

PROGRAM

Nobel Prize Special Session (July 15th, Wednesday 13:30-16:15)

Nobel Prize Special Session I (13:30-14:30)

Chair : H. Ohno (*Tohoku University*)

“My journey with Electronic Materials Symposium and future success”

Isamu Akasaki (Meijo University, Nagoya University)

Akio Sasaki (Kyoto University)

Break (14:30-14:45)

Nobel Prize Special Session II (14:45-16:15)

Chair : Y. Arakawa (*The University of Tokyo*)

“Road to success and messages for students and young researchers”

Hiroshi Amano (Nagoya University)

Shuji Nakamura (University of California, Santa Barbara)

【July 15th, Wednesday】

Opening Session (13:20-13:30)

Nobel Prize Special Session I (13:30-14:30)

Break (14:30-14:45)

Nobel Prize Special Session II (14:45-16:15)

Break (16:15-16:45)

Session We1: Nitride and Oxide Materials (16:45-17:49)

Chair : T. Nakano (*Shizuoka University*)

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Dependencies of growth temperature and carrier gases in B GaN growth K. Ueyama, H. Mimura, Y. Inoue, T. Aoki and T. Nakano Shizuoka University			
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Film formation process during the low pressure chemical vapor deposition of hexagonal boron nitride A. Masuda, N. Umehara, T. Shimizu, T. Kouno, H. Kominami and K. Hara Shizuoka University			
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Band edge emission from hexagonal boron nitride films grown on sapphire substrates by low pressure chemical vapor deposition N. Umehara, A. Masuda, T. Shimizu, T. Kouno, H. Kominami and K. Hara Shizuoka University			
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In situ studies of strain evolution in molecular beam epitaxial growth of GaN using synchrotron X-ray diffraction T. Sasaki and M. Takahashi Japan Atomic Energy Agency			
We1-5	16:53 (2min+poster)	...	9
Effect of growth conditions on Eu-doped GaN grown by rf-plasma-assisted molecular-beam epitaxy H. Tahara, H. Sekiguchi, K. Yamane, H. Okada and A. Wakahara Toyoashi University of Technology			
We1-6	16:55 (2min+poster)	...	11
Thick (>20 μm) and high-resistivity carbon-doped GaN-buffer layers grown by MOVPE T. Tsuchiya, A. Terano and K. Mochizuki Hitachi, LTD.			
We1-7	16:57 (2min+poster)	...	13
Growth of high crystallinity GaN layers using Ga ₂ O vapor generated from Ga and H ₂ O vapor Y. Yamaguchi*, Y. Taniyama*, H. Takatsu*, T. Sumi*, A. Kitamoto*, M. Imade*, M. Yoshimura*, M. Isemura** and Y. Mori* *Osaka University, **Itochu Plastic Inc.			
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Examination of the initial layer for GaN double polarity selective area growth by using MOVPE N. Osumi, K. Kuze, Y. Inoue and T. Nakano Shizuoka University			

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Growth of ultra-thin GaN layer on AlN template layer by PAMBE M. Kaneko, T. Kimoto and J. Suda Kyoto University			
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Dependences of input InCl ₃ ratio and growth temperature in InGaN growth by tri-halide vapor phase epitaxy M. Meguro*, T. Hirasaki*, T. Hasegawa*, H. Murakami*, Y. Kumagai*, B. Monemar**,** and A. Koukitu* *Tokyo University of Agriculture and Technology, **Linköping University			
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Characterization of compositional fluctuation in InGaN surface by KFM K. Komura, S. Kiyohara, T. Araki and Y. Nanishi Ritsumeikan University			
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We1-23	17:29 (2min+poster)	...	45
Surface energy and facet formation in InN films grown by pressurized-reactor MOVPE A. Kusaba*, Y. Kangawa*, S. Krukowski**, T. Kimura***,****, T. Tanikawa***,****, R. Katayama***,****, T. Matsuoka***,**** and K. Kakimoto* *Kyushu University, **UNIPRESS, ***Tohoku University, ****JST-CREST			

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Dependence of stacking fault generation on orientation of MBE-grown β-Ga ₂ O ₃ K. Sasaki, A. Kuramata and S. Yamakoshi Tamura Corporation			
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Thermodynamic and experimental studies on homoepitaxial growth of β-Ga ₂ O ₃ by halide vapor phase epitaxy K. Kawara*, K. Nomura*, K. Goto**, K. Sasaki**,***, Q.-T. Thieu*, R. Togashi*, H. Murakami*, Y. Kumagai*, M. Higashiwaki***, A. Kuramata**, S. Yamakoshi**, B. Monemar**** and A. Koukitu* *Tokyo University of Agriculture and Technology, **Tamura Corporation, ***National Institute of Information and Communications Technology, ****Linköping University			
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Oxygen-radical-assisted pulsed-laser deposition of β-Ga ₂ O ₃ -based films R. Wakabayashi*, T. Oshima*, M. Hattori*, K. Sasaki**, T. Masui**, A. Kuramata**, S. Yamakoshi**, K. Yoshimatsu* and A. Ohtomo* *Tokyo Institute of Technology, **Tamura Corporation			
We1-28	17:39 (2min+poster)	...	55
Electrical and magnetic properties of Sn doped α-(In _{1-x} Fe _x) ₂ O ₃ alloy thin films M. Uchida, K. Akaiwa, K. Kaneko and S. Fujita Kyoto University			
We1-29	17:41 (2min+poster)	...	57
Metastable rh-ITO epitaxial films by Mist-CVD method for GaN devices H. Nishinaka*, M. Oda**,*** and M. Yoshimoto* *Kyoto Institute of Technology, **Kyoto University, ***FLOSFIA Inc.			
We1-30	17:43 (2min+poster)	...	59
Growth condition dependence of Ga-In-O films by mist-CVD K. Tanuma, R. Goto, T. Onuma, T. Yamaguchi and T. Honda Kogakuin University			
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Fabrication of SnO _x thin films by mist chemical vapor deposition T. Uchida*, T. Kawaharamura** and S. Fujita* Kyoto University*, Kochi University of Technology**			
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Fabrication of p-type Cu ₂ O thin films by mist chemical vapor deposition toward photovoltaic applications T. Ikenoue, M. Miyake and T. Hirato Kyoto University			

Poster Session I (We1) (17:49-19:00)

Dinner (19:00-20:00)

Rump Session (20:00-21:30)

“Future Prospects of Nitride Semiconductor Materials and Devices”

Organizer: T. Araki (Ritsumeikan University)
R. Katayama (Tohoku University)

Panelists: M. Arita (The University of Tokyo)
T. Kikkawa (Transphorm Japan)
T. Takeuchi (Meijo University)
H. Hirayama (RIKEN)
T. Miyajima (Meijo University)

【July 16th, Thursday】

Session Th1: Group-IV Semiconductors and 2D Materials (8:30-10:02)

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

- Th1-1 [Invited] 08:30 (30min+poster)** ... 65
Current status and prospect for power semiconductor diamond
Y. Koide
National Institute for Materials Science
- Th1-2 [Invited] 09:00 (30min+poster)** ... 67
Minimal Fab Concept and the Development
S. Hara**, S. Ikeda**, H. Maekawa**, and S. Khumpuang**,
*National Institute of Advanced Industrial Science and Technology, **Minimal Fab Development Association
- Th1-3 09:30 (2min+poster) ... 69
Decomposition process of organometallic silane precursor in plasma-enhanced chemical vapor deposition
K. Sato, T. Ishimaru, K. Yamane, H. Sekiguchi, H. Okada and A. Wakahara
Toyohashi University of Technology
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Fabrication of vertical Ge nanowires on amorphous substrates by combining Au-seeded chemical-vapor deposition with Al-induced crystallization
M. Nakata, K. Toko and T. Suemasu
Tsukuba University
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Amorphicity modulation effect on Au induced lateral crystallization for amorphous Ge on SiO₂
T. Sakaguchi, M. Horii, K. Moto, M. Yoneoka, K. Takakura and I. Tsunoda
Kumamoto National College of Technology
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Au induced lateral crystallization for stressed amorphous Ge on insulating substrate
K. Kusano*, K. Kudo*, T. Sakai*, S. Motoyama**, Y. Kusuda**, M. Furuta**, N. Naka***, T. Numata***, K. Takakura* and I. Tsunoda*
*Kumamoto National College of Technology, **SAMCO Inc., ***HORIBA Ltd.
- Th1-7 09:38 (2min+poster) ... 77
(111) oriented crystal Ge on insulator by low temperature (~ 200 °C) gold induced crystallization
K. Kudo, T. Nomitsu, H. Okamoto, K. Takakura and I. Tsunoda
Kumamoto National College of Technology
- Th1-8 09:40 (2min+poster) ... 79
Formation of (111)-oriented Ge thin films on flexible plastic substrates by metal-induced layer exchange
N. Oya, K. Toko and T. Suemasu
University of Tsukuba
- Th1-9 09:42(2min+poster) ... 81
Epitaxial growth of Ge-rich SiGe layers for Ge/SiGe heterojunction avalanche photodiodes on Si
Y. Miyasaka*, T. Hiraki**, K. Okazaki**, K. Takeda**, T. Tsuchizawa**, K. Yamada**, K. Wada* and Y. Ishikawa*
*The University of Tokyo, **NTT Corporation
- Th1-10 09:44 (2min+poster) ... 83
Crystallization of GeSn on insulating substrates by lateral solid-phase crystallization technique
R. Matsumura, K. Moto, H. Chikita, T. Sadoh, H. Ikenoue and M. Miyao
Kyushu University
- Th1-11 09:46 (2min+poster) ... 85
Characterization of low-resistivity diamond (100) films fabricated by hot-filament chemical vapor deposition
S. Ohmagari*, K. Srimongkon**, H. Yamada*, H. Umezawa*, N. Tsubouchi*, A. Chayahara*, S. Shikata* and Y. Mokuno*
*National Institute of Advanced Industrial Science and Technology, **Khon Kaen University
- Th1-12 09:48 (2min+poster) ... 87
Chemical vapor synthesis of fluorescence nano-crystalline diamond for bio-applications
S. Takigawa, R. Kojima, K. Komiya and H. Isshiki
The University of Electro-Communications

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Investigations on the properties of nano-polycrystalline diamond synthesized by high pressure and high temperature technique K. Hamada, A. Ishikawa, M. Matsushita, F. Ishikawa, H. Ohfuji, T. Shinmei and T. Irifune Ehime University			
Th1-14	09:52 (2min+poster)	...	91
Investigation of residual particles on CVD graphene in transfer process T. Yasunishi, Y. Takabayashi, S. Kishimoto, R. Kitaura, H. Shinohara and Y. Ohno Nagoya University			
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Formation of graphene lateral superlattices on self-ordered SiC facets S. Tanaka*, K. Fukuma*, K. Morita*, S. Hayashi*, T. Kajiwara*, A. Visikovskiy*, T. Iimori**, K. Ienaga**, K. Yaji**, K. Nakatsuji**, F. Komori**, H. Tanaka***, A. Kanda***, N. T. Cuong**** and S. Okada*** *Kyushu University, **The University of Tokyo, ***University of Tsukuba, ****National Institute of Advanced Industrial Science and Technology			
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Challenge to the Fabrication of Molybdenum Disulfide (MoS ₂) Layered Film by Mist Annealing S. Sato, T. Kawaharamura and M. Furuta Kochi University of Technology			
Th1-17	09:58 (2min+poster)	...	97
Micro-nano hybrid copper-carbon powder *S. Ohnishi, **K. Nakagawa, *A. Nakasuga, **T. Toriyama and **Y. Kin *Sekisui Chemical Co., Ltd., **Kansai University			
Th1-18	10:00 (2min+poster)	...	101
Femtosecond laser irradiation onto the 6H-SiC in different ambient R. Miyagawa and O. Eryu Nagoya Institute of Technology			

Session Th2: III-V and II-VI Materials (10:02-10:26)

Chair : H. Sekiguchi (Toyohashi University of Technology)

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Control of thickness and residual impurity inclusion of GaAsN thin films grown by an atomic layer epitaxy Y. Yokoyama*, T. Haraguchi, T. Yamauchi, H. Suzuki, T. Ikari and A. Fukuyama University of Miyazaki			
Th2-2	10:04 (2min+poster)	...	105
Effects of growth temperature on crystalline quality of high nitrogen composition GaAsPN S. Mugikura, N. Urakami, K. Yamane, H. Sekiguchi, H. Okada and A. Wakahara Toyohashi University of Technology			
Th2-3	10:06 (2min+poster)	...	107
Dislocation reduction in MOVPE-grown InGaAs/GaAs MQWs with GaAs/Ge buffer layers on Si substrates by thermal cycle annealing R. Nakao, M. Arai, T. Yamamoto and S. Matsuo NTT Corporation			
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Effect of Si doping on crystal and electronic band structures in catalyst-free MBE-VLS grown GaAs nanowires on (111) Si substrates M. Nakano*, K. Sugihara*, D. Ohori*, K. Sakai*, M. Yamaguchi**, T. Ikari* and A. Fukuyama* *University of Miyazaki, **Nagoya University			
Th2-5	10:10 (2min+poster)	...	111
Temperature dependence photoluminescence of quantum dots grown on (311)B GaAs by molecular beam epitaxy X. M. Lu, A. Kawaguchi, N. Kumagai, T. Kitada and T. Isu Tokushima University			
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Crystallization of low-temperature-grown InGaAs on InP substrate Y. Tominaga*, Y. Kadoya* and H. Morioka** *Hiroshima University, **Bruker AXS K.K.			

Th2-7	10:14 (2min+poster)	...	115
Growth and annealing temperature dependences of the position of In atoms in low-temperature-grown $\text{In}_x\text{Ga}_{1-x}\text{As}$ S. Hirose, Y. Tominaga and Y. Kadoya Hiroshima University			
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Formation of GaSb islands on Si(100) with low-temperature grown GaSb layer R. Machida*, R. Toda*, S. Fujikawa*, S. Hara** and H. I. Fujishiro* *Tokyo University of Science, **National Institute of Information and Communications Technology			
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Quantum confined Stark effect of polar and non-polar ZnO/ZnMgO quantum wells grown by MBE T. Abe, T. Motoyama, M. Yamamoto, A. Yamamoto, H. Kasada, K. Ando and K. Ichino Tottori University			
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Growth mechanisms of ZnS and ZnO thin films by mist CVD K. Uno, Y. Yamasaki, P. Gu and I. Tanaka Wakayama University			
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Heteroepitaxial growth of nonpolar ZnO/AlN on Si (100) substrate using MnS buffer layer T. Nakamura*, T. Nagata*, N. Nguyen*, K. Takahashi**, S.-G. Ri**, K. Ishibashi**, S. Suzuki** and T. Chikyow* *National Institute for Materials Science, **Comet Inc.			
Th2-12	10:24 (2min+poster)	...	125
Contribution of excited species in N_2/O_2 atmospheric pressure plasma to the chemical vapor deposition of ZnO films Y. Nose*, T. Kiguchi*, T. Yoshimura*, A. Ashida*, T. Uehara** and N. Fujimura* *Osaka Prefecture University, **Sekisui Chemical Co., Ltd.			

Break (10:26-10:36)

Poster Session II (Th1, Th2) (10:36-12:00)

Lunch (12:00-13:00)

Session Th3: Characterization and Processes (13:00-14:30)

Chairs : K. Watanabe (*National Institute for Materials Science*), Y. Kangawa (*Kyushu University*)

Th3-1 [Invited] 13:00 (30min+poster)		...	127
Carrier transport in graphene/2D crystal van der Waals junctions T. Machida*, T. Yamaguchi*, Y. Inoue*, Y. Sata*, R. Moriya*, S. Morikawa*, M. Arai*, S. Masubuchi*, K. Watanabe** and T. Taniguchi** *The University of Tokyo, ** National Institute for Materials Science			
Th3-2	13:30 (2min+poster)	...	129
Nonradiative recombination paths in AlGaIn-related structures and their temperature dependence S. Ichikawa*, M. Funato*, Y. Iwasaki** and Y. Kawakami* *Kyoto University, **JFE Mineral Co., Ltd.			
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Carrier dynamics in regularly arrayed InGaN/GaN nanocolumns T. Oto, Y. Mizuno, R. Miyagawa, T. Kano, J. Yoshida and K. Kishino Sophia University			
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Effect of excitation power density on photoluminescence from $\text{n}^+\text{-Ge}$ on Si N. Higashitarumizu and Y. Ishikawa The University of Tokyo			

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Quantum levels in Ge nanodisk array structure fabricated by nano-protein-mask and neutral beam etching investigated by a photoluminescence technique			
D. Ohori*, K. Kondo*, T. Fujii**, T. Okada**, S. Samukawa**, T. Ikari* and A. Fukuyama*			
*University of Miyazaki, **Tohoku University			
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Semiconductor/oxide composite nanowires providing white luminescence			
F. Ishikawa* and Naaki Yamamoto**			
*Ehime University, **Tokyo Institute of Technology			
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Characterization of GaN single crystal using THz ellipsometry			
K. Tachi*, T. Fujii**, T. Araki*, Y. Nanishi*, T. Nagashima***, T. Iwamoto**, Y. Sato**, N. Morita****, R. Sugie**** and S. Kamiyama*****			
*Ritsumeikan University, **Nippo Precision Co., Ltd., ***Setsunan University, ****Toray Research Center Inc., *****Meijo University			
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Polarized Raman scattering of martensitic transformed wurtzite BN			
K. Watanabe and T. Taniguchi			
National Institute for Materials Science			
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Temperature dependence of Hall scattering factor in p-type 4H-SiC with various doping concentrations			
S. Asada, T. Okuda, T. Kimoto and J. Suda			
Kyoto University			
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Dielectric breakdown process of hexagonal boron nitride film			
Y. Hattori*, T. Taniguchi**, K. Watanabe** and K. Nagashio*,***			
*The University of Tokyo, ** National Institute for Materials Science, ***PRESTO-JST			
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Paramagnetic defects in oxide semiconductor films deposited by RF magnetron sputtering			
T. Matsuda and M. Kimura			
Ryukoku University			
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Gate-voltage manipulation of spin signal in ferromagnetic metal/ three dimensional topological insulator			
R. Kumamoto*, Y. Ando*, T. Hamasaki**, F. Yang**, M. Novak**, S. Sasaki**, K. Segawa**, Y. Ando** and M. Shiraishi*			
*Kyoto University, **Osaka University			
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Large thermopower of GaMnAs			
K. Arakawa, Y. Taketomi, J. Yamagami, S. Kaku and J. Yoshino			
Tokyo Institute of Technology			
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Thermoelectric measurement of GaSb/InAs/AlSb superlattices			
Y. Taketomi, K. Arakawa, J. Yamagami, S. Kaku and J. Yoshino			
Tokyo Institute of Technology			
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Annealing effects on the delocalized electronic states of epitaxial two-dimensional nitrogen atomic sheet in GaAs			
Y. Ogawa, Y. Harada, T. Baba, T. Kaizu and T. Kita			
Kobe University			
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Type-I band alignment at β -(Al _x Ga _{1-x}) ₂ O ₃ / β -Ga ₂ O ₃ heterojunctions			
T. Oshima*, M. Hattori*, R. Wakabayashi*, K. Sasaki**, T. Masui**, A. Kuramata**, S. Yamakoshi**, K. Horiba***, H. Kumigashira***, K. Yoshimatsu* and A. Ohtomo*			
*Tokyo Institute of Technology, **Tamura Corporation, ***High Energy Accelerator Research Organization			
Th3-17	14:00 (2min+poster)	...	159
Electronic structures of bilayer hexagonal boron nitride under vertical electric field			
Y. Ota			
Tokyo Metropolitan Industrial Technology Research Institute			

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Epitaxial growth of (α' + α')-Fe-N films by molecular beam epitaxy and their saturation magnetizations			
S. Higashikozono*, K. Ito**, T. Gushi*, K. Toko* and T. Suemasu*			
*University of Tsukuba, **Tohoku University			
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Effect of thermal annealing on optical characteristics of Eu- and Mg-codoped GaN			
H. Tateishi, H. Sekiguchi, M. Kanemoto, K. Yamane, H. Okada and A. Wakahara			
Toyohashi University of Technology			
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Growth of Eu doped GaN nanocolumns			
S. Nishikawa, H. Sekiguchi, T. Imanishi, K. Yamane, H. Okada and A. Wakahara			
Toyohashi University of Technology			
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The mechanism of emission enhancement from Eu-doped GaN by in-plane compressive strain			
T. Inaba, A. Koizumi and Y. Fujiwara			
Osaka University			
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Luminescence properties of Eu-doped $\text{In}_x\text{Ga}_{1-x}\text{N}$ grown by organometallic vapor-phase epitaxy			
A. Koizumi, S. Yamanaka, M. Matsuda and Y. Fujiwara			
Osaka University			
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Heterogeneous integration of InGaAsP/InP-buried heterostructure and Si waveguide using InP growth on InP membrane bonded to Si substrate			
T. Fujii, K. Takeda, H. Nishi., K. Hasebe, T. Kakitsuka, T. Tsuchizawa, A. Shinya, T. Yamamoto and S. Matsuo			
NTT Corporation			
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Fabrication of Si/SiO ₂ /GaN-LED wafer using surface activated bonding			
K. Tsuchiyama, K. Yamane, H. Sekiguchi, H. Okada and A. Wakahara			
Toyohashi University of Technology			
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Inductively coupled plasma reactive ion etching of GaN and InN			
K. Narutani*, T. Yamaguchi*, T. Araki**, Y. Nanishi**, T. Onuma* and T. Honda*			
*Kogakuin University, **Ritsumeikan University			
Th3-26	14:18 (2min+poster)	...	177
Enhancement of carrier lifetimes in p-type 4H-SiC epitaxial layers			
T. Okuda*, T. Miyazawa**, H. Tsuchida**, T. Kimoto* and J. Suda*			
*Kyoto University, **Central Research Institute of Electric Power Industry			
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“Silicon Photonics –Future Prospects of Silicon-based Photodevices–”

Chair : Y. Ishikawa (The University of Tokyo)

Introduction 13:00 (5min)

Y. Ishikawa

The University of Tokyo

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**“My journey with Electronic Materials
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**Isamu Akasaki
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**Akio Sasaki
(Kyoto University)**

Nobel Prize Special Session II

**“Road to success and messages for students
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**Hiroshi Amano
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