

# PROGRAM

**【July 10th, Wednesday】**

Opening Session (13:00-13:10)

Plenary Session (13:10-14:00)

Chair : A. Wakahara (*Toyohashi University of Technology*)

**Plenary 13:10 (50min) ... 1**  
**Thermodynamics of alloy semiconductors and their thin-film growths**  
**K. Onabe**  
**The University of Tokyo**

Session We1: Oxide-I (14:00-14:57)

Chair : H. Tampo (*National Institute of Advanced Industrial Science and Technology*)

**We1-1 [Invited] 14:00 (30min) ... 5**  
**Advances in oxide semiconductor based thin film transistors**  
**H. Kumomi**  
**Tokyo Institute of Technology**

We1-2 14:30(3min+poster) ... 9  
Thick film growth of zinc oxide on n-GaN by electrodeposition with photoexcitation  
K. Uno, S. Ikegami, M. Sainokami, Y. Tauchi and I. Tanaka  
Wakayama University

We1-3 14:33(3min+poster) ... 11  
Low temperature formation of ZnO films using non-equilibrium atmospheric pressure N<sub>2</sub> Plasma with small amount of O<sub>2</sub> below 1%  
Y. Nose\*, T. Nakamura\*, T. Yoshimura\*, A. Ashida\*, T. Uehara\*\* and N. Fujimura\*  
\*Osaka Prefecture University, \*\*Sekisui Integrated Research Inc.

We1-4 14:36(3min+poster) ... 13  
Nucleation and grain growth process of ZnO by electrochemical method  
A. Ashida, N. Nouzu, T. Yoshimura and N. Fujimura  
Osaka Prefecture University

We1-5 14:39(3min+poster) ... 15  
Characterization of ZnTe and ZnTeO by the DLTS method  
N. Tsuboya, J. Hinata, Y. Nabetani, T. Muranaka and T. Matsumoto  
University of Yamanashi

We1-6 14:42(3min+poster) ... 17  
RF-MBE growth of AlO<sub>x</sub>/AlN/GaN heterostructures  
Y. Sugiura\*\*\*, T. Yamaguchi\*, T. Honda\* and M. Higashiwaki\*\*  
\*Kogakuin University, \*\*National Institute of Information and Communications Technology

We1-7 14:45(3min+poster) ... 19  
Growth and properties of high quality AlO<sub>x</sub> by atmospheric pressure mist CVD  
T. Uchida\*, T. Kawaharamura\*\* and S. Fujita\*  
\*Kyoto University, \*\*Kochi University of Technology

We1-8 14:48(3min+poster) ... 21  
Fabrication of transparent conductive oxide thin films by ultrasonic spray assisted mist deposition method  
T. Ikenoue, S. Sakamoto and Y. Inui  
The University of Shiga Prefecture

We1-9 14:51(3min+poster) ... 23  
Effect of oxygen sources on the electrochemical growth process of Cu<sub>2</sub>O epitaxial films  
S. Sato, A. Ashida, T. Yoshimura and N. Fujimura  
Osaka Prefecture University

We1-10 14:54(3min+poster) ... 25  
Chemical fabrication of transparent Cu metal thin film for infrared reflective thin film  
H. Nagai, T. Okada, T. Honda and M. Sato  
Kogakuin University

### Break (14:57-15:15)

## Session We2: Optical Properties & Devices (15:15-17:00)

*Chairs : M. Fujita (Osaka University) & J. Suda (Kyoto University)*

**We2-1 [Invited] 15:15 (30min)** ... 27  
**Photonic crystal nanocavity laser for optical interconnect**  
**S. Matsuo**  
NTT

We2-2 15:45(3min+poster) ... 29  
Introduction of tensile-strained dilute nitride quantum wells to dielectric-rod type photonic crystal device  
F. Ishikawa\*\*\*, H. Goto\*\* and M. Morifuji\*\*  
\*Ehime University, \*\*Osaka University

We2-3 15:48(3min+poster) ... 31  
Clear observation of cavity mode of GaAs/air multilayer structure  
H. Komatsu, Y. Nakagawa, K. Morita, T. Kitada and T. Isu  
The University of Tokushima

We2-4 15:51(3min+poster) ... 33  
Two-color emission from wafer-bonded GaAs/AlAs coupled multilayer cavity by optical pumping  
C. Harayama, S. Katoh, Y. Nakagawa, K. Morita, T. Kitada and T. Isu  
The University of Tokushima

We2-5 15:54(3min+poster) ... 35  
Effect of etching mask on Al-rich Al<sub>x</sub>Ga<sub>1-x</sub>As dry etching for photonic crystal fabrication  
Y. Togano, Y. Kitabayashi, F. Ishikawa and M. Kondow  
Osaka University

We2-6 15:57(3min+poster) ... 37  
Air-hole retained growth for embedding photonic-crystal structures by MBE  
M. Nishimoto, K. Ishizaki, K. Maekawa, K. Kitamura and S. Noda  
Kyoto University

We2-7 16:00(3min+poster) ... 39  
Wavelength extension of GaAsBi laser with low temperature coefficient of lasing wavelength  
T. Fuyuki and M. Yoshimoto  
Kyoto Institute of Technology

We2-8	16:03(3min+poster)	...	41
Terahertz emission from a (113)B GaAs/AlAs coupled multilayer cavity with self-assembled InAs quantum dots			
M. Ogarane*, S. Katoh*, Y. Nakagawa***, K. Morita*, T. Kitada* and T. Isu*			
*The University of Tokushima, **Nichia Corporation			
We2-9	16:06(3min+poster)	...	43
Capturing a terahertz wave by photonic-crystal slab			
R. Kakimi, M. Fujita, M. Nagai, M. Ashida and T. Nagatsuma			
Osaka University			
We2-10	16:09(3min+poster)	...	45
Grating coupler for terahertz-wave integrated circuits using a photonic-crystal slab			
A. Suminokura, T. Ishigaki, M. Fujita and T. Nagatsuma			
Osaka University			
We2-11	16:12(3min+poster)	...	47
The evaluation of radiation detection for GaN and B GaN			
K. Atsumi, A. Miyake, H. Mimura, Y. Inoue, T. Aoki and T. Nakano			
Shizuoka University			
We2-12	16:15(3min+poster)	...	49
High-field properties of Ge pin photodiodes on Si			
S. Nagatomo and Y. Ishikawa			
The University of Tokyo			
We2-13	16:18(3min+poster)	...	51
Biosensing application of silicon photonic crystal waveguides having air-band optical cavity			
K. Hirai*, T. Araki*, J. Cai*, K. Wada*, Y. Ishikawa*, K. Hayashi**, T. Horiuchi**, Y. Iwasaki**, Y. Ueno** and E. Tamechika**			
*The University of Tokyo, **NTT			
We2-14	16:21(3min+poster)	...	53
Excitonic fine structure of AlN studied by polarization-resolved photoluminescence spectroscopy			
R. Ishii, M. Funato and Y. Kawakami			
Kyoto University			
We2-15	16:24(3min+poster)	...	55
Electrochemical formation and optical characterization of GaN porous structures			
Y. Kumazaki, A. Watanabe, R. Jinbo, Z. Yatabe and T. Sato			
Hokkaido University			
We2-16	16:27(3min+poster)	...	57
Exciton localization characteristics in Al-rich AlGaIn/AlN quantum wells			
T. Oto, R. G. Banal, M. Funato and Y. Kawakami			
Kyoto University			
We2-17	16:30(3min+poster)	...	59
Impact of ultra-thin InN layers in GaN matrix for light-emitting diodes with super weak waveguides			
D. Tajimi*, Y. Sugiura*, T. Hatakeyama*, T. Onuma***, T. Yamaguchi* and T. Honda*			
*Kogakuin University, **Tokyo National College of Technology			
We2-18	16:33(3min+poster)	...	61
Fabrication of nitride air/AlGaIn distributed Bragg reflector vertical microcavities using thermal decomposition of GaN			
R. Tao, M. Arita, S. Kako and Y. Arakawa			
The University of Tokyo			

We2-19	16:36(3min+poster)	...	63
Massive improvement in ultra-violet emission of thermal annealed AlGdN			
K. Tzuzi*, Y. Ishizu*, T. Kita*, Y. Chigi**, T. Nishimoto**, H. Tanaka**, M. Kobayashi**, T. Ishihara*** and H. Izumi***			
*Kobe University, **YUMEX INC, ***Hyogo Prefectural Inst. of Tech			
We2-20	16:39(3min+poster)	...	65
Low-temperature-dependent red light-emitting diode with Eu and Mg codoped GaN active layer			
R. Matsumura*, T. Otani*, H. Sekiguchi*, Y. Takagi**, H. Okada* and A. Wakahara*			
*Toyohashi University of Technology, **Hamamatsu Photonics K. K			
We2-21	16:42(3min+poster)	...	67
Preparation of Europium-doped GaN films grown by radical-nitrogen-assisted compound-source MBE			
S. Yudate, Y. Koyama and S. Shirakata			
Ehime University			
We2-22	16:45(3min+poster)	...	69
Enhancement of red luminescence intensity in Eu-doped GaN/AlGaIn multiple quantum well structures grown by organometallic vapor phase epitaxy			
T. Arai, R. Wakamatsu, D. Lee, A. Koizumi and Y. Fujiwara			
Osaka University			
We2-23	16:48(3min+poster)	...	71
Optical characteristics of Eu and Mg codoped AlGaIn			
M. Kanemoto*, H. Sekiguchi*, Y. Takagi**, H. Okada* and A. Wakahara*			
*Toyohashi University of Technology, **Hamamatsu Photonics K. K.			
We2-24	16:51(3min+poster)	...	73
Luminescence properties of Eu-doped GaN under resonant excitation and quantitative evaluation of luminescent sites			
R. Wakamatsu, D. Lee, A. Koizumi and Y. Fujiwara			
Osaka University			
We2-25	16:54(3min+poster)	...	77
Design of Si guide layer buried Er <sub>2</sub> SiO <sub>5</sub> waveguides by FDTD method			
K. Sakaguchi, Y. Terada, T. Nakajima, T. Kimura and H. Isshiki			
The University of Electro-Communications			
We2-26	16:57(3min+poster)	...	79
Building a measurement system for optical propagation properties in waveguides			
R. Sasamoto, Y. Terada and H. Isshiki			
The University of Electro-Communications			

Poster Session I (We1-2) (17:00-19:00)

Dinner (19:00-20:00)

Rump Session (20:00-21:30)

*“Carrier Design of Science and Technology Students and Researchers”*

*Organizer:* Y. Mori (Osaka University)

*Panelists:* T. Ogawa (Osaka University)  
G. Okada (Spectronix Corporation)  
T. Tokura (Osaka University)  
M. Isemura (Itochu Plastics Inc.)  
K. Kaneko (Kyoto University)  
T. Kageyama (QD Laser, Inc.)

*Chairs:* Y. Mori (Osaka University)  
K. Negishi (Osaka University and Koyasan University)

## 【July 11th, Thursday】

### Session Th1: Electron Devices & Metal-Semiconductor Contacts (8:30-9:27)

Chair : S. Naritsuka (*Meijo University*) & H. Isshiki (*The University of Electro-Communications*)

<b>Th1-1 [Invited] 8:30 (30min)</b>	...	81	
<b>Graphene plasmons and their applications to terahertz lasers</b>			
<b>T. Otsuji</b>			
<b>Tohoku University</b>			
Th1-2	09:00(3min+poster)	...	85
Analysis of surface potential of GaN layers by Kelvin force microscopy			
N. Okada, T. Yamamoto, K. Yamane and K. Tadatomo			
Yamaguchi University			
Th1-3	09:03(3min+poster)	...	87
Influence of native surface oxide on GaN surface band bending			
R. Amiya, Y. Sugiura, D. Tajimi, T. Yamaguchi and T. Honda			
Kogakuin University			
Th1-4	09:06(3min+poster)	...	89
Effects of surface modification on emission property of GaN Schottky diodes			
S. Fujioka*, R. Amiya*, T. Onuma***, T. Yamaguchi* and T. Honda*			
*Kogakuin University, **Tokyo National College of Technology			
Th1-5	09:09(3min+poster)	...	91
AC operation of low-Mg-doped p-GaN Schottky diodes			
T. Aoki*, N. Kaneda**, T. Mishima** and K. Shiojima*			
*University of Fukui, **Hitachi Cable Ltd.			
Th1-6	09:12(3min+poster)	...	93
Characterization of AlGaIn/GaN HEMT by UV assisted CV method			
Y. Hashimoto, S. Kiyohara, J. Kikawa, T. Araki, Y. Nanishi, H. Tomita, M. Sugimoto and M. Kanechika			
Ritsumeikan University			
Th1-7	09:15(3min+poster)	...	95
Characterization of transfer property of AlGaIn/GaN HEMT			
S. Kiyohara*, Y. Hashimoto*, J. Kikawa*, T. Araki*, Y. Nanishi**, H. Tomita***, M. Sugimoto*** and M. Kanechika****			
*Ritsumeikan Univ., **Seoul National University, ***Toyota Motor Corp., ****Toyota Central R&D Laboratories, Inc.			
Th1-8	09:18(3min+poster)	...	97
High-temperature operation of diamond field-effect transistors with Al <sub>2</sub> O <sub>3</sub> passivation layer			
K. Hiramata*, H. Sato*, Y. Harada*, H. Yamamoto* and M. Kasu**,**			
*NTT, **Saga University			
Th1-9	09:21(3min+poster)	...	99
21-kV SiC BJTs With Space-Modulated Junction Termination Extension			
T. Okuda, H. Miyake, T. Kimoto and J. Suda			
Kyoto University			
Th1-10	09:24(3min+poster)	...	101
Evaluation of degradation due to electron irradiation of Si <sub>1-x</sub> C <sub>x</sub> S/D n-type Si MOSFET			
M. Hori*, Y. Asai**, M. Yoneoka*, I. Tsunoda*, K. Takakura*, T. Nakashima***, E. Simoen**** and C. Claeys****			
*Kumamoto National College of Technology, **Kyushu University, ***Chuo Denshi Kogyo Co. LTD, ****IMEC			



## Session Th2: Group III-V and IV Materials (9:27-10:12)

Chair : K. Yamashita (*Kyoto Institute of Technology*)

Th2-1	09:27(3min+poster)	...	103
Crystalline and electrical characteristics of C <sub>60</sub> doped GaAs layers			
J. Nishinaga and Y. Horikoshi			
Waseda University			
Th2-2	09:30(3min+poster)	...	105
Study of the optical properties of C <sub>60</sub> and Si co-doped GaAs layers			
W. Ding*, A. Suzuki*, A. Fukuyama*, J. Nishinaga**, Y. Horikoshi** and T. Ikari*			
*Miyazaki University, **Waseda University			
Th2-3	09:33(3min+poster)	...	107
Experimental study of a symmetric STM image on asymmetric GaAs(001)-c(4*4)a			
S. Kaku, K. Yagyu and J. Yoshino			
Tokyo Institute of Technology			
Th2-4	09:36(3min+poster)	...	109
Growth of free-standing quasi-InGaAs substrate and low thermal resistance InGaAs metamorphic buffer using in-situ curvature measurement			
R. Nakao, M. Arai, R. Iga and M. Kohtoku			
NTT			
Th2-5	09:39(3min+poster)	...	111
Growth of GaAsN quantum wells by using surface nitridation enhanced N incorporation			
N. Urakami*, H. Ito*, H. Sekiguchi*, H. Okada** and A. Wakahara*			
*Toyohashi University of Technology, **Electronics-Inspired interdisciplinary Research Institute			
Th2-6	09:42(3min+poster)	...	113
Comparative study of selective growth of GaAs on Ti, SiO <sub>2</sub> , and graphene masks by molecular beam epitaxy			
H. Iha, Y. Hirota, Y. Shirai, T. Iwatsuki, H. Kato, N. Yamamoto, S. Naritsuka and T. Maruyama			
Meijo University			
Th2-7	09:45(3min+poster)	...	115
Study of abnormal growth in (100) GaAs microchannel epitaxy -Effect of mask pattern-			
M.Tomita, H.Takakura, T.Hishida, D.Kanbayashi, S.Naritsuka and T.Maruyama			
Meijo University			
Th2-8	09:48(3min+poster)	...	117
Formation of highly quality nanocrystal diamond with Si-V luminescent center			
Y. Souma, K. Matsushima, T. Shigeeda, S. Takigawa and H. Isshiki			
The University of Electro-Communication			
Th2-9	09:51(3min+poster)	...	119
Silicon intercalation at the SiC-graphene interface			
S. Kimoto, T. Kajiwara, A. Visikovskiy and S. Tanaka			
Kyushu University			
Th2-10	09:54(3min+poster)	...	121
New polytypes (4H, 6H) of III-nitrides grown by hetero-step-flow mode on vicinal SiC surfaces			
Y. Ishiyama*, M. Takaki*, Y. Hagihara*, J. Nishinaka**, M. Funato**, Y. Kawakami**, A. Hashimoto*** and S. Tanaka*,			
*Kyushu University, **Kyoto University, ***University of Fukui			

Th2-11	09:57(3min+poster)	...	123
Initial stages of graphene growth via MBE by LEED analysis S. Hayashi, A. Visikovskiy, T. Kajiwara and S. Tanka Kyushu University			
Th2-12	10:00(3min+poster)	...	125
Electron irradiation effect of Au induced lateral crystallization for amorphous Ge on SiO <sub>2</sub> K. Moto, S. Sakiyama, T. Kaneko, T. Ootsubo, T. Sakai, K. Nakashima, M. Yoneoka, K. Takakura and I. Tsunoda Kumamoto National College of Technology			
Th2-13	10:03(3min+poster)	...	127
Formation of photo-induced charge transfer composites using graphene oxide and application to heterojunction devices G. Kalita*, M. Umeno** and M. Tanemura* *Nagoya Institute of Technology, **Chubu University			
Th2-14	10:06(3min+poster)	...	131
Growth of pentacene crystallinity control layers for benzodithiophene-dimer field-effect transistors T. Sakai, Y. Matsumoto, H. Osuga, K. Uno and I. Tanaka Wakayama University			
Th2-15	10:09(3min+poster)	...	133
Surface transformation and transmitted light characterization of 6H-SiC by femtosecond laser irradiation R. Miyagawa and O. Eryu Nagoya Institute of Technology			

Break (10:12-10:20)

Poster Session II (Th1-2) (10:20-12:00)

Lunch (12:00-13:00)

Session Th3: Silicon Carbides and Nitrides Growth (13:00-14:33)

*Chair : J. Suda (Kyoto University) & T. Tsuchiya (Hitachi, Ltd.)*

<b>Th3-1 [Invited] 13:00(30min)</b>		...	135
<b>PVT-grown SiC single crystals and their applications to power electronics</b> <b>T. Fujimoto</b> <b>Nippon Steel &amp; Sumitomo Metal Corporation</b>			
Th3-2	13:30(3min+poster)	...	137
Structural characterization of 4H-AlN/4H-GaN short-period superlattice coherently grown on 4H-SiC (11-20) by plasma-assisted molecular-beam epitaxy M. Kaneko, S. Ueta, H. Okumura, T. Kimoto and J. Suda Kyoto University			
Th3-3	13:33(3min+poster)	...	139
Structural characterization of stacking mismatch boundaries in 2H-AlN grown on 6H-SiC (0001) by plasma-assisted molecular beam epitaxy T. Higashi, M. Kaneko, T. Kimoto and J. Suda Kyoto University			



Th3-4	13:36(3min+poster)	...	141
Effects of threading dislocation on MOVPE growth of Si-doped AlN G. Nishio, H. Miyake and K. Hiramatsu Mie University			
Th3-5	13:39(3min+poster)	...	143
Luminescence image of cleaved crystal in hexagonal boron nitride grown by temperature gradient method K. Watanabe and T. Taniguchi National Institute for Materials Science			
Th3-6	13:42(3min+poster)	...	145
Remarkable surface morphology improvement of semipolar (1 $\bar{1}$ 02) AlN homoepitaxial films by nucleation control growth S. Ichikawa*, M. Funato*, S. Nagata** and Y. Kawakami* *Kyoto University, **JFE Mineral Co. Ltd.			
Th3-7	13:45(3min+poster)	...	147
Growth characteristics of semipolar {11-22} GaN homoepitaxial layers J. Nishinaka, M. Funato and Y. Kawakami Kyoto University			
Th3-8	13:48(3min+poster)	...	149
Double polarities selective area growth of GaN in MOVPE by using carbon mask Y. Fujita, Y. Takano, Y. Inoue and T. Nakano Shizuoka University			
Th3-9	13:51(3min+poster)	...	151
Crystallographic polarity dependence of surface morphology evolution during MOVPE growth of GaN/Sapphire N. Yoshinogawa*, T. Iwabuchi*, K. Shojiki*, T. Kimura***, T. Tanikawa***, R. Katayama*** and T. Matsuoka*** *Tohoku University, **Japan Science and Technology Agency			
Th3-10	13:54(3min+poster)	...	153
Effect of indium surfactant on MOVPE growth of N-polar GaN T. Aisaka*, T. Tanikawa***, T. Kimura***, T. Iwabuchi*, K. Shojiki*, R. Katayama***, T. Hanada*** and T. Matsuoka*** *Tohoku University, **Japan Science and Technology Agency			
Th3-11	13:57(3min+poster)	...	155
Interdiffusion of Mg-Fe dopants in GaN T. Tsuchiya, T. Kitatani, A. Terano and K. Mochizuki Hitachi, Ltd.			
Th3-12	14:00(3min+poster)	...	157
Epitaxial growth on high-quality GaN crystals by the Na-flux method M. Honjo, H. Takazawa, Y. Todoroki, H. Imabayashi, D. Matsuo, K. Murakami, M. Maruyama, M. Imade, M. Yoshimura and Y. Mori Osaka University			
Th3-13	14:03(3min+poster)	...	159
The effects of solution stirring by the thermal convection on GaN crystal growth by the Na-flux method K. Nakamura, Y. Harada, H. Iga, K. Murakami, H. Imabayashi, H. Takazawa, Y. Todoroki, D. Matsuo, M. Maruyama, M. Imade, M. Yoshimura, Y. Mori Osaka University			
Th3-14	14:06(3min+poster)	...	161
Growth of thick GaN on Si substrate with 3C-SiC intermediate layer M. Katagiri*, H. Fang*, H. Miyake*, K. Hiramatsu*, H. Oku**, H. Asamura** and K. Kawamura** *Mie University, **Air Water R&D Co., Ltd			

Th3-15	14:09(3min+poster)	...	163
RF-MBE growth of GaN films on $\alpha$ -Ga <sub>2</sub> O <sub>3</sub> /sapphire template T. Hatakeyama, T. Yamaguchi, D. Tajimi, Y. Sugiura and T. Honda Kogakuin University			
Th3-16	14:12(3min+poster)	...	165
The GaN growth on pseudo aluminum templates by molecular beam epitaxy S. Osawa, T. Hatakeyama, D. Tajimi, T. Yamaguchi and T. Honda Kogakuin University			
Th3-17	14:15(3min+poster)	...	167
Growth and characterization of GaN on graphene/Si (100) substrates by RF-MBE S. Uchimura*, J. Sakaguchi*, T. Araki*, Y. Nanishi***, T. Fujishima***, A. Hsu***, K. K. Kim****, T. Palacios***, A. Pesquera****, A. Centeno**** and A. Zurutuza**** *Ritsumeikan University, **Seoul National University, ***Massachusetts Institute of Technology, ****Dongguk University, *****Graphene S. A			
Th3-18	14:18(3min+poster)	...	169
Low temperature selective growth of c-plane GaN using Ti mask by RF-MBE N. Yamamoto, H. Kato, Y. Hirota, H. Iha, T. Maruyama and S. Naritsuka Meijo University			
Th3-19	14:21(3min+poster)	...	171
Observation of phase separation on m-plane InGaN film by micro-beam X-ray diffraction K. Shojiki*, T. Hanada***, J. H. Choi***, Y. Imai***, S. Kimura***, T. Shimada*, T. Tanikawa***, R. Katayama*** and T. Matsuoka*** *Tohoku University, **JST, ***JASRI			
Th3-20	14:24(3min+poster)	...	173
InGaN/GaN multi-quantum well growth by raised pressure MOVPE T. Doi, Y. Honda, M. Yamaguchi and H. Amano Nagoya University			
Th3-21	14:27(3min+poster)	...	175
Film thickness dependence of composition and relaxation of In-rich InGaN epilayers grown by RF-MBE M. Sakamoto*, K. Wang**, T. Araki*** Y. Nanishi and E. Yoon *Ritsumeikan University, **Seoul University			
Th3-22	14:30(3min+poster)	...	177
Thickness dependence of structural and electrical properties of thin InN grown by RF-MBE J. Sakaguchi*, T. Araki*, T. Fujishima**, E. Matioli**, T. Palacios** and Y. Nanishi**** *Ritsumeikan University, **Massachusetts Institute of Technology, ***Seoul National University			

### Break (14:33-14:48)

### Session Th4: Spintronics and Ferromagnetics (14:48-15:18)

Chair : M. Oogane (Tohoku University)

Th4-1	14:48(3min+poster)	...	179
Epitaxial growth of (CoMn) <sub>i</sub> N thin films by molecular beam epitaxy Y. Yasutomi, T. Sanai, K. Ito, K. Toko and T. Suemasu University of Tsukuba			

Th4-2	14:51(3min+poster)	...	181
Epitaxial growth and magnetic characterization of $\text{Co}_{4-x}\text{Fe}_x\text{N}$ ( $x = 0.4 \sim 2.9$ ) thin films grown by molecular beam epitaxy			
T. Sanai, K. Ito, Y. Yasutomi, K. Toko and T. Suemasu			
University of Tsukuba			
Th4-3	14:54(3min+poster)	...	183
Negative spin-polarization in $\text{Fe}_3\text{N}$ grown by molecular beam epitaxy			
K. Ito*, K. Harada*, T. Sanai*, K. Okamoto**, K. Kabara***, H. Takahashi***, K. Toko*, S. Ueda****, Y. Imai*****, K. Miyamoto*****, T. Okuda*****, M. Tsunoda***, A. Kimura** and T. Suemasu*			
*University of Tsukuba, **Hiroshima University, ***Tohoku University, ****NIMS, *****AIST, *****HSRC			
Th4-4	14:57(3min+poster)	...	185
Growth and characterization of Li codoped (Ga,Mn)As			
S. Miyakozawa, L. Chen, F. Matsukura and H. Ohno			
Tohoku University			
Th4-5	15:00(3min+poster)	...	187
Electric field effects on magnetic properties of Ta/CoFeB/MgO structures detected by ferromagnetic resonance			
A. Okada, S. Kanai, M. Yamanouchi, S. Ikeda, F. Matsukura and H. Ohno			
Tohoku University			
Th4-6	15:03(3min+poster)	...	189
Temperature dependence of tunnel magnetoresistance properties of CoFeB-MgO perpendicular anisotropy magnetic tunnel junction			
Y. Takeuchi, K. Mizunuma, S. Ishikawa, H. Sato, S. Ikeda, M. Yamanouchi, S. Fukami, F. Matsukura and H. Ohno			
Tohoku University			
Th4-7	15:06(3min+poster)	...	191
Fabrication of magnetic tunnel junctions using $L_{10}$ -ordered MnAl Films			
H. Saruyama, M. Oogane, Y. Kurimoto, H. Naganuma and Y. Ando			
Tohoku University			
Th4-8	15:09(3min+poster)	...	193
Thickness dependence of spin relaxation in thin Pt on GaAs			
J. C. Ryu, A. Sasaki, J. Shiogai, M. Kohda and J. Nitta			
Tohoku University			
Th4-9	15:12(3min+poster)	...	195
Carrier inversion in Si based diluted magnetic semiconductor using organic ferroelectric as gate dielectric			
Y. Miyata, O. Kyohei, T. Yoshimura, A. Ashida and N. Fujimura			
Osaka Prefecture University			
Th4-10	15:15(3min+poster)	...	197
Switchable photo-induced current of strongly correlated ferroelectric $\text{YMnO}_3$ thin films			
H. Uga, Y. Okumura, T. Yoshimura, A. Ashida and N. Fujimura			
Osaka Prefecture University			

## Session Th5: Solar Cells (15:18-15:42)

*Chair : M. Sugiyama (The University of Tokyo)*

Th5-1	15:18(3min+poster)	...	199
Structural design of photonic crystals for enhancing optical absorption of solar cells			
Y. Kawamoto, Y. Tanaka and S. Noda			
Kyoto University			
Th5-2	15:21(3min+poster)	...	201
Investigation of mini-band formation in strain-balanced InGaAs/GaAsP superlattice solar cells by using a photorefectance method			
T. Aihara*, Y. Yokoyama*, M. Kojima*, H. Suzuki*, A. Fukuyama*, Y. Wang**, M. Sugiyama**, Y. Nakano** and T. Ikari*			
*University of Miyazaki, **The University of Tokyo			

Th5-3	15:24(3min+poster)	...	203
Efficiency enhancement of GaAs solar cells with 100-period InGaAs / GaAsP quantum wells with a bandgap of 1.23 eV H. Fujii, K. Toprasertpong, K. Watanabe, M. Sugiyama and Y. Nakano The University of Tokyo			
Th5-4	15:27(3min+poster)	...	205
Effects of built-in electric field on carrier escape from the intermediate band in InAs/GaAs quantum dot solar cell T. Kada, A. Hasegawa and T. Kita Kobe University			
Th5-5	15:30(3min+poster)	...	207
Carrier dynamics in InAs/GaAs quantum dot superlattice solar cells N. Kasamatsu, A. Hasegawa and T. Kita Kobe University			
Th5-6	15:33(3min+poster)	...	209
Fabrication of ITO/p-InP hetero-junction nanowire-array solar cells M. Yoshimura*, E. Nakai*, K. Tomioka*** and T. Fukui* *Hokkaido University, **JST			
Th5-7	15:36(3min+poster)	...	211
Optimization of the AlN thickness for the polarization engineered nitride photocathode for water splitting A. Nakamura*, K. Fujii**, M. Sugiyama* and Y. Nakano* *The University of Tokyo, **Global Solar+ Initiative			
Th5-8	15:39(3min+poster)	...	213
Carrier transport in tunneling-enhanced multiple quantum well solar cells K. Toprasertpong, H. Fujii, Y. Wang, K. Watanabe, M. Sugiyama and Y. Nakano The University of Tokyo			

### Session Th6: Oxide-II (15:42-16:06)

*Chair : T. Oshima (Tokyo Institute of Technology)*

Th6-1	15:42(3min+poster)	...	217
Modification in crystal structures of alpha-Ga <sub>2</sub> O <sub>3</sub> grown on sapphire substrates Y. Ito, S. D. Lee and S. Fujita Kyoto University			
Th6-2	15:45(3min+poster)	...	219
Doping and alloying effects on electrical properties of alpha-Ga <sub>2</sub> O <sub>3</sub> thin films on sapphire substrates K. Akaiwa, N. Suzuki, K. Suzuki, K. Kaneko and S. Fujita Kyoto University			
Th6-3	15:48(3min+poster)	...	221
Evaluation of electrical conductivity and crystal structure of alpha-V <sub>2</sub> O <sub>3</sub> -Ga <sub>2</sub> O <sub>3</sub> thin films K. Kaneko, S. Komori, I. Kakeya, S. Fujita and K. Tanaka Kyoto University			
Th6-4	15:51(3min+poster)	...	223
Semi-insulation behavior in conducting beta-Ga <sub>2</sub> O <sub>3</sub> single crystal surfaces by thermal oxidation T. Oshima*, K. Kaminaga*, A. Mukai*, K. Sasaki**, T. Masui***, A. Kuramata**, S. Yamakoshi**, S. Fujita**** and A. Ohtomo*,***** *Tokyo Institute of Technology, **Tamura Corp., ***KOHAI Co., Ltd., ****Kyoto University, *****Materials Research Center for Element Strategy			
Th6-5	15:54(3min+poster)	...	225
Characterization of Ga-In-O films fabricated by molecular precursor method T. Yasuno, T. Oda, H. Nagai, H. Hara, Y. Sugiura, T. Yamaguchi, M. Sato and T. Honda Kogakuin University			



Th6-6	15:57(3min+poster)	...	227
Characteristics of $(\text{InN})_x(\text{In}_2\text{O}_3)_{1-x}$ films grown on yttria-stabilized zirconia			
A. Kobayashi*, T. Itoh*, J. Ohta*, M. Oshima* and H. Fujioka****			
*The University of Tokyo, ** Japan Science and Technology Agency			
Th6-7	16:00(3min+poster)	...	229
Paramagnetic defects in powder of oxide semiconductors induced by plasma			
T. Matsuda, D. Nishimoto, K. Takahashi, T. Ueno and M. Kimura			
Ryukoku University			
Th6-8	16:03(3min+poster)	...	231
$\text{TiO}_2$ particle production with flame synthesis method for nanoparticles by using flashing spray - relationship between ambient pressure and particle characteristics -			
M. Oshima*, A. Yoneda**, M. Matsushita**, J. Senda** and K. Ishida***			
*Fukui University of Technology, **Doshisha University, ***HORIBA, Ltd.			

### Poster Session III (Th3-Th6) (16:06-18:30)

Break (18:30-19:00)

**Banquet (19:00-21:00)**

## 【July 12th, Friday】

### Session Fr1: Low-dimensional System (8:50-10:05)

Chair : H. Sekiguchi (*Toyohashi University of Technology*)

- Fr1-1 [Invited] 8:50 (30min)** ... 233  
**III-V Nanowire/Si Heterojunction Tunnel Field-Effect Transistors**  
**K. Tomioka\*\*\*\*, T. Fukui\***  
\*Hokkaido University, \*\* JST
- Fr1-2 09:20(3min+poster) ... 237  
Manufacturability of quantum dot lasers by molecular beam epitaxy  
T. Kageyama\*, K. Nishi\*\*\*\*, M. Yamaguchi\*, Y. Maeda\*, R. Mochida\*\*\*\*, K. Takemasa\*, T. Yamamoto\*\*\*\*\*, M. Sugawara\*\*\*\* and Y. Arakawa\*\*\*  
\*QD Laser, Inc., \*\*Fujitsu Laboratories Ltd., \*\*\*The University of Tokyo
- Fr1-3 09:23(3min+poster) ... 241  
Optical properties of InAs QDs embedded in strain-relaxed InGaAs barriers on (113)B GaAs substrate  
S. Katoh, Y. Yasunaga, Y. Nakagawa, K. Morita, T. Kitada and T. Isu  
The University of Tokushima
- Fr1-4 09:26(3min+poster) ... 243  
Spectral gain feature of InAs/GaAs quantum dot semiconductor optical amplifier  
T. Andachi, M. Suwa, T. Matsumura and T. Kita  
Kobe University
- Fr1-5 09:29(3min+poster) ... 245  
Scaling behavior of InAlAs/AlGaAs quantum dots grown on GaAs by molecular beam epitaxy  
X. M. Lu\*, M. Koyama, Y. Izumi, S. Adachi and S. Muto  
The University of Tokushima
- Fr1-6 09:32(3min+poster) ... 247  
In-plane magnetic field effect on magnetic focusing in an InGaAs two-dimensional electron gas  
T. Okayasu, M. Kohda and J. Nitta  
Tohoku University
- Fr1-7 09:35(3min+poster) ... 249  
Stimulated emission by photo excitation in (1 $\bar{1}$ 01) InGaN/GaN multiple quantum well with cavity structure on a patterned Si substrate  
M. Kushimoto, T. Tanikawa, Y. Honda, M. Yamaguchi and H. Amano  
Nagoya University
- Fr1-8 09:38(3min+poster) ... 251  
Impact of recombination lifetimes on exciton hopping in semipolar (11 $\bar{2}$ 2) InGaN quantum wells  
T. Ozaki, J. Nishinaka, M. Funato and Y. Kawakami  
Kyoto University
- Fr1-9 09:41(3min+poster) ... 253  
Structural and optical properties of ZnSe-based nanostructures grown by Selective MBE  
A. Higuchi, H. Asano, S. Ueno, M. Nakamura, T. Muranaka, Y. Nabetani and T. Matsumoto  
University of Yamanashi
- Fr1-10 09:44(3min+poster) ... 255  
Growth of Wurtzite InP/GaP Core-shell Nanowires by Selective-area Metal Organic Vapor Phase Epitaxy  
F. Ishizaka, K. Ikejiri, K. Tomioka and T. Fukui  
Hokkaido University



Fr1-11	09:47(3min+poster)	...	257
Effectiveness of alternating supply of Ga and As in self-catalyzed GaAs nanowires growth on Si substrate by MBE			
R. Kizu, M. Yamaguchi and H. Amano			
Nagoya University			
Fr1-12	09:50(3min+poster)	...	259
Study on the lateral growth on GaAs Nanowires			
T. Wada, Y. Kohashi, S. Hara and J. Motohisa			
Hokkaido University			
Fr1-13	09:53(3min+poster)	...	261
Effect of Be doping on electron-phonon interaction within self-catalyzed MBE-VLS grown GaAs nanowires on (111)Si substrate			
A. Suzuki*, A. Fukuyama*, J. H. Paek**, M. Yamaguchi** and T. Ikari*			
*University of Miyazaki, **Nagoya University			
Fr1-14	09:56(3min+poster)	...	263
Growth of GaN nanowires on a (111)Si substrate by RF-MBE under alternating supply			
S. Mizutani, Y. Honda, M. Yamaguchi and H. Amano			
Nagoya University			
Fr1-15	09:59(3min+poster)	...	265
Atomic structures of InGaN nanowires investigated by STEM with Cs-corrected system			
M. Imura*, Y. Koide*, Y. Nakayama*, M. Takeguchi*, T. Tsumuraya*,**, T. Miyazaki*, S. Mizutani***, T. Tabata***, S. Nakagawa***, M. Yamaguchi***, and H. Amano***			
*NIMS, **RIKEN, ***Nagoya University			
Fr1-16	10:02(3min+poster)	...	267
Room-temperature PL emissions from site-controlled single GaN/AlGaN nanowire quantum dots			
K. Choi, M. Arita, S. Kako and Y. Arakawa			
The University of Tokyo			

Break (10:05-10:15)

Poster Session IV (Fr1) (10:15-11:45)

Lunch (11:45-13:00)

## Special Session (13:00-15:50)

### *“Recent Progress of Power Devices -Approaching to Commercialize-”*

*Chair : A. Wakahara (Toyohashi University of Technology)*

13:00 (5min)

Introduction

A. Wakahara

Toyohashi University of Technology

**Tutorial 13:05 (45min) ... 269**

**Present status and future prospects of novel semiconductor power electronics**

**H. Okumura**

**National Institute of Advanced Industrial Science and Technology**

**SP-1 [Invited] 13:50(30min) ... 271**

**Present and future of silicon crystal for power devices**

**H. Yamamoto**

**Chiba Institute of Technology**

**SP-2 [Invited] 14:20(30min) ... 273**

**GaN based power devices - current status, challenges, and expectations -**

**T. Kachi**

**Toyota Central R&D Labs., Inc.**

**SP-3 [Invited] 14:50(30min) ... 277**

**Development of gallium oxide power devices**

**K. Sasaki\*\*\*, M. Higashiwaki\*\*, A. Kuramata\*, T. Masui\*\*\* and S. Yamakoshi\***

**\*Tamura Corporation, \*\*NICT, \*\*\*Koha Co., Ltd.**

**SP-4 [Invited] 15:20(30min) ... 279**

**SiC power device and application to power conversion systems**

**K. Ohtsuka**

**Mitsubishi Electric Corporation**

## Closing Session (15:50-16:00)