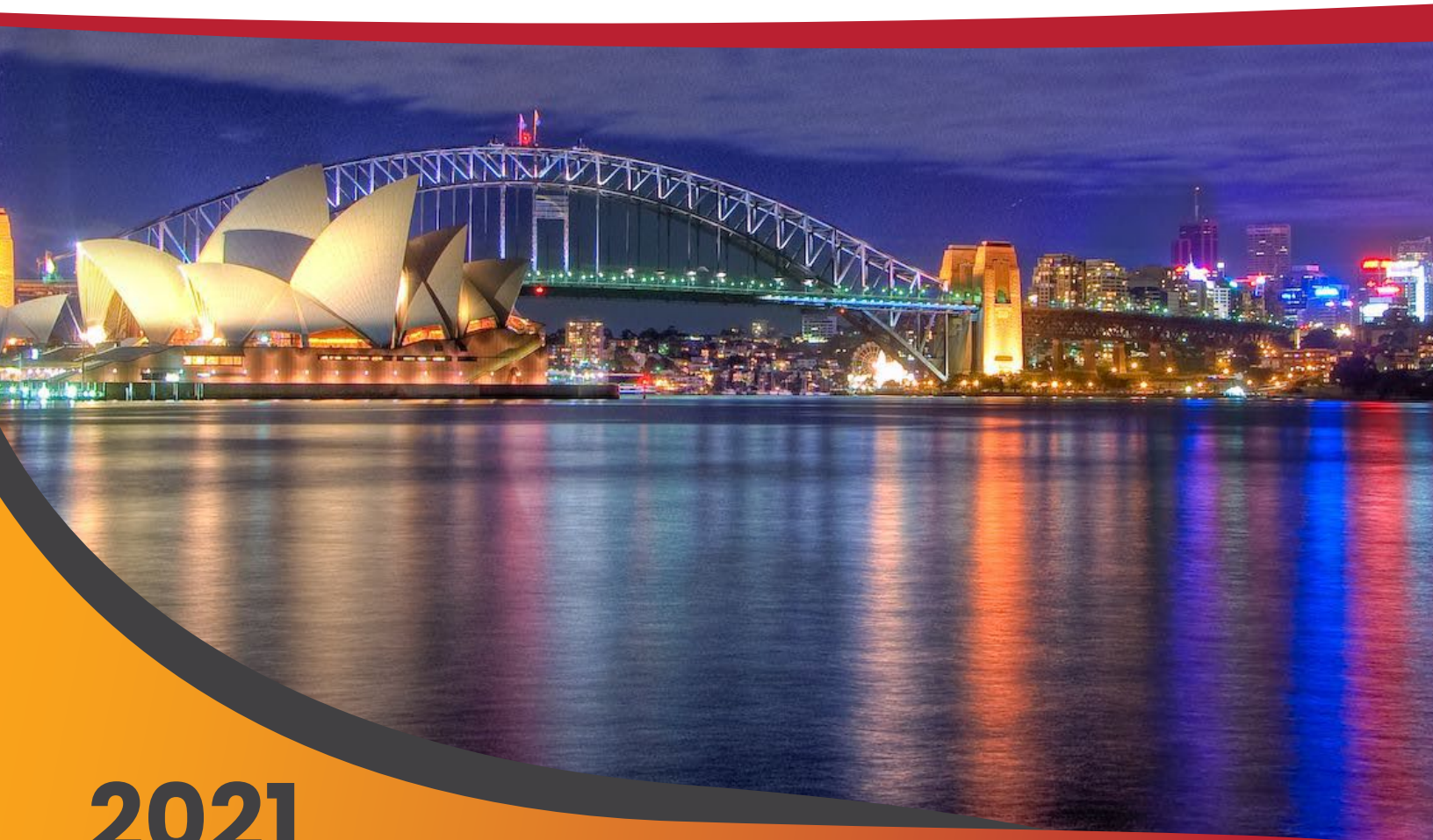
IEEE
ISAF 2021

Virtual Conference | May 16-21, 2021



2021 CONFERENCE PROGRAM

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UFFC IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society

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Welcome Message from the Chairs

Dear Colleagues,

In 2021, the IEEE International Symposium on Applications of Ferroelectrics (ISAF) has joined with International Symposium on Integrated Functionalities (ISIF) and Piezoresponse Force Microscopy (PFM).

While we are sure many of us were very much looking forward to an in-person meeting in Sydney, we welcome all participants to our online meeting. We hope this experience during the COVID19 pandemic can be as constructive as possible and lead to new insights and collaborations for the future. Please take advantage of the fact there is no limitation to viewing content during this meeting. The asynchronous nature and recorded sessions allow all participants to view and review as much conference material as they please, something that is simply impossible during in-person meetings. Do not hesitate to use the online forum capabilities as this is an excellent method to begin conversations that can be solidified when we can meet in person again (hopefully in Tours, France in June 27-July 1 of 2022!).

We have an excellent program this year. An outstanding set of speakers will contribute to our tutorial sessions covering a broad range of topics associated with our three combined meetings. The tutorial speakers are kind enough to offer two live Q&A sessions for each ISAF/ISIF/PFM tutorial during the week to accommodate various time zones. Our plenary speakers are Mark Humayun, Beatriz Noheda, Jun-Ming Liu, Marin Alexe and Dragan Damjanovic, they will give live video presentations and Q&A sessions. Each of these speakers are absolute world-leaders in their respective research fields and will no doubt provide interesting new insights to their current and past research, and also their perspective for the future. In addition to the 5 plenary talks, the scientific program will have approximately 80 sessions with 698 abstracts, of which 380+ are oral talks, 83 are invited talks, 63 are ferroelectrics young investigator talks and 170+ are posters. As well as our regular plenary, invited/contributed and poster sessions, we have several special sessions organized. These include, a celebration of 100 years since the first publication in ferroelectrics with guest speakers Xi Yao, Susan Trolier-McKinstry, Takaaki Tsurumi and Andrew Bell. We have a Women in Engineering Keynote talk from Susan Trolier-McKinstry. With regret, we will have a memorial session for Professor Pim Groen of Delft University whom passed away last year. Pim was a regular attendee of our meetings and well known to many in the field. A special initiative will also be trialled this year, with the inclusion of a session celebrating outstanding contributions of young ferroelectrics researchers from around the world. This session will provide a platform for up-and-coming researchers and will be an exciting place for sharing of novel and new ideas.

We would like to thank all those involved in the organization of the meeting, as well as the participants for their contributions. A particular mention should go to our sponsors, please ensure you check their details on the conference website and show your support by contacting and discussing with them any current or future needs you have associated with their products or services.

Lastly, we wish everyone a great meeting in 2021. Hopefully a year the world gets back to some normality.

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Shujun Zhang and John Daniels

IEEE ISAF-ISIF-PFM 2021 Organizers

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ISAF TPCs

Fundamentals of ferroelectrics and multiferroic materials (theory, modeling and experiments)
Chair: Xiaoli Tan- Iowa State University, USA
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Applications of ferroelectrics
Chair: Qifa Zhou- University of Southern California, USA
***Members*:**
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Sandy Cochran- University of Glasgow, UK
Junling Wang- Nanyang Technological University, Singapore
Do-Kyun Kwon- Korea Aerospace University, South Korea
Ron Polcawich- DARPA, USA
Vladimir Shur- Ural Federal University, Russia
Roger Whatmore- Imperial College London, UK
Jungho Ryu- Yeungnam University, Korea

Processing of piezoelectric crystals, ceramics, thick and thin films, composite, polymers, glass-ceramics and MLCCs
Chair: Alp Sehirlioglu- Case Western University, USA
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Kazumi Kato- AIST, Japan
Barbara Malic- Institut Jožef Stefan, Slovenia
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Structure characterization and properties of ferroelectrics:
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Kyle Webber- Friedrich-Alexander Universität, Germany
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Peggy Zhang- University of New South Wales, Australia

Lead-free dielectric and piezoelectric materials (A3+):
Chair: Ke Wang- Tsinghua Uni., China;
Hajime Nagata- Tokyo University of Science, Japan;
Wook Jo- Ulsan National Institute of Science and Technology, Korea
Members:
Jing-Feng Li- Tsinghua University, China
Satoshi Wada- University of Yamanshi, Japan
Jae-Ho Jeon- Korean Institute of Materials Science, Korea
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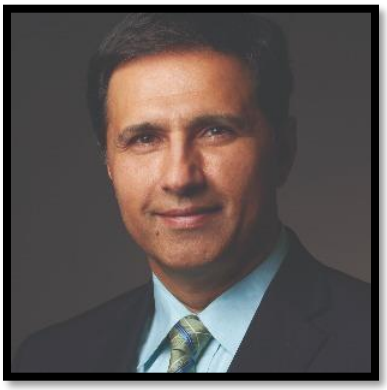


Mark S. Humayun, MD, PhD

Cornelius J. Pings Chair in Biomedical Sciences, Professor of Ophthalmology, Biomedical Engineering, and Integrative Anatomical Sciences.

Director of the USC Ginsburg Institute for Biomedical Therapeutics, and Co-Director of the USC Roski Eye Institute

Department of Physics

Friday, May 21st

9:00 AM – 10:00 AM AEST

Advanced Retinal Implants for Ophthalmology

Abiotic- Biotic interfaces in Ophthalmology have played and will in the future play an important role in not only restoring vision but hopefully also preventing vision loss. These interfaces can be wearable or implantable and are wirelessly connected. They can be diagnostic and/or therapeutic and in the future will benefit from artificial intelligence algorithms. This talk will focus mostly on a bioelectronic retinal implant but also briefly describe some other implants for Ophthalmology. Bioelectronic implants are those that are implanted in the eye either epiretinally (ganglion cell side) or subretinally (in between the retina and eye wall). Also, these implants can be situated at the visual cortex. Argus II epiretinal implant is the only FDA and EMA approved medical implant. It has 60 electrodes and both data and power are delivered via inductive coupling. This device is intended to restore useful vision for people suffering from retinitis pigmentosa, a genetic condition that leads to retinal blindness. The most recent results from the Argus II retinal Prosthesis (clinicaltrials.gov NCT00407602). The subjects of the clinical trials implanted with a Second Sight Argus II implant had severe outer retinal degenerations (photoreceptor loss). In the clinical trial, visual function was evaluated by visual function tests presented on an LCD screen, including Square Localization, Direction of Motion, and Grating Visual Acuity. Assessments of functional vision included controlled Orientation and Mobility (O&M) tasks, and the Functional Low-Vision Observer Rated Assessment (FLORA). The talk will cover some of the engineering challenges as well as surgical and clinical learnings. Pixium Prima is a subretinal implant that is in early clinical trials for dry age-related macular degeneration and is a photovoltaic based device and this will also be covered. Visual Cortical implants like the Second Sight ORION and the Utah device which are in early clinical trials will also be discussed. Lastly, some other non-bioelectronic devices such as scaffolds form stem cells which are also in early clinical trials will be discussed.

Beatriz Nohed

Zernike Institute for Advanced Materials & Cognitive Systems and Materials center (CogniGron)

University of Groningen

Monday, May 17th

8:00 PM – 9:00 PM AEST

Ferroelectric Memories At Last

In spite of being one of the first (or perhaps the first) non-volatile semiconducting memory demonstrated almost 70 years ago, ferroelectrics have struggled to compete in the race towards miniaturization and it is only recently that ferroelectric memories can be scaled down sufficiently to be introduced at the industrial scale. The enabler of this success is the family of hafnia-based thin films, until recently a material used in transistors simply as insulating layer, which can be stabilized in a polar state, at sizes as small as a few nanometers. After a period of incredulity, in which multiple proofs of robust switching were collected, the first challenge has been to understand how ferroelectricity is achieved in these materials: What, at first, seemed like a puzzling set of miscellaneous mechanisms (size, doping, strain etc.), is now rationalized as volume changing routes that induce low molar volume, fluorite-like, metastable phases, among which two different polar phases, with orthorhombic and rhombohedral symmetries, have been reported. More recently, the scientific focus has moved to understanding the device behavior, as the properties of the ferroelectric layer strongly depend on the thickness, the electrode configuration and chemistry, as well as the magnitude and duration of the applied electric field pulses, challenging the robustness and reliability of future devices.

Here we present results on two-terminal LSMO/Hf0.5Zr0.5O2/LSMO multiferroic tunnel junctions showing both tunneling magnetoresistance effect (TMR) and tunneling electroresistance effect (TER), and their four associated resistance states by magnetic and electric field switching. Upon electric field cycling, the TER displays progressive enhancement reaching values as large as 106 %. Simultaneously, sign reversal of the TMR develops allowing electrical control of spin polarization. The epitaxial nature of these heterostrucutres (grown on SrTiO3 substrates) allows for an in-depth structural and microstructural investigation, including atomic resolution imaging in operando TEM and synchrotron experiments with electric field applied in-situ, that have allowed to directly demonstrate the crucial role of oxygen exchange in the switching characteristics in hafnia-based devices.

J. –M. Liu

Laboratory of Solid State Microstructures, Nanjing University

Institute for Advanced Materials, South China Normal University

Tuesday, May 18th

12:00 PM – 1:00 PM AEST

Multifold Control Of Magnetoelectric States In Multiferroic Nanodot Array

The first-priority application potentials of multiferroic/ferroelectric materials would be associated with the ultra-density data storages, and therefore various approaches along this line become particularly attractive. Recently, interest in ferroelectric/multiferroic topological domain structures is rapidly increasing with findings of a wealth of emerging exotic phenomena and prospect applications not only for future nanoelectronic devices. Certainly, the associated emerging fundamental issues of multiferroic physics and materials science are also attractive in the community. For example, observations of a number of fascinating domain structures in ferroelectric nanostructures have been reported, and additional topology associated with order parameters is discussed. Besides, various types of excitations and dynamic responses in these domain structures are expected. Among all of these emerging phenomena, we are particularly interested in topological domain structures and their emerging functionalities.

In fact, it is still challenging to characterize and manipulate various topological states and their related physical properties. In this presentation, we will address our recent works on manipulation of various ferroelectric topological states, e.g. quadrant vortex domains, central domains (monopole-like polarization texture with polarization pointing toward/from the central core), and fascinating domain wall properties, in epitaxial BiFeO3 (BFO) nanodots / nanoislands under well-controlled and combined preparation conditions. We have also been involved in domain switching and domain wall conductivity in well-prepared BFO nanostructures. These works as a whole package represent a comprehensive step towards understanding of the ferroelectric/multiferroic nanostructures and their application potentials.

Marin Alexe

University of Warwick

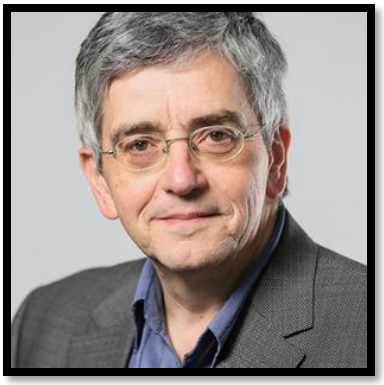
Wednesday, May 19

7:00 PM – 8:00 PM AEST

Induced Functionalities by Symmetry Breaking

Symmetry lies at the heart of the laws of nature and determines material properties at the fundamental level. We all know that breaking the inversion symmetry is directly mapped into materials properties by inducing a plethora of effects such as dielectric polarisation along with pyro- and ferroelectricity, piezoelectricity, bulk photovoltaic effect, electro-optic effect and second harmonic generation, etc. Material symmetry in chiefly determined by its pristine crystallographic structure, but external stimuli can also lower symmetry or even break the inversion symmetry. A well-known example of such stimulus is the strain gradient that breaks the inversion and induces electric polarisation in any material, including centrosymmetric materials, by the so-called flexo-electric effect.

In this talk, I will focus on inducing the effects associated with inversion symmetry breaking in native centrosymmetric materials. I will show that strain gradients not only induce electric polarisation but also convert any semiconductor in a photovoltaic/photogalvanic generator by the flexo-photovoltaic effect. Similarly, built-in electrical fields within ubiquitous Schottky contacts break the symmetry at the interface inducing piezo- and pyroelectricity with completely different tweaking parameters. I will also show that ferroelectric polarisation breaks locally the symmetry in contiguous materials, especially magnetic oxides, inducing/enhancing effects such as topological Hall effect.



Dragan Damjanovic

Group for Ferroelectrics and Functional Oxides, Institute of Materials

Swiss Federal Institute of Technology in Lausanne – EPFL

Thursday, May 20

7:00 PM – 8:00 PM AEST

Piezoelectricity: Symmetry Breaking, Disorder, Charge Transport And Multiproperty Coupling

The world of piezoelectric materials looks very different today than it did just 25 years ago: materials based on wurtzite and fluorite structures are today ferroelectric, centrosymmetric materials are considered for piezoelectric applications, monoclinic phases have been recognized in Pm3m perovskites, lead-free materials are said to show a promise to replace PZT, and flexoelectricity has been proposed as a viable alternative to piezoelectricity. These discoveries and perceptions are based on new theoretical approaches, advances in sophisticated characterization techniques, are driven in part by societal pressures, are sometimes revived old ideas, but, above all, are a result of readiness to look beyond the established interpretations. In fact, some of these breakthroughs and advances required “only” scratching of the surface” and looking deeper into the underlaying complexity of the material. The electro-mechanical coupling is always more complex than it looks at the first sight, has multiple origins and disentanglement of the resulting contributions to the properties is in the center of the science and applications of piezoelectric materials.

In that spirit, the focus of this presentation is on a second look at (i) the local atomic symmetry and disorder in oxide perovskites, (ii) nanoscale motion of domains and their mutual interactions in canonical ferroelectrics, (iii) piezoelectric effect in nonferroelectric oxides with fluorite structure and (iv) multicoupling of the electrical, chemical, elastic, thermal and optical processes in organometallic halide perovskites. The electro-mechanical response originating from the long-range and short-range displacements of electrons and atoms will be contrasted and emergence of the apparent giant electrostrictive and piezoelectric effects in some of these materials will be discussed.

Tutorials

PFM

1. Electromechanical phenomena probed by AFM – the challenges and opportunities of quantification

Nina Balke
Oak Ridge National Laboratory

Progress in many areas of science is indelibly linked to advances in techniques to investigate functional behavior on the micro- and nanoscale that have become essential in material science and device engineering. In areas such as ferroelectricity, energy storage and conversion, and information technologies, some important advancements are related to the development of atomic force microscopy (AFM) techniques which probe electro-(chemo-)mechanical phenomena, for example piezoresponse force microscopy (PFM). Current advances include multi-frequency approaches, the exploration of new measurables, and machine learning and experiment automatization. However, an underlying challenge to all these developments is the extraction of quantitative functional material properties which is necessary to compare results across AFMs, across different characterization techniques, and with theory to make AFM a truly integrated research approach leading to the physical understanding of new phenomena and materials. In this talk I want to highlight the challenges and opportunities to achieve the goal of quantitative material properties for the example of piezo- and ferroelectric but also ion conducting materials. This includes the understanding of signal origins under local electric fields to identify unwanted signal contributions as well as taking contact resonance cantilever vibrations into account. In the end, I will demonstrate the successful case of layered CuInP2S6 where PFM is used to extract the piezoelectric constant which is directly compared to theory, X-ray, and transmission electron microscopy to identify unusual ferroelectric properties in this material.

This work was supported by the U.S. Department of Energy, Office of Science, Basic Energy Sciences, Materials Science and Engineering Division. The experiments were conducted at the Center for Nanophase Materials Sciences, which is a DOE Office of Science User Facility.

2. Putting Ferroic Domains in Perspective: Multiscale and Dynamic Imaging

Yachin Ivry
Technion Israel Institute of Technology

A major question in the study of solid-state materials is: how are macroscopic and atomistic properties tailored at the intermediate scale? Ferroelectrics provide us with a unique opportunity to address this fascinating question and delve into the mesoscale. Ferroelectrics exhibit domains that mediate between the atomic-scale dipole moments and the macroscopic functionality. Thus, understanding domain organization and dynamics is a key goal in the study of these polar materials. In this tutorial, we will focus on the available imaging capabilities of spatial and temporal domain organization. The main emphasize will be on the prominent imaging method, piezoresponse force microscopy (PFM). The dos and don'ts of these methods will be discussed, strengthening our confidence in domain analysis as either readers or authors of papers with PFM data. To expose the expanding limits of contemporary domain imaging, some burning challenges will be discussed, such as: How can we observe fast domain dynamics with slow imaging methods? How can we distinguish between ferroelectric and ferroelastic domains during domain dynamics? How can we observe domain switching and domain evolution during phase transitions? How does the domain structure relate to the macroscopic behavior? What can PFM tell us about the domain-wall behavior?

The tutorial is suitable for a broad audience, including those who seek to understand domain-imaging data as well as those who actively work or wish to work with domain-imaging techniques.

ISIF

1. Introduction to piezoelectric MEMS technologies – History and recent trends
Isaku Kanno
Kobe University

2. Embedded Ferroelectric Memory at Texas Instruments: Technology, Reliability, and Applications
Ted Moise
Texas Instruments

An overview of non-volatile, Ferroelectric Random-Access Memory (FRAM) technology, reliability, and applications will be presented. Unlike conventional floating-gate based non-volatile memories, FRAM takes advantage of the electric dipole present within the ferroelectric material PbZrTiO3 (PZT) to store information. With write speeds 100x faster than flash memory and nearly-infinite write endurance, FRAM has applications both as a standalone memory and as an embedded memory when combined with a microcontroller.

In this tutorial, the key process steps and integration approach to embed PZT-based FRAM within a CMOS process flow will be overviewed. PZT capacitor electrical properties, bit distributions, and design considerations will be described. The impact of various stress conditions, such as thermal depolarization, imprint, and cycling will be summarized. The tutorial concludes with a brief survey of PZT-based FRAM applications and some high-level considerations for Hafnium-based ferroelectric memories.

Since achieving FRAM production in 2007, Texas Instruments (TI) and its partners have qualified and released hundreds of products with applications ranging from ultra-low power micro-controllers and medial devices to automotive event data recorders.

ISAF

1. Harvesting Energy from Mechanical Sources Using Piezoelectric Materials
Shad Roundy
University of Utah

In this tutorial I will cover the basic concepts of harvesting mechanical energy (i.e. motion and vibration) with piezoelectric materials. I will start with an introduction to mechanical energy harvesting. What types of energy are we trying to harvest? Why do we want to do this? When is it beneficial? I will then cover the basic concepts of mechanical energy harvesting separated from the specific the transduction technology (i.e. piezoelectric, electrostatic, etc.). The goal here is answer the question: how much energy could be harvested from a given source from any type of transducer? I will then move to piezoelectric energy harvesting covering two cases: static and dynamic energy harvesting. We will discuss the basic theory of piezoelectric energy harvesting for both cases. In static systems, the goal is typically to design the transducer with as much electromechanical coupling as possible. In the dynamic case, there is often a level of coupling beyond which output power saturates and a larger transducer or more coupling is not beneficial. Finally, I'll discuss current and potential future research topics.

2. Theory of Polarization
Nicola Spaldin
ETH Zurich

This tutorial will guide you towards understanding how the electric polarization is defined, calculated and measured in bulk periodic solids.

3. Ferroelectric Effect in Photovoltaic Materials
Christoph Brabec
Friedrich-Alexander-Universität Erlangen-Nürnberg

4. Fundamentals and Applications of Energy Storage

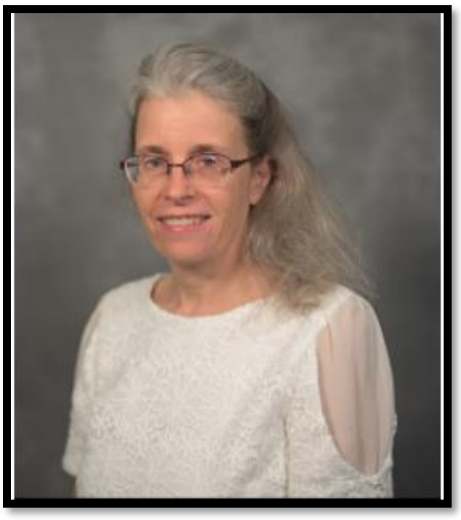
Yun Liu
The Australian National University

Antiferroelectric materials have recently become a hot research topic due to their promising applications in energy storage. However, there are some ambiguous descriptions about antiferroelectric concept and physical phenomenon as well as structure-property relationship in antiferroelectric materials. In this tutorial, I will start from the basic concept and origin of the antiferroelectricity, distinguishing it from ferroelectric and ferrielectric property based on their average structure. I will then briefly introduce a structural analysis approach to give you a more powerful tool to picture/identify antiferroelectric phases/components. I will discuss the defect and local structure derived antiferroelectric-like phenomena, surface effect, antiferroelectric-ferroelectric phase transition and “wake-up” effect. In the end I will focus the application of antiferroelectric materials in energy storage, including some perspectives on how to design antiferroelectricity for optimal performance.

Women in Engineering

Monday, May 17
11:00 PM – 1:00 AM AEST

Keynote:



Susan Trolier-McKinstry, Pennsylvania State University

Crafting a Scientific Career from Successes and Failures

Ferroelectric materials are now in widespread use in capacitors, piezoelectric devices, electrooptics, thermistors, and memory elements. This presentation will track the history of ferroelectricity from its inception through major milestones in finding ferroelectricity in a host of different crystal structures, understanding the link between crystal structure, domain structure, and properties. The contributions from many luminaries in the history of the field will be described.

Memorial Session of Prof. Pim Groen

Wednesday, May 19
5:00 AM – 6:00 AM AEST

Pim Groen, Professor and Chairman of Aerospace Structures and Materials, Delft University of Technology, Netherland, passed away on Wednesday 6 May 2020.

Pim Groen graduated in Chemistry from the University of Leiden in 1987 and obtained his PhD on ceramic superconductors in 1990. From 1987 to 2002 Prof. Groen worked for Philips Research in both the Netherlands and Germany, following which he became the R&D manager for Morgan Electroceramics. From 2008 to 2011 Prof. Groen worked as head of the Materials Performance group at TNO Science & Industry. From 2011 he was program manager for 'Large Area Printing' and 'Printed Conductive Structures' at the TNO Holst Centre. In 2009 Prof. Groen joined the Novel Aerospace Materials department in the field of smart materials and sensors and became Professor of the Smart Materials Chair in 2012. He combined this position with his work at the Holst Centre. Together with the people in hisresearch group, he focused on the development of smart, multifunctional materials, such aspiezoelectric composites. This technology can, among other things, increase the usability of wireless sensors that monitor the need for maintenance in hard-to-reach areas of aircraft by producing energy through vibrational energy harvesting, effectively eliminating the need for batteries.

In addition to his research activities, Prof. Groen was an active member of the Ferroelectric community and well known to many who regularly attend ISAF meeting. In 2019 he provided a tutorial session on The road towards flexible and smart electronic materials that was well received by all those that attended.

This is a memorial session for Pim, where his friends as well as former colleagues and students will give technical presentations relevant to his research fields.

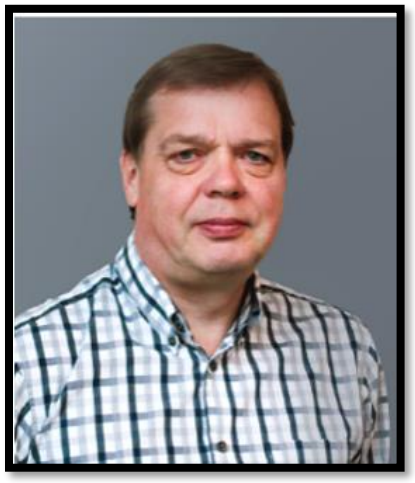
- Clive Randall (Pennsylvania State University)
- Demosthenis Giannopoulos (TU Delft)
- Sybrand van der Zwaag (TU Delft)
- Ian Reaney (University of Sheffield)
- Barbara Malic (Jožef Stefan Institute)
- Hamideh Khanbareh (University of Bath)
- Anton Tuluk (TU Delft)
- Tadhg Mahon (TU Delft)

Ferroelectric Publication 100-Year Anniversary Celebration

Tuesday, May 18th
9:00 PM – 10:00 PM AEST

In 1921, Joseph Valasek published the first paper on the ferroelectric behaviour in Rochelle Salt: J. Valasek, Piezoelectric and allied phenomena in Rochelle salt, Phys. Rev., 17 (1921)475-481.

A ferroelectric material can be described as one in which there is a spontaneous polarization which can be reoriented between two or more crystallographically defined states by applied external electric field. In the following century, numerous ferroelectric materials have been designed and developed to enable countless device advances. This includes dielectric capacitors, piezoelectric sensors and actuators, pyroelectric detectors, electrocaloric solid state cooling, electro-optical devices and non-volatile memories, to name just a few. Please join us during a special session of the meeting for topical celebrations of the impact offerroelectrics on society, predictions of the next century of ferroelectricity, and a birthday celebration for this scientific milestone. The special presentations below will be given in honour of this event.



Andrew Bell, University of Leeds

What Have Ferroelectrics Ever Done for Us?

Ferroelectric materials are at the heart of an exceptionally wide range of electrotechnical devices, across multiple market sectors. The scope of applications encompasses the ubiquity of capacitors and PIR sensors, through to the relative obscurity of, say, helicopter icing. detection. This diversity is due not only to the polarization's sensitivity to multiple external variables, but also to its coupling to other material characteristics such as lattice strain, refractive index and magnetization, resulting in piezoelectric, electro-optic and magnetoelectric effects. A further characteristic that promotes exploitation is the variety of material forms through which ferroelectrics can deliver their properties, including single crystals, bulk ceramics, thick films/multilayers, thin films, polymers and composites. This tutorial-style presentation will attempt to review exemplars of the most significant, interesting and entertaining applications of ferroelectric materials. Although a historically biased perspective is inevitable, the approach will be multi-faceted and will also feature new and emerging technologies. The talk will address device mechanisms, material figures of merit, relevant process technology, relative market size and how each application ranks on an arbitrary "cool" scale.

Takaaki Tsurumi, Tokyo Institute of Technology

Past and Future of Multi-layered Ceramics Capacitors (MLCCs)

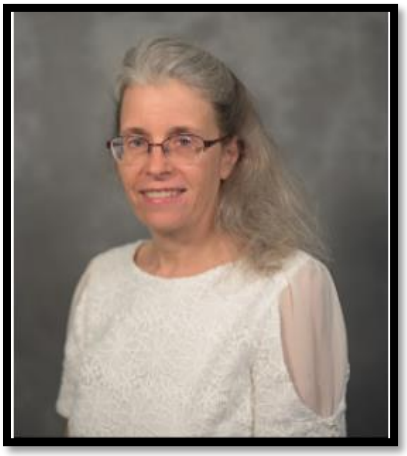
After the discovery of barium titanate (BT) in 1940s, the BT-based MLCCs become indispensable electronic components in modern electronic circuits. The former part of this presentation will trace the history of BT-based MLCC with stressing on the usage of nickel internal electrodes, the role of rare earth dopants, the reliability issue and the size effect of BT. In the later parts, our latest results of the development of energy storage MLCCs base on the long rage ionic motion to generate huge polarization. We believe that the MLCC technology will be a key to prevent the global warming and the climate change in the future.

Xi Yao, Xi'an Jiaotong University

The History of Dielectric and Ferroelectric Research in China

The research on dielectric and ferroelectric in China was started in the early 1950s by Prof. Jidan Chen in Jiaotong University, Shanghai, China, who is the pioneer and one of the major founders of the Chinese dielectric research field. In the late 1970s and early 1980s, a group of visiting scientists and students from China began studying and researching in many western countries, especially in the United States and Europe, including United Kingdom, France, Germany, etc. In the following decades, more Chinese scientists, students and engineers visited, studied and worked in many universities, institutions and

companies around the world. Some of them have played a very important role in the forefront and development of this field. At present, China has developed into almost the largest dielectrics and ferroelectric community, and has made great contributions to the field. Looking forward to the future, let us work together and strengthen cooperation to promote the further development of dielectric and ferroelectric research and application to meet the ultra-rapid development of modern science and technology.



Susan Trolier-McKinstry, Pennsylvania State University

100 Years of Ferroelectricity

Ferroelectric materials are now in widespread use in capacitors, piezoelectric devices, electrooptics, thermistors, and memory elements. This presentation will track the history of ferroelectricity from its inception through major milestones in finding ferroelectricity in a host of different crystal structures, understanding the link between crystal structure, domain structure, and properties. The contributions from many luminaries in the history of the field will be described.

Program: Live Zoom & Gather Town Sessions

***Times are listed in AEST.**

Monday, May 17

9:00AM - 11:00AM
Ferroelectrics Committee Meeting A

10:00AM - 10:30AM
Tutorial Q&A: Fundamentals and Applications of Energy Storage
Yun Liu

11:00AM - 12:00PM
Gather Town Exhibit Hall

5:00PM - 5:30PM
Tutorial Q&A: Ferroelectric Effect in Photovoltaic Materials
Christoph Brabec

6:00PM - 7:00PM
Student Social

8:00PM - 9:00PM
Plenary: Ferroelectric Memories At Last
Beatriz Noheda

9:00PM - 11:00PM
Ferroelectrics Committee Meeting B

10:00PM - 11:00PM
Gather Town Exhibit Hall

11:00PM - 1:00AM
Women In Engineering

Tuesday, May 18

12:30AM - 1:00AM
Tutorial Q&A: Ferroelectric Effect in Photovoltaic Materials
Christoph Brabec

2:00AM - 3:00AM
Gather Town Networking Break

9:00AM - 10:00AM
Student Networking

10:00AM - 11:00AM
Gather Town Exhibit Hall

11:00AM - 11:30AM
Tutorial Q&A: Introduction to piezoelectric MEMS technologies – History and recent trends
Isaku Kanno

12:00PM - 1:00PM
Plenary: Multifold Control Of Magnetoelectric States In Multiferroic Nanodot Array
J. – M. Liu

9:00PM - 10:00PM
Ferroelectric Publication 100-Year Anniversary Celebration
Susan Trolier-McKinstry
Xi Yao
Takaaki Tsurumi
Andrew Bell

10:00PM - 11:00PM
Gather Town Exhibit Hall

11:00PM - 11:30PM
Tutorial Q&A: Electromechanical phenomena probed by AFM – the challenges and opportunities of quantification
Nina Balke

Wednesday, May 19

5:00AM - 6:00AM
Memorial Session of Prof. Pim Groen (TU Delft)
Nelleke Groen
Demosthenis Giannopoulos
Clive Randall
Ian Reaney
Barbara Malic
Hamideh Khanbareh
Anton Tuluk
Tadhg Mahon

6:00AM - 6:30AM
Tutorial Q&A: Embedded Ferroelectric Memory at Texas Instruments: Technology, Reliability, and Applications
Ted Moise

8:00AM - 8:30AM
Tutorial Q&A: Electromechanical phenomena probed by AFM – the challenges and opportunities of quantification
Nina Balke

12:00PM - 12:30PM
Tutorial Q&A: Harvesting Energy from Mechanical Sources Using Piezoelectric Materials
Shad Roundy

1:00PM - 2:00PM
Gather Town Exhibit Hall

5:00PM - 5:30PM
Tutorial Q&A: Theory of Polarization
Nicola Spaldin

6:00PM - 6:30PM
Tutorial Q&A: Introduction to piezoelectric MEMS technologies – History and recent trends
Isaku Kanno

7:00PM - 8:00PM
Plenary: Induced Functionalities by Symmetry Breaking
Marin Alexe

9:00PM - 10:00PM
Ferroelectric Award Ceremony

10:00PM - 11:00PM
Panel: Meet the EIC and the T-UFFC
Peter Lewin
Alfred Yu
Jacob Jones
Susan Trolier-McKinstry
Nazanin
Barbara Malic

11:00PM - 12:00AM
Gather Town Exhibit Hall

Thursday, May 20

1:00AM - 1:30AM
Tutorial Q&A: Embedded Ferroelectric Memory at Texas Instruments: Technology, Reliability, and Applications
Ted Moise

1:00AM - 1:30AM
Tutorial Q&A: Harvesting Energy from Mechanical Sources Using Piezoelectric Materials
Shad Roundy

2:00AM - 2:30AM
Tutorial Q&A: Theory of Polarization
Nicola Spaldin

10:00AM - 11:00AM
Sydney Opera House Virtual Tour

4:00PM - 5:00PM
Gather Town Exhibit Hall

5:00PM - 6:00PM
Student Pitch Competition

6:00PM - 6:30PM
Tutorial Q&A: Fundamentals and Applications of Energy Storage
Yun Liu

6:00PM - 6:30PM
Tutorial Q&A: Putting Ferroic Domains in Perspective: Multiscale and Dynamic Imaging
Yachin Ivry

7:00PM - 8:00PM
Plenary: Piezoelectricity: Symmetry Breaking, Disorder, Charge Transport And Multiproperty Coupling
Dragan Damjanovic

8:00PM - 9:00PM
Gather Town Networking Break

9:00PM - 10:00PM
Student Contest Award Ceremony

10:00PM - 11:00PM
Gather Town Exhibit Hall

Friday, May 21

2:00AM - 2:30AM
Tutorial Q&A: Putting Ferroic Domains in Perspective: Multiscale and Dynamic Imaging
Yachin Ivry

9:00AM - 10:00AM
Plenary: Advanced Retinal Implants for Ophthalmology
Mark S. Humayun

10:00AM - 11:00AM
Gather Town Exhibit Hall

3:30PM - 4:00PM
Closing Ceremony & Student Awards

Technical Program Table of Contents (On Demand)

08:30:00AM - 12:00:00PM
A1L-1: ISAF: Domains
Session Chair: Asif Khan (Georgia Tech, US)

3493: The Synthesis, Domain Structures and Electrical Properties of <001>-Textured 1%Sm-PMN-29PT Piezoelectric Ceramics
Kun Zheng, Yi Quan, Jian Zhuang, Jinyan Zhao, Wei Ren, Lingyan Wang, Zhe Wang
Xi'an Jiaotong University, China

3630: Ferroelectric Switching of Multidomain KNbO3 Single Crystals
Liyan Wu{1}, Weiguo Zhang{2}, P. Shiv Halasyamani{2}, Jonathan Spanier{1}
{1}Drexel University, United States; {2}University of Houston, United States

3329: Dislocation-Based Domain-Engineering in Ferroelectric KNbO3 Single Crystals
Marion Höfling{2}, Maximilian Trapp{2}, Lukas Porz{2}, Enrico Bruder{2}, Hans-Joachim Kleebe{2}, Hana Uršič{1}, Jürgen Rödel{2}, Jurij Koruza{2}
{1}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia; {2}Technical University of Darmstadt, Germany

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08:30:00AM - 12:00:00PM
A1L-2: ISIF: 10 Years of Hafnia Ferroelectrics
Session Chair: Susan Trolier-McKinstry (Pennsylvania State University)

3067: Operando Observation of Reversible Oxygen Migration and Phase Transitions in Ferroelectric Hf0.5Zr0.5O2
Pavan Nukala{2}, Majid Ahmadi{7}, Evgenios Stylianidis{6}, Ruben Hamming-Green{7}, Mart Salverda{7}, Yingfen Wei{7}, Sytze de Graaf{7}, Arjan Burema{7}, Tamalika Banerjee{7}, Alexander Björling{4}, Dan Mannix{3}, Henny W. Zandbergen{1}, Sylvia Matzen{5},
{1}Delft University of Technology, Netherlands; {2}Indian Institute of Science, India; {3}Lund University, Sweden; {4}Lund University, MAX IV Laboratory, Sweden; {5}Université Paris-Saclay, Centre de Nanosciences et Nanotechnologies, CNRS, France; {6}Univ

3500: Field-Induced Structural Change in HfO2-Based Ferroelectric Materials (for Invited Young Investigator Symposium)
Takao Shimizu{4}, Takanori Mimura{5}, Yuki Tashiro{3}, Takanori Kiguchi{2}, Takahisa Shiraishi{2}, Toyohiko Konno{2}, Osami Sakata{1}, Hiroshi Funakubo{3}
{1}Japan Synchrotron Radiation Research Institute, Japan; {2}Tohoku University, Japan; {3}Tokyo Institute of Technology, Japan; {4}Tokyo Institute of Technology / National Institute for Materials Science, Japan; {5}University of Virginia / Tokyo Institute

3172: Temperature Dependent Phase Transitions in Ferroelectric HfO2
Terence Mittmann{2}, Monica Materano{2}, Patrick Dominic Lomenzo{2}, Alfred Kersch{1}, Thomas Mikolajick{2}, Uwe Schroeder{2}
{1}Munich University of Applied Sciences, Germany; {2}NaMLab gGmbH, Germany

3255: Thermal Stability of Antiferroelectric-Like Al:HfO2 Thin Films
Alexis Payne{2}, Nicholas Strnad{3}, Hanan Alex Hsain{2}, Younghwan Lee{2}, Jacob L. Jones{2}, Brendan Hanrahan{1}
{1}DEVCOM Army Research Laboratory, United States; {2}North Carolina State University, United States; {3}US Army Research Laboratory, United States

3571: The Effect of Temperature on the Ferroelectric Properties of Hafnium Zirconium Oxide MFM Thin-Film Varactors
Sukhrob Abdulazhanov, Maximilian Lederer, David Lehninger, Tarek Ali, Ricardo Olivo, Thomas Kämpfe
Fraunhofer Institute for Photonic Microsystems, Germany

3134: Ferroelectricity Patterning in a Thin Dielectric HfO2 Film
Anastasia Chouprik, Roman Kirtaev, Maxim Spiridonov, Andrey M. Markeev, Dmitrii Negrov
Moscow Institute of Physics and Technology, Russia

3200: Compositional and Phase Dependence of Elastic Modulus of Crystalline and Amorphous Hf1-xZrxO2 Thin Films
Shelby Fields{3}, David Olson{3}, Samantha Jaszewski{3}, Chris Fancher{1}, Sean Smith{2}, Diane Dickie{3}, Giovanni Esteves{2}, Michael Henry{2}, Paul Davids{2}, Patrick Hopkins{3}, Jon Ihlefeld{3}
{1}Oak Ridge National Laboratory, United States; {2}Sandia National Laboratories, United States; {3}University of Virginia, United States

3741: Causes for Ferroelectricity in Doped HfO2 Films - Centenary of the First Publication Announcing Ferroelectricity in Doped HfO2
Uwe Schroeder
NaMLab gGmbH, Germany

08:30:00AM - 12:00:00PM
A1L-3: Lead Free Dielectric: Energy Storage Film & MLCC
Session Chair: Ahmad Safari (Rutger Uni. US)

3083: BaTiO3-Based Solid Solutions for Energy Storage Applications
Marco Deluca, Federica Benes, Theresa Gindel, Vignaswaran Veerapandiyan
Materials Center Leoben Forschung GmbH, Austria

3150: Phase-pure AgNbO3 Antiferroelectric Thin Films on Si substrates by non-aqueous sol-gel method
Liang Shu, Xin Zhang, Jing Gao, Yu Huang, Yue-Yu-Shan Cheng, Lisha Liu, Jing-Feng Li
Tsinghua University, China

3082: Simultaneously Achieved High Energy Storage Density and Efficiency in (K,Na)NbO3-Based Lead-Free Ferroelectric Films
Yu Huang{3}, Liang Shu{3}, Suwei Zhang{2}, Zhen Zhou{3}, Yue-Yu-Shan Cheng{3}, Biaolin Peng{1}, Lisha Liu{3}, Jing-Feng Li{3}
{1}Guangxi University, China; {2}National Institute of Metrology, China; {3}Tsinghua University, China

3031: Effects of Amorphous Phase on the Energy Storage Properties of Bi(Mg0.5Tix)O3 Thin Films
Zhonghua Yao, Juan Xie, Hua Hao, Hanxing Liu
Wuhan University of Technology, China

3331: Ultrahigh–Energy Density Lead-Free Dielectric Films via Polymorphic Nanodomain Design
Hao Pan
Tsinghua University, China

3339: Flexible All-Inorganic Na0.5Bi0.5TiO3-Based Film Capacitor for High-Performance Dielectric Energy Storage
Panpan Lv, Di Wang, Changhong Yang, Xin Cheng
University of Jinan, China

3275: BiFeO3-SrTiO3 Based Materials for High Energy Density Capacitors
Zhilun Lu{5}, Ge Wang{5}, Weichao Bao{1}, Jinglei Li{6}, Linhao Li{5}, Ali Mostaed{5}, Huijing Yang{3}, Hongfen Ji{7}, Dejun Li{4}, Antonio Feteira{2}, Fangfang Xu{1}, Derek C. Sinclair{5}, Dawei Wang{5}, Shi-Yu Liu{4}, Ian M. Reaney{5}
{1}Shanghai Institute of Ceramics, Chinese Academy of Sciences, China; {2}Sheffield Hallam University, United Kingdom; {3}Tangshan Normal University, China; {4}Tianjin Normal University, China; {5}University of Sheffield, United Kingdom; {6}Xi'an Jiaotong

3387: Ultra-High Energy Storage Density in BNT-BT Thin Film with B-Site Elements Doping
Yanjiang Xie, Hua Hao, Minghe Cao, Zhonghua Yao, Hanxing Liu
Wuhan University of Technology, China

3625: Silver Niobate Thin Films for Energy Storage Applications
Jack Leber, Ahmad Safari
Rutgers University, United States

08:30:00AM - 12:00:00PM
A1L-4: Ferroelectric Applications: Sensors & Actuators
Session Chair: Xiaoning Jiang (NCSU, US)

3406: Designing Ordered Structure with Piezoceramic Actuation Units (OSPAU) for Generating Continual Nano-Step Motion
Zhanmiao Li{1}, Xiangyu Gao{2}, Jikun Yang{1}, Xudong Xin{1}, Xingyu Yi{1}, Lang Bian{1}, Shuxiang Dong{1}
{1}Peking University, China; {2}Xi'an Jiaotong University / Peking University, China

3697: Designing and Fabrication of Me Composite and Me Sensor
Rui Chen{1}, Zhiyun Chen{2}, Wenning Di{1}, Li Lu{1}, Jie Jiao{1}, Haosu Luo{1}
{1}Shanghai Institute of Ceramics, Chinese Academy of Sciences, China; {2}Shanghai Jiao Tong University, China

3238: Piezoelectric Pressure Sensors as Switching Devices
Weibo Gao, Qing-Ming Wang
University of Pittsburgh, United States

3107: Design and Experimental Validation of a Stress-Controlled Pressure Sensor for Wearable Pulse Monitoring
Havva Çeliktaş Oğuzcan, Mustafa Beyaz
Antalya Bilim University, Turkey

3115: Selectivity and Sensitivity of BiFeO3 MEMS Sensors to Micro-Amount of Hydrogen Sulfide Gas
Xiaojie Li{1}, Lintong Zhang{1}, Jianguo Chen{1}, Wei Ren{1}, Jiaqiang Xu{2}, Jinrong Cheng{1}
{1}Shanghai University, China; {2}Shanghai University, Nanoscale Engineering Science and Technology Laboratory, China

3206: Inkjet-Printed Transparent Piezoelectric Haptic Devices
Sebastjan Glinšek{2}, Longfei Song{2}, Nicolas Godard{2}, Veronika Kovacova{2}, Stéphanie Girod{2}, Matthieu Rupin{1}, Emmanuel Defay{2}
{1}Hap2U, France; {2}Luxembourg Institute of Science and Technology, Luxembourg

3227: Buckling Control of Multilayered Diaphragm Structures for Highly Sensitive Piezoelectric Ultrasonic Microsensors
Kaoru Yamashita, Takuma Yoshida, Akifumi Nishikawa, Genichiro Kiyota, Masashi Matsuda, Shota Nakajima
Kyoto Institute of Technology, Japan

3229: Pulse-Induced Vibration Modes and Natural Frequencies of Piezoelectric Ultrasonic Microsensors on Buckled Diaphragm Structures
Kaoru Yamashita, Wataru Dei, Shota Fujii, Tomoya Suetaka, Zhengxi Yi, Tomoki Nishioka
Kyoto Institute of Technology, Japan

3551: Rare Earth Orthoferrite Based LaFeO3 Pervoskites for sub-ppm NO2 Gas Detection
Kyungtaek Lee, Sugato Hajra, Manisha Sahu, Hoe Joon Kim
Daegu Gyeongbuk Institute of Science and Technology, Korea

3002: Electro-Chemo-Mechanical Coupling: A Novel Approach to Micro Actuation
Evgeniy Makagon{2}, Ellen Wachtel{2}, Lothar Houben{2}, Sidney Cohen{2}, Yuanyuan Li{1}, Junying Li{1}, Anatoly Frenkel{1}, Igor Lubomirsky{2}
{1}Stony Brook University, United States; {2}Weizmann Institute of Science, Israel

3575: The Quartz Surface Microbalance - a Possible Candidate for Rapid Respiratory Virus Detection
Ivan Avramov
Georgy Nadjakov Institute of Solid State Physics, Bulgaria

08:30:00AM - 12:00:00PM
A1L-5: Ferroelectric Applications: Energy Harvesting
Session Chair: Yaojin Wang (NJUST, China)

3056: Lead-Free Composite Piezo-Ultrasound Induced Energy Harvesting for Biomedical Applications
Laiming Jiang, Gengxi Lu, Yushun Zeng, Yizhe Sun, Runze Li, Mark Humayun, Qifa Zhou
University of Southern California, United States

3588: Magneto-Mechano-Electric Energy Harvesting by Magnetoelectric Composite for IoT Sensor Systems
Jungho Ryu{4}, Geon-Tae Hwang{3}, Dae-Yong Jong{1}, Shashank Priya{2}
{1}Inha University, Korea; {2}Pennsylvania State University, United States; {3}Pukyong National University, Korea; {4}Yeungnam University, Korea

3189: Fabrication of Piezoelectric Ceramics Foams and Their Applications in Energy Field
Huajun Sun, Yong Zhang
Wuhan University of Technology, China

3030: Piezo- and Pyroelectric Energy Harvesting for Chemical Applications
Yan Zhang{1}, Pham Thi Thuy Phuong{3}, Chris R. Bowen{2}
{1}Central South University, China; {2}University of Bath, United Kingdom; {3}Vietnam Academy of Science and Technology, Vietnam

3008: Aeroacoustic Energy Harvesting Using Relaxor Ferroelectric Single Crystal Fibre Composite
David Munk{1}, Scott Moss{1}, Ethan Jg Ellul{1}, Gareth Vio{2}
{1}Defence Science and Technology Group, Australia; {2}University of Sydney, Australia

3061: Vibration Energy Harvesting Using the Relaxor Ferroelectric Mn-PMN-PZ-PT Under Near-Operational Conditions
Ethan Jg Ellul{1}, Scott Moss{1}, David Munk{1}, David Blunt{1}, Wenyi Wang{1}, Eric Lee{1}, Riyazal Hussein{1}, Peter Stanhope{1}, Peter Finkel{3}, John Daniels{2}, John Thornton{1}
{1}Defence Science and Technology Group, Australia; {2}University of New South Wales, Australia; {3}US Naval Research Laboratory, United States

3099: Polymer Based Piezoelectric Energy Harvesting from Ocean Waves
Veronika Kovacova, Olivier Bouton, Mathieu Gerard, Emmanuel Defay, Jerome Polesel
Luxembourg Institute of Science and Technology, Luxembourg

3417: A Multiferroic Module for Biomechanical Energy Harvesting
Hanzhou Wu{1}, Alexander Tatarenko{2}, M.I. Bichurin{2}, Yaojin Wang{1}
{1}Nanjing University of Science and Technology, China; {2}Yaroslav-the-Wise Novgorod State University, Russia

3473: Simulation Analysis and Experiment of a Multi-Modal Piezoelectric Energy Harvester
Jian-Xu Wang, Ming-Chen Wang, Chun-Ming Wang
Shandong University, China

3479: Triboelectric Nanogenerator Based on Lead Free Triple Perovskites for Self-Powered Morse Code Generator
Sugato Hajra, Manisha Sahu, Hoe Joon Kim
Daegu Gyeongbuk Institute of Science and Technology, Korea

3574: Freeze Casting 2-2 Structured Porous Ferroelectrics for Enhancing the Longitudinal, Transverse and Hydrostatic Energy Harvesting Figures of Merit
Holly Pearce{2}, James I. Roscow{2}, Yan Zhang{1}, Chris R. Bowen{2}, Hamideh Khanbareh{2}
{1}Central South University, China; {2}University of Bath, United Kingdom

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08:30:00AM - 06:30:00PM
F1P-6: ISAF- Poster: Fundamental
Session Chair: Hana Ursic (Institute Jozef Stefan, Slovenia)

3023: Correlation Between Soft Mode Frequency and Carrier Concentration in Doped Strontium Titanate Crystals
Seiji Kojima
University of Tsukuba, Japan

3026: Thermal Diffusion in Polar Crystals
Yuriy Poplavko
National Technical University of Ukraine Igor Sikorsky Kyiv Polytechnic Institute, Ukraine

3111: Prediction Design and Experimental Verification of BiFeO3-PbTiO3 Based Solid Solutions
Zhixiang Jiao{2}, Jie Jian{2}, Jianguo Chen{2}, Jian Yu{1}, Jinrong Cheng{2}
{1}Donghua University, China; {2}Shanghai University, China

3149: The Possibility of Fine Domain Structure Modification in PMN-PT Single Crystal for Optical Application
Xin Liu{2}, Qingyuan Hu{2}, Ye Zhao{2}, Andrei D. Ushakov{1}, Vladimir Ya. Shur{1}, Zhenrong Li{2}, Xiaoyong Wei{2}, Zhuo Xu{2}
{1}Ural Federal University, Russia; {2}Xi'an Jiaotong University, China

3208: Ab Initio Study on the Electronic and Ferroeletric Properties of Two-Dimentional In2Se3 Monolayer
Naouel Chelil, Mohammed Sahnoun, Hamida Bouhani-Benziane, Houda Mokhefi
University of Mascara, Algeria

3241: Investigation of Manganese Doped Ferroelectric [NH4][Zn(HCOO)3] Formate Framework Using EPR Spectroscopy
Vidmantas Kalendra{4}, Marius Navickas{4}, Laivydas Giriunas{4}, Timur Biktagirov{2}, Uwe Gertsmann{2}, Wolf Gero Schmidt{2}, Mirosław Mączka{3}, Andreas Pöppl{1}, Juras Banys{4}, Mantas Šimėnas{4}
{1}Leipzig University, Germany; {2}Paderborn University, Germany; {3}Polish Academy of Sciences, Poland; {4}Vilnius University, Lithuania

3272: Amplitude Dependences of Dielectric Losses in a Thin-Film Nanogranular Composite Ferromagnetic – Ferroelectric
Alexandr Kalgin, Andrey Lun, Alexander Sidorkin
Voronezh State University, Russia

3294: Highly Nonlinear Magnetoelectric Effect in Buckled Honeycomb Antiferromagnetic Co4Ta2O9
Nara Lee{4}, Dong Gun Oh{4}, Sungkyun Choi{1}, Jae Young Moon{4}, Jong Hyuk Kim{4}, Hyunjun Shin{4}, Kwanghyo Son{2}, Jürgen Nuss{1}, Valery Kiryukhin{3}, Young Jai Choi{4}
{1}Max Planck Insitute for Solid State Research, Germany; {2}Max Planck Institute for Intelligent Systems, Germany; {3}Rutgers University, United States; {4}Yonsei University, Korea

3297: Anisotropic and Nonlinear Magnetodielctric Effects in Orthoferrite ErFeO3 Single Crystals
Hyunjun Shin, Dong Gun Oh, Jong Hyuk Kim, Nara Lee, Young Jai Choi
Yonsei University, Korea

3324: Hybrid Improper Ferroelectricity in A-Site Cation Ordered Li2La2Ti3O10 Ceramic with Triple-Layer Ruddlesden-Popper Structure
Xiao Qiang Liu{2}, Bi Hui Zhang{2}, Diming Xu{1}, Xiang Ming Chen{2}
{1}Peking University, China; {2}Zhejiang University, China

3342: Dielectric Properties and Impedance Analysis of Y/Yb-Doped Multiferroic TbMnO3
Peng-Ying Tsai, Bo-Hong Chen, Yu-Wei Lue, Tai-Chun Han
National University of Kaohsiung, Taiwan

3355: Repolarization of Ferroelectric Superlattices BaZrO3/BaTiO3
Alexander Sidorkin{3}, Lolita Nesterenko{3}, Yaovi Gagou{2}, Pier Saint-Gregoire{1}, Alexey Pakhomov{3}, Nadezhda Popravko{3}, Alexandr Kalgin{3}, Andrey Lun{3}
{1}CA laboratory, France; {2}Université de Picardie Jules Verne, France; {3}Voronezh State University, Russia

3358: Dielectric and Ferroelectric Properties of BiFeO3-PbTiO3 Multilayer Thin Films on Stainless Steel Substrates
Wenhui Lu, Jian Zhai, Jianguo Chen, Jinrong Cheng
Shanghai University, China

3377: Electrochemically-Formed Electrets in LaMnO3 Thin Films
Yong-Jin Kim, Chan-Ho Yang
KAIST, Korea

3457: Flexoelectrical Enhancement of Phase Competition in La Substituted BiFeO3 Thin Films
Youngki Yeo, Yong-Jin Kim, Chan-Ho Yang
KAIST, Korea

3478: Low and Near Room Temperature Ferroelectric Properties of Sm0.5Gd0.5FeO3 Single Crystal
Ramki Chakaravarthy, Gang Zhao, Luo Xiong, Ma Xiaoxuan, Jinrong Cheng, Shixun Cao, Wei Ren
Shanghai University, China

3541: Influence of Alternating Current Poling on Piezoelectric PMN-PT Single Crystal
Geon-Ju Lee{2}, Hwang-Pill Kim{2}, Ho-Yong Lee{1}, Wook Jo{2}
{1}Sun Moon University, Korea; {2}Ulsan National Institute of Science and Technology, Korea

3657: Counterbalancing Imbalanced Spin Arrangement Leads to Significant Magnetoelectric Coupling in Pb(Fe1/2Nb1/2)O3
Jae-Hyeon Cho{1}, Ju-Hyeon Lee{1}, Haeseong Jang{1}, Nyun Jong Lee{2}, Wook Jo{1}
{1}Ulsan National Institute of Science and Technology, Korea; {2}University of Ulsan, Korea

3683: Electric Field Gradient and Polarization in HIF Materials from ab-initio Calculations
Samuel Santos{4}, Michel Lacerda Marcondes{3}, Pedro-Rocha Rodrigues{4}, Ivan Paula Miranda{3}, Lucy V Credidio Assali{3}, Helena Maria Petrilli{3}, Armandina Maria Lima Lopes{2}, João Pedro Esteves Araújo{1}
{1}Faculdade de Ciências da Universidade do Porto, Portugal; {2}Faculdade de Ciências da Universidade do Porto, IFIMUP, Portugal; {3}Universidade de São Paulo, Brazil; {4}University of Porto, Portugal

3705: Switchable Bias-Field Effect in Tensile Strained BaTiO3 Epitaxial Film
Jun Han Lee{2}, Nguyen Xuan Duong{3}, Min-Hyoung Jung{1}, Junhyung Kim{2}, Gye-Hyeon Kim{2}, Daehwan Park{2}, Changhee Sohn{2}, Kibog Park{2}, Hu Young Jeong{2}, Tae Heon Kim{3}, Yoon Seok Oh{2}
{1}Sungkyunkwan University, Korea; {2}Ulsan National Institute of Science and Technology, Korea; {3}University of Ulsan, Korea

3027: Polar Bonds Ordering and Negative Thermal Expansion
Yuriy Poplavko
National Technical University of Ukraine Igor Sikorsky Kyiv Polytechnic Institute, Ukraine

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08:30:00AM - 06:30:00PM
F1P-6: ISAF-Poster: Ferroelectric Applications
Session Chair: Xiaoning Jiang (NCSU, US)

3062: Research on Motion Control of Bionic Mimosas Based on IPMC Driving
Hongyan Wang{1}, Aifen Tian{2}, Xuan Hui{2}, Kang Liu{1}, Yu Zou{1}
{1}Shaanxi Kekong Technology Industry Research Institute, Shaanxi Science and Technology Holding Group, China; {2}Xi'an University of Science and Technology, China

3096: Development of Active Piezoelectric and Ultrasonic Reverse Osmosis, Ultra- and Microfiltration Membranes with Improved Selectivity and Productivity
Andrey Rybyanets, Ekaterina Petrova, Natalia Shvetsova, Stepan Shcherbinin
Southern Federal University, Russia

3139: Transparent Relaxor-PbTiO3 Crystals and Their Application for Through-Illumination Photoacoustic Transducers
Chaorui Qiu{1}, Liao Qiao{1}, Jinfeng Liu{1}, Xiangyu Gao{2}, Zhuo Xu{1}, Fei Li{1}
{1}Xi'an Jiaotong University, China; {2}Xi'an Jiaotong University / Peking University, China

3204: Study of Polarization Switching and Negative Capacitance Regime in Epitaxial Ferroelectric Thin Films Structures
Andra-Georgia Boni, Cristina Chirila, Lucian Trupina, Lucian Dragos Filip, Ioana Pintilie, Lucian Pintilie
National Institute of Materials Physics, Romania

3290: Ferroelectric PVDF-Based Triboelectric-Piezoelectric Hybrid Nanogenerator for a Mechanical Energy Harvesting from Human Foot
Dong Woo Lee{1}, Dong Geun Jeong{1}, Jong Hun Kim{5}, Hyun Soo Kim{2}, Gonzalo Murillo{3}, Gwan-Hyoumg Lee{5}, Hyun-Cheol Song{4}, Jong Hoon Jung{1}
{1}Inha University, Korea; {2}Inha University / Korea Institute of Science and Technology, Korea; {3}Institute of Microelectronics of Barcelona IMB-CNM, Spain; {4}Korea Institute of Science and Technology, Korea; {5}Seoul National University, Korea

3354: Piezo-Catalytic Hydrogen Generation and Degradation of Organic Dyes by 0.7BiFeO3-0.3BaTiO3 Nano Particles with Proper Band Alignment
Yanhua Sun, Xiaoning Li, Shujun Zhang, Zhenxiang Cheng
University of Wollongong, Australia

Monday, May 17

3403: The Large Piezoelectricity and High Power Density of a 3D-Printed Multilayer Copolymer in a Rugby Ball-Structured Mechanical Energy Harvester
Xiaoting Yuan{1}, Xiangyu Gao{2}, Jikun Yang{1}, Xinyi Shen{1}, Zhanmiao Li{1}, Sujian You{1}, Zehuan Wang{1}, Shuxiang Dong{1}
{1}Peking University, China; {2}Xi'an Jiaotong University / Peking University, China

3423: All-Inorganic Flexible Piezoelectric Energy Harvester Enabled by Two Dimensional Mica
Yang Wang, Yaojin Wang
Nanjing University of Science and Technology, China

3428: Flexible Respiration-Driven Pyroelectric Nanogenerators Enabled by Glass Fiber Fabric
Yang Liu, Yaojin Wang
Nanjing University of Science and Technology, China

3459: Bio-Inspired Flexible Vibration Visualization Sensor Based on Piezoelectrochromic Effect
Yuxin Yang{2}, Yaojin Wang{1}
{1}Nanjing University of Science and Technology, China; {2}Tsien Hsue-Shen College, Nanjing University of Science and Technology, China

3468: Common Issues with Estimation of Electrocaloric Response of Thin Films by Indirect Method Based on Maxwell Relations
Yunlong Sun, Danyang Wang
University of New South Wales, Australia

3472: A Rotational Piezoelectric Energy Harvester Based on Trapezoid Beam: Simulation and Experiment
Ming-Chen Wang, Jian-Xu Wang, Chun-Ming Wang
Shandong University, China

3496: A Magneto-Mechano-Electric (MME) Energy Harvester Based on Rectangular Cymbal Structure
Zhonghui Yu, Jikun Yang, Xiaoting Yuan, Zhanmiao Li, Shuxiang Dong
Peking University, China

3546: A Simple Solid State Refrigeratior Prototype Based on Electrocaloric Effect
Yuanbo Li, Tongqing Yang
Tongji University, China

3568: Ferroelectric Polymer Composite for Magnetoelectric Application
Shashikant Gupta, Rajeev Gupta, Ashish Garg
Indian Institute of Technology Kanpur, India

3595: BiFeO3 Microspheres with High FeOH+ Levels Synthesized by Hydrothermal Method with PEG Surfactant for Efficient Degradation of Tetracycline
Hongjie Xing{1}, Suwei Zhang{2}, Jingji Zhang{1}, Huiwei Du{1}, Zejie Zhu{1}, Jiangying Wang{1}, Yaxuan Yao{2}, Lingling Ren{2}
{1}China Jiliang University, China; {2}National Institute of Metrology, China

3633: Multifunctional BaTiO3 Based Printed Devices for Wearable Medical Applications
Zois Michail Tsikriteas, James I. Roscow, Chris R. Bowen, Hamideh Khanbareh
University of Bath, United Kingdom

3645: Structured Piezoelectric (K,Na)NbO3-Polydimethylsiloxane Composite Scaffolds for Neuroregeneration
Vlad Jarkov{1}, Imaan Waqar{2}, Christopher Adams{2}, Hamideh Khanbareh{1}
{1}University of Bath, United Kingdom; {2}University of Keele, United Kingdom

08:30:00AM - 06:30:00PM
F1P-7: ISAF- Poster: Processing
Session Chair: Kui Yao (A Star, Singapore)

3071: Effects of Surface Roughening Method on the Performance of Ionic Polymer Metal Composition
Aifen Tian{4}, Yue Sun{4}, Xixi Wang{4}, Jiahua Li{3}, Xinrong Zhang{1}, Hongyan Wang{2}
{1}Chang'an University, China; {2}Shaanxi Kekong Technology Industry Research Institute, Shaanxi Science and Technology Holding Group, China; {3}Sichuan University, China; {4}Xi'an University of Science and Technology, China

3102: Preparation and Performance Analysis of Pt-IPMC for Driving Bionic Tulip
Aifen Tian{4}, Xixi Wang{4}, Yue Sun{4}, Xinrong Zhang{1}, Hongyan Wang{2}, Liang Yang{3}
{1}Chang'an University, China; {2}Shaanxi Kekong Technology Industry Research Institute, Shaanxi Science and Technology Holding Group, China; {3}Xi'an Jiaotong University, China; {4}Xi'an University of Science and Technology, China

3137: Significantly Enhanced Figure of Merits Piezoelectric Single Crystal Composites for Underwater Acoustic Transducer Applications
Ting Wang, Fei Li, Hongliang Du, Zhuo Xu
Xi'an Jiaotong University, China

3161: Large Piezoelectriclike Response from Inhomogeneously Deformed Silicon Crystals
Dongxia Tian, Yu Hou, Qi Pan, Baojin Chu
University of Science and Technology of China, China

3219: Formation of Flat Piezoelectric Thin Films by Solid-Phase Crystallization of Diphenylalanine
Pavel Zelenovskii{2}, Denis Alikin{5}, Konstantin Romanyuk{2}, Vladislav Slabov{1}, Kirill Keller{1}, Maria Correia{2}, Semen Vasilev{4}, Svitlana Kopyl{2}, Syed Tofail{4}, Andrei Kholkin{3}
{1}ITMO University, Russia; {1}ITMO University, Portugal; {2}University of Aveiro, Portugal; {3}University of Aveiro, CICECO, Portugal; {4}University of Limerick, Ireland; {5}Ural Federal University, Russia

3221: Optimization of Cold-Sintering of Bismuth Ferrite
Samir Salmanov{2}, Minghai Yao{1}, Katarina Žiberna{2}, Tadej Rojac{2}, Danjela Kuščer{2}, Barbara Malič{2}, Brahim Dkhil{1}, Clive Randall{3}, Mojca Otoničar{2}
{1}CentraleSupélec, Université Paris-Saclay, France; {2}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia; {3}Pennsylvania State University, United States

3230: Investigation of the Structural Properties of PbTiO3 Thin Films
Elton Carvalho Lima{4}, José de Los Santos Guerra{3}, Ariano De Giovanni Rodrigues{2}, Maria Inês Basso Bernardi{1}, Jean-Claude M'peko{1}, Antônio Carlos Hernandes{1}
{1}Universidade de São Paulo, Brazil; {2}Universidade Federal de São Carlos, Brazil; {3}Universidade Federal de Uberlândia, Brazil; {4}Universidade Federal do Tocantins, Brazil

3231: Temperature and Bias Electric Field Dependence of the Diffuse Phase Transition of PMN Ceramics
Elton Carvalho Lima{3}, José de Los Santos Guerra{2}, Eudes de Borges Araújo{1}
{1}São Paulo State University, Brazil; {2}Universidade Federal de Uberlândia, Brazil; {3}Universidade Federal do Tocantins, Brazil

3239: Effects of Excess Lead Oxide and Thermal Treatment on Conductivity and Dielectric Properties of Lead Iron Tungstate
Eva Kröll, Vladimir V. Shvartsman, Doru C. Lupascu
University of Duisburg-Essen, Germany

3285: A Novel Method for Fabricating Curved Single Crystal Composites
Nanxiang Jia, Hongliang Du, Zhuo Xu, Fei Li
Xi'an Jiaotong University, China

3322: Investigations on Photovoltaic Performance of Sol-Gel Derived BiFeO3-Based Heterostructures via Compositional Modification
Shibing Xiao, Huajun Sun, Xiaofang Liu, Huiting Sui
Wuhan University of Technology, China

3325: Enhanced Photocatalytic Performance of Dual Z-Scheme BPQDs/g-C3N4/BiFeO3 Composites and Mechanism Insight
Ziyu Yao, Huiting Sui, Huajun Sun
Wuhan University of Technology, China

3341: Thermal Stability of Dielectric and Energy Storage Performances of Ca-Substituted BNTZ Ferroelectric Ceramics
Ruiyi Jing, Qingyuan Hu, Xiaoyong Wei, Li Jin
Xi'an Jiaotong University, China

3370: Growth of <110> Oriented Soft Lead Zirconate Titanate Single Crystals via Solid-State Single Crystal Growth Method
Honghui Wang, Song Xia, Tingting Wang, Ming Ma, Zhenrong Li
Xi'an Jiaotong University, China

3380: Enhanced Piezoelectric Properties and Thermal Stability of Nd-Doped PMN-PT Single Crystals
Qian Li, Yangbin Liu, Fei Li, Zhuo Xu
Xi'an Jiaotong University, China

3391: Formation Mechanism of Barium Titanate Single Crystalline Microplates Based on Topochemical Transformation
Leiyang Zhang, Qingyuan Hu, Xiaoyong Wei, Li Jin
Xi'an Jiaotong University, China

3393: Self-Assembled BN Films Enhance the Energy Storage Properties of Polymer Dielectrics
Chao Chen, Jing Li, Xiaoyong Wei
Xi'an Jiaotong University, China

3421: Structure, Spectral Analysis and Microwave Dielectric Properties of Novel X (NaBi)0.5MoO4-(1-x)Bi2/3MoO4 (X = 0.2 ~ 0.8) Ceramics with Low Sintering Temperatures
Shuzhao Hao, Di Zhou
Xi'an Jiaotong University, China

3430: Highly-Flexible and Transparent Ceramic-Polymer Nanocomposite Films for Mechanical Energy Harvesting
Dabin Lin{2}, Zhuo Zhang{2}, Xiao Meng{2}, Weiguo Liu{2}, Lin Zhang{1}
{1}Massachusetts Institute of Technology, United States; {2}Xi'an Technological University, China

3470: Ultra-High Energy Density Induced by Diversified Enhancement Effects in Antiferroelectric Multilayer Ceramic Capacitors
Xiaohui Liu, Tongqing Yang
Tongji University, China

3471: Analysis on Discharge Behavior of Antiferroelectric Ceramics for Pulse Capacitors
Jinggang Gao, Tongqing Yang
Tongji University, China

3475: Enhanced Electrocaloric, Pyroelectric and Energy Storage Performance of Pb1-xLax(Hf0.65Ti0.35)1-x/4O3 Ferroelectric Ceramics
Jingjing Guo, Tongqing Yang
Tongji University, China

3501: Studies of the Physical Properties of Silver Paste with Various Organic Additives
Yingbang Yao, Yongcai Hu, Shengguo Lu
Guangdong University of Technology, China

3565: Wafer Level Control of (100) Orientation in LaNiO3 Thin Films Grown by RF Magnetron Sputtering with Different Target Materials
Jung In Yang, William Drawl, Nathan Bishop, Bradley Gibble, Susan Trolier-McKinstry
Pennsylvania State University, United States

3604: Exploration on the Preparation Process of Pure Phase Bismuth Ferrite Ceramic Powder
Tian Gang
Shandong University, China

3612: Epitaxy Growth and Characterization of BaTiO3 Thin Films
Jie Wang
Harbin Institute of Technology, Yugoslavia

3665: Permanently Self-Triggered Poling State in Mn-Doped Pb(Mg1/3Nb2/3)O3-PbTiO3 Single Crystals
Hwang-Pill Kim{2}, Geon-Ju Lee{2}, Ho-Yong Lee{1}, Wook Jo{2}
{1}Sun Moon University, Korea; {2}Ulsan National Institute of Science and Technology, Korea

3676: The Improved Piezoelectric Properties and Thermal Stability of Textured PMN-PT
Hye-Lim Yu, Woo-Seok Kang, Wook Jo
Ulsan National Institute of Science and Technology, Korea

3694: Synthesis of BaNiO3 Perovskite Oxide by Molten Salt Method
Jeong-Woo Seon, Jun-Yong Choi, Wook Jo
Ulsan National Institute of Science and Technology, Korea

08:30:00AM - 06:30:00PM
F1P-7: ISAF-Poster: Lead Free Ferroelectrics
Session Chair: Shujun Zhang (University of Wollongong)

3091: Revealing the Structural, Dielectric and Piezoelectric Properties of Lead-Free (1-x)(K0.5Bi0.5)TiO3-xBiAlO3 Solid Solution
Manish Badole, Sushmita Dwivedi, Tanvi Pareek, Sunil Kumar
Indian Institute of Technology Indore, India

3092: Understanding the Structure-Property Relation in La/Sc Co-Doped KNN Ceramics
Sushmita Dwivedi, Manish Badole, Tanvi Pareek, Sunil Kumar
Indian Institute of Technology Indore, India

3198: Local Insight Into Temperature Evolution of the BiFeO3-BaTiO3 Solid Solution Electromechanical Properties
Alexander Abramov{3}, Denis Alikin{3}, Dzmitry Zhaludkevich{1}, Anton Turygin{3}, Andrei D. Ushakov{3}, Alexander Zheludkevich{1}, Andrius Pakalniškis{4}, Ramunas Skaudžius{4}, Vladimir Ya. Shur{3}, Dmitry Karpinsky{1}, Andrei Kholkin{2}
{1}Scientific-Practical Materials Research Centre of NAS of Belarus, Belarus; {2}University of Aveiro, CICECO, Portugal; {3}Ural Federal University, Russia; {4}Vilnius University, Lithuania

3293: Quenching Effects on Depolarization Temperature of CuO-Doped (Bi1/2Na1/2)TiO3-Based Solid Solution Ceramics
Seiji Harada, Yuka Takagi, Hajime Nagata, Tadashi Takenaka
Tokyo University of Science, Japan

3304: Enhanced Energy Storage Properties in Bi0.5Na0.5TiO3-Based Lead-Free Ceramics
Hang Xie{2}, Jiwen Xu{1}, Linjing Liu{2}, Qiangwei Kou{2}, Enwei Sun{2}, Yunfei Chang{2}
{1}Guilin University of Electronic Technology, Guangxi Key Laboratory of Information Materials, China; {2}Harbin Institute of Technology, China

3353: Investigation MFS and MFM Structures Based on BaxSr1-xTiO3 Thin Films
Mikhail Afanasiev{1}, Dmitry Kiselev{2}, Galina Chucheva{1}
{1}Fryazino branch of the Kotelnikov Institute of Radioengineering and Electronics of Russian Academy, Russia; {2}National University of Science and Technology MISIS, Russia

3361: Tailoring the Dielectric and Piezoelectric Properties of High Temperature 0.75BiFeO3-0.25BaTiO3 Ceramic by Mixing Powders Calcined at Different Temperatures
Binbin Tong, Xin Shen, Jian Guo, Jianguo Chen, Jinrong Cheng
Shanghai University, China

3372: Nonergodicity-Derived Thermal Stability of Electromechanical Strain Properties in Lead-Free BNT-ST-CT Incipient Piezoceramics
Hyoung-Su Han, Hoang Thien Khoi Nguyen, Trang An Duong, Sang-Sub Lee, Chang Won Ahn, Jae-Shin Lee
University of Ulsan, Korea

3411: Enhanced Energy Density in a and B-Sites Co-Doped AgNbO3-Based Ceramics
Wenna Chao{2}, Tongqing Yang{2}, Yongxiang Li{1}
{1}Shanghai Institute of Ceramics, Chinese Academy of Sciences, China; {2}Tongji University, China

3425: Large Piezoelectricity in Ternary Lead-Free Single Crystals
Shuhao Wang{2}, Chao Chen{1}, Haosu Luo{3}, Yaojin Wang{2}
{1}Jingdezhen Ceramic Institute, China; {2}Nanjing University of Science and Technology, China; {3}Shanghai Institute of Ceramics, Chinese Academy of Sciences, China

3445: Structural and Dielectric Characterization of (1-x) BiScO3 -x BaTiO3 Ceramics for Energy Storage Applications
Jincymol Joseph{1}, Zhenxiang Cheng{2}, Shujun Zhang{2}
{1}Australian Institute of Innovative Materials, University of Wollongong, Australia; {2}University of Wollongong, Australia

3489: Enhanced Piezoelectric Properties and Electrical Resistivity in Eu-Modified CaBi2Nb2O9 High Curie Temperature Piezoelectric Ceramics
Juan-Nan Chen, Chun-Ming Wang
Shandong University, China

3499: Preparation, Structure and Electrical Properties of SrTiO3-BiFeO3 Thin Films
Yixiang Zhou, Xinzhu Liu, Haotian Lei, Kaixin Xu
Henan University, China

3509: High Performance Aurivillius-Type Bismuth Titanate-Tantalate (Bi3TiTaO9) Piezoelectric Ceramics for High Temperature Applications
Chen-Yang Liu, Chun-Ming Wang
Shandong University, China

3527: The Possibility of Tailoring Dielectric Properties by Thermal Etching in $BaBi_4Ti_4O_{15}$ (BBT) Relaxor Ferroelectrics
Vipul Kumar Sharma, Rashi Nathawat, Satyapal Singh Rathore
Manipal University Jaipur, India

3534: Influence of Non-Stoichiometry on Microstructure and Composition of Na0.5Bi0.5TiO3
Marija Dunce, Eriks Birks, Maija Antonova, Liga Bikse, Sanija Dutkevica, Otto Freimanis, Arturs Atvars, Maris Livins
University of Latvia, Latvia

3621: High-Entropy Perovskite Ceramics With Robust Ferroelectricity
Zhiyong Liu, Shuangchang Xu
Nanchang Hangkong University, China

3669: Enhanced Piezoelectric Activity with Good Thermal Stability in Ta-Cr Co-Modified CaBi4Ti4O15 High-Temperature Piezoceramics
Yang Liu{1}, Peng Zheng{1}, Lili Li{2}, Fei Wen{2}, Wangfeng Bai{1}, Liang Zheng{1}, Yang Zhang{1}
{1}Hangzhou Dianzi University, China; {2}Hangzhou Dianzi University / University of Wollongong, China

3672: Realizing High Energy Storage Properties and Outstanding Charge-Discharge Performances in Ca Doped Sr2NaNb5O15 Tungsten Bronze Ceramics with CuO Modification
Xinzhong Zhang{2}, Peng Zheng{2}, Lili Li{3}, Fei Wen{3}, Wangfeng Bai{2}, Jingji Zhang{1}, Liang Zheng{2}, Yang Zhang{2}
{1}China Jiliang University, China; {2}Hangzhou Dianzi University, China; {3}Hangzhou Dianzi University / University of Wollongong, China

3681: Controlling the Boundary Layer Capacitance (BLC) Related Dielectric Loss by Defect Chemistry and Post-Heat Treatment
Ju-Hyeon Lee{2}, Thuy-Linh Pham{1}, Jong-Sook Lee{1}, Wook Jo{2}
{1}Chonnam National University, Korea; {2}Ulsan National Institute of Science and Technology, Korea

3682: Synergistic Effect of Achieving Excellent Energy Storage Properties and Charge-Discharge Performance in Bi0.5Na0.5TiO3-Based Dielectric Ceramics
Yuqin Ding{1}, Wangfeng Bai{1}, Peng Zheng{1}, Lili Li{2}, Fei Wen{2}, Jiwei Zhai{3}
{1}Hangzhou Dianzi University, China; {2}Hangzhou Dianzi University / University of Wollongong, China; {3}Tongji University, China

3684: A Novel (Bi0.5Na0.5)TiO3-Based Lead-Free Ceramic Capacitors Featuring Concurrently High Energy Storage Density and High Efficiency Under Low Electric Field
Xinyu Zhao{2}, Wangfeng Bai{2}, Peng Zheng{2}, Lili Li{3}, Fei Wen{3}, Jingji Zhang{1}, Jiwei Zhai{4}
{1}China Jiliang University, China; {2}Hangzhou Dianzi University, China; {3}Hangzhou Dianzi University / University of Wollongong, China; {4}Tongji University, China

3686: Improvement of High Temperature Dielectric Property by Switching La-Doping Site on (Bi1/2Na1/2)TiO3-CaZrO3 Ceramic
Bo-Kyung Kim, Ju-Hyeon Lee, Wook Jo
Ulsan National Institute of Science and Technology, Korea

3688: Inducing soft-ferromagnetism in 100(1-x)BiFeO3-100xBaTiO3 by engineering superexchange path
Nuri Ko, Jae-Hyeon Cho, Wook Jo
Ulsan National Institute of Science and Technology, Korea

3703: Highly Enhanced Thermal Stability in Quenched Na0.5Bi0.5TiO3-Based Lead-Free Piezoceramics
Ji Zhang, Yaojin Wang
Nanjing University of Science and Technology, China

08:30:00AM - 06:30:00PM
F1P-8: ISAF- Poster: Characterization & Properties I
Session Chair: Andreja Golob (Jozef Stefan Institute, Slovenia)

3016: Dielectric Properties and Infrared Spectra of Ag0.92Li0.08NbO3 Ceramics
Edita Palaimiene{2}, Jan Macutkevic{2}, Juras Banys{2}, Irena Gruszka{1}, Antoni Kania{1}
{1}Institute of Physics, University of Silesia in Katowice, Poland; {2}Vilnius University, Lithuania

3045: Tuning the Photovoltaic Effect of BiFeO3 Thin Films via Oxygen Vacancy Doping
Hangbo Zhang, Marin Alexe
University of Warwick, United Kingdom

3384: Effect of Additives on Lead-Free Antiferroelectric NaNbO3 Ceramics
Hiroshi Maiwa, Yugeng Liu, Atushi Sakurai
Shonan Institute of Technology, Japan

3402: Enhanced Photocatalytic Activity in Ferroelectric BiFeO3 Powders Treated by a Corona Poling Method
Lintong Zhang, Jianguo Chen, Dengren Jin, Jinrong Cheng
Shanghai University, China

3404: Investigation on the Dielectric Temperature Stability of BaTiO3-Based Ceramics Fabricated by a Phase-Mixed Sintering Technique
Guojun Chen, Dengren Jin, Sainan Zhu, Jinrong Cheng, Jianguo Chen
Shanghai University, China

3418: Ultra-High Piezoelectric Coefficients in Relaxor Piezoelectric Ceramic
Lang Bian{1}, Zhanmiao Li{2}, Wenwu Cao{1}, Shuxiang Dong{2}
{1}Harbin Institute of Technology, China; {2}Peking University, China

3429: The Structural Control of Plate-Like NaNbO3 Particles via Topochemical Process
Yongbo Fan{2}, Weijia Wang{1}
{1}Northwestern Polytechnical University, China; {2}University of Sheffield / Northwestern Polytechnical University, China

3467: Structure and Piezoelectric Properties of Pb(Ni1/3Nb2/3)O3-PbTiO3 Using in Situ Synchrotron Diffraction
Yueyun Zhang, Hui Liu, Shengdong Sun, Jun Chen
University of Science and Technology Beijing, China

3488: Reduced Coercive Field and Enlarged Strain in BiFeO3-PbTiO3-0.15BaZrO3 Piezoelectric Ceramics
Jie Jian, Jianguo Chen, Jinrong Cheng
Shanghai University, China

3514: Dielectric, Piezoelectric, and Electromechanical Properties of Morphotropic Phase Boundary Compositions in the BiScO3-PbTiO3-Pb(Sn1/3Nb2/3)O3 Ternary Solid Solutions
Heng-Tao Liu, Chun-Ming Wang
Shandong University, China

3543: Ultrahigh Breakdown Strength and Improved Energy Density of Polymer Nanocomposites with Gradient Distribution of Ceramic Nanoparticles
Yanda Jiang{2}, Xin Zhang{2}, Zhong-Hui Shen{3}, Xinhui Li{2}, Jingjing Yan{2}, Bao-Wen Li{2}, Wen Nan{1}
{1}Tsinghua University, China; {2}Wuhan University of Technology, China; {3}Wuhan University of Technology / Tsinghua University, China

3564: Transition of Growth Modes in Electroforming Processes in a Crystalline Solid
Heung-Sik Park, Ji Soo Lim, Jeonghun Suh, Chan-Ho Yang
KAIST, Korea

3596: Enhanced Energy Storage Density of Bi0.5Na0.5TiO3-KNbO3 Relaxor Antiferroelectric Ceramics by A-Site Defect Engineering
Lulu Wu{1}, Jingji Zhang{1}, Yapi Liu{1}, Huiwei Du{1}, Zejie Zhu{1}, Jiangying Wang{1}, Wangfeng Bai{2}, Peng Zheng{2}, Fei Wen{3}
{1}China Jiliang University, China; {2}Hangzhou Dianzi University, China; {3}Hangzhou Dianzi University / University of Wollongong, China

3605: Greatly Enhanced Breakdown Strength and Energy Density in Ultraviolet-Irradiated Polypropylene
Jiayu Chen{3}, Bao-Wen Li{3}, Yi Sun{3}, Pengxiang Zhang{3}, Zhong-Hui Shen{4}, Xin Zhang{3}, Ce-Wen Nan{1}, Shujun Zhang{2}
{1}Tsinghua University, China; {2}University of Wollongong, Australia; {3}Wuhan University of Technology, China; {4}Wuhan University of Technology / Tsinghua University, China

3606: Oxygen-Ion Conductivity of Re Tungstates Ln14W4O33 (Ln = Nd, Sm, Gd)
Anna Shlyakhtina{3}, Nikolay Lyskov{1}, Sergei Cheryak{2}, Igor Kolbanev{3}, Anna Kasyanova{4}, Dmitriy Medvedev{4}
{1}Institute of Problems of Chemical Physics RAS, Russia; {2}Lomonosov Moscow State University, Russia; {3}N.N. Semenov Federal Research Center for Chemical Physics RAS, Russia; {4}Ural Federal University, Russia

3607: Study of the Eu and Sm Valence State in Oxygen-Ion Conductors Based on Ln2Hf2O7 (Ln = Eu, Sm)
Anna Shlyakhtina{3}, Nikolay Lyskov{2}, Alexander Shchegolikhin{1}, Igor Kolbanev{3}, Elena Konysheva{4}, Lidia Shcherbakova{3}
{1}Emanuel Institute of Biochemical Physics RAS, Russia; {2}Institute of Problems of Chemical Physics RAS, Russia; {3}N.N. Semenov Federal Research Center for Chemical Physics RAS, Russia; {4}University of Nottingham Ningbo China, China

3608: Piezoelectric and Strain Properties of KTN Single Crystal Near Curie Temperature
Fengying Liu
Shandong University, China

3623: Method of Testing Full Matrix Parameters Using One Sample
Da Huo{1}, Limei Zheng{2}, Rui Zhang{1}
{1}Harbin Institute of Technology, China; {2}Shandong University, China

3626: La2MoO6 Oxymolybdate Doped with Sodium: Atomic Structure and Physical Properties
Anna Shlyakhtina{3}, Ekaterina Orlova{2}, Elena Kharitonova{2}, Natalia Sorokina{1}, Valentina Voronkova{2}
{1}Federal Scientific Research Centre Crystallography and Photonics (KIF), RAS, Russia; {2}M.V. Lomonosov Moscow State University, Russia; {3}N.N. Semenov Federal Research Center for Chemical Physics RAS, Russia

3663: Significantly Enhanced Energy Storage Performance of Flexible Composites Using Anti-Ferroelectric Fillers
Zhihao Qian{2}, Fei Wen{3}, Ranran Zhang{2}, Lili Li{3}, Lin Zhang{4}, Peng Zheng{2}, Wangfeng Bai{2}, Jingji Zhang{1}, Xiaoyi Gao{4}, Wei Wu{2}, Gaofeng Wang{2}, Shujun Zhang{4}
{1}China Jiliang University, China; {2}Hangzhou Dianzi University, China; {3}Hangzhou Dianzi University / University of Wollongong, China; {4}University of Wollongong, Australia

3664: The Finite-Element Simulation Study the Discharged Energy Density of Polymer Composites by COMSOL Multiphysics
Ranran Zhang{2}, Lili Li{3}, Fei Wen{3}, Lin Zhang{4}, Peng Zheng{2}, Wangfeng Bai{2}, Jingji Zhang{1}, Xiaoyi Gao{4}, Wei Wu{2}, Gaofeng Wang{2}, Shujun Zhang{4}
{1}China Jiliang University, China; {2}Hangzhou Dianzi University, China; {3}Hangzhou Dianzi University / University of Wollongong, China; {4}University of Wollongong, Australia

3666: Effects of Na+ Substitutions on High-Field Dielectric Nonlinearity and Piezoelectric Responses of PMS-PZT Piezoelectric Ceramics
Mengmeng Hao{1}, Qiuchen Wu{2}, Fangfang Zen{1}, Jianjia Zhang{1}, Huitao Guo{1}, Wenzhong Lu{1}, Guifen Fan{1}
{1}Huazhong University of Science and Technology, China; {2}University of Nebraska–Lincoln, United States

3687: High Performance Mangetoelectric Multiferroicity Realized in (Pb,Co)(Fe1/2Nb1/2)O3 Through (Pb,Co)(Zr,Ti)O3 Substitution
Ji-Hun Park, Jae-Hyeon Cho, Wook Jo
Ulsan National Institute of Science and Technology, Korea

3692: Morphology-Controlled Growth of Single Crystal BaNiO3 Using Molten Salt Method
Jun-Yong Choi{2}, Hwang-Pill Kim{2}, Haeseong Jang{2}, Min Gyu Kim{1}, Jaechan Ryu{2}, Wook Jo{2}
{1}Pohang University of Science and Technology, Korea; {2}Ulsan National Institute of Science and Technology, Korea

3708: Enhanced Transduction Coefficient in Piezoelectric PZT Ceramics by Mixing Powders Calcined at Different Temperatures
Jian Guo, Binbin Tong, Jianguo Chen, Jinrong Cheng
Shanghai University, China

3735: The Dielectric and Piezoelectric Properties of the 1-3 Model PMN-PT/PVDF Composite Materials
Yannan Liang, Weimin Xia, Junhong Xing
Xi'an University of Technology, China

08:30:00AM - 06:30:00PM
F1P-8: ISIF: Posters
Session Chair: Brady Gibbons (Oregon State University, US)

3014: Piezoelectric Response in HfO2 and PbTiO3: A Comparative First-Principles Investigation
Sangita Dutta, Hugo Aramberri, Jorge Íñiguez
Luxembourg Institute of Science and Technology, Luxembourg

3068: Temperature Stability of Ferroelectric AlScN Films on Pt and Mo Electrodes
Md Redwanul Islam{2}, Niklas Wolff{2}, Georg Schönweger{2}, Adrian Petraru{2}, Hermann Kohlstedt{2}, Fabian Lofink{1}, Lorenz Kienle{2}, Simon Fichtner{2}
{1}Fraunhofer Institute for Silicon Technology, Germany; {2}Kiel University, Germany

3104: Enhanced Ferroelectric Properties of Epitaxial La-Doped Hf0.5Zr0.5O2 Thin Films
Tingfeng Song{1}, Romain Bachelet{2}, Guillaume Saint-Girons{2}, Raul Solanas{1}, Ignasi Fina{1}, Florencio Sánchez{1}
{1}Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain; {2}Université de Lyon-Institut des Nanotechnologies de Lyon (UMR5270/CNRS), Ecole Centrale de Lyon, France

3119: Study of Leakage Currents Mechanisms in Ferroelectric Hf0.5Zr0.5O2 Thin Film
Rabei Barhoumi, Jordan Bouaziz, Pedro Rojo Romeo, Nicolas Baboux, Benoît Manchon, Greta Segantini, Ingrid Cañero-Infante, Bertrand Vilquin, Damien Deleruyelle
Université de Lyon-Institut des Nanotechnologies de Lyon (UMR5270/CNRS), Ecole Centrale de Lyon, France

3120: Nonvolatile Manipulation of Electronic and Ferromagnetic Properties of NiO-Ni Epitaxial Film by Ferroelectric Polarization Charge
Mingyuan Yan{2}, Jianmin Yan{1}, Mengyuan Zhang{2}, Feifei Wang{2}, Renkui Zheng{1}
{1}Shanghai Institute of Ceramics, Chinese Academy of Sciences, China; {2}Shanghai Normal University, China

3173: Highly Thermally Stable Au–Al Bimetallic Conductive Thin Films with a Broadband Transmittance Between UV and NIR Regions
Dong Su, Guangzu Zhang, Shenglin Jiang
Huazhong University of Science and Technology, China

3310: Synthesis, Dielectric and Ferroelectric Characterization of Perovskite (Sr2Ta2O7)100-x(La2Ti2O7)x Ceramics: Application to Dielectric Resonator Antennas
Mohamad Haydoura{5}, Ratiba Benzerga{5}, Claire Le Paven{5}, Laurent Le Gendre{1}, Florent Marlec{5}, Vincent Laur{2}, Alexis Chevalier{2}, Yang Bai{3}, Heli Jantunen{3}, Franck Tessier{4}, Francois Chevire{4}, Ala Sharaiha{5}
{1}Université de Rennes 1, CNRS, IETR-UMR 6164, France; {2}University of Bretagne Occidentale, LABSTICC, France; {3}University of Oulu, Finland; {4}University of Rennes, Institut des Sciences Chimiques de Rennes, France; {5}University of Rennes, Institute

3334: Risk Screening as an Efficient Approach for Responsible Development of Lead-Free HfO2-Based Piezoelectric Materials
Madison Horgan, Hanan Alex Hsain, Khara Grieger, Jacob L. Jones
North Carolina State University, United States

3408: The Influence of Glass Components on the Electrical Properties of Li1.3Al0.3Ti1.7(PO4)3 Solid State Electrolyte
Jing Rui Kang, Rui Gu, Xiaoyong Wei
Xi'an Jiaotong University, China

3431: BaTiO3 Composite Thin Films Based Energy Harvesting Applications
Xiao Meng, Dabin Lin, Zhuo Zhang, Weiguo Liu
Xi'an Technological University, China

3530: Deposition Temperature Dependent Polarization Switching Properties of Atomic Layer Deposited Hf0.5Zr0.5O2 Thin Films
Dong Hyun Lee, Geun Taek Yu, Se Hyun Kim, Juyong Park, Kun Yang, Min Hyuk Park
Pusan National University, Korea

3591: Mitigating Wake-Up Effect and Improving the Endurance of Ferroelectric Hf0.5Zr0.5O2 by Optimizing Electric Pulse Width
Juyong Park, Dong Hyun Lee, Min Hyuk Park
Pusan National University, Korea

3593: The Electrocaloric Effect of Nanolaminate Structure HfO2/ZrO2 Film with Antiferroelectricity
Kun Yang, Dong Hyun Lee, Juyong Park, Min Hyuk Park
Pusan National University, Korea

3624: Structural and Electrical Properties of Lead Free (1-x)Bi0.5Na0.5TiO3-xNi0.5Zn0.5Fe2O4 Based Magnetoelectric Composite
Parminder Singh, Jayant Kolte, Puneet Sharma
Thapar Institute of Engineering and Technology, India

3650: Nickel Hard Mask for Patterning PZT-Based Piezoelectric MEMs
Pannawit Tipsawat, Susan Trolier-McKinstry
Pennsylvania State University, United States

3715: Simulation of Actual Performance in 3D Cross Point Array by Improving Non-Linearity of Ferroelectric Tunnel Junction Memory
Hojin Lee{2}, Joonbong Lee{2}, Jinho Byun{1}, Jaekwang Lee{1}, Taekjib Choi{2}
{1}Pusan National University, Korea; {2}Sejong University, Korea

3721: Interface Engineering in Hafnia Based Ultra-Thin Ferroelectric Capacitors
Joonbong Lee{2}, Myeongseop Song{3}, Woosung Jang{4}, Jinho Byun{1}, Hojin Lee{2}, Min Hyuk Park{1}, Youngmin Kim{4}, Jaekwang Lee{1}, Seungchul Chae{3}, Taekjib Choi{2}
{1}Pusan National University, Korea; {2}Sejong University, Korea; {3}Seoul National University, Korea; {4}Sungkyunkwan University, Korea

3088: Effect of Sc-Content on the High-Temperature Degradation of AlScN Thin Films
Niklas Wolff{3}, Md Redwanul Islam{3}, Maximilian Kessel{1}, Lutz Kirste{1}, Agnė Žukauskaitė{1}, Oliver Ambacher{1}, Fabian Lofink{2}, Simon Fichtner{2}, Lorenz Kienle{3}
{1}Fraunhofer Institute for Applied Solid State Physics, Germany; {2}Fraunhofer Institute for Silicon Technology, Germany; {3}Kiel University, Germany

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08:30:00AM - 06:30:00PM
F1P-9: ISAF- Poster: Characterization & Properties II
Session Chair: Yaojin Wang (NJUST, China)

3051: Microstructure Characterization and Properties of Porous Piezoceramics
Natalia Shvetsova, Igor Shvetsov, Maria Lugovaya, Mikhael Marakhovsky, Olga Bryl, Andrey Rybyanets
Southern Federal University, Russia

3052: Fabrication and Characterization of Ceramic Matrix Piezocomposites
Maria Lugovaya, Igor Shvetsov, Natalia Shvetsova, Mikhael Marakhovsky, Olga Bryl, Andrey Rybyanets
Southern Federal University, Russia

3101: Structural Features of Porous Sol-Gel PZT Films
Aleksandra Atanova{1}, Olga Zhigalina{1}, Dmitry Khmelenin{1}, Dmitry Seregin{2}, Konstantin Vorotilov{2}
{1}FSRC Crystallography and Photonics RAS, Russia; {2}MIREA - Russian Technological University, Russia

3116: Prediction and Demonstration of Narrow Bandgap Ferroelectric Semiconductors for Photovoltaic Application
Qiang Wu, Huanpo Ning, Jian Yu
Donghua University, China

3118: Impact of Alternating Current Electric Field Poling on Piezoelectric and Dielectric Properties of Pb(In1/2Nb1/2)O3-Pb(Mg1/3Nb2/3)O3-PbTiO3 Ferroelectric Crystals
Jinfeng Liu, Liao Qiao, Fei Li, Zhuo Xu
Xi'an Jiaotong University, China

3132: Frequency Dependence of Coercive Fields of [001]- and [011]-Poled Rhombohedral Pb(In1/2Nb1/2)O3-Pb(Mg1/3Nb2/3)O3-PbTiO3 Single Crystals
Liao Qiao, Jinfeng Liu, Zhuo Xu, Fei Li
Xi'an Jiaotong University, China

3164: Half-Metallic Ferromagnetism inGa1-xTixP Alloys: An Ab-Initio Study
Nacera Benbouchi{1}, Mohammed. El Amine Monir{2}, Fatima.Zohra Dahou{3}
{1}Université de Mascara, Algeria; {2}Université Mustapha Stambouli de Mascara, Algeria; {3}University of Oran 1, Algeria

3166: Significantly Improved Electric Field Induced Strain of Bi(Mg1/2Ti1/2)O3-Pb(Mg1/3Nb2/3)O3-PbTiO3 Ceramics by Template Grain Growth Method
Hongrui Jia, Linghang Wang
Xi'an Jiaotong University, China

3174: Ferroelectric Structures Barium-Strontium Titanate/Porous Glass
Andrey Tumarkin{2}, Natalya Tyurnina{1}, Zoya Tyurnina{1}, Olga Sinelshchikova{1}, Alexander Gagarin{2}, Sergey Sviridov{1}, Eugeny Sapego{2}
{1}Institute of Silicate Chemistry, Russia; {2}Saint Petersburg Electrotechnical University, Russia

3175: Structure and Microwave Characterization of Glass-Ceramic Ferroelectric Composite Material KFeSi/BaTiO3
Andrey Tumarkin{2}, Natalya Tyurnina{1}, Zoya Tyurnina{1}, Olga Sinelshchikova{1}, Alexander Gagarin{2}, Sergey Sviridov{1}, Eugeny Sapego{2}
{1}Institute of Silicate Chemistry, Russia; {2}Saint Petersburg Electrotechnical University, Russia

3178: Change of the Domain Structure by Electron and Ion Beam Irradiation in Relaxor SBN Single Crystals
Evgeny Greshnyakov{2}, Vera Shikhova{2}, Alla Nuraeva{2}, Dmitry Chezganov{2}, Maxim Nebogatikov{2}, Elena Pashnina{2}, Victor Anikin{2}, Lyudmila Ivleva{1}, Vladimir Ya. Shur{2}
{1}Prokhorov General Physics Institute, Russian Academy of Sciences, Russia; {2}Ural Federal University, Russia

3196: Non-Linear Dielectric Response of Layered CuInP2S6 Crystal
Andrius Dziaugys{3}, Ilona Zamaraite{3}, Jan Macutkevic{3}, Seweryn Miga{1}, Jan Dec{1}, Yulian Vysochanskii{2}, Juras Banys{3}
{1}University of Silesia, Poland; {2}Uzhhorod National University, Ukraine; {3}Vilnius University, Lithuania

3202: Quantification of Polar Entities in Quenched Na0.5Bi0.5TiO3-BaTiO3 Ceramics
Andreas Wohninsland, Ann-Katrin Fetzer, Hans-Joachim Kleebe, Jürgen Rödel, Lalitha Kodumudi Venkataraman
Technical University of Darmstadt, Germany

3209: Domain Growth on Lithium Niobate Nonpolar Cuts Induced by Focused Ion Beam
Dmitry Chezganov, Elena Pashnina, Evgeny Vlasov, Anton Turygin, Alla Nuraeva, Vladimir Ya. Shur
Ural Federal University, Russia

3217: Crystal Structure and Piezoelectric Properties of Racemic Crystals of Diphenylalanine
Pavel Zelenovskii{3}, Konstantin Romanyuk{3}, Michelle Liberato{2}, Fabio Ferreira{1}, Paula Brandão{3}, Alla Nuraeva{5}, Vladimir Yuzhakov{5}, Wendel Alves{1}, Luis Mafra{3}, Svitlana Kopyl{3}, Andrei Kholkin{4}
{1}Federal University of ABC, Brazil; {2}Universidade de São Paulo, Brazil; {3}University of Aveiro, Portugal; {4}University of Aveiro, CICECO, Portugal; {5}Ural Federal University, Russia

3220: Impurities Control on Ferroectric Thin Films Deposited by PLD
Cristina Chirila, Andra-Georgia Boni, Viorica Stancu, Iuliana Pasuk, Luminita Amarande, Lucian Trupina, Cosmin Istrate, Radu Cristian, Ioana Pintilie, Lucian Pintilie
National Institute of Materials Physics, Romania

3226: The Thermal Properties of LaBGeO5 Crystals
Ilya Shnaidshtein
Lomonosov Moscow State University, Russia

3263: Peculiarities of Dipolar Ordering in Mixed Cation Halide Perovskites
Sergejus Balčiūnas{3}, Mantas Šimėnas{3}, Sarunas Svirskas{3}, Martynas Kinka{3}, Vytautas Samulionis{3}, Robertas Grigalaitis{3}, Juras Banys{3}, Andrius Garbaras{1}, Anna Gagor{2}, Mirosław Mączka{2}, Adam Sieradzki{4}
{1}Center for Physical Sciences and Technology, Lithuania; {2}Polish Academy of Sciences, Poland; {3}Vilnius University, Lithuania; {4}Wrocław University of Science and Technology / Polish Academy of Sciences, Poland

3298: High-Performance Sm-Doped Pb(Mg1/3Nb2/3)O3-PbZrO3-PbTiO3-Based Piezoceramics
Qinghu Guo{2}, Pengbin Wang{2}, Fei Li{3}, Huajun Sun{2}, Hua Hao{2}, Hanxing Liu{2}, Shujun Zhang{1}
{1}University of Wollongong, Australia; {2}Wuhan University of Technology, China; {3}Xi'an Jiaotong University, China

3308: Peculiarities of the Dielectric Dispersion in Metastable Perovskites BiCrO3 and BiCr0.9Sc0.1O3
Robertas Grigalaitis{3}, Vaidotas Pauksta{3}, Juras Banys{3}, Joao Pedro Cardoso{2}, Andrei Salak{2}, Davide Delmonte{1}, Edmondo Gilioli{1}
{1}Institute of Materials for Electronics and Magnetism-CNR, Italy; {2}University of Aveiro, CICECO, Portugal; {3}Vilnius University, Lithuania

3348: Effect of Bi-Site Doping in BiFe0.95Mn0.05O3 Nanoparticles
Astita Dubey, Marianela E. Castillo, Vladimir V. Shvartsman, Doru C. Lupascu
University of Duisburg-Essen, Germany

3352: Enhanced Piezoelectric Properties and Electric Thermal Stability of High Temperature BiFeO3-PbTiO3-BaTiO3 Piezoelectric Ceramics with Bi2O3 Excess
Xin Shen, Binbin Tong, Shoukun Qin, Jianguo Chen, Jinrong Cheng
Shanghai University, China

3357: Enhanced Dielectric and Ferroelectric Properties in Lead Magnesium Niobate-Lead Titanate Ferroelectrics Solid Solutions by Controlling the Sintering Protocols
Yunyao Huang, Qingyuan Hu, Xiaoyong Wei, Li Jin
Xi'an Jiaotong University, China

3367: Synthesis of BaTiO3@ZnO:Er-PEG Nanoparticles
Jennifer León, Sandra Fuentes
Universidad Católica del Norte, Chile

3375: Tuning Phase Fractions and Leakage Properties of Chemical Solution Deposition Derived Mixed-Phase BiFeO3 Thin Films
Jinling Zhou{3}, Daniel Sando{3}, Xuan Cheng{2}, Zhijun Ma{1}, Nagarajan Valanoor{3}, Qi Zhang{3}
{1}Hubei University, China; {2}Monash University, Australia; {3}University of New South Wales, Australia

3376: Halide Dependent Raman Spectroscopic Investigation of Mixed Hybrid Halides MAPbBr3-xClx with x=0, 2, 2.5, 3
Syed Furqanul Hassan Naqvi{1}, Jae-Hyeon Ko{1}, Chang Won Ahn{2}, Tae Heon Kim{2}
{1}Hallym University, Korea; {2}University of Ulsan, Korea

3381: Temperature Dependent Raman Spectroscopic Study of Methylammonium Lead Bromide (MAPbBr3)
Dong Hoon Kang{1}, Jae-Hyeon Ko{1}, Chang Won Ahn{2}, Tae Heon Kim{2}
{1}Hallym University, Korea; {2}University of Ulsan, Korea

08:30:00AM - 06:30:00PM
F1P-9: PFM -Posters
Session Chair: Yunseok Kim (Sungkyunkwan University (SKKU))

3192: In-Plane Polarization Contribution to the Vertical Piezoresponse Force Microscopy Signal Mediated by the Cantilever "Buckling"
Lyubov Gimadeeva{3}, Denis Alikin{3}, Alexander Ankudinov{1}, Qingyuan Hu{4}, Vladimir Ya. Shur{3}, Andrei Kholkin{2}
{1}Ioffe Institute, Russia; {2}University of Aveiro, CICECO, Portugal; {3}Ural Federal University, Russia; {4}Xi'an Jiaotong University, China

3247: Polarization-Dependent Stiffness of Ferroelectric BaTiO3 Single Crystals at the Nanoscale
Christina Stefani{1}, Martí Checa{1}, Gustau Catalán{2}, Liam Collins{3}, Stephen Jesse{3}, Neus Domingo{1}
{1}Catalan Institute of Nanoscience and Nanotechnology ICN2, Spain; {2}Catalan Institute of Nanoscience and Nanotechnology ICN2 and ICREA, Spain; {3}Oak Ridge National Laboratory, United States

3252: Humidity Effect on Dynamic Ferroelectric Polarization Switching Under Different Writing Speeds
Irena Spasojevic{1}, Albert Verdaguer{3}, Neus Domingo{1}, Gustau Catalán{2}
{1}Catalan Institute of Nanoscience and Nanotechnology ICN2, Spain; {2}Catalan Institute of Nanoscience and Nanotechnology ICN2 and ICREA, Spain; {3}Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain

3426: Tuning Polarization Switching-Induced Injected Current by Mechanical Force in BiFeO3 Film
Fengyuan Zhang
University College Dublin / Southern University of Science and Technology, China

3529: High Speed Visualization of Ferroelectric Domains by Friction Asymmetry
Seongwoo Cho{1}, Iaroslav Gaponenko{2}, Kumara Cordero Edwards{2}, Loïc Musy{2}, Céline Lichtensteiger{2}, Patrycja Paruch{2}, Seungbum Hong{1}
{1}KAIST, Korea; {2}University of Geneva, Switzerland

12:30:00PM - 03:00:00PM
A2L-1: ISIF: Tunneling & Skymions
Session Chair: Alexei Gruverman (University of Nebraska at Lincoln)

3714: Negative Permittivity in Polar Skyrmions
Ramamoorthy Ramesh
University of California, Berkeley / Lawrence Berkeley National Laboratory, United States

3004: Freestanding Ultrathin Ferroelectric - Dielectric - Ferroelectric Heterostructure (For Invited Young Investigator Symposium)
Saidur Bakaul{1}, Yushi Hu{3}, Qi Zhang{4}, Sergei Prokhorenko{2}, Yousra Nahas{2}, Amanda Petford-Long{1}, Laurent Bellaiche{2}, Nagarajan Valanoor{4}
{1}Argonne National Laboratory, United States; {2}University of Arkansas, United States; {3}University of Chicago, United States; {4}University of New South Wales, Australia

3718: Ferroelectric as Tunneling Barrier in Magnetic Tunnel Junctions
Qi Li{1}, Yuewei Yin{2}
{1}Pennsylvania State University, United States; {2}University of Science and Technology of China, China

3647: Effect of Oxygen Deficiency on the Resistive Switching of Hf0.5Zr0.5O2 Ferroelectric Tunnel Junctions
Yoandris Gonzalez Hernandez{1}, Rajesh Katoch{1}, Andreas Dörfler{1}, Azza Hadj Youssef{1}, Sam Netzke{3}, Stephen Urquhart{3}, Dominique Drouin{4}, Andranik Sarkissian{2}, Andreas Ruediger{1}
{1}INRS Énergie Matériaux Télécommunications Research Centre, EMT, Canada; {2}Plasmionique Inc., Canada; {3}University of Saskatchewan, Canada; {4}University of Sherbrooke, Canada

3095: Fabrication and Electrical Characterisation of Hf0.5Zr0.5O2 Ferroelectric Tunnel Junction for Neuromorphic Application
Benoît Manchon{1}, Greta Segantini{1}, Nicolas Baboux{1}, Pedro Rojo Romeo{1}, Rabei Barhoumi{1}, Ingrid Cañero-Infante{1}, Dominique Drouin{2}, Bertrand Vilquin{1}, Damien Deleruyelle{1}
{1}Université de Lyon-Institut des Nanotechnologies de Lyon (UMR5270/CNRS), Ecole Centrale de Lyon, France; {2}University of Sherbrooke, Canada

3049: Electroresistance and Ferroelectric Polarization in HZO Films Down to 2 nm
Milena Sulzbach, Saúl Estandía, Jaume Gàzquez, Florencio Sánchez, Josep Fontcuberta, Ignasi Fina
Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain

12:30:00PM - 03:00:00PM
A2L-2: ISIF: HfO2
Session Chair: Susan Trolier-McKinstry (Pennsylvania State University)

3259: Enhanced Stability of Orthorhombic Ferroelectric Phase in HfxZr1-xO2 Films Enabled by Epitaxial Stabilization
Ting Feng, Huan Tan, Florencio Sánchez, Ignasi Fina
Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain

3007: Epitaxy of Ferroelectric Hf0.5Zr0.5O2 Thin Films: Key Factors for Orthorhombic Phase Formation
Yankun Wang, Liyan Dai, Jinyan Zhao, Haoxian Wang, Yanxiao Sun, Qiang Wang, Yijun Zhang, Wei Ren, Gang Niu
Xi'an Jiaotong University, China

3055: Enhanced Ferroelectric Properties of Hafnia-Zirconia (Hf, Zr)O2 Capacitors via New Processing Strategies for Controlled Interfacial Oxide Growth
Hanan Alex Hsain{1}, Younghwan Lee{1}, Shelby Fields{2}, Samantha Jaszewski{2}, Madison Horgan{1}, Patrick Edgington{1}, Jon Ihlefeld{2}, Gregory Parsons{1}, Jacob L. Jones{1}
{1}North Carolina State University, United States; {2}University of Virginia, United States

3126: Mist CVD-Derived (Hf, Zr)O2 Ferroelectric Thin Films Newly Post-Deposition Annealed by Rapid Thermal Annealing
Yuki Fujiwara, Junya Onishi, Hiroyuki Nishinaka, Masahiro Yoshimoto, Minoru Noda
Kyoto Institute of Technology, Japan

3518: Process Influences on the Microstructure of BEoL Integrated Ferroelectric Hafnium Zirconium Oxide
Maximilian Lederer, David Lehninger, Sukhrob Abdulazhanov, André Reck, Ricardo Olivo, Thomas Kämpfe, Konrad Seidel
Fraunhofer Institute for Photonic Microsystems, Germany

3040: Critical Effect of Bottom Oxide Electrode on Ferroelectricity of Epitaxial Hf0.5Zr0.5O2 Thin Films
Saúl Estandía{1}, Jaume Gàzquez{1}, Maria Varela{2}, Nico Dix{1}, Mengdi Qian{1}, Raul Solanas{1}, Ignasi Fina{1}, Florencio Sánchez{1}
{1}Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain; {2}Universidad Complutense de Madrid, Spain

3072: Effect of Bottom Electrodes on HZO Thin Film Properties
Greta Segantini{2}, Pedro Rojo Romeo{2}, Benoît Manchon{2}, Nicolas Baboux{2}, Rabei Barhoumi{2}, Ingrid Cañero-Infante{2}, Damien Deleruyelle{2}, Bertrand Vilquin{2}, Sharath Sriram{1}
{1}RMIT University, Australia; {2}Université de Lyon-Institut des Nanotechnologies de Lyon (UMR5270/CNRS), Ecole Centrale de Lyon, France

3296: Science and Technology of Transformational High-K Dielectric HfO2/TiO2 Nanolaminates for Next Generation Nanoelectronics
Orlando Auciello{4}, Yuanning Chen{2}, Israel Mejia{1}, Jesus Alcantar{1}, Elida de Obaldia{3}, Chun Wu{2}, Deborah Riley{2}
{1}Centro de Ingeniería y Desarrollo Industrial, Mexico; {2}Microsol Technologies Inc., United States; {3}Universidad Tecnológica de Panamá, Panama; {4}University of Texas at Dallas, United States

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12:30:00PM - 03:00:00PM
A2L-3: Lead Free Dielectric: Energy Storage Ceramic
Session Chair: Ahmad Safari (Rutger Uni. US)

3129: Influence of A-Site Defect on Phase Transitions and Dielectric Properties of AgNbO3-Based Ceramics
Jing Li, Xiaoyong Wei
Xi'an Jiaotong University, China

3732: Enhanced Energy Storage Performance of Bi0.5Na0.5TiO3-Based Ceramics with Superior Temperature Stability Under Low Electric Fields
Xiaojie Lou, Ruirui Kang, Zepeng Wang, Lixue Zhang
Xi'an Jiaotong University, China

3005: Synergic Modulation of the Multi-Scale Structures on the Energy Storage Properties of Silver Niobate-Based Ceramics
Jing Wang{2}, Yu Rao{2}, Xuhui Fan{2}, Jin Zhang{1}, Lei Zhao{1}, Kongjun Zhu{2}
{1}Hebei University, China; {2}Nanjing University of Aeronautics and Astronautics, China

3032: Lead-Free Relaxor-Ferroelectric Ceramics for High-Energy-Storage Applications
Abdullah Jan{2}, Hanxing Liu{1}, Hua Hao{1}, Zhonghua Yao{1}, Minghe Cao{1}, Safeer Ahmad Arbab{2}, Muhammad Tahir{1}, Millicent Appiah{1}, Atta Ullah{1}, Marwa Emmanuel{3}, Amjad Ullah{1}, Abdul Manan{1}
{1}Wuhan University of Technology, China; {2}Wuhan University of Technology / Islamia College Peshawar, Pakistan; {2}Wuhan University of Technology / Islamia College Peshawar, China; {3}Wuhan University of Technology / University of Dodoma, China

3034: Tailoring the Dielectric Properties and Energy Storage Density of 0.94NaNbO3−0.02SZ−xBi2O3 Through Substitution Strategy
Marwa Emmanuel{2}, Hua Hao{1}, Hanxing Liu{1}, Sahini Mtabazi{1}
{1}Wuhan University of Technology, China; {2}Wuhan University of Technology / University of Dodoma, China

3160: High Performance Lead Free Antiferroelectric Ceramics
He Qi, Jun Chen
University of Science and Technology Beijing, China

3510: Large Energy Storage Density and Excellent Temperature Stability in Barium Zirconate Titanate-Based Lead-Free Ceramics
Xiaobo Zhao, Shengguo Lu
Guangdong University of Technology, China

12:30:00PM - 03:00:00PM
A2L-4: Ferroelectric Applications: Photocatalyst & Electrocaloric
Session Chair: Nengneng Luo (Guangxi Uni., China)

3474: The Photocatalytic Properties and Gas Sensitivity of Bismuth Ferrite Oxides
Jianguo Chen, Dengren Jin, Jinrong Cheng
Shanghai University, China

3560: Preparation and Characterization of Novel Ferroelectric (Ba0.85Ca0.15)(Zr0.1Ti0.9)O3(BCZT)-Ag2O Nano-Composite with Excellent Visible Light Photocatalytic Activity
S. Abhinay, Rituraj Singh, Monika Singh, Ranabrata Mazumder
National Institute of Technology Rourkela, India

3677: Pyro-Electro-Catalytic Decontamination of Water Using the Pyroelectric Effect of Low Curie Temperature, Lead-Free Ferroelectric Ceramics
Eleanor Roake{2}, Bethany Patenall{1}, Margaret Hopkins{1}, Chris R. Bowen{1}
{1}University of Bath, United Kingdom; {2}University of Bath, EPSRC, United Kingdom

3256: Direct Visualization of the Dynamics of Antiferroelectric Switching via Electrocaloric Imaging
Pablo Vales-Castro{1}, Romain Faye{3}, Miquel Vellvehí{4}, Youri Nouchokgwe{3}, Xavier Perpinya{4}, Jose Manuel Caicedo{1}, Xavier Jordà{4}, Krystian Roleder{5}, Dariusz Kajewski{5}, Amador Perez-Tomás{1}, Emmanuel Defay{3}, Gustau Catalán{2}
{1}Catalan Institute of Nanoscience and Nanotechnology ICN2, Spain; {2}Catalan Institute of Nanoscience and Nanotechnology ICN2 and ICREA, Spain; {3}Luxembourg Institute of Science and Technology, Luxembourg; {4}National Centre of Microelectronics (IMB-CN

3038: Electrocaloric Properties of Ba1-xSrxSnyTi1-yO3 Ceramics
Zhenglyu Li, Christian Molin, Sylvia Gebhardt
Fraunhofer Institute for Ceramic Technologies and Systems, Germany

3218: Directly Measured Electrocaloric Effect in Relaxor Polymer Nanocomposites
Yusra Hambal, Karl-Heinz Menze, Vladimir V. Shvartsman, Doru C. Lupascu
University of Duisburg-Essen, Germany

3344: Big Electrocaloric Effects in Na0.5Bi0.5TiO3-Based Films
Changhong Yang, Jin Qian, Xiaofang Zhang, Xiujuan Lin, Shifeng Huang, Xin Cheng
University of Jinan, China

3549: Giant Electrocaloric Effect in Lead-Free Ferroelectric Multilayer Ceramics Designed for the Application on Commercial Microelectronic Devices
Xiaodong Jian, Shengguo Lu
Guangdong University of Technology, China

3382: Temperature Change Due to Deformation of the Poled PZT Ceramics Composite
Hiroshi Maiwa
Shonan Institute of Technology, Japan

03:30:00PM - 06:30:00PM
A3L-1: FYIA: Fundamentals
Session Chair: Astri Haugen (DTU, DK)

3074: A Room-Temperature Ferroelectric Semimetal (for Invited Young Investigator Symposium)
Pankaj Sharma
University of New South Wales, Australia

3156: First-Principles Study on the Structure and Performance of Cation Doped KSr2Nb5O15
Qian Chen, Shuyao Cao, Jie Xu, Feng Gao
Northwestern Polytechnical University, China

3265: Novel Functionalities at Twin Domain Crossings (for Invited Young Investigator Symposium)
Kumara Cordero Edwards{2}, Iaroslav Gaponenko{2}, Sahar Saremi{1}, Lane W. Martin{1}, Patrycja Paruch{2}
{1}University of California, Berkeley, United States; {2}University of Geneva, Switzerland

3284: Domain Wall Conductivity in BiFeO3
Lisha Liu, Jing-Feng Li, John Daneils
Tsinghua University, China

3356: Reversibility of the Electric-Field-Induced Phase Transitions in Perovskite Antiferroelectrics
Mao-Hua Zhang{2}, Changhao Zhao{2}, Lovro Fulanović{2}, Niloofar Hadaeghi{2}, Sonja Egert{2}, Hongbin Zhang{2}, Pedro Braga Groszewicz{1}, Jurij Koruza{2}
{1}Delft University of Technology, Netherlands; {2}Technical University of Darmstadt, Germany

3394: Unraveling the Mysterious Intermediate State in Zr-rich PbZr1-xTixO3
Nan Zhang{5}, Zheyi An{5}, Marek Paściak{2}, Hiroko Yokota{1}, Mike Glazer{4}, Zuo-Guang Ye{3}
{1}Chiba University, Japan; {2}Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {3}Simon Fraser University, Canada; {4}University of Oxford, United Kingdom; {5}Xi'an Jiaotong University, China

3448: Characterizing Local Cation and Oxygen Structure in Lead-Free Antiferroelectrics (for Invited Young Investigator Symposium)
Matthew J. Cabral{2}, Shujun Zhang{3}, Nengneng Luo{1}, Xiaozhou Liao{2}
{1}Guangxi University, China; {2}University of Sydney, Australia; {3}University of Wollongong, Australia

Monday, May 17

3507: Shear-Driven Polarization Switched κ-Al2O3 Structure Ferroelectric Materials (for Invited Young Investigator Symposium)
Shintaro Yasui
Tokyo Institute of Technology, Japan

3511: Conductivity Control via Minimally Invasive Anti-Frenkel Defects in a Functional Oxide
Donald Malcolm Evans
University of Augsburg, Germany

3536: Thermodynamic and Kinetic Origin of Ferroelectricity in Fluorite-Structured Oxides (for Ferroelectrics Young Investigator Star Series)
Min Hyuk Park
Pusan National University, Korea

3579: Uncovering a Hidden Antiferroelectric Phase with Interfacial Electrostatic Engineering (for Invited Young Investigator Symposium)
Julia Mundy{5}, Bastien F. Grosso{4}, Colin A. Heikes{7}, Dan Ferenc Segedin{6}, Zhe Wang{1}, Yu-Tsun Shao{1}, Cheng Dai{10}, Berit H. Goodge{2}, Quintin N. Meier{4}, Christopher T. Nelson{9}, Bhagwati Prasad{11}, Fei Xue{10}, David A. Muller{2}, Lena F.
{1}Cornell University, United States; {2}Cornell University / Kavli Institute at Cornell for Nanoscale Science, United States; {3}Cornell University / Leibniz-Institut für Krist, United States; {4}ETH Zürich, Switzerland; {5}Harvard University, United Sta

3480: Strain, Domain Walls, and the Spin Cycloid in BiFeO3 Thin Films -for Invited Young Investigator Symposium
Daniel Sando{6}, Mengjiao Han{2}, Vivasha Govinden{6}, Oliver Paull{6}, Florian Appert{5}, Vincent Garcia{4}, Stéphane Fusil{4}, Brahim Dkhil{1}, Jean Juraszek{5}, Yinlian Zhu{3}, Xiuliang Ma{2}, Valanoor Nagarajan{6}
{1}CentraleSupélec, Université Paris-Saclay, France; {2}Chinese Academy of Sciences, China; {3}Institute of Metal Research, Chinese Academy of Sciences, China; {4}Unité Mixte de Physique CNRS/Thales - Université Paris-Saclay, France; {5}Université de Roue

3180: Flexoelectric-Like Response from the Surface Effect in Ferroelectric Ceramics (for Invited Young Investigator Symposium)
Baojin Chu
University of Science and Technology of China, China

3722: Ionic Control of Ferroelectric Behavior in Layered Van der Waals Crystals (Ferroelectrics Young Investigator Star Series)
Sabine M. Neumayer
Oak Ridge National Laboratory, United States

3727: Multitechnique Approach to Phase Transitions and Molecular Dynamics in Hybrid Perovskites
Mantas Šimėnas{3}, Sergejus Balčiūnas{3}, Sarunas Svirskas{3}, Martynas Kinka{3}, Vidmantas Kalendra{3}, Anna Gagor{2}, Adam Sieradzki{4}, Robertas Grigalaitis{3}, Andreas Pöppl{1}, Mirosław Mączka{2}, Juras Banys{3}
{1}Leipzig University, Germany; {2}Polish Academy of Sciences, Poland; {3}Vilnius University, Lithuania; {4}Wrocław University of Science and Technology / Polish Academy of Sciences, Poland

03:30:00PM - 06:30:00PM
A3L-2: ISIF: PiezoMEMS
Session Chair: Betul Akkopru-Akgun (Pennsylvania State University)

3368: Influence of Thickness and Electrical History on Crack Initiation and Propagation in Lead Zirconate Titanate Thin Films
Kathleen Coleman{1}, Raul Bermejo{4}, Dominique Leguillon{3}, Maximilian Ritter{4}, Susan Trolier-McKinstry{2}
{1}Army Research Laboratory, United States; {2}Pennsylvania State University, United States; {3}Sorbonne Université, France; {4}University of Leoben, Austria

3130: Opportunities for Realizing Competitive Electromechanical Transducers from Lead-Free Perovskite Oxide Films
Kui Yao, Huajun Liu, Shuting Chen, Jian Wei Chai
Agency for Science, Technology and Research, Singapore

3364: Piezoelectric Micromirrors for Space Exploration
Runar Dahl-Hansen{2}, Jo Gjessing{2}, Frode Tyholdt{2}, Charalampos Fragkiadakis{1}, Peter Mardilovich{1}
{1}aixACCT Systems GmbH, Germany; {2}SINTEF, Norway

3307: Microfabrication and Characterization of Dual-Frequency Piezoelectric Micromachined Ultrasonic Transducers
Lixiang Wu{2}, Mohssen Moridi{2}, Gaofeng Wang{1}, Qifa Zhou{3}
{1}Hangzhou Dianzi University, China; {2}Silicon Austria Labs GmbH, Austria; {3}University of Southern California, United States

3717: Evaluation of Muscle Contraction by Measuring Mechanomyogram Using PZT-Based Acoustic Emission Sensor
Yusuke Takei, Takeshi Kobayashi
National Institute of Advanced Industrial Science and Technology, Japan

3628: In-Plane Bulk Acoustic Resonators Using 50nm-Thick Nano-Laminated Ferroelectric Hf0.5Zr0.5O2
Troy Tharpe, Faysal Hakim, Roozbeh Tabrizian
University of Florida, United States

3435: Design and Simulation of Piezoelectric MEMS Glucose Sensor
Sujan Yenuganti, Sankalp Paliwal
Birla Institute of Technology and Science, Pilani, India

3277: Electrical Reliability of Lead Zirconate Titanate Piezoelectric Films
Betul Akkopru-Akgun{3}, Wanlin Zhu{3}, Jung In Yang{3}, Song Won Ko{2}, Peter Mardilovich{1}, Susan Trolier-McKinstry{3}
{1}aixACCT Systems GmbH, United Kingdom; {2}KoTech, United States; {3}Pennsylvania State University, United States

3011: A Miniaturized Aerosol Sensor Module Based on a Piezoelectric MEMS Oscillator
Chien-Hao Weng{1}, Cheng-Yen Wu{1}, Gayathri Pillai{1}, Sheng-Hsian Tseng{2}, Chih-Yuan Yeh{2}, Ying-Zong Juang{2}, Sheng-Shian Li{1}
{1}National Tsing Hua University, India; {1}National Tsing Hua University, Taiwan; {2}Taiwan Semiconductor Research Institute, Taiwan

3042: {001}-Textured Nb-Doped Pb(Zr,Ti)O3 Thin Films on Stainless Steel by Pulsed Laser Deposition
Juliette Cardoletti{3}, Philipp Komissinskiy{3}, Silvo Drnovšek{1}, Barbara Malič{2}, Lambert Alff{3}
{1}Jožef Stefan Institute, Slovenia; {2}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia; {3}Technical University of Darmstadt, Germany

3584: Activation Energies for Crystallization of Manganese-Doped (K,Na)NbO3 Thin Films Deposited from an Acetylacetone Modified Chemical Solution
Leonard Jacques, Veronika Kovacova, Jung In Yang, Susan Trolier-McKinstry
Pennsylvania State University, United States

03:30:00PM - 06:30:00PM
A3L-3: Processing: Thick Films & Single Crystals
Session Chair: Jinrong Cheng (Shanghai Uni. China)

3481: Alternating Current Poling and Direct Current Poling for Pb(Mg1/3Nb2/3)O3-PbTiO3 Single Crystals
Tomoaki Karaki{2}, Yiqin Sun{2}, Cong Luo{1}, Zhuangkai Wang{2}, Yohachi Yamashita{2}
{1}Shanghai Institute of Technology, China; {2}Toyama Prefectural University, Japan

3036: Material and Process Development for Direct-Printing of Piezoceramic Thick Film Structures via Aerosol Jet Technology
Christoph Briegel, Holger Neubert, Sylvia Gebhardt
Fraunhofer Institute for Ceramic Technologies and Systems, Germany

3114: Integration of Aerosol Deposited 0.9Pb(Mg1/3Nb2/3)O3–0.1PbTiO3 Thick Films on Low-Cost Stainless Steel and Flexible Polymer Substrates
Matej Sadl{3}, Oana Andreea Condurache{3}, Andreja Benčan Golob{3}, Mirela Dragomir{2}, Uroš Prah{3}, Barbara Malič{3}, Marco Deluca{4}, Udo Eckstein{1}, Daniel Hausmann{1}, Neamul Hayet Khansur{1}, Kyle Grant Webber{1}, Hana Uršič{3}
{1}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {2}Jožef Stefan Institute, Slovenia; {3}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia; {4}Materials Center Leoben Forschung GmbH, Austria

3117: Controllable Synthesis and Piezoelectric / Photoelectric Properties of Large Size BiOCl Square Microplates
Lixin Li{2}, Chen Chen{1}, Feifei Wang{2}, Zhiguo Yi{1}
{1}Shanghai Institute of Ceramics, Chinese Academy of Sciences, China; {2}Shanghai Normal University, China

3613: Enhanced Performance of Flexible Piezoelectric PVDF Sensors by Ultrasonic Spray Coating Method
Sepide Taleb, Miguel A. Badillo-Ávila, Mónica Acuautla
University of Groningen, Netherlands

3060: Challenges and Accomplishments of Developing Lead-Based Piezoelectric Single Crystals Using the Solid-State Crystal Growth Method
Andrew Manettas{2}, Peter Kabakov{3}, Christopher Dean{3}, Valsala Kurusingal{3}, Inna Karatchevtseva{1}
{1}Australian Nuclear Science and Technology Organisation, Australia; {2}Australian Nuclear Science and Technology Organisation / DMTC Ltd., Australia; {3}Maritime Underwater Systems, Thales Australia, Australia

3253: Effect of Alternating Current Poling on the Domain Structures of Pb(Mg1/3Nb2/3)O3-xPbTiO3 Single Crystals
Haotian Wan{2}, Chengtao Luo{2}, Wei-Yi Chang{1}, Yohachi Yamashita{2}, Xiaoning Jiang{2}
{1}CTS Corp., United States; {2}North Carolina State University, Japan; {2}North Carolina State University, United States

3519: Ultra-High Piezoelectric Properties in Potassium Tantalate Niobate Single Crystal
Xiangda Meng{1}, Fei Huang{1}, Hao Tian{2}
{1}Harbin Institute of Technology, China; {2}Harbin Institute of Technology / Shanxi University, China

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03:30:00PM - 06:30:00PM
A3L-4: Ferroelectric Applications: Ultrasonic Transducer
Session Chair: Qifa Zhou (USC, US)

3143: Piezocrystals for Power Ultrasonics
Sandy Cochran
University of Glasgow, United Kingdom

3047: Small Aperture Transducers for Intravenous Sonothrombolysis
Xiaoning Jiang
North Carolina State University, United States

3201: Fabrication of a Large Aperture Angle, Lens Less Line Focus Ultrasonic Transducer & Validation with Standard Materials
Saleh Alghamdi, Ruixin Feng, Qing-Ming Wang
University of Pittsburgh, United States

3213: Confocal Modal Analysis of X-Band FBARs
Aleem Siddiqui{1}, Gwendolyn Hummel{1}, Ian Young{1}, Alexander Ruyack{1}, Jaime McClain{1}, Giovanni Esteves{1}, Ruochen Lu{2}, Adam Edstrand{1}, Robert Reger{1}, Songbin Gong{2}, Christopher Nordquist{1}
{1}Sandia National Laboratories, United States; {2}University of Illinois at Urbana-Champaign, United States

3223: A Mn-PMN-PZ-PT Based Ultrasonic Projector
Scott Moss{1}, Ethan Jg Ellul{1}, David Munk{1}, George Jung{1}, Joel Smithard{1}, Peter Finkel{3}, John Daniels{2}, John Thornton{1}
{1}Defence Science and Technology Group, Australia; {2}University of New South Wales, Australia; {3}US Naval Research Laboratory, United States

3237: Corrosion Monitoring of Metal Alloys Using a Line-Focus Ultrasonic Transducer System
Menghan Jiang, Qiuyan Li, Qing-Ming Wang
University of Pittsburgh, United States

3351: Functional Backing Layers Design for Ultrasonic Transducer with Large Bandwidth
Chenxue Hou, Chunlong Fei, Dongdong Chen, Yintang Yang
Xidian University, China

3383: Novel 1-3 Composite Transducer Overcome Lateral Mode
Pengfei Lin, Chunlong Fei, Dongdong Chen, Di Li, Yintang Yang
Xidian University, China

3385: Intelligent Optimization Design of 2-2 Piezo-Composite Materials for Ultrasonic Transducer
Dongdong Chen, Pengfei Lin, Chunlong Fei, Di Li, Yintang Yang
Xidian University, China

3618: Improving Receive and Transmit Sensitivities of Piezoelectric Micromachined Ultrasound Transducers

Christopher Cheng{2}, Ajay Dangi{1}, Sumit Agrawal{2}, Sri-Rajasekhar Kothapalli{2}, Susan Trolier-McKinstry{2}
{1}Apple, United States; {2}Pennsylvania State University, United States

Tuesday, May 18

08:30:00AM - 12:00:00PM
B1L-1: ISAF: Characterisation (Relaxors)
Session Chair: John Daniels (UNSW Sydney)

3010: Abrupt Crossover to a Relaxor Ground State in (1-x)K0.5Bi0.5TiO3-(x)Na0.5Bi0.5TiO3
Gobinda Adhikary, Rajeev Ranjan
Indian Institute of Science, India

3163: Bi0.5Na0.5TiO3-Based Relaxor Ferroelectric Energy Storage Ceramics for Pulse Power Capacitor
Dongxu Li{2}, Zong-Yang Shen{1}, Hua Hao{2}, Hanxing Liu{2}
{1}Jingdezhen Ceramic Institute, China; {2}Wuhan University of Technology, China

3048: In situ X-Ray Diffraction Study on the Enhanced Strain Response in Crystallographically Textured PMN-PT
Scarlet Kong{2}, Alain Moriana{4}, Shujun Zhang{3}, Stefano Checchia{1}, John Daniels{2}
{1}European Synchrotron Radiation Facility, France; {2}University of New South Wales, Australia; {3}University of Wollongong, Australia; {4}University of Wollongong / DMTC Ltd., Australia

3109: Influence of Neutron and Gamma Irradiation on the Dielectric, Ferroelectric and Electrocaloric Properties of Polycrystalline (1-x)Pb(Mg1/3Nb2/3)O3–xPbTiO3
Hana Uršič{3}, Uroš Prah{3}, Anze Jazbec{1}, Luka Snoj{2}, Andraz Bradeško{3}, Tadej Rojac{3}, Silvo Drnovšek{1}, Marko Vrabelj{3}, Barbara Malič{3}
{1}Jožef Stefan Institute, Slovenia; {2}Jožef Stefan Institute / University of Ljubljana, Slovenia; {3}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia

3317: Scaling Behavior of Internal Bias Field in Mn-Doped 0.24Pb(In1/2Nb1/2)O3-0.47Pb(Mg1/3Nb2/3)O3-0.29PbTiO3 Single Crystal
Enwei Sun, Xudong Qi, Yunfei Chang, Bin Yang, Rui Zhang, Wenwu Cao
Harbin Institute of Technology, China

3506: Enhanced Dielectric Response Over a Wide Temperature Range by Inducing Tri-Relaxor Phenomenon in Ferroelectrics
Jinghui Gao{1}, Jingzhe Xu{1}, Ruifeng Yao{1}, Lisheng Zhong{1}, Shengtao Li{1}, Xiaobing Ren{2}
{1}Xi'an Jiaotong University, China; {2}Xi'an Jiaotong University / National Institute for Materials Science, China

3397: Study on the Formation Mechanism of Titanium In-Diffused PMN-PT Waveguides
Qingyuan Hu, Rui Yang, Xin Liu, Xiaoyong Wei
Xi'an Jiaotong University, China

3140: New Ways of Quantifying Structural Uncertainty in (1-x)[Pb(Mg1/3Nb2/3)O3]-xPbTiO3 via Bayesian and Rietveld Refinements
Alexandra Henriques{2}, Mojca Otoničar{1}, Rachel Broughton{2}, Jacob L. Jones{2}
{1}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia; {2}North Carolina State University, United States

08:30:00AM - 12:00:00PM
B1L-2: ISIF: Memory & Transistors
Session Chair: Glen Fox (Fox Materials Consulting, LLC)

3712: Monolithic Three Dimensional (M3D) Ferroelectric FET (FeFET)
Sourav Dutta, Suman Datta
University of Notre Dame, United States

Tuesday, May 18

3009: Domain Wall Memristors and Their Applications in Neuromorphic Devices
Ahmet Suna{1}, Olivia Baxter{1}, Haidong Lu{2}, James McConville{1}, Raymond McQuaid{1}, Amit Kumar{1}, Alexei Gruverman{2}, Marty Gregg{1}
{1}Queen's University Belfast, United Kingdom; {2}University of Nebraska–Lincoln, United States

3199: Industry Perspective: A New Generation of Memory Devices Enabled by Ferroelectric Hafnia and Zirconia
Tony Schenk, Stefan Mueller
Ferroelectric Memory GmbH, Germany

3583: Modeling-Augmented Bottom-Up Ferroelectric Memory Development: from Physical Mechanisms to Reliability of Ferroelectric Memories
Milan Pešić, Bastien Beltrando, Shruba Gangopadhyay, Muthukumar Kaliappan, Michael Haverty, Andrea Padovani, Luca Larcher
Applied Materials Inc, United States

3563: Polycrystalline Hexagonal YMnO3 Films for Reconfigurable Energy-Efficient Devices
Rong Wu, Dong Jik Kim, Sebastian Schmitt, Veeresh Deshpande, Catherine Dubourdieu
Helmholtz-Zentrum Berlin für Materialien und Energie, Germany

3462: Resistive Switching and Multilevel Memory Storage in AlFeO3 Heterostructures
Badari Narayana Rao{1}, Shintaro Yasui{2}, Tsukasa Katayama{3}, Mitsuru Itoh{2}
{1}Chiba University, Japan; {2}Tokyo Institute of Technology, Japan; {3}University of Tokyo, Japan

3702: Towards Synaptic Simulation for Neuromorphic Computation Using Hafnia Based Memristors: Material Aspects
Gang Niu{2}, Qiang Wang{2}, Sourav Roy{2}, Yankun Wang{2}, Shijie Zhai{2}, Yijun Zhang{2}, Zuo-Guang Ye{1}, Wei Ren{2}
{1}Simon Fraser University, Canada; {2}Xi'an Jiaotong University, China

3306: Ferroelectric and Resistance Resistive Switching Effect of Complex Oxide Solid Solution Thin Films for FeRAM Application
Tingting Jia
Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China

3524: Microstructural Implications for Neuromorphic Synapses Based on Ferroelectric Hafnium Oxide
Franz Müller, Maximilian Lederer, Ricardo Olivo, André Reck, Tarek Ali, Konrad Seidel, Thomas Kämpfe
Fraunhofer Institute for Photonic Microsystems, Germany

3029: Programmable C-Doped Ge2Sb2Te5 PCRAM with Large On/Off Ratio, Linear and Symmetric Modulated Conductance for Synaptic Simulation
Qiang Wang{2}, Gang Niu{2}, Ren Luo{2}, Ruobing Wang{1}, Zhitang Song{1}, Wei Ren{2}, Sannian Song{1}
{1}Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China; {2}Xi'an Jiaotong University, China

3585: Very Thin PZT Films with Platinum Electrodes
Joe Evans, Naomi Montross
Radiant Technologies, Inc., United States

Tuesday, May 18

08:30:00AM - 12:00:00PM
B1L-3: Processing: Ceramics II
Session Chair: Dawei Wang (SIAT, China)

3359: Solid-State Synthesis of AgNbO3 in Air and Oxygen Atmospheres and the Influence on the Antiferroelectric Properties
Mao-Hua Zhang, Lovro Fulanović, Leif Carstensen, Jurij Koruza
Technical University of Darmstadt, Germany

3389: Single-Atom-Doping Engineered Microwave Absorber for Better Interfacial Impedance Matching and Attenuation Ability
Pengxiang Zhang{2}, Xihua Zhang{1}, Bin Li{1}, Feng Dang{1}, Bao-Wen Li{2}
{1}Shandong University, China; {2}Wuhan University of Technology, China

3390: Vibration Suppression of Smart Piezoelectric Cantilever Beam Using Fuzzy-PID Controller
Sankalp Paliwal, Sujan Yenuganti
Birla Institute of Technology and Science, Pilani, India

3444: Enhancing Electromechanical Properties via Templated Grain Growth (TGG) of Pb(Sc1/2Nb1/2)O3 – PbZrO3 – PbTiO3 Piezoelectric Ceramics
Alain Moriana{3}, Scarlet Kong{1}, John Daniels{1}, Zhenxiang Cheng{2}, Shujun Zhang{2}
{1}University of New South Wales, Australia; {2}University of Wollongong, Australia; {3}University of Wollongong / DMTC Ltd., Australia

3461: Enhanced High Energy Storage Density of (Pb0.91Ba0.03La0.04)(Zr0.5Sn0.5)O3 Antiferroelectric Ceramics Using Hot-Pressing Method
Guanglong Ge, Bo Shen, Jiwei Zhai
Tongji University, China

3463: Realizing Superior Energy Storage Density and Efficiency in BNT-Based Lead-Free Ceramics
Fei Yan, Bo Shen, Jiwei Zhai
Tongji University, China

3466: Microscopic Insight Into the Piezoresponse of KNN-Based Ceramics
Jiwei Zhai, Bo Shen, Kun Zhu
Tongji University, China

3469: Ultra-Transparent PMN-PT Electro-Optic Ceramics and its Application in Optical Communication
Yongcheng Zhang, Yalin Qin, Ze Fang, Xiaodong Jiang
Qingdao University, China

3540: Antiferroelectric Multilayer Ceramic Capacitors of NaNbO3-SrSnO3-Na1/2Bi1/2TiO3 for Energy Storage Applications
Lovro Fulanović, Mao-Hua Zhang, Yuping Fu, Jurij Koruza, Jürgen Rödel
Technical University of Darmstadt, Germany

3542: Acoustic Monitoring of the Cold Sintering Process
Shruti Gupta, Elizabeth Trautman, Susan Trolier-McKinstry, Andrea Arguelles
Pennsylvania State University, United States

Tuesday, May 18

08:30:00AM - 12:00:00PM
B1L-4: PFM IV
Session Chair: Olga Ovchinnikova (Oak Ridge National Laboratory)

3581: Probing Electric Polarization on the Atomic Scale: the Case of Confined Water, Hexagonal Boron Nitride and its Heterostructures
Laura Fumagalli
University of Manchester, United Kingdom

3170: Anisotropic Ion Migration and Electronic Conduction in van der Waals Ferroelectric CuInP2S6
Dawei Zhang{1}, Zheng-Dong Luo{2}, Yao Yin{1}, Peggy Schoenherr{1}, Chuhan Sha{1}, Ying Pan{1}, Pankaj Sharma{1}, Marin Alexe{2}, Jan Seidel{1}
{1}University of New South Wales, Australia; {2}University of Warwick, United Kingdom

3181: Creation of Nanodomain Structures in the Monocrystalline Thin Films of LNOI
Boris Slautin{2}, Houbin Zhu{1}, Vladimir Ya. Shur{2}
{1}Jinan Jingzheng Electronics Co. Ltd., China; {2}Ural Federal University, Russia

3250: Non-Linear Nanoscale Piezoresponse in Semiconductor Piezoelectrics with Schottky Barriers
Helena Lozano{3}, Gustau Catalán{2}, Jaume Esteve{3}, Gonzalo Murillo{3}, Neus Domingo{1}
{1}Catalan Institute of Nanoscience and Nanotechnology ICN2, Spain; {2}Catalan Institute of Nanoscience and Nanotechnology ICN2 and ICREA, Spain; {3}Institute of Microelectronics of Barcelona IMB-CNM, Spain

3207: Local Electromechanical Properties of the Polycrystalline BiFeO3 Thin Films: Collective Polarization and Transport Phenomena
Denis Alikin{7}, Yevhen Fomichov{1}, Saulo Reis{5}, Alexander Abramov{7}, Dmitry Chezganov{7}, Vladimir Ya. Shur{7}, Eugene Eliseev{2}, Sergei V. Kalinin{4}, Anna Morozovska{3}, Eudes de Borges Araújo{5}, Andrei Kholkin{6}
{1}Charles University, Czech Rep.; {2}Institute for Problems of Materials Science, National Academy of Sciences of Ukraine, Ukraine; {3}National Academy of Sciences of Ukraine, Ukraine; {4}Oak Ridge National Laboratory, United States; {5}São Paulo State U

3254: Unusual Polarization Textures and Enhanced Mechanical and Electrical Sensitivity at Crossings of Ferroelastic Twin Domains in Pb(Zr0.2Ti0.8)O3 Thin Films
Philippe Tückmantel{3}, Kumara Cordero Edwards{3}, Iaroslav Gaponenko{3}, Joshua Agar{1}, Lane W. Martin{2}, Patrycja Paruch{3}
{1}Lehigh University, United States; {2}University of California, Berkeley, United States; {3}University of Geneva, Switzerland

3450: Coexistence of Antiferroelectricity and Ferroelectricity in PbZrO3 Thin Film Explored by Scanning Probe Microscopy
Huimin Qiao{2}, Fangping Zhuo{3}, Jinxing Wang{1}, Yunseok Kim{2}
{1}Harbin Institute of Technology, China; {2}Sungkyunkwan University, Korea; {3}Technical University of Darmstadt, Germany

3482: Physical Mechanism of Ferroelectricity Tuning in Polymer Blends
Xinhui Li, Yanda Jiang, Xiaofei Liu, Xin Zhang
Wuhan University of Technology, China

3642: Understanding Tetragonal-Cubic Phase Transitions in Single Crystal BaTiO3
Asaf Hershkovitz, Hemaprabha Elangovan, Maya Barzilay, Yachin Ivry
Technion – Israel Institute of Technology, Israel

Tuesday, May 18

12:30:00PM - 03:00:00PM
B2L-1: ISIF: Domain Walls & Multiferroics
Session Chair: Nazanin Bassiri-Gharb (Georgia Institute of Technology)

3249: Impact of Strain Gradients and Domain Walls on the Effective Mechanical Properties of Ferroelectrics
Neus Domingo
Catalan Institute of Nanoscience and Nanotechnology ICN2, Spain

3427: Memories Are Made of This: My Journey Into the Development of New Multiferroic Materials - for Invited Young Investigator Symposium
Lynette Keeney
Tyndall National Institute, University College Cork, Ireland

3288: Unusual Domain Walls Properties and Phase Diagrams of Van der Waals Ferrielectric Low-Dimensional Layered Chalcogenides
Anna Morozovska{2}, Eugene Eliseev{1}, Kyle Kelley{3}, Yulian Vysochanskii{4}, Sergei V. Kalinin{3}, Petro Maksymovych{3}
{1}Institute for Problems of Materials Science, National Academy of Sciences of Ukraine, Ukraine; {2}National Academy of Sciences of Ukraine, Ukraine; {3}Oak Ridge National Laboratory, United States; {4}Uzhhorod National University, Ukraine

3455: Electromechanical Manipulation of Topological Defects to Yield Giant Piezoelectric Response in Epitaxial Lead Zirconate Titanate Bilayers on Silicon
Richard Winkler{4}, Yangyang Zhang{4}, Qi Zhang{4}, Zhe Wang{2}, Yimei Zhu{1}, Myung-Geun Han{1}, Darrell G. Schlom{3}, Nagarajan Valanoor{4}
{1}Brookhaven National Laboratory, United States; {2}Cornell University, United States; {3}Cornell University / Leibniz-Institut für Krist, United States; {4}University of New South Wales, Australia

3648: The Energy Landscape of HfO2 and ZrO2 and the Implications for Phase Formation
Luis Azevedo Antunes, Alfred Kersch
Munich University of Applied Sciences, Germany

3578: Magnetoelectric Coupling Effect at the Ni/FE-Hf0.5Zr0.5O2 Interface
Yury Matveyev{1}, Anna Dmitriyeva{3}, Vitalii Mikheev{3}, Sergei Zarubin{3}, Anastasia Chouprik{3}, Giovanni Vinai{2}, Vincent Polewczyk{2}, Piero Torelli{2}, Christoph Schlueter{1}, Igor Karateev{4}, Evgeny Tsymbal{5}, Andrei Zenkevich{3}
{1}Deutsches Elektronen-Synchrotron, Germany; {2}Istituto Officina dei Materiali, Italy; {3}Moscow Institute of Physics and Technology, Russia; {4}National Research Center Kurchatov Institute, Russia; {5}University of Nebraska–Lincoln, United States

3028: Thermal Stability Mechanisms in High-Permittivity Microwave Dielectrics
Yuriy Poplavko
National Technical University of Ukraine Igor Sikorsky Kyiv Polytechnic Institute, Ukraine

12:30:00PM - 03:00:00PM
B2L-2: Fundamentals: 2D Ferroelectrics & New Opportunities for Ferroelectric Films
Session Chair: Geoff Brennecka (Colorado School of Mines, US)

3228: Tunable Quadruple-Well Ferroelectric van-der-Waals Crystals
Nina Balke{2}, Sabine M. Neumayer{2}, Lei Tao{3}, Andrew O'Hara{3}, Michael A. Susner{1}, Michael A. McGuire{2}, Sokrates Pantelides{3}, Petro Maksymovych{2}
{1}Air Force Research Laboratory, United States; {2}Oak Ridge National Laboratory, United States; {3}Vanderbilt University, United States

3287: Influence of Pb in the Character and Properties of the Ferroelectric Transition in Sn2P2(SeyS1-y)6 Around the Lifshitz Point
Vitalii Liubachko{2}, Alberto Oleaga{1}, Agustin Salazar{1}, Yulian Vysochanskii{2}
{1}University of the Basque Country, Universidad del País Vasco, Euskal Herriko Unibertsitatea, Spain; {2}Uzhhorod National University, Ukraine

3440: Tunning Magnetism by Ferroelectric Polarization in 2D Van der Waals Heterostructures
Zhenxiang Cheng
University of Wollongong, Australia

3235: Free-Standing Ferroelectric and Magnetoelectric Single Crystal Membranes with Super-Elasticity
Guohua Dong, Suzhi Li, Ziyao Zhou, Xiangdong Ding, Ming Liu
Xi'an Jiaotong University, China

3726: Structural and Electronic Properties of Two-Dimensional Freestanding BaTiO3/SrTiO3 Heterostructures
Fanhao Jia, Shaowen Xu, Guodong Zhao, Chao Liu, Wei Ren
Shanghai University, China

12:30:00PM - 03:00:00PM
B2L-3: Processing: Ceramics I
Session Chair: Dawei Wang (SIAT, China)

3105: Impact Modulated Electromechanical Response in Functional Ceramics Using Aerosol Deposition
Neamul Hayet Khansur{1}, Udo Eckstein{1}, Matej Sadl{2}, Hana Uršič{2}, Kyle Grant Webber{1}
{1}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {2}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia

3003: Non-Classical Electrostrictive Phenomena in Hydrated Acceptor Doped BaZrO3: Proton Trapping and Dopant Size Effect
Evgeniy Makagon{3}, Maximilian Hoedl{1}, Rotraut Merkle{1}, Eugene Kotomin{2}, Joachim Maier{1}, Igor Lubomirsky{3}
{1}Max Planck Institute for Solid State Research, Germany; {2}University of Riga, Latvia; {3}Weizmann Institute of Science, Israel

3112: High-Performance Pyroelectric Energy Harvesters Based on PMN-PMS-PZT Ceramics with High Thermal Conductivity Fillers
Qingping Wang
Hubei University of Education, China

3258: Characterization of the Cold Sintering Process of Functional Ceramics
Clive Randall
Pennsylvania State University, United States

3305: Modified Pb(Mg1/3Nb2/3)O3-PbZrO3-PbTiO3 Ceramics with High Piezoelectricity and Temperature Stability
Pengbin Wang{2}, Qinghu Guo{2}, Fei Li{3}, Hua Hao{2}, Huajun Sun{2}, Hanxing Liu{2}, Shujun Zhang{1}
{1}University of Wollongong, Australia; {2}Wuhan University of Technology, China; {3}Xi'an Jiaotong University, China

Tuesday, May 18

12:30:00PM - 03:00:00PM
B2L-4: Special Session: Memorial for Prof. Pim Groen
Session Chair: Sybrand Zwaag (TUDELFT, NL)

3024: High Energy Density Lead Free Capacitors
Ian M. Reaney
University of Sheffield, United Kingdom

3559: Application Driven Design, Manufacturing and Optimization of Piezoelectric Polymer Composites: A Tribute to Pim Groen's Work
Hamideh Khanbareh{4}, Daniella Deutz{5}, Vincent Stuber{1}, Nijesh James{3}, Jibran Khaliq{2}, Sybrand van der Zwaag{1}
{1}Delft University of Technology, Netherlands; {2}Northumbria University, United Kingdom; {3}St. Joseph's College Devagiri, India; {4}University of Bath, United Kingdom; {5}University of Southern Denmark, Denmark

3081: Soft-Chemistry Supported Approaches to Design of Ferroelectric-Oxide Thin-Film Structures
Barbara Malič{1}, Aleksander Matavž{2}, Vid Bobnar{1}
{1}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia; {2}Katholieke Universiteit Leuven, Belgium

3100: Modelling the Formation and Properties of Unstructured and Structured Granular Piezoceramic-Polymer Composites: A Tribute to Pim Groen's Work
Sybrand van der Zwaag{1}, Daan van Den Ende{1}, Miguel Gutierrez{1}, Stanley van Kempen{1}, Hamideh Khanbareh{2}
{1}Delft University of Technology, Netherlands; {2}University of Bath, United Kingdom

3257: Celebrating the Intellectual and Technological Contributions of Pim Groen
Clive Randall{2}, Ian M. Reaney{3}, Sophie Guillemet-Fritsch{1}, Daniella Deutz{4}
{1}CIRIMAT, France; {2}Pennsylvania State University, United States; {3}University of Sheffield, United Kingdom; {4}University of Southern Denmark, Denmark

3070: Measurement of Piezoelectric Properties of BiFeO3-PVDF Terpolymer Composites
Anton Tuluk, Tadhg Mahon, Sybrand van der Zwaag, Pim Groen
Delft University of Technology, Netherlands

3084: Effect of Particle Size on the Piezoelectric Properties of KNLN/PVDF Composite Films
Tadhg Mahon, Sundaram Anandakrishnan, Sybrand van der Zwaag, Pim Groen
Delft University of Technology, Netherlands

03:30:00PM - 06:30:00PM
B3L-1: FYIA: PbFree
Session Chair: Nagarajan Valanoor (UNSW, AU)

3050: High Energy Storage Properties and Good Thermal Stabilities in Weakly Coupling Relaxor Ferroelectric BaTiO3-Bi(Zn2/3Ta1/3)O3
Qian Wang, Fu-Zheng Xian, Chun-Ming Wang
Shandong University, China

3142: Seeing Structural Origins and Foreseeing New Pathways to Improved Lead-Free Piezoelectrics with Aberration-Corrected Scanning Transmission Electron Microscopy
Haijun Wu{2}, Jiagang Wu{3}, Huajun Liu{1}, Moaz Waqar{2}, Kui Yao{1}, John Wang{2}, Stephen Pennycook{2}{1}Agency for Science, Technology and Research, Singapore; {2}National University of Singapore, Singapore; {3}Sichuan University, China

Tuesday, May 18

3274: Strain-Induced Room-Temperature Ferroelectricity in SrTiO3 Membranes (for Invited Young Investigator Symposium)
Ruijuan Xu{2}, Jiawei Huang{3}, Edward Barnard{1}, Seung Sae Hong{2}, Prastuti Singh{2}, Ed Wong{1}, Thies Jansen{2}, Varun Harbola{2}, Jun Xiao{2}, Bai Yang Wang{2}, Sam Crossley{2}, Di Lu{2}, Shi Liu{4}, Harold Hwang{2}
{1}Lawrence Berkeley National Laboratory, United States; {2}Stanford University, United States; {3}Westlake University, China; {4}Westlake University / Westlake Institute for Advanced Study, China

3316: Structural Modulation in Pb-Free Tungsten Bronze Ferroelectrics (for Invited Young Investigator Symposium)
Xiao Li Zhu, Xiao Qiang Liu, Wen Bin Feng, Zi Jin Yang, Kun Li, Xiang Ming Chen
Zhejiang University, China

3333: Ultra-High Electrostrictive Effect in Lead-Free Ferroelectric Ceramics (for Invited Young Investigator Symposium)
Li Jin
Xi'an Jiaotong University, China

3407: (K,Na)NbO3-Based Lead-Free Single Crystals: Growth, Full Tensor Properties and Domain Structure
Limei Zheng{2}, Da Huo{1}
{1}Harbin Institute of Technology, China; {2}Shandong University, China

3483: Giant Strain and Domain Investigation in Bismuth Sodium Titanate Based Lead-Free Ceramics (for Invited Young Investigator Symposium)
Jinyan Zhao{2}, Nan Zhang{2}, Zhe Wang{2}, Gang Niu{2}, Wei Ren{2}, Zuo-Guang Ye{1}
{1}Simon Fraser University, Canada; {2}Xi'an Jiaotong University, China

3522: Octahedral Rotation Coupled with Polarization in Niobium-Based Perovskites Oxides (for Invited Young Investigator Symposium)
Yuuki Kitanaka, Tetsuo Tsuchiya
National Institute of Advanced Industrial Science and Technology, Japan

3616: Development of Lead-Free Bismuth Titanate-Based Sol-Gel Composite
makiko Kobayashi, Hiroaki Akatsuka, Kei Nakatsuma
Kumamoto University, Japan

3709: Processing Challenges in Lead-Free Potassium Sodium Niobate Piezoelectric Ceramics (for Invited Young Investigator Symposium)
Hao-Cheng Thong, Yi-Xuan Liu, Zhao Li, Ke Wang
Tsinghua University, China

3362: Ultrahigh Energy Storage Density and Efficiency in AgNbO3-Based Antiferroelectric Ceramics: Design and Mechanisms
Nengneng Luo{1}, Kai Han{1}, Matthew J. Cabral{2}, Shujun Zhang{3}, Yuezhou Wei{1}
{1}Guangxi University, China; {2}University of Sydney, Australia; {3}University of Wollongong, Australia

03:30:00PM - 06:30:00PM
B3L-2: Ferroelectric Applications: Other Applications
Session Chair: Guangzu Zhang (HUST, China)

3295: Science and Technology of Integrated Super-High Dielectric Constant AlOx/TiOy Nanolaminates / Diamond for Transformational Nanoelectronics
Jiangwei Liu{1}, Elida de Obaldia{2}, Bo Da{1}, Yasuo Koide{1}, Orlando Auciello{3}
{1}National Institute for Materials Science, Japan; {2}Universidad Tecnológica de Panamá, Panama; {3}University of Texas at Dallas, United States

3153: Ferroelectric Thickness Dependent Characteristics of Negative Capacitance Transistors
Sandeep Semwal, Abhinav Kranti
Indian Institute of Technology Indore, India

3169: Response of Charged Ferroelectric Domain Walls to Alternating Voltages
Jan Schultheiß{3}, Erik Lysne{3}, Jakob Schaab{1}, Lukas Puntigam{4}, Zewu Yan{1}, Edith Bourret{2}, Donald Evans{3}, Stephan Krohns{4}, Dennis Meier{3}
{1}ETH Zürich, Switzerland; {2}Lawrence Berkeley National Laboratory, United States; {3}Norwegian University of Science and Technology, Norway; {4}University of Augsburg, Germany

3212: Reconfigurable Unpatterned Metasurfaces via Acoustoelectric Gating of Graphene (RUMAEG)
Aleem Siddiqui, Amun Jarzembski, Isaac Ruiz, Michael Wood, Michael Goldflam, Loren Gastian, Darren Branch, Thomas Beechem
Sandia National Laboratories, United States

3452: Fast Charge Transfer via Dielectric Layers at Lithium Ion Battery Interface
Takashi Teranishi{2}, Ryoji Yamanaka{2}, Shinya Kondo{2}, Akira Kishimoto{2}, Ken-Ichi Mimura{1}, Kazumi Kato{1}, Sou Yasuhara{3}, Shintaro Yasui{3}
{1}National Institute of Advanced Industrial Science and Technology, Japan; {2}Okayama University, Japan; {3}Tokyo Institute of Technology, Japan

3454: Polarization Controlled Resonant Tunneling by Bands Engineering
Jing Su, Xiaohui Liu
Shandong University, China

3508: Pyroelectric Potential Decay Vs LiNbO3 Crystal Dimensions
Volodymyr Tkachenko{1}, Romina Rega{1}, Simona Itri{1}, Reinhard Schwödiauer{2}, Pietro Ferraro{1}, Simonetta Grilli{1}
{1}Institute of Applied Sciences and Intelligent Systems of the National Research Council (CNR-ISASI), Italy; {2}Johannes Kepler University, Austria

3548: Novel Methodology for Bacteria Adhesion Control
Emilia Oleandro{1}, Romina Rega{1}, Martina Mugnano{1}, Filomena Nazzaro{2}, Pietro Ferraro{1}, Simonetta Grilli{1}
{1}Institute of Applied Sciences and Intelligent Systems of the National Research Council (CNR-ISASI), Italy; {2}Institute of Food Sciences - National Research Council, Italy

3539: An Electrically Tunable Color-Visualization Strategy Based on Ba0.5Sr0.5TiO3 Thin Films
Rui Wang{1}, Jinying Zhang{1}, Bingnan Wang{1}, Xin Wang{1}, Xinye Wang{1}, Defang Li{1}, Jingyi Chen{1}, Chenyu Guo{2}
{1}Beijing Institute of Technology, China; {2}Xi'an University of Science and Technology, China

3436: Low-Temperature Sterilization of Piezoelectric Ceramics
Magnus Rotan{1}, Mikalai Zhuk{1}, Philip Boughton{2}, Julia Glaum{1}
{1}Norwegian University of Science and Technology, Norway; {2}University of Sydney, Australia

3631: Polarization-Modulated Photovoltaic Effect at the Morphotropic Phase Boundary in Ferroelectric Ceramics
Liyan Wu{2}, Aaron Burger{1}, Andrew Bennett-Jackson{1}, Jonathan Spanier{1}, Peter Davies{2}
{1}Drexel University, United States; {2}University of Pennsylvania, United States

3662: Observation of Shift, Ballistic, and Magnetically Induced Bulk Photocurrent in Piezoelectric Sillenite Crystals
Aaron Burger{1}, Lingyuan Gao{2}, Radhe Agarwal{1}, Alexey Aprelev{1}, Edward Schruba{1}, Alejandro Gutierrez-Perez{1}, Jonathan Spanier{1}, Andrew Rappe{2}, Vladimir Fridkin{1}
{1}Drexel University, United States; {2}University of Pennsylvania, United States

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03:30:00PM - 06:30:00PM
B3L-3: Fundamentals: DFT Theory
Session Chair: Zhenxiang Cheng (UOW, AU)

3018: Predictions for New Antiferroelectric Materials
Hugo Aramberri, Natalya Fedorova, Jorge Íñiguez
Luxembourg Institute of Science and Technology, Luxembourg

3086: An Atomic-Scale Investigation of the Disruption of Long-Range Correlations in Homovalent and Heterovalent Substituted BaTiO3
Florian Mayer, Maxim Popov, Jürgen Spitaler, Marco Deluca
Materials Center Leoben Forschung GmbH, Austria

3191: Rotopolar Coupling Driving the Antiferroelectric Phase Transition in PbZrO3
Konstantin Shapovalov, Massimiliano Stengel
Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain

3266: Hybrid Improper Ferroelectricity and Pressure-Induced Enhancement of Polarization in Ba3Ce2O7 Predicted by a First-Principles Calculation
Bu Hang Chen, Xiao Qiang Chen, Xiang Ming Chen
Zhejiang University, China

3438: From First- to Second-Principles Modelling of Ferroelectric Oxides
Philippe Ghosez
Université de Liège, Belgium

3557: Revisiting Electrostriction
Jiacheng Yu{1}, Daniel Tanner{3}, Eric Bousquet{2}, Pierre-Eymeric Janolin{1}
{1}CentraleSupélec, Université Paris-Saclay, CNRS, France; {2}Université de Liège, Belgium; {3}Université Paris-Saclay, CentraleSupélec, CNRS, Université de Liège, France

3573: Electronic Structure Origin of the Antiferroelectric Phase in NaNbO3
Niloofar Hadaeghi, Hongbin Zhang
Technical University of Darmstadt, Germany

3589: Theoretical Study on Tunneling Current Formula for Multi-Resitive Ferroelectric Thin Films
Yanzhe Dong, Xiaoyan Lu
Harbin Institute of Technology, China

3679: Hybrid Improper Ferroelectricity in AA'Fe 2 O 6 Double Perovskites: An Ab-Initio Study
Samuel Santos{4}, Michel Lacerda Marcondes{3}, Pedro-Rocha Rodrigues{4}, Ivan Paula Miranda{3}, Lucy V Credidio Assali{3}, Helena Maria Petrilli{3}, Armandina Maria Lima Lopes{2}, João Pedro Esteves Araújo{1}
{1}Faculdade de Ciências da Universidade do Porto, Portugal; {2}Faculdade de Ciências da Universidade do Porto, IFIMUP, Portugal; {3}Universidade de São Paulo, Brazil; {4}University of Porto, Portugal

3689: Group Theory Analysis to Study Phase Transitions of Sr3Hf2O7
Estelina Lora Da Silva{5}, Adeleh Mokhles Gerami{1}, Prasannan Neenu Lekshmi{5}, Michel Lacerda Marcondes{4}, Lucy V Credidio Assali{4}, Helena Maria Petrilli{4}, Joao Guilherme M. Correia{1}, Armandina Maria Lima Lopes{3}, João Pedro Esteves Araújo{2}
{1}CERN, Switzerland; {2}Faculdade de Ciências da Universidade do Porto, Portugal; {3}Faculdade de Ciências da Universidade do Porto, IFIMUP, Portugal; {4}Universidade de São Paulo, Brazil; {5}University of Porto, Institute of Physics for Advanced Materia

3719: Why Lattices and High Valence States Are Stabilized in Perovskite-Type Oxides by Madelung Lattice Site Potentials ?
Masahiro Yoshimura
National Cheng Kung University, Taiwan

Wednesday, May 19

08:30:00AM - 12:00:00PM
C1L-1: ISAF: Domains/Films II
Session Chair: Wanlin Zhu (Penn State, US)

3188: Free-Standing Ferroelectric Oxide Superlattices
Yaqi Li{6}, Edoardo Zatterin{7}, Alexander Björling{5}, Michele Conroy{11}, Kalani Moore{10}, Adam Justin Clancy{6}, Sungmyung Kang{4}, Marios Hadjimichael{9}, Dirk Groenendijk{3}, Edouard Lesne{3}, Anastasiia Pylypets{2}, Fedir Borodavka{2}, Andrea Cavig
{1}European Synchrotron Radiation Facility, France; {2}Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {3}Kavli Institute of Nanoscience, Delft University of Technology, Netherlands; {4}London Centre for Nanotechnology, United Kingdom;

3246: Strain Engineering of Single-Crystal Ferroelectric Membranes on Silicon and Flexible Platforms
David Pesquera{1}, Eric Parsonnet{3}, Alexander Qualls{3}, Ruijuan Xu{2}, Andrew Gubser{3}, Jieun Kim{3}, Yizhe Jiang{3}, Gabriel Velarde{3}, Yen-Lin Huang{3}, Harold Hwang{2}, Ramamoorthy Ramesh{4}, Lane W. Martin{3}
{1}Catalan Institute of Nanoscience and Nanotechnology ICN2, Spain; {2}Stanford University, United States; {3}University of California, Berkeley, United States; {4}University of California, Berkeley / Lawrence Berkeley National Laboratory, United States

3343: Antiphase Boundary Induced Switching Behaviors in a BiFeO3 Film
Yangyang Zhang{2}, Myung-Geun Han{1}, Daniel Sando{2}, Nagarajan Valanoor{2}, Yimei Zhu{1}
{1}Brookhaven National Laboratory, United States; {2}University of New South Wales, Australia

3378: Dielectric and Energy Storage Properties of Bismuth Titanate Based Thin Film Materials
Cheng Tao, Minghe Cao, Hua Hao, Zhonghua Yao, Hanxing Liu
Wuhan University of Technology, China

3396: Determination of the Nanoscale Distribution of the Ferroelectric Response in Composite BaTiO3 Films Using a Machine Learning Approach
Sebastian Schmitt{1}, Rama K. Vasudevan{2}, Maurice Seifert{1}, Albina Borisevich{2}, Nina Balke{2}, Veeresh Deshpande{1}, Sergei V. Kalinin{2}, Catherine Dubourdieu{1}
{1}Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; {2}Oak Ridge National Laboratory, United States

3443: Epitaxial Stabilization of a Low-Symmetry Phase of BiFeO3 with Giant Electromechanical Response
Oliver Paull{5}, Changsong Xu{4}, Xuan Cheng{1}, Yangyang Zhang{5}, Bin Xu{3}, Kyle Kelley{2}, Liam Collins{2}, Alex de Marco{1}, Rama K. Vasudevan{2}, Laurent Bellaiche{4}, Valanoor Nagarajan{5}, Daniel Sando{5}
{1}Monash University, Australia; {2}Oak Ridge National Laboratory, United States; {3}Soochow University, China; {4}University of Arkansas, United States; {5}University of New South Wales, Australia

3515: Structure and Electrical Properties of SrTiO3/BiFeO3 Heterostructure Films
Yixiang Zhou, Xinzhu Liu, Chunli Diao
Henan University, China

3520: Electric Field and Temperature Induced Phase Transitions in Antiferroelectric Thin Films of PbZrO3
Pauline Dufour{4}, André Chanthbouala{4}, Thomas Maroutian{5}, C. Jacquemont{4}, Florian Godel{4}, Lluis Yedra{1}, Mojca Otoničar{2}, Nicolas Guiblin{1}, Manuel Bibes{4}, Brahim Dkhil{1}, Stéphane Fusil{3}, Vincent Garcia{3}
{1}CentraleSupélec, Université Paris-Saclay, France; {2}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia; {3}Unité Mixte de Physique CNRS/Thales - Université Paris-Saclay, France; {4}Unité Mixte de Recherche CNRS/Thales, Fr

3562: Fabrication by Neon Ion Milling and Characterization of Barium Titanate Nanopillars
Ibukun Olaniyan{2}, Sebastian Schmitt{2}, Javier Garcia Fernandez{1}, Jürgen Albert{2}, Veeresh Deshpande{2}, Robin Cours{1}, Martin Hÿtch{1}, Sylvie Schamm-Schardon{1}, Catherine Dubourdieu{2}
{1}CEMES-CNRS, France; {2}Helmholtz-Zentrum Berlin für Materialien und Energie, Germany

3597: Domain Scaling and Coupling of Structural Distortions in Tensile-Strained PbTiO3 Heterostructures
Céline Lichtensteiger{1}, Marios Hadjimichael{2}, Jean-Marc Triscone{1}
{1}University of Geneva, Switzerland; {2}University of Geneva / University College London / London Centre for Nanotechnology, Switzerland

3620: Two-Step Phase Transition Behavior in Tensile-Strained (PbxSr1-x)TiO3 Thin Films Below 50 nm Thickness
Tomoaki Yamada{1}, Yuto Ota{1}, Masahito Yoshino{1}, Daisuke Ichinose{2}, Takao Shimizu{3}, Hiroshi Funakubo{2}, Takanori Nagasaki{1}
{1}Nagoya University, Japan; {2}Tokyo Institute of Technology, Japan; {3}Tokyo Institute of Technology / National Institute for Materials Science, Japan

3627: Ultrahigh Anharmonicity Low-Permittivity Tunable Nanocrystalline Thin Films
Matthias Falmbigl{2}, Iryna Golovina{2}, Christopher Hawley{2}, Aleksandr Plokhikh{2}, Or Shafir{1}, Ilya Grinberg{1}, Jonathan Spanier{2}
{1}Bar-Ilan University, Israel; {2}Drexel University, United States

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08:30:00AM - 12:00:00PM
C1L-2: Fundamentals: Domains & Electromechanical Behavior I
Session Chair: Marco Deluca (MCL, Leoben)

3186: Forward Growth of Ferroelectric Domains with Charged Domain Walls. Local Switching on Non-Polar Cuts
Vladimir Ya. Shur, Elena Pelegova, Anton Turygin, Mikhail Kosobokov, Yuri Alikin
Ural Federal University, Russia

3065: Electric Field Control of the Fano Resonance in BaTiO3
Vivek Dwij, Binoy Krishna De, V.G. Sathe
UGC-DAE-Consortium for Scientific Research, India

3097: High Field Induced Electroformation in Sodium Bismuth Titanate
Pengrong Ren{2}, Maximilian Gehringer{1}, An-Phuc Hoang{1}, Sebastian Steiner{1}, Binxiang Huang{1}, Andreas Klein{1}, Till Frömling{1}
{1}Technical University of Darmstadt, Germany; {2}Xi'an University of Technology, China

3273: Enhanced Dielectric Properties of Textured Ba0.6Sr0.4TiO3 Ceramics via Gel-Tape-Casting
Jie Xu, Yujian Wang, Yiting Guo, Shuhang Liu, Feng Gao
Northwestern Polytechnical University, China

3183: 1D to 2D Domain Shape Transformation by Pulse Laser Irradiation of Lithium Niobate
Vladimir Ya. Shur, Evgeniy Mingaliev, Mikhail Kosobokov, Andrey Makaev, Dmitry Kuznetsov, Maxim Nebogatikov, Dmitry Chezganov
Ural Federal University, Russia

3245: Domain Walls in Ferroic Materials: A Statistical Physics Approach to Predicting the Static and Dynamic Behavior of Interfaces
Nirvana Caballero, Thierry Giamarchi, Patrycja Paruch
University of Geneva, Switzerland

3433: In Situ Domain Switching in (100) BaTiO3 Films
Trygve Magnus Ræder{1}, Rama K. Vasudevan{4}, Joshua Agar{2}, Tor Grande{3}
{1}Danmarks Tekniske Universitet, Denmark; {2}Lehigh University, United States; {3}Norwegian University of Science and Technology, Norway; {4}Oak Ridge National Laboratory, United States

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08:30:00AM - 12:00:00PM
C1L-3: Lead Free Piezoelectrics: Crystal, Textured & Phase Boundary Exploration
Session Chair: Jurij Koruza (Uni. Darmstadt, Germany)

3148: Exploration of New Ferroelectric-Relaxor Boundaries in (Bi1/2Na1/2)TiO3-SrTiO3-ABO3 Ternary Systems
Jae-Shin Lee, Hyoung-Su Han, Trang An Duong, Hoang Thien Khoi Nguyen, Sang-Sub Lee
University of Ulsan, Korea

3058: Growth and Piezoelectric Characterisation of Lead-Free Single Crystals Utilising Solid-State Crystal Growth
Peter Kabakov{3}, Andrew Manettas{2}, Christopher Dean{3}, Inna Karatchevtseva{1}, Valsala Kurusingal{3}
{1}Australian Nuclear Science and Technology Organisation, Australia; {2}Australian Nuclear Science and Technology Organisation / DMTC Ltd., Australia; {3}Maritime Underwater Systems, Thales Australia, Australia

3281: Textured Lead-Free Piezoelectric Composites with Enhanced Energy Harvesting Properties
Yuan Sun{1}, Jie Wu{1}, Yingchun Liu{1}, Li Jin{3}, Shantao Zhang{2}, Bin Yang{1}, Yunfei Chang{1}
{1}Harbin Institute of Technology, China; {2}Nanjing University, China; {3}Xi'an Jiaotong University, China

3603: Ultra-Large Electric-Field-Induced Strain in Potassium Sodium Niobate Crystals
Chengpeng Hu{1}, Xuejie Sun{1}, Xizhe Wu{1}, Hao Tian{2}
{1}Harbin Institute of Technology, China; {2}Harbin Institute of Technology / Shanxi University, China

3422: Large Piezoelectric Strain with Superior Thermal Stability of Lead-Free Potassium Sodium Niobate-Based Grain Orientation-Controlled Ceramics for High Frequency Ultrasonic Transducer Application
Yi Quan{2}, Wei Ren{2}, Chunlong Fei{3}, Lingyan Wang{2}, Tomoaki Karaki{1}
{1}Toyama Prefectural University, Japan; {2}Xi'an Jiaotong University, China; {3}Xidian University, China

3555: Manganese Doping Enhanced Local Heterogeneity and Piezoelectric Properties in Potassium Tantalate-Niobate Single Crystal
Peng Tan{1}, Yu Wang{1}, Hao Tian{2}
{1}Harbin Institute of Technology, China; {2}Harbin Institute of Technology / Shanxi University, China

3158: Rayleigh Behavior at the Orthorhombic to Tetragonal Phase Transition Temperature of Li-Doped KNN-Based Materials
Alexander Martin{2}, Neamul Hayet Khansur{1}, Daisuke Urushihara{2}, Toru Asaka{2}, Kyle Grant Webber{1}, Ken-Ichi Kakimoto{2}
{1}Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; {2}Nagoya Institute of Technology, Japan

3283: One Site, Two Cations, Three Environments: s^2 and s^0 Electronic Configurations Generate Pb-Free Relaxor Behaviour in a Perovskite Oxide
Wesley Surta{2}, John Claridge{2}, Andrew J. Bell{1}, Matthew Rosseinsky{2}
{1}University of Leeds, United Kingdom; {2}University of Liverpool, United Kingdom

3326: Understanding Piezoelectricity of High-Performance Potassium Sodium Niobate Ceramics from Diffused Multi-Phase Coexistence and Domain Feature
Xi-Xi Sun{2}, Junwei Zhang{1}, Xiang Lv{2}, Xi-Xiang Zhang{1}, Yao Liu{3}, Fei Li{3}, Jiagang Wu{2}
{1}King Abdullah University of Science and Technology, Saudi Arabia; {2}Sichuan University, China; {3}Xi'an Jiaotong University, China

3516: Multiphase-Orientated Design of Multifunctional (K,Na)NbO3-Based Ceramics
Xiangjian Wang, Shengguo Lu
Guangdong University of Technology, China

3587: Polarization Rotation at Morphotropic Phase Boundary in a New Lead-Free Piezoelectric Ceramic Na1/2Bi1/2V1-xTixO3
Zhao Pan{5}, Yuki Sakai{6}, Mao-Hua Zhang{3}, Jurij Koruza{3}, Hajime Yamamoto{4}, Hajime Hojo{2}, Shogo Kawaguchi{1}, Jürgen Rödel{3}, Masaki Azuma{6}
{1}Japan Synchrotron Radiation Research Institute, Japan; {2}Kyushu University, Japan; {3}Technical University of Darmstadt, Germany; {4}Tohoku University, Japan; {5}Tokyo Institute of Technology, Japan; {6}Tokyo Institute of Technology / Kanagawa Institu

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08:30:00AM - 12:00:00PM
C1L-4: ISAF: Spectroscopy & Photoelectric Effects
Session Chair: Zibin Chen (Uni. Sydney, AU)

3491: Crystal Structure, Dielectric Properties and Optical Bandgap Control in KNbO3-BiMeO3 (Me=Fe, Mn) Ceramics
Cristina Pascual-Gonzalez{2}, Carolina Elicker{1}, Mario Moreira{1}, Sergio Cava{1}, Iasmi Sterianou{3}, Dawei Wang{4}, Antonio Feteira{3}
{1}Federal University of Pelotas, Brazil; {2}IMDEA Materials Institute, Spain; {3}Sheffield Hallam University, United Kingdom; {4}Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China

3729: Local Structure Investigation in PZT Single Crytals by Synchrotron X-Ray Absorption Spectroscopy
Rattikorn Yimnirun
Vidyasirimedhi Institute of Science and Technology, Thailand

3044: Modulus Spectroscopy for the Detection of Parallel Electric Responses in Ferroelectrics
Till Frömling{2}, Yao Liu{2}, An-Phuc Hoang{2}, Sebastian Steiner{2}, Maximilian Gehringer{2}, Mikalai Zhuk{1}, Julia Glaum{1}, Bai-Xiang Xu{2}
{1}Norwegian University of Science and Technology, Norway; {2}Technical University of Darmstadt, Germany

3135: Surface and Interface Chemistry and Electronic Structure of Pb(Zr,Ti)O3 Sol-Gel Films Using X-Ray Photoelectron Spectroscopy
Nick Barrett{2}, Ibrahima Gueye{4}, Gwenael Le Rhun{1}, Olivier Renault{1}, Emmanuel Defay{3}
{1}CEA-Grenoble, France; {2}CEA-Saclay, France; {3}Luxembourg Institute of Science and Technology, Luxembourg; {4}Université Grenoble Alpes, CEA-Leti / National Institute for Materials Science, Japan

3155: Photochromic and Luminescence Modulation Behaviors of KSr2Nb5O15-Based Ferroelectric Ceramics
Shuyao Cao, Qian Chen, Jie Xu, Feng Gao
Northwestern Polytechnical University, China

3243: Physical Chemistry of Ferroelectric Surfaces: Pyrocatalysis and Ferrocatalysis
Irena Spasojevic{2}, Elzbieta Pach{3}, Kumara Cordero Edwards{6}, Ignacio Villar{1}, Virginia Pérez-Dieste{1}, Carlos Escudero{1}, M. Fernandez-Serra{5}, Albert Verdaguer{4}, Neus Domingo{2}
{1}ALBA Synchrotron Light Source, Spain; {2}Catalan Institute of Nanoscience and Nanotechnology ICN2, Spain; {3}Catalan Institute of Nanoscience and Nanotechnology, ICMAB-CSIC, Spain; {4}Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain; {

3251: Oxidation Processes at the Surface of BaTiO3 Thin Films Under Environmental Conditions
Irena Spasojevic{1}, Guillaume Sauthier{1}, Jose Manuel Caicedo{1}, Albert Verdaguer{2}, Neus Domingo{1}
{1}Catalan Institute of Nanoscience and Nanotechnology ICN2, Spain; {2}Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain

3414: Local Structure of NaNbO3-Based Antiferroelectrics from Solid-State NMR Spectroscopy
Sonja Egert{2}, Mao-Hua Zhang{2}, Niloofar Hadaeghi{2}, Jurij Koruza{2}, Gerd Buntkowsky{2}, Pedro Braga Groszewicz{1}
{1}Delft University of Technology, Netherlands; {2}Technical University of Darmstadt, Germany

3517: Unraveling Correlation Between Light-Induced Enhancement of Piezoelectricity and the Bulk Photovoltaic Effect in BiFeO3
Yooun Heo, Marin Alexe
University of Warwick, United Kingdom

3521: Thermal Evolution of the Cubic Fraction in $Na_{½}Bi_{12}TiO_3$-6 mole%$BaTiO_3$ Analyzed by ^{23}Na Nuclear Magnetic Resonance
Monica Pinto-Salazar{2}, Lalitha Kodumudi Venkataraman{2}, Gerd Buntkowsky{2}, Pedro Braga Groszewicz{1}
{1}Delft University of Technology, Netherlands; {2}Technical University of Darmstadt, Germany

3728: Bulk Photovoltaic Effects in BiFeO3 Planar Capacitors
Seiji Nakashima, Ren Kato, Hironoro Fujisawa
University of Hyogo, Japan

3731: Raman Spectroscopy Study of the Switchable Phases of Metal-Organic Frameworks DUT-8
Alexander Krylov{1}, Irena Senkovska{3}, Stefan Kaskel{3}, Evgenia Slyusareva{2}, Svetlana Krylova{1}, Alexander Vtyurin{1}
{1}Kirensky Institute of Physics FRC KSC SB RAS, Russia; {2}Siberian Federal University, Russia; {3}Technische Universität Dresden, Germany

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08:30:00AM - 12:00:00PM
C1L-5: PFM I
Session Chair: Seungbum Hong (KAIST)

3395: Decoupling Competing Electromechanical Mechanisms in Dynamic Atomic Force Microscopy
Boyuan Huang, Jiangyu Li
Southern University of Science and Technology, China

3242: Direct and Converse Electromechanical Characterization of Nanomaterials
Yonatan Calahorra
Technion – Israel Institute of Technology, Israel

3015: Nanoscale Ferroelectric Characterization with Heterodyne Megasonic Piezoresponse Force Microscopy (HM-PFM) Technique
Qibin Zeng{2}, Hongli Wang{2}, Zhuang Xiong{1}, Qicheng Huang{3}, Kuan Sun{1}, Zhen Fan{3}, Kaiyang Zeng{2}
{1}Chongqing University, China; {2}National University of Singapore, Singapore; {3}South China Normal University, China

3017: Local C-V Characterization for Ferroelectric Films
Yoshiomi Hiranaga{1}, Takanori Mimura{4}, Takao Shimizu{3}, Hiroshi Funakubo{2}, Yasuo Cho{1}
{1}Tohoku University, Japan; {2}Tokyo Institute of Technology, Japan; {3}Tokyo Institute of Technology / National Institute for Materials Science, Japan; {4}University of Virginia / Tokyo Institute of Technology, Japan

3248: Subsurface Volume Probed in Piezoresponse Force Microscopy Imaging
Martí Checa{1}, Christina Stefani{1}, Liam Collins{3}, Stephen Jesse{3}, Gustau Catalán{2}, Neus Domingo{1}
{1}Catalan Institute of Nanoscience and Nanotechnology ICN2, Spain; {2}Catalan Institute of Nanoscience and Nanotechnology ICN2 and ICREA, Spain; {3}Oak Ridge National Laboratory, United States

3441: Investigating Ferroic Behavior of Metal Halide Perovskites
Yongtao Liu{2}, Roger Proksch{1}, Olga S. Ovchinnikova{2}
{1}Asylum Research, Oxford Instruments Company, United States; {2}Oak Ridge National Laboratory, United States

3674: Ferroelectricity in Methylammonium Lead Iodide Perovskite Solar Cells
Tobias Leonhard, Holger Röhm, Alexander Schulz, Michael Hoffmann, Alexander Colsmann
Karlsruhe Institute of Technology, Germany

12:30:00PM - 03:00:00PM
C2L-1: ISIF: Al,ScN I
Session Chair: Jon Ihlefeld (University of Virginia)

3740: Tetrahedral Ferroelectrics Based on Cation-Substituted ZnO and AlN
Jon-Paul Maria, John Hayden, Wanlin Zhu, Steven Baksa, Saiphaneedra Bachu, Rui Zu, Mario Imperatore, Noel Chris Giebink, Venkatraman Gopalan, Nasim Alem, Ismaila Dabo, Susan Trolier-McKinstry
Pennsylvania State University, United States

3090: Downscaling and Low Temperature Deposition of Ferroelectric (Al1-xScx)N Thin Films Deposited by Dual Sputtering
Shinnosuke Yasuoka{3}, Takao Shimizu{4}, Masato Uehara{1}, Hiroshi Yamada{1}, Morito Akiyama{1}, Yoshiomi Hiranaga{2}, Yasuo Cho{2}, Hiroshi Funakubo{3}
{1}National Institute of Advanced Industrial Science and Technology, Japan; {2}Tohoku University, Japan; {3}Tokyo Institute of Technology, Japan; {4}Tokyo Institute of Technology / National Institute for Materials Science, Japan

3151: Fully Oriented 3 µm Thick Al0.75Sc0.25N Films on Non-Epitaxial Substrates
Asaf Cohen, David Ehre, Sergey Khodorov, Igor Lubomirsky
Weizmann Institute of Science, Israel

3577: Sputtered AlN-Based Ferroelectric Thin Films
John Hayden, Mohammad Hossain, Yihuang Xiong, Kevin Ferri, Wanlin Zhu, Mario Imperatore, Noel Chris Giebink, Susan Trolier-McKinstry, Ismaila Dabo, Jon-Paul Maria
Pennsylvania State University, United States

3641: Tile-Target Sputtering Process for Sub-50nm Ferroelectric Sc0.28Al0.78N Films
Sushant Rassay{2}, Faysal Hakim{2}, Chao Li{1}, Nitin Choudhary{1}, Christian Forgey{1}, Roozbeh Tabrizian{2}
{1}Plasma-Therm LLC, United States; {2}University of Florida, United States

3195: Double-Layer Actuators Based on Ferroelectric Aluminum-Scandium-Nitride with Improved Stability and Piezoelectric Response
Tom-Niklas Kreutzer, Simon Fichtner, Bernhard Wagner, Fabian Lofink
Fraunhofer Institute for Silicon Technology, Germany

3576: Zn1-xMgxO: A II-VI Ferroelectric
Kevin Ferri, John Hayden, Wanlin Zhu, Steven Baksa, Saiphaneedra Bachu, Rui Zu, Mario Imperatore, Noel Chris Giebink, Venkatraman Gopalan, Nasim Alem, Ismaila Dabo, Susan Trolier-McKinstry, Jon-Paul Maria
Pennsylvania State University, United States

12:30:00PM - 03:00:00PM
C2L-2: Fundamentals: Domains & Electromechanical Behavior II
Session Chair: Marco Deluca (MCL, Leoben)

3301: Anisotropic Ferrielectricity and Ultra-High Electromechanical Response in PbZrO3 Thin Films
Yulian Yao{1}, Aaron B. Naden{4}, Sergey Lisenkov{3}, Amit Kumar{2}, Inna Ponomareva{3}, Nazanin Bassiri-Gharb{1}
{1}Georgia Institute of Technology, United States; {2}Queen's University Belfast, United Kingdom; {3}University of Southern Florida, United States; {4}University of St Andrews / Queen's University of Belfast, United Kingdom

3392: A New Comprehensive View on the Dynamics of Phase Transitions in BaTiO3
Viktor Bovtun, Dmitry Nuzhnyy, Martin Kempa, Tetyana Ostapchuk, Jan Petzelt, Stanislav Kamba
Institute of Physics of the Czech Academy of Sciences, Czech Rep.

3502: Enhanced Dielectric and Piezoelectric Properties of 0.57(Bi0.8La0.2)FeO3-0.43PbTiO3 Solid Solutions with Fe Additions
Yongchen Wang, Zhixiang Jiao, Jianguo Chen, Jinrong Cheng
Shanghai University, China

3636: Oxygen Vacancy in BaTiO3 Domain Walls: Atomic Scale Realization of Local Electrical Conductance
Hemaprabha Elangovan, Maya Barzilay, Yachin Ivry
Technion – Israel Institute of Technology, Israel

3659: Domain Walls in Ferroelectrics
Sukriti Mantri, John Daniels
University of New South Wales, Australia

3655: Giant Electromechanical Responses via Activated Vacancy Motion: A New Paradigm for Materials with Unique Functionalities
Kyle Kelley{3}, Anna Morozovska{2}, Eugene Eliseev{1}, Stephen Jesse{3}, Sergei V. Kalinin{3}, Rama K. Vasudevan{3}
{1}Institute for Problems of Materials Science, National Academy of Sciences of Ukraine, Ukraine; {2}National Academy of Sciences of Ukraine, Ukraine; {3}Oak Ridge National Laboratory, United States

3646: Exploiting Dynamic of Ferroelectric Domains and Hidden States in Relaxors for Neuromorphic Computing
Brahim Dkhil
CentraleSupélec, Université Paris-Saclay, France

3300: Coexistence of Multiple Morphotropic Phase Boundaries in Strained La-Doped BiFeO3 Thin Films
Xiaozhe Yin{2}, Chao Chen{2}, Zhen Fan{2}, Minghui Qin{2}, Min Zeng{2}, Xubing Lu{2}, Guofu Zhou{2}, Xingsen Gao{2}, Jun-Ming Liu{1}, Deyang Chen{2}
{1}Nanjing University, China; {2}South China Normal University, China

3698: Influence of Dielectric Losses on Anisotropy of Acoustic Attenuation in Lithium Niobate Crystals
Farkhad Akhmedzhanov{1}, Jakhongir Kurbanov{1}, Jamoliddin Nazarov{2}
{1}Academy of Sciences of Uzbekistan, Uzbekistan; {2}Navoi State Mining Institute, Uzbekistan

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12:30:00PM - 03:00:00PM
C2L-3: Lead Free Ferroelectrics: Processing
Session Chair: Hajime Nagata (Tokyo Uni Science, Japan)

3085: Sol-Gel Processed (K, Na)NbO3-Based Lead-Free Piezoelectric Films
Jing-Feng Li
Tsinghua University, China

3336: Impact of Synthesis Conditions on the Ferroelectric Behaviors of Mn/Nb Co-Doped BaTiO3
Shenglan Hao{1}, Pascale Gemeiner{1}, Mojca Otoničar{2}, Pascal Ruello{3}, Houssny Bouyanfif{4}, Charles Paillard{1}, Brahim Dkhil{1}
{1}CentraleSupélec, Université Paris-Saclay, France; {2}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia; {3}Le Mans Université, France; {4}Université de Picardie Jules Verne, France

3532: A Modified Approach for Dielectric-Temperature Stability of BaTiO3-Based Materials
Millicent Appiah{1}, Hua Hao{1}, Zhen Liu{1}, Xuewen Jiang{1}, Marwa Emmanuel{2}, Jan Abdullah{1}, Zhonghua Yao{1}, Minghe Cao{1}, Hanxing Liu{1}
{1}Wuhan University of Technology, China; {2}Wuhan University of Technology / University of Dodoma, China

3706: A Novel Method of Preparing Antiferroelectric Silver Ag(Nb1-xTax)O3 Ceramics
Yan Li, Zhuozhuang Xie, Hongbo Liu
Shanghai University of Engineering Science, China

3707: Cold Sintering Preparing High-Quality NaNbO3 Ceramics
Wenbin Huang, Hongbo Liu
Shanghai University of Engineering Science, China

3006: Understanding the Effects of the A-Site Environment on Potassium Sodium Niobate Lead-Free Ceramics by Comparison Study
Xiang Lv{1}, Jiagang Wu{2}, Xi-Xiang Zhang{1}
{1}King Abdullah University of Science and Technology, Saudi Arabia; {2}Sichuan University, China

3069: Charge Formation and Its Impact on Polarization Kinetics Studied by Means of Ab Initio Based Molecular Dynamics Simulation in BaTiO3
Ruben Khachaturyan, Theophilus Wallis, Anna Grünebohm
Ruhr-University Bochum, Germany

3171: Sodium Bismuth Titanate Based High-Temperature Capacitor Materials
An-Phuc Hoang{1}, Sebastian Steiner{1}, Fan Yang{2}, Linhao Li{2}, Derek C. Sinclair{2}, Till Frömling{1}
{1}Technical University of Darmstadt, Germany; {2}University of Sheffield, United Kingdom

3340: Defect Engineering Electrical Properties of Lead-Free Potassium Sodium Niobate-Based Ceramics
Ruichen Li, Xi-Xi Sun, Ting Zheng, Jiagang Wu
Sichuan University, China

12:30:00PM - 03:00:00PM
C2L-4: Fundamentals: Domains & Switching Dynamics
Session Chair: Rajeev Ranjan (Indian Inst Sci., India)

3184: THz Dynamics of Topological Structures in Ferroelectric Materials
Marek Paściak
Institute of Physics of the Czech Academy of Sciences, Czech Rep.

3136: 3D Imaging of Ferroelectric Domain Walls by FIB Tomography
Erik Roede{3}, Aleksander Mosberg{3}, Donald Evans{3}, Theodor Holstad{3}, Zewu Yan{1}, Edith Bourret{2}, Antonius van Helvoort{3}, Dennis Meier{3}
{1}ETH Zürich, Switzerland; {2}Lawrence Berkeley National Laboratory, United States; {3}Norwegian University of Science and Technology, Norway

3144: Quantifying the Impact of Varying Defect Landscapes on Domain Wall Motion
Ralph Bulanadi{2}, Kumara Cordero Edwards{2}, Philippe Tückmantel{2}, Sahar Saremi{1}, Giacomo Morpurgo{2}, Lane W. Martin{1}, Patrycja Paruch{2}
{1}University of California, Berkeley, United States; {2}University of Geneva, Switzerland

3179: The Origin of Barkhausen Switching Noise During Polarization Reversal in Lithium Niobate Single Crystals
Andrei Akhmatkhanov, Iliya Kipenko, Alexander Esin, Vladimir Ya. Shur
Ural Federal University, Russia

3121: Multistep Stochastic Switching Processes in Tetragonal, Rhombohedral and Orthorhombic Ferroelectrics
Yuri Genenko, Ivan Vorotiahin, Mao-Hua Zhang, Jurij Koruza
Technical University of Darmstadt, Germany

3349: Ultrafast Photostriction in Nanostructured Ferroelectrics
Ruizhe Gu{2}, Gwenaelle Vaudel{2}, Vincent Juvé{2}, Stéphane Fusil{3}, Benjamin Carcan{4}, M. Mohamed Ali Khaled{5}, Houssny Bouyanfif{4}, Vincent Garcia{3}, Cécile Carretero{6}, Daniel Sando{7}, Lluis Yedra{1}, Charles Paillard{1}, Nicolas Jaouen{6}, Bra
{1}CentraleSupélec, Université Paris-Saclay, France; {2}Le Mans Université, France; {3}Unité Mixte de Physique CNRS/Thales - Université Paris-Saclay, France; {4}Université de Picardie Jules Verne, France; {5}Université de Picardie Jules Verne, Laboratoire

3561: Thermal Effects on the Roughness and Dynamics of Ferroelectric Domain Walls Driven from an Initial Flat Configuration in a Disordered Potential Landscape
Guillaume Rapin{3}, Sophia Ehrensperger{1}, Cédric Blaser{2}, Nirvana Caballero{3}, Patrycja Paruch{3}
{1}DACM, State of Geneva, Switzerland; {2}Federal Institute of Metrology METAS, Switzerland; {3}University of Geneva, Switzerland

3629: Dynamic Polarization Switching by Picosecond THz Pulse
Elena Mishina, Vladislav Bylik, Alexander Sigov
MIREA - Russian Technological University, Russia

Wednesday, May 19

03:30:00PM - 06:30:00PM
C3L-1: FYIA: Structure Characterization & Properties
Session Chair: Julian Walker (NTNU, No)

3057: Colossal Electrocaloric Effect of Ceramic-Polymer Composites (for Invited Young Investigator Symposium)
Guangzu Zhang
Huazhong University of Science and Technology, China

3269: Manipulating Properties in Bismuth Ferrite-Based Relaxor Ferroelectrics Guided by Domain Configuration (for Invited Young Investigator Symposium)
Ting Zheng, Jiagang Wu
Sichuan University, China

3279: Point Defect-Induced Dielectric Response Mechanism of RECOB Crystals
Xinyu Lu, Yanlu Li, Linyu Bai, Xiaoji Zhao, Fapeng Yu, Xian Zhao
Shandong University, China

3299: Defect Chemistry, Charge Transport Mechanisms, and Lifetime in Heavily Nb Doped PZT Films
Betul Akkopru-Akgun, Susan Trolier-McKinstry
Pennsylvania State University, United States

3369: In-Situ Electron Microscopy Investigation of Ferroelectric Materials---for Invited Young Investigator Symposium
Zibin Chen, Qianwei Huang, Xiaozhou Liao
University of Sydney, Australia

3373: Strain Mechanism, Thermal Stability and Aging Behavior of BiFeO3-BaTiO3 Piezoelectric Ceramics Near the Morphotropic Phase Boundary
Jianguo Chen{2}, Shujun Zhang{3}, Fei Wen{1}, Xiaoyi Gao{4}, Jinrong Cheng{2}
{1}Hangzhou Dianzi University / University of Wollongong, China; {2}Shanghai University, China; {3}University of Wollongong, Australia; {4}Wuhan University of Technology, China

3566: Direct Imaging of Charged Ferroelectric Topologies During Movement (For Invited Young Investigator Symposium)
Michele Conroy{8}, Eoghan O'Connell{6}, Colin Ophus{1}, Kalani Moore{7}, Lewys Jones{4}, Quentin Ramasse{5}, Eileen Courtney{6}, Clive Downing{4}, Alexei Gruverman{9}, Marty Gregg{3}, Roger Whatmore{2}, Ursel Bangert{7}
{1}Berkeley National Laboratory, United States; {2}Imperial College London, United Kingdom; {3}Queen's University Belfast, Ireland; {4}Trinity College Dublin, Ireland; {5}University of Leeds, United Kingdom; {6}University of Limerick, Ireland; {7}Universi

3660: Domain Percolation in Polycrystalline Ferroelectrics (for Invited Young Investigator Symposium)
Sukriti Mantri, John Daniels
University of New South Wales, Australia

3675: Poling-Induced Effects in Pb(Mg1/3Nb2/3)O3–PbTiO3 Ceramics (for Invited Young Investigator Symposium)
Mojca Otoničar{1}, Andraz Bradeško{1}, Samir Salmanov{1}, Ching-Chang Chung{2}, Alexandra Henriques{2}, Jacob Jones{2}, Tadej Rojac{1}
{1}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia; {2}North Carolina State University, United States

3547: Ferroelectric Domain Evolution Induced by Photorefractive Space Charge Fields (for Invited Young Investigator Symposium)
Hao Tian{2}, Yu Wang{1}, Peng Tan{1}
{1}Harbin Institute of Technology, China; {2}Harbin Institute of Technology / Shanxi University, China

3447: Topology and Control of Self-Assembled Domain Patterns in Low-Dimensional Ferroelectrics
Yousra Nahas{1}, Sergei Prokhorenko{1}, Qi Zhang{2}, Vivasha Govinden{2}, Nagarajan Valanoor{2}, Laurent Bellaiche{1}
{1}University of Arkansas, United States; {2}University of New South Wales, Austria; {2}University of New South Wales, Australia

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03:30:00PM - 06:30:00PM
C3L-2: ISIF: Al,ScN II
Session Chair: Jon Ihlefeld (University of Virginia)

3464: Ferroelectric Properties of Doped Aluminum Nitride (AlN) Films for Invited Young Investigator Symposium
Wanlin Zhu{3}, Betul Akkopru-Akgun{3}, John Hayden{3}, Jung In Yang{3}, Keisuke Yazawa{1}, Daniel Drury{1}, Michele Pirro{2}, Matteo Rinaldi{2}, Geoff Brennecka{1}, Jon-Paul Maria{3}, Susan Trolier-McKinstry{3}
{1}Colorado School of Mines, United States; {2}Northeastern University, United States; {3}Pennsylvania State University, United States

3594: Growth and Chemical Effects on Ferroelectric Switching of (Al,Sc)N Films
Geoff Brennecka{1}, Daniel Drury{1}, Keisuke Yazawa{1}, Andriy Zakutayev{2}
{1}Colorado School of Mines, United States; {2}National Renewable Energy Laboratory, United States

3442: Coercive Field Reduction in Epitaxial Ferroelectric Wurtzite Al1-xScxN Thin Films [for Invited Young Investigator Symposium]
Keisuke Yazawa{1}, Daniel Drury{1}, Andriy Zakutayev{2}, Geoff Brennecka{1}
{1}Colorado School of Mines, United States; {2}National Renewable Energy Laboratory, United States

3639: Temperature-Dependent Lowering of Coercive Field in 300 nm Sputtered Ferroelectric Al0.70Sc0.30N
Ved Gund, Benyamin Davaji, Hyunjea Lee, Mohammad Asadi, Joseph Casamento, Huili Xing, Debdeep Jena, Amit Lal
Cornell University, United States

3640: The Scaling of Ferroelectricity in ScxAl1-xN Under Large Stress and Temperature Variations
Shaurya Dabas{2}, Sushant Rassay{2}, Chao Li{1}, Nitin Choudhary{1}, Christian Forgey{1}, Roozbeh Tabrizian{2}
{1}Plasma-Therm LLC, United States; {2}University of Florida, United States

3725: Volume-Matched Piezoelectric Superlattices from First-Principles
Minglang Hu, Xiaoqing Yang, Wei Ren
Shanghai University, China

03:30:00PM - 06:30:00PM
C3L-3: Processing: Nanoscale Phenomena & Related Processing Techniques
Session Chair: Hajime Nagata (Tokyo Uni Science, Japan)

3046: Nanomaterial Dipole Templating in 3D Printed Composite Flexible Piezoelectric Energy Harvesters
Nick Shepelin, Peter Sherrell, Eirini Goudeli, Amanda Ellis
University of Melbourne, Australia

3177: Nanoscale Investigations of Ageing in Multilayer Ceramic Capacitors
Alessio Morelli{2}, Garry McLaughlin{2}, Maureen Strawhorne{1}, John Byrne{2}, Patrick Lemoine{2}
{1}AVX Ltd, United Kingdom; {2}Ulster University, United Kingdom

3366: Low Temperature Synthesis and Characterization of Vertical Aligned Piezoelectric ZnO Nanowires for Energy Harvesting
Abderrahmane Hamdi{3}, Mervat Alamri{1}, Karim Dogheche{3}, Dominique Deresmes{2}, Denis Remiens{3}, Elhadj Dogheche{3}
{1}IEMN DOAE Université Polytechnique Hauts-de-France, France; {2}Université de Lille, Institut d'électronique, de Microélectronique et de Nanotechnologie, France; {3}Université Polytechnique Hauts-de-France / IEMN DOAE UMR CNRS 8520, France

3503: Pyro-Electrohydrodynamic Jet Printing of an Organic Dye in Diluted Solutions for Detecting Low Abundant Molecules
Simona Itri{2}, Romina Rega{2}, Danila del Giudice{1}, Martina Mugnano{2}, Volodymyr Tkachenko{2}, Annukka Kokkonen{3}, Sanna Aikio{3}, Sanna Uusitalo{3}, Pietro Ferraro{2}, Simonetta Grilli{2}
{1}CNR-ISASI / University of Campania L.Vanvitelli, Italy; {2}Institute of Applied Sciences and Intelligent Systems of the National Research Council (CNR-ISASI), Italy; {3}VTT- Technical Research Centre of Finland, Finland

3512: Transparent Polypropylene Ferroelectret Films with Longitudinal and Transverse Piezoelectric Activity
Xiaoqing Zhang, Zehai Ruan, Qianqian Hu
Tongji University, China

3526: The Charge Reversal of Adsorbed DNA Film and its Influence on the Bending Signal of Microcantilever Biosensor
Yuan Yang, Neng-Hui Zhang, Jun-Zheng Wu, Mei-Hong Zhou
Shanghai University, China

3567: Controlled Synthesis and Electromechanical Characterization of Europium and Titanium-Containing Nanocrystals
Benard Kavey, Gabriel Caruntu
Central Michigan University, United States

3545: Rational Design of Dielectric Materials for High-Energy Density Capacitor Applications
Jingjing Yan
Wuhan University of Technology, China

3556: Phase Sequence and Properties of Piezoelectric K0.5Na0.5NbO3 Ceramics Sintered by Different Processes
Mariana Gomes{2}, Rui Vilarinho{2}, Rui Pinho{1}, Abílio Almeida{2}, M. Elisabete Costa{1}, Paula Vilarinho{1}, Joaquim Agostinho Moreira{2}
{1}University of Aveiro, Portugal; {2}University of Porto, Portugal

3602: Bi-Templated Grain Growth Maximizing the Effects of Texture on Piezoelectricity
Woo-Seok Kang{3}, Tae-Gon Lee{2}, Joo-Hee Kang{1}, Hye-Lim Yu{3}, Ju-Hyeon Lee{3}, Gangho Choi{3}, Sun-Woo Kim{2}, Sahn Nahm{2}, Wook Jo{3}
{1}Korea Institute of Materials Science, Korea; {2}Korea University, Korea; {3}Ulsan National Institute of Science and Technology, Korea

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03:30:00PM - 06:30:00PM
C3L-4: Fundamentals: Relaxors
Session Chair: Rajeev Ranjan (Indian Inst Sci., India)

3210: Metrology of Nanoscale Regions in Relaxor Ferroelectrics
Jiri Hlinka
Institute of Physics of the Czech Academy of Sciences, Czech Rep.

3185: Dynamic Behavior of Polar Nano-Entities in Lead-Based Relaxor and Relaxor Ferroelectrics
Lukas M. Riemer{2}, Kanghyun Chu{2}, Yang Li{4}, Hana Uršič{3}, Mojca Otoničar{3}, Tadej Rojac{3}, Andrew J. Bell{4}, Brahim Dkhil{1}, Dragan Damjanovic{2}
{1}CentraleSupélec, Université Paris-Saclay, France; {2}École Polytechnique Fédérale de Lausanne, Switzerland; {3}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia; {4}University of Leeds, United Kingdom

3190: Understanding of Ultrahigh Dielectric and Piezoelectric Properties in Pb(Mg1/3Nb2/3)O3-PbTiO3 Relaxor-Ferroelectrics Single Crystals
Yang Li, Andrew J. Bell
University of Leeds, United Kingdom

3437: Photovoltaic Properties of Ferroelectric PMN-PT Crystals
Anatolii Makhort, Bohdan Kundys
Université de Strasbourg, CNRS, France

3498: Impact of Electric Field on the Phenomenological Coefficient and a Large Electrocaloric Strength in 0.73Pb(Mg1/3Nb2/3)O3-0.27PbTiO3 Single Crystals
Xiaodong Jian, Xiangjian Wang, X. B. Zhao, Yingbang Yao, B. Liang, T. Tao, Shengguo Lu
Guangdong University of Technology, China

3638: Unsupervised Machine Learning of Ferroelectric Relaxor Structures from Atomically Resolved STEM Data: Generative and Causal Models
Sergei V. Kalinin{1}, Christopher T. Nelson{1}, Ichiro Takeuchi{2}, Rama K. Vasudevan{1}, Maxim Ziatdinov{1}
{1}Oak Ridge National Laboratory, United States; {2}University of Maryland, United States

3723: Local to Meso-Scale Structural Order Characterized by Real-Space 2-D Partial Pair Correlation Functions
Elizabeth Dickey, Stephen Funni
Carnegie Mellon University, United States

Thursday, May 20

08:30:00AM - 12:00:00PM
D1L-1: Processing: Composites
Session Chair: Yanxue Tang (Shanghai normal uni. China)

3656: Piezoelectric and Dielectric Composites
Ahmad Safari, Jake Dechiara, Jack Leber, Haochen Lyu
Rutgers University, United States

3165: Characterization and Dielectric Tunability of Ba0.6Sr0.4TiO3/P(VDF-TrFE-CTFE) Composites
Yiting Guo, Li Wang, Jie Xu, Feng Gao
Northwestern Polytechnical University, China

3176: Microstructure and Dielectric Properties of (Ba0.6Sr0.4)Tio3/PEEK Functional Composites Prepared via Cold-Pressing Sintering
Shuhang Liu, Yiting Guo, Jie Xu, Feng Gao
Northwestern Polytechnical University, China

3197: Composite Flexible Films Prepared by Hot Pressing for Low-Energy Harvesting and Storage
Mirjana Vijatovic Petrovic{5}, Floriana Craciun{2}, Francesco Cordero{2}, Elisa Mercadelli{1}, Carmen Galassi{1}, Nikola Ilic{5}, Elisabetta Brunengo{3}, Zeljko Despotovic{4}, Jelena Bobic{5}, Adis Dzunuzovic{5}, Paola Stagnaro{3}
{1}CNR-ISTEC, Istituto di Scienza e Tecnologia dei Materiali Ceramici, Italy; {2}CNR-Istituto di Struttura della Materia, Rome, Italy; {3}CNR-SCITEC, Istituto di Scienze e Tecnologie Chimiche, Italy; {4}Institute Mihajlo Pupin, Serbia; {5}University of Be

3401: Preparation and Properties Study of Piezoelectric Composite Films Based on 3D Ceramic Nanofiber Network
Yimei Xie, Xiaofei Liu
Wuhan University of Technology, China

3413: Enhanced Performance of Piezoelectric Composite Nanogenerator Based on Gradient Porous PZT Ceramic Structures for Energy Harvesting
Huan Liu, Xiujuan Lin, Shuo Zhang, Yu Huan, Shifeng Huang, Xin Cheng
University of Jinan, China

3416: Increase of Breakdown Field in P(VDF-HFP)/h-BN/Nano-Metal Composites Through Coulomb-Blockade Effect of Nano-Size Metal
Sung-Yub Ji, Han-Bo Jung, Min-Kyu Kim, Ji-Ho Lim, Daeyong Jeong
Inha University, Korea

3434: Development of Polymer-Ceramic-Metal Acoustic Matching Layers for Medical Ultrasound Transducers
Smitha Shetty{1}, Prapassorn Numkiatsakul{3}, Regina Incarnato{2}, Hal Kunkel{2}, Haifeng Wang{2}, Clive Randall{1}, Susan Trolier-McKinstry{1}
{1}Pennsylvania State University, United States; {2}Philips Ultrasound, United States; {3}University of Illinois at Urbana-Champaign, United States

3456: Two-Dimensional Sr2Nb2O7 Nano-Sheets Induced Highly Energy Storage Density in PVDF/PMMA Blend Polymer Composites
Hairui Bai, Bo Shen, Jiwei Zhai
Tongji University, China

3654: Multi-Layer 0-3 Composite with Al2O3 Ceramic and PVDF for Energy Storage
Haochen Lyu, Jack Leber, Ahmad Safari
Rutgers University, United States

Thursday, May 20

08:30:00AM - 12:00:00PM
D1L-2: Processing: Thin Films I
Session Chair: Yuji Noguchi (Kumamoto Uni. Japan)

3122: Design of Giant Polarization in Ferroelectric Thin Films
Jun Chen
University of Science and Technology Beijing, China

3020: Perseverance of Ferroelectricity Close to Unit-Cell Thickness in Chemical Vapour Deposited Aurivillius Phase Thin Films
Lynette Keeney{1}, Zineb Saghi{2}, Marita O'Sullivan{3}, Jonathan Alaria{3}, Michael Schmidt{1}, Louise Colfer{1}
{1}Tyndall National Institute, University College Cork, Ireland; {2}Université Grenoble Alpes, CEA-Leti, France; {3}University of Liverpool, United Kingdom

3093: Growth and Electrical Properties of High-Curie Point Rhombohedral Mn-Pb(In1/2Nb1/2)O3-Pb(Mg1/3Nb2/3)O3-PbTiO3 Thin Films
Zihao Li, Yuchun Wang, Yanxue Tang, Xiangyong Zhao, Zhihua Duan, Tao Wang, Wangzhou Shi, Feifei Wang
Shanghai Normal University, China

3157: Flexible KNN Based All-Inorganic Biocompatible Piezoelectric Thin Films Enabled by Metal Foils
Yue-Yu-Shan Cheng, Lisha Liu, Yu Huang, Liang Shu, Jing-Feng Li
Tsinghua University, China

3214: Nanocomposite-Seeded Epitaxial Growth of Single-Domain Lithium Niobate Thin Films as a New Potential Material for X-Band RF Applications
Robynne Paldi{1}, Arjun Aryal{3}, Zhimin Qi{1}, Mahmoud Behzadirad{3}, Michael Wood{2}, James Barnard{1}, Darren Branch{2}, Tito Busani{3}, Haiyan Wang{1}, Aleem Siddiqui{2}
{1}Purdue University, United States; {2}Sandia National Laboratories, United States; {3}University of New Mexico, United States

3222: Growth Window of Epitaxial PbSc0.5Ta0.5O3 Thin Films
Takanori Mimura{2}, Ian Brummel{1}, Kiumars Aryana{1}, Patrick Hopkins{1}, Jon Ihlefeld{1}
{1}University of Virginia, United States; {2}University of Virginia / Tokyo Institute of Technology, United States

3225: Impact of Incident Ion Energy on Crystallization, Microstructure, and Ferroelectric Behavior of Hafnium Oxide Thin Films Deposited by High Power Impulse Magnetron Sputtering
Samantha Jaszewski{2}, Shelby Fields{2}, Alejandro Salanova{2}, Ching-Chang Chung{1}, Jacob L. Jones{1}, Jon Ihlefeld{2}
{1}North Carolina State University, United States; {2}University of Virginia, United States

3582: Growth of (CaO)(CaMnO3)n Thin Films by Pulsed Laser Deposition
Bruna Machado Silva{3}, João Oliveira{3}, Tiago Rebelo{3}, Pedro Rocha-Rodrigues{1}, Prasannan Neenu Lekshmi{4}, Armandina Maria Lima Lopes{2}, João Pedro Esteves Araújo{1}, Leonard Francis{3}, Bernardo Almeida{3}
{1}Faculdade de Ciências da Universidade do Porto, Portugal; {2}Faculdade de Ciências da Universidade do Porto, IFIMUP, Portugal; {3}Universidade do Minho / Universidade do Porto, Portugal; {4}University of Porto, Institute of Physics for Advanced Materia

Thursday, May 20

08:30:00AM - 12:00:00PM
D1L-3: Lead Free Piezoelectrics: NBT & KNN based
Session Chair: Jürgen Rödel (Darmstadt Uni., Germany)

3365: Perspective for Hard Lead-Free Nbt-Based Piezoceramics
Jürgen Rödel, Lalitha K.V., Jurij Koruza
Technical University of Darmstadt, Germany

3374: Development of KNN-Based Lead-Free Piezoelectric Ceramics
Jiagang Wu
Sichuan University, China

3658: Piezoelectric Properties and Depolarization Temperature on Quenched (Bi1/2Na1/2)TiO3-Based Solid Solution Ceramics
Hajime Nagata, Yuka Takagi, Tadashi Takenaka
Tokyo University of Science, Japan

3505: Large Strain Response and Decreased Loss in Lead-Free Bismuth Sodium Titanite Piezoelectric Thin Films by Annealing in O2 Atmosphere
Zhe Wang, Jinyan Zhao, Kun Zheng, Wei Ren, Jian Zhuang, Lingyan Wang, Yi Quan
Xi'an Jiaotong University, China

3244: Structure-Microstructure-Property Correlation in Quenched Na1/2Bi1/2TiO3-BaTiO3 Piezoceramics
Andreas Wohninsland, Ann-Katrin Fetzer, Hans-Joachim Kleebe, Lalitha Kodumudi Venkataraman
Technical University of Darmstadt, Germany

3311: Potassium Sodium Niobate Ceramics with Broad Phase Transition Range: Temperature-Insensitive Strain
Nan Zhang, Chunlin Zhao, Jiagang Wu
Sichuan University, China

3400: The Structure Evolution with Increased Dopant Level in KNN Ferroelectric Ceramics
Xiaoyi Gao{3}, Zibin Chen{1}, Fei Li{4}, Shujun Zhang{2}
{1}University of Sydney, Australia; {2}University of Wollongong, Australia; {3}Wuhan University of Technology, China; {4}Xi'an Jiaotong University, China

3590: Investigation of High Piezoelectric Properties of KNNSb-SrxBNZ Ceramics
Yuan Cheng{1}, Jie Xing{1}, Chao Wu{1}, Ting Wang{1}, Lixu Xie{1}, Yi-Xuan Liu{2}, Xingyu Xu{2}, Ke Wang{2}, Dingquan Xiao{1}, Jianguo Zhu{1}
{1}Sichuan University, China; {2}Tsinghua University, China

3592: Comprehensive Investigation of Structural and Electrical Properties of KNNS-xBC-BKZ-Fe2O3 Ceramics
Lixu Xie, Jie Xing, Zhi Tan, Yuan Cheng, Jianguo Zhu
Sichuan University, China

08:30:00AM - 12:00:00PM
D1L-4: ISIF: Flexible & Wearable Devices
Session Chair: Orlando Auciello (University of Texas at Dallas)

3695: Ultra-Thin Piezoelectric MEMS for SHM, Healthcare and Haptics (for Invited Young Investigator Symposium)
Takeshi Kobayashi, Toshihiro Takeshita, Yusuke Takei, Takahiro Yamashita
National Institute of Advanced Industrial Science and Technology, Japan

3685: Novel Piezoelectric Polymer Composites for Flexible Electronic Device
Soma Guhathakurta
SABIC Research and Technology Pvt. Ltd., India

3291: Conformable Piezoelectric Sensors/Transducers for Physiological Bio-Signals Decoding
Lin Zhang
Massachusetts Institute of Technology, United States

3716: Flexible Film Loudspeaker Based on Ultrathin Piezoelectric Bare Chip
Takahiro Yamashita, Toshihiro Takeshita, Atsushi Oouchi, Takeshi Kobayashi
National Institute of Advanced Industrial Science and Technology, Japan

3701: Single Crystalline BaTiO3 Membranes via Graphene/Ge Template and Surface Orientation Impact
Liyan Dai{2}, Jinyan Zhao{2}, Yankun Wang{2}, Heping Wu{2}, Yanxiao Sun{2}, Lingyan Wang{2}, Peng Shi{2}, Zuo-Guang Ye{1}, Wei Ren{2}, Gang Niu{2}
{1}Simon Fraser University, Canada; {2}Xi'an Jiaotong University, China

3690: Development of Lamination Sealing Method for Ultra-Thin PZT MEMS Device
Toshihiro Takeshita, Takahiro Yamashita, Yusuke Takei, Daniel Zymelka, Takeshi Kobayashi
National Institute of Advanced Industrial Science and Technology, Japan

3617: Ferroelectric Hf0.5Zr0.5O2 for Wearable Applications
Kartik Sondhi, Faysal Hakim, Roozbeh Tabrizian, Toshikazu Nishida
University of Florida, United States

3734: Large-Area Atomic-Smooth Polyvinylidene Fluoride Langmuir–Blodgett Film Exhibiting Significantly Improved Ferroelectric and Piezoelectric Responses
Shan He, Yang Shen, Mengfan Guo, Zhenkang Dan
Tsinghua University, China

3704: Flexible and Transparent Devices Based on Perovskite Oxide Ferroelectric Films
Guoliang Yuan{2}, Yaojin Wang{2}, Junming Liu{1}
{1}Nanjing University, China; {2}Nanjing University of Science and Technology, China

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12:30:00PM - 03:00:00PM
D2L-1: ISIF: Energy Generation & Storage
Session Chair: Sandwip Dey (Arizona State University)

3739: Piezoelectric and Ferroelectric Devices for Energy Efficiency and Power
Sarah Bedair{1}, Mary Galanko Klemash{1}, Ryan Rudy{1}, Victor Tseng{1}, Brendan Hanrahan{1}, Iain Kierzewski{2}, Nathan Lazarus{1}, Jeffrey Pulskamp{1}, Joshua Radice{3}
{1}DEVCOM Army Research Laboratory, United States; {2}General Technical Services, United States; {3}US Naval Academy, United States

3652: Approaches to Develop High Performance Piezoelectric Vibration Energy Harvester
Takeshi Yoshimura
Osaka Prefecture University, Japan

3569: Mechanically Robust PVDF and Bacterial Cellulose Based Triboelectric Energy Harvester and Self-Powered Wireless Motion Sensor
Bushara Fatma, Ashish Garg
Indian Institute of Technology Kanpur, India

3673: Activation Processes in Superionic Rare Earth Trifluorides
Farkhad Akhmedzhanov, Siroziddin Mirzaev, Georgiy Nujdov
Academy of Sciences of Uzbekistan, Uzbekistan

3182: Influence of Different Electrodes and Atmospheres on the Interface and Dielectric Properties of Li0.5La0.5TiO3 Ceramics
Xiaoyong Wei, Rui Gu, Jingrui Kang
Xi'an Jiaotong University, China

3262: Electromechanical Properties of 2-Degree-of-Freedom MEMS Piezoelectric Vibration Energy Harvester Under Impulsive Force
Sengsavang Aphayvong{1}, Takeshi Yoshimura{1}, Shuichi Murakami{2}, Kensuke Kanda{3}, Norifumi Fujimura{1}
{1}Osaka Prefecture University, Japan; {2}Osaka Research Institute of Industrial Science and Technology, Japan; {3}University of Hyogo, Japan

3268: Ba-Based Complex Perovskite Ceramics with Superior Energy Storage Characteristics
Ruida Shi{3}, Xiao Ma{1}, Pianpian Ma{2}, Xiao Li Zhu{3}, Maosen Fu{1}, Xiang Ming Chen{3}
{1}Northwestern Polytechnical University, China; {2}Zhejiang Sci-Tech University, China; {3}Zhejiang University, China

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12:30:00PM - 03:00:00PM
D2L-2: ISIF: Photo Effects & Solar
Session Chair: Sandwip Dey (Arizona State University)

3019: Photo-Induced Strain in Ferroelectric Thin Film Integrated in Devices
Sylvia Matzen{2}, Loïc Guillemot{2}, Stéphane Gable{2}, Komalika Rani{2}, Thomas Maroutian{2}, Guillaume Agnus{2}, Sheena K. K. Patel{4}, Haiden Wen{1}, Anthony DiChiara{1}, Oleg Shpyrko{4}, Eric Fullerton{4}, Dafiné Ravelosona{2}, Roopali Kukreja{3}, Phi
{1}Argonne National Laboratory, United States; {2}Université Paris-Saclay, Centre de Nanosciences et Nanotechnologies, CNRS, France; {3}University of California, Davis, United States; {4}University of California, San Diego, United States

3145: Influence of Substrate Stress on the Photovoltaic Properties of BiFeO3 Films
Alfredo Blázquez Martínez, Stéphanie Girod, Veronika Kovacova, Sebastjan Glinšek, Torsten Granzow
Luxembourg Institute of Science and Technology, Luxembourg

3260: Optical Switch of Resistance in Ferroelectric Junctions
Xiao Long, Huan Tan, Florencio Sánchez, Josep Fontcuberta, Ignasi Fina
Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain

3720: Humidity Stability of Two-Dimensional Organic-Inorganic Hybrid Perovskites Under a External Electric Field
Seulyoung Park, Jaichan Lee
Sungkyunkwan University, Korea

12:30:00PM - 03:00:00PM
D2L-3: Lead Free Ferroelectrics: Property & Applications
Session Chair: Haibo Zhang (HUST, China)

3327: Flexible and High-Performance Organic-Inorganic Composite Piezoelectric Nanogenerators Based on Modified BaTiO3
Huiling Guo, Fang Wang, Qi Wu, Huajun Sun, Huiting Sui
Wuhan University of Technology, China

3224: Haptic Feedback Enhancement and Tuning Using Periodic Reflectors
Anurupa Shaw
KellyOCG, France

3013: Biocompatible Ferroelectric Nanofibers for Bioengineering, Multimodal Bioimaging and Sensors
Alexander M. Grishin
KTH Royal Institute of Technology, Sweden

3523: Flexible Lead-Free Ferroelectric-Based Nanogenerator as Piezoelectric Energy Harvester
Huiqing Fan, Xiaohu Ren, Yuwei Zhao, Weijia Wang
Northwestern Polytechnical University, China

3312: Large Electrocaloric Response with Superior Temperature Stability in NaNbO3-Based Relaxor Ferroelectrics Benefiting from Crossover Region
Ling Zhang, Chunlin Zhao, Ting Zheng, Jiagang Wu
Sichuan University, China

3486: Ferroelectric, Piezoelectric and Dielectric Properties of (1-x)Ba(Zr0.2Ti0.8)O3-x(Ba0.8Pb0.2)TiO3 Ceramics
Chao Zhou, Xiaoxiao Zhang, Tiantian Yu, Sen Yang
Xi'an Jiaotong University, China

3152: Large Non-Classical Electrostriction in Aliovalent and Isovalent Doped Ceria
Maxim Varenik, Ellen Wachtel, Elad Gaver, Igor Lubomirsky
Weizmann Institute of Science, Israel

3363: High-Throughput Preparation and Property Investigations on Lead-Free Piezoelectric Ceramics
Faqiang Zhang{1}, Guanhua Song{1}, Zhifu Liu{2}, Yongxiang Li{1}
{1}Shanghai Institute of Ceramics, Chinese Academy of Sciences, China; {2}Shanghai Institute of Ceramics, Chinese Academy of Sciences / UCAS, China

3451: Polaronic Hopping and Magnetoelectric Effect in Colossal Permittivity A-Site Distorted LiCuNb3O9 Perovskite
Dandan Gao, Wanbiao Hu
Yunnan University, China

3346: A Combined Degradation of Dyes and Inactivation of Bacteria by Using Piezoelectric BaTiO3 Ceramics
Yuwen Wang, Panpan Lv, Changhong Yang, Shifeng Huang, Xin Cheng
University of Jinan, China

12:30:00PM - 03:00:00PM
D2L-4: PFM II
Session Chair: Yunseok Kim (Sungkyunkwan University (SKKU))

3477: Real-Time Machine Learning in Scanning Probe Microscopy
Joshua Agar
Lehigh University, United States

3141: Machine Learning for Ferroelectric Domain Walls and Topological Textures
Fangping Zhuo{3}, Chenxi Wang{2}, Chan-Ho Yang{1}
{1}KAIST, Korea; {2}Sungkyunkwan University, Korea; {3}Technical University of Darmstadt, Germany

3651: Automated Experimentation in Piezoresponse Force Microscopy via Machine Learning
Kyle Kelley, Maxim Ziatdinov, Stephen Jesse, Sergei V. Kalinin, Rama K. Vasudevan
Oak Ridge National Laboratory, United States

3637: (Auto) Encoding Ferroelectric Domain Dynamics and Structure-Property Relationships: from Physics Discovery to Automated Experiment
Sergei V. Kalinin{2}, Roger Proksch{1}, Yongtao Liu{2}, Rama K. Vasudevan{2}, Maxim Ziatdinov{2}
{1}Asylum Research, Oxford Instruments Company, United States; {2}Oak Ridge National Laboratory, United States

3544: Machine Learning-Identified Nanoscale Electromechanical Contributors in Pb(Zr0.53Ti0.47)O3 Thin Films
Kerisha Williams{1}, Fengyuan Zhang{4}, David Edwards{3}, Aaron B. Naden{5}, Yulian Yao{1}, Sabine M. Neumayer{3}, Amit Kumar{2}, Nazanin Bassiri-Gharb{1}, Brian Rodriguez{3}
{1}Georgia Institute of Technology, United States; {2}Queen's University Belfast, United Kingdom; {3}University College Dublin, Ireland; {4}University College Dublin / Southern University of Science and Technology, Ireland; {5}University of St Andrews / Q

3653: Dynamic Manipulation in Piezoresponse Force Microscopy: Creating Non-Equilibrium Phases with Large Electromechanical Response
Kyle Kelley{4}, Yao Ren{7}, Anna Morozovska{2}, Eugene Eliseev{1}, Yoshitaka Ehara{3}, Hiroshi Funakubo{5}, Thierry Giamarchi{6}, Nina Balke{4}, Rama K. Vasudevan{4}, Ye Cao{7}, Stephen Jesse{4}, Sergei V. Kalinin{4}
{1}Institute for Problems of Materials Science, National Academy of Sciences of Ukraine, Ukraine; {2}National Academy of Sciences of Ukraine, Ukraine; {3}National Defense Academy, Japan; {4}Oak Ridge National Laboratory, United States; {5}Tokyo Institute

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03:30:00PM - 06:30:00PM
D3L-1: FYIA: Processing
Session Chair: Jon Ihlefeld (Uni. Virginia, US)

3066: Fabrication of Pseudo-Cubic BaTiO3-Bi(Mg1/2Ti1/2)O3-BiFeO3 Ceramics and Origin of Ferroelectric and Piezoelectric Responses
Ichiro Fujii{3}, Shintaro Ueno{3}, Yukio Sato{2}, Yoshihiro Kuroiwa{1}, Satoshi Wada{3}
{1}Hiroshima University, Japan; {2}Kyushu University, Japan; {3}University of Yamanashi, Japan

3079: Design of Alkaline Niobate Based Multilayer Piezoceramic for Invited Young Investigator Symposium
Keiichi Hatano, Nobuhiro Sasaki
Taiyo Yuden Co., Ltd., Japan

3292: Understanding and Designing of Ferroelectric Polymers from a Molecular Perspective (for Invited Young Investigator Symposium)
Yang Liu, Qing Wang
Pennsylvania State University, United States

3330: Ultrahigh Electro-Strain in Acceptor-Doped KNN Lead-Free Piezoelectric Ceramics via Defect Engineering (for Invited Young Investigator Symposium)
Yejing Dai{1}, Zhihao Zhao{1}, Shujun Zhang{2}
{1}Sun Yat-sen University, China; {2}University of Wollongong, Australia

3494: Tailoring BaTiO3-Based Thin Films from Aqueous Chemical Solution Deposition by in Situ Characterization - for Invited Young Investigator Symposium
Kristine Bakken{1}, Anders Bank Blichfeld{2}, Viviann Hole Pedersen{2}, Julia Glaum{2}, Tor Grande{2}, Mari-Ann Einarsrud{2}
{1}Materials Center Leoben Forschung GmbH, Austria; {2}Norwegian University of Science and Technology, Norway

3535: Recent Developments in Quenching Na1/2Bi1/2TiO3-Based Piezoceramics (for Invited Young Investigator Symposium)
Qiumei Wei{1}, Pengrong Ren{3}, Andreas Wohninsland{2}, Mao-Hua Zhang{2}, Mankang Zhu{2}, Lalitha Kodumudi Venkataraman{2}
{1}Beijing University of Technology, China; {2}Technical University of Darmstadt, Germany; {3}Xi'an University of Technology, China

3278: Single Crystal-Like Piezoelectric Properties in Grain-Oriented Ferroelectric Ceramics (for Invited Young Investigator Symposium)
Yunfei Chang{1}, Jie Wu{1}, Zhen Liu{2}, Fei Li{3}, Enwei Sun{1}, Linjing Liu{1}, Qiangwei Kou{1}, Bin Yang{1}
{1}Harbin Institute of Technology, China; {2}Technical University of Darmstadt, Germany; {3}Xi'an Jiaotong University, China

3314: Anomalous Dielectric Behaviour at the Monoclinic to Tetragonal Phase Transition in Fergusonite Structured Microwave Dielectric Ceramics
Di Zhou, Fangfang Wu, Huanhuan Guo
Xi'an Jiaotong University, China

3315: Low-Temperature Processing of Bi-Based Ferroelectric Ceramics Utilizing Liquid-Phase Synthesis Techniques (for Invited Young Investigator Symposium)
Manabu Hagiwara{1}, Yuta Shinjo{1}, Kengo Sakamoto{1}, Hiroki Taniguchi{2}, Shinobu Fujihara{1}
{1}Keio University, Japan; {2}Nagoya University, Japan

3552: 2D Dielectric/Ferroelectric Perovskite Nanosheets and Their Applications for Power Energy Storage (for Invited Young Investigator Symposium)
Bao-Wen Li
Wuhan University of Technology, China

3611: Sandwich-Structured Polymer Nanocomposites for Dielectric Energy Storage Applications
Haibo Zhang
Huazhong University of Science and Technology, China

3696: Bismuth-Containing Perovskite Single Crystals with High Curie Temperature and Superior Ferro-/Piezoelectric Performance
Zenghui Liu{2}, Wei Ren{2}, Zuo-Guang Ye{1}
{1}Simon Fraser University, Canada; {2}Xi'an Jiaotong University, China

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03:30:00PM - 06:30:00PM
D3L-2: Processing: Thin Films II
Session Chair: Yuji Noguchi (Kumamoto Uni. Japan)

3211: Enabling New Phenomena in Classic Materials – a Case Study of BaTiO3
Lane W. Martin
University of California, Berkeley, United States

3309: Deposition and Dielectric Characterization of Perovskite and TTB Oxide Thin Films of the (Sr,La)-(Ta,Ti)-O System
Mohamad Haydoura{2}, Claire Le Paven{2}, Ratiba Benzerga{2}, Laurent Le Gendre{1}, Xavier Castel{2}, Ala Sharaiha{2}
{1}Université de Rennes 1, CNRS, IETR-UMR 6164, France; {2}University of Rennes, Institute of Electronics and Telecommunications of Rennes, France

3320: Performance Enhancements in Poly(Vinylidene Fluoride)-Based Films for Pressure Sensing Application and Actuator
Chao Zhang, Huajun Sun, Quanyao Zhu
Wuhan University of Technology, China

3439: Role of Bi Sticking Coefficient in BNT Thin Film Growth by Sputtering
Arthur Hamieh, Freddy Ponchel, Denis Remiens
Université Polytechnique Hauts-de-France / IEMN DOAE UMR CNRS 8520, France

3458: Probing the Coexistence of Ordered and Disordered Domain Structures in Bi0.5Na0.5TiO3-Based Thin Films for Enhanced Piezoelectric Performance
Kun Zhu, Bo Shen, Jiwei Zhai
Tongji University, China

3572: Crack-Free Bilayer PZT Film on Metal Foil by Dip-Coat Chemical Solution Deposition
Travis Peters, Susan Trolier-McKinstry
Pennsylvania State University, United States

3619: Ferroelectric and Charge Transport Properties in Strain-Engineered Two-Dimensional Lead Iodide Perovskites
Dohyung Kim{2}, Bogdan Dryzhakov{2}, Yongtao Liu{2}, Olga S. Ovchinnikova{1}, Bin Hu{2}, Sergei V. Kalinin{1}, Mahshid Ahmadi{2}
{1}Oak Ridge National Laboratory, United States; {2}University of Tennessee, United States

3321: Enhanced Energy Storage Performance of BaTiO3-Based Thin Films by Composition Control and Structure Design of Amorphous-Crystal Nanodomains
Xuewen Jiang, Hua Hao, Jiahao Lv, Minghe Cao, Zhonghua Yao, Hanxing Liu
Wuhan University of Technology, China

03:30:00PM - 06:30:00PM
D3L-3: Lead Free Piezoelectrics: BF & BLSF based
Session Chair: Haibo Zhang (HUST, China)

3733: Phase Boundary and Defect Engineering in BiFeO3-BaTiO3-Based Dielectrics
Soonil Lee, Fazli Akram, Salman Khan, Tauseef Ahmed, Soo Yong Choi, Jihee Bae, Muhammad Habib, Myong-Ho Kim
Changwon National University, Korea

3533: Bismuth Layer-Structured Ferroelectric Ceramics for High Temperature Piezoelectric Applications
Chun-Ming Wang
Shandong University, China

3059: Electrical Properties and Temperature Stability of BiFeO3-BaTiO3 Based Ceramics
Christopher Dean, Peter Kabakov, Valsala Kurusingal
Maritime Underwater Systems, Thales Australia, Australia

3103: Effect of BaTiO3 Seeding on the Piezoelectric Properties of Mechanochemically Activated 0.67BiFeO3-0.33BaTiO3 Ceramics
Gianni Ferrero{3}, Katarina Žiberna{2}, Maja Makarovič{1}, Tadej Rojac{2}, Barbara Malič{2}, Konstantin Astafiev{3}, Erling Ringgaard{3}, Rasmus Lou-Møller{3}, Astri Bjørnetun Haugen{4}, Bhaskar Reddy Sudireddy{4}
{1}Jožef Stefan Institute, Slovenia; {2}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia; {3}Meggitt A/S, Denmark; {4}Technical University of Denmark, Denmark

3345: Preparations of BiFeO3-Based Piezoelectric Ceramic and its High Temperature Acoustic Emission Sensors
Chao Feng, Changhong Yang, Xin Cheng, Shifeng Huang
University of Jinan, China

3398: The Origin of Optimized Electrostrain in BiFeO3-Based Electroceramics
Ge Wang, Zhilun Lu, Dawei Wang, Derek C. Sinclair, Ian M. Reaney
University of Sheffield, United Kingdom

03:30:00PM - 06:30:00PM
D3L-4: ISAF: Characterisation (Structure XRD/TEM)
Session Chair: Zibin Chen (Uni. Sydney, AU)

3236: Exploring the Links Between Chemistry and Structure to Functional Properties with Electron Microscopy
James Lebeau{1}, Abinash Kumar{1}, Jonathon Baker{2}, Preston Bowes{2}, Shujun Zhang{3}, Elizabeth Dickey{2}, Douglas Irving{2}
{1}Massachusetts Institute of Technology, United States; {2}North Carolina State University, United States; {3}University of Wollongong, Australia

3337: Understanding the Structure-Property Relationship in Lead-Free Piezoelectric [1-x]Ba(Zr,Ti)O3-[x](Ba,Ca)TiO3 Through in Situ Total Scattering, Neutron Diffraction, and EXAFS
Michelle Dolgos{3}, Charles Culbertson{2}, Alicia Manjon Sanz{1}
{1}Oak Ridge National Laboratory, United States; {2}Sandia National Laboratories, United States; {3}University of Calgary, Canada

3371: Electric Field-Induced Antiferroelectric-Ferroelectric Phase Transition and In-Situ Synchrotron X-Ray Characterization in NaNbO3-Based Lead-Free Ceramics
Aiwen Xie{2}, Jian Fu{2}, Shujun Zhang{3}, Ruzhong Zuo{1}
{1}Anhui Polytechnic University, China; {2}Hefei University of Technology, China; {3}University of Wollongong, Australia

3080: Atomic-Level-Structural Analysis of Different Crystal Entities in Lead-Free Piezoelectrics
Andreja Benčan Golob{3}, Oana Andreea Condurache{3}, Goran Dražić{2}, Hana Uršič{3}, Dragan Damjanovic{1}, Tadej Rojac{3}
{1}École Polytechnique Fédérale de Lausanne, Switzerland; {2}Jožef Stefan Institute / National Institute of Chemistry, Slovenia; {3}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia

3203: Structural Investigation of Sn(II) Metastable Perovskite Oxide Systems
Rachel Broughton, Shaun O'Donnell, Eric Gabilondo, Paul Maggard, Jacob Jones
North Carolina State University, United States

3347: Dominant Contribution of Low Symmetry Phases to Piezoresponse in Oxide Ferroelectrics
Yinlian Zhu
Institute of Metal Research, Chinese Academy of Sciences, China

3127: Structural Evolution in PbZrO3-Based Antiferroelectric Perovskites
Hui Liu{2}, Yang Ren{1}, Jun Chen{2}
{1}Argonne National Laboratory, United States; {2}University of Science and Technology Beijing, China

3233: Atomic-Scale Investigation of Nb-Rich Extended Defects in Alkali Niobate Epitaxial Thin Films
Moaz Waqar{2}, Haijun Wu{2}, Khuong Phuong Ong{1}, Huajun Liu{1}, Kui Yao{1}, Stephen J. Pennycook{2}, John Wang{2}
{1}Agency for Science, Technology and Research, Singapore; {2}National University of Singapore, Singapore

Friday, May 21

08:30:00AM - 12:00:00PM
E1L-1: ISAF: Characterisation (Crystals/Polymers/Composites)
Session Chair: Jurij Koruza (Uni. Darmstadt, Germany)

3580: Crystal Growth and Diffuse Scattering from Tetragonal Tungsten Bronze Ba2RFeNb4O15
Bi-Xia Wang, Matthew Krogstad, Hong Zheng, Ray Osborn, Stephan Rosenkranz, Daniel Phelan
Argonne National Laboratory, United States

3691: Toroidal Polar Topology in Strained Ferroelectric Polymer
Mengfan Guo, Ce-Wen Nan, Yang Shen
Tsinghua University, China

3453: Ferroelectric Polymer Nanocomposites Exhibiting Anomalously Improved Dielectric Constant and High Energy Density Enabled by CdSe/Cd1–xZnxS Quantum Dots
Li Li, Yunyun Cheng, Ting Han, Guanghui Zhao, Lijie Dong
Wuhan University of Technology, China

3661: High Temperature Dielectric Polymer with Both High Discharged Energy Density and Energy Efficiency
Luna Ye{2}, Fei Wen{3}, Lin Zhang{4}, Lili Li{3}, Jianguo Chen{5}, Peng Zheng{2}, Wangfeng Bai{2}, Jingji Zhang{1}, Xiaoyi Gao{6}, Chao Chen{6}, Wei Wu{2}, Gaofeng Wang{2}, Shujun Zhang{6}
{1}China Jiliang University, China; {2}Hangzhou Dianzi University, China; {3}Hangzhou Dianzi University / University of Wollongong, China; {4}Massachusetts Institute of Technology, United States; {5}Shanghai University, China; {6}University of Wollongong,

3021: Morphology of Small Diameter Barium Titanate Nanoparticle and Polyvinylidene Diflouride-Trifluoroethylene Composites
Christine McGinn{2}, Nasim Farahmand{1}, Stephen O'Brien{1}, Ioannis Kymissis{2}
{1}City College of New York, United States; {2}Columbia University, United States

3128: Flexible Dielectric Nanocomposites with Simultaneously Large Discharge Energy Density and High Energy Efficiency Utilizing (Pb,La)(Zr,Sn,Ti)O3 Antiferroelectric Nanoparticles as Fillers
Kailun Zou{2}, Yu Dan{3}, Yuxi Yu{3}, Ying Zhang{3}, Qingfeng Zhang{3}, Yinmei Lu{3}, Haitao Huang{1}, Xin Zhang{4}, Yunbin He{3}
{1}Hong Kong Polytechnic University, China; {2}Huazhong University of Science and Technology, China; {3}Hubei University, China; {4}Wuhan University of Technology, China

3147: Complexity in the Structural Phase Transitions in Pb(Hf0.92Sn0.08)O3 Single Crystals
Irena Jankowska-Sumara{4}, Marek Paściak{2}, Jae-Hyeon Ko{1}, Andrzej Majchrowski{3}, A. Piekara{4}
{1}Hallym University, Korea; {2}Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {3}Military University of Technology, Poland; {4}Pedagogical University of Cracow, Poland

3465: Local Observation of Depolarization of Poly(Vinylidene Fluoride/Trifluoroethylene) 55/45 Film Using Piezoresponse Force Microscopy
Jun Takarada, Takaaki Tone, Shota Saihara, Yoshiro Tajitsu
Kansai University, Japan

3622: High Energy Density of Polymer Composites Using PZT@SiO2 Fillers with Morphotropic Phase Boundary
Bing Xie{2}, Tong Tong Wang{2}, Qi Wang{2}, Ling Zhang{3}, Haibo Zhang{1}
{1}Huazhong University of Science and Technology, China; {2}Nanchang Hangkong University, China; {3}Shihezi University, China

3678: Compositional Engineering of Ferroelectric Plastic Crystals
Julian Walker, Ingvild Holck, Tor Grande, Mari-Ann Einarsrud
Norwegian University of Science and Technology, Norway

Friday, May 21

08:30:00AM - 12:00:00PM
E1L-2: ISAF: Domains/Films I
Session Chair: Dragan Damjanovic (EPFL, Switzerland)

3022: Visible-Light Active Ferrophotovoltaics
Yuji Noguchi
Kumamoto University, Japan

3075: Depolarization Field Tuning of Nanoscale Ferroelectric Domains in (001) PbZr0.4Ti0.6O3/SrTiO3/ PbZr0.4Ti0.6O3 Epitaxial Heterostructures
Vivasha Govinden, Qi Zhang, Daniel Sando, Valanoor Nagarajan
University of New South Wales, Australia

3089: Film Thickness Dependence of Ferroelectric Properties in Polar-Axis Oriented Epitaxial (Bi, K)TiO3 Films Prepared by Hydrothermal Method
Rurika Kubota, Yoshiharu Ito, Akinori Tateyama, Minoru Kurosawa, Hiroshi Funakubo
Tokyo Institute of Technology, Japan

3232: Fabrication of NaNbO3-(Ca0.5Sr0.5)ZrO3 Antiferroelectric Thin Film by Pulsed Laser Deposition
Kosuke Beppu, Ryouma Inoue, Takahiro Wada
Ryukoku University, Japan

3012: Effect of Substrate on PZT Films Properties
Liubov Delimova{1}, Nina Zaitseva{1}, Valentin Ratnikov{1}, Valentin Yuferev{1}, Dmitry Seregin{2}, Konstantin Vorotilov{2}, Alexander Sigov{2}
{1}Ioffe Institute, Russia; {2}MIREA - Russian Technological University, Russia

3033: Investigation of Magnetic Cation Partitioning and Charged Domain Walls at Structural Defect Sites in Multiferroic Aurivillius Phase Thin Films
Louise Colfer{1}, Michele Conroy{5}, Eoghan O'Connell{3}, Kalani Moore{4}, Michael Schmidt{1}, Brenda Long{2}, Lynette Keeney{1}
{1}Tyndall National Institute, University College Cork, Ireland; {2}University College Cork, Ireland; {3}University of Limerick, Ireland; {4}University of Limerick, Bernal Institute, Ireland; {5}University of Limerick, Bernal Institute and Imperial Colleg

3054: Polarization Control of Photoinduced Current in Ferroelectric PZT Epitaxial Thin Films
Komalika Rani, Stéphane Gable, Thomas Maroutian, Philippe Lecoeur, Sylvia Matzen
Université Paris-Saclay, Centre de Nanosciences et Nanotechnologies, CNRS, France

3064: Photoinduced Strain in Ferroelectric-Based Cantilevers
Stéphane Gable, Komalika Rani, Thomas Maroutian, Philippe Lecoeur, Sylvia Matzen
Université Paris-Saclay, Centre de Nanosciences et Nanotechnologies, CNRS, France

3108: Determination of a Threshold Force in the Mechanical Switching of Ferroelectric Domains in PbZr0.2Ti0.8O3 Thin Films
Sergio González-Casal{2}, Xiaofei Bai{2}, David Albertini{2}, Nicolas Baboux{4}, Bertrand Vilquin{4}, Pedro Rojo Romeo{4}, Solene Brottet{2}, Bruno Canut{2}, Jean Paul Barnes{1}, Matthieu Bugnet{3}, Ingrid Cañero-Infante{4}, Brice Gautier{2}
{1}CEA, France; {2}Institut des Nanotechnologies de Lyon, France; {3}MATEIS - INSA Lyon, France; {4}Université de Lyon-Institut des Nanotechnologies de Lyon (UMR5270/CNRS), Ecole Centrale de Lyon, France

3110: Probing the Behaviour of Surface Water and Ferroelectric PbTiO3 Thin Films as a Function of Relative Humidity and Temperature
Loïc Musy, Iaroslav Gaponenko, Christian Weymann, Patrycja Paruch
University of Geneva, Switzerland

3632: Study of a Residual Ferroelectric Contribution in Antiferroelectric Lead-Zirconate Thin Films
Caroline Borderon{1}, Kevin Nadaud{2}, Mamadou D. Coulibaly{1}, Raphael Renoud{1}, Micka Bah{2}, Stéphane Ginestar{1}, Hartmut Gundel{1}
{1}Université de Nantes, IETR, France; {2}Université de Tours, GREMAN UMR 7347, France

3635: Stabilization and Manipulation of In-Plane Polarization in a Ferroelectric-Dielectric Superlattice
Nives Strkalj, Marco Bernet, Jakob Schaab, Morgan Trassin, Manfred Fiebig
ETH Zürich, Switzerland

08:30:00AM - 12:00:00PM
E1L-3: ISAF: Macroscopic Properties I
Session Chair: Julia Glaum (NTNU, No)

3113: High-Performance Pyroelectric Materials for Infrared Detection and Imaging
Yanxue Tang{2}, Xiangyong Zhao{2}, Feifei Wang{2}, Haosu Luo{1}
{1}Shanghai Institute of Ceramics, Chinese Academy of Sciences, China; {2}Shanghai Normal University, China

3131: Textured Ferroelectric Ceramics with High Electromechanical Coupling Factors Over a Broad Temperature Range
Shuai Yang{3}, Jinglei Li{3}, Yao Liu{3}, Mingwen Wang{3}, Liao Qiao{3}, Xiangyu Gao{4}, Yunfei Chang{1}, Hongliang Du{3}, Zhuo Xu{3}, Shujun Zhang{2}, Fei Li{3}
{1}Harbin Institute of Technology, China; {2}University of Wollongong, Australia; {3}Xi'an Jiaotong University, China; {4}Xi'an Jiaotong University / Peking University, China

3035: Effect of AC-Poling on Hard Type Piezoelectric Materials
Hiroshi Kishi{2}, Takayuki Gotoh{1}, Koichiro Morita{1}, Yoshiki Iwazaki{1}, Takaaki Tsurumi{2}
{1}Taiyo Yuden Co., Ltd., Japan; {2}Tokyo Institute of Technology, Japan

3076: The Electrocaloric Effect in Bi0.5Na0.5TiO3-Bi0.5K0.5TiO3 Solid Solutions
Ye Zhao, Jun-Hu Lv, Qian Wang, Chun-Ming Wang
Shandong University, China

3094: Effect of Metal Electrodes on the Steady-State Leakage Current in PZT Films
Alexander Sigov, Yury Podgorny, Alexey Petrushin, Konstantin Vorotilov
MIREA - Russian Technological University, Russia

3124: Giant Energy Storage Efficiency and Superior Temperature Stability Achieved in BaTiO3-NaNbO3-Bi(Zn0.5Zr0.5)O3 Ceramics
Wenrong Xiao, Shenglin Jiang, Guangzu Zhang
Huazhong University of Science and Technology, China

3125: High Electrocaloric Effect in Barium Titanate-Sodium Niobate Ceramics with Core-Shell Grain Assembly
Chao Zhang{1}, Quanpei Du{1}, Wenru Li{1}, Dong Su{1}, Meng Shen{1}, Xiaoshi Qian{2}, Bing Li{3}, Haibo Zhang{1}, Shenglin Jiang{1}, Guangzu Zhang{1}
{1}Huazhong University of Science and Technology, China; {2}Shanghai Jiao Tong University, China; {3}Shenyang National Laboratory for Materials Science, Institute of Metal Research, CAS, China

3133: Low Electric-Field-Induced Strain and High Energy Storage Efficiency in (Pb,Ba,La)(Zr,Sn,Ti)O3 Antiferroelectric Ceramics Through Regulating the Content of La
Ying Yang{1}, Pin Liu{2}, Yujing Zhang{1}, Guangzu Zhang{1}, Shenglin Jiang{1}
{1}Huazhong University of Science and Technology, China; {2}Nanjing University of Information Science & Technology, China

3323: The Diffusion Behavior on the Formation and Evolution Mechanism of Core-Shell Structure in BaTiO3-Based Dielectric Ceramics
Hua Hao, Cheng Chen, Xin Lai, Appiah Millicent, Zhonghua Yao, Minghe Cao, Hanxing Liu
Wuhan University of Technology, China

3737: Structure-Properties Relations of New Antiferroelectric Perovskite System: PbHfO3-Pb(Mg1/2W1/2)O3 Solid Solutions
Pan Gao{2}, Zenghui Liu{5}, Nan Zhang{5}, Hua Wu{1}, Alexei A. Bokov{3}, Wei Ren{5}, Zuo-Guang Ye{4}
{1}Donghua University, China; {2}Shannxi University of Science and Technology, China; {3}Simon Fraser University, Canada; {4}Simon Fraser University / Xi'an Jiaotong University, China; {5}Xi'an Jiaotong University, China

3736: Electrocaloric Effect in Mn Doped PZT Ceramic: Positive or Negative?
Ming Wu, Jinghui Gao, Lisheng Zhong, Xiaojie Lou
Xi'an Jiaotong University, China

08:30:00AM - 12:00:00PM
E1L-4: Fundamentals: Multiferroicity & Magnetoelectric Behavior
Session Chair: Zhenxiang Cheng (UOW, AU)

3264: Field-Induced Transition and Electric Field-Controlled Magnetism in (Bi,R)FeO3 Ceramics
Xiang Ming Chen, Lu Liu, Jing Chen
Zhejiang University, China

3077: Discovery of Room Temperature Ferromagnetic Spin Ordering in Multiferroic Double Perovskite Oxides
Jian Yu, Huanpo Ning, Qiang Wu
Donghua University, China

3270: Structure Evolution and Room-Temperature Multiferroic Characteristics of h-R1-xInxFeO3 (R=Ho, Yb and Lu) Solid Solutions
Mei Ying Liu, Xiang Ming Chen
Zhejiang University, China

3289: Magnetoelectric Coupling in Organic Crystals
Wei Qin
Shandong University, China

3600: Magneto-Elastic Coupling in a Multiferroic Hexagonal Ferrite
Shiqing Deng{5}, Shengdong Sun{5}, Jun Li{4}, Ping Miao{3}, Shaobo Cheng{1}, Wenbin Wang{2}, Yimei Zhu{1}, Jun Chen{5}
{1}Brookhaven National Laboratory, United States; {2}Fudan University, China; {3}Institute of High Energy Physics, Chinese Academy of Sciences, China; {4}Institute of Physics, Chinese Academy of Sciences, China; {5}University of Science and Technology Bei

3350: Turning Electric and Magnetic Properties of BiFeO3-SrTiO3 Ceramics by Doping
Hongbo Liu, Yuping Ren, Yuanyuan Wang, Liangwen Hai
Shanghai University of Engineering Science, China

3360: The Role of the Rare-Earth in the Ferroelectric Properties of the RMn2O5 Compounds
Marie-Bernadette Lepetit
Institut Néel, CNRS, France

3388: Strain Operational Range Around the Interface of 2-2 Magnetoelectric Composite and its Influence on Piezoelectric Properties in Cross-Sectional Piezo-Response Force Microscopy
Anantha P Bhat, Ranjith Ramadurai
Indian Institute of Technology Hyderabad, India

3460: BiFeO3-Based Piezoceramics with Excellent Temperature Stability
Yunjing Shi, Bo Shen, Jiwei Zhai
Tongji University, China

3490: Ultra-Flexible and Malleable Fe/BaTiO3 Multiferroic Heterostructures for Functional Devices
Yunting Guo{2}, Yanan Zhao{2}, Ziyao Zhou{2}, Zhenlin Luo{1}, Ming Liu{2}
{1}University of Science and Technology of China, China; {2}Xi'an Jiaotong University, China

3553: Effect of Fe3+ Substitution on Magnetoelectric Coupling of TbMnO3
Rui Vilarinho{4}, Andre Maia{3}, Matus Mihalik Jr.{2}, Maria Zentková{2}, Marian Mihalik{2}, P. Proschek{1}, J. Prokleška{1}, C. Kadlec{3}, F. Kadlec{3}, Stanislav Kamba{3}, Abílio Almeida{4}, Joaquim Agostinho Moreira{4}
{1}Charles University, Czech Rep.; {2}Institute of Experimental Physics of the Slovak Academy of Sciences, Slovakia; {3}Institute of Physics of the Czech Academy of Sciences, Czech Rep.; {4}University of Porto, Portugal

3570: Magnetic and Dielectric Properties of Co-Substituted BiFeO3
Manjunath Balagopalan{2}, Joaquim Agostinho Moreira{2}, Joy P A{1}
{1}CSIR- National Chemical Laboratory, India; {2}University of Porto, Portugal

3742: Single-phase and Biphasic Magnetoelectric Multiferroic Films by Solution Technique
Menka Jain, Jianhang Shi, Austin McDannald, Bryan D. Huey
University of Connecticut, United States

08:30:00AM - 12:00:00PM
E1L-5: ISAF: Macroscopic Properties II
Session Chair: Ichiro Fujii (Uni Yamanashi, Japan)

3724: Multifunctional Perovskites with a High Quality
Wook Jo
Ulsan National Institute of Science and Technology, Korea

3216: Detection and Identification of Vacancy-Related Point Defects in Perovskite Materials
David Keeble
University of Dundee, United Kingdom

3187: Tailoring the Multiferroic Properties of Pb(Fe0.5Nb0.5)O3–BiFeO3 Ceramics
Uroš Prah, Tadej Rojac, Magdalena Wencka, Andreja Benčan Golob, Hana Uršič
Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia; Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Poland

3215: Nonlinear Piezoelectricity in Lead-Based Ferroelectrics and Relaxors
Tadej Rojac{2}, Mirela Dragomir{1}, Mojca Otoničar{2}
{1}Jožef Stefan Institute, Slovenia; {2}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia

3313: Surface Piezoelectricity and Pyroelectricity in Centrosymmetric α-Glycine
Shiri Dishon{3}, Andrei D. Ushakov{2}, Alla Nuraeva{2}, David Ehre{3}, Meir Lahav{3}, Vladimir Ya. Shur{2}, Andrei Kholkin{1}, Igor Lubomirsky{3}
{1}University of Aveiro, CICECO, Portugal; {2}Ural Federal University, Russia; {3}Weizmann Institute of Science, Israel

3318: The Construction of Relaxor Perovskite Na0.5Bi0.5(Fe0.03Ti0.97)O3/Ba(Ti1-xSrx)O3 Multilayer Thin Film and Explorations on Origin of the Enhanced Energy Storage Performance
Huiting Sui, Huajun Sun, Shibing Xiao, Chao Yan, Ye Wang
Wuhan University of Technology, China

3332: Temperature-Dependence of the Electromechanical Quality Factor in Acceptor-Doped Ferroelectrics
Mihail Slabki{2}, Lalitha Kodumudi Venkataraman{2}, Tadej Rojac{1}, Jurij Koruza{2}
{1}Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia; {2}Technical University of Darmstadt, Germany

3700: BiScO3-PbTiO3 Based High Temperature Piezoelectric Ceramics and Their Ultrasonic Transducer Applications
Tian-Long Zhao{2}, Xinhao Sun{2}, Yi Quan{1}, Chunlong Fei{2}, Wei Ren{2}
{1}Xi'an Jiaotong University, China; {2}Xidian University, China

3680: Fabrication of BaTiO3@FeO Core-Shell Nanoparticles with Sintering Dense Nanocrystalline Ceramics for Energy Storage Applications
Hongye Wang, Minghe Cao, Hua Hao, Zhonghua Yao, Hanxing Liu
Wuhan University of Technology, China

3615: Ca3Mn2O7 Structural Path Unraveled by Atomic-Scale Properties: A Combined Experimental and ab initio Study
Pedro Rocha-Rodrigues{1}, Samuel Silva Santos{1}, Ivan Paula Miranda{4}, Gonçalo Nuno Pinho Oliveira{1}, Lucy V Credidio Assali{4}, Helena Maria Petrilli{4}, João Guilherme Correia{3}, João Pedro Esteves Araújo{1}, Armandina Maria Lima Lopes{2}
{1}Faculdade de Ciências da Universidade do Porto, Portugal; {2}Faculdade de Ciências da Universidade do Porto, IFIMUP, Portugal; {3}Universidade de Lisboa, Portugal; {4}Universidade de São Paulo, Brazil

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12:30:00PM - 03:00:00PM
E2L-1: PFM III
Session Chair: Yachin Ivry (Technion Israel Institute of Technology)

3338: Deterministic Switching of Ferroelectric Bubble Nanodomains
Qi Zhang{4}, Sergei Prokhorenko{2}, Yousra Nahas{2}, Lin Xie{1}, Laurent Bellaiche{2}, Alexei Gruverman{3}, Nagarajan Valanoor{4}
{1}Southern University of Science and Technology, China; {2}University of Arkansas, United States; {3}University of Nebraska–Lincoln, United States; {4}University of New South Wales, Australia

3420: Nonlinear Domain Wall Velocity in Ferroelectric Si-Doped HfO2 Capacitors Investigated by Piezoresponse Force Microscopy
Sang Mo Yang
Sogang University, Korea

3106: Non-Ising Domain Walls in Uniaxial Ferroelectric Lead Titanate Thin Films
Christian Weymann{2}, Salia Cherifi-Hertel{1}, Céline Lichtensteiger{2}, Aaron B. Naden{3}, Iaroslav Gaponenko{2}, Patrycja Paruch{2}
{1}IPCM Strasbourg, France; {2}University of Geneva, Switzerland; {3}University of St Andrews / Queen's University of Belfast, United Kingdom

3078: Superior Polarization Retention Through Engineered Domain Wall Pinning
Dawei Zhang, Daniel Sando, Pankaj Sharma, Valanoor Nagarajan, Jan Seidel
University of New South Wales, Australia

3193: Phase Coexistence and Abnormal Response in Ferroelectrics Thin Films and Single Crystals
Xiaoyan Lu{1}, Wenwu Cao{2}, Lane W. Martin{3}
{1}Harbin Institute of Technology, China; {2}Pennsylvania State University, United States; {3}University of California, Berkeley, United States

3711: Control of Ferromagnetic and Ferroelectric Domains in BiFe0.9Co0.1O3 Thin Films by Utilizing Trailing Fields
Takuma Itoh{1}, Marin Katsumata{1}, Kei Shigematsu{1}, Masaki Azuma{2}
{1}Tokyo Institute of Technology, Japan; {2}Tokyo Institute of Technology / Kanagawa Institute of Industrial Science and Technology, Japan

3710: Direct Observation of Magnetization Reversal by Polarization Switching in Multiferroic Co-Substituted BiFeO3 Thin Film
Kei Shigematsu{3}, Keisuke Shimizu{3}, Ryo Kawabe{3}, Hajime Hojo{1}, Haruki Shimizu{3}, Ko Mibu{2}, Marin Katsumata{3}, Masaki Azuma{4}
{1}Kyushu University, Japan; {2}Nagoya Institute of Technology, Japan; {3}Tokyo Institute of Technology, Japan; {4}Tokyo Institute of Technology / Kanagawa Institute of Industrial Science and Technology, Japan

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12:30:00PM - 03:00:00PM
E2L-2: FYIA: Applications
Session Chair: Nagarajan Valanoor (UNSW, AU)

3267: Lead-Free Electroceramics and Capacitors for Energy Storage (for Invited Young Investigator Symposium)
Dawei Wang
Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China

3280: High-Temperature Piezoelectric Crystals for Sensing Applications
Fapeng Yu{2}, Chao Jiang{2}, Xueliang Liu{1}, Shujun Zhang{3}, Xian Zhao{2}
{1}Shandong Original Crystal Technology Co. LTD, China; {2}Shandong University, China; {3}University of Wollongong, Australia

3335: Single-Phase Multicaloric Materials (for Invited Young Investigator Symposium)
Hana Uršič, Uroš Prah, Magdalena Wencka
Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Poland; Jožef Stefan Institute, Jožef Stefan International Postgraduate School, Slovenia

3386: High-Energy-Density Polymer Nanocomposites for Dielectric Energy Storage Applications-for Invited Young Investigator Symposium
Xin Zhang
Wuhan University of Technology, China

3424: Ferro-Catalysis for Nondestructive Tooth Whitening
Yaojin Wang
Nanjing University of Science and Technology, China

3492: Transparent PMN-PT Ferroelectric Ceramics Doped by Rare-Earth Elements (for Invited Young Investigator Symposium)
Yalin Qin{1}, Yongcheng Zhang{1}, Ze Fang{1}, Peikun Yan{1}, Shujun Zhang{2}
{1}Qingdao University, China; {2}University of Wollongong, Australia

3670: Ferroelectricity Will Lead the Way for 21st Century Microelectronics
Asif Khan
Georgia Institute of Technology, United States

3699: Emerging Investigations on Electromechanical Energy Harvesting Devices, Materials and Mechanisms Beyond Traditional Insights
Chang Kyu Jeong
Jeonbuk National University, Korea

3743: High-Performance Magnetoelectric (ME) Composites for Magnetic Sensing and Energy Harvesting Applications
Geon-Tae Hwang{2}, Jungho Ryu{3}, Woon-Ha Yoon{1}
{1}Korea Institute of Materials Science, Korea; {2}Pukyong National University, Korea; {3}Yeungnam University, Korea

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12:30:00PM - 03:00:00PM
E2L-3: ISAF: Macroscopic Properties III
Session Chair: Ichiro Fujii (Uni Yamanashi, Japan)

3667: Displacive Order-Disorder Behavior, Intrinsic Clustering of Lattice Distortions, and Role of Vacancies in A-Site Deficient Perovskites
Igor Levin
National Institute of Standards and Technology, United States

3485: Synthesis, Structure and Electrical Properties of PbZr0.52Ti0.48O3 Ceramics Modified by a Quantum Paraelectric
Neha Claire, Alexei A. Bokov, Zuo-Guang Ye
Simon Fraser University, Canada

3487: Synthesis and Characterization of PbHfO3-Based Novel Antiferroelectric Materials for Energy Storage Applications at High Temperatures
Vidhi Chauhan, Alexei A. Bokov, Zuo-Guang Ye
Simon Fraser University, Canada

3525: Electromechanical Coupling Effects of Wrinkle-Patterned Single-Crystalline BaTiO3 Membranes
Yuqing Zhou{2}, Guohua Dong{2}, Haixia Liu{2}, Yuxin Cheng{2}, Ziyao Zhou{2}, Houbing Huang{1}, Ming Liu{2}, Tai Min{2}, Tao Li{2}
{1}Beijing Institute of Technology, China; {2}Xi'an Jiaotong University, China

3531: New Antiferroelectric Solid Solution with Ultralarge Strain and Ultrahigh Energy-Storage Performance by Synergistic Design
Hongyan Wan{2}, Zenghui Liu{2}, Nan Zhang{2}, Wei Ren{2}, Zuo-Guang Ye{1}
{1}Simon Fraser University, Canada; {2}Xi'an Jiaotong University, China

3554: Electric Property, Anti-Reduction Mechanism of (1-x)BaTiO3-xBiCoO3-Mn Ceramics
Zhen Liu, Hua Hao, Zhiping Luo, Cheng Chen, Zhonghua Yao, Minghe Cao, Hanxing Liu
Wuhan University of Technology, China

3558: Zeolitic-Imidazolate Frameworks as Piezoelectric Energy Harvesters
Davide Rega{1}, Srinidhi Mula{1}, Claudia Damonti{1}, Lorenzo Donà{4}, Denis Alikin{2}, Andrei Kholkin{3}, Bartolomeo Civalleri{4}, Monique van der Veen{1}
{1}Delft University of Technology, Netherlands; {2}University of Aveiro, Portugal; {3}University of Aveiro, CICECO, Portugal; {4}University of Torino, Italy

3586: Improved Energy Storage Properties of Serial SrTiO3-BiFeO3 Composite Thin Films Prepared by a Sol-Gel Method
Chunli Diao{1}, Hanxing Liu{2}
{1}Henan University, China; {2}Wuhan University of Technology, China

3601: Characterization of Bismuth Oxychloride Powder Synthesized by Hydrothermal Method
Pusit Pookmanee, Kanjanaporn Narong
Maejo University, Thailand

12:30:00PM - 03:00:00PM
E2L-4: Fundamentals: Mean Field & Related Approaches
Session Chair: Nengneng Luo (Guangxi Uni., China)

3041: On the Polarization of M/FE/M Structures
Valentin Yuferev, Liubov Delimova
Ioffe Institute, Russia

3025: Spontaneous Polarization as Polar-Sensitive Structure Manifestation
Yuriy Poplavko
National Technical University of Ukraine Igor Sikorsky Kyiv Polytechnic Institute, Ukraine

3167: Electronic Contributions to Ferroelectricity and Field-Induced Phase Transitions in Doped HfO2
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3476: Polarization Spinodal at Ferroelectric Morphotropic Phase Boundary
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3668: Applications of Phase-Field Simulation on Dielectric Composites for Capacitive Energy Storage
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Composite flexible films prepared by hot pressing for low-energy harvesting and storage

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The important task of scientific community nowadays is finding the way to use enormous amount of mechanical energy released everywhere around us as a renewable and safe energy source.

This research was focused on the preparation of flexible composite films, by combining a highly flexible polyvinylidene fluoride (PVDF) polymer matrix with lead-free piezoelectric perovskites, $0.94[(Bi_{0.5}Na_{0.5})TiO_3]$-$0.06BaTiO_3$ (NBT-BT), in different ratios, using the hot pressing method. A crucial point of this investigation is to show that this material is quite versatile and possesses functional properties which are sensitive to both microscopic and chemical modifications.

Detailed investigation of processed flexible films led to the main conclusion that electrical properties of these composites can be affected by different factors. Firstly, the hot-pressing method itself induces the formation of electroactive β-phase of PVDF polymer, the NBT-BT as filler with negatively charged surface enables a predominant formation of desirable piezoelectric PVDF phase as well and additionally, there is an influence of concentration and type (pre-preparation method) of the added filler.

Dielectric permittivity values of composites were up to 110 and highly depend on the filler amount. A very useful zone around room temperature as a plateau with relatively constant dielectric permittivity and losses was noticed in each film`s dielectric spectra. Anelastic measurements have shown a complete agreement with dielectric properties in which the temperature dependence of the Young's modulus and the losses are dominated by those of the polymer.

Regarding the resulting dielectric and ferroeletric properties of the flexible composites, the potential of these materials for the energy storage application was investigated. Energy density efficiencies obtained for investigated materials have shown a decreasing trend with increasing amount of filler with values of 66-74 %.

Assembled energy harvesting units were made by proper wiring and covering the flexible film with Kapton protection layer. The obtained output voltage while applying the impact force was from 1 V to 7 V, depending on the type of the flexible film.

The main conclusion derived from this study is that composite flexible films made of lead-free NBT-BT filler and PVDF, have high potential to be used for environmentally safe low-energy storage and energy harvesting devices.