

January 23 – 25, 2019

DoubleTree by Hilton Orlando at Sea World
Conference Hotel | Orlando, FL, USA

ELECTRONIC MATERIALS AND APPLICATIONS (EMA 2019)

CONFERENCE PROGRAM



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ORGANIZED BY THE ACERS ELECTRONICS AND BASIC SCIENCE DIVISIONS



ceramics.org/ema2019

WELCOME

On behalf of The American Ceramic Society's Electronics and Basic Science Divisions, welcome to the 2019 Conference on Electronic Materials and Applications (EMA 2019). We are glad you could join us for this international conference focused on fundamental properties and processing of ceramic and electroceramic materials and their applications in electronic, electro/mechanical, magnetic, dielectric, and optical components, devices, and systems.

As in past years, the 2019 technical program includes plenary talks, invited lectures, contributed papers, poster presentations and open discussions. A full schedule is included here, as well on our EMA 2019 app (QR codes included on the front of this guide). You will find symposia focused on advanced characterization methods; processing, properties, and applications of advanced electronic materials; ferroic oxides; complex oxide films; mesoscale properties of electronic materials; complex oxide and chalcogenide semiconductors; superconducting and magnetic materials; structure-property relationships in relaxors; ion conductors; basic science and electronic applications in microstructure evolution; materials for 5G telecommunications; thermal transport; and material design.

We would also like to call your attention to the multiple networking opportunities available to facilitate collaborations for scientific and technical advances related to materials, components, devices, and systems. Special lunchtime sessions will be geared toward students and young professionals. The grand finale of the meeting will again be the popular "Failure: The Greatest Teacher" where established researchers discuss the great ideas that they've had that did not work out for one reason or another. We hope to see you there!

Thank you for your participation.

ORGANIZING COMMITTEE



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TABLE OF CONTENTS

Sponsors	i
Schedule at a Glance	ii
Regulations	iii
Plenary Speakers	iv
Floorplan/Symposia	iv
Special Events	v – viii

Final Program

Presenting Author Index	1 – 4
Wednesday	5 – 14
Thursday	14 – 21
Friday	21 – 26

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EVENT SPONSORS

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SCHEDULE AT A GLANCE

TUESDAY, JANUARY 22, 2019

Conference registration	5:00 p.m. – 6:30 p.m.	Main Lobby
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WEDNESDAY, JANUARY 23, 2019

Conference registration	7:30 a.m. – 6:00 p.m.	Main Lobby
Plenary session I	8:30 a.m. – 9:30 a.m.	Orange A
Coffee break	9:30 a.m. – 10:00 a.m.	Orange Foyer
Concurrent technical sessions	10:00 a.m. – 5:30 p.m.	Orange A & B, Citrus A & B, Cypress B & C, Magnolia A and B/C
Student workshop	12:30 p.m. – 2:00 p.m.	Orange B
Poster session set up	12:30 p.m. – 5:00 p.m.	Orange C/D
Lunch on own	12:30 p.m. – 2:00 p.m.	
Coffee break	3:30 p.m. – 4:00 p.m.	Orange Foyer
Poster session & reception	5:30 p.m. – 7:30 p.m.	Orange C/D
Basic Science Division tutorial	7:45 p.m. – 9:45 p.m.	Citrus A

THURSDAY, JANUARY 24, 2019

Conference registration	7:30 a.m. – 6:00 p.m.	Main Lobby
Plenary session II	8:30 a.m. – 9:30 a.m.	Orange A
Coffee break	9:30 a.m. – 10:00 a.m.	Orange Foyer
Concurrent technical sessions	10:00 a.m. – 5:30 p.m.	Orange A & B, Citrus A & B, Cypress B & C, Magnolia A and B/C
Student workshop	12:30 p.m. – 2:00 p.m.	Orange B
Lunch on own	12:30 p.m. – 2:00 p.m.	
Coffee break	3:30 p.m. – 4:00 p.m.	Orange Foyer
Student & Young Professionals reception	5:30 p.m. – 6:30 p.m.	Barefoot Bar
Conference dinner	7:00 p.m. – 9:00 p.m.	Orange C/D

FRIDAY, JANUARY 20, 2017

Conference registration	7:30 a.m. – 4:00 p.m.	Main Lobby
Concurrent technical sessions	8:30 a.m. – 5:00 p.m.	Orange A & B, Citrus A & B, Cypress B & C, Magnolia A and B/C
Lunch on own	12:30 p.m. – 2:00 p.m.	
Failure – the greatest teacher	5:15 p.m. – 6:15 p.m.	Orange B

Welcome from The American Ceramic Society (ACerS)

The ACerS community is open to all, and we're happy to have you with us. ACerS values diverse and inclusive participation within the field of ceramic science and engineering. We strive to promote involvement and access to leadership opportunity regardless of race, ethnicity, gender, religion, age, sexual orientation, nationality, disability, appearance, geographic location, career path or academic level.

If you are a new member or joining us for the first time, please see the events available for you on page iv, or visit the ACerS registration desk to learn more.

For all guests, if you need access to a nursing mother's room or other special needs, please ask us at the ACerS registration desk. For childcare services, please check with the hotel concierge or a listing of licensed and bonded caregivers.

We hope you enjoy the conference and want you to know that all individuals are welcome at ACerS conferences and events.

MEETING REGULATIONS



Cell phones
silent

During oral sessions conducted during Society meetings, unauthorized photography, videotaping, and audio recording is strictly prohibited for two reasons:

- (1) conference presentations are the intellectual property of the presenting authors as such are protected, and
- (2) engaging in photography, videotaping, or audio recording is disruptive to the presenter and the audience.

Failure to comply may result in the removal of the offender from the session or from the remainder of the meeting.

Note: The Society may engage photographers to photograph sessions for marketing and promotional purposes.



No photography/
recording

MEETING REGULATIONS

The American Ceramic Society is a nonprofit scientific organization that facilitates the exchange of knowledge meetings and publication of papers for future reference. The Society owns and retains full right to control its publications and its meetings. The Society has an obligation to protect its members and meetings from intrusion by others who may wish to use the meetings for their own private promotion purpose. Literature found not to be in agreement with the Society's goals, in competition with Society services or of an offensive nature will not be displayed anywhere in the vicinity of the meeting. Promotional literature of any kind may not be displayed without the Society's permission and unless the Society provides tables for this purpose. Literature not conforming to this policy or displayed in other than designated areas will be disposed. The Society will not permit unauthorized scheduling of activities during its meeting by any person or group when those activities are conducted at its meeting place in interference with its programs and scheduled activities. The Society does not object to appropriate activities by others during its meetings if it is consulted with regard to time, place, and suitability. Any person or group wishing to conduct any activity at the time and location of the Society meeting must obtain permission from the Executive Director or Director of Meetings, giving full details regarding desired time, place and nature of activity.

Diversity Statement: The American Ceramic Society values diverse and inclusive participation within the field of ceramic science and engineering. ACerS strives to promote involvement and access to leadership opportunity regardless of race, ethnicity, gender, religion, age, sexual orientation, nationality, disability, appearance, geographic location, career path or academic level. Visit the registration desk if you need access to a nursing mother's room or need further assistance. For childcare services, please check with the concierge at individual hotels for a listing of licensed and bonded caregivers.

The American Ceramic Society plans to take photographs and video at the conference and reproduce them in educational, news or promotional materials, whether in print, electronic or other media, including The American Ceramic Society's website. By participating in the conference, you grant The American Ceramic Society the right to use your name and photograph for such purposes. All postings become the property of The American Ceramic Society.

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Registration Requirements: Attendance at any meeting of the Society shall be limited to duly registered persons.

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PLENARY SPEAKERS



Maria

Wednesday, January 23,
8:30 – 9:30 AM | Orange A

Jon-Paul Maria, Professor, Materials Science and Engineering Department, The Pennsylvania State University, USA

Title: *Electroceramic thin films for IR plasmonic applications*



Chiang

Thursday, January 24,
8:30 – 9:30 AM | Orange A

Yet-Ming Chiang, Kyocera professor, Materials Science and Engineering Department, Massachusetts Institute of Technology, USA

Title: *Ceramics are enabling the next generation of energy storage technologies*

SPECIAL EVENTS

Electronics Division Student Workshops

Wed, Jan. 23 | 12:30 p.m. – 2:00 pm | Orange B

Overview of Topics at EMA: A Student Guide to the Meeting

Thurs, Jan. 24 | 12:30 p.m. – 2:00 pm | Orange B

What's Next: What to Expect in Different Career Paths

Poster Session and Welcome Reception

Wed, Jan. 23 | 5:30 p.m. – 7:30 p.m. | Orange C/D

Renew acquaintances and get to know new faces within the EMA community during the poster session and welcome reception

Basic Science Division Tutorial

Wed, Jan. 23 | 7:40 p.m. – 8:45 p.m. | Citrus A

Impedance spectroscopy: Opportunities and its application in materials

7:40 p.m. Introduction

7:45 p.m. **Rosario Gerhardt**, Georgia Tech
Impedance spectroscopy: Basics, challenges and opportunities

8:15 p.m. **Daniel Lewis**, Rensselaer Polytechnic Institute
Progress on understanding the relationship between impedance measurements and microstructure

Student and Young Professional Reception

Thurs, Jan. 24 | 5:30 p.m. – 6:30 p.m. | Barefoot Bar

Following a stimulating day of sessions, join with other students and young professionals at this casual reception.

Conference Dinner

Thurs, Jan. 24 | 7:00 p.m. – 9:00 p.m. | Orange C/D

All conference attendees are invited to attend the conference dinner. Student awards will be announced at this event.

Failure – the Greatest Teacher

Fri, Jan. 25 | 3:30 p.m. – 5:00 p.m. | Orange B

Come hear recognized leaders in the field discuss failure—and perhaps recount some of their most spectacular learning experiences—during a frank and friendly discussion in a relaxed atmosphere.

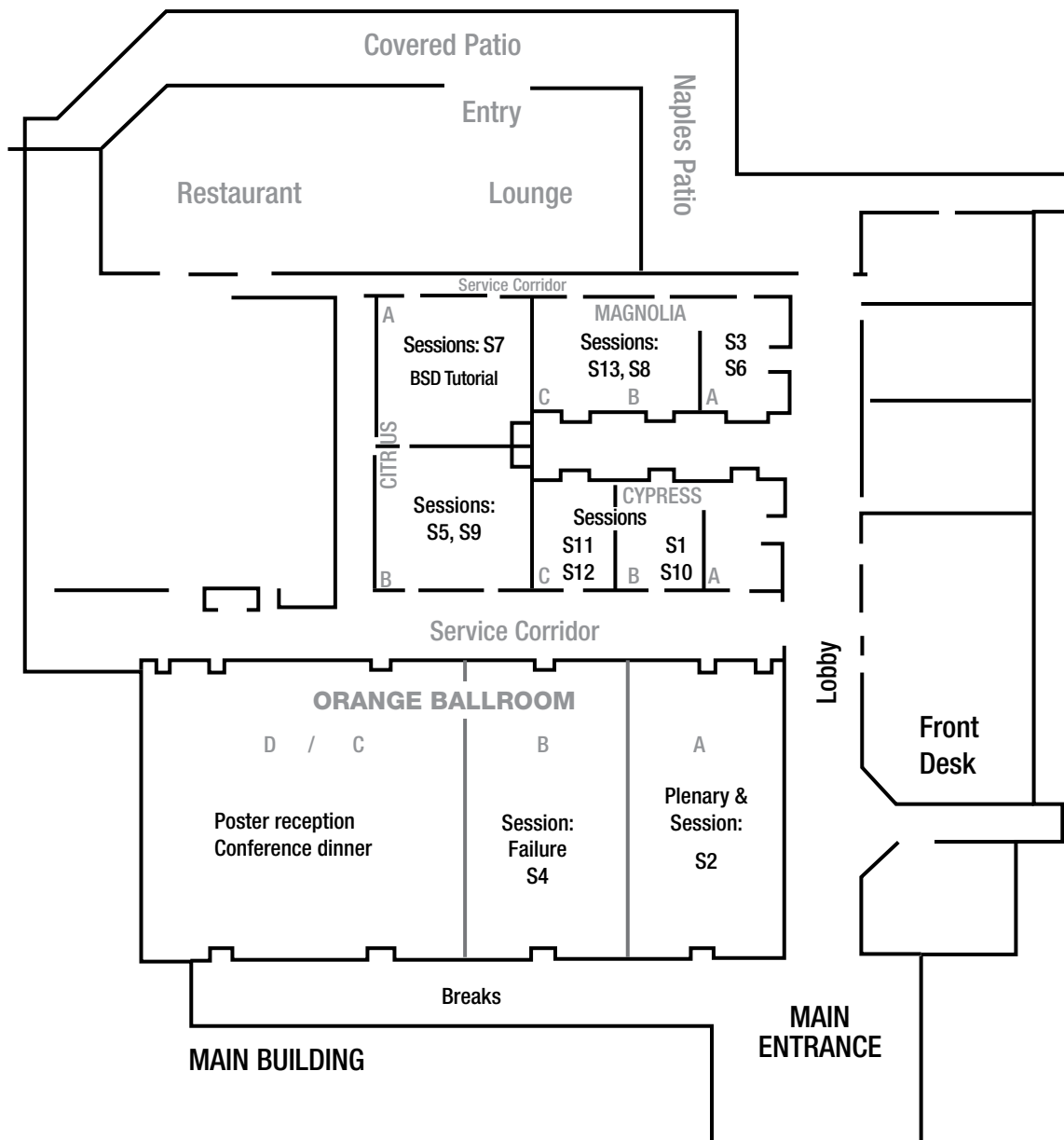
3:30 p.m. **Dragan Danjanovic**, École polytechnique fédérale de Lausanne
Failure of Communication: Example of lead-free piezoelectrics

4:00 p.m. **Andrew Bell**, Institute for Materials Research, University of Leeds
Failures: The stepping stones to success

4:30 p.m. **Susan Trolrier-McKinstry**, The Pennsylvania State University
Memory Failure

FLOOR PLAN

Doubletree by Hilton Floor Plan



SYMPOSIA

EMA 2019 ORGANIZING COMMITTEE

Jon Ihlefeld, Electronics Division
Alp Sehrioglu, Electronics Division

Jeffrey Rickman, Basic Science Division
John Blendell, Basic Science Division

S1. CHARACTERIZATION OF STRUCTURE-PROPERTY RELATIONSHIPS IN FUNCTIONAL CERAMICS

David W. McComb, The Ohio State University, USA; **Abhijit Pramanick**, City University of Hong Kong, Hong Kong; **Julian Walker**, The Pennsylvania State University, USA; **Arno Merkle**, XRE, Belgium; **Hugh Simons**, Technical University of Denmark, Denmark

S2. ADVANCED ELECTRONIC MATERIALS: PROCESSING STRUCTURES, PROPERTIES, AND APPLICATIONS

Shujun Zhang, University of Wollongong, Australia; **Xiaoli Tan**, Iowa State University, USA; **Kyle Webber**, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany; **Satoshi Wada**, University of Yamanashi, Japan

S3. FRONTIERS IN FERROIC OXIDES: SYNTHESIS, STRUCTURE, PROPERTIES, AND APPLICATIONS

John Heron, University of Michigan, USA; **Morgan Trassin**, ETH Zurich, Laboratory of Functional Materials, Switzerland; **Jinxing Zhang**, Beijing Normal University, China

S4. COMPLEX OXIDE THIN FILM MATERIALS DISCOVERY: FROM SYNTHESIS TO STRAIN/INTERFACE ENGINEERED EMERGENT PROPERTIES

Aiping Chen, Los Alamos National Laboratory, USA; **Elizabeth Paisley**, Sandia National Laboratories, USA; **Hyoungjeen Jeon**, Pusan National University, South Korea; **Jon-Paul Maria**, The Pennsylvania State University, USA; **James Rondinelli**, Northwestern University, USA; **Sean Smith**, Sandia National Laboratories, USA; **Judith L. MacManus-Driscoll**, University of Cambridge, UK

S5. MESOSCALE PHENOMENA IN FERROIC NANOSTRUCTURES: BEYOND THE THIN-FILM PARADIGM

Edward Gorzkowski, Naval Research Laboratory, USA; **Serge M. Nakhmanson**, University of Connecticut, USA; **Seungbum Hong**, KAIST, South Korea

S6. COMPLEX OXIDE AND CHALCOGENIDE SEMICONDUCTORS: RESEARCH AND APPLICATIONS

Ryan Comes, Auburn University, USA; **Matthew Brahlek**, The Pennsylvania State University, USA; **Anderson Janotti**, University of Delaware, USA; **Rafael Jaramillo**, Massachusetts Institute of Technology, USA; **Steven Spurgeon**, Pacific Northwest National Lab, USA

S7. SUPERCONDUCTING AND MAGNETIC MATERIALS: FROM BASIC SCIENCE TO APPLICATIONS

Gang Wang, Institute of Physics, Chinese Academy of Sciences, China; **Michael Susner**, Air Force Research Laboratory, USA; **Timothy Haugan**, Air Force Research Laboratory, USA; **Haiyan Wang**, Purdue University, USA; **Charles Rong**, US Army RDECOM ARL, USA

S8. STRUCTURE-PROPERTY RELATIONSHIPS IN RELAXOR CERAMICS

Marco Deluca, Materials Center Leoben Forschung GmbH, Austria; **Prasanna V. Balachandran**, University of Virginia, USA; **Antonio Feteira**, Sheffield Hallam University, UK; **Jiri Hlinka**, Institute of Physics, Academy of Sciences of the Czech Republic, Czech Republic

S9. ION CONDUCTING CERAMICS

Yingge Du, Pacific Northwest National Laboratory, USA; **Hui (Claire) Xiong**, Boise State University, USA; **Fanglin (Frank) Chen**, University of South Carolina, USA; **Erik Spoerke**, Sandia National Laboratory, USA

S10. CURRENT CHALLENGES IN MICROSTRUCTURAL EVOLUTION: FROM BASIC SCIENCE TO ELECTRONIC APPLICATIONS

Wolfgang Rheinheimer, Purdue University, USA; **Alexander Colsmann**, Karlsruhe Institute of Technology (KIT), Germany; **Holger Röhm**, Karlsruhe Institute of Technology (KIT), Germany; **Tobias Leonhard**, Karlsruhe Institute of Technology (KIT), Germany

S11. ELECTRONIC MATERIALS APPLICATIONS IN 5G TELECOMMUNICATIONS

Nate Orloff, National Institute of Standards and Technology, USA; **Geoff Brennecke**, Colorado School of Mines, USA; **Ling Cai**, Corning, USA; **Turan Birol**, University of Minnesota, USA

S12. THERMAL TRANSPORT IN FUNCTIONAL MATERIALS AND DEVICES

Brian M. Foley, Georgia Institute of Technology, USA; **Brian F. Donovan**, United States Naval Academy, USA

S13. FROM BASIC SCIENCE TO AGILE DESIGN OF FUNCTIONAL MATERIALS: ALIGNED COMPUTATIONAL AND EXPERIMENTAL APPROACHES AND MATERIALS INFORMATICS

Mina Yoon, Center for Nanophase Materials Science, Oak Ridge National Laboratory, USA; **Lan Li**, Boise State University, USA; **Peilin Liao**, Purdue University, USA

STUDENT AWARDS AND COMPETITION:

Jennifer Andrew, University of Florida, USA

TECHNICAL SESSIONS BY SYMPOSIUM



Sessions	Date	Time	Location
PLENARY SESSION			
Plenary Session I	Jan. 23, 2019	8:30 a.m. - 10:00 a.m.	Orange A
Poster Session	Jan. 23, 2019	5:30 p.m. - 7:30 p.m.	Orange C/D
S1: CHARACTERIZATION OF STRUCTURE-PROPERTY RELATIONSHIPS IN FUNCTIONAL CERAMICS			
Imaging and Analytical Techniques I	Jan. 23, 2019	10:00 a.m. - 12:15 p.m.	Cypress B
Imaging and Analytical Techniques II	Jan. 23, 2019	2:00 p.m. - 5:15 p.m.	Cypress B
Imaging and Analytical Techniques III	Jan. 24, 2019	10:00 a.m. - 12:00 p.m.	Cypress B
S2: ADVANCED ELECTRONIC MATERIALS: PROCESSING STRUCTURES, PROPERTIES, AND APPLICATIONS			
Advanced Electronic Materials: Processing	Jan. 23, 2019	10:00 a.m. - 12:30 p.m.	Orange A
Advanced Electronic Materials: Material Design	Jan. 23, 2019	2:00 p.m. - 4:00 p.m.	Orange A
Advanced Electronic Materials: Property I	Jan. 23, 2019	4:00 p.m. - 5:15 p.m.	Orange A
Advanced Electronic Materials: Property II	Jan. 24, 2019	10:00 a.m. - 12:30 p.m.	Orange A
Advanced Electronic Materials: Lead free I	Jan. 24, 2019	2:00 p.m. - 4:00 p.m.	Orange A
Advanced Electronic Materials: Lead free II	Jan. 24, 2019	4:00 p.m. - 5:30 p.m.	Orange A
Advanced Electronic Materials: Lead free III	Jan. 25, 2019	8:30 a.m. - 10:30 a.m.	Orange A
Advanced Electronic Materials: Characterization	Jan. 25, 2019	10:30 a.m. - 12:30 p.m.	Orange A
S3: FRONTIERS IN FERROIC OXIDES: SYNTHESIS, STRUCTURE, PROPERTIES, AND APPLICATIONS			
Magnetic, Magnetoelectric, and Multiferroic Phenomena	Jan. 23, 2019	10:00 a.m. - 12:00 p.m.	Magnolia A
Domains, Domain Walls, and Topological structures	Jan. 23, 2019	2:00 p.m. - 4:00 p.m.	Magnolia A
Ferroelectric films and ceramics: Domain States, Switching, and Applications	Jan. 23, 2019	4:00 p.m. - 5:30 p.m.	Magnolia A
S4: COMPLEX OXIDE THIN FILM MATERIALS DISCOVERY: FROM SYNTHESIS TO STRAIN/INTERFACE ENGINEERED EMERGENT PROPERTIES			
Controlled Synthesis I	Jan. 23, 2019	10:00 a.m. - 12:30 p.m.	Orange B
Controlled Synthesis II	Jan. 23, 2019	2:00 p.m. - 4:00 p.m.	Orange B
Advanced Characterization of Oxide Heterostructures	Jan. 23, 2019	4:00 p.m. - 5:30 p.m.	Orange B
Functionality: Ferroic I	Jan. 24, 2019	10:00 a.m. - 11:15 a.m.	Orange B
Functionality: Ferroic II	Jan. 24, 2019	11:15 a.m. - 12:30 p.m.	Orange B
Controlled Synthesis III	Jan. 24, 2019	2:00 p.m. - 3:30 p.m.	Orange B
Functionality at Oxide/Metal Interface	Jan. 24, 2019	4:00 p.m. - 5:30 p.m.	Orange B
Functionality: Ferroic III	Jan. 25, 2019	8:30 a.m. - 10:00 a.m.	Orange B
Functionality: Optical	Jan. 25, 2019	10:30 a.m. - 12:15 p.m.	Orange B
S5: MESOSCALE PHENOMENA IN FERROIC NANOSTRUCTURES: BEYOND THE THIN-FILM PARADIGM			
Mesoscale Phenomena in Ferroic Nanostructures: Beyond the Thin-Film Paradigm I	Jan. 24, 2019	2:00 p.m. - 5:30 p.m.	Citrus B
Mesoscale Phenomena in Ferroic Nanostructures: Beyond the Thin-Film Paradigm II	Jan. 25, 2019	8:30 a.m. - 11:30 a.m.	Citrus B
S6: COMPLEX OXIDE AND CHALCOGENIDE SEMICONDUCTORS: RESEARCH AND APPLICATIONS			
Oxide Semiconductors	Jan. 24, 2019	10:00 a.m. - 12:15 p.m.	Magnolia A
Chalcogenide Semiconductors	Jan. 24, 2019	2:00 p.m. - 5:15 p.m.	Magnolia A
Electron Microscopy of Oxides and Chalcogenides	Jan. 25, 2019	8:30 a.m. - 10:30 a.m.	Magnolia A
Emerging Oxides	Jan. 25, 2019	10:30 a.m. - 1:00 p.m.	Magnolia A

TECHNICAL SESSIONS BY SYMPOSIUM

Sessions	Date	Time	Location
S7: SUPERCONDUCTING AND MAGNETIC MATERIALS: FROM BASIC SCIENCE TO APPLICATIONS			
Superconducting and Magnetic Materials I	Jan. 23, 2019	10:00 a.m. - 12:30 p.m.	Citrus A
Superconducting and Magnetic Materials II	Jan. 23, 2019	2:00 p.m. - 4:00 p.m.	Citrus A
Superconducting and Magnetic Materials III	Jan. 23, 2019	4:00 p.m. - 5:00 p.m.	Citrus A
Superconducting and Magnetic Materials IV	Jan. 24, 2019	10:00 a.m. - 12:00 p.m.	Citrus A
Superconducting and Magnetic Materials V	Jan. 24, 2019	2:00 p.m. - 4:00 p.m.	Citrus A
Superconducting and Magnetic Materials VI	Jan. 24, 2019	4:00 p.m. - 5:30 p.m.	Citrus A
Superconducting and Magnetic Materials VII	Jan. 25, 2019	8:30 a.m. - 10:00 a.m.	Citrus A
Superconducting and Magnetic Materials VIII	Jan. 25, 2019	10:00 a.m. - 11:45 a.m.	Citrus A
S8: STRUCTURE-PROPERTY RELATIONSHIPS IN RELAXOR CERAMICS			
Perovskite Relaxors I	Jan. 24, 2019	2:00 p.m. - 4:00 p.m.	Magnolia B/C
Perovskite Relaxors II	Jan. 24, 2019	4:00 p.m. - 5:15 p.m.	Magnolia B/C
Applications of Relaxors	Jan. 25, 2019	8:30 a.m. - 10:00 a.m.	Magnolia B/C
Non-Perovskite Relaxors and Advanced Multiscale Modeling and Characterization	Jan. 25, 2019	10:00 a.m. - 12:15 p.m.	Magnolia B/C
Local Structure of Relaxors	Jan. 25, 2019	2:00 p.m. - 3:00 p.m.	Magnolia B/C
S9: ION-CONDUCTING CERAMICS			
Lithium Ion Batteries	Jan. 23, 2019	10:00 a.m. - 12:30 p.m.	Citrus B
Cation Conducting Ceramics for Energy Storage	Jan. 23, 2019	2:00 p.m. - 5:30 p.m.	Citrus B
Oxygen Conducting Ceramics	Jan. 24, 2019	10:00 a.m. - 11:45 a.m.	Citrus B
S10: CURRENT CHALLENGES IN MICROSTRUCTURAL EVOLUTION: FROM BASIC SCIENCE TO ELECTRONIC APPLICATIONS			
Grain Boundary Structure, Mobility and Characterization	Jan. 24, 2019	2:00 p.m. - 4:45 p.m.	Cypress B
Properties of Interfaces	Jan. 25, 2019	8:30 a.m. - 12:00 p.m.	Cypress B
Interfaces in Organohalide Solar Cells	Jan. 25, 2019	2:00 p.m. - 3:30 p.m.	Cypress B
S11: ELECTRONIC MATERIALS APPLICATIONS IN 5G TELECOMMUNICATIONS			
Electronic Materials Applications in 5G Telecommunications I	Jan. 24, 2019	10:00 a.m. - 12:30 p.m.	Cypress C
Electronic Materials Applications in 5G Telecommunications II	Jan. 24, 2019	2:00 p.m. - 6:00 p.m.	Cypress C
Electronic Materials Applications in 5G Telecommunications III	Jan. 25, 2019	8:30 a.m. - 12:20 p.m.	Cypress C
S12: THERMAL TRANSPORT IN FUNCTIONAL MATERIALS AND DEVICES			
Nano-HX: Fundamentals & Applications I	Jan. 23, 2019	10:00 a.m. - 12:00 p.m.	Cypress C
Nano-HX: Fundamentals & Applications II	Jan. 23, 2019	2:15 p.m. - 4:00 p.m.	Cypress C
Tunable Thermal Properties	Jan. 23, 2019	4:00 p.m. - 4:30 p.m.	Cypress C
S13: FROM BASIC SCIENCE TO AGILE DESIGN OF FUNCTIONAL MATERIALS: ALIGNED COMPUTATIONAL AND EXPERIMENTAL APPROACHES AND MATERIALS INFORMATICS			
Materials by Design: Computational/Experimental Emerging Strategies	Jan. 23, 2019	10:00 a.m. - 12:15 p.m.	Magnolia B/C
Novel Phenomena: Interface/Multi-scale/Low-D	Jan. 23, 2019	2:00 p.m. - 3:45 p.m.	Magnolia B/C
High-throughput Computational/Experimental Approaches/Functional Perovskite	Jan. 24, 2019	10:00 a.m. - 12:15 p.m.	Magnolia B/C
S14: FAILURE – THE GREATEST TEACHER			
Failure: The Greatest Teacher	Jan. 25, 2019	3:30 p.m. - 5:00 p.m.	Orange B

PHASE 4.3 NOW AVAILABLE!



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PHASE

Equilibria Diagrams

Technical Meeting and Exhibition

MST 19

MATERIALS SCIENCE & TECHNOLOGY

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SEPTEMBER 29 – OCTOBER 3, 2019

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Oral Presenters

Name	Date	Time	Room	Page Number	Name	Date	Time	Room	Page Number
A									
Ahn, J.	23-Jan	5:00PM	Citrus B	10	Floyd, R.	23-Jan	10:45AM	Orange A	6
Aigner, R.	24-Jan	10:10AM	Cypress C	20	Freeland, J.	23-Jan	4:00PM	Orange B	8
Amoroso, D.	25-Jan	11:15AM	Magnolia B/C	24	Fujii, I.	24-Jan	4:30PM	Orange A	15
B					G				
Balachandran, P.	25-Jan	10:30AM	Magnolia A	23	Ganguly, K.	24-Jan	11:15AM	Magnolia A	17
Bang, S.	23-Jan	10:30AM	Orange A	6	Gao, J.	24-Jan	3:15PM	Orange A	15
Batra, R.	23-Jan	11:15AM	Magnolia B/C	11	Garcia, V.	25-Jan	11:00AM	Magnolia A	23
Beechem, T.E.	23-Jan	4:00PM	Orange A	6	Gaskins, J.	23-Jan	11:00AM	Cypress C	10
Bell, A.J.	25-Jan	4:00PM	Orange B	26	Ge, C.	23-Jan	4:30PM	Citrus B	10
Berenov, A.	24-Jan	12:00PM	Orange B	16	Geessinck, J.	23-Jan	11:15AM	Orange B	8
Bergmann, F.	24-Jan	12:10PM	Cypress C	20	Gerhardt, R.A.	25-Jan	9:00AM	Cypress B	25
Bernard, D.	23-Jan	11:00AM	Cypress B	5	Giri, A.	23-Jan	11:15AM	Cypress C	10
Blanchet, M.	24-Jan	11:30AM	Magnolia A	17	Glau, J.	24-Jan	4:30PM	Magnolia B/C	19
Blendell, J.	25-Jan	10:45AM	Cypress B	25	Gong, S.	25-Jan	10:00AM	Cypress C	25
Bower, R.	25-Jan	11:15AM	Orange B	22	Gorzowski, E.	25-Jan	11:15AM	Citrus B	23
Brahlek, M.	24-Jan	11:45AM	Magnolia A	17	Grady, Z.M.	23-Jan	2:45PM	Citrus B	10
Braun, J.L.	23-Jan	3:00PM	Cypress C	11	Gregg, M.	25-Jan	9:30AM	Citrus B	23
Bredar, A.R.	24-Jan	12:00PM	Magnolia A	17	Grove, K.M.	25-Jan	9:45AM	Orange A	21
Brown, D.L.	23-Jan	4:30PM	Orange A	6	Guillemet-Fritsch, S.	23-Jan	4:45PM	Orange A	6
Buixaderas, E.	25-Jan	10:00AM	Magnolia B/C	24	Gulgun, M.A.	25-Jan	9:30AM	Cypress B	25
Bullard, T.	24-Jan	4:00PM	Citrus A	18	Guo, E.	23-Jan	5:15PM	Orange B	8
Burkovsky, R.	24-Jan	12:15PM	Orange B	16	Gupta, S.K.	24-Jan	12:00PM	Orange A	15
C					H				
Campanini, M.	23-Jan	4:00PM	Magnolia A	7	Hadi, A.	23-Jan	11:15AM	Orange A	6
Ceh, M.	24-Jan	10:15AM	Cypress B	14	Hagelauer, A.	24-Jan	4:30PM	Cypress C	21
Chae, S.	24-Jan	2:30PM	Orange B	16	Hagerstrom, A.	24-Jan	11:10AM	Cypress C	20
Chambers, S.	24-Jan	4:00PM	Orange B	16	Han, H.	24-Jan	4:00PM	Citrus B	17
Che, S.	24-Jan	5:15PM	Citrus A	18	Hardy, M.T.	24-Jan	2:40PM	Cypress C	20
Chen, A.	23-Jan	10:00AM	Magnolia A	7	Haugan, T.J.	25-Jan	10:00AM	Citrus A	24
Chen, A.	24-Jan	4:15PM	Citrus B	17	Hayashi, K.	25-Jan	11:30AM	Orange A	21
Chen, H.	24-Jan	4:45PM	Magnolia A	18	Hebard, A.	24-Jan	4:30PM	Orange B	16
Chen, W.	25-Jan	12:00PM	Orange A	22	Hennig, R.G.	24-Jan	10:00AM	Magnolia B/C	21
Cheng, Z.	23-Jan	2:30PM	Cypress C	11	Herrera-Pineda, N.	24-Jan	10:30AM	Cypress B	14
Chiang, Y.	24-Jan	8:40AM	Orange A	14	Hill, M.D.	25-Jan	9:00AM	Cypress C	25
Choi, B.	23-Jan	12:00PM	Orange A	6	Hirai, D.	24-Jan	5:15PM	Orange B	16
Colsmann, A.	25-Jan	3:00PM	Cypress B	25	Hlinka, J.	25-Jan	10:30AM	Citrus B	23
Comin, R.	24-Jan	11:30AM	Citrus A	18	Hoffman, J.E.	24-Jan	2:00PM	Citrus A	18
D					I				
Damjanovic, D.	23-Jan	2:00PM	Orange A	6	Holcomb, M.B.	25-Jan	8:45AM	Orange B	22
DeCoster, M.E.	24-Jan	5:00PM	Magnolia A	18	Holtz, M.E.	25-Jan	9:00AM	Orange B	22
Deluca, M.	23-Jan	2:45PM	Cypress B	5	Horibe, M.	25-Jan	9:30AM	Cypress C	25
Deluca, M.	25-Jan	11:00AM	Magnolia B/C	24	Hu, G.	23-Jan	3:15PM	Magnolia B/C	12
Deng, R.	23-Jan	11:45AM	Magnolia B/C	11	Hu, J.	23-Jan	11:15AM	Magnolia A	7
Diercks, D.R.	25-Jan	8:30AM	Cypress B	25	Hu, Y.	23-Jan	12:00PM	Citrus B	9
Dkhil, B.	24-Jan	11:30AM	Orange A	14	Huang, J.	25-Jan	8:30AM	Citrus A	23
Dolgos, M.	24-Jan	2:00PM	Magnolia B/C	19	Huddleston, W.	23-Jan	11:45AM	Citrus B	9
Dong, X.	23-Jan	4:00PM	Citrus A	9	Huey, B.	23-Jan	2:00PM	Magnolia A	7
Dong, Y.	24-Jan	2:30PM	Cypress B	20	Hussain, A.	23-Jan	5:15PM	Magnolia A	7
Donovan, B.F.	23-Jan	2:15PM	Cypress C	11	Hwang, J.	23-Jan	11:45AM	Cypress B	5
Dou, L.	24-Jan	11:45AM	Magnolia B/C	21	J				
Dreyer, C.E.	25-Jan	11:30AM	Magnolia A	23	Jalan, B.	24-Jan	10:45AM	Magnolia A	17
Drisko, J.A.	24-Jan	5:30PM	Cypress C	21	Jeen, H.	23-Jan	3:15PM	Orange B	8
Du, Y.	23-Jan	2:45PM	Orange B	8	Jin, H.	24-Jan	5:00PM	Orange B	16
E					K				
Ekerdt, J.G.	23-Jan	2:00PM	Orange B	8	Jones, C.D.	23-Jan	10:45AM	Citrus B	9
El Marssi, M.	25-Jan	9:30AM	Orange B	22	Jones, J.L.	25-Jan	10:30AM	Orange A	21
El-Hinnawy, N.	24-Jan	4:00PM	Cypress C	21	K				
Engel-Herbert, R.	23-Jan	10:00AM	Orange B	7	Kang, C.	23-Jan	4:15PM	Orange A	6
Engel-Herbert, R.	23-Jan	10:30AM	Orange B	8	Kaufmann, B.	23-Jan	10:30AM	Cypress B	5
Engel-Herbert, R.	25-Jan	12:00PM	Magnolia A	23	Kaufmann, B.	23-Jan	12:00PM	Magnolia B/C	11
F					K				
Fan, Z.	24-Jan	10:45AM	Orange A	14	Keen, D.	23-Jan	4:45PM	Cypress B	5
Farghadany, E.	23-Jan	12:15PM	Orange B	8	Kepaptsoglou, D.	25-Jan	9:00AM	Magnolia A	23
Feteira, A.	24-Jan	4:00PM	Magnolia B/C	19	Khalsa, G.	25-Jan	11:30AM	Cypress C	26
Fields, S.S.	24-Jan	11:00AM	Orange B	15	Kim, J.	24-Jan	3:00PM	Orange A	15
Fisher, I.	23-Jan	10:30AM	Citrus A	8	Klemm, R.A.	25-Jan	11:00AM	Citrus A	24

Presenting Author List

Poster Presenters

<u>Name</u>	<u>Date</u>	<u>Time</u>	<u>Room</u>	<u>Page Number</u>	<u>Name</u>	<u>Date</u>	<u>Time</u>	<u>Room</u>	<u>Page Number</u>
		O					V		
Olson, D.	23-Jan	5:30PM	Orange C/D	13	Verlinde, K.K.	23-Jan	5:30PM	Orange C/D	12
		P					W		
Pachuta, K.	23-Jan	5:30PM	Orange C/D	13	Walters, L.N.	23-Jan	5:30PM	Orange C/D	13
Phan, B.	23-Jan	5:30PM	Orange C/D	13	Wang, H.	23-Jan	5:30PM	Orange C/D	13
		R			Wang, Q.	23-Jan	5:30PM	Orange C/D	13
Rowe, T.	23-Jan	5:30PM	Orange C/D	13	Wang, Y.	23-Jan	5:30PM	Orange C/D	13
		S					Z		
Shi, X.	23-Jan	5:30PM	Orange C/D	12	Zanca, B.	23-Jan	5:30PM	Orange C/D	13
Skinner, P.	23-Jan	5:30PM	Orange C/D	13	Zhao, J.	23-Jan	5:30PM	Orange C/D	12
		T							
Toledo, R.P.	23-Jan	5:30PM	Orange C/D	12					
Tong, J.	23-Jan	5:30PM	Orange C/D	13					

Wednesday, January 23, 2019

Plenary Session I

Room: Orange A

Session Chair: Jon Ihlefeld, University of Virginia

8:30 AM

Introduction

8:40 AM

(EMA-PLEN- 001-2019) Electroceramic Thin Films for IR Plasmonic Applications

J. Maria*¹

1. Pennsylvania State University, Department of Materials Science and Engineering, USA

9:30 AM

Break

S1: Characterization of Structure–Property Relationships in Functional Ceramics

Imaging and Analytical Techniques I

Room: Cypress B

Session Chairs: David McComb, The Ohio State University; Arno Merkle, XRE

10:00 AM

(EMA-S1-001-2019) Supersonic Propagation of Atomic Motion by Phonons in Fresnoite (Invited)

M. E. Manley*¹

1. Oak Ridge National Lab, Materials Science and Technology Division, USA

10:30 AM

(EMA-S1-002-2019) Microscale electrical characterization and current path detection in ZnO varistor ceramics

B. Kaufmann*¹

1. Montan University Leoben, Institut für Struktur- und Funktionskeramik, Austria

10:45 AM

(EMA-S1-003-2019) Property-Thickness Dependencies for Dielectric and Dielectric/Piezoelectric Multilayer Thin Films

T. Moran*¹; K. Suzuki²; J. Steffes¹; S. Matonis¹; T. Hosokura²; T. Okamoto²; K. Murayama²; N. Tanaka²; B. Huey¹

1. University of Connecticut, Institute of Material Science, USA
2. MuRata Manufacturing Co., Ltd., Japan

11:00 AM

(EMA-S1-004-2019) 3D modelling of ferroelectric composite using X-ray micro tomography images: Effective permittivity and tunability (Invited)

D. Bernard*¹; C. Elissalde¹; C. Estournes²; J. Lesseur¹; E. Plougouven¹; M. Maglione¹

1. ICMCB-CNRS, France
2. CIRIMAT, LCMIE, France

11:30 AM

(EMA-S1-005-2019) Characterizing defective 2-D oxides via operando X-ray total scattering: Links to pseudocapacitance

S. T. Mixture*¹; P. Metz¹; R. Koch¹; P. Gao¹; M. Flint¹; A. Ladonis¹

1. Alfred University, MSE, USA

11:45 AM

(EMA-S1-006-2019) Correlating structure and properties of amorphous functional ceramics using 4-dimensional scanning transmission electron microscopy (Invited)

J. Hwang*¹; M. Abbasi¹; R. Sakidja²; N. Oyler⁴; M. Paquette³; P. Rulis³

1. Ohio State University, MATERIALS SCIENCE AND ENGINEING, USA
2. Missouri State University, Physics, Astronomy and Materials Science, USA
3. University of Missouri - Kansas City, Physics and Astronomy, USA
4. University of Missouri, Kansas City, Chemistry, USA

Imaging and Analytical Techniques II

Room: Cypress B

Session Chairs: Julian Walker, Norwegian University of Science and Technology; Abhijit Pramanick, City University of Hong Kong

2:00 PM

(EMA-S1-007-2019) Revealing Switching Character in Ferroelectric Thin Films: Insights from Multidimensional Spectroscopy and Deep Learning (Invited)

L. W. Martin*¹

1. University of California, Berkeley, Materials Science and Engineering, USA

2:30 PM

(EMA-S1-008-2019) Effect of lithium stoichiometry on acoustic phonon modes in LiTaO₃

J. Ivy*¹; A. Pramanick²; G. L. Brennecke¹

1. Colorado School of Mines, Metallurgical and Materials Engineering, USA
2. City University of Hong Kong, Materials Science and Engineering, Hong Kong

2:45 PM

(EMA-S1-009-2019) Raman spectroscopy of functional ceramics (Invited)

M. Deluca*¹

1. Materials Center Leoben Forschung GmbH, Austria

3:15 PM

(EMA-S1-010-2019) Design of new Pb-free relaxors based on physicochemical effects of various atomic substitutions

A. Pramanick*¹

1. City University of Hong Kong, Applied Physics and Materials Science, Hong Kong

3:30 PM

Break

4:00 PM

(EMA-S1-011-2019) Structure characterization of antiferroelectrics and relaxors (Invited)

X. Tan*¹

1. Iowa State Univ, Mater. Sci. & Eng., USA

4:30 PM

(EMA-S1-012-2019) Reconstructing potential profile and band bending in functional heterojunctions: Examples of SrTiO₃/Ge(001) and SrTiO₃/Si(001) epitaxial films

P. Sushko*¹; N. F. Quackenbush²; J. C. Woicik²; Z. Lim²; J. H. Ngai³; S. Chambers¹

1. Pacific Northwest National Laboratory, Physical Sciences Division, Physical & Computational Sciences Directorate, USA
2. National Institute of Standards and Technology, Materials Measurement Science Division, Material Measurement Laboratory, USA
3. University of Texas-Arlington, Department of Physics, USA

4:45 PM

(EMA-S1-013-2019) Refining the local structure of functional materials using synchrotron X-ray and spallation neutron total scattering/pair distribution functions (Invited)

D. Keen*¹

1. Rutherford Appleton Laboratory, ISIS Facility, United Kingdom

S2: Advanced Electronic Materials: Processing Structures, Properties, and Applications

Advanced Electronic Materials: Processing

Room: Orange A

Session Chairs: Kui Yao, Institute of Materials Research and Engineering, A*STAR; Susan Trolrier-McKinstry, Pennsylvania State University

10:00 AM

(EMA-S2-001-2019) Cold Sintering of PZT Ceramics (Invited)

D. Wang¹; H. Guo²; C. Morandi¹; C. Randall¹; S. Trolrier-McKinstry*¹

1. Pennsylvania State University, Materials Science and Engineering, USA
2. Pennsylvania State University, Materials Research Institute, USA

10:30 AM**(EMA-S2-002-2019) Densification and electrical properties of thermodynamically metastable SnO prepared by the cold sintering process**S. Bang^{*1}; T. De Beauvoir¹; C. Randall¹

1. Pennsylvania State University, Materials Research Institute, USA

10:45 AM**(EMA-S2-003-2019) Quantifying Cold Sintering**R. Floyd^{*1}; S. Lowum²; J. Maria²

1. North Carolina State University, USA
2. Pennsylvania State University, USA

11:00 AM**(EMA-S2-004-2019) Investigating Cold Sintering Mechanisms and Resulting Properties**S. Lowum^{*1}; R. Floyd²; R. Bermejo³; J. Maria¹

1. Pennsylvania State University, Materials Science and Engineering, USA
2. North Carolina State University, Materials Science and Engineering, USA
3. Montanuniversitaet Leoben, Institut fuer Struktur- und Funktionskeramik, Austria

11:15 AM**(EMA-S2-005-2019) Thermopower Determination using Pyrolytic Graphite and Aluminum Thermocouple**A. Hadi^{*1}; B. Hill²

1. Montana Technological University, Materials Science and Engineering Department, USA
2. Montana Technological University, Electrical Engineering Department, USA

11:30 AM**(EMA-S2-006-2019) Structure and properties of lead-free piezoelectric ceramic coatings derived from thermal spray process (Invited)**K. Yao^{*1}; S. Chen¹; K. Guo¹; S. Tan¹; S. Liew¹; C. Tan¹; F. Tay²

1. Institute of Materials Research and Engineering, A*STAR (Agency for Science, Technology and Research), Singapore
2. National University of Singapore, Department of Mechanical Engineering, Singapore

12:00 PM**(EMA-S2-007-2019) IR transparent ZnS ceramics sintered by VHP method using hydrothermally synthesized ZnS powders**B. Choi^{*1}; S. Nahm¹

1. Korea University, Advanced Materials Engineering, Republic of Korea

12:15 PM**(EMA-S2-008-2019) Synthesis, Photoluminescence and Photocatalytic Characteristics of Nanocomposites of Reduced Graphene Oxide-Nanoparticles**A. Nemati^{*1}; E. Nemati²

1. Sharif University of Technology, Tehran, Iran, Department of Materials Science & Engineering, Islamic Republic of Iran
2. Ecole de Technologie Superieure, Department of Mechanical Engineering, Canada

Advanced Electronic Materials: Material Design

Room: Orange A

Session Chair: Ichiro Fujii, University of Yamanashi

2:00 PM**(EMA-S2-009-2019) Large electrically and optically induced strain in single crystals of methylammonium lead bromide and chloride hybrid perovskites (Invited)**L. M. Riemer¹; B. Lim²; E. Horvath³; L. Forro³; D. Damjanovic^{*1}

1. Swiss Federal Institute of Technology in Lausanne - EPFL, Group for Ferroelectrics and Functional Oxides, Switzerland
2. National University of Singapore, Singapore
3. Swiss Federal Institute of Technology in Lausanne - EPFL, Laboratory of Nanostructures and Novel Electronic Materials, Switzerland

2:30 PM**(EMA-S2-010-2019) Water Printing of Ferroelectric Polarization (Invited)**J. Zhang^{*1}

1. Beijing Normal University, China

3:00 PM**(EMA-S2-011-2019) Search for the nitride perovskite LaWN₃, from prediction to characterization**K. R. Talley^{*1}; J. Mangum¹; C. Perkins²; R. Woods-Robinson²; A. Mehta³; G. L. Brennecke¹; A. Zakutayev²

1. Colorado School of Mines, Metallurgical Materials and Engineering, USA
2. National Renewable Energy Laboratory, USA
3. SLAC National Accelerator Laboratory, USA

3:15 PM**(EMA-S2-012-2019) Strain and polarization dynamics of relaxor-ferroelectrics from cryogenic to ambient temperatures**L. M. Riemer^{*1}; I. Gaponenko²; D. Damjanovic¹

1. Group for Ferroelectrics and Functional Oxides, Swiss Federal Institute, Switzerland
2. Department of Quantum Matter Physics, University of Geneva, Switzerland

3:30 PM**Break****Advanced Electronic Materials: Property I**

Room: Orange A

Session Chair: Soonil Lee, Changwon National University

4:00 PM**(EMA-S2-013-2019) Leveraging Momentum for Increased Tuning of Phonon-Polariton Metasurfaces**T. E. Beechem^{*1}; C. Saltonsall¹; J. Valentine²; T. Gilbert²; J. Matson²; F. Ugwu²; J. Caldwell²

1. Sandia National Laboratories, Optical Sciences, USA
2. Vanderbilt University, USA

4:15 PM**(EMA-S2-014-2019) High-performance Nanostructured Metal Oxide Gas Sensors using a Morphological Evolution**C. Kang^{*1}; Y. Song¹; S. Yi¹; G. Kim¹

1. Korea Institute of Science and Technology, Center for Electronic Materials, Republic of Korea

4:30 PM**(EMA-S2-015-2019) Stability of Epitaxial Pseudocubic Group IV-V Semiconductors**D. L. Brown^{*1}; S. R. Phillpot¹; K. Jones¹

1. University of Florida, Material Science and Engineering, USA

4:45 PM**(EMA-S2-016-2019) Electrically conductive AlN by incorporation of graphene nanoplatelets**D. Kenfau²; S. Guillemet-Fritsch^{*1}; P. Dufour³; C. Tenailleau³; M. Locatelli²; V. Bley²; L. Laudebat²; Z. Valdez-Nava²

1. CNRS CIRIMAT, Material Science, France
2. LAPLACE, Electrical Engineering, France
3. University de Toulouse, Material Science, France

5:00 PM**(EMA-S2-017-2019) A comparison of photoelectric property of Titania, Ce-doped Titania and TiO₂-CeO₂ nanocomposite**A. Nemati^{*1}; N. Ahmadi²; M. Bagherzade²

1. Sharif University of Technology, Tehran, Iran, Department of Materials Science & Engineering, Islamic Republic of Iran
2. IAU, Department of Materials Engineering, Islamic Republic of Iran

S3: Frontiers in Ferroic Oxides: Synthesis, Structure, Properties, and Applications

Magnetic, Magnetoelectric, and Multiferroic Phenomena

Room: Magnolia A

Session Chairs: John Heron, University of Michigan; Morgan Trassin, ETH Zurich

10:00 AM

(EMA-S3-001-2019) Connecting Anomalous Exchange Bias with Hidden Interface in Oxide Heterostructures

A. Chen*¹

1. Los Alamos National Lab, USA

10:15 AM

(EMA-S3-002-2019) Magnetic Properties of Ferroic Oxide Materials Integrated on Si (100) Substrates (Invited)

S. Singamaneni*¹

1. The University of Texas at El Paso, Physics, USA

10:45 AM

(EMA-S3-003-2019) Ultralow energy electric field control of magnetism (Invited)

B. Prasad*¹; Y. Huang¹; S. Manipatruni²; T. Gosavi²; C. Lin²; D. Nikonov²; I. Young²; R. Ramesh¹

1. University of California Berkeley, Materials Science and Engineering, USA
2. Intel Corp., Exploratory Integrated Circuits, Components Research, USA

11:15 AM

(EMA-S3-004-2019) Strain-mediated Voltage Control of Magnetic Skyrmions: Phase-field Simulation and Analytical Model (Invited)

J. Hu*¹

1. University of Wisconsin-Madison, Materials Science and Engineering, USA

11:45 AM

Break

Domains, Domain Walls, and Topological structures

Room: Magnolia A

Session Chairs: Morgan Trassin, ETH Zurich; John Heron, University of Michigan

2:00 PM

(EMA-S3-005-2019) Nanoscale Ferroelectric Domain Evolution in BiFeO₃

J. Steffes¹; R. Cordier¹; M. Martin¹; T. Moran¹; S. Matonis¹; K. Atamanuk¹; A. Chen²; Y. Huang³; B. Prasad⁴; R. Ramesh³; B. Huey*¹

1. University of Connecticut, Materials Science & Engineering, USA
2. Los Alamos National Lab, USA
3. UC Berkeley, Materials Science and Engineering, USA
4. University of California Berkeley, Materials Science and Engineering, USA

2:15 PM

(EMA-S3-006-2019) Interconversion of domains and domain walls (Invited)

M. C. Weber*¹; E. Hassanpour¹; A. Bortis¹; Y. Tokunaga²; Y. Taguchi³; Y. Tokura³; A. Cano⁴; T. Lottermoser¹; M. Fiebig¹

1. ETH Zurich, Department of Materials, Switzerland
2. University of Tokyo, Department of Advanced Materials Science, Japan
3. RIKEN Center for Emergent Matter Science CEMS, Japan
4. Institut NEEL, MCBT, France

2:45 PM

(EMA-S3-007-2019) Topological structures as nanoscale functional elements (Invited)

J. Seidel*¹

1. University of New South Wales, Australia

3:15 PM

(EMA-S3-008-2019) Design of ferroelectric polarization states during epitaxial growth

N. Strkalj*¹; G. De Luca¹; S. Pal¹; M. Campanini²; M. Rossell²; M. Fiebig¹; M. Trassin¹

1. ETH Zurich, Switzerland
2. EMPA, Switzerland

3:30 PM

Break

Ferroelectric films and ceramics: Domain States, Switching, and Applications

Room: Magnolia A

Session Chairs: Morgan Trassin, ETH Zurich; Jinxing Zhang, Beijing Normal University

4:00 PM

(EMA-S3-009-2019) Direct Imaging of Polarization Gradients by Atomic Resolution Differential-Phase Contrast STEM (Invited)

M. Campanini*¹; M. Rossell¹; J. Nordlander²; M. Trassin²; C. Yang³; R. Ramesh⁴; M. Fiebig²; R. Erni¹

1. Empa, Swiss Federal Laboratories for Materials Science and Technology, Electron Microscopy Center, Switzerland
2. ETH Zurich, Department of Materials, Switzerland
3. Korea Advanced Institute of Science and Engineering (KAIST), Department of Physics, Republic of Korea
4. Lawrence Berkeley National Laboratory, Materials Sciences Division, USA

4:30 PM

(EMA-S3-010-2019) Functionalized ferroic coatings on metallic medical implants

P. Vilarinho*¹; S. Zlotnik¹; M. Maltez da Costa¹; M. Fernandes¹

1. University of Aveiro, Department of Materials and Ceramics, Portugal

4:45 PM

(EMA-S3-011-2019) Grain-grain interaction effect on ferroelastic switching in polycrystalline ferroelectric thin films

K. Yazawa*¹; J. Blendell¹

1. Purdue University, School of Materials Engineering, USA

5:00 PM

(EMA-S3-012-2019) Enhanced Energy Storage in Sn-doped BZT-BCT Thin Films

R. Yuan*¹; D. Xue²; T. Lookman¹; A. Chen¹

1. Los Alamos National Lab, USA
2. Xi'an Jiaotong University, China

5:15 PM

(EMA-S3-013-2019) Ferroelectric Na_{0.52}K_{0.44}Li_{0.04}Nb_{0.84}Ta_{0.10}Sb_{0.06}O₃ ceramic: Giant piezoelectric response with intrinsic polarization and resistive leakage analyses

A. Hussain*¹; B. Kumar¹

1. University of Delhi, Department of Physics and Astrophysics, India

S4: Complex Oxide Thin Film Materials

Discovery: From Synthesis to Strain/Interface Engineered Emergent Properties

Controlled Synthesis I

Room: Orange B

Session Chairs: Elizabeth Paisley, Sandia National Laboratories; Megan Holtz, Cornell University

10:00 AM

(EMA-S4-001-2019) Pushing the frontiers of complex oxide thin film growth (Pioneer talk) (Invited)

R. Engel-Herbert*¹

1. The Pennsylvania State University, Materials Science and Engineering, USA

10:30 AM**(EMA-S4-002-2019) Utilizing self-regulated growth windows in vanadate thin films**J. Lapano¹; M. Brahlek²; J. Roth¹; T. Kuznetsova¹; R. Engel-Herbert^{*1}

1. The Pennsylvania State University, Materials Science and Engineering, USA
2. Oak Ridge National Lab, USA

10:45 AM**(EMA-S4-003-2019) Novel Functionalities in Atomically Controlled Oxide Heterostructures by Pulsed Laser Deposition (Pioneer talk) (Invited)**G. Rijnders^{*1}

1. University of Twente, MESA+ Institute, Netherlands

11:15 AM**(EMA-S4-004-2019) Charge transfer at the LaCoO₃-LaTiO₃ interface**J. Geessinck^{*1}; G. Koster¹; G. Rijnders¹

1. University of Twente, Faculty of Science and Technology, Netherlands

11:30 AM**(EMA-S4-005-2019) Ab initio thermodynamics of complex surface oxides under controlled growth conditions (Pioneer talk) (Invited)**A. Soon^{*1}

1. Yonsei University, Materials Science and Engineering, Republic of Korea

12:00 PM**(EMA-S4-006-2019) Expiscating the accurate atomic structure of complex surface oxides on Cu(111): A first-principles investigation**Y. Lee^{*1}; T. Lee¹; A. Soon¹

1. Yonsei University, Materials Science & Engineering, Republic of Korea

12:15 PM**(EMA-S4-007-2019) Epitaxial (Li,La)TiO₃ thin films by means of Pulsed Laser Deposition**E. Farghadany^{*1}; n. Bagués Salguero²; R. E. Williams²; D. W. McComb²; A. Sehirlioglu¹

1. Case Western Reserve University, Materials Science and Engineering, USA
2. Center for Electron Microscopy and Analysis (CEMAS), USA

Controlled Synthesis II

Room: Orange B

Session Chairs: Roman Engel-Herbert, The Pennsylvania State University; Uwe Schroeder, Namlab gGmbH

2:00 PM**(EMA-S4-008-2019) Ferroelectric Barium Titanate and Barium Strontium Titanate Thin Films (Invited)**E. L. Lin¹; B. I. Edmondson¹; J. G. Ekerdt^{*1}

1. University of Texas at Austin, Chemical Engineering, USA

2:30 PM**(EMA-S4-009-2019) Interfacial Oxygen Defect Engineering in Binary Oxide Heterostructures**Q. Lu^{*1}; D. Lee²; C. Sohn¹; L. Sun³; G. Hu⁴; P. Ganesh⁴; B. Yildiz³; H. Lee¹

1. Oak Ridge National Laboratory, Materials Science and Technology Division, USA
2. University of South Carolina, Department of Mechanical Engineering, USA
3. Massachusetts Institute of Technology, Department of Nuclear Science and Engineering, USA
4. Oak Ridge National Lab, Center for Nanophase Materials and Sciences, USA

2:45 PM**(EMA-S4-010-2019) Defect chemistry in SrFeO_{3-δ}**Y. Du^{*1}

1. PNNL, USA

3:00 PM**(EMA-S4-011-2019) Topotactic synthesis and properties of epitaxial SrMnO_{3-δ}F_y oxyfluoride films**J. Wang^{*1}; Y. Shin²; E. Arenholz²; J. Rondinelli²; S. May¹

1. Drexel University, Materials Science and Engineering, USA
2. Northwestern University, Department of Materials Science and Engineering, USA
3. Lawrence Berkeley National Laboratory, Advanced Light Source, USA

3:15 PM**(EMA-S4-012-2019) A facile path for electron transport in NbO₂**G. Kim²; Y. Zhang²; T. Min¹; H. Suh⁴; J. Jang⁴; H. Kong¹; J. Lee¹; J. Lee¹; T. Jeon⁵; I. Lee⁶; J. Cho⁷; H. Ohta³; H. Jeen^{*1}

1. Pusan National University, Department of Physics, Republic of Korea
2. Hokkaido University, Graduate School of Information Science and Technology, Japan
3. Hokkaido University, Research Institute for Electronic Science, Japan
4. Korea Basic Science Institute, Republic of Korea
5. Pohang Accelerator Laboratory, Republic of Korea
6. Pusan National University, Department of Naval Architecture and Ocean Engineering, Republic of Korea
7. Pusan National University, Department of Physics Education, Republic of Korea

3:30 PM**Break****Advanced Characterization of Oxide Heterostructures**

Room: Orange B

Session Chairs: Scott Chambers, Pacific Northwest National Laboratory; Peter Meisenheimer, University of Michigan

4:00 PM**(EMA-S4-013-2019) Non-equilibrium Manipulation of Phases in Complex Oxide Heterostructures (Invited)**J. Freeland^{*1}

1. Argonne National Laboratory, USA

4:30 PM**(EMA-S4-014-2019) Probing structure-property relationships in complex oxides using X-ray diffraction imaging and scanning probe microscopies**Q. Li^{*1}; H. Wen¹

1. Argonne National Laboratory, Advanced Photon Source, USA

4:45 PM**(EMA-S4-015-2019) Probing electronic and Magnetic Interactions at Complex Oxide Interfaces (Invited)**D. P. Kumah^{*1}

1. North Carolina State University, Physics, USA

5:15 PM**(EMA-S4-016-2019) Competing spin-orbital entanglement in ferroelastic heterostructures**E. Guo^{*1}

1. Institute of Physics, Chinese Academy of Sciences, China

S7: Superconducting and Magnetic Materials: From Basic Science to Applications**Superconducting and Magnetic Materials I**

Room: Citrus A

Session Chair: Gang Wang, Institute of Physics, Chinese Academy of Sciences

10:00 AM**(EMA-S7-001-2019) Quasi-one-dimensional topological insulators and superconductors: Bi₂X₄ (X=I,Br) (Invited)**F. Zhang^{*1}

1. University of Texas at Dallas, Department of Physics, USA

10:30 AM**(EMA-S7-002-2019) Nematicity and superconductivity: New methods and new materials to study the effects of nematic quantum criticality (Invited)**I. Fisher^{*1}

1. Stanford University, Applied Physics, USA

11:00 AM

(EMA-S7-003-2019) Discovery of a novel spin-triplet superconductor in a uranium based compound (Invited)S. Ran*¹; C. Eckberg²; T. Metz²; S. Saha²; I. Liu²; J. Paglione²; N. Butch¹

1. NIST, Center for Neutron Research, USA
2. University of Maryland, Center for Nanophysics and Advanced Materials, Department of Physics, USA

11:30 AM

(EMA-S7-004-2019) The melilite-type room temperature ferromagnetic semiconductor candidate (Invited)H. Yang¹; B. Gong¹; K. Liu*¹; Z. Lu¹

1. Renmin University of China, Department of Physics, China

12:00 PM

(EMA-S7-005-2019) Magnetic Skyrmion Nanodomains in Centrosymmetric Magnets (Invited)W. Wang*¹

1. Institute of Physics, China

Superconducting and Magnetic Materials II

Room: Citrus A

Session Chair: Timothy Haugan, U.S. Air Force Research Laboratory

2:00 PM

(EMA-S7-006-2019) Orbital Origin of Extremely Anisotropic Superconducting Gap in Nematic Phase of FeSe Superconductor (Invited)X. Zhou*¹

1. National Lab for Superconductivity, Institute of Physics, China

2:30 PM

(EMA-S7-007-2019) Synthesis and study of novel superconducting materials (Invited)B. Lv*¹

1. The University of Texas at Dallas, Department of Physics, USA

3:00 PM

(EMA-S7-008-2019) Structural Domains and Intrinsic Pinning in Ni-substituted Ba(Fe_{1-x}Ni_x)₂As₂M. Susner*¹; S. Chong²; T. J. Haugan³

1. Air Force Research Laboratory, USA
2. Victoria University of Wellington, New Zealand
3. U.S. Air Force Research Laboratory, AFRL/RQMQ, USA

3:15 PM

(EMA-S7-009-2019) Phase diagram of Rb-intercalated NbSe₂ synthesized by solid-state reactionX. Fan¹; H. Chen¹; S. Jin¹; G. Wang*¹; X. Chen¹

1. Institute of Physics, Chinese Academy of Sciences, China

3:30 PM

Break

Superconducting and Magnetic Materials III

Room: Citrus A

Session Chair: Ian Fisher, Stanford University

4:00 PM

(EMA-S7-010-2019) Single crystals and films of (Li,Fe)OHFeSe superconductors: Electronic phase separation and exotic charge transport (Invited)X. Dong*¹

1. Institute of Physics, CAS, China

4:30 PM

(EMA-S7-011-2019) Frustrated ordering instabilities and superconductivity in quasi-one-dimensional K₂Cr₃As₃ (Invited)K. M. Taddei*¹; G. Xing⁴; j. Sun⁴; Y. Fu⁴; Y. Li⁴; Q. Zheng²; A. Sefat²; D. J. Singh⁴; C. de la Cruz¹

1. Oak Ridge National Laboratory, Neutron Scattering Division, USA
2. Oak Ridge National Lab, Materials Science and Technology Division, USA
3. Oak Ridge National Laboratory, USA
4. University of Missouri, Columbia, Physics and Astronomy, USA

S9: Ion-Conducting Ceramics**Lithium Ion Batteries**

Room: Citrus B

Session Chairs: Yingge Du, PNNL; Erik Spøerke, Sandia National Laboratories

10:00 AM

(EMA-S9-001-2019) Using in-situ and operando methods to characterize phase changes in charged lithium nickel cobalt aluminum oxide cathode materials (Invited)E. A. Stach*¹; S. Hwang²; K. Karki³; S. Kim⁴; W. Chang¹; G. Zhuo⁵; M. Whittingham⁶; Q. Yang⁶

1. University of Pennsylvania, Department of Materials Science and Engineering, USA
2. Brookhaven National Laboratory, Center for Functional Nanomaterials, USA
3. Hummingbird Scientific, USA
4. Korea Institute of Science and Technology, Republic of Korea
5. Binghamton University, USA
6. Brookhaven National Laboratory, USA

10:30 AM

(EMA-S9-002-2019) Lithium ion diffusion during the growth induced the new materials discoveryL. Wang*¹; Z. Yang¹; M. Bowden²; S. Chambers¹; Y. Du¹

1. Pacific Northwest National Laboratory, Physical and Computational Sciences Directorate, USA
2. Pacific Northwest National Laboratory, Environmental Molecular Sciences Laboratory, USA

10:45 AM

(EMA-S9-003-2019) Defect generation in TiO₂ nanotube anodes via heat treatment in various atmospheres for lithium-ion batteriesA. I. Savva¹; K. A. Smith¹; M. Lawson¹; C. D. Jones*¹; S. R. Croft¹; A. E. Weltner¹; P. J. Simmonds¹; L. Li¹; H. Xiong¹

1. Boise State University, Material Science and Engineering, USA

11:00 AM

(EMA-S9-004-2019) Atomic-to-mesoscale mechanism of ion conductivity in nanostructured metal oxide and carbon materials (Invited)M. Sushko*¹

1. Pacific Northwest National Laboratory, USA

11:30 AM

(EMA-S9-005-2019) Cold Sintering Process for Development of All-Solid-State Li BatteriesJ. Seo*¹; E. Gomez²; T. Mallouk³; C. Randall¹

1. The Pennsylvania State University, Materials Science and Engineering, USA
2. The Pennsylvania State University, Chemical Engineering, USA
3. The Pennsylvania State University, Chemistry, USA

11:45 AM

(EMA-S9-006-2019) Li₄Ti₅O₁₂-Li_{0.45}La_{0.52}TiO₃-Ni all-solid-state lithium-ion battery anode compositesW. Huddleston*¹; F. Dynys²; A. Sehrliglu¹

1. Case Western Reserve University, Department of Materials Science and Engineering, USA
2. NASA Glenn Research Center, USA

12:00 PM

(EMA-S9-007-2019) Defects/Disorder-Mediated Fast Ion Conduction in Ceramics (Invited)Y. Hu*¹

1. Florida State University, Chemistry & Biochemistry, USA

Cation Conducting Ceramics for Energy Storage

Room: Citrus B

Session Chairs: Hui Xiong, Boise State University; Yan-Yan Hu, Florida State University

2:00 PM**(EMA-S9-008-2019) Ion conducting quantum materials (Invited)**S. Ramanathan*¹

1. Purdue University, MSE, USA

2:30 PM**(EMA-S9-009-2019) Rethinking Solid State Sodium Ion Conductors for Low Temperature Batteries**E. Spörke*¹; A. Peretti¹; S. Percival¹; J. A. Bock¹; H. J. Brown-Shaklee¹; L. Small¹

1. Sandia National Laboratories, USA

2:45 PM**(EMA-S9-010-2019) Low temperature processing of sodium ion battery electrodes and electrolytes via the Cold Sintering Process**Z. M. Grady*¹; T. De Beauvoir¹; A. Ndayishimiye¹; J. Seo¹; C. Randall¹

1. The Pennsylvania State University, Materials Science and Engineering, USA

3:00 PM**(EMA-S9-011-2019) Computing the Anisotropic Chemical Strain in Non-Stoichiometric Oxides for Solid Oxide Fuel Cell and Li-ion Battery Applications (Invited)**Y. Qi*¹

1. Michigan State University, Department of Chemical Engineering and Materials Science, USA

3:30 PM**Break****4:00 PM****(EMA-S9-012-2019) Magnesium and mobility: An investigation of defects and Mg mobility in spinel oxides**S. Lapidus*¹; R. Bayliss²; B. Key³; J. Cabana²

1. Argonne National Lab, X-Ray Science Division, USA
2. University of Illinois, Chicago, USA
3. Argonne National Lab, USA

4:15 PM**(EMA-S9-013-2019) Morphological and Chemical Changes Associated with the Precipitation of Cobalt Oxide Nanosheets Using Various Cations**K. Pachuta*¹; E. Pentzer²; M. Berger²; A. Wu³; A. Sehrliglu¹

1. Case Western Reserve University, Materials Science and Engineering, USA
2. Case Western Reserve University, Chemistry, USA
3. Mines Paris Tech, France

4:30 PM**(EMA-S9-014-2019) High-quality tungsten oxide epitaxial film and its neuromorphic application (Invited)**C. Ge*¹

1. Institute of Physics, Chinese Academy of Sciences, China

5:00 PM**(EMA-S9-015-2019) Development of Solid Oxide Reversible Fuel Cells for energy storage systems applications**J. Ahn*¹; Y. Choi¹; S. Woo²; S. Kim²; T. Kim²

1. Research Institute of Industrial Science and Technology, Republic of Korea
2. Korea Institute of Energy Research, Republic of Korea

5:15 PM**(EMA-S9-016-2019) 3D nm-thick membrane for ultrafast selective mass transportation**S. Liang¹; T. Wang²; Z. Qi¹; M. Biener¹; M. Worsley¹; T. Braun¹; Y. Wang¹; J. Biener¹; T. Baumann¹; S. Kim²; J. Ye*¹

1. Lawrence Livermore National Laboratory, USA
2. University of Illinois at Chicago, USA

S12: Thermal Transport in Functional Materials and Devices**Nano-HX: Fundamentals & Applications I**

Room: Cypress C

Session Chairs: Brian Donovan, United States Naval Academy; Brian Foley, Georgia Institute of Technology

10:00 AM**(EMA-S12-001-2019) Phonon thermal transport: Reconciling predictions with reality (Invited)**L. Lindsay*¹

1. Oak Ridge National Laboratory, Materials Science and Technology Division, USA

10:30 AM**(EMA-S12-002-2019) High thermal conductivity in the cubic BAs crystals**S. Li¹; Q. Zheng²; Y. Lv²; X. Liu¹; C. Li³; X. Wang¹; P. Y. Huang²; D. A. Broido³; D. G. Cahill²; B. Lv*¹

1. University of Texas at Dallas, Department of Physics, USA
2. University of Illinois at Urbana-Champaign, Department of Materials Science & Engineering and Materials Research Laboratory, USA
3. Boston College, Department of Physics, USA

10:45 AM**(EMA-S12-003-2019) Electrical and Thermal Analysis of Vertical GaN-on-GaN PN Diodes**L. Yates*¹; S. Usami²; G. Pavlidis¹; K. Nagamatsu²; Y. Honda²; H. Amano²; S. Graham¹

1. Georgia Institute of Technology, Mechanical Engineering, USA
2. Nagoya University, Japan

11:00 AM**(EMA-S12-004-2019) Thermal boundary conductance across heteroepitaxial ZnO/GaN interfaces: Experimental assessment of the phonon gas model**J. Gaskins*¹; G. N. Kotsonis⁶; A. Giri³; E. Sachet³; C. T. Shelton¹; S. Ju⁷; A. Rohkopf⁸; Y. Wang⁹; T. Bai²; Z. Liu¹⁰; Z. Cheng²; B. M. Foley⁵; S. Graham²; T. Luo¹⁰; A. Henry²; M. Gorsky⁹; J. Shiomi⁷; J. Maria⁴; P. E. Hopkins¹

1. University of Virginia, Mechanical and Aerospace Engineering, USA
2. Georgia Institute of Technology, Mechanical Engineering, USA
3. North Carolina State University, MSE, USA
4. North Carolina State University, USA
5. University of Virginia, USA
6. Pennsylvania State University, USA
7. The University of Tokyo, Japan
8. Massachusetts Institute of Technology, USA
9. University of California, Los Angeles, USA
10. University of Notre Dame, USA

11:15 AM**(EMA-S12-005-2019) Interfacial defect vibrations enhance thermal transport in amorphous multilayers with ultrahigh thermal boundary conductance**A. Giri*¹; S. King³; A. Henry⁴; P. E. Hopkins²; J. Gaskins²

1. University of Virginia, USA
2. University of Virginia, Mechanical and Aerospace Engineering, USA
3. Intel Corporation, USA
4. Massachusetts Institute of Technology, Mechanical Engineering, USA

11:30 AM**(EMA-S12-006-2019) The Importance of Optical Like Phonons in Disordered Solids**H. Seyf*¹; A. Henry²

1. Georgia Institute of Technology, George W. Woodruff School of Mechanical Engineering, USA
2. Massachusetts Institute of Technology, Department of Mechanical Engineering, USA

Nano-HX: Fundamentals & Applications II

Room: Cypress C

Session Chairs: Brian Foley, Georgia Institute of Technology; Brian Donovan, United States Naval Academy

2:15 PM**(EMA-S12-007-2019) Probing Hot Electron Relaxation in Transparent Conducting Oxides**B. F. Donovan^{*}; R. Warzoha¹; A. Giri²; R. Basu¹

1. United States Naval Academy, USA
2. University of Virginia, Mech Engineering, USA

2:30 PM**(EMA-S12-008-2019) Electrical, Thermal and Contact Properties of VO₂ Thin Films during Metal-Insulator Transition**Z. Cheng^{*}; Z. Zhu¹; B. M. Foley¹; S. T. White²; R. F. Haglund²; S. Graham¹

1. Georgia Institute of Technology, Department of Mechanical Engineering, USA
2. Vanderbilt University, USA

2:45 PM**(EMA-S12-009-2019) Thermal properties of thin Nb₂O₅ determined by thermoreflectance method**L. Mitterhuber^{*}; E. Kraker¹; K. Fladischer¹; S. Defregger¹

1. Materials Center Leoben Forschungs GmbH, Microelectronics, Austria

3:00 PM**(EMA-S12-010-2019) Thermal Conductivity Mapping of High Entropy Carbides and Diborides**J. L. Braun^{*}; C. M. Rost¹; J. Gild²; T. Harrington²; D. Olson¹; J. Luo²; K. Vecchio²; P. E. Hopkins¹

1. University of Virginia, Mechanical and Aerospace Engineering, USA
2. University of California, San Diego, Materials Science and Engineering, USA

3:15 PM**(EMA-S12-011-2019) Rethinking phonons in random alloys**H. Seyf^{*}; A. Henry²

1. Georgia Institute of Technology, George W. Woodruff School of Mechanical Engineering, USA
2. Massachusetts Institute of Technology, Department of Mechanical Engineering, USA

3:30 PM**Break****Tunable Thermal Properties**

Room: Cypress C

Session Chairs: Brian Foley, Georgia Institute of Technology; Brian Donovan, United States Naval Academy

4:00 PM**(EMA-S12-012-2019) Tunable thermal conductivity of π -conjugated two-dimensional polymers**H. Ma¹; E. O'Donnel²; Z. Tian^{*}

1. Cornell University, Mechanical and Aerospace Engineering, USA
2. Virginia Tech, USA

4:15 PM**(EMA-S12-013-2019) Thermal transport and variable thermal conductivity of antiferroelectric lead zirconate (PZO) through the paraelectric phase transition**J. Tomko^{*}; J. Gaskins²; D. Olson²; T. Grant¹; J. Ihlefeld¹; P. E. Hopkins²

1. University of Virginia, Materials Science and Engineering, USA
2. University of Virginia, Mechanical and Aerospace Engineering, USA

S13: From Basic Science to Agile Design of Functional Materials: Aligned Computational and Experimental Approaches and Materials Informatics**Materials by Design: Computational/Experimental Emerging Strategies**

Room: Magnolia B/C

Session Chair: Mina Yoon, Oak Ridge National Laboratory

10:00 AM**(EMA-S13-001-2019) Predicting the surface phase diagram of Ag(111) using ab initio grand canonical Monte Carlo (Invited)**R. B. Wexler¹; T. Qiu¹; A. M. Rappe^{*}

1. University of Pennsylvania, Chemistry, USA

10:30 AM**(EMA-S13-002-2019) Quasi-two-dimensional magnetism and unusual intermediate spin state in Cobaltite involving isolated CoO₄ tetrahedra (Invited)**Q. Zhang^{*}; G. Cao¹; F. Ye²; H. Cao²; S. Chi²; M. Matsuda²; W. Shelton¹; S. Nagler²; D. Tennant²; W. Plummer¹; R. Shelton¹; J. Zhang¹

1. Louisiana State University, Physics and Astronomy, USA
2. ORNL, USA

11:00 AM**(EMA-S13-003-2019) First principles investigation of metal-to-insulator transitions in rare earth nickelates induced by chemical doping**P. Yoo¹; P. Liao^{*}

1. Purdue University, USA

11:15 AM**(EMA-S13-004-2019) Potential Ferroelectric Binary Oxides--Hafnia and Beyond (Invited)**R. Batra^{*}; H. Tran¹; B. S. Johnson²; G. Rossetti³; J. L. Jones²; R. Ramprasad³

1. Georgia Institute of Technology, Materials Science and Engineering, USA
2. North Carolina State University, Materials Science and Engineering, USA
3. University of Connecticut, USA

11:45 AM**(EMA-S13-005-2019) Theory, design and experiments on transparent microwave absorbers for window application**R. Deng^{*}; K. Zhang¹; T. Zhang¹

1. Shanghai Institute of Ceramics, Chinese Academy of Sciences, China

12:00 PM**(EMA-S13-006-2019) Modelling of the highly non-linear electrical behavior of ZnO varistor ceramics**B. Kaufmann^{*}

1. Montan University Leoben, Institut für Struktur- und Funktionskeramik, Austria

Novel Phenomena: Interface/Multi-scale/Low-D

Room: Magnolia B/C

Session Chair: Peilin Liao, Purdue University

2:00 PM**(EMA-S13-007-2019) Understanding the Carrier Mobility in Two-Dimensional Semiconductors (Invited)**Y. Liu^{*}

1. The University of Texas at Austin, USA

2:30 PM**(EMA-S13-008-2019) Transport Properties of Low-Dimensional Electronic Materials**L. Li^{*}

1. Boise State University, USA

2:45 PM**(EMA-S13-009-2019) Ab Initio Data Analytics Approaches to Catalyst Design (Invited)**S. V. Levchenko^{*1}

1. Skolkovo Institute of Science and Technology, Center for Electrochemical Energy Storage, Russian Federation

3:15 PM**(EMA-S13-010-2019) Predicting Synthesizable Functional Edge Reconstructions in 2D Monolayers**G. Hu^{*1}; X. Sang¹; R. Unocic¹; P. Ganesh¹

1. Oak Ridge National Lab, USA

3:30 PM**(EMA-S13-011-2019) Symmetry-Based Identification of 2D Materials for Piezoelectric Applications**J. T. Paul^{*1}; R. G. Hennig¹

1. University of Florida, Materials Science and Engineering, USA

Poster Session

Room: Orange C/D

5:30 PM**(EMA-P001-2019) Mechanisms of Enhanced Thermal Stability of Polarization in Lead-Free $(\text{Bi}_{1/2}\text{Na}_{1/2})_{0.94}\text{Ba}_{0.06}\text{TiO}_3/\text{ZnO}$ Ceramic Composites**Z. Fan^{*1}; L. Zhou²; T. Kim³; J. Zhang²; S. Zhang²; X. Tan¹

1. Iowa State University, USA
2. Nanjing University, China
3. Ames Laboratory, USA

(EMA-P002-2019) Sequence of polarization switching events in polycrystalline perovskite ferroelectricsJ. Schulthei¹; L. Liu²; J. Daniels³; D. Damjanovic²; J. Koruza^{*1}

1. TU Darmstadt, Germany
2. Swiss Federal Institute of Technology in Lausanne - EPFL, Ceramics Laboratory, Switzerland
3. University of New South Wales, Australia

(EMA-P003-2019) Effect of off-stoichiometry, structural heterogeneity and piezoelectricity on lead-free $\text{Na}_{0.5}\text{Bi}_{0.5}\text{TiO}_3$ - BaTiO_3 systemA. Mishra^{*1}; R. Ranjan¹

1. Indian Institute of Science, Materials Engineering, India

(EMA-P004-2019) Investigation into the role of grain-to-grain interaction in determining the coupling between lattice-strain and non-180° domain switching in rhombohedral perovskite piezoceramicsN. Kumar^{*1}; R. Ranjan¹

1. Indian Institute of Science, Materials Engineering, India

(EMA-P005-2019) Probing the poling-induced change in the degree of structural disorder in of BaTiO_3 -based piezoceramics with Eu^{+3} photoluminescenceA. De^{*1}; R. Ranjan¹

1. Indian Institute of Science, Materials Engineering, India

(EMA-P006-2019) Electrocaloric effects in BaTiO_3 -based single crystals and ceramicsM. O. Karabasov¹; V. Shvartsman¹; M. Sanlialp¹; D. C. Lupascu^{*1}

1. Institute for Materials Science and Center for Nanointegration Duisburg-Essen (CENIDE), University of Duisburg-Essen, Germany

(EMA-P007-2019) Advances in Neutron 3-D Reciprocal Space Mapping for in-situ and Texture studiesC. Fancher^{*1}; C. Hoffmann¹

1. Oak Ridge National Lab, USA

(EMA-P008-2019) Maleic acid-doped triglycine sulphate single crystal for high performance of opto-electronics devicesA. Hussain^{*1}; B. Kumar¹

1. University of Delhi, Department of Physics and Astrophysics, India

(EMA-P009-2019) Ferroelectric HfO_2 thin films with abundant dopantsS. Nakayama^{*1}; H. Funakubo²; H. Uchida¹

1. Sophia University, Materials and Life Sciences, Japan
2. Tokyo Institute of Technology, Japan

(EMA-P010-2019) Preferential crystal growth of BaTiO_3 thick film using nanosheet templates interface layerK. Murase^{*1}; T. Shiraishi²; T. Kiguchi²; T. J. Konno²; H. Funakubo³; H. Uchida¹

1. Sophia University, Materials and Life Sciences, Japan
2. Tohoku University, Japan
3. Tokyo Institute of Technology, Japan

(EMA-P011-2019) Structure and electrical properties of $\text{SrTiO}_3/\text{BiFeO}_3$ thin films for energy storage applicationsC. Diao¹; H. Liu^{*1}; H. Hao¹; Z. Yao¹; M. Cao¹

1. Wuhan University of Technology, China

(EMA-P012-2019) Investigation of Domain Reorientation and Phase Transitions due to Inhomogeneous Stresses in Potassium Sodium Niobate-based PiezoelectricsJ. Zhao^{*1}; S. Funn¹; E. C. Dickey¹; J. L. Jones¹

1. North Carolina State University, Materials Science and Engineering, USA

(EMA-P013-2019) Heat Transfer and Package Design for Integrated Thermoelectric and Piezoelectric Energy ConversionM. Estrada^{*1}; B. Gamboa¹; R. Guo¹; A. S. Bhalla¹

1. The University of Texas at San Antonio, Electrical and Computer Engineering, USA

(EMA-P014-2019) A Study on the effect of $\alpha\text{-FeOOH}@/\text{SiO}_2$ structure on the chromaticityY. Kim^{*1}

1. Korea Institute of Ceramic Engineering and Technology (KICET), Engineering Ceramic Center, Republic of Korea

(EMA-P015-2019) A Study on the Improvement of Dispersion of TiO_2 by Surface Modification and Silica CoatingY. Kim^{*1}

1. Korea Institute of Ceramic Engineering and Technology (KICET), Engineering Ceramic Center, Republic of Korea

(EMA-P016-2019) Functionalization of grain boundaries using cold sinteringK. K. Verlinde^{*1}; C. Randall¹

1. Pennsylvania State University, Materials Science and Engineering, USA

(EMA-P017-2019) Property and Structure Analysis of Novel 2D Group-III Oxides Predicted by Evolutionary AlgorithmH. Lester^{*1}; B. Revard²; S. R. Xie¹; D. Gluhovic¹; R. G. Hennig¹

1. University of Florida, Materials Science and Engineering, USA
2. Cornell University, USA

(EMA-P018-2019) The synthesized diamonds micro structures consolidation and fractal relation to thermal-electro conductivityS. Veljkovic¹; V. Mitic^{*1}; M. Mohr²; V. Paunovic¹; G. Lazovic¹; H. Fecht³

1. Serbian Academy of Sciences, Institute of Technical Sciences, Serbia
2. University of Nis, Faculty of Electronic Engineering, Serbia
3. Ulm University, Institute of Micro and Nanomaterials, Germany
4. University of Belgrade, Faculty of Mechanical Engineering, Serbia
5. Ulm University, Institute of Functional Nanosystems FNS, Germany

(EMA-P019-2019) Spontaneous relaxor to ferroelectric transition in $(\text{Bi}_{1/2}\text{Na}_{1/2})\text{TiO}_3$ - BaTiO_3 piezoceramics and role of point defectsX. Shi^{*1}; N. Kumar¹; M. Hoffman¹

1. University of New South Wales, School of Materials Science & Engineering, Australia

(EMA-P020-2019) Optical and electrical properties of MPS/PANI:ErR. P. Toledo^{*1}; A. F. Oliveira¹; D. R. Huanca¹

1. Federal University of Itajubá, Instituto de Física e Química, Brazil

(EMA-P021-2019) DC and AC lifetimes of multilayer ceramic capacitors under highly accelerated aging conditionsH. J. Brown-Shaklee^{*1}; J. A. Bock²; L. Garten³; R. H. Wilke¹; C. Fitzgerald²

1. Sandia National Laboratories, USA
2. Sandia National Laboratories, Electronic, Optical, and Nano Materials, USA
3. U.S. Naval Research Laboratory, USA

(EMA-P022-2019) Leakage Current Measurements of X7R MLCC Capacitors Under Gamma RadiationJ. A. Bock*; H. J. Brown-Shaklee¹

1. Sandia National Laboratories, Electronic, Optical, and Nano Materials, USA

(EMA-P023-2019) Large Magnetoelectric Coupling in (Bfco-Pzt) Multiferroic Composites

A. Marzouki*

1. Laboratoire Structures, Propriétés et Modélisation des Solides, CentraleSupélec, CNRS-UMR8580, Université Paris-Saclay, France

(EMA-P025-2019) Multiferroic Bi₂WO₆-based Two-Phase NanocompositesH. Wang*; L. Li²; J. Huang¹; X. Gao¹; X. Sun¹; H. Wang¹

1. Purdue University, USA
2. Huazhong University of Science and Technology, China

(EMA-P026-2019) Thin film modeling of colossal permittivity materialsT. Fujita*; Y. Shintaro¹; M. Itoh¹

1. Tokyo Institute of Technology, Japan

(EMA-P027-2019) ZnO Varistors: A Thin Film StudyK. Ferri*; E. A. Paisley²; J. Maria¹

1. Pennsylvania State University, Materials Science and Engineering, USA
2. Sandia National Laboratories, USA

(EMA-P028-2019) Visualization of Domain Structure and Switching Property of Defect Engineered Nickel Ferrite for the Next Generation Non-volatile Memory DevicesS. Cho*; J. Cho²; J. Ryu³; K. Song⁴; Y. Oh²; W. Jo²; S. Hong¹

1. Korea Advanced Institute of Science and Technology (KAIST), Materials Science and Engineering, Republic of Korea
2. Ulsan National Institute of Science and Technology (UNIST), Republic of Korea
3. Yeungnam University, Republic of Korea
4. Korea Institute of Materials Science, Republic of Korea

(EMA-P029-2019) Nanoscale Computational Studies of Ferroelectric Mesa StructuresL. Kuna*; L. Ye²; J. Mangeri¹; B. Huey²; S. Nakhmanson²

1. University of Connecticut, Physics, USA
2. University of Connecticut, Department of Materials Science and Engineering, USA
3. Institute of Physics, Czech Academy of Sciences, Czechia

(EMA-P030-2019) Structure-property relationships in lacunar spinels from band theoryY. Wang*; J. Rondinelli¹

1. Northwestern University, Materials Science and Engineering, USA

(EMA-P031-2019) Beamline 11-BM at the Advanced Photon Source: Synchrotron Powder Diffraction SimplifiedS. Lapidus*; L. Ribaud¹

1. Argonne National Lab, X-Ray Science Division, USA

(EMA-P032-2019) Variations in the electronic structure during chemical exfoliation of LiCoO₂ into CoO₂L. Kendall*; K. Pachuta¹; E. Pentzer²; A. Sehirlioglu¹

1. Case Western Reserve University, Materials Science and Engineering, USA
2. Case Western Reserve University, Chemistry, USA

(EMA-P033-2019) Structural and Magnetic studies in S = 1/2 trigonal lattice Ba₃CuV₂O₉A. Biswas*; S. Gondh²; A. K. Pramanik²

1. Indian Institute of Science Education and Research, Kolkata, Physical Science, India
2. Jawaharlal Nehru University, School of Physical Sciences, India

(EMA-P034-2019) Utilizing Polarization Extension in (1-x)NaNbO₃-(x)BaZrO₃ Perovskites to Discover a Novel Relaxor Ferroelectric MaterialT. Rowe*; D. Topham²; M. Dolgos¹

1. University of Calgary, Chemistry, Canada
2. Oregon State University, Chemistry, USA

(EMA-P035-2019) Li-Substituted Layered-Spinel Cathode Material for Sodium-Ion BatteriesP. Skinner*; C. Deng¹; H. Xiong¹

1. Boise State University, Materials Science and Engineering, USA

(EMA-P036-2019) Synergistic effect of microstructure engineering and mechanical decladding on long term cycling of lithium lanthanum titanate (LLTO) based solid

Q. Wang*

1. Zhengzhou University, Materials Science and Engineering, China

(EMA-P037-2019) Preparation and electrical conductivity of Lithium Zinc Silicate as oxide-based solid electrolyte materialK. A. Alshaye*; R. Suzuki¹; S. Ono¹; M. Higuchi¹

1. Tokai University, Japan

(EMA-P038-2019) Electrical properties in Tysonite-based solid electrolyteK. Hasegawa*; A. Mineshige¹; T. Tsujioka¹; T. Yazawa¹

1. University of Hyogo, Engineering, Japan

(EMA-P039-2019) Redox stability of Sc-substituted La_{0.6}Sr_{0.4}FeO_{3-d} interconnector for solid oxide cellsS. Kim*; H. Choi¹; T. Kim¹; D. Seo¹; S. Woo²

1. Korea Institute of Energy Research, Energy Materials Center, Republic of Korea
2. Korea Institute of Energy Research, Republic of Korea

(EMA-P040-2019) Alkaline Earth Substituted Bismuth Pyrostannate (Bi_{2-x}M_xSn₂O_{7-x/2}); M= Mg, Ca, Sr, BaB. Zanca*; M. Dolgos¹

1. University of Calgary, Chemistry, USA

(EMA-P041-2019) Exploratory Data Analysis of Exfoliated Cobalt Oxide Nanosheet SolutionsK. Pachuta*; E. Pentzer²; S. Young¹; A. Sehirlioglu¹

1. Case Western Reserve University, Materials Science and Engineering, USA
2. Case Western Reserve University, Chemistry, USA

(EMA-P042-2019) Protonic Ceramic Electrochemical Devices by Integrated 3D Printing and Laser Processing

J. Tong*

1. Clemson University, USA

(EMA-P043-2019) Densification and Grain Growth in the Mg_xZn_xNi_xCu_xCo_xO (x=0.2) Entropy Stabilized Oxide SystemK. Gann*; V. Jacobson¹; G. Brennecke¹

1. Colorado School of Mines, USA

(EMA-P044-2019) Thermal Conductivity Investigations of Cubic Strontium Niobate, SrNbO₃.T. Grant*; D. Olson²; H. J. Brown-Shaklee³; B. M. Foley⁴; J. Ihlefeld¹; P. E. Hopkins²; M. Campion⁵

1. University of Virginia, Material Science and Engineering, USA
2. University of Virginia, Mechanical and Aerospace Engineering, USA
3. Sandia National Laboratories, USA
4. Pennsylvania State University, Mechanical and Nuclear Engineering, USA
5. Massachusetts Institute of Technology, Material Science and Engineering, USA

(EMA-P045-2019) The influence of titanium adhesion layer oxygen stoichiometry on thermal boundary conductance at gold contactsD. Olson*; K. Freedy¹; S. McDonnell¹; P. E. Hopkins¹

1. University of Virginia, USA

(EMA-P046-2019) Molybdenum nitride as a zero dimensional electrideL. N. Walters*; J. Rondinelli¹

1. Northwestern University, Materials Science, USA

(EMA-P047-2019) Computational Discovery of One-Dimensional Semiconductors and MagnetsJ. C. Lu*; J. T. Paul¹; S. Shah¹; R. G. Hennig¹

1. University of Florida, Materials Science and Engineering, USA

(EMA-P048-2019) Electronic structure of the Ruddlesden-Popper analogs of methylammonium lead iodideB. Phan*; R. G. Hennig¹; S. R. Xie¹; S. R. Phillpot¹; P. Li¹

1. University of Florida, material science and engineering, USA

Basic Science Division Tutorial: Impedance Spectroscopy and its Application in Materials

Room: Citrus A

7:40 PM

Introduction

7:45 PM

Impedance spectroscopy: Basics, challenges and opportunities

Rosario Gerhardt, Georgia Tech

8:15 PM

Progress on understanding the relationship between impedance measurements and microstructure

Daniel Lewis, Rensselaer Polytechnic Institute

Thursday, January 24, 2019

Plenary Session II

Room: Orange A

Session Chair: John Blendell, Purdue University

8:30 AM

Introduction

8:40 AM

(EMA-PLN-002-2019) Ceramics are enabling the next generation of energy storage technologies

Y. Chiang*¹

1. Massachusetts Institute of Technology, USA

9:30 AM

Break

S1: Characterization of Structure–Property Relationships in Functional Ceramics

Imaging and Analytical Techniques III

Room: Cypress B

Session Chairs: Hugh Simons, Technical University of Denmark; Scott Misture, Alfred University

10:00 AM

(EMA-S1-014-2019) Atomic-Scale Mechanisms for Interfacial Damage Resistance in Ion-Irradiated $\text{La}_2\text{Ti}_2\text{O}_7$ / SrTiO_3 Thin Film Heterostructures

S. R. Spurgeon*¹; M. Sassi²; T. Kaspar²; V. Shutthanandan³

1. Pacific Northwest National Laboratory, Energy and Environment Directorate, USA
2. Pacific Northwest National Lab, Physical and Computational Sciences Directorate, USA
3. Pacific Northwest National Lab, Environmental Molecular Sciences Laboratory, USA

10:15 AM

(EMA-S1-015-2019) Microstructure Tailoring of Oxide Thermoelectrics to Increase the Figure of Merit (ZT) Value

M. Ceh*¹; S. Bernik¹; C. Ow Yang²; M. A. Gulgun²

1. Jozef Stefan Institute, Nanostructured Materials, Slovenia
2. Sabanci University, FENS MatSE and NanoEng, Turkey

10:30 AM

(EMA-S1-016-2019) $\text{Y}_2\text{BiFe}_2\text{O}_{12}$: The Saga Continues

N. Herrera-Pineda*²; M. García-Guaderrama³; G. Herrera-Perez³; M. E. Fuentes-Montero¹; J. Napoles-Duarte¹; J. P. Palomares-Baez¹; C. M. Ornleas-Gutierrez²; E. M. Guerrero-Lestarjette⁴

1. UACH, Computacional Chemistry, Mexico
2. UACH, Mexico
3. U de G, Mexico
4. NanoTech, Mexico
5. CONACyT, Mexico

10:45 AM

(EMA-S1-017-2019) Exploring the potential of metal-organic framework hybrid ferroelectric perovskites for energy harvesting applications

J. Walker*¹; M. Einarsrud¹

1. Norwegian University of Science and Technology, Materials Science and Engineering, Norway

11:00 AM

(EMA-S1-018-2019) Electromechanical and structural characterization of piezoceramics under high-power drive (Invited)

M. Slabki¹; J. Daniels²; J. Koruza*¹

1. TU Darmstadt, Germany
2. University of New South Wales, Australia

11:30 AM

(EMA-S1-019-2019) Strain Engineering Thermal Conductivity in Oxide Perovskites (Invited)

A. Sarantopoulos³; E. Langenberg³; D. Saha¹; W. Ong⁴; D. Schlom²; F. Rivadulla²; J. A. Malen*¹

1. Carnegie Mellon University, USA
2. Cornell University, Department of Materials Science and Engineering, USA
3. Universidad de Santiago de Compostela, Spain
4. Zhejiang University, China

S2: Advanced Electronic Materials: Processing Structures, Properties, and Applications

Advanced Electronic Materials: Property II

Room: Orange A

Session Chairs: Barbara Malic, Jozef Stefan Institute; Brahim Dkhil, Université Paris-Saclay

10:00 AM

(EMA-S2-018-2019) $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ -based multilayer elements: Processing, electrocaloric effect and fatigue properties (Invited)

L. Fulanovic¹; A. Bradesko¹; S. Drnovsek¹; V. Bobnar²; B. Malic*¹

1. Jozef Stefan Institute, Electronic Ceramics Department, Slovenia
2. Jozef Stefan Institute, Condensed Matter Physics, Slovenia

10:30 AM

(EMA-S2-019-2019) Antiferroelectric Materials as Dielectric Coolants

B. Rozic¹; B. Asbani²; H. Uršič³; M. El Marssi²; R. Pirč¹; J. Koruza⁴; B. Malic³; Z. Kutnjak*¹

1. Jozef Stefan Institute, Slovenia
2. University of Picardie Jules Verne, France
3. Jozef Stefan Institute, Electronic Ceramics Department, Slovenia
4. Technische Universität Darmstadt, Germany

10:45 AM

(EMA-S2-020-2019) Microstructural evolution in antiferroelectric ceramics under monotonic and cyclic electric fields

Z. Fan*¹; X. Tan¹

1. Iowa State University, USA

11:00 AM

(EMA-S2-021-2019) Doped $\text{Ba}_{0.06}\text{Na}_{0.47}\text{Bi}_{0.47}\text{TiO}_3$ lead-free ceramics for high temperature electronics

V. Mussi Toschi*¹; C. Bogicevic¹; H. Laville²; P. Janolin¹

1. CentraleSupélec, Université Paris Saclay, Laboratoire Structures, Propriétés et Modélisation des Solides UMR CNRS, France
2. Exxelia Technologies, France

11:15 AM

(EMA-S2-022-2019) Investigation on Terahertz time-domain spectroscopy in mixed rare earth orthoferrite

A. Wu*¹

1. Shanghai Institute of Ceramics, CAS, China

11:30 AM

(EMA-S2-023-2019) Ferroelectrics as a toolbox for refrigeration (Invited)

B. Dkhil*¹

1. CentraleSupélec-Univ. Paris-Saclay, France

12:00 PM

(EMA-S2-024-2019) Phase Equilibria and Relaxor Ferroelectric Behavior in (1-x)[Bi_{1/2}(Na_{0.5}K_{0.5})_{1/2}TiO₃]-xPbZrO₃ SystemS. K. Gupta^{*1}; B. Gibbons¹; D. Cann¹

1. Oregon State University, Mechanical, Industrial, and Manufacturing Engineering, USA

12:15 PM

(EMA-S2-025-2019) The slope approach to enhance magnetoelectric coupling in 0-3 composite ceramicsM. Naveed-Ul-Haq¹; V. Shvartsman¹; H. Trivedi¹; S. Salamon²; S. Webers²; H. Wende²; U. Hagemann³; M. Labusch⁴; J. Schröder⁴; D. C. Lupascu^{*1}

1. University of Duisburg-Essen, Institute for Materials Science and Center for Nanointegration Duisburg-Essen (CENIDE), Germany
2. University of Duisburg-Essen, Faculty of Physics and Center for Nanointegration Duisburg-Essen, Germany
3. University of Duisburg-Essen, Interdisciplinary Center for Analytics on the Nanoscale (ICAN) and Center for Nanointegration Duisburg-Essen (CENIDE), Germany
4. University of Duisburg-Essen, Institute of Mechanics, Department of Civil Engineering, Germany

Advanced Electronic Materials: Lead free I

Room: Orange A

Session Chair: Jacob Jones, North Carolina State University

2:00 PM

(EMA-S2-026-2019) (K,Na)NbO₃-based Lead-free Piezoceramics: Simultaneous Enhancement of Piezoelectricity and Temperature Stability (Invited)J. Li^{*1}; Q. Liu¹; Y. Zhang¹; K. Wang¹; X. Zhang¹; L. Li¹

1. Tsinghua University, School of Materials Science and Engineering, China

2:30 PM

(EMA-S2-027-2019) Lead-free hard-type relaxor (Na_{1/2}Bi_{1/2})TiO₃-BaTiO₃ composites for high power piezoelectric applicationsL. Kodumudi Venkataraman^{*1}; M. Slabki¹; J. Koruza¹; J. Rödel¹

1. Technical University Darmstadt, Germany

2:45 PM

(EMA-S2-028-2019) The influence of K₂O non-stoichiometry on the electrical properties of (K,Na)_{1/2}Bi_{1/2}TiO₃ ceramicsL. Li^{*1}; M. Li²; D. C. Sinclair¹

1. University of Sheffield, Materials Science & Engineering, United Kingdom
2. University of Nottingham, Department of Mechanical, Materials and Manufacturing Engineering, United Kingdom

3:00 PM

(EMA-S2-029-2019) Electrical properties of crystalline (Na_{1-x}K_x)NbO₃ thin film grown at low temperature using two-dimensional Sr₂Nb₃O₁₀ nanosheet seed layerJ. Kim^{*1}; S. Nahm¹

1. Korea University, KU-KIST Graduate School of Converging Science and Technology, Republic of Korea

3:15 PM

(EMA-S2-030-2019) AgNbO₃-based Lead-free Antiferroelectrics for Energy Storage ApplicationsJ. Gao^{*1}; L. Zhao²; Y. Zhang¹; Q. Liu¹; S. Zhang³; J. Li¹

1. Tsinghua University, China
2. Hebei University, China
3. University of Wollongong, Australia

3:30 PM

Break

Advanced Electronic Materials: Lead free II

Room: Orange A

Session Chair: Jing-Feng Li, Tsinghua University

4:00 PM

(EMA-S2-031-2019) Robust Dielectric/Ferroelectric Response in 2D Perovskite Nanosheets (Invited)B. Li^{*1}; M. Osada²; T. Sasaki²

1. Wuhan University of Technology, Center for Smart Materials and Devices, China
2. National Institute for Materials Science, WPI-MANA, Japan

4:30 PM

(EMA-S2-032-2019) Fabrication of <110>-oriented 0.85(Bi_{0.5}Na_{0.5})TiO₃-0.15BaTiO₃ ceramics by a reactive templated grain growth method and their electric properties (Invited)I. Fujii^{*1}; K. Kawachi¹; S. Ueno¹; S. Wada¹

1. University of Yamanashi, Japan

5:00 PM

(EMA-S2-033-2019) Fatigue Mechanisms of Lead Free (Bi_{1/2}Na_{1/2})TiO₃-BaTiO₃ Piezoceramic SystemX. Shi^{*1}; N. Kumar¹; M. Hoffman¹

1. University of New South Wales, School of Materials Science & Engineering, Australia

5:15 PM

(EMA-S2-034-2019) Lead-free Bi_{0.5}Na_{0.5}TiO₃-BaTiO₃ epitaxial films: Thickness-dependent phase transition and piezoelectricityZ. Zhou^{*1}; J. Li¹

1. Tsinghua University, School of Material Science and engineering, China

**S4: Complex Oxide Thin Film Materials
Discovery: From Synthesis to Strain/Interface
Engineered Emergent Properties****Functionality: Ferroic I**

Room: Orange B

Session Chairs: Er-Jia Guo, Beijing National Laboratory for Condensed Matter Physics; Qiyang Lu, Oak Ridge National Laboratory

10:00 AM

(EMA-S4-017-2019) Root causes of ferroelectricity in doped HfO₂ (Pioneer talk) (Invited)U. Schroeder^{*1}; T. Mittmann¹; T. Schenk²; A. Kersch⁴; J. LeBeau³; E. D. Grimley³; J. L. Jones³; T. Mikolajick¹

1. Namlab gGmbH, Ferroelectrics, Germany
2. Luxembourg Institute of Science and Technology, Luxembourg
3. North Carolina State University, Materials Science & Engineering, USA
4. Hochschule München, Germany

10:30 AM

(EMA-S4-018-2019) Field cycling improvement of HfO₂ based ferroelectric capacitors using IrO₂ electrodesT. Mittmann^{*1}; M. H. Park²; L. Pintilie³; T. Mikolajick⁴; U. Schroeder¹

1. namlab, Germany
2. Pusan National University, School of Material Science and Engineering, Republic of Korea
3. National Institute of Materials Physics, Romania
4. TU Dresden, Chair of Nanoelectronic Materials, Germany

10:45 AM

(EMA-S4-019-2019) Time Dependence of Pyroelectric Response in Ferroelectric Hf_{0.58}Zr_{0.42}O₂ FilmsS. W. Smith^{*1}; M. Henry¹; M. Rodriguez²; J. Ihlefeld²

1. Sandia National Laboratories, USA
2. University of Virginia, Department of Materials Science and Engineering, USA

11:00 AM

(EMA-S4-020-2019) Polarization and permittivity dependence on electrode stress for ferroelectric Hf_{0.58}Zr_{0.42}O₂ filmsS. S. Fields^{*1}; S. W. Smith²; M. Henry²; S. L. Wolfley²; M. Rodriguez²; P. S. Davids²; J. Ihlefeld¹

1. University of Virginia, Department Materials Science and Engineering, USA
2. Sandia National Laboratories, USA

Functionality: Ferroic II

Room: Orange B

Session Chairs: Mikel Holcomb, West Virginia University; Mimoun El Marssi, Université de Picardie Jules Verne

11:15 AM**(EMA-S4-021-2019) Interfaces in oxide quantum heterostructures (Pioneer talk) (Invited)**H. Lee*¹

1. Oak Ridge National Lab, USA

11:45 AM**(EMA-S4-022-2019) Nanoscale Ferroelectric Switching Dynamics and Through-Thickness Mapping of CoFe₂O₄ and BiFeO₃ Vertically Aligned Nanocomposites**M. Martin*¹; R. Cordier¹; J. Steffes¹; A. Chen²; B. Huey¹

1. University of Connecticut, USA
2. Los Alamos National Lab, USA

12:00 PM**(EMA-S4-023-2019) Effect of doping on the pyroelectric properties of sputtered PZT films**A. Berenov*¹; L. Allers²; B. Moffat²; J. Phair²; P. K. Petrov¹; R. Whatmore¹

1. Imperial College London, Materials, United Kingdom
2. Pyreos Limited, United Kingdom
3. Korvus Technology Ltd, United Kingdom

12:15 PM**(EMA-S4-024-2019) Smearing of antiferroelectric phase transition and emergence of new structures in PbZrO₃ epitaxial thin films**R. Burkovsky*¹

1. Peter the Great St. Petersburg Polytechnic University, Physical Electronics, Russian Federation

Controlled Synthesis III

Room: Orange B

Session Chairs: Guus Rijnders, University of Twente; Paul Rogge, Drexel University

2:00 PM**(EMA-S4-025-2019) Single-crystal high entropy perovskite oxide epitaxial films**Y. Sharma*²; B. Musico¹; X. Gao²; C. Hua²; H. Lee²; V. Keppens¹; T. Ward²

1. University of Tennessee, Department of Material Science and Engineering, USA
2. Oak Ridge National Lab, USA

2:15 PM**(EMA-S4-026-2019) Spectroscopic Characterization of Epitaxial Mg_{0.2}Co_{0.2}Ni_{0.2}Cu_{0.2}Zn_{0.2}O Thin Films**G. N. Kotsonis*¹; C. M. Rost²; B. Wang²; J. Maria¹

1. Pennsylvania State University, Materials Science and Engineering, USA
2. Pennsylvania State University, Electrical Engineering, USA
3. University of Virginia, Mechanical and Aerospace Engineering, USA

2:30 PM**(EMA-S4-027-2019) Defect and disorder driven dielectric properties of entropy-stabilized oxides**S. Chae*¹; Z. Wang²; J. Schwartz¹; L. Williams¹; S. Novakov¹; P. B. Meisenheimer¹; D. Schlom²; R. Hovden¹; E. Kioupakis¹; J. Heron¹

1. University of Michigan, Materials Science and Engineering, USA
2. Cornell University, USA

2:45 PM**(EMA-S4-028-2019) Lateral anionic heterostructures in oxide films via lithographically-defined topochemical reactions**B. M. Lefler*¹; S. May¹

1. Drexel University, Materials Science and Engineering, USA

3:00 PM**(EMA-S4-029-2019) Growth of epitaxial oxide thin films on Graphene**B. Zou*¹; C. Walker¹; K. Wang¹; V. Tileli¹; O. Shafarost¹; N. Harrison²; N. Klein¹; N. Alford¹; P. K. Petrov¹

1. Imperial College London, Department of Materials, United Kingdom
2. Imperial College London, Chemistry, United Kingdom

3:15 PM**(EMA-S4-030-2019) BiFeO₃ film growth conditions: Effects on strain, interface and functional properties**P. Vilarinho*¹; M. Tomczyk¹; A. Tkach¹; I. M. Reaney²

1. University of Aveiro, Department of Materials and Ceramics, Portugal
2. University of Sheffield, Materials Science and Engineering, United Kingdom

Functionality at Oxide/Metal Interface

Room: Orange B

Session Chairs: Yogesh Sharma, Oak Ridge National Laboratory; George Kotsonis, The Pennsylvania State University

4:00 PM**(EMA-S4-031-2019) Layer-resolved Determination of Built-in Potentials at the n-SrTiO_{3-d}/p-Ge(001) and n-SrNb_{1-x}Ti_xO_{3-d}/i-Si(001) Heterojunctions**S. Chambers*⁵; P. Sushko⁵; Y. Du¹; S. R. Spurgeon²; M. Bowden³; N. F. Quackenbush³; J. C. Woicik²; J. H. Ngai⁴; Z. Lim⁶; M. Chrysler²; Z. Zhu⁷; J. LeBeau⁷; A. Penn⁸; T. Lee⁹; J. M. Ablett⁹

1. Pacific Northwest National Laboratory, Physical Sciences Division, USA
2. Pacific Northwest National Laboratory, Energy and Environment Directorate, USA
3. National Institute of Standards and Technology, Materials Measurement Science Division, USA
4. Pacific Northwest National Laboratory, Environmental Molecular Sciences Laboratory, USA
5. Pacific Northwest National Laboratory, Physical and Computational Sciences Directorate, USA
6. University of Texas at Arlington, Department of Physics, USA
7. North Carolina State University, Materials Science & Engineering, USA
8. Diamond Light Source, United Kingdom
9. Soliel Light Source, France

4:15 PM**(EMA-S4-032-2019) Interfacial structures and built-in field at the n-SrTiO₃(001)/p-Ge(001) heterojunctions**P. Sushko*¹; Y. Du¹; S. R. Spurgeon²; M. Bowden³; J. M. Ablett⁴; T. Lee⁵; N. F. Quackenbush⁶; J. C. Woicik⁶; S. Chambers⁶

1. Pacific Northwest National Laboratory, Physical Sciences Division, Physical & Computational Sciences Directorate, USA
2. Pacific Northwest National Laboratory, Energy and Environment Directorate, USA
3. Pacific Northwest National Laboratory, Environmental Molecular Sciences Laboratory, USA
4. L'Orme des Merisiers, Synchrotron SOLEIL, France
5. Diamond Light Source, United Kingdom
6. National Institute of Standards and Technology, Materials Measurement Science Division, Material Measurement Laboratory, USA

4:30 PM**(EMA-S4-033-2019) Strontium titanate (SrTiO₃): A complex oxide substrate for thin films and heterostructures with emergent properties (Pioneer talk) (Invited)**A. Hebard*¹; H. Jin¹; X. Zhu¹

1. University of Florida, Physics, USA

5:00 PM**(EMA-S4-034-2019) Characterization of defects in metal/SrTiO_{3-δ} Schottky-like junctions**H. Jin*¹; X. Zhu¹; A. Hebard¹

1. University of Florida, Physics, USA

5:15 PM**(EMA-S4-035-2019) First-principles analysis of interface capacitance in metal/dielectric/metal capacitors**D. Hirai*¹; A. Honda¹

1. Murata Manufacturing Co., Ltd., Japan

S5: Mesoscale Phenomena in Ferroic Nanostructures: Beyond the Thin-Film Paradigm

Mesoscale Phenomena in Ferroic Nanostructures: Beyond the Thin-Film Paradigm I

Room: Citrus B

Session Chairs: Edward Gorzkowski, Naval Research Lab; Eric Patterson, US Naval Research Lab

2:00 PM

(EMA-S5-001-2019) Strain works as “nanorobot” to synthesize novel multiferroics (Invited)

H. Lee*¹; C. Sohn¹

1. Oak Ridge National Lab, USA

2:30 PM

(EMA-S5-002-2019) Ferroelectric polarization switching induced interfacial magnetic phase competitions at LSMO/PZT heterostructures

B. Paudel*¹; I. Vasiliev¹; M. Hammouri¹; E. Fohtung¹; A. Chen³

1. New Mexico State University, Physics, USA
2. California State University at Los Angeles, Physics, USA
3. Center for Integrated Nanotechnologies, Los Alamos National Laboratory, USA

2:45 PM

(EMA-S5-003-2019) Nanoscale investigation of room temperature ferromagnetism in Li-doped Bismuth ferrite

Y. Sharma*¹; R. Agarwal²; L. Collins³; A. Ievlev³; I. Ivanov³; V. R. Cooper¹; S. Kalinin³; S. Hong⁵; T. Ward⁵

1. Oak Ridge National Laboratory, Materials Science & Technology Division, USA
2. Drexel University, Materials Science and Engineering, USA
3. Oak Ridge National Lab, USA
4. Oak Ridge National Laboratory, Materials Science and Technology Division, USA
5. KAIST, Materials Science, Republic of Korea

3:00 PM

(EMA-S5-004-2019) From local to macroscale effects of defects on ferroelectric polarisation and domain walls (Invited)

P. Paruch*¹

1. University of Geneva, Physics, Switzerland

3:30 PM

Break

4:00 PM

(EMA-S5-005-2019) The Role of Tubular Scaffold Network in Self-Assembled Vertically Aligned Nanocomposite Films

H. Han*¹; T. Lookman¹; A. Chen¹

1. Los Alamos National Lab, USA
2. Los Alamos National Lab, Theoretical Division, USA

4:15 PM

(EMA-S5-006-2019) Size Controlled Functionalities in Ferroic Nanocomposites (Invited)

A. Chen*¹; Z. Wang²; J. MacManus-Driscoll³; R. Prasankumar¹; L. Chen⁴; J. Li⁵; T. Lookman¹; H. Wang⁶; Q. Jia⁷

1. Los Alamos National Lab, USA
2. International Iberian Nanotechnology Laboratory, Portugal
3. University of Cambridge, Dept. of Materials Science, United Kingdom
4. The Pennsylvania State University, Materials Science and Engineering, USA
5. University of Washington, Seattle, USA
6. Purdue University, School of Materials Engineering, USA
7. University at Buffalo, Materials Design and Innovation, USA

4:45 PM

(EMA-S5-007-2019) Mesoscale-level computational studies of size, shape and anisotropy effects in particulate ferroelectric-dielectric composites

D. Zhu¹; J. Mangeri²; K. Pitike¹; R. Wang³; P. Alpay¹; O. Heinonen⁴; S. Nakhmanson*¹

1. University of Connecticut, Materials Science and Engineering, USA
2. Institute of Physics, Czech Academy of Sciences, Czechia
3. Wuhan University, School of Civil Engineering, China
4. Argonne National Laboratory, USA

5:00 PM

(EMA-S5-008-2019) Thin film magnetoelectric resonators for magnetic field sensing (Invited)

M. Staruch*¹; S. Bennett¹; J. Baldwin¹; B. Matis¹; K. Bussmann¹; P. Finkel¹

1. U.S. Naval Research Laboratory, USA

S6: Complex Oxide and Chalcogenide Semiconductors: Research and Applications

Oxide Semiconductors

Room: Magnolia A

Session Chairs: Ryan Comes, Auburn University; Koustav Ganguly, University of Minnesota

10:00 AM

(EMA-S6-001-2019) Modifying the conductivity of strontium titanate by light exposure (Invited)

V. Poole¹; J. Huso¹; M. McCluskey*¹

1. Washington State University, USA

10:30 AM

(EMA-S6-002-2019) Surface Studies of SrTiO₃ Films Grown by Hybrid MBE

S. Thapa*¹; M. Blanchet¹; W. Bowers¹; E. Roeder²; S. Chikara¹; R. B. Comes¹

1. Auburn University, Dept. of Physics, USA
2. University of Washington- Bothel, Physics, USA

10:45 AM

(EMA-S6-003-2019) Strain-Engineered Stannate Heterostructures with High Mobility (Invited)

A. Prakash²; B. Jalan*¹

1. University of Minnesota, Chemical Engineering and Materials Science, USA
2. University of Minnesota, USA

11:15 AM

(EMA-S6-004-2019) Mobility Optimization in High-Pressure Oxygen Sputter-Deposited Epitaxial Ba_{1-x}La_xSnO₃ Thin Films

K. Ganguly*¹; W. Postiglione¹; H. Yun¹; J. Jeong¹; A. Mkhoyan¹; B. Jalan¹; C. Leighton¹

1. University of Minnesota, Department of Chemical Engineering and Materials Science, USA

11:30 AM

(EMA-S6-005-2019) Electronic and Catalytic Behavior of Mn-based Spinels Grown by Molecular Beam Epitaxy

M. Blanchet*¹; S. Chikara¹; A. R. Bredar²; B. Farnum²; R. B. Comes¹

1. Auburn University, Dept. of Physics, USA
2. Auburn University, Dept. of Chemistry, USA

11:45 AM

(EMA-S6-006-2019) Growth of the delafossite PdCoO₂ by molecular beam epitaxy

M. Brahlek*¹

1. Oak Ridge National Laboratory, USA

12:00 PM

(EMA-S6-007-2019) Evidence and Influence of Copper Vacancies in p-Type CuGaO₂ Mesoporous Films

A. R. Bredar*¹; M. Blanchet¹; R. B. Comes¹; B. H. Farnum¹

1. Auburn University, USA

Chalcogenide Semiconductors

Room: Magnolia A

Session Chair: Rafael Jaramillo, Massachusetts Institute of Technology

2:00 PM

(EMA-S6-008-2019) Chalcogenide Materials and Applications: From bulk to 2D (Invited)

K. A. Morgan*¹; I. Zeimpekis¹; K. C. Huang¹; Z. Feng¹; C. Craig¹; E. Weatherby¹; N. Aspiotis¹; G. Alzaidy¹; A. Ravagli¹; B. Moog¹; F. Guzman¹; A. H. Lewis¹; M. Delaney¹; D. W. Hewak¹

1. University of Southampton, Optoelectronics Research Centre, United Kingdom

2:30 PM**(EMA-S6-009-2019) Mechanism and Applications of Large and Persistent Photoconductivity in CdS**H. Yin*; R. Jaramillo¹

1. Massachusetts Institute of Technology, USA

2:45 PM**(EMA-S6-010-2019) Shining Light on Perovskite Chalcogenides: Semiconductors for Visible to Infrared Optoelectronics (Invited)**

J. Ravichandran*

1. University of Southern California, Chemical Engineering and Materials Science, USA

3:15 PM**(EMA-S6-011-2019) Chemical bonding and electronic structure analysis of layered hexagonal ZnIn₂S₄**J. Lee*; T. Lee*; W. Jang*; A. Soon¹

1. Yonsei University, Materials Science and Engineering, Republic of Korea

3:30 PM**Break****4:00 PM****(EMA-S6-012-2019) Route to topological quantum effects via defect engineering (Invited)**

S. Oh*

1. Rutgers, the State University of New Jersey, USA

4:30 PM**(EMA-S6-013-2019) First-Principle Studies of Charged Point Defects in Two-Dimensional Semiconductors**B. Rijal*; R. G. Hennig¹

1. University of Florida, Material Science and Engineering, USA

4:45 PM**(EMA-S6-014-2019) Influence of zinc sulfide shell structure on hydrogen sensing properties of zinc oxide nanorod-based gas sensor**H. Chen*; Y. Tsai¹

1. National Chi Nan University, Applied Materials and Optoelectronics, USA

5:00 PM**(EMA-S6-015-2019) Thermal Conductivity of PbTe/PbSe Superlattice Thin Films**M. E. DeCoster*; X. Chen*; K. Zhang*; H. Baumgart*; P. E. Hopkins¹1. University of Virginia, Mechanical Engineering, USA
2. Old Dominion University, USA**S7: Superconducting and Magnetic Materials: From Basic Science to Applications****Superconducting and Magnetic Materials IV**

Room: Citrus A

Session Chair: Xingjiang Zhou, National Lab for Superconductivity

10:00 AM**(EMA-S7-013-2019) Emergent two-dimensional superconductivity in few-layer stanene (Invited)**

D. Zhang*

1. Tsinghua University, China

10:30 AM**(EMA-S7-014-2019) Electrostatic gating as a tool for inducing superconductivity (Invited)**M. Osofsky*; E. Lock*; J. Prestigiacomo*; K. Perkins*; A. Boyd*; A. Nath*; R. Myers-Ward*; P. Dev*; T. Reinecke*; D. K. Gaskill¹

1. Naval Research Laboratory, USA

11:00 AM**(EMA-S7-015-2019) 2D Magnets and Heterostructures (Invited)**

X. Xu*

1. University of Washington, USA

11:30 AM**(EMA-S7-016-2019) Electronic properties of Ruddlesden-Popper chromium oxide perovskites (Invited)**

R. Comin*

1. Massachusetts Institute of Technology, Physics, USA

Superconducting and Magnetic Materials V

Room: Citrus A

Session Chair: Michael Susner, Air Force Research Laboratory

2:00 PM**(EMA-S7-017-2019) STM studies of density wave evolution in a cuprate superconductor (Invited)**J. E. Hoffman*; T. Webb¹

1. Harvard University, Physics, USA

2:30 PM**(EMA-S7-018-2019) Atomic visualization of copper oxide structure in epitaxial cuprate SrCuO₂ films (Invited)**

X. Ma*

1. Tsinghua University, Department of Physics, China

3:00 PM**(EMA-S7-019-2019) High-temperature interface superconductivity in bilayer cuprate films grown by pulsed laser deposition (Invited)**

Y. Xie*

1. Zhejiang University, Department of Physics, China

3:30 PM**Break****Superconducting and Magnetic Materials VI**

Room: Citrus A

Session Chair: Jennifer Hoffman, Harvard University

4:00 PM**(EMA-S7-020-2019) Optically Triggered Microwave Emission from an Inductively Charged Superconducting Ring (Invited)**T. Bullard*; J. Bulmer*; J. Murphy*; M. Ferdinandus*; C. Eakins*; D. Latypov*; T. J. Haugan⁴1. UES, Inc., USA
2. University of Cambridge, United Kingdom
3. University of Dayton Research Institute, USA
4. Air Force Research Labs, RQQM, USA
5. Air Force Institute of Technology, USA
6. ARA, Berrie Hill, USA**4:30 PM****(EMA-S7-021-2019) Linking Raman spectroscopy and transport measurements for YBCO micro bridges aiming to predict process induced degradation (Invited)**K. Lange*; J. Bulmer*; J. Feighan*; T. J. Haugan*; W. O'Neill*; M. Sparkes¹1. University of Cambridge, Institute for Manufacturing, United Kingdom
2. University of Cambridge, Department of Materials Science & Metallurgy, United Kingdom
3. US Air Force Research Laboratory, AFRL/RQQM, USA**5:00 PM****(EMA-S7-022-2019) Role of iron in the ferromagnetic-antiferromagnetic boundary of La_{0.5}Ca_{0.5}Mn_{1-x}FexO_{3+δ} (0 ≤ x ≤ 0.5) manganites**H. A. Martinez-Rodriguez*; G. Herrera-Perez*; F. Jurado*; A. Reyes-Rojas¹1. CIMAV, Physics of Materials, Mexico
2. Universidad Nacional de Colombia, Ciencias Exactas, Colombia**5:15 PM****(EMA-S7-023-2019) Large Tunable Intrinsic Gap in Rhombohedral-stacked Tetralayer Graphene at Half-filling**S. Che*; K. Myhro*; Y. Shi*; Y. Lee*; K. Thilaha*; K. Bleich*; D. Smirnov*; C. N. Lau¹1. Ohio State University, Physics, USA
2. University of California, Riverside, Physics, USA
3. National High Magnetic Field Laboratory, USA

S8: Structure–Property Relationships in Relaxor Ceramics

Perovskite Relaxors I

Room: Magnolia B/C

Session Chairs: Dwight Viehland, Virginia Tech; Tadej Rojac, Jozef Stefan Institute

2:00 PM

(EMA-S8-001-2019) Accidental Discoveries of Relaxor Ferroelectrics (Invited)

M. Dolgos*¹

1. University of Calgary, Department of Chemistry, Canada

2:30 PM

(EMA-S8-002-2019) Bismuth Ferrite-Based Lead-Free Relaxor Ceramics and Multilayers with Large Electromechanical Strain and Recoverable Energy Density (Invited)

D. Wang*¹; Z. Fan²; G. Wang³; W. Li³; D. Zhou³; A. Khesro⁴; S. Murakami¹; A. Feteira⁵; X. Tan⁶; I. M. Reaney⁷

1. University of Sheffield, United Kingdom
2. Iowa State University, USA
3. Xi'an Jiaotong University, China
4. Abdul Wali Khan University, Pakistan
5. Sheffield Hallam University, United Kingdom
6. Iowa State University, Materials Science & Engineering, USA
7. University of Sheffield, Materials Science and Engineering, United Kingdom

3:00 PM

(EMA-S8-003-2019) Effect of A-site substitutions on dielectric and energy storage properties of BaTiO₃-BiScO₃ relaxor ferroelectrics

S. Nayak*¹; S. Venkateshwarlu¹; A. Setiadi¹; M. Jørgensen²; K. Beyer³; O. Borkiewicz²; A. Pramanick¹

1. City University of Hong Kong, Department of Materials Science and Engineering, Hong Kong
2. Aarhus University, Department of Chemistry, Denmark
3. Argonne National Laboratory, Advanced Photon Source, USA

3:15 PM

(EMA-S8-004-2019) Sintering and dielectric study of the pseudobinary Pb(Fe_{0.5}Nb_{0.5})O₃-BiFeO₃ system

R. Sherbondy*¹; U. Prah²; H. Uršič²; G. L. Brennecke³; T. Rojac²; B. Malic²

1. Colorado School of Mines, Metallurgical and Materials Engineering, USA
2. Jozef Stefan Institute, Electronic Ceramics Department, Slovenia

3:30 PM

Break

Perovskite Relaxors II

Room: Magnolia B/C

Session Chairs: Michelle Dolgos, Oregon State University; Dawei Wang, University of Sheffield

4:00 PM

(EMA-S8-005-2019) Effect of minor doping on the relaxor behaviour and electrostrain of BNT-BKT-BT ceramics

A. Feteira*¹

1. Sheffield Hallam University, United Kingdom

4:15 PM

(EMA-S8-006-2019) Spontaneous relaxor-ferroelectric transition in 0.91(Na_{1/2}Bi_{1/2})TiO₃-0.09BaTiO₃

L. Kodumudi Venkataraman*¹; J. Koruza¹; M. Hinterstein²; J. Rödel²; P. Groszewicz³

1. Technical University Darmstadt, Institute of Materials Science, Germany
2. Karlsruhe Institute of Technology, Institute for Applied Materials - Ceramic Materials and Technologies, Germany
3. Technical University Darmstadt, Institute of Physical Chemistry, Germany

4:30 PM

(EMA-S8-007-2019) Temperature dependent polarization reversal mechanism in (Bi_{1/2}Na_{1/2})TiO₃-based relaxor ceramics

J. Glaum*¹; H. Simons²; J. Hudspeth³; M. Acosta⁴; J. Daniels⁴

1. Norwegian University of Science and Technology NTNU, Materials Science and Engineering, Norway
2. Technical University of Denmark, Denmark
3. European Synchrotron Radiation Facility, France
4. University of New South Wales, Australia
5. University of Cambridge, United Kingdom

4:45 PM

(EMA-S8-008-2019) Piezoelectric properties of lead-free relaxor ferroelectric Bi(Zn_{2/3}Nb_{1/3})O₃-BaTiO₃ (BZN-BT) system

J. M. Marshall*¹

1. University of Warwick, Physics, United Kingdom

5:00 PM

(EMA-S8-009-2019) Piezoelectric and Dielectric Thick Films Fabricated on Metal Substrates by Aerosol Deposition

E. A. Patterson*¹; S. D. Johnson¹; E. Gorzkowski¹

1. Naval Research Lab, USA

S9: Ion–Conducting Ceramics

Oxygen Conducting Ceramics

Room: Citrus B

Session Chairs: Yingge Du, PNNL; Hui Xiong, Boise State University

10:00 AM

(EMA-S9-017-2019) The Dual Tales of Ionic Electrolyte Gating: Pushing Electrochemical Transformations and Restoring Electrostatic Doping in Functional Oxides (Invited)

H. Zhou*¹

1. Argonne National Laboratory, Advanced Photon Source, USA

10:30 AM

(EMA-S9-018-2019) Preparation of Highly Conductive Lanthanum Silicate-Based Oxide Ion Conductor

A. Mineshige*¹; M. Momai¹; S. Yagi¹; H. Hayakawa¹; Y. Takayama¹; Y. Kagoshima¹; T. Yazawa¹

1. University of Hyogo, Japan

10:45 AM

(EMA-S9-019-2019) Fast Oxygen Ion Conduction in Bi₄Ti₃O₁₂

L. Li*¹; M. Li²; D. C. Sinclair¹

1. University of Sheffield, Materials Science & Engineering, United Kingdom
2. University of Nottingham, Department of Mechanical, Materials and Manufacturing Engineering, United Kingdom

11:00 AM

(EMA-S9-020-2019) Reducing operating temperatures of ionic conductors using vertically aligned nanocomposite thin film approaches, experiment and modelling (Invited)

J. MacManus-Driscoll*¹; B. Zhu¹; G. Schusteritsch¹; C. J. Pickard¹

1. University of Cambridge, Dept. of Materials Science, United Kingdom

11:30 AM

(EMA-S9-021-2019) Demonstration of the Cold Sintering Process for the Bi-based Ceramics

K. Tsuji*¹; T. De Beauvoir¹; C. Randall¹

1. Pennsylvania State University, Materials Science and Engineering, USA

S10: Current Challenges in Microstructural Evolution: From Basic Science to Electronic Applications

Grain Boundary Structure, Mobility and Characterization

Room: Cypress B

Session Chair: Yanhao Dong, Massachusetts Institute of Technology

2:00 PM

(EMA-S10-001-2019) Grain Boundary Atomic Structures, Segregation and Properties in Electronic Materials (Invited)

Y. Ikuhara*¹

1. University of Tokyo, Institute of Engineering Innovation, Japan

2:30 PM

(EMA-S10-003-2019) Tailoring grain boundary mobility in zirconia ceramics (Invited)

Y. Dong*¹; J. Li¹; I. Chen²

1. Massachusetts Institute of Technology, Nuclear Science and Engineering, USA
2. University of Pennsylvania, Materials Science and Engineering, USA

3:00 PM

(EMA-S10-004-2019) Disconnections, Grain Growth and Grain Boundary Chemistry (Invited)

H. Sternlicht*¹; W. Rheinheimer²; A. Mehlmann³; A. Rothchild³; M. J. Hoffmann⁴; N. P. Padture¹; W. D. Kaplan³

1. Brown University, School of Engineering, USA
2. Purdue University, School of Materials Engineering, USA
3. Technion - Israel Inst of Tech, Dept. of Materials Engineering, Israel
4. University of Karlsruhe, Institute for Applied Materials (IAM-KM), Germany

3:30 PM

Break

4:00 PM

(EMA-S10-005-2019) The Grain Boundaries of Strontium Titanate that Facilitate Anti-thermal Grain Growth (Invited)

A. R. Krause*¹; A. Roti Roti²; M. Harmer²

1. University of Florida, Materials Science and Engineering, USA
2. Lehigh University, Materials Science and Engineering, USA

4:30 PM

(EMA-S10-006-2019) Diffusional drag in SrTiO₃

W. Rheinheimer*¹; K. Karra¹; R. Garcia¹; M. J. Hoffmann²

1. Purdue University, School of Materials Engineering, USA
2. University of Karlsruhe, Institute for Applied Materials (IAM-KM), Germany

S11: Electronic Materials Applications in 5G Telecommunications

Electronic Materials Applications in 5G Telecommunications I

Room: Cypress C

Session Chair: Geoff Brennecka, Colorado School of Mines

10:00 AM

(EMA-S11-001-2019) What is 5G and how can materials help?

N. Orloff*¹; T. Biroli²; L. Cai³; G. L. Brennecka⁴

1. National Institute of Standards and Technology, Communications Technology Laboratory, USA
2. University of Minnesota, Chemical Engineering and Materials Science, USA
3. Corning Incorporated, USA
4. Colorado School of Mines, USA

10:10 AM

(EMA-S11-002-2019) BAW Filters for 5G (Invited)

R. Aigner*¹

1. Qorvo, Acoustic R&D, USA

10:40 AM

(EMA-S11-003-2019) How an understanding of the loss mechanism in microwave ceramics can be used to enhance their performance and develop switchable microwave devices (Invited)

N. Newman*¹; J. Gonzales¹; S. Gajare¹

1. Arizona State University, Materials Program, USA

11:10 AM

(EMA-S11-004-2019) Nonlinear polarization dynamics in the tens of GHz

A. Hagerstrom*¹; E. Marksz¹; S. Das²; C. Long¹; R. Ramesh²; L. W. Martin²; N. Orloff¹

1. National Institute of Standards and Technology, Communications Technology Laboratory, USA
2. University of California, Berkeley, Materials Science and Engineering, USA

11:30 AM

(EMA-S11-005-2019) Enabling tunable, low-loss millimeter-wave electronics through the stabilization of strain-engineered oxide superlattices

E. Marksz*¹; A. Hagerstrom²; N. Dawley²; I. Takeuchi¹; D. Schlom²; N. Orloff³

1. University of Maryland, Department of Materials Science and Engineering, USA
2. Cornell University, Department of Materials Science and Engineering, USA
3. National Institute of Standards and Technology, Communications Technology Laboratory, USA

11:50 AM

(EMA-S11-006-2019) Determining orientation and alignment of multi-layer carbon fiber composites using waveguides

N. Popovic*¹; D. B. Knorr²; J. Booth²; E. Garboczi²; C. Long²; N. Orloff²

1. University of Colorado, Boulder, Electrical Engineering, USA
2. National Institute of Standards and Technology, USA
3. US Army Research Laboratory, USA

12:10 PM

(EMA-S11-007-2019) Characterization of extremely small nonlinearities in the dielectric response of glass-ceramics in the microwave range

F. Bergmann*¹; H. Maune²; G. Jakob³; M. Letz¹

1. Schott AG, R&D, Germany
2. Technical University Darmstadt, Germany
3. Johannes Gutenberg University, Germany

Electronic Materials Applications in 5G Telecommunications II

Room: Cypress C

Session Chair: Nate Orloff, NIST

2:00 PM

(EMA-S11-008-2019) Technical Panel on 5G (Invited)

N. Orloff*¹; T. Biroli²; L. Cai³; G. L. Brennecka⁴

1. NIST, Communications Technology Laboratory, USA
2. Rutgers University, USA
3. Corning Incorporated, USA
4. Colorado School of Mines, USA

2:40 PM

(EMA-S11-009-2019) Epitaxial Growth of ScAlN for High Power Millimeter Wave Transistors and Resonators (Invited)

M. T. Hardy*¹; B. P. Downey¹; N. Nepal¹; E. Jin²; D. Storm¹; S. Katzer¹; D. Meyer¹

1. Naval Research Laboratory, Electronic Science and Technology Division, USA
2. National Academy of Science National Research Council Postdoctoral Scholar Residing at the U.S. Naval Research Laboratory, USA

3:10 PM

(EMA-S11-010-2019) The Use of MEMS and PCM Technologies in the Design of Tunable RF Devices (Invited)

R. Mansour*¹

1. University of Waterloo, ECE Department, Canada

3:40 PM

Break

4:00 PM

(EMA-S11-011-2019) Material Optimizations in Chalcogenide-Based Phase-Change RF Switches for 5G Applications (Invited)N. El-Hinnawy*¹

1. Jazz Semiconductor, USA

4:30 PM

(EMA-S11-012-2019) Multiphysical Design Approach for RF BAW Modules on a SiCer Substrate (Invited)A. Hagelauer*¹; V. Chauhan¹; V. Silva¹; U. Stehr²; M. Fischer²; J. Müller²; R. Weigel¹

1. Friedrich-Alexander-University Erlangen-Nuremberg, Institute for Electronics Engineering, Germany
2. TU Ilmenau, Germany

5:00 PM

(EMA-S11-013-2019) Material, Device, and Integration Challenges for High-Frequency Piezoelectric Microresonators (Invited)C. D. Nordquist*¹; M. Henry¹; D. W. Branch²; G. Esteves¹; A. Siddiqui¹; M. Eichenfield¹; R. W. Reger¹; A. Edstrand¹; K. Knisely¹; T. A. Friedmann¹; T. Pluym¹; B. A. Griffin¹

1. Sandia National Laboratories, Microsystems Science and Technology Center, USA
2. Sandia National Laboratories, Nano and Micro Sensors, USA

5:30 PM

(EMA-S11-014-2019) Embedded standards for 5G and millimeter-waves (Invited)J. A. Drisko*¹; R. Chamberlin¹; X. Ma¹; A. D. Feldman¹; F. Quinlan¹; J. Booth¹; N. Orloff¹; C. Long¹

1. National Institute of Standards and Technology, USA

S13: From Basic Science to Agile Design of Functional Materials: Aligned Computational and Experimental Approaches and Materials Informatics**High-throughput Computational/Experimental Approaches/Functional Perovskite**

Room: Magnolia B/C

Session Chair: Lan Li, Boise State University

10:00 AM

(EMA-S13-012-2019) Discovery of 2D Half-Metals and Other Low-Dimensional Magnets by Materials Informatics (Invited)R. G. Hennig*¹

1. University of Florida, Materials Science and Engineering, USA

10:30 AM

(EMA-S13-013-2019) High throughput ab initio and machine learning for screening perovskites (Invited)D. Morgan*¹; R. Jacobs¹

1. University of Wisconsin, Madison, USA

11:00 AM

(EMA-S13-014-2019) Orientational disorder matters: Thermodynamic stability and electronic structure of hybrid organic-inorganic perovskitesS. R. Xie*¹; M. Sexton¹; S. R. Phillpot¹; J. Xue¹; R. G. Hennig¹

1. University of Florida, Materials Science and Engineering, USA

11:15 AM

(EMA-S13-015-2019) Accelerated Discovery and Design of Perovskite-Based Advanced Functional Materials (Invited)K. Yang*¹; J. Cheng¹; Y. Li¹

1. University of California San Diego, Department of NanoEngineering, USA

11:45 AM

(EMA-S13-016-2019) Two-Dimensional Organic-Inorganic Hybrid Perovskites (Invited)L. Dou*¹

1. Purdue University, Chemical Engineering, USA

Friday, January 25, 2019**S2: Advanced Electronic Materials: Processing Structures, Properties, and Applications****Advanced Electronic Materials: Lead free III**

Room: Orange A

Session Chair: Zuo-Guang Ye, Simon Fraser University

8:30 AM

(EMA-S2-035-2019) Defect Chemistry of ABO₃ Ceramics (Invited)S. Lee*¹; J. Kim¹; J. U. Rahman²; M. Kim¹

1. Changwon National University, School of Materials Science and Engineering, Republic of Korea
2. Korea Institute of Ceramic Engineering and Technology (KICET), Republic of Korea

9:00 AM

(EMA-S2-036-2019) Fractal Nature as a Bridge Between Ceramics Structures and Energy (Invited)V. Mitic*¹; G. Lazovic²; V. Paunovic²; S. Veljkovic²; B. Vlahovic⁴

1. Serbian Academy of Sciences, Institute of Technical Sciences, Serbia
2. University of Nis, Faculty of Electronic Engineering, Serbia
3. University of Belgrade, Faculty of Mechanical Engineering, Serbia
4. North Carolina Central University, USA

9:30 AM

(EMA-S2-037-2019) Electric field and pressure induced defect chemistry in lead free potassium sodium niobate piezoelectricsP. Vilarinho*¹; R. Pinho¹; M. Costa¹; I. M. Reaney²; J. Noudem³

1. University of Aveiro, Department of Materials and Ceramics, Portugal
2. University of Sheffield, Materials Science and Engineering, United Kingdom
3. IUT-Caen, CRISMAT, France

9:45 AM

(EMA-S2-038-2019) Impact of process optimization and composition on thin film BNKT microstructure, ferroelectric and piezoelectric responseK. M. Grove*¹

1. Oregon State University, Materials Science, USA

10:00 AM

Break**Advanced Electronic Materials: Characterization**

Room: Orange A

Session Chair: Dragan Damjanovic, Swiss Federal Institute of Technology in Lausanne - EPFL

10:30 AM

(EMA-S2-039-2019) Deconvolved intrinsic and extrinsic contributions to electrostrain in high performance, Nb-doped PZT piezoceramics near the MPB (Invited)C. Zhao¹; D. Hou²; C. Chung²; H. Zhou²; A. Kynast¹; E. Hennig⁴; W. Liu¹; S. Li¹; J. L. Jones*²

1. Xi'an Jiaotong University, School of Electrical Engineering, China
2. North Carolina State University, Dept. of Materials Science & Engineering, USA
3. PI Ceramic GmbH, Germany

11:00 AM

(EMA-S2-040-2019) Structures and Properties of Bismuth-Based High-T_c Piezo-/ferroelectrics (Invited)Z. Ye*¹

1. Simon Fraser University, Canada

11:30 AM

(EMA-S2-041-2019) Local structure studies of ferroelectrics by X-ray fluorescence holography (Invited)K. Hayashi*¹

1. Nagoya Institute of Technology, Japan

12:00 PM

(EMA-S2-042-2019) Study of an hourglass-shaped high-temperature piezoelectric vibration energy harvester based on BiScO₃-PbTiO₃ (BSPT) piezoceramicsW. Chen^{*}; A. Gurdal¹; S. Tuncdemir¹; C. Randall²

1. Solid State Ceramics, Inc, USA
2. Pennsylvania State University, Materials Science and Engineering, USA

12:15 PM

(EMA-S2-043-2019) Effects of Post-irradiation Annealing on Structural Changes in Ferroelectric Thin Film CapacitorsH. Zhou^{*}; M. Liu¹; S. Williams²; L. Griffin²; C. Cress³; M. Rivas⁴; R. Rudy⁴; R. G. Polcawich⁴; E. Glaser²; N. Bassiri-Gharb²; A. Hawari¹; J. L. Jones¹

1. North Carolina State University, USA
2. Georgia Institute of Technology, USA
3. Naval Research Laboratory, USA
4. US Army Research Laboratory, USA

S4: Complex Oxide Thin Film Materials

Discovery: From Synthesis to Strain/Interface Engineered Emergent Properties

Functionality: Ferroic III

Room: Orange B

Session Chairs: Roman Burkovsky, Peter the Great St. Petersburg Polytechnic University; Sean Smith, Sandia National Laboratories

8:30 AM

(EMA-S4-036-2019) Magnetic Frustration Engineering Through Stereochemical Disorder in Single Crystalline Entropy-Stabilized OxidesP. B. Meisenheimer^{*}; L. Williams¹; E. Kioupakis¹; J. Heron¹

1. University of Michigan, Materials Science and Engineering, USA

8:45 AM

(EMA-S4-037-2019) Co-existence of ferromagnetism and superparamagnetism in thin films of La_{0.7}Sr_{0.3}MnO₃M. B. Holcomb^{*}; N. Mottaghi¹; R. Trappen¹; S. Kumari¹; A. Penn²; C. Huang³; S. Yousefi¹; G. Bhandari¹; J. LeBeau²; M. Seehra¹

1. West Virginia University, Physics, USA
2. North Carolina State University, Materials Science & Engineering, USA
3. West Virginia University, Mechanical & Aerospace Engineering, USA

9:00 AM

(EMA-S4-038-2019) Epitaxial Multiferroic Superlattices Combining Hexagonal and Cubic Ferrites (Invited)M. E. Holtz^{*}; R. Steinhardt¹; D. Muller¹; R. Ramesh³; J. Mundy²; D. Schlom¹

1. Cornell University, Materials Science and Engineering, USA
2. Harvard University, Physics, USA
3. UC Berkeley, Materials Science and Engineering, USA
4. Cornell University, Applied and Engineering Physics, USA

9:30 AM

(EMA-S4-039-2019) Strain effects in ferroic superlatticesM. El Marssi^{*}; J. Belhadi¹; B. Carcan¹; H. Bouyanfif¹; Y. Gagou¹; F. Ravau²; M. Jouiad²

1. Université de Picardie Jules Verne, LPMC, France
2. Masdar Institute of Science and Technology, United Arab Emirates

9:45 AM

(EMA-S4-040-2019) Well-Ordered Stripe Domains in BiFeO₃ grown on TbScO₃ by Molecular-Beam EpitaxyA. B. Mei^{*}; D. Schlom¹

1. Cornell University, Materials Science & Engineering, USA

Functionality: Optical

Room: Orange B

Session Chairs: Qian Li, Argonne National Laboratory; Hyoungjeen Jeon, Pusan National University

10:30 AM

(EMA-S4-041-2019) Complex Oxide Thin Films as Alternative Plasmonic Materials (Pioneer talk) (Invited)P. K. Petrov^{*}; M. Wells¹; R. Bower¹; B. Zou¹; A. Mihai¹

1. Imperial College, Materials, United Kingdom

11:00 AM

(EMA-S4-042-2019) SrNbO₃/Metal composites for chiral optics plasmonics devicesA. Mihai^{*}; M. Wells²; B. Zou²; P. K. Petrov²; S. Maier¹

1. Imperial College, United Kingdom
2. Imperial College London, Department of Materials, United Kingdom

11:15 AM

(EMA-S4-043-2019) Plasmonic Transition Metal Oxide Nano-arrays: Fabrication and CharacterisationR. Bower^{*}; M. Wells¹; A. Mihai¹; B. Zou¹; P. K. Petrov¹

1. Imperial College London, Department of Materials, United Kingdom

11:30 AM

(EMA-S4-044-2019) Multiferroic bandgap tuning in (001) ordered Bi(Fe,Cr)O₃ heterostructuresM. Walden^{*}; G. L. Brenneka¹; C. Ciobanu²

1. Colorado School of Mines, Materials Science, USA
2. Colorado School of Mines, Mechanical Engineering, USA

11:45 AM

(EMA-S4-045-2019) Interfacial perturbation of Epsilon Near Zero (ENZ) Modes in Cadmium Oxide Thin FilmsE. L. Radue^{*}; E. L. Runnerstrom²; K. Kelley²; J. Maria³; P. E. Hopkins¹

1. University of Virginia, Mechanical and Aerospace Engineering, USA
2. North Carolina State University, Material Science and Engineering, USA
3. Pennsylvania State University, Materials Science, USA

12:00 PM

(EMA-S4-046-2019) Tailorable Au nanoparticles embedded in epitaxial TiO₂ thin films for tunable optical propertiesS. Misra^{*}; L. Li¹; J. Jian¹; J. Huang¹; X. Wang¹; D. Zemlyanov⁴; J. Jang²; F. H. Ribeiro³; H. Wang¹

1. Purdue University, Materials Engineering, USA
2. Ulsan National Institute of Science and Technology, Republic of Korea
3. Purdue University, Chemical Engineering, USA
4. Purdue University, Birck Nanotechnology Center, USA

S5: Mesoscale Phenomena in Ferroic Nanostructures: Beyond the Thin-Film Paradigm

Mesoscale Phenomena in Ferroic Nanostructures: Beyond the Thin-Film Paradigm II

Room: Citrus B

Session Chairs: Seungbum Hong, Argonne Nat Lab; Serge Nakhmanson, University of Connecticut

8:30 AM

(EMA-S5-009-2019) Tomographic Atomic Force Microscopy of BiFeO₃; Ferroelectricity and Electrical Conductivity Resolved in Three Dimensions (Invited)J. Steffes^{*}; R. Ramesh²; B. Huey¹

1. University of Connecticut, Materials Science and Engineering, USA
2. University of California, Berkeley, Materials Science and Engineering, USA

9:00 AM

(EMA-S5-010-2019) What happens at the surface of ferroelectrics?Y. Ivry^{*}; M. Barzilay¹; A. Hershkovitz¹; R. Weinstock¹; C. Saguy¹

1. Technion - Israel Institute of Technology, Israel

9:15 AM**(EMA-S5-011-2019) First-principles parameterization of Landau energy functionals for multiferroic GaV_4Se_8** J. Mangeri*¹

1. Institute of Physics, Czech Academy of Sciences, Dielectrics, USA

9:30 AM**(EMA-S5-012-2019) Conducting Domain Walls for Ephemeral Nanocircuitry (Invited)**M. Gregg*¹

1. Queen's University Belfast, School of Maths and Physics, United Kingdom

10:00 AM**Break****10:30 AM****(EMA-S5-013-2019) Nanoscale functionality of bismuth ferrite domain walls and ferroelectric skyrmions (Invited)**J. Hlinka*¹

1. Academy of Sciences of the Czech Republic, Institute of Physics, Czechia

11:00 AM**(EMA-S5-014-2019) Mesoscale-level Modeling of Light Transmission through Polycrystalline Ceramics**L. Kuna*¹; J. Mangeri²; J. Wollmershauser³; E. Gorzkowski³; S. Nakhmanson⁴

1. University of Connecticut, Physics, USA
2. Institute of Physics, Czech Academy of Sciences, Czechia
3. U.S. Naval Research Laboratory, USA
4. University of Connecticut, Department of Materials Science and Engineering, USA

11:15 AM**(EMA-S5-015-2019) Light-Matter Interactions in Low Symmetry Nanocrystalline Ceramics near the Mie Scattering Limit**E. Gorzkowski*¹; J. Wollmershauser²; J. Drazin³; B. Feygelson¹; G. Beadie¹

1. Naval Research Lab, USA
2. U.S. Naval Research Laboratory, USA
3. ASEE, USA

S6: Complex Oxide and Chalcogenide Semiconductors: Research and Applications**Electron Microscopy of Oxides and Chalcogenides**

Room: Magnolia A

Session Chair: Steven Spurgeon, Pacific Northwest National Laboratory

8:30 AM**(EMA-S6-016-2019) In situ biasing and 4D STEM of Relaxor Ferroelectric Complex Oxides (Invited)**J. LeBeau*¹; R. Dhall¹; M. J. Cabral¹; A. Kumar¹

1. North Carolina State University, Materials Science & Engineering, USA

9:00 AM**(EMA-S6-017-2019) Atomic-scale characterization of complex oxides using Scanning Electron Microscopy Transmission Electron Microscopy (Invited)**D. Kepaptsoglou*¹; F. Azough²; T. Mizoguchi²; R. Freer³; Q. Ramasse¹

1. SuperSTEM, United Kingdom
2. University of Tokyo, Institute of Industrial Science, Japan
3. University of Manchester, Materials, United Kingdom

9:30 AM**(EMA-S6-018-2019) In-situ characterization of multi-functional materials at atomic-resolution using aberration-corrected STEM (Invited)**R. F. Klie*¹; X. Rui¹; X. Hu¹

1. University of Illinois at Chicago, Department of Physics, USA

10:00 AM**Break****Emerging Oxides**

Room: Magnolia A

Session Chair: Matthew Brahlek, Oak Ridge National Laboratory

10:30 AM**(EMA-S6-019-2019) Data-Driven Informatics Approaches for Rational Design of Complex Oxides (Invited)**P. Balachandran*¹

1. University of Virginia, Materials Science and Engineering, USA

11:00 AM**(EMA-S6-020-2019) Real-space imaging of the spin cycloid in BiFeO_3 (Invited)**V. Garcia*¹

1. CNRS/Thales, France

11:30 AM**(EMA-S6-021-2019) Current-density implementation for calculating flexoelectric coefficients for cubic oxides (Invited)**C. E. Dreyer*¹

1. Stony Brook University and Flatiron Institute, Physics and Astronomy, USA

12:00 PM**(EMA-S6-022-2019) Discovery of non-Fermi liquid behavior in SrVO_3 (Invited)**R. Engel-Herbert*¹; M. Brahlek²; J. Roth¹; T. Birol³

1. The Pennsylvania State University, Materials Science and Engineering, USA
2. Oak Ridge National Laboratory, USA
3. Rutgers University, USA

12:30 PM**(EMA-S6-023-2019) Effect of strain on the metal-insulator transition and orbital polarization in strongly covalent CaFeO_3 (Invited)**P. C. Rogge*¹; S. May¹

1. Drexel University, USA

S7: Superconducting and Magnetic Materials: From Basic Science to Applications**Superconducting and Magnetic Materials VII**

Room: Citrus A

Session Chair: Xucun Ma, Tsinghua University

8:30 AM**(EMA-S7-024-2019) Self-assembled vertically aligned Ni nanopillars in CeO_2 with anisotropic magnetic and transport properties for energy applications (Invited)**J. Huang*¹; Z. Qi¹; L. Li¹; H. Wang¹; S. Xue¹; B. Zhang¹; X. Zhang¹; H. Wang²

1. Purdue University, USA
2. Purdue University, School of Materials Engineering, USA

9:00 AM**(EMA-S7-025-2019) An Old Frontier with New Opportunities: Magnetocaloric Materials and Magnetic Refrigeration (Invited)**Z. Turgut*¹; M. McLeod²; J. Horwath¹; B. Majumdar³

1. US Air Force Research Laboratory, USA
2. University of Dayton Research Institute, USA
3. New Mexico Tech, Materials and Metallurgical Engineering Department, USA

9:30 AM**Break**

Superconducting and Magnetic Materials VIII

Room: Citrus A

Session Chair: Xiaoli Dong, Institute of Physics, CAS

10:00 AM**(EMA-S7-026-2019) Update on Aircraft Electric Propulsion and Impact of Superconducting and Cryogenic Technology (Invited)**T. J. Haugan^{*2}; M. Susner¹

1. Air Force Research Laboratory, USA
2. U.S. Air Force Research Laboratory, AFRL/RQQM, USA

10:30 AM**(EMA-S7-027-2019) Atomic Layer Deposition of Ultrathin Al₂O₃ Tunnel Barriers for Metal-Insulator-Metal Tunnel Junctions (Invited)**J. Wu^{*1}

1. University of Kansas, USA

11:00 AM**(EMA-S7-028-2019) Terahertz emission from the intrinsic Josephson junctions in a thin slitted annular microstrip antenna of the high-temperature superconductor Bi₂Sr₂CaCu₂O_{8+δ} (Invited)**R. A. Klemm^{*1}; S. Bonnough¹; N. Shouk¹; R. Shouk¹

1. University of Central Florida, Physics, USA

11:30 AM**(EMA-S7-029-2019) The Effect of Growth Temperature on the Artificial Pinning Center Landscape in BaHfO₃ and Y₂O₃ Doped YBa₂Cu₃O_{7-x} Thin Films**M. Sebastian^{*1}; B. Gautam²; C. Ebbing¹; J. Huang³; H. Wang³; J. Wu⁴; T. J. Haugan⁵

1. University of Dayton Research Institute, USA
2. University of Kansas, Department of Physics and Astronomy, USA
3. Purdue University, School of Materials Engineering, USA
4. University of Kansas, USA
5. Air Force Research Laboratory, Aerospace Systems Directorate, USA

S8: Structure-Property Relationships in Relaxor Ceramics**Applications of Relaxors**

Room: Magnolia B/C

Session Chairs: Marco Deluca, Materials Center Leoben Forschung GmbH; Antonio Feteira, Sheffield Hallam University

8:30 AM**(EMA-S8-010-2019) Fatigue and Excessive Heating during Electrocaloric Cycling of Pb(Mg_{1/3}Nb_{2/3})O₃-PbTiO₃ Ceramics (Invited)**A. Bradesko¹; M. Vrabelj¹; L. Fulanovic¹; A. Hedl¹; M. Otonicar¹; H. Uršič¹; Z. Kutnjak²; A. Henriques³; C. Chung²; J. L. Jones³; B. Malic¹; T. Rojac^{*1}

1. Jozef Stefan Institute, Electronic Ceramics Department, Slovenia
2. Jozef Stefan Institute, Condensed Matter Physics, Slovenia
3. North Carolina State University, Dept. of Materials Science & Engineering, USA

9:00 AM**(EMA-S8-011-2019) Nanodomain distribution, texture, and apparent symmetry (Invited)**D. Viehland^{*1}

1. Virginia Tech, Materials Science and Engineering, USA

9:30 AM**Break****Non-Perovskite Relaxors and Advanced Multiscale Modeling and Characterization**

Room: Magnolia B/C

Session Chairs: Igor Levin, NIST; Andrew Rappe, University of Pennsylvania

10:00 AM**(EMA-S8-012-2019) The importance of disorder in tetragonal tungsten-bronzes (Invited)**E. Buixaderas^{*1}

1. Institute of Physics, Czech Academy of Sciences, Dielectrics, Czechia

10:30 AM**(EMA-S8-013-2019) Relaxor behaviour and disorder in tetragonal tungsten bronzes (Invited)**F. D. Morrison^{*1}

1. University of St Andrews, Chemistry, United Kingdom

11:00 AM**(EMA-S8-014-2019) Different origin of relaxor behavior in hetero- and homo-valent substituted BaTiO₃: Raman spectroscopy and ab initio modeling perspectives**M. N. Popov¹; J. Spitaler¹; V. Veerapandiyani¹; M. Deluca^{*1}

1. Materials Center Leoben Forschung GmbH, Austria

11:15 AM**(EMA-S8-015-2019) First-principles study of piezoelectric (Ba,Ca)TiO₃-Ba(Ti,Zr)O₃ solid solutions (Invited)**D. Amoroso^{*1}; A. Cano²; P. Ghosez¹

1. University of Liege, Belgium
2. Institut NEEL, CNRS, France

11:45 AM**(EMA-S8-016-2019) Different models for the polar nanodomain structure of relaxor ferroelectrics and their effect on the diffuse scattering patterns (Invited)**R. T. Welberry^{*1}; M. Pasciak²

1. Australian National University, Research School of Chemistry, Australia
2. Czech Academy of Sciences, Institute of Physics, Czechia

Local Structure of Relaxors

Room: Magnolia B/C

Session Chairs: Elena Buixaderas, Institute of Physics, Czech Academy of Sciences; Richard Welberry, Australian National University

2:00 PM**(EMA-S8-017-2019) Nanoscale Atomistic Models of Relaxor Ferroelectrics from Diffraction Data (Invited)**I. Levin^{*1}

1. NIST, USA

2:30 PM**(EMA-S8-018-2019) Relaxor physical properties controlled via compressive epitaxial strain (Invited)**J. Kim²; H. Takenaka³; Y. Qi¹; A. M. Rappe^{*1}; L. W. Martin²

1. University of Pennsylvania, Chemistry, USA
2. University of California, Berkeley, Materials Science and Engineering, USA
3. University of Nebraska, Lincoln, Physics, USA

S10: Current Challenges in Microstructural Evolution: From Basic Science to Electronic Applications

Properties of Interfaces

Room: Cypress B

Session Chair: Wolfgang Rheinheimer, Purdue University

8:30 AM

(EMA-S10-007-2019) Correlative Nanoscale Quantification of Grain Boundary Microstructures (Invited)

D. R. Diercks*¹

1. Colorado School of Mines, USA

9:00 AM

(EMA-S10-008-2019) Effect of Processing Parameters on the Microstructure and Electrical Properties of Ceramics (Invited)

R. A. Gerhardt*¹

1. Georgia Institute of Technology, Materials Science and Engineering, USA

9:30 AM

(EMA-S10-009-2019) Probing the Influence of Surface Charges on Amorphous Salt Electrolyte (Invited)

M. A. Gulgun*¹; S. Shawuti¹; A. Benli¹; H. D. Batili¹; C. Ow Yang¹; M. Sezen¹

1. Sabanci University, FENS, Turkey

10:00 AM

Break

10:30 AM

(EMA-S10-010-2019) Metalorganic vapor phase epitaxy of CdTe thin films on graphene and mica through chemical and van der Waals mixed interactions

X. Sun*¹; D. Mohanty¹; Z. Lu¹; Y. Xiang¹; Y. Wang¹; L. Zhang²; K. Kisslinger²; J. Shi¹; L. Gao³; M. Washington¹; G. Wang¹; T. Lu¹; I. Bhat¹

1. Rensselaer Polytechnic Institute, USA
2. Brookhaven National Laboratory, USA
3. University of Science and Technology Beijing, China

10:45 AM

(EMA-S10-011-2019) Linking Surface Anisotropy to Equilibrium Crystal Shape in NiO-MgO

D. A. Lowing¹; J. Blendell*¹; W. Rheinheimer¹

1. Purdue University, MSE, USA

11:00 AM

(EMA-S10-012-2019) Surface Faceting of Barium Strontium Titanate Alloys with Changing Composition

M. J. Michie*¹

1. Purdue University, Materials Engineering, USA

11:15 AM

(EMA-S10-013-2019) The role of point defects and defect gradients in flash sintering of perovskite oxides

W. Rheinheimer*¹; X. Phuah²; H. Wang¹; F. Lemke³; M. J. Hoffmann³; H. Wang¹

1. Purdue University, School of Materials Engineering, USA
2. Purdue University, USA
3. University of Karlsruhe, Institute for Applied Materials (IAM-KM), Germany

11:30 AM

(EMA-S10-014-2019) FLASH sintering of KNN in different atmospheres

A. M. Senos*¹; R. Serrazina¹; E. Ndehkordi¹; P. Vilarinho²

1. University of Aveiro/ CICECO, Materials and Ceramic Engineering, Portugal
2. University of Aveiro, Department of Materials and Ceramics, Portugal

11:45 AM

(EMA-S10-015-2019) Modeling long term behavior of PbTe-based thermoelectric generators

Y. Sadia*¹; D. Ben Ayoun¹; Y. Gelbstein¹

1. Ben-Gurion University of the Negev, Material Engineering, Israel

Interfaces in Organohalide Solar Cells

Room: Cypress B

Session Chair: Hadas Sternlicht, Brown University

2:00 PM

(EMA-S10-016-2019) The Optoelectronics of Organohalide Perovskite Solar Cells (Invited)

P. Meredith*¹

1. Swansea University, Physics, United Kingdom

2:30 PM

(EMA-S10-017-2019) Ferroic domains regulate photocurrent in single-crystalline CH₃NH₃PbI₃ films self-grown on FTO/TiO₂ substrate (Invited)

J. Li*¹

1. University of Washington, Mechanical Engineering, USA

3:00 PM

(EMA-S10-018-2019) Ferroelectric domains in methylammonium lead iodide perovskite solar cells

H. Roehm¹; T. Leonhard¹; M. J. Hoffmann¹; A. Colmann*¹

1. Karlsruhe Institute of Technology, Germany

3:15 PM

(EMA-S10-019-2019) Probing the Microstructure of Methylammonium Lead Iodide Perovskite Solar Cells

T. Leonhard*¹; A. Schulz¹; H. Roehm¹; S. Wagner¹; F. Altermann¹; W. Rheinheimer²; M. J. Hoffmann¹; A. Colmann¹

1. Karlsruhe Institute of Technology, Germany
2. Purdue University, USA

S11: Electronic Materials Applications in 5G Telecommunications

Electronic Materials Applications in 5G Telecommunications III

Room: Cypress C

Session Chair: Nate Orloff, NIST

8:30 AM

(EMA-S11-015-2019) All-Oxide BST-Components for Reconfigurable Communication Systems (Invited)

H. Maune*¹; D. Walk¹; P. Salg²; L. Zeinar²; D. Kienemund¹; C. Schuster¹; A. Radetina²; P. Komissinskiy²; L. Alff²; R. Jakoby¹

1. Technische Universität Darmstadt, Institute for Microwave Engineering and Photonics, Germany
2. Technische Universität Darmstadt, Advanced Thin Film Technology, Germany

9:00 AM

(EMA-S11-016-2019) Ceramic Oxide Magnetic and Dielectric Materials for 5G Wireless Communications (Invited)

M. D. Hill*²; D. Cruickshank²; I. MacFarlane²; D. Firor¹

1. Skyworks RF Ceramics, Process Engineering, USA
2. Skyworks RF Ceramics, Research and Development, USA
3. Research Consultant, USA

9:30 AM

(EMA-S11-017-2019) mmWave Material Characterization for 5G and automotive applications in AIST (Invited)

M. Horibe*¹; Y. Kato¹; R. Sakamaki¹; I. Hirano¹

1. National Institute of Advanced Industrial Science and Technology (AIST), Electromagnetic Measurement Group, Japan

10:00 AM

(EMA-S11-018-2019) Lithium Niobate Thin Films for Resonators and Filters at 5G Frequencies (Invited)

S. Gong*¹

1. University of Illinois at Urbana-Champaign, ECE, USA

10:30 AM

(EMA-S11-019-2019) Study Dielectric Properties of Polymer-Ceramic Composites at Microwave Frequencies

M. Sarkarat*; W. Reainthippayasakul¹; S. Perini¹; M. Lanagan¹

1. The Pennsylvania State University, Materials Research Institute, USA

10:50 AM

(EMA-S11-020-2019) Glass ceramics for MW applications

I. M. Reaney*¹

1. University of Sheffield, Materials Science and Engineering, United Kingdom

11:10 AM

(EMA-S11-021-2019) DFT+DMFT study of optical properties of metallic double perovskite Sr₂VNbO₆

A. Paul*¹; T. Biro¹

1. University of Minnesota, Chemical Engineering and Material Science, USA

11:30 AM

(EMA-S11-022-2019) Ultrafast control of material properties through non-linear lattice dynamics from first principles (Invited)

G. Khalsa*¹; N. A. Benedek¹

1. Cornell University, USA

12:00 PM

(EMA-S11-023-2019) Computational studies of dielectric loss in relaxor ferroelectrics

J. Mangeri¹; P. Ondrejko*²; D. Zhu⁴; N. Orloff³; A. Hagerstrom²; K. Co⁴; P. Alpay⁴; S. Nakhmanson⁴

1. Institute of Physics, Czech Academy of Sciences, Dielectrics, USA
2. National Institute of Standards and Technology, USA
3. National Institute of Standards and Technology, Communications Technology Laboratory, USA
4. University of Connecticut, Materials Science and Engineering, USA

S14: Failure: The Greatest Teacher

Failure: The Greatest Teacher

Room: Orange B

Session Chair: Geoff Brennecke, Colorado School of Mines

3:30 PM

Dragan Danjanovic: Failure of Communication: Example of lead-free piezoelectrics

4:00 PM

(EMA-S14-001-2019) Failures: The stepping stones to success

A. J. Bell*¹

1. University of Leeds, Institute for Materials Research, United Kingdom

4:30 PM

Susan Trolier-McKinstry: Memory Failure

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37 Rb 85.4678 Rubidium	38 Sr 87.62 Strontium	39 Y 88.90585 Yttrium	40 Zr 91.224 Zirconium	41 Nb 92.90638 Niobium	42 Mo 95.96 Molybdenum	43 Tc (98.0) Technetium	44 Ru 101.07 Ruthenium	45 Rh 102.9055 Rhodium	46 Pd 106.42 Palladium	47 Ag 107.8682 Silver	48 Cd 112.411 Cadmium	49 In 114.818 Indium	50 Sn 118.71 Tin	51 Sb 121.76 Antimony	52 Te 127.5 Tellurium	53 I 126.90447 Iodine	54 Xe 131.293 Xenon
55 Cs 132.9054 Cesium	56 Ba 137.327 Barium	57 La 138.90547 Lanthanum	72 Hf 178.48 Hafnium	73 Ta 180.9488 Tantalum	74 W 183.84 Tungsten	75 Re 186.207 Rhenium	76 Os 190.23 Osmium	77 Ir 192.222 Iridium	78 Pt 195.084 Platinum	79 Au 196.966569 Gold	80 Hg 200.59 Mercury	81 Tl 204.3833 Thallium	82 Pb 207.2 Lead	83 Bi 208.9804 Bismuth	84 Po (209) Polonium	85 At (210) Astatine	86 Rn (222) Radon
87 Fr (223) Francium	88 Ra (226) Radium	89 Ac (227) Actinium	104 Rf (261) Rutherfordium	105 Db (262) Dubnium	106 Sg (263) Seaborgium	107 Bh (264) Bohrium	108 Hs (265) Hassium	109 Mt (266) Meitnerium	110 Ds (268) Darmstadtium	111 Rg (269) Roentgenium	112 Cn (285) Copernicium	113 Nh (284) Nihonium	114 Fl (289) Flerovium	115 Mc (288) Moscovium	116 Lv (293) Livermorium	117 Ts (294) Tennessine	118 Og (294) Oganesson
58 Ce 140.116 Cerium	59 Pr 140.90766 Praseodymium	60 Nd 144.242 Neodymium	61 Pm (145) Promethium	62 Sm 150.36 Samarium	63 Eu 151.964 Europium	64 Gd 157.25 Gadolinium	65 Tb 158.92535 Terbium	66 Dy 162.5 Dysprosium	67 Ho 164.93032 Holmium	68 Er 167.259 Erbium	69 Tm 168.93041 Thulium	70 Yb 173.054 Ytterbium	71 Lu 174.967 Lutetium				
90 Th 232.0377 Thorium	91 Pa 231.03688 Protactinium	92 U 238.02891 Uranium	93 Np (237) Neptunium	94 Pu (244) Plutonium	95 Am (243) Americium	96 Cm (247) Curium	97 Bk (247) Berkelium	98 Cf (251) Californium	99 Es (252) Einsteinium	100 Fm (257) Fermium	101 Md (258) Mendelevium	102 No (259) Nobelium	103 Lr (262) Lawrencium				

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