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GLASS & OPTICAL MATERIALS DIVISION (GOMD

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2024 ANNUAL MEETING

LAS VEGAS, NEVADA

MAY 19-23, 2024 GOLDEN NUGGET LAS VEGAS HOTEL & CASINO

SUBMISSION DEADLINE: DECEMBER 11, 2023

2024 ANNUAL MEETING

LAS VEGAS, NEVADA

Welcome to the Glass & Optical Materials Division 2024 Annual Meeting

Join ACerS Glass & Optical Materials Division for GOMD 2024, May 19-23, 2024 in Las Vegas, Nevada, for a program featuring six symposia: Fundamentals of the Glassy State; Glass and Interactions with Its Environment; Optical and Electronic Materials and Devices; Outreach, Glass Technology, Manufactory, Recycling and Cross-Cutting Topics; Delbert Day Honorary Symposium; and Mark Davis Honorary Symposium. Technical sessions consisting of both 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 conference will also be an opportunity to honor the life and scientific and technological contributions of the two glass giants: Delbert Day and Mark J. Davis.

Students are encouraged to enter their presentations in the annual student poster competition for professional recognition and cash awards. Students attending GOMD 2024 are also invited to attend a career roundtable discussion with scientists from industry, national laboratories, and academia about career opportunities and other topics in a casual environment. GOMD 2024 will provide a unique opportunity for students to learn, interact, and win!

The conference takes place at the iconic Golden Nugget Las Vegas Hotel & Casino, which is in historical downtown Las Vegas, Nevada. The hotel is located right on the Fremont Street Experience—a major pedestrian tourist attraction featuring daily concerts, light shows on the world's largest video screen, and various shops and restaurants. Las Vegas itself is considered the entertainment capital of the world and is known worldwide for its nightlife, shows, exhibits, museums, theme parks, parties, and casinos, among other attractions.

The GOMD Executive Committee, program chairs, and volunteer organizers sincerely hope you will join us in Las Vegas for GOMD 2024 to learn about the latest breakthroughs in glass science, to find new collaborative opportunities and to exchange ideas in the international glass community.

We look forward to meeting you in person in Fabulous Las Vegas!



Mathieu Bauchy University of California, Los Angeles bauchy@ucla.edu



Morten M. Smedskjaer Aalborg University mos@bio.aau.dk

2023 - 2024 GOMD OFFICERS

Irene Peterson Chair

Corning Research and Development Corporation

Michelle Korwin-Edson Chair-Elect Owens Corning

Mathieu Bauchy Vice Chair University of California, Los Angeles

Jessica Rimsza Secretary Sandia National Laboratory



Agenda and Schedule of Events

SUNDAY, MAY 19

Registration	
Welcome Reception	5:00 p.m 7:00 p.m.

MONDAY, MAY 20

Registration	7:30 a.m 5:30 p.m	
Stookey Award Lecture	8:00 a.m 9:00 a.m	
Concurrent Technical Sessions	9:20 a.m 6:00 p.m	١.
Lunch on Own	12:00 p.m 1:30 p.m.	
Poster Session and Reception	6:30 p.m 8:00 p.m	١.

TUESDAY, MAY 21

Registration	7:30 a.m 5:30 p.m.
George W. Morey Award Lecture	8:00 a.m 9:00 a.m.
Concurrent Technical Sessions	9:20 a.m 6:00 p.m.
Lunch on Own	12:00 p.m 1:30 p.m.
Conference Banquet	7:30 p.m 10:00 p.m.

WEDNESDAY, MAY 22

Registration	7:30	a.m	3:30 p.m.
Varshneya Frontiers of Glass Science Lecture	8:00	a.m	9:00 a.m.
Concurrent Technical Sessions	9:20	a.m	3:20 p.m.
Lunch on Own	. 12:00	p.m	1:30 p.m.
Free Time			3:20 p.m.

THURSDAY, MAY 23

Registration	8:00 a.m	12:00 p.m.
Varshneya Frontiers of Glass Technology Lecture	8:00 a.m	9:00 a.m.
Concurrent Technical Sessions	9:20 a.m	12:00 p.m.

GOLDEN NUGGET LAS VEGAS HOTEL & CASINO

129 E Fremont St, Las Vegas, NV 89101 Phone Number: +1 (800) 634-3454

Cut-Off Date: April 17, 2024

Click <u>HERE</u> to make a reservation.

To make a reservation by phone, please call +1 (800) 634-3454 and reference group code GSGOMD1.



ABSTRACT DEADLINE: DECEMBER 11, 2023

GOMD2024 EXECUTIVE COMMITTEE

- Chair: Irene Peterson Corning Research and Development Corporation
- Chair-elect: Michelle Korwin-Edson Owens Corning
- Vice Chair: Mathieu Bachy University of California, Los Angeles
- Secretary: Jessica Rimsza Sandia National Laboratory

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ABSTRACT SUBMISSION INSTRUCTIONS

- Visit <u>ceramics.org/gomd2024</u> to review session topics
- Select "Submit Abstract" to be directed to the Abstract Central website

Abstract title plus text total character limit (including spaces) is 1,5000 characters.

If you have questions, please contact Karen McCurdy at kmccurdy@ceramics.org or +1-614-794-5866

2024 ANNUAL MEETING

SYMPOSIUM 1

FUNDAMENTALS OF THE GLASSY STATE

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 sessions.

SESSION 1

Glass Formation and Structural Relaxation

ORGANIZERS

- Sabyasachi Sen University of California Davis, U.S. sbsen@ucdavis.edu
- Collin Wilkinson Alfred University, U.S. wilkinsonc@alfred.edu

This session will address all fundamental aspects of glass formation, including experimental, modeling, and theoretical developments in our understanding of the glass transition and relaxation. All glass-forming systems, including oxide, nonoxide, metallic, organic, and model glasses will be covered. Topics of interest include but are not limited to various relaxation phenomena and dynamical processes in the glass transition range, including fragility, structural and dynamical heterogeneity, nonexponential, and nonlinear relaxation.

SESSION 2

Glass Crystallization and Glass-Ceramics

ORGANIZERS

Hrishikesh Kamat Glidewell Laboratories, U.S. hrishikesh.kamat@glidewelldental.com

Alfonso Pedone University of Modena & Reggio Emilia, Italy pedone@unimore.it

Ashutosh Goel Rutgers University, U.S. ag1179@soe.rutgers.edu This session is devoted to advancing our fundamental understanding of crystallization in glasses and its application in glass-ceramics and related materials. The symposium will cover experimental, analytical/characterization, as well as numerical/modeling aspects of nucleation and growth in glass-forming materials. Topics to be covered include, but are not limited to, the following.

- Theoretical, simulation, and experimental studies of nucleation and crystal growth in glasses and liquids
- The role of glass composition, structure, and nucleating agents on crystallization
- Phase separation and its role in influencing crystallization
- Novel methods and characterization techniques (ex-situ, in-situ) to understand crystallization
- Modeling and simulation techniques to elucidate crystallization and glassforming ability of liquids
- Crystallization phenomena in organic and metallic materials
- Novel processing techniques for glass-ceramics
- Microstructure/property relationships in glass-ceramics
- Predicting glass-ceramic generation
- Applications of glass-ceramics



SESSION 3

Structural Characterizations of Glasses and Melts

This session will present recent advances on structural aspects of glasses and melts at the short- and medium-range order, including heterogeneities. Any contribution that covers basic glass characterization and correlation between the glass and melt structure and glass properties is welcome. Further, especially welcome are contributions including, but not limited to, various experimental techniques, such as magnetic resonance spectroscopy; X-ray, neutron, and light scattering; X-ray absorption and emission spectroscopy; vibrational spectroscopy; and scanning probe and electron microscopies.

ORGANIZERS

- Daniel Neuville CNRS-IPGP-UP, France neuville@ipgp.fr
- **Dominique de Ligny** Friedrich-Alexander-Universität, Germany dominique.de.ligny@fau.de

SESSION 4

Atomistic Simulation and Predictive Modeling of Glasses

Modeling and simulation play an important role in materials research, particularly for glasses, amorphous, and nanostructured materials due to their complex nature. This session will focus on computer simulations and modeling approaches to gain insight into the structures, properties, and behavior of glasses and glassforming liquids. Of particular interest are recent developments and applications of first-principles, classical, and mesoscale methods and their integration with the aim of expanding the space- and timescales explored by conventional modeling techniques. Also, numerical studies that help the interpretation of experimental data and structural validation using methods such as X-ray and neutron diffraction, solid-state NMR, and other spectroscopic techniques are especially welcomed. Finally, integrated computational material design of glass compositions using physics-based modeling and simulation methods will also be covered.

ORGANIZERS

- Adama Tandia Corning Inc., U.S. tandiaa@corning.com
- Alfonso Pedone
 University of Modena & Reggio Emilia, Italy pedone@unimore.it
 - Hiroyuki Inoue University of Tokyo, Japan inoue@iis.u-tokyo.ac.jp

SESSION 5

Data-Driven Modeling and Machine Learning for Glass Science

Data-driven methods and artificial intelligence-based models have attracted much attention in recent years to solve complex problems in the field of glass science. In particular, machine learning has been successfully applied to solve long-standing problems, such as predicting composition–property relationships, developing optimized glass compositions, accelerating glass modeling, and even understanding some fundamental aspects of the glass transition. This session will focus on recent advances in the use of machine learning and artificial intelligence in glass science, technology, and modeling. Topics of interest include, but are not limited to, the application of machine learning and artificial intelligence to develop and interpret composition–property relationships, design optimized glass compositions, 3D printing and additive manufacturing of glasses, advanced computational modeling by developing machine-learned interatomic potentials and accelerating glass simulations, image processing, predicting the structure of glasses, identifying key structural patterns/descriptors that govern glass properties, and understanding the fundamentals of the glassy state.

- Xiaonan Lu Pacific Northwest National Laboratory, U.S. xiaonan.lu@pnnl.gov
- N.M. Anoop Krishnan Indian Institute of Technology, India krishnan@iitd.ac.in
- Daniel Cassar Brazilian Center for Research in Energy and Materials, Brazil daniel.cassar@ilum.cnpem.br

2024 ANNUAL MEETING

SESSION 6

Mechanical Properties of Glasses

ORGANIZERS

Timothy Gross Corning Inc., U.S. grosstm@corning.com

Satoshi Yoshida AGC Inc., Japan satoshi.s.yoshida@agc.com This session will discuss the mechanical properties of disordered materials across multiple scales while bridging the fields of metallic and nonmetallic glasses, as well as mechano-optical and mechanoelectrical couplings. We will consider the structural origin of elasticity, plasticity, and fracture with the objective of designing glasses with superior toughness, defect tolerance, and stiffness, combining mechanical and various functional properties. Particular attention shall be given to the identification of general, material-independent constitutive laws, which may be used as guidelines to improve the 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 on the following topics are especially invited.

- Dynamic fracture and brittleness, or crack initiation, including the application of in-situ techniques
- Slow crack growth and stress corrosion cracking, 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
- Mechanoelectrical and mechano-optical couplings

SESSION 7

Glass Under Extreme Conditions

ORGANIZERS

- Madoka Ono Tohoku Univeisty, Japan madoka.ono.d7@tohoku.ac.jp
- Jingshi Wu Corning Inc., U.S. Wu.l@corning.com
- Anita Zeidler University of Bath, U.K. az207@bath.ac.uk

This session will cover the recent progress in understanding the structure and properties of glass under extreme conditions, such as high pressure, high stress, high temperature, high radiation, and highly reactive conditions. Many manufacturing processes, such as fiber drawing, laser writing, and irradiation aging, are concerned with these conditions. New knowledge of glass structure and properties under extreme conditions can help design new glasses for these applications, as well as in using such conditions to synthesize glasses with superior properties. Experimental studies, novel in situ analysis methods, and computational approaches are within the scope of this session.



SESSION 8

Chalcogenide Glasses and Amorphous Materials

This session aims to present and discuss the recent developments in both fundamental and applied research in chalcogenide glasses and amorphous semimetals (e.g., phase-change materials). Topics of interest include structural characterization; structure-property relationship; and advances in physical properties, such as optical, electrical, thermal, crystallization, glass forming, and mechanical behaviors.

SESSION 9

Metallic Glasses

This session aims to present and discuss the recent developments in both fundamental and applied research in metallic glasses. The ability to create metallic materials with a noncrystalline structure has attracted increasing attention due to the unique properties of such materials. Topics of interest include, but are not limited to, glass-forming ability, glass transition and relaxation, predictive machine learning models, structural characterization, crystallization, atomistic simulations, discovery of new glass forming compositions, novel synthesis and thermoplastic forming methods, and advances in understating the physical properties. The effects of temperature, strain-rate, post-processing, and sample size on mechanical deformation of metallic glasses are also of particular interest.

SESSION 10

Sol-Gel and MOF Glasses

The sol-gel process uses low-temperature processing approaches to produce glass and hybrid organic-inorganic materials with high purity, excellent homogeneity, well-controlled morphology, and easily tailored functionalities. Metal-organic framework (MOF) glasses are a newly emerging class of hybrid amorphous materials with interesting domain structures, nanoporosity, superior functionalities, and cost-effectiveness due to low-temperature processing. This session will focus on all aspects of these materials, including the following.

- Low temperature routes to bulk, film, nanoparticle, porous, and hybrid amorphous organic-inorganic materials
- Structural characterizations using spectroscopic, scattering, and imaging techniques
- Glass formation mechanism, glass transition, relaxation, and phase transitions
- New functionalities based on the optical, electrical, thermal, mechanical, chemical, and biomedical properties
- Emerging sol-gel and MOF materials for energy and other applications

ORGANIZERS

- Pierre Lucas The University of Arizona, U.S. pierre@arizona.edu
- Shuai Wei Aarhus University, Denmark shuai.wei@chem.au.dk

ORGANIZERS

- Binghui Deng Tesla Inc., U.S. dbhhit@gmail.com
- Golden Kumar University of Texas at Dallas, U.S. golden.kumar@utdallas.edu

ORGANIZERS



Aalborg University, Denmark yy@bio.aau.dk

2024 ANNUAL MEETING

SYMPOSIUM 2

GLASS AND INTERACTIONS WITH ITS ENVIRONMENT – FUNDAMENTALS AND APPLICATIONS

This symposium is dedicated to fundamentals and applications of how glass is used in contact with specific environments, e.g., with the human body, how glass surface and interfaces evolve or can be modified in different environments, and how glass can be used to contain other materials and prevent their release in the environment.

SESSION 1

Glasses, Glass-Ceramics, and Glass-Based Biomaterials

ORGANIZERS

- Delia Brauer University of Jena, Germany delia.brauer@uni-jena.de
- Åbo Akademi, Finland leena.hupa@abo.fi

Ongoing research producing promising results for the expanded use of various glasses and glass-ceramics in bone regeneration and dental applications has also inspired the investigation of a wide array of novel glass-based materials for contemporary applications, such as wound healing, soft tissue engineering, cancer treatment, and bacterial/fungal-resistance. This session will cover each of these areas and will focus on the examination of the role of compositions, processing methods, structures, and targeted cellular and biological responses of biomedical glasses and glass-ceramics, which warrant their candidacy for further use across the medical fields/wide array of medical applications.

SESSION 2

Dissolution and Interfacial Reactions

ORGANIZERS

- Nicholas Stone-Weiss Corning Inc., U.S. StoneWeiNM@corning.com
- Stephane Gin CEA Marcoule, France stephane.gin@cea.fr
- Jincheng Du University of North Texas, U.S. Jincheng.Du@unt.edu

This session will focus on the dissolution and degradation of glasses and glass-ceramics in aqueous environments, covering both the intermediate role of interfacial reactions between aqueous environments and glasses, including hydrolysis reactions, cation interdiffusion, and incorporation of water into the glass matrix; condensation and precipitation reactions; and longer time frame aspects of glass dissolution. Studies focusing on glass surface and water reaction mechanisms and interfacial structures and transport behaviors using either computational or experimental methodologies are particularly encouraged. Elucidation of the mechanisms and kinetics of glass degradation in studies conducted under various conditions are also welcomed, for example, those that investigate the influence of solution composition, temperature, glass composition, reactive surface area, gel layers, secondary phases, environmental materials, and radiation on glass dissolution.



SESSION 3

Glass Surfaces, Interfaces, and Coatings

Glass surfaces remain an enduring area of scientific and technological challenges for applications of glass. New approaches to understand and customize surface and interfacial behaviors with glass modifications and value-added coatings represent a critical direction for the future of glass. This session will focus on surfaces and interfaces in glassy and film-related systems, with a scope that includes fundamental studies of intrinsic glass surfaces, structure-property relations at surfaces/interfaces, innovations in glass surface characterization, novel methods for modifying surfaces, emerging concepts around functional coatings on glass, and properties of glassy/ amorphous thin films. Featured as well in this session will be a continuing series of tutorial talks on surface characterization techniques, highlighting detailed analysis of glass surfaces and thin film systems, and coupled with panel discussion of tricks, tips, and pitfalls common to the study of glass surfaces.

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SESSION 4

Materials for Waste Immobilization

Topics in this session will address new developments and innovative applications for materials and materials processing methods for the immobilization of nuclear and hazardous wastes. Progress in the processing and testing of materials for immobilization is critical to the efficient and safe treatment and disposition of nuclear wastes around the world. This session will focus on synthesis, characterization, testing, and modeling techniques that quantify and allow understanding of waste form behavior. Materials of interest may include glass, ceramics, glass-ceramics, and other composite matrices.

ORGANIZERS

- Nick Smith Corning Inc., U.S. smithnj@corning.com
- Seong H. Kim The Pennsylvania State University, U.S. seongkim@psu.edu

- Jaime George Pacific Northwest National Laboratory, U.S. jaime.george@pnnl.gov
- Joe Ryan Pacific Northwest National Laboratory, U.S. joe.ryan@pnnl.gov

2024 ANNUAL MEETING

SYMPOSIUM 3

OPTICAL AND ELECTRONIC MATERIALS AND DEVICES – FUNDAMENTALS AND APPLICATIONS

Optical and electronic materials and devices are of critical importance for various 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

Laser Interactions with Glasses

ORGANIZERS

Casey Schwarz Ursinus College, U.S. cschwarz@ursinus.edu

Keith J. Veenhuizen Lebanon Valley College, U.S veenhuiz@lvc.edu The field of light interaction with matter has attracted increased attention with advances in ultrashort pulse lasers and high-power fiber lasers, along with the need to design and fabricate structures for use in low-loss applications. New phenomena have been observed and new applications have been developed, whereby lasers are employed in diverse areas, such as cutting, welding, and engraving of glass; fabrication of waveguides, gratings and micro-channels inside the bulk of glass; and, most recently, 3D printing through additive or subtractive laser-assisted processing. Lasers have been shown to be versatile in other applications of phase change, whereby glass or amorphous media are "converted" in a controlled way to crystalline or composites (glass ceramics) material. These advances have been realized in optical phase-change materials; laser-induced crystallization, such as seen in the fabrication of active single crystal architecture; and strengthening of glass and other applications, where a knowledge of not only the material but the light/matter interaction mechanism is required. This session will focus on the most recent and advanced issues pertaining to the science and applications of laserglass interactions, such as laser irradiation effects, compositional and structural changes, and dynamics and mechanisms of laser-induced modifications.



SESSION 2

Charge and Energy Transport in Disordered Materials

Understanding and predicting transport phenomena in disordered media, whether in the bulk or at an interface, are still open problems for scientists in the field and are essential for the development of more efficient and cheap materials for a broad range of applications, both as standalone articles as well as for components in more integrated systems. Increased application of glassy and nanoheterogeneous (glass-ceramics, nanostructured composites) materials in areas such as energy generation and storage (photovoltaics, fuel cells, thermoelectrics, batteries), thermal isolation or conduction media, low-loss dielectrics, and electronic conduction (microelectronics, nanoelectronics), has encouraged research into the fundamental nature and control of bulk transport processes. Relevant phenomena at the surfaces of these types of materials can be equally as complicated, and with the rapid advances being made in fields like consumer electronics and flat panel display, understanding and controlling charge transport at the "2D" level has become a critical design consideration. This session is intended to provide a general forum for the discussion of the mechanisms, properties, and application of charge and energy transport phenomena in such disordered systems. Contributions on the experimental, theoretical, and modeling aspects relevant to the bulk and/or surface manifestations of these topics are encouraged. Topics of interest include, but are not limited to, the following.

- New material synthesis and characterization
- Novel experimental methods and instrumentation
- Charge transport theory and modeling (ionic and electronic transport)
- Thermal transport (including photonic systems and processes)
- Computational modeling of energy and charge transport

- Caio Bragatto Coe College, U.S. cbragatto@coe.edu
- Gabriel Agnello Corning Inc., U.S. agnellogp@corning.com

2024 ANNUAL MEETING

SESSION 3

Optical Fibers and Waveguides

ORGANIZERS

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Sylvain Danto

ICMCB, University of Bordeaux, France sylvain.danto@u-bordeaux.fr

The field of optical fibers application is not confined to telecommunication technologies. Optical fibers can be used in numerous other applications, such as sensing, new laser source, biomedicine, defense, and security. This session will be an opportunity to discuss the state-of-the-art and recent advances in the design, fabrication, characterization, and applications of innovative and exotic fibers. Topics of interest include, but are not limited to, the following.

- New optical fibers design
- New fiber fabrication technology
- Optical fibers for communication
- Microstructure optical fibers
- Mechanical reliability of optical fibers
- Optical waveguides for sensing
- Heavy metal oxide optical fibers
- Multicore fibers
- Multimaterial fibers
- Optical fibers for health
- Optical fibers for new laser sources
- Optical fibers for supercontinuum generation

SESSION 4

Optical and Optoelectronic Glass-Based Devices

ORGANIZERS

Juejun Hu Massachusetts Institute of Technology, U.S. hujuejun@MIT.edu

Laeticia Petit

Tampere University, Finland laeticia.petit@tuni.fi Glasses are important materials for optical components and devices given their excellent optical transparency and versatile processing. Novel oxide and nonoxide glass compositions and fabrication technology development have further enabled emerging applications, such as light emission, imaging, high-speed communications, 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, fiber-optic devices, metamaterials/metasurfaces, and integrated photonic components.



SESSION 5

Rare-earth and Transition Metal-doped Glasses and Ceramics for Photonic Applications

Rare earth and transition-metal doped materials play fundamental roles in many applications, such as optical communication, sensing, medical diagnosis, or clean energy systems. These roles are the result of intense research efforts on the development of new materials, material platforms, and designs. A deep understanding of the underlying science that determines the optical properties of these dopants has been achieved over the years. This session will cover the following topics.

- Glass and transparent ceramic lasers
- Ceramic phosphors for solid-state lighting
- Wavelength converters for photovoltaic systems
- Nanoprobe phosphors for biophotonics
- Energy transfer or light storage mechanisms in solids
- Applications in quantum information science
- Optical amplifiers for telecommunication

- Doris Moencke Alfred University, U.S. moncke@alfred.edu
- Volkmar Dierolf Lehigh, U.S. vod2@lehigh.edu

2024 ANNUAL MEETING

SYMPOSIUM 4

OUTREACH, GLASS TECHNOLOGY, MANUFACTURY, RECYCLING, AND CROSS-CUTTING TOPICS

Glass can be engineered with a wide range of properties and in many different forms for 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). A further important component of this symposium is a session on outreach because such a discussion will allow the field to attract a substantial pool of future researchers on glass science.

SESSION 1

STEAM Outreach

ORGANIZERS

- Charmayne Lonergan Missouri University of Science & Technology, U.S clonergan@mst.edu
- Kathryn Goetschius Corning Inc., U.S. GoetschiK@corning.com
- Casey Schwarz Ursinus College, U.S. cschwarz@ursinus.edu

This session will highlight efforts to promote awareness and interest in science, technology, engineering, art, and mathematics (STEAM) topics, both within the individual's communities and abroad, as well as to educate the next generation of STEAM professionals. Work that integrates or focuses on underrepresentation and energy equity in the context of STEAM education is encouraged. Presentations should focus on outreach activities related to GOMD or ACerS-related topics, including exploration of STEAM essentials and best practices for developing and disseminating activities and tools to prepare students for technical careers; supporting K-12 STEM programs through outreach to teachers and schools; development of curricula and/or courses to support STEAM in schools and universities; and the importance of addressing the imminent gap in a qualified STEAM workforce, particularly in GOMD-related areas.

SESSION 2

Challenges in Glass Manufacturing

ORGANIZERS

- Corning Inc., U.S. petersonim@corning.com
- Scott Cooper CelSian, Netherlands scott.cooper@celsianglass.com
- Alexandra Mitchell Corning Inc., U.S. mitchellal@corning.com
- Katelyn Kirchner The Pennsylvania State University, U.S. kak6117@psu.edu

The glass industry requires constant innovation to meet the needs for new compositions, new products, and sustainable manufacturing processes. This session will cover the spectrum of new research, development and engineering advances from the lab to the factory, including the following.

- Physics and chemistry of glass melting and forming (modeling and experiments)
- Energy efficiency strategies
- New furnace designs and process control methods
- Furnace materials (new materials, corrosion, and wear studies)
- New concepts for melting and forming
- Post-forming treatments



SESSION 3

Additive Manufacturing of Glass

The session provides a forum for exchanging and discussing current issues and trends in additive manufacturing (AM) of glasses. The session will cover recent theoretical and experimental advances in the processing and characterization of 3D-printed glasses for biomedical, optical, architectural, functional, and artistic applications. The session will also provide a forum to a broader audience for emerging technological applications of 3D-printed glasses. All contributions from academia, national laboratories, and industries that address recent advances and new applications are welcome. Topics include, but are not limited to, the following.

- Oxide and nonoxide glasses
- Glass from polymeric precursors
- AM methods
- Densification methods
- Optical and electrical properties
- Glass structural characterizations
- Specific applications

SESSION 4

Recycling and Sustainability

A common perception concerning glass is its infinite recyclability. However, recycling in its strictest sense, with cullet used as feedstock for the original articles ("closedloop recycling"), is not straightforward. A fundamental limiting factor is the difficulty in the separation of glass from heterogeneities. Contaminants lead to defects, such as stones and streaks, or deviations from the original chemical composition. This symposium is open to the widest expressions of circular economy applied to glass. Closed-loop recycling may be improved, as an example, by new equipment and logistic strategies. The manufacturing of new glass-based construction materials ("open-loop recycling"), such as glass foams, glass-ceramics, alkali-activated materials (geopolymers), may represent a valid alternative, if providing adequate revenues to compensate for new thermal treatments and/or additives. This session will explore these challenges.

ORGANIZERS

- Jonathan Massera Tampere University, Finland jonathan.massera@tut.fi
- Giorgia Franchin University of Padova, Italy giorgia.franchin@unipd.it
- Rebecca J. Dylla-Spears Lawrence Livermore National Laboratory, U.S. dyllaspears1@llnl.gov

- Enrico Bernardo University of Padova, Italy enrico.bernardo@unipd.it
- Carol Click Corning Inc., U.S. clickc@corning.com

2024 ANNUAL MEETING

SYMPOSIUM 5

DELBERT DAY HONORARY SYMPOSIUM

ORGANIZERS

Kisa S. Ranasinghe Kennesaw State University, U.S. kranasin@kennesaw.edu v

Qiang Fu
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 fuq2@corning.com



Delbert E. Day

This symposium stands as a tribute to the remarkable legacy of Delbert E. Day, celebrating his profound impact on the realm of glass science and technology, marked by pioneering applications that have reshaped the field. Through this event, we aspire to create a dynamic platform that facilitates engaging dialogues among researchers centered around themes that mirror the expansive scope of his work. The symposium will delve into a spectrum of subjects closely aligned with the essence of his lifelong endeavors, embracing facets such as the structural characteristics of oxide glasses, nucleation and crystallization of silicate glasses,

borate and phosphate glasses, nuclear waste glass, bioactive glasses as delivery devices, and biomedical applications of glass and glass-ceramics.



SYMPOSIUM 6

MARK DAVIS HONORARY SYMPOSIUM



Mark J. Davis

Mark J. Davis possessed an inspiring mind that was equal parts scientist, teacher, connector, and trailblazer. As a trained geologist, Davis devoted his scientific endeavors to the study of nucleation phenomena. Further, he made side steps into numerous other topics of study in glass science, in particular laser glass and optics. In all areas, significant contributions were made and progress was enabled. Outside of the laboratory, Davis made contributions to the greater materials science community via service, chairing, and organizing meetings of the ICG Technical Committee "Crystallization and Glass-Ceramics" (TC7) and the ACerS Glass &

Optical Division (GOMD). Here, Davis was especially concerned with encouraging and intensifying the mutual exchange between academia and industry, as well as forging the connection between students and established researchers across the globe. This session, honoring Davis, aims to blaze the trail of his profound scientific and personal legacy in the education, science, and industry of glass and glass-ceramics.

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