



# DRIP XVIII Program

## Sunday, September 8

16:00 – 18:00 **Registration**

18:00 – 21:00 **Welcome reception**

## Monday, September 9

08:45 Welcome Word

### Session 1 Gallium Oxide

09:00 1.1-I: Osamu Ueda

#### **Current Status of Characterization of Defects in EFG-grown $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Single Crystals**

O. Ueda (1), A. Kuramata (2), H. Yamaguchi (3), M. Kasu (4)

(1) Meiji University, Kawasaki, Kanagawa, Japan

(2) Novel Crystal Technology Inc., Sayama, Saitama, Japan

(3) National Institute of Advanced Industrial Science and Technology, Tsukuba, Ibaraki, Japan

(4) Saga University, Saga, Japan

09:30 1.2-I: Jonathan Pelz

#### **Nanometer-scale Characterization and Imaging of Interface and Defect Properties in $\beta$ -Ga<sub>2</sub>O<sub>3</sub> and GaN-based device structures using Ballistic Electron Emission Microscopy and Scanning-Probe Deep Level Transient Spectroscopy**

J. Pelz (1), K. Galiano (1), D.A. Gleason (1), S.A. Ringel (2), A.R. Arehart (2), A.M. Hilton (3), J.L. Brown (3), A.T. Neal (4), D.L. Dorsey (4), E.R. Heller (4)

(1) Dept. of Physics, The Ohio State University, Columbus, OH, USA

(2) Dept. of Electrical & Computer Engineering, The Ohio State University, Columbus, OH, USA

(3) KBRwyle Aerospace Group, Dayton, OH, USA

(4) Materials and Manufacturing Directorate, Air Force Research Laboratory, Dayton, OH, USA

10:00 1.3-O

#### **Defect characterization of $\beta$ -Gallium Oxide epitaxial layer using low-frequency noise spectroscopy**

Christian Golz (1), Fariba Hatami (1), W. Ted Masselink (1), Günter Wagner (2),

Zbigniew Galazka (2), Saud Bin Anooz (2), Andreas Popp (2)

(1) Humboldt-Universität zu Berlin, Institute for Physics, Berlin, Germany

(2) Leibniz-Institut für Kristallzüchtung, Berlin, Germany

10:15 1.4-O

#### **Synchrotron X-ray topography observation of dislocations with Burgers vector of $n\langle 010 \rangle$ in $\beta$ -Ga<sub>2</sub>O<sub>3</sub> single crystal grown by edge-defined film-fed growth method**

Yongzhao Yao, Yukari Ishikawa, Yoshihiro Sugawara

Japan Fine Ceramics Center, Nagoya, Japan



10:30 – 11:00 Coffee break

## Session 2 Group IV Semiconductors (I)

11:00 2.1-I: Masataka Hourai

### Recognition and imaging of point defects' diffusion, recombination and reaction in Czochralski-silicon crystals during growth

Masataka Hourai, Eiichi Asayama, Toshiaki Ono, Hideshi Nishikawa, Masahiko Okui

SUMCO Corporation, 1-52 Kubara, Yamashiro-cho, Imari, Saga 849-4256, Japan

11:30 2.2-O

### In situ dislocation kinetic study in silicon during heating and solidification

Maike Becker, S.W. Neves Dias, G. Regula, H. Ouaddah, G. Reinhart, N. Mangelinck-Noël

Aix Marseille Univ, Université de Toulon, CNRS, IM2NP, Marseille, France

11:45 2.3-O

### Experimental and theoretical analysis of the growth ridge geometry of Czochralski-grown silicon crystals

Ludwig Stockmeier (1), Christian Kranert (1), Peter Fischer (1), Boris Epelbaum (2),

Christian Reimann (2), Jochen Friedrich (2), Georg Raming (3), Alfred Miller (3)

(1) Fraunhofer THM, Freiberg, Germany

(2) Fraunhofer IISB, Erlangen, Germany

(3) Siltronic AG, Burghausen, Germany

12:00 2.4-O

### Climb of the 90° Partial Dislocation in Treated and Untreated Brown Type IIa Natural Diamond

Fraser Laidlaw (1), R. Beanland (1), D. Fisher (2)

(1) Department of Physics, University of Warwick, Coventry, UK

(2) De Beers Technologies UK, Maidenhead, UK

12:15 2.5-O

### Characterization of silicon crystals grown from melt in a granulate crucible

Kaspars Dadzis (1), U. Juda (1), K. Irmischer (1), M. Albrecht (1), R. Menzel (1), C. Reimann (2),

C. Kranert (2), R. Weingärtner (2), M. Müller (3), M. Ehrl (3)

(1) Leibniz-Institut für Kristallzüchtung (IKZ), Berlin, Germany

(2) Fraunhofer IISB, Erlangen, Germany

(3) Technische Universität Bergakademie Freiberg, Germany

12:30 2.6-O

### Vacancy clustering in dislocation-free high-purity germanium

Kevin-Peter Gradwohl (1), Oleksii Gybin (1), Jozsef Janicsko-Csathy (1), Uta Juda (1),

Martin Schmidbauer (1), R. Radhakrishnan Sumathi (1), Melissa Roder (2),

Andreas Danilewsky (2)

(1) Leibniz-Institut für Kristallzüchtung, Berlin, Germany

(2) Kristallographie, Institut für Geo- und Umweltwissenschaften, Albert-Ludwigs-University Freiburg, Germany



12:45 2.7-O

**Multi-scale analysis of dislocation generation during the cast-growth of high-performance multicrystalline Si ingots by using PL imaging and TEM**

Yutaka Ohno (1), Kazuya Tajima (2), Kentaro Kutsukake (3)

(1) IMR, Tohoku University, Japan

(2) Noritaka Usami, GSE, Nagoya University, Japan

(3) RIKEN, Japan

13:00 – 14:30 Lunch

**Session 3 Characterization techniques (I)**

14:30 3.1-I: Daniela Cavalcoli

**Defective State Studies in III-Nitride Alloys by Surface Photovoltage Spectroscopy**

Daniela Cavalcoli (1), M.A. Fazio (1), A. Minj (2)

(1) Physics and Astronomy Department, University of Bologna, Italy

(2) IMEC, Leuven, Belgium

15:00 3.2-O

**Cathodoluminescence and Atom Probe Study of Mg Implanted GaN Homoepitaxial Layer: An Evidence of Mg Pipe Diffusion along Dislocations**

Wei Yi (1), Jun Chen (1), Ashutosh Kumar (1), Jun Uzuhashi (1), Takashi Kimura (1), Tadakatsu Ohkubo (1), Takashi Sekiguchi (1), Kazuhiro Hono (1), Shinya Takashima (2), Masaharu Edo (2)

(1) National Institute for Materials Science, Tsukuba, Japan

(2) Fuji Electric Co. Ltd., Hino, Tokyo 191-8502, Japan

15:15 3.3-O

**Characterisation of AlN thin films grown on nano-patterned sapphire substrates by combining electron channelling contrast imaging and electron backscattered diffraction**

Aeshah Alasmari (1), W. Avis (1), P. Bozinakis (1), J. Bruckbauer (1), G. Ferenczi (1), B. Hourahine (1), G. Kusch (1), R.W. Martin (1), R. McDermott (1), G. Naresh-Kumar (1), B. Starosta (1), A. Knauer (2), V. Kueller (2), S. Hagedorn (2), S. Walde (2), M. Weyers (2), P.-M. Coulon (3), P.A. Shields (3), A. Winkelmann (4), C. Trager-Cowan (1)

(1) Department of Physics, SUPA, University of Strathclyde, Glasgow, UK

(2) Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, Berlin, Germany

(3) Department of Electronic and Electrical Engineering, Centre of Nanoscience & Nanotechnology, University of Bath, Bath, UK

(4) Laser Components Department, Laser Zentrum Hannover e.V., Hannover, Germany

15:30 3.4-I: Jan Ingo Flege

**In situ growth and characterization of oxide on transition metal surfaces and novel 2D materials**

Jan Ingo Flege

Applied Physics and Semiconductor Spectroscopy, Brandenburg University of Technology Cottbus-Senftenberg, Cottbus, Germany



16:00 3.5-O

**Quantification of Basal Plane Stacking Faults on (11-22) GaN by Laboratory X-ray Diffraction**

Markus Pristovsek (1), Martin Frentrup (1), Fengsai Zhu (2), Tongtong Zhu (1,2),  
Colin J. Humphreys (1)

*Department of Metallurgy and Materials Science, University of Cambridge, Cambridge, UK*

*(1) current address: Institute for Materials and Systems for Sustainability, Nagoya University, Nagoya, Japan*

*(2) current address: University of Warwick, UK*

16:15 3.6-O

**Depth-resolved three-dimensional characterization of semiconductors using nanobeam X-ray diffraction combined with differential-aperture technique**

Yasuhiko Imai (1), Kazushi Sumitani (1), Shigeru Kimura (1), Kazuki Shida (2),  
Shotaro Takeuchi (2), Tetsuya Tohei (2), Akira Sakai (2)

*(1) Center for Synchrotron Radiation Research, Japan Synchrotron Radiation Research Institute (JASRI), Japan*

*(2) Graduate School of Engineering Science, Osaka University, Toyonaka, Osaka, Japan*

16:30 – 17:00 Coffee break

## Session 4 Classical III-V Semiconductors

17:00 4.1-I: **Andreas Beyer**

**Two-, three- and four-dimensional STEM characterization of antiphase domains in GaP/Si utilizing quantitative image simulation**

Andreas Beyer, Jürgen Belz, Manveer Munde, Kerstin Volz

*Department of Physics and Materials Science Center, Philipps-Universität Marburg, Germany*

17:30 4.2-O

**Strain generation in InP after SiNx deposition by HR-STEM**

M. Gutiérrez (1), D.F. Reyes (1), D. Araujo (1), J.P. Landesman (2), E. Pargon (3)

*(1) University of Cadiz, Department of Materials Science, Spain*

*(2) Univ Rennes, CNRS, IPR (Institut de Physique de Rennes), France*

*(3) Université Grenoble Alpes, CNRS, LTM (Laboratoire des Technologies de la Microélectronique), France*



17:45 4.3-O

**Impact of Al on defect density in GaP buffers on Si(100) substrates studied by electron channeling contrast imaging**

Manali Nandy (1), Christian Koppka (1), Agnieszka Paszuk (1), Oliver Supplie (1),

Peter Kleinschmidt (1), Thomas Hannappel (1), Markus Feifel (2), Frank Dimroth (2)

(1) Institute of Physics, Technische Universität Ilmenau, GustavKirchhoff-Straße 5, 98693, Ilmenau, Germany,

(2) Fraunhofer Institute for Solar Energy Systems ISE, Freiburg, Germany

18:00 4.4-O

**Comparative Study of the Photo-elastic Anisotropy of Si and GaAs**

Martin Herms (1), Gert Irmer (2), Matthias Wagner (1), Gregor Kupka (1), Nando Kirchner (1)

(1) PVA Metrology & Plasma Solutions GmbH., Jena-Maua, Germany

(2) Institute for Theoretical Physics, TU Bergakademie, Freiberg, Germany

18:15 4.5-O

**Deep Level Study of the Extended Defects in GaMnAs/InGaAs/GaAs Ferromagnetic Structures with a Small Lattice Mismatch**

Oleg Soltanovich (1), V.A. Kovalskiy (1), M.V. Dorokhin (2), R.N. Kriukov (2)

(1) Institute of Microelectronics Technology RAS, Chernogolovka, Russia

(2) Research Institute of Physics and Technology, Lobachevsky State University, Nizhni Novgorod, Russia

18:30 – 20:30

Poster session 1 & Buffet

(Posters see page 30)



**Tuesday, September 10**

**Session 5 Characterization Techniques (II)**

08:45 **5.1-I: Catherine Bougerol**

**Investigation of doping in III-nitrides by combining atom probe tomography, EDX spectroscopy and electron holography**

Catherine. Bougerol (1), L. Amichi (2), P.H. Jouneau (2), E. Monroy (2), E. Robin (2), D. Cooper (3), A. Dussaigne (3), A. Grenier (3), P. Vénégues (4), P. De Mierry (4)

(1) Université Grenoble Alpes, CNRS, Institut Néel, Grenoble, France

(2) Université Grenoble Alpes, CEA, INAC, Grenoble, France

(3) Université Grenoble Alpes, CEA, LETI, Grenoble, France

(4) Université Côte d'Azur, CRHEA, Valbonne, France

09:15 **5.2-O**

**Using laser pulse length variation for the determination of capture cross sections of DX centers in AlN**

Klaus Thonke, Matthias Lamprecht

Institute of Quantum Matter, University of Ulm, Ulm, Germany

09:30 **5.3-O**

**Time-resolved photoluminescence spectral analysis of carrier recombination processes in 4H-SiC**

Koichi Murata (1), Anli Yang (1), Koji Maeda (1), Tetsuya Miyazawa (1), Hidekazu Tsuchida (1), Takeshi Tawara (2,3)

(1) Central Research Institute of Electric Power Industry (CRIEPI), 2-6-1 Nagasaka, Yokosuka, Kanagawa, Japan

(2) National Institute of Advanced Industrial Science and Technology (AIST), Japan

(3) Fuji Electric Co., Ltd. 4-18-1 Tsukama, Matsumoto, Nagano, Japan

09:45 **5.4-O**

**Cation vacancies and Si DX centers in Si doped Al<sub>0.9</sub>Ga<sub>0.1</sub>N**

Filip Tuomisto (1), Igor Prozheev (1), Frank Mehnke (2), Tim Wernicke (2), Michael Kneissl (2)

(1) Department of Physics, University of Helsinki, Finland

(2) Institute of Solid State Physics, Technische Universität Berlin, Germany

10:00 **5.5-O**

**Low Vacuum Scanning Electron Microscopy for Widegap Semiconductors and Insulating Materials**

Takashi Sekiguchi (1), Yusuke Ominami (2), Hiroyuki Suzuki (2)

(1) Faculty of Pure and Applied Sciences, University of Tsukuba, Tsukuba, Japan

(2) Hitachi High-Technologies, Tokyo, Japan



10:15 5.6-O

**Improvement of Signal-to-Noise Ratio in Carrier Distribution Imaging in Intermittent Contact Scanning Nonlinear Dielectric Microscopy Based on Boxcar Integration**

Kohei Yamasue, Yasuo Cho

Research Institute of Electrical Communication, Tohoku University, Japan

10:30 – 11:00 Coffee break

**Session 6 Group IV Semiconductors (II)**

11:00 6.1-O

**Control of Dislocations in Quasi-Single Crystalline Silicon**

Fang Zhang (1), Xuegong Yu (1), Shuai Yuan (1), Deren Yang (1), Liang He (2), Runguang Hu (2), Chao Liu (3), Zexin Zhang (3)

(1) Zhejiang University, Hangzhou, China,

(2) LDK Solar Co. Ltd, XinYu, China,

(3) Sornid Co. Ltd., Jiujiang, China

11:30 6.2-O

**Dislocation dynamics during directional solidification of silicon**

Maria Tsoutsouva (1), N. Mangelinck-Noël (2), G. Regula (2), M. Becker (2), H. Ouaddah (2), M. Di Sabatino (3), E. Grove Dyrvik (3), G. Stokkan (4), B. Rynningen (4)

(1) Department of Physics, NTNU, Trondheim, Norway

(2) Aix Marseille Univ, Université de Toulon, CNRS, Marseille, France

(3) Department of Materials Science and Engineering, NTNU, Trondheim, Norway

(4) SINTEF Industry, Trondheim, Norway

11:45 6.3-O

**Alloy Stability of GeSn and SiGeSn with Sn concentrations up 15 % Utilizing Low-Temperature Molecular Beam Epitaxy**

Daniel Schwarz, Michael Oehme, Jörg Schulze

Institute of Semiconductor Engineering, University of Stuttgart, Germany

12:00 6.4-O

**Characterization of lifetime reducing defects in freestanding epitaxial Si layers**

Ralf Sorgenfrei, A. Ivanov, P. Barth, F.D. Heinz, S. Al-Hajjawi, B. Steinhäuser, S. Riepe

Fraunhofer-Institute for Solar Energy Systems, Freiburg, Germany

12:15 6.5-O

**Evaluation of Strain Relaxation in Stripe-Shaped Ge<sub>1-x</sub>Sn<sub>x</sub> Mesa Structure Using X-ray Diffraction Reciprocal Space Mapping**

Yuki Takahashi (1), Ryo Yokogawa (1), Kohei Suda (1), Atsushi Ogura (1), Ichiro Hirose (2)

(1) Meiji University, Kawasaki, Japan

(2) Japan Synchrotron Radiation Research Institute (JASRI), Hyogo, Japan



12:30 6.6-O

**Evaluation of Anisotropic Stress for Laterally Graded Silicon Germanium Wires by Raman Spectroscopy**

Ryo Yokogawa (1), Kouta Takahashi (2), Masashi Kurosawa (2), Motohiro Tomita (3),  
Takanobu Watanabe (3), Atsushi Ogura (1)

(1) School of Science and Technology, Meiji University, Kawasaki, Japan

(2) Graduate School of Engineering, Nagoya University, Nagoya, Japan

(3) Faculty of Science and Engineering, Waseda University, Tokyo, Japan

12:45 6.7-O

**Oxygen segregation at imperfect low- $\Sigma$  tilt boundaries in Si for solar cells**

Yutaka Ohno (1), Takeyasu Tamaoka (2), Hideto Yoshida (2), Seiji Takeda (2), Yasuo Shimizu (3),  
Yasuyoshi Nagai (3), Kentaro Kutsukake (4), Tatsuya Yokoi (5), Katsushi Matsunaga (5),  
Noritaka Usami (5)

(1) IMR, Tohoku University, Japan

(2) ISIR, Osaka University, Japan

(3) The Oarai Center, IMR, Tohoku University, Japan

(4) RIKEN, Japan

(5) GSE, Nagoya University, Japan

13:00 – 14:30 Lunch

**Session 7 Wide Band Gap Semiconductors (I)**

14:30 7.1-I: Bo Shen

**Epitaxial growth and physical properties of GaN thin films and AlGaIn/GaN heterostructures on various Si substrates**

Bo Shen

Peking University, Beijing, China

15:00 7.2-O

**TEM analysis of the microstructural evolution of AlN epitaxial films during high-temperature annealing**

Leonardo Cancellara (1), Toni Markurt (1), Martin Albrecht (1), Sylvia Hagedorn (2),  
Sebastian Walde (2), Frank Brunner (2), Markus Weyers (2), Shun Washiyama (3),  
Ramon Collazo (3), Zlatko Sitar (3), Dominik Jaeger (4)

(1) Leibniz-Institut für Kristallzüchtung (IKZ), Berlin, Germany

(2) Ferdinand Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik (FBH), Berlin, Germany

(3) North Carolina State University, Raleigh, USA

(4) Evatec AG, Trübbach, Switzerland





15:15 7.3-O

**Can we determine the carrier diffusion length in GaN from cathodoluminescence maps around threading dislocations?**

Vladimir Kaganer (1), J. Lähnemann (1), C. Pfüller (1), O. Brandt (1), K. Sabelfeld (2),  
A. Kireeva (2)

(1) Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im Forschungsverbund Berlin e. V., Berlin, Germany

(2) Institute of Computational Mathematics and Mathematical Geophysics, Russian Academy of Sciences  
Novosibirsk, Russia

15:30 7.4-O

**Achieving grain free (11-22) AlGaN surfaces on m-plane sapphire**

Humberto Foronda, S. Graupeter, F. Mehnke, T. Wernicke, M. Kneissl

Institute of Solid State Physics, Technische Universität Berlin, Germany

15:45 7.5-O

**Hole traps produced in MOVPE-grown n-GaN by hydrogen implantation**

Yutaka Tokuda (1), Shun Itoh (1), Kazuya Tamura (1), Joji Ito (2), Takahide Yagi (2),  
Kenji Shiojima (3)

(1) Aichi Institute of Technology, Toyota, Japan

(2) SHI-ATEX Co., Ltd., Saijo, Japan

(3) University of Fukui, Fukui, Japan

16:00 7.6-O

**Local Electronic State and Crystallographic Structure of Fe in Non-Polar AlFeN Thin Films**

Nobuyuki Tatemizo, Saki Imada, Koji Nishio, Toshiyuki Isshiki

Kyoto Institute of Technology, Japan

16:15 7.7-O

**Deep-Level Defects in Semi-Insulating Silicon Carbide**

Paweł Kamiński, Roman Kozłowski, Tymoteusz Ciuk

Łukasiewicz Research Network – Institute of Electronic Materials Technology, Warszawa, Poland

16:30 – 17:00 Coffee break

## Session 8 Device Processing and Characterization (I)

17:00 8.1-I: Erwine Pargon

**Damage free plasma etching processes of III-V semiconductors for micro-electronic, photonic and photovoltaic applications**

Erwine Pargon (1), Mathieu de Lafontaine (1), Marc Fouchier (1), Camille Petit-Etienne (1),  
Guillaume Gay (1), Sébastien Labau (1), Névine Rochat (2), Jean-Paul Barnes (2),  
Maxime Darnon (3), Jean-Pierre Landesman (4)

(1) Univ. Grenoble Alpes, CNRS, LTM, Grenoble, France

(2) Univ. Grenoble Alpes, CEA, LETI, Grenoble, France

(3) Laboratoire Nanotechnologie Nanosystèmes (LN2) – CNRS UMI-3463;

Institut Interdisciplinaire d'Innovation Technologique (3IT), Université de Sherbrooke, Québec, Canada

(4) Institut de Physique de Rennes, CNRS-UMR France



17:30 8.2-O

**Degree of polarization of the photo-luminescence and cathodo-luminescence for plasma etched InP and GaAs under control of the built-in mechanical stress in SiNx mask layer**

*S. Gérard (1), M. Mokhtari (1), J.P. Landesman (1), C. Levallois (2), M. Fouchier (3), E. Pargon (3), N. Rochat (4), P. Pagnod-Rossiaux (5), F. Laruelle (5), D.T. Cassidy (6), J. Jiménez (7), A. Torres (7)*

*(1) Univ Rennes, CNRS, Institut de Physique de Rennes, France*

*(2) Univ Rennes, INSA Rennes, CNRS, Institut FOTON, France*

*(3) Université Grenoble Alpes, CNRS, LTM (Laboratoire des Technologies de la Microélectronique), France*

*(4) Université Grenoble Alpes, CEA, LETI, F-38000 Grenoble*

*(5) 3SP Technologies S.A.S, Nozay Cedex, France*

*(6) McMaster University, Department of Engineering Physics, Ontario, Canada*

*(7) GdS-Optronlab, Dept. Física de la Materia Condensada, Universidad de Valladolid, Spain*

17:45 8.3-O

**The impact of SiN protective coatings to GaN/Al<sub>0.18</sub>Ga<sub>0.82</sub>N short-period superlattices: defect generation and adsorption effects**

*Jens W. Tomm (1), Felix Mahler (1), Klaus Reimann (1), Michael Woerner (1), Thomas Elsaesser (1), Veit Hoffmann (2), Carsten Netzel (2), Markus Weyers (2)*

*(1) Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie, Berlin, Germany*

*(2) Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, Berlin, Germany*

18:00 8.4-O

**Monarc. Redefining what's possible in cathodoluminescence microscopy**

*Merlin Mueller*

*Gatan GmbH*

18:30 – 20:30

Poster session 2 & Buffet  
(Posters see page 30)



## Wednesday, September 11

### Session 9 Wide Band Gap Semiconductors (II)

08:45 9.1-I: Michael Dudley

#### **The Origins of the Defect Configurations Observed in PVT-Grown SiC Substrates and CVD-Grown Homo-Epitaxial Layers**

Michael Dudley, Balaji Raghothamachar

Dept. of Materials Science & Chemical Engineering, Stony Brook University, USA

09:15 9.2-O

#### **Electron-beam-induced Current Study of Dislocations and Leakage Sites in GaN Schottky Barrier Diodes**

Jun Chen (1), Wei Yi (1), Takashi Kimura (1), Takashi Sekiguchi (1), Ryo Tanaka (2), Shinya Takashima (2), Masaharu Edo (2)

(1) National Institute for Materials Science, Tsukuba, Japan

(2) Fuji Electric Co. Ltd., Hino, Tokyo 191-8502, Japan

09:30 9.3-O

#### **Plastic deformation of GaN substrate induced by elastic strain relaxation of InGaN epilayer free edges**

Joanna Moneta (1), J. Smalc-Koziarowska (1), G. Staszczak (1), P. Dłużewski (2), P. Tausowski (2)

(1) Institute of High Pressure Physics, Polish Academy of Sciences, Warsaw, Poland

(2) Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland

09:45 9.4-O

#### **Stacking Fault Motion of 4H-SiC NiP Diode on p-type Substrate**

Koji Nakayama (1), Mitsuru Sometani (1), Akihiro Koyama (1), Takanori Tanaka (1), Yoshiyuki Yonezawa (1), Kazuma Eto (1), Tomohisa Kato (1), Hajime Okumura (1), Yuji Kiuchi (2), Manabu Takei (3)

(1) National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Ibaraki, Japan

(2) New Japan Radio Co., Ltd., Fujimino, Saitama, Japan

(3) Fuji Electric Co., Ltd., Matsumoto, Nagano, Japan

10:00 9.5-O

#### **Identification of Tri-Carbon Defects in Gallium Nitride**

Ivan Gamov (1), K. Irmscher (1), E. Richter (2), M. Weyers (2)

(1) Leibniz-Institut für Kristallzüchtung, Berlin, Germany

(2) Ferdinand-Braun-Institut, Leibniz-Institut für Hochfrequenztechnik, Berlin, Germany

10:15 9.6-O

#### **Dislocation characterization for AlN single crystal on a wafer scale**

Yongzhao Yao (1), Yukari Ishikawa (1), Yoshihiro Sugawara (1), Narihito Okada (2), Kazuyuki Tadamoto (2)

(1) Japan Fine Ceramics Center, Nagoya, Japan

(2) Yamaguchi University, Japan



10:30 – 11:00 Coffee break

## Session 10 Device Processing and Characterization (II)

11:00 10.1-I: Paul Orville Leisher

### Thermoreflectance-based investigation of facet optical absorption and catastrophic optical mirror damage in high power diode lasers

Paul Orville Leisher (1), Aman K. Jha (2), Chen Li (2), Kevin P. Pipe (2), Mark T. Crowley (3), Daniel Fullager (3), Jason D. Helmrich (3), Prabhu Thiagarajan (3), Rebecca B. Swertfeger (4), Robert J. Deri (4)

(1) Freedom Photonics, Santa Barbara, USA

(2) Mechanical Engineering, University of Michigan, Ann Arbor, MI, USA

(3) Lasertel Inc., Tucson, AZ, USA

(4) Lawrence Livermore National Laboratory, Livermore, CA, USA

11:15 10.2-O

### Study of AlInN/GaN-on-Si high electron mobility transistors tolerance to heavy-ion irradiation

Seshaqiri Rao Challa (1), N. Vega (2,3,4), C. Kristukat (3), N.A. Müller (2), M.E. Debray (2,3), G. Schmidt (1), F. Hörich (1), H. Witte (1), F. Bertram (1), J. Christen (1), A. Dadgar (1), A. Strittmatter (1)

(1) Institut für Physik, Otto-von-Guericke-Universität Magdeburg, Germany

(2) Gerencia de Investigación y Aplicaciones, CNEA, Argentina

(3) Escuela de Ciencia y Tecnología, Universidad Nacional de San Martín (UNSAM), Argentina

(4) Consejo Nacional de Investigaciones Científicas y Tecnológicas (CONICET), Argentina

11:45 10.3-O

### Visualization of Process-Induced Defects and Stress in GaN HEMTs by Cross-Sectional Cathodoluminescence

Ryuichi Sugie, Tomoyuki Uchida, Koji Matsumura, Hideki Sako

Toray Research Center Inc., Otsu, Shiga, Japan

12:00 10.4-O

### 310 nm light emitting diodes on substrates with different off-cut angles

Tim Kolbe (1), Arne Knauer (1), Johannes Enslin (2), Sylvia Hagedorn (1), Anna Mogilatenko (1,3), Tim Wernicke (2), Michael Kneissl (1,2), Markus Weyers (1)

(1) Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, Berlin, Germany

(2) Institute of Solid State Physics, Technische Universität Berlin, Germany

(3) Institute of Physics, Humboldt University of Berlin, Germany

12:15 10.5-O

### Evolution from random lasing to erbium-related electroluminescence via ZnO-based metal-insulator-semiconductor structure devices

Jinxin Chen, Deren Yang, Xiangyang Ma

State Key Laboratory of Silicon Materials and School of Materials Science and Engineering, Zhejiang University, Hangzhou, China



12:30 10.6-O

**Reducing the Dislocation Density within the AlN and AlGaIn:Si Buffer Layers of Deep UVC-LEDs**

Norman Susilo (1), E. Ziffer (1), C. Kuhn (1), B. Belde (1), L. Sulmoni (1), M. Guttmann (1),  
T. Wernicke, M. Kneissl (1,2), S. Hagedorn (2), J. Weinrich (2), A. Mogilatenko (2), C. Netzel (2),  
S. Walde (2), M. Weyers (2), L. Cancellara (3), M. Albrecht (3)

(1) Institute of Solid State Physics, Technische Universität Berlin, Germany

(2) Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, Berlin, Germany

(3) Leibniz-Institut für Kristallzüchtung, Berlin, Germany

12:45 10.7-O

**Investigation of processing-induced defects in GaAs based vertical cavity surface emitting lasers with Al oxide confinement layers**

M. Mokhtari (1), Ph. Pagnod-Rossiaux (1), F. Laruelle (1), J.P. Landesman (2), A. Moréac (2),  
C. Levallois (3), D.T. Cassidy (4), A. Pofelski (5), G.A. Botton (5)

(1) 3SP Technologies S.A.S, France

(2) Univ Rennes, CNRS, IPR (Institut de Physique de Rennes), France

(3) Univ. Rennes, INSA Rennes, CNRS, Institut FOTON, France

(4) Department of Engineering Physics, McMaster University, Hamilton, ON, Canada

(5) Department of Materials Science and Engineering, McMaster University, Hamilton, ON, Canada

13:00 10.8-O

**Direct observation of V-pit induced vertical n-type columns disrupting the vertical breakdown of AlGaIn/GaN-HEMT heterostructures on Si**

Sven Besendörfer (1), Elke Meißner (1), Jochen Friedrich (1), Tobias Erlbacher (1),  
Alaleh Tajalli (2), Matteo Meneghini (2), Gaudenzio Meneghesso (2), Enrico Zanoni (2),  
Roland Püsche (3), Joff Derluyn (3), Farid Medjdoub (4)

(1) Fraunhofer IISB, Erlangen, Germany

(2) Department of information engineering, University of Padova, Italy

(3) EpiGaN, Kempische steenweg, Hasselt, Belgium

(4) IEMN/CNRS, Avenue Poincaré, CS 60069, 59650 Villeneuve d'Ascq, France

13:30 – 15:00 Lunch

15:30 – 23:00 Excursion & Conference Dinner

[\(Excursion details see extra leaflet\)](#)

The Excursion is supported by the Photonics Cluster Berlin Brandenburg.





## Thursday, September 12

### Session 11      Nanostructures and Thin Films

09:00    11.1-I: Anna Reszka

#### **Influence of growth polarity switching on the optical and electrical properties of (Al,Ga)N/GaN nanowire LEDs**

Anna Reszka (1), Slawomir Kret (1), Giorgi Tchutchulashvili (1), Agnieszka Pieniążek (1), Marta Sobanska (1), Zbigniew R. Zytewicz (1), Bogdan J. Kowalski (1), Krzysztof P. Korona (2), Rafal Bozek (2), Stanislav Tiagulskyi (3)

(1) Institute of Physics, Polish Academy of Sciences, Warsaw, Poland

(2) Institute of Experimental Physics, Warsaw University, Poland

(3) Institute of Photonics and Electronics, Czech Academy of Sciences, Praha, Czech Republic

09:30    11.2-O

#### **Influence of thermal annealing on electrical properties of ZnO/GaN single nanorod heterojunctions**

Stanislav Tiagulskyi, Roman Yatskiv, Hana Faitová, Šárka Kučerová, Jan Vaniš, Jan Grym  
Institute of Photonics and Electronics of the Czech Academy of Sciences, Prague, Czech Republic

09:45    11.3-O

#### **Orientation mapping and imaging of nanomaterials using on-axis TKD in the SEM**

Daniel Goran (1), Shang-Wei Chou (2)

(1) Bruker Nano GmbH, Berlin, Germany

(2) Department of Chemistry, National Taiwan University, Taipei, Taiwan

10:00    11.4-O

#### **Microsphere-assisted optical microscopy for nanometrology**

P.C. Montgomery (1), S. Perrin (2), P. Pfeiffer (2), S. Lecler (2)

(1) ICube Laboratory, University of Strasbourg-CNRS, Strasbourg, France

(2) ICube Laboratory, University of Strasbourg-CNRS, Illkirch, France

10:15    11.5-O

#### **Near-field study of axially heterostructured SiGe/Si NWs by $\mu$ -Raman spectroscopy on a graphene control layer**

Jose Luis Pura, Juan Jiménez

GdS-Optronlab, Dept. Física de la Materia Condensada, Universidad de Valladolid, Spain

10:30 – 11:00 Coffee break



## Session 12 Wide Band Gap Semiconductors (III)

11:00 12.1-I: Dabing Li

### Defects evolution and control in AlN

Dabing Li, Xiaojuan Sun, Ke Jiang, Jianwei Ben

(1) Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences, Changchun, China

(2) Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Sciences, Beijing, China

11:30 12.2-O

### Characterization of wurtzite $\text{Al}_{1-x}\text{Sc}_x\text{N}$ with $x \leq 0.41$ grown on $\text{Al}_2\text{O}_3$ substrates by magnetron sputter epitaxy with spectroscopic ellipsometry

Martina Baeumler (1), Yuan Lu (1), Lutz Kirste (1), Mario Prescher (1), Tim Christoph (1), Joachim Wagner (1,3), Agnė Žukauskaitė (1), Oliver Ambacher (1,2)

(1) Fraunhofer Institute for Applied Solid State Physics (IAF), Freiburg, Germany

(2) Department of Sustainable Systems Engineering (INATECH), University of Freiburg, Germany

(3) Present address: Fraunhofer Institute for Photonic Microsystems (IPMS), Dresden, Germany

11:45 12.3-O

### Nanoscale cathodoluminescence of an InGaN single quantum well intersected by individual dislocations

Gordon Schmidt, Peter Veit, Sebastian Metzner, Christoph Berger, Frank Bertram, Armin Dadgar, André Strittmatter, Jürgen Christen

Institute of Physics, Otto-von-Guericke-University Magdeburg, Germany

12:00 12.4-O

### Defect-related ultrafast carrier kinetics in AlGaIn/GaN superlattices

Felix Mahler (1), Klaus Reimann (1), Jens W. Tomm (1), Michael Woerner (1),

Thomas Elsaesser (1), Christos Flytzanis (2), Veit Hoffmann (3), Markus Weyers (3)

(1) Max-Born-Institut für nichtlineare Optik und Kurzzeitspektroskopie, Berlin, Germany

(2) Laboratoire Pierre Aigrain, École Normale Supérieure, Paris, France

(3) Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, Berlin, Germany

12:15 12.5-O

### Accessing the charge carrier diffusivity and non-radiative recombination in GaN waveguide layers for laser diodes

C. Netzel (1), V. Hoffmann (1), S. Einfeldt (1), M. Weyers (1), F. Mahler (2), J.W. Tomm (2)

(1) Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, Berlin, Germany

(2) Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie, Berlin, Germany

12:30 – 12:45 Conclusions, remarks

13:00 – 14:00 Lunch



## Posters

All posters will be presented during both poster sessions 1 and 2:

Monday, September 9, 18:30 – 20:30 and Tuesday, September 10, 18:30 – 20:30

P-1

### **Bending of dislocations in AlN grown by HVPE**

Jingjing Chen, Di di Li, Xu Jun Su, Jun Huang, Mu Tong Niu, Ke Xu

Suzhou Institute of Nano-tech and Nano-bionics, Suzhou Nanowin Science and Technology Co., Ltd., China

P-2

### **Analysis of Macro Defects in GaN Substrate Wafer based on Imaging Cathodoluminescence Technique**

Jun Chen (1), Wei Yi (1), Seiji Higuchi (2), Takashi Sekiguchi (1,3)

(1) National Institute for Materials Science, Tsukuba 305-0044, Japan

(2) HORIBA, Ltd., Tokyo 101-0063, Japan

(3) University of Tsukuba, Tsukuba 305-8577, Japantional Institute for Materials Science

P-3

### **A cathodoluminescence study on the diffusion length in InGaAlP/InGaP/GaAs heterostructures**

Shabnam Dadgostar (1), Cantia Belloso Casuso (1), Oscar Martínez (1), Juan Jiménez (1), Manuel Hinojosa (2), Iván García (2)

(1) GdS-Optronlab, Dept. Física de la Materia Condensada, Universidad de Valladolid, Spain

(2) Instituto de Energía Solar, ETSI de Telecomunicación, Universidad Politécnica de Madrid, 28040 Madrid, Spain

P-4

### **Selective growth of 4H-SiC with improved single polytypes**

Yue Dong, Yongqiang Sun, Wei Lin, Haonan Chen, Yiming Lu, Junyong Kang

Fujian Provincial Key Laboratory of Semiconductors and Applications, Collaborative Innovation Center for

Optoelectronic Semiconductors and Efficient Device, Department of Physics, Xiamen University, Xiamen,

Fujian 361005, China

P-5

### **4O10Cd clustering in ZnB<sup>VI</sup>-rich Cd<sub>x</sub>Zn<sub>1-x</sub>O<sub>y</sub>B<sup>VI</sup><sub>1-y</sub> (B<sup>VI</sup> = S, Se, Te) highly lattice mismatched alloys**

Vyacheslav A. Elyukhin

Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional, Ciudad de México, México





P-6

**The growth mechanism of h-BN on Cu(111) at early stage**

*Yangtao Fan (1), Yin Jun (1), Jing Li (1), Wei Lin (2), Yaping Wu (2), Chunmiao Zhang (2), Junyong Kang (2)*

*(1) Collaborative Innovation Center for Optoelectronic Semiconductors and Efficient Devices, Pen-Tung Sah Institute of Micro-Nano Science and Technology, Xiamen University, Xiamen, Fujian 361005, China*

*(2) Fujian Provincial Key Laboratory of Semiconductors and Applications, Collaborative Innovation Center for Optoelectronic Semiconductors and Efficient Device, Department of Physics, Xiamen University, Xiamen, Fujian 361005, China*

P-7

**Vegard's law relationship between the activation energy for blister formation and the Si concentration in RF co-sputtered a-Si<sub>x</sub>Ge<sub>1-x</sub> layers**

*Cesare Frigeri, M. Serényi (2), R. Schiller (2), A. Csik (3)*

*(1) IMEM-CNR Institute, Parco Area delle Scienze 37/A, 43124 Parma, Italy*

*(2) Institute of Technical Physics and Materials Science, Research Centre for Natural Sciences, Hungarian Academy of Sciences, P.O. Box 49, H-1525 Budapest, Hungary*

*(3) Institute for Nuclear Research, Hungarian Academy of Sciences, P.O. Box 51, H-4001 Debrecen, Hungary*

P-8

**The origin of blue color center in β-Ga<sub>2</sub>O<sub>3</sub> single crystal grown by EFG**

*Bo Fu, Zhitai Jia, Wenxiang Mu, Jin Zhang, Xutang Tao*

*State Key Laboratory of Crystal Materials & Key Laboratory of Functional Crystal Materials and Device, Shandong University, Jinan 250100, China*

P-9

**Photoelastic characterization of residual strain distribution in commercial off-axis SiC substrates**

*Masayuki Fukuzawa, Kazuki Kanamoto*

*Kyoto Institute of Technology, Kyoto, Japan*

P-10

**N K-edge XAS and XES Study of Cr- and Ti-doped AlN Films**

*Saki Imada (1), Nobuyuki Tatemizo (1), Yoshio Miura (2), Kazuki Tsuruta (3)*

*(1) Kyoto Institute of Technology, Kyoto, Kyoto, Japan*

*(2) National Institute for Materials Science, Tsukuba, Ibaraki, Japan*

*(3) Japan Synchrotron Radiation Research Institute, Sayo, Hyogo, Japan*

P-11

**A study of the electrical activity of crystal defects in multicrystalline Si**

*Marta María Jiménez, Ángel Moretón, Óscar Martínez, Miguel Ángel Gonzalez, Juan Jiménez*

*GdS-Optronlab, Dept. Física de la Materia Condensada, Universidad de Valladolid, Spain*



P-12

**Effect of Si and Ge doping on band gap engineering in wurtzite GaN/AlN superlattices from first principles**

Shan Jin (1,2), Xuefei Li (2), Wenxian Yang (1,2), Yukun Zhao (2), Lifeng Bian (1,2), Shulong Lu (2)

(1) School of Nano Technology and Nano Bionics, University of Science and Technology of China, Hefei 230026, China

(2) Key Laboratory of Nanodevices and Applications, Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, Suzhou 215123, China

P-13

**XAFS Investigation of Nanoparticle Formation in  $^{64}\text{Zn}^+$  Ion Implanted and Thermo Oxidized  $\text{SiO}_2$  Film**

E.V. Khramov (1), V.V. Privezentsev (2,3), A.N. Palagushkin (3)

(1) National Research Center "Kurchatov Institute", 123182 Moscow, Russia

(2) Valiev Institute of Physics & Technology, Russian Academy of Sciences, 117218 Moscow, Russia

(3) National Research Center "Institute of System Analysis, Russian Academy of Sciences", 117218 Moscow, Russia

P-14

**Specific and artificial defects in photonic structures based on macroporous n-Si: elimination of the former and possible use of the latter**

K.P. Konin, A.I. Liptuga, O.O. Lytvynenko, F.F. Sizov

V. Lashkaryov Institute of Semiconductor Physics NAS of Ukraine, Kyiv, Ukraine

P-15

**Residual deformations in macroporous silicon**

K.P. Konin, O.Yo. Gudymenko, V.P. Klad'ko, D.V. Morozovs'ka

V. Lashkaryov Institute of Semiconductor Physics NAS of Ukraine, Kyiv, Ukraine

P-16

**TEM Study of Defects in Highly Ordered ZnO Nanorods**

Šárka Kučerová (1,2), Hana Faitova (1,2), Jozef Vesely (1), Ondrej Cernohorsky (1),

Nikola Basinova (1), Jan Grym (1), Jozef Vesely (3)

(1) Institute of Photonics and Electronics, Czech Academy of Sciences, Prague, Czech Republic

(2) Department of Surface and Plasma Science, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic

(3) Department of Physics of Materials, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic

P-17

**Qualitative analysis of daylight photoluminescence imaging compared to daylight electroluminescence imaging**

A. Moreton (1), M. Guada (1), V. Alonso (1), M. Jiménez (1), O. Martínez (1), M.A. Gonzalez (1),  
J. Jiménez (1), S. Gallardo (2), J.I. Morales (2), L. Hernandez (2)

(1) GdS-Optronlab, Dept. Física de la Materia Condensada, Universidad de Valladolid, Spain

(2) Department of Agricultural and Forestry Engineering, School of Forestry, Agronomic and Bioenergy Industry Engineering (EIFAB), University of Valladolid, Soria, Spain



P-18

**Triangular Single Shockley Stacking Fault Analyses on 4H-SiC PiN Diode with Forward Voltage Degradation**

Johji Nishio, A. Okada, C. Ota, M. Kushibe

Corporate Research and Development Center, Toshiba Corporation, Japan

P-19

**Three-dimensionally observation of internal defects in  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (001) wafer by technique of FIB-SEM serial sectioning**

Kenichi Ogawa (1), Naoya Ogawa (1), Ryo Kosaka (1), Toshiyuki Isshiki (1), Yongzhao Yao (2), Yukari Ishikawa (2)

(1) Kyoto Institute of Technology, Matsugasaki, Sakyo-ku, Kyoto 606-8585, Japan

(2) Japan Fine Ceramics Center, 2-4-1 Mutsuno, Atsuta-ku, Nagoya, 456-8587, Japan

P-20

**Model of tensile stress relaxation in thin (0001) Al(Ga)N layers**

Mikhail Rudinsky (1), Sergey Karpov (1), Roman Talalaev (1), Wsevolod Lundin (2)

(1) STR Group - Soft Impact, Ltd., St. Petersburg, Russia

(2) Ioffe Institute, St. Petersburg, Russia

P-21

**Microstructure of Stacking fault complex / carrot defects at the interface between 4H-SiC epitaxial layers and substrates**

Hideki Sako (1,2), Kenji Kobayashi (3), Kentaro Ohira (3), Toshiyuki Isshiki (2)

(1) Toray Research Center, Inc. 3-7, Sonoyama 3, Otsu, Shiga, 520-8567, Japan

(2) Kyoto Institute of Technology, Matsugasaki, Sakyo-ku, Kyoto 606-8585, Japan

(3) Hitachi High-Technologies Corp., Ichige, Hitachinaka, Ibaraki, 312-8504, Japan

P-22

**Development in advanced inspection system for detecting defects in SiC epitaxial wafers**

Junji Senzaki (1), Atsushi Maeda (2), Shota Fujiki (2), Hirokazu Seki (2), Keiichi Morikawa (3), Yoshinori Ueji (3), Kazuhiro Omote (3)

(1) Advanced Power Electronics Research Center, International Institute of Advanced Industrial Science and Technology, Tsukuba, Ibaraki, Japan

(2) Lasertec Corporation, Yokohama, Kanagawa, Japan

(3) Regaku Corporation, Akishima, Tokyo, Japan

P-23

**A comparison of defects between InAs single crystals grown by LEC and VGF methods**

Guiying Shen (1), Youwen Zhao (1), Jingming Liu (1), Zhiyuan Dong (1), Fenghua Wang (1), Hui Xie (1), Jing Sun (1,2), Ding Yu (1,2)

(1) Key Laboratory of Semiconductor Materials Science and Beijing Key Laboratory of Low-Dimensional Semiconductor Materials and Devices, Institute of Semiconductors, Chinese Academy of Sciences, Beijing, 100083, China

(2) College of materials science and opto-electronic technology, University of Chinese Academy of Sciences, Beijing, China



P-24

**Structural analysis of Shockley stacking faults in 4H-SiC single crystals using Raman microscopy**

Kana Shimada, Kanta Asada, Noboru Ohtani

School of Science and Technology, Kwansai Gakuin University, 2-1 Gakuen, Sanda, Hyogo 669-1337, Japan

P-25

**Burgers vector analysis of threading screw dislocations in 4H-SiC single crystals using X-ray topography**

Naoto Shinagawa, Takuto Izawa, Noboru Ohtani

School of Science and Technology, Kwansai Gakuin University, 2-1 Gakuen, Sanda, Hyogo 669-1337, Japan

P-26

**Defect formation in degraded laser diodes**

J. Souto, Jose Luis Pura, Juan Jiménez

GdS-Optronlab, Dept. Física de la Materia Condensada, Universidad de Valladolid, Spain

P-27

**The influence of excitation power on the luminescence spectra detected by two photon excited luminescence confocal microscopy**

A.A. Gladilin, V.P. Danilov, N.N. Il'ichev, V.P. Kalinushkin, M.I. Studenikin, O.V. Uvarov, V.A. Chapnin, A.V. Ryabova, A.V. Sidorin, E.S. Gulyamova, V.V. Tumorin, P.P. Pashinin  
Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia

P-28

**The possibility of two photon excitation luminescence confocal microscopy for investigation of semiconductor crystals and structures**

O.V. Uvarov (1), V.P. Kalinushkin (1), S.A. Mironov (1), A.A. Gladilin (1), G.G. Novikov (2)

(1) Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia

(2) National Research Nuclear University MEPhI, Moscow, Russia

P-29

**Study of optical and electrical properties of dislocations in GaN by SEM methods**

Pavel S. Vergeles (1), E.B. Yakimov (1), V.I. Orlov (1,2)

(1) Institute of Microelectronics Technology and High Purity Materials RAS, Chernogolovka, Russia

(2) Institute of Solid State Physics RAS, Chernogolovka, Russia

P-30

**Characterization of the Al-SiO<sub>2</sub>-p-Si structure by the C-V characteristics method after irradiation with a low-energy electron beam**

Pavel S. Vergeles, E.B. Yakimov, Yu.O. Kulanchikov

Institute of Microelectronics Technology and High Purity Materials RAS, Chernogolovka, Russia



P-31

**Extra half-plane shortening of threading dislocations in Si-doped GaN**

Jonas Weinrich (1), Anna Mogilatenko (1), Frank Brunner (1), Markus Weyers (1),  
Christoph Koch (2)

(1) *Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, Berlin, Germany*

(2) *Humboldt University of Berlin, Institute of Physics, Berlin, Germany*

P-32

**Manipulating the Spin-Valley Coupling Properties on Monolayer  $MPX_3$  ( $M= Mn, Fe; X = S, Se$ ) Alloy**

Yaping Wu, Jiangpeng Zhou, Zhiming Wu, Chunmiao Zhang, Junyong Kang

*Department of Physics, OSED, Fujian Provincial Key Laboratory of Semiconductor Materials and Applications, Xiamen University, China*

P-33

**Deep level defects in Fe-doped semi-insulating InP single crystals grown by VGF-method**

Hui Xie (1), Youwen Zhao (1,2,3), Jingming Liu (1), Zhiyuan Dong (1), Jun Yang (1)

(1) *Key Laboratory of Semiconductor Materials Science and Beijing Key Laboratory of Low-Dimensional Semiconductor Materials and Devices, Institute of Semiconductors, Chinese Academy of Sciences, Beijing, 100083, China*

(2) *University of Chinese Academy of Sciences, Beijing, 100049, China*

(3) *Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Sciences, Beijing 100049, China*

P-34

**Influence of crystal orientation on the formation of Schottky junctions on gallium oxide**

Roman Yatskiv, Jan Grym, Stanislav Tiagulskyi

*Institute of Photonics and Electronics, Czech Academy of Sciences, Prague, Czech Republic*

P-35

**Cathodoluminescence and Scanning Transmission Electron Microscopy study of InGaN/GaN Quantum Wells in Core-shell GaN Nanowires**

Wei Yi (1), Jun Uzuhashi (1), Jun Chen (1), Takashi Kimura (1), Tadakatsu Ohkubo (1),  
Takashi Sekiguchi (1), Kazuhiro Hono (1), Satoshi Kamiyama (2), Tetsuya Takeuchi (2)

(1) *National Institute for Materials Science, Tsukuba 305-0044, Japan*

(2) *Meijio University, Nagoya 468-8502, Japan*

P-36

**Crystal growth and defect of  $Lu_2O_3$  crystal by the heat exchanger method**

Yanru Yin, Guiji Wang, Yue Liu, Zhitai Jia, Xutang Tao

*State Key Laboratory of Crystal Materials & Key Laboratory of Functional Crystal Materials and Devices, Shandong University, Jinan 250100, China*

P-37

**Detection of the nitrogen doping variation on the (000-1) facet of 4H-SiC crystals**

Kaito Yokomoto, Masahiro Yabu, Noboru Ohtani

*School of Science and Technology, Kwansai Gakuin University, 2-1 Gakuen, Sanda, Hyogo 669-1337, Japan*



P-38

### **Optical characterization of multi-stacked CdSe/ZnSe quantum dot layers**

M. Yoneta (1), Y. Banden (1), M. Ohishi (1), M. Honda (2)

(1) Department of Applied Physics, Okayama University of Science, 1-1 Ridai-cho, Okayama 700-0005, Japan

(2) Faculty of Science, Naruto University of Education, Nakajima 748, Naruto-cho, Naruto-shi, Tokushima 772-8502, Japan

P-39

### **Semiconductor Solid Solution (GaAs)<sub>1-x-y</sub>(Ge<sub>2</sub>)<sub>x</sub>(ZnSe)<sub>y</sub> with Quantum Dots**

Sirajiddin Zainabidinov, Akramjon Boboev, Joxongir Usmonov

Andijan State University named after Z.M.Babur. Andijan, Uzbekistan 170100

P-40

### **Investigation of defects in n type GaSb: A Comparison between lightly and heavily Te-doped GaSb single crystals**

Youwen Zhao (1,2), Hui Xie (1), Guiying Shen (1), Jingmin Liu (1), Fenghua Wang (1),  
Ding Yu (1,2), Jing Sun (1,2)

(1) Key Laboratory of Semiconductor Materials Science, Beijing Key Laboratory of Low Dimensional Semiconductor Materials and Devices, Institute of Semiconductors, Chinese Academy of Sciences, Beijing 100083, China

(2) College of materials science and opto-electronic technology, University of Chinese Academy of Sciences, Beijing, 100049, China

P-41

### **Fabrication Of High Power GaN Blue Laser Diode By Electron Cyclotron Resonance Coating With Depressed Catastrophic Optical Damage**

Zhibai Zhong (1), Wei Lin (1), Zhiming Wu (1), Junyong Kang (1), Chiaen Lee (2), Changcheng Chuo (2), Chenke Hsu (2)

(1) Fujian Provincial Key Laboratory of Semiconductors and Applications, Collaborative Innovation Center for Optoelectronic Semiconductors and Efficient Device, Department of Physics, Xiamen University, Xiamen, Fujian 361005, China

(2) Technology Center, Sanan Optoelectronic Co.Ltd, Xiamen 361009, China

P-42

### **Direct observation of deep defects in wide bandgap Halide Perovskites**

Igal Levine (1), Omar Garcia Vera (2), Michael Kulbak (1), Carolin Rehmann (2),  
Dagar Janardan (2), José A. Márquez Prieto (3), Sergiu Levenco (3), Thomas Unold (3),  
Gary Hodes (1), Isaac Balberg (4), David Cahen (1), Thomas Dittrich (2)

(1) Dept. of Materials & Interfaces, Weizmann Inst. of Science, Rehovot 76100, Israel

(2) Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Institut für Si-Photovoltaik, 12489 Berlin, Germany

(3) Department Structure and Dynamics of Energy Materials, Helmholtz-Zentrum Berlin, 14109 Berlin, Germany

(4) The Racah Institute of Physics, The Hebrew University, Jerusalem 91904, Israel

P-43

### **Cathodoluminescence study on graded buffer layers of metamorphic single junction III-V solar cells**

Akio Ogura (1), Mitsuru Imaizumi (1), Wei Yi (2), Jun Chen (2), Hidetoshi Suzuki (3)

(1) Japan Aerospace Exploration Agency, Tsukuba, Ibaraki, Japan

(2) National Institute for Materials Science, Tsukuba, Ibaraki, Japan

(3) University of Miyazaki, Miyazaki, Miyazaki, Japan