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A World of Science and Technology

PACRIM 12

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Abstracts due November 9, 2016

The 12th Pacific Rim Conference on Ceramic and Glass Technology

including – Glass & Optical Materials Division Meeting (GOMD 2017)

May 21 – 26, 2017

PACRIM Partner Societies:

The American Ceramic Society

The Australian Ceramic Society

The Ceramic Society of Japan

The Chinese Ceramic Society

The Korean Ceramic Society

ceramics.org/pacrim12

Organizing Chair:

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The American Ceramic Society
www.ceramics.org

The 12th Pacific Rim Conference on Ceramic and Glass Technology

including GLASS & OPTICAL MATERIALS DIVISION MEETING (GOMD 2017)

Introduction

The Pacific Rim Conference on Ceramic and Glass Technology is a biannual conference held in collaboration with the ceramic societies of the Pacific Rim countries—The American Ceramic Society, The Ceramic Society of Japan, The Chinese Ceramic Society, The Korean Ceramic Society, and The Australian Ceramic Society. The 1st PACRIM conference was hosted by The American Ceramic Society (ACerS) at Maui, Hawaii, in 1993. After almost 25 years, it is befitting to return to the Big Island of Hawaii for the 12th PACRIM conference. Over the years, PACRIM conferences have earned a distinct reputation as a premier forum for presentations and discussions on the state-of-the-art and emerging topics in ceramic and glass technologies.

The technical program of PACRIM 12 will cover a wide range of exciting topics including multiscale modeling; innovative processing and manufacturing; nanotechnology and structural ceramics; multifunctional materials and systems; ceramics for energy and environment; and ceramics for biology, medicine, and human health. Over 30 symposia are planned that will identify global challenges and opportunities for ceramic and glass technologies.

As in 2009 and 2013, the ACerS Glass and Optical Materials Division is hosting its annual division meeting at PACRIM 12. Several key symposia have been planned by GOMD, including symposia to honor Professor Jacques Lucas and Professor Komatsu Kinen for their contributions to glass science and technology.

The 3rd International Richard M. Fulrath Symposium on the frontier of ceramic technologies for sustainable development is also planned. The Richard M. Fulrath award program promotes friendship among Japanese and United States researchers and scholars. This year's theme of the Fulrath Symposium is Discontinuous Progress for Ceramic Innovations.

To engage and promote future leaders in the field of ceramics science and technology, a Young Investigator Forum is being organized. The title of this exciting symposium is Design and Application of Next Generation Multifunctional Materials: Addressing the New Millennium's Societal Challenges.

I invite all of you to take advantage of this opportunity to visit the beautiful Big Island of Hawaii for the PACRIM/GOMD conference. This conference will provide an excellent forum for interactions and friendships with participants from various continents, who are involved in research, development, engineering, manufacturing, and application of ceramics and glass materials.

I look forward to your participation at PACRIM 12, and I am sure this conference will inspire and enrich you.

Dileep Singh
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Rates:

Hotel confirms the following 2017 guest room rates:

Resort View	$205.00
Ocean View	$225.00
Deluxe Ocean View	$245.00
Government	Prevailing Government Per Diem

A discounted daily resort charge of $10.00 plus tax is assessed per room, per night and includes: High Speed Internet Access/WIFI access; PlayStation 3 access with unlimited movies and games; local, toll-free and credit card calls (no access fee); Hawaiian cultural activities; 20 percent discount on Lagoon Beach toys and 10 percent discount on Ocean Sports cruises.

Cut Off Date: April 17, 2017

Proceedings

Authors of accepted abstracts will be invited to submit papers for inclusion in the *Ceramic Transactions*, which will be published after the meeting and available for an additional fee.

Abstract Submission Instructions

Visit the meeting website at **www.ceramics.org/pacrim12** to review the session topics and select the "Submit Abstract" hyperlink to be directed to the Abstract Central website. Follow the prompts to create an account and submit your abstract online.

Please note that your ACerS member login and password will not work on this website. You will need to set up a new account login and password for the Abstract Central website. If you have questions, please contact Marilyn Stoltz at **mstoltz@ceramics.org** or 614-794-5868.

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MULTISCALE MODELING AND SIMULATION

S1: Characterization and Modeling of Ceramic Interfaces: Structure, Bonding, and Grain Growth

The evolution of ceramic microstructures, including densification and grain growth, is controlled by the formation of interfaces and grain boundaries. The grain boundary core structure, interatomic bonding behavior, and potential segregation to the interface plane can be controlled by suitable processing conditions and strongly affect grain growth behavior. An in-depth mechanistic understanding based on thermodynamic stability and kinetic phenomena at grain boundaries is required to tailor overall microstructures in polycrystalline ceramics. Recent progress in atomic resolution and in situ characterization as well as modeling enables us to gain a fundamental mechanistic understanding of grain boundary formation and grain growth. This symposium focuses on new phenomenological findings that emerged from advanced characterization and modeling efforts of grain boundary and interface structures. Special emphasis will be placed on the impact of atomic and electronic interface structures on microstructure evolution and grain growth phenomena.

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S2: Virtual Materials Design and Ceramic Genome

Recent progress in high-throughput materials design and ceramic genome have significantly enhanced efficiency for achieving improved materials performance, optimized processing, discovery of new materials, and design of structural components. This symposium focuses on the design, modeling, and simulation of ceramics and composites with various approaches in computational research and experimental measurements across length and time scales to further optimize their behavior and facilitate the design of new ceramics and composites with tailored properties. A broader perspective is desired, including the ceramic genome; virtual materials design for new innovative materials and thermo-structure; integrated materials computational engineering; prediction of the structure and properties of crystals, glasses, and defects; modeling materials behavior under extreme/harsh environments; application of novel simulation methods for materials processing and performance; and simulation of novel ceramics for functional applications.

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– Liping Huang, Rensselaer Polytechnic Institute, USA
– Kwang-Ryeol Lee, Korea Institute of Science and Technology, Korea
– Ting Liao, University of Wollongong, Australia

Tentative Schedule of Events

Sunday, May 21	
Registration	3:00 – 7:00 p.m.
Welcome Reception	5:00 – 7:00 p.m.
Monday, May 22	
Registration	7:30 a.m. – 6:00 p.m.
Plenary Session	9:00 a.m. – 12:00 p.m.
Concurrent Technical Sessions	1:20 – 6:00 p.m.
Tuesday, May 23	
Registration	7:30 a.m. – 6:00 p.m.
Concurrent Technical Sessions	8:30 a.m. – 12:00 p.m.
Concurrent Technical Sessions	1:20 – 6:00 p.m.
Poster Session	5:30 – 8:00 p.m.
Wednesday, May 24	
Registration	7:30 a.m. – 12:30 p.m.
Concurrent Technical Sessions	8:30 a.m. – 12:00 p.m.
Free Afternoon	
Thursday, May 25	
Registration	8:00 a.m. – 6:00 p.m.
Concurrent Technical Sessions	8:30 a.m. – 12:00 p.m.
Concurrent Technical Sessions	1:20 – 6:00 p.m.
Evening Event	7:00 – 9:30 p.m.
Friday, May 26	
Registration	8:00 a.m. – 12:00 p.m.
Concurrent Technical Sessions	8:30 a.m. – 12:00 p.m.

INNOVATIVE PROCESSING AND MANUFACTURING

S3: Novel, Green, and Strategic Processing and Manufacturing Technologies

The properties and performance of materials largely depend on their processing and manufacturing routes. Manufacturing processes carefully designed with sufficient understanding of forming/sintering behaviors lead to reliable performance of components and products of large size and complex shapes. Recently developed new processing and manufacturing technologies of ceramic materials and systems give us unique properties that cannot be achieved from the conventional routes. On the other hand, we should take into account at least two critical issues in making materials and products. One is that the technologies are "green" or environmentally benign so as to avoid generation of elements and compounds hazardous to the human health and environments and to protect the global environment by preserving energy during the fabrication. The other is that they are "strategic" or using no or less quantity of rare natural resources for stable production.

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- Richard D. Sisson Jr., Worcester Polytechnic Institute, USA
- Hisayuki Suematsu, Nagaoka University of Technology, Japan
- Guo-Jun Zhang, Donghua University, China

S4: Polymer-Derived Ceramics (PDCs) and Composites

The conversion of polymers directly to ceramics offers unusual scientific and technological opportunities. The polymers can be shaped in the organic state before being transformed to ceramics. Their properties and nanostructure can be manipulated at the molecular level. Unusual porous structures can be made from them. Their potential applications range far and wide from energy and environment, to medicine, sensors, aerospace, and defense.

This symposium will address recent developments in PDCs that include processing and shaping (as in additive manufacturing), characterization of nanostructure, new chemistries, and structural and functional properties. These attributes result from the linkage between a wide stretch of length scales, starting with chemical design of the organic molecules to the science and technology for fabricating net-shape engineering components.

Presentations that emphasize applications of PDCs in fields of energy, life sciences, defense, aerospace, and security are welcomed.

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- Philippe Miele, University of Montpellier 2, France
- Gurpreet Singh, Kansas State University, USA
- Gian Domenico Sorarù, University of Trento, Italy
- Yoshiyuki Sugahara, Waseda University, Japan
- Yiguang Wang, Northwestern Polytechnical University, China
- Yingde Wang, National University of Defense Technology, China

S5: Advanced Powder-Processing and Manufacturing Technologies

Powder processing is critical to the economical production of high-reliability advanced ceramics and can enhance materials functionalities to enable new and broader application in high-technology clean energy and energy-saving industries for sustainable society. To realize these attributes, powder design and synthesis, suspension control, and structural control of the granulated feedstock, green body, and sintered ceramics must be well understood and carefully engineered.

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– Satoshi Tanaka, Nagaoka University of Technology, Japan
– Wei-Hsing Tuan, National Taiwan University, Taiwan
– Yiquan Wu, Alfred University, USA
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S6: Synthesis and Processing of Materials Using Electric Currents and Pressures

Electric fields and currents are powerful processing parameters in addition to the temperature and time parameters available in traditional sintering. Applications of electric current have been leveraged to produce materials with unique properties and/or increase processing efficiency. Of particular note is the wide spread (and continuously increasing) use of the technique often referred to as spark plasma sintering, field-assisted-sintering technique, and current-activated pressure-assisted densification, among others. Experimental and modeling papers covering fundamental as well as application-oriented studies are solicited.

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S7: Porous Ceramics: Innovative Processing and Advanced Applications

Porous ceramics with various pore scales are utilized in many advanced engineering applications, including filters, separators, insulators, membranes, catalytic supports, catalysts, absorbers, sensors, and lightweight structural components. This symposium will share recent advances in the general understanding or methodologies pertaining to the forming, characterizing, modeling, and engineering of porous materials of ceramics, glass, glass-ceramics, and carbon. Porous materials can be based on various morphologies, such as foams, syntactic foams, honeycombs, fibers, bioinspirations, membranes, aerogels, composites, and additive manufacturing components. Engineering applications include thermal management or energy-related technologies (renewable energy, energy saving, energy conversion, heat exchange, and storage), environmental protection (filtration, catalysis, adsorption, and sensing). This symposium focuses on processing and applications of porous materials, including but not limited to the areas of ceramics, chemistry, mechanics, fluid dynamics, modeling and simulation, and application engineering.

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– Yoshikazu Suzuki, University of Tsukuba
– Jingyang Wang, Institute of Metal Research, Chinese Academy of Sciences, China
– James Zimmerman, Corning Incorporated, USA

S8: Additive Manufacturing and 3-D Printing Technologies

Additive manufacturing methods are novel fabrication processes of ceramic components with functional structures. The processes allow for innovative complex part fabrication, client customization, rapid prototyping, and distributed manufacturing. 3-D models are designed minutely according to theoretical concepts in computer graphic applications, and 2-D cross sections are created by slicing operations automatically. High-resolution laser beams are scanned on a spread ceramic powder bed with or without resin binders to form solid planes of 2-D cross sections. Through layer stacking, ceramic precursors or components with the 3-D models are fabricated. In other processes, paste materials with ceramic particles dispersed are fused from nozzles moving freely in three dimensions to create composite precursors. Various functional components of dielectric lattices to control electromagnetic waves, biomaterials components for medical applications, and ceramics electrode with large surface area will be newly developed. Large-scale structural components for aerospace and other high-temperature applications can be fabricated with internal cooling path networks formed. This symposium focuses on superiority of design, efficient processing, and rational evaluations in the additive manufacturing processes.

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– Miranda Fateri, FH Aachen, Germany
– Cynthia Gomes, BAM, Germany
– Nahum Travizky, University of Erlangen-Nürnberg, Germany

S9: Ceramic Integration and Joining Technologies

Traditional methods used for fabricating ceramic and ceramic-matrix composites (CMCs) have limitations in their manufacturability of large parts and complex shapes. Also, the production of components can be costly and time consuming. These limitations can be overcome by novel fabrication processes of joining and integration of ceramics and CMCs. Such processes enable fabrication and utilization of components for high-temperature structural applications in energy, environment, transportation, and aerospace. Joining processes allow for simpler parts to be combined to form large structures or complicated shapes. Integration processes allow ceramic and CMC parts and components to be incorporated with a metal-based system. Joining and integration approaches include adhesion, brazing, glass sealing, diffusion bonding, transient liquid-phase bonding, and reactive processing.

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NANOTECHNOLOGY AND STRUCTRUAL CERAMICS

S10: Multifunctional Nanomaterials and Their Heterostructures for Energy and Sensing Devices

The growing possibilities of engineering nanostructures of various compositions (pure, doped, composites, heterostructures) on various substrates has intensified the research on the integration of various compositions in multilayers and stacked systems, which warrants an intensive exchange of information among materials developers and device engineers. This includes techniques that offer advanced processing, enhanced properties, and low-temperature synthesis, with a focus on the materials innovation and integration challenges.

Special emphasis will be given to novel synthesis approaches, functionalization, processing, and characterization of nanoparticles, nanowires, nanoscopic films, and their heterostructures. Application of nanostructures and heterostructures in catalysis, energy, and sensing applications will form the major scientific thrust areas. Also, thin films for electrical, optical, and catalytic applications, including multilayers, functionally and compositionally graded layers, and coatings with tailored morphologies will be in the focus of the covered topical areas.

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– Danie Chua, National Singapore University, Singapore
– Anand S. Khanna, IIT Bombay, India

S11: Engineering Ceramics: Processing and Characterizations

Conventional and nanostructured engineering ceramics offer unique combinations of properties that have the potential to fulfill the demanding material needs in structural and functional applications, such as those in the aerospace, automotive, energy, engineering, environment, and microelectronics industries. Globally, significant progress has been made in the material development and manufacturing technologies pertaining to these materials. However,

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challenges remain with regard to increasing the degree of penetration of these materials into the marketplace. The successful entry of engineering ceramics into the marketplace depends on the consistent development of materials with improved properties, thus providing solutions for engineering conditions with special requirements.

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– Laifei Cheng, Northwestern Polytechnical University, China
– Katsumi Yoshida, Tokyo Institute of Technology, Japan

S12: Design, Development, and Applications of Ceramic-Matrix Composites

Ceramic-matrix composites (CMCs) possess good mechanical reliability and outstanding high-temperature and ablation resistances. These properties enable the use of CMCs for many demanding applications in modern aerospace, aviation, nuclear energy, and transportation. In recent years, driven by industry needs, the world has seen a great boom in CMC research. Many innovative processing and manufacturing technologies of CMCs have emerged, and a variety of new CMCs with unprecedented properties and composition/structure design have been developed. Research on understanding the correlation between properties and processing techniques will be emphasized.

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– Christian Wilhelmi, EADS Innovation Works/Airbus Group Innovations, Germany
– Guojun Zhang, Donghua University, China

S13: Advanced Structural Ceramics for Extreme Environments

Structural ceramics are enabling materials for applications that involve extreme environments, such as those associated with nuclear power generation, turbine engines, hypersonic flight, and high-speed machining. The radiation levels, temperatures, heat fluxes, wear/abrasion, and other environments encountered in these applications exceed the capabilities of existing materials. Hence, new ceramics and composites are needed. Some of the critical challenges to be met include thermal/chemical stability, complex shape forming, thermal shock resistance, radiation tolerance, and damage tolerance. This symposium will focus on design of new materials, processing, structure–property relationships, thermal and mechanical properties, oxidation resistance, machining and joining, and stability of advanced structural ceramics from fundamental and application-oriented perspectives.

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– Jochen Schneider, Materials Chemistry, RWTH Aachen, Germany
– Luc J Vandeperre, Imperial College London, U.K.
– Guo-Jun Zhang, Shanghai Institute of Ceramics, Chinese Academy of Sciences, China

S14: Novel Spray Coatings

Advanced spray-coating technology has been developed in a variety of forms for providing highly functional ceramic films at high deposition rates. It can produce ceramic films as dense as their sintered counterparts, unlike those deposited by conventional thermal spray methods. Also, some of the technology produces high-quality films at low temperatures so that even polymer substrates can be used. Depending on the properties of the ceramic films, applications can be found in sensors and actuators, biomedical implants, battery and fuel cells, smart phones, air and water purifiers, and others.

This symposium will concentrate on novel coating technology based on different spraying powders than conventional thermal spraying. Novel coating methods include aerosol deposition, cold spray, warm spray in categorized kinetic spray method, nanoparticle deposition, room-temperature granule spray under vacuum, cold spray, warm spray, solution plasma spray and others.

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– Edward Gorzkowski, Naval Research Laboratory, USA
– Chang-Hee Lee, Hanyang University, Korea
– Chang-Jiu Li, Xi'an Jiatong University, China
– Ralf Moos, University of Bayreuth, Germany
– Minoru Osada, National Institute for Materials Science, Japan

S15: Advanced Wear-Resistant Materials: Tribology and Reliability

This symposium focuses on recent advances in wear-resistant materials and coatings development, evaluation of microstructures and properties, and novel applications based on tribology and reliability. Particular emphasis is placed on integrated structural properties, environmental properties, and functionality through innovative material and coating processing; composition and architecture optimization; advanced wear-resistant materials; and low friction coatings for extreme environments and life prediction modeling. Useful information on successful applications to industry, such as automobile and high-load machinery, will be included.

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– Byung-Koog Jang, National Institute for Materials Science, Japan
– Zhengyi FU, Wuhan University of Technology, Wuhan, China

S16: Geopolymers: Low-Energy and Environmental-Friendly Ceramics

Ceramic-like inorganic polymers can be made under low-energy conditions, such as ambient temperatures and pressures. These materials include aluminosilicates or "geopolymers," phosphates, and other chemically bonded inorganic compounds. The use of waste products or natural materials as starting compounds or as reinforcements in composites demonstrates the ecofriendly and sustainable nature of these materials. Novel potential applications of such composites include hydrogen storage, water purification and biocidal activity, porous materials for CO_2 sequestration, thermal insulation, fire-resistant building materials, and structural ceramic composites.

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MULTIFUNCTIONAL MATERIALS AND SYSTEMS

S17: Advanced Functional Ceramics and Critical Materials Perspective

With the advancement of science and technology, there is a growing trend toward the increasing importance of ceramic materials, which are resistant to heat, chemically stable, and have a wide variety of functions. However, seeking new functions is simply considered routine, and the need exists to develop safe and secure ceramic materials for the next generation. This symposium will discuss advanced functional ceramic materials (environmental catalysts, semiconductors, and porous materials) as chemical sensors, dielectric materials, and thermoelectric materials.

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– Satoshi Wada, University of Yamanashi, Japan
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S18: Microwave Dielectric Materials and Their Applications

Microwave dielectric materials are important in modern microwave communication technologies because of their important applications as microwave resonators, filters, antennas, etc. Recently, new devices with superior performance have been developed to respond to the requirement of increased channel capacity in ground-based cellular and satellite communications. To meet the specifications of the present and future systems, improved or new microwave components based on dedicated dielectric materials and new designs are required. The device performance is closely related to material characteristics. This symposium provides a forum for the worldwide microwave community from academy and industry to discuss topics such as materials development, design, measurement techniques, applications, devices, technology trends, and market demands.

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– Danilo Suvorov, Jozef Stefan Institute, Slovenia
– Rick Ubic, Boise State University, USA

S19: Transparent Ceramic Materials and Devices

Transparent ceramics are emerging as a highly promising alternative to single-crystal materials for potential utilization in a wide range of optical and photonic applications. A particular emphasis will be placed on the fundamental issues to advance our understanding and utilization of advanced optical ceramics and related-devices.

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– Do Kyung Kim, Korea Advanced Institute of Science and Technology, Korea, dkkim@kaist.ac.kr
– Akio Ikesue, World-lab Corp., Japan
– Ying Shi, Shanghai University, China
– Takunori Taira, Institute for Molecular Science, Japan
– Shiwei Wang, Shanghai Institute of Ceramics, China

S20: Crystalline Materials for Electrical, Optical, and Medical Applications

The session will cover all aspects, from basic research and material characterization, through physicochemical aspects of growth, synthesis, and deposition techniques, to the technological development of industrialized materials. For this purpose, worldwide experts in the various topics will be invited to introduce their most recent activities.

ORGANIZERS

– **Kiyoshi Shimamura**, National Institute for Materials Science, Japan, SHIMAMURA.Kiyoshi@nims.go.jp
– **Noboru Ichinose**, Waseda University, Japan, ichinose@waseda.jp
– **Xutang Tao**, Shandong University, China, txt@sdu.edu.cn
– Nerine J. Cherepy, Lawrence Livermore National Laboratory, USA
– Didier Chaussende, Grenoble Institute of Technology, France
– Luisa E. Bausá, Autonomous University of Madrid, Spain
– Valérie Demange, Rennes Institute of Chemical Sciences, France
– Alain Largeteau, Institute for Solid State Chemistry Bordeaux, France
– Kenji Toda, Niigata University, Japan
– Mikio Higuchi, Hokkaido University, Japan

CERAMICS FOR ENERGY AND ENVIRONMENT

S21: Solid Oxide Fuel Cells and Hydrogen Technologies

Worldwide interest in solid oxide fuel cells (SOFCs), as a promising future electricity-generation technology, has remarkably increased in recent years because of their high electrical efficiency and multifuel capability (hydrogen, carbon monoxide, methane, etc.). Recent developments in engineered electrode architectures, component materials chemistry, cell and stack designs, and fabrication processes have led to significant improvements in the electrical performance and performance stability as well as reduction in the operating temperature of such cells. Although their development continues to face various problems with high-temperature materials as well as design of cost-effective materials and manufacturing processes, SOFCs are expected to enter the commercial markets in the near future.

Hydrogen economy as an emerging energy alternative relies on development of novel materials to realize the promise and expectation for a cleaner environment. Material needs and technologies in the areas of hydrogen production, storage, delivery, and safety will be addressed in conjunction with hydrogen-based alternative energy sources.

ORGANIZERS

– **Fatih Dogan**, Missouri University of Science and Technology, USA, doganf@mst.edu
– **Masanobu Awano**, National Institute of Advanced Industrial Science and Technology, Japan, masa-awano@aist.go.jp
– **Nguyen Minh**, University of California, San Diego, USA, nminh@ucsd.edu
– **Kuan-Zong Fung**, National Cheng Kung University, Taiwan, z87009@email.ncku.edu.tw

– **Thomas Pfeifer**, Fraunhofer Institute for Ceramic Technologies and Systems, Germany, Thomas.pfeifer@ikts.fraunhofer.de
Guntae Kim, Ulsan National Institute of Science and Technology, Korea, gtkim@unist.ac.kr

S22: Direct Thermal to Electrical Energy Conversion Materials and Applications

Significant advancements have been achieved in direct thermal-to-electrical energy conversion materials. This symposium provides an open forum to highlight up-to-date theoretical ideas, new materials, and new device concepts and applications. It will focus on novel materials, processing and synthesis methods, and technologies and applications related to direct thermal-to-electric energy conversion, specifically on thermoelectrics and thermionics. Thermal, electrical, and mechanical properties of new materials and processing of those materials into device structures also will be emphasized. Theoretical studies of transport properties, band structure, and crystal chemistry of materials, thermodynamic analysis, and energy transfer also will be included. Experiments that include new capabilities in solid-state synthesis, new bulk materials, thin films, superlattices and nanostructured materials, material properties, and device performance measurements will be reported.

ORGANIZERS

– **Hua-Tay Lin**, Guangdong University of Technology, China, huataylin@gdut.edu.cn
– **Michitaka Ohtaki**, Kyushu University, Japan, ohtaki@mm.kyushu-u.ac.jp
– **Jin-Sang Kim**, Korea Institute of Science and Technology (KIST), Korea, jskim@kist.re.kr
– Terry Tritt, Clemson University, USA
– Lidong Chen, Shanghai Institute of Ceramics, China
– Anke Weidenkaff, University of Stuttgart, Germany
– Kunihito Koumoto, Nagoya University, Japan
– Hsin Wang, Oak Ridge National Laboratory, USA

S23: Materials for Solar Thermal Energy Conversion and Storage

Concentrated solar technology is expected to contribute significantly to a future sustainable, efficient, and diverse energy mix. Together with suitable thermal energy storage systems, concentrated solar energy may provide base load power. Moreover, concentrated solar energy can be used for high-temperature process technology, e.g., for the production of fuels or chemicals. Material requirements in the field of concentrated solar energy are manifold: Besides thermal and thermomechanical stability, lifetime, and environmental resistance, appropriate functional properties (optical, chemical, and thermal) also must be taken into account.

The following topics will be covered: absorber materials (light-absorbing performance, selective coatings, robustness against thermal cycling, interactions with environmental effects, such as airborne mineral dust, vapor, and salts); innovative high-temperature construction and isolation materials for solar receivers and solar reactors; mirrors and mirror coatings (reflectivity, stability against pitting and delamination, self-cleaning surfaces, lifetime prediction considering temperature swings, ultraviolet irradiation, rain, dust, etc.); heat-transfer media (molten salts, particles, molten metals, etc.) with improved stability and wider operating temperatures; reactions between heat-transfer media and other components; novel materials for thermal energy storage systems (phase change materials, materials for thermochemical storage systems); and materials for (solar) thermochemical processes to produce H_2, CO, or synthetic fuels (metal oxide-based redox materials, catalysts, sulfur-based cycles, Cu–Cl cycle, etc.).

ORGANIZERS

– **Martin Schmücker**, German Aerospace Center, Germany, martin.schmuecker@dlr.de
– **Weihuan Zhao**, University of North Texas, USA, Weihuan.Zhao@unt.edu
– Martin Roeb, German Aerospace Center, Germany
– Anthony McDaniel, Sandia National Laboratories, USA

S24: Photovoltaic and Related Materials and Technologies

The significant increase in demand of world energy consumption, including clean and efficient energy resources, has prompted the imperative searches of new materials and technologies. The technology aiming for the effective and efficient use of solar energy is one of the top priorities to guarantee sustainable growth and development of the present society. This symposium will focus on the advanced materials and technologies of photovoltaic materials and devices, including inorganic, organic, and hybrid compounds and materials. A broad perspective is desired, including photovoltaic materials; solar cells (such as silicon-based, semiconductor compounds, dye-sensitized, and emerging perovskite-type materials); solar energy conversion systems; transparent conduction oxides/non-oxides/compounds films/electrodes; fundamental materials properties and characterization of solar energy conversion; state-of-the art of solar cell materials and architectures; structure–property correlations; and materials development and processing technologies for reliable and efficient solar-energy conversion and related fundamental and practical application technologies.

ORGANIZERS

– **Tohru Sekino**, Osaka University, Japan, sekino@sanken.osaka-u.ac.jp

CALL FOR PAPERS

Abstracts due November 9, 2016

– Yoshikazu Suzuki, Tsukuba University, Japan
– Federico Rosei, NRS-EMT, Université du Quebec, Canada
– Jin-Hyo Boo, Sungkyunkwan University, Korea
– Yanfeng Gao, Shanghai Institute of Ceramics, China
– Jyh-Ming Ting, National Cheng Kung University, Taiwan
– Udo Bach, Monash University, Australia
– Yi-Bing Cheng, Monash University, Australia

S25: Ceramics for Next Generation Nuclear Energy

Nuclear power is a recognized option to support increasing global energy demand. Materials issues related to expanding nuclear power include performance under extreme conditions such as elevated temperatures, mechanical stresses, high radiation doses, and corrosive environments. Structural materials and fuels for advanced reactors are critical to future nuclear power as are technologies and materials needed to achieve safe and hazard-free operation. In addition, a more comprehensive understanding of the processes and mechanisms underlying the long-term behavior of materials for nuclear applications is needed.

This symposium will address topics ranging from materials development for fission and fusion reactors, to radiation detection and isotope production. The radiation response of ceramics, glasses, and composite materials to identify linkages and commonalities in their behaviors will be discussed. In addition, the symposium will address lifetime extension of existing nuclear reactors and the challenges for future nuclear endeavors. Papers are solicited on a wide variety of topics related to materials aspects in nuclear energy using experiment, theory, and simulation.

ORGANIZERS

– **Jake Amoroso**, Savannah River National Laboratory, USA, Jake.amoroso@srs.gov
– Josef Matyas, Pacific Northwest National Laboratory, USA
– Weon-Ju Kim, Korea Atomic Energy Research Institute, Korea
– Yutai Katoh, Oak Ridge National Laboratory, USA
– Andrew Nelson, Los Alamos National Laboratory, USA
– Alexander Gottberg, TRIUMF, Canada
– Travis Knight, University of South Carolina, USA
– Takashi Nozawa, National Institutes for Quantum and Radiological Science and Technology, Japan
– Ming Tang, Los Alamos National Laboratory, USA
– Qing Huang, Ningbo Institute of Materials Technology and Engineering, China
– Harlan Brown-Shaklee, Sandia National Laboratories, USA

S26: Advances in Materials and Technology for Perovskite and Next Generation Solar Cells

The significant increase in demand of world energy consumption as well as clean and efficient energy resources has prompted the imperative searches of new materials and technologies. Recently, advanced materials and technologies for perovskite and next-generation solar cells have been exploited to develop economically viable, high-performance solar cells with long-term stability, which is crucial for commercial production. This symposium will focus on the important issues and phenomena that are at the frontier of understanding and materials development in perovskite solar cells and next-generation solar cells, including cells film/single-crystal growth, chemistry of materials, surfaces/interfaces, hysteresis, photophysics, air stability, and fundamental and devices modeling.

ORGANIZERS

– **Yoon-Bong Hahn**, Chonbuk National University, Korea, ybhahn@chonbuk.ac.kr
– S.R.P. Silva, Surrey University, U.K.
– Hyun Suk Jung, Sungkyunkwan University, Korea
– Hua Zhang, Nanyang Technological University, Singapore
– Silke Christiansen, Helmholtz Zentrum Berlin, Germany
– Dongling Ma, INRS, Canada

S27: Ceramics for Enabling Environmental Protection: Clean Air and Water

This symposium will focus on ceramic technologies as enablers for removal of pollutants that are already present in the environment, reduction or elimination of future pollution sources, and development of new processes and products with respect to efficiency, economy, ecology, and reduced resource consumption. The scope of the symposium extends from recent scientific breakthroughs in materials, processing, and systems design that help environmental protection, to implementation of these improvements into already existing and new product applications.

ORGANIZERS

– **Michael J. Lance**, Oak Ridge National Laboratory, USA, lancem@ornl.gov
– **Daniel Grohol**, The Dow Chemical Co., USA, DGrohol@dow.com
– **Nahum Travitzky**, University of Erlangen-Nuremberg, Germany, nahum.travitzky@fau.de
– Hau-Tay Lin, Guangdong University of Technology, China
– Xiaowei Yin, Northwestern Polytechnical University, China
– Paolo Colombo, Università di Padova, Italy
– Eugene Medvedovski, Endurance Technologies Inc., Canada
– In-Hyuck Song, Korea Institute of Materials Science, Korea
– Toshihiro Ishikawa, Tokyo University of Science, Japan
– Valeriy M. Pogrebenkov, Tomsk Polytechnic University, Russia

S28: Advanced Materials and Technologies for Electrochemical Energy Storage Systems

During the past two decades, research groups in academics and industries around the globe have developed numerous cathode and anode materials and electrolytes that can be used in electrochemical storage systems for storing more and more energy per unit mass or unit volume. As a result, lithium-ion battery technology is making serious progress in the transportation industry. Challenges at the battery system level remain with regard to energy, power, cost, life, and safety. The technology is slowly making landmark advances in other industries, including stationary storage systems for wind farms and solar plants. Improvements in materials design, electrodes architecture, and cell chemistry are required to extend the life, enhance the safety, and lower the cost of rechargeable lithium-ion batteries. A deeper understanding of the battery materials–property relationship, electrode–electrolyte interface phenomena, and cell failure mechanisms is needed. The search for advanced high-capacity electrode materials and the implementation of the challenging lithium–sulfur and lithium–air batteries will be necessary to overcome current energy density shortfall in lithium-ion batteries. Abstracts are solicited on the fundamental and applied aspects of rechargeable lithium-ion batteries, lithium–sulfur, and lithium–air batteries, and beyond lithium technologies, including sodium batteries, magnesium batteries, and supercapacitors. We also invite abstracts on all-solid-state batteries and solid electrolytes.

ORGANIZERS

- **Palani Balaya**, National University of Singapore, Singapore, mpepb@nus.edu.sg
- **Kisuk Kang**, Seoul National University, Korea, matlgen1@snu.ac.kr
- **Mickael Dolle**, Université de Montréal, Canada, mickael.dolle@umontreal.ca
- Ilias Belharouak, Qatar Environment and Energy Research Institute, Qatar
- Shirley Meng, University of California, San Diego, USA
- Dany Carlier-Larregaray, ICMCB-CNRS, France
- Naoaki Yabuuchi, Tokyo Denki University, Japan
- Robert Dominko, National Institute of Chemistry, Slovenia
- Neeraj Sharma, University of New South Wales, Australia

S29: Advances in Polar, Magnetic, and Semiconductor Materials: Extending Temperature Limits

This symposium provides an international forum for scientists, engineers, and technologists to exchange ideas on high-temperature materials development, processing, characterization, and application. Polarization and transport properties are greatly influenced by thermal conditions and electromagnetic field strengths. High-permittivity dielectrics with low current leakage are needed for power electronics capacitor and packaging applications. Operating temperatures for power electronic circuits are being increased beyond 200°C by the revolution in wide-bandgap semiconductors. Magnetic materials and components also must function at higher temperatures. New piezoelectrics offer operating temperatures that are comparable to, or higher than, traditional lead zirconate titanate ceramics. This symposium brings together topics that couple to the challenges of understanding structure–property relationships and optimizing the design, fabrication, and properties of materials for high-temperature applications. We invite abstracts on advances in basic science and technology—such as costs, sustainability, and integration in electronic circuits—and will discuss how these can be used to address technological issues faced by the industries.

ORGANIZERS

- **Michael Lanagan**, Pennsylvania State University, USA, mxl46@psu.edu
- Behai Ma, Argonne National Laboratory, USA
- Steven Milne, University of Leeds, U.K.
- Paul Ohodnicki, National Energy Technology Laboratory, USA
- Shujun Zhang, University of Wollongong, Australia

S30: Glasses and Ceramics for Nuclear and Hazardous Waste Treatment

As nuclear energy and fuel reprocessing efforts expand, there is increasing need to generate knowledge on the processing, properties, and testing of glass and ceramic materials used in nuclear waste immobilization. Responsible environmental stewardship requires treatment and stabilization of hazardous wastes that result from industrial processes. Glass and ceramic matrices often are appropriate to immobilize such wastes. This symposium will address the use of immobilization techniques, such as vitrification, the role of cementitious materials in the stabilization of waste, and the structural integrity of vitrified and cemented waste forms. Alternative low-temperature waste forms, such as hydroceramics and geopolymers, will be considered as well as high-temperature glass composite materials, glass-ceramics, and ceramic waste forms. Recycled industrial waste in glass and ceramic products will be discussed. Additional topics include characterization and testing techniques for waste forms, accelerated testing to assess durability, and modeling of behavior over long timescales. This symposium is endorsed by the ACerS Nuclear and Environmental Technology Division and ICG TC05.

ORGANIZERS

- **Kevin M. Fox**, Savannah River National Laboratory, USA, kevin.fox@srnl.doe.gov
- Russell J. Hand, University of Sheffield, U.K.

CALL FOR PAPERS

Abstracts due November 9, 2016

– Joseph V. Ryan, Pacific Northwest National Laboratory, USA
– Nicolas Clavier, Marcoule Separation Chemistry Institute, France
– Yaohiro Inagaki, Kyushu University, Japan
– Cheon-Woo Kim, Korea Hydro and Nuclear Power Company Ltd., Korea

CERAMICS IN BIOLOGY, MEDICINE, AND HUMAN HEALTH

S31: Advances in Bioceramics: Biomineralization and Bioinspired Materials

Biomineralization is the basis to understanding self-assembled growth of mineralized tissues whether it is in bone, mollusk shells, eggs, crustacean exoskeletons, or diatoms. Revealing the influence of organic/inorganic interactions is paramount to this understanding. These interactions are critical in implantable bioceramics and bioactive ceramics used in dental and orthopedic applications. Bioinspired materials designs have focused on assembling organic/inorganic structures that are mechanically robust and have the potential to be multifunctional. This symposium will address these topics and the development of new biocomposite materials, bioactive ceramics, porous bioceramics, and nanostructured materials. Themes related to further understanding the self-assembly process and biocompatibility, as well as other subjects that focus on ceramics used in a biological environment and/or fabricated with biomimetic or bioinspired design strategies will be covered.

ORGANIZERS

– **Joanna McKittrick**, University of California, San Diego, USA, jmckittrick@ucsd.edu
– Laurie Gower, University of Florida, USA
– Hui-Suk Yun, Korea Institute of Materials Science, Korea
– Po-Yu Chen, National Tsing Hua University, Taiwan
– David Kisailus, University of California, Riverside, USA
– Andre Studart, ETH-Zürich, Switzerland
– Stephan E. Wolf, University of Erlangen-Nürnberg, Germany

S32: Nanostructured Bioceramics and Ceramics for Biomedical Applications

Recent advances in nanostructured ceramics for medical applications have resulted from three complementary forces. First, there is a natural evolution from the microscale to the nanoscale as novel processing and characterization techniques become available. Second, nanostructured ceramics provide exceptional capabilities for specialized interactions with proteins, DNA, viruses, and other nanoscale biological structures. Third, novel techniques for processing ceramic materials are being developed that will facilitate improvements in medical and dental care. This symposium will allow for discussion among the many groups involved in the development and use of bioceramics, including ceramic researchers, medical device manufacturers, and clinicians.

ORGANIZERS

– **Roger J Narayan**, University of North Carolina and North Carolina State University, USA, roger_narayan@unc.edu
– **Akiyoshi Osaka**, Okayama University, Japan, a-osaka@cc.okayama-u.ac.jp
– Min Wang, The University of Hong Kong, Hong Kong
– Markus Reiterer, Medtronic, USA
– Mohan Edirisinghe, University College London, U.K.
– Chikara Ohtsuki, Nagoya University, Japan
– Hui-suk Yun, Korea Institute of Materials Science, Korea
– Rizhi Wang, University of British Columbia, Canada

SPECIAL TOPICS

Third International Richard M. Fulrath Symposium on Discontinuous Progress for Ceramic Innovations

The Richard M. Fulrath award was initiated in 1978 to promote technical and personal friendships between United States and Japanese ceramic engineers/scientists. The award has been presented to more than 130 Japanese and 50 U.S. scientists and engineers who have made significant contributions and innovations in various areas of ceramics science and technology. Any innovation begins from a small but discontinuous progress from conventional concepts or expected results. In this sense, discontinuous progress is the mother of innovation. The Third International Richard M. Fulrath Symposium in PacRim12 focuses on such discontinuous progresses for ceramic innovations. The future health of many ceramics industries relies on the ability to innovate and develop new advanced technologies and applications. Many Fulrath winners are providing this leadership in innovation to make ceramic academia and industry more exciting and attractive by making discontinuous progress.

The technical program will cover wide ranging topics, but presentations should include discontinuous progress from conventional concepts or expected results.

All Fulrath award winners from Japan and the U.S. as well as award candidates are invited to make presentations in their specific areas of interest and highlight contributions for discontinuous progress for ceramic innovations.

ORGANIZERS

– **Mrityunjay Singh**, Ohio Aerospace Institute, NASA Glenn Research Center, USA, m.singh@juno.com
– **Takaaki Tsurumi**, Tokyo Institute of Technology, Japan, ttsurumi@ceram.titech.ac.jp
– Elizabeth Dickey, North Carolina State University, USA
– Yuji Akimoto, Shoei Chemical Inc., Japan
– Greg Morscher, The University of Akron, USA
– Ken-ichi Kakimoto, Nagoya Institute of Technology, Japan
– Roger J. Narayan, North Carolina State University, USA

Young Investigator Forum: Design and Application of Next-Generation Multifunctional Materials—Addressing the New Millennium's Societal Challenges

Sustainability has become an integral component of research for the 21st century. The key challenges we face include rapid urbanization, growing and aging population, large amount of waste disposed to landfills annually, global impoverishing of natural resources and environment (fossil fuels, minerals, water and energy scarcity, etc.), declining infrastructure, emergency to control carbon dioxide emissions, and climate change. Recent global research trends cover the search for alternative and reusable energy sources, fast and reliable medical theranostic methods, and new functional materials—in combination with the development of innovative ("greener," more efficient) synthesis approaches—that exhibit unique properties allowing for their implementation in energy-, health-, and environment-related applications. Novel materials design paradigms are needed for fabricating multifunctional materials for a broad variety of applications, which can bring game-changing solutions to some of the problems we face. Herein, the symposium aims to bring together young researchers and scientists from around the globe to discuss new approaches in materials design, synthesis, characterization, and implementation in new technologies, thus providing a platform for intensive exchange of ideas, knowledge, and network building.

ORGANIZERS

– **Surojit Gupta**, University of North Dakota, USA, surojit.gupta@engr.und.edu
– **Eva Hemmer**, University of Ottawa, Canada, ehemmer@uottawa.ca
– **Valerie Wiesner**, NASA Glenn Research Center, USA, valerie.l.wiesner@nasa.gov
– Jun-ichi Tatami, Yokohama National University, Japan
– G. Costa, NASA Glenn Research Center, USA
– Aiguo Zhou, Henan Polytechnic University, China
– Dongsheng Wen, University of Leeds, U.K.
– Peter R. Wich, Johannes Gutenberg-Universität Mainz, Germany
– T. Fischer, University of Cologne, Germany

GLASS & OPTICAL MATERIALS DIVISION MEETING 2017

Introduction

Glass & Optical Materials Division Meeting (GOMD 2017) takes place May 21–26, 2017, in Waikoloa, Hawaii. The technical program features six symposia—Fundamentals of the Glassy State, Glasses in Healthcare, Optical and Electronic Materials and Devices, Glass Technology and Crosscutting Topics, Professor Jacques Lucas Honorary, and Professor Komatsu Kinen Honorary. Technical oral and poster presentations led by technical leaders from industry, national laboratories, and academia will provide an open forum for glass scientists and engineers from around the world to present and exchange findings on recent advances in various aspects related to glass science and technology.

The GOMD Executive Committee, program chairs, and volunteer organizers invite you to join us at GOMD 2017 to learn the state-of-the-art of glass science and engineering, find new collaboration opportunities, and exchange ideas in the international glass community. GOMD 2017 will provide a unique opportunity for students to learn, to interact, and to win prizes and awards! See details below. We look forward to seeing you in Hawaii!

GOMD 2017 STUDENT ACTIVITIES

Poster Session and Student Poster Competition

Organizer
– **Mathieu Bauchy**, University of California, Los Angelese

Poster abstracts will be accepted for all sessions and symposia. Students are encouraged to enter their presentations in the annual poster competition for professional recognition and cash awards!

Career Round Table

Organized by Global Graduate Researcher Network (GGRN) and President's Council of Student Advisors (PCSA)

Students attending GOMD 2017 are invited to attend an information round table discussion with scientists from industry, national laboratories, and academia. This will be an opportunity for students to ask scientists questions in a casual environment on diverse topics (work–life balance, career opportunities, etc.). The scientists will rotate every 15 minutes so that students have the chance for candid discussions with several professional scientists during the session.

May 21 – 26, 2017 | Hilton Waikoloa Village | Waikoloa, Hawaii, USA

CALL FOR PAPERS

Abstracts due November 9, 2016

S1: FUNDAMENTALS OF THE GLASSY STATE

In-depth exchanges and discussions on fundamental principles of glass science will be explored in this forum. Contributions covering experimental and theoretical developments in the field of glass science are welcome. Topics of interest include novel developments in the following sessions.

Session 1: Glass Formation and Relaxation

This session will address all aspects of glass formation, including experimental, modeling, and theoretical development in our understanding of the glass transition and relaxation. All glass systems, including oxides, metallic glasses, organic glasses, and chalcogenides, will be covered.

ORGANIZERS

– **Ozgur Gulbiten**, Corning Incorporated, USA
– **Xiaoju Guo**, Corning Incorporated, USA

Session 2: Topology and Rigidity

Since their introduction, topological constraint theory and rigidity concepts have resulted in many breakthroughs in our understanding of the composition dependence of glass properties and, thereby, have enabled the nanoengineering of high-performance glasses. This session will focus on recent advances in topological modeling and cover experimental, computational, and theoretical studies.

ORGANIZERS

– **M. Bauchy**, University of California Los Angeles, USA
– **M. Smedskjaer**, Aalborg University, Denmark

Session 3: Glass, Entropy, and the Glass Transition

Divergence of timescales, the glass transition, the role of configurational entropy, and the extrapolations to absolute zero remain issues of fundamental curiosity, and their understanding also begins to have impact in concrete applications of glass. Interestingly, very similar approaches are taken in fields as different as melt-derived glasses, glass transitions in paramagnetic and superparamagnetic materials, or collapsing zeolites. It is anticipated that the bridging consideration of experimental and computer-generated glass transitions may provide a new perspective at some of the application-related problems of glass science, subject to the present session.

ORGANIZER

– **Lothar Wondraczek**, Otto Schott Institute of Materials Research (OSIM), University of Jena, Germany

Session 4: Mechanical Properties of Amorphous Solids

This session will cover the recent progress in understanding the mechanical properties of amorphous solids, including but not limited to oxide glasses, chalcogenide glasses, metallic glasses, and soft glassy materials. The deformation, wear, and fracture mechanisms under various testing conditions—such as tension, compression, indentation, and scratch—and across various time and spatial scales will be included. The similarity and distinctions between various glassy systems will be solicited. Experimental and computational studies will be included.

ORGANIZERS

– **Jian Luo**, Corning Incorporated, USA
– **Yunfeng Shi**, Rensselaer Polytechnic Institute, USA

2017 GOMD PROGRAM CHAIR

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2015-16 GOMD OFFICERS

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Secretary

Liping Huang
Rensselaer Polytechnic Institute
huangL5@rpi.edu

Session 5: Glass Under Extreme Conditions

This session will cover the recent progress in understanding structure and properties of glass under extreme conditions, such as high pressure, high stress, high temperature, high radiation, and highly reactive conditions, in designing glass for these applications and in utilizing such conditions to synthesize glass with superior properties. Experimental and computational studies will be included.

ORGANIZERS

– **Liping Huang**, Rensselaer Polytechnic Institute, USA
– **Benoit Rufflé**, Université Montpellier II, France
– **Morten Mattrup Smedskjær**, Aalborg University, Denmark
– **Yann Vaills**, University of Orléans, France

Session 6: Novel Modeling of Amorphous Materials

There have been new approaches to more realistically model glasses and amorphous materials.

- Machine learning to obtain efficient and accurate interatomic potentials
- Methods to include experimental information in the process of computer modeling
- Methods to computationally design materials with preferred structural, optical, or electronic properties
- Methods to efficiently explore configuration space

ORGANIZER

– **David Drabold**, Ohio University, USA
– **Parthapratim Biswas**, Univ. of Southern Mississippi
– **Jaakko Akola**, Tampere University, Finland
– **R. O. Jones**, Forschungszentrum Jülich, Germany

S2: GLASSES IN HEALTHCARE—FUNDAMENTALS AND APPLICATION

In addition to the current application of glasses and glass-ceramics for bone regeneration in medicine and dentistry, there is growing interest in the application of novel glass products in dental remineralization and wound healing. Emerging areas in the applications of bioactive glasses also will be covered, including interaction with bacteria, drug delivery systems, cancer treatment, and soft tissue engineering. Discussions will cover biomedical glasses composed of silicate, borate, and phosphate compositions, metal-ion-doped bioactive glasses for targeting specific cellular and biological responses, and formation of melt-derived, sol–gel, and mesoporous glasses into various architectures, including nanoparticles and nanofibers.

- Dedicated Larry L. Hench Memorial session on bioactive glasses
- Glasses for dental or soft tissue applications
- Nanoparticles and therapeutics
- Structural basis of bioactive glass design

ORGANIZERS

– **Julian Jones**, Imperial College London, U.K.
– **Delia S. Brauer**, Friedrich Schiller University Jena, Germany
– **Ashutosh Goel**, Rutgers, The State University of New Jersey, USA

S3: OPTICAL AND ELECTRONIC MATERIALS AND DEVICES—FUNDAMENTALS AND APPLICATIONS

Optical and electronic materials and devices are of critical importance for a broad range of applications, including sustainable energy, information technology, nonvolatile memory, sensing, medical diagnostics and treatment, and national defense. This symposium will address processing and properties of optical and electronic materials as well as design, fabrication, and performance of functional devices.

Session 1: Photon and Glass Interaction

With the technology advancement and the broad application of glass in electronic devices and information technology, the interaction between photon and glass is becoming a critical topic of research. Applications, such as plasma cleaning, ultraviolet cleaning, and ultraviolet curing, involve high-energy high-intensity photons, where the interaction of photon on glass generates electron or hole centers. Photons in the form of laser pulses can be tuned to cover a wide range of time, temporal, and energy scales. This session will focus on the fundamental understanding of the generation and identification of defect centers. The effect from photon energy, energy density, and pulse frequency as well as glass-matrix and existing multivalent species in the glass will be covered during the session.

ORGANIZERS

– **Xiaoju Guo**, Corning, Incorporated, USA
– **Albert Heberle**, Corning, Incorporated, USA
– **S.K. Sundaram**, Alfred University, USA

CALL FOR PAPERS

Abstracts due November 9, 2016

Session 2: Quantum Processes in Glasses

Quantum processes in glasses encompass quite a wide range. For example, large quantum fluctuations serve to inhibit glass formation as tunneling and zero-point energy allow particles to traverse barriers, facilitating movement. Quantum efficiency and energy transfer processes in rare-earth-doped glasses show strong compositional dependence. Quantum-doped glasses unravel nonlinear optical processes. Selected topics of interest include:

- Quantum mechanic modeling of glasses
- Quantum fluctuations and glass formation
- Quantum dots and other structures in glasses
- Quantum optical processes in rare-earth-doped glasses

ORGANIZERS

– **S.K. Sundaram**, Alfred University, USA
– **D.A. Nolan**, Corning Incorporated, USA
– **N.F. Borelli**, Corning Incorporated, USA

Session 3: Charge and Energy Transport in Disordered Materials

The control of charge and energy streams in materials is central to their application in a broad range of thermal, energy generation/storage, and electronic technologies. As the underlying structure of these systems become disordered, challenges in understanding and manipulating transport phenomena become paramount in establishing structural design criteria, formulation, and processing methods to provide optimized properties. With the increased consideration and application of glassy and nanoheterogeneous (e.g., glass-ceramics, nanocomposite) materials in such areas as energy generation and storage (e.g., photovoltaics, fuel cells, thermoelectrics, batteries), thermal isolation or conduction media, and low-loss dielectrics and electronic conduction (microelectronics, nanoelectronics), new insights into the fundamental nature and control of transport processes and their coupling become important. This symposium provides a general forum for the discussion of the mechanisms, properties, and applications of charge and energy transport phenomena in such disordered systems. Contributions on the experimental, theoretical, and modeling aspects of these topics are encouraged.

ORGANIZERS

– **B.G. Potter Jr.**, University of Arizona, USA
– **Krishna Muralidharan**, University of Arizona, USA
– **Gang Chen**, Ohio University, USA
– **David Drabold**, Ohio University, USA
– **Mario Affatigato**, Coe College, USA

Session 4: Sciences and Applications of Optical Ceramics and Glass-ceramics

Glass-ceramic and optical ceramic materials are emerging as a highly promising alternative to single-crystal materials for potential use in a wide range of optical and photonic applications. A particular emphasis will be placed on the fundamental issues to advance our understanding and utilization of glass-ceramics and optical ceramics and related devices. Session topics include science of transparent glasses and ceramics, novel processing, scintillators and spectroscopy, laser materials, modeling, and theory computation.

ORGANIZERS

– **Yiquan Wu**, Alfred University, USA
– **Xiang-hua Zhang**, Université de Rennes I, France
– **John S. McCloy**, Washington State University, USA

Session 5: Glass-based Optical Devices

Glasses are important materials for optical components and devices given their excellent optical transparency and versatile processing. Novel oxide and non-oxide glass compositions and fabrication technology development have further enabled emerging applications, such as light emission, infrared imaging, nonlinear optical signal processing, and sensing. This session will cover material synthesis and processing as well as device fabrication and applications of innovative device architectures, including but not limited to, molded optics, diffractive optics, thin-film optical coatings, and integrated photonic devices.

ORGANIZERS

– **Juejun Hu**, Massachusetts Institute of Technology, USA
– **Rongping Wang**, Australia National University, Australia
– **Heike Ebendorff-Heidepriem**, The University of Adelaide, Australia

Session 6: Glasses in Detector Applications

This session highlights application of glasses in radiation and particle detectors. These detectors are critical to fundamental discovery in physics, e.g., neutrinos and gravitational waves. Selected topics:

- Photomultiplier tube glasses for neutrino detection
- Glasses for neutron detectors
- Glasses in detection of gravitational waves
- Glasses for nuclear fusion research
- Proton-detecting glasses
- Color-glass condensates

ORGANIZERS

– **S.K. Sundaram**, Alfred University, USA
– **Mario Affatigato**, Coe College, USA

Session 7: Rare-earth-doped Glasses and Ceramics for Photonic Applications

Rare-earth-doped glasses and ceramics have broader photonic applications. In general, rare-earth doping allows for a larger bandwidth and, thus, larger wavelength tuning ranges. This session invites latest developments in this exciting area of research and scientific discovery.

ORGANIZERS

– **Setsuhisa Tanabe**, Kyoto University, Japan
– **John Ballato**, Clemson University, USA
– **Shibin Jiang**, Photonics Inc., USA

Session 8: Optical Fibers and Waveguides

The field of optical fibers application is not confined to telecommunication technologies. Optical fibers can be used in applications, such as sensing, new laser sources and amplifiers, biomedicine, defense, and security. This session will be an opportunity for discussions about the state-of-the-art and recent advances in the design, fabrication, characterization, and applications of innovative and exotic fibers.

ORGANIZERS

– **Johann Troles**, Université de Rennes I, France
– **Daniel Milanese**, Politecnico di Torino, Italy

S4: GLASS TECHNOLOGY AND CROSSCUTTING TOPICS

Glass can be engineered with a wide range of properties and in many forms to make it important in active and passive applications for current and emerging energy and environmental technologies. This symposium will draw an arc from the fundamental approaches (interplay of theory, modeling, and experiment) via material properties (compositional influences and signatures) and their characterization (in situ, ex situ) to manufacturing (novel processing techniques).

Session 1: Glass Surfaces and Treatments

The structure and composition of glass surfaces dominate their interactions with the environment and other materials. Glass surfaces are commonly treated (thermally, mechanically, or chemically) prior to use, with important implications upon the resulting functionality. Advancements in thermal poling, ion-exchange strengthening, corrosion inhibition, and coating adhesion will be discussed. This session will focus on fundamental understanding of glass surface chemistry, changes in surface chemistry from treatment and processing, and the performance of real material systems from controlled surface chemistry. Contributions will include corrosion phenomena, coatings, ion-exchange, thermal forming and tempering, and associated advancements in characterization.

ORGANIZER

– **Rob Schaut**, Corning Incorporated, USA

Session 2: Chalcogenide Materials for Memory Applications

Phase change and conducting bridge memory devices now are established as serious competitors to conventional nonvolatile computer memory. We propose the session will emphasize the following topics.

- Materials science of memory materials
- New directions (There are some very fresh ideas emerging, such as using PCMs for neuromorphic computing.)
- Modeling and simulation (materials and device modeling, simulation as tool for materials discovery)

ORGANIZER

– **David Drabold**, Ohio University, USA
– **Stephen Elliott**, University of Cambridge
– **Michael Kozicki**, Arizona State University
– **Gang Chen**, Ohio University

Session 3: Challenges in Glass Manufacturing

Industrially fabricated glass is one of the most important materials used in society. New applications and compositions, more stringent quality requirements, increasing costs, and compliance with environmental regulations drive constant innovation in glass equipment and processes. New laboratory and modeling approaches have dramatically increased understanding of melting and forming processes and improved energy efficiency and equipment design. This session will cover recent developments.

This symposium is being supported by The ACerS Manufacturing Division.

- Physics and chemistry of melting and forming—experiments and modeling
- Energy efficiency—combustion, heat transfer, and new energy-saving technologies
- Furnace design and process control—sensors, flue gas chemistry, and emissions
- Corrosion and wear—refractories and electrodes
- New melting and forming concepts

ORGANIZERS

– **Mathieu Hubert**, CelSian Glass & Solar, The Netherlands
– **Irene Peterson**, Corning Incorporated, USA

CALL FOR PAPERS

Abstracts due November 9, 2016

Session 4: Waste Immobilization—Waste Form Development: Processing and Performance

This session will focus on the use of glasses and glass-ceramics for immobilization of nuclear and hazardous wastes. Renewed interest in nuclear power generation and fuel reprocessing means that processing, properties, and testing of vitreous materials also needs to be expanded. Similarly, treatment of hazardous waste for disposal or recycle is of current interest in many countries.

- Materials technologies for vitrification and sintering of nuclear, hazardous, and toxic wastes, which includes waste immobilization in durable matrices
- New and innovative applications of materials and materials processes and alternative waste form materials and processing methods
- Waste-form performance and accelerated testing to assess chemical durability
- Modeling of glass and glass-ceramic dissolution over short and long timescales
- Characterization and properties of natural and archeological analogues
- Characterization and testing techniques to quantify waste form properties

ORGANIZERS

– **Stephane Gin**, CEA, France
– **Joseph Ryan**, Pacific Northwest National Laboratory, USA
– **S.K. Sundaram**, Alfred University, USA
– **John S. McCloy**, Washington State University, USA

S5: PROFESSOR JACQUES LUCAS HONORARY SYMPOSIUM

Professor Jacques Lucas pioneered the research and development of infrared materials, especially in fluoride glasses and fibers and chalcogenide glasses, during the past five decades. He founded and headed the CNRS Glass and Ceramic Lab at University of Rennes for 30 years, published more than 450 articles, coauthored several books, and trained numerous students. Four start-up companies were founded based on the laboratory discoveries. Lucas is a Fellow of The American Ceramic Society and a member of French Academy of Sciences.

This symposium brings together colleagues, former students, and friends of Lucas to celebrate his outstanding teaching and research career by presenting their current research results. Presentations covering all aspects of non-oxide glasses, including, but not limited to structural characterization, structure–property relationship, novel processing methods, compositional trends, and advances in physical properties, such as optical, thermal, electrical, and mechanical behavior are welcome. Technological applications of nonoxide glasses also are of interest, including, but not limited to the fields of energy, sensing, optics, biomedical, phase change material, and microelectronics. Presentations covering new developments in chalcogenide, halide, metallic organic glasses, and all types of non-oxides glass compositions are welcome. The symposium will consist of invited talks and contributed talks.

ORGANIZERS

– **Shibin Jiang**, Photonics Inc., USA
– **Xiang-hua Zhang**, Université de Rennes, France
– **Bruno Bureau**, Université de Rennes, France
– **Jean-Luc Adam**, Université de Rennes, France
– **Pierre Lucas**, University of Arizona, USA
– **S.K. Sundaram**, Alfred University, USA

S6: PROFESSOR KOMATSU KINEN HONORARY SYMPOSIUM

Professor Takayuki (Taka) Komatsu has had a long and distinguished career at the Nagaoka University of Technology, where he is currently in his last year as a full professor and vice president for research and education. His scientific work has pioneered the use of laser light in the formation of specialty oriented crystals and broadly contributed to the understanding of crystallization. He has over 200 publications with his students and collaborators. Dr. Komatsu is a recipient of a 1996 Richard M. Fulrath award by the American Ceramic Society, and was the Conference Chair of the 11th International Symposium on Crystallization in Glasses and Liquids, held in Nagaoka in October of 2015.

This symposium celebrates Taka Komatsu's contributions to materials science. Friends, former students, and colleagues, will join in tribute to Taka. This symposium will consist of invited talks covering topics of interest in the broad area of crystallization.

ORGANIZERS

– **Tsuyoshi Honma**, Nagaoka University of Technology, Japan
– **Kenji Shinozaki**, National Institute of Advanced Industrial Science and Technology (AIST-Kansai), Osaka, Japan
– **Yoshihiro Takahashi**, Tohoku University, Japan
– **Akihiko Sakamoto**, OLED Material Solutions Co., Japan
– **Himanshu Jain**, Lehigh University, USA
– **Mario Affatigato**, Coe College, USA

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