

# SPECIAL THANKS

IWGO 2019 has been funded, in part, by the generous contributions of these organizations.

Conference Sponsor



Novel Crystal Technology, Inc.



agnitron  
MOCVD SOLUTIONS AND SERVICES



OCI Vacuum  
Microengineering Inc.



THE OHIO STATE  
UNIVERSITY  
INSTITUTE FOR  
MATERIALS RESEARCH

SAINT-GOBAIN

## POSTER SESSION I

Tuesday, 5:00–6:00 pm

- P1.1 Intentional Iron Diffusion in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (Bray)
- P1.2 Demonstration of CuI as a P-N Heterojunction to  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (Gallagher)
- P1.3 Synchrotron X-Ray Topography Observation of Defects in Vertical-Bridgman-Grown  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Single Crystal (Kasu)
- P1.4 High-Performance Si/  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> pn Heterojunction Diodes (Kim)
- P1.5 Demonstration of (AlGa)<sub>2</sub>O<sub>3</sub>-channel MOSFETs (Okumura)
- P1.6 High-Performance Solar-Blind Lateral Schottky Photodiode Based on Heteroepitaxial  $\gamma$ -Ga<sub>2</sub>O<sub>3</sub> Thin Film (Qin)
- P1.7 Ga<sub>2</sub>O<sub>3</sub> Field Effect Transistors on Grown on Sapphire by MOCVD (Razeghi)
- P1.8 Enhanced III-Nitride Quantum Wells Grown on Conductive, Transparent (-201)-  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>, for High Efficiency Vertical Visible and UV Light-Emitting Devices (Roqan)
- P1.9 Highly Rectifying Contacts on (In,Ga)<sub>2</sub>O<sub>3</sub> Thin Films Grown by PLD (Splith)
- P1.10 Metal/BaTiO<sub>3</sub> /  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Dielectric Heterojunction Diode with 5.7 MV/cm Breakdown Field (Xia)
- P1.11 High-Performances Self-Powered Deep Ultraviolet Photodetector Based on  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>/4H-SiC Heterojunction (Yu)
- P1.12 Impact of Flat-Band Shift in the HfAlO<sub>2</sub>/Ga<sub>2</sub>O<sub>3</sub> MOSCAPs with Different Gate Metal (Zhang)
- P1.13 Electrical Property of  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> Films on m-Plane Sapphire Substrates (Akaiwa)
- P1.14 MOCVD Growth of  $\beta$ -(Al<sub>x</sub>Ga<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub> Thin Films on Ga<sub>2</sub>O<sub>3</sub> Substrates (Bhuiyan)
- P1.15 Effects of Nano Epitaxial Lateral Overgrowth on Growth of  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> by Halide Vapor Phase Epitaxy (Cha)
- P1.16 MOCVD Growth of  $\epsilon$ - Ga<sub>2</sub>O<sub>3</sub> Thin Films on Si(111) Substrate with AlN Buffer (Chen)
- P1.17 Growth of High-Crystalline-Quality  $\alpha$ - Ga<sub>2</sub>O<sub>3</sub> Epilayer Grown by Halide Vapor-Phase Epitaxy Using Pulse Oxygen Flow Mode (Jeon)
- P1.18 Ga-Etching of Different  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Surface (Mazzolini)
- P1.19 Excitonic Emission Observed in Mist CVD Grown  $\alpha$ - Ga<sub>2</sub>O<sub>3</sub> (Muazzam)
- P1.20 Ga<sub>2</sub>O<sub>3</sub> on Si(100) Based Vertical Schottky UV-C Photodetectors by Molecular Beam Epitaxy (Mukhopadhyay)
- P1.21 MBE Growth and Characterization of  $\beta$ - Ga<sub>2</sub>O<sub>3</sub>/NbNx Heterostructures on SiC (Nepal)
- P1.22 Biaxial-Textured Epitaxial Gallium Oxide Thin Films on Low Cost, Flexible Metal Substrates (Sun)
- P1.23 Growth of High Quality  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> on Sapphire Substrate by Mist-CVD (Yang)
- P1.24 Mobility Calculation of the Gallium Oxide Double-Gate Metal-Insulator-Semiconductor Structure (Cha)
- P1.25 A Computational Survey of Wide Band Gap Materials for Next-Generation Power Electronic Devices Beyond Ga<sub>2</sub>O<sub>3</sub> (Gorai)
- P1.26 Thermodynamic Study on Halide Vapor Phase Epitaxy of Ga<sub>2</sub>O<sub>3</sub> Using GaCl or GaCl<sub>3</sub> as a Group-III Precursor (Kamo)
- P1.27 Stress/Strain Behavior of Infrared-Active Phonons and Phonon Deformation Potentials in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (Korlacki)
- P1.28 Epsilon-Gallium Oxide-Based Ferroelectric Semiconductors (Mishra)
- P1.29 Temperature-Dependent Thermal and Thermoelectric Properties of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Thin Films and Bulk Substrates (Handweg)
- P1.30 Electron Diffraction and Cathodoluminescence Imaging of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Using a Scanning Electron Microscope (Gunasekar)
- P1.31 Atomic Scale Investigation of Substitutional Alloying in  $\beta$ -(In<sub>x</sub>Ga<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub> and  $\beta$ -(Al<sub>x</sub>Ga<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub> (Johnson)
- P1.32 Study of Defects in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> by Steady-State Capacitance Spectroscopy (Li)
- P1.33 Properties of Epitaxial  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> films Determined by Long-Wavelength Spectroscopic Ellipsometry and Their Relation to Strain (Mock)
- P1.34 Diffusion of Hydrogen in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> and Interplay with Gallium Vacancies (Reinertsen)
- P1.35 Multi-Photon Photoluminescence Behaviors of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> as Probed by Wavelength-Dependent Nonlinear Optical Spectroscopy (Song)
- P1.36 Utilizing Steady-State Photocapacitance Measurements to Study Migration/Passivation of Defects in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (Zimmermann)
- P1.37 Deep Traps in N-Type  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub>:Sn Films Grown by HVPE on (0001) Sapphire Vladimir I. Nikolaev, Ioffe Institute & Perfect Crystals LLC

## POSTER SESSION II

Wednesday, 5:00–6:00 pm

- P2.1 Crucible Material Alloys Based on Platinum for VB  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Crystal Growth in Ambient Air (Hoshikawa)
- P2.2 Relation Between Emission Spots and Reverse Leakage Current in HVPE (001)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Schottky Barrier Diodes (Kasu)
- P2.3 Developments in Bulk Growth Of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> via the Czochralski Method and Fabrication of (010) Epi-Ready Substrates (Lindsey)
- P2.4 Switching Characteristics of PFC Circuit Using  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Schottky Barrier Diodes (Arima)
- P2.5 Schottky Barrier Height Engineering in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Using a Dielectric Interlayer (Bhattacharyya)
- P2.6 Large Area Nanometer-Thin Ga<sub>2</sub>O<sub>3</sub> Films from Gallium-Melt Exfoliation (Cooke)
- P2.7 Role of Oxygen Vacancies and Interface States in High Quality Schottky Contacts to  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (Hou)
- P2.8 Electrical Behavior of (100)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Schottky Diodes with Different Schottky Metals (Jiang)
- P2.9 Ultraviolet-C p-NiO/n-Ga<sub>2</sub>O<sub>3</sub> Photodetectors Grown on c-Plane Sapphire by Pulsed Laser Deposition (Li)
- P2.10 Band Gap Tunable  $\beta$ -(Al<sub>x</sub>Ga<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub> Thin Film Achieved by Ultra-High Temperature Annealing (Liao)
- P2.11 Impact of Electron-Beam Irradiation on the Performance of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Schottky Barrier Diodes (Lin)
- P2.12 p-NiO/n-Ga<sub>2</sub>O<sub>3</sub> Heterojunction for Power Electronics (Lu)
- P2.13 High Responsivity Tin Alloyed Ga<sub>2</sub>O<sub>3</sub> Solar Blind Photodetectors on  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Substrates by Molecular Beam Epitaxy (Mukhopadhyay)
- P2.14 Optical Float-Zone Grown Bulk  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>-Based Linear MSM Array of UV-C Photodetectors (Pratiyush)
- P2.15 LPCVD-Grown  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>-Based UV-C Photodetectors: Effect of Oxygen Flow (Pratiyush)
- P2.16  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Solar-Blind Photodetector on Thermal Pretreated c-Plane and r-Plane Sapphire Substrates by Pulsed Laser Deposition (Shalabi)
- P2.17 Large Area (7mmx7mm) Schottky Solar-Blind Photodiode with a Benchmark Response Speed (Yang)
- P2.18 Effect of Inlet Position and Flow Velocity in Hot-Wall Mist Chemical Vapor Deposition During Ga<sub>2</sub>O<sub>3</sub> Thin Film Growth (Bae)
- P2.19 Carrier Compensation and Scattering Mechanism in Laser-MBE Grown Degenerate Si-Doped Ga<sub>2</sub>O<sub>3</sub> (-201) Homoepilayers (Chen)
- P2.20 Heteroepitaxy of  $\epsilon$ - Ga<sub>2</sub>O<sub>3</sub> Thin Films by Metal Organic Chemical Vapor Deposition (Chen)
- P2.21 Effect of Plasma Treatment of GaN Templates on  $\epsilon$ - Ga<sub>2</sub>O<sub>3</sub> Epitaxial Growth by Mist Chemical Vapor Deposition (Ito)
- P2.22 Comparison of Ga<sub>2</sub>O<sub>3</sub> Thin Films on c-Plane and m-Plane Sapphire Substrates Grown by Mist CVD (Kim)
- P2.23 Gallium Oxide Deposition by Atomic Layer Deposition and Improved Electrical Properties by Annealing (Kroencke)
- P2.24 Growth of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Layer on  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (-201) and c-Plane Sapphire Substrate by HVPE (Lee)
- P2.25 Morphology Effect of Different Unintentional Substrate Offcuts on (010)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Films Homoepitaxially Grown by MBE (Mazzolini)
- P2.26 Investigation of Thermal and Chemical Stabilities of (001), (010), and (-2 01)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Substrates in a Flow of Either N<sub>2</sub> or H<sub>2</sub> (Togashi)
- P2.27 High Temperature LPCVD Growth of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Films (Zhang)
- P2.28 Technoeconomic Analysis of Gallium Oxide Wafer Cost (Reese)
- P2.29 Device-Level Thermal Management of Gallium Oxide Field-Effect Transistors (Choi)
- P2.30 Evolution and Recovery of Ion Implantation-Induced Damage Zone in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (Anber)
- P2.31 Optical Absorption of Impurities in Doped Ga<sub>2</sub>O<sub>3</sub> (Bhandari)
- P2.32 Insights on Oxygen Vacancies in G<sub>2</sub>O<sub>3</sub> Epitaxial Films (Freitas)
- P2.33 Nanoscale Studies of Schottky Barrier Contacts on (-201)  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Using Ballistic Electron Emission Microscopy (BEEM) (Galiano)
- P2.34 Neutron Irradiation and Thermal Anneal Impact on Ga<sub>2</sub>O<sub>3</sub> Deep Level Defects (Gao)
- P2.35 Thermal Conductivity of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Thin Films Grown by Molecular Beam Epitaxy (Vaca)
- P2.36 Deep Level Traps in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Studied by Thermally Stimulated Current (TSC) Spectroscopy (Wang)



IWGO 2019

INTERNATIONAL WORKSHOP ON GALLIUM OXIDE AND OTHER RELATED MATERIALS

# PROGRAM OVERVIEW

August 12-15, 2019



## MONDAY

12:00 pm – 6:30 pm Registration

▲ Invited Talk

	PreSessions
1:00 pm – 2:00 pm	Perspectives on Ga <sub>2</sub> O <sub>3</sub> Application <i>Vivek Mehrotra, Teledyne</i>
2:00 pm – 5:00 pm	GOX Special Session <i>Kelson Chabak, Air Force Research Laboratory; Jim Speck, University of California, Santa Barbara; Mike Scarpulla, The University of Utah; Michael Thompson, Cornell University; Shin Mou, Air Force Research Laboratory</i>
5:30 pm – 6:30 pm	Welcome Reception

## TUESDAY

8:00 am – 5:00 pm Registration

▲ Invited Talk

8:30 am	<b>Welcome</b>
8:40 am	<b>KEY 1.1</b> ▲ Evolution of Ga <sub>2</sub> O <sub>3</sub> Power Devices: Past, Present, and Future <i>Masataka Higashiwaki, National Institute of Information and Communications Technology</i>
9:20 am	<b>EPI 1.1</b> ▲ Homoepitaxial β-Ga <sub>2</sub> O <sub>3</sub> Thin Films Growth by MOCVD Using Various Oxygen Sources <i>Andrei Osinsky, Agnitron Technology</i>
9:40 am	<b>EPI 1.2</b> ▲ Correlation Between Substrate Miscut Angle and Growth Rate for Homoepitaxial β-Ga <sub>2</sub> O <sub>3</sub> Layers Grown by MOVPE <i>Andreas Popp, Leibniz-Institut für Kristallzüchtung</i>
10:00 am	<b>EPI 1.3</b> MOCVD Epitaxy of Si-Doped β-Ga <sub>2</sub> O <sub>3</sub> Thin Films with Record High Electron Mobilities <i>Zixuan Feng, The Ohio State University</i>
10:15 am	<b>EPI 1.4</b> MOVPE Growth of Homoepitaxial β-Ga <sub>2</sub> O <sub>3</sub> Films Using Far Injection Showerhead <i>Praneeth Ranga, The University of Utah</i>
10:30 am	<b>Break</b>
10:45 am	<b>EPI 2.1</b> ▲ Integration of Corundum-Structured Oxides for Device Tailoring <i>Shizuo Fujita, Kyoto University</i>
11:05 am	<b>EPI 2.2</b> Epitaxial Stabilization of κ-(In <sub>1-x</sub> Ga <sub>x</sub> ) <sub>2</sub> O <sub>3</sub> and κ-(Al <sub>1-x</sub> Ga <sub>x</sub> ) <sub>2</sub> O <sub>3</sub> Layers up to xIn ≤ 0.28 and xAl ≤ 0.68 by Tin-Assisted VCCS-PLD <i>Max Kneib, Universität Leipzig</i>
11:20 am	<b>EPI 2.3</b> Ternary Orthorhombic (In <sub>1-x</sub> Ga <sub>x</sub> ) <sub>2</sub> O <sub>3</sub> and (Al <sub>1-x</sub> Ga <sub>x</sub> ) <sub>2</sub> O <sub>3</sub> Thin Films: Growth and Material Properties <i>Anna Häsza, Universität Leipzig</i>
11:35 am	<b>EPI 2.4</b> Epitaxial Growth of α-(In <sub>1-x</sub> Al <sub>x</sub> ) <sub>2</sub> O <sub>3</sub> Alloy Films by Mist Chemical Vapor Deposition <i>Daisuke Tahara, Kyoto Institute of Technology</i>
11:50 am	<b>EPI 2.5</b> ▲ Ga <sub>2</sub> O <sub>3</sub> Phase Control and Heterojunctions Using Plasma-Enhanced Atomic Layer Epitaxy <i>Virginia D. Wheeler, U.S. Naval Research Laboratory</i>
12:10 pm – 1:40 pm	<b>Lunch Break (Lunch is not provided)</b>
1:40 pm	<b>DEV 1.1</b> Demonstration of Over 10-A Ga <sub>2</sub> O <sub>3</sub> Schottky Barrier Diodes Fabricated by Using High-Quality β-Ga <sub>2</sub> O <sub>3</sub> Homoepitaxial Films <i>Kohei Sasaki, Novel Crystal Technology, Inc.</i>
1:55 pm	<b>DEV 1.2</b> Near Unity Ideality Factor for Sidewall Schottky Contacts Achieved Through Anisotropic Wet Etching of β-Ga <sub>2</sub> O <sub>3</sub> <i>Yuewei Zhang, University of California, Santa Barbara</i>
2:10 pm	<b>DEV 1.3</b> ▲ Influence of Voltage, Temperature and Radiation Damage on Vertical Geometry Ga <sub>2</sub> O <sub>3</sub> Rectifiers <i>Jiancheng Yang, University of Florida</i>
2:30 pm	<b>DEV 1.4</b> Investigation of Interfacial Evolution at Beta Phase Gallium Oxide Titanium/Gold Ohmic Junctions <i>Ming-Hsun Lee, University of Michigan</i>
2:45 pm	<b>DEV 1.5</b> Field-Plated Lateral β-Ga <sub>2</sub> O <sub>3</sub> Schottky Barrier Diode with High Reverse Blocking Voltage of More Than 3 kV <i>Hu Zhuangzhuang, Xidian University</i>
3:00 pm	<b>DEV 1.6</b> High Temperature (> 350 °C) Schottky Contacts on β-Ga <sub>2</sub> O <sub>3</sub> <i>Caixia Hou, University of Canterbury</i>

## TUESDAY

CONTINUED

▲ Invited Talk

3:15 pm	<b>DEV 1.7</b> Dual-Modality Solar-Blind Ultraviolet Light Sensing by β-Ga <sub>2</sub> O <sub>3</sub> Nanoelectromechanical Transducer <i>Xu-Qian Zheng, Case Western Reserve University</i>
3:30 pm	<b>Break</b>
3:45 pm	<b>DEV 2.1</b> β-Ga <sub>2</sub> O <sub>3</sub> Delta-Doped Field Effect Transistors with Cutoff Frequency of 27GHz <i>Zhanbo Xia, The Ohio State University</i>
4:00 pm	<b>DEV 2.2</b> Ga <sub>2</sub> O <sub>3</sub> MOSFETs with (AlGa) <sub>2</sub> O <sub>3</sub> Back Barrier <i>Takaumi Kamimura, National Institute of Information and Communications Technology</i>
4:15 pm	<b>DEV 2.3</b> Self-Aligned Gate Thin-Channel β-Ga <sub>2</sub> O <sub>3</sub> MOSFETs <i>Kyle J Liddy, KBRwyle</i>
4:30 pm	<b>DEV 2.4</b> Nearly-Ideal Characteristics of SiO <sub>2</sub> /β-Ga <sub>2</sub> O <sub>3</sub> MOS Capacitors Fabricated with High-Temperature O <sub>2</sub> -Annealing <i>Koji Kita, The University of Tokyo</i>
4:45 pm	<b>DEV 2.5</b> Development of Si-α-(Al <sub>1-x</sub> Ga <sub>x</sub> ) <sub>2</sub> O <sub>3</sub> /α-(Cr <sub>1-x</sub> Ga <sub>x</sub> ) <sub>2</sub> O <sub>3</sub> High Electron Mobility Transistors <i>Giang T. Dang, Kochi University of Technology</i>
5:00 - 6:00 pm	Poster Session I and Reception
7:00 - 9:00 pm	Rump Session: Is Ga <sub>2</sub> O <sub>3</sub> Too Hot to Handle?

## WEDNESDAY

8:00 am – 5:00 pm Registration

▲ Invited Talk

8:30 am	<b>Welcome Back</b>
8:40 am	<b>KEY 2.2</b> ▲ Ga <sub>2</sub> O <sub>3</sub> Power Schottky Barrier Diodes and Transistors: Design Principles and Experimental Validation <i>Grace H. Xing, Cornell University</i>
9:20 am	<b>EPI 3.1</b> ▲ Growth of Gallium Oxide by HVPE <i>Yoshinao Kumagai, Tokyo University of Agriculture and Technology</i>
9:40 am	<b>EPI 3.2</b> ▲ Halide Vapor Phase Epitaxy of Meta-Stable Ga <sub>2</sub> O <sub>3</sub> <i>Yuichi Oshima, National Institute for Materials Science</i>
10:00 am	<b>EPI 3.3</b> Influence of Growth Temperature and Input VI/III Ratio on Crystallinity in Homoepitaxy of β-Ga <sub>2</sub> O <sub>3</sub> by Halide Vapor Phase Epitaxy <i>Ken Goto, Tokyo University of Agriculture and Technology</i>
10:15 am	<b>EPI 3.4</b> Single-Phase α-(Al <sub>1-x</sub> Ga <sub>x</sub> ) <sub>2</sub> O <sub>3</sub> Films Grown on m-Plane Sapphire Substrates by Plasma-Assisted Molecular Beam Epitaxy <i>Riena Jinno, Cornell University</i>
10:30 am	<b>Break</b>
10:45 am	<b>EPI 4.1</b> ▲ Thermodynamics and Suboxide-Related Kinetics during Molecular Beam Epitaxy of Ga <sub>2</sub> O <sub>3</sub> : Catalysis, Faceting, and Phase Formation <i>Oliver Bierwagen, Paul-Drude-Institut für Festkörperelektronik</i>
11:05 am	<b>EPI 4.2</b> High Electron Density β-(Al <sub>0.16</sub> Ga <sub>0.82</sub> ) <sub>2</sub> O <sub>3</sub> /Ga <sub>2</sub> O <sub>3</sub> Modulation Doping with Ultrathin (1 nm) Spacer Layer <i>Nidhin Kurian Kalarickal, The Ohio State University</i>
11:20 am	<b>EPI 4.3</b> Acceptors in (010) β-Ga <sub>2</sub> O <sub>3</sub> Grown by Plasma-Assisted Molecular Beam Epitaxy <i>Akhil Mauze, University of California, Santa Barbara</i>
11:35 am	<b>EPI 4.4</b> Efficient Suboxide Sources for Oxide MBE Using the Sublimation of SnO <sub>2</sub> +Sn and Ga <sub>2</sub> O <sub>3</sub> +Ga Mixtures <i>Georg Hoffmann, Paul-Drude-Institut für Festkörperelektronik</i>
11:50 am	<b>EPI 4.5</b> Substrate-Orientation Dependence of In-Mediated Metal-Exchange Catalysis During β-Ga <sub>2</sub> O <sub>3</sub> Homoepitaxy by MBE <i>Piero Mazzolini, Paul-Drude-Institut für Festkörperelektronik</i>
12:10 pm – 1:35 pm	<b>Lunch Break (Lunch is not provided)</b>
1:35 pm	<b>MOD 1.1</b> ▲ First-Principles Studies of Ga <sub>2</sub> O <sub>3</sub> : Defects, Doping, and Heterostructures <i>Chris G. Van de Walle, University of California, Santa Barbara</i>
1:55 pm	<b>MOD 1.2</b> Ab-initio Study of the Effects of Stress on the Low Field Electron Mobility in β-Ga <sub>2</sub> O <sub>3</sub> <i>Ankit Sharma, University at Buffalo</i>

## WEDNESDAY

CONTINUED

▲ Invited Talk

2:10 pm	<b>MOD 1.3</b> Calculated Electron Paramagnetic Resonance Parameters for Defects in β-Ga <sub>2</sub> O <sub>3</sub> and Related Materials <i>Dmitry Skachkov, University of Florida</i>
2:25 pm	<b>MOD 1.4</b> Theoretical Investigation of Infrared Photodetection in Gallium Oxide/Aluminum Gallium Oxide Quantum Well Structures <i>Joseph E Lyman, The University of Utah</i>
2:40 pm	<b>MOD 1.5</b> ▲ Ab Initio Electron Transport in Monoclinic β-Ga <sub>2</sub> O <sub>3</sub> <i>Uttam Singiseti, University at Buffalo</i>
3:00 pm	<b>Break</b>
3:15 pm	<b>DEV 3.1</b> Orientation Dependence in Ga <sub>2</sub> O <sub>3</sub> Vertical Fin-Channel Power Devices <i>Wenshen Li, Cornell University</i>
3:30 pm	<b>DEV 3.2</b> Etch Damage Control in Deep-Recessed β-Ga <sub>2</sub> O <sub>3</sub> Field Effect Transistors <i>Chandan Joishi, The Ohio State University; Indian Institute of Technology Bombay</i>
3:45 pm	<b>DEV 3.3</b> Lateral 750 V Ga <sub>2</sub> O <sub>3</sub> MISFET with 100 MW/cm <sup>2</sup> Power Figure-of-Merit <i>Kornelius Tetzner, Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik</i>
4:00 pm	<b>DEV 3.4</b> Ga <sub>2</sub> O <sub>3</sub> Field Plated MOSFETs with Ohmic Cap Layer <i>Ke Zeng, University at Buffalo</i>
4:15 pm	<b>DEV 3.5</b> Comparison Between Lateral and Vertical Ga <sub>2</sub> O <sub>3</sub> Isolation Structures <i>Carlo De Santi, University of Padova</i>
4:30 pm	<b>DEV 3.6</b> Static and Switching Characteristics of Enhancement-Mode β-Ga <sub>2</sub> O <sub>3</sub> MOSFET <i>Hang Dong, Institute of Microelectronics, Chinese Academy of Sciences</i>
4:45 pm	<b>DEV 3.7</b> Hydrogen Environment Anisotropic Thermal Etching Characteristics of (010) β-Ga <sub>2</sub> O <sub>3</sub> and Fabrication of High Aspect Nanowall Structure <i>Yuki Ooe, Sophia University</i>
5:00 pm - 6:00 pm	Poster Session II and Reception
6:45 pm - 8:45 pm	Dinner Reception at The Ohio State Faculty Club

## THURSDAY

8:00 am – 2:00 pm Registration

▲ Invited Talk

8:30 am	<b>Welcome—Last Day</b>
8:40 am	<b>KEY 3.3</b> ▲ Recent Progress in Edge-Defined Film-Fed Growth and Halide Vapor Phase Epitaxy of β-Ga <sub>2</sub> O <sub>3</sub> for Power Device Applications <i>Akito Kuramata, Novel Crystal Technology, Inc.</i>
9:20 am	<b>BULK 1.1</b> ▲ Czochralski-Grown Bulk β-Ga <sub>2</sub> O <sub>3</sub> Single Crystals Doped with Mono-, Di-, Tri-, and Tetravalent Ions, and VGF-Grown Bulk ZnGa <sub>2</sub> O <sub>4</sub> Single Crystals <i>Zbigniew Galazka, Leibniz-Institut für Kristallzüchtung</i>
9:40 am	<b>BULK 1.2</b> Phonon Order and Longitudinal-Optical Phonon Plasmon Coupling in β-Ga <sub>2</sub> O <sub>3</sub> <i>Mathias M. Schubert, University of Nebraska-Lincoln</i>
9:55 am	<b>BULK 1.4</b> Bulk β-Ga <sub>2</sub> O <sub>3</sub> Single Crystal Growth Interface Control and In-Plane Polarization <i>Wenxiang Mu, Shandong University</i>
10:10 am	<b>Break</b>
10:25 am	<b>TRN 1.1</b> Thermal Characterization of Delta-Doped β-Ga <sub>2</sub> O <sub>3</sub> MESFET <i>Nitish Kumar, Georgia Institute of Technology</i>
10:40 am	<b>TRN 1.2</b> Thermal Boundary Conductance Across Heterogeneous Ga <sub>2</sub> O <sub>3</sub> -Diamond Interfaces <i>Zhe Cheng, Georgia Institute of Technology</i>
10:55 am	<b>TRN 1.3</b> Integration of Thinned Ga <sub>2</sub> O <sub>3</sub> with Single Crystal 4H-SiC for Thermal Management of Ga <sub>2</sub> O <sub>3</sub> Power Devices <i>Jacob H. Leach, Kyma Technologies</i>

## THURSDAY

CONTINUED

▲ Invited Talk

11:10 am	<b>TRN 1.4</b> Characterization of Annealing-Induced Conductivity Changes in (-201) β-Ga <sub>2</sub> O <sub>3</sub> <i>Marko J. Tadjer, U.S. Naval Research Laboratory</i>
11:25 am	<b>TRN 1.5</b> Orientation-Dependent Electrical Performance of β-Ga <sub>2</sub> O <sub>3</sub> MOSFETs <i>Taylor Moule, University of Bristol</i>
11:40 am	<b>TRN 1.6</b> Investigation of Hydrogen in MOCVD β-Ga <sub>2</sub> O <sub>3</sub> <i>Adam Neal, Air Force Research Laboratory</i>
11:55 am - 1:25 pm	<b>Lunch Break (Lunch is not provided)</b>
1:25 pm	<b>CHA 1.1</b> Full-Bandgap Investigation of Electronic Defect States in High-Mobility MOCVD-Grown (010) β-Ga <sub>2</sub> O <sub>3</sub> <i>Hemant Jagannath Ghadi, The Ohio State University</i>
1:40 pm	<b>CHA 1.3</b> Comparison of the Electrical Properties of β-Ga <sub>2</sub> O <sub>3</sub> Layers Homoepitaxially Grown by MOVPE and HVPE <i>Andreas Fiedler, Leibniz-Institut für Kristallzüchtung</i>
1:55 pm	<b>CHA 1.4</b> Characteristics of Terahertz Emissions from (010) and (-201) Surfaces of β-Ga <sub>2</sub> O <sub>3</sub> Excited by Femtosecond Laser Pulses <i>Kawayama Iwao, Osaka University</i>
2:10 pm	<b>CHA 1.5</b> Electron Paramagnetic Resonance and Charge State Transition Levels of Cobalt in β-Ga <sub>2</sub> O <sub>3</sub> <i>Klaus Irmischer, Leibniz-Institut für Kristallzüchtung</i>
2:25 pm	<b>CHA 1.6</b> Ga <sub>2</sub> O <sub>3</sub> Field Plated MOSFETs with Ohmic Cap Layer <i>Matthew Hilfiker, University of Nebraska-Lincoln</i>
2:40 pm	<b>Break</b>
2:55 pm	<b>CHA 2.1</b> Direct Determination of Point Defects and Complexes in β-Ga <sub>2</sub> O <sub>3</sub> Using Scanning Transmission Electron Microscopy <i>Jinwoo Hwang, The Ohio State University</i>
3:10 pm	<b>CHA 2.2</b> Direct Imaging of Surface Segregation of Tin Dopants and Preferential Dopant Sites in β-(Al <sub>0.15</sub> Ga <sub>0.85</sub> ) <sub>2</sub> O <sub>3</sub> Films <i>Celesta S. Chang, Cornell University</i>
3:25 pm	<b>CHA 2.3</b> Observation and Classification of Dislocations in EFG-Ga <sub>2</sub> O <sub>3</sub> Substrates <i>Yongzhao Yao, Japan Fine Ceramics Center</i>
3:40 pm	<b>CHA 2.4</b> Leveraging Three Dimensional Chemical Imaging to Investigate Structure and Chemistry of β-(Al <sub>1-x</sub> Ga <sub>x</sub> ) <sub>2</sub> O <sub>3</sub> : Towards an Ultra-High Band Gap Material <i>Jith Sarker, University at Buffalo-SUNY</i>
3:55 pm	<b>CHA 2.5</b> Optical Transitions in β-Ga <sub>2</sub> O <sub>3</sub> Single Crystal Studied by Electoreflectance Measurements <i>Takeyoshi Onuma, Kogakuin University</i>
4:10 pm	<b>CHA 2.6</b> IR-VUV Dielectric Function of Kappa-(In,Al,Ga) <sub>2</sub> O <sub>3</sub> Thin Films <i>Chris Sturm, Universität Leipzig</i>
4:25 pm – 4:55 pm	<b>Closing</b>

IWGO is managed by



mrs.org/conference-services