

GOX 2022 Program Overview

Room /Time	Jefferson 1 & Atrium	Jefferson 2-3
MoM		KEY1: Keynote Address AC-MoM: Characterization & Modeling I BG-MoM: Bulk & Epitaxy I
MoA		MD-MoA: Process & Devices I TM-MoA: Characterization & Modelling II
MoP	Poster Sessions: Advanced Characterization Techniques (AC) Dielectric Interfaces (DI) Electronic and Photonic Devices, Circuits and Applications (EP) Electronic Transport & Breakdown Phenomena (ET) Heterogeneous Material Integration (HM)	
TuM		AC-TuM: Advanced Characterization & Microscopy PS1-TuM: Plenary Session I TM-TuM: Characterization & Modelling III
TuA		DI-TuA: Processes & Devices II EG-TuA: Bulk & Epitaxy II
TuP	Poster Sessions: Epitaxial Growth (EG) Material and Device Processing & Fabrication Techniques (MD) Theory, Modeling and Simulation (TM)	
WeM		PS2-WeM: Plenary Session II EP1-WeM: Process & Devices III EP2-WeM: Process and Devices IV

Monday Morning, August 8, 2022

Room Jefferson 2-3		
8:30am	Welcome and Sponsor Thank You	Keynote Address Session KEY1 Keynote Address Moderator: Kelson Chabak , Air Force Research Laboratory
8:45am	INVITED: KEY1-2 Keynote Lecture: Ga ₂ O ₃ Device Technologies: Power Switching and High-Frequency Applications, and Beyond, Masataka Higashiwaki , Department of Physics and Electronics, Osaka Metropolitan University, Japan; T. Kamimura , S. Kumar , Z. Wang , National Institute of Information and Communications Technology, Japan; T. Kitada , J. Liang , N. Shigekawa , Department of Physics and Electronics, Osaka Metropolitan University, Japan; H. Murakami , Y. Kumagai , Department of Applied Chemistry, Tokyo University of Agriculture and Technology, Japan	
9:30am	INVITED: AC-MoM-5 Characterization of Deep Acceptors in β -Ga ₂ O ₃ by Deep Level Optical Spectroscopy, H. Ghadi , J. McGlone , E. Cornuelle , The Ohio State University; A. Senckowski , University of Massachusetts Lowell; S. Sharma , U. Singiseti , University of Buffalo; M. Wong , University of Massachusetts Lowell; A. Arehart , Steven A Ringel , The Ohio State University	Advanced Characterization Techniques Session AC-MoM Characterization & Modeling I Moderator: Becky Peterson , University of Michigan
10:00am	AC-MoM-7 Determination of Cation Vacancy and Al Diffusion Constants in B-(Al,Ga) ₂ O ₃ / Ga ₂ O ₃ Superlattices, H. Yang , A. Levin , B. Eisner , A. Bhattacharyya , P. Ranga , S. Krishnamoorthy , Michael Scarpulla , University of Utah	
10:15am	AC-MoM-8 Defect Characterization in Gallium Oxide and Related Materials Using Terahertz Electron Paramagnetic Resonance Ellipsometry: Fe in Ga ₂ O ₃ , Mathias Schubert , University of Nebraska, Lincoln; S. Richter , Lund University, Sweden; S. Knight , P. Kuehne , Linkoping University, Sweden; M. Stokey , R. Korlacki , University of Nebraska-Lincoln; V. Stanishev , Linkoping University, Sweden; Z. Galazka , K. Irmischer , Leibniz-Institut fuer Kristallzuechtung, Germany; S. Mu , C. Van de Walle , University of California at Santa Barbara; V. Ivády , MPI Physics of Complex Systems, Germany; O. Bulancea-Lindvall , I. Abrikosov , Linkoping University, Sweden; V. Darakchieva , Lund University, Sweden	
10:30am	BREAK	
10:45am	INVITED: BG-MoM-10 β -Ga ₂ O ₃ Growth and Wafer Fabrication, A. Brady , G. Foundos , Chase Scott , Northrop Grumman SYNOPTICS; V. Gambin , Northrop Grumman Corporation; K. Stevens , Northrop Grumman SYNOPTICS; J. Blevins , Air Force Research Laboratory, Afghanistan	Bulk Growth Session BG-MoM Bulk & Epitaxy I Moderator: John Blevins , Air Force Research Laboratory
11:15am	BG-MoM-12 Increasing the Bandgap of β -Ga ₂ O ₃ via Alloying with Al ₂ O ₃ or Sc ₂ O ₃ in Czochralski-grown Crystals, Benjamin Dutton , J. Jesenovec , B. Downing , J. McCloy , Washington State University	
11:30am	BG-MoM-13 Chemi-Mechanical Polishing and Subsurface Damage Characterization of 2-inch (010) Semi-Insulating β -Ga ₂ O ₃ Substrates, David Snyder , Penn State Applied Research Laboratory	
11:45am	BG-MoM-14 Ge-Delta Doped β -Ga ₂ O ₃ Grown Via Plasma Assisted Molecular Beam Epitaxy, Thaddeus Asel , Air Force Research Laboratory, Materials and Manufacturing Directorate, USA; E. Steinbrunner , Wright State University, Department of Electrical Engineering; J. Hendrick , Air Force Institute of Technology, Department of Engineering Physics; A. Neal , S. Mou , Air Force Research Laboratory, Materials and Manufacturing Directorate, USA	
12:00pm	BG-MoM-15 High Purity n-type β -Ga ₂ O ₃ Films with 10 ¹³ cm ⁻³ Residual Acceptor Concentration by MOCVD, Andrei Osinsky , F. Alema , Agnitrion Technology	

Monday Afternoon, August 8, 2022

Room Jefferson 2-3		
1:45pm	INVITED: MD-MoA-1 High Aspect Ratio Ga ₂ O ₃ -based Homo and Heterostructures by Plasma-free Metal-assisted Chemical Etching, <i>Xiuling Li</i> , University of Texas at Austin; <i>H. Huang, C. Chan, J. Michaels</i> , University of Illinois, Urbana-Champaign	Material and Device Processing and Fabrication Techniques Session MD-MoA Process & Devices I Moderator: Man-Hoi Wong , University of Massachusetts Lowell
2:15pm	MD-MoA-3 Blocking Behavior of N and Fe Ion Implanted β -Ga ₂ O ₃ , <i>Bennett Cromer</i> , Cornell University; <i>W. Li</i> , University of California at Berkeley; <i>K. Smith</i> , Cornell University; <i>K. Gann</i> , Cornell University, Iceland; <i>K. Nomoto</i> , Cornell University; <i>N. Hendriks</i> , University of California at Santa Barbara; <i>A. Green, K. Chabak</i> , Air Force Research Laboratory; <i>M. Thompson, D. Jena, G. Xing</i> , Cornell University	
2:30pm	MD-MoA-4 Evolution and Recovery of Ion Implantation-Induced Damage Zone in β -Ga ₂ O ₃ , <i>Elaf Anber, D. Foley, J. Nathaniel</i> , Johns Hopkins University; <i>A. Lang</i> , American Society for Engineering Education; <i>J. Hart</i> , Johns Hopkins University; <i>M. Tadjer, K. Hobart</i> , US Naval Research Laboratory; <i>S. Pearton</i> , University of Florida, Gainesville; <i>M. Taheri</i> , Johns Hopkins University	
2:45pm	MD-MoA-5 Heterogeneous Integration of Single-Crystal β -Ga ₂ O ₃ and N-Polar GaN Substrates With ZnO Interlayer Deposited by Atomic Layer Deposition, <i>Zhe (Ashley) Jian</i> , University of Michigan, Ann Arbor; <i>C. Clymore</i> , University of California, Santa Barbara; <i>D. Agapiou</i> , University of Michigan, Ann Arbor; <i>U. Mishra</i> , University of California, Santa Barbara; <i>E. Ahmadi</i> , University of Michigan, Ann Arbor	
3:00pm	MD-MoA-6 Structural Transformation of β -Ga ₂ O ₃ through Si-implantation, <i>Snorre Braathen Kjeldby, A. Azarov, P. Nguyen</i> , Centre for Materials Science and Nanotechnology, University of Oslo, Norway; <i>V. Venkatachalapathy</i> , Centre for Materials Science and Nanotechnology, University of Oslo and Department of Materials Science, National Research Nuclear University, "MEPhI", Norway; <i>R. Mikšová</i> , Nuclear Physics Institute of the Czech Academy of Sciences, Czechia; <i>A. Macková</i> , Nuclear Physics Institute of the Czech Academy of Sciences and Department of Physics, Faculty of Science, J.E. Purkyně University, Czechia; <i>J. García-Fernández, A. Kuznetsov, Ø. Prytz, L. Vines</i> , Centre for Materials Science and Nanotechnology, University of Oslo, Norway	
3:15pm	MD-MoA-7 Electrical Characteristics of <i>in Situ</i> Mg-Doped Ga ₂ O ₃ Current-Blocking Layer for Vertical Devices, <i>Sudipto Saha</i> , University at Buffalo-SUNY; <i>L. Meng, A. Bhuiyan, Z. Feng, H. Zhao</i> , Ohio State University; <i>U. Singiseti</i> , University at Buffalo-SUNY	
3:30pm	BREAK	
3:45pm	INVITED: TM-MoA-9 Transport, Doping, and Defects in β -Ga ₂ O ₃ , <i>Adam Neal</i> , Air Force Research Laboratory, Materials and Manufacturing Directorate, USA	Theory, Modeling and Simulation Session TM-MoA Characterization & Modelling II Moderator: Mike Thompson , Cornell University
4:15pm	TM-MoA-11 Structural Changes to Beta Gallium Oxide from Ion Irradiation Damage: Model and Relation to in-Situ Experiments, <i>Alexander Petkov, D. Cherns, D. Liu</i> , University of Bristol, UK; <i>W. Chen, M. Li</i> , Argonne National Laboratory, USA; <i>J. Blevins</i> , Air Force Research Laboratory, USA; <i>V. Gambin</i> , Northrop Grumman; <i>M. Kuball</i> , University of Bristol, UK	
4:30pm	TM-MoA-12 Band Structure Across κ -(In _x Ga _{1-x}) ₂ O ₃ / κ -(Al _y Ga _{1-y}) ₂ O ₃ Thin Film Interfaces, <i>Ingvid Julie Thue Jensen, A. Thøgersen, E. Fertitta, B. Belle</i> , SINTEF Materials Physics, Norway; <i>A. Langørgen, S. Cooil, Y. Hommedal, Ø. Prytz, J. Wells, L. Vines</i> , University of Oslo, Norway; <i>H. von Wenckstern</i> , University of Leipzig, Germany	
4:45pm	TM-MoA-13 Aluminum Incorporation Striations in (-201) β -(Al _x Ga _{1-x}) ₂ O ₃ Films Grown on C-Plane and Miscut Sapphire Substrates, <i>Kenny Huynh, Y. Wang, M. Liao</i> , University of California Los Angeles; <i>P. Ranga</i> , University of Utah; <i>S. Krishnamoorthy</i> , University of California at Santa Barbara; <i>M. Goorsky</i> , University of California, Los Angeles	
5:00pm	TM-MoA-14 Plasmon-phonon Coupling in Electrostatically Gated β -Ga ₂ O ₃ Films with Mobility Exceeding 200 cm ² V ⁻¹ s ⁻¹ , <i>A. Rajapitamahuni, A. Manjeshwar</i> , University of Minnesota, USA; <i>A. Kumar, A. Datta</i> , University at Buffalo; <i>P. Ranga</i> , University of California Santa Barbara; <i>L. Thoutam</i> , SR University, Warangal, India; <i>S. Krishnamoorthy</i> , University of California Santa Barbara; <i>Uttam Singiseti</i> , University at Buffalo; <i>B. Jalan</i> , University of Minnesota, USA	

Advanced Characterization Techniques

Room Jefferson 1 & Atrium - Session AC-MoP

Advanced Characterization Techniques Poster Session

5:15pm – 7:15pm

AC-MoP-1 Advanced Defect Characterization in β -Ga₂O₃ Without the Arrhenius Plot, *Jian Li*, NCKU, Taiwan; *A. Neal*, *S. Mou*, Air Force Research Laboratory, Materials and Manufacturing Directorate, USA; *M. Wong*, University of Massachusetts Lowell

AC-MoP-2 Infrared-Active Phonon Modes and Static Dielectric Constants of Orthorhombic LiGaO₂, *Teresa Gramer*, *M. Stokey*, *R. Korlacki*, *M. Schubert*, University of Nebraska - Lincoln

AC-MoP-3 Spectroscopic Ellipsometry Optical Analysis of Zinc Gallate at Elevated Temperatures, *Emma Williams*, University of Nebraska-Lincoln, USA; *M. Hilfiker*, *U. Kilic*, *Y. Traouli*, *N. Koeppe*, *J. Rivera*, *A. Abakar*, *M. Stokey*, *R. Korlacki*, University of Nebraska - Lincoln; *Z. Galazka*, Leibniz-Institut für Kristallzüchtung, Germany; *M. Schubert*, University of Nebraska - Lincoln

AC-MoP-4 The Electron Spin Hamiltonian for Fe³⁺ in Monoclinic β -Ga₂O₃, *Steffen Richter*, Lund University, Sweden; *S. Knight*, *P. Kühne*, Linköping University, Sweden; *M. Schubert*, University of Nebraska - Lincoln; *V. Darakchieva*, Lund University, Sweden

AC-MoP-5 Characterization of (010) β -Ga₂O₃ to Support Fabrication, Wafer Size Scaleup, and Epi Development, *David Snyder*, Penn State Applied Research Laboratory

AC-MoP-6 Photoluminescence Spectroscopy of Cr³⁺ in β -Ga₂O₃ and (Al_{0.1}Ga_{0.9})₂O₃, *Cassandra Remple*, *J. Jesenovc*, *B. Dutton*, *J. McCloy*, *M. McCluskey*, Washington State University

AC-MoP-7 Surface Relaxation and Rumpling of Sn Doped β -Ga₂O₃(010), *Nick Barrett*, CEA Saclay, France; *A. Pancotti*, Universidade Federal de Jataí, Brazil; *T. Back*, AFRL; *W. Hamouda*, *M. Laccheb*, *C. Lubin*, *A. Boucly*, CEA Saclay, France; *P. Soukiasian*, Université Paris-Saclay, France; *J. Boeckl*, *D. Dorsey*, *S. Mou*, *T. Asel*, AFRL; *G. Geneste*, CEA, France

AC-MoP-8 Probing Vacancies and Hydrogen Related Defects in β -Ga₂O₃ with Positrons and FTIR, *Corey Halverson*, *M. Weber*, *J. Jesenovc*, *B. Dutton*, *C. Remple*, *M. McCluskey*, *J. McCloy*, Washington State University

AC-MoP-9 Evolution of Anisotropy and Order of Band-to-Band Transitions, Excitons, Phonons, Static and High Frequency Dielectric Constants Including Strain Dependencies in Alpha and Beta Phase (Al_xGa_{1-x})₂O₃, *Megan Stokey*, University of Nebraska-Lincoln; *R. Korlacki*, *M. Hilfiker*, *T. Gramer*, University of Nebraska - Lincoln; *J. Knudtson*, University of Nebraska-Lincoln; *S. Richter*, Lund University, Sweden; *S. Knight*, Linköping University, Sweden; *A. Mock*, Weber State University; *A. Mauze*, *Y. Zhang*, *J. Speck*, University of California Santa Barbara; *R. Jinno*, *Y. Cho*, *H. Xing*, *D. Jena*, Cornell University; *Y. Oshima*, National Institute for Materials Science, Japan; *E. Ahmadi*, University of Michigan; *V. Darakchieva*, Lund University, Sweden; *M. Schubert*, University of Nebraska - Lincoln

AC-MoP-10 Photoluminescence Mapping of Gallium Oxide and Aluminum Gallium Oxide Epitaxial Films, *Jacqueline Cooke*, *P. Ranga*, University of Utah; *J. Jesenovc*, *J. McCloy*, Washington State University; *S. Krishnamoorthy*, University of California at Santa Barbara; *M. Scarpulla*, *B. Sensale-Rodriguez*, University of Utah

AC-MoP-11 Cathodoluminescence (CL) Evaluation of Silicon Implant Activation and Damage Annealing in Beta Ga₂O₃ EPI in Heavily Silicon Doped Contact Regions, *Stephen Tetlak*, Air Force Research Laboratory; *K. Gann*, *J. McCandless*, Cornell University; *K. Liddy*, Air Force Research Laboratory; *D. Jenna*, *M. Thompson*, Cornell University

AC-MoP-12 Non-Destructive Characterization of Annealed Si-Implanted Thin Film β -Ga₂O₃, *Aine Connolly*, *K. Gann*, Cornell University; *S. Tetlak*, Air Force Research Laboratory; *V. Protasenko*, Cornell University; *M. Slocum*, *S. Mou*, Air Force Research Laboratory; *M. Thompson*, Cornell University

Dielectric Interfaces

Room Jefferson 1 & Atrium - Session DI-MoP

Dielectric Interfaces Poster Session

5:15pm – 7:15pm

DI-MoP-1 Band Offsets of MOCVD Grown β -(Al_{0.21}Ga_{0.79})₂O₃/ β -Ga₂O₃ (010) Heterojunctions, *T. Morgan*, *J. Rudie*, *M. Zamani-Alavijeh*, *A. Kuchuk*, University of Arkansas; *N. Orishchin*, *F. Alema*, Agnitron Technology Incorporated; *A. Osinsky*, Agnitron Technology Incorporated, United States Minor Outlying Islands (the); *R. Sleezer*, Minnesota State University at Mankato; *G. Salamo*, University of Arkansas, United States Minor Outlying Islands (the); *Morgan Ware*, University of Arkansas

DI-MoP-2 Optimization of MOCVD Grown In-situ Dielectrics for β -Ga₂O₃, *G. Wang*, University of Wisconsin - Madison; *F. Alema*, Agnitron Technology Inc.; *J. Chen*, University of Wisconsin - Madison; *A. Osinsky*, Agnitron Technology Inc.; *C. Gupta*, University of Wisconsin-Madison; *Shubhra Pasayat*, University of Wisconsin - Madison

Electronic and Photonic Devices, Circuits and Applications

Room Jefferson 1 & Atrium - Session EP-MoP

Electronic and Photonic Devices, Circuits and Applications

Poster Session – 5:15pm – 7:15pm

EP-MoP-1 Investigating Ohmic Contacts for High Temperature Operation of Ga₂O₃ Devices, *William Callahan*, Colorado School of Mines; *S. Sohel*, National Renewable Energy Laboratory; *M. Sanders*, *R. O'Hayre*, Colorado School of Mines; *D. Ginley*, *A. Zakutayev*, National Renewable Energy Laboratory

EP-MoP-2 Gate Effects of Channel and Sheet Resistance in β -Ga₂O₃ Field-Effect Transistors using the TLM Method, *Ory Maimon*, Department of Electrical Engineering, George Mason University; *N. Moser*, Air Force Research Laboratory, Sensors Directorate; *K. Liddy*, *A. Green*, *K. Chabak*, Air Force Research Laboratory, Sensors Directorate, USA; *C. Richter*, *K. Cheung*, *S. Pookpanratana*, Nanoscale Device and Characterization Division, National Institute of Standards and Technology; *Q. Li*, Department of Electrical Engineering, George Mason University

EP-MoP-3 Lateral β -Ga₂O₃ Schottky Barrier Diodes With Interdigitated Contacts, *Jeremiah Williams*, Air Force Research Laboratory, Sensors Directorate; *A. Arias-Purdue*, Teledyne; *K. Liddy*, *A. Green*, Air Force Research Laboratory, Sensors Directorate; *D. Dryden*, *N. Sepelak*, KBR; *K. Singh*, Air Force Research Laboratory, Sensors Directorate; *F. Alema*, *A. Osinsky*, Agnitron Technology; *A. Islam*, *N. Moser*, *K. Chabak*, Air Force Research Laboratory, Sensors Directorate

EP-MoP-4 Optimized Annealing for Activation of Implanted Si in β -Ga₂O₃, *Katie Gann*, *J. McCandless*, Cornell University; *T. Asel*, *S. Tetlak*, Air Force Research Laboratory; *D. Jena*, *M. Thompson*, Cornell University

Electronic Transport and Breakdown Phenomena

Room Jefferson 1 & Atrium - Session ET-MoP

Electronic Transport and Breakdown Phenomena Poster Session

5:15pm

ET-MoP-2 Electric Field Mapping in β -Ga₂O₃ by Photocurrent Spectroscopy, *Darpan Verma*, *M. Adnan*, *S. Dhara*, Ohio State University; *C. Sturm*, Universität Leipzig, Germany; *S. Rajan*, *R. Myers*, Ohio State University

ET-MoP-3 Activation of Si, Ge, and Sn Donors in High-Resistivity Halide Vapor Phase Epitaxial β -Ga₂O₃:N, *Joseph Spencer*, Naval Research Laboratory/Virginia Tech CPES; *M. Tadjer*, *A. Jacobs*, *M. Mastro*, *J. Gallagher*, *J. Freitas, Jr*, Naval Research Laboratory; *T. Tu*, *A. Kuramata*, *K. Sasaki*, Novel Crystal, Japan; *Y. Zhang*, Virginia Tech (CPES); *T. Anderson*, *K. Hobart*, Naval Research Laboratory

Heterogeneous Material Integration

Room Jefferson 1 & Atrium - Session HM-MoP

Heterogeneous Material Integration Poster Session

5:15pm – 7:15pm

HM-MoP-1 Structural and Thermal Transport Analysis of Wafer Bonded β -Ga₂O₃ |4H-SiC, *Michael Liao*, *K. Huynh*, *Y. Wang*, UCLA; *Z. Cheng*, UIUC; *J. Shi*, GaTech; *F. Mu*, IMECAS, China; *T. You*, *W. Xu*, *X. Ou*, ShanghaiTech, China; *T. Suga*, Meisei University, Japan; *S. Graham*, GaTech; *M. Goorsky*, UCLA

HM-MoP-2 Advances in Plasma-Enhanced Atomic Layer Deposited (PEALD) Ga₂O₃ Films, *Virginia Wheeler*, *A. Lang*, *N. Nepal*, *E. Jin*, *D. Katzer*, *V. Gokhale*, *B. Downey*, *D. Meyer*, US Naval Research Laboratory

HM-MoP-3 Grafted Si/Ga₂O₃ pn Diodes, *H. Jang*, *D. Kim*, University of Wisconsin - Madison; *J. Gong*, University of Wisconsin at Madison; *F. Alema*, *A. Osinsky*, Agnitron Technology Inc.; *K. Chabak*, Air Force Research Laboratory; *G. Jessen*, BAE Systems; *G. Vincent*, Northrup Grumman; *S. Pasayat*, *C. Gupta*, University of Wisconsin - Madison; *Zhenqiang Ma*, 1415 Engineering Drive

HM-MoP-4 Two-Dimensional Gallium Oxide Realized via Confinement Heteroepitaxy, *Furkan Turker*, *C. Dong*, *M. Wetherington*, The Pennsylvania State University; *H. El-Sherif*, Harvard University; *S. Holoviak*, *Z. Trdinich*, The Pennsylvania State University; *G. Krishnan*, *C. Whittier*, McMaster University, Canada; *S. Sinnott*, The Pennsylvania State University; *N. Bassim*, McMaster University, Canada; *J. Robinson*, The Pennsylvania State University

Tuesday Morning, August 9, 2022

Room Jefferson 2-3		
8:30am	Welcome and Sponsor Thank You	Plenary Session Session PS1-TuM Plenary Session I Moderator: Kelson Chabak , Air Force Research Laboratory
8:45am	INVITED: PS1-TuM-2 Plenary Lecture: Gallium Oxide Electronics - Device Engineering Toward Ultimate Material Limits, Siddharth Rajan , The Ohio State University	
9:15am	INVITED: TM-TuM-4 First-Principles Modeling of Ga ₂ O ₃ , Hartwin Peelaers , University of Kansas	Theory, Modeling and Simulation Session TM-TuM Characterization & Modelling III Moderator: Michael Scarpulla , University of Utah
9:45am	TM-TuM-6 Theory of Acceptor-Donor Complexes in Ga ₂ O ₃ , I. Chatratin , F. Sabino, University of Delaware; P. Reunchan , Kasetsart University, Thailand; Anderson Janotti , University of Delaware	
10:00am	TM-TuM-7 Donor Doping of Monoclinic and Corundum (Al _x Ga _{1-x}) ₂ O ₃ , Darshana Wickramaratne , US Naval Research Laboratory; J. Varley , Lawrence Livermore National Laboratory; J. Lyons , US Naval Research Laboratory	
10:15am	TM-TuM-8 The Co-Design, Fabrication, and Characterization of a Ga ₂ O ₃ -on-SiC MOSFET, Yiwen Song , Pennsylvania State University; A. Bhattacharyya , University of Utah; A. Karim , D. Shoemaker , Pennsylvania State University; H. Huang , Ohio State University; C. McGray , Modern Microsystems, Inc.; J. Leach , Kyma Technologies, Inc.; J. Hwang , Ohio State University; S. Krishnamoorthy , University of California at Santa Barbara; S. Choi , Pennsylvania State University	
10:30am	BREAK	
10:45am	INVITED: AC-TuM-10 Defects in Gallium Oxide – How We “See” and Understand Them, Jinwoo Hwang , The Ohio State University	Advanced Characterization Techniques Session AC-TuM Advanced Characterization & Microscopy Moderator: Ginger Wheeler , Naval Research Laboratory
11:15am	AC-TuM-12 Atomic-Scale Investigation of Point and Extended Defects in Ion Implanted β-Ga ₂ O ₃ , Hsien-Lien Huang , C. Chae, The Ohio State University; A. Senckowski , M. Wong, Penn State University; J. Hwang , The Ohio State University	
11:30am	AC-TuM-13 Microscopic and Spectroscopic Analysis of (100), (-201) and (010) (Al _x Ga _{1-x}) ₂ O ₃ Films Using Atom Probe Tomography, Jith Sarker , University at Buffalo-SUNY; A. Bhuiyan , Z. Feng , L. Meng , H. Zhao , The Ohio State University; B. Mazumder , University at Buffalo-SUNY	
11:45am	AC-TuM-14 Phase and Microstructure Evolution of κ-Ga ₂ O ₃ Thin Films Grown by MOCVD, Jingyu Tang , K. Jiang, Carnegie Mellon University, China; M. Cabral , A. Park , Carnegie Mellon University; L. Gu , Carnegie Mellon University, China; R. Davis , L. Porter , Carnegie Mellon University	
12:00pm	AC-TuM-15 Investigation of Extended Defects in Ga ₂ O ₃ Substrates and Epitaxial Layers using X-ray Topography, Nadeemullah A. Mahadik , M. Tadjer, T. Anderson, K. Hobart, Naval Research Laboratory, USA; K. Sasaki , A. Kuramata , Novel Crystal Technology, Japan	

Tuesday Afternoon, August 9, 2022

Room Jefferson 2-3		
1:45pm	INVITED: EG-TuA-1 Progress in Beta-Gallium Oxide Materials and Properties, <i>James Speck</i> , University of California Santa Barbara	Epitaxial Growth Session EG-TuA Bulk & Epitaxy II Moderator: Xiuling Li, University of Texas Austin
2:15pm	EG-TuA-3 (110) β -Ga ₂ O ₃ Epitaxial Films Grown by Plasma-Assisted Molecular Beam Epitaxy, <i>Takeki Itoh, A. Mauze, Y. Zhang, J. Speck</i> , University of California at Santa Barbara	
2:30pm	EG-TuA-4 Si-doped β -Ga ₂ O ₃ Films Grown at 1 $\mu\text{m/hr}$ by Suboxide MBE, <i>Kathy Azizie, P. Vogt, F. Hensling, D. Schlom, J. McCandless, H. Xing, D. Jena</i> , Cornell University; <i>D. Dryden, A. Neal, S. Mou, T. Asel, A. Islam, A. Green, K. Chabak</i> , Air Force Research Laboratory	
2:45pm	INVITED: EG-TuA-5 MOCVD Growth of Ga ₂ O ₃ and (Al _x Ga _{1-x}) ₂ O ₃ , <i>Hongping Zhao</i> , The Ohio State University	
3:15pm	EG-TuA-7 MOVPE of (100) β -Ga ₂ O ₃ for Vertical Power Devices - Challenges to Epitaxial Growth Process, <i>Andreas Popp, T. Chou, S. Bin Anooz, R. Grüneberg, V. Tran Thi Thuy, J. Rehm, Z. Galazka, P. Seyidov, K. Irmscher, M. Albrecht, J. Schwarzkopf</i> , LEIBNIZ-INSTITUT FÜR KRISTALLZÜCHTUNG im Forschungsverbund Berlin e.V., Germany	
3:30pm	BREAK	
3:45pm	DI-TuA-9 Dielectric Integration on (010) β -Ga ₂ O ₃ : Al ₂ O ₃ , SiO ₂ Interfaces and their Thermal Stability, <i>Ahmad Islam</i> , Air Force Research Laboratory; <i>A. Miesle</i> , University of Dayton; <i>M. Dietz</i> , Wright State University; <i>K. Leedy, S. Ganguli</i> , Air Force Research Laboratory; <i>G. Subramanyam</i> , University of Dayton; <i>W. Wang</i> , Wright State University; <i>N. Sepelak, D. Dryden</i> , KBR, Inc.; <i>T. Asel, A. Neal, S. Mou, S. Tetlak, K. Liddy, A. Green, K. Chabak</i> , Air Force Research Laboratory	Dielectric Interfaces Session DI-TuA Processes & Devices II Moderator: Kornelius Tetzner, Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik (FBH), Germany
4:00pm	DI-TuA-10 Deep Etch Field-Terminated β -Ga ₂ O ₃ Schottky Barrier Diodes With 4.2 MV/cm Parallel Plate Field Strength, <i>Sushovan Dhara, N. Kalarickala, A. Dheenana, C. Joishi, S. Rajan</i> , The Ohio State University	
4:15pm	DI-TuA-11 Demonstration of Low Thermal Resistance in Ga ₂ O ₃ Schottky Diodes by Junction-Side-Cooled Packaging, <i>Boyan Wang, M. Xiao, J. Knoll, Y. Qin</i> , Virginia Polytechnic Institute and State University; <i>J. Spencer</i> , U.S. Naval Research Laboratory; <i>M. Tadjer</i> , U.S. Naval Research Laboratory; <i>C. Buttay</i> , Univ Lyon, CNRS, INSA Lyon, Université Claude Bernard Lyon 1, Ecole Centrale de Lyon, Ampère, France; <i>K. Sasaki</i> , Novel Crystal Technology, Japan; <i>G. Lu, C. DiMarino, Y. Zhang</i> , Virginia Polytechnic Institute and State University	
4:30pm	DI-TuA-12 High Temperature In-situ MOCVD-grown Al ₂ O ₃ Dielectric on (010) β -Ga ₂ O ₃ with 10 MV/cm Breakdown Field, <i>Saurav Roy</i> , University of California Santa Barbara; <i>A. Bhattacharyya</i> , University of Utah; <i>C. Peterson, S. Krishnamoorthy</i> , University of California Santa Barbara	
4:45pm	DI-TuA-13 Metal Oxide (PtOX) Schottky Contact with High-k Dielectric Field Plate for Improved Field Management in Vertical β -Ga ₂ O ₃ Devices, <i>Esmat Farzana</i> , University of California Santa Barbara; <i>A. Bhattacharyya</i> , The University of Utah; <i>T. Itoh, S. Krishnamoorthy, J. Speck</i> , University of California Santa Barbara	
5:00pm	DI-TuA-14 Field Plated β -Ga ₂ O ₃ Mis Diodes with High-k TiO ₂ Interlayer for Increased Breakdown and Reduced Leakage Current, <i>Nolan Hendricks</i> , Air Force Research Laboratory; UC Santa Barbara; <i>A. Green, A. Islam, K. Leedy, K. Liddy, J. Williams</i> , Air Force Research Lab; <i>E. Farzana, J. Speck</i> , UC Santa Barbara; <i>K. Chabak</i> , Air Force Research Lab	

Epitaxial Growth

Room Jefferson 1 & Atrium - Session EG-TuP

Epitaxial Growth Poster Session

5:15pm – 7:15pm

EG-TuP-1 α -phase Gallium Oxide Thin Films Stabilized on a-, r- and m-plane Sapphire Substrates via Reactive Magnetron Sputtering and Pulsed Laser Deposition, *Edgars Butanovs*, Institute of Solid State Physics University of Latvia

EG-TuP-2 Epitaxial Growth of $(Al_xGa_{1-x})_2O_3$ by Suboxide MBE, *Jacob Steele, K. Azizie, J. McCandless*, Cornell University; *T. Asef*, Air Force Research Lab; *H. Xing, D. Jena, D. Schlom*, Cornell University

EG-TuP-3 LPCVD Grown n-Ga₂O₃ on p-GaN and Demonstration of p-n Heterojunction Behavior, *Arnab Mondal, A. Nandi, M. Yadav*, Indian Institute of Technology Mandi, India; *A. Bag*, Indian Institute of Technology Guwahati, India

EG-TuP-5 Free Carrier Control in Homoepitaxial β -Ga₂O₃ Thin Films by Tin Impurity Doping, *Neeraj Nepal, B. Downey, V. Wheeler, D. Katzer, E. Jin, M. Hardy, V. Gokhale, T. Growden*, US Naval Research Laboratory; *K. Chabak*, Air Force Research Laboratory; *D. Meyer*, US Naval Research Laboratory

EG-TuP-6 MBE Growth of Doped and Insulating Homoepitaxial β -Ga₂O₃, *Jon McCandless, V. Protasenko, B. Morell*, Cornell University; *E. Steinbrunner, A. Neal*, Air Force Research Laboratory, Materials and Manufacturing Directorate, USA; *Y. Cho, N. Tanen, H. Xing, D. Jena*, Cornell University

EG-TuP-7 High Conductivity Homoepitaxial β -Ga₂O₃ Regrowth Layers by Pulsed Laser Deposition, *Hyung Min Jeon*, KBR; *K. Leedy*, Air Force Research Laboratory

EG-TuP-8 Low-Temperature Epitaxial Growth and in Situ Atomic Layer Doping of β -Ga₂O₃ Films via Plasma-Enhanced ALD, *Saidjafarzoda Ilhom, A. Mohammad, J. Grasso, B. Willis*, University of Connecticut; *A. Okyay*, Stanford University; *N. Biyikli*, University of Connecticut

EG-TuP-9 Highly conductive β -Ga₂O₃ and $(Al_xGa_{1-x})_2O_3$ epitaxial films by MOCVD, *Fikadu Alema*, Agnitron Technology; *T. Itoh, J. Speck*, Materials Department, University of California, Santa Barbara; *A. Osinsky*, Agnitron Technology

EG-TuP-10 Investigation of Structural and Optical Properties of Rhombohedral Ga₂O₃ Deposited by Mist-CVD, *Usman Ul Muazzam, P. S Chavan, R. Muralidharan, S. Raghavan, D. N Nath*, Centre for Nano Science and Engineering, Indian Institute of Science, India

Material and Device Processing and Fabrication Techniques

Room Jefferson 1 & Atrium - Session MD-TuP

Material and Device Processing and Fabrication Techniques

Poster Session – 5:00pm – 7:00pm

MD-TuP-1 Record Low Specific Resistance Ohmic Contacts to Highly Doped MOVPE-Grown β -Ga₂O₃ and β -(Al_xGa_{1-x})₂O₃ Epitaxial Films, *Carl Peterson*, University of California Santa Barbara; *F. Alema*, Agnitron Technology; *S. Roy*, University of California Santa Barbara; *A. Bhattacharyya*, University of Utah; *A. Osinsky*, Agnitron Technology; *S. Krishnamoorthy*, University of California Santa Barbara

MD-TuP-3 MOCVD β -Ga₂O₃ Gate-recessed MESFET, *Hannah Masten, J. Lundh, J. Spencer*, US Naval Research Laboratory; *F. Alema, A. Osinsky*, Agnitron Technology; *A. Jacobs, K. Hobart, M. Tadjer*, US Naval Research Laboratory

MD-TuP-4 Subsurface Damage Analysis of Chemical Mechanical Polished (010) β -Ga₂O₃ Substrates, *Michael Liao, K. Huynh, L. Matto, D. Luccioni, M. Goorsky*, UCLA

MD-TuP-5 Diffusion of Zn in β -Ga₂O₃, *Ylva Knausgård Hommedal, Y. Frodason, L. Vines, K. Johansen*, Centre for Materials Science and Nanotechnology/Dep. of Physics, University of Oslo, Norway

MD-TuP-6 Initial Nucleation of Metastable γ -Ga₂O₃ During sub-Millisecond Thermal Anneals of Amorphous Ga₂O₃, *Katie Gann, C. Chang, M. Chang, D. Sutherland, A. Connolly, D. Muller, R. van Dover, M. Thompson*, Cornell University

MD-TuP-7 Heavily Doped β -Ga₂O₃ Deposited by Magnetron Sputtering, *Adetayo Adedeji*, Elizabeth City State University; *J. Lawson, C. Ebbing*, University of Dayton Research Institute; *J. Merrett*, Air Force Research Laboratory

MD-TuP-8 Point Defect Distributions in Ultrafast Laser Induced Periodic Surface Structures on β -Ga₂O₃, *D. Ramdin, E. DeAngelis, M. Noor, M. Haseman, E. Chowdhury, Leonard Brillson*, Ohio State University

Theory, Modeling and Simulation

Room Jefferson 1 & Atrium - Session TM-TuP

Theory, Modeling and Simulation Poster Session

5:00pm - 7:00pm

TM-TuP-1 Simulation Study of Single Event Effects in Ga₂O₃ Schottky Diodes, *Animesh Datta, U. Singisetti*, University at Buffalo

TM-TuP-2 Anisotropic Photoresponsivity and Deviation from Beer-Lambert Law in Beta Gallium Oxide, *Md Mahsinur Rahman Adnan, D. Verma, S. Dhara*, The Ohio State University; *C. Sturm*, Universitat Leipzig, Germany; *S. Rajan, R. Myers*, The Ohio State University

TM-TuP-4 Self-Trapped Holes and Polaronic Acceptors in Ultrawide Bandgap Oxides, *John Lyons*, US Naval Research Laboratory

TM-TuP-5 Modeling for a High-Temperature Ultra-Wide Bandgap Gallium Oxide Power Module, *Benjamin Albano*, Virginia Tech Center for Power Electronics Systems; *B. Wang, C. DiMarino, Y. Zhang*, Virginia Tech Center for Power Electronics

TM-TuP-6 Atomic Surface Structure of Sn doped β -Ga₂O₃(010) Studied by Low-energy Electron Diffraction, *Alexandre Pancotti*, Universidade Federal de Jatai, Brazil; *J. T. Sadowski*, Center for Functional Nanomaterials, Brookhaven National Laboratory; *A. Sandre Kilian*, Universidade Federal de Jatai, Brazil; *D. Duarte dos Reis*, Universidade Federal do Mato Grosso do Sul, Brazil; *C. Lubin*, SPEC, CEA, CNRS, Université Paris-Saclay, CEA Saclay, France; *A. Boucly*, SPEC, CEA, CNRS, Université Paris-Saclay, France; *P. Soukiassian*, SPEC, CEA, CNRS, Université Paris-Saclay, CEA Saclay, France; *J. Boeckl, D. Dorsey*, Air Force Research Laboratory; *M. Shin, T. ASEL*, Air Force Research Lab; *J. Brown, N. Barrett*, SPEC, CEA, CNRS, Université Paris-Saclay, CEA Saclay, France; *T. Back*, SPEC, CEA, CNRS, Université Paris-Saclay, CEA Saclay

TM-TuP-7 Determination of Gallium Vacancy and Aluminum Diffusion Constants in b-(Al,Ga)₂O₃ / Ga₂O₃ Superlattices, *Haobo Yang Yang*, University of Utah

Wednesday Morning, August 10, 2022

Room Jefferson 2-3		
8:30am	Welcome and Sponsor Thank You	Plenary Session Session PS2-WeM Plenary Session II Moderator: Kelson Chabak, Air Force Research Laboratory
8:45am	INVITED: PS2-WeM-2 Plenary Lecture: Fundamental Limits of Ga ₂ O ₃ Power Devices and How to Get There, <i>Huili Grace Xing</i> , Cornell University	
9:15am	EP-WeM-4 Remarkable Improvement of Conductivity in B-Ga ₂ O ₃ by High-Temperature Si Ion Implantation, <i>Arka Sardar, T. Isaacs-Smith, S. Dhar</i> , Auburn University; <i>J. Lawson, N. Merrett</i> , Air Force Research Laboratory, USA	Electronic and Photonic Devices, Circuits and Applications Session EP-WeM Process & Devices III Moderator: Uttam Singiseti, University of Buffalo, SUNY
9:30am	INVITED: EP-WeM-5 Towards Lateral and Vertical Ga ₂ O ₃ Transistors for High Voltage Power Switching, <i>Kornelius Tetzner, J. Würfl, E. Bahat-Treidel, O. Hilt</i> , Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik (FBH), Germany; <i>Z. Galazka, S. Bin Anooz, A. Popp</i> , Leibniz-Institut für Kristallzüchtung (IKZ), Germany	
10:00am	EP-WeM-7 Comparison of β -Ga ₂ O ₃ Mosfets With TiW and NiAu Metal Gates for High-Temperature Operation, <i>Nicholas Sepelak</i> , KBR, Wright State University; <i>D. Dryden</i> , KBR; <i>R. Kahler</i> , University of Texas at Dallas; <i>J. William</i> , Air Force Research Lab, Sensors Directorate; <i>T. Asef</i> , Air Force Research Laboratory, Materials and Manufacturing Directorate; <i>H. Lee</i> , University of Illinois at Urbana-Champaign; <i>K. Gann</i> , Cornell University; <i>A. Popp</i> , Leibniz-Institut für Kristallzüchtung, Germany; <i>K. Liddy</i> , Air Force Research Lab, Sensors Directorate; <i>K. Leedy</i> , Air Force Research Laboratory, Sensors Directorate; <i>W. Wang</i> , Wright State University; <i>W. Zhu</i> , University of Illinois at Urbana-Champaign; <i>M. Thompson</i> , Cornell University; <i>S. Mou</i> , Air Force Research Laboratory, Materials and Manufacturing Directorate, USA; <i>K. Chabak, A. Green</i> , Air Force Research Laboratory, Sensors Directorate; <i>A. Islam</i> , Air Force Research Laboratory, Sensors Directorate	
10:15am	EP-WeM-8 High Electron Mobility Si-doped β -Ga ₂ O ₃ MESFETS, <i>Arkka Bhattacharyya</i> , University of Utah; <i>S. Roy</i> , University of California at Santa Barbara; <i>P. Ranga</i> , University of Utah; <i>S. Krishnamoorthy</i> , University of California at Santa Barbara	
10:30am	BREAK	
10:45am	EP2-WeM-10 β -Ga ₂ O ₃ Lateral FinFETs Formed by Atomic Ga Flux Etching, <i>Ashok Dheenan, N. Kalarickal, Z. Feng, L. Meng</i> , The Ohio State University; <i>A. Fiedler</i> , IKZ Berlin, Germany; <i>C. Joishi, A. Price, J. McGlone, S. Dhara, S. Ringel, H. Zhao, S. Rajan</i> , The Ohio State University	Electronic and Photonic Devices, Circuits and Applications Session EP2-WeM Process and Devices IV Moderator: Christina DiMarino, Virginia Tech
11:00am	EP2-WeM-11 Insights Into the Behaviour of Leakage Current in Lateral Ga ₂ O ₃ Transistors on Semi-Insulating Substrates, <i>Zequan Chen, A. Mishra, M. Smith, T. Moule</i> , University of Bristol, UK; <i>M. Uren</i> , University of Bristol, UK; <i>S. Kumar, M. Higashiwaki</i> , National Institute of Information and Communications Technology, Japan; <i>M. Kuball</i> , University of Bristol, UK	
11:15am	EP2-WeM-12 Device Figure of Merit Performance of Scaled Gamma-Gate β -Ga ₂ O ₃ MOSFETs, <i>Kyle Liddy, A. Islam, J. Williams, D. Walker, N. Moser, D. Dryden, N. Sepelak, K. Chabak, A. Green</i> , AFRL	
11:30am	EP2-WeM-13 Electromigration of Native Point Defects and Breakdown in Ga ₂ O ₃ Vertical Devices, <i>M. Hasegan, D. Ramdin</i> , Ohio State University; <i>W. Li, K. Nomoto, D. Jena, G. Xing</i> , Cornell University; <i>Leonard Brillson</i> , Ohio State University	
11:45am	Closing Remarks, Sponsor Thank You, & Collection of e-Surveys	

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