

Oct. 23 (Sun.)

IWGO 2022 Program

Oct. 23 (Sun.)

Registration	15:30-17:30
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Welcome Reception	17:30-19:30
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Oct. 24 (Mon.)

Welcome Opening	8:45-9:00
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Plenary 1	9:00-10:00
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Chair : M. Higashiwaki (OMU/NICT)

Plenary 1 (Plenary)	9:00 - 10:00
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Progress of α -Ga₂O₃ for actual device applications

Shizuo Fujita,^{*,1} Kantaro Kaneko,^{1,2} and Katsuhisa Tanaka¹

¹Kyoto University, Japan, ²Ritsumeikan University, Japan

Epitaxy 1 (MBE1: Doping)	10:00-12:15
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Chair : O. Bierwagen (PDI)

Epi 1-1 (Invited)	10:00 - 10:30
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MOCVD growth of Ga₂O₃ and (AlGa)₂O₃: thin films and heterostructures

Hongping Zhao^{*,1,2}

¹Department of Electrical and Computer Engineering, The Ohio State University, United States of America,

²Department of Materials Science and Engineering, The Ohio State University, United States of America

Break	10:30 - 10:45
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Epi 1-2 (Invited)	10:45 - 11:15
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Single-domain κ -Ga₂O₃ thin films grown on ϵ -GaFeO₃ substrates by mist CVD

Hiroyuki Nishinaka,^{*,1} Osamu Ueda,² Noriaki Ikenaga,³ Noriyuki Hasuike,¹ and Masahiro Yoshimoto¹

¹Faculty of Electrical Engineering and Electronics, Kyoto Institute of Technology, Japan, ²Meiji Renewable Energy Laboratory, Meiji University, Japan, ³Kanazawa Institute of Technology, Japan

Epi 1-3 (Oral)	11:15 - 11:30
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Impurity scattering and doping control in MBE grown Ga₂O₃

Jonathan McCandless,^{*,1} Brad Morell,² Vladimir Protasenko,¹ Grace Xing,^{1,2,3} and Debdeep Jena^{1,2,3}

¹School of Electrical and Computer Engineering, Cornell University, United States of America, ²Department of Materials Science and Engineering, Cornell University, United States of America, ³Kavli Institute, Cornell University, United States of America

Epi 1-4 (Oral)	11:30 - 11:45
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Continuous Si doping in (010) and (001) β -Ga₂O₃ films by plasma-assisted molecular beam epitaxy

Takeki Itoh,^{*} Akhil Mauze, Yuewei Zhang, and James S. Speck

Materials Department, University of California, Santa Barbara, United States of America

Oct. 24 (Mon.)

Epi 1-5 (Oral)

11:45 - 12:00

Towards controllable Si doping in oxide molecular beam epitaxy: the example of β - Ga_2O_3 doped by a solid SiO source

Andrea Ardenghi,^{*,1} Oliver Bierwagen,¹ Andreas Falkenstein,² Georg Hoffmann,¹ Jonas Lähnemann,¹ Manfred Martin,² and Piero Mazzolini³

¹Paul-Drude-Institut für Festkörperelektronik, Germany, ²Institute of Physical Chemistry, RWTH Aachen University, Germany, ³Department of Mathematical, Physical and Computer Science, University of Parma, Italy

Epi 1-6 (Oral)

12:00 - 12:15

Doping and diffusion of Mg in (010) β - Ga_2O_3 films grown by plasma-assisted molecular beam epitaxy

Akhil Mauze, Yuewei Zhang, Takeki Itoh, and James S. Speck^{*}

Materials Department, University of California, Santa Barbara, United States of America

Lunch

12:15 - 14:00

Device 1

14:00-15:30

Chair : A. Green (AFRL)

Dev 1-1 (Invited)

14:00 - 14:30

Analysis of methods to improve the thermal management of β -gallium oxide transistors

Samuel Graham^{*,1,2}

¹Georgia Institute of Technology, United States of America, ²University of Maryland, United States of America

Dev 1-2 (Invited)

14:30 - 15:00

Addressing the thermal challenges of Ga_2O_3 power devices by packaging

Yuhao Zhang,^{*,1} Boyan Wang,¹ Ming Xiao,¹ Yuan Qin,¹ Christina DiMarino,¹ Guo-Quan Lu,¹ Kohei Sasaki,² and Cyril Buttay³

¹Center for Power Electronics Systems, Virginia Tech, United States of America, ²Novel Crystal Technology, Japan, ³University Lyon, CNRS, France

Dev 1-3 (Oral)

15:00 - 15:15

Conduction processes, modeling and deep levels in nitrogen-implanted β -Gallium oxide Schottky diodes

Carlo De Santi,^{*,1} Manuel Fregolent,¹ Matteo Buffolo,¹ Masataka Higashiwaki,^{2,3} Gaudenzio Meneghesso,¹ Enrico Zanoni,¹ and Matteo Meneghini¹

¹Department of Information Engineering, University of Padova, Italy, ²Department of Physics and Electronics, Osaka Metropolitan University, Japan, ³National Institute of Information and Communications Technology, Japan

Dev 1-4 (Oral)

15:15 - 15:30

Quantum transport in Ga_2O_3 ballistic electron devices

Nazir Hossain and Man Hoi Wong^{*}

ECE Department, University of Massachusetts Lowell, United States of America

Break

15:30 - 15:45

Process

15:45-17:15

Chair : H. Okumura (Univ. of Tsukuba)

Proc 1-1 (Invited)

15:45 - 16:15

The anisotropy of ohmic contacts to gallium oxideRebecca L. Peterson^{*,1,2} and Ming-Hsun Lee²¹Department of Electrical Engineering and Computer Science, University of Michigan, United States of America,²Department of Materials Science and Engineering, University of Michigan, United States of America

Proc 1-2 (Oral)

16:15 - 16:30

P-Si/n-Ga₂O₃ heterostructures fabricated by surface-activated bondingZhenwei Wang,^{*,1} Daiki Takatsuki,² Jianbo Liang,² Takahiro Kitada,^{1,2} Naoteru Shigekawa,² and Masataka Higashiwaki^{1,2}¹National Institute of Information and Communications Technology, Japan, ²Department of Physics and Electronics, Osaka Metropolitan University, Japan

Proc 1-3 (Oral)

16:30 - 16:45

High breakdown (001) β -Ga₂O₃ Schottky barrier diode with high resistance anode termination formed by oxygen annealingQiming He,^{*,1,2} Xuanze Zhou,² Weibing Hao,² Chen Chen,² Wei Guo,² Qiuyan Li,² Qi Liu,² Guangwei Xu,² Xiaolong Zhao,² and Shibing Long²¹School of Electronic and Information Engineering, Beihang University, China, ²School of Microelectronics, University of Science and Technology of China, China

Proc 1-4 (Oral)

16:45 - 17:00

Fabrication of high aspect DBR structures for optical integrated devices by hydrogen environment anisotropic thermal etching of β -Ga₂O₃Yuki Yamazaki,^{*,1} Tomoaki Monma,¹ Takeki Aikawa,¹ and Akihiko Kikuchi^{1,2,3}¹Sophia University, Japan, ²Sophia Photonics Research Center, Japan, ³Sophia Semiconductor Research Institute, Japan

Proc 1-5 (Oral)

17:00 - 17:15

Nanocrystalline diamond growth on (010) β -Ga₂O₃ and β -(Al_xGa_{1-x})₂O₃ for thermal management of power electronicsJames Spencer Lundh,^{*,1} Tatyana Feygelson,² Hannah N. Masten,¹ Alan G. Jacobs,² Boris Feygelson,² Kohei Sasaki,³ Akito Kuramata,³ Bradford Pate,² Karl D. Hobart,² and Marko J. Tadjer²¹National Research Council Postdoctoral Fellow at U.S. Naval Research Laboratory, United States of America,²U.S. Naval Research Laboratory, United States of America, ³Novel Crystal Technology, Inc., Japan

break

17:15 - 17:30

Poster 1 (Bulk, Epitaxy, Process)

17:30-19:00

Chair : Y. Oshima (NIMS)

Pos 1-01 (Poster)

17:30 - 19:00

Numerical study of spiral formation of crystal during β -Ga₂O₃ crystal growth using Czocharlski methodMasaya Iizuka,^{*,1} Yuji Mukaiyama,¹ and Vladimir Artemyev²¹STR Japan K.K., Japan, ²Semiconductor Technology Research d.o.o. Beograd (STR Belgrade), Serbia

Pos 1-02 (Poster)

17:30 - 19:00

Polarization dependent optical absorptions in Czochralski-grown Mn doped β -Ga₂O₃

Benjamin L. Dutton,^{*,1,2} Jani Jesenovc,^{1,2} Joel B. Varley,³ Lars F. Voss,³ and John S. McCloy^{1,2}

¹*Institute of Materials Research, Washington State University, United States of America,* ²*Materials Science and Engineering Program, Washington State University, United States of America,* ³*Lawrence Livermore National Laboratory, United States of America*

Pos 1-03 (Poster)

17:30 - 19:00

Source powder preparation for doping control in β -Ga₂O₃ single crystal grown by EFG method

Tae Wan Je,^{*,1} Su Bin Park,¹ Hui Yeon Jang,¹ Su Min Choi,¹ Mi Seon Park,¹ Yeon-Suk Jang,¹ Won Jae Lee,¹ Jun Beom Kwon,² Jung Won Park,² Jin Ki Kang,³ Yun Ji Shin,⁴ and Si Yong Bae⁴

¹*Department of Advanced Materials Engineering, Dong-Eui University, Republic of Korea,* ²*Quantamaterials, Republic of Korea,* ³*Axel, Republic of Korea,* ⁴*Korea Institute of Ceramic Engineering and Technology, Republic of Korea*

Pos 1-04 (Poster)

17:30 - 19:00

Fabrication of β -Ga₂O₃ single crystal ribbons with different orientation by EFG method

Su-Bin Park,^{*,1} Tae-Wan je,¹ Hui-yeon Jang,¹ Su-Min Choi,¹ Mi-Seon Park,¹ Yeon-Suk Jang,¹ Won-Jae Lee,¹ Yoon-Gon Moon,² Jin-Ki Kang,² Yun-Ji Shin,³ and Si-Young Bae³

¹*Department of Advanced Materials Engineering, Dong-Eui University, Republic of Korea,* ²*AXEL, Republic of Korea,* ³*Korea Institute of Ceramic Engineering and Technology, Republic of Korea*

Pos 1-05 (Poster)

17:30 - 19:00

Growth of β -Ga₂O₃ single crystals by optimizing temperature gradient of EFG system

Yun-Ji Shin,^{*,1} Su-Min Lim,^{1,2} Won-Jae Lee,³ Seong-Min Jeong,¹ and Si-Young Bae¹

¹*Semiconductor materials Center, Korea Institute of Ceramic Engineering and Technology, Republic of Korea,* ²*Department of Smart Green Technology Engineering, Pukyong National University, Republic of Korea,* ³*Department of Advanced Materials Engineering, Dong-Eui University, Republic of Korea*

Pos 1-06 (Poster)

17:30 - 19:00

Growth of β -Ga₂O₃ layers on a 6-inch wafer using halide vapor-phase epitaxy

Kazuki Naito,^{*,1} Yudai Shimizu,¹ Kohei Sasaki,² Ken Goto,³ and Yoshinao Kumagai³

¹*Taiyo Nippon Sanso Corporation, Japan,* ²*Novel Crystal Technology, Inc., Japan,* ³*Tokyo University of Agriculture and Technology, Japan*

Pos 1-07 (Poster)

17:30 - 19:00

Sub-oxide vapor phase epitaxy for the growth of high-purity gallium oxide

Quang Tu Thieu,^{*} Kohei Sasaki, and Akito Kuramata

Novel Crystal Technology, Inc., Japan

Pos 1-08 (Poster)

17:30 - 19:00

Growth window of α -Ga₂O₃ on m-plane sapphire for pulsed laser deposition

Clemens Petersen,^{*} Sofie Vogt, Max Kneiß, Holger von Wenckstern, and Marius Grundmann

Felix Bloch Institute for Solid State Physics, Universität Leipzig, Germany

Pos 1-09 (Poster)

17:30 - 19:00

Ge delta-doped β -Ga₂O₃ grown via plasma-assisted molecular beam epitaxy

Thaddeus James Asel,^{*,1} Erich Steinbrunner,^{1,2} Yunjo Kim,^{1,3} Adam Neal,¹ and Shin Mou¹

¹*Materials and Manufacturing Directorate, Air Force Research Laboratory, United States of America,* ²*Department of Electrical Engineering, Wright State University, United States of America,* ³*ARCTOS Technology Solutions LLC, United States of America*

Pos 1-10 (Poster)

17:30 - 19:00

Time-of-flight mass spectrometric study of Ga₂O₃ growth system in a metalorganic vapor phase epitaxy reactorHaruka Tozato,^{*,1} Ken Goto,¹ Taro Nishimura,¹ Kazutada Ikenaga,^{1,2} Shogo Sasaki,³ Masato Ishikawa,⁴ Hideaki Machida,⁴ and Yoshinao Kumagai¹¹Department of Applied Chemistry, Tokyo University of Agriculture and Technology, Japan, ²TAIYO NIPPON SANJO CORPORATION, Japan, ³FLOuRISH Institute, Tokyo University of Agriculture and Technology, Japan, ⁴Gas-Phase Growth Ltd., Japan

Pos 1-11 (Poster)

17:30 - 19:00

Comparison of metalorganic vapor phase epitaxy of β -Ga₂O₃ using triethylgallium and diethylgallium ethoxideKen Goto,^{*,1} Taro Nishimura,¹ Haruka Tozato,¹ Shogo Sasaki,² Kazutada Ikenaga,^{1,3} Masato Ishikawa,⁴ Hideaki Machida,⁴ and Yoshinao Kumagai¹¹Department of Applied Chemistry, Tokyo University of Agriculture and Technology, Japan, ²FLOuRISH Institute, Tokyo University of Agriculture and Technology, Japan, ³TAIYO NIPPON SANJO CORPORATION, Japan, ⁴Gas-Phase Growth Ltd., Japan

Pos 1-12 (Poster)

17:30 - 19:00

Homoepitaxial growth of Ge-doped β -Ga₂O₃ films by mist chemical vapor depositionTemma Ogawa,^{*,1} Hiroyuki Nisinaka,² Kazuki Shimazoe,¹ Tatsuji Nagaoka,³ Hiroki Miyake,³ and Masahiro Yoshimoto²¹Department of Electronics, Kyoto Institute of Technology, Japan, ²Faculty of Electrical Engineering and Electronics, Kyoto Institute of Technology, Japan, ³Power Electronics R & D Div. 2, MIRISE Technologies Corporation, Japan

Pos 1-13 (Poster)

17:30 - 19:00

Silane-mediated expansion of domains in Si-doped κ -Ga₂O₃ epitaxy and relevant effect on the in-plane electronic conductionPiero Mazzolini,^{*,1,2} Zsolt Fogarassy,³ Antonella Parisini,¹ Francesco Mezzadri,^{2,4} David Diercks,⁵ Matteo Bosi,² Luca Seravalli,² Anna Sacchi,¹ Giulia Spaggiari,^{1,2} Danilo Bersani,¹ Oliver Bierwagen,⁶ Benjamin Moritz Janzen,⁷ Marcella N. Marggraf,⁷ Markus R. Wagner,⁷ Ildiko Cora,³ Béla Pecz,³ Abbas Tahraoui,⁶ Alessio Bosio,¹ Carmine Borelli,¹ Stefano Leone,⁸ and Roberto Fornari^{1,2}¹Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy, ²IMEM-CNR, Italy, ³Centre for Energy Research, Hungarian Academy of Sciences, Institute for Technical Physics and Materials Science, Hungary, ⁴Department of Chemistry, Life Sciences and Environmental Sustainability, University of Parma, Italy, ⁵Shared Instrumentation Facility, Colorado School of Mines Golden, United States of America, ⁶Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im Forschungsverbund Berlin e.V., Germany, ⁷Technische Universität Berlin, Institute of Solid State Physics, Germany, ⁸Fraunhofer IAF, Fraunhofer Institute for Applied Solid State Physics, Germany

Pos 1-14 (Poster)

17:30 - 19:00

Strain engineering of β -Ga₂O₃: Pulsed-laser deposition on (100) θ -Al₂O₃ templates and impacts of compressive strain on physical propertiesKazuki Koreishi,^{*,1} Takuto Soma,¹ Motohisa Kado,² and Akira Ohtomo¹¹Department of Chemical Science and Engineering, Tokyo Institute of Technology, Japan, ²Toyota Motor Corporation, Japan

Pos 1-15 (Poster)

17:30 - 19:00

Thermodynamic analysis of β -Ga₂O₃ growth using Ga₂O and H₂O source gasesRie Togashi,^{*,1} Akari Suzuki,¹ Haruka Ishida,¹ Shigeyoshi Usami,² Masayuki Imanishi,² Masahiko Hata,³ and Yusuke Mori²¹Department of Engineering and Applied Sciences, Sophia University, Japan, ²Graduate School of Engineering, Osaka University, Japan, ³Itochu Plastics Inc., Japan

Pos 1-16 (Poster)

17:30 - 19:00

Demonstration of δ -Ga₂O₃ epitaxial thin films using β -Fe₂O₃ buffer layers by mist CVDTakahiro Kato,^{*}¹ Hiroyuki Nishinaka,² Kazuki Shimazoe,¹ and Masahiro Yoshimoto²¹Department of Electronics, Kyoto Institute of Technology, Japan, ²Faculty of Electrical Engineering and Electronics, Kyoto Institute of Technology, Japan

Pos 1-17 (Poster)

17:30 - 19:00

Investigation of (001) β -Ga₂O₃ homoepitaxial films grown by MOCVD with assistance of indiumWenbo Tang,^{*}¹ Yongjian Ma,¹ Tiwei Chen,¹ Xiaodong Zhang,¹ Xin Zhou,² and Baoshun Zhang¹¹University of Science and Technology of China, China, ²Nanjing University of Science and Technology, China

Pos 1-18 (Poster)

17:30 - 19:00

RF-MBE growth of Mg doped GaN on β -Ga₂O₃ ($\bar{2}01$) substratesTomoya Yamaguchi,^{*}¹ mahiro Hayasaki,¹ Tomohiro Yamaguchi,¹ Tohru Honda,¹ Kohei Sasaki,² Akito Kuramata,² and Takeyoshi Onuma¹¹Kogakuin University., Japan, ²Novel Crystal Technology, Inc., Japan

Pos 1-19 (Poster)

17:30 - 19:00

Temperature dependence of homoepitaxial layer growth by MOVPE on (010) β -Ga₂O₃ substrateKazutada Ikenaga,^{*}^{1,2} Taro Nishimura,¹ Ken Goto,¹ Masato Ishikawa,³ Hideaki Machida,³ Tomo Ueno,⁴ and Yoshinao Kumagai^{1,5}¹Department of Applied Chemistry, Tokyo University of Agriculture and Technology, Japan, ²TAIYO NIPPON SANJO CORPORATION, Japan, ³Gas-Phase Growth Ltd., Japan, ⁴Department of Electrical and Electronic Engineering, Tokyo University of Agriculture and Technology, Japan, ⁵Institute of Global Innovation Research, Tokyo University of Agriculture and Technology, Japan

Pos 1-20 (Poster)

17:30 - 19:00

A new approach to β -Ga₂O₃ epitaxyDaniela Gogova,^{2,3} Dat Q. Tran,^{2,3} Steffen Richter,^{1,2,3} Valdas Jokubavicius,^{2,3} Rositsa Yakimova,³ Axel R. Persson,^{2,3} Per O.A. Persson,^{2,3} Olle Kordina,^{2,3} Bo Monemar,^{2,3} Mathias Schubert,^{2,3,4} Plamen P. Paskov,^{2,3} and Vanya Darakchieva^{*,1,2,3}¹Solid State Physics and NanoLund, Lund University, Sweden, ²Center for III-Nitride Technology C3NiT - Janzén, Linköping University, Sweden, ³Department of Physics, Chemistry and Biology, Linköping University, Sweden, ⁴Department of Electrical and Computer Engineering, University of Nebraska-Lincoln, United States of America

Pos 1-21 (Poster)

17:30 - 19:00

Structural fluctuation in twist direction of α -(AlGa)₂O₃ thin films grown on c- and a-sapphire substrates by mist chemical vapor depositionKazuyuki Uno,^{*} Hiroto Tamura, and Marika Ohta

Faculty of Systems Engineering, Wakayama Univ., Japan

Pos 1-22 (Poster)

17:30 - 19:00

Effect of additional HCl on Ga₂O₃ particle formation in a GaCl-O₂-N₂ systemRisa Nagano,^{*}¹ Kentaro Ema,² Kohei Sasaki,² Akito Kuramata,² and Hisashi Murakami¹¹Tokyo University of Agriculture and Technology, Japan, ²Novel Crystal Technology, Inc., Japan

Pos 1-23 (Poster)

17:30 - 19:00

Influence of synthesis conditions on growth of α -Ga₂O₃ film in Mist-CVD processTakeru Wakamastu,^{*}¹ Hitoshi Takane,¹ Kentaro Kaneko,¹ Tsutomu Araki,² and Katsuhisa Tanaka¹¹Kyoto University, Japan, ²Ritsumeikan University, Japan

Pos 1-24 (Poster)

17:30 - 19:00

Bandgap tuning in β -(In_xGa_{1-x})₂O₃ by low-temperature oxide-molecular-beam-epitaxyZhirun Li,^{*}¹ Jonathan Wagstaff,¹ Tien Khee Ng,¹ Huafan Zhang,¹ Mihai Apreutesei,² Bambar Davaasuren,¹ Nimer Wehbe,¹ Wojciech Ogieglo,¹ Yue Wang,¹ Redha H. Al Ibrahim,¹ and Boon S. Ooi¹¹King Abdullah University of Science and Technology, Saudi Arabia, ²Riber, France

Pos 1-25 (Poster)

17:30 - 19:00

Growth of Ga₂O₃ film on ScAlMgO₄ substrate by mist-CVDSyuhei Yamashita,^{*}¹ Hitoshi Takane,² Yuichi Wada,¹ Yuto Yamafuji,¹ Junjiro Kikawa,¹ Makoto Matsukura,³ Takahiro Kojima,³ Takashi Shinohe,⁴ Kentaro Kaneko,² and Tsutomu Araki¹¹Ritsumeikan University, Japan, ²Kyoto University, Japan, ³OXIDE, Japan, ⁴FLOSFIA, Japan

Pos 1-26 (Poster)

17:30 - 19:00

MBE growth of GaN on ($\bar{2}01$) β -Ga₂O₃Alexander Austin Chaney,^{*}¹ Adam Neal,² Shin Mou,² and Thaddeus Asel²¹Azimuth Corporation, United States of America, ²Materials and Manufacturing Directorate, AFRL, United States of America

Pos 1-27 (Poster)

17:30 - 19:00

Growth and structural analysis of α -Ga₂O₃/ α -V₂O₃ hetero-structure on sapphire substrateKazuaki Akaiwa^{*} and Kunio Ichino

Tottori University, Japan

Pos 1-28 (Poster)

17:30 - 19:00

Elucidation of the epitaxial relation between β -Ga₂O₃ ($\bar{2}01$) thin film and CeO₂ (001) substrate for heterogeneous integrationsXiao Tang^{*} and Xiaohang Li

King Abdullah University of Science and Technology, Saudi Arabia

Pos 1-29 (Poster)

17:30 - 19:00

Insights from independent control of gallium precursor and substrate temperature during LPCVD of β -Ga₂O₃Gavax Joshi,^{*} Yogesh Singh Chauhan, and Amit Verma

Department of Electrical Engineering, IIT Kanpur, India

Pos 1-30 (Poster)

17:30 - 19:00

The effect of reactant gases on the surface morphologies of as grown surfaces in the homoepitaxial growth of (001) β -Ga₂O₃ by halide vapor phase epitaxyHae-Yong Lee,^{*} Young Jun Choi, and Hae-Gon Oh

LumiGNtech Co., Ltd., Republic of Korea

Pos 1-31 (Poster)

17:30 - 19:00

Chemical solution deposition of epitaxial (InGa)₂O₃ and (AlGa)₂O₃ thin films with tunable bandgapsXiao Tang^{*} and Xiaohang Li

King Abdullah University of Science and Technology, Saudi Arabia

Pos 1-32 (Poster)

17:30 - 19:00

Deposition of β -Ga₂O₃ thin films by pulsed MOCVDTao Zhang,^{*} Yifan Li, Qian Feng, Yachao Zhang, Jincheng Zhang, and Yue Hao

Xidian University, China

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Pos 1-33 (Poster)

17:30 - 19:00

Electrical properties of silicon-implanted α -Al₂O₃

Hironori Okumura,*¹ Riena Jinno,¹ Akira Uedono,¹ and Masataka Imura²

¹University of Tsukuba, Japan, ²NIMS, Japan

Pos 1-34 (Poster)

17:30 - 19:00

Fabrication of metastable polymorphs and polymorph heterostructures by ion beam irradiation of gallium oxide

Alexander Azarov, Calliope Bazioti, Vishnukanthan Venkatachalapathy, Ponniah Vajeeston, Augustinas Galeckas, and Andrej Kuznetsov*

University of Oslo, Norway

Pos 1-35 (Poster)

17:30 - 19:00

Centimeter-scale freestanding Ga₂O₃ membrane by thermal exfoliation

Yi Lu,* Shibin Krishna, Che-Hao Liao, Xiao Tang, Na Xiao, and Xiaohang Li

Electrical and Computer Engineering Program, CEMSE Division, King Abdullah University of Science and Technology, Saudi Arabia

Pos 1-36 (Poster)

17:30 - 19:00

Investigation of SiO₂/ β -Ga₂O₃(001) band alignment considering the effects of interface dipole layer formation

Daiki Takeda*¹ and Koji Kita^{1,2}

¹Department of Material Engineering, The University of Tokyo, Japan, ²Department of Advanced Materials Science, Graduate School of Frontier Sciences, The University of Tokyo, Japan

Pos 1-37 (Poster)

17:30 - 19:00

In-situ epitaxial growth of β -Ga₂O₃ coated semiconductor tape for flexible UV photodetectors

Xiao Tang* and Xiaohang Li

King Abdullah University of Science and Technology, Saudi Arabia

Pos 1-38 (Poster)

17:30 - 19:00

Bandgap-tunable high-crystal-quality β -(AlGa)₂O₃ template for power devices preparing by Thermal Interdiffusion Alloying (TIA) method

Che-Hao Liao,*¹ Xiao Tang,² Yi Lu,² Shibin Krishna,² and Xiaohang Li²

¹National Yunlin University of Science and Technology, Taiwan, ²King Abdullah University of Science and Technology, Saudi Arabia

Pos 1-39 (Poster)

17:30 - 19:00

Thermal stress analysis of β -Ga₂O₃ via Raman spectroscopy

Tomoyuki Uchida* and Ryuichi Sugie

Toray Research Center Inc., Japan

Pos 1-40 (Poster)

17:30 - 19:00

Indium oxide metal-semiconductor field-effect transistors

Fabian Schoeppach,* Holger von Wenckstern, and Marius Grundmann

Felix Bloch Institute for Solid State Physics, Universität Leipzig, Germany

Pos 1-41 (Poster) 17:30 - 19:00

P-type conductivity in $\text{Mg}_x\text{Ni}_{1-x}\text{O}$ films deposited on sapphire substrates by RF magnetron sputtering

Mamoru Murayama,^{*} Akito Ishikawa,¹ Tomohiro Yamaguchi,¹ Tohru Honda,¹ Kohei Sasaki,² Akito Kuramata,² and Takeyoshi Onuma¹

¹Department of Applied Physics, Kogakuin University, Japan, ²Novel Crystal Technology, Inc., Japan

Pos 1-42 (Poster) 17:30 - 19:00

Self-aligned photolithography using backside exposure through metal patterns on $\beta\text{-Ga}_2\text{O}_3$ substrates

Takayoshi Oshima

National Institute for Material Science, Japan

Pos 1-43 (Poster) 17:30 - 19:00

vdW-bond-assisted exfoliation of Ga_2O_3 membrane for vertical configuration electronics

Yi Lu,^{*} Shubin Krishna, Che-Hao Liao, Xiao Tang, Alaa Almushaikeh, and Xiaohang Li

Electrical and Computer Engineering Program, CEMSE Division, King Abdullah University of Science and Technology, Saudi Arabia

Pos 1-44 (Poster) 17:30 - 19:00

Enhanced performance of amorphous In_2O_3 thin film transistors using hydrogen rapid thermal annealing

Na Xiao

Department of Electrical and Computer Engineering King Abdullah, University of Science and Technology (KAUST), Saudi Arabia

Pos 1-45 (Poster) 17:30 - 19:00

Taper angle dependence of $\beta\text{-Ga}_2\text{O}_3$ submicron structures using inductively coupled plasma reactive ion etching

Glen Isaac Maciel García,^{*} Saravanan Yuvaraja, Vishal Khandelwal, Yi Lu, and Xiaohang Li

Advanced Semiconductor Laboratory, Electrical and Computer Engineering Program, CEMSE Division, King Abdullah University of Science and Technology (KAUST), Saudi Arabia

Pos 1-46 (Poster) 17:30 - 19:00

Bilayer $\text{Al}_2\text{O}_3/\text{Ga}_2\text{O}_3$ stack for scallop-free deep trench isolation

Mritunjay Kumar,^{*} Vishal Khandelwal,¹ Saravanan Yuvaraja,¹ Yi Lu,¹ Biplab Sarkar,² and Xiaohang Li¹

¹King Abdullah University of Science and Technology (KAUST), Advanced semiconductor Laboratory, Saudi Arabia, ²Department of Electronics and Communication Engineering, Indian Institute of Technology, India

Pos 1-47 (Poster) 17:30 - 19:00

Properties of Sn- and Si-doped Ga_2O_3 thin films produced using sol-gel techniques

Kate McKergow Wislang,^{*} Rodrigo Martínez Gazoni,^{2,3} and Martin Allen^{1,2}

¹Department of Electrical and Computer Engineering, University of Canterbury, New Zealand, ²The MacDiarmid Institute for Advanced Materials and Nanotechnology, New Zealand, ³School of Physical and Chemical Sciences, University of Canterbury, New Zealand

Pos 1-48 (Poster) 17:30 - 19:00

Sputtered polycrystalline MgZnO/Al reflective electrodes for AlGaIn based homojunction tunnel junction deep-ultraviolet LEDs

Tatsuhiro Tanaka,^{*} Taichi Matsubara,¹ Kengo Nagata,^{1,2} Maki Kushimoto,¹ Yoshio Honda,³ and Hiroshi Amano³

¹Graduate School of Engineering, Nagoya University, Japan, ²Toyoda Gosei Co., Ltd., Japan, ³Institute of Materials and Systems for Sustainability, Nagoya University, Japan

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Pos 1-49 (Poster)

17:30 - 19:00

Examination of proper impurity doping and annealing conditions for solution processed Ga₂O₃ thin films

Akihiro Momota, Takuya Shibahara, ChenYiZhan Li, and Naoki Ohtani*

Department of Electronics, Doshisha University, Japan

Pos 1-50 (Poster)

17:30 - 19:00

High responsivity solar-blind based on p-MnO/n-Ga₂O₃ p-n junction

Iman Roqan,^{*}¹ Norah Alwadai,^{1,2} Somak Mitra,¹ Zohoor Alharbi,¹ Fatimah Alreshidi,¹ and Hadeel Alamoudi¹

¹ King Abdullah University of Science and Technology, Saudi Arabia, ²Princess Nourah bint Abdulrahman University, Saudi Arabia

Pos 1-L1 (Poster) - Late News -

17:30 - 19:00

Growth of α -In₂O₃ films with different concentrations of In₂O₃ powder used as source precursor by mist CVD

Akito Taguchi,^{*}¹ Kentaro Kaneko,² Ken Goto,³ Takeyoshi Onuma,¹ Tohru Honda,¹ Yoshinao Kumagai,³ Shizuo Fujita,⁴ and Tomohiro Yamaguchi¹

¹Kogakuin University, Japan, ²Ritsumeikan University, Japan, ³Tokyo University of Agriculture and Technology, Japan, ⁴Kyoto University, Japan

Pos 1-L2 (Poster) - Late News -

17:30 - 19:00

First demonstration of β -Ga₂O₃ non-volatile flash memory

Vishal Khandelwal,^{*}¹ Manoj Kumar Rajbhar,¹ Biplab Sarkar,² and Xiaohang Li¹

¹Advanced Semiconductor Laboratory, Electrical, and Computer Engineering Program, CEMSE Division, King Abdullah University of Science and Technology (KAUST), Saudi Arabia, ²Department of Electronics and Communication Engineering, Indian Institute of Technology, India

Oct. 25 (Tue.)

Plenary 2

9:00-10:00

Chair : M. Higashiwaki (OMU/NICT)

Plenary 2 (Plenary)

9:00 - 10:00

Overview of the growth and physical properties of Czochralski-grown bulk β -Ga₂O₃ single crystals and related compounds

Zbigniew Galazka

*Leibniz-Institut für Kristallzüchtung, Germany***Epitaxy 2 (CVD)**

10:00-12:15

Chair : H. Nishinaka (KIT)

Epi 2-1 (Invited)

10:00 - 10:30

Preparation of conductive Si-doped α -(Al_xGa_{1-x})₂O₃ thin films using chloro(3-cyanopropyl)dimethylsilane via mist CVDGiang T Dang,^{1,2} Yuki Tagashira,¹ Tatsuya Yasuoka,¹ Xiaojiao Liu,¹ Li Liu,¹ and Toshiyuki Kawaharamura*,¹¹*School of Systems Engineering, Kochi University of Technology, Japan,* ²*Institute of Physics, Vietnam Academy of Science and Technology, Viet Nam*

break

10:30 - 10:45

Epi 2-2 (Oral)

10:45 - 11:00

Selective-area-grown high-aspect-ratio β -Ga₂O₃ structures fabricated by HCl-based halide vapor phase epitaxy

Takayoshi Oshima* and Yuichi Oshima

National Institute for Materials Science, Japan

Epi 2-3 (Oral)

11:00 - 11:15

Crystallinity improvement of 100-mm-diameter β -Ga₂O₃ epitaxial wafer

Chia-Hung Lin,* Kentaro Ema, Satoshi Masuya, Quang Tu Thieu, Ryoichi Sakaguchi, Kohei Sasaki, and Akito Kuramata

Novel Crystal Technology, Inc., Japan

Epi 2-4 (Oral)

11:15 - 11:30

Homo- and hetero-epitaxial growth of β -Ga₂O₃ layers by solid-source tri-halide vapor phase epitaxyKyohei Nitta,*¹ Kohei Sasaki,² Akito Kuramata,² and Hisashi Murakami¹¹*Tokyo University of Agriculture and Technology, Japan,* ²*Novel Crystal Technology, Inc., Japan*

Epi 2-5 (Oral)

11:30 - 11:45

MOCVD epitaxial development of differently oriented β -(Al_xGa_{1-x})₂O₃ films with fast growth rates and Al composition up to 63%A F M Anhar Uddin Bhuiyan,¹ Lingyu Meng,¹ Hsien-Lien Huang,² Jith Sarkar,³ Menglin Zhu,² Baishakhi Mazumder,³ Jinwoo Hwang,² and Hongping Zhao^{*,1,2}¹Department of Electrical and Computer Engineering, The Ohio State University, United States of America,²Department of Materials Science and Engineering, The Ohio State University, United States of America,³Department of Materials Design and Innovation, University at Buffalo, United States of America

Epi 2-6 (Oral)

11:45 - 12:00

Epitaxial Growth of (100) β -Ga₂O₃ by MOVPE: Experimental and machine learning approachTa-Shun Chou,^{*} Saud Bin Anooz, Raimund Grüneberg, Thi Thuy Vi Tran, Jana Rehm, Zbigniew Galazka, Palvan Seyidov, Klaus Irmscher, Natasha Dropka, Wolfram Miller, Martin Albrecht, Jutta Schwarzkopf, and Andreas Popp*Leibniz-Institut für Kristallzüchtung (IKZ), Germany*

Epi 2-7 (Oral)

12:00 - 12:15

Epitaxial growth of β -(Al_xGa_{1-x})₂O₃ and β -(In_xGa_{1-x})₂O₃ alloy thin films on (010) β -Ga₂O₃ substrates via mist chemical vapor depositionMasahiro Kaneko,^{*,1} Hiroyuki Nishinaka,² Yuki Kajita,¹ and Masahiro Yoshimoto²¹Department of Electronics, Kyoto Institute Technology, Japan, ²Faculty of Electrical Engineering and Electronics, Kyoto Institute Technology, Japan

Lunch

12:15 - 14:00

Characterization 1 (Point defects, Electrical Properties)

14:00-15:30

Chair : H. Peelaers (Univ. of Kansas)

Char 1-1 (Invited)

14:00 - 14:30

Split Ga vacancies in β -Ga₂O₃ crystals

Filip Tuomisto

Department of Physics, University of Helsinki, Finland

Char 1-2 (Oral)

14:30 - 14:45

Phonons, Isotope Effects, and Point Defects in β - and κ -Ga₂O₃Benjamin M. Janzen,^{*,1} Piero Mazzolini,^{2,3} Roland Gillen,⁴ Andreas Falkenstein,⁵ Vivien F. S. Peltason,¹ Hans Tornatzky,¹ Linus P. Grote,¹ Daniel Cierpinsky,¹ Andrea Ardenghi,² Manfred Martin,⁵ Janina Maultzsch,⁴ Roberto Fornari,³ Zbigniew Galazka,⁶ Oliver Bierwagen,² and Markus R. Wagner¹¹Technische Universität Berlin, Institute of Solid State Physics, Germany, ²Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im Forschungsverbund Berlin e. V., Germany, ³Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy, ⁴Chair of Experimental Physics, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany, ⁵Institute of Physical Chemistry, RWTH Aachen University, Germany,⁶Leibniz-Institut für Kristallzüchtung, Germany

Oct. 25 (Tue.)

Char 1-3 (Oral)

14:45 - 15:00

Gallium vacancy in $\beta\text{-Ga}_2\text{O}_3$: An electron paramagnetic resonance and theoretical study

Nguyen Tien Son,¹ Quoc Duy Ho,^{2,3} Ken Goto,^{*,4} Hiroshi Abe,⁵ Takeshi Ohshima,⁵ Bo Monemar,¹ and Yoshinao Kumagai^{4,6}

¹Department of Physics, Chemistry and Biology, Linköping University, Sweden, ²Bremen Center for Computational Materials Science, University of Bremen, Germany, ³Faculty of General Sciences, Can Tho University of Technology, Viet Nam, ⁴Department of Applied Chemistry, Tokyo University of Agriculture and Technology, Japan, ⁵National Institutes for Quantum Science and Technology, Japan, ⁶Institute of Global Innovation Research, Tokyo University of Agriculture and Technology, Japan

Char 1-4 (Oral)

15:00 - 15:15

Cobalt a promising dopant for producing semi-insulating crystals: Charge state transition levels of cobalt in $\beta\text{-Ga}_2\text{O}_3$ from experiment and theory

Palvan Seyidov,^{*,1} Joel Basile Varley,² Zbigniew Galazka,¹ Ta-Shun Chou,¹ Andreas Popp,¹ Andreas Fiedler,¹ and Klaus Irmscher¹

¹Leibniz-Institut für Kristallzüchtung, Germany, ²Lawrence Livermore National Laboratory, United States of America

Char 1-5 (Oral)

15:15 - 15:30

Dislocation responsible for leakage current in HVPE (001) $\beta\text{-Ga}_2\text{O}_3$ SBD observed by emission microscopy and synchrotron x-ray topography

Sayleap Sdoeung,^{*,1} Kohei Sasaki,² Katsumi Kawasaki,³ Jun Hirabayashi,³ Akito Kuramata,² and Makoto Kasu¹

¹Saga University, Japan, ²Novel Crystal Technology, Japan, ³TDK Corporation, Japan

Break

15:30 - 15:45

Characterization 2 (Optical and Electrical Properties)

15:45-17:15

Chair : T. Onuma (Kogakuin Univ.)

Char 2-1 (Invited)

15:45 - 16:15

Electronic Raman scattering in $\beta\text{-Ga}_2\text{O}_3$

Andreas Fiedler,^{*,1} Palvan Seyidov,¹ Manfred Ramsteiner,² Zbigniew Galazka,¹ and Klaus Irmscher¹

¹Leibniz-Institut für Kristallzüchtung, Germany, ²Paul-Drude-Institut für Festkörperelektronik, Germany

Char 2-2 (Oral)

16:15 - 16:30

Anisotropy of thermal conductivity, sound velocities, and optical phonon modes in $\beta\text{-Ga}_2\text{O}_3$

Markus R. Wagner,^{*,1} Benjamin M. Janzen,¹ Hans Tornatzky,¹ Roland Gillen,² Janina Maultzsch,² Zbigniew Galazka,³ Bartłomiej Graczykowski,⁴ Kai Xu,⁵ Riccardo Rurali,⁵ and Juan S. Reparaz⁵

¹Technische Universität Berlin, Institute of Solid State Physics, Germany, ²Chair of Experimental Physics, FAU Erlangen-Nürnberg, Germany, ³Leibniz Institute for Crystal Growth, Germany, ⁴Faculty of Physics, Adam Mickiewicz University, Poland, ⁵Institut de Ciència de Materials de Barcelona, ICMA-B-CSIC, Spain

Char 2-3 (Oral)

16:30 - 16:45

Impact of growth techniques and post-growth annealing on electronic and phononic properties of κ -Ga₂O₃

Benjamin M. Janzen,^{*}¹ Vivien F. S. Peltason,¹ Nima Hajizadeh,¹ Conrad Hartung,¹ Marcella N. Marggraf,¹ Felix Nippert,¹ Roland Gillen,² Janina Maultzsch,² Piero Mazzolini,^{3,4} Roberto Fornari,^{3,4} Matteo Bosi,⁴ Luca Seravalli,⁴ Alexander Karg,⁵ Martin Eickhoff,⁵ Max Kneiß,⁶ Holger von Wenckstern,⁶ Marius Grundmann,⁶ Elias Kluth,⁷ Martin Feneberg,⁷ Rüdiger Goldhahn,⁷ Andrea Ardenghi,⁸ Oliver Bierwagen,⁸ and Markus R. Wagner¹
¹*Technische Universität Berlin, Institute of Solid State Physics, Germany,* ²*Chair of Experimental Physics, FAU Erlangen-Nürnberg, Germany,* ³*Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy,* ⁴*IMEM-CNR, Italy,* ⁵*Institute of Solid State Physics, University of Bremen, Germany,* ⁶*Universität Leipzig, Felix-Bloch-Institut für Festkörperphysik, Germany,* ⁷*Otto-von-Guericke-Universität Magdeburg, Institut für Physik, Germany,* ⁸*Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im Forschungsverbund Berlin e.V., Germany*

Char 2-4 (Oral)

16:45 - 17:00

Subthreshold AC conductance of lateral Ga₂O₃ transistors: Mobility and carrier density in the subthreshold region

Abhishek Mishra,^{*}¹ Michael J. Uren,¹ Matthew Smith,¹ Masataka Higashiwaki,^{2,3} and Martin Kuball¹
¹*Center for Device Thermography and Reliability, University of Bristol, United Kingdom,* ²*National Institute of Information and Communications Technology, Japan,* ³*Department of Physics and Electronics, Osaka Metropolitan University, Japan*

Char 2-5 (Oral)

17:00 - 17:15

Large breakdown field of Li-doped NiO and demonstration of high-voltage NiO/Ga₂O₃ diodes

Katsunori Danno,^{*} Motohisa Kado, Toshimasa Hara, Tatsuki Takasugi, Hayate Yamano, Yusuke Umetani, and Tetsuya Shoji
Toyota Motor Corporation, Japan

Break

17:15 - 17:30

Poster 2 (Characterization, Theory, Device)

17:30-19:00

Chair : H. Zhao (OSU)

Pos 2-01 (Poster)

17:30 - 19:00

Extended defects in MOVPE homoepitaxial β -Ga₂O₃ films and effects on luminescence

Jacqueline Cooke,^{*}¹ Praneeth Ranga,¹ Jani Jesenovc,^{5,6} Arkka Bhattacharyya,¹ Xueling Cheng,¹ Yunshan Wang,³ John S. McCloy,^{5,6} Sriram Krishnamoorthy,⁴ Michael A. Scarpulla,^{1,2} and Berardi Sensale-Rodriguez¹
¹*Department of Electrical and Computer Engineering, The University of Utah, United States of America,* ²*Department of Materials Science and Engineering, The University of Utah, United States of America,* ³*Department of Chemical Engineering, The University of Utah, United States of America,* ⁴*Materials Department, University of California, Santa Barbara, United States of America,* ⁵*Institute of Materials Research, Washington State University, United States of America,* ⁶*Materials Science & Engineering Program, Washington State University, United States of America*

Pos 2-03 (Poster)

17:30 - 19:00

Influences of orientation and remote O₂ plasma exposure on the interface properties of SiO₂/ β -Ga₂O₃ MOS capacitors

Rujun Sun,^{*}^{1,2} Arkka Bhattacharyya,¹ Muad Saleh,³ Sriram Krishnamoorthy,¹ and Michael A. Scarpulla^{1,4}
¹*Electrical and Computer Engineering, University of Utah, United States of America,* ²*School of Microelectronics, Xidian University, China,* ³*Materials Science and Engineering Program, Washington State University, United States of America,* ⁴*Materials Science and Engineering, University of Utah, United States of America*

Pos 2-04 (Poster)

17:30 - 19:00

Microstructural characterization of β -Ga₂O₃ crystals by photoluminescence mapping measurementsKohei Shoji,^{*,1} Masahiko Nakanishi,¹ Makoto Kasu,² Tomohiro Yamaguti,¹ Tohru Honda,¹ Kohei Sasaki,³ Akito Kuramata,³ and Takeyoshi Onuma¹¹Kogakuin University, Japan, ²Saga University, Japan, ³Novel Crystal Technology, Japan

Pos 2-05 (Poster)

17:30 - 19:00

Crystal defects and lattice constants of high-quality β -Ga₂O₃ edge-defined film-fed grown single crystals studied by synchrotron x-ray topography and high-resolution x-ray diffractionsMuhidul Islam Chaman, Sayleap Sdoeung, and Makoto Kasu^{*}*Department of Electrical and Electronic Engineering, Saga University, Japan*

Pos 2-06 (Poster)

17:30 - 19:00

First identification by charge space spectroscopy of acceptors levels in Zn: β -Ga₂O₃ grown by MOCVD.Georges Bremond,^{*,1} Corinne Sartel,² Zeyu Chi,² Ekaterina Chikoidze,² Gérard Guillot,¹ and Jean-Marie Bluet¹¹University of Lyon, INSA Lyon, CNRS, ECL, UCBL, CPE, Institut des Nanotechnologies de Lyon, France,²Groupe d'Etude de la Matière Condensée (GEMaC), Université Paris-Saclay, UVSQ - CNRS, France

Pos 2-07 (Poster)

17:30 - 19:00

Mechanical properties of β -Ga₂O₃ crystalsHirotaka Yamaguchi,^{*,1} Yukako Kato,¹ Takuya Igarashi,² Yuki Ueda,² Kimiyoshi Koshi,² Shinya Watanabe,² Shigenobu Yamakoshi,² and Akito Kuramata²¹National Institute of Advanced Industrial Science and Technology, Japan, ²Novel Crystal Technology Inc., Japan

Pos 2-08 (Poster)

17:30 - 19:00

TEM characterization of defects in κ -(Ga_{1-x}In_x)₂O₃ thin film grown on (001) FZ-grown ϵ -GaFeO₃ substrate by Mist CVDOsamu Ueda,^{*,1} Hiroyuki Nishinaka,² Noriaki Ikenaga,³ Noriyuki Hasuike,² and Masahiro Yoshimoto²¹Meiji Renewable Energy Laboratory, Meiji University, Japan, ²Faculty of Electrical Engineering and Electronics, Kyoto Institute of Technology, Japan, ³Department of Electrical and Electronic Engineering, Kanazawa Institute of Technology, Japan

Pos 2-09 (Poster)

17:30 - 19:00

Three-dimensional feature of nanopipes in EFG-grown (010) β -Ga₂O₃ crystal characterized by multiphoton-excitation photoluminescenceTomoka Nishikawa,^{*,1} Mayuko Tshukakoshi,¹ Ken Goto,² Hisashi Murakami,² Yoshinao Kumagai,² Masahiro Uemukai,¹ Tomoyuki Tanikawa,¹ and Ryuji Katayama¹¹Osaka University, Japan, ²Tokyo University of Agriculture and Technology, Japan

Pos 2-10 (Poster)

17:30 - 19:00

Evidence of hole conductivity in Zn doped β -Ga₂O₃ thin filmsZeyu CHI,^{*,1} Corinne Sartel,¹ Guillaume Bouchez,¹ François Jomard,¹ Vincent Sallet,¹ Gérard Guillot,² Kamel Boukheddaden,¹ Amador Pérez-Tomás,³ Tamar Tchelidze,⁴ Yves Dumont,¹ and Ekaterine Chikoidze¹¹Groupe d'Etude de la Matière Condensée (GEMaC), Université Paris-Saclay, UVSQ - CNRS, France, ²Univ. Lyon, CNRS, ECL, UCBL, INSA Lyon, CPE, Institut des Nanotechnologies de Lyon (INL-UMR5270), France,³Catalan Institute of Nanoscience and Nanotechnology (ICN2), CSIC and The Barcelona Institute of Science and Technology, Spain, ⁴Faculty of Exact and Natural Science, Department of Physics, Ivane Javakishvili Tbilisi State University, Georgia

Pos 2-11 (Poster)

17:30 - 19:00

Effect of dislocation and impurity on electrical properties of Si-doped α -Ga₂O₃ on sapphire substrateHitoshi Takane,^{*}¹ Hirokazu Izumi,² Hajime Hojo,³ Takeru Wakamatsu,¹ Katsuhisa Tanaka,¹ and Kentaro Kaneko¹¹Kyoto University, Japan, ²Hyogo Prefectural Institute of Technology, Japan, ³Kyushu University, Japan

Pos 2-12 (Poster)

17:30 - 19:00

Anisotropic IR active phonon modes and fundamental direct band-to-band transitions in α -(Al_xGa_{1-x})₂O₃ alloys grown by MOCVDElias Kluth,^{*}¹ A F M Anhar Uddin Bhuiyan,² Lingyu Meng,² Hongping Zhao,^{2,3} Rüdiger Goldhahn,¹ and Martin Feneberg¹¹Institut für Physik, Otto-von-Guericke-Universität Magdeburg, Germany, ²Department of Electrical and Computer Engineering, The Ohio State University, United States of America, ³Department of Materials Science and Engineering, The Ohio State University, United States of America

Pos 2-13 (Poster)

17:30 - 19:00

Characterization of electrical properties of β -Ga₂O₃ epilayer using terahertz time-domain ellipsometryToshiyuki Iwamoto,^{*}^{1,2} Verdad Canila Agulto,² Shuang Liu,² Youwei Wang,² Valynn Katrine Mag-usara,² Takashi Fujii,¹ Ken Goto,³ Yoshinao Kumagai,^{3,4} and Makoto Nakajima²¹Nippo Precision Co.,Ltd., Japan, ²Institute of Laser Engineering, Osaka University, Japan, ³Department of Applied Chemistry, Tokyo University of Agriculture and Technology, Japan, ⁴Institute of Global Innovation Research, Tokyo University of Agriculture and Technology, Japan

Pos 2-14 (Poster)

17:30 - 19:00

THz electron paramagnetic resonance ellipsometry - a new high precision tool to identify defects in gallium oxide: the case of iron dopingSteffen Richter,^{*}^{1,2} Mathias Schubert,^{2,3} Sean Robert Knight,^{1,2} Philipp Kühne,² Alexander Ruder,³ Vallery Stanishev,² Megan Stoeckel,³ Rafal Korlacki,³ Sai Mu,⁴ Chris Van de Walle,⁴ Viktor Ivády,^{2,5} Oscar Bulancea-Lindwall,² Igor Abrikosov,² and Vanya Darakchieva^{1,2}¹Division of Solid State Physics and NanoLund, Lund University, Sweden, ²Linköping University, Sweden, ³University of Nebraska-Lincoln, United States of America, ⁴University of California Santa Barbara, United States of America, ⁵Max Planck Institute for the Physics of Complex Systems, Germany

Pos 2-15 (Poster)

17:30 - 19:00

ZnGa₂O₄, the power bipolar spinel relative of Ga₂O₃Amador Perez-Tomas,^{*}¹ Ekaterine Chikoidze,² H.R. Horng,³ and Farid Medjdoub⁴¹Catalan Institute of Nanoscience and Nanotechnology (ICN2), CSIC, and The Barcelona Institute of Science and Technology, Spain, ²Groupe d'Etude de la Matière Condensée (GEMaC), Université Paris-Saclay, Université de Versailles Saint Quentin en Yvelines, France, ³Institute of Electronics, National Yang Ming Chiao Tung University, Taiwan, ⁴IEMN, CNRS, UMR8520, France

Pos 2-16 (Poster)

17:30 - 19:00

Comparison of group-IV donor elements for tailoring electrical properties of α -Ga₂O₃ grown by pulsed laser depositionSofie Vogt,¹ Max Kneiß,¹ Clemens Petersen,^{*}¹ Thorsten Schultz,² Holger von Wenckstern,¹ Norbert Koch,² and Marius Grundmann¹¹Felix Bloch Institute for Solid State Physics, Universität Leipzig, Germany, ²Department of Physics, Humboldt Universität zu Berlin, Germany

Pos 2-17 (Poster)

17:30 - 19:00

Micro-Raman spectroscopy of bending stresses in β -Ga₂O₃(001) waferIssei Maeda,^{*} Sou Isaji, Noriyuki Hasuike, and Toshiyuki Isshiki

Department of Electronic Systems Engineering, Kyoto Institute of Technology University, Japan

Pos 2-18 (Poster)

17:30 - 19:00

High quality vertical Bridgman and edge-defined film-fed growth β -Ga₂O₃ bulk crystal investigated using high-resolution x-ray diffraction and synchrotron x-ray topographyMuhidul Islam Chaman,¹ Keigo Hoshikawa,² Sayleap Sdoeung,¹ and Makoto Kasu^{*,1}¹Department of Electrical and Electronic Engineering, Saga University, Japan, ²Faculty of Engineering, Shinshu University, Japan

Pos 2-19 (Poster)

17:30 - 19:00

Electronic and optical properties of monoclinic gallium oxide under strain: the full pictureMegan Stoeke,^{*,1} Rafal Korlacki,¹ Matthew Hilfiker,¹ Teresa Gramer,¹ Jenna Knudtson,¹ Steffen Richter,^{2,3} Sean Knight,² Alexis Papamichail,² Alyssa Mock,⁴ Akhil Mauze,⁵ Yuewei Zhang,⁵ James Speck,⁵ Klaus Irmscher,⁶ Zbigniew Galazka,⁶ Jani Jesenovc,⁷ John McCloy,⁷ Vanya Darakchieva,^{2,3} and Mathias Schubert^{1,2}¹University of Nebraska–Lincoln, United States of America, ²Linköping University, Sweden, ³NanoLund and Solid State Physics, Lund University, Sweden, ⁴Weber State University, United States of America, ⁵University of California Santa Barbara, United States of America, ⁶Leibniz-Institut für Kristallzüchtung, Germany, ⁷Washington State University, United States of America

Pos 2-20 (Poster)

17:30 - 19:00

Nitrogen doped p-type β -Ga₂O₃ for optoelectronic devicesSoroush Abbasi Zargaleh,^{*,1,2} C. Sartel,¹ F. Jomard,¹ M. Peres,³ K. Lorenz,³ B. Berini,¹ G. Bouchez,¹ V. Sallet,¹ K. Boukheddaden,¹ Y. Dumont,¹ and E. Chikoidze¹¹Groupe d'Etude de la Matière Condensée (GEMaC), Université Paris-Saclay, UVSQ - CNRS, France, ²Institut des NanoSciences de Paris, Sorbonne Universités, CNRS-UMR, France, ³University of Lisbon, Portugal

Pos 2-22 (Poster)

17:30 - 19:00

Band alignment of orthorhombic Ga₂O₃ with GaN and AlNShibin Krishna,^{*} Yi Lu, Che-Hao Liao, Vishal Khandelwal, and Xiaohang Li

Advanced Semiconductor Laboratory, King Abdullah University of Science and Technology, Saudi Arabia

Pos 2-23 (Poster)

17:30 - 19:00

Structural and electrical properties of thick κ -Ga₂O₃ grown on GaN/sapphire templatesS. I. Stepanov,^{*,2,3} V. I. Nikolaev,^{2,3} A. Y. Polyakov,¹ A. I. Pechnikov,^{2,3} E. B. Yakimov,^{1,4} M. P. Scheglov,² I. V. Shchemerov,¹ A. A. Vasilev,¹ A. A. Kochkova,¹ A. V. Chernykh,¹ A. V. Chikiryaka,² and S. J. Pearton⁵¹National University of Science and Technology MISiS, Russia, ²Ioffe Institute, Russia, ³Perfect Crystals LLC, Russia, ⁴Institute of Microelectronics Technology and High Purity Materials, Russia, ⁵Department of Materials Science and Engineering, University of Florida, United States of America

Pos 2-24 (Poster)

17:30 - 19:00

The origin of the 3.8 eV luminescence line in α -Ga₂O₃David R.L Nicol,^{*,1} Fabien Massabuau,¹ and Yuichi Oshima²¹University of Strathclyde, United Kingdom, ²National Institute for Materials Science, Japan

Pos 2-25 (Poster)

17:30 - 19:00

Study of the contact resistance of α -Ga₂O₃ on m-plane sapphire substrate with respect to Sn concentrations by CTLM methodYuuto Yamafuji,^{*,1} Junjiro Kikawa,¹ Syuuhei Yamashita,¹ Takashi Shinohe,² and Tsutomu Araki¹¹Graduate School of Science and Engineering, Ritsumeikan University, Japan, ²FLOSFIA, Japan

Pos 2-26 (Poster)

17:30 - 19:00

Highly suppressed interface traps of Al₂O₃/GaN by interposing a stoichiometric Ga₂O₃ layerChuanju Wang, Yi Lu, Che-Hao Liao, Shibin Chandroth, Saravanan Yuvaraja, and Xiaohang Li^{*}

King Abdullah University of Science and Technology, Saudi Arabia

Pos 2-28 (Poster)

17:30 - 19:00

Annealing effect on κ -Ga₂O₃ epitaxial layers and role of hydrogen-related defects

Piero Mazzolini,^{*,1,2} Maura Pavesi,¹ Andreas Falkenstein,³ Antonella Parisini,¹ Alessio Bosio,¹ Carmine Borelli,¹ Vivien F. S. Peltason,⁴ Benjamin Moritz Janzen,⁴ Markus R. Wagner,⁴ Matteo Bosi,² Luca Seravalli,² Andrea Ardenghi,⁵ Oliver Bierwagen,⁵ Francesco Mezzadri,^{2,6} Manfred Martin,³ Andrea Baraldi,¹ and Roberto Fornari^{1,2}
¹Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy, ²IMEM-CNR, Parma, Italy, ³Institute of Physical Chemistry, RWTH Aachen University, Germany, ⁴Technische Universität Berlin, Institute of Solid State Physics, Germany, ⁵Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im Forschungsverbund Berlin e.V., Germany, ⁶Department of Chemistry, Life Sciences and Environmental Sustainability, University of Parma, Italy

Pos 2-29 (Poster)

17:30 - 19:00

Impact of RF power on electrical property of NiO films grown by RF magnetron sputtering

Akito Ishikawa,^{*,1} Mamoru Murayama,¹ Tomohiro Yamaguchi,¹ Tohru Honda,¹ Kouhei Sasaki,² Akito Kuramata,² and Takeyoshi Onuma¹

¹Department of Applied Physics, School of Advanced Engineering and Department of Electrical Engineering and Electronics, Graduate School of Engineering, Kogakuin University, Japan, ²Novel Crystal Technology, Inc., Japan

Pos 2-30 (Poster)

17:30 - 19:00

Li-diffusion effect in Ga₂O₃ thin films

Anna Sacchi,^{*,1} Piero Mazzolini,^{1,2} Giacomo Magnani,³ Michele Sidoli,³ Daniele Pontiroli,³ Mauro Riccò,³ Alessio Bosio,¹ Francesco Mezzadri,^{2,3} Maura Pavesi,¹ Giulia Spaggiari,^{1,2} Danilo Bersani,¹ Andrea Ardenghi,⁴ Oliver Bierwagen,⁴ Matteo Bosi,² Luca Seravalli,² Antonella Parisini,¹ Benjamin Moritz Janzen,⁵ Markus R. Wagner,⁵ Andreas Falkenstein,⁶ Manfred Martin,⁶ and Roberto Fornari^{1,2}

¹Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy, ²IMEM-CNR, Italy, ³Department of Chemistry, Life Sciences and Environmental Sustainability, University of Parma, Italy, ⁴Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im Forschungsverbund Berlin e.V., Germany, ⁵Technische Universität Berlin, Institute of Solid State Physics, Germany, ⁶Institute of Physical Chemistry, RWTH Aachen University, Germany

Pos 2-33 (Poster)

17:30 - 19:00

Structural change of Ga₂O₃ induced by charged oxygen vacancies: a first-principles study

Toru Akiyama,^{*} Takahiro Kawamura, and Tomonori Ito
 Mie University, Japan

Pos 2-34 (Poster)

17:30 - 19:00

Electrothermal simulation of vertical β -Ga₂O₃ MOSFETs under switched bias conditions

Junsung Park¹ and Sung-Min Hong^{*,2}

¹SK hynix, Republic of Korea, ²Gwangju Institute of Science and Technology, Republic of Korea

Pos 2-35 (Poster)

17:30 - 19:00

Influence of biaxial strain on bandgaps of β -Ga₂O₃

Takahiro Kawamura^{*} and Toru Akiyama
 Graduate School of Engineering, Mie University, Japan

Pos 2-36 (Poster)

17:30 - 19:00

Simulation of β -Ga₂O₃ lateral field effect rectifier with low turn-on voltage and low leakage current

Qi Liu,^{*} Xuanze Zhou, Guangwei Xu, and Shibing Long
 School of Microelectronics, University of Science and Technology of China, China

Pos 2-37 (Poster)

17:30 - 19:00

Demonstration of hybrid half-wave Cockcroft-Walton voltage multiplier utilizing high performance β -Ga₂O₃ junction barrier Schottky diodesFeihong Wu,^{*}¹ Yuangang Wang,² Guangwei Xu,¹ Yuanjie Lv,² and Shibing Long¹¹*School of Microelectronics, USTC, China,* ²*National Key Laboratory of ASIC, Hebei Semiconductor Research Institute, China*

Pos 2-38 (Poster)

17:30 - 19:00

Inkjet-printed Ga₂O₃ films for flexible and heat-resistant deep ultraviolet photodetectorMengfan Ding,^{*}¹ Kun Liang,² Xiaolong Zhao,¹ Bowen Zhu,² and Shibing Long¹¹*School of Microelectronics, University of Science and Technology of China, China,* ²*Key Laboratory of 3D Micro/Nano Fabrication and Characterization, School of Engineering, Westlake University, China*

Pos 2-39 (Poster)

17:30 - 19:00

 β -Ga₂O₃ UMOSFET with vertical quasi-inversion-mode channelXuanze Zhou,^{*} Qi Liu, Gungwei Xu, and Shibing Long*University of Science and Technology of China, China*

Pos 2-40 (Poster)

17:30 - 19:00

Fabrication and characterization of high-voltage p-Cu_xNi_{1-x}O/ β -Ga₂O₃ heterojunction diodesChao Liao,^{*} Xing Lu, Pai Wen Fang, Tong Ling Xu, Hao Xun Luo, Yu Xin Deng, and Yan Li Pei*School of Electronics and Information Technology, Sun Yat-sen University, China*

Pos 2-41 (Poster)

17:30 - 19:00

Breaking the responsivity-speed dilemma of photodetectors by alternating carrier injectionZhongfang Zhang,^{*} Xiaolong Zhao, Pengju Tan, Xiaohu Hou, Mengfan Ding, Shunjie Yu, Guangwei Xu, and Shibing Long*School of Microelectronics, University of Science and Technology of China, China*

Pos 2-42 (Poster)

17:30 - 19:00

Demonstration of ultrawide bandgap oxide ambipolar transistors for CMOS logicSaravanan Yuvaraja,^{*} Shibin Krishna, Yi Lu, Zhiyuan Liu, Mritunjay Kumar, Dhanu Chettri, Xiao Tang, Glen Isaac Maciel García, Che-Hao Liao, and Xiaohang Li*King Abdullah University of Science and Technology, Saudi Arabia*

Pos 2-43 (Poster)

17:30 - 19:00

Ga₂O₃ NMOS inverter integrated circuit based on monolithic integration of depletion and enhancement mode Ga₂O₃ thin film transistorVishal Khandelwal,^{*} Saravanan Yuvaraja, Glen Isaac Maciel García, Shibin Krishna, and Xiaohang Li*Advanced Semiconductor Laboratory, Electrical, and Computer Engineering Program, CEMSE division, King Abdullah University of Science and Technology (KAUST), Saudi Arabia*

Pos 2-44 (Poster)

17:30 - 19:00

Radiation response and reliability studies of β -Ga₂O₃-based devicesN. Manikanthababu^{*}¹ and Rajendra Singh^{1,2}¹*Department of Physics, Indian Institute of Technology Delhi, India,* ²*Department of Electrical Engineering, Indian Institute of Technology Delhi, India*

Oct. 25 (Tue.)

Pos 2-45 (Poster) 17:30 - 19:00
In-situ growth of $\{201\}$ fiber-textured β -Ga₂O₃ semiconductor tape for flexible thin-film transistor

Xiao Tang* and Xiaohang Li
King Abdullah University of Science and Technology, Saudi Arabia

Pos 2-46 (Poster) 17:30 - 19:00
High-performance harsh-environment-resistant GaO_x solar-blind photodetectors

Xiaohu Hou,* Xiaolong Zhao, Zhongfang Zhang, Mengfan Ding, Shunjie Yu, Guangwei Xu, and Shibing Long
University of Science and Technology of China, China

Pos 2-47 (Poster) 17:30 - 19:00
Demonstration of self-powered NiO_x/β-Ga₂O₃ broadband PIN photodiode

Jose Manuel Taboada Vasquez,*¹ Yi Lu,¹ Mritunjay Kumar,¹ Vishal Khandelwal,¹ Biplab Sarkar,² and Xiaohang Li¹

¹, *Advanced Semiconductor Laboratory, King Abdullah University of Science and Technology (KAUST), Saudi Arabia*, ²*Department of Electronics and Communication Engineering, Indian Institute of Technology Roorkee, India*

Pos 2-48 (Poster) 17:30 - 19:00
High-photoresponsivity self-powered β-Ga₂O₃/p-GaN heterojunction UV photodetectors with In Situ GaON layer by MOCVD

Yongjian Ma,*¹ Tiwei Chen,¹ Xiaodong Zhang,¹ Wenbo Tang,¹ Houqiang Fu,² and Baoshun Zhang¹

¹*School of Nano-Tech and Nano-Bionics, University of Science and Technology of China, China*, ²*Department of Electrical and Computer Engineering, Iowa State University, United States of America*

Pos 2-49 (Poster) 17:30 - 19:00
Study of Ti and Ni contacts to corundum α-Ga₂O₃

Fabien Massabuau,*¹ David Nicol,¹ Francesca Adams,² John Jarman,² Martin Frentrup,² Thomas O'Hanlon,³ Joseph Roberts,⁴ Andras Kovacs,⁵ Paul Chalker,⁴ and Rachel Oliver²

¹*Department of Physics, University of Strathclyde, United Kingdom*, ²*Department of Materials Science and Metallurgy, University of Cambridge, United Kingdom*, ³*Plymouth Electron Microscopy Centre, University of Plymouth, United Kingdom*, ⁴*School of Engineering, University of Liverpool, United Kingdom*, ⁵*Ernst Ruska-Centre, Forschungszentrum Jülich, Germany*

Pos 2-50 (Poster) 17:30 - 19:00
Realization of highly rectifying Schottky barrier diodes and pn-heterojunctions on κ-Ga₂O₃

Max Kneiss, Fabian Schoeppach,* Daniel Splith, Peter Schlupp, Anna Hassa, Holger von Wenckstern, Michael Lorenz, and Marius Grundmann

Felix Bloch Institute for Solid State Physics, Universität Leipzig, Germany

Pos 2-51 (Poster) 17:30 - 19:00
Enhancement-mode β-Ga₂O₃ thin-film transistor epitaxially grown on heterogeneous sapphire substrate

Vishal Khandelwal,* Saravanan Yuvaraja, Glen Isaac Maciel García, Yi Lu, and Xiaohang Li

Advanced Semiconductor Laboratory, Electrical, and Computer Engineering Program, CEMSE division, King Abdullah University of Science and Technology (KAUST), Saudi Arabia

Pos 2-52 (Poster) 17:30 - 19:00
Multi-channel bottom gate In₂O₃ transistor using high k dielectrics

Dhanu Chettri,* Saravanan Yuvaraja, Na Xiao, and Xiaohang Li

Advanced Semiconductor Laboratory, Electrical, and Computer Engineering Program, CEMSE Division, King Abdullah University of Science and Technology (KAUST), Saudi Arabia

Oct. 25 (Tue.)

Pos 2-L1 (Poster) - *Late News* -

17:30 - 19:00

Growth & characterization of high temperature in-situ $\text{Al}_2\text{O}_3/(010)$ $\beta\text{-Ga}_2\text{O}_3$ interface

Saurav Roy,^{*} Arkka Bhattacharyya, Carl Peterson, and Sriram Krishnamoorthy

Materials Department, University of California Santa Barbara, United States of America

Pos 2-L2 (Poster) - *Late News* -

17:30 - 19:00

Identifying Ga_2O_3 polymorphs by electron backscatter diffraction

Martin S. Williams,¹ Isa Hatipoglu,² Partha Mukhopadhyay,² Winston V. Schoenfeld,^{2,3} Shanthi Subashchandran,⁴ Krishnamurthy Daivasigamani,⁵ Kohei Sasaki,⁵ Akito Kuramata,⁵ Robert W. Martin,¹ and Naresh Kumar Gunasekar^{*,1,6}

¹*Department of Physics, SUPA, University of Strathclyde, United Kingdom,* ²*The College of Optics and Photonics, University of Central Florida, United States of America,* ³*Department of Electrical and Computer Engineering, University of Central Florida, United States of America,* ⁴*Crystal growth centre, Anna University, India,* ⁵*Novel Crystal Technology, Japan,* ⁶*School of Physics and Astronomy, Cardiff University, United Kingdom*

Pos 2-L3 (Poster) - *Late News* -

17:30 - 19:00

Demonstration of MOCVD Si-doped $\beta\text{-(Al}_x\text{Ga}_{1-x})_2\text{O}_3$ recessed-gate MESFET

Hannah Masten,^{*,1} James Spencer Lundh,¹ Joseph Spencer,^{2,3} Fikadu Alema,⁴ Andrei Osinsky,⁴ Alan Jacobs,² Karl Hobart,² and Marko Tadjer²

¹*National Research Council Postdoctoral Fellow at US Naval Research Laboratory, United States of America,* ²*US Naval Research Laboratory, United States of America,* ³*Virginia Tech, United States of America,* ⁴*Agnitron Technology, Inc, United States of America*

Oct. 26 (Wed.)

Theory 9:00-10:30

Chair : K. Uno (Wakayama Univ.)

Theo 1-1 (Invited) 9:00 - 9:30

First-principles modeling of the properties of Ga₂O₃

Hartwin Peelaers

Department of Physics and Astronomy, University of Kansas, United States of America

Theo 1-2 (Invited) 9:30 - 10:00

Understanding point defects and impurities in Ga₂O₃ and (Al,Ga)₂O₃ through atomistic simulations

Joel Basile Varley

Lawrence Livermore National Laboratory, United States of America

Theo 1-3 (Oral) 10:00 - 10:15

Electrothermal spice model for β -Ga₂O₃ Schottky barrier diodesFlorian Wilhelm,*,^{1,2} Silas Heydt,² Yuki Uchida,³ Shinya Yamaguchi,³ Shinji Kunori,³ Yuji Komatsu,⁴ and Andreas Lindemann¹*¹Institute of Electric Power Systems, Magdeburg University, Germany, ²Corporate Research and Development, ZF Friedrichshafen AG, Germany, ³Research and Development, Novel Crystal Technology, Inc., Japan, ⁴Corporate Research and Development, ZF Japan Co., Ltd., Japan*

Theo 1-4 (Oral) 10:15 - 10:30

Thermodynamic analysis of group-III sesquioxide growth by molecular beam epitaxyRie Togashi,*,¹ Haruka Ishida,¹ Ken Goto,² Masataka Higashiwaki,^{3,4} and Yoshinao Kumagai²*¹Department of Engineering and Applied Sciences, Sophia University, Japan, ²Department of Applied Chemistry, Tokyo University of Agriculture and Technology, Japan, ³Department of Physics and Electronics, Osaka Metropolitan University, Japan, ⁴National Institute of Information and Communications Technology, Japan*

break

10:30 - 10:45

Characterization 3 (Structural Properties) 10:45-12:15

Chair : M. J. Tadjer (NRL)

Char 3-1 (Invited) 10:45 - 11:15

Building connections between atom positions to materials structure-chemistry: A pathway to design and development of ultrawide bandgap semiconductors

Baishakhi Mazumder

Department of Materials Design and Innovation, University at Buffalo, United States of America

Char 3-2 (Oral)

11:15 - 11:30

Dislocation analysis for large-area thick EFG β -Ga₂O₃ substrates using Borrmann effect synchrotron x-ray topographyYongzhao Yao,^{*,1} Yoshiyuki Tsusaka,² Keiichi Hirano,³ Kohei Sasaki,⁴ Akito Kuramata,⁴ Yoshihiro Sugawara,¹ and Yukari Ishikawa¹¹Japan Fine Ceramics Center (JFCC), Japan, ²University of Hyogo, Japan, ³High Energy Accelerator Research Organization (KEK), Japan, ⁴Novel Crystal Technology, Inc., Japan

Char 3-3 (Oral)

11:30 - 11:45

Experimental determination of critical thickness limitations of (100) and (010) β -(Al_xGa_{1-x})₂O₃ heteroepitaxial filmsJames Spencer Lundh,^{*,1} Kohei Sasaki,² Keita Konishi,² Hannah N. Masten,¹ Jennifer K. Hite,³ Nadeem A. Mahadik,³ Mark Goorsky,⁴ Akito Kuramata,² Karl D. Hobart,³ and Marko J. Tadjer³¹National Research Council Postdoctoral Fellow at U.S. Naval Research Laboratory, United States of America, ²Novel Crystal Technology, Inc., Japan, ³U.S. Naval Research Laboratory, United States of America, ⁴Materials Science and Engineering, University of California Los Angeles, United States of America

Char 3-4 (Oral)

11:45 - 12:00

Characterization of homoepitaxial CIS-MOCVD β -Ga₂O₃ as a function of film thickness and substrate orientationMarko Tadjer,^{*,1} Fikadu Alema,² James Culbertson,¹ Alan Jacobs,¹ James Spencer Lundh,³ Hannah Masten,³ Jennifer Hite,¹ Michael Mastro,¹ Andrei Osinsky,² and Karl Hobart¹¹U.S. Naval Research Laboratory, United States of America, ²Agnitron Technology Inc., United States of America, ³National Research Council Postdoctoral Fellow, United States of America

Char L-1 (Oral) - Late News -

12:00 - 12:15

Operando and ex-situ X-ray topographic observation of dislocations in β -Ga₂O₃ Schottky barrier diodes and their glide and multiplication under device operationYongzhao Yao,^{*,1} Daiki Wakimoto,² Hironobu Miyamoto,² Kohei Sasaki,² Akito Kuramata,² Keiichi Hirano,³ Yoshihiro Sugawara,¹ and Yukari Ishikawa¹¹Japan Fine Ceramics Center, Japan, ²Novel Crystal Technology, Inc, Japan, ³High Energy Accelerator Research Organization (KEK), Japan

Lunch

12:15 - 14:00

Device 2

14:00-15:30

Chair : D. Jena (Cornell Univ.)

Dev 2-1 (Invited)

14:00 - 14:30

MOCVD-grown Gallium (Aluminum) Oxide thin films, heterostructures and in-situ dielectrics (Invited)Sriram Krishnamoorthy,^{*,1} Arkka Bhattacharyya,¹ Praneeth Ranga,² Saurav Roy,¹ and Carl Peterson¹¹Materials, University of California, Santa Barbara, United States of America, ²ECE, University of Utah, United States of America

Dev 2-2 (Oral)

14:30 - 14:45

Demonstration of superjunction-like high-k oxide/ β -Ga₂O₃ lateral schottky barrier diode with more than 1 GW/cm² power figure of meritSaurav Roy,^{*,1} Arkka Bhattacharyya,² Carl Peterson,¹ and Sriram Krishnamoorthy¹¹Materials Department, University of California Santa Barbara, United States of America, ²Department of Electrical and Computer Engineering, University of Utah, United States of America

Dev 2-3 (Oral)

14:45 - 15:00

Field plated β -Ga₂O₃ MIS diodes with high- κ TiO₂ interlayer for increased breakdown and reduced leakage currentNolan Hendricks,^{*,1,2} Andrew Green,¹ Ahmad Islam,¹ Kevin Leedy,¹ Kyle Liddy,¹ Jeremiah Williams,¹ Esmat Farzana,² James Speck,² and Kelson Chabak¹¹*Air Force Research Lab, Sensors Directorate, United States of America,* ²*Materials Department, UC Santa Barbara, United States of America*

Dev 2-4 (Oral)

15:00 - 15:15

Large-size ($4.1 \times 4.1 \text{ mm}^2$) β -Ga₂O₃ field-plated MOSSBD with a 948 V / 27 A handling capabilityFumio Otsuka,^{*} Hironobu Miyamoto, Kohei Sasaki, and Akito Kuramata*Novel Crystal Technology, Inc., Japan*

Dev 2-5 (Oral)

15:15 - 15:30

Application of β -Ga₂O₃ Schottky barrier diode in DC-DC converterJiahong Du,^{*,1} Wei Guo,¹ Guangzhong Jian,² Weibing Hao,¹ Feihong Wu,¹ Guangwei Xu,¹ Xiaolong Zhao,¹ and Shibing Long¹¹*University of Science and Technology of China, China,* ²*Institute of Microelectronics of Chinese Academy of Sciences, China*

Break

15:30 - 15:45

Bulk

15:45-16:45

Chair : Z. Galazka (IKZ)

Bulk 1-1 (Oral)

15:45 - 16:00

Line-shaped defects in bulk β -Ga₂O₃ single crystals grown by the vertical Bridgman techniqueToshinori Taishi,^{*,1} Naoto Kobayashi,¹ Koudai Onozuka,¹ Etsuko Ohba,² and Keigo Hoshikawa¹¹*Shinshu University, Japan,* ²*Fujikoshi Machinery Corporation, Japan*

Bulk 1-2 (Oral)

16:00 - 16:15

2-inch Fe-doped (010) β -Ga₂O₃ substrates prepared by vertical Bridgman methodYuki Ueda,^{*} Takuya Igarashi, Kimiyoshi Koshi, Shigenobu Yamakoshi, and Akito Kuramata*Novel Crystal Technology, Japan*

Bulk 1-3 (Oral)

16:15 - 16:30

A new growth technique for β -Ga₂O₃ single crystals without a precious metal crucibleIsao Takahashi,^{*,1,2} Vladimir Kochurikhin,¹ Taketoshi Tomida,¹ Takamasa Sugawara,² Yasuhiro Shoji,¹ Kei Kamada,^{1,2} Koichi Kakimoto,² and Akira Yoshikawa^{1,2}¹*C&A Corporation, Japan,* ²*Tohoku University, Japan*Dev L-1 (Oral) - *Late News* -

16:30 - 16:45

Development & qualification of 220nm peak response β -(Al)Ga₂O₃-MSM photodetectors for space-based observation of the Herzberg continuumDavid Rogers,^{*,1} Philippe Bove,¹ Eric Sandana,¹ Ferechteh Teherani,¹ Luc Damé,² Lucile Conan,² Mustapha Meftah,² Halma Ghorbel,² Pierre Gilbert,² and Pierre Maso^{2,3}¹*Nanovation, France,* ²*LATMOS, IPSL, CNRS, University Versailles Saint-Quentin en Yvelines, France,* ³*PIT, OVSQ, France*

Oct. 26 (Wed.)

Break	16:45 - 18:30
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Banquet	18:30-21:00
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Oct. 27 (Thu.)

Plenary 3 9:00-10:00

Chair : M. Higashiwaki (OMU/NICT)

Plenary 3 (Plenary) 9:00 - 10:00**Materials and device engineering for high-performance gallium oxide electronics**Siddharth Rajan^{*,1,2}¹*ECE Department, The Ohio State University, United States of America,* ²*MSE Department, The Ohio State University, United States of America*

Device 3 10:00-12:15

Chair : M. H. Wong (HKUST)

Dev 3-1 (Invited) 10:00 - 10:30**Recent developments in gallium oxide device research at AFRL**A. Green,^{*,1} K. Liddy,¹ D. Dryden,² A. Islam,¹ W. Wang,³ E. Sowers,⁴ and K. Chabak¹¹*Air Force Research Laboratory, United States of America,* ²*KBR, United States of America,* ³*Wright State University, United States of America,* ⁴*University of Dayton, United States of America*

Break	10:30 - 10:45
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Dev 3-2 (Invited) 10:45 - 11:15**5.0 kV normally-off β -Ga₂O₃ FinFET with 42 μ m-thick drift layer and HfO₂ gate insulator**Daiki Wakimoto,^{*} Chia-Hung Lin, Quang Tu Thieu, Hironobu Miyamoto, Kohei Sasaki, and Akito Kuramata
*Novel Crystal Technology, Inc., Japan*Dev 3-3 (Oral) 11:15 - 11:30**Over 0.9 GW/cm² multi kV-class fin-shape β -Ga₂O₃ power MESFETs**Arkka Bhattacharyya,^{*,1} Saurav Roy,² Praneeth Ranga,¹ Carl Peterson,² and Sriram Krishnamoorthy²¹*Department of Electrical and Computer Engineering, University of Utah, United States of America,* ²*Materials Department, UCSB, United States of America*Dev 3-4 (Oral) 11:30 - 11:45**Enhancement-mode vertical (100) β -Ga₂O₃ FinFETs with an average breakdown strength of 2.7 MV/cm**Kornelius Tetzner,^{*,1} Michael Klupsch,¹ Saud Bin Anooz,² Ta-Shun Chou,² Zbigniew Galazka,² Karina Ickert,¹ Mathias Matalla,¹ Ralph-Stephan Unger,¹ Eldad Bahat Treidel,¹ Mihaela Wolf,¹ Joachim Würfl,¹ and Oliver Hilt¹¹*Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, Germany,* ²*Leibniz-Institut für Kristallzüchtung, Germany*

Oct. 27 (Thu.)

Dev L-2 (Oral) - *Late News* -

11:45 - 12:00

Nanocrystalline diamond-capped β -(Al_xGa_{1-x})₂O₃/Ga₂O₃ heterostructure field-effect transistor

Hannah Masten,^{*,1} James Spencer Lundh,¹ Joseph Spencer,^{2,3} Tatyana Feygelson,² Alan Jacobs,² Boris Feygelson,² Kohei Sasaki,⁴ Akito Kuramata,⁴ Pai-Ying Liao,⁵ Peide Ye,⁵ Bradford Pate,² Karl Hobart,² Travis Anderson,² and Marko Tadjer²

¹National Research Council Postdoctoral Fellow at US Naval Research Laboratory, United States of America, ²US Naval Research Laboratory, United States of America, ³Virginia Tech, United States of America, ⁴Novel Crystal Technology, Inc., Japan, ⁵Purdue University, United States of America

Dev L-3 (Oral) - *Late News* -

12:00 - 12:15

Multi-kV class homoepitaxial Ga₂O₃-on-SiC power MOSFETs with high heat transfer performance

Arkka Bhattacharyya,^{*,1} Yiwen Song,² Anwarul Karim,² Daniel Shoemaker,² Hsien-Lien Huang,³ Saurav Roy,¹ Craig McGray,⁴ Jacob H. Leach,⁵ Jinwoo Hwang,⁴ Sukwon Choi,² and Sriram Krishnamoorthy¹

¹Materials Department, University of California, Santa Barbara, United States of America, ²Department of Mechanical Engineering, The Penn State University, United States of America, ³Department of Materials Science and Engineering, The Ohio State University, United States of America, ⁴Modern Microsystems, United States of America, ⁵Kyma Technologies, Inc., United States of America

Lunch

12:15 - 14:00

Epitaxy 3 (MBE2: Structural Properties)

14:00-15:30

Chair : S. Rajan (OSU)

Epi 3-1 (Oral)

14:00 - 14:15

β -Ga₂O₃ epitaxial growth on (110) substrate by plasma-assisted molecular beam epitaxy

Takeki Itoh,^{*} Akhil Mauze, Yuewei Zhang, and James S. Speck

Materials Department, University of California, Santa Barbara, United States of America

Epi 3-2 (Oral)

14:15 - 14:30

Phase-selective growth of κ - and β -Ga₂O₃ by In-mediated metal exchange catalysis in plasma-assisted molecular beam heteroepitaxy

Andrea Ardenghi,^{*,1} Oliver Bierwagen,¹ Jonas Lähnemann,¹ Andreas Falkenstein,² Manfred Martin,² and Piero Mazzolini³

¹Paul-Drude-Institut für Festkörperelektronik, Germany, ²Institute of Physical Chemistry, RWTH Aachen University, Germany, ³Department of Mathematical, Physical and Computer Science, University of Parma, Italy

Epi 3-3 (Oral)

14:30 - 14:45

Development of defects in (Al_xGa_{1-x})₂O₃ thin films associated with Al solubility limit observed by atomic force microscopy

Takumi Ohtsuki^{*,1} and Masataka Higashiwaki^{1,2}

¹National Institute of Information and Communications Technology, Japan, ²Department of Physics and Electronics, Osaka Metropolitan University, Japan

Epi 3-4 (Oral)

14:45 - 15:00

Coherently strained (001) β -(Al_xGa_{1-x})₂O₃ thin films on β -Ga₂O₃

Akhil Mauze, Takeki Itoh, Yuewei Zhang, Evelyn Deagueros, and James S. Speck^{*}

Materials Department, University of California, Santa Barbara, United States of America

Oct. 27 (Thu.)

Epi 3-5 (Invited)

15:00 - 15:30

MBE growth and properties of ultrawide bandgap oxide layers spanning 5.0 - 9.0 eV energy gaps

Debdeep Jena,* Jon McCandless, and Riena Jinno
Cornell University, United States of America

Award Ceremony and Closing

15:30-16:00
