Final Program

33rd Annual Conference on Composites, Materials and Structures (U.S. Citizens Only / ITAR Restricted Sessions)
January 26-29, 2009
Radisson Resort at the Port
Cocoa Beach / Cape Canaveral, Florida
Sunday Evening, January 25, 2009
Location: Convention Center

6:00-9:00pm Pre-Registration
Monday Morning, January 26, 2009
Plenary Session
Session Chair: Mark Opeka, Naval Surface Warfare Center, Carderock, West Bethesda, MD
Location: Salons 1, 2 and 3

7:30-8:30  Registration and Continental Breakfast

8:30-8:40  Welcoming Remarks
Mr. Ted Lynch, USACA, Washington, DC

8:40-8:50  Introductory Remarks
Session Chair

8:50-9:20  Keynote Speaker
The Joint Technology Office on Hypersonics (JTOH)
Dr. James Kenyon, Associate Director, Aerospace Technology, Science and Technology
Office of the Under Secretary of Defense for Science and Technology (OUSD (S&T))

9:20-10:00  Advanced Materials Developments of the 1960s and 1970s
Charles Packer, Lockheed Martin Missiles and Space, Palo Alto Research Center, CA (Retired)

10:00-10:20  BREAK

10:20-10:50  Overview of Army Hypersonic Thermal Protection System and Radome Development
Dr. Gerald Russell, U.S. Army RDECOM/AMRDEC, Redstone Arsenal, AL

10:50-11:25  Advances in Ceramics through Government-Supported Research
Dr. Steve Freiman, Freiman Consulting, Gaithersburg, MD
Monday Afternoon, January 26, 2009
Session 1: Ceramic Matrix Composites 1
Session Chairs: Dennis Fox and J. Doug Kiser, NASA Glenn Research Center, Cleveland OH
Location: Salon 2

1:35-1:40  Introductory Remarks
           Session Chairs

1:40-2:00  A New Aluminophosphate Based CMC
           B. Mangrich, S. Sambasivan and G. Hughes, Applied Thin Films, Inc., Evanston IL

2:00-2:20  Barrier Coatings for Environmental Protection of CMCs
           V. Kaul, B. Mangrich and S. Sambasivan, Applied Thin Films, Inc., Evanston IL

2:20-2:40  Progress in Oxide CMC’s
           G. Merrill and J. Morrison, Siemens Power Generation, Orlando FL
           B. Jackson and A. Szewda, ATK-COI Ceramics, San Diego CA
           F. Zok and J. Weaver, University of California, Santa Barbara, CA
           G. Fair, Air Force Research Laboratory, Wright Patterson AFB, OH

2:40-3:00  Oxygen/Steam Elevated Temperature Exposure Testing of Various Oxide and Non-Oxide Ceramic Matrix Composites
           B. McEnerney and M. Fitzsimmons, Pratt & Whitney, Rocketdyne, Canoga Park, CA
           J. Keiser, Oak Ridge National Laboratory, Oak Ridge, TN

3:00-3:20  BREAK

3:20-3:40  Low-cost SiC-SiC for Propulsion Applications
           W. Kowbel, Frontier Materials Co./Materials & Electrochemical Research Corporation, Tucson, AZ

3:40-4:00  Program Update for the Ceramic Matrix Composite Test Method Development Program
           J. Cuneo and J. Koenig, Southern Research Institute Birmingham, AL
           L. Weller and B. Sullivan, Materials Research & Design, Wayne, PA
           A. Calomino, NASA Glenn Research Center, Cleveland, OH

4:00-4:20  Modeling 3D-Woven Architectures for SiC/SiC Turbine Blades
           J. DiCarlo, J. Lang and G. Morscher, NASA Glenn Research Center, Cleveland, OH

4:20-4:40  Domestic Development of SiNC and SiC Structural Ceramic Fibers
           E. Pope, J. Hepp, G. Staab, T. Pham, B. Morkunas, N. Brabham, J. King, D. Harris, C. Hill and K. Kratsch, MATECH/GSM, Westlake Village, CA

4:40-5:00  Intermediate Temperature Hybrid Matrix Composites – Bridging the Gap Between OMC’s and CMC’s
           S. Kirkwood, E. Pope, K. Ringled, J. Hepp and K. Kratsch, MATECH/GSM, Westlake Village, CA
Monday Afternoon, January 26, 2009

Session 2: Carbon-Carbon 1

Session Chair: Keith Bowman, Air Force Research Laboratory, Wright Patterson AFB, OH

Location: Salon 1

1:35-1:40 Introductory Remarks
Session Chair

1:40-2:00 Development of an Aerothermal Test Technique for Evaluating the Nosetip/Leading Edge/Frusta Region of Extended Range Reentry Vehicle Concepts
M. Moser and T. Ferguson, Southern Research Institute, Birmingham, AL
H. Moody, Thermal Technologies, Inc., Shelbyville, TN
R. Koch, The Arnold Engineering Development Center, Arnold AFB, TN

2:00-2:20 Investigation of Carbon-Carbon Material Modifications to Develop a Sharp Stable Nosetip Concept for Extended Range Reentry
T. Ferguson and S. Starrett, Southern Research Institute, Birmingham, AL
H. Moody, Thermal Technologies, Inc., Shelbyville, TN
R. McLaughlin, Intermat, Biddeford, ME
W. Heaner, Air Force Research Laboratory, Wright Patterson AFB, OH

2:20-2:40 Advanced Hypersonic Nose Tip Development
A. Thomas, Fiber Materials, Inc., Biddeford, ME
D. Loper and R. McLaughlin, Intermat, Biddeford, ME

2:40-3:00 Thermal Ablation Response of Lifting Body Nosetips Ground Tested in a Simulated Extended Range Flight Environment
T. Ferguson, M. Moser and C. Wanstall, Southern Research Institute, Birmingham, AL
H. Moody, Thermal Technologies, Inc., Shelbyville, TN
D. Adamczak, P. Erbland and K. Bowman, Air Force Research Laboratory, Wright Patterson AFB, OH

3:00-3:20 BREAK Sponsored by MATECH/GSM

3:20-3:40 Fabrication of Single-Piece 2D Carbon-Carbon Aeroshell
J. Shigley, A. Thompson, R. George, R. Roberts and H. Dovey, ATK Launch Systems, Brigham City, UT
S. Starrett, C. Wanstall, M. Moser and T. Ferguson, Southern Research Institute, Birmingham, AL
H. Moody, Thermal Technologies, Inc., Shelbyville, TN
K. Bowman and V. Bechel, Air Force Research Laboratory, Wright Patterson AFB, OH

3:40-4:00 Low Cost Fabrication of Carbon-Carbon Aeroshells for Hypersonic Vehicles
T. Boarts and K. Buesking, Materials Research & Design, Inc., Wayne, PA

4:00-4:20 Thermal Ablation Modeling and Ground Test Correlation of Frusta Materials for Air Force Extended Range Reentry Conditions
T. Ferguson and A. Griffin, Southern Research Institute, Birmingham, AL
H. Moody, Thermal Technologies, Inc., Shelbyville, TN
K. Bowman, Air Force Research Laboratory, Wright Patterson AFB, OH

4:20-4:40 Development of Hypersonic Control Surfaces with Integral Structural Foam Insulators
D. Driemeyer and J. Ledesma, The Boeing Company, St. Louis, MO
J. Davis, Teledyne Scientific Company, Thousand Oaks, CA

4:40-5:00 Passive Leading Edge Material/Design Optimization
J. Ledesma, R. Perez and M. Chaffey, The Boeing Company, St. Louis, MO
M. Unroe, Air Force Research Laboratory, Wright Patterson AFB, OH

5:00-5:20 Investigating the Interfacial Strength of the Carbon-Carbon/Plasma-Sprayed Alumina Thermal Protection System
J. Jones, D. Drewry, D. Mehoke and K. Hemker, Johns Hopkins University, Department of Materials Science and Engineering, Baltimore, MD
Monday Afternoon, January 26, 2009

Session 3: Materials for Extreme Environments 1 – TaC Development and Testing

Session Chairs: Eric Wuchina, Naval Surface Warfare Center, Carderock Division, West Bethesda, MD and Joseph Pluscauskis, Materials Research & Design, Inc., Wayne, PA

Location: Jamaica (located in the hotel)

1:35-1:40
Introductory Remarks
Session Chairs

1:40-2:00
Development of Ceramic Threat Materials to Support IHPRPT Phase III Objectives
M. Fuller, J. Shigley and R. Roberts, ATK Launch Systems, Brigham City, UT
L. Matson, Air Force Research Laboratory, Wright Patterson AFB, OH
M. Opeka and E. Wuchina, Naval Surface Warfare Center, Carderock Division, West Bethesda, MD
S. DiPietro, Exothermics, Inc., Amherst, NH
T. McKechnie and D. Butts, Plasma Processes, Inc., Huntsville, AL
K. Buesking and J. Pluscauskis, Materials Research & Design, Inc., Wayne, PA
S. Starrett and J. Spain, Southern Research Institute, Birmingham, AL
R. Jurf, ATK COI Ceramics, Inc., San Diego, CA

2:00-2:20
Development of Low Cost Low Erosion Threat Materials to Meet the IHPRPT Phase III Objectives
J. Shigley, M. Sakaguchi and R. Roberts, ATK Launch Systems, Brigham City, UT
L. Matson, Air Force Research Laboratory, Wright Patterson AFB, OH
S. Starrett and J. Spain, Southern Research Institute, Birmingham, AL
K. Buesking and J. Pluscauskis, Materials Research & Design, Inc., Wayne, PA
M. Opeka and E. Wuchina, Naval Surface Warfare Center, Carderock Division, West Bethesda, MD
T. McKechnie, G. Thom, A. Shchetkovskiy and A. Smirnov, Plasma Processes, Inc., Huntsville, AL

2:20-2:40
Process, Microstructure and Property Relationships in Tantalum Carbide-Based IHPRPT Nozzle Materials
S. DiPietro and J. Sekella, Exothermics Inc., Amherst, NH
R. Roberts and M. Fuller, ATK Launch Systems, Brigham City, UT
L. Matson, Air Force Research Laboratory, Wright Patterson AFB, OH
M. Opeka and E. Wuchina, Naval Surface Warfare Center, Carderock Division, West Bethesda, MD
J. Spain, Southern Research Institute, Birmingham, AL

2:40-3:00
Survey of Tantalum Carbide Microstructure Stability
G. Thompson and R. Morris, The University of Alabama, Tuscaloosa, AL
L. Matson, A. Tan and A. Craven, Air Force Research Laboratory, Wright Patterson AFB, OH
E. Wuchina, Naval Surface Warfare Center, Carderock Division, West Bethesda, MD
D. Butts, Plasma Processes Inc., Huntsville, AL
S. DiPietro, Exothermics Inc., Amherst, NH
J. Spain, Southern Research Institute, Birmingham, AL

3:00-3:20
BREAK

3:20-3:40
Ceramic Threat Analysis and Testing Overview
D. Wadiak and J. Zegarski, Lockheed Martin Space Systems Company, Sunnyvale, CA

3:40-4:00
Ceramic Threat Development Subscale Motor Tests
B. Prescott, M. Stevens and K. Karras, Alliant Techsystems, Brigham City, UT
K. Buesking and J. Pluscauskis, Materials Research & Design, Inc., Wayne, PA
S. Smith, Lockheed Martin Space Systems, Advanced Technology Center, Palo Alto, CA

4:00-4:20
Ceramic Threat Development Thermal – Structural Analyses
K. Haberman and J. Ahmad, Lockheed Martin Space Systems Company, Sunnyvale, CA

4:20-4:40
Ceramic Threat Material Science
S. Smith and S. Prasad, Lockheed Martin Space Systems, Advanced Technology Center, Palo Alto, CA

4:40-5:00
TaC/Ta2C and Ta10W Characterization for the Ceramic Threat for Full-Scale Motor Test
J. Spain, Southern Research Institute
K. Buesking, J. Pluscauskis and M. Dion, Materials Research & Design, Inc., Wayne, PA

5:00-5:20
TaC-based Materials and Nozzle Concepts for Aluminized Solid Rocket Motors
D. Butts, Plasma Processes Inc., Huntsville, AL

5:20-5:40
Ceramic Threat Development: Design and Analysis
J. Pluscauskis, M. Dion and K. Buesking, Materials Research & Design, Wayne, PA
J. Spain, Southern Research Institute, Birmingham, AL
C. Tomko, Naval Surface Warfare Center, Dahlgren Division, Washington, DC
Monday Afternoon and Evening Activities, January 26, 2009
Location: Pavilion

2:00-4:00pm  Non-ITAR s Set-up
5:00-9:00pm  Non-ITAR Exhibits Open
6:30-7:30pm  Exhibit Reception Prior to Dinner (Cash Bar)
7:30pm       Dinner
             (Spouses and/or a Guest may attend for an additional fee)

Exhibitors Floor Plan (10 x 10 Booths)
- BoroScience International
- Cincinnati Testing Laboratories
- C-CAT
- COI Ceramics
- KiON Defense Technologies
- MATECH/GSM
- Plasma Processes
- Starfire Systems
- Southern Research Institute
- Thermacore
- Ultramet
- USACA

<table>
<thead>
<tr>
<th>100</th>
<th>101</th>
<th>102</th>
<th>103</th>
<th>104</th>
<th>105</th>
</tr>
</thead>
<tbody>
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<td>COI Ceramics</td>
<td>C-CAT</td>
<td>Starfire Systems</td>
<td>MATECH/GSM</td>
<td>Southern Research Institute</td>
<td>Ultramet</td>
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Reception Dinner
## 2009 Exhibitors Guide

<table>
<thead>
<tr>
<th>Company</th>
<th>Company Profile</th>
<th>Booth No.</th>
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<tbody>
<tr>
<td>COI Ceramics</td>
<td>“COI Ceramics, Inc., is the provider of advanced ceramic products that meet the needs of high temperature applications in both aerospace and industrial markets. These products are classified as Oxide CMCs, Silicon Carbide CMCs, Specialty Engineered Products and Ceramic Fiber Products.”</td>
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<td>C-CAT, Inc.</td>
<td>Carbon-Carbon Advanced Technologies, Inc. (C-CAT, Inc.) is the leading fabricator and integrator of high temperature Carbon-Carbon Composite systems for Aerospace applications. These include thermal protection systems to full up integrated flight vehicle systems. These products range from ACC-6 to Silicon-Carbide coating systems, and furthering to advanced specialty impregnated Carbon-Carbon for increased temperature resistance and oxidation protection. <a href="http://www.c-cat.net">http://www.c-cat.net</a></td>
<td>101</td>
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<td>Starfire Systems</td>
<td>Starfire Systems is an ISO 9001:2000 certified company and is the standard for the development, application, and use of high temperature materials to create high performance products. Our chemistry enables control of molecular structures that can be combined with other materials to produce composites, laminates, and coatings. Our materials and products combine processing ease with the benefits of advanced ceramic materials. Starfire polymer ceramics can be engineered to meet a wide range of applications. Demonstrated real world applications include lightweight, high performance brakes; tough, stable, thin electronic packaging substrates; and a repair kit for the wings of the NASA Space Shuttle. <a href="http://www.starfiresystems.com">http://www.starfiresystems.com</a></td>
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<td>MATECH/GSM</td>
<td>MATECH/GSM specializes in precursor ceramic polymer derived advanced ceramics. In the past 6 years, MATECH/GSM has emerged as the world’s premier developer of high temperature and ultra-high-temperature ceramic fibers. MATECH/GSM’s fibers include silicon nitride/carbide (SiNC), stoichiometric silicon carbide (SIC), hafnium carbide (HfC), tantalum carbide (TaC), yttrium aluminum garnet (YAG), silicon oxycarbide (SiOC), zirconium oxycarbide (ZrOC), and PAN-derived carbon. The development of MATECH’s ceramic fibers has occurred through contracts and grants from the following US Government agencies: National Science Foundation; US Navy (NAVAIR/Joint Strike Fighter); US Air Force (Wright-Patterson AFB and Edwards AFB); Missile Defense Agency; and Department of Energy (DOE). Since its founding in 1989, MATECH has become recognized as a world-class research and development laboratory in the areas of glass, ceramic, and high temperature composites. For more information, contact Dr. Edward J. A. Pope, President &amp; CEO or Kenneth M. Kratsch, Chairman &amp; CEO, MATECH Global Strategic Materials, 31304 Via Colinas, Suite 102, Westlake Village, CA 91362, 818-991-8500 Ext. 1001 or <a href="mailto:ed@matechgs.com">ed@matechgs.com</a> and <a href="mailto:ken@matechgs.com">ken@matechgs.com</a>.</td>
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<td>Southern Research Institute</td>
<td>The Engineering Division of Southern Research offers specialized materials testing and comprehensive engineering and development services to the aerospace, defense, energy, and environmental sectors. The Advanced Materials &amp; Mechanics Groups provide advanced research and development services for materials in extreme physical and thermal environments, which include thermo-mechanical modeling and testing from as low as 25 K to as high as 6000°F (3300°C). The primary technical focus is to supply innovative materials testing and characterization solutions to aerospace, defense, and governmental programs by leveraging Southern Research’s state-of-the-art assets with its clients’ goals.</td>
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<td>Ultramet</td>
<td>Ultramet is an ISO 9001:2000 certified company comprised of engineers, scientists, and support personnel, production and R&amp;D facilities particularly suited to the research, development and production of advanced materials including high temperature capability, corrosion- and erosion-resistant materials. Ultramet personnel will be available to discuss your specific materials-related applications, and questions.</td>
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<td>USACA</td>
<td>USACA champions the business interests of the advanced ceramic producers and end-users of these advanced materials. Members range from the largest U.S. industrial companies to smaller corporations dedicated to the manufacture of advanced ceramic products including ceramic matrix composites, coatings, and monolithic structures.</td>
<td>108</td>
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<td>Cincinnati Testing Labs</td>
<td>Cincinnati Testing Laboratories is an independent material testing facility supporting the aerospace, automotive, defense and biomedical industries. Our professional staff of machinists technicians, and engineers specialize in the conditioning and testing of metallic and non-metallic material that includes super alloys, intermetallics, metal matrix composites, ceramics, plastics, elastomers and advanced composites (CMC, PMC). With a brand new and enlarged state of the art facility, we stand ready to meet the increasing demand for advanced materials characterization.</td>
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<td>Thermacore, Inc.</td>
<td>Thermacore, Inc., designs, develops and manufactures custom thermal management solutions for OEMs worldwide. Thermacore is recognized globally as the technology leader in developing two-phase heat transfer technology. In particular, Thermacore specializes in designing, developing and manufacturing heat pipe based thermal solutions for component level, board level and system level electronics cooling. Thermacore has been in business for the past 38 years and has facilities located in North America (Lancaster, PA) and the United Kingdom (Ashington, Northumberland). Both facilities are ISO 9001 and ISO 14001 certified and capable of producing RoHS Compliant solutions. AS9100 certification is pending. Products and Services: Thermacore’s broad product offering includes heat pipes (round, flat/bent, and vapor chambers), heat pipe assemblies (embedded and remote), heat sinks, cold plates, heat exchangers (liquid-to-air and air-to-air), liquid cooling systems and advanced technologies such as loop heat pipes. Thermacore’s Technology Center also provides engineering design and development services to the electronics industry, government agencies and academic institutions. Markets and Industries Served: Thermacore serves a diversified set of markets and industries that include high performance computing (server/storage/embedded), communications, energy conversion, power electronics, military/aerospace, medical, automotive and transportation.</td>
<td>201</td>
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<td>Plasma Processes, Inc.</td>
<td>Plasma Processes, Inc. (PPI) is an ISO 9001:2000 certified small business specializing in the development and manufacture of high temperature materials, coatings, net-shape structures, and powder processing services. PPI develops, applies and validates coating solutions for thermal protection, electrical isolation, wear and corrosion resistance and dimensional restoration, in addition to the manufacture of net-shape components by vacuum plasma and EL-Form™ deposition processes. PPI serves customers in the government, aerospace/defense and commercial sectors.</td>
<td>202</td>
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<td>BoroScience International, Inc.</td>
<td>BoroScience International, Inc., is leading the discovery and development of new dimensions in boron chemistry. Leveraging more than forty years of specialty chemicals research and development expertise, BoroScience can recommend and develop optimally suited boron compounds, design high-yield, low-cost synthesis pathways, and provide adequate quantities for small-scale pilot or proof-of-principle studies as well as large-scale applications. Ammonia borane, our first large-volume product, is intended for hydrogen storage and fuel cells. Ammonia borane is also the feedstock for production of borazine and polyborazylene, which have great potential to yield advanced boron nitride materials in aerospace, nanomaterials and electronics by CVD and polymer processes. Other compounds under development may be useful for polymer routes to refractory borides and metallic boron structures. Contact BoroScience today and discover the boron dimension! <a href="mailto:info@boroscience.com">info@boroscience.com</a>; <a href="http://www.boroscience.com">www.boroscience.com</a>; (803) 545-4428.</td>
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Tuesday Morning, January 27, 2009
Session 1: Carbon-Carbon 2
Session Chair: Keith Bowman, Air Force Research Laboratory, Wright Patterson AFB, OH
Location: Salon 2

7:30-8:30 Registration and Continental Breakfast

8:35-8:40 Introductory Remarks
Session Chairs

8:40-9:00 Hypersonic Water Cooled Wedge Test Fixture Development for TPS Test and Evaluation
G. Russell, B. Moylan and M. Lewis, U.S. Army RDECOM/AMRDEC, Huntsville, AL
F. Strobel, M. Rembert and J. Gudgen, ITT Advanced Engineering Sciences, Huntsville, AL

9:00-9:20 Multifunctional Aerogel Composites for TPS of Hypersonic Vehicles
F. Hurwitz, NASA Glenn Research Center, Cleveland, OH

9:20-9:40 Advanced Aerogel-Filled Foam Core Composite Insulation for Extended range Hypersonic Vehicles
V. Arrietta, S. Brown, B. Williams and H. Howser, Ultramet, Inc., Pacoima, CA
M. Droge, Ocellus, Inc., Livermore, CA
C. Craft, Air Force Research Laboratory, Wright Patterson AFB, OH

9:40-10:00 Post Test Data Correlation of High-Temperature Structural Insulation for Extended Range C-C Aeroshell Hypersonic Vehicles
L. Weller and B. Sullivan, Materials Research & Design, Inc., Wayne, PA
V. Arrietta, B. Williams and S. Brown, Ultramet, Inc., Pacoima, CA

10:00-10:20 BREAK

10:20-10:40 Oxidation Response of SiC Coated Carbon Foam
S. Lee and O. Ochoa, Texas A&M University, College Station, TX

10:40-11:00 Fabrication of Two-Dimensional Carbon-Carbon Composites for the RATTLRS Turbine Engine Exhaust Nozzle
A. Thompson, J. Shigley, R. George, S. Sullivan, M. Neunzert, T. Easler, J. Reidell and E. Shephard, ATK Launch Systems, Brigham City, UT
R. Nigam, Rolls-Royce, Indianapolis, IN

11:00-11:20 Development of 2D Carbon-Carbon Nozzle Extensions for Liquid Engines
D. Butts, Plasma Processes, Inc., Huntsville, AL

11:20-11:40 Large Scale Manufacturing and Certification of Carbon-Carbon Composites
R. Narayanan and J. Thompson, Carbon-Carbon Advanced Technologies, Kennedale, TX
C. Pagoda, Lockheed Martin Space Systems Company, Littleton, CO

11:40-12:00 Development and Fabrication of the Falcon HTV-2 External Thermal Protection System
C. Pagoda, Lockheed Martin Space Systems Company, Littleton, CO
D. Hecht, Lockheed Martin Aeronautics Company, Fort Worth, TX
Tuesday Morning, January 27, 2009

Session 2: Thermal Management 1

Session Chair: James Klett, Oak Ridge National Laboratory, Oak Ridge, TN

Location: Salon 1

7:30-8:30 Registration
Continental Breakfast Sponsored by MATECH/GSM

8:35-8:40 Introductory Remarks
Session Chair

8:40-9:00 AFRL Thermal Steering Committee
D. Pratt, Air Force Research Laboratory, Wright Patterson AFB, OH

9:00-9:20 High Thermal Performance Electronic Card Retainers for Electronic Packaging
J. Calder, Material Innovations, Inc., Huntington Beach, CA

9:20-9:40 Hybrid Composite Liquid Cooled Electronic Enclosures for Aircraft Electronics
J. Calder, Material Innovations, Inc., Huntington Beach, CA

9:40-10:00 Use of Low-Density Carbon Foam for Thermal Management in Solar Probe Plus
E. Congdon, The Johns Hopkins, Applied Physics Laboratory, Baltimore, MD

10:00-10:20 BREAK Sponsored by MATECH/GSM

10:20-10:40 Modeling the Principal Physical Parameters of Graphite Carbon Foam
L. James and C. Moore, Department of Mechanical Engineering, Florida A&M University, Tallahassee, FL
D. Stephens, Department of Mathematics, Florida A&M University, Tallahassee, FL
G. Wesson, Biological and Agricultural Systems Engineering, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL

10:40-11:00 Low Cost High Shielding Effectiveness EMI coatings for Composite and Plastic Electronic Enclosures
J. Calder, Material Innovations, Inc., Huntington Beach, CA

11:00-11:20 Method of Metalizing Carbon and Graphitic Foams for Better Joining Techniques
B. Poquette, Virginia Tech, Blacksburg, VA

11:20-11:40 Simulation of Fluid Flow and Heat Transfer in Carbon Foam
S. Austin, G. Wesson and K. Walsh, Florida Agricultural & Mechanical University, Tallahassee, FL

11:40-12:00 The Influence of Porosity on the Thermal Properties of Graphite Foam
J. Mueller, S. Kampe and B. Poquette, Department of Materials Science and Engineering, Virginia Tech, Blacksburg, VA
J. Klett, Materials Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN
Tuesday Morning, January 27, 2009
Session 3: Materials for Extreme Environments 2 – UHTCs and Structural Insulators
Session Chairs: James Zaykoski, Naval Surface Warfare Center, Carderock, West Bethesda, MD and T A Parthasarathy (TAP), UES, Inc., Dayton, OH
Location: Jamaica (located in the hotel)

7:30-8:30 Registration
Continental Breakfast Sponsored by MATECH/GSM

7:55-8:00 Introductory Remarks
Session Chairs

8:00-8:20 Economical Manufacture of Refractory Ceramic Composite Aerostructure for Missile Defense Interceptors
V. Arrieta, S. Brown and B. Williams, Ultramet, Pacoima, CA
K. Buesking, Materials Research & Design, Inc., Wayne, PA
M. Droege, Ocellus, Inc., Livermore, CA
D. Perry, MDA, Huntsville, AL

8:20-8:40 Ceramics and Cermets in the System ZrN – Ta
J. Zaykoski and I. Talmy, Naval Surface Warfare Center, Carderock Division, West Bethesda, MD

8:40-9:00 Synthesis Processing and Properties of TaC – TaB2 Ceramics
I. Talmy and J. Zaykoski, Naval Surface Warfare Center, Carderock Division, West Bethesda, MD

9:00-9:20 Summary of Italian UHTC Workshop
D. Glass, NASA Langley Research Center, Hampton, VA

9:20-9:40 C-HfC Composites
T. Stewart, Ultramet, Pacoima, CA

9:40-10:00 Development of UHT Structural Ceramic Fibers
E. Pope, J. Hepp, G. Staab, T. Pham, B. Morkunas, N. Brabham, J. King, D. Harris, C. Hill and K. Kratsch, MATECH/GSM, Westlake Village, CA

10:00-10:20 BREAK Sponsored by MATECH/GSM

10:20-10:40 Advanced Combustion Chamber Materials for HAN-Based Monopropellants
A. Fortini and T. Stewart, Ultramet, Pacoima, CA

10:40-11:00 Correlation of Property-Chemistry-Phase in TaC Based Composites
L. Matson and S. Steel, Air Force Research Laboratory, Wright Patterson AFB, OH
R. Wills, University of Dayton, Dayton, OH

11:00-11:20 Micromechanical Analysis of Room Temperature Properties of Reinforced-NZP (R-NZP™) Composites
K. Buesking, Materials Research & Design, Inc., Wayne, PA
R. Nageswaran, SMAHT Ceramics, Salt Lake City, UT
P. Marchol, Aerojet, Sacramento, CA
M. Opeka, Naval Surface Warfare Center, Carderock Division, West Bethesda, MD

11:20-11:40 Zero Erosion, Non Ablative, Ultra High Temperature Structural Insulators
S. Kirkwood, K. Kratsch, J. Hepp, K. Ringled and E. Pope, MATECH/GSM, Westlake Village, CA

11:40-12:00 Structural Insulators Workshop Review
E. Wuchina, Naval Surface Warfare Center, Carderock Division, West Bethesda, MD
### Session 1: Ceramic Matrix Composites 2

**Session Chairs:** Dennis Fox and J. Doug Kiser, NASA Glenn Research Center, Cleveland OH

**Location:** Salon 2

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>1:35-1:40</td>
<td>Introductory Remarks</td>
<td>Session Chairs</td>
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<tr>
<td>1:40-2:00</td>
<td>Effect of Fiber Architecture on Flexure Properties of HiPerComp™ CMC</td>
<td>D. Dunn, GE Global Research, Niskayuna, NY</td>
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<tr>
<td>2:00-2:20</td>
<td>Effects in Defects in Ceramic Matrix Composites</td>
<td>G. Teti, M. Dion and K. Buesking, Materials Research &amp; Design, Wayne, PA</td>
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<td>T. Moran, Air Force Research Laboratory, Wright Patterson AFB, OH</td>
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<td>J. Rubinsky, Naval Air Systems Command, Patuxent River, MD</td>
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<td>2:20-2:40</td>
<td>Pulsed Thermographic Analysis of Nextel 312/BlackglasTM CMC Composite</td>
<td>P. Khandelwal, Rolls Royce Corporation, Indianapolis, IN</td>
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<td>S. Shepard, Thermal Wave Imaging, Inc., Ferndale, MI</td>
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<td>2:40-3:00</td>
<td>Application of Time Dependent Damage Modeling to CMC Turbine Engine Components</td>
<td>T. Cook, A. Chatterjee, A. Chamberlain and P. Khandelwal, Rolls-Royce, IN</td>
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<td>J. Ahmad, Research Applications Inc., San Diego, CA</td>
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<td>3:00-3:20</td>
<td>BREAK</td>
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<td>J. Fish, Rensselaer Polytechnic Institute, Troy, NY</td>
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<td>A. Washabaugh, Jentek Sensors, Waltham, MA</td>
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</table>
Tuesday Afternoon, January 27, 2009
Session 2:  Thermal Management 2
Session Chair:  James Klett, Oak Ridge National Laboratory, Oak Ridge, TN
Location:  Salon 1

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</thead>
</table>
| 1:35-1:40 | Introductory Remarks
| Session Chair |
| 1:40-2:00 | Thermally Responsive Encapsulated Phase Change Materials |
| S. Ganguli, University of Dayton Research Institute, Dayton, OH |
| A. Roy, Air Force Research Laboratory, Wright Patterson AFB, OH |
| 2:00-2:20 | Guided Multiple Launch Rocket System (GMLRS) Insensitive Munitions Fire Protection Study |
| G. Russell, B. Moylan, M. Smith and L. Hall, U.S. Army RDECOM/AMRDEC, Huntsville, AL |
| M. Rembert and F. Strobel, ITT Advanced Engineering Sciences, Huntsville, AL |
| 2:20-2:40 | Thermal Response of Phase Change Filled Graphitic Foams |
| M. Trammell and J. Klett, Oak Ridge National Laboratory, Oak Ridge, TN |
| 2:40-3:00 | Lunar Based Thermal Radiator for Fission Reactor Heat Rejection – Analysis and Design |
| B. Sullivan, G. Jones and L. Weller, Materials Research and Design, Inc., Wayne, PA |
| J. Calder, Material Innovations, Inc., Huntington Beach, CA |
| 3:00-3:20 | BREAK |
| 3:20-3:40 | Effects of Carbon Nano-Fibers on Cell Morphology, Crush Strength and Thermal Conductivity of Carbon Foam |
| W. Fawcett and D. Shetty, University of Utah, Salt Lake City, UT |
| 3:40-4:00 | Carbon-Carbon Heat Exchanger |
| W. Shih, Allcomp, City of Industry, CA |
| D. Vrable, Thermal Management & Materials Technology, Del Mar, CA |
| 4:00-4:20 | Carbon Composite Liquid to Air Heat Exchanger |
| J. Calder, Material Innovations, Inc., Huntington Beach, CA |
| 4:20-4:40 | Design and Manufacturing for a Lunar Based Thermal Radiator |
| J. Calder, Material Innovations, Inc., Huntington Beach, CA |
| B. Sullivan, Materials Research & Design, Inc., Wayne, PA |
| 4:40-5:00 | Thermal Conductivity of Nano Modified Pitch Based Carbon Fibers |
| R. Alway-Cooper and A. Ogale, Clemson University, Clemson, SC |
| M. Theodore, Universal Technology Corporation, Dayton, OH |
| D. Anderson, University of Dayton Research Institute, Dayton, OH |
Tuesday Afternoon, January 27, 2009

Session 3: Materials for Extreme Environments 3 – Rhenium and Alloys

Session Chairs: Clyde Carr, ATK TPC, Baltimore, MD
Gautham Ramachandran, Lockheed Martin, Sunnyvale, CA

Location: Jamaica (located in the hotel)

1:35-1:40 Introductory Remarks
Session Chairs

1:40-2:00 Advances of Tungsten-Based Alloys
T. Leonhardt, Rhenium Alloys, Inc., Elyria, OH

2:00-2:20 Rhenium Heat Pipes for Hypersonic Leading Edges
A. Fortini, A. Allen and V. Arrieta, Ultramet, Pacoima, CA

2:20-2:40 Thruster Testing of Electroformed Rhenium Components in a Solid Rocket Motor
M. Gidas and C. Carr, ATK TPC, Baltimore, MD
D. Leipold, ATK TPC, Elkton, MD
N. Molengraft, DE Technologies, King of Prussia, PA
T. McKechnie, Plasma Process Inc., Huntsville, AL

2:40-3:00 Engineered Rhenium Development
A. Shchetkovskiy, Plasma Processes, Inc., Huntsville, AL
R. Hickman, NASA Marshall Space Flight Center, Huntsville, AL
T. McKechnie, Plasma Processes, Inc., Huntsville, AL

3:00-3:20 BREAK

3:20-3:40 Low-Erosion, Lightweight Composites for Hot Gas Control Systems
D. Butts, T. McKechnie, A. Smirnov and K. Murphree, Plasma Processes, Inc., Huntsville, AL

3:40-4:00 Thruster Testing of Chemical Vapor Deposition Processed Rhenium Components in a Solid Rocket Motor
M. Gidas and C. Carr, ATK TPC, Baltimore, MD
D. Leipold, ATK TPC Elkton, Elkton, MD
A. Fortini, Ultramet, Pacoima, CA

4:00-4:20 Molybdenum-Rhenium Alloys by Vacuum Plasma Spray Forming
T. McKechnie and S. O’Dell, Plasma Processes Inc., Huntsville, AL
R. Hickman and E. Carrasquillo, NASA Marshall Space Flight Center, Huntsville, AL

4:20-4:40 Tungsten-Rhenium (W2Re)-Based Throat Inserts for High Temperature Dual-Pulse, Solid Rocket Motor Applications
J. Ward and C. Carr, ATK TPC, Baltimore, MD
D. Butts, Plasma Processes, Inc., Huntsville, AL

4:40-5:00 MDA Propulsion Materials Developments Update
M. Opeka, Naval Surface Warfare Center, Carderock Division, West Bethesda, MD
Tuesday Afternoon, January 27, 2009

Session 4: Carbon-Carbon 3: Technology Workshop

Session Chairs: Keith Bowman, Air Force Research Laboratory, Wright Patterson AFB, OH and Ozden Ochoa, Texas A&M University, College Station, TX

Location: Martinique (located in the hotel)

1:35-1:40  Introductory Remarks
Session Chairs

1:40-  Carbon-Carbon Technology Workshop
TBD

33rd Annual Cocoa Beach FINAI Program  16
Tuesday Afternoon and Evening Activities, January 27, 2009
Location: Pavilion

11:00am-2:00pm  ITAR Restricted Expo Opens

5:30-7:30pm  Social
   ITAR Restricted Expo Opens

8:00-9:00pm  Exhibitors Break Down
Wednesday Morning, January 28, 2009
Session 1: JANNAF 1 – Airbreathing Propulsion Subcommittee Technical Sessions on Materials and Structures for Airframe and Propulsion Systems

Session Chairs: David Glass, NASA Langley Research Center, Hampton, VA
Dan Cleyrat, AFRL/RXB-GDIT, Wright Patterson AFB, OH

Location: Salon 2

7:30-8:30 Registration and Continental Breakfast

8:35-8:40 Introductory Remarks
Session Chairs

8:40-9:00 Falcon Leading Edge Arc-Jet Testing
D. Glass, NASA Langley Research Center, Hampton, VA
J. Stewart, Arnold Engineering and Development Center, Arnold AFB, TN
R. Dirling, SAIC, Fountain Valley, CA
S. Sankaran, Lockheed Martin Mission Services, Hampton, VA
W. Bruce, NASA Langley Research Center, Hampton, VA
J. Baughman, Lockheed Martin Mission Services, Hampton, VA

9:00-9:20 Thermal Analysis of Falcon Candidate Leading-Edge Materials Tested at AEDC-H2 Arc Heater Facility
J. Del Corso and W. Bruce, NASA Langley Research Center, Hampton, VA

J. Feie, Air Force Research Laboratory, Wright Patterson AFB, OH
M. Roth, Modern Machine and Tool, Hampton, VA
A. Swanson, Air Force Research Laboratory, Wright Patterson AFB, OH

9:40-10:00 Advanced Multilayer and Opacified Fibrous Insulations for Hypersonic Vehicles
S. Miller, Associates Foundation, Flagstaff, AZ
G. Cunnington, Cunnington Associates, Palo Alto, CA
K. Daryabeigi, NASA Langley Research Center, Hampton, VA

10:00-10:20 BREAK

10:20-10:40 Multi-Axial Damage Index and Accumulation Model for Predicting Fatigue Life of CMC Materials
B. Sullivan and A. Bamberger, Materials Research & Design, Inc., Wayne, PA

10:40-11:00 CMC Durability Modeling
J. Podhiny and B. Sullivan, Materials Research & Design, Inc., Wayne, PA

11:00-11:20 Coating Liberation Root Cause Investigation Thermomechanical Analysis and Evaluation
S. Walker, NASA Langley Research Center, Hampton, VA
J. Warren, Composite Innovations Corporation, Woodland Hills, CA

11:20-11:40 Detection of Sub-surface Delamination in Shuttle Orbiter Slip-Side Joggle Region of the Wing Leading Edge
K. Daryabeigi and S. Walker, NASA Langley Research Center, Hampton, VA

11:40-12:00 Coating Adhesion of Reinforced Carbon Carbon Composites in the Joggle Region of the Shuttle Leading Edge System
W. Vaughn, C. Ohlhorst and P. Howell, NASA Langley Research Center, Hampton, VA
E. Opila, NASA Glenn Research Center, Cleveland, OH
**Wednesday Morning, January 28, 2009**

**Session 2: Structural Ceramics and Hypervelocity Impact Effects**

**Session Chair:** Curtis Martin, Naval Surface Warfare Center, Carderock, West Bethesda, MD

**Location:** Salon 1

<table>
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<th>Time</th>
<th>Event</th>
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<td>7:30-8:30</td>
<td>Registration and Continental Breakfast</td>
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</table>
| 8:35-8:40| Introductory Remarks  
Session Chair                                           |
| 8:40-9:20| Recent Developments in Weather Encounter Research in Support of Radome Material Performance  
B. Moylan and G. Russell, U.S. Army AMRDEC, Huntsville, AL |
| 9:20-10:00| Water Drop/Polymeric Bead Impact Damage Correspondence  
W. Adler, Aquila Laboratory, LLC, Santa Barbara, CA  
R. Kelly Frazer, The Johns Hopkins University, Applied Physics Laboratory, Laurel, MD |
| 10:00-10:20| BREAK                                                          |
| 10:20-10:40| Strength Characterization of Ceramic Matrix Composite Materials  
K. Buesking and B. Campanella, Materials Research & Design Inc., Wayne, PA  
V. Parthasarathy, COI Ceramics, Inc., San Diego, CA  
K. Frazer and A. Siu, The Johns Hopkins University, Applied Physics Laboratory, Laurel, MD |
| 10:40-11:00| Coatings for Oxide/Oxide Ceramic Matrix Composites for Structural Applications  
B. Jackson and J. Glabe, COI Ceramics, Inc., San Diego, CA |
| 11:00-11:20| Rain Erosion Behavior of Quartz/Polysiloxane Composites as a Function of Matrix Composition and Processing Parameters  
J. Dignam, Mentis Sciences Inc., Manchester, NH |
| 11:20-11:40| Qualitative Impact Damage Assessment of ACC6 Carbon-Carbon  
K. Mercer and G. Wonacott, Sand Diego Composites, San Diego, CA |
| 11:40-12:00| Hot Section Monolithic Ceramic Development for Gas Turbine Component Applications  
R. Licht, V. Pujari, A. Vartabedian, G. Wayman and N. Paille, Saint-Gobain High-Performance Materials, Northboro, MA |
Wednesday Afternoon, January 28, 2009

Session 1: JANNAF 2 – Airbreathing Propulsion Subcommittee Technical Sessions on Materials and Structures for Airframe and Propulsion Systems

Session Chairs: David Glass, NASA Langley Research Center, Hampton, VA
Dan Cleyrat, AFRL/RXB-GDIT, Wright Patterson AFB, OH

Location: Salon 2

1:35-1:40 Introductory Remarks
Session Chairs

1:40-2:00 Recent Developments at ARC in Low-to mid-Density Ablators
S. Johnson, NASA Ames Research Center, Moffett Field, CA
S. White, Aspen Aerogels, Northborough, MA
M. Olson, NASA Ames Research Center, Moffett Field, CA

2:00-2:20 Sensitivity of Flexural Test Results to Elastic Properties of Phenolic Impregnated Carbon Ablator (PICA)
C. Lang, NASA Langley Research Center, Hampton, VA

2:20-2:40 Development of Property Database for CVI C-SiC Composite for Hypersonic Applications
G. Morsher and M. Singh, Ohio Aerospace Institute, Dayton, OH

2:40-3:00 Next Generation Heat Exchangers Using Porous Ceramic Foams
M. Wilson, J. Cutts and J. Fellows, Ceramatec, Inc., Salt Lake City, UT

3:00-3:20 BREAK

3:20-3:40 Stochastic Topology Model of Reinforcement Fabrics in Ceramic Matrix Composites
D. Coon, University of Wyoming, Laramie, WY

3:40-4:00 Evaluations of High Temperature Dynamic Seals for Advanced Hypersonic Vehicle Applications
J. DeMange, University of Toledo, Cleveland, OH
P. Dunlap and B. Steinetz, NASA Glenn Research Center, Cleveland, OH

4:00-4:20 Heat Shield Main Interface Seal Transient Analysis for the Orion Spacecraft
B. Steinetz and J. Finkbeiner, NASA Glenn Research Center, Cleveland, OH
S. Kim, CFD Research Corporation, Huntsville, AL

4:20-4:40 Evaluations of Heat Shield Main Interface Seals for the Orion Spacecraft
P. Dunlap, NASA Glenn Research Center, Cleveland, OH
J. DeMange, University of Toledo, Cleveland, OH
B. Steinetz, NASA Glenn Research Center, Cleveland, OH
I. Delgado, NASA Glenn Research Center, Cleveland, OH
S. Taylor, University of Toledo, Cleveland, OH
**Wednesday Afternoon, January 28, 2009**  
**Session 2: Hi-Temperature Sensing Materials and Devices 1 – Hypersonics**

**Session Chair:** John Buckley, Consultant, Newport News, VA  
**Location:** Salon 1

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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| 1:35-1:40 | Introductory Remarks  
Session Chair |
| 1:40-2:00 | HT Re-entry Sensing Requirements, Concepts and Benefits  
J. Buckley, Consultant, Newport News, VA  
Others TBD |
| 2:00-2:20 | Sensing Needs and Capabilities for Hypersonic Aircraft Structures  
R. Hyers, University of Massachusetts, Amherst, MA  
J. Gabour, University of Massachusetts, Amherst, MA  
A. Hanlon, Condition Engineering, Waltham, MA  
C. Stephens, NASA Dryden Flight Research Center, Edwards AFB, CA  
R. Gao, University of Connecticut, Storrs, CT |
| 2:20-2:40 | High-Temperature Structural Instrumentation Developments For Hypersonic Airframe Applications  
| 2:40-3:00 | Heat Flux Sensing on High Temperature Materials  
D. Hubble, C. Pullins, A. Mangalam, T. Diller and A. Mangalam, Virginia Tech, Blacksburg, VA |
| 3:00-3:20 | BREAK |
| 3:20-     | Several Additional Papers TBD |
Wednesday Evening, January 28, 2009

5:00-9:00pm TPS Materials Review and Assessment Meeting
(Martinique)

5:30-7:30pm Student Page Career Networking
(Jamaica - Open to USACA Members Only)
# Thursday Morning, January 29, 2009

## Session 1: Hypersonics 1

**Session Chairs:** Anthony Calomino, NASA Glenn Research Center, Cleveland, OH and Craig Stephens, NASA Dryden Flight Research Center, Edwards Air Force Base, CA

**Location:** Salon 2

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>7:30-8:30</td>
<td>Registration and Continental Breakfast</td>
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<td>8:35-8:40</td>
<td>Introductory Remarks</td>
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<td>Session Chair</td>
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<td>8:40-9:00</td>
<td><strong>Aerogels in the Al2O3-SiO2, ZrO2 Systems</strong></td>
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<td>F. Hurwitz, NASA Glenn Research Center, Cleveland, OH</td>
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<td>9:00-9:20</td>
<td><strong>Polymer-derived Refractory-carbide-based Ultra-High Temperature CMC Concept for Hypersonic Vehicle Hot Structures and TPS</strong></td>
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<td>H. Yun, MATECH, Westlake-Village, CA</td>
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<td>9:20-9:40</td>
<td><strong>High Temperature Thermoelectric Power Generation for Hypersonic Vehicles</strong></td>
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<td>A. Sayir, NASA Glenn Research Center, Cleveland, OH</td>
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<td>9:40-10:00</td>
<td><strong>SiC/SiC Composites for High Temperature Hypersonic Vehicle Applications</strong></td>
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<td>J. Kiser, NASA Glenn Research Center, Cleveland, OH</td>
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<td>10:00-10:20</td>
<td>BREAK</td>
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<td>10:20-10:40</td>
<td><strong>Stress Rupture and Cyclic Oxidation Resistance of Un-Reinforced and Sic Fiber Reinforced Ultra High Temperature Ceramics</strong></td>
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<td>R. Bhatt and D. Fox, NASA Glenn Research Center, Cleveland, OH</td>
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<tr>
<td>10:40-11:00</td>
<td><strong>Leading Edges for X-51 Scramjet Engine</strong></td>
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<td>W. Kowbel, Frontier Materials Co./Materials &amp; Electrochemical Research Corporation, Tucson, AZ</td>
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<td>11:00-11:20</td>
<td><strong>Development of an Innovative Ceramic Composite Mechanical Fastener for High-Temperature Structural Assemblies</strong></td>
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<td>W. Steffier, HyperTherm HTC, Inc., Huntington Beach, CA</td>
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<td>11:20-11:40</td>
<td><strong>Electrical Resistance Method for Damage Detection of Si/SiC based Ceramics</strong></td>
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<td>G. Morscher, Ohio Aerospace Institute, Cleveland, OH</td>
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<td>11:40-12:00</td>
<td><strong>Low Viscosity Slurry Technology for Coatings and Near-Net-Shape Passaged Components</strong></td>
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<td>A. Lobovsky, United Materials Technologies, LLC, Westfield, NJ</td>
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Thursday Morning, January 29, 2009

Session 2: Hi-Temperature Sensing Materials and Devices 2 – Turbines and Power

Session Chair: Lew Schmidt, Naval Air Systems Command, Patuxent River, MD
Location: Salon 1

7:30-8:30  Registration and Continental Breakfast

8:35-8:40  Introductory Remarks
Session Chair

8:40-9:00  Drivers and Requirements for Harsh Environment Sensing in Advanced Power Generation Systems

9:00-9:20  Optical Fiber Sensors for High Temperature Applications
G. Pickrell and A. Wang, Center for Photonics Technology, Virginia Tech, Blacksburg, VA

9:20-9:40  Langasite-Based High Temperature Acoustic Wave Sensors
R. Lad, D. Frankel, G. Bernhardt, T. Moonlight and M. Pereira da Cunha, University of Maine System, Bangor, ME

9:40-10:00 Development and Testing of Harsh Environment, Wireless Sensor Systems for Industrial Gas Turbines
D. Mitchell and A. Kulkarni, Siemens Power Generation, Inc., Orlando, FL
R. Waits, Rove Technical Services, Sunnyvale, CA
A. Lostetter, M. Schupbach and J. Fraley, Arkansas Power Electronics, Inc., Fayetteville, AR

10:00-10:20  BREAK

10:20-10:40 Opportunities for Fiber-Optic Sensing in Gas Turbines at High Temperatures: Designing Smart Materials for Intelligent Systems
E. Pope and D. Harris, MATECH/GSM, Westlake Village, CA

10:40-11:00 Crystal Temperature Sensor Technology
L. Ginzburnsky, LG Tech-Link, Chandler, AZ

11:00-11:20 Demonstration of High-Temperature Fiber Optic Sensors in Aerospace Gas Turbines and Other Relevant Environments Exceeding 1,100
R. Fielder, M. Palmer and M. Davis, Luna Innovations, Blacksburg, VA
<table>
<thead>
<tr>
<th>Time</th>
<th>Session/Activity</th>
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<tbody>
<tr>
<td>1:35-1:40</td>
<td>Introductory Remarks</td>
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<tr>
<td>1:40-2:00</td>
<td>Characterization of Insulations for Hypersonic Vehicle TPS</td>
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<td>K. Dayrabeigi, NASA Langley Research Center, Hampton, VA</td>
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<td>2:00-2:20</td>
<td>Development of Mechanically Attached Flexible Insulation for Responsive Space Access Applications</td>
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<td>J. Embler, Boeing Phantom Works, Huntington Beach, CA</td>
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<td>2:20-2:40</td>
<td>Thermal-Structural Analysis of Structurally-Integrated Thermal Protection Systems</td>
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<td>K. Bey, NASA Langley Research Center, Hampton, VA</td>
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<td>2:40-3:00</td>
<td>Design and Analysis of an Alternative X-51A Control Fin Design Using Lower Cost High Temperature Composite Materials</td>
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<td>C. Iwano, Materials Research &amp; Design, Inc., Wayne, PA</td>
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<td>3:00-3:20</td>
<td>BREAK</td>
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<td>3:20-3:40</td>
<td>Superalloy Heat Pipes for Cowl Inlet Cooling of Hypersonic Vehicles</td>
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<td>S. Rawal, Lockheed Martin Space Systems Company, Denver, CO</td>
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<td>3:40-4:00</td>
<td>Thermal-Structural Analysis of Heat Pipe Cooled Cowl Leading Edges</td>
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<td>E. Klock-McCook, Materials Research &amp; Design, Inc., Wayne, PA</td>
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<td>4:00-4:20</td>
<td>Overview of the Thermal/Mechanical Testing of the C/SiC Ruddervator for NASA ARMD Hypersonics</td>
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<td>C. Stephens, NASA Dryden Space Flight Center, Edwards AFB, CA</td>
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<tr>
<td>4:20-4:40</td>
<td>Post Test Data Correlation for the Ruddervator Subcomponent Test Article</td>
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<td>L. Weller, Materials Research &amp; Design, Inc., Wayne, PA</td>
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<td>4:40-5:00</td>
<td>Leveraging a Wiki to Enhance Virtual Research Collaboration</td>
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<td>M. Melis, NASA Glenn Research Center, Cleveland, OH</td>
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<td>5:00-5:20</td>
<td>Update on CMC’s on European Flight Vehicles</td>
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<td>D. Glass, NASA Langley Research Center, Hampton, VA</td>
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</tbody>
</table>
Thursday Afternoon, January 29, 2009  
**Session 2: Hi-Temperature Sensing Materials and Devices 3 – Technology Gaps Workshop**  
*Session Chair: Lew Schmidt, Naval Air Systems Command, Patuxent River, MD*  
*Location: Salon 1*

1:35-1:40  
**Introductory Remarks**  
Session Chair

1:40-2:00  
**Existing Database Structure and Review of Status**

2:00-2:20  
**Expansion of Database Structure for:**
   (a) Sensor Unit Interface Structures and Materials  
   (b) Sensor Device Materials and Processes

2:20-2:40  
**Fill-in new Database Area Goals**  
TBD

2:40-3:00  
**Fill-in new Database Area Goals, Continued**  
TBD

3:00-3:20  
**BREAK**

3:20-3:40  
**Fill-in new Database Area Capabilities**  
TBD

3:40-4:00  
**Fill-in new Database Area Capabilities, Continued**  
TBD

4:00-4:20  
**Improvements for Next Year, Coordination with ACERS Non-ITAR**  
L. Schmidt, Naval Air Systems Command, Patuxent River, MD
Thursday Evening, January 29, 2009

5:00-9:00pm  TPS Materials Review and Assessment Meeting
(Martinique)
Thank You to Our Conference Sponsors

- Cincinnati Testing Laboratories
- C-CAT
- COI Ceramics
- GE
- KiON Defense Technologies
- MATECH/GSM
- New Mexico Tech
- Naval Surface Warfare Center, Carderock
- Plasma Processes
- Prat & Whitney
- Starfire Systems
- Southern Research Institute
- Thermacore
- Ultramet
- USACA
- University of Missouri
- University of Delaware
- Virginia Tech

Conference Program Chair

Dr. Mark M. Opeka
Naval Surface Warfare Center, Carderock Division
Code 6170
9500 MacArthur Boulevard
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Attendee Survey

Please answer the following questions and return your completed survey to the student pages staffing the meeting room entrances. Completed surveys can also be turned in at the registration desk or emailed to Glen@strategicmi.com

1) The 2009 Annual Composites, Materials and Structures Conference was not held this year at the same time and place as the ACerS ECD Conference. How important is it to you to hold the conferences at the same time and location again in the future?

☐ Very Important  ☐ Somewhat Important  ☐ Important  ☐ Not Important

2) Were you satisfied with the conference location at Cocoa Beach?

☐ Very Satisfied  ☐ Satisfied  ☐ Dissatisfied  ☐ Very Dissatisfied

3) Were you satisfied with the conference Hotel?

☐ Very Satisfied  ☐ Satisfied  ☐ Dissatisfied  ☐ Very Dissatisfied

4) What are the most important aspects of the conference location for you (Please check all that apply)

☐ Access to major airport  ☐ Lodging Cost  ☐ Food Cost

☐ Hotel Facility  ☐ Other ________________________________

5) What elements of the January 2009 Conference Program were of most interest to you? What topics would you like to see covered in 2010?

☐ CMCs  ☐ Hypersonic Materials  ☐ Carbon Carbon

☐ Missile Propulsion Materials  ☐ Thermal Management  ☐ Radome Materials

☐ Other Topics for 2010________________________________________

6) Did you participate in a group functions in the evening(s) during the conference? If yes, which function and would you like to see them offered again for 2010? (Please check all that apply)

Monday Dinner:  ☐ Liked it, offer it again  ☐ Not interested in it for next year

ITAR Exhibition Area:  ☐ Liked it, offer it again  ☐ Not interested in it for next year

☐ Did not participate in evening events

7) Pre-registration is important for the conference planning. Which of the items below might help to promote early registration? (Please check all that apply)

☐ Early Bird discount  ☐ Early release of agenda

☐ Advance marketing/advertising  ☐ Other Suggestions _________________________________

Comments/Suggestions:
___________________________________________________________________________________________
___________________________________________________________________________________________
___________________________________________________________________________________________