended to the authors for high-quality submissions generally in the right format and length and in good English, and to the referees for their prompt and professional reviews of the manuscripts. This was by far the largest EMF ever (by nearly a factor of two), and completion of the refereeing and editing to meet deadlines was not trivial."

The following is a list of the titles and authors of the EMF-10 proceedings.

**PLENARY**

Order and disorder in ferroelectrics  
*R. Blinc*

First-principles theory of polarization and electric fields in ferroelectrics  
*David Vanderbilt*

Ferroelectric and antiferroelectric liquid crystals  
*Sven T. Lagerwall*

**AB-INITIO**

Contribution of Pb to ferroelectricity in perovskite-type oxides  
*Hiromu Miyazawa, Fumiyuki, Ishii, Eijii Natori, Tatsuya Shimoda, and Tamio Oguchi*

Atomistic model potential for PbTiO<sub>3</sub> and PMN by fitting first principles results  
*M. Sepiarsky, Z. Wu, A.*

*Asthasgiri, and R.E. Cohen*

*Ab-initio* investigations of pressure effects on the ferroelectric instabilities in KDP and DKDP  
*G. Colizzi, J. Kohanoff, J. Lasave, S. Koval, and R.L. Migoni*

**THEORY**

Elementary events of ferroelectrics switching using atomic force microscope  
*M. Molotskii and M. Shvebelmann*

Numerical study of the classical 2D discrete frustrated S<sup>4</sup> model  
*V.V. Savkin, A.N. Rubtsov, and T. Janssen*

Semiadiabatic high-field polarization response in ferroelectric I: Hysteresis and nonlinear susceptibility

*E. Klotins, J. Hlinka, and J. Kaupuzs*

Temperature dependence of Monte Carlo Ising-4D order parameter vs. normalized spontaneous polarization  
*Jorge García, Carmen Aragón, and Julio Gonzalo*

Phase transitions in three dimensional Ising systems under free and periodic boundary conditions  
*M. Felisa Martínez Ruiz, Francisca Pajuelo, Jorge García, Carmen Aragón, and Julio A. Gonzalo*

KNbO<sub>3</sub> based neural network system  
*Yunus Babur and Amirullah M. Mamedov*

Analogy between proton and lithium-ion diffusion in perovskite-type oxides  
*Eiko Matsushita and Hidenobu Nishikawa*

## EMF-10 PAPERS

Features of the polarization induced electronic processes in a nonlinear quantum well

*Mehmet S. Bozgeyik, Faruk Karadag, Victor Pogrebnyakm, Ziya G. Altun, and Amirullah M. Mamedov*

## PHASE TRANSITIONS

Influence of quantum zero point energy on the ferroelectric behavior of isomorphous systems

*C. Aragó, J. García, J.A. Gonzalo, C.L. Wang, W.L. Zhong, and X.Y. Xue*

Saturation effects in ferroelectric and ferroelastic phase transitions

*Stuart A. Hayward, Simon A.T. Redfern, and Ekhard K.H. Salje*

A neutron diffraction study of magnetically ordered ferroelectric materials

*S.A. Ivanov, S.-G. Eriksson, R. Tellgren, and H. Rundlöf*

Dielectric study on the phase transitions in RbMgBr<sub>3</sub> and Cs<sub>2</sub>MgCl<sub>4</sub>

*Kazuo Gessi*

Temperature dependence of structures and order parameters in antiferroelectric PbHfO<sub>3</sub>

*Hideshi Fujishita, Yuya Ishikawa, Akira Ogawaguchi, Kenichi Kato, Eijii Nishibori, Masaki Takata, and Makato Sakata*

Experimental study of the Ca effect in the cubic-tetragonal phase transition of Ca<sub>1-x</sub>Sr<sub>x</sub>TiO<sub>3</sub>

*M.C. Gallardo, A.I. Becerro, F.J. Romero, J. Del Cerro, and S.A.T. Redfern*

Dilatometric and dielectric studies of ferroelectric NaNO<sub>2</sub> in the vicinity of the Curie temperature

*Toshihisa Yamaguchi and Toshihara Mitsui*

Clarification of size effects in polycrystalline BaTiO<sub>3</sub> thin films by means of the specific heat measurements: Grain size or film thickness?

*B.A. Strukov, S.T. Davitadze, S.G. Shulman, B.V. Goltzman, and V.V. Lemanov*

<sup>19</sup>F-NMR study in phase transition of [(CH<sub>2</sub>OH)<sub>3</sub>CNH<sub>3</sub>]<sub>2</sub>SiF<sub>6</sub>

*Junko Hatori, Yasumitsu Matsuo, Zbigniew Czaplá, Masaru Komukae, Tohio Osaka, and Seiichiro Ikehata*

Inverse database of phase transitions in crystals with a single phase transition

*V. Janovec, P.E. Tomaszewski, L. Richterová, J. Fábry, and Z. Kluiber*

Ferroelectricity in La<sub>1-x</sub>Bi<sub>x</sub>CrO<sub>3</sub> solid solutions

*J.I.L. Chen and Z.-G. Ye*

Annealing effect of the phase transition in PbIn<sub>1/2</sub>Nb<sub>1/2</sub>O<sub>3</sub> crystal

*Makoto Iwata, Shinji Katagiri, Hiroshi Orihara, Masaki Maeda, Ikuo Suzuki, Hidehiro Ohwa, Naohiko Yasuda, and Yoshihiro Ishibashi*

Dielectric properties in ACu<sub>3</sub>Ti<sub>4</sub>O<sub>12</sub> (A = Ca, Sr, Ba)

*Hidehiro Ohwa, Aritoshi Nakada, Kenichi Naitou, Naohiko Yasuda, Makoto Iwara, and Yoshihiro Ishibashi*

Ferroelectric/antiferroelectric phase coexistence in the intermediate concentration regions of the BA<sub>x</sub>BP<sub>1-x</sub> phase diagram

*S. Lanceros-Mendez, J.A. Mendes, M. Köhler, and G. Schaack*

Dielectric dispersion in [(CH<sub>3</sub>)<sub>3</sub>NH]<sub>3</sub>[Sb<sub>2</sub>Cl<sub>9</sub>(<sub>1-x</sub>)Br<sub>9x</sub>] mixed crystals

*Maciej Wojtas*

Huge dielectric constant of transparent hexagonal BaTiO<sub>3</sub> obtained by containerless processing

*Jianding Yu, Paul-François Paradis, Takehiko Ishikawa, and Shinichi Yoda*

Search for new Pna2<sub>1</sub> ferroelectrics

*C. Capillas, M.I. Aroyo, and J.M. Perez-Mato*

The specific heat of the urea/alkane inclusion compounds around the structural phase transition

*A. Fraile-Rodríguez, L. Rubio-Peña, and A. López-Echarri*

Magnetic field effect on dielectric properties of Pb(Fe<sub>0.5</sub>Nb<sub>0.5</sub>)O<sub>3</sub> (PFN)

*J.T. Wang and C. Zhang*

Phase transition in LiCsSO<sub>4</sub> by EPR of Mn<sup>2+</sup> ions

*M.B. Zapart, P. Czaja, R. Szczesniak, and S.Y. Jeong*

Ferroc phase transitions in Zn<sub>3</sub>B<sub>7</sub>O<sub>13</sub>X boracites

*A.G. Castellanos-Guzman, A. Correa-Gomez, M. Czank, Gurvinderjit Singh, V.S. Tiwari, and V.K. Wadhawan*

## EMF-10 PAPERS

Structure and dynamics of hexatic ferroelectric liquid crystals

*I. Rychetsky, M. Glogarova, and V. Novotna*

Induced phase transition in BiFeO<sub>3</sub> in high-field electron spin resonance

*D. Viehland, J.F. Li, S. Zvyagin, A.P. Pyatakov, A. Bush, B. Ruetter, V.I. Belotelov, and A.K. Zvezdin*

Dielectric properties of Rb<sub>2</sub>CdBr<sub>4</sub> and Rb<sub>2</sub>HgBr<sub>4</sub>

*Fuminao Shimizu and Masaaki Takashige*

## HYDROGEN BONDED

Kinetics of electron emission from ferroelectrics

*A.S. Sidorkin and V.A. Sidorkin*

Thermostimulated electron emission in paraelectric phase of TGS crystals with nickel admixture

*A.A. Sidorkin, O.V. Rogazinskaya, S.D. Milovidova, and V.A. Sidorkin*

Hydrogen bonds in a polarizable medium: Implications for the isotope effect, the phase transition mechanism and quantum effects

*Annette Bussmann-Holder and Naresh Dalal*

Very high resolution <sup>17</sup>O NMR evidence for displacive behavior in hydrogen-bonded solids: Squaric acid

*N.S. Dalal, K.L. Pierce, J. Palomar, and R. Fu*

Multiphase microstructure and peculiarities of the glass state in Cs<sub>5</sub>H<sub>3</sub>(SO<sub>4</sub>)<sub>4</sub>.xH<sub>2</sub>O crystal

*A.I. Baranov, B.V. Merinov, V.S. Ryabkin, and E.P. Efremova*

Refractive and dilative ferroelectric anomalies of DGN crystals

*B. Andriyevsky and Z. Czaplá*

Calorimetric study of (CH<sub>3</sub>NH<sub>3</sub>)<sub>5</sub>Bi<sub>2</sub>Br<sub>11</sub> ferroelectric crystals

*M. Drulis, R. Poprawski, and J. Mróz*

Hydrostatic pressure effect on phase transition in novel crystalline 2-aminopyridine phosphate ferroelectrics

*R. Poprawski, A. Sieradzki, and E.B. Radojewska*

Dielectric properties of triglycine sulphate crystals admixed with phosphoric acid

*A. Czarnecka and J. Stankowska*

Thermal, dielectric, elastic and optical properties of (NH<sub>4</sub>)<sub>2</sub>CuCl<sub>4</sub>.2H<sub>2</sub>O crystal and related compounds

*Maria Slaboszewska, Zbigniew Tylczynski, Adam Pietraszko, and Asror D. Karaev*

Pyroelectric properties of AspTGS crystals

*G. Arunmozhi, E. de Matos Gomes, J.L. Ribeiro, and J.A. Mendes*

Toward the fitting-free microscopical theory of H-bonded ferroelectrics

*Sergey Dolin, Alexander Levin, Tatiana Mikhailova, and Mikhail Solin*

Calorimetric investigation on the ferroelectric phase transition in

TGSe under electric field

*F.J. Romero, M.C. Gallardo, J. Jiménez, A. Czarnecka, and J. del Cerro*

Phase coexistence phenomena and experimental conditions in the ferroelectric-ferroelastic DKDP 218 K transition

*Jean Bornarel, Ryszard Cach, and Zdenek Kvitek*

Structural relaxation in Rb<sub>3</sub>H(SO<sub>4</sub>)<sub>2</sub> single crystals

*T. Pawlowski, B. Hilczer, M. Polomska, and A. Pietraszko*

Thermal properties of KDP under applied electric field

*J.M. Delgado-Sanchez, J.M. Martín-Olalla, M. Koralewski, M.C. Gallardo, S. Ramos, and J. del Cerro*

NMR study on phase transitions in KHSO<sub>4</sub>

*Yukihiko Yoshida, Yasumitsu Matsuo, and Seiichiro Ikehata*

Effect of hydrostatic pressure on the phase transition temperature in [NH<sub>2</sub>(CH<sub>3</sub>)<sub>2</sub>Sb<sub>2</sub>Cl<sub>9</sub>

*M. Zdanowska-Fraczek, R. Jakubas, and M. Krupski*

Electron emission from irradiated ferroelectrics

*O.V. Rogazinskaya, S.D. Milovidova, V.A. Sidorkin, and A.B. Plaksitskii*

Influence of uniaxial pressure on the phase transition of partially deuterated glycinium phosphite

*Toshio Kikuta, Yasuhiro Takemoto, Toshinari Yamazaki, and Noriyuki Nakatani*

## EMF-10 PAPERS

Ferroelastic domain structure and XRD studies of  $[(\text{NH}_4)_{1-x}\text{Rb}_x]_3\text{H}(\text{SO}_4)_2$  crystals: Phenomenological description  
*L. Kirpichnikova, V. Shakhmatov, M. Polomska, B. Hilczer, and A. Pietraszko*

## INCOMMENSURATES

Electric field induced intermediate phase near the ferroelectric lock-in transition in  $\text{Rb}_2\text{ZnCl}_4$   
*K. Elisbihani and G. Eckold*

$^{205}\text{Tl}$ -NMR on  $\text{Tl}_2\text{SeO}_4$   
*Yasumitsu Matsuo and Seiichiro Ikehata*

Phase transition in betaine cadmium chloride monohydrate  
*J. Agostinho Moreira, A. Almeida, M.L. Santos, M.R. Chaves, M.M.R. Costa, L.C.R. Andrade, and Nelson Muga*

Ferroelectric phase in betaine phosphite studied by Raman scattering  
*M.L. Santos, J. Agostinho Moreira, A. Almeida, M.R. Chaves, and A. Klöpperpieper*

Polarisation rotation in the incommensurate phase of  $\text{Sn}_2\text{P}_2(\text{Se}_x\text{S}_{1-x})_6$   
*A. Ouédraogo, I.A. Lukyanchuk, and P. Saint-Grégoire*

Dielectric properties of betaine phosphite-betaine phosphate in improper ferroelastic phase  
*E.V. Balashova and V.V. Lemanov*

Phenomenological description of the acoustic phonon branch of  $\text{K}_2\text{SeO}_4$

*D.G. Sannikov and H. Mashiyama*

Anisotropic effects of bromine substitution in betaine calcium chloride dihydrate  
*L.G. Vieira, J.L. Ribeiro, M.R. Chaves, A. Almeida, O. Hernandez, M. Quilichini, and A. Klöpperpieper*

Amplitudon mode in deuterated thiourea by Raman scattering  
*Ivan Gregora, Jirka Hlinka, and Bohuslav Brezina*

Calorimetric observation of phase transitions in  $\text{Cs}_2\text{CdBr}_4$  crystal  
*Janusz Przeslawski and Zbigniew Czaplá*

Critical dynamics in BCPS at the N-IC phase transition  
*Dieter Michel, Abdoulaye Taye, and Jörn Petersson*

## PEROVSKITES

Phase transitions in perovskite solid solutions with incipient ferroelectrics  
*V.V. Lemanov*

Ti and V substitutions on the  $\text{KNbO}_3$  ceramics: Dielectric study  
*B. Sundarakannan, K. Kakimoto, and H. Ohsato*

Influence of A-site cations on structural and magnetic properties in the double perovskites  $\text{Ca}_{2-x}\text{Sr}_x\text{MnWO}_6$  and  $\text{Sr}_{2-x}\text{Ba}_x\text{MnWO}_6$  ( $0 \leq x \leq 2.0$ )  
*A.K. Azad, S.-G. Eriksson, S.A. Ivanov, R. Mathieu, and P. Svedlindh*

Dielectric response in amorphous

materials based on polar oxides:  $\text{PbTiO}_3$ ,  $\text{PbFe}_{1/2}\text{Nb}_{1/2}\text{O}_3$  and  $\text{PbMg}_{1/3}\text{Nb}_2\text{O}_3$

*L. Korotkov, S. Gridnev, T. Klimentova, V. Dvornikov, Yu. Barmin, S. Kozhukhar, V. Posmet'ev, and D. Urasov*

## DOPED PEROVSKITES

Soft-mode study in Li-doped  $\text{KTaO}_3$   
*V. Zelezny, A. Pashkin, J. Petzelt, M. Savinov, V. Trepakov, and S. Kapphan*

Divalent impurity ions in potassium tantalate studied by EPR  
*A.G. Badalyan, V.A. Trepakov, C.B. Azzoni, P. Galinotto, M.C. Mozzati, L. Jastrabik, J. Rosa, S. Kapphan, and M. Hrabovsky*

Dielectric permittivity study of  $\text{KTaO}_3$  weakly doped by  $^6\text{Li}$  isotope  
*V. Trepakov, M. Savinov, S. Prosendeev, P. Syrnikov, A. Pashkin, J. Petzelt, S. Kapphan, and L. Jastrabik*

## RELAXORS

Frequency dependent dielectric response of electrically inhomogeneous dielectrics  
*A.A. Volkov*

Relaxor-like behavior of  $\text{Pb}_{.5}\text{Ca}_{.5}\text{TiO}_3$  thin films  
*R. Jimenez, C. Alemany, M.L. Calzada, and J. Mendiola*

Memory effects in dielectric and anelastic measurements of PLZT  
*F. Cordero, F. Cracium, A. Fanco, and C. Galassi*

## EMF-10 PAPERS

Dielectric and structural properties of relaxor ferroelectrics

*Zuo-Guang Ye and Alexei A. Bokov*

Recent understanding the dielectric relaxation processes and dipolar disordering in high-symmetry relaxor system  $\text{Cd}_2\text{Nb}_2\text{O}_7$

*N.N. Kolpakova, P. Czarnecki, W. Nawrocik, M.P. Shcheglov, and L. Szczepanska*

Low-temperature dielectric response of relaxor ferroelectrics and related disordered materials

*Stanislav Kamba, Viktor Bovtun, Victor Porokhonsky, Alexej Pashkin, Maxim Sainov, Ivan Rychetsky, and Jan Petzelt*

Relaxor ferroelectrics—From randomfield models to domain state physics

*W. Kleemann, J. Dec, S. Miga, and R. Pankrath*

Microscopic investigation of nanoscale polar regions of  $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ - $\text{PbTiO}_3$  relaxor ferroelectric thin films

*S.K. Singh, P.A. Thomas, and S.B. Palmer*

Microstructure-property relationship in dielectric ceramics containing  $(\text{Nb,Ti})\text{O}_6$  octahedra

*Y. Iqbal and I.M. Reaney*

Solubility of Ho ions and Mg Co-doped  $\text{BaTiO}_3$  analysed by Rietveld method and EXAFS

*H. Ohsato, N. Ozaki, K. Ohnuma, Y. Mizuno, T. Hagiwara, K. Kakimoto, and H. Kishi*

Dynamics of polar nanoregions in

relaxors

*J. Toulouse, D. La-Orauttapong, and O. Svitelskiy*

Optical spectra, properties and first principles computations of

$\text{Ba}(\text{Fe,Nb})\text{O}_3$  and  $\text{Pb}(\text{Fe,Nb})\text{O}_3$   
*R. Demirbilek, A.I. Gubaev, A.B. Kutsenko, S.E. Kapphan, I.P. Raevski, S.A. Prosandeev, B. Burton, L. Jastrabik, and V.S. Vikhnin*

Ferroelectric behavior in epitaxial films of relaxor  $\text{PbMg}_{1/3}\text{Nb}_{2/3}\text{O}_3$

*M. Tyunina, K. Kundzinsh, V. Zauls, and J. Levoska*

Effects of electric field on the domain structure and dielectric properties of rhombohedral (001) plate in PMN-Pt solid solutions

*Naohiko Yasuda, Naoya Uemura, Hidehiro Ohwa, Makoto Iwata, and Yoshihiro Ishibashi*

Effect of high pressure on the relaxor ferroelectrics

$\text{Na}_{1/2}\text{Bi}_{1/2}\text{TiO}_3$  (NBT) and  $\text{PbMg}_{1/3}\text{Nb}_{2/3}\text{O}_3$  (PMN)  
*J. Kreisel, P. Bouvier, B. Dkhil, B. Chaabane, A.M. Glazer, P.A. Thomas, and T.R. Welberry*

Ferroelectric properties of  $\text{BaTiO}_3$  doped with  $\text{La}(\text{Mg}_{1/2}\text{Ti}_{1/2})\text{O}_3$

*A.N. Salak, V.V. Shvartsman, M.P. Seabra, A.L. Kholkin, and V.M. Ferreira*

Relaxor to ferroelectric transition in 6.5/65/35 hot-pressed PLZT ferroelectrics

*B. Vodopivec, Z. Kutnjak, C. Filipic, A. Levstik, J. Holc, and M. Kosec*

Microstructure evolution of the

templated grain growth in textured  $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})_{0.67}\text{Ti}_{0.33}\text{O}_3$  by excess  $\text{PbO}$  addition

*Huiqing Fan, Lili Zhao, and Changsheng Tian*

Dielectric spectroscopy measurements of relaxor ferroelectric PLZT 9/65/35 thin films obtained by RF assisted PLD

*F. Craciun, M. Dinescu, P. Verardi, N. Scarisoreanu, C. Galassi, and D. Piazza*

Dielectric properties of  $\text{PbSc}_{1/2}\text{Nb}_{1/2}\text{O}_3$ - $\text{PbTiO}_3$  ceramics

*A.V. Shil'nikov, S.A. Satarov, A.I. Burkhanov, K. Bormanis, A. Sternberg, and A. Kalvane*

Local electromechanical properties of  $\text{PbMg}_{1/3}\text{Nb}_{2/3}\text{O}_3$  thin films studied by piezoelectric force microscopy

*V. Shvartsman, M. Tyunina, J. Levoska, and A. Kholkin*

Structure and lattice dynamics in PLZT 8/65/35 ceramics irradiated by high-current pulsed electron beam

*V.V. Efimov, S.S. Khasanov, B.N. Mavrin, N.N. Novikova, A.V. Shilnikov, A.I. Burkhanov, V.V. Sikolenko, A. Sternberg, S.I. Tiutiunnikov, D.M. Többens, and V.A. Yakovlev*

Phase coexistence of temperature-dependent phase transformation in relaxor ferroelectric

$\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})_{1-x}\text{Ti}_x\text{O}_3$  single crystal

*R. Chien, V. Hugo Schmidt, Chi-Shun Tu, and L.-W. Hung*

Anomalous behavior of the specific heat of  $\text{AB}'\text{B}''\text{O}_3$  complex

## EMF-10 PAPERS

perovskites at low temperatures

*S. Gvasaliya, S. Lushnikov, Y. Moriya, H. Kawaji, T. Atake, M. Smirnov, and V. Kazimirov*

Raman and neutron scattering study of  $\text{PbMg}_{1/3}\text{Ta}_{2/3}\text{O}_3$  relaxor ferroelectric

*S. Gvasaliya, S. Lushnikov, B. Roessli, and R. Katiyar*

## FERROELASTICS

Ionic transport in twin domain walls

*W.T. Lee, E.K.H. Salje, and U. Bismayer*

Theoretical consideration on the  $90^\circ$  domain walls in tetragonal ferroelectrics

*Yoshihiro Ishibashi and Ekhard Salje*

Novel PZT capacitor technology for high density FRAM device with  $0.18\mu\text{m}$  D/R

*K.M. Lee, K.S. Park, S.D. Nam, B.j. Bae, J.E. Lim, M.S. Lee, S.H. Joo, S.L. Cho, S.O. Park, U.I. Chung, and J.T. Moon*

EPR of ferroelectrics described in nonuniform order parameter

*W. Zapart*

Low-temperature phase transition in  $\text{K}_3\text{Na}(\text{SO}_4)_2$  crystal

*A. Eichner, M. Kaczmarek, M. Wiesner, and B. Mroz*

## DOMAINS

Effect of internal bias field on  $180^\circ$  domain switching in deuterated glycine phosphite

*Zbigniew Czapla and Katarzyna Matyjasek*

On tensor distinction of non-

ferroelastic domains

*D.B. Litvin and V. Janovec*

Influence of the electron irradiation in the SEM on terbium molybdate surface potential state

*L.S. Kokhanchik and B.K. Ponomarev*

Phase diagram of

$\text{Rb}_{2x}\text{Tl}_{2(1-x)}\text{Cd}_2(\text{SO}_4)_3$  solid solutions

*R. Vlokh, I. Girnyk, I. Martunyk-Lototska, Z. Czapla, S. Dacko, and B. Kosturek*

Light deflection study of the formation process of the ferroelastic domain

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*Masaaki Ichiki, Lulu Zhang,  
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*Jae-Yeol Hwang, Sang-A Lee, Chae-Ryong Cho, and Se-Young Jeong*

Fabrication of sol-gel thin films of silicate-doped PZT

*T. Tamura, H. Hoko, Y. Arimoto, and H. Ishiwara*Self-assembled PbTiO<sub>3</sub> nanoislands prepared by MOCVD*M. Shimizu, N. Nonomura, H. Fujisawa, H. Niu, and K. Honda*Polarization switching relaxation in Pb(Zr,Ti)O<sub>3</sub> ceramics*M.H. Lente, A. Picinin, J.P. Rino, and J.A. Eiras*

Fatigue properties of Mn-doped lead zirconate titanate thin films capacitors

*Q. Zhang, D.J. Keeble, P.G. Coleman, and R. Mason***BT,BLT,SBT AND OTHER THIN FILM FERROELECTRICS**

Recent progress of liquid source misted-chemical deposition system for ferroelectric materials

*Toshiaki Tatsuta, Susumi Kawasaki, Shin-Ich Motoyam, Osamu Tsuji, and Tadashi Siosaki*

Current status of Bi-based precursors for integrated ferroelectrics

*Kazumi Kato, Kazuyuki Suzuki, Kiyotaka Tanaka, Desheng Fu, Kaori Nishizawa, and Takeshi Miki*Fabrication and characterization of (Bi,La)<sub>4</sub>Ti<sub>3</sub>O<sub>12</sub> films using LaAlO<sub>3</sub> buffer layers for MFIS structures*Byung-Eun Park and Hiroshi Ishiwara*

Structural behaviour of the mixed-layer Aurivillius phase

*Bi<sub>7</sub>Ti<sub>4</sub>NbO<sub>21</sub>*  
*Philippe Boullay and Danielle Mercurio*Formation of ultra thin SrBi<sub>2</sub>Ta<sub>2</sub>O<sub>9</sub> films using protective layers*Yoshihito Kawashima and Hiroshi Ishiwara*Ferroelectric behaviors of W-doped SrBi<sub>2</sub>Ta<sub>2</sub>O<sub>9</sub> thin films*W.S. Toh, A. Garg, J.M. Xue, J. Wang, Z.H. Barber, and J.E.**Evetts*Leakage current suppression of Pt/Bi<sub>4-x</sub>La<sub>x</sub>Ti<sub>3</sub>O<sub>12</sub>/Ru capacitors by post-annealing of Ru films*T. Furukawa, T. Kuroiwa, Y. Fujisaki, T. Sato, and H. Ishiwara*Influence of heat treatment on Sr<sub>0.9</sub>Bi<sub>2.2</sub>Ta<sub>2</sub>O<sub>9</sub> thin films prepared by aqueous CSD*D. Nelis, D. Mondelaers, G. Vanhoyland, H. van den Rul, M.K. van Bael, J. Mullens, L.C. Poucke, J. D'Haen, and D.J. Wouters*

Competing instabilities in ferroelectric Aurivillius compounds

*J.M. Perez-Mato, P. Blaha, K. Parlinski, K. Schwarz, M. Aroyo, I. Elcoro, and Z. Izaola*Effects of heating process on crystalline orientation and electrical properties of (Bi,La)<sub>4</sub>Ti<sub>3</sub>O<sub>12</sub> thin films derived by chemical solution deposition method*Te-Wei Chiu, Naoki Wakiya, Kazuo Shinozaki, and Nobuyasu Mizutani*Influence of MgO on the structural and electrical properties of Bi<sub>4</sub>Ti<sub>3</sub>O<sub>12</sub>*A. Sanson and R.W. Whatmore*Temperature dependence of microwave and THz dielectric response in Sr<sub>n+1</sub>Ti<sub>n</sub>O<sub>3n+1</sub> (n=1-4)*D. Noujni, S. Kamba, A. Pashkin, V. Bovtun, J. Petzelt, A.-K. Azelsson, N. MCN Alford, P.L. Wise, and I.M. Reany*Aqueous CSD of ferroelectric Bi<sub>3.5</sub>La<sub>0.5</sub>Ti<sub>3</sub>O<sub>12</sub> thin

## EMF-10 PAPERS

films

*A. Hardy, D. Nelis, G. Vanhoyland, M.K. Van Bael, J. Mullens, L.C. Van Poucke, J. D'Haen, and D.J. Wouters*

Low voltage operation of ferroelectric capacitors using Sr-deficient and praseodymium-substituted strontium bismuth tantalate ultra thin films

*Koji Aizawa and Hiroshi Ishiwara*

Investigation of domain structure of SrBi<sub>2</sub>Ta<sub>2</sub>O<sub>9</sub> single crystals via polarized optical and piezoelectric force microscopy

*Harvey Amorín, Vladimir V. Shvartsman, Gilles Trolliart, Michel Manier, Jean-Pierre Mercurio, Andrei L. Kholkin, and M. Elisabete V. Costa*

Ferroelectric behavior of sol-gel derived Bi<sub>4-x</sub>Nd<sub>x</sub>Ti<sub>3</sub>O<sub>12</sub> thin films

*M.S. Tomar, R.E. Melgarejo, A. Hidalgo, S.P. Singh, and R.S. Katiyar*

Crystallographic features of ferroelectric domain structures in (Sr<sub>1-x</sub>Ba<sub>x</sub>)Bi<sub>2</sub>Ta<sub>2</sub>O<sub>9</sub>

*T. Asada, T. Sugawara, and Y. Koyama*

Preparation and properties of V-doped (Bi,Nd)<sub>4</sub>Ti<sub>3</sub>O<sub>12</sub> ferroelectric thin films by chemical solution deposition

*Takashi Hayashi, Naoya Iizawa, Daichi Togawa, Mio Yamada, Wataru Sakamoto, Koichi Kikuta, Toshinobu Yogo, and Shin-Ichi Hirano*

Order-disorder of TMS ions and phase transitions in tetramethylam-

monium calcium chloride (TMCC) studied by NMR

*Dieter Michel, Samir Mulla-Osman, Georg Völkel, and Zbigniew Czaplá*

Sintering behaviour of Ba<sub>x</sub>Sr<sub>1-x</sub>TiO<sub>3</sub>

*Kumaravinothan Sarma, Rehan Farooq, Katy Jarman, Robert C. Pullar, Peter K. Petrov, and Neil McN. Alford*

## PIEZOELECTRICS AND PYROELECTRICS

Role of microheterogeneity in poled 0.7Pb(Mg<sub>1/3</sub>Nb<sub>2/3</sub>)O<sub>3</sub>-0.3PbTiO<sub>3</sub> crystals

*D. Viehland and J.F. Li*

Harmonic analysis of microbeams with PZT on-chip actuating and sensing

*Jia Zhou, Mario Baum, Ralf Schmiedel, Thomas Gessner, Yiping Huang, and Gang Ruan*

AC-poling of functionally graded piezoelectric bending devices

*R. Steinhausen, A. Kouvatov, C. Pientschke, H.T. Langhammer, W. Seifert, H. Beige, and H. Abicht*

Origin of giant piezoelectricity in Pb[(Zn<sub>1/3</sub>Nb<sub>2/3</sub>)<sub>0.91</sub>Ti<sub>0.09</sub>]O<sub>3</sub> single crystals

*Toshio Ogawa and Yoshiki Numamoto*

High frequency PZT composite thick film resonators

*F.E.C. Duval, R.A. Dorey, R.W. Wright, Z. Huang, and R.W. Whatmore*

A highly-sensitive Ba(Ti<sub>1-x</sub>Sn<sub>x</sub>)O<sub>3</sub> thin films dielectric bolometer for uncooled IR sensor

*Minoru Noda, Tetsuo Nomura, Daniel Popovici, Shuuichi Murakami, and Masanori Okuyama*

Evaluation of high field responses of fine scale piezoelectric fibres

*L.J. Nelson, C.R. Bowen, R. Stevens, M. Cain, and M. Stewart*

Integrated PNZT structures for MEMS gyroscope

*Corina Nistorica, Jian Zhang, P. Padmini, Sushma Kotru, and R.K. Pandey*

A novel high frequency surface acoustic wave device based on piezoelectric interdigital transducers

*A.K. Sarin Kumar, P. Paruch, D. Marré, L. Pellegrino, T. Tybell, S. Ballandras, and J.-M. Triscone*

Effect of electric field on hydrostatic piezoelectric coefficients of single domain PZN-PT crystals

*P. Hana, L. Burianova, E. Furman, S. Zhang, T.R. Shrout, and L.E. Cross*

Effects of the particle size and the firing atmosphere on electrical properties in PNN-PZT thick films

*Chae Il Cheon, Jeong Seog Kim, and Tae Song Kim*

Ferroelectric and relaxor-like electro-mechanical strain in BaTi<sub>1-x</sub>Sn<sub>x</sub>O<sub>3</sub> ceramics

*V. Mueller, A. Kouvatov, R. Steinhausen, H. Beige, and H.-P. Abicht*

Properties of PbFe<sub>2/3</sub>W<sub>1/3</sub>O<sub>3</sub>-

## EMF-10 PAPERS

PbTiO<sub>3</sub> ferroic ceramics

*Liliana Mitoseriu*

Screen printed PZT composite thick films

*R.A. Dorey, R.W. Whatmore, S.P. Beeby, R.N. Torah, and N.M. White*

Development aspects of an integrated piezoelectric array incorporating a thin PZT film and radiation collectors

*Christopher Shaw, Spartaco Landi, Roger Whatmore, and Paul Kirby*

Elastic, piezooptic and acoustooptic properties of borate crystals (BaB<sub>2</sub>O<sub>4</sub>, Li<sub>2</sub>B<sub>4</sub>O<sub>7</sub> and CsLiB<sub>6</sub>O<sub>10</sub>)

*I. Martynyuk-Lototska, O. Mys, O. Krupych, V. Adamiv, Ya. Burak, R. Vlokh, and W. Schranz*

Ferroelectric and piezoelectric properties of 0.24Pb(Zn<sub>1/3</sub>Nb<sub>2/3</sub>)O<sub>3</sub>.0.384PbZrO<sub>3</sub>.0.376PbTiO<sub>3</sub> thin films crystallized by hot isostatic pressing

*Masafumi Kobune, Shinichi Kojima, Yusuke Nishioka, Tetsuo Yazawa, Hironori Fujisawa, and Masaru Shimizu*

Study of 1-3 PZT fibre/epoxy composites with low volume fraction of ceramics

*S.H. Choy, H.L.W. Chan, M.W. Ng, and P.C.K. Liu*

Chemically induced interface migration in PZT system during controlling of PbO content

*In-Chul Park, Seuk-Chul Ko, Joon-Hyung Lee, Jeong-Joo Kim, and Sang-Hee Cho*

Shift of the characteristic frequencies of thickness mode piezoelectric

resonators caused by intrinsic losses and external mechanical load

*J.L. San Emeterio and A. Ramos*

High orientation of PZT single crystal grains and piezoelectric properties in 1-3 type composite sheet

*Tadashi Sekiya, Ruiping Wang, Hiroshi Sato, and Yoshiro Shimoyo*

Characterisation and modelling of barium titanate-silver composites

*S. Panteny, R. Stevens, and C.R. Bowen*

Evaluation of piezoelectric resonator parameters using an artificial intelligence technique

*A. Ruiz, J.L. Emeterio, and A. Ramos*

Low temperature behaviour of betaine phosphate-betaine arsenate mixed crystals

*A. Almeida, S. Sarmiento, J.L. Ribeiro, L.G. Vieira, M.R. Chaves, and A. Klöpperpieper*

Annealing induced ordering of SrTiO<sub>3</sub> thin films deposited by laser ablation over Si substrates

*B.G. Almeida, A. Pietka, and J.A. Mendes*

Theoretical study of the ferroelectric effect based on a simple model of ferroelectric material

*Antonin Klíć and Milan Marvan*

Studies on DTGS:PVDF composites for pyroelectric infrared detectors

*A.K. Batra, M. Simmons, Padmaja Guggilla, M.D. Aggarwal, and R.B. Lal*

Experimental design and construction of a flextensional ultrasonic piezoelectric micro-motor

*J.T. Leinvuo, S.A. Wilson, H.J.A.*

*Almond, and R.W. Whatmore*

High piezoelectric sensitivity composites based on ferroelectric ceramics

*V.Yu. Topolov and C.R. Bowen*

New micro structural design concept for polycrystalline composite materials

*A.N. Rybjanets, A.V. Nasedkin, and A.V. Turik*

Evaluation of residual stress in thin ferroelectric films using grazing incident X-ray diffraction

*Peter Kr. Petrov, Kumaravinothan Sarma, and Neil McN. Alford*

Predicted frequency response of integrated pyroelectric PNZT infrared detectors

*A.K. Batra, J.R. Currie, M.D. Aggarwal, R.B. Lal, Sushma Kotru, Corina Nistorica, and R.K. Pandey*

Lead titanate and lead metaniobate porous ferroelectric ceramics

*A.N. Rybjanets, O.N. Rzumovskaja, L.A. Reznitchenko, V.D. Komarov, and A.V. Turik*

Hydrophone arrays assembled from PZT ceramic foams

*H. Kara, R. Ramesh, R. Stevens, N. Jayasundere, V. Humphrey, and C.R. Bowen*

## NONFERROELECTRIC THIN FILMS

High temperature effects in Li-doped ZnO thin films

*A. Deyneka, Z. Hubicka, M. Cada, G. Suchanek, M. Savinov, L. Jastrabik, and G. Gerlach*

One-dimensional proton conductor with strong short-range interactions

*I.V. Stasyuk and O. Vorobyov*

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**UPCOMING MEETINGS****2005 Workshop on Fundamental Physics of Ferroelectrics  
6-9 February 2005  
Williamsburg, Virginia, USA**

This workshop continues a series of experimental and/or theoretical meetings on fundamental issues in the physics of ferroelectrics, held each February since 1990. The 2005 workshop will cover experimental and theoretical issues in synthesizing, measuring, understanding, and predicting the behavior of ferroelectrics and related materials. Topics of particular interest will include piezoelectricity; phase transitions and phase diagrams of multicomponent systems; surfaces, thin films, nanostructure and superlattices; and measurement and calculation of optical, electrical and magnetic properties.

**Important dates**

Deadlines for abstract submission, rooms reservations and pre-registration will be in December 2004.

**Further information and updates**

Visit the workshop Web site at

<http://www.mri.psu.edu/conferences/ferro2005>

**Organizers****Thomas Shrout**

Materials Research Institute  
The Pennsylvania State University  
150 Materials Research Lab Building  
University Park, PA 16802  
phone: +814-865-1645  
fax: +814-865-2326  
email: [tshrout@psu.edu](mailto:tshrout@psu.edu)

**Karin M. Rabe**

Department of Physics and Astronomy  
Rutgers University  
136 Frelinghuysen Road  
Piscataway, NJ 08854-8019  
phone: +732-445-4186  
fax: +732-445-4400  
email: [rabe@physics.rutgers.edu](mailto:rabe@physics.rutgers.edu)

***Ferroelectricity Newsletter***

including all back issues is available on Internet

**<http://www.sp.nps.navy.mil/projects/ferro/ferro.html>**

in Adobe Acrobat PDF file format

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mail: Hannah Liebmann

500 Glenwood Circle #238, Monterey, CA 93940-4724 USA

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<b>UPCOMING MEETINGS</b>
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**The 2nd International Piezoelectric Quartz Crystal and Technology Exposition (CHINAPe2005)  
22-24 June 2005**

**Shanghai, Everbright Convention and Exhibition Center, China**

The First International Piezocrystal and Technology Exposition was held successfully in Shanghai in 21-23 July 2004. Some well-known enterprises invited from UK, Japan, Hongkong, Taiwan, and Mainland China participated in this meeting. As the first national exposition in this industry, CHINAPe2004 was a milestone.

Visions of the second such exposition, CHINAPe2005, will actively expand the scale and influence on the basis of its first exposition, focus to invite the latest international technologies and products to be exhibited, and make this exposition become a platform to promote new technologies and new products, a platform to collectively release industry information and a platform to negotiate and exchange with low-flow demanders.

As a title exposition of International 3C Manufacturing Associated Purchase and Service Exhibition, CHINAPe 2005 will invite manufacturing enterprises in the communication industry, computer industry, and consumer electronics industry. Enterprises manufacturing passive components will get more opportunities to negotiate face-to-face with demanders from all countries and regions.

#### **Customer-Centralized Propaganda Strategy**

The Organizing Committee will do its best to provide substantial benefits to all exhibitors and to the satisfaction of visitors and audience. You may obtain the following benefits in this exposition:

- Establish relationships with potential customers
- Enter sales contracts
- Promote the image of your enterprise
- Get to know market opportunities of this industry
- Evaluate new commercial potentials

#### **Key Exhibitors**

3C manufacturing, IT electronics, electronic instrument, home appliances, digital circuits, audio and video, communication, computer and peripheral equipment industry.

#### **Contact**

Shanghai HANHUI Exhibition Co., Ltd

Room 701, 2nd Building, Hengye Road 129, Hongkou District, Shanghai, China, 200083

phone: +86-21-3608-0616, 3608-0665; fax: +86-21-3608-0665, 3608-0090; email: interelect@cnhhch.com

<http://www.cnhhch.com>

<b>UPCOMING MEETINGS</b>
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**11th International Meeting on Ferroelectricity (IMF-11)****5-9 September 2005****Cataratas del Iguazú, Foz do Iguazu****Argentina-Brazil Border**

The IMF-11 is the 11th in a series of meetings held every four years since 1966. The purpose of IMF-11 is to provide a focused forum for the presentation and discussion of latest advanced research in the field of ferroelectricity. The meeting will include invited lectures from internationally distinguished researchers, contributed presentations and posters, covering a broad range of fundamental and applied topics related to ferroelectric phase transitions, traditional and new materials and related systems. Physical, chemical, structural, dielectric, thermal, acoustic, electromechanical and optical properties and its applications will be considered. Special interest to young contributors attending this conference will be given.

**Topics**

- Advances in theories
- Phase transitions and critical phenomena
- Dielectric and microwave properties
- Domains and domain boundaries
- Structural characterizations
- Infrared and light scattering studies
- Imperfections: Surfaces, interfaces, and defects
- Incommensurate phase and discommensuration
- Relaxor ferroelectrics
- Ferroelectric bulk materials: Single crystals growth and ceramic processing
- Ferroelectric thin films
- Nanoscale ferroelectrics
- Ferroelectrics: Piezoelectric, electrooptic, pyroelectric and other related properties
- Polymers, liquid crystals, and other complex systems
- Piezoelectrics and actuators
- Integrated ferroelectrics
- Applications
- Related materials

**Dates**

Abstract deadline	28 February 2005
Notification of acceptance	2 May 2005
Deadline for reduced fee registration	30 May 2005
Deadline for hotel reservation	1 July 2005
Preliminary program	29 July 2005
Receipt of manuscripts (electronic submission)	26 August 2005
Receipt of manuscripts (printed copies)	6 September 2005

**Chairmen**

Alberto Lopez Garcia (Argentina)  
 Univ. Nacional de La Plata, Argentina  
 abeti@venus.fisica.unlp.edu.ar

José Antonio Eiras (Brazil)  
 UFSCar, Sao Carlos, Brazil  
 eiras@df.ufscar.br

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<b>PUBLICATIONS</b>
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*Piezoelectric Materials in Devices*

23 chapters, 518 pages

Edited by N. Setter

The book is composed of reviews and assessments of material aspects in the design and use of piezoelectrics in various applications, such as actuators, sensors, MEMS, medical transducers, systems for vibration control, high frequency applications, etc.

It is a book for users, designers, and researchers of piezoelectric components who are interested in piezoelectric materials in relation with device performance.

The three **introductory chapters** cover basics of piezoelectricity and piezoelectric materials with an accent on parameters that affect performance, and include also an extensive review on applications.

Within the wide area of **actuators and multi-layer structures**, issues of design, performance, and applications of technologically advanced actuators are presented in seven chapters.

Piezoelectric actuators in systems for **active vibration control** and piezoelectric transformers are given special chapters. In addition, the origin and mechanisms for high strain actuation, aspects of **reliability and lifetime** and mechanical properties of multi-layer actuators driven with high fields are discussed.

Two chapters review nonlinearity, hysteresis, and **functioning under high field**.

Specific chapters cover piezoelectric materials and components in several important and fast developing fields: **Ultrasonic medical diagnostics** (1 chapter), **microsystems (MEMS)** (2 chapters), and **microwave communications** (2 chapters).

The chapters on **novel applied materials** (4) and **technologies** (2) cover materials for high temperature piezoelectric sensors, lead-free piezoelectrics, relaxor-ferroelectric single crystals with exceptionally high electromechanical properties, and related textured thin and thick layers. Rapid prototyping is included too.

The authors:

Claeyssen, Colla, Cross, Damjanovic, Gaucher, Gevorgian, Gonnard, Lethiecq, Lubitz, Muralt, Safari, Schneider, Setter, Shrout, Trolier-McKinstry, Uchino, Wersing, Wolny, Yamashita, and co-authors.

More information:

[electro@epfl.ch](mailto:electro@epfl.ch) [www.electroceraamics.ch](http://www.electroceraamics.ch)

Space Systems Academic Group  
Code SP  
Bullard Hall, Bldg. 233, Room 125  
Naval Postgraduate School  
Monterey, CA 93943 USA

Fall 2004

Ferroelectricity Newsletter

### CALENDAR OF EVENTS 2004

Nov 4-5 • Frontiers in Inorganic Polymers, ACS short course, Philadelphia, Pennsylvania, USA (see *Ferroelectricity Newsletter*, Vol. 12, No. 1, p.13)

Nov 29-  
Dec. 3 • 2004 MRS Fall Meeting, Boston, Massachusetts, USA (see *Ferroelectricity Newsletter*, Vol. 12 Nos. 2/3, p. 26)

Dec 5-10 • Polymer Chemistry: Principles and Practice, ACS short course, Blacksburg, Virginia, USA (see *Ferroelectricity Newsletter*, Vol. 12, No. 1, p. 13)

### 2005

Feb 6-9 • Workshop on Fundamental Physics of Ferroelectrics, Williamsburg, Virginia, USA (see p. 16)

Apr 17-20 • The 17th Annual Symposium on Integrated Ferroelectrics (ISIF 2005), Shanghai, China (see *Ferroelectricity Newsletter*, Vol. 12, Nos. 2/3, p. 27)

Jun 22-24 • The 2nd International Piezoelectric Quartz Crystal and Technology Exposition (CHINAPe2005), Shanghai, China (see p. 17)

Sep 5-9 • 11th International Meeting on Ferroelectricity (IMF-11), Cataratas del Iguazú, Foz do Iguazu, Argentina-Brazil Border (see p. 18)