

Symposium 14

Symposium 14: Advanced Engineering Ceramics and Composites

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

4th International Symposium on Advanced Ceramics (ISAC-4)

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, Karlsruhe Institute of Technology, 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
- Hasan Mandal, Anadolu Univ., Turkey
- Lalit Mohan Manocha, Sardar Patel University, India
- Keiji Matsuhira, 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

Oral Session

Monday, November 15

Room: 1006

14:15 - 16:00: Mechanical Properties of Ceramics

Chair: Fumihiko Wakai (Tokyo Institute of Technology, Japan)

14:15 - 14:45

S14-001 Mechanical Reliability Assessment of Brittle Ceramic Components (Invited)

H.-T. Lin; Oak Ridge National Laboratory, USA

14:45 - 15:15

S14-002 Processing-green structure-microstructure-property Relationship in Ceramics (Invited)

K. Uematsu, S. Tanaka; Nagaoka University of Technology, Japan

15:15 - 15:45

S14-003 Strengthening Mechanism of High-Strength Reaction-sintered Silicon Carbide (Invited)

S. Suyama, Y. Itoh; Toshiba Corporation, Japan

15:45 - 16:00

S14-004 Proof Test of Hybrid Shrink Fits with Ceramic Hub

M. Wagner, H. Binz; University of Stuttgart, Germany

16:00 - 16:15 Break

16:15 - 18:30: Mechanical Properties of Ceramics

Chairs: Hua-Tay Lin (Oak Ridge National Laboratory, USA) and Keizo Uematsu (Nagaoka University of Technology, Japan)

16:15 - 16:45

S14-005 Impact Fracture Behavior of Ceramics and of PE-Fiber-Reinforced Mortars (Invited)

Y. Tanabe¹, M. Yamada¹, M. Kunieda¹, K. Sekine², T. Kumazawa²; ¹Nagoya University, Japan, ²Mino Ceramic Co. Ltd., Japan

16:45 - 17:00

S14-006 Nanofractography of Ceramics by Scanning Probe Microscopy (Invited)

J. Tatami, T. Wakihara, K. Komeya; Yokohama National University, Japan

17:00 - 17:15

S14-007 Effect of Nonlinear Viscoelasticity on Indentation Load Relaxation (Invited)

T. Akatsu, Y. Akimoto, Y. Shinoda, F. Wakai; Tokyo Institute of Technology, Japan

17:15 - 17:30

S14-008 Indentation Fracture (IF) Test for Silicon Nitride Bearing Balls as an International Standard Method

H. Miyazaki, Y. Yoshizawa, T. Ohji; National Institute of Advanced Industrial Science and Technology, Japan

17:30 - 17:45

S14-009 Fracto-emission during Unstable Crack Propagation in Ceramic Materials

T. Shiota, Y. Sato, K. Yasuda; Tokyo Institute of Technology, Japan

17:45 - 18:00

S14-010 Fracture Behavior of Ultra-Thin Al₂O₃ Layer Coated on Ductile Substrate

R. T. Doloksaribu, R. Kitazawa, K. Matumura, Y. Kagawa; The University of Tokyo, Japan

18:00 - 18:15

S14-011 Ballistic Property Testing and Damage Characterization of Metal-Ceramic Interpenetrating Composites for Light Armour Applications

J. Binner, C. Munnings, R. Higginson; Loughborough University, UK

18:15 - 18:30

S14-012 Wear Behavior of SiC Ceramics Sintered with Small Amount of Additives

B. V. M. Kumar¹, Y.-W. Kim¹, H.-T. Bae², D.-S. Lim²; ¹The University of Seoul, Korea, ²Korea University, Korea

Tuesday, November 16

Room: 1006

9:00 - 10:30: Sintering of Ceramics

Chair: Zuhair Munir (University of California, USA)

9:00 - 9:30

S14-013 Fabrication of Advanced Nanocrystalline Ceramics by Spark Plasma Sintering: Theory and Practice (Invited)

R. Chaim; Technion - Israel Institute of Technology, Israel

9:30 - 9:45

S14-014 Structure and Properties of Spark-plasma Sintered TiN-Si₃N₄ Ceramic Nanocomposites Reinforced with Si₃N₄ Nanowires

A. Ragulya¹, V. Kolesnichenko¹, M. Herrmann²; ¹Frantsevich Institute for Problems in Materials Science, Ukraine, ²Fraunhofer Institute for Ceramic Technologies and Systems, Germany

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9:45 - 10:00

S14-015 Microstructure Development and Creep Behavior of Alumina/SiC Micro-nanocomposites Obtained by Spark Plasma Sintering or Pressurless Sintering

M. Jaafar, G. Bonnefont, G. Fantozzi, H. Reveron; MATEIS Insa de Lyon, France

10:00 - 10:15

S14-016 Densification and Mechanical Properties of Al₂O₃-ZrO₂-CeO₂ Ceramics Prepared by Spark Plasma Sintering

E. Yilmaz, O. Ormanci, I. Akin, F. Sahin, O. Yucel, G. Goller; Istanbul Technical University, Turkey

10:15 - 10:30

S14-017 Fabrication of Alumina-Zirconia Based Laminates by Sequential Centrifugal Gel Casting

S. Maleksaeedi¹, M. H. Paydar¹, J. Ma²; ¹Shiraz University, Iran, ²Nanyang Technological University, Singapore

10:30 - 10:45 Break

10:45 - 11:45: Sintering of Ceramics

Chair: Rachman Chaim (Technion-Israel Institute of Technology, Israel)

10:45 - 11:15

S14-018 Grain Size Effect in the Electrical Properties of Nanostructured Functional Oxides through Pressure Modification of the Spark Plasma Sintering Method (Invited)

Z. A. Munir¹, D. Quach¹, S. Kim¹, R. A. D. Souza², M. Martin²; ¹University of California, USA, ²RWTH Aachen University, Germany

11:15 - 11:30

S14-019 Consolidation of Turbostratic Carbon with the Graphitization by SPS and the Mechanical Property

N. Toyofuku¹, M. Nishimoto¹, Y. Kodera¹, M. Ohyanagi¹, Z. A. Munir²; ¹Ryukoku University, Japan, ²University of California, Davis, USA

11:30 - 11:45

S14-020 Multi-Stage Spark Plasma Sintering To Develop ZrB₂-18wt%SiC-xwt%TiSi₂ Composites with Better Properties

N. Gupta, K. M. Reddy, K. Pavani, B. Basu; Indian Institute of Technology, India

14:15 - 16:00: Sintering of Ceramics

Chairs: Yoshihiro Hirata (Kagoshima University, Japan) and Kiyoshi Hirao (National Institute of Advanced Industrial Science and Technology, Japan)

14:15 - 14:45

S14-021 Ultra-fast Densification of Nano- and Submicro-grain Ceramics (Invited)

Z. Fu¹, J. Zhang¹, W. Wang¹, H. Wang¹, Y. Wang¹, S. W. Lee², K. Niihara³; ¹Wuhan University of Technology, China, ²SunMoon University, Korea, ³Nagaoka University of Technology, Japan

14:45 - 15:15

S14-022 GB Phase and Chemical Composition of SiC/Si₃N₄ Nano/Micro-composites – Implications to Mechanical Properties (Invited)

P. Šajgalík¹, Š. Lojanová¹, M. Hnatko¹, Z. Lenčėš, Z. Chlup²; ¹Slovak Academy of Sciences, Slovak Republic, ²Academy of Sciences of the Czech Republic, Czech Republic

15:15 - 15:45

S14-023 Mechanical Principles of Sintering in Micro- and Macro-scale (Invited)

F. Wakai; Tokyo Institute of Technology, Japan

15:45 - 16:00

S14-024 Synthesis and Characterization of cBN/WCCo Composites Obtained by the Pulse Plasma Sintering (PPS) Method

A. Michalski, M. Rosiński, M. Płocińska, J. Szawłowski; Warsaw University of Technology, Poland

16:15 - 18:45: Sintering of Ceramics

Chairs: Zhengyi Fu (Wuhan University of Technology, China) and
Yoshio Sakka (National Institute for Materials Science, Japan)

16:15 - 16:45

S14-025 Development of Highly-efficient Processes for Ceramic Materials Using Microwave Heating (Invited)

K. Hirao¹, M. Fukushima¹, N. Kondo¹, S. Ohashi², S. Hashimoto², Y. Iwamoto²; ¹National Institute of Advanced Industrial Science and Technology, Japan, ²Nagoya Institute of Technology, Japan

16:45 - 17:15

S14-026 Densification, Phases, Microstructures and Mechanical Properties of Liquid Phase-sintered SiC (Invited)

Y. Hirata, N. Matsunaga, S. Sameshima; Kagoshima University, Japan

17:15 - 17:45

S14-027 Processing and Characterization of Multi-walled Carbon Nanotube-Alumina Ceramic Matrix Nanocomposites Ceramic Matrix Composites

M. Estili, A. Kawasaki; Tohoku University, Japan

17:45 - 18:00

S14-028 Fabrication of Silicon Nitride-Based Nano/nano-Composites Through High Energy Mechanical Milling and Spark Plasma Sintering

X. Xu¹, J. W. Zhang¹, T. Nishimura², N. Hirotsaki²; ¹University of Science and Technology of China, China, ²National Institute for Materials Science, Japan

18:00 - 18:15

S14-029 Accelerated Curing in Early-age of Cement-based Materials by Using Microwave Energy: Constant Powers Processes and Phenomenological Modeling

N. Makul, B. Chatveera; Thammasat University, Thailand

18:15 - 18:30

S14-030 Behaviors of Inter-granular Films and Phases During Sintering Process in Liquid-phase-sintered SiC Ceramics

H. Gu; Shanghai Institute of Ceramics, China

18:30 - 18:45

S14-031 Relations between Microstructure and Mechanical Properties of Hot-Pressed RBSN with Sintering Additives of La₂O₃-MgO and Lu₂O₃-SiO₂

J.-W. Ko, S.-H. Lee, Y.-J. Park, H.-D. Kim; Korea Institute of Materials Science, Korea

Wednesday, November 17

Room: 1006

9:00 - 10:30: Superelasticity and Superplasticity of Ceramics

Chair: Takashi Akatsu (Tokyo Institute of Technology, Japan)

9:00 - 9:30

S14-032 Grain Boundary Sliding and Non-Newtonian Flow in Superplastic Ceramics

D. Gómez-García^{1,2}, E. Zapata-Solvas, S. de Bernardi-Martín, A. Domínguez-Rodríguez¹; ¹University of Seville, Spain, ²Imperial College, UK

9:30 - 10:00

S14-033 High-Strain-Rate Superplasticity and Failure in Undoped Tetragonal Zirconia Polycrystals (Y-TZP) (Invited)

K. Hiraga, H. Yoshida, K. Morita, K. B. Nam, M. Tabuchi; National Institute for Materials Science, Japan

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10:00 - 10:15

S14-034 Superelastic Deformation Behavior of Glassy Carbon
Y. Shinoda, T. Akatsu, F. Wakai; Tokyo Institute of Technology, Japan

10:15 - 10:30

S14-035 Estimation Theory for Random Force Exerted on Grains during Superplastic Deformation of Ceramics
T. Okamoto, Y. Yasuda, T. Shiota; Tokyo Institute of Technology, Japan

10:30 - 10:45 Break

10:45 - 12:00: Structural Ceramics

Chair: Diego Gómez-García (University of Seville, Spain)

10:45 - 11:15

S14-036 Thermal Shock Resistance and Plasma Erosion Resistance of ZrO_{2p}(3Y)/BN-SiO₂ Ceramic Composites Targeted for Hall Thruster Channel Walls (Invited)
Y. Zhou, D. Jia, X. Duan; Harbin Institute of Technology, China

11:15 - 11:30

S14-037 Response of Al₂O₃/TiB₂ Ceramic Composite Subjected to High Velocity Impact
J. Zhang, P. Zhai, Z. Fu; Wuhan University of Technology, China

11:30 - 11:45

S14-038 Laser Thermal Shock Experiments - Performance and Evaluation on the Basis of Advanced Ceramics
R. Pulz, B. Rehmer; BAM Federal Institute for Materials Research and Testing, Germany

11:45 - 12:00

S14-039 High Dense Yttria Doped Mullite without Abnormal Grain Growth
J. Rocha¹, S. Sugita¹, K. Uematsu²; ¹Guanajuato University, Mexico, ²Nagaoka University of Technology, Japan

13:15 - 15:00 Structural Ceramics

Chairs: Yu Zhou (Institute for Advanced Ceramics, Harbin Institute of Technology, China) and Junichi Hojo (Kyusyu University, Japan)

13:15 - 13:45

S14-040 Alumina Matrix Nanocomposites for Strength and Wear Resistance by Solid State Precipitation (Invited)
R. I. Todd, A. Mukhopadhyay; University of Oxford, UK

13:45 - 14:15

S14-041 Study on Microstructure and Mechanical Properties of Cr₃C₂/Al₂O₃ Nano-Composites Prepared Via MOCVD in Fluidized Bed (Invited)
H.-T. Lin¹, B.-Z. Liu², P. K. Nayak², S.-Q. Lu², S.-C. Wang³, J.-L. Huang²; ¹Cheng Shiu University, Taiwan, ROC, ²National Cheng-Kung University, Taiwan, ROC, ³Southern Taiwan University of Technology, Taiwan, ROC

14:15 - 14:30

S14-042 Nano-sized Tungsten Carbide Powder Prepared by a Nitride Conversion Method
S.-K. Sun^{1,2}, Y.-M. Kan¹, G.-J. Zhang¹; ¹Shanghai Institute of Ceramics, China, ²Chinese Academy of Sciences, China

14:30 - 14:45

S14-043 Improvement in Mechanical Properties of Al₂O₃/WC Composites due to Ca-PSZ Addition
J. Boonpo, W. Buggakupta, N. Chuankrerkkul; Chulalongkorn University, Thailand

14:45 - 15:00

S14-044 In-Situ Synthesis and Characterization of Alumina Matrix Composites
Z.-C. Chen¹, S. Nugroho², D. Nomoto¹, T. Akao¹, T. Onda¹, A. Kawasaki³; ¹Tottori University, Japan, ²Diponegoro University, Indonesia, ³Tohoku University, Japan

15:15 - 17:15: Structural Ceramics

Chairs: Richard Todd (University of Oxford, UK) and Jow-Lay Huang (National Cheng Kung University, Taiwan)

15:15 - 15:45

S14-045 Systematic Evaluation of Ceramics Corrosion toward New Refractory (Invited)

J. Hojo, S. Sawano, N. Enomoto; Kyushu University, Japan

15:45 - 16:00

S14-046 Mechanical Properties of Alumina Matrix Composites due to a Combination of Strontium and Calcium Hexaluminates

W. Buggakupta; Chulalongkorn University, Thailand

16:00 - 16:15

S14-047 Effect of Dopant Configurations on Oxygen Permeation through Alumina Ceramics under Oxygen Potential Gradients at High Temperatures

T. Matsudaira, M. Wada, S. Kitaoka; Japan Fine Ceramics Center, Japan

16:15 - 16:30

S14-048 *In-Situ* Diffraction Study of Thermal Stability and Self-Recovery in Aluminium Titanate

Z. Oo¹, I. M. Low²; ¹Curtin University of Technology, Malaysia, ²Curtin University of Technology, Australia

16:30 - 16:45

S14-049 Optimum Surface Roughness of Machinable Glass Ceramic in End-milling

M. M. Reddy¹, A. Gorin¹, K. A. Abou-El-Hosseini²; ¹Curtin University of Technology, Malaysia, ²Nelson Mandela Metropolitan University, South Africa

16:45 - 17:00

S14-050 Damage Evolution Mechanisms in Alumina Shocked above HEL

A. K. Mukhopadhyay¹, K. D. Joshi², A. Dey¹, R. Chakraborty¹, A. Mandal¹, J. Ghosh¹, S. Bysakh¹, A. Rav², S. K. Biswas¹, S. C. Gupta²; ¹Central Glass and Ceramic Research Institute, India, ²Bhabha Atomic Research Centre, India

17:00 - 17:15

S14-051 Comparative Study of Shock Deformed Alumina above HEL by Nanoindentation

A. K. Mukhopadhyay¹, K. D. Joshi², A. Dey¹, R. Chakraborty¹, A. Rav², A. Mandal¹, J. Ghosh¹, S. Bysakh¹, S. K. Biswas¹, S. C. Gupta²; ¹Central Glass and Ceramic Research Institute, India, ²Bhabha Atomic Research Centre, India

Thursday, November 18

Room: 1006

9:00 - 10:30: Hard and Environmental Barrier Coatings

Chair: Hideaki Matsubara (Japan Fine Ceramics Center, Japan)

9:00 - 9:30

S14-052 Development of Hard Ceramic Coatings for Extreme Tribological Applications (Invited)

M. Ürgen¹, A. Erdemir², S. Timur¹, K. Kazmanli¹, O. L. Eryilmaz²; ¹Istanbul Technical University, Turkey, ²Argonne National Laboratories, USA

9:30 - 10:00

S14-053 Residual Stresses and Adhesion Energy Measurements in Thin Tribological Coatings (Invited)

D. Singh¹, K. Pappacena¹, O. Eryilmaz¹, J. L. Routbort¹, G. Chen²; ¹Argonne National Laboratory, USA, ²Ohio University, USA

10:00 - 10:30

S14-054 Selection and Design of Environmental Barrier Coatings (Invited)

Y. Wang; Northwestern Polytechnical University, China

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10:45 - 12:00: Hard and Environmental Barrier Coatings

Chair: Mustafa Ürgen (Istanbul Technical University, Turkey)

10:45 - 11:15

S14-055 Electron Beam-PVD of Zirconia Based Ceramic Layers for Thermal Barrier Coating (Invited)
H. Matsubara; Japan Fine Ceramics Center, Japan

11:15 - 11:30

S14-056 Phase Evolution and Thermo-Physical Properties of $\text{La}_2(\text{Zr}_x\text{Hf}_{1-x})_2\text{O}_7$ Pyrochlore Systems for Thermal Barrier Coating (TBC)
S. Kim¹, K. Kwak¹, B.-C. Sim¹, S.-M. Lee¹, Y.-S. Oh¹, B.-K. Jang², H.-T. Kim¹; ¹Korea Institute of Ceramic Engineering and Technology, Korea, ²National Institute of Materials Science, Japan.

11:30 - 11:45

S14-057 Environmental Barrier Coatings for Silicon Nitride
H. F. Chen^{1,2}, H. Klemm¹, A. Michaelis¹; ¹Fraunhofer IKTS Dresden, Germany, ²Shanghai Institute of Ceramics, China

11:45 - 12:00

S14-058 Optical and Tribological Properties of Silicon Carbide Thin Films Grown by Reactive DC Magnetron Sputtering
T. Tavsanoğlu, E. Baskurt, O. Yucel; Istanbul Technical University, Turkey

13:15 - 14:15: Packaging Technologies for Ceramics

Chair: Akihiko Ito (Institute for Materials Research, Tohoku University, Japan)

13:15 - 13:45

S14-059 Microelectronics Package Design Using Experimentally-Validated Modeling and Simulation (Invited)
N. Young, J. Massad, K. Peterson, M. Neilsen, K. Ewsuk; Sandia National Laboratories, USA

13:45 - 14:00

S14-060 Improving Releasability of Y_2O_3 -Based Ceramics from Epoxy Molding Compounds
S. Kitaoka¹, N. Kawashima¹, K. Nakahira¹, M. Yoshiya², S. Miyagawa³, Y. Noguchi³, Y. Uetani⁴; ¹Japan Fine Ceramics Center, Japan, ²Osaka University, Japan, ³TOWA Corporation, Japan, ⁴Nitto Denko Corporation, Japan

14:00 - 14:15

S14-061 *Ab-initio* Study on Atomic Level Bonding on Trivalent Metal Oxide Surface with Acid/Base with H_2O
M. Yoshiya¹, S. Kitaoka², N. Kawashima²; ¹Osaka University, Japan, ²Japan Fine Ceramics Center, Japan

14:15 - 15:00: Laser Processing of Ceramics Coatings

Chair: Khiam Aik Khor (Nanyang Technological University, Singapore)

14:15 - 14:30

S14-062 Laser Chemical Vapor Deposition of Oriented Alpha-alumina Coatings (Invited)
A. Ito¹, T. Kimura², T. Goto¹; ¹Tohoku University, Japan, ²Japan Fine Ceramics Center, Japan

14:30 - 14:45

S14-063 Microstructure of $\text{Ce}_{1-x}\text{Fe}_x\text{O}_2$ Films Prepared by Laser Chemical Vapor Deposition
R. Tu, J. R. V. Garcia, T. Goto; Tohoku University, Japan

14:45 - 15:00

S14-064 Surface Modification of Thermal Sprayed Thermal Barrier Coatings by Laser Treatment
V. Akdoğan, B. Demirel, Ö. Keleş, G. Göller, Y. Taptık; Istanbul Technical University, Turkey

15:00 - 15:15 Break

15:15 - 16:00: Bioceramics

Chair: Rong Tu (Institute for Materials Research, Tohoku University, Japan)

15:15 - 15:45

S14-065 Novel Processing for Bioceramics Through Thermal Spray and Spark Plasma Sintering Technologies (Invited)

K. A. Khor; Nanyang Technological University, Singapore

15:45 - 16:00

S14-066 Hydroxyapatite Nano-barium-strontium-titaniumoxide Composites

N. Demirkol^{1,2}, E. S. Kayali², M. Yetmez³, F. N. Oktar^{4,5}, S. Agathopoulos⁶; ¹Kocaeli University, Turkey, ²Istanbul Technical University, Turkey, ³Karaelmas University, Turkey, ⁴Marmara University, Turkey, ⁵Marmara University, Turkey, ⁶Ioannina University, Greece

Monday, November 15

Room: 1007

14:15 - 16:00: Ultra High Temperature Ceramics

Chair: Hidehiko Tanaka (National Institute for Materials Science, Japan)

14:15 - 14:45

S14-067 Synthesis of Nano Structured Carbides via Templated Sol-Gel Processes (President-Designated)

Y.-B. Cheng; Monash University, Australia

14:45 - 15:15

S14-068 High Temperature Stability of ZrB₂ Based Ultra High Temperature Ceramics (Invited)

G.-J. Zhang; Shanghai Institute of Ceramics, China

15:15 - 15:30

S14-069 Processing of Ultra High Temperature Ceramic – Carbon Fibre Composites

J. Binner¹, B. Vaidyanathan¹, A. Paul¹, S. Venugopal¹, A. Heaton², P. Brown²; ¹Loughborough University, UK, ²Defence Science and Technology Laboratory, UK

15:30 - 15:45

S14-070 Hafnium Carbide and Silicon Carbide Coatings on C Substrates

A. Allemand^{1,2}, O. Szwedek^{1,2}, Y. L. Petitcorps¹, N. Teneze², P. David²; ¹Université de Bordeaux, France, ²CEA-Centre du Ripault-DMAT, France

15:45 - 16:00

S14-071 Processing and Properties of ZrB₂-SiC Ceramics Using Polycarbosilane

S. Kim¹, J.-M. Chae^{1,2}, S.-M. Lee¹, Y.-S. Oh¹, H.-T. Kim¹, S. Nahm²; ¹Korea Institute of Ceramic Engineering and Technology, Korea, ²Korea University, Korea

16:00 - 16:15 **Break**

Symposium 14

16:15 - 18:30: Ultra High Temperature Ceramics

Chairs: Yi-Bing Cheng (Monash University, Australia) and Guo-Jun Zhang (Shanghai Institute of Ceramics, China)

16:15 - 16:30

S14-072 Formation of Tough Interlocking Microstructure in ZrB₂-SiC Based Ultra High Temperature Ceramics by Pressureless Sintering

J. Zou^{1,2}, G.-J. Zhang¹; ¹Shanghai Institute of Ceramics, China, ²Graduate School of Chinese Academy of Sciences, China

16:30 - 16:45

S14-073 Highly Textured HfB₂-SiC Based Ultra High Temperature Ceramics with Anisotropic Properties

D.-W. Ni^{1,2}, G.-J. Zhang¹, Y. Sakka³; ¹Shanghai Institute of Ceramics, China, ²Graduate School of Chinese Academy of Sciences, China, ³National Institute for Materials Science, Japan

16:45 - 17:00

S14-074 Oxidation Behavior of ZrB₂-SiC and ZrB₂-ZrC Composites

I. Akin, F. Sahin, O. Yucel, G. Goller; Istanbul Technical University, Turkey

17:00 - 17:15

S14-075 Evaluation of the Oxidation Behaviour of ZrB₂-SiC at Elevated Temperatures

A. Momozawa¹, Y. Kubota², T. Yoshinaka³, K. Komurasaki⁴, T. Goto⁵, H. Hatta⁶; ¹Tokyo City University, Japan, ²Tokyo University of Science, Japan, ³Japan Aerospace Exploration Agency, Japan, ⁴The University of Tokyo, Japan, ⁵Tohoku University, Japan, ⁶Japan Aerospace Exploration Agency, Japan

17:15 - 17:30

S14-076 Accurate Quantitative Evaluation of Active Oxidation Rate of SiC under Elevated Temperatures

Y. Kubota¹, T. Yoshinaka², H. Hatta², T. Goto³, Y. Kogo¹; ¹Tokyo University of Science, Japan, ²Japan Aerospace Exploration Agency, Japan, ³Tohoku University, Japan

17:30 - 17:45

S14-077 Passive Oxidation and Oxidation Transition of CVD-SiC under High Temperatures

T. Yoshinaka¹, Y. Kubota², T. Goto³, H. Hatta¹; ¹Japan Aerospace Exploration Agency, Japan, ²Tokyo University of Science, Japan, ³Tohoku University, Japan

17:45 - 18:00

S14-078 Joining Ti-Al-C Ceramics and Fabricating Ti-Al-C/Al₂O₃ Laminated Composites by Preferential Oxidation at Low Oxygen Partial Pressure

A. Li, Y. Zhou; Institute of Metal Research, China

18:00 - 18:15

S14-079 High-temperature Strength of Directionally Solidified Boride Eutectics

I. Bogomoj^{1,2}, T. Nishimura², O. Vasylykiv², Y. Sakka², P. Loboda¹; ¹National Technical University of Ukraine "KPI", Ukraine, ²National Institute for Materials Science, Japan

18:15 - 18:30

S14-080 Computer Models of T-x-y Diagrams with Ternary Compounds

V. Lutsyk^{1,2}, N. Yuri^{1,2}; ¹RAS, Russia, ²Buryat State University, Russia

Tuesday, November 16

Room: 1007

9:00 - 10:30: Silicon Carbide Fiber

Chairs: Lalit Manocha (Sardar Patel University, India) and Hidehiko Tanaka (National Institute for Materials Science, Japan)

9:00 - 9:30

S14-081 High-Temperature Fiber Composites by Reactive Melt Infiltration (Invited)

W. Krenkel, F. Gugel, R. Voigt, H. Mucha; University of Bayreuth, Germany

9:30 - 9:45

S14-082 Global and Local Damage Parameters in Carbon Fiber-SiC Matrix Hybrid Ceramics

M. Ikegami¹, S. Q. Guo², Y. Kagawa^{1,2}; ¹The University of Tokyo, Japan, ²National Institute for Materials Science, Japan

9:45 - 10:00

S14-083 Experimental Investigations of Frictional Effects in C-SiC Based Ceramic Matrix Systems

H. Mucha^{1,2}, N. Langhof^{1,2}, W. Krenkel^{1,2}; ¹University of Bayreuth, Germany, ²Fraunhofer ISC, Germany

10:00 - 10:15

S14-084 Understand the Friction Surface Damage of Carbon-Fibre Reinforced Carbon-Silicon Carbide Composites (C_f/C-SiC)

H. Wu, Y. Wang; Loughborough Univeristy, UK

10:15 - 10:30

S14-085 Ablation and Thermal Properties of Carbon Fiber Reinforced Phenolic Matrix Composites Prepared by Spray-up Process

M. M. Dokur, B. Alkan, N. Solak, M. Urgen, G. Goller; Istanbul Technical University, Turkey

10:30 - 10:45 Break

10:45 - 11:45: Silicon Carbide Fiber

Chair: Walter Krenkel (University of Bayreuth, Germany)

10:45 - 11:15

S14-086 Microstructure and Properties of Three Phase Carbon and Ceramic Matrix Composites (Invited)

L. M. Manocha, H. Patel, R. Pande, S. Manocha; Sardar Patel University, India

11:15 - 11:30

S14-087 Microstructure and Mechanical Properties of Joints in Sintered SiC Fiber-Bonded Ceramics

T. Matsunaga¹, H.-T. Lin², R. Asthana³, M. Singh⁴, T. Ishikawa¹, S. Kajii¹; ¹Ube Industries, Ltd., Japan, ²Oak Ridge National Laboratory, USA, ³University of Wisconsin-Stout, USA, ⁴NASA Glenn Research Center, USA

11:30 - 11:45

S14-088 The Machinability of 3D-C/SiC Composites

P. He, S. M. Dong, X. Y. Zhang, Y. S. Ding, L. Gao, Z. Wang; Shanghai Institute of Ceramics, China

14:15 - 15:45: Processing for Silicon Carbide Composites

Chair: Junichi Tatami (Yokohama National University, Japan)

14:15 - 14:45

S14-089 Industrialization of Advanced SiC/SiC Composites and SiC Based Composites; Intensive Activities at Muroran Institute of Technology under OASIS (Invited)

A. Kohyama^{1,2}, Y. Kohno¹, H. Kishimoto¹, J. S. Park^{1,2}, H. C. Jung²; ¹Muroran Institute of Technology, Japan, ²Institute of Energy Science and Technology, Co. Ltd., Japan

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14:45 - 15:15

S14-090 Thermally Conductive, Tough SiC-based Ceramic Attempting to Mimic Nature with High-temperature Properties (Invited)

T. Ishikawa; Ube Industries, Ltd., Japan

15:15 - 15:30

S14-091 Effects of Preform Densification on Near-Net Shaping of NITE-SiC/SiC Composites

N. Nakazato¹, Y. Kohnno¹, H. Kishimoto¹, J.-S. Park^{1,2}, H.-C. Jung², A. Kohyama^{1,2}; ¹Muroran Institute of Technology, Japan, ²Institute of Energy Science and Technology Co. Ltd., Japan

15:30 - 15:45

S14-092 Fabrication of Environmentally Resistant NITE-SiC/SiC Composites

J.-S. Park^{1,2}, H.-C. Jung¹, A. Kohyama^{1,2}; ¹Institute of Energy Science and Technology, Co. Ltd., Japan, ²Muroran Institute of Technology, Japan

S14-093 Cancelled

15:45 - 16:15 Break

16:15 - 18:45: Processing for Silicon Carbide Composites

Chairs: Toshihiro Ishikawa (Ube Industries, Ltd., Japan) and
Takashi Goto (Institute for Materials Research, Tohoku University, Japan)

16:15 - 16:45

S14-094 Properties of Carbide Ceramics from Gelcasting and Pressureless Sintering (Invited)

D. Jiang; Shanghai Institute of Ceramics, China

16:45 - 17:15

S14-095 XAFS Analysis of Ag in the Anti-bacterial Ceramics Glaze (Invited)

N. Isu¹, Y. Kato¹, S. Yamazaki¹, A. Nakahira², C. Numako³; ¹INAX Corp., Japan, ²Osaka Prefecture University, Japan, ³The University of Tokushima, Japan

17:15 - 17:30

S14-096 Mechanical and Corrosion Test on SiC Multilayer Containing Porous Layers

C. V. Bolivar¹, S. Biamino¹, M. Pavese¹, P. Fino¹, P. Hähner², C. Badini¹; ¹DISMIC, Politecnico di Torino, Italy, ²JRC-Institute for Energy European Commission, Netherlands

17:30 - 17:45

S14-097 Joining of Silicon Carbide Ceramics by Using Tape Cast Interlayer

W. B. Tian, H. Kita, N. Kondo, H. Hyuga, T. Nagaoka; National Institute of Advanced Industrial Science and Technology, Japan

17:45 - 18:00

S14-098 The Role of Chromium Carbide and Carbon Additives in Titanium Carbide Sintering

P. Rutkowski, J. Lis, L. Stobierski, G. Górny; AGH University of Science and Technology, Poland

18:00 - 18:15

S14-099 Injection Molding of Alumina-Chromia-Yttria Nanocomposites

R. Gadow, F. Kern, F. Sommer; University of Stuttgart, Germany

18:15 - 18:30

S14-100 Rheological Properties of Mg-SiC Feedstock for the Powder Injection Molding

M. Alimadadi, S. M. Taheri, M. Alizade; Iran Materials and Energy Center, Iran

18:30 - 18:45

S14-101 Thermal and Morphological Characterization of Poly(Butylene Terephthalate)/Silica Nanocomposites

M. Parvinzadeh, R. Hajiraeesi; Islamic Azad University, Iran

Wednesday, November 17

Room: 1007

9:00 - 10:30: Graphite Foams and Porous Ceramics

Chair: Lennart Bergström (Stockholm University, Sweden)

9:00 - 9:30

S14-102 Bonding and Integration of Graphite Foams to Metallic Systems for Thermal Management Applications (Invited)

M. Singh¹, A. L. Gyekenyesi¹, R. Asthana²; ¹Ohio Aerospace Institute, USA, ²University of Wisconsin-Stout, USA

9:30 - 10:00

S14-103 Mechanical Characterization of Graphite Foams (Invited)

A. L. Gyekenyesi, C. E. Smith, M. Singh; Ohio Aerospace Institute, USA

10:00 - 10:30

S14-104 The Annealing of Pyrolytic Graphite to Highly Oriented Pyrolytic Graphite (Invited)

Y. Sodha¹, F. J. Buschmann², R. J. Diefendorf³; ¹ENEOS, Japan, ²Knolls Atomic Power Laboratory, USA, ³Clemson University, USA

10:45 - 12:00: Porous and Textured Ceramics

Chair: Andrew Gyekenyesi (Ohio Aerospace Institute, USA)

10:45 - 11:15

S14-105 Tuning the Structure and Transport Properties of Macroporous Alumina (Invited)

L. Bergström¹, L. Andersson¹, M. A. Knackstedt², A. C. Jones²; ¹Stockholm University, Sweden, ²Australian National University, Australia

11:15 - 11:45

S14-106 Fabrication of Textured Ceramics by Colloidal Processing in a Strong Magnetic Field and Subsequent Sintering (Invited)

Y. Sakka, C. Hu, X. Zhu, T. S. Suzuki, T. Uchikoshi; National Institute for Materials Science, Japan

11:45 - 12:00

S14-107 Electrochemical Reduction of Nitrates on Pt/MWCNTs Prepared by Vapor-phase Impregnation-decomposition Method

J. R. V. Garcia¹, E. T. Santillan¹, A. M. Robledo¹, R. Tu², A. Ito², T. Goto²; ¹National Polytechnic Institute, Mexico, ²Tohoku University, Japan

13:15 - 15:00: Phase, Interface and Microstructure of Ceramics

Chairs: Yuichi Ikuhara (The University of Tokyo, Japan) and Ken Sugawara (TOKUYAMA Corporation, Japan)

13:15 - 13:45

S14-108 Nonstationary Grain Growth in Cemented Carbides: Theoretical Prediction and Experimental Observations (Invited)

S.-J. L. Kang, D.-Y. Yang; Korea Advanced Institute of Science and Technology, Korea

13:45 - 14:15

S14-109 Phase Relationships and Structures of Oxide Crystals Based on First Principles Calculations (Invited)

I. Tanaka^{1,2}, A. Seko¹, A. Togo¹, F. Oba¹; ¹Kyoto University, Japan, ²Japan Fine Ceramics Center, Japan

14:15 - 14:45

S14-110 Grain-Boundary Segregation and Phase-Separation Mechanism in Yttria-Stabilized Tetragonal Zirconia Polycrystal (Invited)

K. Matsu¹, H. Yoshida², Y. Ikuhara³; ¹Tosoh Corporation, Japan, ²National Institute for Materials Science, Japan, ³The University of Tokyo, Japan

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14:45 - 15:00

S14-111 A Simple Potential for the Interaction of Al/ α -Al₂O₃ Interface
X. Lai, L. Liu, H. Mei, P. Zhai; Wuhan University of Technology, China

15:00 - 15:15 Break

15:15 - 16:00: Phase, Interface and Microstructure of Ceramics

Chair: Suk-Joong Kang (Korea Advanced Institute of Science and Technology, Korea)

15:15 - 15:45

S14-112 Atomic Structures, Segregation Site and Properties of Ceramic Interface (Invited)
Y. Ikuhara^{1,2,3}, Y. Sato^{1,2}, N. Shibata¹, T. Mizoguchi¹, T. Yamamoto^{1,2}; ¹The University of Tokyo, Japan, ²Japan Fine Ceramic Center, Japan, ³Tohoku University, Japan

15:45 - 16:00

S14-113 An Atomic-Scale Study of SiAlON Ceramics Using Aberration Corrected Scanning Transmission Electron Microscopy
H. Yurdakul^{1,2}, J. C. Idrobo^{2,3}, S. Turan¹, S. J. Pennycook^{2,3}; ¹Anadolu University, Turkey, ²Oak Ridge National Laboratory, USA, ³Vanderbilt University, USA

16:00 - 17:15: Aluminium Nitride and Related Compounds

Chair: Hasan Mandal (Anadolu University, Turkey)

16:00 - 16:30

S14-114 Effect of Ca-Al-O Compounds Addition on Reflectivity of AlN Ceramics (Invited)
K. Sugawara, Y. Kanechika; TOKUYAMA Corporation, Japan

16:30 - 16:45

S14-115 AlN-TiN Ceramic Nanocomposite Formation by Reactive Milling and Shock Compaction Method
H. AminiMashhadi¹, P. Manikandan¹, G. Kennedy¹, R. Tomoshige², K. Hokamoto³; ¹Kumamoto University, Japan, ²Sojo University, Japan, ³Kumamoto University, Japan

16:45 - 17:00

S14-116 Controlling of Nitriding Process on Reactive Plasma Spraying of Al Particles
M. Shahien, M. Yamada, T. Yasui, M. Fukumoto; Toyohashi University of Technology, Japan

17:00 - 17:15

S14-117 Theoretical Prediction and Synthesis of Hf₃AlN and Zr₃AlN, Novel Layered Ternary Nitrides with Excellent Damage Tolerance
F. Li, J. Wang, J. Wang, Y. Zhou; Institute of Metal Research, China

Thursday, November 18

Room: 1007

9:00 - 10:30: Silicon Nitride and SiAlON

Chair: Jorge Vargas Garcia (National Polytechnic Institute, Mexico)

9:00 - 9:30

S14-118 Silicon Nitride Grain Boundary Glass Chemistry, Structure and Properties (Invited)
S. Hampshire; University of Limerick, Ireland

9:30 - 10:00

S14-119 Effect of Fine Silicon Addition To Develop Strong SRBSN (Sintered Reaction Bonded Silicon Nitride) (Invited)
H.-D. Kim; Korea Institute of Materials Science, Korea

10:00 - 10:15

S14120 Development of CNT-dispersed Si₃N₄ Ceramics with High Strength and Electrical Conductivity by Adding HfO₂ as a Sintering Aid

M. Matsuoka, S. Yoshio, T. Yamakawa, J. Tatami, T. Wakihara, K. Komeya, T. Meguro; Yokohama National University, Japan

10:15 - 10:30

S14-121 Microstructure and Properties of Nanocomposites in Al₂O₃-Si₃N₄ System

L. F. He, H. D. Kim, T. Nakayama, T. Suzuki, H. Suematsu, K. Niihara; Nagaoka University of Technology, Japan

10:30 - 10:45 **Break**

10:45 - 12:00: Silicon Nitride and SiAlON

Chair: Hai-Doo Kim (Korea Institute of Materials Science, Korea)

10:45 - 11:15

S14-122 Parameters Affecting Grain Boundary Chemistry of SiAlON Ceramics (Invited)

N. C. Acikbas¹, H. Mandal², F. Kara², A. Kara², S. Turan², H. Yurdakul², B. Bitterlich³; ¹MDA Advanced Ceramics, Turkey, ²Anadolu University, Turkey, ³Ceramtec AG, Germany

11:15 - 11:45

S14-123 The Development and Practical Applications of High Hardness High Toughness Si₃N₄ Ceramics (Invited)

M. Nagano, N. Mukae, Y. Mori; Nippon Tungsten Co.Ltd., Japan

11:45 - 12:00

S14-124 Electrophoretic Deposition of Ti₃Si(Al)C₂ From Aqueous Suspension

Y. Liang^{1,2}, Z. Sun^{1,3}, J. Chen¹, X. Liu², Y. Zhou¹; ¹Institute of Metal Research, China, ²Northeastern University, China, ³Graduate School of Chinese Academy of Science, China

13:15 - 15:00: Ceramics for Automobile and Power Generator

Chair: Toyohiko Yano (Tokyo Institute of Technology, Japan)

13:15 - 13:45

S14-125 New Technology with Porous Materials; Progress in the Development of the Diesel Vehicle Emission Control (Invited)

K. Ohno; Ibiden Co., Ltd., Japan

13:45 - 14:15

S14-126 Microstructure Change of Li(Ni, Co)O₂-based Positive Materials of Li-ion Batteries During Charge and Discharge (Invited)

Y. Ukyo, Y. Takeuchi¹, C. Okuda, Y. Ito; Toyota Central research & Developments Laboratories Inc., Japan

14:15 - 14:30

S14-127 Fabrication of Silicon Nitride Nanowire Dispersed Epoxy Composites and their Properties

T. Kusunose¹, T. Yagi², T. Sekino³; ¹Kagawa University, Japan, ²NMIJ, National Institute of Advanced Industrial Science and Technology, Japan, ³Tohoku University, Japan

14:30 - 14:45

S14-128 Effect of Water Vapor on Crystal Structure and Cyclic Fatigue Behavior of La_{0.8}Sr_{0.2}MnO₃ at High Temperature

M. Tanaka, T. Matsudaira, I. Tanabe, S. Kitaoka; Japan Fine Ceramics Center, Japan

14:45 - 15:00

S14-129 Innovative Materials for Automotive Industry: Current Status and Perspectives

A. Okada; Nagaoka University of Technology, Japan



Symposium 14

Poster Session

Monday, November 15

Room: Event Hall

12:00 - 14:00

Silicon Carbide

- S14-P001 Sintering of Silicon Carbide Ceramics with Co-addition of Gadolinium Oxide and Silica and Their Mechanical Properties**
T. Yano, Y. Horie, M. Imai, K. Yoshida; Tokyo Institute of Technology, Japan
- S14-P002 The Influence of PyC/SiC Interphase on C/SiC Composites**
Y. Zhu, Z. Huang, X. Liu, M. Yuan, D. Jiang; Shanghai Institute of Ceramics, China
- S14-P003 Effects of Nano-powder Slurry on Microstructure and Microchemistry of NITE SiC and SiC/SiC Composites**
J. Takakura¹, H. Kishimoto¹, J.-S. Park^{1,2}, H.-C. Jung², T. Shibayama³, A. Kohyama^{1,2}; ¹Muroran Institute of Technology, Japan, ²Institute of Energy Science and Technology, Co. Ltd., Japan, ³Hokkaido University, Japan
- S14-P004 Microstructure of Ceramic Phase for Ceramizable Silicone Rubber Based Composites**
Z. Pędzich¹, D. M. Bieliński^{2,3}, J. Dul²; ¹AGH University of Science & Technology, Poland, ²Institute for Polymers & Dyes Technology, Poland, ³Technical University of Łódź, Poland
- S14-P005 Bending Strength Property of SiC Composite Ceramics Depending on Surface Grinding Condition**
 K. W. Nam¹, E. S. Kim¹, S. W. Park²; ¹Pukyong National University, Korea, ²Kyoto National University, Japan
- S14-P006 Increasing the Elastic Limit of SiC/SiC Ceramics by Growth of SiC Nano Wires in the SiC Fiber Preform**
A. Bruno¹, P. René¹, H. Plaisantin², E. Philippe², E. Bouillon², P. Weisbecker¹, S. Jacques¹; ¹LCTS, France, ²Snecma Propulsion Solide, France
- S14-P007 A Fundamental Study for Crack Healing of SiC Ceramics and SiC/SiC Composite Ceramics**
 K. W. Nam, I. S. Seo; Pukyong National University, Korea
- S14-P008 Integration of UV-LIGA Process with Slip Casting for Fabricating Polycarbosilane-Derived Silicon Carbide MEMS**
T. Namazu¹, T. Ishikawa¹, Y. Hasegawa², K. Kuroda³, Y. Takami³, S. Inoue¹; ¹University of Hyogo, Japan, ²ART Kagaku, Co. Ltd., Japan, ³Silveralloy, Co. Ltd., Japan
- S14-P009 The effect of Filler (SiC, Si, Carbon Black) Addition during LSI Process for C/C-SiC Composite**
K. Seyoung¹, I.-S. Han¹, K.-S. Hong¹, D.-W. Seo¹, J.-H. Yu¹, S.-D. Kim¹, S.-K. Woo¹, B.-K. Jang²; ¹Korea Institute of Energy Research, Korea, ²National Institute for Materials Science, Japan
- S14-P010 Effect of Particle Size on the Dynamic Mechanical Behavior and Deformed Microstructure of SiCp/Al Composites**
D. Cao, L. Liu, W. She, P. Zhai, Q. Zhang; Wuhan University of Technology, China
- S14-P011 Rheological Behavior of Al- SiC_p Feedstock**
A. Ghanbari¹, M. Alizadeh¹, E. Ghasemi²; ¹Iran Materials and Research Center, Iran, ²Iran Paint Research Center, Iran
- S14-P012 Rheological Behavior of Al- SiC_p Feedstocks**
A. Ghanbari¹, M. Alizadeh¹, E. Ghasemi²; ¹Iran Materials and Energy Research Center, Iran, ²Iran paint Research, Iran
- S14-P013 Passive Oxidation Behavior CVD SiC at Moderate Temperatures**
N. Kumatani, R. Tu, T. Goto; Tohoku University, Japan

Nitride Ceramics

- S14-P014 Oxidation Behavior of AlN/h-BN Nano Composites at High Temperatures**
H. Jin^{1,2}, W.-Z. Li¹, Y. Huang¹, N. Gao¹, B. He¹, G. Qiao¹, Z. Jin³; ¹Xi'an Jiaotong University, China, ²Far East Holding Group Co. Ltd., China
- S14-P015 Sintering of Silicon Nitride Ceramics with Magnesium Silicon Nitride and Yttrium Oxide as Sintering Additives**
J. Guojian¹, X. Jiayue¹, P. Guihua², Z. Hanrui³, L. Wenlan³, X. Suying³, M. Yongjun⁴; ¹Shanghai Institute of Technology, China, ²Guangxi Normal University, China, ³Shanghai Institute of Ceramics, China, ⁴Shanghai University, China
- S14-P016 The Effect of Heat-Treatment on Thermal Conductivity of Silicon Nitride Ceramics**
K. Yoshida¹, Y. Sekimoto², K. Katayama², T. Wasanpiarnpong³, M. Imai¹, T. Yano¹; ¹Tokyo Institute of Technology, Japan, ²Tokai University, Japan, ³Chulalongkorn University, Thailand
- S14-P017 Influence of Additives on the Nitridation of Silicon**
Y.-C. Lee, W.-H. Tuan; National Taiwan University, Taiwan
- S14-P018 Wear Characteristics of Si₃N₄ Ceramics According to the Amount of Additive SiO₂ Nano Colloidal**
 S. H. Hwang, H. I. Je, Y. K. Jeong, K. W. Nam; Pukyong National University, Korea
- S14-P019 The Crack Healing Behavior of Si₃N₄ Ceramics with SiO₂ 1.3 wt.% Nano - Colloidal Additive**
 K. W. Nam¹, S. H. Park¹, K. K. Eun¹, J. S. Kim²; ¹Pukyong National University, Korea, ²NGE Tech, Korea
- S14-P020 Analyses of Microstructure and Oxygen Content Effects on Thermal Conductivity of AlN Ceramics by Using Slack's Plot**
R. Kobayashi, K. Oh-ishi; Chuo University, Japan
- S14-P021 Aluminium Oxynitride as Material for High-Temperature Applications**
D. Zientara¹, J. Domagała¹, D. P. Sert², M. M. Bučko¹, Ež. Godlewska¹, G. Górný¹, J. Lis¹; ¹AGH – University of Science and Technology, Poland, ²Ecole Europeene d'Ingenieurs en Genie des Materiaux, France
- S14-P022 Tribological Behaviour of SiAlON Ceramics**
N. C. Acikbas¹, H. Mandal², F. Kara², Kumar³, B. Basu³; ¹Bilecik University, Turkey, ²Anadolu University, Turkey, ³Indian Institute of Technology, India
- S14-P023 Cutting Performance of SiAlON Based Ceramic Materials**
A. Çelik¹, İ. Lazoğlu², Y. Karpat³, A. Kara¹, F. Kara¹; ¹Anadolu University, Turkey, ²Koç University, Turkey, ³Bilkent University, Turkey
- S14-P024 Synthesis and Characterization of SiAlONs by Reduction Nitridation of Aluminosilicate Zeolite**
T. Wakihara, T. Yamakawa, A. Ihara, J. Tatami, K. Komeya, T. Meguro; Yokohama National University, Japan
- S14-P025 Effect of α-Si₃N₄ Addition on Sintering of α-Sialon Powder via Carbonthermal Reduction Nitridation of Boron-rich Slag-based Mixture**
J. Wu, X. Xue, T. Jiang; Northeastern University, China
- S14-P026 Nano Emulsion Silicone Coating on Polyester Textile: Improve Adhesion Using Atmospheric Plasma Treatment**
M. Parvinzadeh¹, I. Ebrahimi²; ¹Islamic Azad University, Iran, ²Isfahan University of Technology, Iran
- S14-P027 Influence of Nanosilica on Surface Properties of Polybutylene Terephthalate/Silica Nanocomposites**
M. Parvinzadeh, R. Hajiraeesi; Islamic Azad University, Iran
- S14-P028 Flammability and Thermal Properties of Polyethylene Terephthalate Fibers Coated with Nano, Micro and Macro Emulsion Silicone**
M. Parvinzadeh, M. H. Rahimi, M. Y. Navid; Islamic Azad University, Iran
- S14-P029 Effects of Processing on the Characteristics of Boron Nitride Whiskers**
Y. Zhang, L. Zhao, H. Gong, S. Tan; Shandong University, China



Symposium 14

S14-P030 Mechanical Properties of Hexagonal Boron Nitride Lubricated Composites
G. Górný, L. Stobierski, P. Rutkowski; AGH University of Science and Technology, Poland,

Structural Oxide Ceramics

S14-P031 Fabrication and Evaluation of Arrayed Needle-like TiO₂ Particle – Transparent Resin Composite Films
S. Kikitsu¹, T. Otsuka¹, H. Miyazaki¹, H. Suzuki², T. Ota³; ¹Shimane University, Japan, ²Shizuoka University, Japan, ³Nagoya Institute of Technology, Japan

S14-P032 Effect of the Starting Materials on the Microstructure of Ce-TZP/BaAl₁₂O₁₉ Composites
S. Oori, T. Kojima, N. Uekawa, K. Kakegawa; Chiba University, Japan

S14-P033 SH – Synthesis of Composite Ceramic Materials Based on Zirconium Compounds
Z. A. Mansurov, I. V. Tancereva, A. Tulepova, I. M. Vongay, A. N. Karabalin; RSE Institute of Combustion Problem, Kazakhstan

S14-P034 Effect of Additive on the Microstructure for ZrO₂-based Ceramics
S. Misu¹, H. Ohnishi², T. Nakatani³, A. Nakahira^{1,4}; ¹Osaka Prefecture University, Japan, ²Nikkato, Japan, ³Daiichi Kigenso, Japan, ⁴Tohoku University, Japan

S14-P035 Recession Behavior of Yb₂SiO₅ under High Speed Steam Jet at High Temperatures
S. Ueno¹, T. Ohji², H.-T. Lin³; ¹Nihon University, Japan, ²National Institute of Advanced Industrial Science and Technology, Japan, ³Oak Ridge National Laboratory, USA

S14-P036 Rheological Properties of Mg-Al₂O₃ Feedstock for the Powder Injection Molding
S. M. Taheri, M. Alimadadi, M. Alizadeh; Iran Materials and Energy Research Center, Iran

S14-P037 Synthesis and Evaluation of Various Zeolites from Waste Glasses
T. Moriguchi¹, K. Kumadani¹, T. Shirai¹, M. Sato², A. Nakahira^{1,2}; ¹Osaka Prefecture University, Japan, ²Tohoku University, Japan

S14-P038 Synthesis on the Properties of HAp with Gd Doping
M. Sato¹, H. Murata, K. Matsunaga, A. Nakahira^{1,2}; ¹Tohoku University, Japan, ²Osaka Prefecture University, Japan, ³Kyoto University, Japan

S14-P039 Investigation of Ettringite Generation in the Different Aqueous Solution
M. Sato¹, K. Yabuta², A. Nakahira^{1,3}; ¹Tohoku University, Japan, ²Nippon Slag Association, Japan, ³Osaka Prefecture University, Japan

S14-P040 Synthesis and Evaluation of Nanowire and Nanofiber Materials by Anodization and Electroplating Methods
Y. Kawabe¹, M. Sato², A. Nakahira^{1,2}; ¹Osaka Prefecture University, Japan, ²Tohoku University, Japan

Functional Oxide Ceramics

S14-P041 Theoretical Study Electronic, Mechanical and Optical Properties of ZrO₂ Polymorphs
J. Feng^{1,2}, Z. C. Huang¹, J. C. Chen², R. Zhou², W. Pan¹; ¹Tsinghua University, China, ²Kunming University of Science and Technology, China

S14-P042 Corrosion Behavior of SnO₂-based Electrode Ceramics in Soda-lime Glass Liquid
G. Luo, Q. Shen, Q. Li, C. Wang, L. Zhang; Wuhan University of Technology, China

S14-P043 Preparation of Bulk Na₂O–BaO–PbO–Nb₂O₅–SiO₂ Glass-Ceramic Dielectrics for Energy Storage Sources
J. Luo, Q. Tang, Q. Zhang, J. Zhu, D. Han, L. Wang, J. Du; General Research Institute for Nonferrous Metals, China

S14-P044 Synthesis and Characterization of AgCl-Transparent Resin Photochromic Composites
H. Shimoguchi¹, H. Miyazaki¹, H. Suzuki², T. Ota³; ¹Shimane University, Japan, ²Shizuoka University, Japan, ³Nagoya Institute of Technology, Japan

- S14-P045 Effect of Electric Field and Temperature on Microstructure in Sodium Potassium Niobate - Cement Composites**
R. Potong, R. Rianyo, P. Jarupoom, K. Pengpat, A. Chaipanich; Chiang Mai University, Thailand
- S14-P046 Influence of Curing Age on Microstructure in Barium Titanate – Portland Cement Composites**
R. Rianyo, R. Potong, N. Jaitanong, A. Chaipanich; Chiang Mai University, Thailand
- S14-P047 Electric and Dielectric Study of Gd³⁺ Substituted Mg Ferrite Synthesized by Conventional Ceramic Method**
 J. Chand¹, G. Kumar^{1,2}, M. Singh¹; ¹Himachal Pradesh University, India, ²Green Hills Polytechnic College, India
- S14-P048 Characterization of Fe-doped Layered Titanate Synthesized by Various Methods**
S. Tajiri¹, A. Nakahira^{1,2}; ¹Osaka Pref. Univ., Japan, ²Tohoku University, Japan
- S14-P049 Effects of TiO₂ Doping Fe-Mn-Cu-Co Spinel on the Physical Properties of Diesel Oil**
D. Huang¹, J. Zhou^{1,2}, H. Cao¹, Y. Dai^{1,2}, W. Chen^{1,2}; ¹Wuhan University of Technology, China, ²State Key Laboratory of Advanced Technology for Materials Synthesis and Processing, China
- S14-P050 Dielectric Characteristics and Phase Evolution of Mg(Ta_{1-x}Nb_x)₂O₆ (x=0–0.16) Ceramics at Microwave Frequencies**
C.-L. Huang, J.-Y. Chen; National Cheng Kung University, Taiwan
- S14-P051 Study on Characteristic Phonon Spectrum of Negative Thermal Expansion Materials with Framework Structure for Material Design**
Y. Yamamura, K. Saito; University of Tsukuba, Japan
- Ceramics Films and Coatings
- S14-P052 Mechanical Properties and Microstructure of Cr-Zn-N-O Thin Films Prepared by Pulsed Laser Deposition**
F. Sekiguchi¹, J. Shirahata¹, H. Asami², T. Suzuki¹, T. Nakayama¹, H. Suematsu¹, K. Niihara¹; ¹Nagaoka University of Technology, Japan, ²Tomakomai National College of Technology, Japan
- S14-P053 Mechanical Properties and Microstructure of (Cr,Ti)(N,O) Thin Films Prepared by Pulsed Laser Deposition**
H. Asami¹, K. Takazawa¹, K. Kuwahara¹, T. Suzuki², T. Nakayama², H. Suematsu², K. Niihara²; ¹Tomakomai National College of Technology, Japan, ²Nagaoka University of Technology, Japan
- S14-P054 The Composition Material on Basis of Diamond Powder, which Plated by Cobalt**
O. V. Derevyanko¹, M. V. Luchka¹, I. L. Shabalin², V. O. Evdokimov¹, E. M. Shlychok¹; ¹Frantsevych Institute for Problems of Materials Science of NASU, Ukraine, ²The University of Salford, UK
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T. Kato, T. Akatsu, Y. Shinoda, F. Wakai; Tokyo Institute of Technology, Japan
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Y. You, A. Ito, R. Tu, T. Goto; Tohoku University, Japan
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P. Zhao, A. Ito, R. Tu, T. Goto; Tohoku University, Japan
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T. Yonesaki, A. Ito, T. Goto; Tohoku University, Japan
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H.-T. Kim¹, K. Kwak¹, B.-C. Shim¹, S.-M. Lee¹, S. Kim¹, Y.-S. Oh¹, B.-K. Jang²; ¹Korea Institute of Ceramic Engineering and Technology, Korea, ²National Institute of Materials Science, Japan
- S14-P060 Synthesis and Nanomechanical Property Characterization of Ternary B-C-N Films**
D.-I. Kim, D. Jeong, K.-H. Kim; Pusan National University, Korea



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Y. Bai¹, J. F. Yang¹, S. W. Lee², H. Chen², F. L. Yu¹; ¹Xi'an Jiaotong University, China, ²Sun Moon University, Korea

Sintering of Ceramics

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T. Katayama¹, S. Sukenaga¹, N. Saito¹, H. Kagata², K. Nakashima¹; ¹Kyushu University, Japan, ²Advanced Cermic Section, TOTO Ltd., Japan
- S14-P063 Effect of TiO₂ Addition on the Properties of Al₂O₃-ZrO₂ Composites Prepared by Spark Plasma Sintering**
O. Ormanci, E. Yilmaz, I. Akin, F. Sahin, O. Yucel, G. Goller; Istanbul Technical University, Turkey
- S14-P064 Residual Stress in 81%SiO₂-13%B₂O₃-4%Na₂O-10%Al₂O₃ Sintered by Spark Plasma Sintering (SPS) and Hot-pressing**
J. Y. Zhang, H. Zhan, Z. Y. Fu; Wuhan University of Technology, China
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T. Kawaguchi¹, Y. Kodera¹, N. Toyofuku¹, M. Ohyanagi¹, Z. A. Munir²; ¹Ryukoku University, Japan, ²University of California, Davis, USA
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D. Manfredi¹, E. P. Ambrosio¹, M. Pavese², S. Biamino², F. Deorsola², P. Fino²; ¹Italian Institute of Technology/Italy, ²Politecnico di Torino, DISMIC, Italy
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L. An, A. Ito, T. Goto; Tohoku University, Japan
- S14-P068 Electrical Conductivity of Silicon Carbide Consolidated with Stacking Disorder-order Transformation by Spark Plasma Sintering**
T. Shibata¹, N. Toyofuku¹, Y. Kodera¹, M. Ohyanagi¹, Z. A. Munir²; ¹Ryukoku University, Japan, ²University of California, USA
- S14-P069 Precipitation of Ni Nanoparticle on TiN Powder by Rotary CVD and Its Densification of TiN/Ni by SPS**
H. Hanekawa, R. Tu, T. Goto; Tohoku University, Japan
- S14-P070 Synthesis and Densification of TiN/TiB₂ Ceramic Composites via Reactive Spark Plasma Sintering Method**
I. Khobta¹, O. Petukhov¹, O. Vasylykiv², Y. Sakka², A. Ragulya¹; ¹National Academy of Science of the Ukraine, Ukraine, ²National Institute for Materials Science, Japan
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M. Gao^{1,2}, R. Tu¹, T. Goto¹; ¹Tohoku University, Japan, ²Wuhan University of Technology, China
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K. Kubota, J. Tatami, T. Wakihara, T. Meguro, K. Komeya; Yokohama National University, Japan
- S14-P073 Milliwave Sintering of Silicon Carbide with Boron and Carbon Additives**
M. Sekimoto^{1,2}, T. S. Suzuki², H. Tanaka², T. Nishimura², Y. Sakka^{1,2}; ¹University of Tsukuba, Japan, ²National Institute for Materials Science, Japan
- S14-P074 Effects of Mechanical Alloying and Microwave Heating on Synthesis and Sintering of Alumina-Mullite-Zirconia Composites**
S. Ghaffari, T. Ebadzade, M. Alizade; Iran Materials and Energy Research Center, Iran
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K. Yasui, N. Toyofuku, Y. Kodera, M. Ohyanagi; Ryukoku University, Japan

- S14-P076 *In-situ* Measurement of Sintering Shrinkage Behavior of Silicon Carbide under Pressure and its Analysis by Master Sintering Curve Theory**
S. Kawakami¹, J. Tatami¹, T. Wakihara¹, K. Komeya¹, T. Meguro¹, P. Xin², M. Ando²; ¹Yokohama National University, Japan, ²Covalent Materials Corporation, Japan
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 G. Moskal, A. Iwaniak, M. Hetmańczyk; The Silesian University of Technology, Poland
- S14-P078 Evaluation of the Sinterability of Hard Metal through High-Purification of Waste Hard Metal Sludge**
J.-H. Pee¹, S.-H. Eum¹, W.-S. Cho¹, K.-J. Kim¹, J.-C. Choi²; ¹ICET, Korea, ²Recytech Korea Co., Ltd., Korea
- S14-P079 Negative Thermal Expansion Behavior and Electrical Conductivity of Mn₃(Cu_{0.6}Si_{0.15}Ge_{0.25})N with Different Sintering Temperatures**
R. Huang, Z. Chen, H. Yang, Z. Wu, X. Chu, L. Li; Technical Institute of Physics and Chemistry, China
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Y. Okuzono, Y. Hirata, N. Matsunaga, S. Sameshima; Kagoshima University, Japan
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Z. Xie, H. Chen, W. Xue, X. Tang; Tsinghua University, China
- S14-P082 Investigation of Structural Properties of Hetero-Module Composite in the B₄C-BN-TiC-SiC-C System**
Z. Kovziridze¹, J. G. Heinrich², R. Görke², H. Bornhöft², U. Kahnert², N. Nizharadze¹, G. Tabatadze¹; ¹Georgian Technical University, Georgia, ²Clausthal University of Technology, Germany
- S14-P083 The Application of Fractography to Strength Estimation of Porous Alumina**
T. Kobayashi, T. Misaki, K. Uemura, T. Shiota, K. Yasuda; Tokyo Institute of Technology, Japan
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C.-H. Wang¹, W.-H. Tuan¹, P. Shen²; ¹National Taiwan University, Taiwan, ²Jilin University, China
- S14-P085 Numerical Analysis of Cation Diffusion in Yttria-zirconia Nanostructured Ceramics**
 R. L. G. Romero¹, D. Gómez-García¹, J. J. Meléndez², A. Domínguez-Rodríguez¹, F. L. Cumbre-Hernández¹; ¹Universidad de Sevilla, Spain, ²Universidad de Extremadura, Spain
- S14-P086 AE Monitoring of Microdamage Accumulation of Ceramic for Artificial Joints**
J. Ikeda¹, K. Nakamura, F. Miyaji¹, Y. Yamada², S. Wakayama²; ¹Japan Medical Materials Corp., Japan, ²Tokyo Metropolitan University, Japan
- S14-P087 Dynamic Mechanical Properties and Damping Mechanism of 0-3 PMN/CNFs/EP Composites**
M. Shi, Z. Huang, Y. Qin; Wuhan University of Technology, China
- S14-P088 PFM Investigation of Morphology and Interface Feature in PZT-PVDF-Portland Cement Composites**
N. Jaitanong¹, H. R. Zeng², G. R. Li², Q. R. Yin², W. C. Vittayakorn¹, R. Yimnirun³, A. Chaipanich¹; ¹Chiang Mai University, Thailand, ²Shanghai Institute of Ceramics, China, ³Suranaree University of Technology, Thailand
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C. C. Bartlow, S. M. Hong, T. B. Reynolds, A. M. Glaeser; University of California, USA
- S14-P090 Analysis of the Apparent Indentation Size Effect in Hot-pressed Boron Suboxide Ceramics**
R. Machaka¹, T. Derry¹, I. Sigalas¹, J. Neethling^{1,2}; ¹University of the Witwatersrand, South Africa, ²NMMU, South Africa
- S14-P091 A Finite Element Approach to the Study of the Nanoindentation Response of Hot-pressed Boron Suboxide Ceramics**
R. Machaka¹, T. Derry¹, I. Sigalas¹, J. Neethling²; ¹University of the Witwatersrand, South Africa, ²NMMU, South Africa