

Symposium 5: Hybrid and Nano-Structured Materials

Main Organizers

- Tohru Sekino, Tohoku University, Japan
- Yoko Suyama, Shimane University, Japan
- Dileep Singh, Argonne National Laboratory, USA
- Igor L. Shabalin, The University of Salford, UK

Co-Organizers

- 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
- Kwang Ho Kim, Pusan National University, Korea
- 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
- 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
- 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

Oral Session

Monday, November 15

Room: 1003

14:15 - 16:00: Nanocomposites and Multi-Dimensional Fibers/Fabrics Reinforced CMCs

Chairs: Jules Routbort (Argonne National Lab., USA) and Tohru Sekino (Tohoku University, Japan)

14:15 - 14:45

S5-001 Hybrid Ceramic Matrix Fibrous Composites: an Overview (Invited)

R. Naslain; University of Bordeaux, France

14:45 - 15:15

S5-002 Hybrid Nanostructured Ceramic Matrix Composites through Solution Route (Invited)

L. M. Manocha, S. Manocha, M. Vyas, P. M. Raole; Sardar Patel University, India

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15:15 - 15:30

S5-003 Hierarchical SiC-based Ceramic Matrix Composites Reinforced with SiC Nanowires Grafted Carbon Fibers

B. Lu, S. M. Dong, Z. Wang, X. Y. Zhang, Y. S. Ding; Chinese Academy of Sciences, China

S5-004 Cancelled

15:30 - 16:00

S5-005 Nanoscale Plasticity in Ceramics and Semiconductors Revised (Invited)

R. Nowak^{1,2}, D. Chrobak^{1,2}, M. Berg³, T. Sekino⁴, K. Niihara²; ¹Aalto University, Finland, ²Nagaoka University of Technology, Japan, ³Hysitron, Inc., USA, ⁴Tohoku University, Japan

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

16:15 - 18:00: Materials Design, Novel Synthesis and Processing Technology (I)

Chairs: Katherine Faber (Northwestern University, USA) and Lian Gao (Shanghai Institute of Ceramics, China)

16:15 - 16:45

S5-006 Microreactor Synthesis Toward Rapid Developments of Nanoparticles (Invited)

H. Nakamura¹, M. Uehara¹, H. Maeda^{1,2,3}; ¹National Institute of Advanced Industrial Science and Technology, Japan, ²Kyushu University, Japan, ³Japan Science and Technology Agency, Japan

16:45 - 17:15

S5-007 Nano-Ceramics as Additives for Heat Transfer Fluids (Invited)

J. L. Routbort, D. Singh, E. Timofeeva, W. Yu, D. France; Argonne National Laboratory, USA

17:15 - 17:30

S5-008 Development of Automatic Combinatorial System for Synthesis of Nanoparticles Using Microreactors

K. Watanabe¹, H. Ozono¹, K. Yamashita², M. Uehara², H. Nakamura², H. Maeda^{1,2,3}; ¹Kyushu University, Japan, ²National Institute of Advanced Industrial Science and Technology, Japan, ³Japan Science and Technology Agency, Japan

17:30 - 17:45

S5-009 Property Control of Semiconductor Nanocrystals by Controlling the Temperature Profile Using Microreactor

C. G. Lee¹, H. Nakamura¹, M. Uehara¹, H. Maeda^{1,2,3}; ¹National Institute of Advanced Industrial Science and Technology, Japan, ²Kyushu University, Japan, ³Japan Science and Technology Agency, Japan

17:45 - 18:00

S5-010 Selective Pulsed Heating for Synthesizing Semiconductor and Metal Submicron Spheres Based on Pulsed Laser Irradiation of Colloidal Nanoparticles

H. Wang, A. Pyatenko, K. Kawaguchi, X. Li, Z. Swiatkowska-Warkocka, N. Koshizaki; National Institute of Advanced Industrial Science and Technology, Japan

Tuesday, November 16

Room: 1003

9:00 - 10:30: Coalescence, Growth and Sintering Behavior

Chairs: Dileep Singh (Argonne National Lab., USA) and Jing Sun (Shanghai Institute of Ceramics, China)

9:00 - 9:30

S5-011 Application of Ultra Accelerated Quantum Chemical Molecular Dynamics to the Study of the Sintering Mechanism (Highlighted Oral)

A. Suzuki, R. Miura, H. Tsuboi, N. Hatakeyama, A. Endou, H. Takaba, A. Miyamoto; Tohoku University, Japan

9:30 - 9:45

- S5-012 Processing and Properties of Nanostructured YSZ Ceramics Produced by Dry Pressing**
J. Binner¹, B. Vaidhyathan¹, K. Annapoorani¹, H. Hodgson²; ¹Loughborough University, UK, ²Dynamic Ceramic Ltd, Crewe, UK

9:45 - 10:00

- S5-013 Lower Sintering Temperature of Nanostructured Dense Ceramics Compacted from Dry Nanopowders Using Powerful Ultrasonic Action**
O. Khasanov¹, U. Reichel², E. Dvilis¹, A. Khasanov¹; ¹Nano-Centre of Tomsk Polytechnic University, Russia, ²Fraunhofer-Institut für Keramische Technologien und Systeme, Germany

10:00 - 10:15

- S5-014 SPS Synthesis/Consolidation of TiAlN-Based Nano-Composite Reinforced with Homogeneously Distributed Cubic Aluminum Nitride Nanocrystals**
B. Hanna^{1,2}, V. Oleg¹, S. Yoshio¹, S. Liap³, T. Y. Kwang³, M. Jan³; ¹National Institute for Materials Science, Japan, ²NASU, Ukraine, ³Nanyang Technological University, Singapore

10:15 - 10:30

- S5-015 Study on Alkali and Alkaline Earth Cations Stabilized Sialon Translucent Ceramics**
H. Wang¹, Z. Yang¹, W. Wang, Z. Fu¹, S.-W. Lee², K. Niihara³; ¹Wuhan University of Technology, China, ²SunMoon University, Korea, ³Nagaoka University of Technology, Japan

10:45 - 11:45: Organic-Inorganic Hybrids (I)

Chairs: Yoko Suyama (Shimane University, Japan) and Ryo Sasai (Shimane University, Japan)

10:45 - 11:15

- S5-016 Preparation of Silica/Modified Poly(Vinyl Alcohol) Organic-Inorganic Hybrid Gas Barrier Films by Sol-Gel Method with Microwave Irradiation (Invited)**
K. Kuraoka, H. Ashihara, A. Hashimoto; Kobe University, Japan

11:15-11:30

- S5-017 Processing and Dielectric Properties of Polyhedral Oligomeric Silsesquioxane (POSS)-Based Nanocomposites**
M.-J. Pan, E. P. Gorzkowski; U.S. Naval Research Laboratory, USA

11:30-11:45

- S5-018 Processes and Applications of Silicon Carbide Nanocomposite Fibers**
D.-G. Shin¹, K.-Y. Cho¹, D.-H. Riu²; ¹Korea Institute of Ceramic Engineering and Technology, Korea, ²Seoul National University of Technology, Korea

14:15 - 16:00: Organic-Inorganic Hybrids (II)

Chairs: Koji Kuraoka (Kobe University, Japan) and Lalit Mohan Manocha (Sardar Patel University, India)

14:15 - 14:45

- S5-019 Molecular Sensing Ability of Layered Inorganic/Luminous Organic Nano-hybrid Solid Materials (Invited)**
R. Sasai; Shimane University, Japan

14:45 - 15:15

- S5-020 Preparation of a Novel Core/shell Structured TiO₂-Polyaniline Nanocomposite and its Application to Solar Cell**
S. Yang, Y. Ishikawa, Q. Feng; Kagawa University, Japan

15:15 - 15:30

- S5-021 Preparing Transparent Conductive SWNT Films Using Biomolecules as Surfactants (Highlighted Oral)**
J. Sun, R. Wang, L. Gao; Shanghai Institute of Ceramics, CAS, China

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15:30 - 15:45

S5-022 Self-Assembled Linear Bundles of BN Nanosheets in Polysiloxane Film under Alternating DC Electric Field

H.-B. Cho, T. Nakayama, H. Suematsu, S. Tanaka, T. Suzuki, W. Jiang, K. Niihara; Nagaoka University of Technology, Japan

15:45 - 16:00

S5-023 Effect of Type of Nanoclay on Thermal Properties of Polyethylene Terephthalate/Clay Nanocomposites

M. Parvinzadeh¹, S. Moradian², A. Rashidi¹, M.-E. Yazdanshenas¹; ¹Islamic Azad University, Iran, ²Amirkabir University of Technology, Iran

16:00 - 16:15 Break

16:15 - 18:00: Materials Design, Novel Synthesis and Processing Technology (II)

Chairs: Hiroyuki Nakamura (National Institute of Advanced Industrial Science and Technology, Japan) and Laszlo A. Gomze (University of Miskolc, Hungary)

16:15 - 16:45

S5-024 Shape-Controlled Synthesis of Inorganic Nanostructures (Invited)

L. Gao; Shanghai Institute of Ceramics, CAS, China

16:45 - 17:15

S5-025 Environmentally Conscious SiC Ceramics Obtained from Natural Precursors: Recent Developments and Challenges (Invited)

J. Ramírez-Rico¹, J. M. Fernandez¹, M. Singh²; ¹Universidad de Sevilla-CSIC, Spain, ²Ohio Aerospace Institute, USA

17:15 - 17:45

S5-026 Graphite-Copper Composites from Natural and Synthetic Scaffolds (Invited)

K. T. Faber, M. T. Johnson, A. E. Sall; Northwestern University, USA

17:45 - 18:00

S5-027 Preparation of BN Nano-film Coated IVa Group Transition Metal Boride Composite Particles by a Novel Solid State Reaction Route

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

Wednesday, November 17

Room: 1003

9:00 - 10:15: Hetero-Modulus Materials

Chairs: Igor L. Shabalin (The University of Salford, UK) and Jingyang Wang (Institute of Metal Research, China)

9:00 - 9:30

S5-028 Hetero Modulus Alumina Matrix Nanoceramics and CMCs with Extreme Dynamic Strength (Invited)

L. A. Gömze¹, L. N. Gömze²; ¹University of Miskolc, Hungary, ²IGREX Engineering Service Ltd., Hungary

9:30 - 10:00

S5-029 Glass-Ceramic/Carbon Nanotube Composites: Processing, Properties and Influence of Nanotube Alignment (Invited)

R. I. Todd, G. Otieno, A. Mukhopadhyay, M. L. H. Green, N. Grobert; University of Oxford, UK

10:00 - 10:15

S5-030 Reaction Hot-Pressing and Property-Composition Relationships of Modified Sialon – Boron Nitride Hetero-Modulus Ceramics

W. Yu¹, S. Igor¹, Z. Lingfei², Z. Valeriy³; ¹University of Salford, UK, ²University of Aveiro, Portugal, ³Ural State Technical University, Russia

10:15 - 10:30 Break

10:30 - 12:00: Mechanical Properties, Fracture and Deformation Mechanics (I)

Chairs: Wei-Hsing Tuan (National Taiwan University, Taiwan) and Richard Todd (University of Oxford, UK)

10:30 - 11:00

S5-031 Ductile Deformation in Alumina and Alumina Nanocomposites under Pseudo-Static to High Strain Rate Condition (Invited)

S. Ghosh, H. Wu; Loughborough University, UK

11:00 - 11:30

S5-032 Design, Structure and Properties of Nano-layered Damage Tolerant Transition-metal Carbides and Nitrides (Invited)

J. Wang, Y. Zhou; Chinese Academy of Sciences, China

11:30 - 11:45

S5-033 A Revolution of Nanolayered MAX Phases Ceramics: Shell-like Design

C. Hu, Y. Sakka, H. Tanaka, T. Nishimura, S. Grasso; National Institute for Materials Science, Japan

11:45 - 12:00

S5-034 Light-Weight B₄C/BN-Based Superhard and Highly Shock-Energy Dissipative Nano-Composites via SPS Synthesis/Consolidation

V. Oleg^{1,2,3}, B. Hanna^{1,3}, S. Yoshio¹, S. Liap², T. Y. Kwang², M. Jan²; ¹National Institute for Materials Science, Japan, ²Nanyang Technological University, Singapore, ³NASU, Ukraine

13:15 - 15:15: Mechanical Properties, Fracture and Deformation Mechanics (II)

Chairs: Houzheng Wu (Loughborough University, UK) and Jun-ichi Matsushita (Tokai University, Japan)

13:15 - 13:45

S5-035 Bio-inspired Design of Toughening Agent (Invited)

W.-H. Tuan; National Taiwan University, Taiwan

13:45 - 14:15

S5-036 Hybridization of Cu by Direct Bonding to Oxidized Silicon Nitride (Highlighted Oral)

S.-I. Tanaka; Tohoku University, Japan

14:15 - 14:45

S5-037 Nano-mechanical Characterization of TiAlN and its Multilayer Thin Films (Highlighted Oral)

R. Ramaseshan, F. Jose, S. Dash, A. K. Tyagi; IGCAR, India

14:45 - 15:00

S5-038 AlN Substrate with a Thick Oxide Layer of High Interfacial Adhesion Strength

K. Hirayama, J. Imai, M. Sato, N. Hashimoto; Panasonic Electric Works Co., Ltd., Japan

15:00 - 15:15

S5-039 Electrodeposition and Characterization of Ni/Ti₃Si(Al)C₂ Composite Coatings

Y. Liang^{1,2}, X. Liu², Y. Zhou¹; ¹Chinese Academy of Sciences, China, ²Northeastern University, China

15:15 - 15:30 **Break**

15:30 - 17:15: Low-dimensional and Anisotropic Nanomaterials

Chairs: Sanjay Mathur (University of Cologne, Germany) and Yanfeng Gao (Shanghai Institute of Ceramics, China)

15:30 - 16:00

S5-040 Preparation, Characterization and Application of One-dimensional Transition Metal Oxide Nanostructures (Invited)

Y. Dai, W. Chen; Wuhan University of Technology, China

16:00 - 16:15

S5-041 Fabrication of ZnO Nanosheet and In₂O₃ Nanorod Films Via the Pyrolysis Reaction of Those Intermediate Compounds by Chemical Bath Deposition

E. Hosono¹, T. Saito¹, S. Fujihara², H. Zhou¹; ¹National Institute of Advanced Industrial Science and Technology, Japan, ²Keio University, Japan

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16:15 - 16:30

S5-042 Nanoparticles Loaded TiO₂ Nanotubes Synthesis by UV Light Induced Reduction Reaction
D. J. Park, T. Sekino, J.-Y. Kim, S. Tsukuda, S.-I. Tanaka; Tohoku University, Japan

16:30 - 16:45

S5-043 The Synthesis and Characterization of Ultra-long Bismuth Telluride Nanotubes by Electrospinning and Galvanic Displacement
K.-J. Lee¹, H. Song¹, H. Jung², N. V. Myung², Y.-H. Choa¹; ¹Hanyang University, Korea, ²University of California-Riverside, USA

16:45 - 17:00

S5-044 CeO₂ Nanoparticles Deposited on Carbon Nanotubes
G. Zheng, R. Nomiyama, H. Sano, Y. Uchiyama; Nagasaki University, Japan

17:00 - 17:15

S5-045 Synthesis of Nitrogen-doped CNTs and their Nanohybrids with Chemically-prepared Au Nanoparticles
T. Sekino¹, S. Y. Moon¹, T. Kusunose², S.-I. Tanaka¹; ¹Tohoku University, Japan, ²Kagawa University, Japan

Thursday, November 18

Room: 1003

9:00 - 10:30: Properties and Multi-Functions in Hybrid and Nanostructured Materials (I)

Chairs: Ivar Reimanis (Colorado School of Mines, USA) and Ying Dai (Wuhan University of Technology, China)

9:00 - 9:30

S5-046 Advanced Morphology Characterization of Nano-Structured Materials (Invited)
S. S. Ray; Council for Scientific and Industrial Research, South Africa

9:30 - 10:00

S5-047 Metal Oxide Nanowires: Growth, Applications and Devices (Invited)
S. Mathur¹, S. Barth¹, F. Hernández-Ramírez², J. D. Prades², A. Romano-Rodríguez², J. R. Morante²; ¹University of Cologne, Germany, ²University of Barcelona, Spain

10:00 - 10:15

S5-048 Preparation of Carbon Quantum Dots with Tunable Photoluminescence by Rapid Laser Passivation in Ordinary Organic Solvents
X. Li, H. Wang, Y. Shimizu, A. Pyatenko, K. Kawaguchi, N. Koshizaki; National Institute of Advanced Industrial Science and Technology, Japan

10:15 - 10:30

S5-049 The Fabrication of 0-D and 1-D Nanomaterials for Nanodevices Using Lipid Nanotubes
Y.-G. Han, M. Aoyagi, M. Asakawa, T. Shimizu; National Institute of Advanced Industrial Science and Technology, Japan

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

10:45 - 12:00: Properties and Multi-Functions in Hybrid and Nanostructured Materials (II)

Chairs: Suprakas Sinha Ray (National Centre Nanostructured Materials, South Africa) and Rajagopalan Ramaseshan (Indira Gandhi Centre for Atomic Research, India)

10:45 - 11:00

S5-050 Solution-phase Processing of Nanostructured VO₂ Thin Films for Smart Windows
Y. F. Gao, L. Kang, Z. Zhang, C. Cao, Z. Chen, J. Du, H. Luo; Shanghai Institute of Ceramics, CAS, China

11:00 - 11:15

S5-051 The Thin-Film Transducers of Pressure and Temperature
K. Svetlana; Ural Federal University, Russia

11:15 - 11:30

S5-052 Electrochemical Performance of TiO₂ Synthesized via Mechanochemical Milling

P. Xiao, M. A. Thein, M. O. Lai, L. Lu; National University of Singapore, Singapore

11:30 - 11:45

S5-053 Electrochemical Properties for Mo_xV_{3-x}O₇/MWNTs Nanocomposites

Q. Zhu^{1,2}, S. Hu¹, W. Jin¹, H. Wen¹, W. Chen^{1,2}, G. Zakharova³; ¹Wuhan University of Technology, China, ²State Key Laboratory of Advanced Technology for Materials Synthesis and Processing, China, ³Russian Academy of Science, Russia

11:45-12:00

S5-054 Nanoscale Mechanical Property Characterization of Ceramics and Ceramic Tribofilms

N. Fujisawa; Hysitron, Inc., USA

13:15 - 15:00: Properties and Multi-Functions in Hybrid and Nanostructured Materials (III)

Chairs: Yong-Ho Choa (Hanyang University, Korea) and Makoto Nanko (Nagaoka University of Technology, Japan)

13:15 - 13:45

S5-055 Nanoscale Magnetic Measurements in Doped Oxides (Invited)

I. Reimanis¹, J. White¹, G. Coors², J. O'Brien³; ¹Colorado School of Mines, USA, ²Ceramtec Inc., USA, ³Quantum Design, USA

13:45 - 14:00

S5-056 Preparation of Nd₂Fe₁₄B Nanoparticles under Femtosecond Laser Ablation in Liquid

T. Yamamoto¹, Y. Shimotsuma¹, M. Sakakura¹, M. Nishi¹, K. Miura¹, K. Hirao¹, M. Sagawa²; ¹Kyoto University, Japan, ²Intermetallics CO., LTD., Japan

14:00 - 14:15

S5-057 Reversible Control in Surface Plasmon Resonance Wavelength of Gold Nanoparticles by Using Polydimethylsiloxane (PDMS)

Y. Tsutsui¹, H. Fudouzi², T. Hayakawa¹, M. Nogami¹; ¹Nagoya Institute of Technology, Japan, ²National Institute for Materials Science, Japan

14:15 - 14:30

S5-058 Nanostructure-Controlled Plasmonic Nanocomposite Films Prepared by Aerosol Deposition

J.-H. Park, J. Akedo; National Institute of Advanced Industrial Science and Technology, Japan

14:30 - 14:45

S5-059 3D Copper Nanostructures for Plasmonic Detection of Molecules

J.-C. Valmalette^{1,2}, J. Julien Romann^{1,2}, K. Sato³, S. Ohara³; ¹Université du Sud Toulon Var, France, ²CNRS, France, ³Osaka University, Japan

14:45-15:00

S5-060 Nano Glass Flakes with Inherent Colour

S. J. Brigham, E. Golden; Glassflake Ltd, Australia

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

15:15 - 16:15: Properties and Multi-Functions in Hybrid and Nanostructured Materials (IV)

Chair: Tadachika Nakayama (Nagaoka University of Technology, Japan)

15:15 - 15:30

S5-061 Study of Structural and Dielectric Properties of Co Doped Copper Ferrite Nanoparticles

A. Azam, M. S. Ansari, A. H. Naqvi; Aligarh Muslim University, India

15:30- 15:45

S5-062 The Behavior of Negative Permittivity and Negative Permeability in Bulk Fe-Al₂O₃ Nanocomposites Prepared by Selective Reduction

R. Fan, Z. Zhang, Z. Shi, M. Gao, J. Guo; Shandong University, China

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15:45 - 16:00

S5-063 Crack-Healing Function of Metal/Al₂O₃ Hybrid Materials
M. Nanko; Nagaoka University of Technology, Japan

16:00-16:15

S5-064 Characterization of Hydroxyapatite with Titanium Nonoxide Ultrafine Powder by using Planet Type Ball Milling
J. Matsushita¹, Y. Hayakawa¹, K. Ishiwata¹, R. Takahashi¹, T. Takehana¹, Y. Matsushita²; ¹Tokai University, Japan, ²Kanagawa Dental College, Japan

Poster Session

Monday, November 15

Room: Event Hall

12:00 - 14:00

- S5-P001 Preparation and Property Control of ZnO Nanoparticles by Two Step Process**
Y. Sakai¹, C-G. Lee², M. Uehara², H. Nakamura², H. Maeda^{1,2,3}; ¹Kyushu University, Japan, ²National Institute of Advanced Industrial Science and Technology, Japan, ³Japan Science and Technology Agency, Japan
- S5-P002 Crystal Structures of Solid Solution (Ba_{1-x}Ca_x)(Sc_{1/2}Nb_{1/2})O₃ System**
H. Nakano¹, T. Ida², M. Takemoto³, H. Ikawa³; ¹Toyohashi University of Technology, Japan, ²Nagoya Institute of Technology, Japan, ³Kanagawa Institute of Technology, Japan
- S5-P003 Synthesis and Characterization of Novel (Na,K)-Nb Double Metal Ethoxides**
K. Kanetuki, Y. Suyama; Shimane University, Japan
- S5-P004 Hybride, Nanostructured Materials of Special Designation on the Basis of Silicon Dioxide**
Z. A. Mansurov, N. N. Mofa, T. A. Shabanova; Al-Farabi Kazakh National University, Kazakhstan
- S5-P005 Determination of Kinetic Effect on Particle Size and Concentration by Microreactor**
L. Zhang¹, H. Nakamura¹, C. Lee¹, M. Uehara¹, H. Maeda^{1,2,3}; ¹National Institute of Advanced Industrial Science and Technology, Japan, ²Kyushu University, Japan, ³Japan Science and Technology Agency, Japan
- S5-P006 The Viscoelasticity Measurement of the Various Shaped Ceramics Nanoparticle Dispersion Slurry**
S. Takamaru¹, T. Nakayama¹, T. Takahashi¹, H. D. Kim¹, J. Yoshimura¹, T. Suzuki¹, H. Suematsu¹, Z. Fu², S. W. Lee³, K. Niihara¹; ¹Nagaoka University of Technology, Japan, ²Wuhan University of Technology, China, ³Sun Moon University, Korea
- S5-P007 Synthesis of Al₂O₃-SiC Nanocomposites Using the Nano Slurry which Homogeneous Dispersion by Beads Mill**
S. Amarume¹, T. Nakayama¹, K. Niihara¹, H. D. Kim¹, Y. Ohba¹, T. Suzuki¹, H. Suematsu¹, Z. Fu², S. W. Lee³; ¹Nagaoka University of Technology, Japan, ²Wuhan University of Technology, China, ³Sun Moon University, Korea
- S5-P008 Phase and Morphology Control of ZnS Nanocrystals by Temperature Profile**
Y. Nakamura¹, S. Sasaki¹, K. Watanabe¹, C.-G. Lee², M. Uehara², H. Nakamura², H. Maeda^{1,2,3}; ¹Kyushu University, Japan, ²National Institute of Advanced Industrial Science and Technology, Japan, ³Japan Science and Technology Agency, Japan
- S5-P009 Formation of CuAlO₂ Thin Films by Ultrasonic Spray Pyrolysis**
I. Suhariadi^{1,2}, Z. Lockman¹, S. D. Hutagalung¹, K. Abrahama², A. Matsuda³; ¹Universiti Sains Malaysia, Malaysia, ²Gadjah Mada University, Indonesia, ³Toyohashi University of Technology, Japan
- S5-P010 Reaction Synthesis of Ti₃SiC₂ Phase in Plasma Sprayed Coating**
Y. Chen^{1,2}, V. Pasumarthi², S. R. Bakshi², A. Agarwal²; ¹Soochow University, China, ²Florida International University, USA

- S5-P011 Synthesis and Properties of Ti₂AlN MAX-phase Coatings by a Hybrid Coating System**
Q. Wang, K. Kim; Pusan National University, Korea
- S5-P012 The Influence of Ferrocene Derivates on Drying of Alkyd Coatings**
 D. Vesely, A. Kalendova, P. Nemeč; University of Pardubice, Czech Republic
- S5-P013 The Influence of Alternating Constituent on Properties Formation of Ceramic Materials on TiN Basis During Electro-Discharge Sintering**
O. V. Derevyanko¹, O. I. Raichenko¹, I. L. Shabalin², V. G. Kolesnichenko¹, M. V. Zamula¹, O. B. Zgalat-Lozynskyy¹; ¹Frantsevych Institute for Problems of Materials Science of NASU, Ukraine, ²The University of Salford, UK
- S5-P014 Improvement of Bonding Strength between Ceramic and Titanium by Supersonic Plasma Spray Coating**
 P. Zhang, Z. C. Zhang, J. F. Yang, Z. H. Han; Xi'an Jiaotong University, China
- S5-P015 Development of Novel Fabrication Processes for the Reaction Bonded Silicon Carbide Hot Gas Filter with a High Strength**
S.-W. Park, K.-S. Cho, C.-S. Kim; Korea Institute of Science and Technology, Korea
- S5-P016 Spark-Plasma-Sintering (SPS) of Tungsten Carbide and Titanium Carbonitride Nanopowders**
 P. Angerer¹, L. G. Yu², K. A. Khor², I. Zalite³; ¹Centre of Electrochemical Surface Technology, Austria, ²Nanyang Technological University, Singapore, ³Riga Technical University, Latvia
- S5-P017 Transparent α -alumina Consolidated with Nanostructure**
N. Miyagi¹, Y. Kodera¹, M. Ohyanagi¹, Z. A. Munir²; ¹Ryukoku University, Japan, ²University of California, Davis, USA
- S5-P018 The Comparison of the Formability on the Fine Patterned Oxide Sintered Body Using the Micro Mold**
H. D. Kim¹, T. Nakayama², M. S. Lee¹, K. Imaki², T. Yoshimura³, T. Suzuki², H. Suematsu², K. Niihara²; ¹Korea Institute of Industrial Technology, Korea, ²Nagaoka University of Technology, Japan, ³Osaka Prefecture University, Japan
- S5-P019 Preparation of Polyethylene Terephthalate/Silica Nanocomposite Using Hydrophilic or Hydrophobic Nanosilica**
M. Parvinzadeh¹, S. Moradian², A. Rashidi¹, M.-E. Yazdanshenas¹; ¹Islamic Azad University, Iran, ²Amirkabir University of Technology, Iran
- S5-P020 Surface Characterization of Polyethylene Terephthalate/Clay Nanocomposites**
M. Parvinzadeh¹, S. Moradian², A. Rashidi¹, M.-E. Yazdanshenas¹; ¹Islamic Azad University, Iran, ²Amirkabir University of Technology, Iran
- S5-P021 Reduction of Electrical Resistance of Synthetic Fibers Using Micro and Nano Silicone Coating**
M. Parvinzadeh; Islamic Azad University, Iran
- S5-P022 Effect of Inorganic Nano Fillers in Bio Degradable Thermoplastic Cornstarch (TPS)/LDPE Hybrids**
S. S. Kim¹, A. Arena¹, C. Poolman¹, B. H. Kim²; ¹Rochester Institute of Technology, USA, ²Chonbuk National University, Korea
- S5-P023 Dye-doped Natural Organic-inorganic Hybrid Materials on Glass Substrates**
N. Kitazawa, W. Aroonjaeng, M. Aono, Y. Watanabe; National Defense Academy, Japan
- S5-P024 Preparation and Characterization of PMMA-Ceramic Composite Materials**
K. Gul; University of Peshawar, Pakistan
- S5-P025 Fabrication and Dielectric Properties of AlN Filled Epoxy Nano-Composites**
 N. Gao¹, X. Yu¹, H. Jin^{1,2}, B. He¹; ¹Xi'an Jiaotong University, China, ²Far East Holding Group Co. Ltd., China
- S5-P026 Composition - Property Correlations of Cordierite/Mullite/Alumina Ceramic Composites Prepared from Non-Standard Powders**
Z. Lingfei¹, S. Olhero¹, S. Igor², J. M. F. Ferreira¹; ¹University of Aveiro, Portugal, ²University of Salford, UK



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- S5-P027 Microstructure – Mechanical Property Correlations of Cordierite/Mullite foam by Tomography and Finite Element Model**
L. Zang¹, L. Courtois², E. Maire², A. Charmetant², T. Zhang², J. M. Ferreira¹; ¹University of Aveiro, Portugal, ²MATEIS lab, France
- S5-P028 Synthesis and Characterization of Zirconia-Alumina Nanocomposites Obtained by Spark Plasma Sintering**
C. Ghitulica¹, B. S. Vasile¹, E. Andronescu¹, E. Vasile², G. Voicu¹, O. R. Vasile¹; ¹University POLITEHNICA of Bucharest, Romania, ²Metav C.D., Romania
- S5-P029 Influences of Crack Size and Ni Volume Fraction on Crack-Healing of Nano-Ni /Al₂O₃ Hybrid Materials**
D. Maruoka, M. Nanko; Nagaoka University of Technology, Japan
- S5-P030 Fabrication and Characterization of Metal Oxide Nanocrystal/Activated Carbon Nanocomposites**
C. Mori¹, K. Teshima¹, H. Kamikawa², S. H. Lee¹, S. Oishi¹; ¹Shinshu University, Japan, ²YAMAHA MOTOR CO., LTD., Japan
- S5-P031 Microstructure and Mechanical Properties of Acid-Treated Carbon Nanofiber/Alumina Composites**
N. Ueda¹, T. Yamakami¹, T. Yamaguchi¹, K. Kitajima¹, T. Nakanishi², F. Miyaji², M. Endo¹, N. Saito¹, S. Taruta¹; ¹Shinshu University, Japan, ²Japan Medical Materials Co., Japan
- S5-P032 Material Properties and Machinability Evaluation of Al₂O₃/cnt Hybrid Composites for Micro EDM**
H.-S. Tak¹, D.-S. Choi², S.-S. Jeong³, D.-Y. Lee³, M.-C. Kang¹; ¹Pusan National University, Korea, ²KIMM, Korea, ³Applied Carbon Nano Technology Co., LTD, Korea
- S5-P033 Formation of 3D Nanonetwork in Different Type of CNT-dispersed ZrO₂-based Nanocomposites and their Electrical Properties**
T. Sekino¹, T. Kusunose², H. Wang³, Z. Fu³, K. Niihara³; ¹Tohoku University, Japan, ²Kagawa University, Japan, ³Wuhan University of Technology, China, ⁴Nagaoka University of Technology, Japan
- S5-P034 Vertically Aligned Patterning of SWCNT by Magnetic Field**
S. Cha, Y. Kim; Kwangwoon University, Korea
- S5-P035 Effective Parameters for Growing Vertically-Aligned Individual Carbon Nanotubes/Nanofibers (CNs) Using Plasma Enhanced Chemical Vapor Deposition (PECVD)**
H. W. Lee^{1,2}, S. Kim², S.-G. Kim²; ¹Pusan National University, Korea, ²Massachusetts Institute of Technology, USA
- S5-P036 Characterization of Electric Transport of Field Effect Transistor with TiO₂ Nanotube Channel**
M. Ishii¹, M. Terauchi², T. Yoshimura¹, T. Nakayama², N. Fujimura¹; ¹Osaka Prefecture University, Japan, ²Nagaoka University of Technology, Japan
- S5-P037 The Influence of One-dimensional TiO₂ with Different Morphology on Photocatalytic Degradation of Gaseous Benzene**
J. Du¹, M. Wen¹, W. Chen^{1,2}, Y. Dai^{1,2}, C. Zhao^{1,2}; ¹Wuhan University of Technology, China, ²Advanced Technology for Materials Synthesis and Processing, China
- S5-P038 Size Dependence of Properties in Cupric Oxide Nanotubes Synthesized from Electrodeposited Copper Nanowires**
Y.-I. Lee¹, K.-J. Lee¹, N. V. Myung², Y.-H. Choa¹; ¹Hanyang University, Korea, ²University of California-Riverside, USA
- S5-P039 Optical, Mechanical and Tribological Properties of Y₂O₃, Er₂O₃ and Nd₂O₃ Doped Polycrystalline Silicon Nitride Ceramics**
B. Joshi¹, Z. Fu², K. Niihara³, S. W. Lee¹; ¹Sunmoon University, Korea, ²Wuhan University of Technology, China, ³Nagaoka University of Technology, Japan
- S5-P040 Characteristics of Silica Contained Y-TZP during Low-Temperature Aging**
H. Usami¹, T. Nakamura¹, H. Nishida², T. Sekino³, H. Onishi⁴, M. Takeuchi⁴, H. Yatani¹; ¹Osaka University, Japan, ²Osaka Dental University, Japan, ³Tohoku University, Japan, ⁴NIKKATO Corporation, Japan

- S5-P041 Hybrid Functional Ru-TiN Heating Resistor Films for High-efficiency Inkjet Printhead**
S.-H. Kwon, W.-S. Kwack, Y.-R. Shin, K.-H. Kim; Pusan National University, Korea
- S5-P042 Simultaneous Amination of TiO₂ Nanoparticles in the Gas Phase Synthesis for Bio-medical Applications**
K.-N. Lee¹, Y.-E. Kim², C.-W. Lee², J.-S. Lee¹; ¹Hanyang University-ERICA, Korea, ²Korea University, Korea
- S5-P043 Design and Trial Fabrication of the Organic Substances Sensor in the Blood with the Micro-needle Using the Polylactic Acid**
A. Konno¹, T. Nakayama¹, M. Fukuda², J. Shirahata¹, T. Suzuki¹, H. Suematsu¹, Z. Fu³, S. W. Lee⁴, K. Niihara¹;
¹Nagaoka University of Technology, Japan, ²Lightnix, Co., Ltd., Japan, ³Wuhan University of Technology, China, ⁴Sun Moon University, Korea
- S5-P044 Making CaTiO₃ Nano-Tubes Inducing Osteoblast Activation by Hydrothermal Synthesis**
H. Nishida¹, T. Sekino², D. J. Park², T. Matumoto³, T. Nakamura³, H. Usami³, K. Yamamoto¹; ¹Osaka Dental University, Japan, ²Tohoku University, Japan, ³Osaka University, Japan
- S5-P045 Formation and Characterization of TiO₂ Thin Films Coated on Glass Beads**
H. Ueoka, Y. Suyama; Shimane University, Japan
- S5-P046 Enhanced Photovoltaic Properties of Hybrid Structured Titania Layer for Dye-Sensitized Solar Cell**
M.-H. Kim, Y.-K. Jeong; Pusan National University, Korea
- S5-P047 Enhancement of Conversion Efficiency of Dye-Sensitized Solar Cell by Low-Temperature Chemically-Synthesized TiO₂ Nanotube Photoelectrode**
J.-Y. Kim, T. Sekino, S. Tanaka; Tohoku University, Japan
- S5-P048 Structure and Properties of Al₄B₂O₉**
A. Anjiki, T. Uchino; Kobe University, Japan
- S5-P049 Luminescence Properties of Ce³⁺ Doped Nanocrystalline SrAl₁₂O₁₉**
A. Yadav^{1,2}, S. Chawla¹, V. Shanker¹, Ramprakash²; ¹National Physical Laboratory, India, ²Birla Institute of Technology, India
- S5-P050 Visible Emission in MgAl₂O₄ Spinel**
S. Sawai, T. Uchino; Kobe University, Japan
- S5-P051 Optical Properties of Color Centers in α-Al₂O₃ Prepared under Vacuum**
S. Ikeda T. Uchino; Kobe University, Japan
- S5-P052 Microstructure and Luminescence of Rare Earth Doped Li(Nb, Ti)O₃ Solid Solutions**
H. Hayashi¹, H. Nakano², M. I. Jones³; ¹KRI, Inc. Japan, ²Toyohashi University of Technology, Japan, ³University of Auckland, New Zealand
- S5-P053 Visible Emission in Silica Crystal**
R. Katayama, T. Iwasaka, T. Uchino; Kobe University, Japan
- S5-P054 Preparation of Composite PMMA Microbeads Hybridized with Fluorescent YVO₄:Bi³⁺,Eu³⁺ Nanoparticles**
K. Akisada, Y. Noguchi, T. Isobe; Keio University, Japan
- S5-P055 Photoluminescence Properties of β-FeSi₂ Grains on Si Substrate with Au Coat Layer**
K. Akiyama¹, K. Yokomizo², S. Kaneko¹, Y. Hirabayashi¹, M. Itakura²; ¹Kanagawa Industrial Technology Center, Japan, ²Kyusyu University, Japan
- S5-P056 ZnO Thin Films Prepared by a Coplanar Surface Discharge Technique**
K. Nabeta, M. Shikatani, M. Okuya; Shizuoka University, Japan
- S5-P057 Magnetic Property Change of NiFe₂O₄ by the Grain Growth**
R. Kurosawa, T. Suzuki, T. Nakayama, H. Suematsu, K. Niihara; Nagaoka University of Technology, Japan



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- S5-P058 Relating Composition, Electronic Structure, and Physical Properties in the AlMgB_{14} Orthorhombic Boride Crystal Family**
L. F. Wan¹, P. J. Huffman¹, S. P. Beckman^{1,2}; ¹Iowa State University, USA, ²Ames Laboratory, USA
- S5-P059 Fabrication of the Nanosized Patterned Thin Film by Sputtering and Nanoimprint Process**
M. Takeda, T. Fujihara, H. D. Kim, T. Nakayama, T. Suzuki, H. Suematu, K. Niihara; Nagaoka University of Technology, Japan
- S5-P060 The Verification of Anisotropic Ceramics Particle Combination Theory by a Molten Salt Method**
J. Yoshimura, T. Nakayama, T. Suzuki, H. Suematsu, K. Niihara; Nagaoka University of Technology, Japan
- S5-P061 Anisotropic Control and Characterization of the Hexagonal Boron Nitride Nanosheets Fabricated by Microscopic Mold**
T. Fujihara, C. H. Baek, M. Takeda, T. Nakayama, T. Suzuki, H. Suematu, K. Niihara; Nagaoka University of Technology, Japan
- S5-P062 Thermal Modification of Photocatalytic Activity in Ag/TiO_2 Nanotube Composites**
M. Terauchi¹, M. Ishii², T. Sekino³, L. Jiwon¹, T. Nakayama¹, T. Suzuki¹, H. Suematsu¹, K. Niihara¹; ¹Nagaoka University of Technology, Japan, ²Osaka Prefecture University, Japan, ³Tohoku University, Japan
- S5-P063 Use of a Natural-dye of TiO_2 Nanotube for Dye-Sensitized Solar Cells**
J. W. Lee¹, M. Terauchi¹, K. Minato², T. Nakayama¹, T. Suzuki¹, H. Suematu¹, K. Niihara¹; ¹Nagaoka University of Technology, Japan, ²Hakodate National College of Technology, Japan