

MONDAY PRESENTATIONS

* Invited Paper

SESSION PL01: Plenary Session I
Session Chairs: Stacia Keller and Christian Wetzel
Monday Morning, July 8, 2019
Evergreen Ballroom E-I, Lobby Level

8:45 AM

Welcome / Opening Ceremony by W. Alan Doolittle, Georgia Institute of Technology

9:00 AM *PL01.01

Developments of Nonpolar/Semipolar Edge Emitting Laser Diodes and VCSELs Shuji Nakamura; University of California Santa Barbara, United States.

9:45 AM *PL01.02

Development of Vertical GaN Power Devices Jun Suda; Nagoya University, Japan.

10:30 AM BREAK

11:00 AM *PL01.03

Efficiency of Nitride LEDs—Impact of Point and Extended Defects Nicolas Grandjean; École Polytechnique Fédérale de Lausanne (EPFL), Switzerland.

11:45 AM *PL01.04

Emerging Applications of III-Nitride Nanocrystals Zetian Mi; University of Michigan, United States.

SESSION A01: UVC LEDs

Session Chairs: Akira Hirano and Leo Schowalter
Monday Afternoon, July 8, 2019
Evergreen Ballroom E-F, Lobby Level

2:00 PM *A01.01

LEE Enhancement in AlGaIn UVC LED Using Photonic Crystal Reflector Hideki Hirayama¹, Yukio Kashima^{1,2}, Yasuhiro Watanabe³, Tomohiko Shibata³, Noritoshi Maeda⁴, Masafumi Jo⁴, Eriko Matsuura^{1,2}, Takeshi Iwai⁴, Mitsunori Kokubo⁵, Takaharu Tashiro⁶, Kanji Furuta⁶, Ryuichi Kamimura⁶, Yamato Osada⁶, Hideki Takagi⁷, Yuichi Kurashima⁷, Yasushi Iwaisako⁸ and Tugumu Nagano⁹; ¹RIKEN, Japan; ²Marubun Co.Ltd., Japan; ³DOWA Electronics Co. Ltd., Japan; ⁴Tokyo Ohka Kogyo Co. Ltd, Japan; ⁵Toshiba Machine Co. Ltd., Japan; ⁶ULVAC Inc., Japan; ⁷AIST, Japan; ⁸Nippon Tungsten Co. Ltd, Japan; ⁹Dai Nippon Printing Co. Ltd., Japan.

2:30 PM A01.02

High Performance UVC LEDs Below 240 nm Fabricated with Pseudomorphic AlGaIn/AlN Technology Leo Schowalter^{1,2}, Akira Yoshikawa², Satoshi Yamada^{1,2}, Jonathan Mann¹, Shyam Bharadwaj³, Josh Lederman³, Ryosuke Hasegawa², Yuta Honma², Tomohiro Morishita², James Grandusky¹, Amy Miller¹, Kazuhiro Nagase², Debdeep Jena³ and Grace Xing³; ¹Crystal IS, United States; ²Asahi Kasei, Japan; ³Cornell University, United States.

2:45 PM A01.03

Fully Transparent AlGaIn-Based UVC LEDs with MOVPE-Grown Tunnel Junctions Luca Sulmoni¹, Christian Kuhn¹, Martin Guttman¹, Johannes Glaab², Frank Mehnke¹, Norman Susilo¹, Tim Wernicke¹, Markus Weyers² and Michael Kneissl^{1,2}; ¹Technische Universität Berlin, Germany; ²Leibniz-Institut für Höchstfrequenztechnik, Germany.

3:00 PM A01.04

Analysis and Control of Mg Diffusion Effect in III-Nitride UV Light-Emitting Devices Theeradetch Detchprohm, Chuan-Wei Tsou, Hoon Jeong, Young Jae Park, Karan Mehta, Ping Chen, Doug Yoder, Shyh-Chiang Shen and Russell Dupuis; Georgia Institute of Technology, Georgia.

3:15 PM A01.05

Impact of Mg Doping of the Electron Blocking Layer on the Reliability of UVC Light Emitting Diodes Jan Ruschel¹, Johannes Glaab¹, Hyun Kyong Cho¹, Jens C. Rass¹, Neysha Lobo Ploch¹, Norman Susilo², Tim Wernicke², Sven Einfeld¹, Markus Weyers¹ and Michael Kneissl²; ¹Ferdinand-Braun-Institut, Germany; ²Technische Universität Berlin, Germany.

3:30 PM A01.06

Microscopic Nonuniform Structure of AlGaIn-Based 260 and 285 nm Light-Emitting Multiple Quantum Wells Grown on AlN Templates with Dense Macrosteps Analyzed by Cathodoluminescence Spectroscopy Yosuke Nagasawa¹, Ryuichi Sugie², Kazunobu Kojima³, Akira Hirano¹, Masamichi Ipponmatsu¹, Yoshio Honda⁴, Hiroshi Amano^{4,5,6}, Isamu Akasaki^{6,7} and Shigefusa F. Chichibu^{3,4}; ¹UV Craftory Co. Ltd., Japan; ²Toray Research Center, Inc., Japan; ³Tohoku University, Japan; ⁴Nagoya University, Japan; ⁵Nagoya University, Japan; ⁶Nagoya University, Japan; ⁷Meijo University, Japan.

3:45 PM BREAK

SESSION A02: Vertical Cavity Lasers

Session Chairs: Theeradetch Detchprohm and Sven Einfeld
Monday Afternoon, July 8, 2019
Evergreen Ballroom E-F, Lobby Level

4:15 PM *A02.01

Epitaxy and Performance of VCSEL Structures Tetsuya Takeuchi¹, Satoshi Kamiyama¹, Motoaki Iwaya¹ and Isamu Akasaki^{1,2}; ¹Meijo University, Japan; ²Nagoya University, Japan.

4:45 PM A02.02

Blue-Green GaN-Based VCSEL with a Monolithic Curved Mirror Fabricated on a Free Standing Semi-Polar {20-21} GaN Substrate Tatsuya Matou, Tatsushi Hamaguchi, Kentaro Hayashi, Tatsuro Jyokawa, Hiroshi Nakajima, Masayuki Tanaka, Noriko Kobayashi, Masamichi Ito, Maho Ohara, Hideki Watanabe, Rintaro Koda and Katsunori Yanashima; Sony Corporation, Japan.

5:00 PM A02.03

Room-Temperature Continuous-Wave Operations of GaN-Based Vertical-Cavity Surface-Emitting Lasers with Buried GaInN Tunnel Junctions Kazuki Kiyohara^{1,2}, Ryota Fuwa¹, Mahito Odawara¹, Tetsuya Takeuchi¹, Satoshi Kamiyama¹, Motoaki Iwaya¹, Isamu Akasaki^{1,3} and Tatsuma Saito³; ¹Meijo University, Japan; ²Stanley Electric Co., Ltd., Japan; ³Nagoya University, Japan.

5:15 PM A02.04

Quality Factors of Vertical Cavities Based on Dislocation-Free and Atomically Flat III-Nitride Hexagonal Micro-Prisms Filip Hjørt¹, Maryam Khalilian², Filip Lenrick³, Olof Hultin², Jovana Colvin⁴, Marcus Bengths¹, Jörgen Bengtsson¹, Johan Gustavsson¹, Jonas Johansson², Rainer Timm⁴, Reine Wallenberg³, Jonas Ohlsson², Zhaoxia Bi², Åsa Haglund¹, Anders Gustafsson² and Lars Samuelson²; ¹Chalmers University of Technology, Sweden; ²Lund University, Sweden; ³Lund University, Sweden; ⁴Lund University, Sweden.

5:30 PM A02.05

Thermal Management Strategies for III-N VCSELs Using Electro-Opto-Thermal Numerical Simulations Karan Mehta², Yuh-Shiuan Liu², Jialin Wang², Hoon Jeong², Theeradetch Detchprohm², Shyh-Chiang Shen², Russell Dupuis¹ and Doug Yoder²; ²Georgia Institute of Technology, United States.

5:45 PM A02.06

Electrically Injected Nonpolar GaN-Based VCSELs with Lattice-Matched Nanoporous Distributed Bragg Reflector Mirrors Saadat Mishkat-Ul-Masabih¹, Andrew A. Aragon¹, Morteza Monavarian¹, Ting Luk² and Daniel Feezell¹; ¹University of New Mexico, United States; ²Sandia National Laboratories, United States.

SESSION B01: Vertical P-N Junctions

Session Chairs: Srabanti Chowdhury and Tetsu Kachi
Monday Afternoon, July 8, 2019
Cedar Ballroom, Second Floor

2:00 PM *B01.01

High Breakdown Voltage Vertical p-n Junction GaN Diodes Tomoyoshi Mishima; Hosei University, Japan.

2:30 PM B01.02

High Voltage Implantation-Free Vertical GaN Power P-N Diodes with a Novel Low-Temperature Plasma-Based Planar Edge Termination Houqiang Fu, Kai Fu, Hanxiao Liu, Shanthan Reddy Alugubelli, Xuanqi Huang, Hong Chen, Tsung-Han Yang, Jossue Montes, Chen Yang, Jingan Zhou, Fernando Ponce and Yuji Zhao; Arizona State University, United States.

2:45 PM B01.03

Achieving a Record High p-n Junction Breakdown Electric Field of 3.9 MV/cm in GaN Using Ion-Compensated Moat Etch Termination Dong, Ji^{1,2}, Burcu Ercan² and Srabanti Chowdhury^{1,2}; ¹Stanford University, United States; ²University of California Davis, United States.

3:00 PM B01.04

Avalanche Capability and Recoverable Breakdown Walkout in Polarization-Doped Vertical GaN pn Diodes Elena Fabris¹, Carlo De Santi¹, Alessandro Caria¹, Kazuki Nomoto², Zongyang Hu², Wenshen Li², Xiang Gao³, Debdeep Jena², Grace Xing², Gaudenzio Meneghesso¹, Enrico Zanoni¹ and Matteo Meneghini¹; ¹University of Padova, Italy; ²Cornell University, United States; ³IQE, United States.

3:15 PM B01.05

GaN-on-GaN PIN Diodes with a High Baliga's Figure-of-Merit of 29.7 GW/cm² Cong Hu¹, Jiale Wang¹, Sung-Wen Huang², Hao-Yu Wang³, Hsien-Chin Chiu³, Hao-Chung Kuo², Ke Xu⁴, Dabing Li⁵ and Xinke Liu¹; ¹Shenzhen University, China; ²National Chiao Tung University, Taiwan; ³Chang-Gung University, Taiwan; ⁴Suzhou Institute of Nano-tech and Nano-bionics, China; ⁵Changchun Institute of Optics, Fine Mechanics and Physics, China.

3:30 PM B01.06

Threshold Switching and Memory Behaviors of GaN-on-GaN Regrown Vertical p-n Diodes with High Temperature Stability Kai Fu, Houqiang Fu, Xuanqi Huang, Tsung-Han Yang, Hong Chen, Jossue Montes, Chen Yang, Jingan Zhou and Yuji Zhao; Arizona State University, United States.

3:45 PM BREAK

SESSION B02: Power Devices
Session Chairs: Elison Matioli and Chang Soo Suh
Monday Afternoon, July 8, 2019
Cedar Ballroom, Second Floor

4:15 PM *B02.01

Enhancement-Mode p-GaN-HEMT Epitaxy Technology on 200 mm Si Substrates Hu Liang¹, Niels Posthuma², Steve Stoffels², Ming Zhao¹ and Stefaan Decoutere²; ¹imec vzw, Belgium; ²imec vzw, Belgium.

4:45 PM B02.02

200mm GaN Power—Technology Status on QST® Platform Vladimir Odnoblyudov, Cem Basceri and Ozgur Aktas; QROMIS, Inc., United States.

5:00 PM B02.03

High-Voltage Low-ON-Resistance p-GaN Gate HEMTs on Si with Suppressed Current Collapse Operations Up to 1000 V Huaxing Jiang¹, Renqiang Zhu¹, Qifeng Lyu¹, Peng Xiang², Kai Cheng² and Kei May Lau¹; ¹Hong Kong University of Science and Technology, Hong Kong; ²Enkris Semiconductor, Inc., China.

5:15 PM B02.04

Low on-Resistance and Low Trapping Effects in 1200 V Superlattice GaN-on-Silicon Heterostructures Riad Kabouche¹, Idriss Abid¹, Malek Zegaoui¹, Roland Puesche², Joff Derluyn², Stefan Degroote², Marianne Germain², Alaleh Tajalli³, Matteo Meneghini³, Gaudenzio Meneghesso³ and Farid Medjdoub¹; ¹IEMN, France; ²EpiGaN, Belgium; ³University of Padova, Italy.

5:30 PM B02.05

624V 5A All-GaN Integrated Cascode for Power Switching Applications Sheng Jiang, Kean Boon Lee, Joseph Pinchbeck, Yidi Yin and Peter Houston; University of Sheffield, United Kingdom.

5:45 PM LATE NEWS

SESSION G01: Unconventional Growth and Substrates
Session Chairs: Russell Dupuis and Jeehwan Kim
Monday Afternoon, July 8, 2019
Evergreen Ballroom A-C, Lobby Level

2:00 PM *G01.01

Sputtering of III-Nitrides and Device Performance of Sputtered Material Hiroshi Fujioka^{1,2}, Kohei Ueno¹ and Atsushi Kobayashi¹; ¹The University of Tokyo, Japan; ²Japan Science and Technology Agency, Japan.

2:30 PM G01.02

Growth of InGaN LEDs Directly on Metal Foils Vladimir Matias¹, Christopher Sheehan¹ and Brendan P. Gunning²; ¹Beam Materials, United States; ²Sandia National Laboratories, United States.

2:45 PM G01.03

MOVPE Growth of AlGa_N on High-Temperature Annealed Sputter-Deposited AlN Templates Kenjiro Uesugi¹, Kanako Shojiki², Yusuke Hayashi³ and Hideto Miyake^{3,2}; ¹Mie University, Japan; ²Mie University, Japan; ³Mie University, Japan.

3:00 PM G01.04

MBE Growth and Epitaxial Characteristics of AlN on Tantalum Nitride Thin Films Neeraj Nepal¹, Scott Katzer¹, Brian P. Downey¹, Matthew T. Hardy¹, David Storm¹, Eric N. Jin^{2,1} and David Meyer¹; ¹U.S. Naval Research Laboratory, United States; ²National Research Council (NRC), United States.

3:15 PM G01.05

Optical Waveguiding in MEMOCVD-Grown AlGa_N for DUV Integrated Optoelectronic Devices Richard Floyd, Fatima Asif, Mikhail Gaevski, Grigory Simin, MVS Chandrashekhar and Asif Khan; University of South Carolina, United States.

3:30 PM G01.06

High-Q Aluminum Nitride Microring Resonators on Sapphire Grown by Ultrahigh Temperature Molecular Beam Epitaxy Yi Sun¹, David A. Laleyan¹, Eric T. Reid¹, Ping Wang¹, Xianhe Liu¹, Ayush Pandey¹, Mohammad Soltani² and Zetian Mi¹; ¹University of Michigan, United States; ²Raytheon, United States.

3:45 PM BREAK

SESSION G02: Epitaxy for UV Devices
Session Chairs: Hideto Miyake and Craig Moe
Monday Afternoon, July 8, 2019
Evergreen Ballroom A-C, Lobby Level

4:15 PM *G02.01

Controlling Defects in AlGa_N and AlN for High Efficiency Deep UV LEDs Tim Wernicke¹, Frank Mehnke¹, Norman Susilo¹, Martin Guttman¹, Eviathar Ziffer¹, Felix Nippert¹, Jonas Weinrich², Anna Mogilatenco², Bettina Belde¹, Luca Sulmoni¹, Sylvia Hagedorn², Sebastian Walde², Carsten Netzel², Christian Kuhn¹, Johannes Enslin¹, Priti Gupta¹, Axel Hoffmann¹, Markus Weyers² and Michael Kneissl^{1,2}; ¹Technische Universität Berlin, Germany; ²Leibniz-Institut für Höchstfrequenztechnik, Germany.

4:45 PM G02.02

Ultraviolet-B Band Lasers Fabricated on Highly Relaxed Al_{0.85}Ga_{0.15}N Thick Films Grown on Sputtered AlN Templates with High Temperature Annealed Shohei Teramura¹, Yusuke Sakuragi¹, Shinji Yasue¹, Shunya Tanaka¹, Yuya Ogino¹, Motoaki Iwaya¹, Tetsuya Takeuchi¹, Satoshi Kamiyama¹, Sho Iwayama^{1,2}, Isamu Akasaki^{1,3} and Hideto Miyake²; ¹Meijo University, Japan; ²Mie University, Japan; ³Nagoya University, Japan.

5:00 PM G02.03

Reducing Residual Stress and Dislocation Density in AlN/SiC by MOCVD for UV-C LEDs Christian J. Zollner, Abdullah Almogbel, Feng Wu, Burhan SaifAddin, Michael Iza, James Speck, Steven P. DenBaars and Shuji Nakamura; University of California, Santa Barbara, United States.

5:15 PM G02.04

Relaxation of AlGa_N Epitaxial Layers on Native GaN Substrates Seiji Mita¹, Ke Wang², Ronny Kirste¹, Shun Washiyama², Dennis E. Szymanski², Will Mecouch¹, Yan Guan², Ramón Collazo² and Zlatko Sitar^{1,2}; ¹Adroit Materials, United States; ²North Carolina State University, United States.

5:30 PM G02.05

Nonpolar (10-10) M-Plane AlGa_{1-x}N Layers Grown on M-Plane Sapphire by MOVPE Duc V. Dinh¹, Hiroshi Amano^{1,2} and Markus Pristovsek¹; ¹Nagoya University, Japan; ²Nagoya University, Japan.

5:45 PM G02.06

Interdiffusion in AlN/AlGa_{1-x}N Distributed Bragg Reflectors Grown by Molecular Beam Epitaxy—Formation of Unintentional Interfacial Layers Maud Nemoz¹, Fabrice Semon¹, Stéphanie Rennesson¹, Mathieu Leroux¹, Denis Lefebvre¹, Sophie Bouchoule², Gilles Patriarche², François Réveret³, Tobias Schulli⁴, Jesus Zuniga-Perez¹ and Jean-Yves Duboz¹; ¹CNRS, France; ²CNRS, France; ³Université Clermont Auvergne, France; ⁴ESRF, France.

SESSION H01: Nano-LEDs
Session Chair: Katsumi Kishino
Monday Afternoon, July 8, 2019
Regency Ballroom E-G, Second Floor

2:00 PM *H01.01

III-N Nanocolumn Visible LEDs Katsumi Kishino^{1,2}, K. Narita¹, A. Yanagihara¹, D. Hatakeyama¹, K. Takimoto¹, N. Sakakibara¹, T. Oto^{3,2} and R. Togashi^{1,2}; ¹Sophia University, Japan; ²Sophia University, Japan; ³Yamagata University, Japan.

2:30 PM H01.02

Electrically Injected GHz-Class GaN/InGaN Core-Shell Nanowire-Based μ -LEDs—Carrier Dynamics and Nanoscale Homogeneity Mohsen Nami, Morteza Monavarian, Arman Rashidi, Saadat Mishkat-UI-Masabih, Ashwin K. Rishinaramangalam, Steve Brueck and Daniel Fezzell; Center for High-Technology Materials, The University of New Mexico, United States.

2:45 PM H01.03

Dislocation-Free, Relaxed c-Oriented Platelets of InGaN as Templates for Visible nanoLEDs Zhaoxia Bi¹, Taiping Lu², Olof Hultin², Ali Nowzari¹, Bo Monemar¹, Kristian Storm³, Jonas Ohlsson³, Anders Gustafsson¹ and Lars Samuelson¹; ¹Lund University, Sweden; ²RISE Acreo AB, Sweden; ³Hexagim AB, Sweden.

3:00 PM H01.04

Towards Electrically-Injected Deep-UV Core-Shell Nanorod LEDs Pierre-Marie Coulon¹, Gunnar Kusch², Norman Susilo³, Lucia Spasevski², Tim Wernicke³, Michael Kneissl³, Robert Martin² and Philip Shields¹; ¹University of Bath, United Kingdom; ²University of Strathclyde, United Kingdom; ³Technische Universität Berlin, Institute of Solid State Physics, Germany.

3:15 PM H01.05

Top-Down Fabrication, Annealing and Regrowth of GaN Nanocolumns for Core-Shell LEDs and Advanced Structures for Power Electronics Vitaly Z. Zubialevich¹, Pietro Pampili¹ and Peter Parbrook^{1,2}; ¹University College Cork, Ireland; ²University College Cork, Ireland.

3:30 PM H01.06

Site- and Polarity-Controlled MOVPE of InGaN/GaN Nanowires for High-Speed LEDs on Silicon Substrates Christian Blumberg¹, Fabian Wefers¹, Johanna Meier², Gerd Bacher², Nils Weimann¹ and Werner Prost¹; ¹University Duisburg-Essen, Germany; ²University Duisburg-Essen, Germany.

3:45 PM BREAK

SESSION D01: Novel Device Concepts
Session Chairs: Yvon Cordier and Charles R. Eddy Jr.
Monday Afternoon, July 8, 2019
Regency Ballroom E-G, Second Floor

4:15 PM *D01.01

GaN Nanowires Based Piezoelectric Generators Noelle Gogneau¹, Pascal Chretien², Nicolas Jamond¹, Lu Lu¹, Nikoleta Jegenyess¹, Martina Morassi¹, Tanbir Sodhi¹, Laurent Travers¹, Jean-Christophe Harmand¹, Francois H. Julien¹, Elie Lefeuvre¹, Frédéric Houze² and Maria Tchernycheva¹; ¹Center for Nanosciences and Nanotechnologies C2N-CNRS, France; ²Laboratoire de Génie Électrique et Électronique de Paris, France.

4:45 PM D01.02

Aluminum Nitride-Based Flexible Surface Acoustic Wave Devices Fabricated on Transparent Polyethylene Naphthalate for Wearable Sensing Leonardo Lamanna^{1,2}, Francesco Rizzi¹, Francesco Guido¹, Luciana Algieri¹, Sergio Marras¹, Vincenzo M. Mastronardi¹, Antonio Qualtieri¹ and Massimo De Vittorio^{1,2}; ¹IIT - Istituto Italiano di Tecnologia, Italy; ²Università del Salento, Italy.

5:00 PM D01.03

Flexible Piezoelectric Generators and Pulse Sensors Using Single-Crystalline III-N Thin Film Jie Chen^{1,2,3}, Noor Nabulsi², Weijie Wang^{2,3}, Heidi Johnson⁴, Seung Kyu Oh^{2,3,5}, Haoran Liu⁶, Shahab Shervin², Sara Pouladi^{1,2,3} and Jae-Hyun Ryou^{1,2,5}; ¹University of Houston, United States; ²University of Houston, United States; ³University of Houston, United States; ⁴Brigham Young University, United States; ⁵University of Houston, United States; ⁶Houston Methodist Research Institute, United States.

5:15 PM D01.04

Flexible Capacitive Piezoelectric Sensor with Ultra-Long Vertical GaN Wires Joël Eymery¹, Amine El Kacimi² and Emmanuelle Pauliac-Vaujour²; ¹CEA, IRIG MEM NRS, France; ²CEA, Leti, Minatec Campus, France.

5:30 PM D01.05

Flexible Metal Foil Substrate with Transfer-Free Epitaxially Grown Single-Crystalline III-N Film for Bendable Inorganic Photonic and Electronic Devices Jae-Hyun Ryou¹, Shahab Shervin¹, Kamrul Alam¹, Mi-Hee Ji², Kaveh Shervin¹, Seung Kyu Oh¹, Theeradetch Detchprohm², Jiming Bao¹ and Russell Dupuis²; ¹University of Houston, United States; ²Georgia Institute of Technology, United States.

5:45 PM D01.06

Demonstration of Transverse Quasi-Phase-Matched AlN Waveguide SHG Device Fabricated by Surface-Activated Bonding and Silicon Removal Shuhei Yamaguchi¹, Asahi Yamauchi¹, Takuya Onodera¹, Masahiro Uemukai¹, Yusuke Hayashi², Hideto Miyake², Toshiaki Hikosaka³, Shinya Nunoue², Keishi Shiomi¹, Yasufumi Fujiwara¹ and Ryouji Katayama¹; ¹Osaka University, Japan; ²Mie University, Japan; ³Toshiba Corporation, Japan.

SESSION I01: Advanced InGaN Characterization
Session Chairs: Frank Bertram and Shigefusa Chichibu
Monday Afternoon, July 8, 2019
Regency Ballroom A-C, Second Floor

2:00 PM *I01.01

Quantitative Atom Probe Tomography of Ternary III-N Alloys—Accuracy Issues and Correlation with Optical Spectroscopy Lorenzo Rigutti; Normandie University, France.

2:30 PM I01.02

Impact of Indium Content on Carrier Localization Length and Wave Function Overlap in Polar InGaN Quantum Wells—Implications for the Green Gap Problem Daniel S. Tanner¹, Philip Dawson², Menno Kappers³, Rachel Oliver³ and Stefan Schulz¹; ¹Tyndall National Institute, Ireland; ²University of Manchester, United Kingdom; ³University of Cambridge, United Kingdom.

2:45 PM I01.03

Nanoscale Characterization of Indium Segregation in III-Nitride Thin Films by Tip-Enhanced Raman Spectroscopy Emanuele Poliani¹, Daniel Seidlitz¹, Maximilian Ries^{1,2}, Markus R. Wagner¹ and Axel Hoffmann¹; ¹Technische Universität Berlin, Germany; ²School for Analytical Sciences Adlershof, Germany.

3:00 PM I01.04

Nanoscale Indium Homogeneity Analysis of an In-Rich InGaN Film by Cathodoluminescence Bowen Sheng^{1,2}, Xiantong Zheng¹, Frank Bertram², Ping Wang¹, Gordon Schmidt², Jürgen Blasing², Zhaoying Chen¹, Peter Veit², André Strittmatter², Juergen Christen², Bo Shen¹ and Xinqiang Wang¹; ¹Peking University, China; ²Otto-von-Guericke-University Magdeburg, Germany.

3:15 PM *I01.05

Challenges in Shifting the Emission of InGaN Quantum Wells towards the Red Martin Albrecht; Leibniz-Institut für Kristallzüchtung, Germany.

3:45 PM BREAK

SESSION F01: Bulk Growth and P-Doping
Session Chairs: Izabella Grzegory and Daisuke Tomida
Monday Afternoon, July 8, 2019
Regency Ballroom A-C, Second Floor

4:15 PM *F01.01

Acidic Ammonothermal Growth of Bulk GaN Yutaka Mikawa, Takayuki Ishinabe, Yuji Kagamitani, Kirota Ikeda and Tae Mochizuki; Mitsubishi Chemical Corporation, Japan.

4:45 PM F01.02

Effects of an Extra Al Metal Added During the Acidic Ammonothermal Growth of GaN Crystals Daisuke Tomida¹, Quanxi Bao^{1,3}, Makoto Saito^{1,2}, Kohei Kurimoto³, Mizuki Ito¹, Tohru Ishiguro¹ and Shigefusa F. Chichibu¹; ¹Tohoku University, Japan; ²Mitsubishi Chemical Corporation, Japan; ³Japan Steel Works, Ltd., Japan.

5:00 PM F01.03

Thick GaN Crystals of High Purity Grown with an Increased Rate by Ammonobasic Method Karolina Grabianska¹, Robert Kucharski¹, Marcin Zajac¹, Damian Włodarczyk², Mikolaj Amilusk¹, Andrzej Suchocki², Leszek Konczewicz¹, Elzbieta Litwin-Staszewska¹, Ryszard Piotrkowski¹ and Michał Boćkowski^{1,3}; ¹Polish Academy of Sciences, Poland; ²Polish Academy of Sciences, Poland; ³Nagoya University, Japan.

5:15 PM F01.04

Defect Analysis of Ammonothermal GaN and HVPE-GaN Grown on Ammonothermal GaN Seeds Using Synchrotron X-Ray Rocking Curve Imaging Lutz Kirste¹, Tomasz Sochacki³, Marcin Zajac³, Thu Nhi Tran Thi², Jose Baruchel² and Michal Boćkowski³; ¹Fraunhofer Institute for Applied Solid State Physics, Germany; ²European Synchrotron Research Facility, France; ³Institute of High Pressure Physics, Polish Academy of Sciences, Poland.

5:30 PM F01.05

Vertical GaN p-n Diodes on Low Dislocation and Low Resistive GaN Wafer Produced by OVPE Method Junichi Takino^{1,2}, Tomoaki Sumi¹, Yoshio Okayama¹, Masaki Nobuoka¹, Akira Kitamoto², Masayuki Imanishi², Masashi Yoshimura², Naomi Asai³, Hiroshi Ohta³, Tomoyoshi Mishima³ and Yusuke Mori²; ¹Panasonic Corporation, Japan; ²Osaka University, Japan; ³Hosei University, Japan.

5:45 PM F01.06

Implantation of Beryllium into Thin Unintentionally Doped Layers of Gallium Nitride Crystallized by Halide Vapor Phase Epitaxy Michal Boćkowski¹, Malgorzata Iwinska¹, Tomasz Sochacki¹, Mikolaj Amilusik¹, Boleslaw Lucznik¹, Michal Fijalkowski¹, Rafal Jakiela², Adam Barcz², Marek Oklej¹, Aneta Sidor¹ and Izabella Grzegory¹; ¹Institute of High Pressure Physics Polish Academy of Sciences (Unipress), Poland; ²Institute of Physics Polish Academy of Sciences, Poland.

POSTER SESSIONS

SESSION AP01: Poster Session I: Light Emitting Devices
Monday Afternoon, July 8, 2019
6:30 PM - 8:30 PM
Grand Ballroom, Second Floor

AP01.01

The Effect of Al(Ga)N Capping Layers in InGaN/GaN Quantum Wells Emitting from Green to Red Stefano Vichi^{1,2}, Yoann Robin¹, Stefano Sanguinetti², Markus Pristovsek¹ and Hiroshi Amano¹; ¹Nagoya University, Japan; ²Università degli Studi di Milano-Bicocca, Italy.

AP01.02

MOVPE GaN Wires with *m*-Plane Core-Shell GaN/AlGaIn MQWs for UV Emission Vincent Grenier¹, Nicolas Mollard², Catherine Bougerol^{1,3}, Bruno Gayral¹, Eva Monroy¹, Joël Eymery⁴, Gwénolé Jacobin³ and Christophe Durand¹; ¹University Grenoble Alpes, CEA, IRIG-PHELIQS-NPSC, France; ²University Grenoble Alpes, CEA IRIG-MEM-LEMMMA, France; ³University Grenoble Alpes, CNRS-NPSC, Institut Néel, France; ⁴University Grenoble Alpes, CEA IRIG-MEM-NRS, France.

AP01.03

Monolithic Two Color Array of InGaN LEDs with Galvanic Isolation Provided by p-n-p Junction Szymon Grzanka^{1,2}, Dario Schiavon^{1,2}, Krzysztof Gibasiewicz¹, Jacek Kacperski^{1,2}, Anna Kafar^{1,2} and Piotr Perlin^{1,2}; ¹Institute of High Pressure Physics, Polish Academy of Sciences, Poland; ²TopGaN Laser Ltd., Poland.

AP01.04

Electrically-Tunable Monolithic Broadband InGaIn-GaN Light-Emitting Diodes—A Consequence of Transient Quantum Confined Stark Effect in Strained Quantum Wells Vikas Pendem, Pratim K. Saha, Shonal Chouksey, Tarni Aggarwal, Ankit Udai, Swaroop Ganguly and Dipankar Saha; Indian Institute of Technology Bombay, India.

AP01.05

Fabrication Process Development on III-Nitride Based Three-Dimensional Light Emitting Diodes for High Electrical Efficiency Kie Young Woo, Hwan-Seop Yeo, Yong Chul Sim, Kwanjae Lee, Seung-Hyuk Lim and Yong-Hoon Cho; Korea Advanced Institute of Science and Technology, Korea (the Republic of).

AP01.06

Recent Progress in AlGaIn UV-C LEDs Grown on SiC Abdullah S. Almogbel^{1,2}, Burhan SaifAddin¹, Christian J. Zollner¹, Michael Iza¹, Hamad Albraithen², Ahmed Y. Alyamani², Abdulrahman M. Albadi², Shuji Nakamura¹, Steven P. DenBaars¹ and James Speck¹; ¹University of California, Santa Barbara, United States; ²KACST, Saudi Arabia.

AP01.07

Strain Free GaN/InAlN Chirped Short Period Superlattice Reduced Thickness Top Cladding for 450 nm InGaIn Laser Diode Avinash S. Paliwal^{1,2}, Kuldip Singh¹ and Manish Mathew^{2,1}; ¹CSIR-Central Electronics Engineering Research Institute, Pilani, India, India; ²Academy of Scientific and Innovative Research (AcSIR), CSIR-CEERI Campus, Pilani, India.

AP01.08

Arrays of Nitride MicroLEDs with Tunnel Junctions Grown by Plasma Assisted Molecular Beam Epitaxy Julia Slawinska, Marcin Siekacz, Grzegorz Muziol, Henryk Turski, Krzesimir Nowakowski-Szkudlarek, Mikolaj Zak, Mikolaj Chlipala, Anna Feduniewicz-Zmuda, Marta Sawicka and Czeslaw Skierbiszewski; Institute of High Pressure Physics, Polish Academy of Sciences, Poland.

AP01.09

High-Temperature Optical Characterization of GaN-Based LEDs for Future Power Electronic Modules Syam Madhusoodhanan¹, Abbas Sabbar¹, Jiangbo Wang², Binzhong Dong², Stanley Ateitty³, Robert Kaplar³, Alan Mantooth¹, Shui-Qing Yu¹ and Zhong Chen¹; ¹University of Arkansas, United States; ²HCSemitek, China; ³Sandia National Lab, United States.

AP01.10

Disorder-Induced Broadband Omnidirectional Distributed Bragg Reflectors Using Dielectric and Nanoporous GaN Systems Morteza Monavarian, Behnam Abaie, Saadat Mishkat-UI-Masabih, Arash Mafi and Daniel Feezell; The University of New Mexico, United States.

AP01.11

Achieving High Uniformity of 200 mm GaN-on-Si LED Epiwafers for Micro LED Applications with Precise Strain-Engineering Atsushi Nishikawa, Alexander Loesing and Burkhard Slischka; ALLOS Semiconductors GmbH, Germany.

AP01.12

AlGaIn LED Degradation Control Method Oleg Rabinovich¹, Sergey Nikiforov², Sergey Didenko¹, Marina Orlova¹, Sergey Marenkin¹, Alexey Ril¹ and Svetlana Podgornaya¹; ¹NUST MISIS, Russian Federation; ²Arhighlight, Russian Federation.

AP01.14

High Quality AlN and AlGaIn Grown on NPSS by MOCVD Jianzheng Hu¹, Shangfeng Liu^{2,1}, Vincent Wang¹, Xinqiang Wang² and Shiping Guo¹; ¹Advanced Microfabrication Equipment Inc., China; ²Peking University, China.

AP01.15

Low-Efficiency-Droop InGaIn Quantum Dot Green Light-Emitting Diodes Chunyu Zhao^{1,2}, Chak Wah Tang¹, Billy Lai¹, Guanghui Cheng², Jiannong Wang² and Kei May Lau¹; ¹Hong Kong University of Science and Technology, Hong Kong; ²Hong Kong University of Science and Technology, Hong Kong.

AP01.16

Application of UV-A and UV-B LEDs for Advanced Semiconductor Metrology and Process Control Kamau Prince; LayTec, Germany.

AP01.17

Development and Temperature-Dependent Characterizations of Resonant Cavity Light Emitting Diodes Using Airgap/AlGaIn Distributed Bragg Mirrors Chuan-Wei Tsou, Theeradetch Detchprohm, Young Jae Park, Karan Mehta, Ping Chen, Hoon Jeong, Doug Yoder, Russell Dupuis and Shyh-Chiang Shen; Georgia Institute of Technology, Georgia.

AP01.18

Fabrication of Dielectric Distributed Bragg Reflector Mirror in UV Laser Fabricated on Sapphire Substrate Shinji Yasue¹, Kosuke Sato^{1,3}, Yusuke Sakuragi¹, Yuya Ogino¹, Shunya Tanaka¹, Shohei Teramura¹, Sho Iwayama¹, Motoaki Iwaya¹, Satoshi Kamiyama¹, Tetsuya Takeuchi¹ and Isamu Akasaki^{1,2}; ¹Meijo University, Japan; ²Akasaki Research Center, Nagoya University, Japan; ³Asahi-Kasei Corporation, Japan.

AP01.19

Controlled, Scalable and Facile Growth of GaN Nanowire-Based LEDs on Variety of Functional Substrates by MOCVD Muhammad A. Johar¹, Aakil Waseem¹, Hyun-Gyu Song², Cho Yong-Hoon² and Sang-Wan Ryu¹; ¹Chonnam National University, Korea (the Republic of); ²Korea Advanced Institute of Science and Technology, Korea (the Republic of).

AP01.20

Optimization of *m*-Plane Core-Shell InGaIn/GaN Nanowires for Flexible Visible LEDs Akanksha Kapoor¹, Vincent Grenier¹, Nan Guan², Catherine Bougerol³, Bruno Gayral¹, Gwénolé Jacobin³, Francois H. Julien², Maria Tchernycheva², Christophe Durand¹ and Joël Eymery⁴; ¹University Grenoble Alpes, CEA, IRIG-PHELIQS-NPSC, France; ²Center of Nanoscience and Nanotechnologies (C2N), France; ³University Grenoble Alpes, CNRS, Institut Néel, France; ⁴University Grenoble Alpes, CEA, IRIG-MEM-NRS, France.

AP01.21

Toward Quantitative Measurement of Sub-Nanometer In Fluctuations in InGaN Quantum Well Govindo J. Syaranamual¹, Tara P. Mishra^{1,2}, Jing Yang Chung^{1,2}, Zhang Li¹, Sarah A. Goodman³, Soo Jin Chua⁴, Eugene A. Fitzgerald³, Stephen J. Pennycook² and Siljiva Gradecak³; ¹Singapore-MIT Alliance for Research and Technology, Singapore; ²National University of Singapore, Singapore; ³Massachusetts Institute of Technology, United States; ⁴National University of Singapore, Singapore.

AP01.22

Recent Advances in Underwater Wireless Optical Communications Using Micro-LEDs Georgios Arvanitakis¹, Rui Bian², Jonathan McKendry¹, Chen Cheng², Enyuan Xie¹, Xiangyu He¹, Gang Yang^{1,3}, Johannes Hermsdorf¹, Mohamed Islam², Ardimas Purwita², Erdan Gu¹, Harald Haas² and Martin Dawson¹; ¹University of Strathclyde, United Kingdom; ²University of Edinburgh, United Kingdom; ³Harbin Institute of Technology at Weihai, China.

AP01.23

AlGaIn UVC LEDs Directly Grown on DC-Sputtered and High Temperature Annealed AlN Templates Shunsuke Kuwaba^{1,2}, Yuri Itokazu^{1,2}, Shogo Motegi^{2,1}, Yosuke Mogami^{1,2}, Atsushi Osawa³, Kazuto Osaki³, Yukitake Tanioka³, Atsushi Maoka³, Masafumi Jo¹, Norihiko Kamata² and Hideki Hirayama¹; ¹RIKEN, Japan; ²Saitama University, Japan; ³SCREEN Finetech Solutions Co. Ltd., Japan.

AP01.24

A Core-Shell-Like High-Efficiency Micro-LED Array Grown on Sapphire Nano-Membrane Seungmin Lee¹, Jongmyeong Kim¹, Jehong Oh¹, Jungel Ryu¹, Yongjo Park¹ and Euijoon Yoon^{1,2,3}; ¹Seoul National University, Korea (the Republic of); ²Seoul National University, Korea (the Republic of); ³Seoul National University, Korea (the Republic of).

AP01.25

Demonstration of Band-to-Band Tunneling and Avalanche Regime in InGaIn LEDs Nicola Rensio¹, Carlo De Santi¹, Pradip Dalapati¹, Desiree Monti¹, Michael Binder², Bastian Galler², Roland Zeisel², Gaudenzio Meneghesso¹, Enrico Zanoni¹ and Matteo Meneghini¹; ¹University of Padova, Italy; ²Osram Opto Semiconductors GmbH, Germany.

AP01.26

Fabrication and Characterization of Multi-Quantum-Shell LEDs with Tunnel Junction Hideki Murakami¹, Atsushi Suzuki¹, Kyohei Nokimura¹, Minoru Takebayashi¹, Nanami Goto¹, Mizuki Terazawa¹, Weifang Lu¹, Naoki Sone^{1,3}, Kazuyoshi Iida^{1,4}, Masaki Ohya^{1,4}, Satoshi Kamiyama¹, Tetsuya Takeuchi¹, Motoaki Iwaya¹ and Isamu Akasaki^{1,2}; ¹Meijo University, Japan; ²Akasaka Research Center, Nagoya University, Japan; ³Koito Manufacturing CO., LTD, Japan; ⁴Toyoda Gosei, Japan.

AP01.27

Color Conversion Enhancement of Light-Emitting Diode with Chemical Synthesized Metal Nanoparticles Through Surface Plasmon Coupling Wen-Yen Chang¹, Chun-Han Lin¹, Hsin-Chun Chiang¹, Yao-Tseng Wang¹, Chia-Chun Ni¹, Chien-Yu Chen¹, Cheng-Jin Cai¹, Wai Fong Tse¹, Yang Kuo², Yean-Woei Kiang¹ and Chih Chung Yang¹; ¹National Taiwan University, Taiwan; ²Tung Nan University, Taiwan.

AP01.28

Monolithic InGaIn RGB LEDs for Full Color Micro-Displays by Jet Printing of Nanospheres Wai Yuen Fu, Hao Lyu and Hoi Wai Choi; The University of Hong Kong, Hong Kong.

AP01.29

Anisotropic Dependence of Light Extraction Behavior on Propagation Path in AlGaIn-Based Deep-Ultraviolet Light-Emitting Diodes Hui Wang¹, Tongjun Yu¹, Lei Fu¹, Huimin Lu² and Jiejun Wu¹; ¹Peking University, China; ²University of Science and Technology Beijing, China.

AP01.30

FDTD Modeling of Light Extraction in Realistic Flip-Chip InGaIn microLEDs Jordan M. Smith¹ and Steven P. DenBaars^{1,2}; ¹University of California, Santa Barbara, United States; ²University of California Santa Barbara, United States.

AP01.31

Bulk nGaIn/InGaIn/pGaIn Nanostructures for High Resolution and Brightness 10x10µm² Micro-LEDs Pixels Soufiane Karakchou^{2,1}, Yacine Halfaya¹, Suresh Sundaram¹, Adama Mballo¹, Taha Ayari^{2,1}, Walid El Huni¹, Renaud Puybare¹, Youssef El Gmili¹, Simon Gautier³, Paul Voss^{2,1}, Jean Paul Salvestrini^{2,1} and Abdallah Ougazzaden^{2,1}; ¹UMI 2958 Georgia Tech - CNRS, France; ²Georgia Institute of Technology, United States; ³Institut Lafayette, France.

AP01.32

Behavior of AlGaIn/AlGaIn MQWs Emission by Improving Underling Layer Kengo Nagata^{1,2}, Hiroaki Makino^{1,2}, Keita Kataoka³, Tetsuo Narita³ and Yoshiki Saito^{1,2}; ¹Toyoda Gosei, Japan; ²TS Opto, Japan; ³Toyota Central R&D Labs, Japan.

AP01.33

Gain Modeling in InGaIn/GaN Microdisk Lasers Christelle Brimont¹, François Chiaruttini¹, Laetitia Doyennette¹, Farsane Tabataba-Vakili^{2,3}, Iannis Roland², Moustafa El Kurdi², Xavier Checoury², Sébastien Sauvage², Stéphanie Rennesson⁴, Eric Frayssinet⁴, Julien Brault⁴, Benjamin Damilano⁴, Jean-Yves Duboz⁴, Fabrice Sémont⁴, Bruno Gayral³, Philippe Boucaud⁴ and Thierry Guillet¹; ¹Laboratoire Charles Coulomb (L2C), Université de Montpellier, CNRS, France; ²C2N, CNRS, University Paris Sud, France; ³CEA, INAC PHELIQS University Grenoble Alpes, France; ⁴Université Côte d'Azur, CRHEA-CNRS, France.

AP01.34

Color Conversion of GaN Blue LEDs Using QDs Embedded in Nanoporous GaN Bingjun Li¹, Zachary Fishman², Shu Hu² and Jung Han¹; ¹Yale University, United States; ²Yale University, United States.

AP01.35

Improvement of DUV LED Efficiencies by Ultra-Thick AlN Epilayer and Moth-Eye Microstructure Changqing Chen, Hanling Long, Shuai Wang, Jun Zhang, Yi Zhang, Maocheng Shan and Jiangnan Dai; Huazhong University of Science and Technology, China.

AP01.36

Lattice Matched InAlN/GaN 1D Photonic Band Gap Crystal (PBC) Structures for Single Mode High-Power Laser Diodes Prabha Sana¹, Christoph Berger¹, Armin Dadgar¹, Marc Peter Schmidt², Jürgen Blasing¹, Gordon Schmidt¹, Hartmut Witte¹, Sebastian Metzner¹, Frank Bertram¹, Juergen Christen¹ and André Strittmatter¹; ¹Otto-von-Guericke Universität Magdeburg, Germany; ²Otto-von-Guericke Universität Magdeburg, Germany.

SESSION BP01: Poster Session I: Electronic Devices

Monday Afternoon, July 8, 2019

6:30 PM - 8:30 PM

Grand Ballroom, Second Floor

BP01.01

Defect Investigation of Regrown, Vertical GaN p-n Diodes Using Deep-Level Optical Spectroscopy Gregory Pickrell¹, Andrew Armstrong¹, Andrew Allerman¹, Mary Crawford¹, Daniel Feezell², Morteza Monavarian², Andrew A. Aragon², Alec Talin³, Francois Leonard³, Kimberlee Celio³, Caleb Glaser¹, Jeffrey Kempisty¹ and Vincent Abate¹; ¹Sandia National Laboratories (NM), United States; ²University of New Mexico, United States; ³Sandia National Laboratories (CA), United States.

BP01.02

Effects of P-GaN Capping Layer on AlGaIn/GaN HEMT Wonho Jang, Hyun-Seop Kim and Ho-Young Cha; Hongik University, Korea (the Republic of).

BP01.03

Monolithically Integrated GaN Power ICs Design Facilitated by the MVSG Compact Model Applied to Enhancement-Mode p-GaN Gate HEMTs Shuzhen You¹, Xiangdong Li^{1,3}, Bertrand Parvais^{1,2}, Niels Posthuma¹, Karen Geens¹, Steve Stoffels¹ and Stefaan Decoutere¹; ¹imec, Belgium; ²Vrije Universiteit Brussels, Belgium; ³KU Leuven, Belgium.

BP01.04

Impact of Interfacial Impurities on the Electrical Performance of Regrown Nonpolar (10-10) GaN Vertical p-n Diodes Andrew A. Aragon¹, Morteza Monavarian¹, Isaac Stricklin¹, Gregory Pickrell², Mary Crawford², Andrew Allerman², Andrew Armstrong² and Daniel Feezell¹; ¹Center for High-Technology Materials, The University of New Mexico, United States; ²Sandia National Laboratories, United States.

BP01.05

Experimental and Analytical Determination of Optimum Carbon Doping Level in AlGaIn/GaN HEMT on Silicon Nayana Remesh, Nagaboopathy Mohan, Rangarajan Muralidharan, Srinivasan Raghavan and Digbijoy N. Nath; Indian Institute of Science, India.

BP01.06

Characteristics of the Resonant Field-Noise Around GaN-HEMT Switching Circuits Katsumi Furuya, Hiroshi Chonan, Toshihide Ide, Ryosaku Kaji, Noriyuki Takada and Mitsuaki Shimizu; National Institute of Advanced Industrial Science and Technology (AIST), Japan.

BP01.07

AlGaIn/GaN HEMT 2DEG Impact by *In Situ* SiN_x Passivating Layer Stoichiometry Grown by MOCVD Md Anwar Siddique¹, Raju Ahmed¹, Jonathan Anderson¹ and Edwin L. Piner^{1,2}; ¹Texas State University, United States; ²Texas State University, United States.

BP01.08

Growth and Characterization of Al_xGa_{1-x}N/GaN/AlN Double-Hetero Structure HEMT Uiho Choi, Kyeongjae Lee, Taemyung Kwak, Taehoon Jang, Yongjun Nam, Donghyeop Jung, Byeongchan So and Okhyun Nam; Korea Polytechnic University, Korea (the Republic of).

BP01.09

Investigation of Relationship Between E-Mode GaN HEMT Dynamic Ron and Different Test Conditions Ziyang Xiao, Prasad Venkatraman, Ali Salih and Woochul Jeon; ON Semiconductor, United States.

BP01.10

Low RF Loss Buffer Layers on 3C-SiC/Si(111) Templates for AlGaIn/GaN High Electron Mobility Transistors Eric Frayssinet¹, Luan Nguyen¹, Marie Lesecq², Nicolas Defrance², Remi Comyn¹, Thi Huong Ngo¹, Marcin Zielinski³, Marc Portail¹, Jean-Claude De Jaeger² and Yvon Cordier¹; ¹University Côte d'Azur CNRS-CRHEA, France; ²CNRS IEMN, University Lille, France; ³NOVASiC, France.

BP01.11

Dynamic Performance of AlGaIn MOSHFETs with High-k ALD Oxides Mikhail Gaevski¹, Shahab Mollah¹, Kamal Hussain¹, Richard Floyd¹, Md Abdullah-Al Mamun¹, MVS Chandrashekar¹, Ifthikhar Ahmad¹, Grigory Simin¹, Virginia Wheeler², Charles R. Eddy Jr.² and Asif Khan¹; ¹University of South Carolina, United States; ²U.S. Naval Research Laboratory, United States.

BP01.12

Direct Bonding of GaN and Diamond Without an Intermediate Layer at Room Temperature Jianbo Liang¹, Makoto Kasu², Martin Kuball³ and Naoteru Shigekawa¹; ¹Osaka City University, Japan; ²Saga University, Japan; ³University of Bristol, United Kingdom.

BP01.13

High Performance Lateral GaN Schottky Barrier Diode on Silicon Substrate with High Breakdown Voltage of 2.74 kV and High Power Figure-of-Merit of 2.53 GW/cm² with Post-Anode-Annealing Treatment Tao Zhang, Jincheng Zhang, Hong Zhou and Yue Hao; Xidian University, China.

BP01.14

Low Static and Dynamic ON-Resistance with Improved Power Figure-of-Merit in AlGaIn/GaN HEMTs on CVD Diamond Kumud Ranjan, Arulkumar Subramaniam and Geok Ing Ng; Nanyang Technological University, Singapore.

BP01.15

High Performance Lateral GaN Schottky Barrier Diode on Silicon Substrate with Molybdenum Anode and Low Turn-on Voltage of 0.31 V Yi Wang, Tao Zhang, Hong Zhou, Jincheng Zhang and Yue Hao; Xidian University, China.

BP01.16

Normally-Off High Electron Mobility Transistors with Regrown p-GaN Gate and LPCVD SiN_x Passivation Yaozong Zhong^{1,2}, Shuai Su^{1,2}, Yu Zhou², Xin Chen², Hongwei Gao², Qian Sun^{1,2} and Hui Yang^{1,2}; ¹University of Science and Technology of China, China; ²Suzhou Institute of Nano-Tech and Nano-Bionics, China.

BP01.17

Improvement of Proton Radiation Hardness Through Bi-Layer Gate Insulating System in GaN-Based MIS-HEMTs Sung-Jae Chang¹, Kyu-Jun Cho¹, Hyun-Wook Jung¹, Jeong-Jin Kim¹, Yoo Jin Jang¹, Sung-Bum Bae¹, Dong-Seok Kim², Youngho Bae³, Hyung Sup Yoon¹, Ho-Kyun Ahn¹, Byoung-Gue Min¹, Haecheon Kim¹ and Jong-Won Lim¹; ¹Electronics and Telecommunications Research Institute, Korea (the Republic of); ²Korea Multi-Purpose Accelerator Complex, Korea Atomic Energy Research Institute, Korea (the Republic of); ³Uiduk University, Korea (the Republic of).

BP01.18

Al_xGa_{1-x}N (x>0.4) Channel MOSFETs with High-k ALD Gate-Oxides Shahab Mollah¹, Kamal Hussain¹, Richard Floyd¹, Md Abdullah-Al Mamun¹, Mikhail Gaevski¹, MVS Chandrashekar¹, Ifthikhar Ahmad¹, Grigory Simin¹, Virginia Wheeler², Charles R. Eddy Jr.² and Asif Khan¹; ¹University of South Carolina, United States; ²Naval Research Laboratory, United States.

BP01.19

Lateral GaN Schottky Barrier Diode for Wireless High Power Transfer with High RF/DC Conversion Efficiency Kui Dang, Hong Zhou, Jincheng Zhang, Jing Ning and Yue Hao; Xidian University, China.

BP01.20

Threshold Voltage Shift in AlGaIn/GaN HEMTs with Body-Diode Based Back-Gate Control Isra Mahaboob, Michael Yakimov, Sean A. Tozier, Kasey Hogan, Emma Rocco and Fatemeh (Shadi) Shahedipour-Sandvik; SUNY Polytechnic Institute, United States.

BP01.21

Polarization Edge Termination for GaN Vertical Power Devices Matthew R. Peart and Jonathan Wierer; Lehigh University, United States.

BP01.22

The Demonstration of Nearly Ideal GaN Vertical Schottky Diodes After Gamma Irradiation Zhaoke Bian, Shenglei Zhao, Jincheng Zhang, Tao Zhang, Jiabo Chen and Yue Hao; Xidian University, China.

BP01.23

High Average Breakdown Field Between Gate and Drain in AlGaIn/GaN HEMTs with High-k Passivation Layer Ryo Tomita, Shingo Ueda, Yuki Kawada and Kazushige Horio; Shibaura Institute of Technology, Japan.

BP01.24

Electronic Band Structure of Etched-and-Regrown Interfaces in p-i-n GaN Epilayers Using Electron Holography Shanthan Reddy Alugubelli¹, Hanxiao Liu¹, Houqiang Fu², Kai Fu², Yuji Zhao² and Fernando Ponce¹; ¹Arizona State University, United States; ²Arizona State University, United States.

BP01.25

Limitations for Reliable Operation at Elevated Temperatures of AlGaIn/GaN HEMT Grown by MOCVD on Silicon Substrate Lars Heuken¹, Alessandro Ottaviani¹, Dirk Fahle², Thorsten Zweipfennig³, Gerrit Lükens³, Holger Kalisch³, Andrei Vescan³, Michael Heuken^{2,3} and Joachim N. Burghartz¹; ¹Institut für Mikroelektronik Stuttgart, Germany; ²AIXTRON SE, Germany; ³RWTH Aachen University, Germany.

BP01.26

Comparison of Performance Limits of GaAs and GaN Vertical Superjunction Devices Xiang Zhou and T. Paul Chow; Rensselaer Polytechnic Institute (RPI), United States.

BP01.27

Field Dependent Off-State Degradation and Recovery of NiO, TiO₂ and Al₂O₃ Based MOS-HEMTs Jaya Jha, Mudassar Imam Yahya Meer, Swaroop Ganguly and Dipankar Saha; IIT Bombay, India.

BP01.28

An Over 2300 V AlGaIn/GaN HEMT with AlGaIn Back Barrier and Hybrid Drain Contacts Weihang Zhang, Jincheng Zhang and Yue Hao; Xidian University, China.

BP01.29

β-Ga₂O₃ Versus GaN HEMTs—A Closer Look Sandeep Kumar, Rohith Soman, Anamika S. Pratiyush, Rangarajan Muralidharan and Digbijoy N. Nath; Indian Institute of Science (IISc), India.

BP01.30

Evaluation of Subsequent Implantation Effect into Mg Implanted Region in GaN Shinya Takashima¹, Ryo Tanaka¹, Katsunori Ueno¹, Hideaki Matsuyama¹, Yuta Fukushima¹, Masaharu Edo¹, Kohei Shima², Kazunobu Kojima², Shigefusa F. Chichibu^{2,3} and Akira Uedono⁴; ¹Fuji Electric Co., Ltd., Japan; ²Tohoku University, Japan; ³Nagoya University, Japan; ⁴University of Tsukuba, Japan.

SESSION CP01: Poster Session I: Photovoltaics, Energy Harvesting and Photo Detectors
Monday Afternoon, July 8, 2019
6:30 PM - 8:30 PM
Grand Ballroom, Second Floor

CP01.01

Design and Simulation of High-Efficiency GaN-Based Betavoltaic Battery Dong-Seok Kim¹, Yong Seok Hwang¹, Jaekwon Suk¹, Jun-Hyeok Lee², Jeong-Gil Kim², Hyeon-Su Lee² and Jung-Hee Lee²; ¹Korea Atomic Energy Research Institute, Korea (the Republic of); ²Kyungpook National University, Korea (the Republic of).

CP01.02

The Effects of Hydrogen Passivation on the Performance of GaInNAs Solar Cells Collin Brown¹, Vincent R. Whiteside¹, Miwa Fukuda¹, Tong Mou², Bin Wang², Amrit Kaple³, Parameswar Hari³, Khalid Hossain⁴, Terry Golding⁴, Mathieu Leroux², Mohamed Al Khalfoui³ and Ian R. Sellers¹; ¹University of Oklahoma, United States; ²University of Oklahoma, United States; ³University of Tulsa, United States; ⁴Amethyst Research Inc., United States; ⁵CRHEA-CNRS, France.

CP01.03

AlGa_N-Based Deep Ultraviolet Schottky Barrier Photodetectors Grown on Si(111) by MOCVD Meixin Feng, Fangzhou Liang, Yingnan Huang, Qian Sun, Jianxun Liu, Xiujian Sun, Xiaoning Zhan, Hongwei Gao, Yu Zhou and Hui Yang; Suzhou Institute of Nano-tech and Nano-bionics, CAS, China.

CP01.04

Influence of AlN Buffer Layer on the Performance of GaN-Based UV Photodetection Devices Govind Gupta¹, Shibin Krishna¹, Neha Aggarwal¹, Abhiram Gundimeda², Alka Sharma¹ and Sudhir Husale¹; ¹CSIR-National Physical Laboratory, India; ²University of Cambridge, United Kingdom.

CP01.05

Graphene/InGa_N Quantum Dots-Based Ultrahighly Sensitive Photodetectors Anqi Hu and Xia Guo; Beijing University of Posts and Telecommunications, China.

CP01.06

Improved Electrical Properties of InGa_N Thin Films Grown on AlN Buffer Layer by RF Sputtering for Solar Cell Applications Pratheesh Kumar Jakkala; Illinois College, United States.

CP01.07

Growth and Fabrication of Al_{0.30}Ga_{0.70}N/AlN Heterostructure Based Solar-Blind UV Photodetection Device Neha Aggarwal, Shubhendra K. Jain, Lalit Goswami, Jasveer Singh, Nita Dilawar and Govind Gupta; CSIR-National Physical Laboratory, India.

CP01.08

Utilization of GaN and Its Alloy Nanostructures as Photoelectrodes for Solar Hydrogen Generation Shivaram B. Kubakaddi; Jawaharlal Nehru Centre for Advanced Scientific Research, Bengaluru, India, India.

SESSION DP01: Poster Session: Sensors, Actuators and Acoustic Devices

Monday Afternoon, July 8, 2019

6:30 PM - 8:30 PM

Grand Ballroom, Second Floor

DP01.01

Influence of Ionic Surfactant Adsorption on the Response of Reference-Electrode-Free GaN/AlGa_N/GaN pH Sensors Jianan Wang¹, Xing Zhang¹, Hua Li¹, Haoran Li², Stacia Keller², Umesh K. Mishra², Brett Nener¹, Giacinta Parish¹ and Rob Atkin¹; ¹The University of Western Australia, Australia; ²University of California Santa Barbara, United States.

DP01.02

Ultra-High Sensitive Mercury Ion Detector Using AlGa_N/GaN HEMT Shivanshu Mishra¹, Nidhi Chaturvedi¹, Richard Lossy², Kuldip Singh¹, Pharyanshu Kachhawa¹, Amber Jain¹, Dheeraj Kharbanda¹, Kaushal Kishore³, Ashok Chauhan¹, Pramod Khanna¹ and Joachim Wuertl²; ¹CSIR-Central Electronics Engineering Research Institute, India; ²Ferdinand-Braun-Institut Leibniz-Institut für Höchstfrequenztechnik, Germany; ³CSIR-Central Electronics Engineering Research Institute, India.

DP01.03

Sensitivity of N-Polar GaN Surface Barrier to Ambient Gases Probed by Contactless Electroreflectance Lukasz Janicki¹, Jan Misiewicz¹, Marcin Siekacz², Henryk Turski², Joanna Moneta², Sandeep Gorantla³, Czesław Skierbiszewski^{2,4} and Robert Kudrawiec^{1,3}; ¹Wrocław University of Science and Technology, Poland; ²Institute of High Pressure Physics PAS, Poland; ³Polich Center for Technology Development PORT, Poland; ⁴TopGaN Sp. z o.o., Poland.

DP01.04

Development of AlGa_N/GaN High Electron Mobility Transistor Based Gas Sensors for Harsh Environmental Applications Chuyoung Cho, Hae-Yong Jeong, Hyeon-Ho Park and Kyung-Ho Park; Korea Advanced Nano Fab Center, Korea (the Republic of).

DP01.05

Design Factors for Reference Electrode Free AlGa_N/GaN-Based pH Sensors Giacinta Parish¹, Farah L. Khir^{1,2}, N. R. Krishnan¹, Jianan Wang¹, Jonathan Krisjanto¹, Haoran Li³, Gilberto A. Umana-Membreno¹, Stacia Keller², Umesh K. Mishra³, Murray V. Baker¹, Brett Nener¹ and Matthew Myers^{4,1}; ¹University of Western Australia, Australia; ²Universiti Teknologi MARA, Malaysia; ³University of California, Santa Barbara, United States; ⁴CSIRO, Australia.

SESSION EP01: Poster Session I: Processing, Fabrication and Thermal Management

Monday Afternoon, July 8, 2019

6:30 PM - 8:30 PM

Grand Ballroom, Second Floor

EP01.01

Pick-and-Place of III-Nitride Devices without Dicing, Enabled by 2D h-BN Grown on Micro-Patterned SiO₂/Sapphire Substrates Taha Ayari^{1,2}, Suresh Sundaram^{1,2}, Chris Bishop³, Adama Mballo², Phuong Vuong², Yacine Halfaya², Soufiane Karakchou^{4,2}, Simon Gautier³, Paul Voss^{4,2}, Jean Paul Salvestrini^{2,1} and Abdallah Ougazzaden^{4,2}; ¹Georgia Tech Lorraine, France; ²CNRS, UMI 2958, G T-CNRS, France; ³Institut Lafayette, France; ⁴Georgia Institute of Technology, France.

EP01.02

Electro-Plated Micro Stud Bumps—An Efficient, Scalable Bonding Technology for Flip Chip Mounting of UV LED Dies Jens Rass^{1,2}, Neysha Lobo Ploch^{1,2}, Christoph Stölmacher¹, Andreas Thies¹, Stefan Hochheim¹, Frank Schnieder¹, Anna Mogilatenko¹, Jan Ruschel¹, Steffen Knigge¹, Olaf Krüger¹ and Sven Einfeld¹; ¹Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, Germany; ²UVphotonics NT GmbH, Germany.

EP01.03

Thermal Conductivity of AlGa_N Layers Grown by MOCVD Dat Q. Tran¹, Pitsiri Sukkaew¹, Hengfang Zhang¹, Jr-Tai Chen¹, Motoaki Iwaya², Isamu Akasaki³, Bo Monemar¹, Vanya Darakchieva¹ and Plamen P. Paskov¹; ¹Linköping University, Sweden; ²Meijo University, Japan; ³Nagoya University, Japan.

EP01.04

Effects of Semiconductor Surface Treatments and Dielectric Anneal on the Electrical Characteristics of GaN-Based Metal-Insulator-Semiconductor Devices Benjamin McEwen¹, Isra Mahaboob¹, Kasey Hogan¹, Emma Rocco¹, Vincent Meyers¹, Sean A. Tozier¹, Aivars Lelis², Ronald Green², Franklin Nouketcha² and Fatemeh (Shadi) Shahedipour-Sandvik¹; ¹SUNY Polytechnic Institute, United States; ²U.S. Army Research Laboratory, United States.

EP01.05

Compositional Changes Occurring in GaN-on-Diamond Adhesion Layers Jonathan Anderson¹ and Edwin L. Piner²; ¹Texas State University, United States; ²Texas State University, United States.

EP01.06

Deep Level Traps Introduced in GaN Layers by High-Temperature Thermal Treatment with SiN Cap Layers Satomu Furuta¹, Masahiro Horita^{1,2}, Nariaki Tanaka³, Tohru Oka² and Jun Suda^{1,2}; ¹Nagoya University, Japan; ²Institute of Materials and Systems for Sustainability, Japan; ³Toyoda Gosei, Japan.

EP01.07

A Hybrid Dry/Photoelectrochemical Etch Approach for Complete Removal of AlN Capping Layer and Ohmic Contact Formation to p-GaN Surface Vincent Meyers, Emma Rocco, Kasey Hogan, Sean A. Tozier, Benjamin McEwen, Isra Mahaboob and Fatemeh (Shadi) Shahedipour-Sandvik; State University of New York Polytechnic Institute, United States.

EP01.08

Electrochemical Characterization on N-Type GaN for Simple Wet-Etching Utilizing S₂O₈²⁻ Containing Solution Masachika Toguchi¹, Kazuki Miwa¹, Fumimasa Horikiri², Noboru Fukuhara², Yoshinobu Narita², Takehiro Yoshida² and Taketomo Sato¹; ¹Hokkaido University, Japan; ²SCIOCS Co., Ltd., Japan.

SESSION FP01: Poster Session: Bulk Growth

Monday Afternoon, July 8, 2019

6:30 PM - 8:30 PM

Grand Ballroom, Second Floor

FP01.01

Detailed Study of HVPE-GaN Doped with Silicon Boleslaw Lucznik, Malgorzata Iwinska, Tomasz Sochacki, Mikolaj Amilusik, Michal Fijalkowski, Marcin Zajac, Elzbieta Litwin-Staszewska, Ryszard Piotrkowski, Leszek Konczewicz, Piotr Jaroszynski, Aneta Sidor, Izabella Grzegory and Michal Boćkowski; Institute of High Pressure Physics Polish Academy of Sciences (Unipress), Poland.

FP01.02

The p-T Windows for Crystallization of GaN from Solution in Ga-Fe in Gas and Solid Pressure Media Systems Bohdan Sadovyi¹, P. Sadovyi¹, S. Porowski¹, I. Petrusha², V. Turkevich², A. Nikolenko³, B. Tsykaniuk³, V. Strelchuk³ and Izabella Grzegory¹; ¹Institute of High Pressure Physics Polish

Academy of Sciences, Poland; ²V. Bakul Institute for Superhard Materials NASU, Ukraine; ³V. Lashkariyov Institute of Semiconductor Physics NASU, Ukraine.

FP01.03

Near-Colorless Free-Standing Bulk GaN c-Plane Substrates with Excellent Crystal Quality Grown by the Ammonothermal Method Daryl Key, Edward Letts and Tadao Hashimoto; SixPoint Materials Inc., United States.

FP01.04

Growth Behaviors of Different GaN Crystal Planes in the Basic Ammonothermal Method Tengkun Li¹, Guoqiang Ren^{1,2}, Xu J. Su¹, Zongliang Liu¹ and Ke Xu^{1,2}; ¹Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, China; ²Suzhou Nanowin Science and Technology Co., Ltd., China.

FP01.05

Comparison of Stress States and Dislocations in HVPE-AIN Films Grown on Sapphire Substrate with Different Buffer Layer Xu J. Su¹, Jun Huang¹ and Ke Xu^{1,2}; ¹Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, China; ²Suzhou Nanowin Science Technology Co., Ltd, China.

FP01.06

Reduction of Dislocation Density and Curvature of GaN Substrates Grown by Hydride Vapor Phase Epitaxy Jianfeng Wang^{1,2}, Yu Xu^{1,2}, Demin Cai², Yumin Zhang^{1,2}, Mingyue Wang^{1,2}, Zongyao Li², Xiaojian Hu^{1,2} and Ke Xu^{1,2}; ¹Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, China; ²Suzhou Nanowin Science and Technology Co., Ltd, China.

FP01.07

Characterization of V-Pits in Fe Doped GaN Grown by HVPE Yumin Zhang^{1,2,3}, Jianfeng Wang^{1,2}, Demin Cai², Yu Xu^{1,2}, Mingyue Wang^{1,2}, Xiaojian Hu^{1,2} and Ke Xu^{1,2}; ¹Suzhou Institute of Nano-tech and Nano-Bionics, Chinese Academy of Sciences, China; ²Suzhou Nanowin Science and Technology Co., Ltd., China; ³University of Science and Technology of China, China.

FP01.08

Influence of Dislocation on the Thermal Decomposition of GaN Yumin Zhang^{1,2,3}, Jianfeng Wang^{1,2}, Demin Cai², Yu Xu^{1,2}, Mingyue Wang^{1,2}, Xiaojian Hu^{1,2}, Zongyao Li² and Ke Xu^{1,2}; ¹Suzhou Institute of Nano-tech and Nano-Bionics, Chinese Academy of Sciences, China; ²Suzhou Nanowin Science and Technology Co., Ltd., China; ³University of Science and Technology of China, China.

SESSION GP01: Poster Session I: Epitaxial Growth
Monday Afternoon, July 8, 2019
6:30 PM - 8:30 PM
Grand Ballroom, Second Floor

GP01.01

Dispersion-Free Low RF Loss GaN-on-Si Structures Grown on 200 mm Si Substrate Using MOVPE Ming Zhao¹, Shane Chang^{1,2,3}, Robert Langer¹ and Nadine Collaert¹; ¹imec, Belgium; ²KU Leuven, Belgium; ³National Chiao Tung University, Taiwan.

GP01.02

Nitridation of GaAs Films Obtained by Close-Spaced Vapor Transport Technique José de Jesús C. Bueno¹, Godofredo García¹, Alberto Luna¹, Fabiola Nieto², Tomás Díaz¹, Enrique Rosendo¹, Antonio Coyopol¹, Román Romano¹, Crisóforo Morales¹ and Reina Galeazzi¹; ¹Benemérita Universidad Autónoma de Puebla, Mexico; ²Benemérita Universidad Autónoma de Puebla, Mexico.

GP01.03

Polarity Control in Hot-Wall MOCVD III-Nitride Epitaxy on On-Axis and Vicinal SiC (000-1) Substrates Hengfang Zhang¹, Ingemar Persson¹, Per Persson¹, Alyssa Mock¹, Pitsiri Sukkaew¹, Jr-Tai Chen² and Vanya Darakchieva¹; ¹Linköping University, Sweden; ²SweGaN AB, Sweden.

GP01.04

Optimization of GaN Nanowires Reformation Process by MOCVD for Device-Quality GaN Templates Rosalía Delgado-Carrascon¹, Dat Q. Tran¹, Pitsiri Sukkaew¹, Alyssa Mock¹, Plamen P. Paskov¹, Rafal Ciechonski¹, Jonas Ohlsson^{3,4}, Yadan Zhu³, Bo Monemar¹, Lars Samuelson³ and Vanya Darakchieva¹; ¹Sweden4Center for III-Nitride Technology C3NiT - Janzén, Linköping University, Sweden; ²GLO-AB, Ideon Science Park, Sweden; ³Department of Solid State Physics, Nanolund, LundUniversity, Sweden; ⁴Hexagem AB, Sweden.

GP01.05

In_{0.9}Ga_{0.1}N Alloys Grown by Plasma-Assisted Molecular Beam Epitaxy (PAMBE) with Growth Rates Up to 1.3 μm/hr Kelsey Jorgensen and James Speck; University of California, Santa Barbara, United States.

GP01.06

Combining Nano-Patterned Sapphire and High Temperature Annealing of AIN for UV LEDs Sylvia Hagedorn¹, Sebastian Walde¹, Nadine Tillner², Ralph-Stephan Unger¹, Harun H. Solak³, Hans-Juergen Lugauer² and Markus Weyers¹; ¹Ferdinand-Braun-Institut Berlin, Germany; ²Osram Opto Semiconductors GmbH, Germany; ³EULITHA AG, Switzerland.

GP01.07

Single Crystal Multilayer Nitride, Metal, Oxide Structures on Engineered Silicon for New Generation RF Filters Application Rytis Dargis¹, Andrew Clark¹, Azadeh Ansari², Zhijian Hao², Mingyo Park², DeaGyu Kim², Robert Yanka¹, Richard Hammond¹, Mukul Debnath¹ and Rodney Pelzel¹; ¹IQE Plc, United States; ²Georgia Institute of Technology, United States.

GP01.08

Optimization of MOCVD Regrown n-GaN Stefano Leone¹, Peter Brueckner¹, Philipp Doering², Theodor Fuchs¹, Lutz Kirste¹, Stefan Mueller¹, Mario Prescher¹, Ruediger Quay¹ and Oliver Ambacher¹; ¹Fraunhofer IAF, Germany; ²Inatech, Germany.

GP01.09

Broad-Band UV Emission from a Two-Dimensional Array of AlGaIn Microstructures Mitsuru Funato, Ken Kataoka and Yoichi Kawakami; Kyoto University, Japan.

GP01.10

Development of Semi-Polar (11-22) GaN for Green Emitters on Si Substrates X Yu, S H. Shen, X. M. Zhao, C Zhu, P Fletcher, Y Cai, Jie Bai and T Wang; University of Sheffield, United Kingdom.

GP01.11

Plasma-Assisted Atomic Layer Epitaxy of Indium Aluminum Nitride Studied Using *In Situ* Grazing Incidence Small-Angle X-Ray Scattering Jeffrey M. Woodward², Samantha G. Rosenberg², Scooter D. Johnson¹, Neeraj Nepal¹, Zachary R. Robinson³, Karl F. Ludwig⁴ and Charles R. Eddy Jr.¹; ¹U.S. Naval Research Laboratory, United States; ²ASEE (residing at U.S. Naval Research Laboratory), United States; ³State University of New York at Brockport, United States; ⁴Boston University, United States.

GP01.12

Enhanced Strain Relaxation in AlGaIn Layers Grown on Sputter-Based AIN Templates Yosuke Mogami^{1,2}, Shogo Motegi^{1,2}, Atsushi Osawa³, Kazuto Osaki³, Yukitake Tanioka³, Atsushi Maeoka³, Yuri Itokazu^{1,2}, Shunsuke Kuwaba^{1,2}, Masafumi Jo¹, Noritoshi Maeda¹, Hiroyuki Yaguchi² and Hideki Hirayama¹; ¹RIKEN, Japan; ²Saitama University, Japan; ³SCREEN Finetech Solutions Co. Ltd, Japan.

GP01.13

Growth of Lattice-Relaxed InGaIn Thick Films on Patterned Sapphire Substrates by Tri-Halide Vapor Phase Epitaxy Kentaro Ema, Rio Uei, Mitsuki Kawabe, Hisashi Murakami, Yoshinao Kumagai and Akinori Koukitu; Tokyo University of Agriculture and Technology, Japan.

GP01.14

The Ammonia Predose—A Tool for Controlling the Bow in GaN-on-Si Structures Alexander M. Hinz¹, David Wallis^{1,2} and Rachel Oliver¹; ¹University of Cambridge, United Kingdom; ²University of Cardiff, United Kingdom.

GP01.15

Achieving High-Quality and Coalescence-Free AIN Template on Nano-Patterned Sapphire Substrate by Pre-Planarization Technique Chia-Yen Huang¹, Yem-Yeu Chang², Cheng-Yao Huang³, Chia-Lung Tsai¹, Hung-Wei Yen³, Yew-Chung Wu¹, Yi-Keng Fu¹ and Yuh-Renn Wu¹; ¹Industrial Technology Research Institute, Taiwan; ²Crystalwise Technology Inc., Taiwan; ³National Taiwan University, Taiwan.

GP01.17

Pulsed Sputter Deposition of AIN and GaN Florian Hörich, Christopher Kahrmann, Jürgen Bläsing, Armin Dadgar and André Strittmatter; Otto-von-Guericke University, Germany.

GP01.18

Mechanisms of Intrinsic Carbon Doping During MOVPE of AIN- and GaN-Based Materials Roman Talalaev and Anna Lobanova; STR Group, Russian Federation.

GP01.19

Shubnikov de-Hass Oscillations of 2DEG in AIN/GaN Heterostructures Grown by Molecular Beam Epitaxy Liuyun Yang, Wenjie Zhang, Jingyue Wang, Tao Wang, Ding Wang, Xiaosong Wu, Bo Shen and Xinqiang Wang; Peking University, China.

GP01.20

P-Doped GaMnN(As) Epitaxial Layers with High Mn Concentration Grown by MBE Edyta Piskorska-Hommel^{1,2}, Jaroslaw Serafiniczuk^{2,3}, Milosz

Grodzicki^{2,4}, Dominika Majchrzak^{1,2}, Jean-Guy Rousset² and Detlef Hommel^{2,4}; ¹Institute of Low Temperature and Structure Research PAS W. Trzebiatowski Institute, Poland; ²PORT Polish Center for Technology Development, Poland; ³Faculty of Fundamental Problems of Technology, Wrocław University of Science and Technology, Poland; ⁴Faculty of Physics and Astronomy, University of Wrocław, Poland.

GP01.21

Growth by PAMBE and Characterization of GaN Doped with As, Towards an Efficient p-Type Doping of III-N Semiconductors for Deep UV Emitters Jean-Guy Rousset¹, Ciechanowicz Paulina^{1,2}, Milosz Grodzicki^{1,2}, Edyta Piskorska-Hommel^{1,3}, Jarosław Serafiniczuk^{1,4}, Ewelina Zdanowicz^{1,5}, Robert Kudrawiec^{1,5} and Detlef Hommel^{1,2}; ¹PORT - Polish Center for Technology Development, Poland; ²Faculty of Physics and Astronomy, University of Wrocław, Poland; ³Institute of Low Temperature and Structure Research, Polish Academy of Sciences, Poland; ⁴Faculty of Microsystems Electronics and Photonics, Wrocław University of Science and Technology, Poland; ⁵Faculty of Fundamental Problems of Technology, Wrocław University of Science and Technology, Poland.

GP01.22

Dramatic Improvement in the Surface Quality of High Temperature Annealed c-Plane (0001) Sapphire Substrates and Its Impact on the Quality of AlN Films from 1 nm to 2 μm Habib Ahmad, Evan A. Clinton, Christopher M. Matthews, Zachary Engel and William A. Doolittle; Georgia Institute of Technology, United States.

GP01.23

PAMBE Growth of 1- or 2-ML Thick In(Ga)N/GaN Quantum Wells Chen Li, Yurii Maidaniuk, Andrian Kuchuk, Yuriy Mazur, Mourad Benamara, Morgan Ware and Gregory Salamo; Institute for Nanoscience and Engineering, United States.

GP01.25

Optimizing Underlayers for Efficient GaInN/GaN Quantum Well Structures—The Delicate Interplay of Hydrogen and Indium Philipp Horenburg¹, Fedor Alexej Ketzer¹, Silke Wolter¹, Torsten Langer¹, Philipp Henning^{1,2}, Shawutjiang (Savutjan) Sidikejiang (Sidik)¹, Heiko Bremers^{1,2}, Uwe Rossow¹ and Andreas Hangleiter^{1,2}; ¹Braunschweig University of Technology, Germany; ²Braunschweig University of Technology, Germany.

GP01.26

Suppressing the Compositional Nonuniformity of AlGaIn Grown on HVPE-AlN Template with Large Macro-Steps Xiaojuan Sun^{1,2}, Ke Jiang^{1,2}, Yuping Jia^{1,2}, Zhiming Shi^{1,2}, Shanli Zhang^{1,2} and Dabing Li^{1,2}; ¹Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences, China; ²University of Chinese Academy of Sciences, China.

GP01.27

Decreasing the Threading Dislocation Density of GaN Films by Preferentially Passivating the Etched Defect Pits Ziguang Ma, Wei Hu and Hong Chen; Institute of Physics, Chinese Academy Sciences, China.

GP01.28

Epitaxial Lateral Overgrowth of GaN on Partially Crystallized Cavity Engineered Sapphire Substrate Jeonghwan Jang¹, Jungel Ryu¹, Duiyoung Yang¹, Daehan Choi¹, Seungmin Lee¹, Daeyoung Moon¹, Giwoong Kim¹, Jehong Oh¹, Yongjo Park¹ and Euijoon Yoon^{1,2,3}; ¹Seoul National University, Korea (the Republic of); ²Research Institute of Advanced Materials, Korea (the Republic of); ³Inter-University Semiconductor Research Center, Korea (the Republic of).

GP01.29

Nitrogen-Rich Condition for High Efficiency P-Type Doping of GaN by Plasma-Assisted Molecular Beam Epitaxy Haipeng Tang and Sharif Sadaf; National Research Council Canada, Canada.

GP01.30

Simple and Accurate Modelling and Prediction of AlGaIn MOVPE Growth for HEMT Structures Matthew Charles, Joel Kanyandekwe and Matthieu Lafossas; CEA-LETI, France.

SESSION HP01: Poster Session I: Nanostructures and Nano-Devices
Monday Afternoon, July 8, 2019
6:30 PM - 8:30 PM
Grand Ballroom, Second Floor

HP01.01

The Influence of AlN Buffer Layer on the Growth of Self-Assembled GaN Nanocolumns on Graphene Andreas Liudi Mulyo^{1,2}, Mohana Krishnappa Rajpalke¹, Per Erik Vullum³, Helge Weman¹, Katsumi Kishino^{2,4} and Bjørn-Ove Fimland¹; ¹Norwegian University of Science and Technology (NTNU), Norway; ²Sophia University, Japan; ³SINTEF Industry, Norway; ⁴Sophia University, Japan.

HP01.02

Displacement Talbot Lithography for Nano-Engineering of III-Nitride Materials Pierre-Marie Coulon¹, Benjamin Damilano², Blandine Alloing², Sebastian Walde³, Johannes Enslin⁴, Gunnar Kusch⁵, Pierre Chausse¹, Stéphane Vézian², Sylvia Hagedorn³, Tim Wernicke⁴, Jean Massies², Jesus Zuniga-Perez², Markos Weyers³, Michael Kneissl^{4,3}, Carol Trager-Cowan³, Robert Martin⁵ and Philip Shields¹; ¹University of Bath, United Kingdom; ²Université Côte d'Azur, CNRS, CRHEA, France; ³Ferdinand-Braun-Institut, Germany; ⁴Technische Universität Berlin, Institute of Solid State Physics, Germany; ⁵University of Strathclyde, United Kingdom.

HP01.03

Structural Stability of GaN Nanowires in Aqueous Electrolytes Under High Optical Excitation Intensities Florian Pantle, Max Kraut, Julia Winnerl, Martin Hetzl, Felix Eckmann, Ian D. Sharp and Martin Stutzmann; Walter Schottky Institute, Germany.

HP01.04

An Alternative Route for Low-Temperature Growth of Crystalline III-Nitride Thin Films and Nanostructures—Hollow-Cathode Plasma-Assisted Atomic Layer Deposition Necmi Biyikli¹, Adnan Mohammad¹, Deepa Shukla² and Saidjafarzoda Ilhom¹; ¹University of Connecticut, United States; ²University of Connecticut, United States.

HP01.05

Ferroelectric Polarization Switching Behavior of Hf_{0.5}Zr_{0.5}O₂ on Gallium Nitride HEMT Heterostructures Chunlei Wu, Hansheng Ye, Benjamin Grisafer, Suman Datta and Patrick Fay; University of Notre Dame, United States.

HP01.06

High Linearity Double-Channel Al(In)GaN/GaN FinFET with High On-Current Jun-Hyeok Lee, Jeong-Min Ju, Kyung-Wan Kim, Jeong-Gil Kim, Dong-Hyeok Son, Seung-Hyeon Kang, Yong-Soo Lee and Jung-Hee Lee; Kyungpook National University, Korea (the Republic of).

HP01.07

Boosting Rabi Splitting of Exciton-Polaritons in a GaN Microrod by Manipulating Optical Modes Guo Yu, Junchao Li, Menglai Lei, Hua Zong and Xiaodong Hu; Peking University, China.

HP01.08

Wafer-Scale MoS₂/GaN Heterostructure Growth Using Metalorganic Chemical Vapor Deposition Taemyung Kwak, Juhun Lee, Hyunwoo Jang, Byeongchan So, Uiho Choi and Okhyun Nam; Korea Polytechnic University, Korea (the Republic of).

HP01.09

Selective Area Growth of GaN Nanowires on Silicon Carbide Theresa Hoffmann¹, Andrea Wieland¹, Julia Winnerl¹, Markus Döblinger², Sonja Matich¹ and Martin Stutzmann¹; ¹Walter Schottky Institute, Germany; ²Ludwig-Maximilians-Universität München, Germany.

HP01.10

Analysis of GaN Vertical Nanowire Transistors with Negative Transconductance as Well as Contact Potential Near Drain Dong-Hyeok Son, Jeong-Gil Kim, Jun-Hyeok Lee, Hyeoun-Su Lee, Yong-Soo Lee and Jung-Hee Lee; Kyungpook National University, Korea (the Republic of).

HP01.11

The Study of Size Dependent Carrier Capture and Recombination Rate of InGaIn Nano-Disk in a Wire Array by Ultrafast Transient Absorption Spectroscopy Pratim K. Saha, Shonal Chouksey, Vikas Pendem, Tarni Aggarwal, Ankit Udai, Swaroop Ganguly and Dipankar Saha; Indian Institute of Technology Bombay, India.

HP01.12

Strongly Linear Polarized Emission from InGaIn Quantum Wire Grown by MOCVD on c-Axis GaN Template Hwan-Seop Yeo, Kwanjae Lee, Yong Chul Sim and Yong-Hoon Cho; Korea Advanced Institute of Science and Technology, Korea (the Republic of).

HP01.13

Lattice-Matched Nano/Mesoporous AlGaIn DBRs for Vertical-Cavity GaN Nanowire Lasers on Si Substrates Mahmoud Behzadizadeh¹, Morteza Monavarian¹, Neal Wostbrock¹, Saadat Mishkat-UI-Masabih¹, Alejandro Manjavacas², Daniel Feezell¹ and Tito Busani¹; ¹University of New Mexico, United States; ²University of New Mexico, United States.

HP01.14

Birefringence of Subsurface Porous GaN Multilayers Alexander Hinz, Peter Griffin, Tongtong Zhu, Rachel Oliver and Boning Ding; University of Cambridge, United Kingdom.

SESSION IP01: Poster Session I: Optical and Electronic Properties
Monday Afternoon, July 8, 2019
6:30 PM - 8:30 PM
Grand Ballroom, Second Floor

IP01.01

Direct Determination of Carrier Concentration in InGaN/GaN Quantum Wells by Photomodulated Reflectivity—Evidence that Efficiency Droop Process has a Greater than 3rd Power Dependence on Carrier Concentration Matthew Halsall¹, Iain Crowe¹, Rachel Oliver³, Menno Kappers³ and Colin J. Humphreys²; ¹The University of Manchester, United Kingdom; ²Queen Mary University of London, United Kingdom; ³University of Cambridge, United Kingdom.

IP01.02

Optical and Structural Properties of One-Directionally Lattice-Matched (11-22) Oriented AlInN/GaN Heterostructures Shawutijiang (Savutjan) Sidikejiang (Sidik)¹, Philipp Henning^{1,2}, Philipp Horenburg¹, Heiko Bremers^{1,2}, Uwe Rossow¹, Ferdinand Scholz² and Andreas Hangleiter^{1,2}; ¹Braunschweig University of Technology, Germany; ²Braunschweig University of Technology, Germany; ³University of Ulm, Germany.

IP01.03

Temperature Dependent Capacitance-Voltage Spectroscopy of Self-Assembled GaN Quantum Dot Ensembles Carlo A. Sgroi¹, Julien Brault², Jean-Yves Duboz², Sébastien Chenot², Arne Ludwig¹ and Andreas D. Wieck¹; ¹Ruhr-Universität Bochum, Germany; ²CNRS – CRHEA, France.

IP01.04

Photoluminescence and Structural Properties of GaN/AlN SLs—Quantum Well Width vs Built-in Electric Field Effects Andrian Kuchuk¹, Yuriy Mazur¹, Yuri Maidaniuk¹, Pijush Ghosh², Hryhorii Stanchu¹, Mourad Benamara¹, Morgan Ware¹ and Gregory Salamo¹; ¹Institute for Nanoscience and Engineering, United States; ²Electrical Engineering Department, United States.

IP01.05

Electrical Properties of GaN Schottky Barrier Diodes with 14 MeV Fast Neutron Irradiation Yuan Ren^{1,3}, Xing Lu^{1,2}, Huaxing Jiang², Baijun Zhang¹, Zhitao Chen³ and Kei May Lau²; ¹Sun Yat-sen University, China; ²Hong Kong University of Science and Technology, Hong Kong; ³Guangdong Institute of Semiconductor Industrial Technology, China.

IP01.06

All-Optical Determination of Free-Carrier Concentration and Composition in Cubic GaN and AlGaIn Elias Baron¹, Michael Deppe², Fabian Tacke², Martin Feneberg¹, Donat J. As² and Rüdiger Goldhahn¹; ¹Otto-von-Guericke-Universität Magdeburg, Germany; ²University of Paderborn, Germany.

IP01.07

Two-Wavelength Excited Photoluminescence Study of Upconversion Photoluminescence from GaPN Alloys Hiroyuki Yaguchi¹, Wataru Takahashi¹, Kengo Takamiya¹, Shuhei Yagi¹, Norihiko Kamata¹, Yuji Hazama² and Hidefumi Akiyama²; ¹Saitama University, Japan; ²The University of Tokyo, Japan.

IP01.08

Influence of the Strain Relaxation on the Optical Property of AlGaIn Quantum Wells Yuri Itokazu^{1,2}, Yosuke Mogami^{1,2}, Shunsuke Kuwaba^{1,2}, Shogo Motegi^{1,2}, Atsushi Osawa¹, Kazuto Osaki³, Yukitake Tanioka³, Masafumi Jo¹, Norihiko Kamata² and Hideki Hirayama¹; ¹RIKEN, Japan; ²Saitama University, Japan; ³SCREEN Finetech Solutions Co. Ltd, Japan.

IP01.09

Electron Beam Induced Current Study of Defects in InGaIn LEDs and Laser Diode Structures Lucja Marona^{1,2}, Dario Schiavon^{1,2}, Szymon Grzanka^{1,2} and Piotr Perlin^{1,2}; ¹Institute of High Pressure Physics, Poland; ²TopGaN, Poland.

IP01.10

Deep Level Luminescence of HVPE Grown GaN by Below-Bandgap Photo-Excitation Daisuke Uehara¹, Moe Kikuchi¹, Bei Ma¹, Ken Morita¹, Hideto Miyake² and Yoshihiro Ishitani¹; ¹Chiba University, Japan; ²Mie University, Japan.

IP01.11

Characterization of Potential Fluctuations and Optical Constants in Al_xIn_{1-x}N Alloys Grown on C-Plane GaN Substrate Daichi Imai¹, Tomoaki Yamaji¹, Makoto Miyoshi², Tetsuya Takeuchi¹ and Takao Miyajima¹; ¹Meijo University, Japan; ²Nagoya Institute of Technology, Japan.

IP01.12

Direct Observation of the Carrier Behavior by Kelvin Probe Force Microscopy Yuping Jia¹, Xiaojuan Sun¹, Cuihong Kai¹, Zhiming Shi¹ and Dabing Li^{1,2}; ¹Changchun Institute of Optics, Fine Mechanics and Physics,

Chinese Academy of Sciences, China; ²University of Chinese Academy of Sciences, China.

IP01.13

Interfacial Polarization of Thin Al_xGa_{1-x} and Er_x Films on GaN(0001) Antoni Ciszewski, Miłosz Grodzicki, Jakub Sito and Piotr Mazur; University of Wrocław, Poland.

IP01.14

Impact of Substrate Misorientation on Nanoscale Optical Properties of InGaIn/GaN Quantum Wells Thomas Weatherley, Wei Liu, Camille Haller, Jean-François Carlin, Raphaël Butté and Nicolas Grandjean; EPFL, Switzerland.

IP01.15

Double Differential Femto-Second Transient Absorption Spectroscopy for Real-Time Probing of Near-Surface Carrier and Photon Dynamics in Semiconductors Shonal Chouksey and Dipankar Saha; Indian Institute of Technology Bombay, India.

IP01.16

Effect of High Temperature Annealing on the Structural and Optical Effects of AlN Grown by Molecular Beam Epitaxy Eric T. Reid, David A. Laleyan, Ping Wang and Zetian Mi; University of Michigan—Ann Arbor, United States.

IP01.17

Surface Electronic Properties of Si-Doped AlGaIn and the Thermionic Emission Characteristics with Adsorption of Alkali Metal Atoms Shigeya Kimura¹, Hisashi Yoshida¹, Shota Uchida² and Akihisa Ogino²; ¹Toshiba, Japan; ²Shizuoka University, Japan.

IP01.18

First-Principles Calculation of Band Gaps of Al_xIn_{1-x}N Alloys and Short Period Al_{1-x}In_xN/Al_{1-x}In_xN Superlattices Takahiro Kawamura¹, Yuma Fujita¹, Yuya Hamaji¹, Toru Akiyama¹, Yoshihiro Kangawa², Izabela Gorczyca³, Tadeusz Suski³, Malgorzata Wierzbowska³ and Stanislaw Krukowski³; ¹Mie University, Japan; ²Kyushu University, Japan; ³Institute of High Pressure Physics, Poland.

IP01.19

Optical Properties of Rare Earth Nitrides Muhammad Azeem^{1,2}; ¹University of Sharjah, United Arab Emirates; ²Victoria University of Wellington, New Zealand.

IP01.20

Effects of 3 MeV Proton Radiation on Ultrawide Bandgap Aluminum Nitride Schottky Barrier Diodes Jossue Montes, Houqiang Fu, Tsung-Han Yang, Hong Chen, Xuanqi Huang, Kai Fu, Izak Baranowski and Yuji Zhao; Arizona State University, United States.

IP01.21

Electrical Characterization of Vertically Conducting GaN-on-Si Heterojunctions Christopher M. Matthews, Evan A. Clinton and William A. Doolittle; Georgia Institute of Technology, United States.

SESSION JP01: Poster Session I: Defect Characterization and Engineering
Monday Afternoon, July 8, 2019
6:30 PM - 8:30 PM
Grand Ballroom, Second Floor

JP01.01

Issues in the Extraction by X-Ray Diffraction of Threading Dislocations Density in GaN Films Grown on Silicon Substrate Victor R. Yon, Patrice Gergaud, Emmanuel Nolot and Matthew Charles; CEA, France.

JP01.02

Behavior of Dislocations Propagating from GaN Substrate to Epitaxial Layer Sho Inotsume^{1,2}, Nobuhiko Kokubo^{1,2,3}, Hisashi Yamada², Shoichi Onda¹, Jun Kojima¹, Junji Ohara^{1,4}, Shunta Harada¹, Miho Tagawa¹ and Toru Ujihara^{1,2}; ¹Nagoya Graduate Schools, Japan; ²AIST GaN-OIL, Japan; ³Current affiliation: Hitachi, Ltd, Japan; ⁴Current affiliation: DENSO Corporation, Japan.

JP01.04

DLTS Investigation of Transient Capacitance and Trap States on p-GaN Gate HEMT Structures Song Yang¹, Sen Huang², Jin Wei¹, Yuru Wang¹, Zheyang Zheng¹, Jiabei He¹ and Kevin J. Chen¹; ¹The Hong Kong University of Science and Technology, Hong Kong; ²Institute of Microelectronics, Chinese Academy of Sciences, China.

JP01.05

Annealing Behavior of Deep Levels in Carbon Implanted n-GaN Giovanni Alfieri and Vinoth K. Sundaramoorthy; ABB, Switzerland.

JP01.06

Multilateral Investigation of Electrical and Microstructural Properties of Threading Dislocations in Na-Flux-Grown GaN Crystals Takeaki Hamachi¹, Tetsuya Tohei¹, Masayuki Imanishi², Yusuke Mori² and Akira Sakai¹; ¹Osaka University, Japan; ²Osaka University, Japan.

JP01.07

GaN Surface Sputter Damage Investigated Using Deep-Level Transient Spectroscopy Xiaoyan Tang¹, Simon Hammersley¹, Vladimir Markevich¹, Iain Crowe¹, Ian Hawkins¹, Trevor Martin², Tony Peaker¹ and Matthew Halsall¹; ¹University of Manchester, United Kingdom; ²IQE, United Kingdom.

JP01.08

Surface States in AlGaIn/GaN High Electron Mobility Transistors—Qualitative Profiles from Channel Photocurrent Spectroscopy Yury Turkulets and Ilan Shalish; Ben Gurion University in the Negev, Israel.

JP01.09

Defects Characterization of Mg Implanted Homoepitaxial GaN on High Quality GaN Substrates Yekan Wang¹, Kenny Huynh¹, Tingyu Bai¹, Mathew H. Breckenridge², James Tweedie³, Michal Boćkowski⁴, Yuzi Liu⁵, Ramón Collazo², Zlatko Sitar² and Mark Goorsky¹; ¹University of California Los Angeles, United States; ²North Carolina State University, United States; ³Adroit Materials, Inc, United States; ⁴Institute of High Pressure Physics, Poland; ⁵Argonne National Laboratory, United States.

JP01.10

The Impact Of Point Defects Present in He Implanted N-Type and P-Type GaN Layers on Thermal Decomposition of InGaIn/GaN QWs in Blue and Green LED and Laser Diodes Emitters Mikolaj Grabowski¹, Ewa Grzanka^{1,2}, Szymon Grzanka^{1,2}, Artur Lachowski^{1,6}, Julita Smalc-Koziorowska^{1,2}, Robert Czernecki^{1,2}, Roman Hrytsak^{1,3}, Grzegorz Gawlik¹, Andrzej Turoś^{4,5} and Mike Leszczynski^{1,2}; ¹Institute of High Pressure Physics Polish Academy of Sciences, Poland; ²Top-GaN Ltd, Poland; ³University of Rzeszow, Poland; ⁴Institute of Electronic Materials Technology, Poland; ⁵Institute of Electron Technology, Poland; ⁶Warsaw University of Technology, Poland.

JP01.11

Microstructural and Compositional Analysis of N-Polar GaN:Mg Hillock Structures Emma Rocco¹, Isra Mahaboob¹, Kasey Hogan¹, Sean A. Tozier¹, Vincent Meyers¹, Benjamin McEwen¹, Olivia Licata², Baishakhi Mazumder², Jamie Hart³, Mitra Taheri³, Michael Reshchikov⁴ and Fatemeh (Shadi) Shahedipour-Sandvik¹; ¹SUNY Polytechnic Institute, Colleges of Nanoscale Science and Engineering, United States; ²University at Buffalo, United States; ³Drexel University, United States; ⁴Virginia Commonwealth University, United States.

JP01.12

Electronic Properties of GaN Nanopipe Threading Dislocation with M-Plane Surface Takashi Nakano¹, Kenta Chokawa¹, Masaaki Araidai^{2,1}, Kenji Shiraishi^{2,1}, Atsushi Oshiyama², Shigeyoshi Usami¹, Akira Kusaba³, Yoshihiro Kangawa^{4,2}, Atsushi Tanaka², Yoshio Honda^{2,1} and Hiroshi Amano^{2,1}; ¹Graduate School of Engineering, Nagoya University, Japan; ²Institute of Materials and Systems for Sustainability, Nagoya University, Japan; ³Graduate School of Engineering, Kyushu University, Japan; ⁴Research Institute for Applied Mechanics Kyushu University, Japan.

JP01.13

Transient Hall Effect Characterization of Non-Exponential Photocarrier Decay in AlGaIn/GaN Heterostructures David R. Daughton, BoKuai Lai and Jeffrey Lindemuth; Lake Shore Cryotronics, United States.

JP01.14

Characteristics of Proton Irradiated AlGaIn/GaN HEMTs Structures Jaime Freitas; U.S. Naval Research Laboratory, United States.

SESSION KP01: Poster Session: Structural Analysis

Monday Afternoon, July 8, 2019

6:30 PM - 8:30 PM

Grand Ballroom, Second Floor

KP01.01

Correlation Between Surface Nanostructure and Luminescence in Mg-Doped GaN Layers Grown on Miscal GaN Substrates Po-Yi Su¹, Hanxiao Liu¹, Shuo Wang¹, Hongpo Hu², Binzhong Dong², Zhihao Wu², Jiangbo Wang², Rong Liu² and Fernando Ponce¹; ¹Arizona State University, United States; ²HC SemiTek Corporation, China.

KP01.02

Analysis of Highly Si-Doped GaN Using Various Lattice Vibration Modes Observed by Infrared and Raman Spectroscopy Bei Ma; Chiba University, Japan.

KP01.03

Observation of Lattice-Plane Bending Angle Modulation of Mg-Doped GaN Homo-Epitaxy by X-Ray Diffraction Topography Jaemyung Kim¹, Okkyun Seo¹, Chulho Song², Satoshi Hiroi¹, Yanna Chen³, Yoshihiro Irokawa⁴, Toshihide Nabatame⁴, Yasuo Koide⁴ and Osami Sakata¹; ¹National Institute for Materials Science, Japan; ²NISSAN ARC, LTD., Japan; ³Northwestern University, United States; ⁴National Institute for Materials Science, Japan.

KP01.04

Structural Analyses of GaInN Films Grown at Different Temperatures on (0001)GaIn/a-Al₂O₃ Templates by RF-MBE Soichiro Ohno¹, Tomohiro Yamaguchi¹, Tsutomu Araki², Tohru Honda¹, Takeyoshi Onuma¹, Hideki Hashimoto¹, Yusuke Nakajima¹, Hiroki Hirukawa¹ and Ryoosuke Yoshida¹; ¹Kogakuin University, Japan; ²Ritsumeikan university, Japan.

KP01.05

Mechanical Stress Mapping of GaN and AlInGaP Films by Raman Scattering Spectroscopy for Characterization of LEDs David M. Miller, Darren Dunphy, Xiaoru Guo, Gregory Stone and Sungwook Huh; Lumileds, United States.

SESSION MP01: Poster Session I: New Materials and Device Concepts

Monday Afternoon, July 8, 2019

6:30 PM - 8:30 PM

Grand Ballroom, Second Floor

MP01.01

Efficient Hybrid Organic/Inorganic P-N White Light-Emitting Diodes with 4,4'-cyclohexane-1,1-diylbis[N,N-bis(4-methylphenyl)aniline] as Hole Transport Layer Danbei Wang¹, Bin Liu¹, Hongmei Zhang², Hong Zhao¹, Tao Tao¹, Zili Xie¹, Rong Zhang^{1,3} and Youdou Zheng¹; ¹Nanjing University, China; ²Institute of Advanced Materials (IAM), Nanjing University of Posts and Telecommunications, China; ³Xiamen University, China.

MP01.02

Boron Rich B(Al)N Alloys Grown by MOVPE Adama Mballo¹, Phuong Vuong¹, Tinh Tran², Suresh Sundaram^{1,3,4}, Yacine Halfaya¹, Feras AlQatari², Xiao Tang², Xiaohang Li², Paul Voss^{1,4} and Abdallah Ougazzaden^{1,4}; ¹CNRS, UMI 2958, G T - CNRS, France; ²King Abdullah University of Science and Technology, Saudi Arabia; ³GT Lorraine, France; ⁴Georgia Institute of Technology, France.

MP01.03

Structural and Electronic Properties of the V-V Compounds Isoelectronic to GaN and Isostructural to Gray Arsenic Zhao Yang, Dan Han and Shiyou Chen; East China Normal University, China.

MP01.04

Proposal of N-Polar (Al)GaIn/AlN High Electron Mobility Transistor and its Heteroepitaxy Tadatashi Ito¹, Narihito Okada¹, Ryota Sakamoto¹, Tatsuya Isono¹, Yongzhao Yao², Yukari Ishikawa² and Kazuyuki Tadamoto¹; ¹Yamaguchi University, Japan; ²Japan Fine Ceramics Center (JFCC), Japan.

MP01.05

Growth of AlN Barriers in Al/AlN/Al SIS Josephson Junctions by Low Temperature Atomic Layer Epitaxy Charles R. Eddy Jr.¹, Daniel J. Pennachio², Joon S. Lee², Anthony McFadden², Samantha G. Rosenberg^{3,1}, Yu H. Chang² and Chris J. Palmström²; ¹Naval Research Laboratory, United States; ²University of California Santa Barbara, United States; ³American Society for Engineering Education, United States.

MP01.06

GaN/AlInO Waveguide for Visible Light Communications Rebecca M. Lentz, Matthew R. Peart and Jonathan J. Wierer; Lehigh University, United States.

MP01.07

Insights into Nucleation and Growth of Thermodynamically Controlled CVD Growth of Hexagonal Boron Nitride (h-BN) Ankit Rao and Srinivasan Raghavan; Indian Institute of Science, India.

TUESDAY PRESENTATIONS

* Invited Paper

SESSION A03: Efficiency in Light Emitters
Session Chairs: Yasufumi Fujiwara and Yoichi Kawakami
Tuesday Morning, July 9, 2019
Evergreen Ballroom E-F, Lobby Level

8:30 AM *A03.01

Exploring the Fundamentals of Efficiency in III-N LEDs James Speck;
University of California, United States.

9:00 AM A03.02

Demonstration of Tunneling and Sub-Bandgap Recombination in InGaN LEDs at Extremely Low Current Levels Nicola Renso, Matteo Buffolo, Carlo De Santi, Gaudenzio Meneghesso, Enrico Zanoni and Matteo Meneghini; University of Padova, Italy.

9:15 AM A03.03

Auger Recombination in AlGaIn/AlN Quantum Wells Felix Nippert¹, Mohammad Tollabi Mazraehno^{1,2}, Matthew J. Davies², Marc P. Hoffmann², Hans-Juergen Lugauer², Thomas Kure¹, Michael Kneissl¹, Axel Hoffmann¹ and Markus R. Wagner¹; ¹Technische Universität Berlin, Germany; ²OSRAM Opto Semiconductors GmbH, Germany.

9:30 AM A03.04

On the Origin of Thermal and Efficiency Droop in III-Nitride Light-Emitting Diodes—A Temperature-Dependent Carrier Dynamics Method Arman Rashidi, Morteza Monavarian, Andrew A. Aragon and Daniel Feezell; Center for High-Technology Materials, The University of New Mexico, United States.

9:45 AM A03.05

Modeling of Thermal Droop in InGaN Layers and UV-A LEDs—Contribution of SRH Recombination and Thermionic Escape Carlo De Santi, Matteo Meneghini, Desiree Monti, Gaudenzio Meneghesso and Enrico Zanoni; University of Padova, Italy.

10:00 AM A03.06

Modeling of Lateral Carrier Diffusion by Considering Indium Composition Fluctuation in Green InGaN LEDs and the Influences of QW Numbers Ren-Shiun Liou¹, Guillaume Lheureux², Bastien Bonef², Cheyenne Lynsky², Ryan White², Abdullah Alhassan², James Speck², Claude Weisbuch^{2,4} and Yuh-Renn Wu^{1,3}; ¹National Taiwan University, Taiwan; ²University of California, Santa Barbara, United States; ³Industrial Technology Research Institute, Taiwan; ⁴CNRS-Ecole Polytechnique, France.

10:15 AM BREAK

SESSION A04: Light Emitter Systems
Session Chairs: Philippe Boucaud, T. Paul Chow and Piotr Perlin
Tuesday Morning, July 9, 2019
Evergreen Ballroom E-F, Lobby Level

10:45 AM *A04.01

Gallium Nitride Micro-LED Drive Circuits for Visible Light Communications Johannes Herrnsdorf¹, Jonathan McKendry¹, Alexander Griffiths¹, Michael Strain¹, Robert Henderson² and Martin Dawson¹; ¹University of Strathclyde, United Kingdom; ²University of Edinburgh, United Kingdom.

11:15 AM A04.02

Heterogeneously Integrated InGaIn Laser—A Grand Challenge from Perspective of Silicon Photonics Toshihiro Kamei^{1,2}, Takeshi Kamikawa¹, Masahiro Araki¹, Steven P. DenBaars¹, Shuji Nakamura¹ and John E. Bowers¹; ¹University of California, Santa Barbara, United States; ²National Institute of Advanced Industrial Science and Technology, Japan.

11:30 AM A04.03

A III-Nitride on Silicon Nanophotonic Platform—Electrical Injection and Microlaser Photonic Circuits Farsane Tabataba-Vakili^{1,2}, Stéphanie Rennesson³, Benjamin Damilano³, Laetitia Doyennette⁴, Christelle Brimont⁴, Thierry Guillet⁴, Eric Frayssinet³, Julien Brault³, Jean-Yves Duboz², Iannis Roland¹, Moustafa El Kurdi¹, Xavier Checoury¹, Sébastien Sauvage¹, Fabrice Semond³, Bruno Gayral² and Philippe Boucaud³; ¹C2N, CNRS, University Paris-Sud, Université Paris-Saclay, France; ²CEA, INAC-PHELIQS,

University Grenoble Alpes, France; ³Université Côte d'Azur, CRHEA-CNRS, France; ⁴L2C, Université de Montpellier, France.

11:45 AM A04.04

MOVPE of Cascaded LEDs Using GaN:Mg/GaN:Ge Tunnel Junctions Silvio Neugebauer, Jürgen Bläsing, Armin Dadgar and André Strittmatter; Otto-von-Guericke University Magdeburg, Germany.

12:00 PM A04.05

High-Power InGaIn Superluminescent Diode with 400-MHz Modulation Bandwidth Exciting Perovskite Nanocrystals for Solid-State Lighting and Visible Light Communication Abdullah A. Alatawi^{1,2}, Jorge A. Holguin-Lerma¹, Chun H. Kang¹, Chao Shen¹, Ibrahim Dursun⁴, Lutfan Sinatra³, Abdulrahman M. Albadri², Ahmed Y. Alyamani², Osman M. Bakr⁴, Tien Khee Ng¹ and Boon S. Ooi¹; ¹King Abdullah University of Science and Technology (KAUST), Saudi Arabia; ²King Abdulaziz City for Science and Technology (KACST), Saudi Arabia; ³Quantum Solutions LLC, Saudi Arabia; ⁴King Abdullah University of Science and Technology (KAUST), Saudi Arabia.

12:15 PM A04.06

Room-Temperature Continuous-Wave Electrically Injected GaN-on-Si Microdisk Lasers Meixin Feng, Jin Wang, Jianxun Liu, Qian Sun, Hongwei Gao, Yu Zhou, Jianping Liu, Shuming Zhang, Deyao Li, Liqun Zhang and Hui Yang; Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, China.

SESSION B03: High Frequency HEMTs
Session Chairs: Debdeep Jena and Farid Medjdoub
Tuesday Morning, July 9, 2019
Cedar Ballroom, Second Floor

8:30 AM *B03.01

W Band and Beyond GaN Devices Yan Tang¹, D. Micovic², D. Regan¹, J. Wong¹, A. Schmitz¹, S. Kim¹ and A. Corrión¹; ¹HRL Laboratories, LLC, United States; ²Raytheon, United States.

9:00 AM B03.02

Evaluation of Bias-Dependent Electron Velocity in mm-Wave N-Polar GaN Deep Recess HEMTs Extracted from Small-Signal Equivalent Circuit Parameters Brian Romanczyk¹, Matthew Guidry¹, Xun Zheng¹, Haoran Li¹, Elaheh Ahmadi², Stacia Keller¹ and Umesh K. Mishra¹; ¹University of California, Santa Barbara, United States; ²University of Michigan, United States.

9:15 AM B03.03

Deeply-Scalable GaN-on-Si HEMTs with f_T up to 300 GHz Zhihong Liu¹, Weichuan Xing², Hanlin Xie¹, Kumud Ranjan², Kenneth E. Lee¹ and Geok Ing Ng²; ¹Singapore-MIT Alliance for Research and Technology, Singapore; ²Nanyang Technological University, Singapore.

9:30 AM B03.04

High Linearity Graded AlGaIn Channel Field Effect Transistors with Epitaxial Passivation Shahadat H. Sohel¹, Andy Xie², Edward Beam², Hao Xue¹, Towhidur Razzak¹, Sanyam Bajaj¹, Yu Cao², Wu Lu¹ and Siddharth Rajan¹; ¹The Ohio State University, United States; ²Qorvo, Inc., United States.

9:45 AM *B03.05

Next Generation RF Switches Using the Super Lattice Castellated Field Effect Transistor (SLCFET) Robert S. Howell; Northrop Grumman Corporation, United States.

10:15 AM BREAK

SESSION B04: Vertical Devices
Session Chairs: Rongming Chu and Hu Liang
Tuesday Morning, July 9, 2019
Cedar Ballroom, Second Floor

10:45 AM B04.01

Vertical GaN Fin Transistor for High Power RF Applications Nadim Chowdhury¹, Qingyun Xie¹, Ujwal Radhakrishna¹, Joshua A. Perozek¹, Xingyu Zou¹, Thomas Jokinen², Garrett J. Schlenvogt², Dimitri A. Antoniadis¹ and Tomas Palacios¹; ¹Massachusetts Institute of Technology, United States; ²Silvaco, Inc., United States.

11:00 AM B04.02

Vertical GaN-on-Si Power Devices Elison Matioli; Ecole Polytechnique Federale de Lausanne, Switzerland.

11:15 AM B04.03

Leakage and Breakdown Mechanisms of 1.2 kV GaN Vertical Power FinFETs Ming Xiao¹, Xiang Gao², Tomas Palacios³ and Yuhao Zhang¹; ¹Virginia Tech, United States; ²IQE RF LLC, United States; ³Massachusetts Institute of Technology, United States.

11:30 AM B04.04

Threshold Voltage Variations in Semi-Vertical GaN-on-Si FETs—A Comprehensive Study Kalparupa Mukherjee¹, Matteo Borga¹, Maria S. Ruzzarin¹, Steve Stoffels², Karen Geens², Hu Liang², Stefaan Decoutere², Gaudenzio Meneghesso¹, Enrico Zanoni¹ and Matteo Meneghini¹; ¹University of Padua, Italy; ²imec, Belgium.

11:45 AM B04.05

Fabrication and Characterization of First GaN-on-Si Based Vertical MOSFETs Debalen Biswas, Naoki Torii, Keiji Yamamoto and Takashi Egawa; Nagoya Institute of Technology, Japan.

12:00 PM B04.06

E-Mode AlGaIn/GaN Vertical Trench MIS-HEMTs with a High (~1 A/mm) Drain Current Fabricated Using AlGaIn Regrowth Technique Akio Yamamoto, Keito Kanatani, Naofumi Yoneda and Masaaki Kuzuhara; University of Fukui, Japan.

12:15 PM B04.07

Estimation of Impact Ionization Coefficient in GaN and Its Temperature Dependence by Photomultiplication Measurements Utilizing Franz-Keldysh Effect Takuya Maeda¹, Tetsuo Narita², Hiroyuki Ueda², Masakazu Kanechika², Tsutomu Uesugi², Tetsu Kachi³, Tsunenobu Kimoto¹, Masahiro Horita^{1,3} and Jun Suda^{1,3}; ¹Kyoto University, Japan; ²Toyota Central R&D Labs., Inc., Japan; ³Nagoya University, Japan.

SESSION G03: BN Epitaxy

Session Chairs: Guillaume Cassabois and Xiaohang Li

Tuesday Morning, July 9, 2019

Evergreen Ballroom A-C, Lobby Level

8:30 AM G03.01

Growth of BGaN Films Using BBr₃ Gas as B Source in MBE Richard C. Cramer, Bastien Bonef, John English and James Speck; University of California, Santa Barbara, United States.

8:45 AM G03.02

Optimization of Vapor Phase Epitaxy for Thick Boron Nitride Films Anthony Rice, Andrew Allerman, Mary Crawford, Michael Smith, Gregory Pickrell and Paul Sharps; Sandia National Laboratories, United States.

9:00 AM G03.03

Ion-Irradiation Effects on Crystal Quality of Epitaxial c-BN (001) Films Kazuyuki Hirama, Yoshitaka Taniyasu, Hideki Yamamoto and Kazuhide Kumakura; NTT Basic Research Laboratories, Japan.

9:15 AM G03.04

MOVPE Grown Hexagonal Boron Nitride for SERS Application Dipankar Chugh, Jennifer Wong-Leung, Li Li, Mykhaylo Lysevykh, Chennupati Jagadish and Hoe Tan; Australian National University, Australia.

9:30 AM G03.05

Molecular Beam Epitaxy and Characterization of Hexagonal Boron Nitride Quantum Dots Ping Wang¹, David A. Laleyan¹, Eric T. Reid¹, Jiseok Gim², Qiannan Wen¹, Zhe Liu¹, Zhaohui Zhong¹, Mackillo Kira¹, Robert Hovden² and Zetian Mi¹; ¹University of Michigan, United States; ²University of Michigan, United States.

9:45 AM G03.06

Phase Control of CVD-Grown BN Layer on Al₂O₃ Substrate Hisashi Yamada¹, Sho Inotsume^{1,2}, Naoto Kumagai¹, Toshikazu Yamada¹ and Mitsuaki Shimizu^{1,2}; ¹National Institute of Advanced Industrial Science and Technology (AIST), Japan; ²Nagoya-University, Japan.

10:00 AM LATE NEWS

10:15 AM BREAK

SESSION G04: Epitaxy for UV Applications
Session Chairs: Motoaki Iwaya and Michael Kneissl
Tuesday Morning, July 9, 2019
Evergreen Ballroom A-C, Lobby Level

10:45 AM *G04.01

Growth of Ultrathin GaN Quantum Wells Towards Deep Ultraviolet Light Sources Xinqiang Wang¹, Y.X. Wang¹, S Ivanov², Tao Wang¹, Bowen Sheng¹, Shiping Guo³, Hideto Miyake⁴, Frank Bertram⁵, Xin Rong¹, V Kozlovsky⁶, Juergen Christen⁵ and Bo Shen¹; ¹Peking University, China; ²Ioffe Institute, Russian Federation; ³Advanced Micro-Fabrication Equipment Inc, China; ⁴Mie University, Japan; ⁵Otto-von-Guericke-University Magdeburg, Germany; ⁶Lebedev Physical Institute, Russian Federation.

11:15 AM G04.02

Highly Efficient UV Emission from Ultrathin GaN/AlN Quantum Wells Grown by Metalorganic Vapor Phase Epitaxy Mitsuru Funato, Hirotsugu Kobayashi and Yoichi Kawakami; Kyoto University, Japan.

11:30 AM G04.03

High Quality AlN Growth by Ammonia-Free High Temperature MOVPE Xuqiang Shen, K Kojima and H Okumura; National Institute of Advanced Industrial Science and Technology (AIST), Japan.

11:45 AM G04.04

High-Temperature Molecular Beam Epitaxy and Characterization of High Quality Al(Ga)N on Sapphire David A. Laleyan¹, Eric T. Reid¹, Xianhe Liu¹, Ayush Pandey¹, Mohammad Soltani², Gianluigi Botton³ and Zetian Mi¹; ¹University of Michigan, United States; ²Raytheon BBN Technologies, United States; ³McMaster University, Canada.

12:00 PM G04.05

Crack and Strain Free 16 µm Thick AlN on Sapphire Templates Iftikhar Ahmad¹, Kamal Hussain¹, Md Abdullah-Al Mamun¹, Mikhail Gaevski¹, MVS Chandrashekar¹, Kenny Huynh², Michael E. Liao², Tingyu Bai², Mark Goorsky², Grigory Simin¹ and Asif Khan¹; ¹University of South Carolina, United States; ²University of California, Los Angeles, United States.

12:15 PM G04.06

Epitaxial Lateral Overgrowth of AlN with Partially Non-Dislocation-Region on Vicinal AlN Template Narihito Okada¹, Fijun Kim¹, Takahiro Saito¹, Sachie Fujikawa², Noritoshi Maeda³, Hideki Hirayama³ and Kazuyuki Tadatomo¹; ¹Yamaguchi University, Japan; ²Tokyo Denki University, Japan; ³Riken, Japan.

SESSION H02: Nanostructures and Nano-Devices I

Session Chairs: Zhaoxia Bi and Andreas Waag

Tuesday Morning, July 9, 2019

Regency Ballroom E-G, Second Floor

8:30 AM *H02.01

Challenges in Accurate Assessment of Nanorod Structures Robert Martin; University of Strathclyde, United Kingdom.

9:00 AM H02.02

AlGaIn Microfins for Efficient UV Emitters: Growth and Optical Characterization Christoph Margenfeld^{1,2}, Hendrik Spende^{1,2}, Maximilian Zapf³, Hans-Juergen Lugauer⁴, Carsten Ronning³, Hergo-Heinrich Wehmann^{1,2} and Andreas Waag^{1,2}; ¹Technische Universität Braunschweig, Germany; ²Epitaxy Competence Center ec2, Germany; ³Friedrich Schiller University Jena, Germany; ⁴Osram Opto Semiconductors GmbH, Germany.

9:15 AM H02.03

Problematics of P-Type AlN Nanowires—Mg/In Codoping and Activation Issues Alexandra M. Siladie^{1,3}, Gwénoél Jacopin², Ana Cros⁴, Núria Garro⁴, Eric Robin^{5,3}, Damien Calliste⁶, Pascal Pochet⁶, Fabrice Donatini², Julien Pernot² and Bruno Daudin¹; ¹CEA, INAC-PHELIQS “Nanophysics and Semiconductors” Group, France; ²Institut Néel, Université Grenoble Alpes, CNRS, Grenoble INP, France; ³Université Grenoble Alpes, France; ⁴Institute of Materials Science (ICMUV), Universidad de Valencia, Spain; ⁵CEA, INAC-MEM, LEMMA, France; ⁶CEA, INAC-MEM, L-SIM, France.

9:30 AM H02.04

High Performance of AlGaIn/GaN FinMISHFETs by Using m-Plane Sidewall Channel Quan Dai, Dong-Hyeok Son, Young-Jun Yoon, Ryun-Hwi Kim, Jeong-Gil Kim, Jun-Hyeok Lee, Hyeon-Su Lee, Kyung-Wan Kim, Yong-Soo Lee and Jung-Hee Lee; Kyungpook National University, Korea (the Republic of).

9:45 AM H02.05

Fabrication of GaN-on-GaN Vertical Nanowire Schottky Barrier Diodes by Top-Down Approach Yaqiang Liao¹, Jia Wang¹, Yuto Ando¹, Xu Yang¹, Jun Hirotani¹, Maki Kushimoto¹, Manato Deki¹, Atsushi Tanaka¹, Shugo Nitta¹, Yoshio Honda¹, Kevin J. Chen² and Hiroshi Amano¹; ¹Nagoya University, Japan; ²Hong Kong University of Science and Technology, China.

10:00 AM H02.06

Surface Passivation Effect by Saturated Ozone Water Treatment on InGaN/GaN Nanostructures Fabricated by Hydrogen Environment Anisotropic Thermal Etching (HEATE) Yusuke Namae¹, Daichi Ito¹, Akihiro Matsuoka¹, Yuki Ooe¹, Yuta Moriya¹ and Akihiko Kikuchi^{1,2}; ¹Sophia University, Japan; ²Sophia Nanotechnology Research Center, Japan.

SESSION M01: Ultrawide Gap Materials and Properties

Session Chairs: Sergej Karpov and André Strittmatter

Tuesday Morning, July 9, 2019

Regency Ballroom E-G, Second Floor

10:45 AM *M01.01

Dopants and Defects in Ultrawide-Band-Gap Nitrides Chris G. Van de Walle; University of California, Santa Barbara, United States.

11:15 AM *M01.02

Hexagonal Boron Nitride: Physics and Applications in the Deep Ultraviolet Guillaume Cassabois; Montpellier University, France.

11:45 AM M01.03

High Quality h-BN Thin Films and Their Application as Flexible Buffer Layer for Conventional III-Nitrides Epitaxy Fang Liu¹, Xin Rong¹, Tao Wang¹, Ye Yu³, Bowen Sheng^{1,2}, Jiaqi Wei¹, Yuantao Zhang³, Frank Bertram², Fujun Xu¹, Xuelin Yang¹, Juergen Christen², Bo Shen¹ and Xinqiang Wang¹; ¹Peking University, China; ²Otto-von-Guericke-University Magdeburg, Germany; ³Jilin University, China.

12:00 PM M01.04

Control of Lateral Quality of 2D h-BN Governs Selective Area Growth of III-N Device Structures Suresh Sundaram^{1,2,3}, Taha Ayari^{2,3}, Soufiane Karakchou^{1,2}, Adama Mballo², Phuong Vuong², Yacine Halfaya², Paul Voss^{1,2}, Jean Paul Salvestrini^{1,2,3} and Abdallah Ougazzaden^{1,2}; ¹Georgia Institute of Technology, France; ²CNRS, UMI 2958, GT - CNRS, France; ³GT Lorraine, France.

12:15 PM M01.05

Metal Organic Chemical Vapor Deposition of Hexagonal Boron Nitride on Transition Metal Surfaces Michael Snure, Gene Siegel, Timothy Prusnick and Stefan C. Badescu; Air Force Research Laboratory, United States.

SESSION I02: Excitons in AlGaIn

Session Chairs: Axel Hoffmann and Saulius Marcinkevicius

Tuesday Morning, July 9, 2019

Regency Ballroom A-C, Second Floor

8:30 AM *I02.01

Control Over Dipolar Exciton Fluids in GaN/(AlGa)N Nanostructures Maria Vladimirova¹, François Chiaruttini¹, Thierry Guillet¹, Christelle Brimont¹, Benoit Jouault¹, Pierre Lefebvre¹, Sébastien Chenot², Yvon Cordier² and Benjamin Damilano²; ¹CNRS-University of Montpellier, France; ²University Cote d'Azur/CNRS, France.

9:00 AM I02.02

Excitonic Effects on Radiative Recombination in AlGaIn Quantum Wells for Deep UV Emitters Greg Rupper, Chelsea R. Haughn, Michael Wraback and Gregory Garrett; U.S. Army Research Laboratory, United States.

9:15 AM I02.03

Role of Exciton Recombination Processes on Internal Quantum Efficiency in AlGaIn-Based UV-B Multiple Quantum Wells Hideaki Murotani^{1,2}, Hiroyuki Miyoshi², Ryohei Takeda², M. A. Khan³, Noritoshi Maeda³, Masafumi Jo³, Hideki Hirayama³ and Yoichi Yamada²; ¹National Institute of Technology, Tokuyama College, Japan; ²Yamaguchi University, Japan; ³RIKEN Cluster for Pioneering Research, Japan.

9:30 AM I02.04

Kinetic Monte Carlo Simulations of Carrier Dynamics in AlGaIn/AlGaIn Quantum Wells Oleg Kravcov, Juras Mickevicius and Gintautas Tamulaitis; Vilnius University, Lithuania.

9:45 AM I02.05

Comparative Study of AlGaIn Multiple Quantum Wells on Annealed-Sputtered-AlN and MOVPE-Grown-AlN on Sapphire Substrates Kanako Shojiki¹, Ryota Ishii², Kenjiro Uesugi³, Mitsuru Funato², Yoichi Kawakami² and Hideto Miyake^{4,1}; ¹Mie University, Japan; ²Kyoto University, Japan; ³Mie University, Japan; ⁴Mie University, Japan.

10:00 AM I02.06

Optically Pumped Stimulated Emission from AlGaIn-Based UV-C Multiple Quantum Wells with High Internal Quantum Efficiency of 16 % at 750 K Hideaki Murotani^{1,2}, Keisuke Hisanaga², Ryohei Tanabe², Akira Hamada², Noritoshi Maeda³, Masafumi Jo³, Hideki Hirayama³ and Yoichi Yamada²; ¹National Institute of Technology, Tokuyama College, Japan; ²Yamaguchi University, Japan; ³RIKEN Cluster for Pioneering Research, Japan.

10:15 AM BREAK

SESSION I03: 2D Gas Properties

Session Chairs: Elke Meissner and Grace Xing

Tuesday Morning, July 9, 2019

Regency Ballroom A-C, Second Floor

10:45 AM I03.01

2D Electron-Hole Gas Bilayers in Undoped AlN/GaN/AlN Heterostructures Reet Chaudhuri, Jeffrey Miller, Samuel J. Bader, Grace Xing and Debdeep Jena; Cornell University, United States.

11:00 AM I03.02

Role of Background Impurities on the Formation of a 2DEG in GaN/AlGaIn Heterostructures Stefan Schmult¹, Steffen Wirth², Victor Solovveyev³, Rico Hentschel⁴, Andre Wachowiak⁴, Andreas Großert⁴, Igor V. Kukushkin³ and Thomas Mikolajick^{1,4}; ¹TU Dresden, Germany; ²Max-Planck-Institute for Chemical Physics of Solids, Germany; ³Institute of Solid State Physics RAS, Russian Federation; ⁴NaMLab gGmbH, Germany.

11:15 AM I03.03

Spectroscopic Toolbox for Nitride HEMT Characterization Yury Turkulets and Ilan Shalish; Ben Gurion University, Israel.

11:30 AM I03.04

Operando Analysis of Local Piezoelectric Lattice Distortion in AlGaIn/GaN HEMT Devices Using Synchrotron Radiation Nanobeam X-Ray Diffraction Akira Ueda¹, Haruna Shiomi¹, Tetsuya Tohei¹, Yuji Ando², Tamotsu Hashizume², Yasuhiko Imai³, Kazushi Sumitani³, Shigeru Kimura³ and Akira Sakai¹; ¹Osaka University, Japan; ²Hokkaido University, Japan; ³JASRI, Japan.

11:45 AM I03.05

Effects of Surface Treatments on the Surface State Density of AlGaIn/GaN Heterostructures Eric Blanton¹, Timothy Prusnick^{1,2}, Gene Siegel^{1,2}, Gordon J. Grzybowski^{1,2}, Bruce Claflin¹, Nicholas R. Glavin³ and Michael Snure¹; ¹Air Force Research Laboratory, United States; ²KBRWyle, United States; ³Air Force Research Laboratory, United States.

12:00 PM *I03.06

Electrical Force Microscopies for the Study of Nitride Semiconductors—Results and Challenges Ana Cros¹, Núria Garro¹, Albert Minj², A. Madalina Siladie³ and Bruno Daudin³; ¹University of Valencia, Spain, Spain; ²CNRS UMR 6252, France; ³University Grenoble-Alpes, CEA-INAC, PHELIQS, France.

SESSION A05: Vertical Cavity Emitters

Session Chairs: Hideki Hirayama and Takao Miyajima

Tuesday Afternoon, July 9, 2019

Evergreen Ballroom E-F, Lobby Level

2:00 PM *A05.01

Progress in Ultraviolet Vertical-Cavity Surface-Emitting Lasers Russell Dupuis, Theeradetch Detchprohm, Chuan-Wei Tsou, Young Jae Park, Hoon Jeong, Jialin Wang, Karan Mehta, Ping Chen, P. D. Yoder and Shyh-Chiang Shen; Georgia Institute of Technology, United States.

2:30 PM A05.02

AlGaIn Multiple Quantum Well (MQW) Design for Low Threshold Mid Ultraviolet Laser Qiang Guo¹, Ronny Kirste², Seiji Mita², Pramod Reddy², Shun Washiyama¹, Yan Guan¹, Felix Nippert³, Will Mecouch², Ramón Collazo^{1,2} and Zlatko Sitar^{1,2}; ¹North Carolina State University, United States; ²Adroit Materials, United States; ³Technische Universität Berlin, Germany.

2:45 PM A05.03

Design of Tunnel-Injected Sub-300 nm AlGaIn-Based Lasers Syed Mohammad Najib Hasan¹, Zane Jamal-Eddine¹, Darshana Wickramaratne², Banaful Paul¹, Siddharth Rajan¹ and Shamsul Arafin¹; ¹The Ohio State University, United States; ²U.S. Naval Research Laboratory, United States.

3:00 PM A05.04

Optimization of Al Composition Gradient P-Type AlGaIn Cladding Layer in UV-B Laser Structure Yuya Ogino¹, Kosuke Sato^{1,2}, Shinji Yasue¹, Motoaki Iwaya¹, Satoshi Kamiyama¹, Tetsuya Takeuchi¹ and Isamu Akasaki^{1,3}; ¹Meijo University, Japan; ²Asahi-Kasei Cooperation, Japan; ³Akasaki Research Center, Nagoya University, Japan.

3:15 PM A05.05

Vertical Microcavity Based on an AlGaIn Membrane with Two Dielectric Distributed Bragg Reflectors Emitting at 330 nm Filip Hjort¹, Johannes Enslin², Michael A. Bergmann¹, Munise Cobet², Johan Gustavsson¹, Tim Wernicke², Michael Kneissl² and Åsa Haglund¹; ¹Chalmers University of Technology, Sweden; ²Technische Universität Berlin, Germany.

3:30 PM A05.06

High Power Blue Surface Emitting Superluminescent LEDs Rory Cahill^{1,2}, Pleun Maaskant², Mahbub Akhter² and Brian Corbett^{1,2}; ¹University College Cork, Ireland; ²Tyndall National Institute, Ireland.

3:45 PM BREAK

SESSION A06: Tunnel Junction Emitters
Session Chairs: Emmanouil Kioupakis and Tetsuya Takeuchi
Tuesday Afternoon, July 9, 2019
Evergreen Ballroom E-F, Lobby Level

4:15 PM A06.01

Tunnel Junctions for Nitride Laser Diodes Czesław Skierbiszewski, Marcin Siekacz, Grzegorz Muziol, Henryk Turski, Krzesimir Nowakowski-Szkudlarek, Mateusz Hajdel, Mikolaj Zak, Anna Feduniewicz-Zmuda, Pawel Wolny and Marta Sawicka; Institute of High Pressure Physics, Polish Academy of Sciences, Poland.

4:30 PM A06.02

Nano-Cathodoluminescence Investigations of Cascaded InGaIn/GaN LED Using GaN:Mg/GaN:Ge Tunnel Junctions Juergen Christen, Gordon Schmidt, Peter Veit, Frank Bertram, Silvio Neugebauer, Jürgen Bläsing, Armin Dadgar and André Strittmatter; Otto-von-Guericke-University Magdeburg, Germany.

4:45 PM A06.03

Hybrid MOCVD/MBE Tunnel Junctions for III-Nitride UVC LEDs and Low Voltage Penalty Blue LEDs Jianfeng Wang¹, Erin Young¹, Burhan SaifAddin¹, Christian J. Zollner¹, Abdullah Almagbel¹, Micha Fireman¹, Michael Iza¹, Shuji Nakamura^{1,2}, Steven P. DenBaars^{1,2} and James Speck¹; ¹University of California, Santa Barbara, United States; ²University of California, Santa Barbara, United States.

5:00 PM A06.04

GaN:Mg/GaN:Ge Tunnel Junctions for Better Light Emitters Christoph Berger, Silvio Neugebauer, Cleopha Seneza, Jürgen Bläsing, Armin Dadgar and André Strittmatter; Otto-von-Guericke-University Magdeburg, Germany.

5:15 PM A06.05

Ge-Doped GaN and (Al,Ga)N Tunnel Junctions on Top of Blue and UV Emitting Structures Victor Fan Arcara^{1,2}, Benjamin Damilano², Guy Feuillet¹, Stéphane Vézian², Sébastien Chenot² and Jean-Yves Duboz²; ¹CEA, France; ²CNRS - CRHEA, France.

5:30 PM A06.06

High Wall Plug Efficiency III-Nitride LEDs with Tunnel Junction Contacts Grown Entirely by MOCVD Abdullah I. Alhassan^{1,2}, Abdulrahman M. Albadi¹, Hamad Albraithen¹, James Speck², Steven P. DenBaars², Shuji Nakamura² and Ahmed Y. Alyamani¹; ¹King Abdulaziz City for Science and Technology, Saudi Arabia; ²University of California, Santa Barbara, United States.

5:45 PM A06.07

Size Dependence of Recombination Processes in Tunnel Junction μ LEDs Krzysztof Gibasiewicz¹, Grzegorz Muziol¹, Marcin Siekacz¹, Jacek Kacperski², Szymon Grzanka^{1,2}, Lucja Marona^{1,2}, Czesław Skierbiszewski¹, Piotr Perlin^{1,2} and Tadeusz Suski¹; ¹Institute of High Pressure Physics, Poland; ²TopGaN, Poland.

SESSION B05: Transistor Performance and Circuits

Session Chairs: Robert Howell and Tomas Palacios
Tuesday Afternoon, July 9, 2019
Cedar Ballroom, Second Floor

2:00 PM *B05.01

Degradation of GaN-Based Lateral and Vertical Devices—Challenges and Perspectives Matteo Meneghini, Carlo De Santi, Alessandro Barbato, Matteo Borgia, Eleonora Canato, Francesca Chiochetta, Elena Fabris, Zhan Gao, Fabrizio Masin, Kalparupa Mukherjee, Arianna Nardo, Fabiana Rampazzo, Maria S. Ruzzarin, Mehdi Rzin, Alaleh Tajalli, Marco Barbato, Gaudenzio Meneghesso and Enrico Zanoni; University of Padova, Italy.

2:30 PM B05.02

Suppression of Green Luminescence by Co-Implantation of Mg/F Ions into GaN at High Temperature Masahiro Takahashi¹, Atsushi Tanaka^{2,3}, Shigeyoshi Usami¹, Yuto Ando¹, Hirotaka Watanabe², Manato Deki², Maki Kushimoto¹, Shugo Nitta², Yoshio Honda² and Hiroshi Amano^{2,4,5}; ¹Nagoya University, Japan; ²Nagoya University IMaSS, Japan; ³NIMS, Japan; ⁴Nagoya University ARC, Japan; ⁵Nagoya University VBL, Japan.

2:45 PM B05.03

QuanFINE—High RF Performance AlGaIn/AlN/GaN HEMTs with a Thin Buffer Layer Ding Yuan Chen^{1,2}, Johan Bergsten², Anna Malmros², Mattias Thorsell², Hans Hjelmgren², Jr-Tai Chen¹, Olof Kordina¹ and Niklas Rorsman²; ¹SweGaN AB, Sweden; ²Chalmers University of Technology, Sweden.

3:00 PM B05.04

Remarkable Lateral Breakdown Voltage in Thin Channel AlGaIn/GaN High Electron Mobility Transistors on Thick AlN/Sapphire Templates Idriess Abid¹, Riad Kabouche¹, Malek Zegaoui¹, Catherine Bougerol², Remi Comyn³, Yvon Cordier³ and Farid Medjdoub¹; ¹IEMN, France; ²Université Grenoble Alpes, France; ³CHREA, France.

3:15 PM B05.05

Monolithic GaN Power Circuits for Highly-Efficient, Fast-Switching Converter Applications with Higher Functionality Patrick Waltereit, Richard Reiner, Stefan Moench, Stefan Mueller, Heiko Czap, Michael Dammann, Lutz Kirste and Ruediger Quay; Fraunhofer Institute for Applied Solid State Physics IAF, Germany.

3:30 PM B05.06

p-GaN Gate HEMTs, RTL Logic and Gate Driver Monolithically Integrated on 200 mm QST® Substrates for GaN ICs Xiangdong Li^{1,2}, Karen Geens², Weiming Guo², Ming Zhao², Shuzhen You², Niels Posthuma², Steve Stoffels², Hu Liang², Vladimir Odnoblyudov³, Cem Basceri³, Ozgur Aktas³, Guido Groeseneken^{1,2} and Stefaan Decoutere²; ¹KU Leuven, Belgium; ²imec, Belgium; ³Qromis, Inc., United States.

3:45 PM BREAK

SESSION B06: Electronic Device Frontiers
Session Chairs: Andrei Vescan and Patrick Waltereit
Tuesday Afternoon, July 9, 2019
Cedar Ballroom, Second Floor

4:15 PM *B06.01

The New Nitrides—Epitaxial Integration of 2D, Ferromagnetic and Superconducting Nitrides with GaN and AlN for Novel Device Applications Debdeep Jena^{1,2}; ¹Cornell University, United States; ²Cornell University, United States.

4:45 PM B06.02

Room Temperature NDR in Digital Alloy AlGaIn Barrier RTDs Ding Wang^{1,2,3}, Zhaoying Chen¹, Tao Wang¹, Shanshan Sheng¹, Juan Su³, Wei Tan³, Shipping Guo⁴, Jian Zhang³, Bo Shen¹ and Xinqiang Wang¹; ¹Peking University, China; ²Tsinghua University, China; ³China Academy of Engineering Physics, China; ⁴Advanced Micro-Fabrication Equipment Inc, China.

5:00 PM B06.03

Control of Resonant Tunneling Voltage in III-Nitride Double-Barrier Heterostructures by δ -Doping Engineering Jimmy Encomendero, Vladimir Protasenko, Debdeep Jena and Grace Xing; Cornell University, United States.

5:15 PM B06.04

First Demonstration of AlGaIn-Based HEMTs with AlN/GaN Superlattice Channels Ming Xiao^{1,2}, Yuhao Zhang¹, Weihang Zhang², Hengsheng Shan^{3,2}, Kui Dang², Jincheng Zhang² and Yue Hao²; ¹Virginia Polytechnic Institute and State University, United States; ²Xidian University, China; ³Shaanxi University of Science and Technology, China.

5:30 PM B06.05

Multi-Channel Tri-Gate Architecture for Future GaN Power Devices Luca Nela, Jun Ma and Elisa Matorioli; EPFL, Switzerland.

5:45 PM B06.06

Novel GaN Based ScAlN Barrier Transistors with Greater Than 2A/mm Current Density James Gillespie¹, Andrew J. Green¹, Robert Fitch¹, Dennis Walker¹, Antonio Crespo¹, Yu Cao², Cathy Lee², Edward Beam², Andy Xie², Jose Jimenez², Vipin Kumar², Miles Lindquist³, Daniel Brooks¹, Gregg Jessen¹ and Kelson Chabak¹; ¹Air Force Research Laboratory, United States; ²Qorvo, United States; ³KBRWyle, United States.

SESSION G05: P-Type and N-Polar Epitaxy

Session Chairs: Hiroshi Fujioka and Kazunobu Kojima

Tuesday Afternoon, July 9, 2019

Evergreen Ballroom A-C, Lobby Level

2:00 PM *G05.01

Growth of P-Type GaN Layers with Low Mg Concentrations by Using MOVPE and the Application to Vertical Power Devices Tetsuo Narita¹, Kazuyoshi Tomita¹, Yutaka Tokuda², Tatsuya Kogiso², Takuya Maeda³, Masahiro Horita^{3,4}, Masakazu Kanechika¹, Hiroyuki Ueda¹, Tetsu Kachi⁴ and Jun Suda^{3,4}; ¹Toyota Central R&D Labs. Inc., Japan; ²Aichi Institute of Technology, Japan; ³Kyoto University, Japan; ⁴Nagoya University, Japan.

2:30 PM G05.02

The Role of Hyper Mg Doping from 1.5×10^{20} to $7.8 \times 10^{20} \text{ cm}^{-3}$ on the Performance of GaN Homo Junction Tunnel Diodes Exhibiting Negative Differential Resistance Ehsan Vadiiee, Evan A. Clinton and William A. Doolittle; Georgia Institute of Technology, United States.

2:45 PM G05.03

Minimizing Mg Re-Passivation in All MOCVD Tunnel Junction Based LEDs Victor Fan Arcara^{1,2}, Benjamin Damilano², Guy Feuillet¹, Aimeric Courville², Sébastien Chenot² and Jean-Yves Duboz²; ¹CEA - LETI, France; ²CNRS - CRHEA, France.

3:00 PM G05.04

Electrical Characterization of N-Polar GaN PN Diodes Grown by MOCVD Dolar Khachariya¹, Dennis E. Szymanski², Pramod Reddy³, Erhard Kohn², Zlatko Sitar^{2,3}, Ramón Collazo² and Spyridon Pavlidis¹; ¹North Carolina State University, United States; ²North Carolina State University, United States; ³Adroit Materials, United States.

3:15 PM G05.05

Properties of Nitrogen-Polar p-Type AlGaIn/GaN Superlattices Grown by MOCVD Athith Krishna, Aditya Raj, Nirupam Hatui, Stacia Keller and Umesh K. Mishra; University of California, Santa Barbara, United States.

3:30 PM G05.06

Growth of High Quality (000-1) GaN on Bulk GaN by Plasma-Assisted Molecular Beam Epitaxy Using the AlN Initiation Layer Christian Wurm, Elaheh Ahmadi, Feng Wu, Stacia Keller, James Speck and Umesh K. Mishra; University of California, Santa Barbara, United States.

3:45 PM BREAK

SESSION G06: Van-der-Waals Epitaxy

Session Chairs: Elaheh Ahmadi and Yasushi Nanishi

Tuesday Afternoon, July 9, 2019

Evergreen Ballroom A-C, Lobby Level

4:15 PM *G06.01

Opportunity and Challenges in 2D Material-Based Layer Transfer (2DLT) of III-N System Jeewan Kim and Wei Kong; Massachusetts Institute of Technology, United States.

4:45 PM G06.02

Plasma-Assisted Molecular Beam Epitaxy of GaN on Graphene—The Effect of Kinetics Marion Gruart^{1,2}, Nathaniel Feldberg^{1,2}, Bruno Gayral^{1,2}, Catherine Bougerol^{2,3}, Stéphanie Pouget^{1,2}, Edith Bellet-Amalric^{1,2}, Núria Garro⁴, Ana Cros⁴, Hanako Okuno^{5,2} and Bruno Daudin^{1,2}; ¹CEA-Grenoble, France; ²Université Grenoble Alpes, France; ³CNRS-Institut Néel, France; ⁴Institute of Materials Science (ICMUV), Universidad de Valencia, Spain; ⁵CEA-INAC, MEM, CEA-Grenoble, France.

5:00 PM G06.03

Van der Waals Epitaxy of Flexible AlGaIn Deep UV LEDs on Monolayer Graphene Ping Wang, Ayush Pandey, David A. Laleyan, Walter J. Shin, Eric T. Reid, Dehui Zhang, Zhe Liu, Zhaohui Zhong and Zetian Mi; University of Michigan, United States.

5:15 PM G06.04

Investigation of GaN with Low Threading Dislocation Density Grown on Graphene/Sputtered AlN Composite Substrate Yachao Zhang, Ge Liu, Kai Su, Jincheng Zhang and Yue Hao; Xidian University, China.

5:30 PM G06.05

A New Approach for Multifunctional Two-Dimension Structure Formation Akihiro Hashimoto; University of Fukui, Japan.

5:45 PM G06.06

Systematic Approach to Developing Empirical Interatomic Potentials for Two-Dimensional III-Nitrides Yuya Hasegawa, Toru Akiyama, Abdul Pradipto, Kohji Nakamura and Tomonori Ito; Mie University, Japan.

SESSION H03: Nanostructures and Nano-Devices II

Session Chairs: Yasuhiko Arakawa and Bruno Daudin

Tuesday Afternoon, July 9, 2019

Regency Ballroom E-G, Second Floor

2:00 PM *H03.01

Nitride Nanowires for Mechanically Flexible Devices Maria Tchernycheva¹, Nan Guan¹, Martina Morassi¹, Lorenzo Mancini¹, Nuno Amador¹, Camille Barbier¹, Akanksha Kapoor², Joël Eymery², Christophe Durand², Vladimir Dubrovskii³, Andrey Babichev³, Ali Madouri¹, Noelle Gogneau¹, Francois H. Julien¹, Ludovic Largeau¹ and Jean-Christophe Harmand¹; ¹C2N-CNRS, University Paris Sud, University Paris Saclay, France; ²University Grenoble Alpes, CEA, INAC, France; ³ITMO University, Russian Federation.

2:30 PM H03.02

Determination of Crystallographic Polarity in Two-Terminal GaN Nanowire Devices by Lateral Piezoresponse Force Microscopy Matt Brubaker, Alexana Roshko, Paul Blanchard, Samuel Berweiger, Charles Little, Todd Harvey and Kris Bertness; National Institute of Standards and Technology, United States.

2:45 PM H03.03

GaN Thin Film and Nanowire Based Flexible Energy Harvesting Nanodevices and Pressure Sensor Aadil Waseem, Muhammad A. Johar, Mostafa Afifi Hassan, Indrajit V. Bagal, Jin Ho Kang and Sang-Wan Ryu; Chonnam National University, Korea (the Democratic People's Republic of).

3:00 PM H03.04

Tuning the Photonic Bandgap in GaN Nanopillar Arrays on Stretchable PDMS Films Kwai Hei Li, Yuk Fai Cheung and Hoi Wai Choi; The University of Hong Kong, Hong Kong.

3:15 PM H03.05

Selective Area Sublimation of GaN for the Fabrication of Nano-Porous Structures and Arrays of Nanolasers Benjamin Damilano¹, Stéphane Vézian¹, Pierre-Marie Coulon², Thi Huong Ngo¹, Pierre Valvin³, Julien Brault¹, Virginie Brandl¹, Marc Portail¹, Philip Shields², Jean Massies¹ and Bernard Gil³; ¹CRHEA-CNRS, France; ²University of Bath, United Kingdom; ³L2C-CNRS, France.

3:30 PM H03.06

Strain-Relaxation Studies of Thick (>100nm) and Wide (>500nm) InGaN Stripe Arrays Chirag Gupta, Yusuke Tsukada, Shubhra Pasayat, Wenjian Liu, Stacia Keller, Shuji Nakamura and Umesh K. Mishra; University of California, Santa Barbara, United States.

3:45 PM BREAK

SESSION L01: Piezoelectricity and Theory for Electronic Devices

Session Chairs: Chris Van de Walle and Doug Yoder

Tuesday Afternoon, July 9, 2019

Regency Ballroom E-G, Second Floor

4:15 PM *L01.01

Nonlinear Piezoelectricity in III-N Heterostructures—The Role of the Growth Plane Saroj K. Patra^{1,3} and Stefan Schulz^{1,2}; ¹Tyndall National Institute, Ireland; ²University College Cork, Ireland; ³University College Cork, Ireland.

4:45 PM L01.02

The Mobility of a GaN-on-AlN Two-Dimensional Hole Gas Samuel J. Bader, Reet Chaudhuri, Grace Xing and Debdeep Jena; Cornell University, United States.

5:00 PM L01.03

Automated Simulation-Assisted Design and Layout of 600V, Lateral GaN Power HFETs Collin Hitchcock¹, Shuyao Chen^{1,2} and T. Paul Chow¹; ¹Rensselaer Polytechnic Institute, United States; ²Cornell University, United States.

5:15 PM L01.04

Phenomena Limiting the Off-State Breakdown Voltage in AlGaIn/GaN HEMTs for Power Converters Nicolò Zagni¹, Francesco Maria Puglisi¹, Paolo Pavan¹, Alessandro Chini¹ and Giovanni Verzellesi^{2,3}; ¹Università degli Studi di Modena e Reggio Emilia, Italy; ²Università degli Studi di Modena e Reggio Emilia, Italy; ³Università degli Studi di Modena e Reggio Emilia, Italy.

5:30 PM L01.05

Currents in Nitride Tunnel Junctions Jean-Yves Duboz, Victor Fan Arcara and Borge Vinter; CNRS, France.

5:45 PM LATE NEWS

SESSION I04: InGaN Properties

Session Chairs: Adrian Avramescu and Lorenzo Rigutti
Tuesday Afternoon, July 9, 2019
Regency Ballroom A-C, Second Floor

2:00 PM I04.01

High Temperature Switching of Exciton Character in Double InGaIn/GaN Quantum Wells Tadeusz Suski¹, Grzegorz Staszczak¹, Grzegorz Muziol¹, Czesław Skierbiszewski^{1,2} and Piotr Perlin^{1,2}; ¹Institute of High Pressures Physics, UNIPRESS, Poland; ²TopGaN, Poland.

2:15 PM I04.02

Carrier Dynamics of Nonpolar and Polar InGaIn/GaN MQWs at High Temperatures Xuanqi Huang¹, Dongying Li¹, Houqiang Fu¹, Kai Fu¹, Tsung-Han Yang¹, Chen Yang¹, Jingan Zhou¹, Jossue Montes¹, Steven P. DenBaars², Shuji Nakamura², Cun-Zheng Ning¹ and Yuji Zhao¹; ¹Arizona State University, United States; ²University of California, Santa Barbara, United States.

2:30 PM I04.03

Impact of Point Defects on Auger Recombination in InGaIn/GaN Quantum Well in the Droop Regime Wei Liu¹, Camille Haller¹, Gordon Callsen¹, Thomas Weatherley¹, Jean-François Carlin¹, Raphaël Butté¹, Gwénoél Jacopin² and Nicolas Grandjean¹; ¹EPFL, Switzerland; ²Institut Néel, Université Grenoble Alpes, CNRS, Grenoble INP, France.

2:45 PM I04.04

Strain Relaxation and Stokes Shift of In_xGa_{1-x}N Epilayers over the Full Composition Range Alec M. Fischer^{1,2}, Joshua J. Williams³ and Fernando Ponce¹; ¹Arizona State University, United States; ²STACE Solar, Canada; ³Arizona State University, United States.

3:00 PM I04.05

Probing Alloy Formation Using Different Excitonic Species—The Particular Case of InGaIn Gordon Callsen, Raphaël Butté and Nicolas Grandjean; École Polytechnique Fédérale de Lausanne (EPFL), Switzerland.

3:15 PM I04.06

Luminescence and Defect Imaging in Semi-Polar InGaIn/GaN ‘Bow-Tie’ Structures on Patterned Si Substrates Jochen Bruckbauer¹, Carol Trager-Cowan¹, Ben Hourahine¹, Aimo Winkelmann^{1,2}, X Yu³, Anja Ipsen⁴, Michael Wallace¹, Paul Edwards¹, G. Naresh Kumar¹, Matthias Hocker⁴, Sebastian Bauer¹, Raphael Müller⁴, Jie Bai³, Klaus Thonke⁴, T Wang³ and Robert Martin¹; ¹University of Strathclyde, United Kingdom; ²Laser Zentrum Hannover e.V., Germany; ³University of Sheffield, United Kingdom; ⁴Ulm University, Germany.

3:30 PM I04.07

Reduced Non-Radiative Recombination in Semi-Polar Green-Emitting III-N Quantum Wells with Strain-Reducing AlInN Buffer Layers Philipp Henning^{1,2}, Daniel Schmid^{1,2}, Philipp Horenburg^{1,2}, Heiko Bremers^{1,2}, Uwe Rossow^{1,2}, Florian Tendille³, Philippe Vennéguès³, Philippe de Mierry³, Jesus Zuniga-Perez³ and Andreas Hangleiter^{1,2}; ¹TU Braunschweig, Germany; ²TU Braunschweig, Germany; ³CNRS, France.

3:45 PM BREAK

SESSION F02: Bulk Growth of AlN and GaN
Session Chairs: Yutaka Mikawa and Marcin Zajac
Tuesday Afternoon, July 9, 2019
Regency Ballroom A-C, Second Floor

4:15 PM *F02.01

AlN Single Crystal Substrate Growth for UV Applications Rafael Dalmau, Jeffrey Britt and Raoul Schlessler; HexaTech, Inc., United States.

4:45 PM F02.02

60mm Bulk AlN Single Crystalline Wafers with Excellent Deep UV Transparency Grown by PVT Method for DUV-LED Applications Qikun Wang, Dan Lei, Guangdong He, Jianchao Gong, Jiali Huang and Jason Wu; Ultratrend Technologies Inc, China.

5:00 PM *F02.03

Recent Advances of GaN Growth by Na-Flux Method Yusuke Mori, Masayuki Imanishi and Masashi Yoshimura; Osaka University, Japan.

5:30 PM F02.04

Modeling of Bulk GaN Crystal Growth from Na-Ga Solution Alexey Kondratyev, Andrei Vorob'ev, Vladimir Kalaev and Roman Talalaev; STR Group Inc., Russian Federation.

5:45 PM F02.05

3-Inch Homogeneous GaN Single Crystal Grown by Na Flux Method Zongliang Liu¹, Ke Xu^{1,2} and Jianfeng Wang^{1,2}; ¹Suzhou Institute of Nano-Tech and Nano-Bionics, CAS, China; ²Suzhou Nanowin Science and Technology Co., Ltd., China.

POSTER SESSIONS

SESSION AP02: Poster Session II: Light Emitting Devices
Tuesday Afternoon, July 9, 2019
6:30 PM - 8:30 PM
Grand Ballroom, Second Floor

AP02.01

Performance Improvement of InGaIn/GaN Blue LEDs with Distributed Contact Flip Chip Design Muhammet Genç^{1,2}, Volodymyr Sheremet³, Mustafa Elçi³, A.E. Kasapoğlu⁴, İsmail Altıntaş⁵, Gamze Egin², Selcen Islamoğlu³, Emre Gur⁴, Nizam Muzaferoğlu², Sezai Elagoz², Oguz Gulseren⁶ and Atilla Aydinli⁷; ¹Sabancı University, Turkey; ²Ermaksan Optoelectronic R&D Center, Turkey; ³Advanced Research Laboratories, Turkey; ⁴Atatürk University, Turkey; ⁵Cumhuriyet University, Turkey; ⁶Bilkent University, Turkey; ⁷Uludağ University, Turkey.

AP02.02

Fabrication of an Array of Sapphire Nano-Membranes for Micro-LED Display Jehong Oh¹, Seungmin Lee¹, Jongmyeong Kim¹, Jungel Ryu¹ and Euijoon Yoon^{1,2,3}; ¹Seoul National University, Korea (the Republic of); ²Seoul National University, Korea (the Republic of); ³Seoul National University, Korea (the Republic of).

AP02.03

Resistance Reduction of n-AlGaIn Layer with AlN Mole Fraction 62% for n-Type Conductive Layer in Deep Ultraviolet Light Emitting Emitters Kengo Nagata^{1,2}, Hiroaki Makino^{1,2}, Keita Kataoka³, Tetsuo Narita³ and Yoshiki Saito^{1,2}; ¹Toyoda Gosei, Japan; ²TS Opto, Japan; ³Toyota Central R&D Labs, Japan.

AP02.04

Multi-Color InGaIn Nanocrystal Micro LEDs Grown by Molecular Beam Epitaxy Xianhe Liu, Kishwar Mashooq, Ayush Pandey, Walter J. Shin and Zetian Mi; University of Michigan, United States.

AP02.05

Optimizing AlGaIn-Based UVB LEDs Using Experimental Device Data in the Nextnano Software Maria Cecilia d. Figueira¹, Alex Trellakis¹, Stefan Birner¹, M. A. Khan^{2,3} and Hideki Hirayama^{2,3}; ¹nextnano GmbH, Germany; ²RIKEN, Japan; ³RIKEN Center for Advanced Photonics (RAP), Japan.

AP02.06

Enhanced Efficiency of InGaIn/GaN MQWs LED with Ga-Doped ZnO Transparent Conducting Layer Sang-Jo Kim¹, Kwang Jae Lee¹, Semi Oh¹, Jang Hwan Han¹, Dong Seon Lee² and Seong-Ju Park¹; ¹Gwangju Institute Science and Technology, Korea (the Republic of); ²Gwangju Institute Science and Engineering, Korea (the Republic of).

AP02.07

Improved the AlGa_N-Based Ultraviolet LEDs Performance with Super-Lattice Structure Last Barrier on Sputtered AlN/Sapphire Substrate Jun Zhang, Qian Chen, Bo Tan, Hanling Long, Yi Zhang, Jiangnan Dai and Changqing Chen; Huazhong University of Science and Technology, China.

AP02.08

High Quality InGa_N/Ga_N Nanopillar Fabricated by Neutral Beam Etching for Directional Micro-LED Kexiong Zhang; National Institute of Advanced Industrial Science and Technology (AIST), Japan.

AP02.09

Half Nanometer Wavelength Uniformity Achievement by Introducing Low Temperature Sensitive InGa_N Deposition Process Bumjoon Kim, Soo Min Lee, Eric Tucker, Drew Hanser and Ajit Paranjpe; Veeco, United States.

AP02.10

Wavefunction Overlap Calculations in Thin and Thick InGa_N/Ga_N Polar and Nonpolar Single Quantum Wells Morteza Monavarian and Daniel Feezell; Center for High-Technology Materials, The University of New Mexico, United States.

AP02.11

Arrays of TiO₂ Sphere for the Improvement of Light Extraction Efficiency in III-Nitride Light-Emitting Diodes Dohyun Kim, Dongsu Shin, Jiyeon Yu and Jinsub Park; Hanyang, Korea (the Republic of).

AP02.12

Room Temperature Luminescence of Passivated InGa_N Quantum Dots Formed by Quantum-Sized-Controlled Photoelectrochemical Etching Xiongliang Wei, Syed Ahmed Al Mueed, Matthew R. Peart, Sun Wei, Renbo Song, Nelson Tansu and Jonathan Wierer; Lehigh University, United States.

AP02.13

Improvement in Heat Dissipation Characteristics of InGa_N/Ga_N Quantum-Well LEDs using Multiple-Layer Hexagonal Boron Nitride Ilguy Choi¹, Kwanjae Lee², Soo Min Kim³, Cheul-Ro Lee¹ and Jin Soo Kim¹; ¹Chonbuk National University, Korea (the Republic of); ²Korea Advanced Institute of Science and Technology, Korea (the Republic of); ³Korea Institute of Science and Technology, Korea (the Republic of).

AP02.14

Design and Growth of Strain Relieved Laser Diode Emitting at 450 nm Avinash S. Paliwal^{1,2}, Kuldip Singh¹ and Manish Mathew^{1,2}; ¹CSIR-Central Electronics Engineering Research Institute, Pilani, India, India; ²Academy of Scientific and Innovative Research (AcSIR), CSIR-CEERI Campus, India.

AP02.15

Enhanced Emission Efficiency of GaInN-Based Green Light-Emitting Diodes with Aluminium Thin-Film Deposition Ryoya Mano¹, Dong-Pyo Han¹, Kengo Yamamoto¹, Seiji Ishimoto¹, Satoshi Kamiyama¹, Tetsuya Takeuchi¹, Motoaki Iwaya¹ and Isamu Akasaki^{1,2}; ¹Meijo University, Japan; ²Nagoya University, Japan.

AP02.16

Investigation of Emission Efficiency in GaInN-Based Green Light-Emitting Diodes with Various Structures of Underlying Layer Dong-Pyo Han¹, Kengo Yamamoto¹, Seiji Ishimoto¹, Ryoya Mano¹, Motoaki Iwaya¹, Tetsuya Takeuchi¹, Satoshi Kamiyama¹ and Isamu Akasaki^{1,2}; ¹Meijo University, Japan; ²Nagoya University, Japan.

AP02.17

Light Extraction Improvement of Transfer Printable GaN LEDs on Si with Backside Roughening Zhi Li, Zeinab Shaban, Yan Lei, Mahbub Akhter, James O'Callaghan and Brian Corbett; Tyndall National Institute, University College Cork, Ireland.

AP02.18

Study on Thermal Management for Chip-Scale Package GaN Light-Emitting Diodes Byongjin Ma; Korea Electronics Technology Institute, Korea (the Republic of).

AP02.19

Electro-Optical Numerical Modeling for the Optimization of InGa_N Based Vertical Cavity Surface Emitting Laser Diodes Zih-Hong Young¹ and Yuh-Renn Wu^{1,2}; ¹National Taiwan University, Taiwan; ²Industrial Technology Research Institute, Taiwan.

AP02.20

Flexible GaN Light Emitting Diode Using Micron-Scale Pyramidal Arrays Zhenhuan Tian^{1,2}, Qiang Li^{1,2}, Xilin Su^{1,2}, Ye Zhang^{1,2}, Maofeng Guo^{1,2}, Minyan Zhang^{1,2}, Wen Ding^{1,2}, Yufeng Li^{1,2}, Feng Yun^{1,2} and S. W. Ricky Lee^{3,4}; ¹Key Laboratory for Physical Electronics and Devices of the Ministry of Education and Shaanxi Provincial Key Laboratory of Photonics & Information Technology, Xi'an Jiaotong University, China; ²Solid-State

Lighting Engineering Research Center, Xi'an Jiaotong University, China; ³Department of Mechanical and Aerospace Engineering, Hong Kong University of Science and Technology, Hong Kong; ⁴HKUST LED-FPD Technology R&D Center at Foshan, China.

AP02.21

Improvement of Quantum Efficiency by Employing Hole Injection-Promoted and Active-Layer-Friendly AlInGa_N Insertion Layer in InGa_N/Ga_N Light-Emitting Diodes Naixin Liu and Tongbo Wei; Institute of Semiconductor, CAS, China.

AP02.22

Thermal Analysis for UV-Micro-LED on GaN-Substrate Under kA/cm² Current Injection Level by Forward Voltage Method and Infrared Imaging Chengcheng Li and Zhizhong Chen; Peking University, China.

AP02.23

Four Monochromatic LEDs Mixing with Two White LEDs for Circadian Rhythm and Vision Simultaneously Jingxin Nie and Zhizhong Chen; Peking University, China.

AP02.24

Fabrication of LED Pixels of 16 × 16 Array Structure Using Si Micro-Cup Substrate Kota Sato¹, Yoshihumi Kamei¹, Ryosuke Nawa¹, Shinya Aikawa², Yasuhisa Usida³, Takeyoshi Onuma¹, Tomohiro Yamaguchi¹ and Toru Honda¹; ¹Kogakuin University, Japan; ²Kogakuin University, Japan; ³Nagoya University, Japan.

AP02.25

Coupling Resonance for CdSe/ZnS Quantum Dots on Blue LED Embedded by Ag Nanoparticles Yifan Chen and Zhizhong Chen; State Key Laboratory for Artificial Microstructure and Mesoscopic Physics, School of Physics, Peking University, China.

AP02.26

Study on ITO Electrode on GaN Shell in Multi-Quantum-Shell LED Atsushi Suzuki¹, Hideki Murakami¹, Kyohei Nokimura¹, Minoru Takebayashi¹, Nanami Goto¹, Mizuki Terazawa¹, Weifang Lu¹, Naoki Sone^{1,2}, Kazuyoshi Iida^{1,3}, Masaki Ohya^{1,3}, Satoshi Kamiyama¹, Tetsuya Takeuchi¹, Motoaki Iwaya¹ and Isamu Akasaki^{1,4}; ¹Meijo University, Japan; ²Koito Manufacturing CO.,LTD, Japan; ³Toyota Gosei Co.,Ltd, Japan; ⁴Akasaki Research Center, Nagoya University, Japan.

AP02.27

Depth Dependent Strain Analysis in AlGa_N Deep Ultra-Violet Light Emitting Diodes Using Surface-Plasmon Enhanced Raman Spectroscopy Gunwoo Jung¹, Kyuheon Kim¹, Chanmi Choi¹, Ukgeun Gang¹, Tachwan Park¹, Boram Jeon¹, Youngbo Moon² and Junghoon Song¹; ¹Kongju National University, Korea (the Republic of); ²UJL, Korea (the Republic of).

AP02.28

Towards High Quality, Low Damage RIE Etched Laser Mirror Facets for Integrated on Wafer InGa_N Laser Diodes Krzysztof Gibasiewicz¹, Jacek Kacperski², Szymon Grzanka^{1,2}, Lucja Marona^{1,2}, Piotr Perlin^{1,2} and Tadeusz Suski¹; ¹Institute of High Pressure Physics, Poland; ²TopGaN, Poland.

AP02.29

Lasing Action on Whispering Gallery Mode of GaN Hexagonal Microdisks Fabricated on Sapphire Substrates Geng He; Key Lab of Advanced Optical Manufacturing Technologies of Jiangsu Province and Key Lab of Modern Optical Technologies of Education Ministry of China, Soochow University, China.

AP02.30

The Effects of Structural Parameters on Optical Gain in InGa_N Based Quantum Wires Laser Diodes Asghar Asgari Tokaldani^{1,2}; ¹University of Tabriz, Iran (the Islamic Republic of); ²University of Western Australia, Australia.

AP02.31

Improving Efficiency of Boron Nitride Deep Ultra-Violet ac-Driven Electroluminescence Devices Weiqiang Yuan¹, Thushan Wickramasinghe² and Wojciech M. Jadwisieniczak¹; ¹Ohio University, United States; ²Ohio University, United States.

AP02.32

Preparation of Carbon Dots by Microwave Synthesis for White LED Devices Zhang Shengnan and Yun Feng; Xi'an Jiaotong University, China.

AP02.33

Improved Emission Performance of N-Polar GaN-Based Blue-Violet Light-Emitting Diodes with a Polarization-Induced Tunneling Junction Gaoqiang Deng, Yuntao Zhang, Long Yan, Xu Han, Ye Yu, Yang Wang and Guotong Du; Jilin University, China.

AP02.34

Dislocation Related Nonradiative Recombination in InGaN Laser Diodes Agata Bojarska¹, Dario Schiavon², Szymon Grzanka¹, Lucja Marona^{1,2}, Grzegorz Staszczak¹, Julita Smalc-Koziorowska¹, Jan Weyher¹ and Piotr Perlin^{1,2}; ¹Institute of High Pressure Physics PAS, Poland; ²TopGaN Limited, Poland.

SESSION BP02: Poster Session II: Electronic Devices
Tuesday Afternoon, July 9, 2019
6:30 PM - 8:30 PM
Grand Ballroom, Second Floor

BP02.01

Stable C-V Characteristics of Al₂O₃/m-Plane GaN Structures at High Temperatures Shota Kaneki and Tamotsu Hashizume; RCIQE of Hokkaido University, Japan.

BP02.02

Investigation of the Early Pinch-Off Effect of AlGaIn/GaN Schottky-Gate Fin-HEMTs and Its Threshold Voltage Modulation Li-Cheng Chang¹, Jhih-Hao Lin², Cheng-Jia Dai¹, Ming Yang¹, Yi-Hong Jiang¹, Yuh-Renn Wu² and Chao-Hsin Wu^{1,2}; ¹National Taiwan University, Taiwan; ²National Taiwan University, Taiwan.

BP02.03

Design of GaN Based Multi-Channel FinFETs with a Full 3D Simulation Chun-Lin Yu¹, Jhih-Hao Lin¹ and Yuh-Renn Wu^{1,2}; ¹National Taiwan University, Taiwan; ²Industrial Technology Research Institute, Taiwan.

BP02.04

Gate-Length Dependence of Gate Lag, Drain Lag and Current Collapse in Field-Plate AlGaIn/GaN HEMTs Tomochika Chiba, Yasunori Saito, Ryouhei Tsurumaki and Kazushige Horio; Shibaura Institute of Technology, Japan.

BP02.05

Normally-Off AlGaIn/GaN HEMT on 200 mm Silicon with ON-Current 500 mA/mm and $V_{th} > 5V$ Sandeep Kumar¹, Sandeep Vura¹, Vanjari S. Charan¹, Surani B. Dolmanan², Sudhiranjan Tripathy², Rangarajan Muralidharan¹ and Digbijoy N. Nath¹; ¹Indian Institute of Science (IISc), India; ²Institute of Materials Research and Engineering (IMRE), Agency for Science, Technology, and Research, Singapore.

BP02.06

Effects of Recessed-Gate Structure on AlGaIn/GaN MIS-HEMTs Using PEALD AlO_xN_y Thin Film Hyun-Seop Kim¹, Myoung-Jin Kang², Ilhwan Hwang², Su-Keun Eom², Kwang-Seok Seo² and Ho-Young Cha¹; ¹Hongik University, Korea (the Republic of); ²Seoul National University, Korea (the Republic of).

BP02.07

Optimization of Crucial Device Parameters for GaN Vertical Trench MOSFETs Shuang Liu, Shenglei Zhao, Jincheng Zhang and Yue Hao; Xidian University, China.

BP02.08

Vertical GaN-on-GaN Schottky Barrier Diode with Fluorite-Ion-Implanted Edge Termination Zirui Liu, Jianfeng Wang, Hong Gu, Ke Xu and Yumin Zhang; Suzhou Institute of Nano-tech and Nano-bionics, Chinese Academy of Sciences, China.

BP02.09

Reliability Investigation on Recessed AlGaIn/GaN SBDs Ge Liu, Shenglei Zhao, Jiabo Chen, Jincheng Zhang and Yue Hao; Xidian University, China.

BP02.10

Electrical Properties of GaAs/GaN Junctions by Bonding GaN Layers Grown on Free Standing Substrates Shoji Yamajo, Jianbo Liang and Naoteru Shigekawa; Osaka City University, Japan.

BP02.11

Characterization of Heavy-Ion Irradiation Effects on AlInN/GaN on Si High-Electron-Mobility Transistors (HEMTs) Seshagiri Rao Challa¹, Nahuel A. Vega^{2,3,4}, Christian Kristukat^{2,3}, Nahuel Müller², Mario Debray^{2,3}, Gordon Schmidt¹, Juergen Christen¹, Florian Hörich¹, Hartmut Witte¹, Armin Dadgar¹ and André Strittmatter¹; ¹Institute für experimentelle Physik/OVGU Magdeburg, Germany; ²Gerencia de Investigación y Aplicaciones, Argentina; ³Escuela de Ciencia y Tecnología, Universidad Nacional de San Martín (UNSAM), Argentina; ⁴Consejo Nacional de Investigaciones Científicas y Tecnológicas (CONICET), Argentina.

BP02.12

Investigation on Threshold Voltage of GaN Vertical MOSFETs Xiufeng Song, Jincheng Zhang, Shenglei Zhao and Yue Hao; Xidian University, China.

BP02.13

Possible Use of Wide Bandgap Semiconductor in Enhancement Mode Using P-Type Gate Dielectric Mudassar Imam Yahya Meer, Yogendra K. Yadav, Akanksha Rawat, Jaya Jha, Swaroop Ganguly and Dipankar Saha; Indian Institute of Technology, India.

BP02.14

AlGaIn/GaN Diode with MIS-Gated Hybrid Anode and Edge Termination Ilhwan Hwang², Raseoung Ki¹, Ho-Young Cha³ and Kwang-Seok Seo¹; ²Seoul National University, Korea (the Republic of); ³Hongik University, Korea (the Republic of).

BP02.15

Breakdown Voltage Analysis for the New RESURF AlGaIn Channel HEMTs Zhongyang Li, Shenglei Zhao, Jincheng Zhang and Yue Hao; Xidian University, China.

BP02.16

Reduction of Radiated Emission from Resonance Coil in GaN Wireless Power Transmission Circuit by Using Nd-Fe-N Core Toshihide Ide^{1,2}, Nobuyoshi Imaoka³, Mikio Oomori², Kimihiro Ozaki³, Mitsuaki Shimizu¹ and Noriyuki Takada²; ¹Advanced Industrial Science and Technology (AIST), Japan; ²Advanced Industrial Science and Technology (AIST), Japan; ³Advanced Industrial Science and Technology (AIST), Japan.

BP02.17

Delta-Doping Effect in Normally-off GaN-cap/AlGaIn/GaN HEMT on Electrical Properties Ryohei Yamaguchi, Jumpei Sumino, Momoe Shojima and Akio Wakejima; Nagoya Institute of Technology, Japan.

BP02.18

Effect of Spatial Position of Traps Located at the Oxide/AlGaIn Interface on the Device Characteristics Sreenadh Surapaneni, Jaya Jha, Swaroop Ganguly and Dipankar Saha; IIT Bombay, India.

BP02.19

Ultra-Low Turn-on Voltage GaN Vertical Schottky Diodes with Tungsten Anode Contact Zhaoke Bian, Tao Zhang, Jiabo Chen, Jincheng Zhang and Shenglei Zhao; Xidian University, China.

BP02.20

GaN Bipolar Junction Transistor for Monolithic Integration Wai Yuen Fu and Hoi Wai Choi; The University of Hong Kong, Hong Kong.

BP02.21

Trap States in Normally-Off Gate-Recessed AlGaIn/GaN/AlGaIn Double-Heterojunction High-Electron-Mobility Transistors Dan Zhu, Jincheng Zhang and Shenglei Zhao; Xidian University, China.

BP02.22

High-Quality Cat-CVD SiN Passivation Layer for Low Current Collapsed AlGaIn/GaN HEMT-on-Si Myoung-Jin Kang¹, Hyun-Seop Kim², Su-Keun Eom¹, Ho-Young Cha² and Kwang-Seok Seo¹; ¹Seoul National University, Korea (the Republic of); ²Hongik University, Korea (the Republic of).

BP02.23

Improvement of Pulse Characteristics of GaN Schottky Barrier Diode Using Diamond Substrate Which has Thermally Better Property than Si Substrate Ra-Seong Ki¹, Ho-Young Cha² and Kwang-Seok Seo¹; ¹Seoul National University, Korea (the Republic of); ²Hongik University, Korea (the Republic of).

BP02.24

Effect of Field Plate on Breakdown Characteristics of p-AlGaIn Gate AlGaIn/GaN HEMTs Junwei Liu, Jincheng Zhang, Shenglei Zhao and Yue Hao; Xidian University, China.

BP02.25

Effect of AlN Insert Layer on AlGa_xN/AlN/GaN HEMT Structure Uijho Choi, Kyeongjae Lee, Yongjun Nam, Taehoon Jang, Donghyeop Jung and Okhyun Nam; Korea Polytechnic University, Korea (the Republic of).

BP02.26

Ka Band AlGaIn/GaN HEMT with U-Trench Gate Ke Wei; Institute of Microelectronics Chinese Academy of Science, China.

BP02.27

Performance of AlGaIn/GaN MISHEMT with Fin-Structured Second Gate in Wide Access Region Ryun-Hwi Kim, Hyeon-Su Lee, Seung-Hyeon Kang and Jung-Hee Lee; Kyungpook National University, Korea (the Republic of).

BP02.28

Comprehensive Study and Optimization of Ti/Au/Al/Ni/Au Ohmic Contact on III-N Heterostructure Yogendra K. Yadav, Bhanu Upadhyay, Mudassar Imam Yahya Meer, Tarni Aggarwal, Swaroop Ganguly and Dipankar Saha; Indian Institute of Technology Bombay, India, India.

BP02.29

GaN Based Gate Drive Circuit for Phase-Shifter Application Weijun Luo; Institute of Microelectronics, Chinese Academy of Sciences, China.

BP02.30

Threshold Voltage Dependence of Normally-Off p-GaN/AlGaN/GaN on Schottky Barrier Height Jozef Osvald; IEE SAS Bratislava, Slovakia, Slovakia.

BP02.31

A Novel Measurement Technique to Investigate OFF-State Performance of AlGaN/GaN HEMT on Silicon Nayana Remesh, Sandeep Kumar, Rangarajan Muralidharan, Srinivasan Raghavan and Digbijoy N. Nath; Indian Institute of Science, India.

BP02.32

High Breakdown Voltage Vertical GaN p-n Junction Diodes with Excellent Breakdown Capabilities by Application of a Two-Step Mesa Structure Hiroshi Ohta¹, Naomi Asai¹, Fumimasa Horikiri², Yoshinobu Narita², Takehiro Yoshida², Tomoaki Nishimura¹ and Tomoyoshi Mishima¹; ¹Hosei University, Japan; ²SCIOCS Co. Ltd., Japan.

SESSION CP02: Poster Session II: Photovoltaics, Energy Harvesting and Photo Detectors

Tuesday Afternoon, July 9, 2019
6:30 PM - 8:30 PM
Grand Ballroom, Second Floor

CP02.01

Van der Waals Epitaxy of AlN Nanorods on Graphene for High-Performance Ultraviolet Detectors Xianjie Xiong; Key Lab of Advanced Optical Manufacturing Technologies of Jiangsu Province and Key Lab of Modern Optical Technologies of Education Ministry of China, Soochow University, China.

CP02.02

Ultrafast Indium Nitride Based VIS-NIR Photo-Detector Shibin Krishna^{1,2}, Alka Sharma¹, Neha Aggarwal¹, Sudhir Husale¹ and Govind Gupta¹; ¹CSIR-National Physical Laboratory, India; ²King Abdullah University of Science and Technology, Saudi Arabia.

CP02.03

Reconsideration of the Gallium Nitride—Dual Functionality as an Electron Transporter and Transparent Conductor for Recyclable Solar Cell Substrate Applications Kwang Jae Lee¹, Namchul Cho² and Jong H. Kim¹; ¹Ajou University, Korea (the Republic of); ²Soonchunhyang University, Korea (the Republic of).

CP02.04

Growth and Fabrication of Backside Illuminated Metal-Semiconductor-Metal Deep Ultraviolet Photodetectors on High Quality AlN Joocheol Jeong, John Son and Joo Jin; Genicom Co., Ltd., Korea (the Republic of).

CP02.05

Solar Conversion of CO₂ with Light and Water Using InGaN Photoelectrode Grown by MBE Hyojung Bae¹, Koike Kayo², Katsushi Fujii², Soon Hyung Kang¹, Sang-Wan Ryu¹ and Jun-Seok Ha¹; ¹Chonnam National University, Korea (the Republic of); ²RIKEN, Japan.

CP02.06

Surface Engineered Polar and Non-Polar GaN Nanostructure Based Ultraviolet Photosensors Monu Mishra¹ and Govind Gupta^{1,2}; ¹CSIR-National Physical Laboratory, India; ²Academy of Scientific & Innovative Research, India.

CP02.07

Effects of the P-Doping in the Charge Layer on Quantum Efficiency in p-i-n GaN-Based Avalanche Photodiodes Seong Ran Jeon; Korea Photonics Technology Institute, Korea (the Republic of).

CP02.08

Non-Hybrid Single Layer Visible-Light Responsive Titanium Oxynitride Thin Films for Light Harvesting Applications Nikhil Reddy Mucha, Dhnanjay Kumar and Surabhi Shaji; North Carolina A&T State University, United States.

SESSION EP02: Poster Session II: Processing, Fabrication and Thermal Management

Tuesday Afternoon, July 9, 2019
6:30 PM - 8:30 PM
Grand Ballroom, Second Floor

EP02.01

ALE of GaN (0001) for Removal of Etch-Induced Damage Kevin A. Hatch¹, Daniel Messina¹, Houqiang Fu², Kai Fu², Xingye Wang¹, Mei Hao¹, Yuji Zhao² and Robert J. Nemanich¹; ¹Arizona State University, United States; ²Arizona State University, United States.

EP02.02

Size Effects of the AlN on the Thermal Transport Across Metal/Semiconductor Interface Yee Rui Koh¹, John T. Gaskins¹, Jeffrey L. Braun¹, Habib Ahmad², John Tomko¹, William A. Doolittle² and Patrick Hopkins¹; ¹University of Virginia, United States; ²Georgia Institute of Technology, United States.

EP02.03

Low Temperature Aluminum Nitride Deposition Enabled by Hydrazine Daniel Alvarez¹, Jeffrey Spiegelman¹ and Keisuke Andachi²; ¹RASIRC, United States; ²Taiyo Nippon Sanso Corporation, Japan.

EP02.04

Detection of Deep Level States Generated in GaN by Mg-Ion Implantation Using Conductance Method for MOS Diodes Masamichi Akazawa and Ryo Kamoshida; Hokkaido University, Japan.

EP02.05

Improved Thermal Performance of Homoepitaxial GaN-FETs Directly Bonded on a Graphite Composite Heat Spreader Lei Li, Aozora Fukui and Akio Wakejima; Nagoya Institute of Technology, Japan.

EP02.06

Optimization of a Cl Based ICP/RIE Plasma Etching of Semi-Insulating GaN Matthew A. Gaddy¹, Vladimir Kuryatkov¹, Keller Andrews², Nicholas Wilson¹, Andreas Neuber¹, Richard Ness³ and Sergey Nikishin¹; ¹Texas Tech University, United States; ²Texas Tech University, United States; ³Ness Engineering, United States.

EP02.07

Photoelectrochemical Etching of Aluminum Nitride for Fast and Low Damage Surface Roughening Yong Ha Choi^{1,2}, Kwang Hyeon Baik³, Rakjun Choi⁴, Jeongtak Oh⁴ and Jihyun Kim^{1,2}; ¹Korea University, Korea (the Republic of); ²Korea University, Korea (the Republic of); ³Hongik University, Korea (the Republic of); ⁴LG Innotek, Korea (the Republic of).

EP02.08

Mg Recoil-Implantation by Nitrogen Bombardment to GaN Toshikazu Yamada, Hisashi Yamada, Hiroshi Chonan, Noriyuki Taoka, Tokio Takahashi and Mitsuaki Shimizu; National Institute of Advanced Industrial Science and Technology, Japan.

SESSION GP02: Poster Session II: Epitaxial Growth

Tuesday Afternoon, July 9, 2019
6:30 PM - 8:30 PM
Grand Ballroom, Second Floor

GP02.01

The Influence of AlN Nucleation Layer on Radio Frequency (RF) Transmission Loss of GaN-on-Si Structure Shane Chang^{4,2,3}, Ming Zhao¹, Valentina Spampinato¹, Alexis Franquet¹, Do Hein¹, Li Chang³ and Akira Uedono⁵; ¹IMEC, Belgium; ²Katholieke Universiteit Leuven, Belgium; ³National Chiao Tung University, Taiwan; ⁴imec, Belgium; ⁵University of Tsukuba, Japan.

GP02.02

Growth of N-Polar AlN on Sapphire with Off-Cut Angle and AlN Bulk Substrate Narihito Okada¹, Tatsuya Isono¹, Tadatoshi Ito¹, Ryota Sakamoto¹, Yongzhao Yao², Yukari Ishikawa² and Kazuyuki Tadatomo¹; ¹Yamaguchi University, Japan; ²Japan Fine Ceramics Center (JFCC), Japan.

GP02.03

Two-Dimensional Rhombohedral BN Grown on AlN Template—The Effect of V/III Ratio on the Interface Quality Chun-Pin Huang¹, Jen-Inn Chyi² and Kun-Yu Lai¹; ¹National Central University, Taiwan; ²National Central University, Taiwan.

GP02.05

AlGaN Nanowires Grown on SiO₂/Si (100) Using Graphene as a Buffer Layer Zhiqiang Liu¹, Xiaoyan Yi¹, Meng Liang¹, Yunyu Wang¹, Junxi Wang¹, Jinmin Li¹ and Helge Weman²; ¹Institute of Semiconductors, China; ²CrayoNano AS, Norway.

GP02.06

2DEG Enhancement in AlN/GaN/AlN Heterostructure for DH-HEMT by Epilayer Stress Engineering Shashank Patwal¹, Manvi Agrawal^{1,2}, Nethaji Dharmarasu², K Radhakrishnan^{1,2} and Seah T. Alex²; ¹Nanyang Technological University, Singapore; ²Nanyang Technological University, Singapore.

GP02.07

Characterisation and Elimination of Sliplines on 200 mm Diameter 1 mm Thick GaN on Silicon Wafers Matthew Charles¹, Joel Kanyandekwe¹, Matthieu Lafossas¹, Mrad Mrad¹, Nicolas Devanciard¹, Mohamad Abdel Sater¹, Carlos Beitia¹, Isabelle Bergeond², Mayeul Durand de Gevigney² and Dario Alliaia²; ¹CEA-LETI, France; ²Unity Semiconductor, France.

GP02.08

Direct Growth of AlGaIn/GaN Structure on AlN Template for Measurement of Effective Mass in InGaN Layer Masatomo Sumiya¹, Dickson Kindole², Shuhei Yashiro^{1,3}, Toru Honda³ and Yasutaka Imanaka²; ¹National Institute for Materials Science, Japan; ²National Institute for Materials Science, Japan; ³Kougakuin, Japan.

GP02.09

Investigation of the Growth, Structural, and Optical Properties of Compositionally Graded InGa_{1-x}N V-Graded Layers Pijush K. Ghosh¹, Andrian Kuchuk², Mirsacid Sarollahi¹, Yurii Maidaniuk², Manal Aldawsari³, Yuriy Mazur², Gregory Salamo² and Morgan Ware¹; ¹University of Arkansas, United States; ²University of Arkansas, Fayetteville, United States; ³University of Arkansas, Fayetteville, United States.

GP02.10

Growth Parameters Influence on InGaN/GaN Heterostructures Quality Oleg Rabinovich, Alexander Savchuk, Marina Orlova, Sergey Marenkin, Sergey Didenko, Alexey Ril and Svetlana Podgornaya; NUST MISIS, Russian Federation.

GP02.11

Metal-Modulated Molecular Beam Epitaxy of Cubic-AlN on MgO Substrate for QCSE-Free Optoelectronic Devices Jian-Wei Liang, Jung-Wook Min, Dalaver Anjum, Kuang-Hui Li, Malleswararao Tangi, Tien Khee Ng and Boon S. Ooi; KAUST, Saudi Arabia.

GP02.12

Resonant and Non-Resonant Raman Spectroscopy of In-Rich InGaN Alloys Grown by Plasma-Assisted MOCVD Daniel Seidlitz¹, Emanuele Poliani¹, Maximilian Ries^{1,2,3}, Markus R. Wagner¹ and Axel Hoffmann¹; ¹Technische Universität, Germany; ²School for Analytical Sciences Adlershof (SALSA), Germany; ³Leibniz-Institut für Analytische Wissenschaften - ISAS - e.V., Germany.

GP02.13

Repair of Multifunctional Two-Dimension Structures by Regrowth of AlN Atomic Layer in MEE Mode Yuta Kamada, Tomoya Takeuchi and Akihiro Hashimoto; University of Fukui, Japan.

GP02.14

Self-Induced InGaN Nanowires with a Controlled InN Mole Fraction by HVPE Mohammed Zeghouane¹, Geoffrey Avit¹, Yamina Andre^{1,2}, Jihen Jridi¹, Catherine Bougerol³, Evelyne Gil^{1,2}, Pierre Ferret⁴, Dominique Castellucci¹, Yoann Robin⁵, Vladimir Dubrovskii², Hiroshi Amano⁵ and Agnes Trassoudaine¹; ¹Université Clermont Auvergne, CNRS, SIGMA Clermont, Institut Pascal, France; ²ITMO University, Kronverkskiy prospekt, Russian Federation; ³CNRS, Institut Néel, France; ⁴University Grenoble Alpes, CEA, LETI, Département Optique et Photonique, France; ⁵IMaSS, Nagoya University, Japan.

GP02.16

Remote Homoepitaxy of GaN on Graphene Using RF-MBE Ukyo Ooe, Shinichiro Mouri, Yasushi Nanishi and Tsutomu Araki; Ritsumeikan University, Japan.

GP02.17

Growth of III-Nitride Materials on Amorphous Substrates Using a Transferred Graphene Buffer Layer Meng Liang, Zhiqiang Liu, Yunyu Wang and Xiaoyan Yi; Institute of Semiconductors, Chinese Academy of Sciences, China.

GP02.18

Influence of Hydrogen in the Carrier Gas on InGaN Layers and Quantum Wells Robert Czernecki^{1,2}, Ewa Grzanka^{1,2}, Julita Smalc-Koziorowska^{1,2}, Pawel Kempisty¹, Szymon Grzanka^{1,2} and Mike Leszczynski^{1,2}; ¹Institute of High Pressure Physics of the Polish Academy of Sciences, Poland; ²TopGaN Ltd., Poland.

GP02.19

Surface Science Studies of GaN Substrates Subjected to Plasma-Assisted Atomic Layer Processes Samantha G. Rosenberg¹, Daniel J. Pennachio¹, Elliot C. Young², Yu H. Chang², Hadass S. Inbar², Jeffrey M. Woodward¹, Zachary R.

Robinson³, Jodi Grzeskowiak⁴, Carl A. Ventrice, Jr.⁵, Chris J. Palmström² and Charles R. Eddy Jr.¹; ¹U.S. Naval Research Laboratory, United States; ²University California, Santa Barbara, United States; ³SUNY Brockport, United States; ⁴University at Albany-SUNY, United States; ⁵SUNY Polytechnic Institute, United States.

GP02.20

Van der Waals Epitaxy of GaN Films on Two-Dimensional h-BN/Sapphire Substrates by Metal-Organic Chemical Vapor Deposition Ye Yu¹, Yuntao Zhang¹, Gaoqiang Deng¹, Fang Liu², Yang Wang¹, Lidong Zhang¹, Xu Han¹ and Xinqiang Wang²; ¹Jilin University, China; ²Peking University, China.

GP02.21

RF-MBE InN Growth on High-Quality AlN Template Yusuke Takabayashi¹, Hidenori Tachibana¹, Faizulsalihin Bin Abas¹, Shinichiro Mouri¹, Tsutomu Araki¹, Hideto Miyake² and Kanako Shojiki¹; ¹Ritsumeikan University, Japan; ²Mie University, Japan.

GP02.22

Characteristics of GaN/h-BN Grown by MOCVD with Various Surface Treatments Min Han, Beo Deul Ryu, Kang Bok Ko and Chang-Hee Hong; Chonbuk National University, Korea (the Republic of).

GP02.23

Ga-Assisted Molecular Beam Epitaxial Growth of GaAsSbN Heterostructure in Axial and Core-Shell Configured Nanowires on (111) Si Rabin Pokharel¹, Prithviraj Deshmukh¹, C. Lewis Reynolds² and Shanthi Iyer^{1,3}; ¹North Carolina A&T State University, United States; ²North Carolina State University, United States; ³North Carolina A&T State University, United States.

GP02.24

In-Plane Anisotropy Characteristics of (0001) Oriented AlN Epilayer Grown on (11-20) Sapphire by HVPE Jingjing Chen¹, Xu J. Su¹, Jun Huang¹, Mu T. Niu¹ and Ke Xu^{1,2}; ¹Suzhou Institute of Nano-Tech and Nano-Bionics, China; ²Suzhou Nanowin Science and Technology, China.

GP02.25

Effect of Crystallinity of SLS Buffer Layer on Warpage of GaN on Si Substrate Yasushi Iyechika, Masayuki Tsukui, Kiyotaka Miyano and Hideshi Takahashi; NuFlare Technology, Inc., Japan.

GP02.26

Effect of Al Injection in InGaN Multi Quantum Well LEDs Manish Mathew^{1,2}, Avinash S. Paliwal^{1,2}, Priyavart Parjapat¹, Bhoopendra Kushwaha¹, Kuldeep Singh¹ and Ashok Chauhan¹; ¹CEERI, Pilani, India; ²Academy of Scientific and Innovative Research (AcSIR), CSIR-Central Electronics Engineering Research Institute Campus, India.

GP02.27

Investigation of AlN Thick Films Grown on Sputtered AlN Templates by Hydride Vapor Phase Epitaxial Growth Jun Huang, Mu T. Niu, Mao S. Sun, Xu J. Su and Ke Xu; Suzhou Institute of Nano-Tech and Nano-Bionics, China.

GP02.28

Strain Relaxation in Al-rich AlGa_{1-x}N Films Grown by RF Plasma-Assisted Molecular Beam Epitaxy Naozumi Tachibana, Takeyoshi Onuma, Toru Honda and Tomohiro Yamaguchi; Kogakuin University, Japan.

GP02.29

In-Plane Misfits' Localization in GaN via Graphene-ELOG Technology Yu Xu^{1,3}, Xu J. Su¹, Bing Cao², Zongyao Li¹, Demin Cai³, Yi Liu², Yumin Zhang^{1,3}, Jianfeng Wang^{1,3}, Chinhua Wang² and Ke Xu^{1,3}; ¹Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, China; ²Soochow University, China; ³Suzhou Nanowin Science and Technology Co., Ltd., China.

GP02.30

Substrate-Decomposition-Free van der Waals Epitaxy of GaN on Graphene Jeong Hwan Park, Junyeob Lee, Mundo Park, Jesung Lee, Hoemin Kwak and Dong Seon Lee; Gwangju Institute of Science and Technology (GIST), Korea (the Republic of).

GP02.31

The Influence of AlN Seeding Layer Growth Temperature on Nucleation of Self-Assembled GaN Nano-Columns Yaozheng Wu¹, Bin Liu¹, Ke Wang¹, Zhenhua Li¹, Tao Tao¹, Zili Xie¹, Dunjun Chen¹, Hai Lu¹, Rong Zhang^{1,2} and Youdou Zheng¹; ¹Nanjing University, China; ²Xiamen University, China.

GP02.32

Effects of GaN film Growth Rate on Surface Morphology and Material Quality Zhang Hepeng, Xue Junshuai, Yongrui Fu, Weiting Qiang, Yanqing Jia, Jincheng Zhang and Yue Hao; Xidian University, China.

GP02.33

GaN Growth on Ceramics by Low Temperature RP-MOCVD Robert Dubreuil and Jonny Tot; Lakehead University, Canada.

GP02.34

Acquirement and Significance Analysis of No Gallium and No Aluminum Environment of MOCVD Reactor Chaopu Yang², Wenqing Fang¹, Jiancheng TANG² and Fan Yang¹; ¹Nanchang University, China; ²Nanchang University, China.

SESSION HP02: Poster Session II: Nanostructures and Nano-Devices
Tuesday Afternoon, July 9, 2019

6:30 PM - 8:30 PM

Grand Ballroom, Second Floor

HP02.01

Structural, Photo- and Cathodo-Luminescence Studies of GaN/Al(Ga) N Core-Shell Nanowires Andrian Kuchuk¹, Aleksandra Wierzbicka², Anna Reszka², Marta Sobanska², Yuriy Mazur¹, Yuriy Maidaniuk¹, Mourad Benamara¹, Qigeng Yan¹, Hryhorii Stanchu¹, Zbigniew R. Zytikiewicz² and Gregory Salamo²; ¹University of Arkansas, United States; ²Polish Academy of Sciences, Poland.

HP02.02

InN Pillars on GaN(0001)—Correlation of Structural, Optical and Electrical Properties Peter Lytvyn^{1,2}, Andrian Kuchuk¹, Yuriy Mazur¹, S.P. Minor¹, Yuriy Maidaniuk¹, Mourad Benamara¹, Morgan Ware¹ and Gregory Salamo¹; ¹Institute for Nanoscience and Engineering, United States; ²V. Lashkaryov Institute of Semiconductor Physics, Ukraine.

HP02.03

Probing the Dynamics of Single Photon Emission in InGaN QDs Xiaoxiao Sun¹, Ping Wang¹, Zhaoqing Chen¹, Kang Gao², Weikun Ge¹, Yasuhiko Arakawa², Bo Shen¹, Xinqiang Wang¹ and Mark J. Holmes²; ¹Peking University, China; ²Institute for Nano Quantum Information Electronics, Japan.

HP02.04

Optical Properties of Closed-Packed Array of GaN Inverted Nanopyramids Pavlos Bozinakis¹, Pierre-Marie Coulon², Michael Wallace¹, Jochen Bruckbauer¹, Paul Edwards¹, Lennart Ramakers³, Philip Shields² and Robert Martin¹; ¹University of Strathclyde, United Kingdom; ²University of Bath, United Kingdom; ³University of Strathclyde, United Kingdom.

HP02.05

Tip-Enhanced Raman Spectroscopy of Buried In_{0.11}Ga_{0.89}N Single Quantum Wells Maximilian Ries^{1,2,3}, Emanuele Poliani¹, Daniel Seidlitz¹, Markus R. Wagner¹, Axel Hoffmann¹ and Norbert Esser^{1,2,3}; ¹Technische Universität, Germany; ²School for Analytical Sciences Adlershof, Germany; ³Leibniz-Institut für Analytische Wissenschaften - ISAS - e.V., Germany.

HP02.06

Flexible Photosensors with InGaN-GaN Core-Shell Nanowires and Dots-Inside-a-Nanowire Horizontally Inserted in Graphene Jihoon Song¹, Sangmoon Han¹, Ilgyu Choi¹, Cheul-Ro Lee¹, Mee-Yi Ryu² and Jin Soo Kim¹; ¹Chonbuk National University, Korea (the Republic of); ²Kangwon National University, Korea (the Republic of).

HP02.07

Crystallographic Chemical Wet Etching of AlGaIn Nanostructures Barbara A. Kazanowska¹, Keshab Sapkota², Andrew Allerman², Kevin Jones¹ and George T. Wang²; ¹University of Florida, United States; ²Sandia National Laboratories, United States.

HP02.08

Epitaxial Growth and Characterization of AlGaIn Nanowire Heterostructures Yong-Ho Ra, Dae-Woo Jeon, SunWoog Kim, YoungJin Lee, Jin-Ho Kim, Jonghee Hwang and Tae Young Lim; Korea Institute of Ceramic Engineering & Technology, Korea (the Republic of).

HP02.09

Mechanisms of GaN Quantum Dot Formation During Nitridation of Ga Droplets Hongling Lu¹, Caleb Reese¹, Sunyeol Jeon¹, Yaming Fan², Yuqun Zhuo², Qi Liang¹ and Rachel Goldman¹; ¹University of Michigan, United States; ²Tsinghua University, China.

HP02.10

Enhanced Blue Emission From InGaN/GaN Multiple Quantum Well Nanorods by Surface Plasmon in Silver Nanowires Chuyoung Cho and Kyung-Ho Park; Korea Advanced Nano Fab Center, Korea (the Republic of).

HP02.11

Potential Mapping in GaN Nanowire P-N Junction via Off-Axis Electron Holography Anitha Jose¹, Sharif Sadaf², Haipeng Tang² and Karen Kavanagh¹; ¹Simon Fraser University, Canada; ²Advanced Electronics and Photonics, National Research Council Canada, Canada.

HP02.12

Epitaxially Grown InGaN/GaN Nanowires on Graphene Glass Dingding Ren¹, Zhaolong Chen², Julie S. Nilsen³, Lyubomir Ahtapodov¹, Boris Borisov⁴, Anjan Mukherjee¹, Yang Li¹, Zhiqiang Liu^{1,5}, Antonius T. van Helvoort³, Bjørn-Ove Fimland¹, Zhongfan Liu² and Helge Weman¹; ¹Norwegian University of Science and Technology, Norway; ²Peking University, China; ³Norwegian University of Science and Technology, Norway; ⁴SVT Associates, United States; ⁵Chinese Academic of Sciences, China.

HP02.13

Luminescent Properties of Zigzag-Graded InGaIn Quantum Wells Mirsaeid Sarollahi¹, Pijush Ghosh¹, Manal Aldawsari², Yuriy Maidaniuk², Andrian Kuchuk³, Yuriy Mazur², Gregory Salamo^{3,2,4} and Morgan Ware^{1,2,3}; ¹University of Arkansas, United States; ²University of Arkansas, United States; ³University of Arkansas, United States; ⁴University of Arkansas, United States.

HP02.14

Optical Properties of Thick Compositionally Graded InGaIn Films Manal A. Aldawsari¹, Pijush Ghosh², Mirsaeid Sarollahi², Andrian Kuchuk³ and Morgan Ware^{1,2,3}; ¹University of Arkansas, United States; ²University of Arkansas, United States; ³Institute for Nanoscience and Engineering, United States.

HP02.15

Linear Response of Bound Electrons to a Quasi-Static Oscillating Field in GaN Nanowire Structures Chi Cuong Huynh, Roger Evrard and Ngoc Duy Nguyen; University of Liège, Belgium.

HP02.16

Vertical Mesopore Arrays in nGaIn by Anodic Etching and ICP Surface Etching Xilin Su, Yufeng Li, Minyan Zhang, Peng Hu and Feng Yun; Xi'an Jiaotong University, China.

SESSION IP02: Poster Session II: Optical and Electronic Properties
Tuesday Afternoon, July 9, 2019

6:30 PM - 8:30 PM

Grand Ballroom, Second Floor

IP02.01

Impact of Surface Morphology on Leakage in III-Nitrides Based Optoelectronic and Power Electronic Devices on Si (111) Shashwat Rathkanthiwar, Anisha Kalra, Nayana Remesh, Abheek Bardhan, Nagaboopathy Mohan, Rangarajan Muralidharan, Digbijoy N. Nath and Srinivasan Raghavan; Indian Institute of Science, India.

IP02.02

Electron/hole Injections in p-GaN/AlGaIn/GaN HEMTs under Forward Gate Bias and their Effects on Device Behaviors Xi Tang^{1,2,3}, Nam-Trung Nguyen², Sima Dimitrijević², Jiannong Wang³ and Baikui Li¹; ¹Shenzhen University, China; ²Queensland Micro- and Nanotechnology Centre, Australia; ³The Hong Kong University of Science and Technology, Hong Kong.

IP02.03

Study of P-Type Doping of Hexagonal Boron Nitride Grown by MOCVD Adama Mballo¹, Suresh Sundaram^{1,2}, Phuong Vuong¹, Ashutosh Srivastava^{1,3}, Soufiane Karakchou^{1,3}, Taha Ayari^{1,2}, Yacine Halfaya¹, Simon Gautier⁴, Paul Voss^{1,3}, Jean Paul Salvestrini^{1,2} and Abdallah Ougazzaden^{1,3}; ¹CNRS, UMI 2958, GT-CNRS, France; ²GT-Lorraine, France; ³Georgia Institute of Technology, France; ⁴Institut Lafayette, France.

IP02.04

Contactless Electroreflectance Studies of the Surface Fermi Level in GaN/AlN Heterostructures with Buried 2D Hole Gas Lukas Janicki¹, Reet Chaudhuri², Samuel J. Bader³, Grace Xing^{2,4,5}, Debdeep Jena^{2,4,5} and Robert Kudrawiec¹; ¹Wroclaw University of Science and Technology, Poland; ²Cornell University, United States; ³Cornell University, United States; ⁴Cornell University, United States; ⁵Cornell University, United States.

IP02.05

Investigation of Hexagonal Inclusions in Zincblende GaN Using Cathodoluminescence and Electron Backscatter Diffraction in the SEM Jochen Bruckbauer¹, Dale Waters¹, Ben Hourahine¹, Menno Kappers², Martin Frentrup², David Wallis^{2,3}, Carol Trager-Cowan¹ and Aimo Winkelmann^{1,4}; ¹University of Strathclyde, United Kingdom; ²University of Cambridge, United Kingdom; ³University of Cardiff, United Kingdom; ⁴Laser Zentrum Hannover e.V., United Kingdom.

IP02.06

Functional Metal-GaN Micro-Stripe Structures for Infrared and Ultraviolet Regions Yoshihiro Ishitani¹, Tsubasa Yamakawa¹, Bojin Lin¹, Kensuke Oki¹, Bei Ma¹, Ken Morita¹, Yusuke Hayashi², Hideto Miyake² and

Kazuhiro Ohkawa³; ¹Chiba University, Japan; ²Mie University, Japan; ³King Abdullah University of Science and Technology, Saudi Arabia.

IP02.07

Growth of Non-Polar GaN Nanowires—Ultrashort Carrier Dynamics of Semi-Polar (11-22) GaN/InGaN Multiple Quantum Well Co-Axial Nanowires Muhammad A. Johar¹, Hyun-Gyu Song², Aadil Waseem¹, Jin Ho Kang^{1,3}, Yong-Hoon Cho² and Sang-Wan Ryu¹; ¹Chonnam National University, Korea (the Republic of); ²Korea Advanced Institute of Science and Technology, Korea (the Republic of); ³Yale University, United States.

IP02.08

Photoluminescence Characterization of Undoped GaN Exposed to NH₃ Plasma Naoto Kumagai^{1,2}, Hirotomo Itagaki³, Tokio Takahashi², Jaeho Kim^{2,1}, Hisato Ogiso³, Shingo Hirose³, Hajime Sakakita^{2,1}, Xuelun Wang^{1,2,4} and Mitsuru Shimizu^{1,4}; ¹AIST, Japan; ²AIST, Japan; ³AIST, Japan; ⁴Nagoya University, Japan.

IP02.09

The Significant Effect of Carbon and Oxygen Contaminants at Pd/p-GaN Interface on its Ohmic Contact Characteristics Sunan Ding and Zhengcheng Li; Suzhou Institute of Nano-Tech and Nano-Bionics, CAS, China.

IP02.10

Fractional Dimensional Treatment of III-N Electronic and Optoelectronic Devices Vikas Pendem, Tarni Aggarwal, Ankit Udai, Pratim K. Saha, Shonal Chouksey, Swaroop Ganguly and Dipankar Saha; Indian Institute of Technology Bombay, India.

IP02.11

Optical and Structural Characterization of Ultra-Thin In(Ga)N/GaN Multi Quantum Wells—The Impact of Growth Parameters Yurii Maidaniuk¹, Yuriy Mazur¹, Chen Li¹, Andrian Kuchuk¹, Mourad Benamara¹, Peter Lytvyn² and Gregory Salamo¹; ¹University of Arkansas, United States; ²National Academy of Sciences of Ukraine, Ukraine.

IP02.12

Structural and Optical Properties of InGaN/InGaN Structures with Extremely Thin Quantum Wells, Grown on InGaN Pseudosubstrates by Metal-Organic Vapor Phase Epitaxy Grzegorz Staszczak¹, Ewa Grzanka^{1,2}, Grzegorz Targowski^{1,2}, Julita Smalc-Koziorowska¹ and Tadeusz Suski¹; ¹Institute of High Pressures Physics, UNIPRESS, Poland; ²TopGaN, Poland.

IP02.13

On the Yellow Luminescence of BGaN Alloys Emil M. Pavelescu; IMT-Bucharest, Romania.

IP02.14

Photoelectrochemical Analysis of Carrier Concentrations in (In,Al)GaN Nanowires for Photonic Devices Huafan Zhang¹, Mohamed Ebaid^{1,2}, Chao Zhao^{1,4}, Jung-Wook Min¹, Guangyu Liu¹, Bilal Janjua^{1,3}, Tien Khee Ng¹, Boon S. Ooi¹ and Jorge A. Holguin-Lerma¹; ¹King Abdullah University of Science & Technology, Saudi Arabia; ²Lawrence Berkeley National Laboratory, United States; ³University of Toronto, Canada; ⁴RWTH Aachen University/Forschungszentrum Jülich Peter Gruenberg Institute (PGI-9), Germany.

IP02.15

Analysis of Leakage Current, Shunt Resistance and Correlation of PL to EL in Green Micro-LEDs by Micro-Photocurrent and Other Optical Methods Kyuheon Kim¹, Junghoon Song¹, Gunwoo Jung¹, Chanmi Choi¹, Ukeun Gang¹, Tachwan Park¹, Boram Jeon¹, Jeong Tak² and Youngbo Moon³; ¹Kongju National University, Korea (the Republic of); ²LED Device Research Center, Korea Photonics Technology Institute, Korea (the Republic of); ³UJL Ltd., Korea (the Republic of).

IP02.16

Possibility of Single Optical Site of Eu and Mg Codoped GaN Hiroto Sekiguchi¹, Masaru Sakai² and Akihiro Wakahara¹; ¹Toyohashi University of Technology, Japan; ²University of Yamanashi, Japan.

IP02.17

Polarisation and Carrier Density Dependent Optical Gain of InGaN/GaN Quantum Well for an Enhanced Performance Ankit Udai, Vikas Pendem, Tarni Aggarwal and Dipankar Saha; Indian Institute of Technology Bombay, India.

IP02.18

Electrical Characteristics of Directly Growth Graphene on p-GaN Zongyao Li¹, Yu Xu^{2,1}, Haijian Zhong², Bing Cao³, Chunyu Zhang², Jianfeng Wang^{2,1} and Ke Xu^{2,1}; ¹Suzhou Nanowin Science and Technology Co., Ltd, China; ²Suzhou Institute of Nano-Tech and Nano-Bionics (SINANO), China; ³Soochow University, China.

IP02.19

MIS Capacitance Effect of AlN/ZrO₂ Gate Dielectrics on Zinc-Tin Oxide Thin-Film Transistors Hunho Kim and Woon-Seop Choi; Hoseo University, Korea (the Republic of).

IP02.20

Study of Temperature Dependent Photoluminescence from Swift Heavy Ion Irradiated and as-Deposited Si Rich a-SiN_x:H Thin Films Harsh Gupta¹, Olivier Plantevin², Ravi K. Bommali³, Santanu Ghosh¹ and Pankaj Srivastava¹; ¹Indian Institute of Technology Delhi, India; ²MC HDR Université Paris-Sud, France; ³Institute of Physics, India.

IP02.21

Quantitative Evaluation of Interfacial Charges at GaN/AlGaIn Interfaces Takuya Hoshii¹, Akira Nakajima², Shin-ichi Nishizawa³, Hiromichi Ohashi¹, Kuniyuki Kakushima¹, Hitoshi Wakabayashi¹ and Kazuo Tsutsui¹; ¹Tokyo Institute of Technology, Japan; ²National Institute of Advanced Industrial Science and Technology (AIST), Japan; ³Kyushu University, Japan.

SESSION JP02: Poster Session II: Defect Characterization and Engineering

Tuesday Afternoon, July 9, 2019

6:30 PM - 8:30 PM

Grand Ballroom, Second Floor

JP02.01

Improvement of Lattice Curvature of GaN Film on Sapphire Substrate Using Lattice Modulated InGaIn Layer by Thermal Decomposition Takushi Kaneko, Narihito Okada and Kazuyuki Tadamoto; Yamaguchi University, Japan.

JP02.02

A Spatial Distribution of the E_v+0.88 eV Trap in 2-Inch p-GaN Grown by MOVPE on GaN Substrate Yutaka Tokuda¹, Hikaru Yoshida¹, Tetsuo Narita², Kazuyoshi Tomita² and Tetsu Kachi³; ¹Aichi Institute of Technology, Japan; ²Toyota Central R&D Labs., Inc., Japan; ³Nagoya University, Japan.

JP02.03

Analytical Formula for Quantum Efficiency of Radiation Considering Self Absorption Process Hidehiro Asai¹, Kazunobu Kojima², Shigefusa F. Chichibu² and Koichi Fukuda¹; ¹National Institute of Advanced Industrial Science and Technology (AIST), Japan; ²Tohoku University, Japan.

JP02.04

First-Principles Identification of Defect Complexes in the Mg+H-Codoped GaN He Li, Menglin Huang and Shiyu Chen; East China Normal University, China.

JP02.05

Effect of Wafer Off-Angles on Defect Formation in Drift Layers Grown on Freestanding GaN Substrates Kenji Shiojima¹, Fumimasa Horikiri², Yoshinobu Narita², Takehiro Yoshida² and Tomoyoshi Mishima³; ¹University of Fukui, Japan; ²Sciocs Company Ltd., Japan; ³Hosei University, Japan.

JP02.06

Neutron Radiation Damage of Gallium Nitride with Different Growth Orientations Sam C. Sprawls¹, Farnood Mirkhosravi², Joshua Gallagher³, Matthew Durbin³, Emily Mace⁴, Michael Scarpulla^{5,1}, Daniel Feezell^{2,6} and Azaree Lintereur⁷; ¹University of Utah, United States; ²University of New Mexico, United States; ³Penn State University, United States; ⁴Pacific Northwest National Laboratory, United States; ⁵University of Utah, United States; ⁶University of New Mexico, United States.

JP02.07

Interface Defects at p-GaN MO(II)S Capacitors Liwen Sang; National Institute for Materials Science, Japan.

JP02.08

Superior Reliability of Heavy Ion Irradiated AlInN/GaN HFETs Nahuel A. Vega^{1,4}, Seshagiri Rao Challa², Romualdo Ferreyra^{3,4}, Christian Kristukat³, Nahuel Müller¹, Mario Debray¹, Gordon Schmidt², Florian Hörich², Hartmut Witte², Juergen Christen², Armin Dadgar² and André Strittmatter²; ¹Gerencia de Investigación y Aplicaciones, CNEA, Argentina; ²Otto-von-Guericke-Universität Magdeburg, Germany; ³Universidad de San Martín, Argentina; ⁴Consejo Nacional de Investigaciones Científicas y Tecnológicas (CONICET), Argentina.

JP02.09

Minority Carrier Traps in Ion Implanted N-Type Homoepitaxial GaN Giovanni Alfieri and Vinoth K. Sundaramoorthy; ABB, Switzerland.

JP02.10

Analysis of Gate Degradation Under Forward Bias in GaN-Based MIS-HEMTs with LPCVD-SiN₂ Gate Dielectric Yawen Zhao¹, Taotao Que¹, Liang He^{1,3}, Luan Li¹, Qiuling Qiu¹, Xiaorong Zhang³, Yiqiang Ni^{1,3}, Zhenxing Liu¹, Jialin Zhang¹, Xin Gu¹, Jia Chen¹, Ruihong Luo³, Jianguo Chen⁴, Zhiyuan He⁵ and Yang Liu^{1,2,3}; ¹School of Electronics and Information Technology, Sun Yat-Sen University, State Key Laboratory of Optoelectronic Materials and Technologies, China; ²Zhuhai Key Technology Laboratory of Wide Bandgap Semiconductor Power Electronics, Sun Yat-Sen University, China; ³Jiangsu Sinopower Semiconductor Co., Ltd, China; ⁴Founder Microelectronics International Corporation, Ltd, China; ⁵Science and Technology on Reliability Physics and Application of Electronic Component Laboratory, No.5 Electronics Research Institute of the Ministry of Industry and Information Technology, China.

JP02.11

Defects Evolution of GaN Films van der Waals Epitaxy on Graphene Anlin Luo; Key Lab of Advanced Optical Manufacturing Technologies of Jiangsu Province and Key Lab of Modern Optical Technologies of Education Ministry of China, Soochow University, China.

JP02.12

Detection of Yield Impacting Defects on GaN Substrate and Epitaxy Wafers Varun Gupta, Akash Nanda, Michael Walker and Mukundkrishna Raghunathan; KLA Corporation, United States.

SESSION LP01: Poster Session: Theory and Simulation
Tuesday Afternoon, July 9, 2019
6:30 PM - 8:30 PM
Grand Ballroom, Second Floor

LP01.01

Study of Polymer Formation in AlGa_{0.3}N MOVPE by Numerical Analysis Kazuhiro Ohkawa¹, Kenichi Nakamura² and Daisuke Iida³; ¹King Abdullah University of Science and Technology, Saudi Arabia; ²Tokyo University of Science, Japan.

LP01.02

High-Throughput First-Principles Screening of I-III-IV₂-V₄ Quaternary Compound Semiconductors Derived from Ga Tao Zhang and Shiyu Chen; East China Normal University, China.

LP01.03

Improved Simulation of MOCVD Growth of AlN by Using Data Assimilation Masafumi Jo, Yuri Itokazu, Shunsuke Kuwaba and Hideki Hirayama; RIKEN, Japan.

LP01.04

Studies of Stress Effects on the Electrical Performance of AlGa_{0.3}N/GaN HEMTs through *ab initio* Calculation and TCAD Simulation Hui Yung Wong¹, Nelson Braga², Jie Liu² and R. V. Mickevicius²; ¹San Jose State University, United States; ²Synopsys, Inc., United States.

LP01.05

Effective Schottky Barrier Height Model for Ga- and N-Polar GaN by Polarization-Induced Surface Charges with Finite Depth Tetsuya Suemitsu¹ and Isao Makabe²; ¹Tohoku University, Japan; ²Sumitomo Electric Industries, Ltd., Japan.

LP01.06

The Effect of Nonlinear Deformation in Large Size GaN/Sapphire Bilayer System Mengda Li¹, Tongjun Yu¹, Jiejun Wu¹, Jinmi He², Nanliu Liu³, Tong Han¹ and Guoyi Zhang^{1,2,3}; ¹Peking University, China; ²Sino Nitride Semiconductor CO., LTD, China; ³Dongguan Institute of Optoelectronics, Peking University, China.

LP01.07

Electronic Properties of Edge-Functionalized Zigzag GaN Nanoribbons—A First-Principles Study Naresh Alaal and Iman Roqan; King Abdullah University of Science and Technology, Saudi Arabia.

LP01.08

Influence of Polycrystalline Parasitic Growth on AlN Single Crystal PVT Growth Through von-Mises Thermal Stress Simulations Qikun Wang, Jiali Huang, Yinting Zhao, Danyang Fu, Guangdong He, Dan Lei and Jason Wu; Ultratrend Technologies Inc., China.

LP01.09

First-Principles Mechanism Study on the Etching of Silicon Nitride (Si₃N₄) by Aqueous Phosphoric Acid (H₃PO₄) Solution Hyunwook Jung, Junyeop Kim and Byungchan Han; Yonsei University, Korea (the Republic of).

LP01.10

First Principle Prediction of Effective Two Dimensional Buffer Layer for High Quality Gallium Nitride Based Semiconductors Zhiming Shi, Xiaojuan Sun, Yuping Jia and Dabing Li; Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences, China.

LP01.11

Photodetectors AlGa_{0.3}N Heterostructure Optimization Oleg Rabinovich, Sergey Didenko, Marina Orlova, Alexander Savchuk, Sergey Marenkin, Alexey Ril and Svetlana Podgornaya; NUST MISIS, Russian Federation.

SESSION MP02: Poster Session II: New Materials and Device Concepts
Tuesday Afternoon, July 9, 2019
6:30 PM - 8:30 PM
Grand Ballroom, Second Floor

MP02.01

Steep-Slope AlGa_{0.3}N/GaN HEMT with Oxide Based Threshold Switching Device Xuanqi Huang¹, Runchen Fang¹, Chen Yang¹, Kai Fu¹, Houqiang Fu¹, Hong Chen¹, Tsung-Han Yang¹, Jingan Zhou¹, Jossue Montes¹, Michael Kozycki¹, Hugh Barnaby¹, Baoshun Zhang² and Yuji Zhao¹; ¹Arizona State University, United States; ²Suzhou Institute of Nano-Tech and Nano-Bionics (SINANO), China.

MP02.02

Novel Field Emitter Based on an In-Plane-Gate AlGa_{0.3}N/GaN 2DEG Structure Pao-Chuan Shih and Tomas Palacios; Massachusetts Institute of Technology, United States.

MP02.03

Synthesis of New Quaternary Nitride Alloys with Mg by Plasma-Assisted Molecular Beam Epitaxy Iulian Gherasoiu¹, Kin M. Yu², Michael Hawkridge³ and Wladek Walukiewicz²; ¹SUNY Polytechnic Institute, United States; ²City University of Hong Kong, China; ³PANalytical, United States; ⁴Lawrence Berkeley National Laboratory, United States.

MP02.04

Wet Thermal Oxidation of AlInN Matthew R. Peart, Xiongliang Wei, Damir Borovac, Sun Wei, Nelson Tansu and Jonathan Wierer; Lehigh University, United States.

MP02.05

Surface Charge of GaN as a Function of pH Probed by Atomic Force Microscopy Imaging of Adsorbed Ionic Surfactants Jianan Wang¹, Xing Zhang¹, Constance Wang², Hua Li¹, Brett Nener¹, Giacinta Parish¹ and Rob Atkin¹; ¹The University of Western Australia, Australia; ²University of Washington, United States.

MP02.06

Real-Time *in situ* Monitoring of III-Nitride ALD Processes via Multi-Wavelength Ellipsometry—Analysis of Self-Limiting Surface Reaction Mechanisms of Metal Alkyl Precursors and Nitrogen Plasma Species Necmi Biyikli¹, Adnan Mohammad¹, Deepa Shukla², Saidjafarzoda Ilhom¹, Blaine Johs³, Brian Willis⁴ and Ali K. Okay²; ¹University of Connecticut, United States; ²University of Connecticut, United States; ³Film Sense LLC, United States; ⁴University of Connecticut, United States; ⁵Stanford University, United States.

MP02.07

The Importance of Electrical Isolation Between GaN Monolithically Integrated Devices Xiao Ma, Kwai Hei Li and Hoi Wai Choi; The University of Hong Kong, Hong Kong.

MP02.08

Photoluminescence and Electrical Properties of GaN Grown on Natural Graphite Sheet by MBE Takashi Inoue¹, Hoshito Murakawa², Go Sajiki², Toshihiro Hosokawa¹, Akiyoshi Takeda¹ and Hiroshi Okano²; ¹Toyo Tanso Co., Ltd., Japan; ²National Institute of Technology, Kagawa College, Japan.

MP02.09

High-Mobility and High-Stability Thin-Film Transistors Fabricated by Zinc Nitride Based Semiconductors Hyoung-Do Kim and Hyun-Suk Kim; Chungnam National University, Korea (the Republic of).

WEDNESDAY PRESENTATIONS

* Invited Paper

SESSION A07: Deep UV LEDs
Session Chairs: Abdallah Ougazzaden and Zlatko Sitar
Wednesday Morning, July 10, 2019
Evergreen Ballroom E-F, Lobby Level

8:30 AM A07.01

Current Status and Future Directions of High Power AlGaIn-Based UVB LEDs with Emission of 280nm-320nm M. A. Khan^{1,2} and Hideki Hirayama^{1,2}; ¹RIKEN, Japan; ²RIKEN, Japan.

8:45 AM A07.02

High-Efficiency Tunnel-Injection Deep Ultraviolet LEDs at 265 nm Ayush Pandey, Walter J. Shin and Zetian Mi; University of Michigan, Ann Arbor, United States.

9:00 AM A07.03

AlGaIn-Based Deep UV LEDs Grown on High Temperature Annealed Epitaxially Laterally Overgrown AlN/Sapphire Norman Susilo¹, Eviathar Ziffer¹, Sylvia Hagedorn², Leonardo Cancellara³, Carsten Netzel², Sebastian Metzner⁴, Bettina Belde¹, Frank Bertram⁴, Priti Gupta¹, Sebastian Walde², Luca Sulmoni¹, Martin Guttman¹, Tim Wernicke¹, Juergen Christen⁴, Martin Albrecht¹, Markus Weyers² and Michael Kneissl^{1,2}; ¹Technische Universität Berlin, Germany; ²Leibniz-Institut für Höchstfrequenztechnik, Germany; ³Leibniz-Institut für Kristallzüchtung, Germany; ⁴Otto-von-Guericke-University Magdeburg, Germany.

9:15 AM A07.04

Cathodoluminescence Investigation of AlGaIn-Based Deep UV MQWs Grown on AlN/Sapphire Template and Native AlN Substrate—Impact of Defect Density and Inhomogeneity on Luminescence Properties Sebastian Metzner¹, Mohammad T. Mazraehno², Christian Brandl², Marc P. Hoffmann², Gordon Schmidt¹, Frank Bertram¹, Hans-Juergen Lugauer² and Juergen Christen¹; ¹Otto-von-Guericke University Magdeburg, Germany; ²OSRAM Opto Semiconductors, Germany.

9:30 AM A07.05

Enhancement of Light Extraction Efficiency of Tunnel-Injected Deep UV LEDs Walter J. Shin, Ayush Pandey, Xianhe Liu, Kishwar Mashooq and Zetian Mi; University of Michigan, Ann Arbor, United States.

9:45 AM A07.06

Impact of the Growth Substrate on the Efficiency of Deep UV LEDs Gwénolé Jacopin¹, Mohammad T. Mazraehno², Georg Rossbach², Christian Brandl², Marc P. Hoffmann² and Hans-Juergen Lugauer²; ¹CNRS, France; ²OSRAM Opto Semiconductors GmbH, Germany.

10:00 AM A07.07

Influence of Substrate Off-Cut Angle on the Performance of 310 nm Light Emitting Diodes Tim Kolbe^{1,2}, Arne Knauer¹, Johannes Enslin³, Sylvia Hagedorn¹, Anna Mogilatenko¹, Tim Wernicke³, Sven Einfeld¹, Michael Kneissl^{1,3} and Markus Weyers¹; ¹Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, Germany; ²UVphotonics NT GmbH, Germany; ³Technische Universität Berlin, Institute of Solid State Physics, Germany.

10:15 AM BREAK

SESSION A08: Visible Laser Diodes
Session Chairs: Ulrich Schwarz and Thomas Wunderer
Wednesday Morning, July 10, 2019
Evergreen Ballroom E-F, Lobby Level

10:45 AM *A08.01

GaN-Based Distributed Feedback and Distributed Bragg Reflection Laser Diodes with High-Order Surface Gratings Sven Einfeld¹, Ji-Hye Kang¹, Hans Wenzel¹, Erik Freier¹, Veit Hoffmann¹, Mathias Matalla¹, Maria Norman-Reiner¹, Alexander Kuelberg¹, Olaf Brox¹, Joerg Fricke¹, Ralph-Stephan Unger¹, Luca Sulmoni², Markus Weyers¹, Tim Wernicke² and Michael Kneissl^{2,1}; ¹Ferdinand-Braun-Institut, Leibniz-Institut fuer Hoechstfrequenztechnik, Germany; ²Technische Universitaet Berlin, Germany.

11:15 AM A08.02

Narrow-Line Emission at Green Wavelengths—Distributed Feedback (DFB) Grating on InGaIn/GaN Laser Diodes Jorge A. Holguin-Lerma, Tien Khee Ng and Boon S. Ooi; King Abdullah University of Science and Technology, Saudi Arabia.

11:30 AM A08.03

III-N Tunnel Junctions as an Enabling Technology for Efficient Distributed Feedback Laser Diodes Grzegorz Muziol¹, Henryk Turski¹, Mateusz Hajdel¹, Marcin Siekacz¹, Krzesimir Nowakowski-Szkudlarek¹, Kazuki Nomoto², Debdeep Jena², Grace Xing² and Czeslaw Skierbiszewski^{1,3}; ¹Institute of High Pressure Physics PAS, Poland; ²Cornell University, United States; ³TopGaN Ltd., Poland.

11:45 AM A08.04

Monolithically Inverted Laser Diodes and Light Emitting Diodes Grown by Plasma Assisted MBE Henryk Turski¹, Shyam Bharadwaj², Marcin Siekacz¹, Grzegorz Muziol¹, Mikolaj Zak¹, Mikolaj Chlipala¹, Mateusz Hajdel¹, Krzesimir Nowakowski-Szkudlarek¹, Grace Xing², Debdeep Jena² and Czeslaw Skierbiszewski¹; ¹Institute of High Pressure Physics Polish Academy of Sciences, Poland; ²Cornell University, United States.

12:00 PM A08.05

Randomness in Mode Distribution in Modulated (Al,In)GaN Laser Diodes Lukas Uhlig, Matthias Wachs and Ulrich Schwarz; Chemnitz University of Technology, Germany.

12:15 PM A08.06

Optically Pumped GaN-Based Laterally Coupled Distributed-Feedback Semiconductor Lasers with 3rd-Order Surface Gratings Grown on Pendeo-Epitaxy GaN Tsuyoshi Ando¹, Kenta Takagi¹, Yoshiki Morioka², Masahiro Uemukai², Ryuji Katayama², Daichi Imai¹ and Takao Miyajima¹; ¹Meijo University, Japan; ²Osaka University, Japan.

SESSION B07: High Voltage Devices
Session Chairs: Ron Birkhahn and Marianne Germain
Wednesday Morning, July 10, 2019
Cedar Ballroom, Second Floor

8:30 AM *B07.01

Towards Higher Voltage in III-Nitride Devices Farid Medjdoub; IEMN-CNRS, France.

9:00 AM B07.02

Record Small-Signal RF and Off-State Breakdown Characteristics in AlN/GaN/AlN HEMTs Austin L. Hickman, Reet Chaudhuri, Samuel J. Bader, Kazuki Nomoto, Debdeep Jena and Grace Xing; Cornell University, United States.

9:15 AM B07.03

n-AlN MESFETs with Graded AlGaIn Contact Layer Masanobu Hiroki and Kazuhide Kumakura; NTT Basic Research Labs., Japan.

9:30 AM B07.04

Al_{0.75}Ga_{0.25}N/Al_{0.6}Ga_{0.4}N Heterojunction Field Effect Transistor with MBE-Regrown Contacts Hao Xue¹, Choong Hee Lee¹, Kamal Hussain², Towhidur Razzak¹, Md Abdullah-Al Mamun², Zhanbo Xia¹, Shahadat H. Sohel¹, Asif Khan², Siddharth Rajan¹ and Wu Lu¹; ¹The Ohio State University, United States; ²University of South Carolina, United States.

9:45 AM B07.05

AllIn Power Diodes Matthew R. Peart, Damir Borovac, Sun Wei, Nelson Tansu and Jonathan Wierer; Lehigh University, United States.

10:00 AM B07.06

Enhanced Breakdown Voltage in Vertical Schottky Diodes on Compensated GaN Drift Layer Grown on Free-Standing GaN Abhinay Sandupatla¹, Arulkumar Subramaniam^{2,3}, Geok Ing Ng^{1,2}, Kumud Ranjan^{1,2}, Manato Deki³, Shugo Nitta³, Yoshio Honda³ and Hiroshi Amano³; ¹NTU, Singapore; ²Temasek Labs@NTU, Singapore; ³Nagoya University, Japan.

10:15 AM BREAK

SESSION E01: Mg Activation and P-N Junctions

Session Chairs: Tetsuo Narita and Yuji Zhao

Wednesday Morning, July 10, 2019

Cedar Ballroom, Second Floor

10:45 AM E01.01

Clear Evidence of P-Type Formation by Hall-Effect Measurements of Mg-Ion Implanted GaN Activated with Ultra-High-Pressure Annealing

Hideki Sakurai^{1,2,3}, Masato Omori¹, Shinji Yamada^{1,2,3}, Akihiko Koura³, Hideo Suzuki³, Tetsuo Narita⁴, Keita Kataoka⁴, Masahiro Horita^{1,2}, Michal Boćkowski^{1,5}, Jun Suda^{1,2} and Tetsu Kachi¹; ¹Nagoya University, Japan; ²Nagoya University, Japan; ³ULVAC, Inc, Japan; ⁴Toyota Central R&D Labs, Inc., Japan; ⁵Institute of High Pressure Physics Polish Academy of Sciences, Poland.

11:00 AM E01.02

Pulsed-Laser Activation of Implanted Mg Acceptors in GaN Grown on a GaN Substrate

Takao Miyajima¹, Yusuke Yamada¹, Takato Ichikawa¹, Daichi Imai¹ and Toshiyuki Sameshima²; ¹Meijo University, Japan; ²Tokyo University of Agriculture and Technology, Japan.

11:15 AM E01.03

Toward Selective Activation of Mg doped GaN—Impact of Pulsed and Continuous Gyrotron Annealing

Kasey Hogan¹, Emma Rocco¹, Sean A. Tozier¹, Vincent Meyers¹, Benjamin McEwen¹, Isra Mahaboob¹, Michael Shevelev², Vlad Skylar², Randy Tompkins³, Michael Derenge³, Jamie Hart⁴, Kenneth Jones³, Mitra Taheri⁴, Woongje Sung¹ and Fatemeh (Shadi) Shahedipour-Sandvik¹; ¹SUNY Polytechnic Institute, United States; ²Gyrotron Technology Inc., United States; ³Army Research Laboratory, United States; ⁴Drexel University, United States.

11:30 AM E01.04

Photoluminescence Studies of Sequentially Mg and H Ion-Implanted GaN with Various Implantation Depths and Crystallographic Planes

Kohei Shima¹, Hiroko Iguchi², Tetsuo Narita², Keita Kataoka², Kazunobu Kojima¹, Akira Uedono³ and Shigefusa F. Chichibu^{1,4,5}; ¹Tohoku University, Japan; ²Toyota Central R&D Labs, Inc., Japan; ³University of Tsukuba, Japan; ⁴IMaSS, Nagoya University, Japan; ⁵RCIQE, Hokkaido University, Japan.

11:45 AM E01.05

Nonuniform Mg Doping in GaN Epilayers Grown on Mesa Structures

Hanxiao Liu¹, Houqiang Fu², Kai Fu², Shanthan Reddy Alugubelli¹, Po-Yi Su¹, Yuji Zhao² and Fernando Ponce¹; ¹Arizona State University, United States; ²Arizona State University, United States.

12:00 PM E01.06

Demonstration of High-Voltage Regrown Nonpolar *m*-Plane *p*-*n* Diodes for Selective-Area-Doped Power Electronics

Morteza Monavarian¹, Gregory Pickrell², Andrew A. Aragon¹, Isaac Stricklin¹, Mary Crawford², Andrew Allerman², Kimberlee Celio³, Francois Leonard³, Alec Talin³, Andrew Armstrong² and Daniel Feezell¹; ¹Center for High-Technology Materials, The University of New Mexico, United States; ²Sandia National Laboratories, United States; ³Sandia National Laboratories, United States.

12:15 PM E01.07

Demonstration of Mechanically Exfoliated β -Ga₂O₃/GaN p-n Heterojunction

Chen Yang, Jossue Montes, Houqiang Fu, Tsung-Han Yang, Kai Fu, Hong Chen, Jingan Zhou, Xuanqi Huang and Yuji Zhao; Arizona State University, United States.

SESSION H04: Quantum Dot and Single Photon Emission

Session Chairs: Dong Seon Lee and Maria Vladimirova

Wednesday Morning, July 10, 2019

Evergreen Ballroom A-C, Lobby Level

8:30 AM H04.01

Room Temperature Single Photon Emission from Planar GaN/AlN Quantum Dot Samples Grown by MBE

Gordon Callsen, Sebastian Tamariz and Nicolas Grandjean; École Polytechnique Fédérale de Lausanne (EPFL), Switzerland.

8:45 AM H04.02

Bright Single Photon Source Based on an InGa_{0.5}N Quantum Dot in a Site-Controlled Optical Horn Structure

Xiaoxiao Sun¹, Ping Wang¹, Tao Wang¹, Duo Li¹, Zhaoying Chen¹, Ling Chen¹, Kang Gao², Weikun Ge¹, Yasuhiko Arakawa², Bo Shen¹, Mark J. Holmes² and Xinqiang Wang¹; ¹Peking University, China; ²Institute for Nano Quantum Information Electronics, Japan.

9:00 AM H04.03

Self-Organized Desorption Induced GaN Quantum Dot Formation on Top of a Wavelength Matched Deep-UV AlN/AlGa_{0.5}N Distributed Bragg Reflector

Hannes Schürmann¹, Gordon Schmidt¹, Christoph Berger¹, Sebastian Metzner¹, Peter Veit¹, Jürgen Blasing¹, Frank Bertram¹, Armin Dadgar¹, André Strittmatter¹, Juergen Christen¹, Stefan Kalinowski², Stefan Jagsch², Markus R. Wagner² and Axel Hoffmann²; ¹Otto-von-Guericke-University Magdeburg, Germany; ²Technical University Berlin, Germany.

9:15 AM H04.04

Optical Characterization of Single InGa_{0.5}N Quantum Dot with Self-Aligned Two-Photon Plasmonic Nanofocusing

Su-Hyun Gong, Hwan-Seop Yeo, Kie Young Woo, Sejeong Kim, Je-Hyung Kim and Yong-Hoon Cho; Korea Advanced Institute of Science and Technology, Korea (the Republic of).

9:30 AM H04.05

Design of AlGa_{0.5}N/AlN Dot-in-a-Wire Heterostructures UV Emitters

Ioanna Dimkou¹, Akhil Ajay², Edith Bellet-Amalric², Martien I. den Hertog³, Fabrice Donatini³, Nicolas Mollard², Catherine Bougerol³, Eva Monroy² and stephen Purcell⁴; ¹CEA-Leti, France; ²University Grenoble-Alpes, CEA-IRIG-DEPHY-PHELIQS, France; ³University Grenoble-Alpes, CNRS-Institut Néel, France; ⁴University Lyon, Université Claude Bernard Lyon 1, CNRS, Institut Lumière Matière, France.

9:45 AM H04.06

Spatial Distribution and Temporal Evolution of GaN QD Emissions—Blinking Phenomenon Under Cathodoluminescence Excitation

Gordon Schmidt, Sebastian Metzner, Hannes Schürmann, Frank Bertram, Silvio Neugebauer, Christoph Berger, Armin Dadgar, André Strittmatter and Juergen Christen; Otto-von-Guericke University Magdeburg, Germany.

10:00 AM LATE NEWS

10:15 AM BREAK

SESSION G07: Growth on Silicon, Integration and Quantum Dot

Session Chairs: Jung Han and Xinqiang Wang

Wednesday Morning, July 10, 2019

Evergreen Ballroom A-C, Lobby Level

10:45 AM *G07.01

Heteroepitaxy of GaN-Based Materials and Devices on Si

Qian Sun; Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, China.

11:15 AM G07.02

Wafer-Scale Crack-Free 10- μ m-Thick GaN with a Dislocation Density of 5.8×10^7 cm⁻² Grown on Si

Jianxun Liu, Yingnan Huang, Xiujian Sun, Meixin Feng, Yu Zhou, Qian Sun and Hui Yang; Key Laboratory of Nano-Devices and Applications, Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, China.

11:30 AM G07.03

Monolithic On-Chip Integration of HEMTs/Green LEDs

Y Cai, Y Gong, Jie Bai, X Yu, C Zhu, V Esendag, Kean Boon Lee and T Wang; University of Sheffield, United Kingdom.

11:45 AM G07.04

Pendeo-Epitaxy of GaN on Nano-Patterned SOI Substrates—A New Si-Compatible Platform for Micro-Display Applications

Roy Dagher¹, Philippe de Mierry², Blandine Alloing², Virginie Brandli², Hubert Bono³, Maximilien Cottat⁴, Cécile Gourgon⁴, Jesus Zuniga-Perez² and Guy Feuillet¹; ¹CEA Leti, France; ²Université Cote d'Azur, France; ³CEA Leti, France; ⁴Université Grenoble Alpes, France.

12:00 PM G07.05

Density Control of GaN Quantum Dots on AlN Single Crystal

Sebastian Tamariz, Gordon Callsen and Nicolas Grandjean; EPFL, Switzerland.

12:15 PM G07.06

MOCVD Growth and Characterization of InN and InGa_{0.5}N Quantum Dots

Caroline Reilly¹, Shuji Nakamura^{1,2}, Steven P. DenBaars^{1,2} and Stacia Keller²; ¹University of California, Santa Barbara, United States; ²University of California, Santa Barbara, United States.

SESSION J01: Defects in GaN and In-Containing Materials

Session Chairs: Robert Martin and Tadeusz Suski

Wednesday Morning, July 10, 2019

Regency Ballroom E-G, Second Floor

8:30 AM J01.01

Suppression of Polar-Optical Phonon Emission Due to Minigap Formation by Stacking Faults Increases the Hot-Carrier Relaxation Time and Mean-Free Path in GaN—Explanation of the Accumulation of Hot Electrons at 1 eV Above the Conduction-Band Minimum Kelsey Mengle¹, John Lyons², Qimin Yan³, Dylan Bayer¹, Suk Hyun Sung¹, Jonathan Schwartz¹, Robert Hovden¹, Zetian Mi⁴, Chris G. Van de Walle⁵ and Emmanouil Kioupakis¹; ¹University of Michigan, United States; ²U.S. Naval Research Lab, United States; ³Temple University, United States; ⁴University of Michigan, United States; ⁵University of California, Santa Barbara, United States.

8:45 AM J01.02

Mapping of n-GaN Schottky Contacts Formed on Facet-Growth Substrates Using Scanning Internal Photoemission Microscopy Kenji Shiojima¹, Masataka Maeda¹ and Kaori Kurihara²; ¹University of Fukui, Japan; ²Mitsubishi Chemical, Japan.

9:00 AM J01.03

Determination Methods of H1 Trap Concentration in N-Type GaN Schottky Barriers via Sub-Bandgap-Light Isothermal Capacitance Transient Spectroscopy Kazutaka Kanegae¹, Tetsuo Narita², Kazuyoshi Tomita², Tetsu Kachi³, Masahiro Horita^{1,3}, Tsunenobu Kimoto¹ and Jun Suda^{1,3}; ¹Kyoto University, Japan; ²Toyota Central R&D Labs. Inc., Japan; ³Nagoya University, Japan.

9:15 AM J01.04

Temperature Dependence of Polarized Photoluminescence from c-Plane InGaN/GaN Multiple Quantum Wells Grown on Sapphire Nano-Membrane Jongmyeong Kim¹, Seungmin Lee¹, Jehong Oh¹, Jungel Ryu¹, Yongjo Park¹, Seung-Hwan Park² and Euijoon Yoon^{1,3,4}; ¹Seoul National University, Korea (the Republic of); ²Catholic University of Daegu, Korea (the Republic of); ³Research Institute of Advanced Materials, Korea (the Republic of); ⁴Inter-University Semiconductor Research Center, Korea (the Republic of).

9:30 AM J01.05

Improvement of Thermal Stability of InGaN Quantum Wells by Si and Mg Doping Artur Lachowski^{1,2}, Julita Smalc-Koziorowska^{1,3}, Ewa Grzanka^{1,3}, Szymon Grzanka^{1,3}, Lucja Marona^{1,3}, Robert Czernecki^{1,3} and Mike Leszczynski^{1,3}; ¹Polish Academy of Sciences, Poland; ²Warsaw University of Technology, Poland; ³TopGaN Ltd., Poland.

9:45 AM J01.06

Indium Concentration Fluctuations in InGaN/GaN Quantum Wells Pawel P. Michalowski³, Ewa Grzanka^{1,2}, Grzegorz Staszczak¹, Szymon Grzanka^{1,2}, Artur Lachowski¹, Jerzy Plesiewicz², Mike Leszczynski^{1,2} and Andrzej Turos^{3,4}; ¹Institute of High Pressure Physics, Poland; ²TOPGaN, Poland; ³Institute of Electronic Materials Technology, Poland; ⁴National Centre for Nuclear Research, Poland.

10:00 AM J01.07

Engineering the Nitrogen Plasma to Reduce Defects in InN Resulting in a 0.12 eV Moss-Burstein Shift Towards the Fundamental Bandgap Evan A. Clinton¹, Ehsan Vadiel¹, M.B. Tellekamp², Zachary Engel¹, Christopher M. Matthews¹ and William A. Doolittle¹; ¹Georgia Institute of Technology, Georgia; ²National Renewable Energy Laboratory, United States.

10:15 AM BREAK

SESSION H05: Properties of Nanostructures and Nano-Devices

Session Chairs: Ana Cros and Noelle Gogneau

Wednesday Morning, July 10, 2019

Regency Ballroom E-G, Second Floor

10:45 AM H05.01

X-Ray to Revisit Inversion Domain Boundaries In MOVPE GaN Wires Joël Eymery¹, Frédéric Lançon³, Luigi Genovese³ and Damien Salomon²; ¹CEA, IRIG-MEM-NRS, France; ²ESRF, France; ³CEA, IRIG-MEM-LSIM, France.

11:00 AM H05.02

Which Morphology for Axial Nanowire Based InGaN LEDs by PA-MBE? Marion Gruart^{1,2} and Bruno Daudin^{1,2}; ¹CEA / INAC, France; ²Université Grenoble Alpes, France.

11:15 AM H05.03

Position and Composition Controlled High Quality (In, Ga)N Nanowires Grown by HVPE Mohammed Zeghouane⁶, Geoffrey Avit⁶, Yamina Andre^{1,7}, Catherine Bougerol⁸, Evelyn Gil^{6,7}, Pierre Ferret², Dominique Castellucci⁶, Eric Tournier³, Thierry Taliercio⁴, Yoann Robin⁵, Vladimir Dubrovskii⁷, Hiroshi Amano⁵ and Agnes Trassoudaine⁶; ¹Institut Pascal, France; ²CEA-LETI, France; ³IES, University Montpellier, France; ⁴IMaSS, Nagoya University, Japan; ⁵Université Clermont Auvergne, CNRS, SIGMA Clermont, Institut Pascal, France; ⁶ITMO University, Russian Federation; ⁷CNRS, Institut Néel, France.

11:30 AM H05.04

Solution Processable RGB III-Nitride Light Emitters Enabled by Large Area Photoelectrochemical Lift-Off and Colloidal Lithography Lesley Chan^{1,2}, Pavel Shapturenka^{1,2}, Christopher Pynn^{2,3}, Tal Margalith², Steven P. DenBaars^{2,3} and Michael J. Gordon^{1,2}; ¹University of California, Santa Barbara, United States; ²University of California, Santa Barbara, United States; ³University of California, Santa Barbara, United States.

11:45 AM H05.05

Supercontinuum Generation from Dispersion Engineered AlN Nanophotonic Waveguide Arrays Hong Chen, Jingan Zhou, Xuanqi Huang, Houqiang Fu, Kai Fu, Tsung-Han Yang, Jossue Montes, Chen Yang and Yuji Zhao; Arizona State University, United States.

12:00 PM LATE NEWS

12:15 PM LATE NEWS

SESSION M02: Novel Materials, Diodes and Optical Devices

Session Chairs: Juergen Christen and Maria Tchernycheva

Wednesday Morning, July 10, 2019

Regency Ballroom A-C, Second Floor

8:30 AM M02.01

Demonstration of GaN Monolithic Doubly-Resonant Microcavity SHG Device Masahiro Uemukai², Tomoaki Nambu², Takumi Nagata², Toshiki Hikosaka³, Shinya Nunoue³, Keishi Shiomi², Yasufumi Fujiwara², Kazuki Ohnishi¹, Tomoyuki Tanikawa¹ and Ryuji Katayama²; ¹Tohoku University, Japan; ²Osaka University, Japan; ³Toshiba Corporation, Japan.

8:45 AM M02.02

Quasi-Phase-Matched Second Harmonic Generation of UV Light Using AlN Waveguides Ronny Kirste^{1,2}, Dorian Alden^{2,4}, Tinkara Troha³, Seiji Mita^{1,2}, Qiang Guo², Axel Hoffmann⁴, Marko Zgonik³, Ramón Collazo² and Zlatko Sitar²; ¹Adroit Materials, United States; ²North Carolina State University, United States; ³University of Ljubljana, Slovenia; ⁴TU Berlin, Germany.

9:00 AM M02.03

Monolithically Integrated GaN Vertical LED/Quasi-Vertical Power UMOSFET Pairs Using Selective Epi Removal Zhibo Guo¹, Collin Hitchcock¹, Christian Wetzel², Robert F. Karlicek¹, Piao Guanxi³, Yoshiki Yano³, Shuichi Koseki³, Toshiya Tabuchi³, Koh Matsumoto³, Mayank Bulsara⁴ and T. Paul Chow¹; ¹Rensselaer Polytechnic Institute, United States; ²Rensselaer Polytechnic Institute, United States; ³Taiyo Nippon Sanso Corporation, Japan; ⁴MATHESON Tri-Gas, United States.

9:15 AM M02.04

Whispering-Gallery Mode Optically-Pumped Lasing from InGaN/GaN Microdisks on GaN Substrate Hui Zi¹, Kwai Hei Li¹, Hoi Wai Choi¹, Farsane Tabataba-Vakili^{2,3}, Stéphanie Rennesson⁴, Benjamin Damilano⁴, Eric Frayssinet⁴, Jean-Yves Duboz⁴, Fabrice Sémont⁴, Laetitia Doyennette⁵, Christelle Brimont⁵, Thierry Guillet⁵, Bruno Gayral³ and Philippe Boucaud⁴; ¹The University of Hong Kong, Hong Kong; ²Centre de Nanosciences et de Nanotechnologies, CNRS, University Paris-Sud, Université Paris-Saclay, France; ³CEA, INAC-PHELIQS, Nanophysique et semiconducteurs group, University Grenoble Alpes, France; ⁴Université Côte d'Azur, CRHEA-CNRS, France; ⁵Laboratoire Charles Coulomb (L2C), Université de Montpellier, France.

9:30 AM M02.05

Investigating the Signature of Antimony into Dilute-Antimonide (Sb<1%) III-Nitrides Using Micro-Raman Spectroscopy Mohammad F. Chowdhury^{1,2}, Hong Guo² and Zetian Mi^{1,3}; ¹McGill University, Canada; ²McGill University, Canada; ³University of Michigan, United States.

9:45 AM M02.06

First Demonstration of Negative Differential Resistance in $\text{Al}_x\text{Ga}_{1-x}\text{N}$ Homostructure Tunnel Diodes up to $x=0.19$ and High Reverse Bias Tunneling up to $x=0.58$ to Enable Ultraviolet Optoelectronics Evan A. Clinton, Ehsan Vadiiee, Zachary Engel, Christopher M. Matthews and William A. Doolittle; Georgia Institute of Technology, Georgia.

10:00 AM M02.07

Epitaxial $\beta\text{-Ga}_2\text{O}_3/\text{Al}_{0.45}\text{Ga}_{0.55}\text{N}$ Heterojunction-Based Schottky Barrier Diodes for Room and High Temperature Broadband Deep-Ultraviolet Optoelectronics Anisha Kalra, Shashwat Rathkanthiwar, Sandeep Vura, Rangarajan Muralidharan, Srinivasan Raghavan and Digbijoy N. Nath; Indian Institute of Science, India.

10:15 AM BREAK

SESSION M03: Transition Metal and Other Novel Nitrides

Session Chairs: Kazuhiro Ohkawa and Stefan Schulz

Wednesday Morning, July 10, 2019

Regency Ballroom A-C, Second Floor

10:45 AM *M03.01

ScAlN-Based Ferroelectric and Piezoelectric Electro Acoustic Devices Oliver Ambacher^{1,2}, Agne Zukauskaitė¹, A. Ding¹, Lutz Kirste¹, N. Kurz², N. Feil², D. Urban³ and B. Heinz⁴; ¹Fraunhofer Institute for Applied Solid State Physics, Germany; ²Institut für Sustainable Systems Engineering, Germany; ³Fraunhofer IWM, Germany; ⁴Evatec, Switzerland.

11:15 AM *M03.02

Epitaxial Transition-Metal Nitrides—ScAlN, NbN_x, and TaN_x for Next-Generation Electronic Devices Matthew T. Hardy, Scott Katzer, Brian P. Downey, Neeraj Nepal, Mario Ancona, Eric N. Jin, David Storm and David Meyer; Naval Research Laboratory, United States.

11:45 AM M03.03

Prediction and Synthesis of Mg-Sb-N Ternary Nitrides with Wurtzite-Derived and Antiperovskite Structures Karen Heinselman, Stephan Lany, John Perkins and Andriy Zakutayev; National Renewable Energy Laboratory, United States.

12:00 PM M03.04

A Map of New Ternary Metal Nitride Semiconductors Wenhao Sun; Lawrence Berkeley National Labs, United States.

12:15 PM M03.05

MOCVD Growth and Characterization of ZnGeN₂-GaN Alloy Films Benthara H. Jayatunga¹, Md Rezaul Karim², Kathleen Kash¹ and Hongping Zhao²; ¹Case Western Reserve University, United States; ²Ohio State University, United States.

SESSION A09: Micro LEDs

Session Chairs: Kate Kelchner and Jong Kyu Kim

Wednesday Afternoon, July 10, 2019

Evergreen Ballroom E-F, Lobby Level

2:00 PM *A09.01

Self-Passivated High-Efficiency c-Plane Micro-LED Array without Singulation Fabricated on Sapphire Nano-Membrane Structures Seungmin Lee¹, Jongmyeong Kim¹, Jehong Oh¹, Jungel Ryu¹, Yongjo Park¹ and Euijoon Yoon^{2,3,4}; ¹Seoul National University, Korea (the Republic of); ²Research Institute of Advanced Materials, Seoul National University, Korea (the Republic of); ³Inter-University Semiconductor Research Center, Seoul National University, Korea (the Republic of); ⁴Seoul National University, Korea (the Republic of).

2:30 PM A09.02

Efficient Green Semipolar (11-22) InGa_N Micro-Light-Emitting Diodes on (11-22) GaN/Sapphire Template Matthew Wong¹, Michel Khoury¹, Hongjian Li¹, Bastien Bonef¹, Haojun Zhang², Aidan A. Taylor¹, Jared A. Kearns¹, Philippe de Mierry³, James Speck¹, Shuji Nakamura^{1,2} and Steven P. DenBaars^{1,2}; ¹University of California, Santa Barbara, United States; ²University of California, Santa Barbara, United States; ³CNRS-CRHEA, France.

2:45 PM A09.03

Near-Complete Elimination of Size-Dependent Efficiency Decrease of GaN Micro-LEDs by Using Neutral-Beam Etching Xuelun Wang^{1,2,3}, Jun Zhu³, Tokio Takahashi³, Kazuhiko Endo⁴, Daisuke Ohori⁵ and Seiji Samukawa^{5,6,4}; ¹National Institute of Advanced Industrial Science and Technology, Japan; ²Nagoya University, Japan; ³National Institute of Advanced Industrial Science and Technology, Japan; ⁴National Institute of Advanced Industrial Science and Technology, Japan; ⁵Tohoku University, Japan; ⁶Tohoku University, Japan.

3:00 PM A09.04

Blue MicroLED Arrays on Flexible Metal Foils Abdelrahman T. Elshafiey¹, Kenneth Davico¹, Ashwin K. Rishinaramangalam¹, Christopher Sheehan², Vladimir Matias² and Daniel Feezell¹; ¹University of New Mexico, United States; ²Beam Materials, United States.

3:15 PM LATE NEWS

3:30 PM LATE NEWS

3:45 PM BREAK

SESSION A10: Intra Center, UV and BN Emitters

Session Chairs: Nicolas Grandjean and Jennifer Hite

Wednesday Afternoon, July 10, 2019

Evergreen Ballroom E-F, Lobby Level

4:15 PM *A10.01

Development of Semiconductors Intra-Center Photonics Yasufumi Fujiwara, Keishi Shiomi, Yutaka Sasaki, Tomohiro Inaba, Shuhei Ichikawa and Jun Tatebayashi; Osaka University, Japan.

4:45 PM A10.02

Design of Composition-Graded p-AlGa_N Cladding Layer for UVB Laser Diode Structure Kosuke Sato^{1,2}, Shinji Yasue², Yuya Ogino², Shunya Tanaka², Motoaki Iwaya², Tetsuya Takeuchi², Satoshi Kamiyama² and Isamu Akasaki^{2,3}; ¹Asahi-Kasei, Japan; ²Meiji University, Japan; ³Nagoya University, Japan.

5:00 PM A10.03

Realization of High Light Output Power in AlGa_N-Based UVB LED at 310±2nm Emission Using Highly Relaxed (50%) n-AlGa_N Electron Injection Layer M. A. Khan^{1,2,3}, Noritoshi Maeda¹, Masafumi Jo¹, Sachie Fujikawa^{1,2}, Eriko Matsuura^{1,3}, Yukio Kashima^{1,3}, Yoichi Yamada⁴ and Hideki Hirayama¹; ¹Riken, Japan, Japan; ²Tokyo Denki University, Japan; ³Marubun Corporation, Japan; ⁴Yamaguchi University, Japan.

5:15 PM A10.04

Boron Nitride Deep Ultraviolet Light Emitters Grown by Ultra-High-Temperature Molecular Beam Epitaxy David A. Laleyan¹, Eric T. Reid¹, Kelsey Mengle², Emmanouil Kioupakis² and Zetian Mi¹; ¹University of Michigan, United States; ²University of Michigan, United States.

5:30 PM A10.05

First Principles Calculations of Boron Alloyed Group III Nitrides for Higher Efficiency UV and Visible LEDs Logan D. Williams¹, Kevin Greenman² and Emmanouil Kioupakis¹; ¹University of Michigan, United States; ²University of Michigan, United States.

5:45 PM A10.06

Time-Resolved Luminescence Studies of Indirect Excitons in *h*-BN Epitaxial Films Grown by Chemical Vapor Deposition Using Carbon-Free Precursors Shigefusa F. Chichibu^{1,2,3}, Naoki Umehara⁴, Keisuke Takiguchi⁵, Kohei Shima¹, Kazunobu Kojima¹, Yoshihiro Ishitani⁵ and Kazuhiko Hara⁴; ¹Tohoku University, Japan; ²Nagoya University, Japan; ³Hokkaido University, Japan; ⁴Shizuoka University, Japan; ⁵Chiba University, Japan.

SESSION B08: MOS Transistors and Diodes

Session Chairs: Martin Kuball and Matteo Meneghini

Wednesday Afternoon, July 10, 2019

Cedar Ballroom, Second Floor

2:00 PM *B08.01

Interface Control of Al₂O₃-Based MOS Structures for Advanced GaN Transistors Tamotsu Hashizume and Taketomo Sato; Hokkaido University, Japan.

2:30 PM B08.02

Gate-Channel Mobility Enhancement by Using AlN Interlayer in Recessed-Gate GaN-MOSFETs Akira Mukai, Daimotsu Kato, Yousuke Kajiwara, Hiroshi Ono, Aya Shindome and Masahiko Kuraguchi; Toshiba Corporation, Japan.

2:45 PM B08.03

Control of MOS Channel Characteristics of GaN-DIMOSFETs Formed by Mg Ion Implantation Ryo Tanaka¹, Shinya Takashima¹, Katsunori Ueno¹, Hideaki Matsuyama¹, Masaharu Edo¹ and Kiyokazu Nakagawa²; ¹Fuji Electric Co., Ltd., Japan; ²University of Yamanashi, Japan.

3:00 PM B08.04

Impact of Gamma-Ray Irradiation on Capacitance-Voltage Characteristics of Al₂O₃/GaN MOS Diodes with Post-Metallization Annealing Keito Aoshima¹, Masahiro Horita^{1,2}, Shota Kaneki³, Jun Suda^{1,2} and Tamotsu Hashizume³; ¹Nagoya University, Japan; ²Nagoya University, Japan; ³Hokkaido University, Japan.

3:15 PM B08.05

Integrable Quasi-Vertical GaN UMOSFETs for Power and Optoelectronic ICs Zhibo Guo¹, Collin Hitchcock¹, Piao Guanxi², Yoshiki Yano², Shuuichi Koseki², Toshiya Tabuchi², Koh Matsumoto³, Mayank Bulsara³ and T. Paul Chow¹; ¹Rensselaer Polytechnic Institute, United States; ²Taiyo Nippon Sanso Corporation, Japan; ³MATHESON Tri-Gas, United States.

3:30 PM B08.06

Exploring the Electrical Properties of Gate Dielectrics on (000-1) N-Polar GaN Islam Sayed, Wenjian Liu, Silvia Chan, Chirag Gupta, Haoran Li, Matthew Guidry, Stacia Keller and Umesh K. Mishra; University of California, Santa Barbara, United States.

3:45 PM BREAK

SESSION B09: Electronic Device Characterization

Session Chairs: Kei May Lau and Enrico Zanoni

Wednesday Afternoon, July 10, 2019

Cedar Ballroom, Second Floor

4:15 PM *B09.01

Impact of Deep Levels on GaN HEMTs Michael J. Uren and Martin Kuball; University of Bristol, United Kingdom.

4:45 PM B09.02

Dependence of the Current Collapse of GaN HEMTs on Quiescent Gate Voltage Takashi Matsuda¹, Shigeo Yamabe², Eiji Yagyu¹ and Mikiyo Yamamuka¹; ¹Mitsubishi Electric Corporation, Japan; ²MELCO Semiconductor Engineering Corporation, Japan.

5:00 PM B09.03

Dopant Profiling in p-i-n GaN Structures Using Secondary Electrons Shanthan Reddy Alugubelli¹, Hanxiao Liu¹, Houqiang Fu², Kai Fu², Yuji Zhao² and Fernando Ponce¹; ¹Arizona State University, United States; ²Arizona State University, United States.

5:15 PM B09.04

Impact of n-GaN Cap Layer on Gate Leakage Behavior in AlGaN/GaN Heterostructures Grown on Si and GaN Substrates Junji Kotani, Atsushi Yamada and Norikazu Nakamura; Fujitsu Limited, Japan.

5:30 PM B09.05

High Temperature Reverse Bias (HTRB) Tests on GaN Lateral HEMTs Xiang Zhou and T. Paul Chow; Rensselaer Polytechnic Institute (RPI), United States.

5:45 PM B09.06

Impact of Gamma-Ray Irradiation on Device Characteristics of p-GaN/AlGaN/GaN Normally-Off High-Electron-Mobility Transistors Koki Tsurimoto¹, Masahiro Horita^{1,2} and Jun Suda^{1,2}; ¹Nagoya University, Japan; ²Nagoya University, Japan.

SESSION F03: Bulk and HVPE Growth
Session Chairs: Rafael Dalmau and Yusuke Mori
Wednesday Afternoon, July 10, 2019
Regency Ballroom A-C, Second Floor

2:00 PM *F03.01

High Pressure in Physics and Technology of Bulk GaN Crystallization and Wafer Processing Izabella Grzegory; Institute of High Pressure Physics PAS Unipress, Poland.

2:30 PM F03.02

Crystallization of GaN by HVPE Method with Controlled Lateral Growth Tomasz Sochacki, Slawek Sakowski, Boleslaw Lucznik, Mikolaj Amilusik, Michal Fijalkowski, Malgorzata Iwinska, Aneta Sidor, Izabella Grzegory and Michal Boćkowski; Institute of High Pressure Physics PAS, Poland.

2:45 PM F03.03

HVPE-GaN Doped with Carbon and/or Manganese Malgorzata Iwinska, Tomasz Sochacki, Mikolaj Amilusik, Boleslaw Lucznik, Michal Fijalkowski, Marcin Zajac, Elzbieta Litwin-Staszewska, Ryszard Piotrkowski, Leszek Konczewicz, Aneta Sidor, Kacper Sierakowski, Izabella Grzegory and Michal Boćkowski; Institute of High Pressure Physics Polish Academy of Sciences (Unipress), Poland.

3:00 PM F03.04

Growth of High Crystalline Quality GaN with High Growth Rate by THVPE Akira Yamaguchi¹, Daisuke Oozeki², Naoya Kawamoto², Nao Takekawa², Mayank Bulsara³, Hisashi Murakami², Yoshinao Kumagai², Koh Matsumoto¹ and Akinori Koukitu²; ¹Taiyo Nippon Sanso Co., Japan; ²Tokyo University of Agriculture and Technology, Japan; ³Matheson Tri-Gas, Inc., United States.

3:15 PM LATE NEWS**3:30 PM LATE NEWS****3:45 PM BREAK**

SESSION A11: Efficiency and Degradation in Light Emitters

Session Chairs: Aurelien David and Martin Strassburg

Wednesday Afternoon, July 10, 2019

Regency Ballroom A-C, Second Floor

4:15 PM A11.01

Physical Limits of Recombinations in III-Nitride LEDs Aurelien David, Nathan Young, Cory Lund and Michael Craven; Soraa, United States.

4:30 PM A11.02

Hot Carrier Generation—Without Efficiency Droop—In Low Radiative Efficiency MBE-Grown III-Nitride LEDs Andrew C. Espenlaub¹, Daniel J. Myers¹, Erin C. Young¹, Saulius Marcinkevicius², Claude Weisbuch¹ and James Speck¹; ¹University of California, Santa Barbara, United States; ²KTH Royal Institute of Technology, Sweden.

4:45 PM A11.03

Photon-Driven Degradation Processes in GaN-Based Optoelectronic Devices Carlo De Santi¹, Alessandro Caria¹, Nicola Renzo¹, Ezgi Dogmus², Malek Zegaoui², Farid Medjdoub², Gaudenzio Meneghesso¹, Enrico Zanoni¹ and Matteo Meneghini¹; ¹University of Padova, Italy; ²IEMN-CNRS, France.

5:00 PM A11.04

Effects of Well Width Fluctuations on Green InGaN/GaN Quantum Wells Grown at Different Temperatures Boning Ding, John Jarman, Menno Kappers and Rachel Oliver; University of Cambridge, United Kingdom.

5:15 PM A11.05

Contribution of Polarization-Induced Barriers to Excess Forward Voltage in c-Plane Green LEDs Cheyenne Lynsky¹, Guillaume Lheureux¹, Abdullah Alhassan¹, Ryan White¹, Bastien Bonef¹, Yuh-Renn Wu², Claude Weisbuch³, Steven P. DenBaars¹, Shuji Nakamura¹ and James Speck¹; ¹University of California, Santa Barbara, United States; ²National Taiwan University, Taiwan; ³Ecole Polytechnique, CNRS, Université Paris Saclay, France.

5:30 PM A11.06

Interwell Carrier Transport in InGaN/(In)GaN Multiple Quantum Wells Saulius Marcinkevicius¹, Rinat Yapparov¹, Leah Kuritzky², Shuji Nakamura², Steven P. DenBaars² and James Speck²; ¹KTH Royal Institute of Technology, Sweden; ²University of California, Santa Barbara, United States.

5:45 PM A11.07

Measurements of Internal Quantum Efficiency in Various InGaN Single Quantum Wells with Different Qualities by Simultaneous Photoacoustic and Photoluminescence Spectroscopy Keito Mori¹, Yuchi Takahashi¹, Atsushi A. Yamaguchi¹, Yuya Kanitani², Yoshihiro Kudo² and Shigetaka Tomiya²; ¹Kanazawa Institute of Technology, Japan; ²SONY Corporations, Japan.

SESSION G08: Growth for Electronic Devices including C-Doping
Session Chairs: Koh Matsumoto and Yan Tang
Wednesday Afternoon, July 10, 2019
Evergreen Ballroom A-C, Lobby Level

2:00 PM G08.01

200 mm Industrial-Ready Dispersion-Free GaN-on-Si Buffer Technology for 650 V Rated Power Application Ming Zhao¹, Xiangdong Li^{1,2} and Stefaan Decoutere¹; ¹imec, Belgium; ²KU Leuven, Belgium.

2:15 PM G08.02

Extrinsic Carbon Doped AlGa_N/AlN Super-Lattice Buffer for Power Electronic Applications Beyond 1000V Dirk Fahle, Matthias Marx, Hannes Behnenburg, Manuel Kortemeyer and Michael Heuken; AIXTRON SE, Germany.

2:30 PM G08.03

Understanding GaN Homoepitaxial Growth and Substrate-Dependent Effects for Vertical Power Devices Jennifer K. Hite, Travis J. Anderson, James C. Gallagher, Michael A. Mastro, Jaime Freitas, John Lyons, Karl Hobart, Charles R. Eddy Jr. and Francis J. Kub; U.S. Naval Research Laboratory, United States.

2:45 PM G08.04

GaN Micropillar Schottky Diodes with High Breakdown Field Strength Fabricated by Selective-Area Growth Arne Debal¹, Simon Kotzea¹, Michael Heuken^{1,2}, Holger Kalisch¹ and Andrei Vescan¹; ¹RWTH Aachen, Germany, Germany; ²AIXTRON SE, Germany.

3:00 PM G08.05

Compensation in Semi-Insulating Free-Standing GaN:C Substrates—A Carbon-Related Defect Mary Ellen Zvanut¹, Subash Paudel¹, Malgorzata Iwanska², Tomasz Sochacki² and Michal Boćkowski²; ¹University of Alabama at Birmingham, United States; ²Polish Academy of Sciences, Poland.

3:15 PM G08.06

Dependences of External Quantum Efficiency of Radiation and Photoluminescence Lifetime on the Carbon Concentration in GaN on GaN Structures Kazunobu Kojima¹, Fumimasa Horikiri², Yoshinobu Narita², Takehiro Yoshida² and Shigefusa F. Chichibu¹; ¹Tohoku University, Japan; ²Sciocs Co. Ltd., Japan.

3:30 PM G08.07

Eutectic Formation and Polarity Inversion in Nitrides on Silicon Alexandra Roshko, Matt Brubaker, Paul Blanchard, Todd Harvey and Kris Bertness; National Institute of Standards and Technology, United States.

3:45 PM BREAK

SESSION G09: Growth Kinetic and Theory
Session Chairs: James Speck and Euijoon Yoon
Wednesday Afternoon, July 10, 2019
Evergreen Ballroom A-C, Lobby Level

4:15 PM *G09.01

A New Theoretical Approach to Nitride Crystal Growth—Impurity Incorporation Mechanism Yoshihiro Kangawa^{1,2}, Pawel Kempisty^{3,1,2} and Kenji Shiraiishi²; ¹Kyushu University, Japan; ²Nagoya University, Japan; ³Polish Academy of Sciences, Poland.

4:45 PM G09.02

Equilibrium Morphologies of Faceted GaN under Metalorganic Vapor Phase Epitaxy Condition—Wulff Construction Using Absolute Surface Energies Yuki Seta, Abdul Pradipto, Toru Akiyama, Kohji Nakamura and Tomonori Ito; Mie University, Japan.

5:00 PM G09.03

Control of Growth Kinetics Towards Enhanced Red Emissions from Strongly Excited Eu-Doped GaN Shuhei Ichikawa, Jun Tatebayashi and Yasufumi Fujiwara; Osaka University, Japan.

5:15 PM G09.04

Surface Kinetics of GaN Homoepitaxial Growth via MOCVD Andrew Klump¹, Pramod Reddy², Yan Guan¹, Shun Washiyama¹, Seiji Mita², Ramón Collazo¹ and Zlatko Sitar¹; ¹North Carolina State University, United States; ²Adroit Materials, United States.

5:30 PM G09.05

Theoretical Study on Step Bunching Instability During Nitride Semiconductor Growth Yuya Inatomi¹ and Yoshihiro Kangawa^{1,2,3}; ¹Kyushu University, Japan; ²RIAM, Kyushu University, Japan; ³IMaSS, Nagoya University, Japan.

5:45 PM G09.06

Shell Growth Mechanisms on GaN Fin Microstructures Irene Mangano Clavero^{1,2}, Christoph Margenfeld^{1,2}, Hergo-Heinrich Wehmann^{1,2}, Adrian Avramescu³, Hans-Juergen Lugauer³ and Andreas Waag^{1,2}; ¹Technische Universität Braunschweig, Germany; ²Epitaxy Competence Center ec2, Germany; ³Osram Opto Semiconductors GmbH, Germany.

SESSION J02: Structural Defects in Electronic Devices, GaN and AlN

Session Chairs: Ramón Collazo and Atsushi Tanaka
Wednesday Afternoon, July 10, 2019
Regency Ballroom E-G, Second Floor

2:00 PM *J02.01

Identification of Key-Defects in GaN Epitaxial Layers Relevant for the Performance and Reliability of a GaN Based Device Elke Meissner^{1,2}; ¹Fraunhofer Institute for Integrated Systems and Device Technology, Germany; ²University of Erlangen-Nuremberg, Germany.

2:30 PM J02.02

Dislocation Assisted Carrier Transport Mechanisms in Forward Bias GaN pn Junction Leakage Christian A. Robertson, Kai Shek Qwah and James Speck; University of California, Santa Barbara, United States.

2:45 PM J02.03

Quantitative Electron Beam Induced Current STEM Imaging of GaN-Ni Schottky Diodes Zoey Warecki¹, Andrew Armstrong², Andrew Allerman², Alec Talin² and John Cumings¹; ¹University of Maryland College Park, United States; ²Sandia National Laboratory, United States.

3:00 PM J02.04

Direct Observation of V-Pit Induced Vertical N-Type Columns Disrupting Vertical Breakdown of AlGa_N/Ga_N-HEMT Heterostructures on Si Sven Besendörfer¹, Elke Meissner¹, Alaleh Tajalli², Matteo Meneghini², Roland Poesche³, Joff Derluyn³, Farid Medjdoub⁴, Gaudenzio Meneghesso², Enrico Zanon², Jochen Friedrich¹ and Tobias Erlbacher¹; ¹Fraunhofer IISB, Germany; ²University of Padova, Italy; ³EpiGaN, Belgium; ⁴CNRS, France.

3:15 PM J02.05

Investigating the Structural Properties of AlN Thin Films Grown on Nano-Patterned Sapphire Substrates in the Scanning Electron Microscope Carol Trager-Cowan¹, Aeshah Alasamari¹, William Avis¹, Pavlos Bozinakis¹, Jochen Bruckbauer¹, Gergely Ferenczi¹, Ben Hourahine¹, Gunnar Kusch¹, Robert Martin¹, Ryan McDermott¹, G. Naresh Kumar¹, Bohdan Starosta¹, Arne Knauer², Viola Kueller², Sylvia Hagedorn², Sebastian Walde², Markus Weyers², Pierre-Marie Coulon³, Philip Shields³ and Aimé Winkelmann^{4,1}; ¹University of Strathclyde, United Kingdom; ²Ferdinand-Braun-Institut, Germany; ³University of Bath, United Kingdom; ⁴Laser Zentrum Hannover e.V., Germany.

3:30 PM J02.06

A Novel Birefringent Observation for Analyzing Dislocations in GaN Atsushi Tanaka^{1,3}, Shunta Harada¹, Kenji Hanada², Yoshio Honda¹, Toru Ujihara¹ and Hiroshi Amano^{1,3}; ¹Nagoya University, Japan; ²Aichi Synchrotron Radiation Center, Japan; ³National Institute for Materials Science, Japan.

3:45 PM BREAK

SESSION K01: XRD Characterization and Point Defects

Session Chairs: Martin Albrecht and Jaime Freitas
Wednesday Afternoon, July 10, 2019
Regency Ballroom E-G, Second Floor

4:15 PM K01.01

X-Ray Diffraction Characterization of III-Nitride Nanostructures Hryhorii Stanchu¹, Andrian Kuchuk¹, Matthias Auf der Maur², Yuriy Mazur¹, Vasyi Klado³ and Gregory Salamo¹; ¹University of Arkansas, United States; ²University of Rome “Tor Vergata”, Italy; ³V. Lashkaryov Institute of Semiconductor Physics, National Academy of Sciences of Ukraine, Ukraine.

4:30 PM K01.02

Determination of Porosity and Layer Thickness of Porous Distributed Bragg Reflectors via High Resolution X-Ray Techniques Alexander Hinz, Peter Griffin, Martin Frentrup, Tongtong Zhu and Rachel Oliver; University of Cambridge, United Kingdom.

4:45 PM K01.03

Localized Defects, Electronics Bands and Charge Neutrality Levels in AlGa_N—How Do They Move with Composition and Temperature? Pramod Reddy¹, Ji Kim², Shun Washiyama², Ronny Kirste¹, Seiji Mita¹, Douglas Irving², Ramón Collazo² and Zlatko Sitar²; ¹Adroit Materials, Inc., United States; ²North Carolina State University, United States.

5:00 PM K01.04

Strain Manipulation of Donor Self-Compensation in AlN Jonathon N. Baker, Joshua S. Harris, Kelsey J. Mirrielees, Ramón Collazo, Zlatko Sitar and Douglas Irving; North Carolina State University, United States.

5:15 PM K01.05

Study of Optical Scattering Loss Induced by Crystalline Defects Inside AlN Waveguides Using Volume Current Method Hong Chen, Houqiang Fu, Xuanqi Huang and Yuji Zhao; Arizona State University, United States.

5:30 PM K01.06

Dislocation Recovery in Al-Rich Aluminum Gallium Nitride Layers by High Temperature Annealing Shun Washiyama¹, Yan Guan¹, Ke Wang¹, Pegah Bagheri¹, Andrew Klump¹, Qiang Guo¹, James Tweedie², Seiji Mita², Ramón Collazo¹ and Zlatko Sitar^{1,2}; ¹North Carolina State University, United States; ²Adroit Materials, United States.

5:45 PM K01.07

Effects of Stacking Faults on InGa_N and AlGa_N Alloy Compositions in Zincblende Ga_N Heterostructures Boning Ding¹, Menno Kappers¹, Martin Frentrup¹, David Wallis^{1,2} and Rachel Oliver¹; ¹University of Cambridge, United Kingdom; ²University of Cardiff, United Kingdom.

RUMP SESSIONS

(Details available on-site)

SESSION R01: Rump Session: Visible Emitters

Wednesday Afternoon, July 10, 2019

Cedar Ballroom, Second Floor

6:30 pm – 8:30 pm

SESSION R02: Rump Session: Electronic Devices

Wednesday Afternoon, July 10, 2019

Regency Ballroom A-C, Second Floor

6:30 pm – 8:30 pm

SESSION R03: Rump Session: UV Emitters

Wednesday Afternoon, July 10, 2019

Regency Ballroom E-G, Second Floor

6:30 pm – 8:30 pm

THURSDAY PRESENTATIONS

* Invited Paper

SESSION A12: Semi- and Non-Polar LDs and LEDs

Session Chairs: Daniel Feezell and Yoshihiro Kangawa

Thursday Morning, July 11, 2019

Evergreen Ballroom E-F, Lobby Level

8:00 AM *A12.01

Watt-Class Operation of Green Laser Diodes on Semipolar {20-21} Gallium Nitride Substrates Yusuke Nakayama¹, Hideki Watanabe¹, Masahiro Murayama¹, Yasuhiro Kadowaki², Yukihisa Kogure², Takahiro Koyama¹, Noriyuki Fuutagawa¹, Hidekazu Kawanishi¹, Toshiya Uemura³ and Katsunori Yanashima¹; ¹Sony Corporation, Japan; ²Sony Semiconductor Manufacturing Corporation, Japan; ³Toyota Gosei Co., Ltd., Japan.

8:30 AM A12.02

Semipolar InGa_N Distributed-Feedback Laser Diode with a First Order Surface Indium Tin Oxide Grating Haojun Zhang¹, Daniel Cohen², Philip Chan², Matthew Wong², Shlomo Mehari², Daniel Becerra², Shuji Nakamura^{2,1} and Steven P. DenBaars^{1,2}; ¹University of California, Santa Barbara, United States; ²University of California, Santa Barbara, United States.

8:45 AM A12.03

High-Speed Nonpolar Ga_N-Based Superluminescent Diodes for Visible-Light Communication Ashwin K. Rishinaramangalam¹, Arman Rashidi¹, Morteza Monavarian¹, Saadat Mishkat-Ui-Masabih¹, Andrew A. Aragon¹, Changmin Lee², Steven P. DenBaars² and Daniel Feezell¹; ¹University of New Mexico, United States; ²University of California, Santa Barbara, United States.

9:00 AM A12.04

Semipolar Ga_N Optical Devices on Foreign Substrates Michel Khoury¹, Hongjian Li¹, Haojun Zhang¹, Matthew Wong¹, Yi Chao Chow¹, Bastien Bonef¹, Philippe de Mierry², James Speck¹, Shuji Nakamura¹ and Steven P. DenBaars¹; ¹University of California, Santa Barbara, United States; ²CNRS, France.

9:15 AM A12.05

Fabrication of Polar-Plane-Free Faceted InGa_N LED Structures with Polychromatic Emission Properties Yoshinobu Matsuda, Mitsuru Funato and Yoichi Kawakami; Kyoto University, Japan.

9:30 AM BREAK

SESSION B10: Transistors and Diodes

Session Chairs: Oliver Ambacher and Jun Suda

Thursday Morning, July 11, 2019

Evergreen Ballroom E-F, Lobby Level

10:00 AM *B10.01

Visible and Solar-Blind Photodetectors Using AlGa_N High Electron Mobility Transistors with Nanodot-Based Floating Gate Andrew Armstrong¹, Brianna Klein¹, Andrew Allerman¹, Albert Baca¹, Mary Crawford¹, Jacob Podkaminer², Carolos Perez¹, Michael Siegal¹, Erica Douglas¹, Vincent Abate¹ and Francois Leonard³; ¹Sandia National Laboratories, United States; ²Current Affiliation: 3M Corporate Research Labs, United States; ³Sandia National Laboratories, United States.

10:30 AM B10.02

Hot-Electron Trapping and Luminescence in Ga_N-Based GITs and HD-GITs—An Extensive Analysis Elena Fabris¹, Matteo Meneghini¹, Carlo De Santi¹, Matteo Borga¹, Yusuke Kinoshita², Kenichiro Tanaka², Hidetoshi Ishida², Tetsuzo Ueda², Gaudenzio Meneghesso¹ and Enrico Zanoni¹; ¹University of Padova, Italy; ²Panasonic Corporation, Japan.

10:45 AM B10.03

Influence of Dislocation Distribution on Leakage Current in Schottky Diodes Fabricated on HVPE Ga_N Free-Standing Substrates Thi Huong Ngo¹, Remi Comyn¹, Eric Frayssinet¹, Sébastien Chenot¹, Benjamin Damilano¹, Yvon Cordier¹, Florian Tendille², Hyonju Chauveau², Bernard Beaumont², Jean-Pierre Faurie² and Nabil Nahas²; ¹University Côte d'Azur CNRS-CRHEA, France; ²Saint Gobain Lumilog, France.

11:00 AM B10.04

Interface Properties of Lateral MISFETs Fabricated on *m*- and *c*-Plane Yuto Ando¹, Tohru Nakamura², Manato Deki², Shigeyoshi Usami¹, Atsushi Tanaka^{2,3}, Hirotaka Watanabe², Maki Kushimoto¹, Shugo Nitta², Yoshio Honda² and Hiroshi Amano^{2,4,5}; ¹Nagoya University, Japan; ²Nagoya University, Japan; ³National Institute for Materials Science, Japan; ⁴Nagoya University, Japan; ⁵Nagoya University, Japan.

11:15 AM B10.05

Schottky Barrier Diode on *m*-plane AlN Crystal Qin Zhou¹, Honglei Wu¹, Hui Li², Xi Tang¹, Ruisheng Zheng¹, Jiannong Wang² and Baikui Li¹; ¹Shenzhen University, China; ²The Hong Kong University of Science and Technology, Hong Kong.

SESSION C01: Photo Detectors and Solar Cells

Session Chair: Andrew Allerman
Thursday Morning, July 11, 2019
Cedar Ballroom, Second Floor

8:00 AM C01.01

Towards AlGaIn Focal Plane Arrays for Solar-Blind Ultraviolet Detection Robert Rehm, Rachid Driad, Lutz Kirste, Stefano Leone, Thorsten Passow, Frank Rutz and Lars Watschke; Fraunhofer Institute for Applied Solid State Physics IAF, Germany.

8:15 AM C01.02

An Ultra-High-Gain Linear Mode Avalanche Photodiode Based on GaN/AlN Periodically-Stacked Structure with Improved Material Epitaxy and Device Fabrication Xingzhao Wu¹, Lai Wang¹, Julien Brault², Mohamed Al Khalifioui², Maud Nemoz², Zhibiao Hao¹, Yi Luo¹, Changzheng Sun¹, Yanjun Han¹, Bing Xiong¹, Jian Wang¹, Hongtao Li¹, Mo Li², Jianbin Kang³ and Qian Li³; ¹Beijing National Research Center for Information Science and Technology, Department of Electronic Engineering, Tsinghua University, China; ²Université Côte d'Azur, CNRS, CRHEA, France; ³Microsystem & Terahertz Research Center, China Academy of Engineering Physics, China.

8:30 AM C01.03

Polarization-Grading in p-AlGaIn to Realize Record High Zero-Bias External Quantum Efficiency of 88% for Al_{0.40}Ga_{0.60}N-Based p-i-n UV Detectors Anisha Kalra, Shashwat Rathkanthiwar, Rangarajan Muralidharan, Srinivasan Raghavan and Digbijoy N. Nath; Indian Institute of Science, India.

8:45 AM C01.04

Solar Blind High-k ZrO₂ Gate AlGaIn MOSFET Photodetector Mohi Uddin Jewel, MD Didarul Alam, Shahab Mollah, Richard Floyd, Kamal Hussain, Mikhail Gaevski, Iftikhar Ahmad, Grigory Simin, Asif Khan and MVS Chandrashekar; University of South Carolina, United States.

9:00 AM C01.05

III-Nitrides as Promising Platform for Superconducting Nanowire Single Photon Detectors Houssaine Machhadani¹, Julien Zichi³, Catherine Bougerol², Stéphane Lequien¹, Jean-Luc Thomassin¹, Nicolas Mollard¹, Anna Mukhtarova¹, Val Zwiller³, Jean-Michel Gérard¹ and Eva Monroy¹; ¹The French Alternative Energies and Atomic Energy Commission (CEA), France; ²CNRS-Institut Néel, France; ³KTH Stockholm, Department of Applied Physics, Sweden.

9:15 AM C01.06

Effect of Al Content on Al_{1-x}In_xN-on-Silicon (x~0-0.6) Solar Cells Deposited by RF Sputtering Rodrigo Blasco¹, Daniel Montero², Alejandro Braña³, Javier Olea², Sirona Valdueza-Felip¹ and Fernando B. Naranjo¹; ¹University of Alcalá, Spain; ²University Complutense of Madrid, Spain; ³University Autònoma of Madrid, Spain.

9:30 AM BREAK

SESSION C02: Photoelectrochemical Devices and Photodetectors

Session Chairs: Johannes Herrnsdorf and Zetian Mi
Thursday Morning, July 11, 2019
Cedar Ballroom, Second Floor

10:00 AM C02.01

A Large Scale GaN-Based Artificial Photosynthesis System for Unassisted High Efficiency Solar Fuel Generation Mohammad F. Chowdhury^{1,2}, Nhung H. Tran¹, Roksana Rashid¹, Hong Guo² and Zetian Mi^{1,3}; ¹McGill University, Canada; ²McGill University, Canada; ³University of Michigan, United States.

10:15 AM C02.02

InGaN/Si Tandem Photocathode for High Efficiency Unassisted Solar Water Splitting Srinivas Vanka^{1,2}, Baowen Zhou¹, Nick Pant¹, Alexa Roberts¹, Krishnamurthy Kulkarni¹ and Zetian Mi¹; ¹University of Michigan, United States; ²McGill University, Canada.

10:30 AM C02.03

Modified III-Nitrides Structures as Efficient and Stable Photoanodes for PEC Hydrogen Generation and Broadband Photodetectors Praveen Kumar¹, Krishnendu Sarkar¹ and Pooja Devi²; ¹Indian Association for the Cultivation of Science, India; ²Central Scientific Instruments Organization, India.

10:45 AM C02.04

Towards Highly Efficient Photoelectrochemical Water-Splitting Devices via Hybrid GaN-Based Photoanodes Mostafa Afifi Hassan, Santosh S. Patil, Muhammad A. Johar and Sang-Wan Ryu; Chonnam National University, Korea (the Republic of).

11:00 AM C02.05

Structural and Photoelectrochemical Properties of CoO/GaN Photoelectrodes for the Generation of H₂ from Water Martin Velazquez-Rizo, Daisuke Iida and Kazuhiro Ohkawa; King Abdullah University of Science and Technology (KAUST), Saudi Arabia.

11:15 AM C02.06

Impact of Surface Morphology on Performance Parameters of AlGaIn Based UV Photodetectors on Si (111) and Their Application in Solar-UV Monitoring Shashwat Rathkanthiwar, Anisha Kalra, Rangarajan Muralidharan, Srinivasan Raghavan and Digbijoy N. Nath; Indian Institute of Science, India.

SESSION D02: Advanced Sensors and Novel Materials

Session Chairs: Martin Eickhoff and Matthew Hardy
Thursday Morning, July 11, 2019
Regency Ballroom E-G, Second Floor

8:00 AM *D02.01

Group-III-Nitride Based Optoelectronics as Enabling Technology for Medical Implants Ulrich Schwarz^{1,2}, Christian Gößler², Matthias Wachs^{1,2}, Eric Klein³, Michael Schwaerzle^{3,4}, Suleman Ayub³, Daniel Keppeler^{2,5}, Alexander Dieter³, Tobias Moser^{2,5} and Patrick Ruther^{3,4}; ¹Chemnitz University of Technology, Germany; ²OptoGenTech GmbH, Germany; ³University of Freiburg, Germany; ⁴University of Freiburg, Germany; ⁵University Medical Center Göttingen, Germany.

8:30 AM D02.02

Highly Sensitive Hydrogen Sulfide Gas Sensor Based on GaN/InGaIn Heterostructure Jassim B. Shahbaz, Martin Schneider and Ferdinand Scholz; Institute of Functional Nanosystems, Germany.

8:45 AM D02.03

External Control of the Band Bending at GaN(1-100) Surfaces Using Phosphonate Self-Assembled Monolayers Thomas Auzelle⁵, Florian Ullrich^{1,2}, Sebastian Hietzschold^{1,3}, Chiara Sinito⁵, Stefan Brackmann^{3,1}, Eric Mankel^{1,2}, Wolfgang Kowalsky^{1,2,4}, Oliver Brandt⁶, Robert Lovrincic^{1,3} and Sergio Fernández-Garrido^{5,6}; ¹InnovationLab, Germany; ²Technische Universität Darmstadt, Germany; ³Technische Universität Braunschweig, Germany; ⁴Heidelberg University, Germany; ⁵Paul-Drude-Institut für Festkörperelektronik, Germany; ⁶Universidad Autónoma de Madrid, Spain.

9:00 AM D02.04

GaN Schottky Diodes for Proton Beam Monitoring Jean-Yves Duboz¹, Julie Zucchi¹, Eric Frayssinet¹, Sébastien Chenot¹, Jean-Claude Grini² and Joël Herault²; ¹CNRS, France; ²Lacassagne, France.

9:15 AM D02.05

Al_{0.5}Si_{0.5}N_{1.5}, a New Nitride Semiconductor Philippe Vennéguès¹, Roy Dagher¹, Liverios Lymperakis², Vincent Delaye³, Ludovic Largeau⁴ and Adrien Michon¹; ¹Université Côte d'Azur, France; ²Max-Planck-Institut für Eisenforschung GmbH, Germany; ³Université Grenoble Alpes, France; ⁴CNRS, France.

9:30 AM BREAK

SESSION E02: Thermal Transport and Contacts
Session Chairs: Ryo Tanaka and Michael Uren
Thursday Morning, July 11, 2019
Regency Ballroom A-C, Second Floor

10:00 AM E02.01

Influence of Doping on the Thermal Conductivity of HVPE Grown Single Crystal GaN Pegah Bagheri¹, Robert Rounds¹, Qiang Guo¹, Ji Kim¹, Tomasz Sochacki², Ronny Kirste³, Pramod Reddy³, Michal Boćkowski², Zlatko Sitar¹ and Ramón Collazo¹; ¹North Carolina State University, United States; ²Institute of High Pressure Physics, Polish Academy of Sciences, Poland; ³Adroit Materials, Inc., United States.

10:15 AM E02.02

GaN Thermal Conductivity and Its Dependence on Threading Dislocations for Advanced Electronic and Photonic Device Designs Kihoon Park and Can Bayram; University of Illinois at Urbana-Champaign, United States.

10:30 AM E02.03

Ultrahigh Thermal Boundary Conductance Across GaN-SiC Heterogeneous Interfaces by Surface Activated Bonding Zhe Cheng¹, Fengwen Mu², Tadatomo Suga² and Samuel Graham¹; ¹Georgia Institute of Technology, United States; ²University of Tokyo, Japan.

10:45 AM E02.04

Superior Thermal Transport Across an Oxide-Free GaN/Si Heterojunction Interface Fabricated via Direct Wafer Bonding Michael E. Liao¹, Tingyu Bai¹, Yekan Wang¹, Kenny Huynh¹, Viorel Dragoi², Nasser Razek^{3,2}, Eric Guiot⁴, Raphael Caulmilone⁴, Luke Yates⁵, Samuel Graham⁵, Jianguo Wen⁶ and Mark Goorsky¹; ¹University of California, Los Angeles, United States; ²EV Group, Austria; ³G-Ray Medical, Switzerland; ⁴Soitec, France; ⁵Georgia Institute of Technology, United States; ⁶Argonne National Laboratory, United States.

11:00 AM E02.05

Investigation of Pd/Ti/Al/Ti/Au Ohmic Contacts to N-Face GaN for Application in Vertical Schottky Diode on Ammono-GaN Substrates Paweł Prystawko^{1,2}, Mikolaj Grabowski¹, Ewa Grzanka¹, Piotr Kruszewski^{2,1} and Julita Smalc-Koziorowska¹; ¹Institute of High Pressure Physics PAS, Poland; ²TopGaN Ltd, Poland.

11:15 AM E02.06

Simple Wet-Etching for GaN Using an Electrodeless Photo-Assisted Electrochemical Reaction with a Luminous Array Film as the UV Source Fumimasa Horikiri¹, Noboru Fukuhara¹, Hiroshi Ohta², Naomi Asai², Yoshinobu Narita¹, Takehiro Yoshida¹, Tomoyoshi Mishima², Masachika Toguchi³, Kazuki Miwa³ and Taketomo Sato³; ¹Sciocs Company Limited, Japan; ²Hosei University, Japan; ³Hokkaido University, Japan.

SESSION G10: Semi- and Non-Polar Growth
Session Chairs: Peter Parbrook and Tim Wernicke
Thursday Morning, July 11, 2019
Evergreen Ballroom A-C, Lobby Level

8:00 AM *G10.01

Semipolar GaN for Lighting and Display—Will This Ever Become Real? Jung Han; Yale University, United States.

8:30 AM G10.02

Thin SOI—A Dedicated Substrate for Optimal Growth of Semi-Polar Nitrides and Heterostructures Guy Feuillet¹, Rami Mantach^{2,1}, Philippe Vennéguès², Marc Portail², Mathieu Leroux², Philippe de Mierry² and Jesus Zuniga-Perez²; ¹CEA, France; ²CNRS CRHEA, France.

8:45 AM G10.03

Growth and Characterization of Untwinned (10-13) GaN Templates and InGaN/GaN Quantum Wells Nan Hu¹, Duc V. Dinh², Markus Pristovsek², Yoshio Honda^{2,1} and Hiroshi Amano^{2,1,3}; ¹Nagoya University, Japan; ²Institute of Materials and Systems for Sustainability, Nagoya University, Japan; ³Akasaka Research Center, Nagoya University, Japan.

9:00 AM G10.04

Growth and Characterization of Germanium Doped Cubic Al_xGa_{1-x}N Grown by Molecular Beam Epitaxy Michael Deppe¹, Tobias Henksmeier¹, Jürgen W. Gerlach², Dirk Reuter¹ and Donat J. As¹; ¹University of Paderborn, Germany; ²Leibniz Institute of Surface Engineering (IOM), Germany.

9:15 AM LATE NEWS

9:30 AM BREAK

SESSION G11: Growth of In-Containing Alloys
Session Chairs: Qian Sun and Akihiko Yoshikawa
Thursday Morning, July 11, 2019
Evergreen Ballroom A-C, Lobby Level

10:00 AM G11.01

Demonstration of High Quality Aluminum Indium Nitride Grown Via Metal Modulated Epitaxy and Application Towards Polar/Non-Polar Optical Devices Zachary Engel, William A. Doolittle and Evan A. Clinton; Georgia Tech, United States.

10:15 AM G11.02

Understanding and Avoiding Gallium Contamination in InAlN Layers in Close Coupled Showerhead MOVPE Reactors Mrad Mrad, Joel Kanyandekwe, Yann Mazel, Victor R. Yon, Guy Feuillet and Matthew Charles; CEA - Grenoble/France, France.

10:30 AM G11.03

Strain-Balanced Nonpolar InGaN/AlGaIn Heterostructures for Infrared Intersubband Devices Alexander Senichev, Brandon Dzuba, Trang Nguyen, Yang Cao, Rosa Diaz, Michael Manfra and Oana Malis; Purdue University, United States.

10:45 AM G11.04

In Situ XRD RSM Measurements in MBE Growth of GaInN at Different Temperatures Tomohiro Yamaguchi¹, Takuo Sasaki², Masamitsu Takahashi², Soichiro Ohno¹, Tsutomu Araki³, Yasushi Nanishi³, Takeyoshi Onuma⁴ and Tohru Honda¹; ¹Kogakuin University, Japan; ²National Institutes for Quantum and Radiological Science and Technology (QST), Japan; ³Ritsumeikan University, Japan.

11:00 AM G11.05

Pulsed InN-GaN Molecular Beam Epitaxy of (In,Ga)N on Partially Relaxed (In,Ga)N Buffer Caroline Chêze¹, Torsten Ernst¹, Manfred Ramsteiner² and Raffaella Calarco¹; ¹Paul-Drude-Institut für Festkörperelektronik Leibniz-Institut im Forschungsverbund Berlin e.V, Germany; ²Paul-Drude-Institut für Festkörperelektronik Leibniz-Institut im Forschungsverbund Berlin e.V, Germany.

11:15 AM G11.06

Influence of Homogenization Process of InGaN Quantum Wells at Elevated Temperatures on Their Optical Properties and on Decomposition Ewa Grzanka^{1,2}, Szymon Grzanka^{1,2}, Julita Smalc-Koziorowska^{1,2}, Artur Lachowski¹, Lucja Marona^{1,2}, Mikolaj Grabowski¹, Roman Hrytsak¹, Robert Czernecki^{1,2} and Mike Leszczynski^{1,2}; ¹Institute of High Pressure Physics, Poland; ²TOPGaN, Poland.

SESSION I05: THz and Quantum Dots
Session Chair: Eva Monroy
Thursday Morning, July 11, 2019
Regency Ballroom A-C, Second Floor

8:00 AM I05.01

THz Quantum Cascade Devices Based on GaN/AlGaIn Step Quantum Wells Grown by Ammonia MBE and MOCVD on Si(111) and Si(110) Substrates Arnaud Jollivet¹, Maria Tchernycheva¹, Francois H. Julien¹, Virginie Trinité², Eric Frayssinet³, Philippe de Mierry³ and Yvon Cordier³; ¹University Paris-Sud, University Paris-Saclay, France; ²III-V Lab, France; ³Université Côte d'Azur, CNRS, CRHEA, France.

8:15 AM I05.02

Intersubband Transition in m-Plane AlGaIn/GaN MQWs in Mid-Infrared Region Xin Rong, Xinqiang Wang, Guang Chen, Ping Wang, Xiantong Zheng and Bo Shen; School of Physics, Peking University, China.

8:30 AM I05.03

Ultrafast Spectroscopic Study of the Upper Conduction Band Valleys of InN Blair C. Connelly, Chad S. Gallinat and Michael Wraback; U.S. Army Research Laboratory, United States.

8:45 AM I05.04

Modeling the Dispersion of Waveguide Polaritons In GaN Lætitia Doyennette¹, Christelle Brimont¹, Maria Vladimirova¹, Thierry Guillet¹, Geoffrey Kreyder², Francois Réveret², Pierre Dissieux², Francois-Régis Médard², Joel Leymarie², Maksym Gromovyi³, Blandine Alloing³, Stéphanie Rennesson³, Fabrice Sémont³, Jesus Zuniga-Perez³, Edmond Cambil³ and Sophie Bouchoule⁴; ¹Université de Montpellier, France; ²Université Clermont Auvergne, France; ³CRHEA-CNRS, France; ⁴Université Paris-Saclay, France.

FRIDAY PRESENTATIONS

* Invited Paper

SESSION PL02: Plenary Session II
Session Chairs: Stacia Keller and Christian Wetzel
Friday Morning, July 12, 2019
Evergreen Ballroom E-I, Lobby Level

9:00 AM I05.05

Realization of Linewidth Narrowing in a Single Photon Emitting GaN Quantum Dot Kang Gao¹, Munetaka Arita¹, Mark J. Holmes^{2,1} and Yasuhiko Arakawa¹; ¹Institute for Nano Quantum Information Electronics, University of Tokyo, Japan; ²Institute of Industrial Science, Japan.

9:15 AM I05.06

Electrically Tunable Single Quantum Dot Emission in GaN/AlN Nanowires Maria Spies¹, Akhil Ajay², Fabrice Donatini¹, Martien I. den Hertog¹, Eva Monroy² and Bruno Gayral²; ¹University Grenoble Alpes, CNRS, Institut Néel, France; ²University Grenoble Alpes, CEA, IRIG-DEPHY-Phelips, France.

9:30 AM BREAK

SESSION J03: P-Doping and Defects
Session Chairs: Anneli Munkholm and Shinya Takashima
Thursday Morning, July 11, 2019
Regency Ballroom E-G, Second Floor

10:00 AM J03.01

Demonstration of p-Type Conductivity in GaN via Ion Implantation and High Pressure Annealing Mathew H. Breckenridge¹, Andrew Klump¹, Shun Washiyama¹, Qiang Guo¹, Yan Guan¹, Ji Kim¹, Pramod Reddy², Ronny Kirste², Will Mccouch², Seiji Mita², James Tweedie², Michal Boćkowski³, Ramón Collazo¹ and Zlatko Sitar¹; ¹North Carolina State University, United States; ²Adroit Materials, Inc., United States; ³Polish Academy of Sciences, Poland.

10:15 AM J03.02

High-Hole Mobility Lightly Mg-Doped p-GaN Grown on Si Substrates Realized by Reducing Residual Carbon and Threading Dislocation Toshiki Hikosaka, Jumpei Tajima, Hajime Nago, Toshiyuki Oka and Shinya Nunoue; Toshiba Corporation, Japan.

10:30 AM J03.03

Point Defect Reduction in Smooth P-Type N-Polar GaN Grown via MOCVD Dennis E. Szymanski¹, Dolar Khachariya², Ke Wang¹, Andrew Klump¹, Seiji Mita³, Pramod Reddy³, Spyridon Pavlidis², Ramón Collazo¹ and Zlatko Sitar¹; ¹North Carolina State University, United States; ²North Carolina State University, United States; ³Adroit Materials, United States.

10:45 AM J03.04

Role of Capping Material on Mg Ion Implantation Activation in GaN Alan G. Jacobs¹, Boris N. Feigelson¹, Jennifer K. Hite¹, Cameron A. Gorsak², Lunet Luna¹, Travis J. Anderson¹ and Francis J. Kub¹; ¹U.S. Naval Research Laboratory, United States; ²University of Notre Dame, United States.

11:00 AM J03.05

Point Defects in GaN:Mg Crystals Grown by Ammonobasic Method Marcin Zajac¹, Ryszard Piotrkowski¹, Elzbieta Litwin-Staszewska¹, Konrad Sakowski¹, Dariusz Wasik², Robert Kucharski¹ and Michal Boćkowski^{1,3}; ¹Polish Academy of Sciences, Poland; ²University of Warsaw, Poland; ³Nagoya University, Japan.

11:15 AM J03.06

Group III-Nitride Response to High Energy Radiation—A Multidisciplinary Study Miguel C. Sequeira¹, Henrique Vazquez², Jean-Gabriel Mattei³, Flyura Djurabekova², Kai Nordlund², Shuo Zhang⁴, Isabelle Monnet³, Clara Grygiel³, Christian Wetzel⁵, Pablo Mota-Santiago⁶, Patrick Kluth⁶, Eduardo Alves¹ and Katharina Lorenz¹; ¹Instituto Superior Técnico, Portugal; ²University of Helsinki, Finland; ³CEA-CNRS-ENSICAEN-UNICAEN, France; ⁴Lanzhou University, China; ⁵Rensselaer Polytechnic Institute, United States; ⁶Australian National University, Australia.

8:30 AM *PL02.01

Conventional and N-Polar GaN HEMTs for High Frequency and High Power Applications Umesh K. Mishra^{1,2}; ¹University of California, Santa Barbara, United States; ²Transphorm, United States.

9:15 AM *PL02.02

Impact of Vacancy Complexes on the Nonradiative Recombination Processes in III-N Devices Shigefusa F. Chichibu^{1,2,3}, Kohei Shima¹, Kazunobu Kojima¹, Shoji Ishibashi⁴ and Akira Uedono⁵; ¹Tohoku University, Japan; ²Nagoya University, Japan; ³Hokkaido University, Japan; ⁴AIST, Japan; ⁵University Tsukuba, Japan.

10:00 AM BREAK

10:30 AM *PL02.03

Industrial LED Development—From UV to Red and from Efficient Components to Smart Devices Martin Strassburg; OSRAM Opto Semiconductors GmbH, Germany.

11:15 AM *PL02.04

How do we make AlGaIn into a useful semiconductor? Zlatko Sitar; North Carolina State University, United States.

12:00 PM

Closing Ceremony by W. Alan Doolittle, Georgia Institute of Technology; Stacia Keller, University of California, Santa Barbara and Christian Wetzel, Rensselaer Polytechnic Institute