

SPRING MEETING

2013 *Strasbourg
Congress
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May 27th-31st

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JANUARY 16, 2013*

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PROGRAM

MATERIALS FOR ENERGY

- A. Energy conversion applications of atomic layer deposition
- B. Organic and hybrid interfaces in excitonic solar cells: from fundamental science to applications
- C. Advanced thermoelectrics: from materials to devices
- D. Advanced inorganic materials and structures for photovoltaics
- E. Materials and processes from the nuclear fuel cycle
- F. Nanomaterials for energy conversion and storage

ELECTRONIC AND PHOTONIC MATERIALS

- G. Alternative approaches of SiC and related wide bandgap materials in light emitting and solar cell applications
- H. Multifunctional binary and complex oxides films and nanostructures for microelectronic applications
- I. The route to post-Si CMOS devices: from high mobility channels to graphene-like 2D nanosheets
- J. Semiconductor nanostructures towards electronic and optoelectronic device applications - IV
- K. Physics and technology of advanced extra functionality CMOS-based devices
- L. Group III nitrides
- M. Basic research on ionic-covalent materials for nuclear application

ADVANCED AND NANO MATERIALS

- N. Atomic-scale engineering of multifunctional nano-sized materials and films
- O. Synthesis, processing and characterization of nanoscale multi functional oxide films IV
- P. Functional nanowires: synthesis, characterization and applications
- Q. Bionanomaterials for imaging, sensing and actuating
- R. Nano-engineered bioactive interfaces
- S. Protective coatings and thin films '13
- T. Advances and enhanced functionalities of anion-controlled new inorganic materials
- U. Design of multifunctional nano-objects for biomedical applications

METHODS AND CHARACTERIZATIONS

- V. Laser materials interactions for micro- and nano-applications
- W. Ion beam applications: new and innovative approaches
- X. Advances in the characterization of functional materials under relevant process conditions

Symposium T: Advances and enhanced functionalities of anion-controlled new inorganic materials

Mixed anion materials present a wide range of possible applications. Changing properties by anion substitution in oxide-based compounds increases the diversity of physical and chemical characteristics of this group of materials but has been less investigated than cation doping. The present forum covers the entire research area from understanding fundamental aspects based on solid state chemistry and physics to novel devices based on improved materials properties offered by mixed anion compounds. The symposium aims to be the first international meeting for interdisciplinary research and industrial applications of these not yet widely known materials, but with vast utilization prospects based on their enhanced performances.

Scope:

The present Anion-substituted New Inorganic Materials (ANIM) symposium aims at creating an international forum for the different types of researchers involved in this field: experimental and theoretical physicists, materials scientists, solid state chemists, analytical scientists and engineers. The symposium will facilitate interdisciplinary discussions between these differing groups, thereby stimulating collaboration and thus it will strengthen the European and worldwide activities in this expanding field.

Theoretical concepts for novel physics derived from new functions and properties. Coordinate covalent-bonding engineered ceramics, glasses, epitaxial and polycrystalline thin films, single crystals, nanoparticles and nanocomposites.

Advances in synthetic methodologies of anion-substituted inorganic materials. Structure evolution and anion ordering in mixed anion systems.

Surveying the ANIM materials landscape: combined experimental and theoretical prediction investigations of various classes of materials systems, searches for new perovskite-, pyrochlore- or other complex structure materials. Expanding and optimizing their functionalities. Examinations of the physical and electronic properties including ferroelectric, ferromagnetic, semiconductive, thermoelectric, electroresistive, magnetoresistive materials, conductive transparent high temperature stable electrodes, solid state electrolytes, ionic conductors, photocatalytic, luminescent materials, nonlinear optical compounds, etc.

Overview of anion-substituted inorganic materials in device development activities: state-of-the-art characterization and electronic properties improvement based on heterostructures, interface phenomena, electrode interactions and various device prototypes demonstrations.

Hot topics to be covered by the symposium:

1. Innovative synthesis routes for ANIM materials like oxynitrides, oxyfluorides, oxyhydrides and other mixed anion materials (powders, nanomaterials, bulk ceramics, glasses, thin films and single crystals).
2. Structural features and anion ordering of ANIMs.
3. ANIM-based (photo)catalyst materials.
4. Optical properties: luminescence, nonlinear optical properties of ANIM materials.
5. Ferromagnetic, paramagnetic; paraelectric, high-K gate, ferroelectric, multiferroic; semiconducting and electrical conductivity properties of ANIM materials.
6. ANIM-based materials for energy production and storage: solid electrolytes, fuel cell materials, electrodes, solid state capacitor and supercapacitor materials, battery materials, ionic conductor, thermoelectric and hydrogen storage materials.
7. Theory, simulations and combinatorial approaches for design of new ANIM materials and prediction of their functionalities.
8. Technical challenges in the analytical and functional properties characterization of ANIMs.

Invited speakers:

Additional invited talks may be selected from outstanding submitted abstracts. We are honored to announce the participation of the following invited speakers (alphabetical order):

- Paul Attfield, University of Edinburgh, United Kingdom
- Richard Dronskowski, RWTH Aachen University, Germany
- Alicia Duran, Instituto de Cerámica y Vidrio (CSIC), Madrid, Spain
- Duncan Gregory, University of Glasgow, United Kingdom
- Takashi Hisatomi, University of Tokyo, Japan
- Zoltan Lencses, Institute of Inorganic Chemistry Slovak Academy of Sciences, Bratislava, Slovakia
- Shinichi Kikkawa, Hokkaido University, Sapporo, Japan
- Kenneth Poeppelmeier, Northwestern University and Argonne National Laboratory, USA
- Wolfgang Schnick, University of Munich, Germany
- Franck Tessier, CNRS-Université de Rennes 1, France
- Mark Weller, University of Southampton, United Kingdom
- Patrick M. Woodward, Ohio State University, Columbus, USA

Scientific committee:

- Simon J. Clarke, University of Oxford, United Kingdom
- Kazunari Domen, University of Tokyo, Japan
- Stéphane Jobic, Université de Nantes, CNRS, France
- Thomas Lippert, Paul Scherrer Institut (PSI), Würenlingen, Switzerland
- Ralf Riedel, Technische Universität Darmstadt, Hessen, Germany
- Tomoaki Watanabe, Meiji University, Kawasaki, Japan
- Anke Weidenkaff, Empa, Dübendorf, Switzerland

After peer-reviewing, manuscripts presented at this symposium can be published in a Special Virtual Issue on "Anion-substituted Inorganic Materials" of ACS Crystal Growth & Design journal. Follow this link for submission details and manuscripts guidelines: <http://pubs.acs.org/page/cgdefu/submission/authors.html> Manuscripts submission deadline is **May 31, 2013**.

Symposium organizers:

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Deadline for abstract submission: January 16, 2013

E-MRS 2013, May 27 - 31 - Congress Center, Strasbourg, France

SPRING 13 T: Advances and enhanced functionalities of anion-controlled new inorganic materials

Mixed anion materials present a wide range of possible applications. Changing properties by anion substitution in oxide-based compounds increases the diversity of physical and chemical characteristics of this group of materials but has been less investigated than cation doping. The present forum covers the entire research area from understanding fundamental aspects based on solid state chemistry and physics to novel devices based on improved materials properties offered by mixed anion compounds. The symposium aims to be the first international meeting for interdisciplinary research and industrial applications of these not yet widely known materials, but with vast utilization prospects based on their enhanced performances.

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- Shinichi Kikkawa, Hokkaido University, Sapporo, Japan
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- Anke Weidenkaff, Empa, Dübendorf, Switzerland

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Innovator in Electronics

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PROGRAM VIEW : 2013 Spring
MY PROGRAM : 2013 Spring

Symposium : T

Advances and enhanced functionalities of anion-controlled new inorganic materials

27 May 2013 28 May 2013 29 May 2013

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start at	Subject	Num.
08:50	WELCOME ADDRESS : Amparo Fuertes and Ivoyl Koutsaroff	
	Synthesis approaches and crystal structures of anion modified inorganic materials (ANIM) : Amparo Fuertes, Anke Weidenkaff	
09:00	<p>Noncentrosymmetric Mixed Metal Oxide-Fluorides Authors : Kenneth R. Poeppelmeier Affiliations : Northwestern University Department of Chemistry, Evanston, Illinois Resume : Synthesis of noncentrosymmetric materials – materials that lack an inversion center – has been a long-standing and difficult goal of inorganic chemistry. Noncentrosymmetric crystals are required for the UV lasers used in nanolithography to create increasingly small lithographic features. To pursue UV lasers, scientists have sought new SHG active crystals to double the frequency of laser light to higher energies. One such material is the oxyfluoride KBe₂BO₃F₂. Efficient SHG-active crystals often have aligned polar moments in the solid state. One strategy to synthesize highly-efficient SHG crystals is to utilize O/F anions, which are inherently polar, to establish principles and guidelines to target SHG-active materials.</p>	1 1
	<p>add to my program (close full abstract)</p>	
09:40	<p>Extended Layered Cobalt Oxyfluorides, Sr₂CoO₃+xF_{1-x} Authors : Yoshihiro Tsujimoto, Yoshitaka Matsushita, Kazunari Yamaura Affiliations : National Institute for Materials Science Resume : The development of transition metal oxides with perovskite-based structure has stimulated the search for mixed anion systems such as oxynitrides, oxyhalides and oxysulfides because incorporation of two different anions in one structure offers further opportunity to effectively induce chemical and physical properties that the pure oxides cannot possess. Our research has focused on the synthesis of new oxyfluoride perovskite materials, where fluoride anion possesses ionic radius similar to that of oxide anion but different oxidation state and electronegativity from each other. Recently we successfully prepared a new layered cobalt oxyfluoride Sr₂CoO₃F, isostructural with K₂NiF₄-type structure. In my presentation, we will talk about the magnetic and transport properties of Sr₂CoO₃+xF_{1-x} (0 ≤ x ≤ 0.15). All the x series presented are antiferromagnetic semiconductors under ambient pressure, but applying pressure on x = 1 strongly reduces electrical resistivity, possibly involving simultaneous spin state transition.</p>	1 2
	<p>add to my program (close full abstract)</p>	
10:00	<p>The magnetic structures of the anion ordered compounds 15R BaFeO₂F and 6H BaFeO₂F Authors : Oliver Clemens [a], Frank J. Berry [a], Adrian J. Wright [a], Ronald I. Smith [b], Kevin S. Knight [b], Peter R. Slater [a] Affiliations : [a] School of Chemistry, University of Birmingham, Birmingham B15 2TT, United Kingdom. [b] ISIS Facility, Rutherford Appleton Laboratory, Harwell Oxford, Didcot, OX11 0QX, United Kingdom. Resume : Three metastable polymorphs of the perovskite compound BaFeO₂F are known so far and can be prepared by a low temperature fluorination route using PVDF: a cubic [1], a 6H [2] and a 15R [3] perovskite type compound. Whereas the cubic compound shows a random distribution of the oxide and fluoride ions, a high degree of ordering could be confirmed for the 6H and 15R BaFeO₂F compounds. The fluoride ions are preferably located in the hexagonal type layers, which connect two iron coordination octahedra by faces. Such ordering has previously been suggested by Sturza et al. [4] for the low fluoride containing compounds 6H-Ba_{0.8}Sr_{0.2}FeO_{3-d}F_y and 15R-BaFeO₃F_y (F ~ 0.2) and could be confirmed by a</p>	1 3

temperature ammonothermal synthesis of europium-doped SrAlSiN₃ for a nitride red phosphor, *Journal of the Ceramic Society of Japan* 120 [11] 500-502 2012

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- 11:40 **Crystal structure and transport properties of Nitrogen-doped Zirconia single crystals**
Authors : Stefan Berendts, Jens-Peter Eufinger, Ilia Valov, Jürgen Janek, Martin Lerch
Affiliations : a) Justus-Liebig-Universität Gießen, Physikalisch-Chemisches Institut, Heinrich-Buff-Ring 58, D-35392 Gießen, Germany. b) Forschungszentrum Jülich, Institut für Festkörperforschung, Elektronische Materialien (IEM), D-52425 Jülich, Germany. c) Technische Universität Berlin, Institut für Chemie, Straße des 17. Juni 135, D-10623 Berlin, Germany
Resume : The investigated cubic fluorite-type quaternary zirconium oxide nitride YSZ:N single crystals with high nitrogen and low yttria content, prepared via the skull melting method and subsequent direct nitridation, are proven to be the first solid ion conductors with significant nitrogen ion mobility and high ionic conductivity as determined by means of detailed electrochemical investigations. Experimental Section: The presented investigation involves preparation methods of various high nitrogen and low yttria doped zirconia single crystals, their ideal and defect crystal structures, transport properties and their correlation to the structure. Single crystalline Y-Zr-O-N samples (YSZ:N) were prepared by two methods: a) the so-called 'reactive skull melting' method and b) classical skull melting with subsequent direct nitridation of the obtained single crystals. The samples were characterized with respect to the above mentioned properties by several analytical methods such as X-ray and neutron diffraction, AC impedance spectroscopy or electromotive force (emf) measurements - M. Lerch et al., *Prog. Solid State Chem.*, 37 (2009) 81-131. - S. Berendts and M. Lerch, *J. Cryst. Growth*, 336 (2011) 106-111. - I. Valov et al., *Solid State Ionics* 180 (2009) 1463-1470.

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12:00 **Lunch**

Oxynitrides : from powders to thin films (electronic & optical properties) : Ivoyl Koutsaroff, Takashi Hisatomi, Laurent Le Gendre

- 14:00 **Anion order on varying length scales: structural studies of oxynitrides and oxyfluorides with the perovskite, pyrochlore or LiNbO₃ related structures**
Authors : Patrick M. Woodward, Spencer Porter, Allyson Fry
Affiliations : The Ohio State University
Resume : In this talk I will discuss the synthesis and structural characterization of two families of mixed anion compounds containing d0 transition metal ions. The first half of the talk will review our work on ATaO₂N (A = Ba, Sr, Ca), LnTaON₂ and Ln₂Ta₂O₅N₂ (Ln = La, Pr, Ce) compounds. Conventional diffraction measurements show that none of these compounds show complete crystallographic order of the oxide and nitride ions, but probes of local structure including Ta EXAFS, neutron pair distribution function analysis and electron diffuse scattering show that local order on various length scales is present. The second half of the talk will focus on A_{3-x}A'xWO₃F₃ and A_{3-x}A'xWO₃F₃ (A, A' = Na, K, Rb, Ag) compounds. These compounds can be thought of as salts of MoO₃F₃³⁻ and WO₃F₃³⁻ polyatomic anions. Locally the oxide and fluoride ions are highly ordered, but the orientations of the "oxide" and "fluoride" sides of the MoO₃F₃³⁻ ions varies from fully ordered to completely disordered depending on the size and bonding characteristics of the cations. Na_{1.5}Ag_{1.5}MoO₃F₃ and Na_{1.5}Ag_{1.5}WO₃F₃ are the first examples of a cation and anion ordered derivative of the LiNbO₃ structure. Other compositions adopt structures related to perovskite, but complicated by non-cooperative octahedral tilting.

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- 14:40 **High-Throughput Synthesis and Characterisation of (BaxSr1-x)yTi1-yO3 and (BaxSr1-x)yTi1-yO3-zNz Perovskite Thin Films.**
Authors : Anaïs David¹, Samuel Guerin¹, Brian E. Hayden¹, Robert Noble¹, Jean-Philippe Soulié¹ Ivoyl P. Koutsaroff², Shin'ichi Higai², Nobuhiko Tanaka², Takehiro Konoike², Akira Ando², Hiroshi Takagi² and Hideharu Ieki²
Affiliations : 1. Ilika Technologies, Kenneth Dibben House, Chilworth Science Park, Southampton, SO16 7NS, United Kingdom 2. Murata Manufacturing Co., Ltd., 10-1 Higashi Kotari 1-chome, Nagaokakyo, Kyoto, Japan
Resume : BaSrTiO₃ (BSTO) compounds have been the subject of numerous studies due to their use as decoupling capacitors and in tunable microwave applications. They are characterised by a large dielectric constant which varies when applying a DC bias. Optimisation has focused on varying cation ratios and cation substitutions,

2 2

focussing on compositions along the Ba-Sr tie line, doping either the A site, the B site or both within the perovskite. To date little effort has been devoted to the study of anion substitutions within the BSTO perovskite, or the effect of simultaneous substitutions of both anions and cations. We have employed a high-throughput approach to their synthesis and characterisation, enabling a study of the effects of varying the ratio of the A site cations along with the ratio of A site to B site cations. Anion variation was also studied by the synthesis of barium strontium titanium oxynitride compounds, a continuation of the early investigations since 2010 [1]. A modified MBE system incorporating off axis elemental sources [2] in the presence of atomic oxygen from an RF atom source was used to produce perovskite thin films with compositional gradient [3]. The synthesis of the barium strontium titanate thin films was carried out on platinised r-cut sapphire substrates at intermediate temperatures. The oxynitride samples were synthesised in a similar manner but using a mixture of atomic oxygen and nitrogen in the RF atom source. The samples synthesised covered a region focused along the Ba-Sr tie-line in the range $0.5 < x < 0.7$, and a variation of y such that $0.8 < \text{BaSr/Ti} < 1.2$ in $(\text{Ba}_x\text{Sr}_{1-x})\text{Ti}_{1-y}\text{O}_3$ (BSTO) and $(\text{Ba}_x\text{Sr}_{1-x})\text{Ti}_{1-y}\text{O}_{3-z}\text{N}_z$ (BSTON). The thickness range was between 150 and 200 nm. On each sample 196 capacitors were created by adding 250 μm diameter Pt top electrodes. Characterisation of the thin films includes X-ray diffraction, X-ray photoelectron spectroscopy, measure of the dielectric properties at 1 kHz under +/- 6 V DC bias and of the P-E hysteresis response. XPS revealed the chemical states of the different species as well as enabling an estimate of the nitrogen content within the perovskite in the case of BSTON samples. It was found that, although the nitrogen content is very low, there are clear benefits in terms of electrical properties when substituting a small amount of oxygen with nitrogen. While there is a general correlation between dielectric constant and dielectric constant voltage tunability, close inspection reveals that the oxynitride materials with highest dielectric constant do not necessarily correspond to the materials with the highest tunability. The high-throughput approach taken in the present work lend itself to studying the cation doping of BSTON perovskite and examples of Gd, Zr co-doped BSTON thin films will also be presented. 1. I. P. Koutsaroff, et al., S6-006 (invited), Symp. 6 (Advances in Electro Ceramics), ICC3, Nov. 14- 18 (2010) Osaka, Japan 2. S. Guerin and B.E. Hayden, J. Comb. Chem., 8 (2006) 66 3. P.S. Anderson et al. Appl. Phys. Lett., 90(2007) 202907

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15:00

Reactive sputtering deposition of perovskite oxide and oxynitride lanthanum titanium films: structural and dielectric characterization

Authors : Y. Lu¹, C. Le Paven¹, H. Nguyen^{1,2}, R. Benzerga¹, L. Le Gendre¹, F. Tessier³, F. Cheviré³, A. Sharaiha¹, C. Delaveaud², X. Castel¹, S. Députier⁴

Affiliations : 1 Institut d'Electronique et de Télécommunications de Rennes (IETR, UMR-CNRS 6164), Equipe Matériaux Fonctionnels, IUT Saint Briec, Université de Rennes 1, 22000 Saint Briec, France 2 CEA LETI Minatec Campus, 17 Rue des Martyrs, 38 054 Grenoble cedex 9, France 3 Institut des Sciences Chimiques de Rennes (ISCR, UMR-CNRS 6226), Equipe Verres et Céramiques, Université de Rennes 1, 35000 Rennes, France 4 Institut des Sciences Chimiques de Rennes (ISCR, UMR-CNRS 6226), Equipe Chimie du Solide et Matériaux, Université de Rennes 1, 35000 Rennes, France

Resume : In the field of microwaves, the needs of materials with high performances drive the research on perovskite compounds which present attractive dielectric and ferroelectric properties. Our contribution is related to the development of lanthanum titanium perovskite oxide (LTO) and oxynitride films (LTON). Single layers, mixed films and multilayers have been deposited by reactive RF magnetron sputtering using an oxide $\text{La}_2\text{Ti}_2\text{O}_7$ or an oxynitride LaTiO_2N homemade target. The dielectric measurements were performed on MIM devices at low and high frequencies. The LTO oxide films present a moderate dielectric constant (≈ 60) with very low dielectric loss (≈ 0.011) at 10 GHz, with no variation of epsilon under the application of DC electric fields. The dielectric constants of LTON oxynitride films are higher, with values of few hundred but with substantial dielectric loss. LTON films show a variation of their dielectric constant, but only in low frequency ranges (up to 1 MHz). LTO/LTON bilayers exhibit improved values compared to "pure" oxynitride films. The absence of tunability of oxynitride films in high frequencies, as well as the observed dispersed results, suggests that the oxynitride LaTiO_2N compound does not behave as a ferroelectric material. In accordance with literature, its nonlinear dielectric properties may be related to polar nano-regions, coming from a local ordering of oxygen and nitrogen ions in the perovskite structure.

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15:20

Dielectric Properties of d^0 Perovskite Oxynitride ATaO_2N Epitaxial Thin Films

Authors : Daichi Oka^{1 2 3}, Yasushi Hirose^{1 2 3}, Hideyuki Kamisaka^{1 2 3}, Tomoteru Fukumura^{1 2 3}, Seiji Ito⁴, Akira Morita⁴, Hiroyuki Matsuzaki⁴, Katsuyuki Fukutani⁵, Satoshi

2 4

Ishii⁶, Kimikazu Sasa⁶, Daiichiro Sekiba⁶, Tetsuya Hasegawa^{1 2 3}

Affiliations : 1 Department of Chemistry, School of Science, The University of Tokyo; 2 Kanagawa Academy of Science and Technology (KAST); 3 CREST, JST; 4 Department of Nuclear Engineering and Management, School of Engineering, The University of Tokyo; 5 Institute of Industrial Science, The University of Tokyo; 6 Tandem Accelerator Complex, University of Tsukuba

Resume : Perovskite oxynitride ATaO₂N is expected to be the next-generation dielectric material owing to its unique properties such as high dielectric constant. In this study, we fabricated (001)-oriented epitaxial thin films of SrTaO₂N and CaTaO₂N by nitrogen-plasma assisted pulsed laser deposition on (Nb-doped) SrTiO₃ substrate. X-ray diffraction measurements revealed large tetragonal lattice distortion (*c/a* of 1.025) of the SrTaO₂N films due to compressive strain from the substrate (mismatch of -3.2 %) although they were partially relaxed from the substrate. On the other hand, CaTaO₂N thin films were coherently grown on SrTiO₃ reflecting the small mismatch of -1.0 %. The obtained SrTaO₂N and CaTaO₂N films showed dielectric constants of $\epsilon \sim 3000$ and $\epsilon \sim 10$, respectively, which were close to those reported in paraelectric bulk samples synthesized by ammonolysis. However, piezoresponse force microscopy on the SrTaO₂N epitaxial thin films revealed ferroelectric behavior at room temperature. This is the first observation of ferroelectricity in perovskite oxynitrides, to our knowledge. First principles calculations suggested that the ferroelectricity originates from trans-type nitrogen ordering, which can be driven by compressive epitaxial strain. The ferroelectric SrTaO₂N films also showed visible light absorption with a bandgap of 2.27 eV. The present SrTaO₂N epitaxial film is suited for application to ferroelectrics-based photovoltaic cells.

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15:40

RF Sputtered Anion-controlled Perovskites Materials: Paraelectricity Enhancement in Alkaline Earth Titanium Oxynitride Perovskite Thin Film Homocomposites with N-substituted Clusters

Authors : Ivoyl P. Koutsaroff, Shin'ichi Higai, Naoki Iwaji, Shoichiro Suzuki, Atsushi Honda, Nobuhiko Tanaka, Takehiro Konoike, Akira Ando, Karun Malhotra, Hiroshi Takagi, Hideharu Ieki

Affiliations : Murata Manufacturing Co., Ltd. Kyoto, Japan

Resume : We have prepared perovskite oxynitride (Ba,Sr)TiO₃-xN_x (BSTON) thin-films with various thicknesses from 30 nm to 1 μm by using reactive RF sputtering technique at moderate deposition temperatures on Pt coated sapphire and Si substrates[1-2]. The structural and composition characteristics of the A-/B-site co-doped BSTON thin films were studied by STEM-EELS, XPS, powder XRD and synchrotron powder diffraction. The dielectric properties of the obtained thin films were analyzed under various electric fields (up to 5 MV/cm) and temperatures (150K-400K) using precision LCR-meter from 0.1 kHz to 5 MHz. It was found that our BSTON thin-films have pseudo-tetragonal structure with large lattice parameter *c/a* ratio and with increased lattice volume, which was confirmed both experimentally (from film samples and by using "micro-powder" samples made from thicker films) and theoretically by using Density Functional Theory (DFT) simulations [3]. We provide experimental evidence that the anionic substitution lead to formation of BSTO-BSTON homocomposites with N-substitution concentrated within nm size clusters dispersed across the grain boundaries and within the grains, while such anion-substituted perovskite system remains in superparaelectric state (nonpolar) at room temperature, with the higher dielectric constant in comparison to the pure BSTO system, much higher voltage agility, and significantly improved symmetrical stable dielectric loss ($\tan \delta - E$) characteristics under up to ± 1 MV/cm external electric fields is achieved in this system without any annealing treatment after the sputter deposition. 1. I. P. Koutsaroff et al., MRS Fall Meeting, K11.1, Boston, MA, U.S.A., Nov. 29-Dec. 3, 2010. 2. I. P. Koutsaroff, et al., Ceram. Soc. Jpn., The 24th Fall Meeting (Invited), 2R09 (Ext. Abstract), Sapporo, Hokkaido, Japan, Sep. 7-9, 2011. 3. S. Higai, Ceram. Jpn. 46 (2011) 495 (in Japanese).

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16:00

Coffee Break

16:20

How Nitrides and Oxonitrides Illuminate the World - Recent Progress in Advanced LED-Phosphors

Authors : Wolfgang Schnick

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Resume : Investigation of nitridosilicates and oxonitridosilicates has received remarkable attention recently. Structurally, these compounds are related to classical oxosilicates. However, due to substitution of N for O structural variability becomes more versatile. A number of alkaline earth nitridosilicates and

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