

ICSCRM 2022

 DAVOS, Switzerland

Sunday, 11 September 2022 - Tutorial Day

chaired by: Marianne E. Bathen

09.00 Tutorial 1: Introduction to SiC material and growth

Prof. Noboru Ohtani (School of Engineering, Kwansei Gakuin University)

The development of silicon carbide (SiC) crystal growth technology over the last few decades has brought about tremendous progress in SiC power devices. 150 mm diameter SiC substrates with a low dislocation density are currently commercially available, and 4H-SiC substrates in 200 mm diameter are almost ready for the market. However, SiC power devices still suffer from several problems related to materials, i.e., substrates and homoepitaxial layers grown on them, and thus, it is abundantly clear that the further successful development of SiC power devices relies on achieving a deeper understanding of SiC materials and their crystal growth processes, and based on it, improving the technologies for designing, growing, and processing SiC materials.

This tutorial lecture is aimed at explaining the fundamentals of materials science and crystal growth technologies of SiC, which include polytypism and basic material properties of SiC, and bulk and epitaxial growth and doping of SiC crystals. The lecture also focuses on the crystallographic defects existing in SiC crystals, mainly dislocations and stacking faults, highlighting recent achievements in this field. A better understanding of their formation mechanisms and influences on SiC power devices is indispensable for implementing high performance and reliable SiC power devices with reasonable costs.

Presenter Biography

Noboru Ohtani is Professor of School of Engineering at Kwansei Gakuin University, Hyogo, Japan. He earned his Ph.D. degree in 1993 from Imperial College London, UK. Prior to joining Kwansei Gakuin University, he was with Advanced Technology Research Laboratories, Nippon Steel Corporation from 1984 to 2008 after graduating from Tokyo Institute of Technology, Japan, where he obtained MSc degree in Physics in 1984. At Nippon Steel Corporation, he was responsible for leading several research projects on semiconductor materials and devices, particularly focusing on silicon carbide (SiC) semiconductor materials. His current research focuses on crystal growth and defect physics in wide bandgap SiC single crystals with a view to improving the crystal quality.

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10.00 Tutorial 2: Introduction to SiC power devices

Dr. Peter Losee (Qorvo)

In this seminar, we will introduce the audience to the advantages and prospects of SiC power devices. We will review the strengths and challenges of designing with SiC, and contrast to the incumbent Si technologies. State of the art device architectures including MOSFETs, JFETs, Super Junction and bipolar device topics will be discussed. Even though the market adoption and performance advantages of SiC are now undeniable, we will highlight some aspects of the extra burden that these high-voltage, fast switching devices can pose to their peripheral environment including packaging, thermal management, and circuit design. This tutorial should provide graduate students, early career researchers and users new to the field, a sound understanding of SiC power device attributes, factors to consider when designing them, and a glimpse into areas of future development.

Presenter Biography

Dr. Losee received his MS ('03) and PhD ('07) from Rensselaer Polytechnic Institute in Troy, NY, and has spent the past 20+ years in the research and development of SiC power devices including vertical JFETs, MOSFETs, thyristors and various high voltage diodes. He holds more than 30 US patents and has co-authored more than 50 peer reviewed papers in his field of work. Dr. Losee has also been a member of a variety of key technical program committees including ISPSD, IRPS, WiPDA, APEC, ESREF and ICSCRM. Dr. Losee is currently the Senior Engineering Manager of Power Device Solutions at UnitedSiC (now Qorvo) in Princeton, New Jersey, USA where he's worked since 2018. Prior to joining UnitedSiC, Dr. Losee worked at General Electric Research Center for 12 years where he was a Principal Engineer leading the design and development of SiC MOSFETs.

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11.30 Tutorial 3: Silicon Carbide Defects as the Backbone of Quantum Technology

Assoc. Prof. Marina Radulaski (University of California, Davis)

Silicon carbide is an industrially mature wide band gap substrate, which has been present in power electronics and MEMS fields for decades. In the past decade, SiC gained traction as a quantum material, as its lattice defects, called color centers, have shown desirable properties in single photon generation, electron and nuclear spin manipulation, and spin-photon entanglement. Color centers take multiple roles in quantum technologies: deterministic single photon source, spin qubit, nuclear spin quantum memory, spin-photon interface for entanglement distribution, optically read out magnetic sensor, and more. These are basic functionalities that power Quantum Internet, cryptography, computing, simulation and sensing. Integration with photonic, phononic and electronic devices has been underway for efficient and scalable deployment of SiC quantum hardware.

Presenter Biography

Marina Radulaski is an Assistant Professor of Electrical and Computer Engineering at the University of California, Davis where she leads the Quantum Nanophotonics Laboratory. Prof. Radulaski is a recipient of the Google Research Scholar Award 2022, NSF CAREER Award 2021, OneQuantum Leading Female Scientist in 2021, and was selected for the Pauli Center for Theoretical Study Visiting Researcher program 2021, the Rising Stars in EECS cohort 2017, and Scientific American's 30-Under-30 Up and Coming Physicists in 2012. She obtained a Ph.D. in applied physics at Stanford University as a Gabilan Fellow, followed by the position as a Stanford Nano- and Quantum Science and Engineering Postdoctoral Fellow. Her academic training includes two undergraduate degrees, in theoretical physics and computer science, from the University of Belgrade and the Union University in Serbia. Prof. Radulaski has broad international experience in quantum and solid-state physics research performed at UC Davis, Stanford University, ETH Zurich, Lawrence Berkeley National Lab, Hewlett-Packard Labs, Oxford University, the Institute for Quantum Optics and Quantum Information in Vienna, Helmholtz Center Berlin, the Institute of Physics of the Polish Academy of Science, and the Institute of Physics Belgrade.

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13.30 Tutorial 4: Charge Trapping and Reliability Issues in SiC Devices

Prof. Tibor Grasser (Institute for Microelectronics, TU Vienna)

Charge trapping is at the heart of many reliability issues in both Si and SiC devices, and causes for example hysteresis, noise, and the bias temperature instability. After summarizing some key experiments which reveal the physical origin of these phenomena, accurate models will be discussed. In essence, charge trapping is shown to be a temperature activated phenomenon which can be described by a non-radiative multiphonon model. In addition, the experiments reveal the existence of meta-stable defect states which are responsible for various intricacies of the phenomenon. While the detailed model is very accurate, it will be shown that simplified models can be used to capture the essence. Most notably, the capture-emission time (CET), or better, activation energy (AE) maps will be introduced which provide a highly intuitive explanation for dynamic degradation under both DC and AC conditions. Finally, a simplified model for fast gate-stack optimization will be demonstrated to give excellent results across a wide range of degradation conditions and technologies.

Presenter Biography

Prof. Tibor Grasser is an IEEE Fellow and head of the Institute for Microelectronics at TU Wien. He has edited various books, e.g. on the bias temperature instability, hot carrier degradation, and noise (all with Springer), is a distinguished lecturer of the IEEE EDS, has been involved in outstanding conferences such as IEDM (General Chair 2021), IRPS, SISPAD, ESSDERC, and IIRW, is a recipient of the Best and Outstanding Paper Awards at IRPS (2008, 2010, 2012, and 2014), IPFA (2013 and 2014), ESREF (2008) and the IEEE EDS Paul Rappaport Award (2011).

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14.30 Tutorial 5: From standard packages equipped with SiC chips towards true SiC packages

Prof. Nando Kaminski (Universität Bremen, Institut für elektrische Antriebe, Leistungselektronik und Bauelemente)

SiC devices are vertical devices just like in case of silicon power chips. Therefore, it seems to be straight forward to use the same packaging techniques as well, and that is what actually happened in the early days of SiC. This approach worked out reasonably well and was appropriate to start the field, as people were used to those packages and many packaging facilities have been available. However, it also revealed a number of shortcomings, which were limiting the silicon devices already and prevented the full exploitation of the benefits SiC offers. SiC chips feature a higher current density, a smaller junction termination, still smaller chips, higher stiffness and higher switching speeds than their silicon counterparts. Therefore, a mixture of thermal limitations, stray inductances and mechanical issues govern the utilisation of SiC devices and call for better adapted packaging solutions.

The tutorial will focus on a review of existing packages and package trends with respect to the needs of SiC devices. Furthermore, the tutorial will discuss selected aspects of parasitics, before thermal issues and cooling techniques will be covered. Finally, the tutorial will touch on a few reliability topics, especially the reduced power cycling capability of SiC devices and their humidity performance.

Presenter Biography

Nando Kaminski received the Dipl.-Ing. (1994) and Dr.-Ing. (2001) from University of Bremen. He was PhD-candidate at the Daimler-Benz research institute in Frankfurt am Main, where he worked on SiC power devices.

From 1998 until 2008 he was with ABB Switzerland. He worked on IGBTs, IGCTs, diodes, packaging, and reliability and finally he became head of the IGBT module fab.

In 2008, he joined the University of Bremen as full professor. His research interests include alternative semiconductors, material basics, device concepts, simulation, packaging, reliability, influence of parasitics, and EMC.

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16.00 Tutorial 6: From prototype to market – innovating with commercial purpose

Dr. Iulian Nistor (mqSemi AG, Zug)

The power semiconductors industry in general, and the SiC semiconductors in particular, are experiencing an accelerated growth along their entire value chains. Driven by the megatrend of electrification, the application of power semiconductors in all aspects of everyday life is increasingly visible and drives the growth of the entire industry. With optimistic estimations of reaching a total annual market of more than 35-40BUSD by 2030 (from about 15BUSD in 2020), it is not a surprise that many new entrants are trying to build in-roads in this already competitive industry. For new entrants into the field, moving from prototype to a product can be a long way, filled with caveats and challenges that can span from risky product choices that do not meet a real problem to financial viability, and demanding industry standards. This tutorial talk will offer the attendees key concepts that can foster entrepreneurial thinking (in academic research and industry as well) that can ultimately increase the success rate of new products introduction, and generate a new business dynamic in an industry that prepares itself for an unprecedented growth. These concepts range from setting up successful technology roadmaps to understanding applied concepts like market push vs. pull or building a compelling value proposition based on system level benefits rather than component level performance comparisons.

Presenter Biography

Dr. Iulian Nistor is a co-founder of mqSemi AG, a fabless startup focused on the development of the next generations of power semiconductors. Passionate about the megatrend of “electrification of everything” and its related technologies, Iulian has more than 15 years of industrial experience as researcher and manager in the power semiconductors and power electronics fields with 20 patents families to his name and over 40 journal and conference papers. Previously, he held various management and technical roles at Infineon AG, Germany and at ABB's Corporate Research Centers in North America and Switzerland.

He is particularly passionate about the transformation of knowledge and concepts into products and services that meet the unmet needs of an electrified world. He likes to share ideas and is enthusiastic about accompanying all technology and business leaders who wish to expand their technical and commercial solutions into viable and sustainable businesses.

Plenary Talk 1: Monday, 12th September 2022

chaired by: Ulrike Grossner and Gregor Pobegen

09.10 Mo-Plenary-1: A Roadmap for Silicon Carbide Energy Efficient Semiconductors

Dr. Ljubisa Stevanovic (General Electric)

The title of this presentation reflects the author's belief that the time has come to rename our branch of electronics from Power Semiconductors to Energy Efficient Semiconductors. The intent is not to disregard the tradition, but to emphasize the fact that these devices, and our community of experts, play a critical role in reducing global energy consumption and sustaining our planet.

The presentation outlines a roadmap for Silicon Carbide Energy Efficient Semiconductors, viewed through a very wide technology lens spanning from substrates to systems. The author will discuss trends and challenges with scaling of SiC starting material and fab volume, and with device performance, reliability, and ruggedness. Trends and challenges related to single-chip discrete and multi-chip module packaging will also be discussed. The presentation will conclude by highlighting converter applications which required the development of new devices and modules to meet cost, efficiency, reliability, and EMI challenges.

Presenter Biography

Dr. Ljubisa Stevanovic is Chief Engineer and CTO for Silicon Carbide at GE Research in Niskayuna, New York. He leads a multi-disciplinary team which has developed vertically integrated chip-to-converter solutions to facilitate SiC product adoption in GE applications.

Ljubisa has co-authored over 50 scientific publications, and he holds more than 40 U.S. patents. He is the recipient of several internal and external awards, including the GE Hero of Growth (2012) from the CEO of General Electric company.

Ljubisa received the Diploma in Electrical Engineering from Belgrade University (1988), and M.S. (1989) and Ph.D. (1995) degrees in Power Electronics from the California Institute of Technology.

Plenary Talk 2: Monday, 12th September 2022

chaired by: Ulrike Grossner and Gregor Pobegen

10.30 Mo-Plenary-2: Hyundai Motor Group's Innovation in mobility and SiC power modules

Dr. K.Y. Jang (Hyundai Motor Group)

For net-zero, Hyundai Motor Group is actively promoting electrification, and also developing innovative technologies. The unique 800V system in E-GMP has achieved the world best fast-charging speed and high energy efficiency, which will make people more comfortable. The 800V system in E-GMP hires a SiC power module. It is one of key technologies for better energy efficiency in the E-GMP system. There are not only electrified vehicles that Hyundai Motor Group is focusing on, but also AAM (Advanced Air Mobility) development for the future. The aviation sector requires very high reliability because it is directly related to passenger's safety. The potential of SiC in reliability is very high, so SiC could be a strong candidate for AAM in the future. Hyundai Motor Group is transforming itself into an innovative mobility company beyond automotive, and will lead innovation as a game changer in future mobility. SiC semiconductor will play an important role with Hyundai.

Presenter Biography

1. Graduated from the Department of Electrical Engineering, Seoul National University, 1999 (Born in Seoul Korea, 1975.Dec.22)
2. Master degree of Electrical and Electronic Systems, Department of Electrical Engineering, Seoul National University, 2001
3. Fairchild Semiconductor SPM(Smart Power Module) Development and Application Circuit 2001~2005
4. Hyundai Motor Company (2006~2022, Head of Power Module Design Team)

xEV Inverter development 2006~2012

Power module joint development 2013~2014

Design of Si power Module 2015~

Design of SiC power module 2021~

Plenary Talk 3: Friday, 16th September 2022

chaired by: Ulrike Grossner and Gregor Pobegen

14.00 Fr-Plenary-3: Monolithic Bi-Directional Switches — Opening New Horizons in Power Electronics

Prof. Dr. Johann Kolar (ETH Zurich)

Power Electronics is a key technology for all forms of generation and utilization of electric power in modern societies, ranging from renewable energy systems and highly diverse power supply applications including fast-charging of EVs and hyperscale datacenters to variable frequency drives for industry automation. The progress in the area has been driven over the past 40 years by new power semiconductor device concepts and corresponding circuit topologies with a focus on voltage-source converter (VSC) structures and/or the application of switching elements limited to unipolar voltage blocking capability. With reference to recently intensifying R&D activities on two-gate monolithic bi-directional switches (M-BDSs) featuring bipolar voltage blocking and bidirectional current control capability, the talk contemplates on the potential advantages of M-BDSs for the realization of ultra-compact three-phase PFC rectifier systems and next generation inverter systems with low motor insulation stress. In this context the performance gain achievable utilizing three-level T-type VSC topologies and the unique features of current-source converter approaches – today solely employed in thyristor-based high-power medium-voltage motor drives - and AC/AC matrix converter concepts over state-of-the-art VSC systems are highlighted. Final considerations are on the paramount importance of advanced integration and packaging technologies for a next disruptive performance improvement of power electronics systems.

Presenter Biography

Johann W. Kolar is a Fellow of the IEEE, an International Member of the US NAE and a Full Professor and Head of the Power Electronic Systems Laboratory at the Swiss Federal Institute of Technology (ETH) Zurich. He has proposed numerous novel converter concepts incl. the Vienna Rectifier, has spearheaded the development of x-million rpm motors, and has pioneered fully automated multi-objective power electronics design procedures. He has graduated 80+ Ph.D. students, has published 1000+ research papers, 4 book chapters, and has filed 200+ patents. He has served as IEEE PELS Distinguished Lecturer from 2012 - 2016. He has received 40+ IEEE Prize Paper Awards, the 2016 IEEE William E. Newell Power Electronics Award, and 2 ETH Zurich Golden Owl Awards for excellence in teaching. The focus of his current research is on ultra-compact/efficient WBG converter systems, ANN-based design procedures, Solid-State Transformers, ultra-high speed drives, bearingless actuators, and life cycle analysis of power electronics.

Monday, 12th September 2022

09.00 Welcome: Opening session, chaired by: Ulrike Grossner and Gregor Pobegen

09.10 Mo-Plenary-1: A Roadmap for Silicon Carbide Energy Efficient Semiconductors
DR. LJUBISA STEVANOVIC (General Electric)

10.00 Break

10.30 Mo-Plenary-2: Hyundai Motor Group's Innovation in mobility and SiC power modules
DR. K.Y. JANG (Hyundai Motor Group)

11.20 Invited-Poster.1: Enhancement of dislocation contrasts in PL imaging from 4H-SiC bulk wafers by removing subsurface damage using sublimation etching
DAICHI DOJIMA (Kwansei Gakuin University), Mizuho Maki (Kwansei Gakuin University), Daichi Dansako (Kwansei Gakuin University), Kohei Toda (Kwansei Gakuin University), Tadaaki Kaneko (Kwansei Gakuin University)

11.30 Invited-Poster.2: Structural and electrical properties AlGaIn/GaN heterostructures grown onto misoriented 4H-SiC epilayers
FABRIZIO ROCCAFORTE (CNR-IMM), Giuseppe Greco (CNR-IMM), Corrado Bongiorno (CNR-IMM), Emanuela Schilirò (CNR-IMM), Patrick Fiorenza (CNR-IMM), Filippo Giannazzo (CNR-IMM), Marco Mauceri (LPE SpA), Danilo Crippa (LPE SpA), Andrea Severino (STMicroelectronics), Ferdinando Iucolano (STMicroelectronics), Pawel Prystawko (IHPP - PAS), Mike Leszczynski (IHPP - PAS)

11.40 Sponsor and Exhibition Information
ULRIKE GROSSNER (Advanced Power Semiconductor Laboratory, ETH Zurich)

11.45 Introduction to the Industrial News Session: Wolfspeed Industry Update
TOM BARBIERI (Wolfspeed)

Monday, 12th September 2022

14.00 Mo-3-A: MOSFET characterization, chaired by: Lars Knoll and Daniel Haasmann

14.00 Mo-3-A.1: Assessing, controlling and understanding parameter variations of SiC power MOSFETs in switching operation (Invited)

THOMAS AICHINGER (Infineon Technologies Austria AG), Maximilian Wolfgang Feil (Infineon Technologies AG), Paul Salmen (Infineon Technologies AG)

14.30 Mo-3-A.2: Influence of electrons trapped at the interface states on Hall electron mobility in SiC/SiO₂ inversion layers

KOJI ITO (Kyoto University), Masahiro Horita (Kyoto University, Nagoya University), Jun Suda (Kyoto University, Nagoya University), Tsunenobu Kimoto (Kyoto University)

14.50 Mo-3-A.3: On the Frequency Dependence of the Gate Switching Instability in Silicon Carbide MOSFETs

MAXIMILIAN WOLFGANG FEIL (Infineon Technologies AG and Institute for Microelectronics, TU Wien), Katja Waschneck*, Hans Reisinger*, Paul Salmen*, Gerald Rescher (Infineon Technologies Austria AG), Thomas Aichinger (Infineon Technologies Austria AG), Wolfgang Gustin (* Infineon Technologies AG), Tibor Grasser (Institute for Microelectronics, TU Wien)

15.10 Mo-3-A.4: Small-Signal Impedance and Split C-V Characterization of High-κ SiC Power MOSFETs

SALVATORE RACE (Advanced Power Semiconductor Laboratory, ETH Zurich), Ivana Kovacevic-Badstübner*, Roger Stark*, Alexander Tsbizov*, Manuel Belanche Guadas*, Yulieth Arango (Hitachi Energy), Gianpaolo Romano (Hitachi Energy), Lars Knoll (Hitachi Energy), Ulrike Grossner (* Advanced Power Semiconductor Laboratory, ETH Zurich)

14.00 Mo-3-B: Bulk growth, chaired by: Elif Balkas and Peter Wellmann

14.00 Mo-3-B.1: A Twenty-Year Journey of Overcoming Challenges for High Volume Mass Production of SiC Materials (Invited)

GIL CHUNG (SK)

14.30 Mo-3-B.2: Simulation of Whole-surface Step Morphology and Design of Complex Control Pattern for Solution Growth of SiC

DANG YIFAN (Nagoya University)

14.50 Mo-3-B.3: Tailored polycrystalline substrate for SmartSiC substrates enabling high performance power devices

HUGO BIARD (Soitec SA), Walter Schwarzenbach (Soitec SA), Odoul Geraud (Soitec SA), Ionut Radu (Soitec SA), Alexandre Potier (Mersen), Marc Ferrato (Mersen), Eric Guajioty (Mersen)

15.10 Mo-3-B.4: Analysis of effect of additives in solution growth of SiC by first-principles molecular dynamics calculation

SHOTA SEKI (Graduate School of Engineering, Nagoya University), Takahiro Kawamura (Graduate School of Engineering, Mie University), Shunta Harada (Graduate School of Engineering, Nagoya University), Miho Tagawa (Graduate School of Engineering, Nagoya University), Toru Ujihara (Nagoya University)

Monday, 12th September 2022

16.00 Mo-4-A: Divacancy quantum emitters, chaired by: Takeshi Ohshima and Hannes Kraus

16.00 Mo-4-A.1: Creating and controlling spin qubits in silicon carbide for quantum technologies (Invited)

Elena Glen (University of Chicago), Cyrus Zeledon*, Joseph Blanton*, Yeghishe Tsaturyan*, Berk Kovos*, DAVID AWSCHALOM (* University of Chicago)

16.30 Mo-4-A.2: Comparative study of divacancies in 3C-, 4H- and 6H-SiC

DANIAL SHAFIZADE (Department of Physics, Chemistry and Biology, Linköping University), Takeshi Ohshima (National Institutes for Quantum Science and Technology), Son Nguyen*, Ivan G. Ivanov (* Department of Physics, Chemistry and Biology, Linköping University)

16.50 Mo-4-A.3: Divacancies at lattice defects in 4H-SiC
SON NGUYEN (Department of Physics, Chemistry and Biology, Linköping University), Danial Shafizade*, Takeshi Ohshima (National Institutes for Quantum Science and Technology), Ivan Ivanov (* Department of Physics, Chemistry and Biology, Linköping University)

17.10 Mo-4-A.4: The optical properties of the carbon di-vacancy-antisite complex in the light of the TS photoluminescence center

Maximilian Schober (JKU Linz), Nicolas Jungwirth (JKU Linz), Takuma Kobayashi (Osa), Johannes Lehmeier (Lehrstuhl für Angewandte Physik, Department Physik, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)), Michael Krieger (Lehrstuhl für Angewandte Physik, Department Physik, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)), Heiko Weber (Lehrstuhl für Angewandte Physik, Department Physik, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)), MICHEL BOCKSTEDTE (JKU Linz)

16.00 Mo-4-B: MOSFET optimization, chaired by: Tsunenobu Kimoto and Philippe Godignon

16.00 Mo-4-B.1: Direct characterization of 4H-SiC UMOS channels by using 3D van der Pauw devices (Invited)

HIROHISA HIRAI (Advanced Power Electronics Research Center, AIST), Mitsuo Okamoto (Advanced Power Electronics Research Center, AIST), Mitsuru Sometani (Advanced Power Electronics Research Center, AIST), Shinsuke Harada (Advanced Power Electronics Research Center, AIST), Hiroshi Yamaguchi (Advanced Power Electronics Research Center, AIST)

16.30 Mo-4-B.2: Demonstration of SiC trench gate MOSFETs with narrow cell pitch using source self-aligned process

SHINICHI KIMOTO (Advanced Power Electronics Research Center, AIST), Ryosuke Iijima (Corporate Research and Development Center, Toshiba Corp.), Shinsuke Harada (Advanced Power Electronics Research Center, AIST)

16.50 Mo-4-B.3: A fully self-aligned SiC trench MOSFET with 0.5μm channel pitch

MADANKUMAR SAMPATH (Purdue University), Dallas Morisette (Purdue University), James Cooper (Sonrisa Research Inc.)

17.10 Mo-4-B.4: High-quality MOS interface on 4H-SiC (11-20) formed by the oxidation-minimizing process

KYOTA MIKAMI (Kyoto University), Keita Tachiki (Kyoto University), Mitsuaki Kaneko (Kyoto University), Tsunenobu Kimoto (Kyoto University)

Monday, 12th September: Industrial Session A

18.30 Ind-A: Industrial session A, chaired by: Munaf Rahimo and Victor Veliadis

- 18.30 Ind-A.1:** Advantages of Batch Spray for Film Removal and Defect Control in SiC Device Manufacturing
NENAD STANKOVIC (Hitachi Energy Semiconductors), Dmitry Zimin (Hitachi Energy Semiconductors), Carlos Morote, (Tokyo Electron Europe Limited), Brent Schwab (TEL Manufacturing and Engineering America, Inc.), Jeffrey Lauerhaas (TEL Manufacturing and Engineering America, Inc.)
- 18.40 Ind-A.2:** Development of high quality 8 inch 4H-SiC substrates
CHAO GAO (SICC Co. Ltd), Xiaoli Yang (SICC Co. Ltd), Yani Pan (SICC Co. Ltd), Qingrui Liang (SICC Co. Ltd), Luping Wang (SICC Co. Ltd), Jiuyang Zhang (SICC Co. Ltd), Yuhan Gao (SICC Co. Ltd), Xiuxiu Ning (SICC Co. Ltd), Hongyan Zhang (SICC Co. Ltd)
- 18.50 Ind-A.3:** SiC microanalytical characterization using dynamic SIMS
Paula Peres (CAMECA, 29 quai des Grésillons, 92622 Gennevilliers Cedex), Seoyoun Choi (CAMECA, 29 quai des Grésillons, 92622 Gennevilliers Cedex), RENE CHEMNITZER (AMETEK GmbH / CAMECA, Edisonstraße 3, 85716 Unterschleißheim)
- 19.00 Ind-A.4:** Advancements in Non-contact High-resolution Resistivity Imaging of Wide Bandgap Materials
MARCUS KLEIN (SURAGUS GmbH), Senthil Vinodh (SURAGUS GmbH), Bo Chen (SURAGUS GmbH)
- 19.10 Ind-A.5:** 200 mm bulk crystal growth process optimization
IAN MANNING (SK siltron css), Sungchul Baek (SK siltron css), Kevin Moeggenborg (SK siltron css), Matthew Gave (SK siltron css), Gil Chung (SK), Michael Dudley (Stony Brook University), Balaji Raghathamachar (Stony Brook University), Qianyu Cheng (Stony Brook University), Edward Sanchez (SK siltron css)
- 19.20 Ind-A.6:** SmartSiC : Boosting SiC performance for high-voltage power applications
WALTER SCHWARZENBACH (Soitec), Severin Rouchier (Soitec), Guillaume Berre (Soitec), Romain Boulet (Soitec), Enrica Cela (Soitec), Alexis Drouin (Soitec), Audrey Chapelle (Soitec), Sylvain Monnoye (Soitec), Hugues Mank (Soitec), Catherine Moisson (Soitec), Melanie Lagrange (Soitec), Andrea Quintero Colmenares (Soitec), Loic Kabelaan (Soitec), Hugo BIARD (Soitec SA), Laurent Viravaux (Soitec), Nadia Ben Mohamed (Soitec), Damien Radisson (Soitec), Eric Guiot (Soitec), Guillaume Lavaitte (Soitec), Adeline Bouville Lallart (Soitec), Jeremy Roi (Soitec), Julie Widiez (CEA-Leti), Emmanuel Rolland (CEA-Leti), Guillaume Gelineau (CEA-Leti), Kremena Vladimirova (CEA-Leti), Nicolas Troutot (CEA-Leti), Alexandre Moulin (CEA-Leti), Vladimir Prudkovskiy (CEA-Leti), Sophie Barbet (CEA-Leti), Daniel Delprat (Soitec), Philippe Sandri (Soitec), catherine Maddalon (Soitec), Nicolas Daval (Soitec SA), Odoul Geraud (Soitec), Christophe Maleville (Soitec)
- 19.30 Ind-A.7:** High yielding and low defect, large diameter (150 mm and 200 mm) 4H SiC crystal production for power electronics and their quality control
SANTHANARAGHAVAN PARTHASARATHY (onsemi), Roman Drachev (onsemi), Evan Moe (onsemi), Sean Keohane (onsemi)

Monday, 12th September: Industrial Session A

- 19.40 Ind-A.8:** 6500 V SiC MOSFETs with improved 3rd quadrant characteristics and switching performance
SIDDARTH SUNDARESAN (GeneSiC Semiconductor), Jaehoon Park (GeneSiC Semiconductor), Aditi Agarwal (GeneSiC Semiconductor), Vamsi Mulpuri (GeneSiC Semiconductor), Ranbir Singh (GeneSiC Semiconductor) 19.50
- Ind-A.9:** Dynamic AGE-ing® for SiC wafering process
KYOHEI SEGAWA (Toyota Tsusho Corporation)
- 20.00 Ind-A.10:** 4H-SiC substrates using the Fast Sublimation Growth Process
JOHAN EKMAN (Kiselkarbid i Stockholm AB (KISAB))
- 20.10 Ind-A.11:** X-ray metrology for analysis of crystal defects and surface metal contamination
ASSUNTA VIGLIANTE (Sirius X-ray Solutions), Takuya Watanabe (Rigaku Corporation), Hiroshi Kono (Rigaku Corporation), Kazuhiko Omote (Rigaku Corporation)
- 20.20 Ind-A.12:** Fast and fully integrated crystal orientation measurements on 4H-SiC
DR. KAY DORNICH (Freiberg Instruments GmbH), Nadine Schüller (Freiberg Instruments GmbH), Hans Berger (Freiberg Instruments GmbH), Hans Arthur Bradaczek (Freiberg Instruments GmbH)
- 20.30 Ind-A.13:** The development of the advanced inspection system to screen out the BPDs that extend to bar shaped SSFs under forward biasing
YASUYUKI IGARASHI (ITES)
- 20.40 Ind-A.14:** Defect Inspection and Metrology for SiC bare and epitaxy wafers
MUKUNDKRISHNA RAGHUNATHAN (KLA Corporation), Varun Gupta (KLA Corporation), Tom Pierson (KLA Corporation)
- 20.50 Ind-A.15:** Carrier diffusion coefficient in a matter of minutes
Kipras Redeckas (Light Conversion), Vytautas Butkus (Light Conversion), Greta Bučytė (Light Conversion), JONAS BERZINS (Light Conversion), Karolis Neimontas (Light Conversion)

Monday, 12th September: Industrial Session B

18.30 Ind-B: Industrial session B, chaired by: Martin Domeij and Tobias Erlbacher

18.30 Ind-B.1: Total Silicon Carbide solution from wafer making to device making

FREDERIK PRIEWASSER (DISCO HI-TEC EUROPE GmbH)

18.40 Ind-B.2: High Resistive PBN Dielectrics for High Temperature Electrostatic Chuck

WEI FAN (Momentive Technologies), Yuji Morikawa (Momentive Technologies), Takeshi Higuchi (Momentive Technologies), Yoshihiko Matsui (Momentive Technologies), Tomoe Yamamoto (Momentive Technologies), David Sabens (Momentive Technologies), Jon Leist (Momentive Technologies), Bruno Balland (Momentive Technologies), Brian Kozak (Momentive Technologies)

18.50 Ind-B.3: Rapid Homogeneous Heating of SiC Based on Novel Solid State Microwave Power Generators

VASILEIOS RAMOPOULOS (TRUMPF Hüttinger)

19.00 Ind-B.4: Improvements in Pre-CMP Process Flows for the Manufacture of SiC Wafers

WILLIAM GEMMILL (Pureon, Inc), Terry Knight (Pureon Inc), Christian Jentgens (Pureon AG), Helge Willers (Pureon AG), Michael Max (Pureon AG), Caroline Watt (Pureon, Inc)

19.10 Ind-B.5: Enabling the transition to the next phase of high volume SiC MOSFET manufacturing through innovative ion implant solutions

ATUL GUPTA (Axcelis Technologies, Beverly, Massachusetts 01915-1053, USA), Michael Ameen (Axcelis Technologies, Beverly, Massachusetts 01915-1053, USA), Richard Rzeszut (Axcelis Technologies, Beverly, Massachusetts 01915-1053, USA), Christopher Lamontagne (Axcelis Technologies, Beverly, Massachusetts 01915-1053, USA), Genise Bonacorsi (Axcelis Technologies, Beverly, Massachusetts 01915-1053, USA), Giovanni Franco (Independent Consultant)

19.20 Ind-B.6: 150 mm N- and P-Type 4H SiC Substrates Advancement Using the M-SiC(TM) Technology Platform

DARREN HANSEN (Pallidus), Doug Dukes (Pallidus), Victor Torres (Pallidus), Mark Land (Pallidus), Michael Dudley (Stony Brook University), Balaji Raghochamachar (Stony Brook University), SHANSHAN HU (Stony Brook University), Yafei Liu (Stony Brook University) (Withdrawn)

19.30 Ind-B.7: Achieving polish-grade surfaces on laser split silicon carbide: Meister's novel combination of Ceramet and UF6 wheel technologies reduces total cost of ownership

MARKUS PAVLEKOVIC (Meister Abrasives AG), Carmine Sileno (Meister Abrasives AG)

19.40 Ind-B.8: Probus-SiC™ SiC Epitaxial Film Growth Equipment

HIDEYUKI TAKISAWA (TOKYO ELECTRON LIMITED), Tsutomu Yamaki (TOKYO ELECTRON LIMITED)

19.50 Ind-B.9: Energy Filter for Ion Implantation (EFII) Technology Innovating SiC Power Device Manufacturing

MICHAEL RÜB (mi2-factory GmbH), Florian Krippendorf (mi2-factory GmbH), Constantin Csato (mi2-factory GmbH), Hitesh Jayaprakash (Ernst Abbe Hochschule Jena)

Monday, 12th September: Industrial Session B

20.00 Ind-B.10: Graphite-based solutions for SiC PVT furnaces and SiC epitaxy reactors

SEBASTIAN FROMMELT (SGL Carbon), Timo Taetz (SGL Carbon), Thomas Fink (SGL Carbon), Charles Wijayawardhana (SGL Carbon)

20.10 Ind-B.11: Epiluvac Next Generation CVD tools for WBG Semiconductors

MICHAEL MACMILLAN (Epiluvac AB)

20.20 Ind-B.12: NuFlare Technology's EPIREVO™ S8 for 200 mm SiC Epitaxial Growth System

ITARU FUJIKI (NuFlare Technology, Inc.)

20.30 Ind-B.13: Plasma-Therm SiC and GaN Solutions

YANN VISINTAINER (Plasma-Therm), Sven Spiller (Plasma-Therm)

20.40 Ind-B.14: 200mm Silicon Carbide Epitaxy For Power Devices: Equipment And Process Perspective

SILVIO PRETI (LPE spa), Mustafa Abdelmoneim (LPE spa), Mani Azadmam (LPE spa), Andrea Brogi (LPE spa), Francesco Corea (LPE spa), Danilo Crippa (LPE, via Falzarego 8, Baranzate (MI), Italy), Marco Mauceri (LPE spa), Laura Gobbo (LPE spa), Mario Lizzio (LPE spa), Stefano Polli (LPE spa), Marco Puglisi (LPE spa), Luca Specker (LPE spa), Carmelo Vecchio (LPE spa)

20.50 Ind-B.15: New high productivity solution for 150 and 200mm SiC Epitaxy

FRANK WISCHMEYER (AIXTRON SE), Philip Hens (AIXTRON SE, Schottkystraße 10, 91058 Erlangen), Jürgen Erlekampf (AIXTRON SE, Schottkystraße 10, 91058 Erlangen), Pitsiri Booker (AIXTRON SE), Merim Mukinovic (AIXTRON SE), Ben Wright (AIXTRON SE), Barry O'Neil (AIXTRON SE), Dinesh Subramaniam (AIXTRON SE), Jared Holzwarth (AIXTRON SE)

Monday, Industrial Poster Session

18.30 Ind-Poster: Industrial poster session, chaired by: Munaf Rahimo

- Ind-Poster.1:** High-throughput, non-destructive full wafer BPD density quantification of 4H-SiC substrates
CHRISTIAN KRANERT (Fraunhofer IISB), Christian Reimann (Fraunhofer IISB), Jochen Friedrich (Fraunhofer IISB), Martin Fehrentz (Rigaku Europe SE), Shintaro Kobayashi (Rigaku Corporation), Yoshinori Ueji (Rigaku Corporation), Kenta Shimamoto (Rigaku Corporation), Kazuhiko Omote (Rigaku Corporation)
- Ind-Poster.2:** Application of X-Ray Topography for Dislocation Analysis of 4H-SiC in an Industrial Environment
CHRISTIAN KRANERT (Fraunhofer IISB), Christian Reimann (Fraunhofer IISB), Andrey Soukhovjak (SK siltron css), Vladimir Pushkarev (SK siltron css), Matthew Gave (SK siltron css)
- Ind-Poster.3:** 1700V 4H-SiC P-shielding Trench Gate MOSFET
Sinsu Kyoung (PowerCubeSemi,Inc.), Jung-Yun Seo (PowerCubeSemi,INC), Joon-Hyeok Jeon (PowerCubeSemi,Inc.), Tae-Jin Nam (PowerCubeSemi,Inc.), Chang-Heon Yang (YesPowerTechnix), Tai-Young Kang (PowerCubeSemi,Inc.), WHAHYUN KIM (PowerCubeSemi,Inc.), Yusup Jung (PowerCubeSemi,Inc.)
- Ind-Poster.4:** Optical Metrology Solutions for the Process Control of SiC Power Devices
YONG LI (Onto Innovation Inc), Fei Wang (Onto Innovation Inc), Yang Wang (Onto Innovation Inc), Rahul Korlahalli (Onto Innovation Inc), Zhuan Liu (Onto Innovation Inc)
- Ind-Poster.5:** Achieving polish-grade surfaces on laser split silicon carbide: Meister's novel combination of Ceramet and UF6 wheel technologies reduces total cost of ownership
MARKUS PAVLEKOVIC (Meister Abrasives AG), Carmine Sileno (Meister Abrasives AG)
- Ind-Poster.6:** Advancements in Wire Saw Slurry for the Multi-Wire Sawing of SiC Boules
CHRISTIAN JENTGENS (Pureon AG), Helge Willers (Pureon AG), Terry Knight (Pureon Inc), Keith Joye (Pureon Inc), Bryan Goddard (Pureon Inc), William Gemmill (Pureon, Inc), Ravi Bollina (Pureon AG)
- Ind-Poster.7:** Enhanced Performance of 1.2kV SiC Trench MOSFET based on NICE Oxidation
SONGLIN YANG (Dynex Semiconductor Ltd), Yangang Wang (Dynex Semiconductor Ltd)
- Ind-Poster.8:** Towards versatile slurries for industrial SiC CMP
FLORIAN TENDILLE (Saint-Gobain Surface Conditioning), Long Hui Bui (Saint-Gobain Surface Conditioning), Renjie Zhou (Saint-Gobain Surface Conditioning), Lin Fu (Saint-Gobain Surface Conditioning)
- Ind-Poster.9:** Intelligent wafering allows getting 7% more wafers from SiC ingots
IVAN ORLOV (Scientific Visual S.A.), Caroline Cheze (Scientific Visual S.A.), Frédéric Falise (Scientific Visual S.A.)
- Ind-Poster.10:** AIN Single Crystal Substrates for Commercial Applications
Robert Bondokov (Crystal IS), James Grandusky (Crystal IS), KASEY HOGAN (Crystal IS), Sean Branagan (Crystal IS), Naoki Ishigami (Asahi Kasei Corporation), Justin Mark (Crystal IS), Griffin Norbury (Crystal IS), Jianfeng Chen (Crystal IS)
- Ind-Poster.11:** Grinding approach to a clean CMP solution
SALMAN KASSIR (Engis Corporation), Giho Lee (Engis Corporation)

Tuesday, 13th September 2022

8.30 Tu-1-A: Devices, chaired by: T. Paul Chow and Giovanni Breglio

- 08.30 Tu-1-A.1:** GaN devices for the 600V range (Invited)
OLIVER HÄBERLEN (Infineon Technologies Austria AG)
- 09.00 Tu-1-A.2:** Power Cycling on Lateral GaN and β -Ga₂O₃ Transistors
SARAH RUGEN (University of Bremen), Alexander Brunko (University of Bremen), Felix Hoffmann (University of Bremen), Nando Kaminski (University of Bremen)
- 09.20 Tu-1-A.3:** Body Diode of 1.2kV SiC MOSFET: Unipolar and Bipolar Operation
THANH-TOAN PHAM (onsemi), Jimmy Franchi (onsemi), Martin Domeij (onsemi)
- 09.40 Tu-1-A.4:** Hypothesis to explain bipolar dynamic gate stress
DICK SCHOLTEN (Robert Bosch GmbH), Jens Baringhaus (Robert Bosch GmbH), Stefan Noll (Robert Bosch GmbH), Daniel Krebs (Robert Bosch GmbH)

8.30 Tu-1-B: Packaging and reliability, chaired by: Nando Kaminski and Brett Hull

- 08.30 Tu-1-B.1:** Chip-top packaging technologies for SiC devices operational at 250°C with power-cycling durability of over 300,000 cycles (Invited)
SO TANAKA (AIST), Jiro Shinkai*, Masato Ikegawa*, Fumiki Kato*, Hiroshi Sato (* AIST), Hiromi Kurashima (Sumitomo Electric Industries, Ltd.), Yasuki Mikamura (Sumitomo Electric Industries, Ltd.)
- 09.00 Tu-1-B.2:** Noise Margins and BTI Characteristics of 4H-SiC CMOS Circuits in High-Temperature Environment
Takuma Shima*, Toya Kai*, Kazutoshi Kojima (AIST), Takeshi Ohshima (QST), Yasunori Tanaka (AIST), SHIN-ICHIRO KUROKI (* Research Institute for Nanodevices, Hiroshima University)
- 09.20 Tu-1-B.3:** Proven power cycling reliability of ohmic annealing free SiC power device thanks to SmartSiC™ substrate
ERIC GUIOT (Soitec), Frédéric Allibert (Soitec), Jürgen Leib (Fraunhofer IISB), Tom Becker (Fraunhofer Institute for Integrated Systems and Device Technology IISB), Walter Schwarzenbach (Soitec), Tobias Erlbacher (Fraunhofer IISB), Severin Rouchier (Soitec)
- 09.40 Tu-1-B.4:** Reduction of Forward Bias Degradation in 4H-SiC PiN Diodes Fabricated on 4H-SiC Bonded Substrates
NAOKI HATTA (Advanced Power Electronics Research Center, AIST), Seiji Ishikawa*, Kunihide Ozono*, Keiko Masumoto*, Kuniaki Yagi (SICOXS Corporation), Motoki Kobayashi (SICOXS Corporation), Shunsuke Kurihara (Phenitec Semiconductor Co., Ltd.), Shinsuke Harada*, Kazutoshi Kojima (* Advanced Power Electronics Research Center, AIST)

Tuesday, 13th September 2022

10.30 Tu-2-A: New MOS processes, chaired by: Daniel Lichtenwalner and Gerald Rescher

10.30 Tu-2-A.1: Recent progress and challenges in SiC and GaN MOS devices: understanding of physics and chemistry near the MOS interface (Invited)

HEIJI WATANABE* Takuma Kobayashi*, Takuji Hosoi (School of Engineering, Kansai Gakuin University), Takayoshi Shimura (* Graduate School of Engineering, Osaka University)

11.00 Tu-2-A.2: Impact of oxidation process on electron scattering and roughness at 4H-SiC non-polar MOS interfaces

MITSURU SOMETANI (AIST), Hirohisa Hirai*, Mitsuo Okamoto (AIST), Tetsuo Hatakeyama (Toyama Prefectural University), Shinsuke Harada (* Advanced Power Electronics Research Center, AIST)

11.20 Tu-2-A.3: CO₂ post-nitridation annealing for improving immunity to charge trapping in SiC MOS devices

TAKUJI HOSOI (School of Engineering, Kansai Gakuin University), Momoe Ohsako (Osaka University), Kidist Moges*, Koji Ito (Kyoto University), Tsunenobu Kimoto (Kyoto University), Mitsuru Sometani (AIST), Mitsuo Okamoto (AIST), Akitaka Yoshigoe (JAEA), Takayoshi Shimura*, Heiji Watanabe (* Graduate School of Engineering, Osaka University)

11.40 Tu-2-A.4: Nitridation-induced degradation of SiC (1-100) MOS devices

TAKUMA KOBAYASHI*, Takato Nakanuma (Osaka University), Asato Suzuki (Osaka University), Mitsuru Sometani (AIST), Mitsuo Okamoto (AIST), Akitaka Yoshigoe (Japan Atomic Energy Agency (JAEA)), Takayoshi Shimura*, Heiji Watanabe (* Graduate School of Engineering, Osaka University)

10.30 Tu-2-B: Epitaxial growth, chaired by: Jawad UI Hassan and Bernd Thomas

10.30 Tu-2-B.1: Carrier lifetime control for designing buffer and drift layers in 4H-SiC devices (Invited)

KOICHI MURATA (Central Research Institute of Electric Power Industry (CRIEPI)), Tetsuya Miyazawa (CRIEPI), Hidekazu Tsuchida (CRIEPI)

11.00 Tu-2-B.2: Homoepitaxial growth of (111) oriented 3C-SiC

CRISTIANO CALABRETTA (CNR-IMM), Viviana Scuderi (CNR-IMM), Corrado Bongiorno (CNR-IMM), Ruggero Anzalone (STMicroelectronics), Annalisa Cannizaro (CNR-IMM), Marco Mauceri (LPE), Danilo Crippa (LPE), Simona Boninelli (CNR-IMM), Francesco La Via (CNR-IMM)

11.20 Tu-2-B.3: SiC Remote Epitaxy

RACHAEL MYERS-WARD (US Naval Research Laboratory), Daniel Pennachio (US Naval Research Laboratory), Jenifer Hajzus (US Naval Research Laboratory), Andrew Lang (US Naval Research Laboratory), Rhonda Stroud (US Naval Research Laboratory)

11.40 Tu-2-B.4: Benchmarking experiment of substrate quality including SmartSiCTM wafers by epitaxy in a batch reactor

Birgit Kallinger (Fraunhofer IISB), PHILIP HENS (AIXTRON SE), Patrick Berwian (Fraunhofer IISB), Christian Kranert (Fraunhofer IISB), Kevin M. Albrecht (AIXTRON SE), Jürgen Erlekamp (AIXTRON SE)

Tuesday, 13th September 2022

13.30 Tu-3-A: MOSFET physics, chaired by: Thomas Aichinger and Sarit Dhar

13.30 Tu-3-A.1: Physical Modelling of Charge Trapping Effects in SiC MOSFETs (Invited)

MICHAEL WALTL (CDL for Single-Defect Spectroscopy at the Institute for Microelectronics, TU Wien), Christian Schleich*, Aleksandr Vasilev*, Dominic Waldhör (Institute for Microelectronics, TU Wien), Bernhard Stampfer (* CDL for Single-Defect Spectroscopy at the Institute for Microelectronics, TU Wien), Tibor Grasser (Institute for Microelectronics, TU Wien)

14.00 Tu-3-A.2: A novel non-invasive cryostatic spectroscopy technique to characterize the carriers' multiplication factor in silicon carbide power devices

MARCO POCATERRA (ETH Zurich, Integrated Systems Laboratory), Mauro Ciappa (ETH Zurich, Integrated Systems Laboratory)

14.20 Tu-3-A.3: Complications of charge pumping for SiC MOSFETs

JAN LETTENS (onsemi), Fredrik Allerstam (onsemi), Jimmy Franchi (onsemi), Sofie Cambré (Universiteit Antwerpen), Etienne Goovaerts (Universiteit Antwerpen), Henk Vrielinck (onsemi), Peter Moens (onsemi)

14.40 Tu-3-A.4: Heavy-ion-induced defects in degraded SiC power MOSFETs

CORINNA MARTINELLA (Advanced Power Semiconductor Laboratory, ETH Zurich), Marianne Bathen (Advanced Power Semiconductor Laboratory, ETH Zurich), Arto Javanainen (Department of Physics, University of Jyväskylä), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich)

13.30 Tu-3-B: Bulk and epi growth, chaired by: Jianwu Sun and Edward Sanchez

13.30 Tu-3-B.1: Quality Evaluation of 150-mm 4H-SiC Grown at over 1.5 mm/h by High-temperature Chemical Vapor Deposition Method (Invited)

TAKESHI OKAMOTO (MIRISE Technologies Corporation), Hideyuki Uehigashi*, Takahiro Kanda*, Nobuyuki Ohya*, Akiyoshi HORIAI*, Soma Sakakibara*, Takashi Kanemura (all of the above*: MIRISE Technologies Corporation), Kiyoshi Betsuyaku#, Norihiro Hoshino#, Isaho Kamata#, Hidekazu Tsuchida (# CRIEPI)

14.00 Tu-3-B.2: High minority carrier lifetime in low doped 4H-SiC epilayers: Boron as lifetime limiting defect

MISAGH GHEZELLOU (Department of Physics, Chemistry, and Biology (IFM), Linköping University), Marianne Bathen*, Piyush Kumar*, Robert Karsthof (Department of Physics, University of Oslo), Einar Ö. Sveinbjörnsson#, Ulrike Grossner (* Advanced Power Semiconductor Laboratory, ETH Zurich), Peder J. Bergman#, Lasse Vines (Department of Physics), Jawad UI Hassan (# Department of Physics, Chemistry, and Biology (IFM), Linköping University)

14.20 Tu-3-B.3: Impact of conductivity type of vanadium doped 4H-SiC epilayer on semi-insulating characteristics
KAZUTOSHI KOJIMA (AIST), Shinichiro Sato (National Institutes for Quantum Science and Technology), Takeshi Ohshima (QST), Shin-Ichiro Kuroki (Research Institute for Nanodevices, Hiroshima University)

14.40 Tu-3-B.4: Selective area epitaxy of monocrystalline cubic silicon carbide

MAKSYM MYRONOV (The University of Warwick), Gerard Colston (Advanced Epi Materials and Devices)

Tuesday, 13th September 2022

15.30 Tu-4-A: Point defects, chaired by: Jose Coutinho and Yasuto Hijikata

15.30 Tu-4-A.1: Interaction of in-diffused nitrogen with C and Si lattice sites and vacancies after thermal oxidation and NO annealing

MARIANNE BATHEN (Advanced Power Semiconductor Laboratory, ETH Zurich), Piyush Kumar (Advanced Power Semiconductor Laboratory, ETH Zurich, Maria Mendes Martins (Paul Scherrer Institute (PSI)), Judith Wörle (Advanced Power Semiconductor Laboratory, ETH Zurich), Thomas Prokscha (Paul Scherrer Institute (PSI)), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich)

15.50 Tu-4-A.2: Deep Level Reduction in 4H-SiC Treated by Plasma Immersion

GIOVANNI ALFIERI (Hitachi Energy), Lars Knoll (Hitachi Energy)

16.10 Tu-4-A.3: Defect distribution mapping in silicon carbide using the edge transient-current technique

CHRISTIAN DORFER (Advanced Power Semiconductor Laboratory, ETH Zurich), Marianne Bathen (Advanced Power Semiconductor Laboratory, ETH Zurich), Piyush Kumar (Advanced Power Semiconductor Laboratory, ETH Zurich), Judith Wörle (Advanced Power Semiconductor Laboratory, ETH Zurich), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich)

15.30 Tu-4-B: Schottky contacts, chaired by: Won Jae Lee and Tobias Erlbacher

15.30 Tu-4-B.1: Enhanced tunneling current at Schottky contacts formed on heavily P+-implanted SiC

MASAHIRO HARA (Kyoto University), Mitsuaki Kaneko (Kyoto University), Tsunenobu Kimoto (Kyoto University)

15.50 Tu-4-B.2: Influence of thickness, deposition method and annealing temperature on W-based Schottky barrier on 4H-SiC

GABRIELE BELLOCCHI (STMicroelectronics), Marilena Vivona (CNR-IMM), Paolo Badalà (STMicroelectronics), Anna Bassi (STMicroelectronics), Simone Rascunà (STMicroelectronics), Fabrizio Roccaforte (CNR-IMM)

Tuesday, 13th September 2022

16.30 Tu-P-A: Poster session A

Invited-Poster.1: Enhancement of dislocation contrasts in PL imaging from 4H-SiC bulk wafers by removing subsurface damage using sublimation etching

DAICHI DOJIMA (Kwansei Gakuin University), Mizuho Maki (Kwansei Gakuin University), Daichi Dansako (Kwansei Gakuin University), Kohei Toda (Kwansei Gakuin University), Tadaaki Kaneko (Kwansei Gakuin University)

Tu-P-A.1: Impact of Dimensions and Doping on the Breakdown Voltage of a 4H-SiC Vertical JFET

FINN MONAGHAN (Swansea University), Antonio Martinez Muniz (Swansea University), Mike Jennings (Swansea University)

Tu-P-A.2: Al implantation in SiC; where will the ions come to rest

Margareta Linnarsson (KTH-Royal Institute of Technology), Lasse Vines (University of Oslo), ANDERS HALLÉN (KTH-Royal Institute of Technology)

Tu-P-A.3: AC-Stress Degradation in SiC MOSFETs

AIVARS J. LELIS (DEVCOM Army Research Laboratory), Daniel Habersat (DEVCOM Army Research Laboratory)

Tu-P-A.4: 3-D Device Electro-Thermal Simulation Methodology for Optimization of SiC Power MOSFET under UIS Test Condition

Ales Chvala (Slovak University of Technology in Bratislava), JURAJ MAREK (Slovak University of Technology in Bratislava), Jozef Kozarik (Slovak University of Technology in Bratislava), Angelo Alberto Messina (STMicroelectronics), Vincenzo Vinciguerra (STMicroelectronics), Daniel Donoval (S)

Tu-P-A.5: A Scalable SPICE Electrothermal Compact Model for SiC MOSFETs Suitable for Out-of-SOA Operating Conditions

ALESSANDRO BORGHESE (University of Naples Federico II), Michele Riccio (University of Naples Federico II), Luca Maresca (University of Naples "Federico II"), Giovanni Breglio (University of Naples "Federico II"), Andrea Irace (University of Naples "Federico II")

Tu-P-A.6: Optimization of SiC epitaxial growth in vertical high-speed rotating disk CVD reactor by modeling

ALEX GALYUKOV (STR US, Inc.), Daria Zimina (STR US, Inc.)

Tu-P-A.7: Effect of the gas pressure in PVT growth of SiC crystals

ALEX GALYUKOV (STR US, Inc.), Daria Zimina (STR US, Inc.)

Tu-P-A.8: Passivation of very fast near-interface traps at the 4H-SiC/SiO₂ interface using sodium enhanced oxidation
ARNAR MAR VIDARSSON (University of Iceland), Daniel Haasmann (Queensland Micro- and Nanotechnology Centre, Griffith University), Sima Dimitrijevic (Queensland Micro- and Nanotechnology Centre, Griffith University), Einar Sveinbjörnsson (University of Iceland)

Tuesday, 13th September 2022

16.30 Tu-P-A: Poster session A (continued)

Tu-P-A.9: Optimized 750V SiC MOSFETs for Electric Vehicle Inverter Operation

ARASH SALEMI (Alpha and Omega Semiconductor), Bob Zhu (Alpha and Omega Semiconductor), Phong Quang (Alpha and Omega Semiconductor), Yu Ding (Alpha and Omega Semiconductor), Kiran Chatty (Alpha and Omega Semiconductor), David Sheridan (Alpha and Omega Semiconductor)

Tu-P-A.10: Impact of Negative Turn-Off Gate Voltage and Temperature on Threshold Voltage Instability in Pulsed Gate Voltage Stresses

ARKADEEP DEB (The University of Warwick), Jose Ortiz Gonzalez (The University of Warwick), Mohamed Abdelkader (The University of Warwick), Saeed Jahdi (The University of Bristol), Phil Mawby (The University of Warwick), Layi Alatisse (The University of Warwick)

Tu-P-A.11: High Mobility Silicon Dioxide Layers on 4H-SiC Deposited by means of Atomic Layer Deposition

ARNE BENJAMIN RENZ (University of Warwick), Oliver James Vavasour (University of Warwick), Peter Gammon (The University of Warwick), Tianxiang Dai (University of Warwick), Guy William Clarke Baker (University of Warwick), Phil Mawby (The University of Warwick), Vishal Shah (University of Warwick)

Tu-P-A.12: 3C-SiC Island Growth on 4H-SiC Terraces: Statistical Evidence for Orientation Selection Rule

BART VAN ZEGHBROECK (University of Colorado, Boulder), David Bobela (TrueNano Inc)

Tu-P-A.13: Impact of C injection on defect distribution and interaction with shallow dopants in silicon carbide

MARIANNE BATHEN (Advanced Power Semiconductor Laboratory, ETH Zurich), Robert Karsthof (Department of Physics, University of Oslo), Piyush Kumar (Advanced Power Semiconductor Laboratory, ETH Zurich), Augustinas Galeckas (Department of Physics, University of Oslo), Andrej Kuznetsov (Department of Physics, University of Oslo), Lasse Vines (Department of Physics, University of Oslo), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich)

Tu-P-A.14: Analysis of the Adhesion Behavior at Silicon and Silicon Carbide Surfaces by Zeta-Potential and AFM-based Measurements

SABRINA FRAGER (Infineon Technologies Austria AG and Advanced Power Semiconductor Laboratory, ETH Zurich), R. Fischer (TU Graz), Stefanie Gebhard (Infineon Technologies AG), Stefan Döring (Infineon Technologies AG), Petra Fischer (Infineon Technologies Austria AG), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich)

Tu-P-A.15: DLTS and MCTS analysis of defects induced by neutron reactions with 4H-SiC

MANUEL BELANCHE GUADAS (Advanced Power Semiconductor Laboratory, ETH Zurich), Corinna Martinella (Advanced Power Semiconductor Laboratory, ETH Zurich), Piyush Kumar (Advanced Power Semiconductor Laboratory, ETH Zurich), Christian Dorfer (Advanced Power Semiconductor Laboratory, ETH Zurich), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich)

Tuesday, 13th September 2022

16.30 Tu-P-A: Poster session A (continued)

Tu-P-A.16: Improvement of Interface Properties for Thermal Oxidized SiO₂/SiC MOS capacitor by Post Oxidation Annealing Treatment

Umesh Chand (IME), LAKSHMI KANTA BERA (IME), Navab Singh (IME), Michael Han (IME), V.Q.G Roth (IME), C. H. M Chua (IME), Surasit Chung (IME)

Tu-P-A.17: Robustness of SiC MOSFETs under repetitive high current pulses

BETTINA FINDENIG (KAI GmbH), Markus Sievers (KAI GmbH), Thomas Aichinger (Infineon Technologies Austria AG), Ingo Voss (Infineon Technologies AG)

Tu-P-A.18: Influence of Post-Ion-Implantation Annealing Temperature on The Characteristics of Gate Oxide on 4H Silicon Carbide

LI-JUNG LIN (Master and Ph.D. Program for Science and Technology of Accelerator Light Source, National Yang Ming Chiao Tung University), Bing-Yue Tsui (Institute of Electronics, National Yang Ming Chiao Tung University, Hsinchu, Taiwan)

Tu-P-A.19: Effect of p-type Contact Resistance of SiC MOSFET on Switching Characteristics

YUI NAGASE (Kanazawa Institute of Technology), Shuhei Nakata (Kanazawa Institute of Technology), Takaaki Tominaga (Mitsubishi Electric Co.)

Tu-P-A.20: M-center in low-energy electron irradiated n-type 4H-SiC

IVANA CAPAN (Ruđer Bošković Institute), Tihomir Knežević (Ruđer Bošković Institute), Takeshi Ohshima (QST), Takahiro Makino (QST)

Tu-P-A.21: Performance and Reliability Evaluation of Tri-gate NMOSFET in 4H-SiC

JIA-WEI HU (National Tsing Hua University), Tsung-Yuan Lu (National Tsing Hua University), Yu-Chen Huang (National Tsing Hua University), Fu-Jen Hsu (Fast SiC Semiconductor Inc., National Tsing Hua University), Chih-Fang Huang (National Tsing Hua University), Tian-Li Wu (National Yang Ming Chao Tung University), Feng Zhao (Washington State University)

Tu-P-A.22: Gate Dielectric Current Transport Mechanisms in n-SiC Metal Oxide Semiconductor Capacitor

UMESH CHAND (IME), Lakshmi Kanta Bera (IME), Michael Han (IME), Navab Singh (IME), V.Q.G Roth (IME), C. H. M Chua (IME), Surasit Chung (IME)

Tu-P-A.23: High temperature and corrosion resistant protective coatings for use in SiC PVT crystal growth and epitaxy

CHRISTIAN REIMANN (Fraunhofer IISB), Kevin Schuck (Fraunhofer IISB), Lukas Friedel (Fraunhofer IISB), Michael Lang (Fraunhofer IISB), Jochen Friedrich (Fraunhofer IISB), Torsten Kornmeyer (Nippon Kornmeyer Carbon Group GmbH), Dirk Muetzenich (Nippon Kornmeyer Carbon Group GmbH)

Tu-P-A.24: Temperature dependent electrical properties of n-type 4H-SiC substrates

DANIEL LICHTENWALNER (Wolfspeed), Jae-Hyung Park (Wolfspeed), Steven Rogers (Wolfspeed), Hemant Dixit (Wolfspeed), Andreas Scholze (Wolfspeed), Simon Bubel (Wolfspeed), Sei-Hyung Ryu (Wolfspeed)

Tuesday, 13th September 2022

16.30 Tu-P-B: Poster session B

Invited-Poster.2: Structural and electrical properties AlGaIn/GaN heterostructures grown onto misoriented 4H-SiC epilayers

FABRIZIO ROCCAFORTE (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Giuseppe Greco (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Corrado Bongiorno (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Emanuela Schilirò (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Patrick Fiorenza (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Filippo Giannazzo (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Marco Mauceri (LPE SpA, Strada XVI – Zona Industriale, I-95121, Catania, Italy), Danilo Crippa (LPE, via Falzarego 8, Baranzate (MI), Italy), Andrea Severino (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Ferdinando Iucolano (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Pawel Prystawko (IHPP - PAS, Sokolowska 29/37, Warsaw 01-152, Poland), Mike Leszczynski (IHPP - PAS, Sokolowska 29/37, Warsaw 01-152, Poland)

Tu-P-B.1: Optimization of TaSi₂ Processing For 500 °C Durable SiC JFET-R Integrated Circuits

DAVID SPRY (NASA Glenn), Philip Neudeck (NASA Glenn), Carl Chang (HX5, LLC), Srihari Rajgopal (NASA Glenn), Jose Gonzalez (HX5, LLC)

Tu-P-B.2: Enhanced Device Performance with Vertical SiC Gate-All-Around Nanowire Power MOSFETs

DONG YANG (PGI-9, Forschungszentrum Jülich GmbH), Stephan Wirths (Hitachi Energy Research), Lars Knoll (Hitachi Energy Research), Yi Han (PGI-9, Forschungszentrum Jülich GmbH), Dan Mihai Buca (PGI-9, Forschungszentrum Jülich GmbH), Qing-Tai Zhao (PGI-9, Forschungszentrum Jülich GmbH)

Tu-P-B.3: Influence of stacking faults originating from star-defects in 4H-SiC epitaxial layers

Sami El Hageali (National Renewable Energy Laboratory), NADEEM MAHADIK (Naval Research Laboratory), Robert Stahlbush (Naval Research Laboratory), Harvey Guthrey (National Renewable Energy Laboratory), Steve Johnston (National Renewable Energy Laboratory), Jake Soto (Microchip), Bruce Odekirk (Microchip), Brian Gorman (Colorado School of Mines), Mowafak Al-Jassim (National Renewable Energy Laboratory)

Tu-P-B.4: Enhancement of light extraction in 4H silicon carbide by nanostructuring the surface with high temperature annealing

ENORA VUILLERMET (University of Technology of Troyes, L2n, CNRS-EMR 7004.), Elise Usureau (University of Technology of Troyes, L2n, CNRS-EMR 7004.), Mihai Lazar (University of Technology of Troyes, L2n, CNRS-EMR 7004.), Regis Deturche (University of Technology of Troyes, L2n, CNRS-EMR 7004.)

Tu-P-B.5: High sensitivity surface defect inspection of SiC and SmartSiC substrates using a DUV laser-based system
ENRICA CELA (Soitec), Sam Shahidi (KLA+), Prasant Parangi (KLA+), Ramesh Shrestha (KLA+), Gavin Simpson (KLA+), Julie Widiez (CEA-Leti), Nicolas Daval (Soitec), Audrey Chapelle (Soitec), Severin Rouchier (Soitec), Walter Schwarzenbach (Soitec)

Tuesday, 13th September 2022

16.30 Tu-P-A: Poster session B (continued)

Tu-P-B.6: 10kV+ rated SiC n-IGBTs: novel collector side design approach breaking the trade-off between dV/dt and device efficiency

IOANNIS ALMPANIS (University of Nottingham), Paul Evans (University of Nottingham), Marina Antoniou (The University of Warwick), Peter Gammon (The University of Warwick), Lee Empringham (University of Nottingham), Florin Udrea (University of Cambridge), Phil Mawby (The University of Warwick), Neophytos Lophitis (University of Nottingham)

Tu-P-B.7: Surface-localized 15R formation on 4H-SiC (0001) Si-face by laser annealing for power n-type MOSFETs
FABIEN ROZÉ (Laser Systems and Solutions of Europe (LASSE)), Toshiyuki Tabata (Laser Systems and Solutions of Europe (LASSE)), Sébastien Kerdilès (Université Grenoble Alpes, CEA-Leti), Leonard Rubin (Axcelis Technologies), Pierre-Edouard RAYNAL (Laser Systems and Solutions of Europe (LASSE)), Pablo Acosta Alba (Université Grenoble Alpes, CEA-Leti), Dwight Roh (Axcelis Technologies, Mathieu Opprecht (Université Grenoble Alpes, CEA-Leti), Fulvio Mazzamuto (Laser Systems and Solutions of Europe (LASSE))

Tu-P-B.8: High Density High Efficiency 65W AC-DC Adaptor Enabled by SiC MOSFET with Ultralow $V_{GS(on)}$

FU-JEN HSU (Fast SiC Semiconductor Incorporated, National Tsing Hua University), Cheng-Tyng Yen (Fast SiC Semiconductor Incorporated), Hsiang-Ting Hung (Fast SiC Semiconductor Incorporated), Jia-Wei Hu (National Tsing Hua University), Chih-Fang Huang (National Tsing Hua University)

Tu-P-B.9: Transport phenomena during liquid Si-induced 4H-SiC surface structuring in a sandwich configuration
GABRIEL FERRO (Laboratoire des Multimateriaux et Interfaces, Université de Lyon), Yann Jousseau (Laboratoire des Multimateriaux et Interfaces, Université de Lyon), François Cauwet (Laboratoire des Multimateriaux et Interfaces, Université de Lyon)

Tu-P-B.10: Wide Range Temperature Sensor with SiC Schottky Diode – Error Source Analysis

Vlad Moise (University “POLITEHNICA” Bucharest), Florin Draghici (University “POLITEHNICA” Bucharest), GHEORGHE PRISTAVU (University “POLITEHNICA” Bucharest), Razvan Pascu (National Institute for Research and Development in Microtechnologies - IMT Bucharest), Florin Mitu (University “POLITEHNICA” Bucharest), Gheorghe Brezeanu (University “POLITEHNICA” Bucharest)

Tu-P-B.11: Measurement and analysis of body diode stress of 3.3 kV SiC-MOSFETs with intrinsic body diode and embedded SBD

GEON-HEE LEE (Kwangwoon University), Jang-Kwon Lim (RISE Research Institutes of Sweden AB), Sang-Mo Koo (Kwangwoon University), Mietek Bakowski (RISE Research Institutes of Sweden AB)

Tu-P-B.12: PL signatures from decoration of dislocations in SiC bare and epitaxial wafers

GIL CHUNG (SK siltron css), CHUNGHYUN LEE (SK siltron css), Tawhid Rana (SK siltron css), Andrey Soukhovjak (SK siltron css)

Tuesday, 13th September 2022

16.30 Tu-P-B: Poster session B (continued)

Tu-P-B.13: Evaluation of crystal quality and dopant activation of Smart Cut™- transferred 4H-SiC thin film using Raman spectroscopy

GUILLAUME GELINEAU (CEA-Leti), Julie Widiez (CEA-Leti), Emmanuel Rolland (CEA-Leti), Kremena Vladimirova (CEA-Leti), Alexandre Moulin (CEA-Leti), Vladimir Prudkovskiy (CEA-Leti), Nicolas Troutot (CEA-Leti), Patrice Gergaud (CEA-Leti), Denis Mariolle (CEA-Leti), Sophie Barbet (CEA-Leti), Vincent Amalbert (CEA-Leti), Gérard Lapertot (Univ. Grenoble Alpes, CEA, Grenoble INP, IRIG, PHELIQS), Karine Mony (Univ. Grenoble Alpes, CEA, Grenoble INP, IRIG, PHELIQS), Severin Rouchier (Soitec SA), Romain Boulet (Soitec), Guillaume Berre (Soitec), Walter Schwarzenbach (Soitec SA), Yann Bogumilowicz (CEA-Leti)

Tu-P-B.14: Suppression of in-grown SF formation and BPD propagation in 4H-SiC epitaxial layer by sublimating sub-surface damage before the growth

KOHEI TODA (Kwansei Gakuin University), Daichi Dojima (Kwansei Gakuin University), Kiyoshi Kojima (Toyota Tsusho Corporation), Hiroshi Mihara (Kwansei Gakuin University), Shinichi Mitani (Kwansei Gakuin University), Tadaaki Kaneko (Kwansei Gakuin University)

Tu-P-B.15: Study of GHz-burst femtosecond laser micropunching of 4H-SiC wafers

HANAN MIR (Fraunhofer Institute for Solar Energy Systems), Fabian Meyer (Fraunhofer Institute for Solar Energy Systems), Andreas Arnold Brand (Fraunhofer Institute for Solar Energy Systems), Katrin Erath (Fraunhofer Institute for Solar Energy Systems), Jan-Frederik Nekarda (Fraunhofer Institute for Solar Energy Systems)

Tu-P-B.16: OPuS-MAGNM - Miniaturized Optically Pumped Solid State Quantum Magnetometers for Space Applications
HANNES KRAUS (NASA Jet Propulsion Laboratory), Andreas Gottscholl (NASA Jet Propulsion Laboratory), Corey Cochran (NASA Jet Propulsion Laboratory)

Tu-P-B.17: Mechanism of defect contrast formation in off-axis SiC wafers by polarized light microscopy

SHUNTA HARADA (Nagoya University), Kenta Murayama (Mipox Corporation)

Tu-P-B.18: Surge current test to determine current limit of SiC-IGBT module toward assembling pulse power source
Hiroyuki Matsushima (Hitachi, Ltd.), Hiroyuki Okino (Hitachi, Ltd.), Naoki Watanabe (Hitachi, Ltd.), Akio Shima (Hitachi, Ltd.)

Tu-P-B.19: Study on Estimation of Device Yield in Non-Epitaxial 4H-SiC Material Relating to Defect Densities Influencing Bipolar Degradation with XRT- Measurements

HITESH JAYAPRAKASH (Ernst Abbe Hochschule Jena), Constantin Csato (mi2-factory GmbH), Tobias Erlbacher (Fraunhofer IISB), Christian Kranert (Fraunhofer IISB), Florian Krippendorf (mi2-factory GmbH), Paul Wimmer (Fraunhofer IISB), Christian Reimann (Fraunhofer IISB), Michael Rüb (mi2-factory GmbH)

Tuesday, 13th September 2022

16.30 Tu-P-B: Poster session B (continued)

Tu-P-B.20: Gate Oxide Reliability and the Relation of Extrinsic Defects to Epitaxial Defects on 4H-SiC

HOLGER SCHLICHTING (Fraunhofer Institute for Integrated Systems and Device Technology IISB), Minwho Lim (Fraunhofer Institute for Integrated Systems and Device Technology IISB), Tom Becker (Fraunhofer Institute for Integrated Systems and Device Technology IISB), Tobias Erlbacher (Fraunhofer IISB)

Tu-P-B.21: Investigation of defect generation and propagation in electrically and photonically stressed Silicon Carbide

HONGYU PENG (Stony Brook University), Zeyu Chen (Stony Brook University), Yafei Liu (Stony Brook University), Qianyu Cheng (Stony Brook University), Shanshan Hu (Stony Brook University), James Watson (Opcondys), Kristin Sampayan (Opcondys), Stephen Sampayan (Opcondys), Balaji Raghothamachar (Stony Brook University), Michael Dudley (Stony Brook University)

Tu-P-B.22: An Estimation of Load-dependent Characteristics of SiC Power MOSFETs while Active-gate-driving

HAJIME TAKAYAMA (Kyoto University), Shuhei Fukunaga (Graduate School of Engineering, Osaka University), Takashi Hikiyama (Kyoto University)

Wednesday, 14th September 2022

8.30 We-1-A: MOS characterization methods, chaired by: Einar Sveinbjörnsson and Peter Losee

08.30 We-1-A.1: Outlook for dielectric/SiC interfaces for future generation MOSFETs (Invited)

DANIEL LICHTENWALNER (Wolfspeed), Sei-Hyung Ryu (Wolfspeed), Brett Hull (Wolfspeed), Scott Allen (Wolfspeed), John Palmour (Wolfspeed)

09.00 We-1-A.2: Electroluminescence Spectra of a Gate Switched MOSFET at Cryogenic and Room Temperatures agree with Ab Initio Calculations of 4H-SiC/SiO₂ Interface Defects

MAGDALENA WEGER (KAI GmbH), Dominik Biermeier (KAI GmbH), Maximilian Wolfgang Feil (Infineon Technologies AG), Jonathon Cottom (UCL London), Michel Bockstedte (JKU Linz), Gregor Pobegen (KAI GmbH)

09.20 We-1-A.3: Investigation of thermal oxidation of 4H-SiC using positron annihilation spectroscopy

PIYUSH KUMAR (Advanced Power Semiconductor Laboratory, ETH Zurich), Carlos Vigo (ETH Zurich), Maria Mendes Martins (Paul Scherrer Institute (PSI) and Advanced Power Semiconductor Laboratory, ETH Zurich), Marianne Bathen (Advanced Power Semiconductor Laboratory, ETH Zurich), Judith Wörle (Advanced Power Semiconductor Laboratory, ETH Zurich), Thomas Prokscha (Paul Scherrer Institute (PSI)), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich)

8.30 We-1-B: Growth, chaired by: Hidekazu Tsuchida and Didier Chausse

08.30 We-1-B.1: Status of SiC for power MOSFETs (Invited)

ELIF BALKAS (Wolfspeed), Yuri Khlebnikov (Wolfspeed, Inc.), Robert Leonard (Wolfspeed, Inc.), Matthew Conrad (Wolfspeed), Thomas Kuhr (Wolfspeed, Inc.), Adrian Powell (Wolfspeed, Inc.), Jong Hyup Lee (Wolfspeed, Inc.), Simon Bubel (Wolfspeed)

09.00 We-1-B.2: Reversible vs. irreversible processes during liquid Si / 4H-SiC interface reconstruction at high temperature

DIDIER CHAUSSENDE (Univ. Grenoble Alpes, CNRS, Grenoble INP, SIMaP), Xinming Xing (Univ. Grenoble Alpes, CNRS, Grenoble INP, SIMaP), Takeshi Yoshikawa (Institute of Industrial Science, The University of Tokyo)

09.20 We-1-B.3: Step structure manipulation and impact on dislocation interactions and crystal quality during the early stages of PVT growth of 4H-SiC crystals

SHANSHAN HU (Stony Brook University), Yafei Liu (Stony Brook University), Hongyu Peng*, Qianyu Cheng*, Zeyu Chen*, Balaji Raghothamachar*, Michael Dudley (* Stony Brook University), Darren Hansen (Pallidus), Douglas Dukes (Pallidus), Liam Young (Pallidus), Sam Griswold (Pallidus), Hunter Briccetti (Pallidus)

09.40 We-1-B.4: Prevention of Bunched Basal Plane Dislocation Arrays in 4H-SiC PVT-Growth

JOHANNES STEINER (Crystal Growth Lab, Materials Department 6, FAU), Peter Wellmann (Crystal Growth Lab, Materials Department 6, FAU), Binh Duong Nguyen (Research Center Jülich Institute for Advanced Simulation), Stefan Sandfeld (Research Center Jülich Institute for Advanced Simulation)

Wednesday, 14th September 2022

10.30 We-2-A: Color centers, chaired by: Takeshi Ohshima and Corey Cochrane

10.30 We-2-A.1: Charge state control over point defects in SiC devices (Invited)

MARIANNE BATHEN (Advanced Power Semiconductor Laboratory, ETH Zurich), Marius Enga*, Gard Selnesaunet*, Snorre Kjeldby*, Augustinas Galeckas*, Lasse Vines (* Department of Physics, University of Oslo), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich)

11.00 We-2-A.2: Vanadium in 3C-SiC: An efficient emitter in the optical telecom band

IVAN G. IVANOV (Linköping University), Danial Shafizade (Linköping University), Son Nguyen (Department of Physics, Chemistry and Biology, Linköping University), Rositsa Yakimova (Linköping University)

11.20 We-2-A.3: First-principles calculations on the positively charged carbon vacancy defect in 4H-SiC for quantum emitter applications

PÉTER UDVARHELYI (Budapest University of Technology and Economics, Wigner Research Centre for Physics), Meysam Mohseni*, Gergő Thiering (* Wigner Research Centre for Physics), Adam Gali (Budapest University of Technology and Economics, Wigner Research Centre for Physics)

11.40 We-2-A.4: Impact of Oxidation and Post Annealing on the Density and Optical Properties of Color Centers at SiO₂/SiC Interfaces

TAKATO NAKANUMA (Graduate School of Engineering, Osaka University), Takuma Kobayashi*, Kosuke Tahara#, Taishi Kimura#, Katsuhiko Kutsuki (#Toyota Central R&D Labs., Inc.), Takayoshi Shimura*, Heiji Watanabe (* Graduate School of Engineering, Osaka University)

10.30 We-2-B: X-ray analysis, chaired by: Nadeem Mahadik and Jeong Hyun Moon

10.30 We-2-B.1: Nucleation sites of stacking faults detected by in-operando X-ray topography for designing bipolar-degradation-free SiC MOSFETs (Invited)

KUMIKO KONISHI (Hitachi, Ltd.), Ryusei Fujita*, Keisuke Kobayashi*, Akio Yoneyama*, Kotaro Ishiji (Kyushu Synchrotron Light Research Center), Hiroyuki Okino*, Toru Ujihara (Nagoya University), Akio Shima (* Hitachi, Ltd.)

11.00 We-2-B.2: Effective Penetration Depth Investigation for Deflected Dislocations on Grazing Incidence Synchrotron X-ray Topographs of 4H-SiC Wafers

QIANYU CHENG (Stony Brook University), Hongyu Peng*, Shanshan Hu*, Zeyu Chen*, Yafei Liu*, Balaji Raghothamachar*, Michael Dudley (* Stony Brook University), Ian Manning (SK siltron css), Andrey Soukhojak (SK siltron css), Gil Chung (SK siltron css)

11.20 We-2-B.3: Implementation of large scale deep learning non-destructive methods for characterizing industrial SiC materials

ROBERT LEONARD (Wolfspeed), Matthew Conrad (Wolfspeed), Edward Van Brunt (Wolfspeed), Jason Witry (Wolfspeed), Elif Balkas (Wolfspeed)

11.40 We-2-B.4: Synchrotron X-ray Plane Wave Topography Analysis of Lattice Strain induced by High Energy Ion Implantation of 4H-SiC Epiwafer

ZEYU CHEN (Stony Brook University), Yafei Liu*, Hongyu Peng*, Qianyu Cheng*, Shanshan Hu*, Balaji Raghothamachar*, Michael Dudley (* Stony Brook University), Reza Ghandi (GE research), Stacey Kennerly (GE research), Peter Thieberger (Brookhaven National Laboratory)

Wednesday, 14th September 2022

13.40 We-3-A: Characterization methods, chaired by: Michael Dudley and Masashi Kato

13.40 We-3-A.1: Accurate determination of the temperature dependence of the refractive index of 4H-SiC at the wavelength of 632 nm

ELISA DEMETRA MALLEMACÉ (Mediterranea University of Reggio Calabria), Sandro Rao*, Maurizio Casalino#, Mario Iodice (# Institute of Applied Sciences and Intelligent Systems (ISASI), National Research Council (CNR)), Giuliana Faggio*, Giacomo Messina (* Mediterranea University of Reggio Calabria), Francesco Giuseppe Della Corte (University of Naples "Federico II")

14.00 We-3-A.2: Dielectric Properties of Silicon Carbide measured by Electrical Impedance Spectroscopy

PHILIPP NATZKE (Advanced Power Semiconductor Laboratory, ETH Zurich), Manuel Belanche Guadas*, Raphael Färber (ETH Zurich), Ulrike Grossner (* Advanced Power Semiconductor Laboratory, ETH Zurich)

14.20 We-3-A.3: Quantification of secondary electron doping contrast in the scanning electron microscope on 4H-SiC

MAXIMILIAN MOSER (KAI GmbH), Gregor Pobegen (KAI GmbH), Jürgen Smoliner (Institut für Festkörperelektronik)

14.40 We-3-A.4: Lifetime projection of bipolar operation of SiC DMOSFET

CHRISTIAN SCHLEICH (CDL for Single-Defect Spectroscopy at the Institute for Microelectronics, TU Wien), Maximilian Wolfgang Feil (Infineon Technologies AG), Dominic Waldhör*, Aleksandr Vasilev#, Tibor Grasser (*Institute for Microelectronics, TU Wien), Michael Waltl (# CDL for Single-Defect Spectroscopy at the Institute for Microelectronics, TU Wien)

13.40 We-3-B: Material characterization, chaired by: Sarit Dhar and Wook Bahng

13.40 We-3-B.1: Depth profile analyses of deep levels near 4H-SiC p+-n junctions formed by Al ion implantation HARUKI FUJII (Kyoto University), Kazutaka Kanegae (Kyoto University), Mitsuaki Kaneko (Kyoto University), Tsunenobu Kimoto (Kyoto University)

14.00 We-3-B.2: Controlled macrostepping of Si-face 4°off 4H-SiC over a large area via liquid Si-induced reconstruction

YANN JOUSSEAUME (Laboratoire des Multimateriaux et Interfaces, Université de Lyon), François Cauwet (Laboratoire des Multimateriaux et Interfaces, Université de Lyon), Judith Würle (Advanced Power Semiconductor Laboratory, ETH Zurich), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich), Gabriel Ferro (Laboratoire des Multimateriaux et Interfaces, Université de Lyon)

14.20 We-3-B.3: A Plasma Polish Dry Etch process to prepare 4H-SiC substrates for device fabrication

SAMANTHA MAZZAMUTO (Oxford Instruments Plasma Technology), Andrew Newton*, Vishal Shah (University of Warwick), Benjamin Renz (University of Warwick), Peter Gammon (The University of Warwick), Robert Gunn*, Brian Dlugosch (* Oxford Instruments Plasma Technology)

14.40 We-3-B.4: Characterization of prismatic slip in SiC crystals by chemical etching method

SHANSHAN HU (Stony Brook University), Shuai Fang (SICC Co. Ltd), Yafei Liu*, Qianyu Cheng*, Hongyu Peng*, Zeyu Chen*, Yuhao Gao (SICC Co. Ltd), Chao Gao (SICC Co. Ltd), Balaji Raghobhamachar (Stony Brook University), Michael Dudley (* Stony Brook University)

Wednesday, 14th September 2022

15.30 We-4-A: MOS interface, chaired by: Fredrik Allerstam and Patrick Fiorenza

15.30 We-4-A.1: Oxide and Interface Defect Analysis of lateral 4H-SiC MOSFETs through CV Characterization and TCAD Simulations

ALEKSANDR VASILEV (CDL for Single-Defect Spectroscopy at the Institute for Microelectronics, TU Wien), Maximilian Wolfgang Feil (Infineon Technologies AG), Christian Schleich*, Bernhard Stampfer*, Gerhard Rzepa (Global TCAD Solutions GmbH), Gregor Pobegen (KAI GmbH), Tibor Grasser (Institute for Microelectronics, TU Wien), Michael Waltl (*CDL for Single-Defect Spectroscopy at the Institute for Microelectronics, TU Wien)

15.50 We-4-A.2: Temperature Dependence of the Channel and Drift Resistance of SiC Power MOSFETs Extracted from C-V and I-V Measurements

ROGER STARK (Advanced Power Semiconductor Laboratory, ETH Zurich), Alexander Tsibizov (Advanced Power Semiconductor Laboratory, ETH Zurich), Salvatore Race (Advanced Power Semiconductor Laboratory, ETH Zurich), Ivana Kovacevic-Badstubner (Advanced Power Semiconductor Laboratory, ETH Zurich), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich)

16.10 We-4-A.3: Degradation of NO-Nitrided SiC MOS Devices Due to Excimer Ultraviolet Light Illumination

HIROKI FUJIMOTO (Graduate School of Engineering, Osaka University), Takuma Kobayashi (Graduate School of Engineering, Osaka University), Mitsuru Sometani (AIST), Mitsuo Okamoto (AIST), Takayoshi Shimura (Graduate School of Engineering, Osaka University), Heiji Watanabe (Graduate School of Engineering, Osaka University)

15.30 We-4-B: Device optimization, chaired by: Sei-Hyung Ryu and Fabrizio Roccaforte

15.30 We-4-B.1: SiC Microelectrodes for X-ray Radiotherapy

PHILIPPE GODIGNON (CNM Barcelona), Celeste Fleta (IMB-CNM (CSIC))

15.50 We-4-B.2: Contribution of a split-off band to tunneling current in heavily-doped p-type SiC Schottky barrier diodes

TAKEAKI KITAWAKI (Kyoto University), Masahiro Hara (Kyoto University), Hajime Tanaka (Osaka University), Mitsuaki Kaneko (Kyoto University), Tsunenobu Kimoto (Kyoto University)

16.10 We-4-B.3: Investigation on Switching Characteristics of 3.3kV SiC Power MOSFETs with SiO₂/SiN Gate Stack GIANPAOLO ROMANO (Hitachi Energy), Andrei Mihaila (Hitachi Energy), Yulieth Arango (Hitachi Energy), Antoni Ruiz (Hitachi Energy), Lars Knoll (Hitachi Energy)

Wednesday, 14th September 2022

16.30 We-P-A: Poster session A

Invited-Poster.1: Enhancement of dislocation contrasts in PL imaging from 4H-SiC bulk wafers by removing subsurface damage using sublimation etching

DAICHI DOJIMA (Kwansei Gakuin University), Mizuho Maki (Kwansei Gakuin University), Daichi Dansako (Kwansei Gakuin University), Kohei Toda (Kwansei Gakuin University), Tadaaki Kaneko (Kwansei Gakuin University)

We-P-A.1: 4H-SiC lateral MOSFETs with N/P double implanted drift region implemented on HPSI substrate without epi-layer

HYOUNG WOO KIM (Korea Electrotechnology Research Institute), Jeong Hyun Moon (Korea Electrotechnology Research Institute), Nam Kyun Kim (Korea Electrotechnology Research Institute), Wook Bahng (Korea Electrotechnology Research Institute)

We-P-A.2: Improvement of the conformal stability of 150 mm 4H SiC wafers

IAN MANNING (SK siltron css), Jonathan Searson (SK siltron css), Kevin Moeggenborg (SK siltron css), Matthew Gave (SK siltron css), Gil Chung (SK), Edward Sanchez (SK siltron css)

We-P-A.3: SiC MOSFETs biased C-V curves: a temperature investigation

ILARIA MATA CENA (University of Naples "Federico II"), Luca Maresca (University of Naples "Federico II"), Andrea Itrace (University of Naples "Federico II"), Giovanni Breglio (University of Naples "Federico II"), Santolo Daliento (University of Naples "Federico II")

We-P-A.4: Development of Quasi-Vertical GaN-on-SiC Trench MOSFETs

JON EVANS (Swansea University), Jash Patel (KLA Corporation (SPTS Division)), Ahmed Ben Khaial (Swansea University), Rhonda Hyndman (KLA Corporation (SPTS Division)), Finn Monaghan (Swansea University), Mike Jennings (Swansea University), Huma Ashraf (KLA Corporation (SPTS Division)), Rob Harper (Compound Semiconductor Centre), Matt Elwin (Swansea University)

We-P-A.5: Evaluation of Hysteresis Response in Achiral Edges of Graphene Nanoribbons on Semi-insulating SiC
Sobin Mathew (TU Ilmenau), Vladislav Kurtash (TU Ilmenau), Sergey Lebedev (Ioffe Institute), Alexander Lebedev (Ioffe Institute), Bernd Hähnlein (TU Ilmenau), JÖRG PEZOLDT (TU Ilmenau)

We-P-A.6: In-situ monitoring of the ambient gas phase during PVT growth of nominally undoped high resistivity SiC boules

JONAS IHLE (Crystal Growth Lab, Materials Department 6, FAU), Peter Wellmann (Crystal Growth Lab, Materials Department 6, FAU)

We-P-A.7: Chemical vapor deposition of Ti₃SiC₂ thin films on SiC materials: process modeling and experiments

JORGE SANCHEZ (Univ. Grenoble Alpes, CNRS), Fatma Trabelsi (Univ. Grenoble Alpes, CNRS), Michalis Gavalas (Univ. Grenoble Alpes, CNRS), Marc Fivel (Univ. Grenoble Alpes, CNRS), Elisabeth Blanquet (Univ. Grenoble Alpes, CNRS), Frederic Mercier (Univ. Grenoble Alpes, CNRS)

Wednesday, 14th September 2022

16.30 We-P-A: Poster session A (continued)

We-P-A.8: Theory of electronics and thermodynamics of boron in 4H-SiC

Vitor Torres (University of Aveiro), Ivana Capan (Ruđer Bošković Institute), JOSE COUTINHO (University of Aveiro)

We-P-A.9: Models of reaction products involving carbon interstitials in 4H-SiC

JOSE COUTINHO (University of Aveiro), Vitor Torres (University of Aveiro)

We-P-A.10: S-EVC method for sorting wafers with defects that extend to bar shaped SSFs

KAZUMI TAKANO (ITES), Yasuyuki Igarashi (ITES), Yohsuke Matsushita (ITES)

We-P-A.11: Propagation behavior of threading screw dislocation during PVT growth and the PVT/solution hybrid growth on 4H-SiC substrates with higher off-angles

KAZUMA ETO (Advanced Power Electronics Research Center, National institute of advanced industrial science and technology), Takeshi Mitani (Advanced Power Electronics Research Center, National institute of advanced industrial science and technology, 16-1 Onogawa, Tsukuba, Ibaraki 305-8569), Kenji Momose (Showa Denko K.K.), Tomohisa Kato (Advanced Power Electronics Research Center, National institute of advanced industrial science and technology)

We-P-A.12: Impact of high-energy electrons and protons on the long term reliability of silicon carbide power MOSFETs
KIMMO NISKANEN (University of Jyväskylä), Arto Javanainen (University of Jyväskylä), Heikki Kettunen (University of Jyväskylä), Mikko Rossi (University of Jyväskylä), Jukka Jaatinen (University of Jyväskylä), Daniel Söderström (University of Jyväskylä)

We-P-A.13: Impact of Source Metallization on Short Circuit Ruggedness and Reliability of SiC Power MOSFETs

IVANA KOVACEVIC-BADSTÜBNER (Advanced Power Semiconductor Laboratory, ETH Zurich), Salvatore Race (Advanced Power Semiconductor Laboratory, ETH Zurich), Alexander Tsibizov (Advanced Power Semiconductor Laboratory, ETH Zurich), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich)

We-P-A.14: Investigations on 4H-SiC Low Voltage nMOSFETs with Thin Thermal SiO₂/Deposited Oxide Gate Dielectric
KEVIN CHO (onsemi), Brian Lee (onsemi), Ki Min Kim (onsemi), Doojin Choi (onsemi), KS Park (onsemi)

We-P-A.15: Exploring Al-implantation induced damage in 4H-SiC using low-energy muon spin rotation spectroscopy
PIYUSH KUMAR (Advanced Power Semiconductor Laboratory, ETH Zurich), Maria Mendes Martins (Paul Scherrer Institute (PSI) and Advanced Power Semiconductor Laboratory, ETH Zurich), Marianne Bathen (Advanced Power Semiconductor Laboratory, ETH Zurich), Judith Wörle (Advanced Power Semiconductor Laboratory, ETH Zurich), Thomas Prokscha (Paul Scherrer Institute (PSI)), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich)

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16.30 We-P-A: Poster session A (continued)

We-P-A.16: Impact of metallization and energy on the response of proton irradiated 4H-SiC based Schottky diodes
PIYUSH KUMAR (Advanced Power Semiconductor Laboratory, ETH Zurich), Manuel Belanche Guadas (Advanced Power Semiconductor Laboratory, ETH Zurich), Natalija Für (Advanced Power Semiconductor Laboratory, ETH Zurich), Luka Guzenko (Advanced Power Semiconductor Laboratory, ETH Zurich), Judith Wörle (Advanced Power Semiconductor Laboratory, ETH Zurich), Marianne Bathen (Advanced Power Semiconductor Laboratory, ETH Zurich), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich)

We-P-A.17: The Impact of Back Grinding on the Performance of an 1.2 kV 4H-SiC DMOSFET
YUAN-CHEN LEE (National Taiwan University), Kung-Yen Lee (National Taiwan University), CHI-CHIN CHIU (National Taiwan University), HSIEN-YI WU (National Taiwan University), Yi-Hsuan Li (National Taiwan University), Shih-Hsuan Chen (National Taiwan University)

We-P-A.18: SPICE Modeling for Accurate Static and Dynamic Characteristics of a SiC VDMOSFET at High Temperature
CHI-CHIN CHIU (National Taiwan University), Kung-Yen Lee (National Taiwan University), Po-Chun Huang (National Taiwan University), Chih-Lun Liu (National Taiwan University), Yan-Yu Wen (National Taiwan University), Chien-Neng Huang (National Taiwan University)

We-P-A.19: The Edge Termination Structures for 3.3 kV 4H-SiC Power Devices
HSIEN-YI WU (National Taiwan University), Kung-Yen Lee (National Taiwan University), Ping-Kai Chang (National Taiwan University), Hsiang-Min Hsieh (National Taiwan University), Rwei-Ci Wu (National Taiwan University)

We-P-A.20: Modified hot-zone design of growth cell for HPSI 4H-SiC crystal growth
WON JAE LEE (Dong-Eui University), Jung Woo Choi (Senic)

We-P-A.21: Temperature gradient control with an air-pocket design for growth of high quality SiC crystal
Won Jae Lee (Dong-Eui University), JUNG WOO CHOI (Senic)

We-P-A.22: Quantitative Characterization of Contact Angle on SiC: Polarity, Polytype, Native Oxide Layer, and Surface Finishing Condition Dependence
Won Jae Lee (Dong-Eui University), Jung Gon Kim (Wafermasters. Inc), WOO SIK YOO (Wafermasters. Inc)

We-P-A.23: Highly efficient floating field rings for SiC power electronic devices - A systematic experimental study
LIRONG BRODERICK (Sangdest Microelectronics (Nanjing) Co., LTD), Jonathan Moulton (Sangdest Microelectronics (Nanjing) Co., LTD), Oleg Rusch (Fraunhofer IISB), Tobias Erlbacher (Fraunhofer IISB), Yunji Corcoran (Sangdest Microelectronics (Nanjing) Co., LTD)

Wednesday, 14th September 2022

16.30 We-P-B: Poster session B

Invited-Poster.2: Structural and electrical properties AlGaIn/GaN heterostructures grown onto misoriented 4H-SiC epilayers

FABRIZIO ROCCAFORTE (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Giuseppe Greco (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Corrado Bongiorno (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Emanuela Schilirò (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Patrick Fiorenza (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Filippo Giannazzo (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Marco Mauceri (LPE SpA, Strada XVI – Zona Industriale, I-95121, Catania, Italy), Danilo Crippa (LPE, via Falzarego 8, Baranzate (MI), Italy), Andrea Severino (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Ferdinando Iucolano (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Pawel Prystawko (IHPP - PAS, Sokolowska 29/37, Warsaw 01-152, Poland), Mike Leszczynski (IHPP - PAS, Sokolowska 29/37, Warsaw 01-152, Poland)

We-P-B.1: Transfer of heteroepitaxial grown 3C-SiC layers for application in optical frequency combs
MANUEL KOLLMUSS (Crystal Growth Lab, Materials Department 6, FAU), Xiaodong Shi (Technical University of Denmark), Haiyan Ou (Technical University of Denmark), Peter Wellmann (Crystal Growth Lab, Materials Department 6, FAU)

We-P-B.2: Numerical Analysis of the Schottky Contact Properties on the Forward Conduction of MPS/JBS SiC Diodes
MARCO BOCCAROSSA (University of Naples Federico II), Alessandro Borghese (University of Naples Federico II), Luca Maresca (University of Naples "Federico II"), Michele Riccio (University of Naples Federico II), Giovanni Breglio (University of Naples Federico II), Andrea Irace (University of Naples "Federico II")

We-P-B.3: Power SiC MOSFET Under Repetitive UIS and Short Circuit Stress
JURAJ MAREK (Slovak University of Technology in Bratislava), Jozef Kozárik (NanoDesign), Ales Chvala (bla), Michal Minárik (Slovak University of Technology), Matej Matus (Slovak University of Technology), Lubica Stuchlikova (Slovak University of Technology)

We-P-B.4: Investigation of doping and dopant dependence of n-type 4H-SiC with low-energy muon spin spectroscopy
MARIA MENDES MARTINS (Paul Scherrer Institute (PSI) and Advanced Power Semiconductor Laboratory, ETH Zurich), Piyush Kumar (Advanced Power Semiconductor Laboratory, ETH Zurich), Marianne Bathen (Advanced Power Semiconductor Laboratory, ETH Zurich), Judith Wörle (Advanced Power Semiconductor Laboratory, ETH Zurich), Lasse Vines (University of Oslo), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich), Thomas Prokscha (Paul Scherrer Institute (PSI))

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16.30 We-P-B: Poster session B (continued)

We-P-B.5: Exploring UV-laser effects on Al-implanted 4H-SiC

MARILENA VIVONA (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Filippo Giannazzo (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Gabriele Bellocchi (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Paolo Badalà (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Anna Bassi (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Corrado Bongiorno (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Salvatore Di Franco (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Simone Rascunà (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Fabrizio Roccaforte (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania)

We-P-B.6: Degradation of channel and drift resistance induced by proton and neutron irradiation in SiC power MOSFETs
CORINNA MARTINELLA (Advanced Power Semiconductor Laboratory, ETH Zurich), Roger Stark (Advanced Power Semiconductor Laboratory, ETH Zurich), Salvatore Race (Advanced Power Semiconductor Laboratory, ETH Zurich), Ruben Garcia Alia (CERN Engineering Department, 1211 Geneva 23, Switzerland), Arto Javanainen (Department of Physics, University of Jyväskylä, FI-40014 Jyväskylä, Finland), Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich)

We-P-B.7: Comparison of the performance-degrading near-interface traps in commercial SiC MOSFETs

MAYANK CHATURVEDI (Queensland Micro- and Nanotechnology Centre, Griffith University, Brisbane, QLD 4111, Australia), Sima Dimitrijevic (Queensland Micro- and Nanotechnology Centre, Griffith University, Brisbane, QLD 4111, Australia), Daniel Haasmann (Queensland Micro- and Nanotechnology Centre, Griffith University, Brisbane, QLD 4111, Australia), Hamid Amini Moghadam (Queensland Micro- and Nanotechnology Centre, Griffith University, Brisbane, QLD 4111, Australia), PEYUSH PANDE (Department of Electronics and Communication Engineering, Graphic Era (Deemed to be University), Dehradun, India), Utkarsh Jadli (Queensland Micro- and Nanotechnology Centre, Griffith University, Brisbane, QLD 4111, Australia)

We-P-B.8: Self-aligned nickel-based ohmic contacts to P- and Al-ion implanted SiC

MATTIAS EKSTRÖM (KTH Royal Institute of Technology), Carl-Mikael Zetterling (KTH Royal Institute of Technology)

We-P-B.9: Purification and Structural Properties of Recycled Ultra-High Purity Silicon Carbide Powder for Single Crystal Growth

SEULKI KIM (Korea Institute of Ceramic Engineering and Technology), Jae-Heum Lee (G-TECH), Kyu-Hyun Kim (G-TECH), Younki Lee (Gyeongsang National University), Myung-Hyun Lee (Korea Institute of Ceramic Engineering and Technology)

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16.30 We-P-B: Poster session B (continued)

We-P-B.10: Towards SiC-based VUV pin-photodiodes - Investigations on 4H-SiC photodiodes with shallow implanted Al emitters

MICHAEL SCHRAML (Chair of Electron Devices, University of Erlangen-Nuremberg, Cauerstrasse 6, 91058 Erlangen, Germany), Tobias Erlbacher (Fraunhofer IISB, Schottkystrasse 10, 91058 Erlangen, Germany), Niklas Papatthanasou (sglux GmbH, Richard-Willstätter-Str. 8, 12489 Berlin, Germany)

We-P-B.11: Growth of polycrystalline SiC thin films by chemical vapor deposition for brain implants

MICHALIS GAVALAS (Univ. Grenoble Alpes, CNRS), Frederic Mercier (Univ. Grenoble Alpes, CNRS), Jorge Sanchez (Univ. Grenoble Alpes, CNRS), Clement Hebert (Univ. Grenoble Alpes, CNRS), Elisabeth Blanquet (Univ. Grenoble Alpes, CNRS), Konstantinos Zekentes (Univ. Grenoble Alpes, CNRS)

We-P-B.12: A Modeling of 4H-SiC Super-Junction MOSFETs with Filtered High Energy Implantation

MINWHO LIM (Fraunhofer IISB), Constantin Csato (mi2-factory GmbH), Julietta Förthner (Fraunhofer IISB), Oleg Rusch (Fraunhofer IISB), Kevin Ehrensberger (Fraunhofer IISB), Barbara Kupfer (Fraunhofer IISB), Susanne Beuer (Fraunhofer IISB), Susanne Oertel (Fraunhofer IISB), Dong-Wook Byun (Kwangwoon University), Seongjun Kim (POSTECH), Sang-Mo Koo (Kwangwoon University), Hoon-Kyu Shin (POSTECH), Tobias Erlbacher (Fraunhofer IISB)

We-P-B.13: Improved Performance of SiC CMOS Ring Oscillators By Post-nitridation Treatment in CO₂

Mizuki Kuniyoshi (ULVAC-Osaka University Joint Research Laboratory for Future Technology), Kidist Moges (Graduate School of Engineering, Osaka University), Takuma Kobayashi (Graduate School of Engineering, Osaka University), Takuji Hosoi (School of Engineering, Kwansai Gakuin University), Takayoshi Shimura (Graduate School of Engineering, Osaka University), Keita Tachiki (Department of Electronic Science and Engineering, Kyoto University), Tsunenobu Kimoto (Department of Electronic Science and Engineering, Kyoto University), Heiji Watanabe (Graduate School of Engineering, Osaka University)

We-P-B.14: Vacancy-related color centers in two-dimensional silicon carbide monolayers

MEYSAM MOHSENI (Wigner Research Centre for Physics), Ismaeil Abdolhosseini Sarsari (Isfahan University of Technology), Adam Gali (Budapest University of Technology and Economics, Wigner Research Centre for Physics)

We-P-B.15: Short Channel Effects of SiC MOSFET based on S-MOS Cell Concept

MUNAF RAHIMO (mqSemi AG), Iulian Nistor (mqSemi AG), David Green (Silvaco Europe Ltd.)

We-P-B.16: DLTS study on silicon vacancy in 4H-SiC introduced by electron irradiation

YUTA MURAKAMI (Department of Electronic Science and Engineering, Kyoto University), Mitsuaki Kaneko (Kyoto University), Tsunenobu Kimoto (Kyoto University)

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16.30 We-P-B: Poster session B (continued)

We-P-B.17: Evaluation of strain in 3C-SiC/Si epiwafers from X-ray diffraction measurements.

Marcin Zielinski (Novasic), Marcin Bussel (Novasic), Hugues Mank (Soitec), Sylvain Monnoye (Soitec), Marci Portail (Université Côte d'Azur, CNRS, CRHEA), Adrien Michon (Université Côte d'Azur, CNRS, CRHEA), Yvon Cordier (Université Côte d'Azur, CNRS, CRHEA), Viviana Scuderi (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Francesco La Via (Institute for Microelectronics and Microsystems (IMM), National Research Council of Catania)

We-P-B.18: P-type impurities and doping in 4H-SiC

NIAMH SMITH (UCL London), Alex Shluger (UCL London)

We-P-B.19: Experimental and simulation studies of nitrogen incorporation kinetics during physical vapor transport growth of 4H-SiC

TAKUTO OTA (Kwansei Gakuin University, School of Science and Technology), Shunsuke Asano (Kwansei Gakuin University, School of Science and Technology), Noboru Ohtani (Kwansei Gakuin University, School of Science and Technology)

We-P-B.20: Raman scattering microscopy imaging of stacking faults in 4H-SiC epitaxial layers

HIRONO OKANO (Kwansei Gakuin University, School of Science and Technology), Noboru Ohtani (Kwansei Gakuin University, School of Science and Technology), Junji Senzaki (National Institute of Advanced Industrial Science and Technology (AIST))

We-P-B.21: Investigation of dislocation structure in heavily nitrogen-doped 4H-SiC crystals

ASAHI NAKAI (Kwansei Gakuin University, School of Science and Technology), Shungo Tamura (Kwansei Gakuin University, School of Science and Technology), Noboru Ohtani (Kwansei Gakuin University, School of Science and Technology)

We-P-B.22: Ultra-high sensitive pH sensor based on a microwire-4H-SiC dual-gate junction field effect transistor (4H-SiC-DGJFET)

OLFA KARKER (IMEP-LaHC, Univ. Grenoble Alpes, CNRS, Grenoble INP, F-38000 Grenoble, France), Konstantinos Zekentes (MRG-IESL/ FORTH, VassilikaVouton, PO Box 1385 Heraklion, Greece), Nikolaos Makris (MRG-IESL/ FORTH, VassilikaVouton, PO Box 1385 Heraklion, Greece), Valérie Stambouli-Sene (LMGP, Univ. Grenoble Alpes, CNRS, Grenoble INP, F-38000 Grenoble, France), Edwige BANO (IMEP-LaHC, Univ. Grenoble Alpes, CNRS, Grenoble INP, F-38000 Grenoble, France)

We-P-B.23: NO annealing simulation of 4H-SiC/SiO₂ by charge-transfer type molecular dynamics

Yuki Ohuchi (Fuji Electric Co., Ltd.), Hidenori Saeki (Fuji Electric Co., Ltd.), Hiroki Sakakima (The University of Tokyo), Satoshi Izumi (The University of Tokyo)

Thursday, 15th September 2022

9.00 Th-1-A: Quantum sensing, chaired by: Marianne E. Bathen and Adam Gali

09.00 Th-1-A.1: Magnetometry using spin defects in SiC for planetary exploration (Invited)

COREY COCHRANE (NASA Jet Propulsion Laboratory), Hannes Kraus (NASA Jet Propulsion Laboratory)

09.30 Th-1-A.2: Strain-dependent photoluminescence line shifts of the TS color center in 4H-SiC

JOHANNES LEHMEYER (Lehrstuhl für Angewandte Physik, Department Physik, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)), Alexander Fuchs (Lehrstuhl für Angewandte Physik, Department Physik, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)), Matthias Popp (Lehrstuhl für Angewandte Physik, Department Physik, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)), Michael Krieger (Lehrstuhl für Angewandte Physik, Department Physik, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)), Heiko Weber (Lehrstuhl für Angewandte Physik, Department Physik, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU))

09.50 Th-1-A.3: Temperature sensitivity improvement of SiC-VSi-based quantum sensor by simultaneous-resonated optically detected magnetic resonance

YUICHI YAMAZAKI (QST), Yuta Masuyama (QST), Kazutoshi Kojima (National Institute of Advanced Industrial Science and Technology), Takeshi Ohshima (QST)

10.10 Th-1-A.4: Electrically detected magnetic resonance of SiC defects for quantum technologies

BRETT JOHNSON (RMIT University)

9.10 Th-1-B: Extended defects, chaired by: Noboru Ohtani and Gabriel Ferro

09.10 Th-1-B.1: Suppression of stacking fault expansion in SiC PiN diodes by H+ implantation

MASASHI KATO (Nagoya Institute of Technology), Ohga Watanabe (Nagoya Institute of Technology), Toshiki Mii (Nagoya Institute of Technology), Hitoshi Sakane (SHI-ATEX Co.,Ltd.), Shunta Harada (Graduate School of Engineering, Nagoya University)

09.30 Th-1-B.2: Formation and Expansion Behavior of Complex Stacking Fault in 180 um Thick SiC Epitaxial Layers

NADEEM MAHADIK (Naval Research Laboratory), Robert Stahlbush (Naval Research Laboratory), Miguel Hinojosa (Army Research Laboratory), Aivars Lelis (Army Research Laboratory), Woongje Sung (SUNY Polytechnic Institute Colleges of Nanoscale Science and Engineering)

09.50 Th-1-B.3: Analysis of Basal Plane Dislocation Motion Induced by P+ Ion Implantation Using Synchrotron X-ray Topography

ZEYU CHEN (Stony Brook University), Yafei Liu*, Hongyu Peng*, Qianyu Cheng*, Shanshan Hu*, Balaji Raghothamachar*, Michael Dudley (* Stony Brook University), Stephen Mancini#, Seung Yup Jang#, Woongje Sung (# SUNY Polytechnic Institute Colleges of Nanoscale Science and Engineering)

10.10 Th-1-B.4: Suppression of recombination enhanced dislocation glide motion in 4H-SiC by hydrogen ion implantation

SHUNTA HARADA (Nagoya University), Toshiki Mii (Nagoya Institute of Technology), Hitoshi Sakane (SHI-ATEX Co.,Ltd.), Masashi Kato (Nagoya Institute of Technology)

Thursday, 15th September 2022

11.00 Th-2-A: JFETs, chaired by: Peter Moens and Mike Jennings

11.00 Th-2-A.1: High temperature operation of SiC complementary JFET logic gates fully fabricated by ion implantation (Invited)

MITSUAKI KANEKO (Kyoto University), Masashi Nakajima (Kyoto University), Qimin Jin (Kyoto University), Tsunenobu Kimoto (Kyoto University)

11.30 Th-2-A.2: Anomalously high electron mobility in S-implanted n-type SiC

TAIGA MATSUOKA (Kyoto University), Mitsuaki Kaneko (Kyoto University), Tsunenobu Kimoto (Kyoto University)

11.50 Th-2-A.3: Early Burn-In Parasitic Conduction in 500 °C Durable SiC JFET ICs

PHILIP NEUDECK (NASA), David Spry (NASA Glenn), Liangyu Chen (Ohio Aerospace Institute)

12.10 Th-2-A.4: Temperature Dependence of a Self-Sensing Monolithically Integrated Circuit Breaker Based on a 4H-SiC JFET Technology

NORMAN BOETTCHER (Fraunhofer Institute for Integrated Systems and Device Technology IISB), Julian Kauth (Friedrich-Alexander University, Chair of Electron Devices), Tobias Erlbacher (Fraunhofer Institute for Integrated Systems and Device Technology IISB)

12.30 Th-2-A.5: Remarkable improvement of threshold voltage controllability in ion-implantation-based SiC JFETs by adopting bottom-gate structure

SHUNYA SHIBATA (Kyoto University), Taiga Matsuoka (Kyoto University), Mitsuaki Kaneko (Kyoto University), Tsunenobu Kimoto (Kyoto University)

11.30 Th-2-B: Growth and functionalization, chaired by: Francesco La Via and Sang-Mo Koo

11.30 Th-2-B.1: Suppression of SiC-inclusions in 4H-SiC crystals grown from Si-Cr-C based solution saturated with SiC

TAKESHI MITANI (Advanced Power Electronics Research Center, AIST), Sakiko Kawanishi (Institute of Multidisciplinary Research for Advanced Materials, Tohoku University), Kazuma Eto*, Tomohisa Kato (* Advanced Power Electronics Research Center, AIST), Didier Chaussende (Univ. Grenoble Alpes, CNRS, Grenoble INP, SIMaP), Takeshi Yoshikawa (Institute of Industrial Science, The University of Tokyo)

11.50 Th-2-B.2: Epitaxial growth of Boron Carbide on 4H-SiC

YAMINA BENAMRA (Laboratoire des Multimateriaux et Interfaces, Université de Lyon), François Cauwet*, Laurent Auvray*, Jérôme Andrieux*, Maria de la Paz Alegre Salguero (Materials Science Department, Universidad de Cádiz), Fernando Lloret (Materials Science Department, Universidad de Cádiz), Daniel Araujo (Materials Science Department, Universidad de Cádiz), Marina Gutierrez (Materials Science Department, Universidad de Cádiz), Gabriel Ferro (* Laboratoire des Multimateriaux et Interfaces, Université de Lyon)

12.10 Th-2-B.3: Metal functionalized SiC hybrid electrodes for catalysis

Ivan Shtepliuk (Linköping University), Tihomir Iakimov (Linköping University), Ivan Ivanov (Linköping University), Filippo Giannazzo (CNR-IMM), ROSITSA YAKIMOVA (Linköping University)

Thursday, 15th September 2022

14.00 Th-P-A: Poster session A

Invited-Poster.1: Enhancement of dislocation contrasts in PL imaging from 4H-SiC bulk wafers by removing subsurface damage using sublimation etching

DAICHI DOJIMA (Kwansei Gakuin University), Mizuho Maki (Kwansei Gakuin University), Daichi Dansako (Kwansei Gakuin University), Kohei Toda (Kwansei Gakuin University), Tadaaki Kaneko (Kwansei Gakuin University)

Th-P-A.1: Capacitance-voltage characteristics of SiC metal-oxide-semiconductor field-effect transistor thinned by high-speed plasma etching using high-pressure plasma

MASAAKI OSHIMA (Osaka University), Yuma Nakanishi (Osaka University), Daisetsu Toh (Osaka University), Kazuto Yamauchi (Osaka University), Yasuhisa Sano (Osaka University)

Th-P-A.2: Ni-silicide ohmic contacts on 4H-SiC formed by multi pulse excimer laser annealing

PAOLO BADALÀ (STMicroelectronics, Stradale Primosole 50, 95121, Catania), Ioannis Deretzis (CNR-IMM, Strada VIII n.5, Zona Industriale, 95121, Catania), Salvatore Sanzaro (CNR-IMM, Strada VIII n.5, Zona Industriale, 95121, Catania), Corrado Bongiorno (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Giuseppe Fiscaro (CNR-IMM, Strada VIII n.5, Zona Industriale, 95121, Catania), Simone Rascunà (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Gabriele Bellocchi (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Anna Bassi (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Massimo Boscaglia (STMicroelectronics, Stradale Primosole 50, 95121, Catania), Daniele Pagano (STMicroelectronics, Stradale Primosole 50, 95121, Catania), Patrizia Vasquez (STMicroelectronics, Stradale Primosole 50, 95121, Catania), Marius Enachescu (Center for Surface Science and Nanotechnology, University Politehnica of Bucharest, Splaiul Independentei nr. 313, AN031, District 6, 060042 Bucharest, Romania), Alessandra Alberti (CNR-IMM, Strada VIII n.5, Zona Industriale, 95121, Catania), Antonino La Magna (CNR-IMM, Strada VIII n.5, Zona Industriale, 95121, Catania)

Th-P-A.3: Evolution of interface state density and near interface oxide traps under controlled NO annealing in SiO₂/SiC lateral MOSFETs

PATRICK FIORENZA (CNR-IMM), Marco Camalleri (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Laura Scalia (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Edoardo Zanetti (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Mario Saggio (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Filippo Giannazzo (CNR-IMM), Fabrizio Roccaforte (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania) ROBERT BERNAT (Ruđer Bošković Institute), Ivana Capan (Ruđer Bošković Institute), Luka Snoj (Jožef Stefan Institute), Vladimir Radulović (Jožef Stefan Institute), Takahiro Makino (QST), Takeshi Ohshima (QST)

Th-P-A.4: 3C-SiC/Si Schottky Barrier Diodes - Challenges and Solutions

PETER WARD (Tyndall National Institute)

Thursday, 15th September 2022

14.00 Th-P-A: Poster session A (continued)

Th-P-A.5: Impact of laser annealing process timescale in SiC backside ohmic contact formation

PIERRE-EDOUARD RAYNAL (Laser Systems and Solutions of Europe (LASSE), Gennevilliers 92230, France), Fabien Rozé (LASSE), Sébastien Halty (Laser Systems and Solution of Europe (LASSE)), Toshiyuki Tabata (Laser Systems and Solutions of Europe (LASSE), Gennevilliers 92230, France), Fulvio Mazzamuto (Laser Systems and Solutions of Europe (LASSE), Gennevilliers 92230, France)

Th-P-A.6: Development of Hydrophilic Bonding Technologies for SiC Wafers

TSUNG-PO CHUANG (National Yang Ming Chiao Tung University), chai wei ku (National Yang Ming Chiao Tung University), Ray-Hua Horng (National Yang Ming Chiao Tung University), Po-Jung Lin (Global Wafers Co. Ltd)

Th-P-A.7: Thermal Neutron Detection Properties of 4H-SiC Schottky Barrier Diodes

ROBERT BERNAT (Ruđer Bošković Institute), Ivana Capan (Ruđer Bošković Institute), Luka Snoj (Jožef Stefan Institute), Vladimir Radulović (Jožef Stefan Institute), Takahiro Makino (QST), Takeshi Ohshima (QST)

Th-P-A.8: Basal Plane dislocation slip band characterization and epitaxial propagation in 4H SiC

GIL CHUNG (SK Siltron css), Robert Viveros (SK siltron css), Chunghyun Lee (SK siltron css), Andrey Soukhovjak (SK siltron css), Vladimir Pushkarev (SK siltron css), Qianyu Cheng (Stony Brook University), Balaji Raghothamachar (Stony Brook University), Michael Dudley (Stony Brook University)

Th-P-A.9: Selective oxidation during AFM electrical characterization of doped SiC layers

ROSINE COQ GERMANICUS (Normandie University Caen), Abdelhaq Boumaarouf (Normandie University Caen), Christina Villeneuve-Faure (Université de Toulouse), Vishal Shah (University of Warwick), Peter Gammon (The University of Warwick), Ulrike Luders (Normandie University Caen)

Th-P-A.10: High-speed plasma etching of gallium oxide substrates using atmospheric-pressure plasma with hydrogen-helium mixed gas

YASUHISA SANO (Osaka University), Taiki Sai (Osaka University), Genta Nakaue (Osaka University), Daisetsu Toh (Osaka University), Kazuto Yamauchi (Osaka University)

Th-P-A.11: Correlation between Q-factor and residual stress in epitaxial 3C-SiC double-clamped beam resonators

SERGIO SAPIENZA (Institute for Microelectronics and Microsystems (IMM) of Bologna, National Research Council of Italy), Matteo Ferri (Institute for Microelectronics and Microsystems (IMM) of Bologna, National Research Council of Italy), Luca Belsito (Institute for Microelectronics and Microsystems (IMM) of Bologna, National Research Council of Italy), Diego Marini (Institute for Microelectronics and Microsystems (IMM) of Bologna, National Research Council of Italy), Marcin Zielinski (Novasic), Francesco La Via (Institute for Microelectronics and Microsystems (IMM) of Catania, National Research Council of Italy), Alberto Roncaglia (Institute for Microelectronics and Microsystems (IMM) of Bologna, National Research Council of Italy)

Thursday, 15th September 2022

14.00 Th-P-A: Poster session A (continued)

Th-P-A.12: Pulsed forward bias body diode stress of 1200 V SiC MOSFETs with individual mapping of basal plane dislocations

Sara Kochoska (onsemi), Martin Domeij (onsemi), Thanh-Toan Pham (onsemi), Sotirios Maslougkas (onsemi), Swapna Sunkari (onsemi), Joshua Justice (onsemi), Hrishikesh Das (onsemi)

Th-P-A.13: Recent Progress in Noncontact Electrical Characterization for SiC and Related Compounds

ALEXANDRE SAVTCHOUK (Semilab SDI), Marshall Wilson (Semilab SDI), Jacek Lagowski (semilabsdi llc)

Th-P-A.14: Optimizing Neural Interface Passivation with PECVD a-SiC:H Films

SCOTT GREENHORN (Grenoble INP - LMGP), Konstantinos Zekentes (Univ. Grenoble Alpes, CNRS), Valérie Stambouli-Sene (Grenoble INP - LMGP), Edwige Bano (IMEP-LaHC), Andrei Uvarov (Plasma-Therm)

Th-P-A.15: 4H-SiC full wafer mapping image of CMP-finished subsurface damage by laser light scattering

DAICHI DOJIMA (Kwansei Gakuin University), Daichi Dansako (Kwansei Gakuin University), Mizuho Maki (Kwansei Gakuin University), Kohei Toda (Kwansei Gakuin University), Tadaaki Kaneko (Kwansei Gakuin University)

Th-P-A.16: Effects of plasma treatment on the physical properties of NiAl contacts on n-type 4H-SiC

YOUNG JAE PARK (Pohang University of Science and Technology), Minwho Lim (Fraunhofer), Min Jae Kang (POSTECH), Min Jae Sung (POSTECH), Ju Young Kwak (POSTECH), Nam Suk Lee (POSTECH), Chaeho Shin (Korea Research Institute of Standards and Science), Byung-Gun Park (Korea Atomic Energy Research Institute), Tobias Erlbacher (Fraunhofer IISB), Seongjun Kim (POSTECH), Hoon-Kyu Shin (POSTECH)

Th-P-A.17: Ohmic contact formation at low temperature using Ni-based metal alloy on n-type 4H-SiC

Seongjun Kim (POSTECH), Minwho Lim (Fraunhofer), YOUNG JAE PARK (POSTECH), Min Jae Kang (POSTECH), Min Jae Sung (POSTECH), Ju Young Kwak (POSTECH), Nam Suk Lee (POSTECH), Chaeho Shin (Korea Research Institute of Standards and Science), Byung-Gun Park (Korea Atomic Energy Research Institute), Tobias Erlbacher (Fraunhofer IISB), Hoon-Kyu Shin (POSTECH)

Th-P-A.18: Structural properties of epitaxially grown SiC films with step-graded nitrogen doping on 4H-SiC substrate

MIN JAE KANG (POSTECH), Young Jae Park (POSTECH), Seongjun Kim (POSTECH), Dong Ick Son (Korea Institute of Science and Technology), Hoon-Kyu Shin (POSTECH)

Thursday, 15th September 2022

14.00 Th-P-A: Poster session A (continued)

Th-P-A.19: Growth of SiC single crystals using recycled CVD-SiC as source materials

YONG-HYEON KIM (Korea Institute of Ceramic Engineering and Technology), Su-Min Lim (Korea Institute of Ceramic Engineering and Technology), Si-Young Bae (Korea Institute of Ceramic Engineering and Technology), Myung-Hyun Lee (Korea Institute of Ceramic Engineering and Technology), Yoonjoo Lee (Korea Institute of Ceramic Engineering and Technology), Seulki Kim (Korea Institute of Ceramic Engineering and Technology), Yun-Ji Shin (Korea Institute of Ceramic Engineering and Technology), In-Seok Yang (Hana), Sang-Il Lee (Hana Materials Inc.), Jin-Yong Park (Hana Materials Inc.), Il-gon Kim (Hana Materials Inc.), Yong-Jin Kwon (Hana Materials Inc.), Chang-Min Kim (Hana Materials Inc.), Yeonsuk Jang (Dong-Eui University), Won Jae Lee (Dong-Eui University), Seong-Min Jeong (Korea Institute of Ceramic Engineering and Technology)

Th-P-A.20: Synthesis of V-doped SiC powder from recycled high purity sources for semi-insulating SiC crystal growth
Yong-Jin Kwon (Hana Materials Inc.), YONG-HYEON KIM (Korea Institute of Ceramic Engineering and Technology), Sang-Il Lee (Hana Materials Inc.), Chang-Min Kim (Hana Materials Inc.), Kap-Ryeol Ku (Senic Inc.), Won Jae Lee (Dong-Eui University), Eunjin Jung (KXT Inc.), Seong-Min Jeong (Korea Institute of Ceramic Engineering and Technology)

Th-P-A.21: Electrical Properties of Inhomogeneous Schottky Barrier on Ga₂O₃/4H-SiC Diodes

MIN-YEONG KIM (Kwangwoon University), Hee-Jae Lee (Kwangwoon University), Dong-Wook Byun (Kwangwoon University), Seung-Woo Jung (Kwangwoon University), Myeong-Cheol Shin (Kwangwoon University), Michael A. Schweitz (Kwangwoon University), Sang-Mo Koo (Kwangwoon University)

Th-P-A.22: Electrical Characteristics and Deep Level Defects of Ga₂O₃/SiC Heterojunction Diodes with Different Annealing Atmospheres

DONG-WOOK BYUN (Kwangwoon University), Min-Yeong Kim (Kwangwoon University), Soo-Young Moon (Kwangwoon University), Hee-Jae Lee (Kwangwoon University), Geon-Hee Lee (Kwang), Myeong-Cheol Shin (Kwangwoon University), Sang-Mo Koo (Kwangwoon University)

Th-P-A.23: Investigation of Electrical Performance of Ga₂O₃/4H-SiC with Dielectric Interlayer

Hee-Jae Lee (Kwangwoon University), Soo-Young Moon (Kwangwoon University), Myeong-Cheol Shin (Kwangwoon University), Michael A. Schweitz (Kwangwoon University), Sang-Mo Koo (Kwangwoon University)

Thursday, 15th September 2022

14.00 Th-P-B: Poster session B

Invited-Poster.2: Structural and electrical properties AlGaIn/GaN heterostructures grown onto misoriented 4H-SiC epilayers

FABRIZIO ROCCAFORTE (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Giuseppe Greco (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Corrado Bongiorno (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Emanuela Schilirò (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Patrick Fiorenza (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Filippo Giannazzo (CNR-IMM, Strada VIII n.5, Zona Industriale, I-95121, Catania), Marco Mauceri (LPE SpA, Strada XVI – Zona Industriale, I-95121, Catania, Italy), Danilo Crippa (LPE, via Falzarego 8, Baranzate (MI), Italy), Andrea Severino (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Ferdinando Iucolano (STMicroelectronics, Stradale Primosole 50, I-95121, Catania), Pawel Prystawko (IHPP - PAS, Sokolowska 29/37, Warsaw 01-152, Poland), Mike Leszczynski (IHPP - PAS, Sokolowska 29/37, Warsaw 01-152, Poland)

Th-P-B.1: Investigation of the nucleation process during the initial stage of PVT growth of 4H-SiC

SVEN STRÜBER (Crystal Growth Lab, Materials Department 6 (i-meet), FAU Erlangen-Nürnberg, Martensstr. 7, D-91058 Erlangen, Germany), Matthias Arzig (Crystal Growth Lab, Materials Department 6 (i-meet), FAU Erlangen-Nürnberg, Martensstr. 7, D-91058 Erlangen, Germany), Johannes Steiner (Crystal Growth Lab, Materials Department 6 (i-meet), FAU Erlangen-Nürnberg, Martensstr. 7, D-91058 Erlangen, Germany), Michael Salamon (Fraunhofer Institute for Integrated Circuits, Development Center for X-Ray Technology (EZRT), Flugplatzstraße 75, 90768 Fürth, Germany), Norman Uhlmann (Fraunhofer Institute for Integrated Circuits, Development Center for X-Ray Technology (EZRT), Flugplatzstraße 75, 90768 Fürth, Germany), Peter Wellmann (Crystal Growth Lab, Materials Department 6 (i-meet), FAU Erlangen-Nürnberg, Martensstr. 7, D-91058 Erlangen, Germany)

Th-P-B.2: Examination of MnO₂-based CMP slurry for 4H-SiC(0001) Wafer that enables high speed and reduction of latent scratch density

TAKUMA NAKAMURA (MITSUI MINING & SMELTING CO., LTD.), Akinori Kumagai (MITSUI MINING & SMELTING CO., LTD.), Yasunobu Saruwatari (MITSUI MINING & SMELTING CO., LTD.), Shuhei Hara (MITSUI MINING & SMELTING CO., LTD.)

Th-P-B.3: Study of Defects in 4H-SiC Epitaxy at Various Buffer Layer Growth Conditions

TAWHID RANA (SK siltron css), Jun Wu (SK siltron css), Gil Chung (SK), Matthew Gave (SK siltron css)

Th-P-B.4: Impact of JFET Width on Conduction Characteristics for P-Channel SiC IGBT

ERJUN WANG (School of Integrated Circuits, University of Chinese Academy of Sciences), Xiaoli Tian (Institute of Microelectronics of Chinese Academy of Sciences), Chengzhan Li (CRRRC Times Electric Co. Ltd), Xinyu Liu (Institute of Microelectronics of Chinese Academy of Sciences), Chengyue Yang (Institute of Microelectronics of Chinese Academy of Sciences), Yun Bai (Institute of Microelectronics of Chinese Academy of Sciences), Yidan Tang (Institute of Microelectronics of Chinese Academy of Sciences)

Thursday, 15th September 2022

14.00 Th-P-B: Poster session B (continued)

Th-P-B.5: AI-based designing scheme for TED-MOS enabling rapid and accurate device development
TOMOKA SUEMATSU (Hitachi, Ltd.), Takeru Suto (Hitachi, Ltd.), Keisuke Kobayashi (Hitachi, Ltd.), Yuki Mori (Hitachi, Ltd.), Haruka Shimizu (Hitachi, Ltd.), Akio Shima (Hitachi, Ltd.)

Th-P-B.6: Bipolar Characteristics of Vanadium-doped 4H-SiC Semi-Insulating Layer for Well-less CMOS Circuits
TOYA KAI (Research Institute for Nanodevices, Hiroshima University), Kazutoshi Kojima (National Institute of Advanced Industrial Science and Technology(AIST)), Takeshi Ohshima (National Institutes for Quantum Science and Technology), Yasunori Tanaka (National Institute of Advanced Industrial Science and Technology(AIST)), Shin-ichiro Kuroki (Research Institute for Nanodevices, Hiroshima University)

Th-P-B.7: Operating Characteristics of 4H-SiC 3T/4T- Active Pixel Sensors
MASAYUKI TSUTSUMI (Research Institute for Nanodevices, Hiroshima University), Meguro Tatsuya (Research Institute for Nanodevices, Hiroshima University), Akinori Takeyama (Research Institute for Nanodevices, Hiroshima University), Takeshi Ohshima (QST), Yasunori Tanaka (National Institute of Advanced Industrial Science and Technology(AIST)), Shin-ichiro Kuroki (Research Institute for Nanodevices, Hiroshima University)

Th-P-B.8: The Influence of Growth Parameters on the Heteroepitaxial Growth of High Quality 3C-SiC
Gerard Colston (The University of Warwick), Benjamin Renz (The University of Warwick), Peter Gammon (The University of Warwick), Phil Mawby (The University of Warwick), VISHAL SHAH (University of Warwick)

Th-P-B.9: Optimizing Noncontact Doping and Electrical Defect Metrology for Production of SiC Epitaxial Wafers
VLADIMIR PUSHKAREV (SK siltron css), Tawhid Rana (SK siltron css), Matthew Gave (SK siltron css), Edward Sanchez (SK siltron css), Alexandre Savtchouk (Semilab SDI), Marshall Wilson (Semilab SDI), Dmitriy Marinskiy (Semilab SDI), Jacek Lagowski (Semilab SDI)

Th-P-B.10: Parameter Extraction from Transfer Characteristics Measurement of 4H-SiC MOSFET in Extremely High Temperature Ambient
VUONG VAN CUONG (Research Institute for Nanodevices, Hiroshima University), Tatusya Meguro (Research Institute for Nanodevices, Hiroshima University), Seiji Ishikawa (Phenitac Semiconductor Corp.), Hiroshi Sezaki (Phenitac Semiconductor Corp.), Tomonori Maeda (Phenitac Semiconductor Corp.), Shin-ichiro Kuroki (Research Institute for Nanodevices, Hiroshima University)

Thursday, 15th September 2022

14.00 Th-P-B: Poster session B (continued)

Th-P-B.11: Bias temperature stress instability in 4H-SiC capacitors with different metal gate in extremely high temperature environment
VUONG VAN CUONG (Research Institute for Nanodevices, Hiroshima University), Kaho Koyanagi (Research Institute for Nanodevices, Hiroshima University), Tatusya Meguro (Research Institute for Nanodevices, Hiroshima University), Shin-ichiro Kuroki (Research Institute for Nanodevices, Hiroshima University)

Th-P-B.12: Impact of Bias Temperature Instabilities on the Performance of Power Electronics employing SiC MOSFETs
YOANLYS HERNANDEZ BARRIOS (Institute for Microelectronics, TU Wien), Christian Schleich (CDL for Single-Defect Spectroscopy at the Institute for Microelectronics, TU Wien), Bernhard Stampfer (CDL for Single-Defect Spectroscopy at the Institute for Microelectronics, TU Wien), Tibor Grasser (Institute for Microelectronics, TU Wien, Gusshausstrasse 27-29, Vienna, Austria), Michael Watl (CDL for Single-Defect Spectroscopy at the Institute for Microelectronics, TU Wien)

Th-P-B.13: Femtosecond Laser Surface Modification of 4H-SiC
(National Yang Ming Chiao Tung University), Yi-Hsien Liu (National Yang Ming Chiao Tung University), CHUNG-WEI CHENG (National Yang Ming Chiao Tung University), Tsung-Po Chuang (National Yang Ming Chiao Tung University), chai wei ku (National Yang Ming Chiao Tung University), Ray-Hua Horng (National Yang Ming Chiao Tung University)

Th-P-B.14: Bias-induced Instability of 4H-SiC CMOS
YU-XIN WEN (Institute of Electronics, National Yang Ming Chiao Tung University, Hsinchu, Taiwan, R.O.C.), Bing-Yue Tsui (Institute of Electronics, National Yang Ming Chiao Tung University, Hsinchu, Taiwan, R.O.C.)

Th-P-B.15: Effect of impurity and defect on thermal and optical properties of single crystal SiC
XUECHAO LIU (Shanghai Institute of Ceramics, Chinese Academy of Sciences), Shiye Zhuo (Shanghai Institute of Ceramics, Chinese Academy of Sciences), Hao Wang (Shanghai Institute of Ceramics, Chinese Academy of Sciences), Xinfeng Zhu (Shanghai Institute of Ceramics, Chinese Academy of Sciences), Ziqiang Hao (Shanghai Institute of Ceramics, Chinese Academy of Sciences), Minghui Zhang (Shanghai Institute of Ceramics, Chinese Academy of Sciences), Xiuhong Pan (Shanghai Institute of Ceramics, Chinese Academy of Sciences)

Th-P-B.16: Influence of Cell Design and Gate-to-source Voltage on Avalanche Robustness of SiC MOSFET integrated JBS Diode
CHONGYU JIANG (Zhejiang University), Hongyi Xu (Zhejiang University), Na Ren (Zhejiang University), Kuang Sheng (Zhejiang University)

Th-P-B.17: Optimization of 1200V SiC Schottky Diodes for Single Event Immunity
YUNYI QI (The University of Warwick), Marina Antoniou (The University of Warwick), Peter Gammon (The University of Warwick)

Thursday, 15th September 2022

14.00 Th-P-B: Poster session B (continued)

Th-P-B.18: Curvature development in free-standing polycrystalline 3C-SiC thick films

YANN GALLOU (Univ. Grenoble Alpes, CNRS, Grenoble INP, SIMaP), Didier Chaussende (Univ. Grenoble Alpes), Guy Chichignoud (Univ. Grenoble Alpes, CNRS, Grenoble INP, SIMaP), Marie Duvois (Univ. Grenoble Alpes, CNRS, Grenoble INP, SIMaP), Alexandre Potier (Mersen)

Th-P-B.19: Avalanche robustness investigation of SiC avalanche diodes at high temperatures

Takato Sekiguchi (Advanced Power Electronics Research Center, National Institute of Advanced Industrial Science and Technology (AIST)), Masaya Mochiduki (Advanced Power Electronics Research Center, National Institute of Advanced Industrial Science and Technology (AIST)), Masayuki Yamamoto (Advanced Power Electronics Research Center, National Institute of Advanced Industrial Science and Technology (AIST)), Koji Nakayama (Advanced Power Electronics Research Center, National Institute of Advanced Industrial Science and Technology (AIST)), Yasunori Tanaka (Advanced Power Electronics Research Center, National Institute of Advanced Industrial Science and Technology (AIST))

Th-P-B.20: Observation of BPD-TED conversion in a thick SiC epitaxial layer

YUAN BU (Research & Development Group, Hitachi, Ltd.), Hiroyuki Okino (Hitachi, Ltd.), Kumiko Konishi (Hitachi, Ltd.), Akio Shima (Hitachi, Ltd.)

Th-P-B.21: Effect of termination region on unclamped inductive switching failure for 4H-SiC VDMOS

SHAORYU LIU (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences), Xinhong Chen*, li Zheng*, Junhong Feng*, Yuehui Yu (* Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences)

Th-P-B.22: Tailoring the Charge Carrier Lifetime Distribution of 10 kV SiC PiN Diodes by Physical Simulations

ZIMO YUAN (KTH Royal Institute of Technology), Adolf Schöner (II-VI Kista AB), Sergey Reshanov (II-VI Kista AB), Wlodek Kaplan (II-VI Kista AB), Mietek Bakowski (RISE Acreo Swedish ICT AB), Anders Hallén (KTH Royal Institute of Technology)

Th-P-B.23: High quality single crystal recrystallization of thin 4H-SiC films deposited by PVD techniques, a way for new emerging fields

Elise Usureau (Laboratory Light, Nanomaterials & Nanotechnologies, CNRS EMR 7004, University of Technology of Troyes), Enora Vuillermet (Laboratory Light, Nanomaterials & Nanotechnologies, CNRS EMR 7004, University of Technology of Troyes), MIHAI LAZAR (Laboratory Light, Nanomaterials & Nanotechnologies, CNRS EMR 7004, University of Technology of Troyes), Aurore Andrieux (Laboratoire Interdisciplinaire Carnot de Bourgogne (ICB), UMR 6303 CNRS) Alexandre Jacquemot (MICROTEST)

Friday, 16th September 2022

9.00 Fr-1-A: Device reliability, chaired by: Peter Gammon and Gunnar Malm

09.00 Fr-1-A.1: Reliability and Standardization for SiC Power Devices (Invited)

DON GAJEWSKI (Wolfspeed), Satyaki Ganguly (Wolfspeed), Daniel Lichtenwalner (Wolfspeed), Edward Van Brunt (Wolfspeed), Brett Hull (Wolfspeed), Scott Allen (Wolfspeed), John Palmour (Wolfspeed)

09.30 Fr-1-A.2: Humidity Robustness of 3.3kV SiC-MOSFETs for Traction Application - Compared to Standard Silicon IGBTs in Identical Packages

MICHAEL HANF (University of Bremen), Jan-Hendrik Peters (University of Bremen), Felix Hoffmann (University of Bremen), Nando Kaminski (University of Bremen)

09.50 Fr-1-A.3: 650V vertical SiC MOSFETs and diodes with improved terrestrial-neutron single-event burnout

DANIEL LICHTENWALNER (Wolfspeed), Satyaki Ganguly (Wolfspeed), Brian Fetzer (Wolfspeed), Callie Woods (Wolfspeed), Don Gajewski (Wolfspeed), Sei-Hyung Ryu (Wolfspeed), Brett Hull (Wolfspeed), Scott Allen (Wolfspeed), John Palmour (Wolfspeed)

10.10 Fr-1-A.4: Reliability of SiC MOSFET power modules under consecutive H3TRB and Power Cycling Stress

FELIX HOFFMANN (University of Bremen), Stefan Schmitt (Semikron Elektronik GmbH&Co. KG), Nando Kaminski (University of Bremen)

9.10 Fr-1-B: Data-driven optimization, chaired by: Andrea Irace and Julie Widiez

09.10 Fr-1-B.1: Data-driven and artificial intelligent based identification of screw dislocations and Burgers vector direction on X-ray topography of 4H-SiC wafer

BINH DUONG NGUYEN (Research Center Jülich Institute for Advanced Simulation), Melissa Roder (Kristallographie, Albert-Ludwigs-University Freiburg, Freiburg), Andreas Danilewsky (Kristallographie, Albert-Ludwigs-University Freiburg, Freiburg), Johannes Steiner (Crystal Growth Lab, Materials Department 6, FAU), Peter Wellmann (Crystal Growth Lab, Materials Department 6, FAU), Stefan Sandfeld (Research Center Jülich Institute for Advanced Simulation)

09.30 Fr-1-B.2: Correlation of extended Defects with electrical Yield of MOSFET Devices

DANIEL BAIERHOFER (Robert Bosch GmbH), Bernd Thomas (Robert Bosch GmbH), Frank Staiger (Robert Bosch GmbH), Benjamin Marchetti (Robert Bosch GmbH), Christian Foerster (Robert Bosch GmbH), Tobias Erlbacher (Fraunhofer IISB)

09.50 Fr-1-B.3: The optimization, fabrication and comparison of 10 kV-rated 4H-SiC IGBTs and MOSFETs

BENJAMIN RENZ (University of Warwick), Tianxiang Dai (University of Warwick), Vishal Shah (University of Warwick), Marina Antoniou (The University of Warwick), Neophytos Lophitis (University of Nottingham), Amit K. Tiwari (University of Cambridge), Tatjana Trajkovic (Department of Engineering, University of Cambridge), Florin Udrea (University of Cambridge), Phil Mawby (The University of Warwick), Peter Gammon (The University of Warwick) (Withdrawn)

Friday, 16th September 2022

11.00 Fr-2-A: Charge carrier characterization, chaired by: Michael Rüb and Ivana Capan

11.00 Fr-2-A.1: Hole capture cross section of the Al acceptor level at finite temperature

MASASHI KATO (Nagoya Institute of Technology), Jing Di (Nagoya Institute of Technology), Yutaro Ohkouchi (Nagoya Institute of Technology), Taisuke Mizuno (Nagoya Institute of Technology), Masaya Ichimura (Nagoya Institute of Technology), Kazutoshi Kojima (National Institute of Advanced Industrial Science and Technology)

11.20 Fr-2-A.2: Analysis of electron and hole mobility in nitrided 4H-SiC MOSFETs using substrate-bias and Hall measurements

SARIT DHAR (Auburn University), Suman Das (Auburn University), Yongju Zheng (Auburn University), Ayayi Ahyi (Auburn University), Tamara Isaacs-smith (Auburn University)

11.40 Fr-2-A.3: Anisotropy of hole mobility in 4H-SiC over wide ranges of acceptor concentration and temperature
RYOYA ISHIKAWA (Kyoto University), Hajime Tanaka (Osaka University), Mitsuaki Kaneko (Kyoto University), Tsunenobu Kimoto (Kyoto University)

11.00 Fr-2-B: Processing optimization, chaired by: Heiji Watanabe

11.00 Fr-2-B.1: Threshold voltage adjustment on 4H-SiC MOSFETs using p-doped polysilicon as a gate material
ALEXANDER MAY (Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB), Mathias Rommel (Fraunhofer IISB), Affan Abbasi (University of Arkansas), Tobias Erlbacher (Fraunhofer IISB)

11.20 Fr-2-B.2: Critical angle of MeV Al-ion channeling implantation into SiC

AKIRA INOUE (Kyoto University), Mitsuaki Kaneko (Kyoto University), Yoshiyuki Yonezawa (National Institute of Advanced Industrial Science and Technology(AIST)), Tsunenobu Kimoto (Kyoto University)

11.40 Fr-2-B.3: Temperature Dependent Mobility Model for Predictive TCAD Simulations of 4H-SiC
HEMANT DIXIT (Wolfspeed), Daniel Lichtenwalner (Wolfspeed), Andreas Scholze (Wolfspeed), Jae-Hyung Park (Wolfspeed), Steven Rogers (Wolfspeed), Simon Bubel (Wolfspeed), Sei-Hyung Ryu (Wolfspeed)

Friday, 16th September 2022

14.00 Fr-Plenary-3: Plenary talk 3, chaired by: Ulrike Grossner and Gregor Pobegen

14.00 Fr-Plenary-3: Monolithic Bidirectional Switches – Opening New Horizons in Power Electronics

PROF. DR. JOHANN KOLAR (ETH Zurich)

15.00 Fr-Plenary-4: Closing session, chaired by: Ulrike Grossner

15.00 Fr-Plenary-4: Official closing of the ICSCRM2022 and announcement of the ICSCRM2023
Prof. Ulrike Grossner (ETH Zurich), Dr. Gregor Pobegen (KAI GmbH), Prof. Andrea Irace (University of Naples "Federico II")

16.00 End of ICSCRM 2022, the 19th Edition of the International Conference on Silicon Carbide and Related Materials

Thanks a lot for all of your contributions and let's meet again at ICSCRM 2023!

