International Workshop on Gallium Oxide and Related Materials 2015 (IWGO 2015)

Tuesday, November 3, 2015
Karasuma Kyoto Hotel

18:00-20:00 Welcome Reception
Karasuma Kyoto Hotel
http://karasuma.kyotohotel.co.jp/english/

Wednesday, November 4, 2015
Katsura Campus, Kyoto University

Opening Remarks
Main Hall, ROHM Plaza

9:30
Opening Remarks
S. Fujita[1] and M. Higashiwaki[2];
[1]Photonics and Electronics Science and Engineering Center, Kyoto University, Kyoto, Japan; [2]National Institute of Information and Communications Technology, Koganei, Tokyo, Japan

Session A: Plenary
Main Hall, ROHM Plaza
Session Chair: Y. Kumagai, Program Committee Chair, Tokyo University of Agriculture and Technology, Japan

9:45 A1 (Plenary)
Exploring Novel Materials for Electronic Applications
H. Hosono;
Materials and Structures Laboratory & Materials Research Center for Element Strategy, Tokyo Institute of Technology, Yokohama, Japan

10:45 Break

Session B: Bulk Growth
Main Hall, ROHM Plaza
Session Chair: R. Fornari, Program Committee, Università di Parma, Italy

11:15 B1 (Invited)
Bulk Growth and Properties of High Quality β-Ga_2O_3, In_2O_3 and SnO_2 Single Crystals
Z. Galazka, K. Irmscher, R. Uecker, D. Klimm, M. Pietsch, M. Albrecht, M. Naumann, A. Kwasniewski, T. Schulz, R. Schewski, and M. Bickermann;
Leibniz Institute for Crystal Growth, Berlin, Germany

11:45 B2
Properties of Gallium Oxide Single-Crystal Substrates Made by Edge-Defined Film-Fed Growth
A. Kuramata, T. Masui, K. Koshi, S. Watanabe, Y. Yamaoka, and S. Yamakoshi;
Tamura Corporation, Sayama, Saitama, Japan

12:00 B3
Lateral Dopant Segregation of β-Ga_2O_3 Single Crystals by Edge-Defined Film-Fed Growth (EFG) Method
S. Watanabe, Y. Yamaoka, K. Koshi, T. Masui, A. Kuramata, and S. Yamakoshi;
Tamura Corporation, Sayama, Saitama, Japan

12:15 B4
ß-Ga_2O_3 Single Crystal Growth in VB or VGF Furnace with Air Atmosphere
E. Ohba[1], T. Kobayashi[1], J. Yanagisawa[1], C. Miyagawa, Y. Nakamura, and K. Hoshikawa[2];
[1]Fujikoshi Machinery Corp., Matsushiro, Nagano, Japan; [2]Faculty of Engineering, Shinshu University, Nagano, Japan

12:30 Lunch

Session C: MBE / PLD Growth
Main Hall, ROHM Plaza
Session Chair: O. Bierwagen, Program Committee, Paul-Drude-Institut für Festkörperelektronik (PDI), Germany

14:00 C1 (Invited)
Progress in PAMBE Growth of β-Ga_2O_3
J. S. Speck;
Materials Department, University of California, Santa Barbara, CA, USA

14:30 C2
MBE Growth of Gallium Tin Oxide Thin Films on *c*-Plane (0001) Sapphire Substrate
K. Pourang[1], A. Verma[1,2], S. Rouvimov[1], J. Verma[1], G. Xing[1,2,3], and D. Jena[1,2,3];
[1]Department of Electrical Engineering, University of Notre Dame, IN, USA; [2]School of Electrical and Computer Engineering, Cornell University, Ithaca, NY, USA; [3]Department of Materials Science and Engineering, Cornell University, Ithaca, NY, USA

14:45 C3
β-$(Al_xGa_{1-x})_2O_3/Ga_2O_3$ Heterostructures Grown on β-Ga_2O_3(010) Substrates by Plasma-Assisted Molecular Beam Epitaxy
S. W. Kaun, F. Wu, and J. S. Speck;
Materials Department, University of California, Santa Barbara, CA, USA

15:00 C4
N-type Doping of γ-Ga_2O_3 Epitaxial Films
T. Oshima[1], K. Matsuyama[1], K. Yoshimatsu[1], and A. Ohtomo[1,2];
[1]Department of Applied Chemistry, Tokyo Institute of Technology, Tokyo, Japan; [2]Materials Research Center for Element Strategy (MCES), Tokyo Institute of Technology, Yokohama, Japan

15:15 C5
Miscibility and Phase Separation in the $(In_xGa_{1-x})_2O_3$ System
R. Schewski[1], T. Markurt[1], T. Schulz[1], T. Remmele[1], G. Wagner[1], M. Baldini[1], H. von Wenckstern[2], M. Grundmann[2], and M. Albrecht[1];
[1]Institute for Crystal Growth, Berlin, Germany; [2]Universität Leipzig, Institut für Experimentelle Physik II, Leipzig, Germany

15:30 C6
Growth and Electric Properties of Conductive β-$(Al_xGa_{1-x})_2O_3$ Films
R. Wakabayashi[1], T. Oshima[1], M. Hattori[1], K. Sasaki[2], T. Masui[2], A. Kuramata[2], S. Yamakoshi[2], K. Yoshimatsu[1], and A. Ohtomo[1,3];
[1]Department of Applied Chemistry, Tokyo Institute of Technology, Tokyo, Japan; [2]Tamura Corporation, Sayama, Saitama, Japan; [3]Materials Research Center for Element Strategy (MCES), Tokyo Institute of Technology, Yokohama, Japan

15:45 Break

Session D: Theory and Modeling
Main Hall, ROHM Plaza
Session Chair: S. A. Ringel, The Ohio State University, U.S.A.

16:15 D1 (Invited)
Understanding the Electronic and Optical Properties of β-Ga_2O_3
J. B. Varley[1], A. Schleife[2], H. Peelaers[3], A. Janotti[3], and C. Van de Walle[3];
[1]Lawrence Livermore National Laboratory, Livermore, CA, USA; [2]Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, USA; [3]Materials Department, University of California, Santa Barbara, CA, USA

16:45 D2
Atomistic Modelling for Predicting β-Gallium Oxide Properties
Ş. C. Bădescu[1,2], D. B. Thomson[2], J. M. Mann[2], and G. H. Jessen[2];
[1]Wyle Aerospace Group, Dayton, OH, USA; [2]Wright Patterson Air Force Base, Dayton, OH, USA

17:00 D3
Lattice and Electronic Structure Evaluations of Cu Doped beta Gallium Oxide by ab-initio Calculation
K. Uno, S. Nakamura, and I. Tanaka;

Department of Applied Physics, Wakayama University, Wakayama, Japan

17:15 Short Break

Session E: Poster Session
17:30 – 20:00
Lounge in the 2nd and 3rd Floors, ROHM Plaza
Chair: A. Kuramata, Program Committee, Tamura Corporation, Japan

E1
Surface Termination and Chemical Properties of the (001) β-Ga_2O_3
R. Anvari[1, 2], G. A. Umana-Membreno[1], M. Baker[2], D. Spagnoli[2], G. Parish[1], and B. Nener[1];
[1]School of Electrical, Electronics and Computer Engineering, University of Western Australia, Australia; [2]School of Chemistry and Biochemistry, University of Western Australia, Australia

E2
Electronic Defects in In_2O_3 Thin Films on *r*-Plane Sapphire
F. Schmidt, D. Splith, S. Müller, H. von Wenckstern, and M. Grundmann;
Universität Leipzig, Institut für Experimentelle Physik II, Leipzig, Germany

E3
Photoconductive Properties of Beta-Gallium Oxide Nanowires
S. Kumar[1], S. Dhara[2], R. Agarwal[2], and R. Singh[1];
[1]Department of Physics, Indian Institute of Technology Delhi, New Delhi, India; [2]Department of Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA, USA

E4
High Mobility Amorphous Ga_2O_3-CdO Alloy Thin Films Synthesized by Room Temperature Sputtering
C. Liu[1], W. Gao[2], Y. Foo[1], B. He[1], M. Kamruzzaman[1], J. A. Zapien[1], W. Zhang[1], W. Walukiewicz[2], and K. M. Yu[1,2];
[1]Department of Physics and Materials Science, City University of Hong Kong, Hong Kong; [2]Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA, USA

E5
Investigation of the Opto-Electronic Properties of Sn Doped α-Ga_2O_3
E. Chikoidze[1], E. Shigematsu[1,2], G. Bouchez[1], Y. Chang[1], Y. Dumont[1],
K. Akaiwa[2], K. Kaneko[2], Sh. Fujita[2], H.J. von Bardeleben[3], and J. L. Cantin[3];
[1]Groupe d'Etudes de la Matière Condensée (GEMaC), Université de Versailles, Versailles, France; [2]Department of Electronic Science and Engineering, Kyoto University, Kyoto, Japan; [3]Sorbonne Universités, Paris, France

E6
Stability of Self-Trapped Excitons in a β-Ga_2O_3 Single Crystal
S. Yamaoka and M. Nakayama;
Department of Applied Physics, Graduate School of Engineering, Osaka City University, Osaka, Japan

E7
Structural and Optical Properties of Er^{3+}-Doped Beta-Ga_2O_3 Thin Films
Z. P. Wu[1,2], Q. R. Hu[1,2], P. G. Li[1,2], and W. H. Tang[1,2];
[1]Laboratory of Optoelectronics Materials and Devices, School of Science, Beijing University of Posts and Telecommunications, Beijing, China; [2]State Key Laboratory of Information Photonics and Optical Communications, Beijing University of Posts and Telecommunications, Beijing, China

E8
Electrical Properties of Sn-Doped Corundum-Structured Ga_2O_3 Thin Films on Sapphire Substrates
K. Akaiwa, K. Kaneko, and S. Fujita;
Department of Electronic Science and Engineering, Kyoto University, Kyoto, Japan

E9
Photoelectron Spectroscopic Study of Electronic State of β-Ga_2O_3 Single Crystal
T. Nagata[1], S. Ueda[2,3], Y. Yamashita[1,2], M. Higashiwaki[4], A. Kuramata[5], N. Ikeno[1,6], Y. Suzuki[1,6], and T. Chikyow[1];
[1]International Center for Materials Nanoarchitectonics (WPI-MANA), National Institute for Materials Science (NIMS), Tsukuba, Ibaraki, Japan; [2]Synchrotron X-ray Station at SPring-8, NIMS, Hyogo, Japan; [3]Quantum Beam Unit, NIMS, Tsukuba, Ibaraki, Japan; [4]National Institute of Information and Communications Technology, Koganei, Tokyo, Japan; [5]Tamura Corporation, Sayama, Saitama, Japan; [6]Meiji University, Kawasaki, Kanagawa, Japan

E10
From 3D Structures to Thin Films - Different β-Ga_2O_3 Structures Prepared by Ultrasonic Nebulization and Spray Pyrolysis
C. Schmidt, A. Fechner, and D. R. T. Zahn;
Semiconductor Physics, Technische Universität Chemnitz, Chemnitz, Germany

E11
Comparative Study on Thermal Stability of Group-III Oxides
R. Togashi[1], K. Nomura[1], C. Eguchi[1], Y. Kisanuki[1], K. Goto[1,2], Q. T. Thieu[1,3], H. Murakami[1], Y. Kumagai[1], A. Kuramata[2], S. Yamakoshi[2], B. Monemar[3,4], and A. Koukitu[1];
[1]Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan; [2]Tamura Corporation, Sayama, Saitama, Japan; [3]GIRO, Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan; [4]Linköping University, Linköping, Sweden

E12
STM-Measurements of (100) Surfaces of β-Ga_2O_3 Single Crystal
A. Siebert[1], M. Mulazzi, and Z. Galazka[2];
[1]Humboldt-University of Berlin, Berlin, Germany; [2]Leibnitz Institute for Crystal Growth, Berlin, Germany

E13
Measurements of Third-Order Nonlinear Optical Susceptibility of β-Ga_2O_3 Single Crystals
S. Saito[1], M. Ichida[2], T. Onuma[3,1], K. Sasaki[4,1], A. Kuramata[4], N. Sekine[1], A. Kasamatsu[1], and M. Higashiwaki[1];
[1]National Institute of Information and Communications Technology, Koganei, Tokyo, Japan; [2]Department of Physics, Konan University, Hyogo, Japan; [3]Department of Applied Physics, Kogakuin University, Tokyo, Japan; [4]Tamura Corporation, Saitama, Japan

E14
Characterization of Au/ALD-Al_2O_3/β-Ga_2O_3 (010) MOS Capacitors by Optical-Isothermal Capacitance Transient Spectroscopy
T. Kamimura[1], D. Krishnamurthy[1], A. Kuramata[2], S. Yamakoshi[2], and M. Higashiwaki[1];
[1]National Institute of Information and Communications Technology, Koganei, Tokyo, Japan; [2]Tamura Corporation, Sayama, Saitama, Japan

E15
Characterization of the β-Ga_2O_3 Films Grown by Pulsed Laser Deposition
Q. Feng[1,2], B. Dai[1,2], F. Li[1,2], W. Xie[1,2], T. Xu[1,2], and Y. Hao[1,2];
[1]School of Microelectronics, Xidian University, China; [2]Key laboratory of Wide Band-gap Semiconductor Materials and Devices, Xidian University, China

E16
Growth of α-$(AlGa)_2O_3$ by Mist CVD and Evaluation of Its Thermal Stability
M. Takahashi, T. Hatakeyama, T. Onuma, T. Yamaguchi, and T. Honda;
Dept. of Applied Physics, School of Advanced Engineering, Graduate School of Engineering, Kogakuin University, Hachioji, Tokyo, Japan

E17
Strong Fermi-Level Pinning at Metal/β-Ga_2O_3($\bar{2}$01) Interface
R. Wakabayashi[1], T. Oshima[1], M. Hattori[1], K. Sasaki[2], T. Masui[2], A. Kuramata[2], S. Yamakoshi[2], K. Yoshimatsu[1], and A. Ohtomo[1,3];
[1]Department of Applied Chemistry, Tokyo Institute of Technology, Tokyo, Japan; [2]Tamura Corporation, Sayama, Saitama, Japan;

[3]Materials Research Center for Element Strategy (MCES), Tokyo Institute of Technology, Yokohama, Japan

E18

Elastic Properties and Load-Strain Curves of β-Ga_2O_3 Single Crystals

L. I. Guzilova[1], A. A. Golovatenko[1,2,3], V. N. Maslov[1,2], V. L. Abdrachmanov[4], D. V. Zav'yalov[4], S. I. Stepanov[1,5], E. S. Vasilyeva[5], A. E. Romanov[1,2], and V. I. Nikolaev[1,2,3];
[1]ITMO University, Saint Petersburg, Russia; [2]Ioffe Physical Technical Institute, Russia; [3]Perfect Crystals LLC, Saint Petersburg, Russia; [4]Volgograd State Technical University, Volgograd, Russia; [5]Peter the Great St. Petersburg Polytechnic University, Russia

E19

Tuning the Conductivity Type in the Ferrimagnetic ε-$Ga_{2-x}Fe_xO_3$ Compound

A. Demchenko[1], Y. Chang[2], E.Chikoidze[2], B. Berini[2], C. Lefèvre[1], F. Roulland[1], C. Ulhaq-Bouillet[1], G. Versini[1], S. Barre[1], C. Leuvrey[1], Y. Dumont[2], and N. Viart[1];
[1]Institut de Physique et Chimie des Matériaux de Strasbourg and Labex NIE, University of Strasbourg, France; [2]GEMaC (Groupe d'Etude de la Matière Condensée) Université de Versailles St Quentin -CNRS, Versailles, France

E20

Anisotropy, Phonon Modes and Band-to-Band Transitions in Single-Crystal Monoclinic Beta-Ga_2O_3 Determined by THz to VUV Generalized Ellipsometry

M. Schubert[1], R. Korlacki[1], S. Schoeche[1], V. Darakchieva[2], B. Monemar[2,3], K. Goto[3,4], K. Nomura[3], H. Murakami[3], Q.-T. Thieu[3], R. Togashi[3], Y. Kumagai[3], A. Kuramata[4], M. Higashiwaki[5], A. Koukitu[3], S. Yamakoshi[4], E. Janzén[2], D. Gogova[6,7], M. Schmidbauer[7],
and Z. Galazka[7];
[1]Center for Nanohybrid Functional Materials, University of Nebraska-Lincoln, USA; [2]Department of Physics, Chemistry and Biology, IFM, Linkoping University, Linkoping, Sweden; [3]Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan; [4]TamuraCorporation, Sayama, Saitama, Japan; [5]National Institute of Information and Communications Technology, Koganei, Tokyo, Japan; [6]Central Lab of Solar Energy and New Energy Sources at the Bulg. Acad. Sci., Sofia, Bulgaria; [7]Leibniz Institute for Crystal Growth, Berlin, Germany

E21

Silicon-Implanted β-Ga_2O_3 / Sapphire Deep Ultra-Violet Photodetectors

S. Oh[1], M. Mastro[2], J. Hite[2], and J. Kim[1];
[1]Department of Chemical and Biological Engineering, Korea University, Seoul, KOREA; [2]US Naval Research Lab., Power Electronic Materials Section, Washington, DC, USA

E22

Coexistence of Unipolar/Bipolar Resistive Switching in Metal/GaO_x/NiO_x/Metal Heterostructures

X. L. Chu[1,2], Z. P. Wu[1,2], D. Y. Guo[1,2], Q. R. Hu[1,2], P. G. Li[1,2], and W. H. Tang[1,2];
[1]Laboratory of Optoelectronics Materials and Devices, School of Science, Beijing University of Posts and Telecommunications, Beijing, China; [2]State Key Laboratory of Information Photonics and Optical Communications, Beijing University of Posts and Telecommunications, Beijing, China

E23

β-Ga_2O_3/p-Si Heterojunction Based Solar-Blind Avalanche Photodetector

X. C. Guo[1,2], Z. P. Wu[1,2], D. Y. Guo[1,2], P. G. Li[1,2], and W. H. Tang[1,2];
[1]Laboratory of Optoelectronics Materials and Devices, School of Science, Beijing University of Posts and Telecommunications, Beijing, China; [2]State Key Laboratory of Information Photonics and Optical Communications, Beijing University of Posts and Telecommunications, Beijing, China

E24

Schottky Contacts on β-Ga_2O_3 Thin Films Grown by Pulsed Laser Deposition

D. Splith, S. Müller, H. von Wenckstern, and M. Grundmann;
Semiconductor Physics Group, Institute for Experimental Physics II, Universität Leipzig, Leipzig, Germany

E25

Schottky Contacts and pn-Heterojunctions on Heteroepitaxial In_2O_3 Thin Films Grown by Pulsed Laser Deposition

D. Splith, F. Schmidt, S. Lanzinger, S. Müller, H. von Wenckstern, and M. Grundmann[1];
[1]Semiconductor Physics Group, Institute for Experimental Physics II, Universität Leipzig, Leipzig, Germany

E26

Enhanced Performance β-Ga_2O_3 Solar-Blind Photodetector by Surface Plasmon Polariton

Y. An, Z. Wu, and W. Tang;
Laboratory of Optoelectronics Materials and Devices, School of Science, Beijing University of Posts and Telecommunications, Beijing, China

E27

Sensor Properties of Metal–Ga Oxide–GaAs Structures

V. Kalygina, V. Gaman, I. Prudaev, and O. Tolbanov;
Tomsk State University, Tomsk, Russia

E28

Fabrication of Schottky Barrier Diodes of EFG-Grown Sn-Doped β-Ga_2O_3 ($\bar{2}01$) Single-Crystals

Y. Koga, K. Harada, K. Hanada, T. Oishi, and M. Kasu;
Department of Electrical and Electronic Engineering, Saga University, Saga, Japan

E29

Si-Doped Ga_2O_3 Films Grown by Pulsed Laser Deposition

F. Zhang, K. Saito, T. Tanaka, M. Nishio, and Q. Guo;
Department of Electrical and Electronic Engineering, Synchrotron Light Application Center, Saga University, Saga, Japan

E30

The Effect of Growth Temperature on Structural and Optical Properties of Europium Doped Ga_2O_3 Films

Z. Chen, K. Saito, T. Tanaka, M. Nishio, and Q. Guo;
Department of Electrical and Electronic Engineering, Synchrotron Light Application Center, Saga University, Saga, Japan

E31

Growth and Characterization of β-Gallium Oxide Nanostructures for Applications in Nanoscale Devices

R. Singh and S. Kumar;
Department of Physics, Indian Institute of Technology Delhi, New Delhi, India

E32

Atmospheric-Pressure CVD Growth of SnO_2 and Ga_2O_3 Nanostructures

T. Terasako[1], T. Kurashige[1], Y. Ohmori[2], Y. Kawasaki[2], T. Saeki[2], N. Monden[2], and M. Yagi[3];
[1]Graduate School of Science & Engineering, Ehime University, Matsuyama, Ehime, Japan; [2]Faculty of Engineering, Ehime University, Matsuyama, Ehime, Japan; [3]National Institute of Technology, Kagawa College, Kagawa, Japan

E33

Effect of Substrate Temperature on Structures and Optical Properties of $(AlGa)_2O_3$ Films

X. Wang, K. Saito, T. Tanaka, M. Nishio, and Q. Guo;
Department of Electrical and Electronic Engineering, Synchrotron Light Application Center, Saga University, Saga, Japan

E34

Ultra-Rapid Solid-Phase Epitaxial Growth of β-Ga_2O_3 Thin Films on NiO-Buffered Sapphire (0001) Substrates by KrF Excimer Laser Annealing

D. Shiojiri[1], D. Fukuda[1], N. Tsuchimine[2], K. Koyama[3], S. Kaneko[4], A. Matsuda[1], and M. Yoshimoto[1];
[1]Department of Innovative and Engineered Materials, Tokyo Institute of Technology, Yokohama, Japan; [2]TOSHIMA Manufacturing Company Limited, Higashimatsuyama, Saitama, Japan; [3]Namiki Precision Jewel Company Limited, Tokyo, Japan; [4]Kanagawa Industrial Technology Center, Ebina, Kanagawa, Japan

E35
Growth and Characterization of Gallium Oxide Thin Films Grown on C-plane Sapphire Substrates by Plasma-Assisted Molecular Beam Epitaxy
N. Trong[1], L. Duc[1], J.-H. Song[2], and S.-K. Hong[1];
[1]Department of Advanced Materials Science, Chungnam National University, Daejeon, Republic of Korea; [2]Departemt of Physics, Kongju National University, Chungnam, Republic of Korea

E36
Investigation of Crystal Orientation of β-Ga_2O_3 Thin Film Grown on Sapphire Substrate by Room Temperature Deposition and Subsequent Annealing
H. Ishimoto, H. Ogata, S. Koba, I. Tsunoda, and K. Takakura;
National College of Technology, Kumamoto College, Japan

E37
A GaN-Template on (-2 0 1) β-Ga_2O_3 Substrate by Atmospheric Pressure Metal Organic Chemical Vapor Deposition (MOCVD)
Y.-P. Lan[1], K. P. Sou[1], C.-Y. Lee[2], R.-M. Lin[3], and C.-Y. Chang[2,4];
[1] Microelectronic and information system research center, National Chiao Tung University, Hsinchu, Taiwan; [2] Research Center for Applied Sciences, Academia Sinica, Taipei, Taiwan; [3]Department of Electronic Engineering, Chang Gung University, Taoyuan City, Taiwan; [4]Institute of Electronics, National Chiao Tung University, Hsinchu, Taiwan

E38
Halide Vapor Phase Epitaxy of ε-Ga_2O_3
Y. Oshima, E. G. Víllora, and K. Shimamura;
Optical Single Crystals Group, National Institute for Materials Science, Tsukuba, Ibaraki, Japan

E39
Electrical Properties of Sn-Doped α-$(In_{1-x}Fe_x)_2O_3$ Alloy Thin Films with Room Temperature Ferromagnetism
M. Uchida[1], K. Akaiwa[1], S. Komori[1], I. Kakeya[1], K. Kaneko[2], and S. Fujita[2];
[1]Department of Electronic Science and Engineering, Kyoto University, Kyoto, Japan; [2]Photonics and Electronics Science and Engineering Center, Kyoto University, Kyoto, Japan

E40
Etch-Pit Observation of EFG-grown β-Ga_2O_3 Single Crystals
M. Kasu[1], T. Uematsu[1], S. Masuya[1], T. Moribayashi[1], K. Hanada[1], K. Koshi[2], K. Sasaki[2], and A. Kuramata[2];
[1]Departement of Electrical and Electronic Engineering, Saga University, Saga, Japan; [2]Tamura Corporation, Sayama, Japan

E41
β-Ga_2O_3 Crystals Grown from Ga_2O_3-Al_2O_3 Melt
V. I. Nikolaev[1,2,3], V. N. Maslov[1,2], V. M. Krymov[1,2], E. V. Kalashnikov[4], A. I. Pechnikov[2,3], V. E. Bougrov[2], and A. E. Romanov[1,2];
[1]Ioffe Institute, St Petersburg, Russia; [2]ITMO University, St. Petersburg, Russia; [3]Perfect Crystals LLC, St. Petersburg, Russia; [4]MGOU, Moscow, Russia

E42
Metastable rh-ITO Epitaxial Films on Various Sapphire Substrates with α-Ga_2O_3 Buffer Layers
H. Nishinaka and M. Yoshimoto;
Faculty of Electrical Engineering and Electronics, Kyoto Institute of Technology, Kyoto, Japan

E43
GaN Growth on (100) β-Ga_2O_3 Substrates by HVPE
V. I. Nikolaev[1,2,3], A. I. Pechnikov[1], S. I. Stepanov[3,4], V. M. Krymov[2,3],
V. N. Maslov[2,3], V. E. Bougrov[3], and A. E. Romanov[2,3];
[1]Perfect crystals LLC, St. Petersburg, Russia; [2]Ioffe Institute, St. Petersburg, Russia; [3]ITMO University, St. Petersburg, Russia; [4]St. Petersburg Polytechnic University, Russia

E44
Growth Temperature Dependence of Ga_2O_3 Growth Rate by Mist CVD
K.Tanuma, T. Onuma, T. Yamaguchi, and T. Honda;
Dept. of Applied Physics, School of Advanced Engineering, Graduate School of Engineering, Kogakuin University, Hachioji, Tokyo, Japan

E45
Fabrication of p-Type NiO Thin Films by Molecular Precursor Method
R. Goto, T. Onuma, T. Yamaguchi, H. Nagai, M. Sato, and T. Honda;
Dept. of Applied Physics, School of Advanced Engineering, Graduate School of Engineering, Kogakuin University, Hachioji, Tokyo, Japan

E46
Properties of β-Ga_2O_3 Hetero-Epitaxial Layers Grown by MOCVD and ALD
F. Boschi[1], M. Bosi[2], E. Buffagni[2], T. Berzina[2], C. Ferrari[2], L. Aversa[3], R. Tatti[3], R. Verucchi[3], and R. Fornari[1];
[1]Dept. of Physics and Earth Sciences, Parma Univ., Italy;
[2,3]CNR-IMEM Institute, Research Units of 43124 Parma[2] and 38100 Trento[3], Italy

E47
Improvement of Growth Conditions of β-Ga_2O_3 Single Crystal by EFG Method
Z. Jia, W. Mu, and X. Tao;
Institute of Crystal Materials, Shandong University, Ji'nan, China

E48
Dry Etching of β-Ga_2O_3 (100), (010), and ($\bar{2}$01)
S. W. Kaun, J. E. Hogan, E. C. H. Kyle, and J. S. Speck
Materials Department, University of California, Santa Barbara, CA, USA

E49 (Late News)
Three-Dimensional Polaron State at E_F in In_2O_3 Single Crystals
C. Janowitz[1], V. Scherer[1], M. Nazarzadehmoafi[1], Z. Galazka[2], and R. Manzke[1];
[1]Institut für Physik, Humboldt-Universität zu Berlin, Berlin, Germany; [2]Leibniz-Institut für Kristallzüchtung, Berlin, Germany

E50 (Late News)
Characterization and MOSFET Fabrication on β-Ga_2O_3 Films Grown by MOCVD on Sapphire Substrates
M. J. Tadjer[1], M. A. Mastro[1], N. A. Mahadik[1], M. Currie[1], V. D. Wheeler[1], J. D. Greenlee[2], J. K. Hite[1], K. D. Hobart[1], C. R. Eddy, Jr.[1], and F. J. Kub[1];
[1]United States Naval Research Laboratory, Washington DC, USA;
[2]National Research Council, Washington DC, USA

E51 (Late News)
Stress Behavior of Annealed β-Ga_2O_3 Films Grown by Metalorganic Chemical Vapor Deposition
R. H. Horng[1], C. Y. Huang[1], J. H. Liang[2], and D. S. Wuu[2];
[1]Graduated Institute of Precision Engineering, National Chung Hsing University, Taichung, Taiwan; [2]Department of Materials Science and Engineering, National Chung Hsing University, Taichung, Taiwan

E52 (Late News)
Chemical Vapor Deposition of β-Ga_2O_3 Films using Non-Equilibrium N_2/O_2 Plasma Generated Near Atmospheric Pressure
T. Kiguchi[1], Y. Nose[1], K. Takada[1], T. Uehara[2], N. Fujimura[1];
[1]Graduate School of Engineering, Osaka Prefecture University, Osaka, Japan; [2]Sekisui Chemical Co. Ltd., Kamitoba, Kyoto, Japan

E53 (Late News)
Electrical Conductivity and Gas-Sensing Properties of the In_2O_3 Surface Electron Accumulation Layer
O. Bierwagen[1], J. Rombach[1], A. Papadogianni[1], M. Mischo[2], V. Cimalla[2], O. Ambacher[3], T. Berthold[4], S. Krischok[4], and M. Himmerlich[4];
[1]Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany;
[2]Fraunhofer Institut für Angewandte Festkörperphysik, Freiburg, Germany; [3]Institut für Mikrosystemtechnik, Freiburg, Germany;
[4]Institut für Physik, TU Ilmenau, Ilmenau, Germany

E54 (Late News)
Reforming of Thermally Oxidized Film on GaN by Annealing with High-Temperature and High-Pressure Water
Y. Tada[1], M. Horita[2], K. Yoshitsugu[1], Y. Ishikawa[1], and Y. Uraoka[1];
[1]Nara Institute of Science and Technology, Ikoma, Nara, Japan;
[2]Kyoto University, Kyoto, Japan

Thursday, November 5, 2015
Katsura Campus, Kyoto University

Session F: Characterization (I)
Main Hall, ROHM Plaza
Session Chair: K. Uno, Steering Committee Chair, Wakayama University, Japan

9:00 F1 (Invited)
Growth and Investigation of Group-III Sesquioxides and Fabrication of Basic Devices Thereon
H. von Wenckstern;
Universität Leipzig, Leipzig, Germany

9:30 F2
Quantitative Characterization of Deep Level Defects and Schottky Barriers in (010) β-Ga_2O_3 Materials
S. A. Ringel[1], A. R. Arehart[1], Z. Zhang[1], E. Farzana[1], S. Kaun[2], and J. S. Speck[2];
[1]Department of Electrical and Computer Engineering, The Ohio State University, Columbus, OH, USA; [2]Materials Department, University of California-Santa Barbara, CA, USA

9:45 F3
Epitaxial Relationship and Capacitance-Voltage Characteristics of γ-Al_2O_3 Films Grown on (010) β-Ga_2O_3 Substrates
M. Hattori[1], T. Oshima[1], R. Wakabayashi[1], K. Sasaki[2], T. Masui[2], A. Kuramata[2], S. Yamakoshi[2], K. Yoshimatsu[1], and A. Ohtomo[1,3];
[1]Department of Applied Chemistry, Tokyo Institute of Technology, Tokyo, Japan; [2]Tamura Corporation, Saitama, Japan; [3]Materials Research Center for Element Strategy, Tokyo Institute of Technology, Yokohama, Japan

10:00 F4
Conductance Spectroscopy Study of Interface States in ALD Deposited SiO_2 on β-Ga_2O_3
K. Zeng and U. Singisetti;
Electrical Engineering Department, University at Buffalo (SUNY), Buffalo, NY, USA

10:15 F5
Schottky Character of Noble Metal-In_2O_3 Interfaces
M. Nazarzadehmoafi[1], F. Titze[1], M. Mohammed[1,2], S. Machulik[1], C. Janowitz[1], M. Mulazzi[1,3], Z. Galazka[3], and R. Manzke[1];
[1]Institut für Physik, Humboldt-Universität zu Berlin, Berlin, Germany; [2]Department of Physics, Faculty of science, Assiut University, Assiut, Egypt; [3]Leibniz-Institut für Kristallzüchtung, Berlin, Germany

10:30 Break

Session G: CVD
Main Hall, ROHM Plaza
Session Chair: Z. Galazka, Leibniz Institute for Crystal Growth, Germany

11:00 G1
Homoepitaxial Growth of β-Ga_2O_3 Layers on (100) and (010) Oriented Substrates by using MOVPE
G. Wagner, M. Baldini, K. Irmscher, A. Fiedler, R. Schewski, and M. Albrecht;
Institute for Crystal Growth, Berlin, Germany

11:15 G2
Semiconducting Sn-Doped Ga_2O_3 Layers Grown by Metal Organic Vapor Phase Epitaxy
M. Baldini, M. Albrecht, K. Irmscher, R. Schewski, and G. Wagner;
Leibniz Institute for Crystal Growth, Berlin, Germany

11:30 G3
Crack-Free GaN (0001) Epitaxial Layer Grown by MOCVD on β-Ga_2O_3 (-201) Substrate
Y. Yamashita, K. Iizuka, Y. Morishima, A. Kuramata, and S. Yamakoshi;
Tamura Corporation, Sayama, Saitama, Japan

11:45 G4
Si Doping of β-Ga_2O_3 in Halide Vapor Phase Epitaxy and Its Electrical Properties
K. Goto[1,2], K. Nomura[2], H. Murakami[2], Q. T. Thieu[2], R. Togashi[2], Y. Kumagai[2], A. Kuramata[1], B. Monemar[2,3], A. Koukitu[2], and S. Yamakoshi[1];
[1]Tamura Corporation, Sayama, Saitama, Japan; [2]Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan; [3]Linköping University, Linköping, Sweden

12:00 G5
Halide Vapor Phase Epitaxy of α-Ga_2O_3
Y. Oshima, E. G. Víllora, and K. Shimamura;
Optical Single Crystals Group, National Institute for Materials Science, Tsukuba, Ibaraki, Japan

12:15 G6
Fabrication of Conductive Sn-Doped β-Ga_2O_3 Films by Mist Chemical Vapor Deposition
S.-D. Lee and S. Fujita;
Photonics and Electronics Science and Engineering Center, Kyoto University, Kyoto, Japan

12:30 Lunch

Session H: Devices
Main Hall, ROHM Plaza
Session Chairs: J. Suda, Kyoto University, Japan;
D. Jena, Program Committee, Cornell University, U.S.A.

14:00 H1 (Invited)
Mist Epitaxy Growth of α-Ga_2O_3 and Its Power Device Application
M. Oda and T. Hitora;
FLOSFIA, INC., Kyodai-Katsura Venture Plaza, Kyoto, Japan

14:30 H2
Ga_2O_3 MOSFETs with a Resistive Buffer Layer for Reliable Channel Doping by Ion Implantation
M. H. Wong[1], K. Sasaki[2,1], A. Kuramata[2], S. Yamakoshi[2], and M. Higashiwaki[1];
[1]National Institute of Information and Communications Technology, Koganei, Tokyo, Japan; [2]Tamura Corporation, Sayama, Saitama, Japan

14:45 H3
Electric Double Layer Transistor on a β-Ga_2O_3 Single Crystal
K. Ueno;
Department of Basic Science, University of Tokyo, Tokyo, Japan

15:00 H4
Temperature-Dependent Device Characteristics of HVPE-Grown Ga_2O_3 Schottky Barrier Diodes
K. Konishi[1], K. Sasaki[2,1], K. Goto[2,3], K. Nomura[3], Q. T. Thieu[3], R. Togashi[3], H. Murakami[3], Y. Kumagai[3], B. Monemar[3,4], A. Koukitu[3], A. Kuramata[2], S. Yamakoshi[2], and M. Higashiwaki[1];
[1]National Institute of Information and Communications Technology, Koganei, Tokyo, Japan; [2]Tamura Corporation, Sayama, Saitama, Japan; [3]Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan; [4]Linköping University, Linköping, Sweden

15:15 H5
Method of Choice for Fabrication of High-Quality Ga_2O_3-Based Schottky Diodes
S. Müller, F. Schmidt, D. Splith, H. von Wenckstern, and M. Grundmann;
Universität Leipzig, Institut für Experimentelle Physik II, Leipzig, Germany

15:30 Break

16:00 H6
Crystal Orientation of β-Ga_2O_3 Layers Formed on GaN Template Substrates and Its Application to Deep UV Sensors
S. Nakagomi, T. Sato, and Y. Kokubun;
Ishinomaki Senshu Univ., Ishinomaki, Miyagi, Japan

16:15 H7
Mn Doped β-Ga_2O_3 Thin Films for Improving Solar-Blind Photoelectric Performance
D. Guo, Z. Wu, and W. Tang;
Laboratory of Optoelectronics Materials and Devices, School of Science, Beijing University of Posts and Telecommunications, Beijing, China

16:30 H8
Electrochemical Application of Ga_2O_3: CO_2 to HCOOH Conversion
T. Sekimoto[1], M. Deguchi[1], S. Yotsuhashi[1], T. Masui[2], A. Kuramata[3], and S. Yamakoshi[3];
[1]Advanced Research Division, Panasonic Corporation, Kyoto, Japan; [2]Koha Co., Ltd., Nerima, Tokyo, Japan; [3]Tamura Corporation, Sayama, Saitama, Japan

16:45 H9 (Tutorial)
Fundamentals of Wide-Band-Gap Semiconductor Power Devices – Important Technologies to Realize Ideal Power Devices –
J. Suda;
Kyoto University, Kyoto, Japan

17:15 Short Break

17:30-20:00 Banquet
Café "Arte"

Friday, November 6, 2015
Katsura Campus, Kyoto University

Session I: Characterization (II)
Main Hall, ROHM Plaza
Session Chairs: B. Monemar, Linköping University, Sweden/Tokyo University of Agriculture and Technology, Japan;
F. Tuomisto, Aalto University, Finland

9:00 I1 (Invited)
Vacancy Defects in SnO_2, In_2O_3, and Ga_2O_3 Studied with Positron Annihilation Spectroscopy
F. Tuomisto, E. Korhonen, V. Prozheeva, and I. Makkonen;
Department of Applied Physics, Aalto University, Aalto, Finland

9:30 I2
A Reappraisal of Anisotropy Effects in Bulk β-Ga_2O_3
R. Fornari[1], A. Baraldi[1], F. Boschi[1], A. Parisini[1], M. Pavesi[1], F. Ricci[2],
A. Filippetti[2], and V. Fiorentini[2];
[1]Dept. of Physics and Earth Sciences, Univ. of Parma, Parma, Italy; [2]Dept. of Physics, Univ. of Cagliari, Monserrato (CA), Italy

9:45 I3
Optical Anisotropy in (010) Plane of β-Ga_2O_3 Single Crystals
T. Onuma[1,2], S. Saito[2], K. Sasaki[3,2], T. Masui[3], T. Yamaguchi[1], T. Honda[1], and M. Higashiwaki[2];
[1]Department of Applied Physics, Kogakuin University, Tokyo, Japan; [2]National Institute of Information and Communications Technology, Tokyo, Japan; [3]Tamura Corporation, Saitama, Japan

10:00 I4
Optical Properties of Doped and Intrinsic β-Ga_2O_3
I. G. Ivanov[1], K. Goto[2,3], K. Nomura[2], H. Murakami[2], Q.-T. Thieu[2], R. Togashi[2], Y. Kumagai[2], A. Kuramata[3], M. Higashiwaki[4], A. Koukitu[2], S. Yamakoshi[3], E. Janzén[1], and B. Monemar[1,2];
[1]Department of Physics, Chemistry & Biology, Linköping University, Linköping, Sweden; [2]Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan; [3]TamuraCorporation, Sayama, Saitama, Japan; [4]National Institute of Information and Communications Technology, Koganei, Tokyo, Japan

10:15 Break

10:45 I5
Electron Spin Resonance of n-Type α-Ga_2O_3 Fabricated by Using Mist Epitaxy
J. Kikawa[1] and M. Oda[2];
[1]Research Organizations of Science and Engineering, Ritsumeikan University, Kusatsu, Shiga, Japan; [2]FLOSFIA, INC., Kyodai-Katsura Venture Plaza, Kyoto, Japan

11:00 I6
EPR Studies of Defects in β-Ga_2O_3
N. T. Son[1], K. Goto[2,3], K. Nomura[2], H. Murakami[2], Q. T. Thieu[2], R. Togashi[2], Y. Kumagai[2], A. Kuramata[3], M. Higashiwaki[4], A. Koukitu[2], S. Yamakoshi[3], B. Monemar[1,2], and E. Janzén[1];
[1]Department of Physics, Chemistry and Biology, Linköping University, Linköping, Sweden; [2]Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan; [3]Tamura Corporation, Sayama, Saitama, Japan; [4]National Institute of Information and Communications Technology, Koganei, Tokyo, Japan

11:15 I7
Evaluation of Band Offset at β-$(Al_xGa_{1-x})_2O_3$/β-Ga_2O_3 Heterointerface
M. Hattori[1], R. Wakabayashi[1], T. Oshima[1], K. Sasaki[2], T. Masui[2], A. Kuramata[2], S. Yamakoshi[2], K. Horiba[3,4], H. Kumigashira[3,4], K. Yoshimatsu[1], and A. Ohtomo[1,4];
[1]Department of Applied Chemistry, Tokyo Institute of Technology, Tokyo, Japan; [2]Tamura Corporation, Saitama, Japan; [3]Photon Factory, Institute of Materials Structure Science, High Energy Accelerator Research Organization, Ibaraki, Japan; [4]Materials Research Center for Element Strategy, Tokyo Institute of Technology, Yokohama, Japan

11:30 I8
Effective Electron Masses to Determine Conduction Band Nonparabolicity in $In_2O_3$and SnO_2
M. Feneberg[1], C. Lidig[1], J. Nixdorf[1], O. Bierwagen[2,4], Z. Galazka[3], M.E. White[4], J. S. Speck[4], and R. Goldhahn[1];
[1]Institut für Experimentelle Physik, Otto-von-Guericke Universität Magdeburg, Magdeburg, Germany; [2]Paul Drude Institut für Festkörperelektronik, Berlin, Germany; [3]Leibniz-Institut für Kristallzüchtung, Berlin, Germany; [4]Materials Department, University of California, Santa Barbara, USA

11:45 Break

Session J: Late News
Main Hall, ROHM Plaza
Session Chair: T. Oshima, Steering Committee, Tokyo Institute of Technology, Japan

12:15 J1
Field-Plated Ga_2O_3 MOSFETs with a Breakdown Voltage of Over 750 V
M. H. Wong[1], K. Sasaki[2,1], A. Kuramata[2], S. Yamakoshi[2], and M. Higashiwaki[1];
[1]National Institute of Information and Communications Technology, Koganei, Tokyo, Japan; [2]Tamura Corporation, Sayama, Saitama, Japan

12:30 J2
Comprehensive *In-Situ* Study of the Metal Incorporation and Reaction Kinetics for the MBE Growth of Ga_2O_3 and $(Ga_x,In_{1-x})_2O_3$
P. Vogt and O. Bierwagen;
Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany

12:45 J3
Barrier Heights and Temperature Dependence of β-Ga_2O_3 Schottky Diodes
G. A. Jayawardena, A. C. Ahyi, and S. Dhar;
Department of Physics, Auburn University, Auburn, USA

Closing Remarks
Main Hall, ROHM Plaza

13:00

Closing Remarks

Shizuo Fujita[1] and Masataka Higashiwaki[2];
[1]Photonics and Electronics Science and Engineering Center, Kyoto University, Kyoto, Japan; [2]National Institute of Information and Communications Technology, Koganei, Tokyo, Japan