

CALL FOR PAPERS  
Abstracts Due November 30, 2011

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# 2012 GLASS & OPTICAL MATERIALS DIVISION ANNUAL MEETING

May 20-24, 2012 | Hilton St. Louis at the Ballpark | St. Louis, MO



# 2012 GOMD ANNUAL MEETING

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## Introduction:

Join the Glass & Optical Materials Division in St. Louis for a program involving the physical properties and technological processes important to glasses, amorphous solids, and optical materials of all kinds. The meeting will feature four symposia. Sessions headed by technical leaders from industry, government laboratories, and academia will cover the latest advances in glass science and technology, as well as a focused examination of the amorphous state. The poster session will highlight late-breaking research as well as the annual student poster contest.

St. Louis is the second largest city in Missouri. The city's famous landmark, the shining steel Gateway Arch, was designed by Eero Saarinen in 1966 to commemorate Thomas Jefferson's vision of westward expansion. Besides the Arch, attractions in the city include expansive Forest Park with its first-rate, free museums and one of the nation's top botanical gardens. Located just steps away from the city's major attractions, Hilton St. Louis hotel is a masterful architectural design with soaring lobby, spectacular city views of the Busch Stadium and Gateway Arch, stylish accommodations, luxurious facilities, state-of-the-art business center, concierge amenities and a first-rate array of food and beverage venues, and 360 rooftop bar 26th floor indoor/outdoor lounge with spectacular views inside Busch Stadium, Arch, and the city skyline.

For latest updates about the meeting, please join our Facebook group GOMD 2012: **ACerS Glass & Optical Materials Division Spring Meeting**. The Facebook group members are invited to connect with other meeting participants and discuss all aspects of the meeting – from basic logistics such as food and lodging, to talks and sessions they are interested in attending, and special events associated with the meeting. We look forward to seeing you in St. Louis!

## SYMPOSIUM I: GLASS SCIENCE

The Glass Science Symposium will cover recent theoretical and experimental advances in fundamental and applied glass science, including glass structure and properties, theoretical modeling, glass transition and relaxation, corrosion, glass surfaces, and issues related to ancient glasses.

### Session 1: Glass Structure and Properties

**Organizers:** **Sabyasachi Sen**, University of California-Davis  
[sbsen@ucdavis.edu](mailto:sbsen@ucdavis.edu)

**Randall E. Youngman**, Corning, Incorporated  
[youngmanre@corning.com](mailto:youngmanre@corning.com)

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

### Session 2: Non-oxide Glasses

**Organizers:** **Andriy Kovalskyy**, Austin Peay State University  
[Kovalskyya@apsu.edu](mailto:Kovalskyya@apsu.edu)

**J. David Musgraves**, Clemson University  
[jdm047@clemson.edu](mailto:jdm047@clemson.edu)

The session covers a wide range of topics on fundamentals and applications of non-oxide glasses, such as chalcogenides, fluorides, borides and others. Scientific areas of interest include, basic properties (optical, electrical, thermal), advanced structural studies (EXAFS, XPS, vibrational methods, NMR, positron annihilation etc.), photo- and radiation-induced effects, temperature-induced phenomena, modeling, aging and relaxation in non-oxide glass networks. Contributions in emerging practical applications of non-oxide glasses in optics/photonics, phase-change and other non-volatile memories, nanotechnology, biomedical field, energy, sensors, radiation dosimetry, lithography are welcomed.

## Program Chairs:

### Juejun (JJ) Hu

Department of Materials  
Science & Engineering  
University of Delaware  
Newark, DE 19716  
[hujuejun@udel.edu](mailto:hujuejun@udel.edu)



### J. David Musgraves

School of Materials  
Science & Engineering  
Clemson University  
Clemson, SC 29634  
[jdm047@clemson.edu](mailto:jdm047@clemson.edu)



## Division Chair

### Steve Martin

Iowa State University  
[swmartin@iastate.edu](mailto:swmartin@iastate.edu)  
(515) 294-0745

## Vice Chair

### Kelly Simmons-Potter

University of Arizona  
[kspotter@ece.arizona.edu](mailto:kspotter@ece.arizona.edu)  
(520) 626-0525

## Secretary

### Shibin Jiang

AdValue Photonics, Inc.  
[sjiang@advaluephotonics.com](mailto:sjiang@advaluephotonics.com)  
(520) 790-5468

## Chair-Elect

### John Ballato

Clemson Research Park AMRL  
[jballat@clemson.edu](mailto:jballat@clemson.edu)  
(864) 656-1035

## Incoming Secretary

### Steve Feller

Coe College  
[sfeller@coe.edu](mailto:sfeller@coe.edu)  
(319) 399-8633

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### Session 3: Computer Simulation and Modeling of Glasses

**Organizer:** **Jincheng Du**, University of North Texas  
Jincheng.Du@unt.edu

This session focuses on recent progresses of atomistic scale simulations of glasses to elucidate their structure and structure-property relationships through either classical or first principle based approaches. It covers development of empirical potential models to better describe silicate, borate, aluminate, phosphate or mixed former systems. Development of potentials for non-oxide based systems, interfaces of glass with other materials, methods to improve agreement with experimental structural data, techniques to calculate optical properties, thermo-mechanical responses, and diffusion mechanisms will be covered. The session provides an opportunity to discuss the challenges and potential solutions of these challenges of atomistic simulations of glasses.

### Session 4: Glass Transition and Relaxation

**Organizer:** **Ulrich Fotheringham**, SCHOTT AG, Inc.  
ulrich.fotheringham@schott.com

A fundamental understanding of glass transition and relaxation is essential for enabling future breakthroughs in glass science and technology. This session will cover the thermodynamics and dynamics of glass transition and relaxation phenomena from both theoretical and experimental perspectives, with particular emphasis on recent developments.

### Session 5: Glass Corrosion and Surface Science

**Organizer:** **Nathan P. Mellott**, Alfred University  
mellott@alfred.edu

Glass is currently a component of, or a candidate for, advanced material systems utilized in a variety of technological applications including photovoltaic modules, biomedical devices, and nuclear waste storage. Optimized performance in established applications and successful integration into new market products require an improved fundamental understanding of both glass corrosion and surfaces. This session will address a variety of relevant aspects of glass corrosion and surfaces including atomic to macroscale structural controls on corrosion, surface structure and reactivity, coupling of theoretical and experimental studies of corrosion, and the effects of glass corrosion on properties will be addressed.

### Session 6: Topological Constraints and Rigidity: Theory and Experiment

**Organizer:** **Pierre Lucas**, University of Arizona  
pierre@email.arizona.edu

The topological description of amorphous structures has been an active subject of studies since the development of the rigidity percolation theory by Phillips and Thorpe more than three decades ago. Topological constraints theory describes how microscopic bond arrangements govern the thermal, mechanical and transport properties of glasses at the macroscopic level. Topological theories have been successfully applied to oxide glasses and advances such as temperature dependent constraints have been brought out. This session will focus on recent developments of both theoretical and experimental aspects of the topological description of glasses. Contributions covering modeling as well as measurements of properties and structure are encouraged.

## SYMPOSIUM 2: OPTICAL MATERIALS & DEVICES

Optical materials and devices are of critical importance for a variety of applications including sustainable energy, remote sensing, medical diagnostics and treatment, and national defense. This symposium will address processing and properties of optical materials as well as design, fabrication, and performance of optical devices.

### Session 1: Active Optical Materials

**Organizers:** **John Ballato**, Clemson University  
jballat@clemson.edu

**Shibin Jiang**, AdValue Photonics, Inc.  
sjiang@advaluephotonics.com

Light emitting and optically-active materials and devices are enabling elements within a wide variety of modern technologies. This symposium will address the processing and properties of optical materials as well as design, fabrication, and performance of active optical devices. Of particular focus will be inorganic, organic, and hybrid glasses and crystals in bulk, thin film, or fiber form that exhibit light-emissive, nonlinear, electro-optic, magneto-optic, and related active optical phenomenon.

### Session 2: Photosensitivity and Laser Modification of Glasses

**Organizers:** **Mario Affatigato**, Coe College  
maffatig@coe.edu

**Denise Krol**, University of California-Davis  
dmkrol@ucdavis.edu

**Takayuki Komatsu**, Nagaoka University of Technology  
komatsu@mst.nagaokaut.ac.jp

This session will be open to presentations in the area of laser interaction with glasses. In particular, it welcomes papers on the topics of femtosecond interactions; thermal mechanisms for structural change; laser induced crystallization; laser damage from electronic mechanisms; laser induced nanostructures; photosensitivity; and general papers on laser induced property changes in glasses. Experimental results, computer models, and other explorations of light-induced changes are appropriate.

## HOTEL INFORMATION

### Hilton St. Louis at the Ballpark

1 South Broadway | St. Louis, Missouri, 63102  
Tel: 1-314-421-1776

#### Room Rates\*

\$129.00 plus tax - Single/Double/Triple/Quad  
\$ 70.00 plus tax - Student  
\$104.00 plus tax - Government

\*Reserve your room by April 19, 2012 to secure the negotiated conference rate.

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## Session 3: Optical Fibers and Planar Photonic Devices

**Organizers:** **Juejun Hu**, University of Delaware  
hujuejun@udel.edu

**Norman Anheier**, Pacific Northwest National Lab  
norm.anheier@pnnl.gov

Glasses are important materials for optical fibers and on-chip photonic devices given their excellent optical transparency and capacity for low-loss fiber and planar processing. Novel oxide and non-oxide glass compositions and fabrication technology development have further enabled emerging applications such as light emission, nonlinear optical signal processing, evanescent wave spectroscopy, and sensing. This session will cover material synthesis and processing as well as device fabrication and applications of innovative device architectures including nanostructured optical fibers, photonic crystals, and optical micro-cavities.

## Session 4: Optical Absorption

**Organizer:** **Mark Davis**, SCHOTT North America, Inc.  
mark.davis@us.schott.com

All aspects relating to absorption and/or redirection of energy in glass and related materials will be the subject of this symposium, including:

- absorption, including intrinsic and extrinsic sources and their temperature dependencies
- scattering
- reflection
- energy trapping
- resonance behavior
- characterization techniques

Theoretical and experimental approaches are welcome.

## Session 5: Optical Coatings

**Organizer:** **Julien Lumeau**, Univ. of Central Florida  
jlumeau@creol.ucf.edu

**S. K. Sundaram**, Alfred University  
sundaram@alfred.edu

Optical interference filters based on multilayer coatings allow achieving various optical functions and therefore find a wide range of applications from telecommunication to biomedical. These coatings can be made from different materials (e.g., metals, dielectric, and polymers) and deposited on various substrates. Despite the maturity of the technology, numerous challenges exist in order to achieve optimal performances. A non-exhaustive list of those one includes the control and the characterization of the optical properties, the spatial control of the layer thickness or refractive index for fabricating gratings, photonic band-gap structures or waveguides, the study of the electrical and mechanical properties of coatings, and the functionalization of coatings for optical sensors. This session intends to cover all aspects of optical coatings on materials, components, and devices.

## Session 6: Optical Ceramics and Glass Ceramics

**Organizer:** **Robert J. Pavlacka**, Army Research Lab  
robert.pavlacka.ctr@mail.mil

Ceramics with transparency in the visible or IR spectrum are useful for applications such as solid state lasers, transparent armor, high temperature windows, missile domes, and scintillators. This session will focus on processing, characterization, and performance of transparent ceramic materials and devices. Some topics of interest include novel green forming methods, sintering and advanced densification methods, grain boundary characterization, optical and mechanical behavior, and device performance.

## SYMPOSIUM 3: CROSS-CUTTING TOPICS

The symposium consists of five sessions with broad interdisciplinary coverage. Novel material synthesis methods, glass characterization techniques, and emerging technological applications of glass and ceramic materials constitute the focus of this symposium.

## Session 1: Glass and Optical Materials for Energy and Environmental Applications

**Organizers:** **Barrett G. Potter**, University of Arizona  
bgpotter@mse.arizona.edu

**Kelly Simmons-Potter**, University of Arizona  
kspotter@ece.arizona.edu

The ongoing need for renewable energy generation and storage, enhanced energy efficiency, and minimized environmental impact have motivated the investigation of new materials systems and process strategies that exploit a range of electronic, optical, chemical, and mechanical properties and phenomena. This session will provide a forum for the discussion of new results in topic areas including, but not limited to: materials and processes for solar energy (e.g. photovoltaics, solar thermal) and fuel cell development; energy storage strategies; and bulk material and thin film technologies for energy management (optical, thermal).

## ABSTRACT SUBMISSION INSTRUCTIONS

Visit [www.ceramics.org/gomd2012](http://www.ceramics.org/gomd2012) to review the session topics and select the "Submit Abstract" hyperlink to be directed to the Abstract Central website. If you have questions, please contact Marilyn Stoltz at [mstoltz@ceramics.org](mailto:mstoltz@ceramics.org) or 614-794-5868.

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## Session 2: NMR Studies of the Structures and Dynamics of Glasses

**Organizer:** Steve Martin, Iowa State University  
swmartin@iastate.edu

Two main areas of using NMR spectroscopy to study the structure, properties, and dynamics of glasses, supercooled liquids, and glass forming liquids will be featured. First, the session will examine the use of various NMR spectroscopies to examine the short and intermediate range atomic structure of glasses, supercooled liquids, and glass forming liquids. While not meant to limit the range of solicited papers, the focus will be on and papers are requested that use NMR techniques to extend our understanding of and abilities to tailor the structure of glass, supercooled liquids, and glass forming liquids. Secondly, the session will examine the use of various NMR spectroscopies to examine the many dynamic processes that are active in glasses, supercooled liquids, and glass forming liquids. While not meant to limit the range of solicited papers, the focus will be on and papers are requested that use various NMR spectroscopies to probe dynamic processes in glasses, supercooled liquids, and glass forming liquids, such as structural relaxation, ion diffusion, and molecular reorientation. Papers that report new and innovative NMR techniques that expand our understanding of the structure of and of the dynamics of processes in glasses, supercooled liquids, and glass forming liquids are especially encouraged.

## Session 3: Archeological Glass Science and Technology

**Organizers:** Denis Strachan, Pacific Northwest National Laboratory  
denis.strachan@pnnl.gov

**Hongjie Luo**, Shanghai Institute of Ceramics, Chinese Academy of Sciences  
hongjieluo@mail.sic.ac.cn

**Weidong Li**, Shanghai Institute of Ceramics, Chinese Academy of Sciences  
liwd@mail.sic.ac.cn

Glass and glassy materials, such as ceramic glazes and enamels on metals and ceramics, are present on many archaeological sites. Their presence on archaeological sites indicates a sophisticated level of craft practice and materials understanding. For over 120 years, glass-containing artifacts have been studied for their compositional variability. Although much less constrained than the ideal, natural and man-made analogues also provide the possibility of examining experiments of a far greater duration than possible in laboratory experiments. We invite papers that continue to broaden the investigation of the science and technology of archaeological glasses and glassy materials, including studies of production sites and glasses with unusual optical properties or process controls.



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## Session 4: Liquid Synthesis and Sol-gel Derived Materials

**Organizer:** **Brian Riley**, Pacific Northwest National Laboratory  
[brian.riley@pnnl.gov](mailto:brian.riley@pnnl.gov)

Liquid and sol-gel materials synthesis routes are becoming more and more common in laboratory practice. These techniques allow compositional flexibility and often provide a near-room-temperature synthesis route for chemistries that might be difficult to make with compound fusion at high temperatures. Room temperature synthesis routes require less production energy and allow for more control over microstructure. Materials produced through these methods range from mineral structures to silica aerogels. These material structures can often be subsequently heat-treated for densification or left in the porous state, depending on the specific application. This session will cover topics related to liquid synthesis and sol-gel derived materials for various applications.

## SYMPOSIUM 4: FESTSCHRIFT TO THE GLASS RESEARCH CAREER OF PROF. DELBERT E. DAY

Locating the 2012 meeting of the Glass and Optical Materials Division of the American Ceramic Society in St. Louis, MO in May 2012 provides the opportunity to celebrate the research career of Prof. Delbert E. Day, Curators' Professor Emeritus of Ceramic Engineering, Missouri University of Science and Technology. Prof. Day celebrates his 75th birthday in 2011, making this a propitious time to celebrate a glass science career that has entered its sixth decade with little sign of slowing down.

### Session 1: The Mixed Alkali Effect and Ion Conducting Glasses

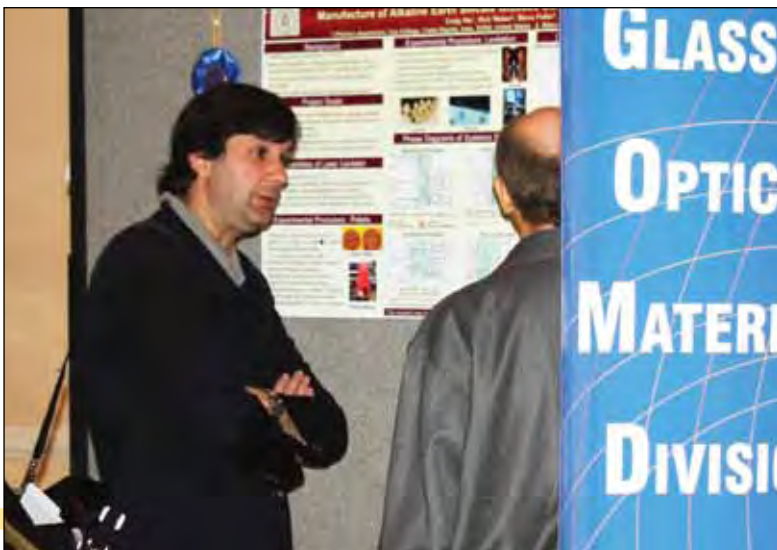
**Organizer:** **David Sidebottom**, Creighton University  
[sidebottom@creighton.edu](mailto:sidebottom@creighton.edu)

Prof. Day devoted much of his early career to studying the mixed alkali effect in oxide glasses, including important contributions on internal friction, ion conductivity and thermal properties. His review article "Mixed alkali glasses - Their properties and uses," *J. Non-Cryst. Solids* **21**, 343-372 (1976), is the most highly cited paper authored by Prof. Day, and continues to be cited by researchers in the field. This session will include papers on the mixed alkali effect, as well as papers pertaining to ion-conducting glasses and relaxation phenomena.

### Session 2: Phosphate Glasses: Their Structures, Properties and Applications

**Organizer:** **Richard Brow**, Missouri University of Science & Technology  
[brow@mst.edu](mailto:brow@mst.edu)

Prof. Day has studied the properties of phosphate glasses and melts for many years, including early studies of ion conducting systems. More recently, he discovered that low-temperature iron phosphate glasses can incorporate large concentrations of a wide-range of different oxides in their structure, while retaining outstanding chemical durability, thus making them candidates for hosting nuclear wastes. This session will include papers on the iron phosphate glasses, with more general papers on the structure, properties and applications of other phosphate glasses.



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### Session 3: DTA and DSC Methods for Glass Crystallization Study

**Organizer:** **Edgar Zanotto**, Federal University São Carlos  
dedz@ufscar.br

Due to the facility and high speed of differential thermal analytical techniques, hundreds of papers about glass crystallization by these methods are published every year. There is thus scope for a serious brainstorming aiming at clarifying what sort of relevant quantitative information one can get from DTA and DSC techniques. For instance, is it really possible to determine crystal nucleation rates, crystal growth rates, overall crystallization, critical cooling rates, glass stability parameters, activation enthalpies, solidus and liquidus temperatures by DTA or DSC? With his colleague at Missouri S&T, Prof. Chandra Ray, Prof. Day has made important contributions to the use of differential thermal analytical techniques to characterize nucleation and crystallization kinetics, glass forming tendency and critical cooling rates for glass-forming melts. This session will include invited review talks as well as short presentations on the current state-of-the-art in characterizing nucleation and crystallization behavior by DSC and DTA methods.

### Session 4: Glasses for Bio-Medical Applications

**Organizers:** **Julian Jones**, Imperial College London  
julian.r.jones@imperial.ac.uk

**Matthew Hall**, Alfred University  
hallmm@alfred.edu

In 1985, Prof. Day founded Mo-Sci Corporation, to produce glass microspheres used to treat inoperable liver cancer. More recently, Prof. Day, his students, and colleagues at Missouri S&T have shown that borate-based glasses possess remarkable transformation kinetics to bio-compatible materials, and have potential applications as scaffolds for bone defects and for soft tissue treatments, including wound healing. This session will provide a forum to present the results of basic and applied research on the use of glass and glass-ceramic materials in the areas of medicine and biotechnology. Appropriate topics include, but are not limited to: bioactive glasses and glass-ceramics, glass ionomer cements, dental materials, glass components of medical devices, biosensors, glasses for pharmaceutical packaging, glass-based microfluidics, and the interactions of biological systems with glass surfaces.

## POSTER SESSION & STUDENT POSTER COMPETITION:

**Organizer:** **Morten Smedskjaer**, Corning, Inc.  
smedskjamm@corning.com

Description: 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!

## PRELIMINARY SCHEDULE

### Sunday, May 20, 2012

Registration 3 p.m. - 7 p.m.  
Welcome Reception 5 p.m. - 7 p.m.

### Monday, May 21, 2012

Registration 7:30 a.m. - 5:30 p.m.  
Stookey Lecture of Discovery 8:00 a.m. - 9:00 a.m.  
Coffee Break 9 a.m. - 9:20 a.m.  
Concurrent Technical Sessions 9:20 a.m. - 12 p.m.  
Lunch on Own 12 p.m. - 1 p.m.  
Poster Session Setup 12 p.m. - 5:30 p.m.  
Concurrent Technical Sessions 1 p.m. - 5:40 p.m.  
Coffee Break 3 p.m. - 3:20 p.m.  
GOMD General Business Meeting 5:45 p.m. - 6:30 p.m.  
Poster Session 6:30 p.m. - 9 p.m.

### Tuesday, May 22, 2012

Registration 7:30 a.m. - 5 p.m.  
George W. Morey Award 8 a.m. - 9 a.m.

Coffee Break 9 a.m. - 9:20 a.m.  
Concurrent Technical Sessions 9:20 a.m. - 12 p.m.  
Norbert J. Kreidl Award for Young Scholars 12 p.m. - 1 p.m.  
Lunch On Own 12 p.m. - 1 p.m.  
Concurrent Technical Sessions 1 p.m. - 5:40 p.m.  
Coffee Break 3 p.m. - 3:20 p.m.  
GOMD Conference Dinner 7 p.m. - 10 p.m.

### Wednesday, May 23, 2012

Registration 7:30 a.m. - 5 p.m.  
Concurrent Technical Sessions 8 a.m. - 12 p.m.  
Coffee Break 10 a.m. - 10:20 a.m.  
Lunch on Own 12 p.m. - 1 p.m.  
Concurrent Technical Sessions 1 p.m. - 5:40 p.m.  
Coffee Break 3 p.m. - 3:20 p.m.

### Thursday, May 24, 2012

Registration 7:30 a.m. - 12 p.m.  
Concurrent Technical Sessions 8 a.m. - 12 p.m.  
Coffee Break 10 a.m. - 10:20 a.m.

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