Advance Program, Exhibition Information and Registration on-line: www.imaps.org/hitec

IMAPS International Conference and Exhibition on

High Temperature Electronics (HiTEC 2010)

May 11-13, 2010
Hyatt Regency Hotel
Albuquerque, New Mexico, USA

Oganizing Committee:

Wayne Johnson, Auburn University
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Randy Normann, Perma Works, LLC
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Corporate Sponsor:

Program Overview

Plenary Talk: Al Hefner, NIST

Session TA1: High Temperature Packaging: Die Attach
Chair: Al Hefner, NIST

Session TA2: High Temperature Integrated Circuits / Memory
Chair: Colin Johnston, Oxford Applied Technology-UK

Plenary Talk: Doug Blankenship, DOE

Session TP1: High Temperature Packaging: General
Chair: Doug Blankenship, DOE

Session TP2: SiC Switch Technologies
Chair: Mohammad Mojarradi, NASA

Plenary Talk: Joe Weimer, USAF

Session WA1: High Temperature Passives: Capacitor Technologies
Chair: David Shaddock, General Electric Global Research

Session WA2: SiC Based Inverters & Converters
Chair: Joe Weimer, USAF

Plenary Talk: Mohammad Mojarradi, NASA

Session WP1: High Temperature Passives: Capacitors & Resistors
Chair: Randy Normann, Perma Works, LLC

Session WP2: SiC Power Modules & Amplifiers
Chair: TBD

Plenary Talk: Laura Marlino, Oak Ridge National Laboratory

Session THA1: Hybrid Electric Vehicles Components
Chair: Laura Marlino, Oak Ridge National Laboratory

Session THA2: MEMS & Sensors
Chair: Liangyu Chen, Ohio Aerospace Institute (OAI)/NASA Glenn Research Center

Session THP1: High Temperature Batteries
Chair: Joe Henfling, Sandia National Laboratories

Roundtable Discussion

Organized by: International Microelectronics And Packaging Society (IMAPS)
Bringing Together The Entire Microelectronics Supply Chain!

Early Bird Registration, Tabletop Registration and Hotel Deadline: April 10, 2010

Message from the Organizing Committee:

The members of the Conference Committee are pleased to invite you to the IMAPS High Temperature Electronics Conference (HiTEC 2010).

This is the premier event addressing the needs of the high temperature electronics community. Applications for high temperature electronics include smart energy, underhood automotive, oil well logging, geothermal, more electric aircraft, space, industrial sensors, etc. HiTEC 2010 provides a comprehensive technical program addressing the applications, and the latest development in devices, circuits, MEMS, sensors, packaging, power sources, and materials to address the challenges of these applications.

Tabletop exhibits will compliment the technical program by providing you an opportunity to view the latest products for high temperature electronics. This is a truly unique opportunity for suppliers, fabricators, and users to meet and talk about the needs, issues and opportunities in this exciting and important area.

Please join us in Albuquerque, New Mexico for HiTEC 2010.

HiTEC Tabletop Exhibition

"An opportunity to talk to industry leaders"

Exhibit Hours

Tuesday - May 11 — 12:00 noon - 7:30 pm

Refreshment Breaks, Lunch and a Reception will be held in the Exhibit Hall.

Wednesday - May 12 — 10:00 am - 3:00 pm

Refreshment Break and Lunch will be held in the Exhibit Hall.

Tabletop Registration Fees

	On/Before 4/10/10	After 4/10/10
IMAPS Corporate Member	$575	$675
Non-Corporate Member	$675	$775

Included with your registration: one six-foot draped table, two chairs, carpeting, one copy of Proceedings on CD-ROM, one copy of the final list of attendees (sent after the event) and exhibit hall admission for two booth personnel.

Only tabletop exhibits will be accepted. Free standing exhibits will not be allowed at this event.

For more information, visit www.imaps.org/hitec or contact Ann Bell at *202-548-8717*

Exhibitors on HiTEC 2010 CD-ROM

IMAPS is offering Exhibiting Companies the opportunity to have an unlimited amount of product promotion information on the Conference CD-ROM. **Exhibitors must submit ONE pdf or word file, via e-mail, containing the information you want to appear to abell@imaps.org on or before April 10, 2010.** Files must be sent to Ann Bell (abell@imaps.org). Submissions must be as stated and arrive by the deadline. There is no charge for participation.

Companies that already reserved exhibit space!

CISSOID*

Micropac Ind., Inc.

Pacific Aerospace and Electric (PA&E)

Perma Works LLC

Texas Instruments

Thank you to the HiTEC Corporate Sponsor*

Tuesday, May 11

Registration: 7:15 am – 7:30 pm

Continental Breakfast: 7:15 am – 7:45 am

Exhibit Hours: 12:00 noon – 7:30 pm
Refreshment Breaks, Lunch and Reception in the Exhibit Hall

Reception in the Exhibit Hall: 6:00 pm – 7:30 pm

Opening Remarks: 7:45 am – 8:00 am
Conference Chairs

Plenary Talk: 8:00 am – 8:40 am
Title: NIST High Temperature Electronics Research
Speaker: Al Hefner, NIST

TA1 - High Temperature Packaging: Die Attach

Chair: Al Hefner, NIST
8:45 am – 12:15 pm

Assessing the Reliability of Die Attach Materials in Electronic Packages for High Temperature Applications
M. Sousa, S. Riches, C. Johnston, P. S. Grant, University of Oxford

Mechanical and Thermal Properties of TLPS Die Attach
F. Patrick McCluskey, K. Smith, University of Maryland – CALCE

Metallurgy for SiC Die Attach for Operation at 500°C
R. Wayne Johnson, Ping Zheng, Phillip Henson, Auburn University; Liangyu Chen, Ohio Aerospace Institute/NASA Glenn Research Center

Break: 10:15 am – 10:45 am

Swelling Phenomena in Sintered Silver Die Attach Structures at High Temperatures: Reliability Problems and Solutions for an Operation Above 350°C
Nicolas Heuck, S. Müller, A. Bakin, A. Waag, Institute for Semiconductor Technology

Migration of Sintered Nanosilver Die-attach Material atHigh Temperatures in Dry Air
Guo-Quan Lu, Yunhui Mei, Dimeji Ibitayo, Xu Chen, Shufang Luo, Virginia Tech

Assessment of Au-Ge Die Attachment for an Extended Junction Temperature Range in Power Applications
Satoshi Tanimoto, Kohei Matsui, Yoshinori Murakami, Hiroshi Yamaguchi, Hajime Okumura, Nissan Motor Co., Ltd.

TA2 - High Temperature Integrated Circuits / Memory

Chair: Colin Johnston, Oxford Applied Technology - UK
8:45 am – 12:15 pm

High Temperature CMOS Reliability and Drift
Shane Rose, Quartzdyne Inc.

High-Temperature, Bulk-CMOS Integrated Circuits for a Distributed FADEC System
Daniel Howe, Steven Majerus, Steven Garverick, David Hiscock, Walter Merrill, Scientific Monitoring Incorporated

Evaluation of Commercial SOI Driver Performances While Operated in Extreme Conditions (up to 200°C)
Khalil El Falahi, B. Allard, D. Tournier, D. Bergogne, Universite de Lyon

Break: 10:15 am – 10:45 am

“Digital” Vacuum Microelectronics: Carbon Nanotube-Based Inverse Majority Gates for High Temperature Applications
Harish Manohara, M. Mojarradi, R. Toda, R. Lin, A. Liao, Jet Propulsion Laboratory

Compact Modeling of the High Temperature Effect on the Single Event Transient Current Generated by Heavy Ions in SOI 6T-SRAM
El Hafed Boufouss, Joaquin Alvarado, Denis Flandre, Université Catholique de Louvain (UCL)

A High-Temperature Folded-Cascode Operational Transconductance Amplifier in 0.8-μm BCD-on-SOI
Chiahung Su, University of Tennessee

Lunch Break in the Exhibit Hall: 12:15 pm – 1:15 pm

Plenary Talk: 1:20 pm – 2:20 pm
Title: High Temperature Vision for Geothermal Research
Speaker: Doug Blankenship, DOE

TP1 - High Temperature Packaging: General

Chair: Doug Blankenship, DOE

2:20 pm – 6:05 pm

Application of High Temperature Electronics Packaging Technology to Signal Conditioning and Processing Circuits
S. T. Riches, K. Cannon, GE Aviation Systems - Newmarket; C. Johnston, P. Grant, M. Sousa, Oxford University; J. Gulliver, Sonex Wireline; M. Langley, Meggitt U.K.; R. Pittson, S. Serban, D. Baghurst, Gwent Electronic Materials; M. Firmstone, Thermastrate Ltd.

Characterization of Thick Film Technology for 300°C Packaging
R. Wayne Johnson, Rui Zhang, Auburn University; Vinayak Tilak, Tan Zhang, David Shaddock, GE Global Research Center

Parylene HT: A High Temperature Vapor Phase Polymer for Electronics Applications
Rakesh Kumar, Specialty Coating Systems, Inc.

Break in the Exhibit Hall: 3:55 pm – 4:30 pm

The Behaviour of Au-Au Wire Bonds in Extreme Environments
Daniel Shepherd, Patrick Grant, Colin Johnston, Oxford University Materials; Steve Riches, GE Aviation

High Temperature Solders Containing Aluminum
Hiren Kotadia, Omid Mokhtari, Melanie Bottrill, Mike Clode, Mark Green, Samjid Mannan, King's College London

Thermomechanical Stresses in Copper Films at Elevated Temperature
Javad Zarbakhsh, Martin Lederer, Rui Huang, Thomas Detzel, Brigitte Weiss, KAI GmbH

TP2 - SiC Switch Technologies

Chair: Mohammad Mojarradi, NASA

2:20 pm – 6:05 pm

Comparison of High Temperature Operation of Silicon Carbide MOSFETs and Bipolar Junction Transistors
Jim Richmond, Khiem Lam, Sei-Hyung Ryu, Quingchun (Jon) Zhang, Brett Hull, Mrinal Das, Albert Burk, Anant Agarwal, John Palmour, Cree Inc.

High Temperature Silicon Carbide DMOSFET Based DC-DC Converter
Siddharth Potbhare, Akin Akturk, Neil Goldsman, James M. McGarrity, Anant Agarwal, University of Maryland

High-Temperature Switching Performance of Normally-off SiC JFET's Compared to Competing Approaches
Jeffrey B. Casady, David C. Sheridan, Andrew Ritenour, SemiSouth Laboratories, Inc.

1200V 6A High Temperature SiC BJTs
Anders Lindgren, Martin Domeij, Transic AB

High Temperature Ultra High Voltage SiC Thyristors
Ranbir Singh, E. Lieser, S. Jeliazkov, S. Sundaresan, GeneSiC Semiconductor Inc.

Study of Failure Mechanisms of IGBT Inverters Operating in Combined Aeronautical Constraints
Hassan Abbad El Andaloussi, Eric Woirgard, Stéphane Azzopard, University of Bordeaux; Pascal Rollin, Technofan; Tony Lhommeau, Hispano-Suiza

Exhibit Hall Reception: 6:10 pm – 7:30 pm

HiTEC Speaker Information

Final Manuscripts for the HiTEC Proceedings are due April 2, 2010.
Send Your Final Manuscript Via E-Mail to jmorris@imaps.org, in PDF format only (PDF can be in color).

PowerPoint/Presentation file used during session: Speaker's responsibility to bring to session on USB and/or CD (recommended to have back-up on personal laptop, cd-rom, or memory stick). Laptops will be provided by IMAPS in each session room.

Selected Manuscripts from HiTEC will be considered for publishing in the *Journal of Microelectronics and Electronic Packaging*. Invitations will be made separately. Inquiries can be sent to jmep@imaps.org.

Speakers must register for this conference at the reduced speaker rates. Early registration deadline and hotel cut-off is April 10, 2010. Hotel availability and pricing will not be guaranteed after April 10th.

Thank you to the HiTEC Corporate Sponsor:

Wednesday, May 12

Registration: 7:15 am – 6:00 pm

Continental Breakfast: 7:15 am – 8:00 am

Exhibit Hours: 10:00 am – 3:00 pm
Refreshment Break and Lunch in the Exhibit Hall

Plenary Talk: 8:00 am – 8:40 am

Title: USAF Integrated Vehicle Energy Technology: InVEnT Program
Speaker: Joe Weimer, USAF

WA1 - High Temperature Passives: Capacitor Technologies

Chair: David Shaddock, General Electric Global Research
8:45 am – 11:45 am

Capacitor Characterization Study for a High Power, High Frequency Converter Application
Jeffery T. Stricker, Navjot Brar, Jim Scofield, Hiroyuki Kosai, Biswajit Ray, Seana McNeal, Jennifer DeCerbo, William Lanter, Tyler Bixel, US Air Force Research Laboratory

High Temperature Capacitors Based on [0001] and [1120] Sapphire Dielectrics
Liang-Yu Chen, Ohio Aerospace Institute (OAI)/NASA Glenn Research Center

Demonstrated Performance Characteristics for Improved High Temperature Ceramic Capacitors Intended for Use in Extreme, Harsh Environments
Mustafa A. Syammach, Michael J. Roach, Fauzi A. Syammach, Mustapha Habibi, Eclipse NanoMed, LLC

WA2 - SiC Based Inverters & Converters

Chair: Joe Weimer, USAF
8:45 am – 12:15 pm

New High Temperature Electronic Components for Power Management and Motor Control Applications
Pierre Delatte, V. Dessard, A. Saib, N. Pequignot, G. Picún, L. Demeûs, L. Martinez, T. Krebs, J.-C. Doucet, CISSOID S.A.

The Development and Qualification of a DC-DC Converter for 225°C (437°F) Operating Temperature
Bob Hunt, Chris Andrews, C-MAC MicroTechnology

High Temperature Performance of a 2 kW Interleaved DC-DC Converter
Hiroyuki Kosai, Seana McNeal, Brett Jordan, James Scofield, Biswajit Ray, UES, Inc.

Break in the Exhibit Hall: 10:15 am – 10:45 am

WA1 (continued)

Nanocomposite Film Dielectrics for High Temperature Power Conditioning Capacitors
Kirk Slenes, Lew Bragg, TPL, Inc.

Wide Temperature, High Energy Density Film Capacitors for Power System Conditioning
Shihai Zhang, Douglas Kushner, Chen Zou, Strategic Polymer Sciences, Inc.

WA2 (continued)

High Temperature Inverter for Airborne Application
Fabien Dubois, Dominique Bergogne, Herve Morel, Regis Meuret, University of Lyon

Effect of High Temperature Ageing on Active and Passive Power Devices
Remi Robutel, Cyril Buttay, Christian Martin, Christophe Raynaud, Simeon Dampieni, Dominique Bergogne, Universite de Lyon

Design of High Temperature EMI Input Filter for a 2 kW HVDC-Fed Inverter
Remi Robutel, Christian Martin, Herve Morel, Cyril Buttay, Dominique Bergogne, Universite de Lyon; Nicolas Gazel, SAFRAN Group

Lunch in the Exhibit Hall: 12:15 pm – 1:15 pm

Student Paper Competition sponsored by:

Thank You!

To all of the Members of the Organizing Committee, the Local Volunteers, and the Session Chairs who will make HiTEC 2010 a Great Success!

Plenary Talk: 1:20 pm – 2:20 pm

Title: NASA Needs for High Temperature Electronics for Space Systems
Speaker: Mohammad Mojarradi, NASA

WP1 - High Temperature Passives: Capacitors & Resistors

Chair: Randy Normann, Perma Works, LLC
2:20 pm – 6:05 pm

A Comparison of Multilayer Ceramic Capacitor Technologies for High Temperature Applications
Craig Nies, Scott Harris, AVX Corporation - Advanced Products and Technology Center

Development of High Voltage and High Capacitance Stacked Ceramic Capacitors for High Temperature Applications
John Bultitude, John McConnell, Abhijit Gurav, Travis Ashburn, Jeff Franklin, Lonnie Jones, Xilin Xu, Jim Magee, Mark Laps, KEMET Electronics Corporation

Robust Class-I BME Ceramic Capacitors for High Temperature Applications
Abhijit Gurav, Xilin Xu, Jim Magee, Jeff Franklin, Travis Ashburn, KEMET Electronics Corporation

Break: 3:55 pm – 4:30 pm

Reliability Assessment of Passives for 300°C using HALT
David Shaddock, Tan Zhang, Vinayak Tilak, General Electric Global Research

300°C Resistor Drift and Failure Analysis
Mark Hahn, Ron Smith, Milton Watts, Quartzdyne Electronics

WP2 - SiC Power Modules & Amplifiers

Chair: TBD
2:20 pm – 6:05 pm

High Temperature 230°C Isolated Power Supply
R. Schupbach, B. Reese, R. Shaw, J. Hornberger, A. Lostetter, APEI, Inc.

Performance and Reliability Characteristics of 1200 V, 100 A, 250°C Half-Bridge SiC MOSFET-JBS Diode Power Modules
James Scofield, Neil Merrett, Jim Richmond, Anant Agarwal, Scott Leslie, US Air Force Research Laboratory

High Temperature 250°C Silicon Carbide Power Modules with Integrated Gate Drive Boards
R. Schupbach, B. McPherson, J. Hornberger, R. Shaw, B. Reese, A. Lostetter, B. Rowden, K. Okumura, T. Otsuka, A. Mantooth, APEI, Inc.

Development of a 300°C Capable SiC Based Operational Amplifier
Vinayak Tilak, Cheng-Po Chen, Peter Losee, Emad Andarawis, GE Global Research Center

Development of a SiC SSPC Module with Advanced High Temperature Packaging
Douglas C. Hopkins, Yuanbo Guo, Herbert E. Dwyer, James D. Scofield, DensePower, LLC

High Temperature Power Module Fabrication
R. Wayne Johnson, Michael Palmer, Auburn University; Tracy Autry, Rizal Aguirre, Victor Lee, Microsemi, Inc.

Thursday, May 13

Registration: 7:15 am – 3:30 pm

Continental Breakfast: 7:15 am – 8:00 am

Plenary Talk: 8:00 am – 8:40 am

Title: Hybrid Electric Vehicle High Temperature Needs
Speaker: Laura Marlino, Oak Ridge National Laboratory

THA1 - Hybrid Electric Vehicles Components

Chair: Laura Marlino, Oak Ridge National Laboratory
8:45 am – 11:45 am

Edge-Controlled Mechanical Failure of Si and SiC Semiconductor Chips
A. A. Wereszczak, O. M. Jadaan, T. P. Kirkland, Oak Ridge National Laboratory

High-Temperature, High-Dielectric-Constant Capacitors for
U. (Balu) Balachandran, M. Narayanan, B. Ma, Argonne National Laboratory

SiC High Temperature Power Module Electrical Evaluation Procedure
Puqi Ning, Fred Wang, Virginia Tech - (CPES)

THA2 - MEMS & Sensors

Chair: Liangyu Chen, Ohio Aerospace Institute (OAI)/NASA Glenn Research Center
8:45 am – 12:15 pm

Piezoelectric Structural Sensor Technology for Extreme Environments
Edward Alberta, Raffi Sahul, Wesley Hackenberger, TRS Technologies; Xiaoning Jiang, North Carolina State University; Shujun Zhang, Thomas Shrout, The Pennsylvania State University

Performance and Reliability of MEMS Gyroscopes at High Temperatures
F. Patrick McCluskey, C. Patel, University of Maryland - CALCE; D. Lemus, TRX Inc.

Development of High Temperature Acoustic Transducer Materials for Downhole Imaging in Geothermal Applications
Edward Alberta, Raffi Sahul, Seongtae Kwon, Kevin Snook, Wesley Hackenberger, TRS Technologies; Shujun Zhang, Thomas Shrout, The Pennsylvania State University

Break: 10:15 am – 10:45 am

Rugged ICs Against Corrosion, Shock Plus Hotter Temperatures
James J. Wang, Power Gold LLC

A Universal BCD-on-SOI Based High Temperature Short Circuit Protection for SiC Power Switches
Liang Zuo, S. K. Islam, M. A Huque, B. J. Blalock , L. M. Tolbert, University of Tennessee

Packaging Technology for High Temperature Capacitive Pressure Sensors
Liang-Yu Chen, Ohio Aerospace Institute/NASA Glenn Research Center; Glenn M. Beheim, Roger D. Meredith, NASA Glenn Research Center

Modeling and Simulation of the Thermal Drift Characteristics of the Piezo Resistive Pressure Sensor
Redouane Otmani, Nasreddine Benmoussa, Kherreddine Ghaffour, Abou Bekr Belkaïd University-Research Unit of Materials and Renewable Energies URMER

SiGe Amplifier and Buffer Circuits for High Temperature Applications
Dylan B. Thomas, Nelson E. Lourenco, John D. Cressler, Steven Finn, Georgia Tech

Lunch: 12:15 pm – 1:15 pm

THP1 - High Temperature Batteries

Chair: Joe Henfling, Sandia National Laboratories
1:20 pm – 2:50 pm

New Rechargeable Battery for Application in a Wide Temperature Range
Josip Caja, T. Don Dunstan, Mario Caja, Electrochemical Systems, Inc.

High Temperature Lithum Alloy Cells with Improved Low Temperature Performance
Arden P. Johnson, Cuiyang Wang, John S. Miller, Electrochem Solutions, Inc.

Practical Oil Field Requirements for New High-Temperature Batteries
Randy Normann, Brett Bouldin, Perma Works LLC

Roundtable Discussion

2:50 pm – 3:30 pm
How do Wide Band Gap Devices Enter Commercial Market in Competition with Silicon Devices?

Closing Remarks: 3:30 pm

Registration Form

Register On-Line at www.imaps.org/hitec

HiTEC 2010 Conference - May 11 - 13, 2010

❑ Dr. ❑ Mr. ❑ Ms. Member ID# ________________

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Registration Fees: Early Registration Ends 4/10/10

Conference Fees

	(On or before **4/10**)	(After **4/10**)
❑ IMAPS Member	$500	$600
❑ Non-member	$600	$700
❑ Speaker ❑ Chair ❑ Chapter Officer	$375	$475
❑ Student	$200	$300

All conference fees above include access to all sessions and exhibits events, all meals listed and a Proceedings on CD-ROM. Each registration above also includes a one-year individual membership/renewal in IMAPS. Does not apply to corporate or affiliate memberships.

❑ Exhibits Only (does not include lunch) **FREE**

Exhibits Lunch (per person/per day) $25

❑ Tuesday ❑ Wednesday ❑ Thursday

Tabletop Exhibit (May 11th & 12th)

❑ IMAPS Corporate Member	$575	$675
❑ Non-IMAPS Corporate Member	$675	$775

❑ Yes, we will participate in the CD-ROM*

*see inside front cover for details and deadlines.

Additional Purchases

❑ Guest/Family Member *(meals only)*	$160	$160
❑ CD-ROM Proceedings *(Member Rate)*	$200	$200
❑ CD-ROM Proceedings *(Non-Member Rate)*	$300	$300
❑ Add to Ship in the US	$7	$7
❑ Add to Ship Overseas	$25	$25

Housing *(Hotel Cut-off is April 10, 2010)*

Housing Accommodations **must** be made directly to:

Hyatt Regency Hotel
330 Tijeras NW
Albuquerque, NM 87102
Phone: 515-842-1234

Single/Double - $115/night + tax

Please reference IMAPS when making reservation to receive the group rate.

Payment

HiTEC10

Conference Fee: $ ______________________

Tabletop Exhibit Fee: $ ______________________

Additional Purchases: $ ______________________

Total Payment Due: $ ______________________

❑ Enclosed is a check payable in US funds to IMAPS

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