



# 2013第二届国际新材料大会

BIT's 2<sup>nd</sup> Annual World Congress of Advanced Materials-2013

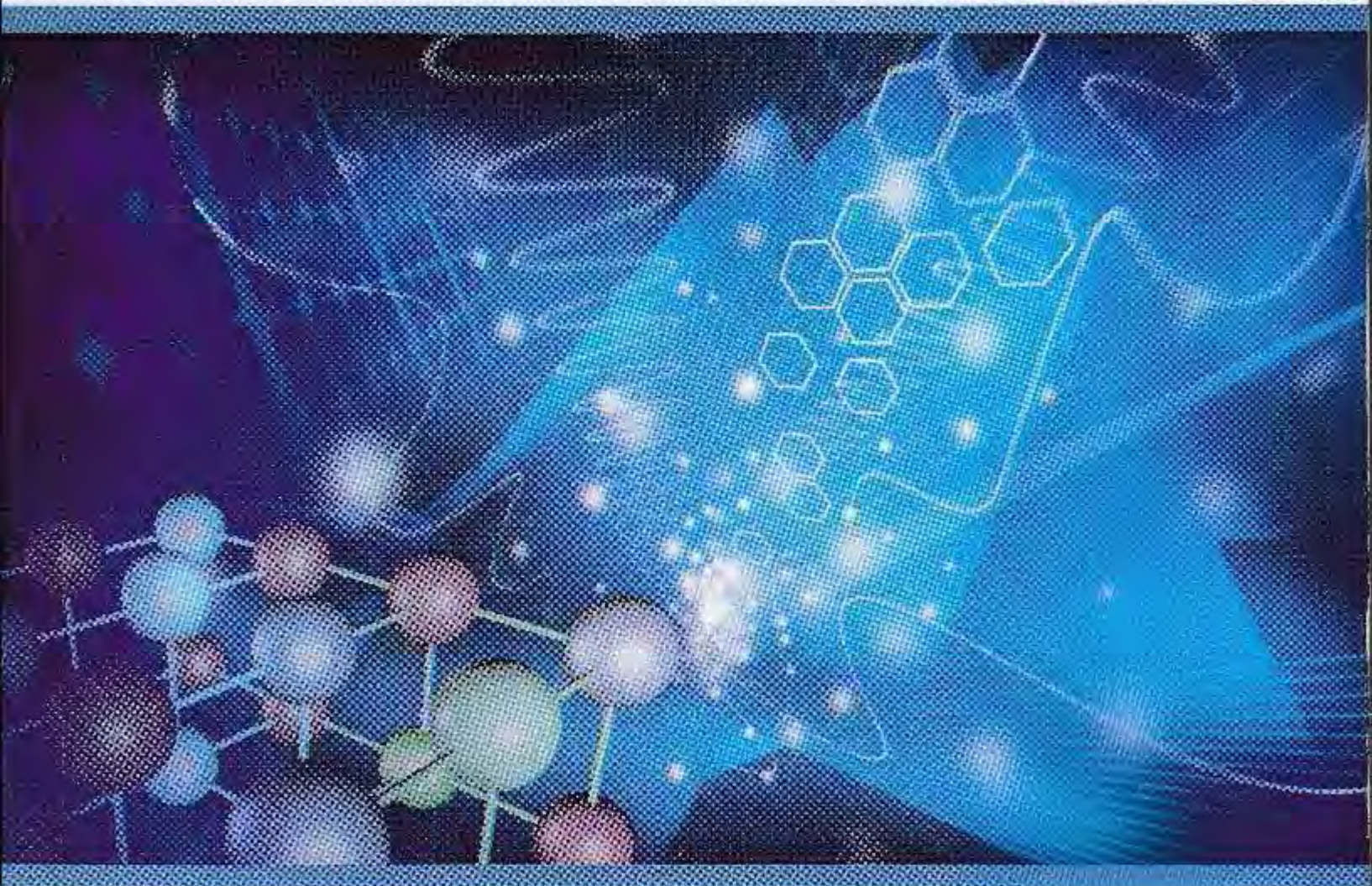


# 2013第四届国际纳米医药大会

BIT's 4<sup>th</sup> Annual World Congress of NanoMedicine-2013

时间: 2013年6月5-7日  
Time: June 5-7, 2013

地点: 中国苏州国信雅都大酒店  
Venue: Grand Trustel Aster Suzhou, China



## 主办单位

### Hosting Organizations

国家外国专家局国外人才信息研究中心  
Information Research Center of International Talents,  
State Administration of Foreign Experts Affairs (SAFEA)

苏州市人才工作领导小组办公室  
Suzhou Personnel Work Leading Group Office

苏州市人力资源和社会保障局  
Suzhou Municipal Human Resources and Social Security Bureau

苏州工业园区管理委员会  
Suzhou Industrial Park Administrative Committee

## 承办单位

### Operating Organizations

苏州市外国专家局  
Suzhou Bureau of Foreign Experts Affairs

苏州工业园区组织人事局  
Organization and Personnel Bureau of Suzhou Industrial Park

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# BIT's 2<sup>nd</sup> Annual World Congress of Advanced Materials-2013

中文  
English

Time: June 5-7, 2013 Venue: Grand Trustel Aster Suzhou, China

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**Theme: High-end, Smartness and Pro-Environment**



**Past Conference Report**  
**WCAM-2013**

BIT's 2nd Annual World Congress of Advanced Materials-2013 (WCAM-2013), held in Grand Trustel Aster Suzhou on June 5-7, achieved a consummation. The theme of this conference is "High-end, Smartness and Pro-Environment". Over 200 honored guests presented at the ceremony and gave brilliant speeches on invitation, among them are Dr. Baixin Liu, Academician and Professor, Chinese Academy of Sciences, China; Dr. Chang-Hyun Kim, Vice President, Samsung Electro-Mechanics Co., Korea; Dr. William C. Tang, Associate Dean and Professor, University of California, USA; Dr. Michel Meunier, Canada Research Chair in Laser Micro/Nano-Engineering of Materials, Laser Processing and Plasmonics Laboratory, Department of Engineering Physics, Ecole Polytechnique de Montreal, Canada; Dr. Mengsu Yang, Chair Professor, Department of Biology & Chemistry, City University of Hong Kong, Hong Kong, China. More than 300 world-renowned experts, professors, laboratory principals, project leaders and representatives of well-known enterprises attended the conference.

This annual congress comprised 7 Tracks and 23 sessions following the ceremony, including "Basic Topics of Material Science"; "Optical, Electronic and Magnetic Materials"; "Novel and Advanced Materials"; "Biomaterials and Pharmaceutical/Medical Materials"; "Materials for Energy and Environment"; "Advanced Technology of Materials for Industrial Applications"; "Material Property Characterization, Simulation and Control"...etc.

This annual conference, brought together nearly 350 specialists from 37 countries and areas, was devoted to the leading issues and popular topics and provide up-to-date information to all over the world. On the other hand, the meeting provided a brilliant information platform for domestic researchers to communicate with international experts and pushed forward the advanced materials development. According to the investigation after the conference, most of our participants expressed that they would like to attend WCAM in the next year. Depending on the warmly support and good suggestions from all of the participants, we are quite confident in organizing WCAM-2014 which would be better and more successful than WCAM-2013. All of us are looking forward to meeting you again in 2014.

## Highlights of the Conference

- 300+ Oral Presentations Covering the Hot Topics and Cutting-edge Technology in the Whole Field of Advanced Materials

## Programmed Sessions at a Glance

- Opening Ceremony and Keynote Forum
- Track 1: Basic Topics of Material Science
- Track 2: Optical, Electronic and Magnetic Materials

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### Hosting Organization



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- 100+ Posters Demonstrating
- Cutting-edge Keynote Addresses by Prominent Leaders from China and Abroad
- Creating a Harmonious Environment for Project Matchmaking and Promotion
- Opportunities to Visit Chinese Natural and Humanistic Landscapes

- Track 3: Novel and Advanced Materials
- Track 4: Biomaterials and Pharmaceutical/Medical Materials
- Track 5: Materials for Energy and Environment
- Track 6: Advanced Technology of Materials for Industrial Applications
- Track 7: Material Property Characterization, Simulation and Control
- Project Matchmaking, Investment and Partnership

## Renowned Speakers



**Dr. Michel Meunier**, Professor, Ecole Polytechnique de Montreal, Canada  
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**Dr. Baixin Liu**, Academician and professor, Chinese Academy of Sciences, China  
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**Dr. Chang-Hyun Kim**, Vice President, Samsung Electro-Mechanics Co., Korea  
[Read More](#)



**Dr. William C. Tang**, Associate Dean/Professor, University of California, USA  
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**Dr. Qiming Zhang**, Vice President & CTO, Strategic Polymer Sciences, Inc., USA  
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**Dr. Victor Li**, Professor, University of Michigan, USA  
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**Dr. Chuan-Jian Zhong**, Professor, State Univ. of New York at Binghamton, USA  
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**Dr. Simon X. Yang**, Professor, University of Guelph, Canada  
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**Dr. Lu Li**, Professor, National University of Singapore, Singapore  
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## Exhibition and Poster

WCAM-2013 provides an ideal platform to showcase your new technologies and products in China. It is developed to maximize your exposure, generate new leads, build brand awareness, and solidify business relations.

### Why Reserve a Booth at WCAM-2013

- Meet with International Leaders and Senior Officers in the Field of Advanced Materials
- Maximize Your Opportunities for Collaboration
- Explore Business Opportunities in China and beyond
- Spotlight Your Technologies and Its Commercial Application
- Superior Networking Opportunities with Senior Professionals and Industry Elites

## Sponsorship

WCAM-2013 is one of the most effective international marketing platforms in the field of advance materials, which offers a wide range of sponsoring categories for branding and highlighting your company in order to achieve the best publicity.

### Expand Your Business - A Cost Effective Sponsorship

- Get Cost and Time Effective Marketing Exposure and Boost Your Brand Recognition
- Set Up Stronger Alliances, New Partnerships
- Showcase Products and Services to a Targeted Prospects of Decision-makers
- Opportunity to Speak and Announce Recent Company Development
- Network from 800+ Professionals Offering Opportunities, before, during and after the Conference

## Past Event-WCAM 2012

BIT's 1st World Congress of Advanced Materials (WCAM-2012), successfully held in Beijing International Convention Center on June 6-8, 2012 were nearly 400 participants from more than 33 countries and areas have attended the WCAM-2012.

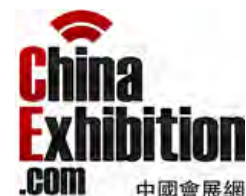
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## Scenery of Suzhou

Suzhou is located in the center of the Yangtze Delta, in the south of Jiangsu Province, with Shanghai to the east, Zhejiang Province to the south, Wuxi City to the west and the Yangtze River to the north. Since 42% area of the city is covered by water, including a vast number of ponds and streams, Suzhou is praised as the 'Oriental Venice'. Taihu Lake, four fifths of which is in the territory of Suzhou, is one of the four largest fresh lakes in China, with East Hill, West Hill and other scenic spots in its vicinity. The city is cut by the Beijing-Hangzhou Grand Canal from north to south. Together with its mild climate, making it an available destination all year round, fertile landscape and abundance of produce, it is no wonder that Suzhou is called 'paradise on earth'.

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## BIT' Upcoming Events



Nano-S&T 2015  
(September 24-26, 2015, Xi'an, China)



LCES2015  
(September 24-26, 2015, Xi'an, China)



GCC2015  
(September 24-26, 2015, Xi'an, China)



WCORT2015  
(September 24-26, 2015, Xi'an, China)



WCBE2015  
(September 24-26, 2015, Xi'an, China)



- 09:15-09:35 **Title:** *Ferromagnetic Superconductors and Spin Fluctuation Mediated Cooper Pairing*  
**Dr. Antheunis de Visser**, Associate Professor, University of Amsterdam, The Netherland
- 09:35-09:55 **Title:** *From Superconductivity towards Thermoelectricity: Germanium based Skutterudites*  
**Dr. Ernst Bauer**, Professor, Vienna University of Technology, Austria
- 09:55-10:15 **Title:** *Development in Processing of YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-x</sub> and MgB<sub>2</sub> Superconductors*  
**Dr. Jacques Noudem**, Professor, University of Caen Basse Normandie, France
- 10:15-10:25 **Coffee Break**
- 10:25-10:45 **Title:** *The Role of the Josephson Effect on the Properties of the 2G Coated Conductors*  
**Dr. Pierre Bernstein**, Professor, CRISMAT-CNRS, France
- 10:45-11:05 **Title:** *Ultrafast Dynamics in Topological Insulators and Fe-based Pnictides*  
**Dr. Chih Wei Luo**, Associate Professor, National Chiao Tung University, Taiwan
- 11:05-11:25 **Title:** *Graphene, Graphite and Superconductivity*  
**Dr. Rafael Baquero**, Professor, Department of Physics, Cinvestav, Mexico
- 11:25-11:45 **Title:** *Pairing in High T<sub>c</sub> Cuprates from Attraction of Quantum Spin Vortices*  
**Dr. Pieralberto Marchetti**, Associate Professor, University of Padua, Italy
- 11:45-12:05 **Title:** *Combining Materials for a Superconducting Spintronics*  
**Dr. Matthias Eschrig**, Professor, University of London, UK

## Session 2-5: Thin Films

*Time: 08:30-12:10, June 6, 2013 (Thursday) ; Place: Sunshine Hall, 4<sup>th</sup> Floor, GTAS*

- Chair** **Dr. Frank Klose**, Professor, Australian Nuclear Science & Technology Organization, Australia
- Co-Chair** **Dr. Rachel Desfeux**, Professor, University of Artois, France
- 08:30-08:35 **Chair's Introduction**
- 08:35-09:00 **Keynote Speech**  
**Title:** *Nanoregion Anion-Substituted Homocomposite-type New Thin Film Dielectric Materials and Their Applications for Tunable Microwave Devices and Frequency Agile Reconfigurable RF Front-End*  
**Dr. Ivoyl P. Koutsaroff**, Chief Research Engineer, Murata Manufacturing Co. Ltd., Japan
- 09:00-09:25 **Title:** *Neutron Scattering Investigations on Multiferroic Thin Film Structures*  
**Dr. Frank Klose**, Professor Group Leader, Australian Nuclear Science & Technology Organization, Australia
- 09:25-09:50 **Title:** *Magnetic Oxide Thin Films for on-chip Nonreciprocal Photonic Devices*  
**Dr. Lei Bi**, Professor, University of Electronic Science and Engineering of China, China
- 09:50-10:15 **Title:** *Work Function Engineering on ZnO TCO for OLED Application*  
**Dr. Dong Chan Shin**, Professor, Chosun University, South Korea



## Title: Nanoregion Anion-Substituted Homocomposite-type New Thin Film Dielectric Materials and Their Applications for Tunable Microwave Devices and Frequency Agile Reconfigurable RF Front-End

*Ivoyl P. Koutsaroff*

*Chief Research Engineer*

MURATA Manufacturing Co., Ltd.

Japan

### **Abstract**

We have prepared perovskite oxynitride (Ba,Sr)TiO<sub>3-x</sub>N<sub>x</sub> (BSTON) thin-films with various thicknesses from 30 nm to 800 nm using reactive RF sputtering technique at moderate deposition temperatures on Pt coated sapphire and Si substrates. 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 (DTF) simulations. 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 (up to 7:1 tuning ratio at 7.5V) [1-2], and significantly improved symmetrical stable dielectric loss ( $\tan \delta - E$ ) characteristics under up to  $\pm 1$  MV/cm external electric fields is achieved in this system without any annealing treatment after the RF sputter deposition. These results show that new BSTON-based variable capacitors (varactors), which are with ultraminiature size, could be able to outperform in the future the modern GaAs-based varactors [3].

### References

- [1.] I. P. Koutsaroff, et al., MRS Fall Meeting, Symposium K, "Oxide Nanoelectronics", 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.] H. Hirano, T. Kimura, I. P. Koutsaroff, M. Kadota, K. Hashimoto, M. Esashi and S. Tanaka, "Integration of BST varactors with surface acoustic wave device by film transfer technology for tunable RF filters", J. Micromech. Microeng. 23, 025005 (2013).

### **Biography**

Dr. Ivo(yi) P. Koutsaroff is a Chief Research Engineer working on Advanced Functional Thin Film Materials & Devices at Murata Manufacturing Co. Ltd., Business & Technology R&D Development Unit, Kyoto, Japan. He received his M.Sc. degree in Applied Physics from Sofia University in 1986, and his Ph.D. degree in Semiconductor Material Physics from Sun-Yat Sen University, Guangzhou and Institute of Semiconductors, Chinese Academy of Sciences, Beijing in 1993. Prior to joining Murata in 2005, since 1994, he had held several research and engineering positions at the University of Toronto, Canada; Electrotechnical Laboratory (AIST), Tsukuba, Japan; and E&G Optoelectronics (Perkin-Elmer), Montreal, Quebec. From 1999 to 2005 he has been engaged in manufacturing and development activities at Gennum Corporation in Toronto, Canada, related primarily to the low dielectric loss high density ferroelectric thin film decoupling and tunable capacitor devices used in RF-front-end communication modules. Being a manufacturing engineer from 1998 to 2001, he was actively involved in Statistical Process Control (SPC) and Design of Experiments (DOE) activities for Plasma Enhanced Chemical Vapor Deposition (PECVD), Reactive Ion etching (RIE), RF sputtering, and Rapid Thermal Annealing (RTA) steps in different semiconductor class production lines. He was a licensed Professional Engineer (P.Eng) in Ontario, Canada. He has authored more than 60 publications, co-edited proceedings in the ferroelectric thin films field, and chaired sessions in various international conferences, as well as holds a dozen of patents. He is a member of the IEEE, the Materials Research Society (MRS), the American Chemical Society (ACS), and the American Ceramic Society (ACerS). He is the principle organizer of the 1<sup>st</sup> International Symposium on "Advances and Enhanced Functionalities of Anion-controlled New Inorganic Materials (ANIM)", as part of E-MRS 2013 Spring Meeting, Strasbourg, France, May 27 – 31, 2013.

专家编号: A0047

<b>WCAM-2013 海外专家推荐表</b>			
专家姓名: Ivoyl P. Koutsaroff		从事专业: 物理学	
职务: 首席研究工程师	学历: 博士	性别: 男	国别: 日本
机构名称: 株式会社村田制作所, 日本			
来华目的:	交流与合作		
来华时间	从: 2012.6.5	至: 2012.6.7	
交流地点: 苏州国信雅都大酒店			
经费来源	国际差旅: 资助	国内差旅: 资助	
来华交流项目名称: 纳米区域阴离子取代同源复合型新薄膜介电材料及其在可调的微波器件和频率捷变可重构射频前端的应用			
<b>交流合作内容:</b>			
<p>We have prepared perovskite oxynitride (Ba,Sr)TiO<sub>3</sub>-xNx (BSTON) thin-films with various thicknesses from 30 nm to 800 nm using reactive RF sputtering technique at moderate deposition temperatures on Pt coated sapphire and Si substrates. 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 (DTF) simulations. 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 (up to 7:1 tuning ratio at 7.5V), and significantly improved symmetrical stable dielectric loss (tan - E) characteristics under up to ±1 MV/cm external electric fields is achieved in this system without any annealing treatment after the RF sputter deposition. These results show that new BSTON-based variable capacitors (varactors), which are with ultraminiature size, could be able to outperform in the future the modern GaAs-based varactors.</p> <p>我们已经准备了各种厚度的钙钛矿氮氧化物 (钡, 锶) TiO<sub>3</sub>-xNx (BSTON) 薄膜, 从 30 纳米到 800 纳米, 采用反应磁控溅射技术在铂涂层蓝宝石和硅衬底上沉积适当地温度。通过 STEM-EELS, XPS, 粉末 X 射线衍射和同步加速器粉末衍射对共掺 BSTON 薄膜的 A-/B-型的结构和组成特征进行了研究。在不同的电场 (小于等于 5MV/cm) 和温度 (150K-400K) 下通过使用精密 LCR-meter 从 0.1 kHz 至 5 MHz 分析所得到薄膜的介电性能。结果发现, 我们的 BSTON 薄膜有伪四方结构, 具有较大的晶格参数 c/ a 值和晶格体积的增加, 同时也实验证实了这一点 (从膜样品, 和通过使用由较厚的膜样品制作的“微粉”), 理论上利用密度泛函理论 (DTF) 模拟。我们提供了实验证据, 阴离子取代与 N-取代导致 BSTO-BSTON 同源复合材料的形成, 集中在纳米尺寸集群分布在晶界和晶粒内, 而室温下这样的阴离子取代钙钛矿系统仍然在超顺电状态 (非极性), 相对于纯粹的 BSTO 系统它具有较高的介电常数, 更高的电压敏捷性 (调谐比小于 7:1, 在 7.5V), 并在小于 ±1MV/cm 的外部电场下, 达到了明显地提高对称稳定的介电损耗 (tan - E) 的特性, 在本系统中没有任何退火处理后的 RF 溅射淀积。这些结果表明, 新超小型尺寸的 BSTON 基的可变电容器 (变容二极管) 可</p>			

以在将来能够超越现代基于 GaAs 的变容二极管。

### 专家背景:

Dr. Ivo(yi) P. Koutsaroff is a Chief Research Engineer working on Advanced Functional Thin Film Materials & Devices at Murata Manufacturing Co. Ltd., Business & Technology R&D Development Unit, Kyoto, Japan. He received his M.Sc. degree in Applied Physics from Sofia University in 1986, and his Ph.D. degree in Semiconductor Material Physics from Sun-Yat Sen University, Guangzhou and Institute of Semiconductors, Chinese Academy of Sciences, Beijing in 1993. Prior to joining Murata in 2005, since 1994, he had held several research and engineering positions at the University of Toronto, Canada; Electrotechnical Laboratory (AIST), Tsukuba, Japan; and E&G Optoelectronics (Perkin-Elmer), Montreal, Quebec. From 1999 to 2005 he has been engaged in manufacturing and development activities at Gennum Corporation in Toronto, Canada, related primarily to the low dielectric loss high density ferroelectric thin film decoupling and tunable capacitor devices used in RF-front-end communication modules. Being a manufacturing engineer from 1998 to 2001, he was actively involved in Statistical Process Control (SPC) and Design of Experiments (DOE) activities for Plasma Enhanced Chemical Vapor Deposition (PECVD), Reactive Ion etching (RIE), RF sputtering, and Rapid Thermal Annealing (RTA) steps in different semiconductor class production lines. He was a licensed Professional Engineer (P.Eng) in Ontario, Canada. He has authored more than 60 publications, co-edited proceedings in the ferroelectric thin films field, and chaired sessions in various international conferences, as well as holds a dozen of patents. He is a member of the IEEE, the Materials Research Society (MRS), the American Chemical Society (ACS), and the American Ceramic Society (ACerS). He is the principle organizer of the 1st International Symposium on "Advances and Enhanced Functionalities of Anion-controlled New Inorganic Materials (ANIM)", as part of E-MRS 2013 Spring Meeting, Strasbourg, France, May 27 – 31, 2013.

Ivo(yi) P. Koutsaroff博士是日本京都村田制造所商务和技术研发部门的一位首席研究工程师，主要研究领域是先进功能薄膜材料与器件。1986年在索非亚大学他获得了应用物理学的理科硕士学位，1993年在孙中山大学和中国科学院半导体研究所获得半导体材料物理学博士学位。2005年加入村田制作所，自1994年以来，在此之前，他曾在加拿大多伦多大学电工实验室(AIST)，日本筑波市和魁北克蒙特利尔E&G光电(Perkin-Elmer公司)举行了多次的研究和工程职位。从1999年到2005年，他一直在加拿大多伦多Gennum公司从事生产和研发工作，主要涉及到的低介电损耗高密度的铁电薄膜去耦和射频前端通信模块使用可调谐电容器装置。在1998年至2001年作为一个制造工程师，他积极参与了统计过程控制(SPC)和实验设计(DOE)的活动，等离子体增强化学气相沉积(PECVD)，反应离子刻蚀(RIE)，射频溅射，快速热退火(RTA)的步骤在不同的半导体类生产线。在加拿大安大略省他是持牌专业工程师(专业工程师)。在铁电薄膜领域，他撰写了60多份刊物和合编诉讼，并在各种国际会议上主持会议，以及持有十几专利。他分别是IEEE，材料研究学会(MRS)，美国化学协会(ACS)，美国陶瓷学会(ACerS)中的一员。他主持了2013年5月27日-31日在法国斯特拉斯堡举行的第一届国际研讨会E-MRS2013年春季会议上“阴离子控制的新型无机材料(ANIM)的进展和增强功能”的分会。

### 合作方式:

面议