submit abstracts by November 19, 2014

call for papers

may 17 – 21

Hilton Miami Downtown
Miami, Florida, USA

2015
GLASS & OPTICAL MATERIALS DIVISION and DEUTSCHE GLASTECHNISCHE GESELLSCHAFT

ACerS GOMD–DGG Joint Annual Meeting

The American Ceramic Society
www.ceramics.org

ceramics.org/gomd-dgg

may 17 – 21 | Hilton Miami Downtown

2015

ACERS GOMD–DGG JOINT ANNUAL MEETING

Join The American Ceramic Society and the Deutsche Glastechnische Gesellschaft for the 2nd Joint Annual ACerS GOMD–DGG. Building on the success of the 2014 joint meeting, GOMD–DGG 2015 will continue to strengthen ties between the European and US glass communities.

Presentations and posters will explore the fundamental nature of the glassy state, glass applications in healthcare, energy and environment, glass manufacturing challenges, nuclear waste immobilization, optical materials, and more. With over 400 submissions expected, GOMD–DGG 2015 will provide a unique opportunity for glass scientists and technologists to interact.

GOMD–DGG 2015 includes five symposia with more than 20 sessions led by technical leaders from industry, government laboratories, and academia covering the latest advances in glass science and technology. The poster session will highlight late-breaking research and feature the annual student poster contest.

The newly renovated Hilton Miami Downtown gives attendees easy access to Miami's famous beaches, shopping, nightlife arts, and culture. Attractions near the hotel include South Beach, Historic Art Deco District, Miami Design District, City Center, Jungle Island, Viscaya Museum and Gardens, Bal Harbour, Dolphin Mall, Coral Gables, Merrick Park, and Arsht Center for the Performing Arts.

We invite you to come to Miami to find new collaboration opportunities and to exchange ideas in the international glass community.

Stay up-to-date on GOMD–DGG 2015 at ceramics.org/gomd-dgg.
We look forward to seeing you in Miami!

Hilton Miami Downtown Hotel
1601 Biscayne Boulevard
Miami, FL 33132

Rates
$164 – Single/Double $132 – Student

Reserve your room online at ceramics.org/gomd-dgg or by phone at 1-305-374-0000 by **April 17, 2015** to secure the conference rate.

Program Chairs:

Gang Chen
Ohio University, USA
cheng3@ohio.edu

Steve Martin
Iowa State University, USA
swmartin@iastate.edu

Reinhard Conradt
RWTH Aachen University, Germany
conradt@ghi.rwth-aachen.de

SYMPOSIUM 1: Energy and Environmental Aspects—Fundamentals and Application

Symposium Chairs:
Steve Martin, Iowa State University, USA, swmartin@iastate.edu
Joachim Deubener, Clausthal University of Technology, Germany, joachim.deubener@tu-clausthal.de

Glass can be engineered with a wide range of properties and in many different forms to make it important in both 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), long-time performance and recycling aspects (cradle-to-cradle) of glasses and glass systems. Current applications and future directions in the fields of architecture, mobility, power, as well as chemical (catalysis) and biological (biomass) interactions will be addressed.

Session 1: Flat Glasses, Fibers, Foams, and Enamels

Session Chair:
Joachim Deubener, Clausthal University of Technology, Germany

This session will focus on glass structure and the structural origin of macroscopic properties of oxide and nonoxide systems. Contributions will feature short- and intermediate-range structure, obtained from spectroscopy and diffraction, as well as efforts to understand the impact of thermal history on glass structure and properties.

Session 2: Active Glassy Materials

Session Chair:
Steve Martin, Iowa State University, USA

This session will cover glasses in functional roles as sealants, solders, frequency converters, ion conductors, catalysers, concentrators, capacitors, etc. for energy and environmental applications, including experimental and theoretical development in the understanding of their functional properties. Special focus will be on energy storage issues ranging from ion conductive glasses via battery technology to application perspectives in e-mobility and consumer electronics.

Session 3: Thin Film Technologies

Session Chair:
B. G. Potter, Jr., University of Arizona, USA

This session will cover functional glassy films and glassy and polycrystalline films on glasses for energy and environmental applications with special focus on their physical modeling (single coats, stacks, etc.), depositions techniques (sputtering, evaporation, sol-gel, etc.), metrics and chemistry (roughness, surface chemistry, dielectric properties, etc.), performance, and environmental issues.

SYMPOSIUM 2: Glasses in Healthcare—Fundamentals and Application

Symposium Chairs:
Mohamed N. Rahaman, Missouri University of Science and Technology, USA, rahaman@mst.edu
Aldo R. Boccaccini, University of Erlangen-Nuremberg, Germany, aldo.boccaccini@ww.uni-erlangen.de

In addition to the current application of glasses and glass-ceramics in medicine and dentistry, there is growing interest in the application of novel glass products in important areas, such as bone regeneration and wound healing. Emerging areas in the applications of bioactive glasses will also be covered, including antibacterial materials, drug delivery systems, and soft tissue engineering. Functional products based on glasses and glass-ceramics for applications, such as treatment of cancer and osteomyelitis will be also addressed. Discussions will cover biomedical glasses composed of silicate, borate, and phosphate compositions, metal ion-doped bioactive glasses for targeting specific cellular and biological responses, the formation of melt-derived, so-gel and mesoporous glasses into specific architectures, such as three-dimensional scaffolds, particles and fibers, including nanoparticles and nanofibers, as well as coatings, thin films and composites.

Proposed Session Topics

- Compositional design of glasses for biomedical applications
- Interactions of glasses in the biological environment
- Modeling and characterization of structure and properties
- Applications in regenerative medicine and tissue engineering
- Glasses for growth factor and drug delivery
- Glasses in wound healing, vascularisation, and soft tissue engineering
- Glasses and glass-ceramics in dentistry
- Applications in cancer treatment and osteomyelitis
- Roundtable discussion on key issues and future directions in glasses for healthcare

GOMD LEADERSHIP

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ACerS' AACS Division is planning an **Ancient Glass: Composition, Technology and Deterioration** workshop May 16-17. Contact Glenn Gates at ggates@thewalters.org to help with organization.

SYMPOSIUM 3: Fundamentals of the Glassy State

Symposium Chairs:
Gang Chen, Ohio University, USA, cheng3@ohio.edu
Liping Huang, Rensselaer Polytechnic Institute, USA, huangl5@rpi.edu
Pierre Lucas, University of Arizona, USA, pierre@u.arizona.edu
Lothar Wondraczek, University of Jena, Germany, lothar.wondraczek@uni-jena.de

This symposium will provide a discussion forum on fundamental principles of glass science. Contributions covering experimental and theoretical developments in the field of glass science are welcome. Topics of interest include novel developments in the following seven sessions:

Session 1: Glass Formation and Structural Relaxation

Session Chair:
Dominique de Ligny, University of Erlangen, Germany

This session will address all aspects of glass formation, including experimental and theoretical development in our understanding of the glass transition, glass forming ability, structural relaxation processes, nonlinear and nonexponential behavior of glasses, viscous flow and fragility, glass heterogeneity, etc.

Session 2: Nucleation, Growth, and Crystallization in Glasses

Session Chairs:
Edgar D. Zanotto, Federal University of São Carlos, Brazil
Mark J. Davis, SCHOTT North America Inc., USA

This session will provide an opportunity for high-level discussions about the state-of-art and relevant issues on crystallization processes in glass-forming liquids and on the development and characterization of new glass-ceramics. Important problems will be discussed such as the applicability of the Stokes-Einstein-Eyring (viscosity) relationship in calculating the effective diffusion coefficients that control crystal nucleation and growth; understanding of the relationship, if any, between the molecular structure of glass-forming liquids and the nucleation and growth mechanisms; the exact role played by the residual glass (e.g., stress effects, crack deflection or initiation, electrical conductivity, etc.); and the exact role of nucleating agents.

Session 3: Structural Characterization of Glasses

Session Chairs:
Gang Chen, Ohio University, USA
Steve Martin, Iowa State University, USA
Hellmut Eckert, University of Münster, Germany
Randall E.Youngman, Corning Incorporated, USA

This session will cover new developments in experimental techniques to advance the understanding of glass structure. Areas of interest include, developments and applications of various experimental techniques, such as X-ray, neutron, and light scattering; X-ray absorption and emission spectroscopy; vibrational spectroscopy; NMR spectroscopy; and scanning probe microscopy to study the short-range, medium-range, nanoscale structure, and heterogeneity of glasses.

ABSTRACT SUBMISSION INSTRUCTIONS

Visit **ceramics.org/gomd-dgg**. Select "Submit Abstract" to be directed to the Abstract Central website. Please contact Marilyn Stoltz at **mstoltz@ceramics.org** or 614-794-5868 with questions.

Session 4: Computer Simulations and Modeling

Session Chairs:
Jincheng Du, University of North Texas, USA

Walter Kob, Universite Montpellier, France

Carlo Massobrio, Institut de Physique et Chimie des Matériaux de Strasbourg, France

This session will focus on understanding structure features; mechanical, thermodynamic, electrical, and other properties; and the chemical durability of glasses through classical and *ab initio* atomistic simulations, topological constraint theory, and other modeling methods. Advances in interpreting experimental structural data from X-ray and neutron diffraction, solid-state NMR and other spectroscopic methods by using atomistic simulations will be covered. This session will also feature the development of interatomic potentials for complex systems with mixed and exotic glass formers, methodologies to extend the time and length scales in glass simulations, and other fronts and challenges in modeling and simulation of glasses.

Session 5: Mechanical Properties of Glasses

Session Chair:
Lothar Wondraczek, University of Jena, Germany

This session will discuss the mechanical properties of disordered materials on a multiscale level, bridging the fields of metallic and nonmetallic glasses. We will consider the structural origin of elasticity, plasticity, and fracture with the objective of designing glasses with superior toughness, defect tolerance, and stiffness. Particular attention shall be given to the identification of general, material-independent constitutional laws which may act as levers for controlling mechanical properties; the combination of experimental approaches and computational modeling of the stress-response of glasses and early stages of damage infliction; and the interplay between size and time effects, stress-corrosion, and the chemical aspect of fracture.

Contributions are especially invited on:

- Dynamic fracture and brittleness, including the application of in-situ techniques
- Subcritical fracture and stress corrosion, the underlying chemistry and transport phenomena in high stress fields
- Multiscale investigation of elasticity, plasticity and hardness in relation to bulk topology through combining mechanical analyses with structural analyses
- Strategies for toughening inorganic oxide glasses as well as metallic glasses

The session is partially supported by the priority program 1594 "Topological Engineering of Ultrastrong Glasses" of the German Science Foundation. A limited number of travel grants are available for Ph.D. students, subject to individual application.

Session 6: Non-oxide and Metallic Glasses

Session Chairs:
Pierre Lucas, University of Arizona, USA

Yunfeng Shi, Rensselaer Polytechnic Institute, USA

This session welcomes presentations covering all aspects of chalcogenide, halide, and metallic glasses, including structural characterization, structure-property relationship, novel processing methods, compositional trends, and advances in physical properties such as optical, thermal, electrical, and mechanical behavior. Technological applications of these glasses will be covered, including the field of energy, sensing, optics, biomedical, and microelectronics. Presentations covering new developments in all types of nonoxide and metallic glass compositions are welcome.

Session 7: Glass Under Extreme Conditions

Session Chairs:
Liping Huang, Rensselaer Polytechnic Institute, USA

Benoit Rufflé, Université Montpellier II, France

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, highly reactive conditions, etc., in designing glass for these applications, as well as in utilizing such conditions to synthesize glass with superior properties. Both experimental and computational studies will be included.

ATTENTION GLASS AND OPTICAL MATERIALS STUDENTS

Limited complimentary student registrations are available for presenters and attendees, so make sure to submit your abstract today. Check out all the student opportunities at GOMD–DGG!

- **Student Poster Competition:** Submit an abstract to enter the annual poster competition for professional recognition and cash prizes.
- **Networking events with glass community leaders**

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Nucleation, Growth and Crystallization in Glasses—Fundamentals and Applications

a short course by Edgar Zanotto

May 16-17.

SYMPOSIUM 4: Optical and Electronic Materials and Devices—Fundamentals and Applications

Symposium Chairs:

Kathleen Richardson, University of Central Florida, USA, kcr@creol.ucf.edu

David A. Drabold, Ohio University, USA, drabold@ohio.edu

Juejun Hu, University of Delaware, USA, hujuejun@udel.edu

Johann Troles, Université de Rennes, France, johann.troles@univ-rennes1.fr

Optical and electronic materials and devices are of critical importance for 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. Topics of interest include:

- Electronic ceramics
- Dielectric materials
- Optically-active materials and devices
- Phase change memories
- Conducting bridge materials
- Laser interactions with materials
- Glass-ceramics and glass-matrix composites for optical and electronic applications
- Fibers and on-chip photonic and optoelectronic devices
- Optical coatings
- Novel material processing
- Fabrication methods

Session 1: Amorphous Semiconductors: Materials and Devices

Session Chairs:

David A. Drabold, Ohio University, USA

Stephen R. Elliott, Cambridge University, United Kingdom

Amorphous semiconductors and glasses are among the most important electronic materials for applications ranging from photovoltaics to computer memories, but many basic questions remain. While we solicit papers in this broad area, we note a few areas of particular interest: (1) Chalcogenide memory materials. The utility of chalcogenide materials ranges from digital X-ray radiography to computer memory applications. The area is currently of very high interest both for materials science and optimization. Papers are sought for Phase Change memory (PCM) materials and conducting bridge (CBRAM) materials, as well as other topics involving chalcogenide glasses. We welcome papers on both technological and fundamental materials aspects; (2) Amorphous electronic and optical materials. The basic science of these systems, their photo-response and novel applications are all suitable topics for this session. Some examples include hydrogenated amorphous silicon and its PV and microbolometer (IR imaging) applications, amorphous phases of carbon and graphene.

Session 2: Optical Fibers

Session Chair:

Johann Troles, Université de Rennes, France

Today, the field of applications of optical fibers is not only confined for telecommunication technologies. Optical fibers are or can be used in other numerous fields of applications such as sensing, new laser source, biomedicine, defense and security. This session will be an opportunity for discussions about the state of the art and recent advances in the elaborations, designs and the applications of innovative and exotic fibers.

Session 3: Optical Materials for Components and Devices

Session Chairs:

Juejun Hu, Massachusetts Institute of Technology, USA

Shibin Jiang, AdValue Photonics Inc, USA

Session 4: Glass-ceramics and Optical Ceramics

Session Chair:

Kathleen Richardson, University of Central Florida, USA

Romain Gaume, University of Central Florida, USA

Yiquan Wu, Alfred University, USA

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. This session will provide a forum for researchers, students, and entrepreneurs to present and dis-

cuss their recent scientific results on a wide variety of topics related to science and engineering issues associated with glass-ceramic and optical ceramic materials. 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.

SYMPOSIUM 5: Glass Technology and Cross-cutting Topics

Symposium Chairs:
Reinhard Conradt, RWTH Aachen University, Germany, conradt@ghi.rwth-aachen.de

James Williams, SCHOTT North America Inc., USA, william.james@us.schott.com

Session 1: Challenges in Glass Manufacturing

Session Chairs:
Reinhard Conradt, RWTH Aachen University, Germany

Hong Li, PPG Industries Inc., USA

Irene Peterson, Corning Incorporated, USA

Industrially fabricated glass is among the most important material in society, with applications ranging from uses in civil engineering, automotive engineering, fabrication of composites, and packaging to a host of special applications. Related industries are facing increasing quality demand, energy costs, and stringent environmental legislation. As "traditional" as this branch of industry may be viewed by the public, there is a quest for evolutionary and revolutionary concepts to make better glass in more efficient ways with wider ranges of application. The symposium will highlight this development and cover:

- Physical and chemical fundamentals
- Energy efficiency, flue gas chemistry, combustion, and heat transfer
- Furnace design and advanced melting concepts comprising process control and sensors
- Advances in modeling of glass melting and forming
- Secondary manufacturing comprising surface treatment and new glass products

Session 2: Transparent Protective Systems

Session Chairs:
Andrew A. Wereszczak, Oak Ridge National Laboratory and the University of Tennessee

Parimal Patel, US Army Research Laboratory

Glasses and glass-ceramics are or can be critical subcomponents in many transparent protective systems. The predictability and improvement of their responses to impact (i.e., high strain energies), temperature fluctuations and residual stresses, bending, and combinations thereof are continually sought. This session will promote improved familiarity, communication, and collaboration between practitioners of transparent protective systems with glass scientists and engineers. General topics include:

- Candidate materials and rationale for their use
- High strain rate, triaxial loading, and high-pressure experimental response and modeling
- Flaws and nonhomogeneities and mechanical response correlation
- Fracture under dynamic conditions
- Lamination, interlayer bonding, and their effects

Session 3: Liquid Synthesis and Sol-gel-derived Materials

Session Chairs:
Rui Almeida, Instituto Superior Técnico, Portugal

Alicia Duran, Instituto de Cerámica y Vidrio - CSIC, Spain

Sol-gel processing uses low-temperature processing approaches to produce glass and ceramic materials with high purity, excellent homogeneity, and well-controlled morphology. This session will focus on all aspects of sol-gel derived and nanostructured materials prepared by liquid synthesis, including:

- Sol-gel routes to bulk, film, glass coating, colloidal, nanoparticle, porous, and hybrid materials
- Structural characterization using spectroscopic, scattering, and imaging techniques
- Computer simulations through the molecular dynamics, Monte-Carlo, and reverse Monte-Carlo simulation methods
- New functionalities based on the optical, electrical, thermal, mechanical, chemical, and biomedical properties
- New sol-gel materials and products for energy and other applications

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

Session Chair:
James Marra, Savannah River National Laboratory, USA

This session will focus on the use of glasses and glass-ceramics for the immobilization of nuclear and hazardous wastes. The renewed interest in nuclear power generation and fuel reprocessing means that the 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. The session will cover materials technologies for the treatment of nuclear, hazardous, and toxic wastes, which includes waste immobilization and encapsulation in inert matrices. New and innovative applications of materials and materials processes and alternative waste form materials and processing methods will be highlighted. Waste-form performance and accelerated testing to assess durability will be also covered as well as modeling of their behavior over long timescales. Additional topics include characterization and testing techniques to quantify waste form properties.