

## Aug. 7 (Tue) Kitakyushu International Conference Center

### Room A

#### Thermoelectric Materials I

Chairs: Prof. Teruyuki Ikeda and Dr. Yoshikazu Shinohara

- 9:00 – 9:20 O-23 **Effects of Milling Rotational Speed on n-type  $\text{Bi}_2\text{Te}_{2.67}\text{Se}_{0.33}$  Thermoelectric Semiconductors**  
Kenichi Hanasaku and Kazuhiro Hasezaki  
Tokushima University, Japan
- 9:20 – 9:40 O-24 **Thermal characteristics of energy cascade utilization system based on solar thermal power supply**  
Koji Kusano, Yusuke Minami and Kazuhiro Hasezaki  
Tokushima University, Japan
- 9:40 – 10:10 O-25 (Keynote) **Design and Synthesis of High Efficiency Peak to Peak (PtoP) type Thermoelectric Power Module Constructed by Functionally-Gradient-Layers**  
SuDong Park, Jong Ho Park, Byungki Ryu, Jaywan Chung  
Korea Electrotechnology Research Institute (KERI), South Korea
- 10:10 – 10:30 O-26 (Invited) **Theoretical Evaluation of Thermoelectric Materials with Uniform and Graded Structures for Thermoelectric Power Generation**  
Yoshikazu Shinohara, Yoshiki Takagiwa, Yukihiko Isoda and Masahiro Goto  
National Institute for Materials Science, Japan
- 10:30 – 10:50 Break

#### Thermoelectric Materials II

Chairs: Prof. Kazuhiro Hasezaki and Prof. Shinji Munetoh

- 10:50 – 11:10 O-27 (Invited) **Graphene promoted oxygen vacancies in perovskite for enhanced thermoelectric properties**  
Yuchi Fan<sup>1</sup> and Akira Kawasaki<sup>2</sup>  
1 Donghua University, P. R. China  
2 Tohoku University, Japan
- 11:10 – 11:30 O-28 **Development of Low-cost and Non-toxic Thermoelectric Material for Sensor Application**  
Yoshiki Takagiwa<sup>1</sup>, Yukihiko Isoda<sup>1</sup>, Masahiro Goto<sup>1</sup>, Yoshikazu Shinohara<sup>1</sup>, Akiko Saito<sup>2</sup>, and Teruyuki Ikeda<sup>2</sup>  
1 National Institute for Materials Science (NIMS), Japan  
2 Ibaraki University, Japan
- 11:30 – 11:50 O-29 **An efficient way of exploring microstructure and thermoelectric properties of multicomponent systems using composition-graded bulk materials**  
Akiko Saitoh<sup>1</sup>, Hiroto Nishimine<sup>1</sup>, Ayako Ikeda<sup>2</sup>, Yoshiki Takagiwa<sup>2</sup>, Tsuyoshi Nishi<sup>1</sup>, Hiromichi Ohta<sup>1</sup>, and Teruyuki Ikeda<sup>1</sup>  
1 Ibaraki University, Japan; 2 National Institute for Materials Science, Japan
- 11:50 – 12:10 O-30 (Invited) **Thermal probe method analysis for  $\text{Ba}_8\text{Au}_x\text{Si}_{46-x}$  single crystal clathrate with Au composition gradient**  
Shinji Munetoh, Yuuki Osakabe and Keita Yamasoto  
Kyushu University, Japan
- 12:10 – 13:30 Exhibition & Lunch

### Room B

#### Surface and Interface

Chairs: Prof. Rong Tu and Prof. Hitoshi Kohri

- 9:10 – 9:30 O-31 (Invited) **Attempt to Increase the Toughness of Biodegradable Resin**  
Hitoshi Kohri<sup>1</sup>, Yuta Watanabe<sup>1</sup>, Hiroyuki Tsukumo<sup>2</sup> and Yasumi Yuma<sup>2</sup>  
1 Kogakuin University, Japan  
2 KSK CO., LTD, Japan
- 9:30 – 9:50 O-32 **Joining of 93W Alloy and Mo1 Alloy with a Cu Interlayer by Plasma Activated Sintering**  
Mei Rao, Jiahui Ding, Jian Zhang, Guoqiang Luo, Qiang Shen and Lianmeng Zhang  
Wuhan University of Technology, P. R. China
- 9:50 – 10:10 O-33 **Structural Difference in Aluminum/Carbon Fiber Interface of Carbon Fiber Reinforced Aluminum Matrix Composites Fabricated by Two Different Powder Metallurgical Processes**  
Grégory Laret<sup>1</sup>, Hiroki Kurita<sup>2</sup>, Jean-Marc Heinz<sup>3</sup> and Jean-François Silvain<sup>1</sup>  
1 ICMCB-CNRS, France; 2 Shizuoka University, France  
3 ENSCBP, France
- 10:10 – 10:30 O-34 **Development of surface treatment to realize novel biomaterial realize both tissue compatibility and antibacterial property**

Yusuke Tsutsumi, Masaya Shimabukuro, Peng Chen, Maki Ashida, Hisashi Doi and Takao Hanawa  
Tokyo Medical and Dental University, Japan

10:30 – 10:50 Break

### **Biological and Optical Functions I**

Chairs: Prof. Toshiki Miyazaki and Prof. Kouichi Nakano

10:50 – 11:10 O-35 (Invited) **Functionally Graded Metal Implants with Ability of Bone Integration**

Toshiki Miyazaki  
Kyushu Institute of Technology, Japan

11:10 – 11:30 O-36 (Invited) **Several Boundaries and Functionally Graded Layers -Study on Biofilms that have Functionally Graded Characteristics on the Boundaries-**

Kouichi Nakano  
Kyushu Institute of Technology, Japan

11:30 – 11:50 O-37 **Using Regenerated Cellulose as Adhesives in Cellulose-based Green Composites**

K. Suzuki, A. N. Nakagaito and H. Takagi  
Tokushima University, Japan

11:50 – 12:10 O-38 **Preparation of Microcapsules coated with Styrene-modified CNF using Supercritical Carbon dioxide**

Shinichi Tokunaga, Kenji Mishima, Taku M. Aida, Tanjina Sharmin and Miyuki Nakamura  
Fukuoka University, Japan

12:10 – 13:30 Exhibition & Lunch

### **Room C**

### **Centrifugal Processing**

Chairs: Prof. Takahiro Kunimine and Prof. Yoshimi Watanabe

9:10 – 9:30 O-39 **Fabrication of Cu Alloy-Based Self-Lubricating Functionally Graded Materials by Combination of Centrifugal Mixed-Powder Method and Aging Treatment**

Hisashi Sato, Tomoaki Kayano, Tadachika Chiba and Yoshimi Watanabe  
Nagoya Institute of Technology, Japan

9:30 – 9:50 O-40 **Metal-Matrix FGMs with Matrix-Composition Gradient Processed by Centrifugal Sintered-Casting**

Takahiro Kunimine<sup>1</sup>, Motoko Yamada<sup>2</sup>, Hisashi Sato<sup>2</sup> and Yoshimi Watanabe<sup>2</sup>  
1 Kanazawa University, Japan  
2 Nagoya Institute of Technology, Japan

9:50 – 10:10 O-41 (Invited) **Fabrication of FGMs under Centrifugal Force and Their Some Applications**

Yoshimi Watanabe  
Nagoya Institute of Technology, Japan

10:10 – 10:30 O-42 **Horizontal Type FGMs Manufacturing System under the Centrifugal Force, NOC 2000**

Yasumasa Oya<sup>1</sup>, Hisashi Sato<sup>2</sup> and Yoshimi Watanabe<sup>2</sup>  
1 OHYA-CHUZOSHO Co., Ltd., Japan  
2 Nagoya Institute of Technology, Japan

10:30 – 10:50 Break

### **Multifunctions**

Chairs: Prof. Thorsten Gerdes and Prof. Makoto Kobashi

10:50 – 11:20 O-43 (Keynote) **Copper/diamond functionally graded materials**

J.-F. Silvain<sup>1,2</sup>, C. Azina<sup>1,2</sup>, Y.F. Lu<sup>2</sup> and J.-L. Battaglia<sup>1</sup>  
1 CNRS, University of Bordeaux, France  
2 University of Nebraska-Lincoln, USA

11:20 – 11:40 O-44 **Fabrication and Characterization of Al-Cu System Graded Impactors in Light Gas Gun Experiments**

Jianian Hu, Guoqiang Luo, Jiqin Chen, Jian Zhang, Qiang Shen and Lianmeng Zhang  
Wuhan University of Technology, P. R. China,

11:40 – 12:00 O-45 (Invited) **Functionally graded carbon nanotube reinforced aluminum matrix composite tube fabricated by hot extrusion process**

Hansang Kwon<sup>1,2</sup>, Kwangjae Park<sup>1</sup>, Dasom Kim<sup>1</sup>, Jehong Park<sup>2</sup>, Seungchan, Cho<sup>3</sup>, Akira Kawasaki<sup>4</sup> and Kwonhoo Kim<sup>1</sup>,  
1 Pukyong National University, South Korea; 2 Next Generation Materials Co., Ltd., South Korea; 3 South Korea Institute of Materials Science, South Korea; 4 Tohoku University, Japan

12:00 – 13:30 Exhibition & Lunch

**Main Hall****Plenary Lecture**

Chair: Dr. Yoshikazu Shinohara

13:30 – 14:20 PL-2

**"Manufacture and properties of layered, graded and 3D anisotropic materials for applications in communications and energy storage"**

Prof. Patrick S. Grant  
Department of Materials, University of Oxford, UK

14:20 – 14:40

Break

**Room A****Structural Analysis and Design I**

Chairs: Dr. Daria Sidorenko and Prof. Fumio Narita

14:40 – 15:10 O-46

**(keynote) Electro-elastodynamic Behavior of Functionally Graded Piezoelectric Thin Plates**

Fumihiko Ashida<sup>1</sup>, Takuya Morimoto<sup>1</sup> and Hidenori Ozaki<sup>2</sup>  
1 Shimane University, Japan  
2 OPTON Co. Ltd., Japan

15:10 – 15:30 O-47

**Modelling of Functionally Graded Micro-beams with Variable Length Scale Parameters**

Reza Aghazadeh, Serkan Dag and Ender Cigeroglu  
Middle East Technical University, Turkey

15:30 – 15:50 O-48

**(Invited) Finite Element Analysis and Design of Flexible Functionally Graded Piezocomposites - Toward Effective Vibration and Temperature Energy Harvesting Materials**

Kotaro Mori<sup>1</sup>, Zhenjin Wang<sup>2</sup> and Fumio Narita<sup>2</sup>  
1 Ibaraki University, Japan  
2 Tohoku University, Japan

15:50 – 16:10 O-49

**Multiscale simulation of multiferroic composite materials**

Shota Fukui and Yasutomo Uetsuji  
Osaka Institute of Technology, Japan

16:10 – 16:30 O-50

**Modern Design of Diamond Cutting Tools: Mechanical Alloying, Nanomodification, Functional Graded Coatings**

Daria Sidorenko, Pavel Loginov and Evgeny Levashov  
National University of Science and Technology "MISIS", Russia

16:30 – 16:50 O-51

**Particle Size Effects on Mechanical Properties of Wood Plastic Composites**

Naoyuki Shiraishi<sup>1</sup>, Yasutomo Uetsuji<sup>1</sup> and Hirokazu Ito<sup>2</sup>  
1 Osaka Institute of Technology, Japan  
2 National Institute of Advanced Industrial Science and Technology, Japan

**Room B****Multi-dimensional printing II**

Chairs: Prof. Fujio Tsumori and Prof. Soshu Kirihara

14:40 – 15:00 O-52

**(Invited) Trial of functionally-graded Zr-based alloy builds for biomedical applications**

Naoyuki Nomura, Torun Gözden, Keiko Kikuchi and Akira Kawasaki  
Graduate School of Engineering, Tohoku University, Japan

15:00 – 15:20 O-53

**Cladded layer with graded composition WC/Co using Laser Metal Deposition**

Yorihiro Yamashita<sup>1</sup>, Yoshinori Funada<sup>1</sup>, Takahiro Kunimine<sup>2</sup>, Yuji Sato<sup>3</sup> and Masahiro Tsukamoto<sup>3</sup>  
1 Industrial Research Institute of Ishikawa, Japan; 2 Kanazawa University, Japan  
3 Osaka University, Japan

15:20 – 15:40 O-54

**(Invited) Stereolithographic Additive Manufacturing of Metal and Ceramic Components with Functional Geometries**

Soshu Kirihara  
Osaka University, Japan

15:40 – 15:50

Short Break

**Biological and Optical Functions II**

Chairs: Prof. Takayuki Narushima and Prof. Kouichi Nakano

15:50 – 16:10 O-55

**(Invited) Formation and Antibacterial Activity of TiO<sub>2</sub> Layers on Ti-Au Alloys**

Takayuki Narushima, Kyosuke Ueda, Takatoshi Ueda and Naoki Sato  
Tohoku University, Japan

16:10 – 16:30 O-56

**Evaluation of Optical Properties on FGPJ between Cu and SUS304 for Quality Assurance**

Kazuki Iwakiri and Kouichi Nakano  
Engineering Kyushu Institute of Technology, Japan

16:30 – 16:50 O-57 **Effect of Thermo-mechanical Processing on Microstructure and Mechanical Properties of Harmonic-structure Pure Copper**  
Guodong Li<sup>1,2</sup>, Shuichi Morinaka<sup>2</sup>, Mie Kawabata<sup>2</sup>, Chaoli Ma<sup>1</sup> and Kei Ameyama<sup>2</sup>  
1 Beihang University, P. R. China;  
2 Ritsumeikan University, Japan

**Room C**

**Processings**

Chairs: Dr. J-F Silvain and Prof. Hansang Kwon

14:40 – 15:00 O-58 **Preparation of AlN/Mo Functionally Graded Materials by Tape Casting and Spark Plasma Sintering**  
Yueqi Wu, Fei Chen, Mei Huang, Qiang Shen and Lianmeng Zhang  
Wuhan university of technology, P. R. China,

15:00 – 15:20 O-59 *(Invited)* **Compositionally and porosity graded metal-ceramic composite for thermal barrier applications**  
Christian Richter, Monika Willert-Porada, Andreas Rosin, Walter Krenkel and Thorsten Gerdes  
University of Bayreuth, Germany

15:20 – 15:40 O-60 **Effect of Al/Ni Molar Ratio on Cell Morphology and Constituting Phase of Porous Ni-Al Intermetallic Compounds**  
Yunmao Shu, Asuka Suzuki, Naoki Takata and Makoto Kobashi  
Nagoya University, Japan

15:40 – 16:00 O-61 *(Invited)* **Formation of Oriented and Graded Grain Structure in Fe-Cu-C Alloy by Liquid Phase Sintering and Carburation**  
Ryuzo Watanabe<sup>1</sup>, Yasuaki Okita<sup>2</sup> and Akira Kawasaki<sup>3</sup>  
1 Japan Aerospace Technology Foundation, Japan; 2 JFE Steel Corp., Japan  
3 Tohoku Univ., Japan

16:00 – 16:20 O-62 **Boron carbide reinforced Al composite plate fabricated by casting followed by rolling process**  
Seungchan Cho, Donghyun Lee, Sangmin Shin, Ilguk Jo, Sang-Kwan Lee and Sang-Bok Lee  
Korea Institute of Materials Science (KIMS), South Korea

16:20 – 16:40 O-63 **Bonding strength of Al/resin joint via functionally graded interpenetrating phase layer**  
Asuka Suzuki<sup>1</sup>, Yuta Arai<sup>2</sup>, Naoki Takata<sup>1</sup> and Makoto Kobashi<sup>1</sup>  
1 Nagoya University, Japan  
2 Nagoya University (Currently: The Japan Commercial Broadcasters Association)

17:00 –

**Memorial Ceremony of Prof. M. Willert-Porada and Prof. T. Hirai**