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# Ferroelectricity Newsletter

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

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Volume 1, Number 4

Fall 1993

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## **THE FERROELECTRICITY NEWSLETTER IS ONE YEAR OLD: TAKING STOCK AND LOOKING AHEAD**

This issue completes the first year of publication of the quarterly update on what's happening in the field of ferroelectrics.

Last December we set out to inform the ferroelectrics community about upcoming meetings worldwide, and to provide highlights of conferences as well as lists of papers, research reports, and patents. We also promised to gather information on professional societies and scientific journals, and round out each issue with a calendar of events and each volume with an index. You will find **this yearly index on page 11 of this issue**. We invite you to peruse it and judge for yourself if we have kept our promise.

**Your response during this first year of publication has been extremely encouraging** and suggests that this newsletter evidently fills a need in the ferroelectrics community. Our goal, however, is to keep honing this tool of communication, and in order to accomplish this, we will ask you in our next issue to complete a **short questionnaire**.

One of the main developments during this first year of the *Ferroelectricity Newsletter* was the **continuous expansion in the scope of our readership**, particularly from colleagues overseas. In the beginning we tried to contain our international mailing list, but word got around, and we keep receiving inquiries from many parts of Europe, especially after major international conferences.

Taking our cue from this trend, **Volume 2 of the newsletter will feature overviews of research activities in different parts of the world**. In this issue we had originally planned to focus on research activities in the field of ferroelectrics presently pursued in Japan. As it stands now, the **Winter 1993** issue will give an overview of the state of the art in **Europe**, followed by a summary of **Japanese activities** in ferroelectrics in the **Spring 1994** issue.

Since the year **1994** marks the **centennial of the observation of the first dielectric anomaly with temperature in Rochelle Salt**, you will be treated to some personal accounts of important events in the history of ferroelectricity. Don't miss them in the upcoming issues.

Rudolf Panholzer  
Editor-in-Chief

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### **Ferroelectricity Newsletter**

Volume 1, Number 4  
Fall 1993

The *Ferroelectricity Newsletter* is published quarterly by the Naval Postgraduate School, Space Systems Academic Group, Monterey, California, with the support of the Defense Advanced Research Projects Agency (DARPA) and the Office of Naval Research (ONR).

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**RECENT PAPERS ON  
FERROELECTRICS**

Volume 2, Issue 3 (May/June 1993)  
of *Condensed Matter News* lists  
abstracts of papers on ferroelectrics.

The following papers will appear in a  
forthcoming issue of

**Ferroelectrics**

The elastic, piezoelectric, and dielectric  
constants of tetragonal PbTiO<sub>3</sub> single  
crystals

Z. Li, M. Grimsditch, X. Xu, and S.-  
K. Chan

Ferroelectric diffused electrical bilayer  
model for membrane excitation

Kotaro Shirane, Takayuki Tokimoto,  
Kozou Shinagawa, and Yoshiko  
Yamaguchi

The orientation of (Pb,Lu)TiO<sub>3</sub> thin  
films grown on different substrates by  
multi-ion-beam reactive cosputtering  
technique

Dingquan Xiao, Jumu Zhu, Jianguo  
Zhu, Zhili Xiao, Zhenghong Qian,  
Hailong Zhang, Huachong Guo, and  
Bizheng Xie

Crystal structure of the electric-field-  
induced ferroelectric phase of NaNbO<sub>3</sub>

V.A. Shuvaeva, M. Yu. Antipin, S.V.  
Lindeman, O.E. Fesenko, V.G.  
Smotrakov, Yu. T. Struchkov

On twinning of lithium niobate crystals  
under uniaxial loading

T.K. Barsamian, B.E. Mdivanyan,  
A.V. Tadevossian, R.A. Vardanian,  
and V. Sh. Shekhtman

The following papers will appear in a  
special issue of

**Ferroelectrics**

on Crystal Growth

Growth and optical properties of  
ferroelectric tungsten bronze crystals

R.R. Neurgaonkar, W.K. Cory, J.  
R. Oliver, E.J. Sharp, G.L. Wood,  
and G.J. Salamo

**PROFESSIONAL SOCIETIES****MATERIALS RESEARCH SOCIETY**

Membership in the Materials Research Society (MRS) is open to anyone  
with an interest in materials development, processing, or characterization.

**Membership benefits**

- First to know status -- Members automatically receive the Call for Papers and Program for MRS Meetings
- Subscription to the *MRS Bulletin*, a monthly publication with timely news and features on research and development of advanced materials
- Subscription to the *JMR Abstracts*, providing advance information on forthcoming articles appearing in the *Journal of Materials Research*
- Subscription to the *Journal of Materials Research* at a very low member rate. *JMR* is an international archival journal encompassing physical, chemical, and engineering research on advanced materials and processing techniques.
- The annual MRS Membership Directory
- Opportunity to purchase MRS books and videotapes at member prices 15-25% lower than list prices
- Reduced rates for journals and books from other scientific publishers
- Career services including the Job Placement Center at the MRS Spring and Fall Meetings and a free Position Wanted ad in the *MRS Bulletin*

**MATERIALS RESEARCH SOCIETY**

9800 McKnight Road  
Pittsburgh, PA 15237  
Phone (412) 367-3003  
Fax (412) 367-4373

**European Materials Research Society**

The goal of the European Materials Research Society (E-MRS) is to bring together professionals active in the field of advanced materials. In addition, worldwide contact between researchers is encouraged through the organization of conferences covering materials science and technology. A series of 25 symposia proceedings volumes have been published, with eight further volumes in preparation.

This series of symposia proceedings provides a medium by which the entire scientific community can keep pace with the latest developments.

Volume 16 of this series, *Magnetic thin films, multilayers, and superlattices*, contains the proceedings of Symposium C of the E-MRS Spring Conference, held in Strasbourg, France, from 29 May to 1 June 1990.

To obtain copies of E-MRS symposia proceedings, write to:

*In the US and Canada*

Elsevier Science Publishers  
Attn: Karien van der Harst  
PO Box 103  
1000 AC Amsterdam  
The Netherlands

Elsevier Science Publishers  
Attn: Judy Weislogel  
PO Box 882  
Madison Square Station  
New York, NY 10159

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## PROFESSIONAL SOCIETIES

### *AMERICAN ASSOCIATION FOR CRYSTAL GROWTH*

Founded in 1966, the American Association for Crystal Growth (AACG) is a national, nonprofit organization which is affiliated with the International Association for Crystal Growth (IACG). The purpose of AACG is to organize and support activities to advance the theory and practice of crystal growth, crystal characterization, and applications.

Every three years, AACG sponsors a week-long national conference. In addition, it sponsors special symposia and workshops, the latter on purification and protein crystal growth.

Membership in the AACG is open to everyone with a professional interest in theoretical and experimental work on the growth and properties of single crystals in bulk, thin film, or particulate form, crystallization phenomena, crystal production, and crystal applications.

The approximately 700 members, the largest fraction of which comes from the US, include engineers, scientists, educators, technologists, marketing representatives, and students.

**Membership benefits** include:

- Exchange of information with colleagues
- *AACG Newsletter*, published three times a year
- Roster of current members and their mailing addresses
- Automatic mailing of meeting announcements
- Reduced registration fees at AACG conferences
- Free employment advertisements in the *AACG Newsletter*

American Association for Crystal Growth  
PO Box 3233  
Thousand Oaks, CA 91359-0233  
Phone (805) 492-7047  
Fax (805) 492-4062

### *THE ELECTROCHEMICAL SOCIETY, INC.*

#### **History and Scope**

In 1901, six scientists, recognizing the future of scientific and industrial electrochemistry, invited their colleagues to join them in the formation of an American electrochemical society. This invitation resulted in 337 charter members, 52 of whom met and founded the Society in Philadelphia on 3 April 1902.

The formation of the Society was dictated by the rapid development of electrochemistry and related disciplines; its continuance has been assured by the value of the Society's activities to both fundamental and applied workers. In 1930, the international character of the Society was acknowledged by its incorporation as The Electrochemical Society, Inc., and in succeeding years its scope has broadened to encompass a wide range of subjects associated with electrochemical and solid state phenomena.

The vision of the Society's founders has been achieved during more than

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### *FERROELECTRICS PAPERS*

*cont.*

Growth and properties of triglycine sulfate (TGS): Review

*R.B. Lal, and A.K. Batra*

KTP and isomorphs—recent progress in device and material development

*L.K. Cheng, and J.D. Bierlein*

The following papers will appear in a forthcoming issue of

#### *Integrated Ferroelectrics*

Size effects on dielectric susceptibility of ferroelectric ultra thin films

*Baodong Qu, Weilie Zhong, Keming Wang, Zhonglie Wang*

Phase transitions in polar crystal RbLiCrO<sub>4</sub>

*A.I. Kruglik, S.V. Melnikova, A.D. Vasilyev, and K.S. Aleksandrov*

The study of the phase transitions in mixed crystals of the NH<sub>4</sub>HSeO<sub>4</sub> group

*A.A. Sukhovskiy, I.P. Aleksandrova, O.V. Rozanov*

On the nature of anomalous thermal hysteresis in crystals with incommensurate phase

*S.A. Gridnev, V.V. Gorbatenko, and B.N. Prasolov*

Unusual phase transitions in Pb<sub>1-x</sub>Sn<sub>x</sub>Te<sub>1-y</sub>Se<sub>y</sub> and Pb<sub>1-x</sub>Sn<sub>x</sub>Te<sub>1-y</sub>S<sub>y</sub> crystals induced by SN off-center ions

*A.I. Lebedev and I.A. Sluchinskaya*

Electron spectrum and optical constants of ferroelectrics with hydrogen bonds

*I.V. Stasyuk, and R.Y. Stetsiv*

Dielectric and electrostrictive properties of PMN-based complex perovskites

*E.P. Smirnova, O.V. Rubinshtein, and V.A. Isupov*

Prognosis of crystals with phase transitions in the *a*-K<sub>2</sub>SO<sub>4</sub> family

*B.V. Beznosikov*

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**FERROELECTRICS PAPERS**

cont.

Phenomenological theory of phase transitions in DMAAS crystals

*S.V. Pavlov and L.F. Kirpichnikova*

Memory effects in incommensurate phase and kinetic of electronic sub-systems

*R.F. Mamin*

Influence of the ferroelectric substrate on ultrathin High- $T_C$  superconductor films

*S.N. Dorogovtsev*

Recent advances in compositionally orderable ferroelectrics

*A.A. Bokov and I.P. Rayevsky*

Effects of local center interaction with soft modes in ferroelectrics

*V.X. Vikhnin*

Investigations of ferroelastic phase transitions in  $ABF_6O_6H_2O$  crystals (A: Zn, Co, Mg, Mn, Fe; B: Ti, Si)

*I.N. Flerov, M.V. Gorev, S.V. Melnikova, M.L. Afanasyev, and K.S. Aleksandrov*

The resonance and neutron diffraction study of  $Rb_2ZnBr_4$  under hydrostatic pressure

*I.P. Aleksandrova, K. Parlinsky, R. Currat, C. Vettier, and G. Eckhold*

A microscopical model of the structural phase transitions in  $La_{2-x}M_xCuO_4$

*N.M. Plakida and S.E. Krasavin*

High- $T_c$  superconductivity: New applications of ferroelectrics at microwave frequencies

*O.G. Vendik, L.T. Ter-Martirosyan, A.I. Dedyk, S.F. Karmanenko, and P.A. Chakalov*

Information writing mechanisms in thin-film MFIS structures

*I.L. Baginsky and E.G. Kostsov*

-- continued on page 5

**PROFESSIONAL SOCIETIES****ELECTROCHEMICAL SOCIETY** -- continued from page 3

90 years of the Society's existence. Over 5000 scientists and engineers from more than 40 countries hold individual membership, and the Society is supported by more than 125 corporations through Patron and Sustaining Memberships.

**Objectives**

1. The advancement of the theory and practice of electrochemistry, electrometallurgy, electrothermics, electronics, and allied subjects.
2. The encouragement of research and the dissemination of knowledge in the fields of electrochemical and solid state science and technology.
3. The assurance of the availability of adequate training in the fields of electrochemistry and solid state science for chemists, engineers, metallurgists, physicists, solid state scientists, and others in related subjects.

**Divisions and Groups**

The technical activities of the Society are carried on by Divisions and Groups, the latter serving organizationally as a means of developing areas of interest within the Society. Members of the Society may affiliate with one or more Divisions or Groups, as determined by their interests. There are currently nine Divisions and two Groups.

*Divisions:*

1. Battery
2. Corrosion
3. Dielectrics and Insulation
4. Electrodeposition
5. Electronics
  - New Electronic Technologies
  - Semiconductors
6. High Temperature Materials
7. Industrial Electrolytics
8. Organic and Biological Electrochemistry
9. Physical Electrochemistry

*Groups:*

1. Energy Technology
2. Luminescence and Display Materials

**Meetings**

*Society* -- Major international meetings of the Society are held in the spring and fall of each year. At these meetings, the Divisions and Groups hold general sessions and sponsor symposia on specialized subjects. The meeting programs, with brief abstract of each paper, are published in advance in the *Journal of the Electrochemical Society*.

*Topical* -- From time to time, Divisions and Groups of the Society sponsor separate meetings devoted entirely to one special area of interest. These meetings often provide opportunities for detailed evaluation and extended discussion not ordinarily possible at Society meetings.

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## PROFESSIONAL SOCIETIES

**ELECTROCHEMICAL SOCIETY** -- continued from page 4

### Publications

*Journal of the Electrochemical Society* -- This monthly publication contains technical papers covering basic research and technology of interest in the areas of concern to the Society. Papers submitted for publication are subjected to careful evaluation and review by authorities in the field before acceptance, and high standards are maintained for the technical content of the *Journal*.

*Extended Abstracts* -- Extended (500-1000 word) abstracts of all technical papers presented at the Spring and Fall Meetings of the Society are published in serialized softbound volumes, which are available for purchase at the meetings or by subscription.

*Proceedings Volumes* -- Papers presented in symposia at Society and Topical Meetings are published from time to time as serialized softbound Proceedings Volumes. These provide up-to-date views of specialized topics and frequently offer comprehensive treatment of rapidly developing areas.

*Monograph Volumes* -- These hardbound publications provide authoritative topics in electrochemistry and related disciplines and have won widespread acceptance in the scientific community at large as primary reference works.

### Benefits of Membership

1. The assurance of being kept aware of pertinent scientific and technical developments through the *Journal of the Electrochemical Society*, which each member receives, and other Society publications. Members also receive discount on Monograph Volumes.

2. The stimulation of personal association and technical exchange with fellow scientists and engineers. Members receive reduced registration fees at Society Meetings.

3. The opportunity to contribute to the advancement of science and technology through support of Society activities.

Applications for admission and information with regard to membership may be obtained from Society members, from the membership desk at Society meetings, or from Society headquarters.

THE ELECTROCHEMICAL SOCIETY, INC.

10 South Main Street  
Pennington, NJ 08534-2896  
Phone (609) 737-1902  
Fax (609) 737-2743

## FERROELECTRICS PAPERS

cont.

Ferroelectric phase transition induced pseudo-stark splitting in spectra of  $\text{Li}_2\text{Ge}_7\text{O}_{15}:\text{Cr}^{3+}$  crystals

*S.A. Basun, S.P. Feofilov, and A.A. Kaplyanskii*

Critical behavior of uniaxial  $\text{Sn}_2\text{P}_2\text{S}(\text{Se})_6$  ferroelectrics

*Yu.M. Vysochansky, S.I. Perechinsky, V.M. Rizak, and I.M. Rizak*

On the role of charge carriers in the thermo-optical memory effect for  $\text{Sn}_2\text{P}_2\text{Se}_6$  ferroelectric-semiconductor in the incommensurate phase

*I.M. Rizak, V.M. Rizak, S.I. Perechinsky, Yu.M. Vysochansky, and V.*

*Yu. Slivka*

The following papers will appear in a special issue of

### *Ferroelectrics*

on the Proceedings of the 2nd CIS-USA Seminar on Ferroelectrics

New ferroelectrics in the  $\text{KTiOPO}_4$  family

*S.Yu. Stefanovich, B.V. Mill, and A.V. Butashin*

Transmission electron microscopy study of KDP crystals

*E.I. Suvorova and V.V. Klechkovskaya*

EPR studies of phase transitions and incommensurate states in  $3\text{D}^{1-}$ -ions doped  $\text{MgSiF}_6 \cdot 6\text{H}_2\text{O}$  crystals

*A.M. Ziatdinov and V.G. Kuryavyi*

Electrooptics of polymer dispersed ferroelectric liquid crystals

*V.Ya. Zyryanov, S.L. Smorgon, and V.F. Shabanov*

Peculiarities of low-frequency dielectric behavior of piezoceramics PZTNB in morphotropic region

*N.M. Galiyarova, S.V. Gorin, and A.V. Shilnikov*

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**FERROELECTRICS PAPERS**  
cont.

Gyrotropic and birefringent properties of ferroelectric TGS

*O.S. Kushnir, Y.I. Shopa, and O.G. Vlokh*

Volume-sensitive piezoelectric composites for electroacoustic transducers

*L.N. Syrkin, E.T. Kancherova, N.N. Feoktistova, and L.N. Tatarenko*

Multilayer ferroelectric-semiconductor structures for controlled sensors with memory

*V.P. Afanasjev and G.P. Kramar*

Photoferroelectric phenomena in ferroelectric-ferroelastic  $\text{Cd}_2\text{Nb}_2\text{O}_7$

*N.N. Kolpakova, Z.G. Ye, J.-P. Rivera, H. Schmid, and R.G. Verentchikova*

Dielectric nonlinearity and Raman scattering studies of the polarization state evolution in lead magnesium niobate

*N.N. Krainik, L.A. Markova, and A.A. Karamjan*

Modeling of the critical state in the granular High- $T_c$  superconductors

*V.V. Bryksin, S.N. Dorogovtsev, Yu.I. Kuzmin, and A.N. Samukhin*

Epitaxial growth of  $\text{Pb}(\text{Zr},\text{Ti})\text{O}_3$  thin films on sapphire (0112)

*T.S. Argunova, B.M. Goltsman, T.P. Efimova, T.B. Zhukova, G.N. Mosina, L.M. Sorokin, T.A. Shaplygina, and M.P. Scheglov*

Structure and properties of new ferroelectric crystals  $\text{M}_5\text{Nb}_3\text{O}_{18}$  ( $\text{M} = \text{NH}_4, \text{K}, \text{Rb}$ )

*N. Sidorov, V. Mitrofanov, V. Kuznetsov, A. Gutzol, V. Kalinnikov, and S. Stefanovich*

Secondary electron emission from thin ferroelectric, semiconducting, HT-superconducting layers (model and methodical possibilities)

-- continued on page 7

**UPCOMING MEETINGS****Third Williamsburg Workshop on First-Principles Calculations for Ferroelectricity**

**6 - 9 February 1994**  
**Williamsburg, VA**

**Scope**

Advances in phase transitions, physical properties, lattice dynamics, electronic structure, statistical mechanics, and molecular mechanics.

**Sponsors**

Office of Naval Research  
Gordon and Breach Journal *Ferroelectrics*  
Carnegie Institution of Washington

**Deadline for Abstracts**

31 December 1993

**Contact**

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E-mail [cohen@quartz.ciw.edu](mailto:cohen@quartz.ciw.edu)

**The 1994 Spring Meeting of the Materials Research Society**

**4 - 8 April 1994**  
**San Francisco, CA**

**Symposium F: Epitaxial Oxide Thin Films and Heterostructures**

Oxide thin films and multi-layer heterostructures are now being grown with very high crystalline quality through a variety of thin-film deposition technologies. It is the intent of this symposium to address issues that are relevant to the understanding of microstructural evolution and the structure-property-processing interrelationships in areas that are of technological relevance. Some examples are ferroelectric thin films using oxide electrodes for memories, high-temperature superconductor thin films for microwave and digital logic applications, electro-optic thin films, and magnetic oxide thin films. Materials issues that are relevant to the integration of these oxide-based technologies with conventional semiconductor-drive electronics are of special importance.

**Topics**

- Thin-film process technologies: materials research, developmental work, and scaling issues
- Growth mechanisms and microstructural evolution
- Buffer layers and templates for integration with Si, GaAs, and InP

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## UPCOMING MEETINGS

**MRS Spring 94 Meeting** -- continued from page 6

- Growth of nonplanar substrates
- Microstructural characterization
- Physical properties (electrical transport, optical dielectrical, and magnetic behavior)
- Device integration efforts

Joint sessions with Symposium N, *Better Ceramics Through Chemistry VI*, and Symposium S, *High-Temperature Superconductors: Multilayers, Interfaces, and Applications*, are anticipated.

### Abstract Deadline

1 November 1993

### Organizers

**R. Ramesh**, Bellcore, 331 Newman Springs Road, Red Bank, NJ 07701-7040, Phone (908) 758-3126, Fax (908) 758-4372

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E-mail wolfr@prl.philips.nl

### Symposium H: Polycrystalline Thin Films: Structure, Texture, Properties, and Applications

Polycrystalline films with thicknesses in the range of tens to thousands of nanometers are essential elements in a wide range of technologies. Examples include IC metallizations, magnetic recording media, magnetoresistive sensors, diffusion barriers, adhesion and seed layers, silicide contacts, wear-resistant coatings, and ferroelectric and superconducting thin films. Since the properties of the films are strongly influenced by grain size and preferred orientation (texture), the ways in which processing (deposition and annealing) can influence these parameters are of great technological and scientific interest. The main theme of the symposium is the role of grain structure, grain-to-grain "epitaxy," and interfaces in determining the behavior of thin films, especially those which are metallic and ceramic in nature.

### Topics

- Effects of deposition and post-deposition processing on grain structure
- Evolution and measurement of texture and "epitaxy" in polycrystalline thin films
- Reactions and transformations at interphase interfaces and grain boundaries

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### FERROELECTRICS PAPERS

*Yu.Ya. Tomashpolsky* cont.

Diffusion and electromigration of silver in PZT and HTSC ceramics

*G.S. Kulikov, R. Sh. Malkovich, E.A. Skoryatina, V.P. Usacheva, T.A. Shaplygina, S.F. Gafarov, and T.D. Dzhafarov*

A novel TGS/70:30 VDF:TrFE copolymer composite material for pyroelectric sensors

*M. Petty, J. Tsibouklis, J. Holland, M.C. Petty, W.J. Feast, and R. Richards* □

### EMF-7 PROCEEDINGS

The Proceedings of the Seventh European Meeting on Ferroelectricity (EMF-7), held from 8 - 12 July 1991 in Dijon, France, have been published in Volumes 124 - 128 (1991 and 1992) of the journal *Ferroelectrics*.

R.M. Pick, L. & G. Godefroy, and M. Maglione functioned as guest editors.

The 10 sessions of the EMF-7 are published in the following volumes:

#### Volume 124

1. Theoretical aspects of ferroelectricity
2. Crystal growth and structure
3. Phases transitions (including incommensurate and ferroelastic)

#### Volume 125

3. Phases transitions, cont'd
4. Spectroscopic studies

#### Volume 126

5. Dielectric and optical properties
6. Domains, boundaries, and surfaces

#### Volume 127

7. Ceramics, Polymers, and Composites

#### Volume 128

8. Applications of ferroelectrics
9. Superconductivity in oxides
10. Invited lectures

Volume 128 also contains an author index and a complete table of contents. Volume 124 lists the names of the 407 participants, coming from 30 different countries.

For information on how to obtain *Ferroelectrics*, see the Spring 1993 issue of the *Ferroelectricity Newsletter*, p. 10. □

<b>UPCOMING MEETINGS</b>
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**MRS 1994 Spring Meeting** --continued from page 7

- Correlation of structure with properties and behavior, including magnetic properties, superconductivity, normal conductivity, electromigration, interdiffusion, stress, and other mechanical properties
- Optimization of properties through the control of grain structure and texture
- Theoretical modeling of the behavior of polycrystalline thin films based on structural parameters, such as grain size and orientation distribution functions

Joint sessions with Symposium B, *Advanced Metallization for Devices and Circuits: Science, Technology, and Manufacturability*, and Symposium C, *Materials Reliability in Microelectronics IV*, are anticipated.

**Abstract Deadline**

1 November 1993

**Organizers**

**Michael Parker**, IBM Fellow Program, IBM ADSTAR, Dept. 808, Bldg. 028, 5600 Cottle Rd., San Jose, CA 95193, Phone (408) 256-4039, Fax (408) 256-5151, E-mail mparker@sjevm13.vnet.ibm.com

**Jerrold Floro**, Division 1112, Sandia National Laboratories, PO Box 5800, Albuquerque, NM 87185  
Phone (505) 844-4708, Fax (505) 844-9185

**Robert Sinclair**, Dept. of Materials Science & Engineering, Stanford University, Stanford, CA 94305  
Phone (415) 723-1102, Fax (415) 725-4034

**Katayun (Katy) Barmak**, Dept. of Materials Science & Engineering, Lehigh University, 5 E. Packer Ave., Bethlehem, PA 18015; Phone (215) 758-4218, Fax (215) 758-4244, E-mail kab6@lehigh.edu

**David A. Smith**, Dept. of Materials Science & Engineering, Stevens Institute of Technology, Hoboken, NJ 07030  
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**Ninth IEEE International Symposium on the Application of Ferroelectrics**  
**7 - 10 August 1994**  
**University Park, PA**

The ISAF-94 commemorates several important milestones in the history of ferroelectricity:

1. The centennial of the observation of the first dielectric anomaly with temperature in Rochelle Salt (1894)
2. The 75th anniversary of the discovery of ferroelectricity (1920 - 1922)
3. The golden anniversary of the discovery of the first most widely used ferroelectric, BaTiO<sub>3</sub>

The ISAF-94 will cover a wide range of ferroelectric, piezoelectric, and dielectric materials, along with several special sessions devoted to the development of electronic and optical devices.

**Topics**

- Papers related to the history of ferroelectrics
- Piezoelectrics, pyroelectrics, and ferroelectric materials: innovative processing, ceramic technology, single crystals, fibers, polymers, and composites
- Dielectrics, capacitors, and multilayer devices
- Sensor and actuator materials for smart systems, electrostrictive and photostrictive devices, high and low temperature applications, PTC and NTC, thermistors and varistors, and chemical sensors
- Microwave dielectrics and their applications

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**UPCOMING MEETINGS**

**ISAF-94** -- continued from page 8

- Ferroelectric films: processing, applications, and devices; integration of ferroelectrics with semiconductors and superconductors
- Uncooled IR detectors/bolometers, pyroelectrics, novel IR-detectors and imaging systems
- Nonlinear optical materials and devices, photorefractive materials, optical storage in ferroelectrics
- Liquid crystals, ferrofluids, electrorheological fluids and their applications
- Substrate materials for high-Tc superconductors

**Abstract Deadline**

29 January 1994

**General Chairman**

Amar Bhalla, Materials Research Laboratory, The Pennsylvania State University, University Park, PA 16802  
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**Contact**

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**Electroceramics IV**

International Conference on Electronic Ceramics & Applications

**5 - 7 September 1994**

**Aachen, Germany**

The conference continues a series of meetings on advances and recent developments in electronic ceramic materials, components, and applications. Innovations in bulk ceramic and thin film devices, as well as fundamental material properties and opportunities for future applications will be addressed.

**Topics**

- |  |  |
|--|--|
| • Dielectrics                              | • Superconductors                      |
| • Ferroelectrics, piezoelectrics, relaxors | • Substrates and microwave materials   |
| • Grain boundary controlled materials      | • Magnetics                            |
| • Electronic and ionic conductors          | • Processing and mechanical properties |

**Abstract Deadline**

1 March 1994

**Language**

The conference language will be English

**Contact**

Prof. Dr. Rainer Waser, RWTH Aachen University of Technology, D-52056 Aachen, Germany

**UPCOMING MEETINGS****3rd International Symposium on Domain Structure of Ferroelectrics and Related Materials  
6 - 9 September 1994  
Zakopane, Poland****Scope**

Domain structures of ferroelectrics, ferroelastics and higher order ferroics, as well as cross-disciplinary topics, such as twinning, bicrystallography, and others.

**Organizer**

Institute of Molecular Physics of the Polish Academy of Sciences

**Contact**

Prof. Bozena Hilczer, Institute of Molecular Physics, Polish Academy of Sciences, Smoluchowskiego 17/19, PL-60 179 Poznan, Poland  
Phone +(48-61) 67 40 71/140, Fax +(48-61) 67 47 51, E-mail isfd3@marta.ifmpan.poz.edu.pl.

**8th European Meeting on Ferroelectricity  
4 - 8 July 1995  
Nijmegen, The Netherlands****Scope**

Invited and contributed papers will be presented on theoretical, experimental, and application aspects of ferroelectricity, including

- Phase transitions and critical phenomena
- Electronic structure
- Lattice dynamics
- Charge-density wave systems
- Structure and growth
- Acoustic and ferroelastic properties
- Dielectric, piezo- and pyroelectric properties
- Optical properties
- Phase conjugation
- Thin films, surfaces, small particles
- New materials
- Modulated and incommensurate phases
- Disordered and glassy systems
- Domains, domain walls, imperfections
- Raman, Brillouin, IR spectroscopy
- X-ray, neutron and electron spectroscopy
- Polymers
- (Anti)ferroelectric liquid crystals
- Ceramics and composite materials
- Sensors, actuators, transducers
- Ferroelectric/semiconductor integration

**Organizer**

T. Janssen, Department of Physics, University of Nijmegen, 6525 ED Nijmegen, The Netherlands

**Contact**

Mrs. Rina Vos, Secretariat ENF8, Institute for Theoretical Physics, University of Nijmegen

**Correction**

In the Summer 1993 issue, the Calendar of Events showed a wrong date for the **MRS Spring 1994 Meeting. The correct date is 4 - 8 April 1994.**

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**Upcoming Meetings**

Symposium on Silicon Nitride and Silicon Dioxide Thin Insulating Films, San Francisco, CA	22-27 May 94	No.1, p. 9
Third Asian Regional Seminar on Microelectronics and Information Technology (TARSMIT '94), Bangkok, Thailand	9-11 Aug 94	No.1, p.10
Intern'l Symposium on Ferro- and Piezoelectric Materials and Their Application '94 Moscow, Russia	29 Aug-2 Sep 94	No.1, p.10
International Exhibition on Ferro- and Piezotechnics '94, Moscow, Russia	20 Aug-10 Sep 94	No.1, p.10
8th International Symposium on Electrets (ISE 8), Paris, France	7-9 Sep 94	No.1, p.10
13th Conference on Crystal Growth, Stanford Sierra Camp, CA	7-10 Jun 94	No.2, p.10
5th Russian-Japanese Symposium on Ferroelectricity (RJSF-5), Moscow, Russia	23-27 Aug 94	No.2, p.10
6th International Seminar on Ferroelastic Physics, Voronezh, Russia	12-15 Sep 94	No.2, p.11
1994 Fall Meeting of the Materials Research Society, Boston, MA	28 Nov-2 Dec 94	No.2, p.11
Ceramic Processing Science and Technology, Friedrichshafen, Germany	11-14 Sep 94	No.3, p.22
2nd Pacific Rim Conference on Ferroelectric Applications, Melbourne, Australia	21-24 Nov 94	No.3, p.22
1994 IEEE Ultrasonics Symposium, Cannes, France	1-4 Nov 94	No.3, p.23
55th Autumn Meeting of the Japan Society of Applied Physics, Nagoya City, Japan	19-22 Sep 94	No.3, p.23

**Conference Reports**

2nd International Conference on Magnetolectrics, Ascona, Switzerland	12-17 Sep 93	No.1, p.3
International Conference on Ultrasonic Attenuation and Internal Friction, Rome, Italy	5-9 Sep 93	No.1, p.4
41st Spring Meeting of the Japan Society of Applied Physics, Kawasaki City, Japan	28-31 Mar 94	No.3, p.15
11th Meeting on Ferroelectric Materials and Their Application in Japan, Kyoto, Japan	25-28 May 94	No.3, p.20

**Index of Scientific Papers**

7th European Meeting on Ferroelectricity (EMF-7) Proceedings	No.1, p.2
6th International Symposium on Integrated Ferroelectrics (ISIF 94) Papers	No.2, p.2
9th International Symposium on the Application of Ferroelectrics (ISAF '94) Presentations	No.3, p.2
6th International Seminar on Ferroelastic Physics	No.4, p.2

**Special Reports**

New Ferroelectric Devices	No. 1, p.2
Nonvolatile Memory Technology	No.2, p.2
History: Ferroelectricity -- The Early Years	No.1, p.5
Ferroelectricity -- The Middle Years	No.4, p.2
Research in Europe: Thin Films in Germany	No.2, p.5
FELMAS	No.2, p.6
Understanding Ferroelectricity	No.3, p.21
Microwave Dielectric Spectroscopy of Ferroelectrics	No.4, p.8
IEEE Thin Film Ferroelectric Glossary	No.3, p.20
Questionnaire	No.1, p.11

## CALENDAR OF EVENTS

<b>1993</b>	
<b>November</b> 1 7 - 10 29 - 3 Dec	<ul style="list-style-type: none"> <li>• Abstract deadline for the 1994 MRS Spring Meeting</li> <li>• The 1993 PAC RIM Meeting of the American Ceramics Society, Honolulu, HI: International Symposium on Ferroelectric Thin Films. Contact Isabel K. Lloyd, University of Maryland, Materials &amp; Nuclear Engineering, College Park, MD 20742-2115; Phone (301) 405-5221, Fax (301) 314-9467</li> <li>• MRS Fall 1993 Meeting, Boston, MA (see <i>Ferroelectricity Newsletter</i>, Vol. 1, No. 3, p. 11)</li> </ul>
<b>December</b> 31	<ul style="list-style-type: none"> <li>• Abstract deadline for 3rd Williamsburg Workshop for First-Principles Calculations for Ferroelectricity</li> </ul>
<b>1994</b>	
<b>January</b> 29	<ul style="list-style-type: none"> <li>• Abstract deadline for ISAF-94</li> </ul>
<b>February</b> 6 - 9	<ul style="list-style-type: none"> <li>• Third Williamsburg Workshop on First-Principles Calculations for Ferroelectricity, Williamsburg, VA (see p. 6)</li> </ul>
<b>March</b> 1 14 - 16	<ul style="list-style-type: none"> <li>• Abstract deadline for Electroceramics IV (see p. 9)</li> <li>• ISIF 6 Monterey, CA (see <i>Ferroelectricity Newsletter</i>, Vol. 1, No. 3, p. 11)</li> </ul>
<b>April</b> 4 - 8 24 - 28	<ul style="list-style-type: none"> <li>• MRS 1994 Spring Meeting, San Francisco, CA (see p. 6)</li> <li>• American Ceramics Society Meeting, Indianapolis, IN</li> </ul>
<b>August</b> 7 - 10	<ul style="list-style-type: none"> <li>• 9th IEEE Internat. Symposium on the Application of Ferroelectrics, University Park, PA (see p. 8)</li> </ul>
<b>September</b> 5 - 7 6 - 9	<ul style="list-style-type: none"> <li>• Electroceramics IV, Aachen, Germany (see p. 9)</li> <li>• 3rd International Symposium on Domain Structure of Ferroelectrics, Zakopane, Poland (see p. 10)</li> </ul>