

# **3rd International Congress on Ceramics**

# Nov. 14 - 18, 2010 / Osaka, Japan

## www.ceramic.or.jp/icc3

Incorporating the 23<sup>rd</sup> Fall Meeting of Ceramic Society of Japan and

The 20th Iketani Conference

## Organized by the Ceramic Society of Japan [5]

Co-organized by Iketani Science and Technology Foundation 🔊 🎬

Endorsed by International Ceramic Federation LICF1 and Asia-Oceania Ceramic Federation LAOCF1





## **List of Contents**

ons 1
2
sidency 3
4
5
7
8
30
30
30
30
31
32





(as of September, 2009)

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Early in 2005, the American Ceramic Society, the European Ceramic Society and the Ceramic Society of Japan announced a collaborative effort to provide leadership for the global ceramics community that would facilitate the use of ceramic and glass materials. That effort resulted in an agreement to organize a new biennial series of the International Congress on Ceramics, endorsed by the International Ceramic Federation (ICF).

The 1<sup>st</sup> International Congress on Ceramics (ICC1) was held in Canada, 2006, under the organization of the American Ceramic Society, and the 2<sup>nd</sup> Congress (ICC2) was held in Italy, 2008, hosted by the European Ceramic Society. Global business and technology leaders, scientists and researchers gathered to share ideas and visions of the future for ceramic and glass materials, and to engage the worldwide ceramics community in a collective effort to expand the use of these materials in both conventional as well as new and exciting applications.

It has been agreed that the 3<sup>rd</sup> Congress (ICC3) will be held in Japan, 2010, organized by the Ceramic Society of Japan (CerSJ). This Congress incorporates the 23<sup>rd</sup> Fall Meeting of Ceramic Society of Japan and the 20<sup>th</sup> Iketani Conference, and is endorsed and supported by ICF, Asia-Oceania Ceramic Federation (AOCF) as well as many other organizations. Following the styles of the previous two Congresses, the program is designed to advance ceramic and glass technologies to the next generation, through discussing the most recent advances, as well as developing the global roadmap that contains perspective and future trends.

The Congress will consist of voluntarily organized 22 symposia in the most topical and essential themes of ceramic and glass materials, including Characterization, design and processing technologies, Electro, magnetic and optical ceramics and devices, Energy and environment related ceramics and systems, Bio-ceramics and bio-technologies, Ceramics for advanced industry and safety society, and Innovation in traditional ceramics. It will also contain the two special symposia designated by the conference chair; "Emerging and Innovative Technologies for Sustainable Society" and "Road-Maps, Policies and R&D Strategies."

I would like to invite you to visit Osaka, the most vivid city of Japan with traditional culture and history, and actively participate in ICC3. The congress will provide an excellent opportunity for interactions and friendships with participants from over the world, who are involved in research, development, engineering, manufacturing, and application of ceramic and glass materials.

Looking forward to seeing all of you in Osaka, Japan in November, 2010!

September 2009

R. Tihar

Koichi Niihara



President of the 3<sup>rd</sup> International Congress on Ceramics (ICC3) President of the Ceramic Society of Japan (CerSJ) President of the Asia-Oceania Ceramic Federation (AOCF)

President of Nagaoka University of Technology (NUT) Emeritus Professor, Osaka University





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The ICF was established in 1990 as a nongovernmental, nonprofit federation of societies representing ceramists, ceramic engineers and ceramic scientists of the member countries. The purpose of the ICF is to promote and stimulate understanding and cooperation among persons and societies form different countries over the world.

#### http://www.ceramic.or.jp/icf/index.html

As the most important event, the ICF endorses and promotes organization of the innovative series of the International Congress on Ceramics and guarantees their natural and fruitful development. Every two years, ICF appoints a National Ceramic Society that will organize the next ICC as representative of a different region of the world.

#### **3<sup>rd</sup> International Congress on Ceramics**



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### Chair



Koichi Niihara (ICC3 President), Nagaoka University of Technology (NUT), Japan

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## List of Symposia

Symposium 1:	Advanced Structure Analysis and Characterization of Ceramic Materials
Symposium 2A:	Novel Chemical Processing; Sol-Gel and Solution-Based Processing
Symposium 2B:	Novel Chemical Processing; Molecular Routes to Ceramics and Ceramics-based Materials
Symposium 2C:	Novel Chemical Processing; Chemical Tectonics for Materials Design
Symposium 3:	Nano-Crystals and Advanced Powder Technology
Symposium 4:	Green and Smart Processing
Symposium 5:	Hybrid and Nano-Structured Materials
Symposium 6:	Advances in Electro Ceramics
Symposium 7:	Optical Ceramics
Symposium 8:	Glasses - Science & Technology, and Photonic Applications-
Symposium 9A:	Ceramics for Electricity; Energy Conversion and Storage Systems for Green World
Symposium 9B:	Ceramics for Electricity; SOFC and Related Technologies
Symposium 9C:	Ceramics for Electricity; Direct Conversion Technology between Heat and Electricity
Symposium 9D:	Ceramics for Electricity; Advanced Superconducting Materials
Symposium 10:	Ceramics and Composites for Advanced Nuclear Energy and Hazardous Waste Treatment Applications
Symposium 11:	Advanced Ceramic Surface for Environmental Purification: Photocatalysis and Wettability Control
Symposium 12:	Porous Ceramics for Environmental Protection and Advanced Industries
Symposium 13:	Ceramics for Medicine, Biotechnology and Biomimetics
Symposium 14:	Advanced Engineering Ceramics and Composites
Symposium 15:	Advanced Ceramic Sensor Technologies
Symposium 16:	Innovation in Refractories and Traditional Ceramics
Symposium 17:	Health and Safety Aspects of Ceramic Nanoparticles

### Special Symposia

- *Symposium S1:* Emerging and Innovative Technologies for Sustainable Society
- Symposium S2: Road-Maps, Policies and R&D Strategies



## **Symposium 1:** Advanced Structure Analysis and Characterization of Ceramic Materials

#### Scope:

Remarkable developments have been made recently in the structural analysis and characterization of inorganic crystalline and amorphous materials, such as X-ray, neutron, synchrotron and electron diffraction, x-ray/neutron scattering, IR/Raman scattering, NMR, XAFS, first-principle calculations, computer simulations, Rietveld analysis, the maximum-entropy method, in situ measurements at high temperatures/pressures and electron/nuclear density analysis. These techniques enable scientists to study not only static and long-range periodic structures but also dynamic and short-/intermediate-range structures. Multi-scale characterization from the electron to micrometer levels is becoming increasingly important as a means of understanding phenomena at the interfaces, grain boundaries and surfaces of ceramic materials. This symposium will discuss the structure/property relationships of various ceramic materials. (electro, magnetic and optical ceramics; energy and environment related ceramics; bio-ceramics; ceramics for reliability secure society; traditional ceramics). The proposed session topics include:

- X-ray, neutron, synchrotron and electron diffraction
- X-ray absorption fine structure (XAFS)
- Light scattering
- Computer simulation
- First-principles calculations
- Physico-chemical properties
- Structure-property relationships
- Crystal structure, glasses and amorphous materials,
- Nano-structure and micro-structure
- Interfaces, surfaces and grain boundaries.

#### **Organizers:**



Masatomo Yashima



Scott T. Misture

#### Main Organizers

- Masatomo Yashima, Tokyo Institute of Technology, Japan
- Scott T. Misture, Alfred University, USA

- Xiaolong Chen, Institute of Physics, CAS, China
- Takashi Ida, Nagoya Institute of Technology, Japan
- Roman Shpanchenko, Moscow State University, Russia
- Isao Tanaka, Kyoto University, Japan



## Symposium 2A: Novel Chemical Processing; Sol-Gel and Solution-Based Processing

#### Scope:

Solution-based processing, including the sol-gel method, is recognized as a promising strategy for promoting the so-called "green" processing of ceramic materials that can reduce energy consumption and waste emissions. This symposium will cover all aspects of the science and technology concerning sol-gel and solution-based processing of materials such as ceramics, glasses, nanocomposites and organic-inorganic hybrid materials. The technology involves sol-gel and solution-based processing of nanoparticles, powders, coatings, fibers, bulks, and porous and mesoporous materials, which offer a variety of innovative functions leading to electronic, dielectric, magnetic, optical, photonic, chemical, photocatalytic and biomedical applications. The symposium will also target science and technology on innovative sol-gel and solution-derived nano-and micrometerscale structures, which provide excellent functions. The proposed session topics include:

- Science and technology of sol-gel processing
- Sol-gel and solution-derived fine structures for integration
  - Nanoparticles and powders
  - Thin film devices, coatings and membranes
- Sol-gel nano and micro architectures
  - Porous and mesoporous materials
  - Aerogels and related materials
  - Hybrid and nanocomposite materials
- Sol-gel and solution-derived functional materials
  - Electronic, dielectric and magnetic functions
  - Optical and photonic functions
  - Chemical and photocatalytic functions
  - Biomedical functions

#### **Organizers:**

Main Organizers

- Hiromitsu Kozuka, Kansai University, Japan
- Kazumi Kato, AIST, Japan
- Byeong-Soo Bae, KAIST, Korea

- Plinio Innocenzi, University of Sassari, Italy
- Jennifer A. Lewis, University of Illinois, USA
- Kensuke Makita, Central Glass Co., Ltd., Japan
- Kazuki Nakanishi, Kyoto University, Japan
- Michael Popall, Fraunhofer-Institut fur Silicatforschung ISC, Germany



# **Symposium 2B:** Novel Chemical Processing; Molecular Routes to Ceramics and Ceramics-based Materials

#### Scope:

To date, a variety of preparation routes to ceramics and ceramics-based materials have been developed, and molecular routes to ceramics and ceramics-based materials have attracted increasing attention in recent decades. One advantage of these routes is their capability for shaping, such as fiber-spinning and film-formation. It should also be noted that they are ideal for the preparation of inorganic-organic hybrids and meso-structured ceramic materials. This international symposium has therefore been organized to discuss and exchange ideas concerning molecular routes to ceramics and ceramics-based materials. It aims, in particular, to discuss molecular routes via both the liquid phase and the vapor phase, which show some close similarities in terms of precursor design, at the same table. This symposium will bring together researchers from many different fields, including ceramic processing, precursor synthesis and synthetic chemistry for hybrids and meso-structured materials. The symposium may very well yield key developments for future challenges with respect to chemical routes to ceramics-based materials. The proposed session topics include:

- Molecular Precursor Design and Synthesis
- Liquid-phase Process
- Vapor-phase Process
- Organic-to-inorganic Conversion to oxide ceramics
- Organic-to-inorganic Conversion to non-oxide ceramics
- Inorganic-organic Hybrids
- Meso-structured Materials

- Main Organizers
- Takamasa Ishigaki, Hosei University, Japan
- Yoshiyuki Sugahara, Waseda University, Japan
- Co-Organizers
- Jun-ichi Hojo, Kyushu University, Japan
- Yuji Iwamoto, Nagoya Institute of Technology, Japan
- Younghee Kim, Korea Institute of Ceramic Engineering and Technology, Korea
- Ya-li Li, Tianjin University, China
- Philippe Miele, Université Claude Bernard Lyon 1, France
- Ralf Riedel, Technische Universität Darmstadt, Germany



# **Symposium 2C:** Novel Chemical Processing; Chemical Tectonics for Materials Design

#### Scope:

"Chemical tectonics" is a new concept for the processing of functional materials based on precise control of morphology and structures on the atomistic to bulk (typically >cm) scales achieved by taking the most appropriate route to consume the least energy and the smallest amount of natural resources. While there are numerous potential approaches, this symposium will focuse on three methods. The first is a bio-inspired approach, a new process conducted under very mild conditions such as atmospheric pressure and ambient temperature to yield functional materials. The second is synthesis of materials in external fields. such as the electrical, magnetic and mechanical fields, as well as under irradiation with light and microwaves to obtain unique nano- to micro-structures and properties. The third is the fabrication of superlattice and periodic nano-to centimeter-scale structures to achieve unique functions by employing self-organization of molecules and nanoparticles as well as precise computer-assisted structural control. The proposed session topics include:

- · Materials design based on molecular assembly
- Non-equilibrium process
- Bio-mimetic process
- Elemental approach for materials design
- Organic/inorganic composite
- Design of superlattice and periodic structure
- Structural control under external perturbation
- Enhancement of functions via external fields
- Computer-assisted process

#### Organizers:



Katsuhisa Tanaka



Atsunori Matsuda



Jianrong Qiu

Main Organizers

- Katsuhisa Tanaka, Kyoto University, Japan
- Atsunori Matsuda, Toyohashi University of Technology, Japan
- Jianrong Qiu, Zhejiang University, China

- Aldo R. Boccaccini, Imperial College London, UK
- Plinio Innocenzi, Università di Sassari, Italy
- Peter G. Kazansky, University of Southampton, UK
- Dong-Pyo Kim, Chungnam National University, Korea
- Jianbei Qiu, Kunming University of Science and Technology, China
- Zainovia Lockman, Universiti Sains Malaysia, Malaysia
- Masahide Takahashi, Osaka Prefecture University, Japan



## Symposium 3: Nano-Crystals and Advanced Powder Technology

#### Scope:

The properties and performance of ceramic materials/systems are heavily dependent on their processing and manufacturing routes. Recent research and development of new powder processing and nano-crystal manufacturing technologies is providing new opportunities for improving performance in ceramic materials/ systems far beyond conventional ceramic processes. Such progressive ceramic materials/systems are essential to the industry of the future and the sustainable society. The aim of this symposium is to discuss advances in powder synthesis, characterizations and forming technologies for a wide variety of nano-crystal, ceramic, hybrid material and composite systems from this perspective. It also intends to achieve a better understanding of the fundamentals and industrial applicability of these advances through a cross-section investigation of the state-of-the-art properties and applications of nano-crystal and powder-processing technologies for innovative ceramics.

The proposed session topics include:

- · Synthesis, functionalization and processing of nanocrystals
- Nanocubes, nanotubes, nanorods, nanowires, nanosheets and other low-dimensional nanocrystals
- · Processing-property relationships in nano ceramics and composites
- · Powder synthesis, characterization and processing
- Colloidal and dry processing in powder technology
- · Binder and slurry technology
- Novel forming technology
- Patterning, templates and self assembly
- Nanocrystal and powder processing for nano/micro/macrostructure control

#### **Organizers:**



Yuji Hotta



Minoru Osada

Hasan Göcmez

- Yuji Hotta, AIST, Japan
- Minoru Osada, NIMS, Japan
- Hasan Göcmez, Dumlupinar University, Turkey Co-Organizers
- Ilhan A. Aksay, Princeton University, USA
- Lennart Bergström, Stockholm University, Sweden
- Cihangir Duran, Gebze Institute of Technology, Turkey
- George V. Franks, University of Melbourne, Australia
- Masayoshi Fuji, Nagoya Institute of Technology, Japan
- Ludwig J. Gauckler, ETH Zurich, Switzeland
- Tomaž Kosmač, Jožef Stefan Institute, Slovenia
- Renzi Ma, National Institute for Material Science (NIMS), Japan
- Hideki Maekawa, Tohoku University, Japan
- Gary Messing, Pennsylvania State University, USA
- Ce-Wen Nan, Tsinghua University, China

- Valery Petrykin, J. Heyrovsky Institute of Physical Chemistry, Czech Republic
- Richard Riman, Rutgers, The State University of New Jersey, USA
- Satoshi Tanaka, Nagaoka University of Technology, Japan
- Tetsuo Uchikoshi, NIMS, Japan
- Koji Watari, AIST, Japan



## Symposium 4: Green and Smart Processing

#### Scope:

Significant advances have been seen recently in materials processing technologies, which are termed green or smart processes due to their advantages in terms of environmental benignancy and energy efficiency. Green processing technologies can enable the formation of large-scale complex-shaped ceramic components, whose application will result in a reduced environmental burden when assessed from the viewpoints of life cycle and cost performance. Smart processing technology aims to develop advanced processes for materials with improved performance or new functions by supplying the requisite energy and resources only to the required portions, thereby contributing to the establishment of a next-generation manufacturing industry that will exert minimal impact on the environment. The purpose of this symposium is to provide a forum for presenting and discussing recent advances in green and smart processing technologies. The proposed session topics include:

Innovative green manufacturing processes

- Advanced shape forming technologies
- · Advanced joining technologies for large and complicated ceramic parts
- Reaction bonding and reaction sintering processes
- Combustion synthesis
- Innovative processing for high performance ceramic components
- · Beam processing: laser beams, electron beams, ion beams, particle beams
- Nanoparticle technologies: nanoparticle assembling, powder processing, particle dispersion, nanostructural particle bonding, particle characterization
- · Nano/micro structure control: freeform fabrication, patterning, multilayer stacking
- Functionally structured material: photonic structures, micro electro mechanical systems, functionally graded materials, electromagnetic wave devices, etc.

#### **Organizers:**



Soshu Kirihara



Kiyoshi Hirao

25

Zoltan Lences

- Soshu Kirihara, Osaka University, Japan
- Kiyoshi Hirao, AIST, Japan
- Zoltan Lences, Slovak Academy of Sciences, Slovakia *Co-Organizers*
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- Nitin P. Padture, The Ohio State University, USA
- Pavol Sajgalik, Slovak Academy of Sciences, Slovakia
- Dr. Di Zhang, Shanghai Jiao Tong University, China
- You Zhou, AIST, Japan



#### Hybrid and Nano-Structured Materials Symposium 5:

#### Scope:

Hybridization and structural control of ceramic materials on the nanometer scale have been in the limelight during the past two decades because of their ability to enhance properties, add functions and enlarge application areas in conjunction with a fundamental understanding of ceramic materials and related sciences. The objective of this symposium is to discuss progress and challenges on the leading edge, and to share knowledge of hybrid and nanostructured ceramics and related materials among ceramicists, chemists, material scientists and physicists. The topics of this symposium cover a wide variety of materials science and engineering areas, including novel design concepts, synthesis and processing, multi- and hyper-functions, low-dimensional nanostructures, fundamental properties, structure-property correlations, advanced and fusion technologies, ecological/environmental/economical materials and technologies, and applications for hybrid materials such as organic-inorganic, ceramic matrix composite, nanostructured and nanocomposites materials. We also welcome papers on multidisciplinary science and technology for the next generation. The proposed session topics include:

- Materials Design, Novel Synthesis and Processing Technology •
- Organometallic and Polymer Precursors for Hybrids and Nanostructured Materials
- Surface Chemistry and Rheology
- Coalescence, Growth and Sintering Behavior of Nanostructured Ceramics
- Hetero-Modulus Materials with sp<sup>2</sup>-structured Components: Carbon, BN, etc.
- Anisotropic Nanomaterials: Nanotubes, Nanorods, Nanosheets, Nanoplates and Others
- Hybrids and Nanocomposites: Ceramic Matrix, Organic-Inorganic, Multi-Dimensional Fibers/Fabrics Reinforced CMCs
- Mechanical Properties, Fracture and Deformation Mechanics
- Damage Tolerant Materials and Quasi-static to Dynamic Damage Behaviors
- Hybrids for High and Ultra-High Temperatures and Various Severe Environments
- Electrical, Optical, Magnetic, Chemical and Other Properties and Functions
- Design and Realization of Novel Functions
- Multifunctionality in Hybrid and Nanostructured Materials

#### **Organizers:**



Tohru Sekino



Yoko Suyama



- Tohru Sekino, Tohoku University, Japan
- Yoko Suyama, Shimane University, Japan
- Co-Organizers

14

- Fritz Aldinger, Max-Planck Institute, Germany
- Bikramjit Basu, Indian Institute of Technology Kanpur, India
- Anna Biedunkiewicz, West Pomeranian University of Technology, Poland
- Yong Ho Choa, Hanyang University, Korea
- Dominguez-Rodriguez, University of Seville, Spain
- Lian Gao, Shanghai Institute of Ceramics, China
- George Gnesin, Institute for Problems of Materials Science, • Ukraine
- Yury Gogotsi, Drexel University, USA
- John Halloran, University of Michigan, USA
- Junichi Hojo, Kyushu University, Japan
- Walter Krenkel, University of Bayreuth, Germany
- Ashok Kumar, University of South Florida, USA
- Koji Kuraoka, Kobe University, Japan
- Takafumi Kusunose, Osaka University, Japan
- Anatoly Lanin, Scientific Institute of Atomic Energy, Russia



**Dileep Singh** 



Igor L. Shabalin

- Dileep Singh, Argonne National Laboratory, USA
- ٠ Igor L. Shabalin, The University of Salford, UK
- Yoshitake Masuda, AIST, Japan
- Sanjay Mathur, University of Cologne, Germany •
- Amiya K. Mukherjee, University of California Davis, USA
- Hiroyuki Nakamura, AIST, Japan
- Hiromi Nakano, Toyohashi University of Technology, Japan
- Tadachika Nakayama, Nagaoka University of Technology, Japan
- Roger Naslain, University of Bordeaux I, France ٠
- Jules Routbort, Argonne National Lab, USA
- Noriko Saito, NIMS, Japan •
- Mrityunjay Singh, NASA Glenn Research Center, USA •
- Wei-Hsing Tuan, National Taiwan University, Taiwan
- Petr Vityaz, National Academy of Science, Belarus
- Hao Wang, Wuhan University of Technology, China
- Houzheng Wu, Loughborough University, UK
- Yanchun Zhou, Institute of Metal Research, China



## Symposium 6: Advances in Electro Ceramics

#### Scope:

The purpose of this symposium is to provide an international forum on advanced, state-of-the-art synthesis, characterization, fundamental understanding, modeling and application trends and new opportunities for electroceramics. The symposium will cover thin films, single crystals, and bulk and thick-film ceramics; dielectrics, piezoelectrics, ferroelectrics, multiferroelectrics, conductors and semiconductors and microscopic characterization, modeling and simulation of electroceramics. It will place a strong emphasis on emerging areas in the fields of ferroic and conductive materials. Lead-free piezoceramics, high-frequency dielectrics, multiferroics, energy harvesting and transparent semiconductors will be highlighted, in particular. A special session on nanostructure-originated phenomena will also be featured. Recent work on the synthesis, characterization and theoretical modeling of nano-controlled materials and thin films will be among the discussion topics. Novel approaches to nanostructuring, characterization of material properties and physical responses on the nano-scale will be emphasized. The overall result will be to give both students and experienced scientists in the field a broader, more detailed understanding of the current scientific and technological trends with respect to electroceramic materials. The proposed session topics include:

- · Advanced preparation of thin films, ceramics, textured ceramics and single crystals
- · Advanced characterization using new or developed methods
- Advanced measurements of microstructure, and various physical properties
- Materials design utilizing solid-state chemistry and defect chemistry
- Theoretical models, including phase field modeling and first principles calculations for dielectric and conductive phenomena in electroceramics
- State of the Art and new opportunities for applications using electroceramics
- Magnetic materials and applications
- Multiferroic materials and applications
- High-frequency dielectrics and application
- Semiconductors and application
- Transparent conductors and application

#### **Organizers:**



Satoshi Wada



Clive A. Randall

- Satoshi Wada, University of Yamanashi, Japan
- Clive A. Randall, The Pennsylvania State University, USA Co-Organizers
- Takashi lijima, AIST, Japan
- Yoshihiko Imanaka, Fujitsu, Japan
- Naoki Ohashi, NIMS, Japan
- Toshio Kamiya, Tokyo Institute of Tech., Japan
- Toshimasa Suzuki, Taiyo-yuden, Japan
- Wataru Sakamoto, Nagoya Univ., Japan
- Hajime Nagata, Tokyo University of Science, Japan
- Susan Trolier-McKinstry, The Pennsylvania State University, USA
- Ian Reaney, University of Sheffield, England
- Dragan Damjanovic, EPFL, Switzerland
- Long-Qing Chen, The Pennsylvania State University, USA
- Guorong Li, Shanghai Institute of Ceramics, Chinese Academy of Sciences, China
- Derek Sinclair, University of Sheffield, UK
- Suk-Joong L. Kang, KAIST, Korea
- Shashank Priya, Virginia Tech., USA



## Symposium 7: Optical Ceramics

#### Scope:

Optical ceramics have been widely used in applications from classical light shaping to modern optical information processing and telecommunication systems, playing important roles as key enablers of advanced technologies. Expectations are growing for novel ceramics, such as broadband amplifiers, transparent ceramic lasers, nonlinear optical switches, nonoxide optics for infrared applications, novel phosphors for white LEDs and new displays as well as luminescent ceramics enabling high-power illumination, novel pigments and UV absorbers in oxynitrides. Innovation in the advanced processing of materials for realizing superior optical functions is also occurring at a rapidpace. This includes laser processing and syntheses of organic/inorganic nano-composites, where more progress is urgently awaited. This symposium will focus on research on novel optical ceramic materials and their device applications, including single crystals, glasses, powders and thin films, among the following topics:

- Inorganic luminescent materials, Ceramic phosphors for solid-state lighting,
- Nonlinear optical ceramics, Optical switches & modulators,
- Transparent ceramic lasers & amplifier,
- · Photosensitive ceramics, laser fabrication of ceramics, Data storage
- · Scintillator, Optical sensors, Plasmonics, and
- Photo catalytic materials, Oxynitride pigments and UV absorbers, Ceramics for photovoltaic application.

Setsuhisa Tanabe

#### **Organizers:**



Shinichi Kikkawa



Franck Tessier

- Shinichi Kikkawa, Hokkaido University, Japan
- Franck Tessier, CNRS-University of Rennes1, France
- Setsuhisa Tanabe, Kyoto University, Japan
- Co-Organizers
- John Ballato, Clemson University, USA
- Marco Bettinelli, University of Verona, Italy
- Alexandr Gektin , Institute for Scintillation Materials, NAS, Ukraine
- Akio Ikesue, World Lab Co., Japan
- Ludmila I. Isaenko, Institute of Geology and Mineralogy, Russia
- Bert Hintzen, Eindhoven University of Technology, Netherlands
- Masayoshi Mikami, Mitsubishi Chemical Group, Japan
- Jianbei Qiu, Kunming University of Science and Technology, China
- Kiyoshi Shimamura, NIMS, Japan
- Frédéric Smektala, University of Bourgogne, France
- Masahide Takahashi, Osaka Prefecture University, Japan
- Kenji Toda, Niigata University, Japan
- Mikio Higuchi, Hokkaido University, Japan
- Dae Ho Yoon , Sungkyunkwan University, Korea



## *Symposium 8:* Glasses - Science & Technology, and Photonic Applications-

#### Scope:

Since glasses have superior characteristics for shaping and molding, transparency in the wide wavelength range and high chemical and optical durability, they have not only been used in conventional applications, but they have also become increasingly important materials for supporting today's advanced information technologies. Fundamental glass science continues to provide attractive and unresolved subjects in the area of solid state science, on the other hand, in conjunction with the development of modern experimental technologies, including computer simulations. This symposium will address recent developments in the field of glass science and technology, including such areas as structural characterization, modeling and simulations, physical and chemical properties and their theoretical analyses, and sustainable technology for glass processing and manufacturing. It will also cover a full range of topics concerning glasses for photonics and optoelectronics applications, such as fibers and waveguides, active devices, photo-induced phenomena and optical processing. The proposed session topics include:

- Fundamental science of glasses, structure, theory and simulation
- · Glass melts and industrial technology
- Chemical and mechanical properties of glasses
- · Glass and sustainable technology
- Nanostructured glasses
- Glasses for optoelectronics and photonics
- Optical properties of glasses
- Nonconventional and nonoxide glasses

#### Organizers:



Kiyotaka Miura



Shigeru Yamamoto



Himanshu Jain



Kohei Kadono

Main Organizers

- Kiyotaka Miura, Kyoto University, Japan
- Shigeru Yamamoto, Nippon Electric Glass Co., Ltd., Japan
- Himanshu Jain, Lehigh University, USA
- Kohei Kadono, Kyoto Institute of Technology, Japan

- Tomoko Akai, AIST, Japan
- Jong Heo, Pohang University of Science and Technology, Korea
- Kazuyuki Hirao, Kyoto University, Japan
- Hiroyuki Inoue, University of Tokyo, Japan
- Toru Kamihori, Asahi Glass Co., Ltd., Japan
- Peter Kazansky, University of Southampton, UK
- Takayuki Komatsu, Nagaoka University of Technology, Japan
- Wilfried Linz, Schott AG, Germany
- Jun Matsuoka, University of Shiga Prefecture, Japan
- Masayuki Nogami, Nagoya Institute of Technology, Japan

- Carlo Pantano, Pennsylvania State University, USA
- Jianrong Qiu, Zhejiang University, China
- Masahiro Tatsumisago, Osaka Prefecture University, Japan
- Tetsuji Yano, Tokyo Institute of Technology, Japan
- Toshinobu Yoko, Kyoto University, Japan
- Yuanzheng Yue, Aalborg Universitet, Denmark



## **Symposium 9A:** Ceramics for Electricity; Energy Conversion and Storage Systems for Green World

#### Scope:

Many kinds of ceramic materials and components have been utilized in various energy conversion and storage devices and systems, such as rechargeable batteries, fuel cells and solar cells. These devices will be essential for generating renewable energy and reducing wasteful energy consumption in future generations. They are particularly attractive with respect to the use of natural energy sources (solar power, wind power, etc.) In fact, many research groups are working in these fields at this very moment,. In this symposium, various subjects will be discussed, including advanced materials for energy conversion and storage, new energy conversion systems, materials for solar power conversion and various kinds of batteries. The proposed session topics include:

- Rechargeable battery
- Fuel cells (all types)
- Solar cell
- Capacitor
- Others

#### **Organizers:**





Kiyoshi Kanamura

Koichi Kajihara

#### Main Organizers

- Kiyoshi Kanamura, Tokyo Metropolitan University, Japan
- Koichi Kajihara, Tokyo Metropolitan University, Japan

- Dominique Guyomard, CNRS University of Nantes, France
- Tatsumi Ishihara, Kyushu University, Japan
- Ryoji Kanno, Tokyo Institute of Technology, Japan
- Tsutomu Miyasaka, Yokohama Toin Univeristy, Japan
- Ramaswamy Murugan, Pondicherry Engineering College, India
- Shigeto Okada, Kyushu University, Japan
- Yang Shao-Horn, Massachusetts Institute of Technology, USA
- Yasuo Takeda, Mie University, Japan
- Masahiro Tatsumisago, Osaka Prefecture University, Japan



## **Symposium 9B:** Ceramics for Electricity; SOFC and Related Technologies

#### Scope:

A solid oxide fuel cell (SOFC) is one of promising electrochemical reactors using ionic conductive oxide ceramics and is expected to realize high efficiency energy conversion devices. The development of structural control technologies in ceramics will be the key for early realization of such devices, and can be applied to other ceramic electrochemical reactors such as deNOx system for exhaust gas clean-up. Papers in this session are solicited on all aspects of SOFCs and electrochemical reactors related to energy and environmental issues, accompanied with hyper-structural control technologies from nano- to macro- scale in fabrication process. The proposed session topics include:

- Oxygen ion, proton and mixed conductors; conduction mechanisms
- Electrode and electrolyte materials and microstructural engineering
- Ceramic and metallic joining and gas sealing
- Reliability and degradation, stability of cells and stacks.
- · Electrochemical performance of SOFCs and reactors
- Micro SOFCs module fabrication and application
- 3D fabrication of micro modules

#### Organizers:





Yoshinobu Fujishiro

Nigel Sammes

Masashi Mori

Main Organizers

- Yoshinobu Fujishiro, AIST, Japan
- Nigel Sammes, Colorado School of Mines, USA
- Masashi Mori, CRIEPI, Japan

- Masanobu Awano, AIST, Japan
- Fatith Dogan, Missouri University of Science and Technology, USA
- Manabu Ihara, Tokyo Institute of Technology, Japan
- Yasunobu Mizutani, TOHO GAS Co., Ltd., Japan
- Prabhakar Singh, Connecticut Global Fuel Cell Center UTC, USA
- Toshio Suzuki, AIST, Japan
- Yasuo Takeda, University of Mie, Japan
- Hiroyuki Uchida, University of Yamanashi, Japan



# **Symposium 9C:** Ceramics for Electricity; Direct Conversion Technology between Heat and Electricity

#### Scope:

This symposium will focus on the current state-of-the-art thermoelectric materials as well as modules and systems for solid-state power generation and cooling applications. We invite papers on thermoelectric, thermionic and thermo-photovoltaic applications and potential materials. We hope to bring together scientists from the around the world to present and discuss their results in this promising field of research. New classes of thermoelectric materials with controlled nano-structures are showing great promise today as new high-efficiency thermoelectric materials and several kinds of modules indicating good thermoelectric performance by drawing out the properties of thermoelectric materials. In addition, novel thermoelectric phenomena, processing and engineering materials, measurements, and structure-property relationships of materials as applied to solid-state thermal-to-electric conversion will also be included. This special session also invites papers reporting new applications for power conversion and cooling other than those previously investigated in the thermoelectric community. A key objective will be to focus on the scientific capabilities required to provide novel classes of materials and engineering, and their subsequent properties for thermoelectric conversion technologies to a realize green, sustainable world capable of survival. The proposed session topics include:

- · Thermoelectric, thermionic, and thermo-photovoltaic materials
- Nano materials and nanocomposites
- Processing and engineering of materials
- Thermoelectric phenomena
- Measurements and assessments
- Thermoelectric modules
- Thermoelectric power generation
- Thermoelectric cooling
- Application

#### **Organizers:**



Ryoji Funahashi



Kunihito Koumoto

- Ryoji Funahashi, AIST, Japan
- Kunihito Koumoto, Nagoya University, Japan
- Co-Organizers
- Shinsuke Yamanaka, Osaka University, Japan
- Terry Tritt, Clemson University, USA
- George Nolas, University of South Florida, USA
- Lidong Chen, Shanghai Institute of Ceramics, Chinese Academy of Sciences, China
- Won Seon Seo, Korea Institute of Ceramic Engineering & Technology, Korea
- Harald Bottner, Fraunhofer Institute for Physical Measurement Techniques, Germany
- Antoine Maignan, Laboratoire CRISMAT/ENSICAEN, France



## **Symposium 9D:** Ceramics for Electricity; Advanced Superconducting Materials

#### Scope:

Superconducting technology is attracting a great deal of attention today because it is expected to contribute to solving energy-related issues. Further development of superconducting materials is indispensable, however, to achieving wider applications of this technology. This symposium will be devoted to various kinds of superconducting materials, such as advanced metal superconductors (including MgB<sub>2</sub>), high Tc cuprates (BSCCO system, YBCO system, etc.) and iron-based superconductors. It will cover all aspects of research on superconducting materials, including synthesis, new materials, characterizations, superconducting and physical properties, mechanisms, tapes/wires and their applications, thin films and devices. Recent progress in iron-based superconductors in the superconductivity community, will be an important concern of the symposium. The proposed session topics include:

- Synthesis and new materials
- Characterization and structures
- · Superconducting and physical properties, and mechanism
- Tapes/wires and their applications
- Thin films and devices,

#### **Organizers:**





Eiji Takayama-Muromachi

Hiroaki Kumakura

- Eiji Takayama-Muromachi, National Institute for Materials Science, Japan
- Hiroaki Kumakura, National Institute for Materials Science, Japan
- Co-Organizers
- Wilfried Goldacker, Forschungszentrum Karlsruhe, Germany
- Eric E. Hellstrom, Florida State University, USA
- Yanwei Ma, Chinese Academy of Sciences, China
- Ken-ichi Sato, Sumitomo Electric Industries, Ltd., Japan



## **Symposium 10:** Ceramics and Composites for Advanced Nuclear Energy and Hazardous Waste Treatment Applications

Incorporating the 9<sup>th</sup> International Workshop on SiC/SiC Ceramic Composites for Fusion Energy Applications and the 3<sup>rd</sup> International Workshop on Carbon and Silicon Carbide Composites for Advanced Fission.

#### Scope:

Advanced ceramics and ceramic matrix composites are attractive for advanced nuclear devices as these systems push the operating temperature window to allow higher thermal efficiency and the production of process heat for purposes such as hydrogen production and oil extraction. Moreover, the use of these materials mitigates long-term waste disposal due to low-activation. This symposium discusses the current state-of-the-art including processing, fundamental materials science issues, and practical aspects of their deployment.

This symposium will also focus on the use of glasses, ceramics and glass-ceramics in the treatment of nuclear and hazardous wastes and cover materials technologies for the treatment of hazardous and toxic wastes. Processing, properties and testing of traditional glass and cementitious materials need to be expanded to meet the future needs of the nuclear industries. Additionally, current environmental regulations require treatment and stabilization of many hazardous constituents resulting from industrial processes. These regulations are expected to become more stringent in the future and will require stabilization processes and waste forms. The proposed session topics include:

- Material Design, Synthesis, and Characterization
- Radiation Effects
- Functional Properties
- Environmental Effects Other than Irradiation
- Stress, Operating Temperature, and Lifetime-Limiting Issues
- Test Standards and Design Codes
- System Design and Analysis for Ceramic Structures
- Joining and Coating
- Vitrification Technologies
- Cementitious Materials
- Radioactive Waste Immobilization
- Glass-Ceramics and Glass-Ceramic Composite
- Air Pollution Control Residues Inertisation
- Mixed Waste Approaches
- Status of National and International Programs

#### Organizers:





Tatsuya Hinoki

Yutai Katoh



Alex Cozzi

#### Main Organizers

- Tatsuya Hinoki, Kyoto University, Japan
- Yutai Katoh, Oak Ridge National Laboratory, USA Co-Organizers
- Aldo R. Boccaccini, Imperial College London, United Kingdom
- Shaoming Dong, Shanghai Institute of Ceramics, China
- Monica Ferraris, Politecnico di Torino, Italy
- Hans Hegeman, NRG Petten, The Netherlands
- Fumihisa Kano, Toshiba Corporation, Japan
- Akira Kohyama, Muroran Institute of Technology, Japan
- Jacques Lamon, University of Bordeaux, France
- Charles Lewinsohn, Ceramatec, Inc., USA
- Ji Yeon Park, Korea Atomic Energy Research Institute, Korea

Alex Cozzi, Savannah River National Laboratory, USA

- Kazuhiro Sawa, Japan Atomic Energy Agency, Japan
- Lance Snead, Oak Ridge National Laboratory, USA
- Yoshikazu Suzuki, Kyoto University, Japan
- Takashi Takagi, Ibiden Co., Ltd., Japan
- Toyohiko Yano, Tokyo Institute of Technology, Japan

22



# **Symposium 11:** Advanced Ceramic Surface for Environmental Purification: Photocatalysis and Wettability Control

#### Scope:

Solid surface is a field concerned with chemical reactions and direct interfaces with respect to other substances, light, heat and electrical charges for solids themselves. The specific nature of solid surface differs from that of bulk materials in terms of the remarkableness of the properties of molecules and atoms once they satisfy certain conditions, such as chemical composition or position on the surface, even on a nano-scale. In recent years, greater variety and higher functions have been required for industrial materials. The intrinsic properties of specific materials are sometimes insufficient to satisfy all the industrial requirements completely. Various surface technologies are expected to break through the technological limits of traditional materials. Ceramic surface modification for photocatalytic, hydrophilic and hydrophobic properties can contribute to environmental protection in many ways. Not only oxidation and decomposition of contaminated air and water by photocatalytic surfaces, which involve direct removal of environmental toxic compounds, but also self-cleaning surfaces are making indirect contributions to environmental protection by reducing the consumption of chemical compounds. In this symposium, we will focus on recent studies of such ceramic surfaces that can contribute to environmental protection, energy savings and new advanced functions. The proposed session topics include the following:

- TiO<sub>2</sub> photocatalytic purification for air and water
- Modified TiO<sub>2</sub> photocatalyst
- · Novel aspects of catalyst preparation, doping and co-doping
- Visible light active photocatalyst
- Photocatalyst-sorbent combinations (TiO<sub>2</sub>/Carbon, TiO<sub>2</sub>/Cement, etc)
- · Thin film photocatalyst by wet coating process
- Thin film photocatalyst by physical deposition process
- Photocatalyst nano particles
- Surface wettability control by photocatalysis
- Super hydrophobic surface
- Super hydrophilic surface
- Characterization of photocatalytic materials
- · Anti-bacterial, disinfection, and medical applications
- · Processing and properties of advanced surface functional materials

Masahiro Miyauchi

#### **Organizers:**



Toshiya Watanabe

- Toshiya Watanabe, The University of Tokyo, Japan
- Masahiro Miyauchi, AIST, Japan
- Masato Wakamura, Fujitsu LTD, Japan Co-Organizers
- Masato Machida, Kumamoto University, Japan
- Akira Nakajima, Tokyo Institute of Technology, Japan
- Hisashi Ohsaki, AIST, Japan
- Ming Show Wong, National Dong Hwa University Hualien, Taiwan



Masato Wakamura

- Jinhua Ye, NIMS, Japan
- Hiromi Yamashita, Osaka University, Japan
  - Jincai Zhao, Chinese Academy of Sciences (CAS), China



## *Symposium 12:* Porous ceramics for environmental protection and advanced industries

#### Scope:

Increasing attention has been directed recently to the use of highly porous ceramic materials with mean pore diameters ranging from nanometers to several millimeters. They offer many benefits, such as controlled permeability, high surface area, heat resistance, chemical stability, mechanical reliability and environmental compatibility; They can be manufactured in various ways into very diverse components, such as foams, honeycombs, filters, hollow fibers and membranes; and they can be applied in various technological fields. The objective of this symposium is to bring scientists and engineers from industry, academia and research institutions together to discuss the manufacturing and properties of advanced porous ceramic components, with a special focus on their applications for environmental protection. Topics to be discussed in this symposium include materials science and technologies for the control of porous architectures and improvement of properties, as well as applications for environmental protection (e.g., diesel particulate ceramic filters). Innovative applications in various advanced industrial fields such as micro- and ultra-filtration, absorption, catalysis, catalysis support, electrodes, thermal insulators, shock absorbers, heaters and heat exchangers will also be discussed in this symposium.

- Advanced processing methods for porous ceramics
- Structure and properties of porous ceramics
- Design and modeling of porous structures
- Microporous and mesoporous ceramics
- Gas filtration and separation
- Micro filtration and ultra filtration
- · Ceramic membranes and related technologies
- · Absorption, catalysis, and catalysis supports
- Innovative industrial applications of porous ceramics

#### **Organizers:**





Yuji Iwamoto

Paolo Colombo

- Yuji Iwamoto, Nagoya Institute of Technology, Japan
- Paolo Colombo, Universita di Padova, Italy Co-Organizers
- Joerg Adler, Fraunhofer IKTS, Germany
- Yoshinobu Fujishiro, AIST, Japan
- Manabu Fukushima, AIST, Japan
- Shinji Kawasaki, NGK Insulators, Ltd., Japan
- Young-Wook Kim, University of Seoul, Korea
- · Zoltan Lences, Slovak Academy of Sciences, Slovakia
- Takayuki Nagano, Japan Fine Ceramics Center (JFCC), Japan
- Kazushige Ohno, IBIDEN CO., LTD., Japan
- Kiyoshi Okada, Tokyo Inst. Technology, Japan
- Alek Pyzik, Dow Chemical, USA

- Michael Scheffler, Brandenburgische Technische Universitaet Cottbus, Germany
- Sujanto Widjaja, Corning Incorporated, USA
- Yongjie Yan, Shanghai Institute of Ceramics, CAS, China
- Jian-Feng Yang, Xi'an Jiaotong University, China



## **Symposium 13:** Ceramics for Medicine, Biotechnology and Biomimetics

#### Scope:

Ceramic materials are now widely used in biomedical fields, such as the formation of artificial bones and teeth. The high potential of ceramics to exhibit biological functionality is expected to produce novel materials supporting biotechnology. These applications are governed by the interactions of materials and biological molecules. So far, "bioceramics" is a type of biomaterial used for repairing damaged tissues, primarily bone tissues, since the invention of Bioglass® has lod to the production of bioactive materials capable of direct bonding to living bone. Hydroxyapatite and calcium phosphate ceramics are now popular bioceramics for use in artificial bones. While the bone-bonding behavior of materials was understood phenomenologically, very little has been known about the mechanism of either hard or soft tissue attachment or tissue growth on ceramic-based materials, such as glasses, glass ceramics, ceramic composites and organic-inorganic hybrids. This symposium welcomes contributions in all aspects of scientific understanding of the interface between biomedical materials and soft/hard tissues, and the design and construction of nanoscopic interfaces. It will be concerned with, but not restricted to, the chemical and physical properties of surfaces, surface roughness control, surface modification, cell attachment, cell proliferation and differentiation associated with a variety of innovative biomedical functions. It will also involve establishment of biomimetic structures, characterization of natural life-related hard and soft tissues and their formation mechanisms for a wide range of applications in biotechnology. The proposed session topics include:

- Calcium-phosphate ceramics
- Bioactive ceramics
- Bioinert ceramics
- Composites / hybrids
- Tissue engineering
- Scaffolds
- Drug delivery carriers
- Cell-material interactions

#### **Organizers:**





Chikara Ohtsuki

Main Organizers

- Chikara Ohtsuki, Nagoya University, Japan
- Roger Narayan, University of North Carolina, USA
- Sung-Baek Cho, KIGAM, Korea
- Co-Organizers
- Mamoru Aizawa, Meji University, Japan
- Besim Ben-Nissan, University of Technology, Sydney, Australia
- Serena M. Best, University of Cambridge, UK
- Yasuhiko Hirayama, HOYA, Japan
- Koji loku, Tohoku University, Japan
- Kunio Ishikawa, Kyushu University, Japan
- Fumiaki Miyaji, JMM, Japan



- Clinical / animal studies
- Clinical applications
- Biomimetics
- Bioimaging
- Bioseparation
- Environmental science



Sung-Baek Cho

- Akiyoshi Osaka, Okayama University, Japan
- Sang-Hoon Rhee, Seoul National University, Korea
- Takashi Shigematsu, Olympus Terumo Biomaterials Corp., Japan
- Min Wang, The University of Hong Kong, Hong Kong

25



## Symposium 14: Advanced Engineering Ceramics and Composites

Incorporating the 4<sup>th</sup> International Symposium on Advanced Ceramics (organized by JSPS 124<sup>th</sup> Committee (Advanced Ceramics)) and the 4<sup>th</sup> International Symposium on the Science of Engineering Ceramics (organized by CerSJ Engineering Ceramics Division).

#### Scope:

The cutting edge of engineering ceramic research is evolving rapidly, leading into new fields far beyond the conventional image of ceramics. Careful tailoring of micro- and nano-structures, in particular, is yielding superior mechanical and chemical properties, such as high hardness, high strength, good heat/corrosion resistance and good tribological properties, which are not seen in typical metals and polymers. Engineering ceramics and composites are thus expected to find uses as key components in a variety of industrial applications, from engines and generators with high fuel efficiency to devices and systems to maintain clean environments. Long-term durability and structural reliability are, however, critical issues for the secure and safe usage of these materials and components. Our cornerstone symposium will focus on the mechanical behavior and structural design of advanced monolithic and composite ceramics. Engineers and scientists are persevering in their efforts to understand the relationship between mechanical performance and material micro- and nano-structures for the purpose of establishing the reliability and durability of these materials, and this symposium is perfectly suited for this dialog. The proposed session topics include the following:

- Mechanical properties of ceramics, composites and porous materials
- Processing microstructure mechanical properties relations
- Fiber, matrices, and interfaces
- Tribological behaviors
- · Heat and corrosion resistances
- Ultra high temperature ceramics and ternary compounds
- Thermal and environmental barrier coatings
- Coatings to resist wear, erosion and tribological loadings
- Joining and machining of ceramics and composites
- Functionally graded materials and systems
- Mechanics and characterization techniques
- Design, reliability, and life prediction methodologies
- NDE of ceramic components
- Reliability of small scale systems





Takashi Goto

Yi-Bing Cheng

- Main Organizers
- Takashi Goto, Tohoku University, Japan
- Yi-Bing Cheng, Monash Univ., Australia
- Takashi Akatsu, Tokyo Institute of Technology, Japan Co-Organizers
- Zhengyi Fu, Wuhan University of Technology, China
- Stuart Hampshire, Univ. of Limerick, Ireland
- Juergen G. Heinrich, Clausthal Univ. of Technology, Germany
- Michael J. Hoffmann, Univ. of Karlsruhe, Germany
- Dongliang Jiang, Shanghai Institute of Ceramics, China
- Yutaka Kagawa, Univ. of Tokyo, Japan
- Hai-Doo Kim, KIMS, Korea
- Do Kyung Kim, KAIST, Korea
- Tomaz Kosmac, Josef Stefan Institute, Slovenia
- Walter Krenkel, Univ. of Bayreuth, Germany
- Michael Khor, Nanyang Technological University, Singapore
- Hua-Tay Lin, Oak Ridge National Lab, USA



Takashi Akatsu

- Hasan Mandal, Anadolu Univ., Turkey
- Lalit Mohan Manocha, Sardar Patel University, India
- Keiji Matsuhiro, NGK Insulators, Ltd., Japan
- Hideo Takahashi, Asahi Glass Co., Ltd., Japan
- Hidehiko Tanaka, NIMS, Japan
- Junichi Tatami, Yokohama National Univ., Japan
- Jitendra P. Singh, U.S. Army International Technology Center -Pacific
- Mrityunjay Singh, OAI, NASA Glenn Research Center, USA
- Vijay K. Srivastava, Banaras Hindu University, India
- Guo-Jun Zhang, Shanghai Institute of Ceramics, China
- Yu Zhou, Harbin Institute of Technology, Harbin, China



## Symposium 15: Advanced Ceramic Sensor Technologies

#### Scope:

New and improved ceramics are being developed, based on fundamental knowledge, to increase the performance (e.g., sensitivity, selectivity and reliability) of sensors while keeping their fabrication costs low to satisfy market demand. This symposium will focus on the latest advances in the development of new and improved ceramics and in reading a fundamental understanding of the chemical/ physical/biological phenomena at the origin of the sensing mechanism. The interests of this symposium will include, but will not be limited to, 1) development of new materials, nanomaterials, hybrid composites and nanocomposites for sensing devices; 2) improvement of the sensing properties based on the tailoring of the material composition and chemistry; 3) surface treatment and surface functionalization for the enhancement of sensing mechanism; and 5) new and improved sensor design and packaging employing new and improved materials. The proposed session topics include:

- High temperature applications
- Chemical sensors
- Physical sensors
- Biosensors
- New sensor materials
- New principles
- Modeling and simulation
- Sensor arrays and signal processing
- Device applications
- New packaging schemes.





Ichiro Matsubara

Linan An



Hajime Haneda

- Main Organizers
- Ichiro Matsubara, AIST, Japan
- Linan An, Univ. Central Florida, USA
- Hajime Haneda, NIMS, Japan
- Co-Organizers
- Sheikh Akbar, Ohio State Univ., USA
- Pelagia-Irene Gouma, State Univ. New York, USA
- Jong-Heun Lee, Korea Univ., Korea
- Kengo Shimanoe, Kyusyu Univ., Japan
- Woosuck Shin, AIST, Japan
- · Chengying Xu, Univ. Central Florida, USA
- Hideaki Yagi, NGK SPARK PLUG CO. LTD., Japan



## Symposium 16: Innovation in Refractories and Traditional Ceramics

#### Scope:

Refractory materials have been used for managing high temperatures since human beings discovered a fire and began developing various industries utilizing high temperatures, e.g., pottery, steel, metal, cement and glass. Refractory materials are categorized as traditional ceramics from a historical perspective, but they are now supporting fabrication of new functional materials, such as ceramic capacitors. Higher thermal, mechanical and chemical properties are required to achieve higher efficiency in manufacturing from the viewpoint of energy savings and environmental issues. Reactions between refractories and the melting materials and the mechanism of high heat resistance are still being investigated for improving properties and developing new materials. The purpose of this symposium is to discuss advances in processing, refractory systems and analysis from the viewpoints of both science and technology. The symposium will also deal with recent advances and issues concerning other traditional ceramics, including cements, building ceramics and whitewares. Reuse and recycling systems for the materials will also be objects of focus. The proposed session topics include the following:

- Refractories in steel making
- Castable refractories
- Micro wave technologies
- Chrome-free refractories
- · New materials for refractories
- Simulation
- Science of refractories
- · Reuse and recycle systems
- · Cements and building materials
- Whitewares, etc.



Toshiyuki Nishimura



Toshitaka Ota



Kenji Ogawa

- Main Organizers
- Toshiyuki Nishimura, NIMS, Japan
- Toshitaka Ota, Nagoya Institute of Technology, Japan
- Kenji Ogawa, Taiheiyo Cement Corp., Japan
- Co-Organizers
- Shinobu Hashimoto, Nagoya Institute of Technology, Japan
- Marc Huger, ENSCI, France
- Emile Hideki Ishida, Tohoku University, Japan
- Norifumi Isu, INAX Corporation, Japan
- Yuichi Kobayashi, Aichi Institute of Technology, Japan
- John C. G. Lee, Research Institute of Industrial Science & Technology, Korea
- Junji Ommyoji, Okayama Ceramics Research Foundation, Japan
- Victor Carlos Pandolfelli, Universidade Federal São Carlos, Brazil
- Takeshi Shiono, Kyoto Institute of Technology, Japan
- Jeffrey Smith, Missouri University of Science and Technology, USA
- Toyohiko Sugiyama, AIST, Japan
- Jinkun Yu, Northeastern University, China
- Shaowei Zhang, The University of Sheffield, UK



## Symposium 17: Health and Safety Aspects of Ceramic Nanoparticles

#### Scope:

This symposium is the third in a series developed under the auspices of the International Ceramic Federation committee on "Health Aspects of Ceramic Nanoparticles". The goals of this committee are to provide a means of communication and collaboration on these issues that are of interest and concern to the ceramic community. Previous symposia have focused on descriptions of current status and concerns on the health issues and beginning a roadmap to help bring together research in various countries and industries and to foster research collaboration among international laboratories. An important part of this effort has been the goal to disseminate information to those who are not experts but are concerned about the public perception of potential risks of nanoparticles.

This symposium will feature both invited and contributed talks. We solicit presentations that highlight problems that could benefit from discussion and collaboration as well as presentations that are informative and meet the goal of providing education to the ceramic community. The symposium will consist of presentations, a panel discussion and general discussion, and a meeting of the ICF committee. The proposed session topics include:

- Regulatory issues, as applied to specific industries, materials, or countries
- Measurement needs for nanoparticles
- · Case studies of health issues or control for specific materials or industries
- Education of workers and the public
- Status of activities in various countries

#### **Organizers:**

Main Organizers

- Sylvia Johnson, NASA Ames Research Center, USA
- Steve Freiman, Freiman Consulting, USA
- Gary Fischman, NMAB, National Research Council, USA
- Fumio Watari, Hokkaido University, Japan

- Lang Tran, Institute of Occupational Medicine, USA
- Akio Makashima, Japan Advanced Institute of Science and Technology (JAIST), Japan
- Christian Hoffman, EPCOS, Austria
- Kamal Hossain, National Physical Laboratory (NPL), UK

#### **3<sup>rd</sup> International Congress on Ceramics**



Participants wishing to make a presentation on the results of their recent research are cordially invited to submit an abstract. Accepted papers will be presented in either oral or poster sessions. .For abstract submission instruction, please visit www.ceramic.or.jp/icc3. Only on-line submission is available. Submission deadline is April 30, 2010 (on-line submission site will open October 26, 2009). Abstracts will be reviewed by the relevant symposium organizers and the notification of acceptance will be sent to the authors by the end of July, 2010.



It is planned that the proceedings of ICC3 will be published on line in "IOP Conference Series: Materials Science and Engineering (MSE)". The detail will be available in our WEB site: www.ceramic.or.jp/icc3.

## **Begistration**

	Advance fees On or before September 15, 2010.	On–site fees After September 15, 2010.
Member*	50,000 JPY	55,000 JPY
Non-member	55,000 JPY	60,000 JPY
Student**	15,000 JPY	

\* Members of ICF affiliated societies.

\*\*Registrant must provide student I.D.

Note: Registration does not include banquet fee.



For inquiries about general matters, please contact: ICC3 Secretariat via e-mail: icc3@cersj.org

or

Tatsuki Ohji

National Institute of Advanced Industrial Science and Technology (AIST) Anagahora 2266-98, Shimo-shidami, Moriyama-ku, Nagoya 463-8560, Japan TEL +81-(0)52-736-7096, FAX +81-(0)52-736-7405

For inquiries about

• Abstract and paper submission please contact: ICC3 Paper Submission Office c/o ICS Convention Design, Inc. E-mail: icc3-p@ics-inc.co.jp TEL: +81-(0)3-3219-3600 FAX: +81-(0)3-3219-3626 Registration

 Visa and travel information please contact: ICC3 Registration Office c/o ICS Convention Design, Inc.
E-mail: icc3@ics-inc.co.jp TEL: +81-(0)3-3219-3600
FAX: +81-(0)3-3219-3626





## **Conference Date**

November 14-18, 2010

### **Tentative Congress Timetable**

	АМ	РМ	EV
Nov.14 (Sun)		Satellite Symposia	Welcome Reception
Nov.15 (Mon)	Opening Ceremony, Keynote Lectures	Oral & Poster Presentations, Exhibitions	
Nov.16 (Tue)	Oral Presentations, Exhibitions	Oral & Poster Presentations, Exhibitions	
Nov.17 (Wed)	Oral Presentations	Oral Presentations	Banquet
Nov.18 (Thurs)	Oral Presentations	Oral Presentations, Closing Ceremony	

### Venue

Osaka International Convention Center (Grand Cube Osaka) http://www.gco.co.jp RIHGA Royal Hotel Osaka http://www.rihga.co.jp/osaka

Grand Cube Osaka is located in Nakanoshima, which has long served as the most primary base for cultural and economic exchange in Osaka, and has the best of urban functionality and a variety of transportation systems.

Providing the world renowned hospitality for more than 70 years, RIHGA Royal Hotel Osaka is the largest hotel in western Japan, and is connected through a corridor to Grand Cube Osaka.

### Access

#### From Kansai International Airport

- \* Approx. 55min. to JR Osaka Station on the JR Line.
- \* 60min. to JR Osaka Station by Airport Limousine.
- $\ast$  10min. to GCO from Osaka Station by TAXI.

#### From Osaka International Airport (Itami Airport)

- \* Approx. 30 min. to JR Osaka Station by Airport Limousine.
- \* 10min. to GCO from Osaka Station by TAXI.

#### From Osaka Station

- \* Approx. 10 min. to GCO by TAXI.
- \* Congress participants can use shuttle bus service between RIHGA ROYAL HOTEL and JR Osaka Station.
- \* The shuttle bus stop is close to Sakurabashi Exit and takes approx. 10 min.

### **Important Dates**

Commencement of Abstract Submission:	October 26, 2009
Deadline of Abstract Submission:	April 30, 2010
Notification of Abstract Acceptance:	July, 2010



Osaka International Convention Center and RIHGA Royal Hotel Osaka (left)



### Osaka, Tourism Hub of the Kansai Region

Often referred to as the second city of Japan, Osaka was historically the commercial capital of Japan, and to date the heart of Japan's second largest metropolitan area of Kyoto-Osaka-Kobe.

Also, Osaka has been traditionally known as the "nation's kitchen" or the gourmet food capital of Japan. November is the most colorful time of year in Osaka, when the tall noble gingko trees that line Mido-Suji Avenue, Osaka's main thoroughfare, turn bright yellow, and maple trees in Osaka Castle take on vivid shades of orange and red. The two renowned ancient cities, Kyoto and Nara, which are particularly beautiful in November with the colored leaves, are both within easy traveling distance.



Osaka Castle



The water metropolis



The water metropolis



Foods shoppings and Entertainments





## Tourist Information

#### **Osaka Castle**

Construction of Osaka Castle commenced in 1583 by Hideyoshi Toyotomi, who aimed to unify Japan as a nation. This was burned down after the Toyotomi clan was killed in 1615 and although it was rebuilt during the Tokugawa Period, it was struck by lightning in 1665 and was once again reduced to ashes. It remained in ruins for 266 years until 1931 when it was rebuilt to once again grace the Osaka skyline, this time with the help of public donations (approx. ¥75 billion was given). Another restoration project was started in 1995 to restore the main tower to its former splendor, after which this much-loved dynamic symbol of Osaka was registered by the government as a tangible cultural asset.





#### Shitennoji Temple

Built in 598 by Prince Shotoku, Shitennoji was Japan's first governmental temple, featuring a middle gate, a 5-story pagoda, a main hall and an auditorium arranged in a straight line surrounded by corridors. Visitors can enjoy powdered green tea in one of the four tea rooms in the monk's gardens.

#### Sumiyoshi-Taisya Grand Shrine

Constructed 1,800 years ago in a unique style and designated a national treasure, Sumiyoshi-Taisha Grand Shrine is the oldest known shrine in Japan and the headquarters for the approximately 2,300 Sumiyoshi shrines scattered throughout the country.





