

# PROGRAM

**【October 7th, Wednesday】**

Opening Session (13:00-13:10)

Plenary Session (13:10-14:00)

Chair: N. Fujimura (*Osaka Prefecture University*)

Plenary 13:10 (50min+poster) ... 1  
Research on Nitride Semiconductors ~from the Dawn, through the Present, to the Future~  
T. Matsuoka  
Tohoku University

Break (14:00-14:10)

Session We1 (14:10-14:40)

Chair: K. Kojima (*Tohoku University*)

We1 [Invited] 14:00 (30min) ... 5  
Recent Progress of Power Semiconductor Devices and Expectation for GaN Power Devices  
N. Iwamuro  
University of Tsukuba

Break (14:40-14:50)

Session We2 (14:50-15:20)

Chair: T. Araki (*Ritsumeikan University*)

We2 [Invited] 14:50 (30min) ... 9  
Breakthrough Technologies for AlGaIn-based UV-B Laser Diode  
M. Iwaya\*, T. Omori\*, S. Tanaka\*, Y. Ogino\*, K. Yamada\*, S. Ishizuka\*, S. Teramura\*, K. Sato\*\*, S. Iwayama\*\*\*, T. Takeuchi\*, S. Kamiyama\*, I. Akasaki\*\*\*\*, and H. Miyake\*\*\*  
\*Meijo University, \*\*Asahi-Kasei Corporation, \*\*\*Mie University, and \*\*\*\*Nagoya University

Break (15:20-15:30)

Short Presentation 1 (15:30-16:10)

Chair: F. Ishikawa (*Ehime University*)

P1-1 15:30 (2min+poster) ... 11  
RF-MBE growth and characterization of high-In-content GaInN/GaN multiple layers  
K. Tahara, R. Yoshida, H. Hirukawa, T. Yamaguchi, T. Onuma, and T. Honda  
Kogakuin University

P1-2 15:32 (2min+poster) ... 13  
Growth of GaN Film on ScAlMgO<sub>4</sub> Substrate by RF-MBE  
S. Kayamoto\*, T. Fujii\*\*\* T. Fukuda\*\*, R. Sugie\*\*\*, S. Mouri\*, and T. Araki\*  
\*Ritsumeikan Univ, \*\*Fukuda Crystal Laboratory, \*\*\*Toray Research Center, Inc.

P1-3 15:34 (2min+poster) ... 15  
A theoretical model for carbon coverage on GaN polar surfaces during MOVPE  
D. Yoshio\*, Y. Inatomi\*, and Y. Kangawa\*\*\*  
\*Kyushu University, \*\*Nagoya University

P1-4	15:36 (2min+poster)	...	17
Epitaxial Growth of InGaN Thin Film with High InN Molar Fraction by Pulsed DC Sputtering			
Y. Onishi*, H. Miura**, N. Takahashi**, M. Uemukai*, T. Tanikawa*, and R. Katayama*			
*Osaka University, **Tokyo Electron Technology Solutions Limited			
P1-5	15:38 (2min+poster)	...	19
Hole Traps Introduced by Electron Beam Irradiation in Homoepitaxial n-type GaN and Its Irradiation Energy Dependence			
M. Endo, M. Horita, K. Kanegae, and J. Suda			
Nagoya University			
P1-6	15:40 (2min+poster)	...	21
Impact of The Schottky Barrier Height on Deep-level Transient Spectroscopy of Gamma-ray-irradiated n-type GaN			
K. Aoshima, M. Horita, and J. Suda			
Nagoya University			
P1-7	15:42 (2min+poster)	...	23
Fabrication of GaN Polarity-Inverted Structure by Inductively Coupled Plasma Reactive Ion Etching and Surface Activated Bonding			
N. Yokoyama, R. Tanabe, S. Ichikawa, Y. Fujiwara, M. Uemukai, T. Tanikawa, and R. Katayama			
Osaka University			
P1-8	15:44 (2min+poster)	...	25
Transverse Quasi-Phase-Matched Second Harmonic Generation using Polarity-Inverted GaN Channel Waveguide with Input Grating Coupler			
. Murata, N. Yokoyama, T. Komatsu, Y. Morioka, M. Uemukai, T. Tanikawa, and R. Katayama			
Osaka University			
P1-9	15:46 (2min+poster)	...	27
Layer-by-layer Synthesis of Metal Oxide Compounds by Programable Pulsed-DC Sputtering Combined with Oxygen Pulsed Supply			
H. Isshiki*, K. Miyagi*, Y. Tanaka***, and S. Saisho***			
*The University of Electro-Communications, **Shincron Co. LTD.			
P1-10	15:48 (2min+poster)	...	29
Annealed Proton-Exchanged Waveguide with Large Mode Size in Quasi-Phase-Matched MgO:SLT for High Power Second Harmonic Generation			
R. Noro, M. Uemukai, T. Tanikawa, and R. Katayama			
Osaka University			
P1-11	15:50 (2min+poster)	...	31
Growth of GaAs nanowires on 2-inch Si substrate by molecular beam epitaxy			
M. Yukimune, K. Sakaguchi, R. Tsutsumi, T. Ohno, and F. Ishikawa			
Ehime University			
P1-12	15:52 (2min+poster)	...	33
Effect of Bi flux on the molecular beam epitaxial growth of GaAs/GaAsBi core/shell nanowires			
M. Okujima*, S. Mori*, K. Yoshikawa*, M. Yukimune*, R. D. Richards**, and F. Ishikawa*			
*Ehime University, **University of Sheffield			
P1-13	15:54 (2min+poster)	...	35
Two-step photon up-conversion solar cells using up-conversion of holes			
S. Asahi*, M. P. Nielsen**, N. J. Ekins-Daukes**, and T. Kita*			
*Kobe University, **University of New South Wales			
P1-14	15:56 (2min+poster)	...	37
Crystallization of Ni (111) layer on c-plane sapphire substrate for high-quality graphene precipitation - utilization of crystallization starter layer -			
A. Nakashima, T. Kashio, T. Murahashi, T. Soga, T. Maruyama, and S. Naritsuka			
Meijo University			
P1-15	15:58 (2min+poster)	...	39
In-situ X-ray diffraction monitor of multilayer graphene by precipitation method using nanodiamond			
T. Kashio, A. Nakashima, Y. Ueda, T. Maruyama, and S. Naritsuka			
Meijo University			
P1-16	16:00 (2min+poster)	...	41
High pressure and high temperature treatment for the impurity control of P implanted diamond			
K. Higashiura, R. Fukuta, F. Ishikawa, T. Shinmei, H. Ohfuji, and T. Irifune			
Ehime University			

P1-17	16:02 (2min+poster)	...	43
Magnetic tunnel junction based sensors for electric current monitoring M. Oogane, T. Ogasawara, M. Tsunoda, and Y. Ando Tohoku University			
P1-18	16:04 (2min+poster)	...	45
Highly thermal-stable monolayers formed on a gold surface using benzenedithiol H. Takahashi, N. Ikematsu, Y. Hattori, and M. Kitamura Kobe University			
P1-19	16:06 (2min+poster)	...	47
Self-consistent analysis of PCSEL under CW operation S. Katsuno, T. Inoue, M. Yoshida, M. De Zoysa, K. Ishizaki, and S. Noda Kyoto University			
P1-20	16:08 (2min+poster)	...	49
The effect of laser pulse interval on laser-induced periodic nanostructure formation T. Ohgai, R. Miyagawa, and O. Eryu Nagoya Institute of Technology			

Break (16:10-16:20)

### Session We3 (16:20-16:50)

*Chair: H. Nishinaka (Kyoto Institute of Technology)*

We3 [Invited]	16:20 (30min)	...	51
Deep and Vacuum UV Emission Properties in Rocksalt-structured MgZnO T. Onuma*, K. Kudo*, K. Ishii**, M. Ono*, Y. Ota***, K. Kaneko**, T. Yamaguchi*, S. Fujita*, and T. Honda* *Kogakuin University, **Kyoto University, and ***Tokyo Metropolitan Industrial Technology Research Institute			

Break (16:50-17:00)

### Poster Session 1 (17:00-18:00)

Free time (18:00-18:50)

### Company Introduction 1 (18:50-19:00)

### Rump Session (19:00-20:30)

*“PhD researchers lead not only academia but also industry and global society”*

*Organizer:* N. Fujimura (Osaka Prefecture University)

*Panelists:* T. Asahi (Waseda University)  
S. Takahashi (Leave a Nest Co., Ltd.)  
S. Tsuji (Seijo University)  
E. Hoshi (The University of New Mexico)

## 【October 8th, Thursday】

### Session Th1 (9:00-9:30)

Chair: Y. Kangawa (Kyushu University)

Th1 [Invited]	9:30 (30min)	...	55
Introduction to “Future Materials Exploring Initiative-Engineering for Diverse Stable Phases-”			
K. Sato***			
*Japan Science and Technology Agency and **Tokyo University of Agriculture and Technology			

### Break (9:30-9:40)

### Short Presentation 2 (9:40-10:30)

Chair: R. Miyagawa (Nagoya Institute of Technology)

P2-1	9:40 (2min+poster)	...	59
Synthesis of high-entropy oxide epitaxial thin films: layered rock salt $\text{LiCr}_{1/6}\text{Mn}_{1/6}\text{Fe}_{1/6}\text{Co}_{1/6}\text{Ni}_{1/6}\text{Cu}_{1/6}\text{O}_2$			
K. Wang*, K. Nishio*, K. Horiba**, M. Kitamura**, K. Edamura*, D. Imazeki*, R. Nakayama*, R. Shimizu****, H. Kumigashira** ****, and T. Hitosugi*			
*Tokyo Institute of Technology, **High Energy Accelerator Research Organization, ***PRESTO, ****Tohoku University			
P2-2	9:42 (2min+poster)	...	61
Change in the defect structures of composition controlled electronic-ferroelectric $\text{YbFe}_2\text{O}_4$ thin films			
K. Shimamoto, K. Miura, D. Kiriya, T. Yoshimura, A. Ashida, and N. Fujimura			
Osaka Prefecture University			
P2-3	9:44 (2min+poster)	...	63
Formation process of metastable Al-doped $\text{HfO}_2$ thin films phases and directly on Si by atomic layer deposition			
S. Takarae, K. Takada, D. Kiriya, A. Ashida, T. Yoshimura, and N. Fujimura			
Osaka Prefecture University			
P2-4	9:46 (2min+poster)	...	65
Growth of Metastable Rhombohedral Structured Oxides Using Alpha- $\text{Fe}_2\text{O}_3$ Buffer Layers via Mist CVD Method			
K. Shimazoe, H. Nishinaka, Y. Arata, Y. Ito, and M. Yoshimoto			
Kyoto Institute of Technology			
P2-5	9:48 (2min+poster)	...	67
Data Analysis for Sputtering and High-Temperature Annealing in AlN Templates Fabrication			
A. Kusaba*, Y. Kangawa***, K. Norimatsu***, and H. Miyake***			
*Kyushu University, **Nagoya University, ***Mie University			
P2-6	9:50 (2min+poster)	...	69
Epitaxial growth of various p- and n-type oxide thin films on flexible synthetic mica using mist chemical vapor deposition			
Y. Arata, H. Nishinaka, K. Shimazoe, Y. Ito, and M. Yoshimoto			
Kyoto Institute of Technology			
P2-7	9:52 (2min+poster)	...	71
Comparison of Microstructures in alpha- $\text{Ga}_2\text{O}_3$ and alpha- $\text{In}_2\text{O}_3$ Films Grown on alpha- $\text{Al}_2\text{O}_3$ Substrates by Mist CVD			
Y. Hayakawa*, S. Ohno*, T. Yamaguchi*, T. Kiguchi**, S. Takahashi*, H. Yokoo*, T. Onuma*, and T. Honda*			
*Kogakuin University, **Tohoku University			
P2-8	9:54 (2min+poster)	...	73
Elimination of Threading dislocations in alpha- $\text{Ga}_2\text{O}_3$ Grown by Double-layered Epitaxial Lateral Overgrowth			
K. Kawara***, Y. Oshima***, M. Okigawa*, and T. Shinohe*			
*FLOSFIA Inc., **Kyoto University, ***National Institute for Materials Science			
P2-9	9:56 (2min+poster)	...	75
In-plane Anisotropy in the Direction of the Dislocation Bending in alpha- $\text{Ga}_2\text{O}_3$ Grown by Epitaxial Lateral Overgrowth			
K. Kawara***, T. Oshima*, M. Okigawa*, and T. Shinohe*			
*FLOSFIA Inc., **Kyoto University			
P2-10	9:58 (2min+poster)	...	77
P-type alpha- $(\text{Ir,Ga})_2\text{O}_3$ with a band gap of more than 4 eV			
K. Kaneko*, Y. Masuda*, S. Kan*, I. Takahashi**, Y. Kato**, R. Kanno**, M. Sugimoto**, T. Shinohe**, and S. Fujita*			
*Kyoto University, ** FLOSFIA Inc.			

P2-11	10:00 (2min+poster)	...	79
Band alignment of MgZnO alloys and the related band offset calculations Y. Ota*, K. Kaneko**, T. Onuma***, and S. Fujita** *TIRI, **Kyoto University, ***Kogakuin University			
P2-12	10:02 (2min+poster)	...	81
Structural and electronic properties of 2-dimensional GaN on van der Waals substrates T. Yayama*, A. K. Lu**, T. Nakanishi**, and T. Morishita** *Kogakuin University, **AIST			
P2-13	10:04 (2min+poster)	...	83
Raman study of the phase transition in VO <sub>2</sub> ultrathin films on hexagonal-boron nitride B. Yu*, S. Genchi*, M. Yamamoto**, K. Watanabe***, T. Taniguchi***, H. Tanaka* *Osaka University, **Kansai University, ***National Institute for Materials Science			
P2-14	10:06 (2min+poster)	...	85
Topological phase transformation of transition metal dichalcogenides via contacting electron donor molecules K. Matsuyama, A. Fukui, T. Yoshimura, A. Ashida, N. Fujimura, and D. Kiriya Osaka Prefecture University			
P2-15	10:08 (2min+poster)	...	87
Formation of periodic nanostructures by circularly polarized laser H. Matsuura, R. Miyagawa, and O. Eryu Nagoya Institute of Technology			
P2-16	10:10 (2min+poster)	...	89
Removal of polymer residues from PMMA-protected transferred graphene PMMA K. Niwa, T. Fukami, T. Maruyama, and S. Naritsuka Meijo University			
P2-17	10:12 (2min+poster)	...	91
First demonstration and characterization of semipolar deep ultraviolet LEDs on r-AlN R. Akaike, M. Funato, and Y. Kawakami Kyoto University			
P2-18	10:14 (2min+poster)	...	93
Design and Fabrication of AlN Waveguide Microcavity SHG Device S. Umeda, T. Nagata, M. Uemukai, T. Tanikawa, and R. Katayama Osaka University			
P2-19	10:16 (2min+poster)	...	95
Evaluation on formation energies of point defect in group III nitride semiconductors for space-use solar cells R. Suzuki, T. Yayama, and T. Honda Kogakuin University			
P2-20	10:18 (2min+poster)	...	97
Impact of Cell Pitch on High-speed Switching Performance in GaN Vertical Trench MOSFETs T. Ishida, K. Sakao, T. Kachi, and J. Suda Nagoya University			
P2-21	10:20 (2min+poster)	...	99
Suppression of efficiency-droop for Eu-doped GaN using amplified spontaneous emission A. Takeo, S. Ichikawa, S. Maeda, J. Tatebayashi, and Y. Fujiwara Osaka University			
P2-22	10:22 (2min+poster)	...	101
Impact of fabrication errors on laser oscillation in GaN:Eu-based photonic crystal cavities T. Iwaya, S. Ichikawa, M. Murakami, J. Tatebayashi, and Y. Fujiwara Osaka University			
P2-23	10:24 (2min+poster)	...	103
Effect of boron implantation process conditions on isolation characteristics of GaN-based micro LED arrays F. Yoshimura, K. Yamane, and A. Wakahara Toyohashi University of Technology			
P2-24	10:26 (2min+poster)	...	105
Performance Analysis of an InAs/GaAs/Al <sub>0.3</sub> Ga <sub>0.7</sub> As Quantum Dot in well Intermediate Band Solar Cell under Two step Photoexcitations Y. Zhu, S. Asahi, K. Watanabe, and T. Kita Kobe University			

P2-25 10:28 (2min+poster) ... 107  
 Absolute Photoluminescence Spectroscopy on InAs/GaAs Quantum Dot Solar Cells: Bias Voltage Dependence  
 R. Tamaki\*\*\*\*, Y. Shoji\*\*, J.-F. Guillemoles\*\*\*\*\*, and Y. Okada\*\*\*\*\*  
 \*The University of Tokyo, \*\*AIST, \*\*\*IPVF, \*\*\*\*NextPV LIA

**Break (10:30-10:40)**

**Poster Session 2 (10:40-12:10)**

**Company Introduction 2 (12:10-12:50)**

**Free time (Lunch) (12:50-13:40)**

**Session Th2 (13:40-14:10)**

*Chair: M. Kitamura (Kobe University)*

Th2 [Invited] 13:40 (30min) ... 109  
 New ferromagnetic semiconductors and spintronics applications: Fe-doped narrow-gap III-V ferromagnetic semiconductors and heterostructures with high Curie temperature  
 M. Tanaka\*, L. Anh\*, K. Takiguchi\*, S. Goel\*, S. Ohya \*, N. Tu\*\*\*\*, and P. Hai\*\*\*\*\*  
 \*The University of Tokyo, \*\*Ho Chi Minh City University of Pedagogy, \*\*\*Tokyo Institute of Technology

**Break (14:10-14:20)**

**Short Presentation 3 (14:20-15:10)**

*Chair: T. Yayama (Kogakuin University)*

P3-1 14:20 (2min+poster) ... 111  
 Characteristics of droplet formations at the molecular beam epitaxy of GaAsBi compound nanostructures on Si(111) and GaAs(001) substrates  
 K. Yoshikawa\*, K. Nagashima\*\*, T. Yanagida\*\*, and F. Ishikawa\*  
 \*Ehime University, \*\*The University of Tokyo

P3-2 14:22 (2min+poster) ... 113  
 Controlling Bi content in low-temperature-grown GaAs<sub>1-x</sub>Bi<sub>x</sub>  
 T. Umenishi\*, Y. Takagaki\*, Y. Tominaga\*, M. Yukimune\*\*, and F. Ishikawa\*\*  
 \*Hiroshima University, \*\*Ehime University

P3-3 14:24 (2min+poster) ... 115  
 Dramatic enhancement of current and voltage in modulation-doped two-step photon up-conversion solar cells  
 K. Watanabe, S. Asahi, Y. Zhu, and T. Kita  
 Kobe University

P3-4 14:26 (2min+poster) ... 117  
 Development of mid-infrared photodetector can operate under room temperature with high sensitivity using intraband transition  
 K. Nakabayashi, S. Asahi, and T. Kita  
 Kobe University

P3-5 14:28 (2min+poster) ... 119  
 Direct growth of single-layer graphene on 2-inch a-plane sapphire substrate using low-pressure CVD without metal catalyst  
 Y. Ueda, T. Maruyama, and S. Naritsuka  
 Meijo University

P3-6 14:30 (2min+poster) ... 121  
 Low temperature graphite growth on SiO<sub>2</sub> substrate using Ga solution  
 T. Fukami, K. Niwa, Y. Kobayashi, T. Maruyama, and S. Naritsuka  
 Meijo University

P3-7	14:32 (2min+poster)	...	123
Thermal conductivity of suspended twisted bilayer graphene J. Doi, S. Mouri, and T. Araki Ritsumeikan University			
P3-8	14:34 (2min+poster)	...	125
Seed layer technique leading to high-efficiency multi-junction solar cells on glass T. Nishida, T. Suemasu, and K. Toko University of Tsukuba			
P3-9	14:36 (2min+poster)	...	127
Highly Tolerant Diamond Schottky Barrier Photodiodes for High-Power Excimer Lamp and 70 MeV Protons M. Imura*, M. Togawa**, H. Okumura***, J. Nishinaga****, M. Miyahara**, T. Matsuki**** and Y. Koide* *NIMS, **KEK, ***University of Tsukuba, ****AIST			
P3-10	14:38 (2min+poster)	...	129
Electrical and Optical Characteristics of ITO Electrode for Electrically-Tunable Waveguide Phase Shifter A. Tomibayashi, Y. Hisada, M. Uemukai, T. Tanikawa, and R. Katayama Osaka University			
P3-11	14:40 (2min+poster)	...	131
Formation and optical characteristics of Tm,Yb-codoped ZnO nanowires on silicon substrates by sputtering-assisted MOCVD N. Nishiyama, J. Tatebayashi, S. Ichikawa, and Y. Fujiwara Osaka University			
P3-12	14:42 (2min+poster)	...	133
Solution processed nonvolatile organic transistor memories based on ambipolar organic semiconductors M. Higashinakaya*, T. Nagase***, R. Hattori*, S. Tazuhara*, T. Kobayashi*** and H. Naito*** *Osaka Prefecture University, ** RIMED			
P3-13	14:44 (2min+poster)	...	135
Evaluation of carrier mobility in organic metal-oxide-semiconductor capacitors Y. Kimura, Y. Hattori, and M. Kitamura Kobe University			
P3-14	14:46 (2min+poster)	...	137
Influence of the Layer Number of Graphene on Remote Epitaxy of InN by RF-MBE K. Matsushima, S. Mouri, and T. Araki Ritsumeikan University			
P3-15	14:48 (2min+poster)	...	139
Role of Low-Temperature Buffer Layer and GaN Flattening Layer on Metalorganic Vapor Phase Epitaxy of Lattice-Matched InGaN on ScAlMgO <sub>4</sub> S. Yoshida*, N. Ryoki**, K. Miyano**, T. Tanikawa*, M. Uemukai*, and R. Katayama* *Osaka University, **Panasonic Corporation			
P3-16	14:50 (2min+poster)	...	141
First Demonstration of Tunable Single-Mode InGaN Laser with Periodically Slotted Structure A. Higuchi, Masahiro Uemukai, Tomoyuki Tanikawa, and Ryuji Katayama Osaka University			
P3-17	14:52 (2min+poster)	...	143
Design of Transverse Quasi-Phase-Matched Double-Layer AlN Waveguide for 230-nm DUV Second Harmonic Generation Hiroto Honda*, Naoki Yokoyama*, Asahi Yamauchi*, Tenta Komatsu*, Kanako Shojiki**, Hideto Miyake**, Masahiro Uemukai*, Tomoyuki Tanikawa* and Ryuji Katayama* *Osaka University, ** Mie University			
P3-18	14:54 (2min+poster)	...	145
Epitaxial growth of four-inch AlGaIn-based deep ultraviolet LEDs by using a large-scale mass production MOCVD tool J. Yoshinaga*, Y. Yano*, T. Arimura*, S. Koseki*, and H. Hirayama** *Taiyo Nippon Sanso Corporation, **RIKEN			
P3-19	14:56 (2min+poster)	...	147
Growth of AlGaIn on AlN Template by RF-MBE and Their Spectral Responsivity in Deep UV Spectral Region M. Hashimoto, N. Tachibana, M. Nakanishi, T. Yamaguchi, T. Honda, and T. Onuma Kogakuin University			
P3-20	14:58 (2min+poster)	...	149
Relationship between crystallinity and emission property in RF-MBE growth of GaN N. Tachibana, M. Hashimoto, T. Yamaguchi, T. Honda, and T. Onuma Kogakuin University			

P3-21	15:00 (2min+poster)	...	151
Comparative study of dislocation classification in HVPE-grown GaN by etch pit method and multiphoton-excitation photoluminescence imaging M. Tsukakoshi, T. Tanikawa, M. Uemukai, and R. Katayama Osaka University			
P3-22	15:02 (2min+poster)	...	153
Resonance characteristics of piezoelectric GaN cantilever fabricated by photoelectrochemical etching T. Yamada*, Y. Ando*, H. Watanabe**, Y. Furusawa**, M. Deki****, A. Tanaka****, S. Nitta**, Y. Honda**, J. Suda***, H. Amano*** *Nagoya University, **IMaSS, ***NIMS,			
P3-23	15:04 (2min+poster)	...	155
Design of Waveguide Directional Coupler for Electric-Field Driven GaN Mach-Zehnder Interferometer Y. Hisada, A. Tomibayashi, M. Uemukai, T. Tanikawa, and R. Katayama Osaka University			
P3-24	15:06 (2min+poster)	...	157
Design of GaN Waveguide Microcavity Device for Broadband Photon Pair Generation T. Nagata, S. Umeda, M. Uemukai, T. Tanikawa, and R. Katayama Osaka University			
P3-25	15:08 (2min+poster)	...	159
Design of epitaxial layer structure for AlN/GaN/AlGaIn quantum-well channel field-effect transistors grown on AlN substrate J. Sawada*, L. J. Schowalter**, and J. Suda* *Nagoya University, **Asahi Kasei Corporation			
VR-1	15:10 (2min+VRposter)	...	161
Anti Stokes photoluminescence caused by energy transfer in ytterbium doped yttrium aluminum perovskite Y. Nakayama, Y. Harada, and T. Kita Kobe University			
VR-2	15:12 (2min+VRposter)	...	163
Development of MicroLED transfer Technology on flexible sheet R. Maeda*, K. Masuda*, A. Nishikawa**, A. Loesing**, I. Fukunaga***, and H. Sekiguchi**** *Toyohashi University of Technology, **ALLOS Semiconductor GmbH, ***Okinawa Institute of Science and Technology Graduate University, ****JST PRESTO			
VR-3	15:14 (2min+VRposter)	...	165
Development of GaN-based MicroLED Neural Probe for Specific-Depth Optogenetic Control D. Shinko*, H. Yasunaga*, T. Takagi*, Y. Nakayama*, K. Mizuguchi*, A. Nishikawa***, A. Loesing***, M. Ohsawa**, and H. Sekiguchi**** *Toyohashi University of Technology, **Nagoya City University, ***ALLOS Semiconductor GmbH, ****JST PRESTO			
VR-4	15:16 (2min+VRposter)	...	167
Correlation between photo excited carrier and spin order of strongly correlated ferroelectric YMnO <sub>3</sub> thin films K. Miura, K. Shimamoto, D. Kiriya, T. Yoshimura, A. Ashida, and N. Fujimura Osaka Prefecture University			
VR-5	15:18 (2min+VRposter)	...	169
Growth of GaN Crystal with Low Oxygen Concentration and Low Dislocation Density by Na-flux PS Method with Li Addition Technique T. Nakajima, T. Yamada, K. Murakami, M. Imanishi, M. Yoshimura, and Y. Mori Osaka University			
VR-6	15:20 (2min+VRposter)	...	171
Formation of the metastable phase of Hf <sub>x</sub> Zr <sub>1-x</sub> O <sub>2</sub> ferroelectric films deposited by atomic layer deposition method K. Takada, S. Takarae, T. Yoshimura, and N. Fujimura Osaka Prefecture University			

### Company Introduction 3 (15:22-15:52)

### Break (15:52-16:02)

### Session Th3 (16:02-16:32)

*Chair: H. Isshiki (The University of Electro-Communications)*

Th3 [Invited] 16:02 (30min)

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Electron Beam Technology Innovation by Semiconductor Photocathodes and its Commercialization

T. Nishitani\*\*\*, Y. Honda\*, M. Araidai\*, H. Amano\*, M. Tabuchi\*, A. Narita\*, H. Yasuda\*\*\*, F. Ishikawa\*\*\*\*, T. Meguro\*\*\*\*\*,  
A. Koizumi\*\*, D. Sato\*\*, and A. Honda\*\*

\*Nagoya University, \*\*Photo electron Soul Inc., \*\*\*Osaka University, \*\*\*\*Ehime University, \*\*\*\*\*Tokyo University of Science

Break (16:32-16:40)

Poster Session 3 and VR Poster Session (16:40-18:10)

Free time (18:10-19:00)

Online Party (19:00-20:00) and Free Banquet

## 【October 9th, Friday】

### Session Fr1 (9:00-9:30)

*Chair: K. Watanabe (National Institute for Materials Science)*

Fr1 [Invited] 9:00 (30min) ... 177  
Deep-learning-assisted robotic assembly of two-dimensional crystals to build van der Waals superlattices  
S. Masubuchi and T. Machida  
University of Tokyo

### Break (9:30-9:40)

### Company Introduction 4 (9:40-11:00)

#### Tutorial (11:00-11:50)

*Chair: R. Katayama (Osaka University)*

Tutorial 11:00 (50min) ... 181  
Quantum Annealing: Progress and Prospects  
H. Nishimori  
Tokyo Institute of Technology

### Free time (Lunch) (11:50-12:40)

### Company Introduction 5 (12:40-13:40)

#### Special Session (13:40-16:15)

*Chair: T. Otoki (SCIOCS Co. Ltd.)*

13:40 (5min)  
Forefront of 5G technology and business  
Y. Otoki  
SCIOCS Co. Ltd.

SP-1 13:45 (30min) ... 185  
5G system trends and requirements for materials and devices  
K. Watanabe  
Fujitsu laboratories

### Break (14:15-14:25)

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5G Device market Trend and Examples of RF Fronend  
Y. Andoh  
Navian Inc.

### Break (14:55-15:05)

SP-3 15:05 (30min) ... 191  
Technologies on RF Acoustic Devices for Wireless Communications and Challenges for 5th Generation Systems  
M. Ueda  
TAIYO YUDEN Mobile Technology Co. Ltd.

## Break (15:35-15:45)

*Chair: K. Shiojima (University of Fukui)*

SP-4            15:45 (30min)  
GaN HEMT Technologies for 5G Base Transceiver Station Amplifiers  
T. Yamamura  
Sumitomo Electric Industries, Ltd.

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## Closing Session (16:15-16:35)