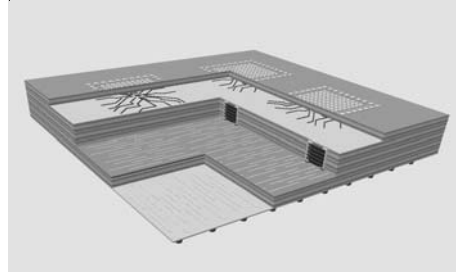


# IMAPS/ACerS 5<sup>th</sup> International Conference and Exhibition on Ceramic Interconnect and Ceramic Microsystems Technologies (CICMT)

**THE CURTIS HOTEL**  
DENVER, COLORADO - USA  
APRIL 21 - 23, 2009



## FINAL PROGRAM

### **GENERAL CO-CHAIRS:**

Michael Lanagan, The Pennsylvania State University  
mlanagan@psu.edu

Jun Akedo, National Institute of Advanced Industrial Science and Technology (AIST)  
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### **TECHNICAL PROGRAM CO-CHAIRS:**

Amy Moll, Boise State University  
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Takaaki Tsurumi, Tokyo Institute of Technology  
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Jens Mueller, University of Ilmenau  
jens.mueller@tu-ilmenau.de

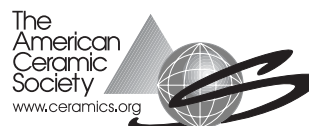
### **CO-SPONSORED BY:**

INTERNATIONAL MICROELECTRONICS AND PACKAGING SOCIETY (**IMAPS**)

*Bringing Together the Entire Microelectronics Supply Chain*

&

THE AMERICAN CERAMIC SOCIETY (**ACERS**)



CICMT Program Outline	
<b>Tuesday, April 21</b>	
7:30 am – 7:30 pm	Registration
10:00 am - 7:30 pm	Exhibit Hours
8:30 am – 9:00 am	<b>Keynote Presentation</b> <b>Title:</b> Development of an H/LTCC-Based HPLC (High Pressure Liquid Chromatography) Microfluidic Consumable <b>Speaker:</b> Geoff Gerhardt, Waters Corporation
9:00 am – 9:30 am	<b>Keynote Presentation</b> <b>Title:</b> Advanced Electro-Ceramics: Present and Future Prospect <b>Speaker:</b> Y. Sakabe, Murata Manufacturing Co., Ltd.
9:30 am – 10:00 am	<b>Keynote Presentation</b> <b>Title:</b> LTCC - Technology: A Challenging Platform for Microsystem Fabrication <b>Speaker:</b> Walter Smetana, Vienna University of Technology
10:00 am – 10:30 am	Break in Exhibit Hall
	<b>Ceramic Micro Systems Track</b>
	<b>Ceramic Interconnect Track</b>
Topical Sessions: 10:30 am - 12:10 pm	<b>Session TA1: Deposition Techniques, ALD, Molecular Deposition, Aerosol Deposition</b> Chairs: Y. C. Lee, University of Colorado at Boulder; Alexander Michaelis, Fraunhofer Institute for Ceramic Technologies and Systems
	<b>Session TA2: Direct Write Technology</b> Chairs: Christopher A. Ablett, Sandia National Laboratories; Seung-Hyun Kim, INOSTEK Inc.
12:10 pm - 1:40 pm	Lunch in Exhibit Hall ( <i>Lunch served 12:10 pm - 1:10 pm</i> )
Topical Session: 1:40 pm - 3:20 pm	<b>Session TP1: Ceramic Actuators in Microsystems (Piezoelectrics Materials and Devices)</b> Chairs: Richard Eitel, University of Kentucky; Fred Barlow, University of Idaho
3:20 pm - 3:50 pm	Break in Exhibit Hall
Topical Session: 3:50 pm - 5:50 pm	<b>Session TP2: Microsystems Materials and Properties</b> Chairs: Donald Plumlee, Boise State University; Charles Lewinsohn, Ceramatec, Inc.
	<b>Session TP3: Electromagnetic Properties Characterization</b> Chairs: Yoshihiko Imanaka, Fujitsu Limited; Minoru Osada, National Institute for Materials Science
6:00 pm - 7:30 pm	Reception in Exhibit Hall
<b>Wednesday, April 22</b>	
7:30 am - 5:00 pm	Registration
10:00 am - 4:00 pm	Exhibit Hours
8:30 am - 10:00 am	<b>Session WA1: International Session on Microsystems</b> Chairs: Leszek Golonka, Wroclaw University of Technology; Karl-Heinz Drue, Technical University of Ilmenau
10:00 am - 10:30 am	Break in Exhibit Hall
Topical Sessions: 10:30 am - 11:50 am	<b>Session WA2: Design and Fabrication of Ceramic Microsystems and Devices</b> Chairs: Torsten Rabe, Federal Institute for Materials Research and Testing (BAM); Thomas Maeder, Ecole Polytechnique Fédérale de Lausanne
	<b>Session WA3: Processing and Design of Integrated Passives in LTCC</b> Chair: Jerry Aguirre, Kyocera America Inc.
12:00 pm - 1:20 pm	Lunch in Exhibit Hall
1:30 pm - 3:30 pm	<b>Session WP1: Interactive Forum (Poster Session)</b> One-on-One Interactive Forum. This is your chance for detailed interaction with authors whose work is too good to miss. <b>Chair:</b> Amy Moll, Boise State University
3:30 pm - 4:00 pm	Break in Exhibit Hall
4:00 pm - 5:30 pm	<b>Session WP2: LTCC Standards</b> Chairs: Howard Imhof, Metalor Technologies USA; Michael Ehlert, Barry Industries Inc.
<b>Thursday, April 23</b>	
7:30 am - Noon	Registration
Topical Sessions: 8:30 am - 10:30 am	<b>Session THA1: Advanced Packaging Technology</b> Chairs: Martin Oppermann, EADS Deutschland GmbH; Ken Peterson, Sandia National Laboratories
10:30 am - 12:00 pm	<b>Session THA2: LTCC University Consortium Meeting</b> Chairs: W. Kinzy Jones, Florida International University; Amy Moll, Boise State University
12:00 pm	Conference Closing Remarks
<b>Thursday, April 23: See inside program for more information on the following...</b>	
IEEE LTCC Standards Working Group (P1787): 8:30 am - 12:00 pm	
NIST Dielectric Measurement Tutorial: 1:30 pm - 4:00 pm	

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## essage from the General Co-Chairs

Welcome to the 5<sup>th</sup> International Conference on Ceramic Interconnect and Ceramic Microsystems Technologies (CICMT)!

CICMT, THE premier global forum on ceramic interconnect and ceramic microsystems, continues to benefit from the complementary interests, strengths, leadership, and joint sponsorship of the International Microelectronics And Packaging Society (IMAPS) and The American Ceramic Society (ACerS). This collaboration, in two of the fastest growing areas of ceramic technology, attracts the participation of leading scientists and engineers from esteemed universities, prestigious national laboratories, and the commercial leaders in the industry.

Back in Denver after a successful meeting in Munich, Germany last year, this event brings together experts from Asia, Europe, and North and South America to present and discuss the latest advances in ceramic interconnect and ceramic microsystems technologies. Coming from more than 40 different organizations including universities as well as industry and government laboratories, the conference will provide a wide spectrum of interests reflected in the papers throughout 12 sessions. This year's keynote and international session speakers will focus on multilayer ceramic components and future applications.

In addition to the Microsystems and Ceramic Integration paths, we are delighted to add a Low Temperature Co-fired Ceramic Processing (LTCC) standards session to promote industrial interactions.

We thank the Technical Program Co-chairs Amy Moll (Boise State University), Jens Müller (Technical University Ilmenau) and Takaaki Tsurumi (Tokyo Institute of Technology); all the Session Chairs for the long hours and hard work they contributed in creating this outstanding program. Our special thanks go out to the staffs and Executive Committees of IMAPS and ACerS, who provided the steady encouragement, excellent assistance, and expert coordination to help make CICMT 2009 a reality. Finally, we thank each and every one of you for contributing to the success of CICMT 2009 through your participation and attendance. We hope that you gain as much from this conference as we have in pulling it together.

Plans are already underway for CICMT 2010 in Chiba, Japan. We welcome your comments, suggestions, and assistance to help us achieve the CICMT goal of accelerating the research, development, and product impact of our exciting ceramic technology thrusts. Please visit our website at [www.cicmt.org](http://www.cicmt.org) for information on future events.

Michael Lanagan and Jun Akedo  
General Co-Chairs

*Tuesday, April 21*

REGISTRATION: 7:30 AM - 7:30 PM

CONTINENTAL BREAKFAST: 7:30 AM - 8:15 AM

EXHIBIT HOURS: 10:00 AM - 7:30 PM

*REFRESHMENT BREAKS, LUNCH & RECEPTION IN EXHIBIT HALL*

OPENING REMARKS: 8:15 AM - 8:30 AM

CONFERENCE CHAIRS

**KEYNOTE PRESENTATION: 8:30 AM - 9:00 AM**

**TITLE:** DEVELOPMENT OF AN H/LTCC-BASED HPLC (HIGH PRESSURE LIQUID CHROMATOGRAPHY)  
MICROFLUIDIC CONSUMABLE

**SPEAKER:** GEOFF GERHARDT, WATERS CORPORATION

**KEYNOTE PRESENTATION: 9:00 AM - 9:30 AM**

**TITLE:** ADVANCED ELECTRO-CERAMICS: PRESENT AND FUTURE PROSPECT

**SPEAKER:** Y. SAKABE, MURATA MANUFACTURING CO., LTD.

**KEYNOTE PRESENTATION: 9:30 AM - 10:00 AM**

**TITLE:** LTCC - TECHNOLOGY: A CHALLENGING PLATFORM FOR MICROSYSTEM FABRICATION

**SPEAKER:** WALTER SMETANA, VIENNA UNIVERSITY OF TECHNOLOGY

BREAK IN EXHIBIT HALL: 10:00 AM - 10:30 AM

## **CICMT Tabletop Exhibition**

**Tuesday, April 21<sup>st</sup>**

**10:00 am - 7:30 pm**

**(Reception in the Exhibit Hall: 6:00 PM - 7:30 PM)**

**Wednesday, April 22<sup>nd</sup>**

**10:00 am - 4:00 pm**

## **SESSION TA1: DEPOSITION TECHNIQUES, ALD, MOLECULAR DEPOSITION, AEROSOL DEPOSITION**

*Chairs:*

Y. C. Lee, University of Colorado at Boulder;  
Alexander Michaelis, Fraunhofer Institute for Ceramic  
Technologies and Systems  
**10:30 AM - 12:10 PM**

ATOMIC LAYER DEPOSITION (ALD) AND MOLECULAR LAYER DEPOSITION (MLD) FOR BARRIER COATINGS ON POLYMERS  
D. S. Seghete, S. H. Jen, J. A. Bertrand, S. M. George, University of Colorado

DEFECT INSPECTION OF ATOMIC LAYER DEPOSITION / MOLECULAR LAYER DEPOSITION-BASED BARRIER COATINGS  
Yadong Zhang, David C. Miller, Jacob A. Bertrand, Shih-Hui Jen, Ronggui Yang, Martin L. Dunn, Steven M. George, Y. C. Lee, DARPA / University of Colorado at Boulder; Yu-Zhong Zhang, Invitrogen / Molecular Probes, Inc.

MECHANICAL ROBUSTNESS OF ALD/MLD-BASED BARRIER COATINGS  
David C. Miller, Ross R. Foster, Yadong Zhang, Shih-Hui Jen, Jacob A. Bertrand, Zhixing Lu, Dragos Seghete, Jennifer L. O'Patchen, Ronggui Yang, Yung-Cheng Lee, Steven M. George, Martin L. Dunn, DARPA / University of Colorado

FLEXIBLE THERMAL GROUND PLANE ENABLED BY ALD/MLD-BASED BARRIER COATINGS  
Ching-Yi Lin, Ronggui Yang, Y. C. Lee, Aziz Abdulagatov, Steven M. George, University of Colorado at Boulder

$(\text{Ba}_{0.6}\text{Sr}_{0.4})\text{TiO}_3$  THICK FILMS DEPOSITED BY AEROSOL DEPOSITION METHOD FOR MULTI-LAYERED CAPACITOR APPLICATIONS  
Daniel Popovici, Hiroki Tsuda, Jun Akedo, National Institute of Advanced Industrial Science and Technology (AIST)

## **SESSION TA2: DIRECT WRITE TECHNOLOGY**

*Chairs:*

Christopher A. Applett, Sandia National Laboratories;  
Seung-Hyun Kim, INOSTEK Inc.  
**10:30 AM - 12:10 PM**

OMNIDIRECTIONAL PRINTING OF FLEXIBLE, SPANNING, AND STRETCHABLE SILVER MICROELECTRODES  
Jennifer A. Lewis, Bok Y. Ahn, Eric B. Duoss, Michael J. Motala, Xiaoying Guo, Sang-II Park, Yujie Xiong, Jongseung Yoon, Ralph G. Nuzzo, John A. Rogers, University of Illinois at Urbana-Champaign

COLLOIDAL GELS INDUCED AT ROOM TEMPERATURE FOR DIRECT-WRITING OF ARTIFICIALLY ENGINEERED MATERIALS  
Hiroya Abe, Soshu Kirihara, Osaka University; Jun Akedo, National Institute of Advanced Industrial Science and Technology (AIST)

DIRECT WRITE OF METALS AND FUNCTIONAL MATERIALS FOR THREE-DIMENSIONAL INTERCONNECTS AND ANTENNAS  
Paul G. Clem, James F. Carroll III, Adam W. Cook, Eric D. Branson, Chris A. Applett, Sandia National Laboratories

HIGH ASPECT PATTERNING OF Ag FINE LINE BY A LASER ASSISTED INK-JET PRINTING  
Jun Akedo, Akito Endo, National Institute of Advanced Industrial Science and Technology

INKJET PRINTING OF POST-FIRED THICK-FILM CAPACITORS  
Marcel Wassmer, Waldemar Diel, Klaus Krueger, Helmuth Schmidt University

LUNCH IN THE EXHIBIT HALL: 12:10 PM - 1:40 PM  
(LUNCH SERVED 12:10 PM - 1:10 PM)

## **SESSION TP1: CERAMIC ACTUATORS IN MICROSYSTEMS (PIEZOELECTRICS MATERIALS AND DEVICES)**

*Chairs:*

Richard Eitel, University of Kentucky;  
Fred Barlow, University of Idaho  
**1:40 PM - 3:20 PM**

PIEZOELECTRIC SINGLE CRYSTAL PMN-PT: FIELD-INDUCED ACTUATION AT TEMPERATURE  
J. F. Carroll III, Sandia National Laboratories; D. A. Payne, University of Illinois at Urbana-Champaign;  
J. Tian, P. Han, H. C. Materials

PZT THICK FILMS FOR MEMS APPLICATIONS BY LITHOGRAPHICALLY STRUCTURED ELECTROPHORETIC DEPOSITION  
Stefan Schimpf, Bertram Schmidt, Otto-von-Guericke University

A HIGH FLOW PIEZOELECTRIC CERAMIC CHOKE FOR AN ADAPTIVE VEHICLE GAS SPRING DAMPER MANUFACTURED BY CERAMIC INJECTION AND CERAMIC INSERT MOLDING  
Matthias Hartmann, Bertram Schmidt, Otto-von-Guericke University of Magdeburg (IMOS);  
Frank Baerecke, Roland Kasper, Institute of Mobile Systems (IMS)

LTCC ELECTROMECHANICAL DEVICES BASED ON PZT THICK FILM TECHNOLOGY  
Tomasz Zawada, Rasmus Lou-Moeller, InSensor A/S; Karsten Hansen, Erling Ringgaard, Ferroperm Piezoceramics A/S;  
Dominik Jurkow, Leszek Golonka, Wroclaw University of Technology

ENHANCED STRUCTURE STABILIZATION AND PIEZOELECTRIC PROPERTIES OF PZT THIN FILMS FOR MEMS APPLICATIONS  
Seung-Hyun Kim, Chang Young Koo, Dong-Hyun Ryu, INOSTEK Inc.; Brian L. Wardle, MIT; Angus I. Kingon, Brown University

BREAK IN THE EXHIBIT HALL: 3:20 PM - 3:50 PM

## SESSION TP2: MICROSYSTEMS MATERIALS AND PROCESSES

*Chairs:*

Donald Plumlee, Boise State University;  
Charles Lewinsohn, Ceramatec, Inc.  
**3:50 PM - 5:50 PM**

THICK FILM CERAMIC CHIP PACKAGING FOR HEARING AIDS  
John Dzarnoski, Doug Link, Starkey Laboratories, Inc.

MICRO-PATTERNING OF GREEN TAPE CERAMIC USING POWDER-BLASTING FOR LTCC MANUFACTURING  
Yves Lacrotte, Farid Amalou, Weixing Yu, Marc P. Y. Desmulliez, Heriot-Watt University

CHARACTERIZATION OF MATERIAL BEHAVIOR OF LOW TEMPERATURE COFIRED CERAMICS AT ELEVATED TEMPERATURES  
Christian Bienert, Andreas Roosen, University Erlangen-Nuremberg

SILVER IN LTCC - INTERFACIAL REACTIONS, TRANSPORT PROCESSES AND INFLUENCE ON PROPERTIES OF CERAMICS  
Torsten Rabe, Carsten Glitzky, Hamid Naghib-zadeh, Gabriele Oder, Federal Institute for Materials Research and Testing (BAM); Markus Eberstein, W.C. Heraeus GmbH; Jörg Töpfer, University Applied Sciences Jena

STRUCTURING OF GREEN SHEETS AND LAMINATES FOR MULTILAYER CERAMIC MICROSYSTEMS WITH A COMBINED LASER AND PUNCHING MACHINE  
Gunter Hagen, KMS Technology Center GmbH; Uwe Partsch, Fraunhofer IKTS

DEVELOPMENT OF NITE-SiC/SiC COMPOSITE COMPACT INTERMEDIATE HEAT EXCHANGER  
Tatsuya Hinoki, Yi-Hyun Park, Satoshi Konishi, Kyoto University

## SESSION TP3: ELECTROMAGNETIC PROPERTIES CHARACTERIZATION

*Chairs:*

Yoshihiko Imanaka, Fujitsu Limited  
Minoru Osada, National Institute for Materials Science  
**3:50 PM - 5:50 PM**

STRUCTURES AND DIELECTRIC PROPERTIES OF  $\text{Bi}_{1.5}\text{Zn}_{1.0}\text{Nb}_{1.5}\text{O}_7$  CUBIC PYROCHLORE THIN FILMS PREPARED BY PULSED LASER DEPOSITION  
Wei Ren, Xiaohua Zhang, Peng Shi, Aifeng Tian, Hong Xin, Xiaofeng Chen, Xiaoqing Wu, Xi Yao, Xi'an Jiaotong University

FABRICATION OF TERAHERTZ WAVE RESONATORS OF TWINNED PHOTONIC CRYSTALS WITH ALUMINA DIAMOND LATTICES BY USING MICRO-STEREOLITHOGRAPHY  
Toshiki Niki, Soshu Kiriara, Osaka University

SIZE EFFECT AND DOMAIN CONTRIBUTION IN BARIUM TITANATE  
Takaaki Tsurumi, Takuya Hoshina, Hiroaki Takeda, Tokyo Institute of Technology

ANTENNA CONCEPTS FOR CERAMIC MULTILAYER MODULES  
P. Uhlig, M. Geissler, S. Holzwarth, J. Leiss, M. Martínez-Vázquez, IMST GmbH; D. Manteuffel, Christian-Albrechts-University of Kiel

HIGHLY ENHANCED DIELECTRIC PROPERTIES OF METAL-DIELECTRIC NANOCOMPOSITES PREPARED BY AEROSOL DEPOSITION METHOD  
Jae-Hyuk Park, Jun Akedo, National Institute of Advanced Industrial Science and Technology (AIST)

BOTTOM-UP FABRICATION OF HIGH-K DIELECTRIC NANOFILMS USING OXIDE NANOSHEETS AS A BUILDING BLOCK  
Minoru Osada, Takayoshi Sasaki, National Institute for Materials Science

RECEPTION IN EXHIBIT HALL: 6:00 PM - 7:30 PM

*Wednesday, April 22*

REGISTRATION: 7:30 AM - 5:00 PM

CONTINENTAL BREAKFAST: 7:30 AM - 8:30 AM

EXHIBIT HOURS: 10:00 AM - 4:00 PM  
REFRESHMENT BREAK & LUNCH IN EXHIBIT HALL

## SESSION WA1: INTERNATIONAL SESSION ON MICROSYSTEMS

*Chairs:*

Leszek Golonka, Wroclaw University of Technology;  
Karl-Heinz Drüe, Technical University of Ilmenau  
**8:30 AM - 10:00 AM**

LIQUID PHASE MORPHOLOGY CONTROL AND PATTERNING OF METAL OXIDES - $\text{TiO}_2$ ,  $\text{ZnO}$ ,  $\text{BaTiO}_3$ ,  $\text{Eu:Y}_2\text{O}_3$ -  
Yoshitake Masuda, National Institute of Advanced Industrial Science and Technology (AIST)

MATERIALS TECTONICS BY STRUCTURAL JOININGS: FABRICATION OF CERAMICS MICRO PATTERNS WITH DIELECTRIC POLYGON TABLETS FOR TERAHERTZ WAVE RESONATIONS BY USING STEREOLITHOGRAPHY  
Soshu Kiriara, Noritoshi Ohota, Toshiki Niki, Masaru Kaneko, Osaka University

THICK-FILM PRESSURE / FORCE SENSORS ON DIFFERENT LTCC SUBSTRATES; A CHARACTERIZATION AND EVALUATION  
Marija Kosec, Marko Hrovat, Hana Uršič, Janez Holc, Silvo Drnovšek, Jena Cilenšek, Josef Stefan Institute; Darko Belavič, Marina Santo Zarnik, HIPOT-RR; Jaroslaw Kita, University of Bayreuth

BREAK IN THE EXHIBIT HALL: 10:00 AM - 10:30 AM

## SESSION WA2: DESIGN AND FABRICATION OF CERAMIC MICROSYSTEMS AND DEVICES

*Chairs:*

Torsten Rabe, Federal Institute for Materials Research and Testing (BAM);

Thomas Maeder, Ecole Polytechnique Fédérale de Lausanne

**10:30 AM - 11:50 AM**

### LTCC FLOW-THROUGH AMPEROMETRIC SENSOR FOR GLUCOSE DETERMINATION

Karol Malecha, Leszek J. Golonka, Piotr Kurek, Wrocław University of Technology; Dorota G. Pijanowska, Polish Academy of Sciences

### REMOTE CONTROLLED VALVES FOR FLOW CONTROL IN LTCC-BASED MICROFLUIDIC DEVICES

Richard E. Eitel, Wenli Zhang, Nitin Satarkar, J. Zach Hilt, University of Kentucky

### DESIGN AND ANALYSIS OF A LOW TEMPERATURE CO-FIRED CERAMIC MICRO-COMBUSTOR

Matthew McCrink, Donald Plumlee, Boise State University

### STRUCTURATION OF THIN BRIDGE AND CANTILEVER STRUCTURES IN THICK-FILM TECHNOLOGY USING MINERAL SACRIFICIAL MATERIALS

Thomas Maeder, Caroline Jacq, Yannick Fournier, Wassim Hraiz, Peter Ryser, Ecole Polytechnique Fédérale de Lausanne

## SESSION WA3: PROCESSING AND DESIGN OF INTEGRATED PASSIVES IN LTCC

*Chair:*

Jerry Aguirre, Kyocera America Inc.

**10:30 AM - 11:50 AM**

### SYNTHESIS AND CHARACTERIZATION OF $(\text{Bi}_{1/2}\text{A}_{1/2})$ -MODIFIED

### $\text{BaTiO}_3$ (A=Na, K) SEMICONDUCTING CERAMICS

H. Takeda, T. Hoshina, T. Tsurumi, Tokyo Institute of Technology; T. Shiosaki, P.-H. Xiang, Nara Institute of Science and Technology

### LOW FIRED HIGH-K DIELECTRICS BURIED INTO LTCC SUBSTRATES

Hamid Naghib-zadeh, Carsten Glitzky, Torsten Rabe, Federal Institute for Materials Research and Testing (BAM)

### HIGHLY INTEGRATED PASSIVE LTCC DEVICE WITH EMBEDDED HIGH-K CAPACITORS

Jens Müller, Rubén Perrone, Stefan Humbla, Matthias A. Hein, Ilmenau University of Technology; Polina Kapitanova, Dmitry Kholodnyak, Irina B. Vendik, Saint-Petersburg Electrotechnical University

### DEFECTS AFFECTING DIELECTRIC PROPERTIES OF $\text{BaTiO}_3$ FILMS IN APPLYING AEROSOL DEPOSITION METHOD TO THIN FILM PROCESS

Song-Min Nam, Jong-Min Oh, Kwangwoon University

LUNCH IN THE EXHIBIT HALL: 12:00 PM - 1:20 PM

## SESSION WP1: INTERACTIVE FORUM (POSTER SESSION)

*One-on-One Interactive Forum. This is your chance for detailed interaction with authors whose work is too good to miss.*

*Chair:*

Amy Moll, Boise State University

**1:30 PM - 3:30 PM**

### EROSION OF LOW-TEMPERATURE CO-FIRED CERAMICS IN A RADIO FREQUENCY INDUCTIVELY COUPLED PLASMA

A. Miller, D. Plumlee, J. Browning, A. Moll, Boise State University

### MEASUREMENT AND SIMULATION OF INTERDIGITAL CAPACITOR STRUCTURES WITH HIGH-PERMITTIVITY THIN FILMS

Clinton P. Scarborough, Grove City College; Steve Perini, Jeremy Accord, Joshua Robinson, George Semouchkin, Michael Lanagan, The Pennsylvania State University

### DEVELOPMENT OF A CONTINUOUS FLOW POLYMERASE CHAIN REACTION DEVICE IN LOW TEMPERATURE CO-FIRED CERAMICS

A. J. Vissotski, D. G. Plumlee, A. J. Moll, Boise State University

### FABRICATION AND CHARACTERISTICS OF DIELECTRIC FILMS BY USING PLASMA ASSISTED AEROSOL DEPOSITION METHOD

M. Mori, N. Akita, S. Baba, Ryukoku University; Jun Akedo, National Institute of Advanced Industrial Science and Technology

BREAK IN EXHIBIT HALL: 3:30 PM – 4:00 PM

## SESSION WP2: LTCC STANDARDS

*Chairs:*

Howard Imhof, Metalor Technologies USA;

Michael Ehlert, Barry Industries Inc.

**4:00 PM - 5:30 PM**

### LTCC STANDARDS SIG

Michael R. Ehlert, Barry Industries Inc.

### LTCC STANDARDS VS. INEMI ROADMAP - A MATCH MADE IN HEAVEN?

Howard Imhof, Metalor Technologies USA; Michael R. Ehlert, Barry Industries Inc.

### LTCC STANDARDS PROGRESS

Michael R. Ehlert, Barry Industries Inc.



*Thursday, April 23*

REGISTRATION: 7:30 AM - 12:00 PM

CONTINENTAL BREAKFAST: 7:30 AM - 8:30 AM

**SESSION THA1: ADVANCED PACKAGING TECHNOLOGY**

*Chairs:*

Martin Oppermann, EADS Deutschland GmbH;  
Ken Peterson, Sandia National Laboratories

**8:30 AM - 10:30 AM**

INVESTIGATION ON THE POROSIFICATION BEHAVIOUR OF FIRED LTCC SUBSTRATES  
A. Bittner, H. Seidel, R. Kautenburger, Saarland University; A. Roosen, University of Erlangen-Nuremberg;  
U. Schmidt, Vienna University of Technology

PACKAGING OF A MEMS OPTICAL SWITCH DURING DEVELOPMENTAL TESTING  
Thomas P. Swiler, Kenneth A. Peterson, Ernest J. Garcia, Sandia National Laboratories

UV-LASER DRILLED  $\mu$ -VIAS IN DIELECTRIC LAYERS ON LTCC AS PART OF A BUILD-UP TECHNOLOGY  
FOR HIGH DENSITY INTERCONNECTIONS  
Karl-Heinz Drüe, Jens Müller, Ilmenau University of Technology

MEASUREMENT AND POTENTIAL PERFORMANCE OF EMBEDDED LTCC INDUCTORS UTILIZING  
FULL TAPE THICKNESS FEATURE CONDUCTORS  
Adam Boutz, William B. Kuhn, Kansas State University

PHOTOFORMABLE THICK FILM DIELECTRIC PROCESS OPTIMIZATION FOR REDUCED VIA SIZE  
Doug Link, Starkey Laboratories, Inc.; M. A. Skurski, E.I. DuPont de Nemours & Co., Inc.

IMPROVED ISOLATION FOR LTCC TRANSCEIVER MODULES USING FULL-TAPE-THICKNESS FEATURES  
Ken Peterson, Richard Knudson, Brian Duverneay, Sandia National Laboratories;  
Greg Barner, Frank Smith, Matthew Johnson, Honeywell Federal Manufacturing & Technology

**SESSION THA2: LTCC UNIVERSITY CONSORTIUM MEETING**

*Chairs:*

W. Kinzy Jones, Florida International University;  
Amy Moll, Boise State University

**10:30 AM - 12:00 PM**

Organization meeting to discuss the creation of a university network similar to MEMS exchange where university and industrial researchers could access LTCC labs in the network - either for an entire fabrication process or just for one piece of equipment.

***For example:***

If Boise State needed something isostatically laminated, they could send it to Florida International University to have it done for a very reasonable cost.

**CONFERENCE CLOSING REMARKS: 12:00 PM**

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***See next page for more information...***

**IEEE LTCC STANDARDS WORKING GROUP (P1787)**

**8:30 AM - 12:00 PM**

**NIST DIELECTRIC MEASUREMENT TUTORIAL**

**1:30 PM - 4:00 PM**



## **IEEE LTCC STANDARDS WORKING GROUP (P1787)**

### **Moderators:**

Mike Smith, DuPont; Marian Hargis, Delphi Electronics and Safety; Mike Ehlert, Barry Industries Inc.

**8:30 AM - 12:00 PM**

The IEEE LTCC Standards Working Group (P1787) is responsible for writing the standard for measuring LTCC materials at high frequency and will be meeting to discuss the candidacy forms, balloting and voting procedures for electing the officers for the Working Group. In addition, the committee will review the document format required by the IEEE Standards Association.

Three subcommittees have been formed to write three substandard. The first subgroup is Measurement of Unmetallized LTCC chaired by Mike Smith. The second, Measurement of Metallized LTCC is chaired by Marian Hargis and the third group, Test Measurements Standard for thermo-physical properties of LTCC is led by Mike Ehlert.

During this session, the members will review the test procedures being written by the subcommittees, metallized, and unmetallized and thermo-physical properties of LTCC.

LUNCH: 12:00 PM - 1:30 PM  
(*NOT PROVIDED - ON YOUR OWN*)

## **NIST DIELECTRIC MEASUREMENT TUTORIAL**

Instructor: Dr. Michael Janezic, NIST

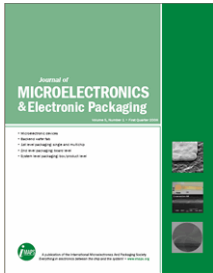
**1:30 PM - 4:00 PM**

The IEEE LTCC Standards Working Group (P1787) is currently developing a series of standard test methods and best practice guides to support the LTCC industry. A key component will be the standardization of high-frequency techniques to measure the broadband dielectric properties of LTCC substrates. To support this effort, the National Institute of Standards and Technology (NIST) have developed new measurement methods to characterize the high-frequency dielectric properties of unmetallized LTCC substrates. In this tutorial, Dr. Michael Janezic, a member of NIST Advanced Materials Metrology Project, will summarize the state-of-the-art nondestructive dielectric measurement techniques and overview the latest measurement procedures in a series of live dielectric substrate measurement demonstrations.

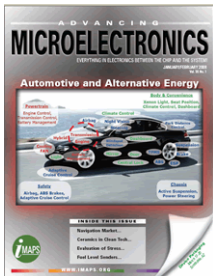


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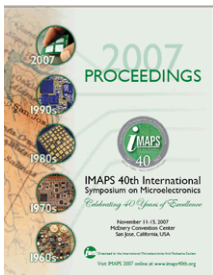


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## Upcoming Events...

### IMAPS and SEMI Topical Workshop on Wire Bonding

*This event will run parallel to the Adhesives/Encapsulants/Molding workshop  
with one admission fee prior to SEMICON West 2009 - July 14-16*

**Moscone Center  
San Francisco, California - USA  
July 13, 2009**

Visit [www.imaps.org/wirebonding](http://www.imaps.org/wirebonding) for more information

### International Conference on High Temperature Electronics Network (HiTEN) Oxford, UK

**September 13 - 16, 2009**

Visit [www.imaps.org/hiten](http://www.imaps.org/hiten) for more information

### Advanced Technology Workshop on RF and Microwave Packaging The Crowne Plaza San Diego San Diego, California - USA September 22 - 24, 2009

Visit [www.imaps.org/rf](http://www.imaps.org/rf) for more information

### Advanced Technology Workshop on Thermal Management Dinah's Garden Hotel Palo Alto, California - USA October 5 - 8, 2009

Visit [www.imaps.org/thermal](http://www.imaps.org/thermal) for more information

### 42<sup>nd</sup> International Symposium on Microelectronics (IMAPS 2009)

**San Jose Convention Center  
San Jose, California - USA  
November 1 - 5, 2009**

Visit [www.imaps2009.org](http://www.imaps2009.org) for more information

### *Featuring Invited Sessions on* Intelligent Uses of Precious Metals in Microelectronics

*These invited sessions will run as part of the technical program  
at the IMAPS 2009 Symposium - November 3-5.*

**San Jose, California - USA**

Visit [www.imaps.org/preciousmetals](http://www.imaps.org/preciousmetals) for more information

**You can also view the IMAPS Calendar at  
[www.imaps.org/calendar](http://www.imaps.org/calendar)**

## Upcoming Events...

### 8<sup>th</sup> Pacific Rim Conference on Ceramic & Glass Technology Includes 2009 Annual Meeting of the International Commission on Glass (ICG)

Hyatt Regency Vancouver  
Vancouver, British Columbia, Canada

**May 31 - June 5, 2009**

[www.ceramics.org/pacrim8](http://www.ceramics.org/pacrim8)

### UNITECR 2009-11th Biennial Worldwide Conference on Refractories

Pestana Bahia Hotel

Salvador, Brazil

**October 13 - 16, 2009**

[www.unitecr2009.org](http://www.unitecr2009.org)

### Materials Science & Technology 2009 Conference & Exhibition (MS&T'09) & ACerS 111<sup>th</sup> Annual Meeting

David L. Lawrence Convention Center

Pittsburgh, Pennsylvania, USA

**October 25 - 30, 2009**

<http://matscitech.org/>

### ACerS Ceramic Materials Short Courses in conjunction with MS&T'09

- Fundamentals of Glass Science and Technology Sintering of Ceramics
  - Solids Flow in Storage and Process
- Dynamic Behavior of Structural and Armor Ceramics
  - Introduction to Ceramic Phase Diagrams
  - Mechanical Properties of Ceramic and Glass

**October 29 - 30, 2009**

[www.ceramics.org/shortcourses](http://www.ceramics.org/shortcourses)

### 34th International Conference & Exposition on Advanced Ceramics & Composites

Hilton Daytona Beach Resort & Ocean Center

Daytona Beach, Florida, USA

**January 24 - 29, 2010**

[www.ceramics.org/daytona2010](http://www.ceramics.org/daytona2010)

### Materials Challenges Facing Adoption of Alternative Fuels

Hilton Cocoa Beach Oceanfront

Cocoa Beach, Florida, USA

**February 21 - 24, 2010**

[www.ceramics.org/meetings/](http://www.ceramics.org/meetings/)

### Materials Science & Technology 2010 Conference & Exhibition (MS&T '10) & ACerS 112<sup>th</sup> Annual Meeting

George R. Brown Convention Center

Houston, Texas, USA

**October 17 - 21, 2010**

[www.ceramics.org/meetings/](http://www.ceramics.org/meetings/)

### 3rd International Congress on Ceramics

Osaka International Convention Center

Osaka, Japan

**November 14 - 18, 2010**

[www.ceramics.org/meetings/](http://www.ceramics.org/meetings/)

# Welcome CICMT Exhibitors

April 21 - 22, 2009

Tuesday - April 21 10:00 am - 7:30 pm (Exhibit Hours)

*Refreshment Breaks, Lunch & Reception in Exhibit Hall.*

Wednesday - April 22 10:00 am - 4:00 pm (Exhibit Hours)

*Refreshment Break & Lunch in Exhibit Hall.*

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## Exhibitors (as of April 3<sup>rd</sup>)

AI Technology, Inc.

Cyber-Technologies

DuPont Electronic Technologies

ESL ElectroScience

FRT of America, LLC

Kyocera America, Inc.

Pac Tech

Sonoscan, Inc.

# THANK YOU FOR YOUR SUPPORT!

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2009 CICMT CONFERENCE  
COMMITTEE!**

*(Organizing Committee & Session Chairs)*

**WE ARE GRATEFUL FOR  
YOUR COMMITMENT!**

**A SPECIAL THANKS  
TO THE  
2009 CICMT PRESENTERS!**

**YOUR PARTICIPATION  
IS  
GREATLY APPRECIATED!**