

**The 8th Japan-Korea International Symposium
on Materials Science and Technology**

JKMST2023 ABSTRACT

Date: August 22 (Tue.) – 25 (Fri.), 2023

Venue: Eikokuji Campus, Kochi University of Technology, Kochi City,
Kochi, Japan



Photograph by A. Yamashita

**The Materials Science Society of Japan
Materials Research Society of Korea**

The 8th Japan-Korea International Symposium on Materials Science and Technology (JKMST2023)



- Date: August 22 (Tue.) - 25 (Fri.), 2023
- Venue: Eikokuji Campus, Kochi University of Technology,
2-22 Eikokuji, Kochi City, Kochi 780-8515, Japan
Please use the QR code for access to the venue. Detailed maps appear in the following pages.
- Access: <https://www.kochi-tech.ac.jp/english/about/access/eikokuji.html>
See pages iv-vii for venue, instruction for presentations, and places for several events.
- Registration desk: In front of Room: A214 in Education&research building (Kyo-iku-Kenkyu-Tou)
- Registration fee:
Member: 55,000 JPY, Student member: 25,000 JPY, Nonmember: 70,000 JPY, Student: 40,000 JPY
Only cash is acceptable at the registration desk.
- Program at a glance:

Date	Time	Event	Place
8/22(Tue.)	17:00-17:35	Registration	Registration desk
	18:00-20:00	Welcome reception for Members & non-members except students	Tsukasa
8/23(Wed.)	08:57-09:00	Opening remark	Room A214
	09:00-12:00	Technical Session I (Plenary, Invited)	Room A214
	12:00-13:30	Lunch	Obi-ya Kansuke
	13:30-16:25	Technical Session II (Invited, Contributed)	Room A214
	16:25-16:30	Let's take our Group photo! & Break	Room A214
	16:30-18:00	Poster Session ※13:15-16:00 for posting	Gallery on A214
	18:20-20:20	JKMST2023 Executive Committee Meeting	Fujinoya
8/24(Thu.)	08:30-10:00	Technical Session III (Invited, Contributed)	Room A214
	10:15-18:40	Excursion to Katsurahama, YAMAKIN Co. Ltd	Gather at <u>Entrance</u>
	19:00-21:00	Banquet & ceremony	Tenka-aji-eida
8/25(Fri.)	08:30-11:10	Technical Session IV (Invited)	Room A214
	11:10-11:15	Closing remark	Room A214

Organized by

The Materials Science Society of Japan (MSSJ), Materials Research Society of Korea (MRS-K)

Supported by

Kochi Visitors & Convention Association

Symposium Committee of JKMST2023

Organization:

MSSJ

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Prof. Toshihiko MAEDA (Chairman)

Prof. Byung-Koog JANG (Vice President)

Prof. Yukihiro SAKAMOTO (Editorial committee)

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Prof. Aichi YAMASHITA (International relations committee)

MRS-K

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JKMST2023 Secretariat:

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8-1 Yonbancho, Chiyoda, Tokyo 102-0081, Japan

E-mail: mssj@shokabo.co.jp

URL: <http://www.mssj.gr.jp>

Access to Eikokuji Campus, Kochi University of Technology

AIRLINE



- Tokyo (Haneda) –Kochi 80 min.
- China (Narita)–Kochi 80 min.
- Nagoya (Komaki) -Kochi 60min.
- Osaka (Itami) –Kochi 45 min.
- Kobe–Kochi 45 min.
- Fukuoka–Kochi 50 min.

From Kochi Ryoma Airport

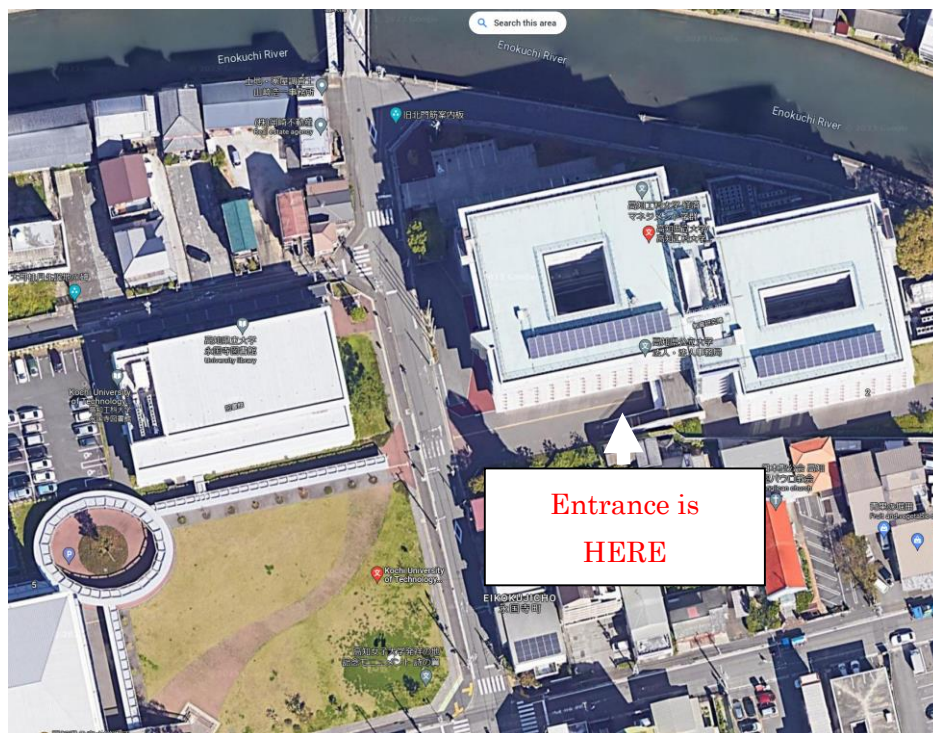
50 minutes by airport bus
Get off at Harimaya-bashi or JR Kochi Station.
5 minutes by taxi or 15 minutes on foot from either bus stop.

Ref. <https://www.kochi-tech.ac.jp/english/about/access/eikokuji.html> accessed at 22 June 2023

The directions and map of **the Venue**



The venue: Education&research building (Kyo-iku-Kenkyu-Tou)



Registration desk: In front of Room A214 on 2F in Kyo-iku-Kenkyu-Tou

Oral session: 2F, A214

Poster session: 2F, Gallery on Room A214

Instructions of presentation

Oral presentaion: LCD projector will be provided. Authors are expected to bring their presentation on their own laptop computers along with a backup copy on a USB Drive in case of laptop failure. LCD projectors accept standard HDM input. Please prepare connectors to the standard HDMI input (male) from your laptop PCs by yourself.

Poster presentation: The size of the poster should be within A0, 841 x 1189 mm. Use the sheet of paper with the shorter side at the top. Presentation number will be denoted in each panerl. See the posing time in page ii.

Best Poster Awards: Awarding ceremony will be held in the Banquet. Please attend the Banquet. See page ii.

Event: Welcome reception at Aug. 22nd (Tue.).

Members & non-members except students

Place: Tsukasa

Address: 1 Chome-2-15 Harimayacho, Kochi, 780-0822

URL: <https://tukasa.owst.jp/en/>



Event: Lunch at Aug. 23rd (Wed.).

All participants

Place: Obi-ya Kansuke / Wasan Obi-ya Kansuke

Address: 2 Chome-2-15 Obiyamachi, Kochi, 780-0841

URL: <https://havakawa.group/obiya.html>

Kochi university of Technology



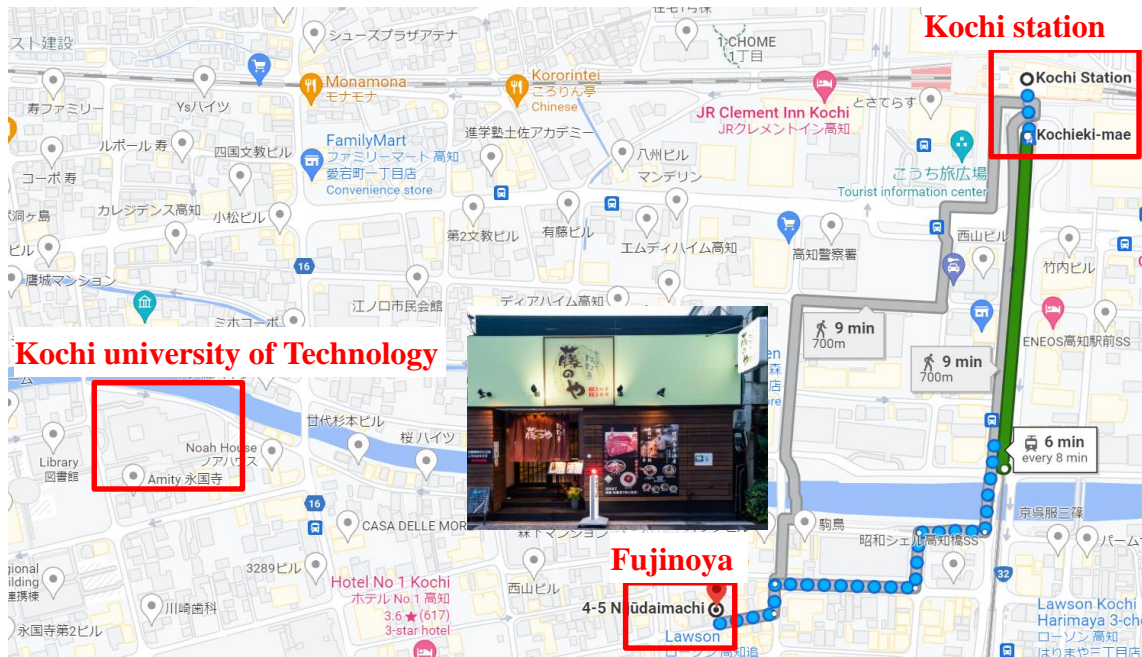
Event: JKMST2023 Executive Committee Meeting at Aug. 23rd (Wed.).

JKMST2023 executive committee members only

Place: Fujinoya

Address: 4-5 Nijūdaimachi, Kochi, 780-0843

URL: <https://fujinoya-kochi.com/>



Event: Banquet & ceremony at Aug. 24th (Thu.).

All participants

Tenka-aji-eida

3 Chome-4-18 Sakaedacho, Kochi, 780-0061

URL: <https://tenkaaji-sakaeda.gorp.jp/>



Program

August 22nd (Tue.)	
17:00-17:35	Registration in front of Room: A214
17:40-18:00	move time
18:00-20:00	Welcome reception. except students

August 23rd (Wed.), Room: A214		
Chair: Prof. Hiroaki NISHIKAWA		
08:57-09:00		Opening remark Toshihiko MAEDA, Kochi University of Technology, Japan
09:00-09:35	1. Plenary	Corrosion behavior of RE-doped silicate as a promising EBC materials <u>Byung-Koog JANG*</u> , Seung-Hyeon KIM**, Yoon-Suk OH***, *Kyushu University, **National Institute for Materials Science (NIMS), Japan, ***Korea Institute of Ceramic Engineering and Technology (KICET), Korea
09:35-10:10	2. Plenary	Transition Metal Phosphide Nanocrystals Electrocatalysts for Water Splitting and Alternative Oxidation Reactions Jin Hyeok KIM, Optoelectronics Convergence Research Center and Department of Materials Science and Engineering, Chonnam National University, Korea
10:10-10:35	3. Invited	Development and Overview of High-Entropy Functional Materials Aichi YAMASHITA, Department of Physics, Tokyo Metropolitan University, Japan
Chair: Prof. Sungwook MHIN		
10:45-11:10	4. Invited	Real Time Optical Spectroscopy in a Wide Variety of Research Areas Yohan YOON, Department of Materials Engineering, Korea Aerospace University, Korea
11:10-11:35	5. Invited	Highly active and stable surface for oxygen evolution reaction in acidic solutions Shigeto HIRAI, Kitami Institute of Technology, Japan
11:35-12:00	6. Invited	Energy Storage Characteristics of Aerosol Deposited PZT Thick Film DaeYong JEONG, Inha University, Korea
Lunch @ Obi-ya Kansuke (See vi)		
Chair: Prof. Yukihiko SAKAMOTO		
13:30-13:55	7. Invited	The design of hybrid dielectric materials for Low-k, low-loss substrates in microwave/mm-wave communication systems Do-Kyun KWON, Department of Materials Science and Engineering, Korea Aerospace University, Korea
13:55-14:20	8. Invited	Electronic Properties of Charge Transferred Heterointerface Between LaCrO ₃ and SrTiO ₃ Hiroaki NISHIKAWA, Faculty of Biology-Oriented Science and Technology, Kindai University, Japan
14:20-14:45	9. Invited	Design of Cathode and Anode Materials for the Application to Zinc Ion Batteries Sang-hwa LEE*, Gye Seok AN**, Jiwan KIM**, Se hun LEE*, <u>Sungwook MHIN**</u> , * Advanced Institute of Convergence Technology, Seoul National University, ** Advanced Materials Engineering, Kyonggi University, Korea

Program

Chair: Prof. Yongwoo KWON		
14:55-15:20	10. Invited	New organic-inorganic hybrid solid electrolytes (HSEs) <u>Jae Hyun KIM*</u> , Hasan Jamal*, Firoz Khan**, *Division of Energy Technology, Daegu Gyeongbuk Institute of Science & Technology, ** Interdisciplinary Research Center for Renewable Energy and Power Systems (IRC REPS), Research Institute, King Fahd University of Petroleum & Minerals (KFUPM), Korea
15:20-15:45	11. Invited	The magnetic critical current density of H-doped SmFeAsO <u>Y. KAMIHARA***</u> , T. KAWAMATU*, T. SUEMURA*, R. HOCHI*, and M. MIURA***, *Dept. APPI, Keio University, **CSRN, Keio University, ***Grad. Sch. Sci. Tech. Seikei University, Japan
Chair: Prof. Seung-Hyeon KIM		
15:45-16:10	12. Invited	Hemoglobin encapsulation within ELP block copolymer nanoparticles to develop effective hemoglobin-based oxygen carrier Sooim SHIN, Department of Bioengineering, Chonnam National University, Korea
16:10-16:25	13. Contributed	Crystal Structure Dependence of Carrier Transport Phenomenon in $Y_{0.77}Gd_{0.23}Ba_2Cu_3O_{7-\delta}$ Thin Films Under Hydrogen Atmosphere during Heat Treatment <u>Hideo NAMITA***</u> , Hiroyuki SATO*, Masanori MATOBA***, Suguru IWASAKI***, Masaya FUJIOKA***, Yoshiko HARA****, Takumu HARADA****, Masashi MIURA****, Yoichi KAMIHARA***, *Department Of Applied Physics And Physico-Informatics, Keio University, **Spintronics Research and Development Center, Keio University, ***Research Institute For Electronic Science, Hokkaido University, ****Superconductivity Research Laboratory, Seikei University, Japan
Chair: Prof. Byung-Koog JANG		
16:25-16:30	all	Photograph of all participants
Chair: Prof. Shigeto HIRAI & Yohan YOON		
16:30-18:00		Poster session
Chair: Prof. Byung-Koog JANG & Do-Kyun KWON		
18:20-20:20	Executive only	JKMST2023 Executive Committee Meeting

Program

August 23rd (Wed.)	
Chair: Profs. Shigeto HIRAI & Yohan YOON	
P1	Nanostructuring induced by ion beam irradiation on Au-deposited Ge substrates <u>Naoto OISHI*</u> , Natsumi HIGASHIDE*, Noriko NITTA*.,**, *School of Engineering Science, Kochi University of Technology, **Center for Nanotechnology, Research Institute, Kochi University of Technology, Japan
P2	Real Time Observation of Halide Segregation in Mixed Halide Perovskite Solar Cells Sanguk WOO*, Ye Won KIM**, Hye-In JUNG*, Yeonghun YUN**, <u>Hangyeol CHOI*</u> , Sangwook LEE**, Yohan YOON* *Department of Materials Engineering, Korea Aerospace University, ** School of Materials Science & Engineering, Kyungpook National University, Korea
P3	Pinning mechanism of High-entropy-type REBa ₂ Cu ₃ O _{7-δ} thin films <u>Mahiro YAMANAKA*</u> , Aichi YAMASHITA*, Daichi OKA*, Yasushi HIROSE*, Toshihiko MAEDA**, Akito SHIMAMURA*, Yusuke NAKANISHI*, Yasumitsu MIYATA*, Yoshikazu MIZUGUCHI*, *Faculty of Science, Tokyo Metropolitan University, **School of Engineering, Kochi University of Technology, Japan
P4	Evaluating The Effectiveness of Ga ₂ O ₃ -rGO Photocatalyst Using UV/VIS Real-time Spectroscopy Simultaneously <u>Hyein JUNG</u> , Sanguk WOO, Yohan YOON Department of Materials Engineering, Korea Aerospace University, Korea
P5	High thermoelectric figure-of-merit and ultra-low lattice thermal conductivity of new high-entropy-type AgBi(S, Se, Te) ₂ <u>Asato SESHITA*</u> , Aichi YAMASHITA*.,**, Takeshi FUJITA**.,***, Akira MIURA****, Takayoshi KATASE*****, Chikako MORIYOSHI*****, Yoshihiro KUROIWA*****, Yoshikazu MIZUGUCHI*, *Department of Physics, Tokyo Metropolitan University, **School of Environmental Science and Engineering, Kochi University of Technology, ***Center for Nanotechnology, Kochi University of Technology, ****Faculty of Engineering, Hokkaido University, *****MDX Research Center for Element Strategy, International Research Frontiers Initiative, Tokyo Institute of Technology, *****, Graduate School of Advanced Science and Engineering, Hiroshima University, Japan
P6	Ultra-Thin Electrode Fabrication via 2D Metallic Nanotiles and Intense Pulsed Light Sintering for High Integration in LTCC Technology <u>Sang Un PARK</u> , Do-Kyun KWON, Department of Materials Science and Engineering, Korea Aerospace University, Korea
P7	Thermoelectric properties of Rb(Zn,Cu) ₄ As ₃ <u>Keigo ONO*.,**</u> , Kunihiro KIHOU**, Yosuke GOTO**, Chul-Ho LEE**, *Department of Applied Physics and Physico-Informatics, Keio University (Dept. APPI, Keio Univ.), **National Institute of Advanced Industrial Science and Technology (AIST), Japan
P8	Low-energy processing and their microwave/mm-wave dielectric properties of Cordierite(Mg ₂ Al ₄ Si ₅ O ₁₈)/ Forsterite (Mg ₂ SiO ₄) ceramics <u>Seok Eun KWON</u> , Na Yeon KWON, Do-Kyun KWON, Department of Materials Science and Engineering, Korea Aerospace University, Korea
P9	Investigation of Deterioration suppression for Photocatalyst Performance of Titanium Oxide <u>Hidehira AOKI*</u> , Masaki HASHIDA**, Satoru IWAMORI**, Sergei KULINICH**, *Graduate School of Engineering, Tokai University, **Research Institute of Science and Technology, Tokai University, Japan
P10	Novel Approach for Synthesis of Complex Perovskite Composites: using 2-D nanosheet <u>Tae Yeong SONG</u> , MyeongU HAN, Do-Kyun KWON, Department of Materials Science and Engineering, Korea Aerospace University, Korea
P11	Effect of Graphene Addition to TiO ₂ Thin Films Prepared by Electrostatic Inkjet Method in a Glove Box Chamber on the Conversion Efficiency of Dye-Sensitized Solar Cells <u>Kemal DURDYEV*</u> , Md. SHAHIDUZZAMAN*.,**, Shinjiro UMEZU***, Tetsuya KANEKO*, Koji TOMITA*, Sergei KULINICH*, Masaki HASHIDA*, Satoru IWAMORI*, *Tokai University, **Kanazawa University, ***Waseda University, Japan

Program

P12	High Corrosion Resistance Boride coating on Carbon Steel Alloy using High-Velocity Oxygen Fuel Spray Coating (HVOF) <u>Seungwook KIM</u> , Hwapyeong LEE, Daeyong JEONG, Department of Materials Science and Engineering, Inha University, Korea
P13	Microstructure of Si Wires on Si(100) Substrates Fabricated using Anodization <u>Miyuki KOCHI</u> , Toshiaki SUZUKI, Masaaki NIWA, Mitsuya MOTOHASHI, Engineering, Tokyo Denki University, Japan
P14	Improved Thermal Properties of Polymer-Ceramic Composite through the Impregnation Process <u>Hwa-Pyeong LEE</u> , Seung-Wook KIM, Dea-Yong JEONG, Inha University, Korea
P15	The Synthesis of $\text{SmFeAsO}_{1-x}\text{F}_x$ (nominal $x = 0.16$) by reaction route using SmOF <u>Ryoma TAKEUCHI*</u> , Yukihiro KOBAYASHI*, Ayumi OKADA* and Yoichi KAMIHARA**, *Department of Applied Physics and Physico-Informatics, Keio University, **Spintronics Research and Development Center, Keio University, Japan
P16	Substitution Effects of Metallic Elements of Mo, W, Nb and Ta in (Pb,Cu)-"1-2-0-1" <u>Kohei IRIE*</u> , Toshihiko MAEDA***, *School of Environmental Science and Engineering, Kochi University of Technology, ** Center for Nanotechnology, Kochi University of Technology, Japan
P17	Improvement of Mechanical Properties by Consideration of Curing Reaction of Furan Resin <u>Taiki ABE</u> , Masatoshi KUBOUCHI, Winarto KURNIAWAN, School of Materials and Chemical Technology, Tokyo Institute of Technology, Japan
P18	Effects of Oxygen Nonstoichiometry and Mixed Valence States of Pb on Superconductivity of (Pb,Cu)-"1-2-1-2" <u>Daimon SAKO*</u> , Toshihiko MAEDA***, *School of Environmental Science and Engineering, Kochi University of Technology, ** Center for Nanotechnology, Kochi University of Technology, Japan
P19	Effects of Ar-O ₂ Atmospheric Pressure Plasma Irradiation Time on EC Durability of Microstructured InN Thin Films <u>Keita MIYASAKA*</u> , Yasushi INOUE*, Osamu TAKAI**, *Department of Advanced Materials Science and Engineering, Chiba Institute of Technology, **Materials and Surface Engineering Research Institute, Kanto-gakuin University, Japan
P20	Bulk crystal growth and characterization of non-centrosymmetric single crystal $\text{CaTa}_4\text{O}_{11}$ <u>Yueshen ZHOU***</u> , Dongsheng YUAN*, Kiyoshi SHIMAMURA***, *Research Center for Electronic and Optical Materials, National Institute for Materials Science, **Graduate School of Advanced Science and Engineering, Waseda University, Japan
P21	Graphitic carbon nitride-coated quartz crystal microbalance gas sensor for H ₂ detection <u>Yasushi ISHIGURO*</u> , Taira NISHITANI*, Can LI**, and Kenji HIRAKURI*, *Department of Electrical and Electronic Engineering, Tokyo Denki University, Japan **Institute of Optoelectronic Materials and Devices, China Jiliang University, China
P22	Improvement of Transparent Conductive Film Properties of ZnO Thin Films <u>Yamato SAKAMOTO*</u> , Yasushi INOUE*, Masanobu KOBAYASHI*, *Department of Advanced Materials Science and Engineering, Chiba Institute of Technology, Japan
P23	Lifetime assessment of unsaturated polyester resin filled with synthetic zeolite under alkaline environment <u>Kohei SAITO*</u> , Tetsuya SAKAI**, Nobuo MITOMO**, Winarto Kurniawan***, Masatoshi KUBOUCHI***, *Industrial Engineering and Management, Graduate School of Industrial Technology, Nihon University, ** Department of Management Engineering, College of Industrial Engineering, Nihon University, ***Department of Chemical Science and Engineering, Tokyo Institute of Technology, Japan
P24	Shape Control of Mesoscopic Si Rolls Fabricated by Anodization <u>Yangmuyi QIAO</u> , Taiki ARAI, Toshiaki SUZUKI, Masaaki NIWA, Mitsuya MOTOHASHI, Engineering, Tokyo Denki University, Japan

Program

P25	Oxidation Mechanism of Si Surface Anodized with Extremely Diluted HF Solution <u>Taiki ARAI*</u> , Yangmuyi QIAO*, Toshiaki SUZUKI*, Akitaka YOSHIGOE**, Mitsuya MOTOHASHI*, * Engineering, Tokyo Denki University, **JAEA, Materials Sciences Research Center, Japan
P26	The Catalytic Activity of Co-doped YBa ₂ Cu ₃ O _{7-δ} for Oxygen Evolution Reaction <u>Hiromasa TAHARA*</u> , Taisuke KAIZUKA*, Rei KURAMOCHI*, Yoichi KAMIHARA**, and Masanori MATOBA**, *Department of Applied Physics and Physico-Infomatics, Keio University, **Spintronics Research and Development Center, Keio University, Japan
P27	A study on temperature-independent arrayed waveguide gratings using a polymer upper cladding applied to silica optical waveguides DongSoo Kang Department of Materials Research Institute, Inha University, South Korea

Program

August 24th (Thr.), Room: A214		
Chair: Prof. Ji-Hwoan LEE		
08:30-08:55	14. Invited	Monolithic photoelectrochemical tandem devices consisting of tunnel oxide passivated contact silicon and BiVO ₄ enabling unassisted water splitting Choongman MOON*, Gihun JUNG, Filipe MARTINHO**, Yun Seog LEE***, Stela CANULESCU**, <u>Byungha SHIN*</u> , *Department of Materials Science and Engineering, KAIST, Korea **Department of Photonics Engineering, Technical University of Denmark, Denmark, *** Department of Mechanical Engineering, Seoul National University, Korea
08:55-09:20	15. Invited	Evaluation of concentration of oxidizers in sulfuric acid electrolyzed with diamond electrodes. <u>Emi SHINDOU***</u> , Hidehiko OHTSU***, Tatsuo NAGAI****, Yukihiro SAKAMOTO***, *Graduate School of Engineering, Chiba Institute of Technology, **Tokyo City University, ***Chiba Institute of Technology, ****Micro Ace Co., Japan
Chair: Prof. DaeYong JEONG		
09:20-09:45	16. Invited	Phase-field modeling of microstructure development in polycrystalline thin films Hwanwook LEE, Jungin PARK, Muhammad Hassaan ALI, <u>Yongwoo KWON</u> , Department of Materials Science and Engineering, Hongik University, Korea
09:45-10:00	17. Contributed	Effects of Additives on Roughening Etchant for Copper and Effect of Roughening on Fine Wiring Formation <u>Akira HOSOMI***</u> , Tsugito YAMASHITA*** and Mitsuhiro WATANABE*, *Kanto Gakuin University, **Mitsubishi Gas Chemical Company, Inc., ***Hightechno Co., Ltd., Japan
Chair: Prof. Toshihiko MAEDA		
10:15-18:40		Excursion
Chair: Prof. Mitsuya MOTOHASHI		
19:00-21:00		Banquet & ceremony

Program

August 25th (Fri.), Room: A214		
Chair: Prof. Do-Kyun KWON		
08:30-08:55	18. invited	Understanding and Manipulating Defects in Materials from Dielectrics to Conductive Materials Soonil LEE, School of Materials Science and Engineering / Department of Materials Convergence and System Engineering, Changwon National University, Korea
08:55-09:20	19. invited	Fabrication of Mesoscopic Si Wires by Introducing Dislocations Mitsuya MOTOHASHI, Department of Information and Communication Engineering, Tokyo Denki University, Japan
09:20-09:45	20. invited	Effect of Sputtered Ti Films on Hydrogen Intrusion into High-strength Steel <u>Yasushi INOUE*</u> , Kazuya KOYAMA*, Daisuke TERADA*, Shumpei OZAWA*, * Department of Advanced Materials Science and Engineering, Chiba Institute of Technology, Japan
Chair: Prof. Yasushi INOUE		
09:55-10:20	21. invited	Preparation of diamond from solid carbon sources using plasma CVD <u>Mai IMAMIYA*</u> , Tomo HIKICHI*, Yukihiro SAKAMOTO**, *COCODIA-JAPAN Co., Ltd, **Chiba Institute of Technology, Japan
10:20-10:45	22. Invited	Self-healing behavior of scandium disilicate with silicon carbide for environmental barrier coatings <u>Seung-Hyeon KIM*</u> , Toshio OSADA*, Byung-Koog JANG**, *NIMS, **Kyushu University, Japan
10:45-11:10	23. Invited	Effect of mold set up on densification behavior of Y ₂ O ₃ during spark plasma sintering <u>Ji-Hwoan LEE*</u> , Byung-Nam KIM*, Byung-Koog JANG**, Koji MORITA*, *National Institute for Materials Science (NIMS), **Kyushu University, Japan
Chair: Prof. Mitsuya MOTOHASHI		
11:10-11:15		Closing remark Byung-Koog JANG, **Kyushu University, Japan