

12th European Conference on Silicon Carbide and Related Materials

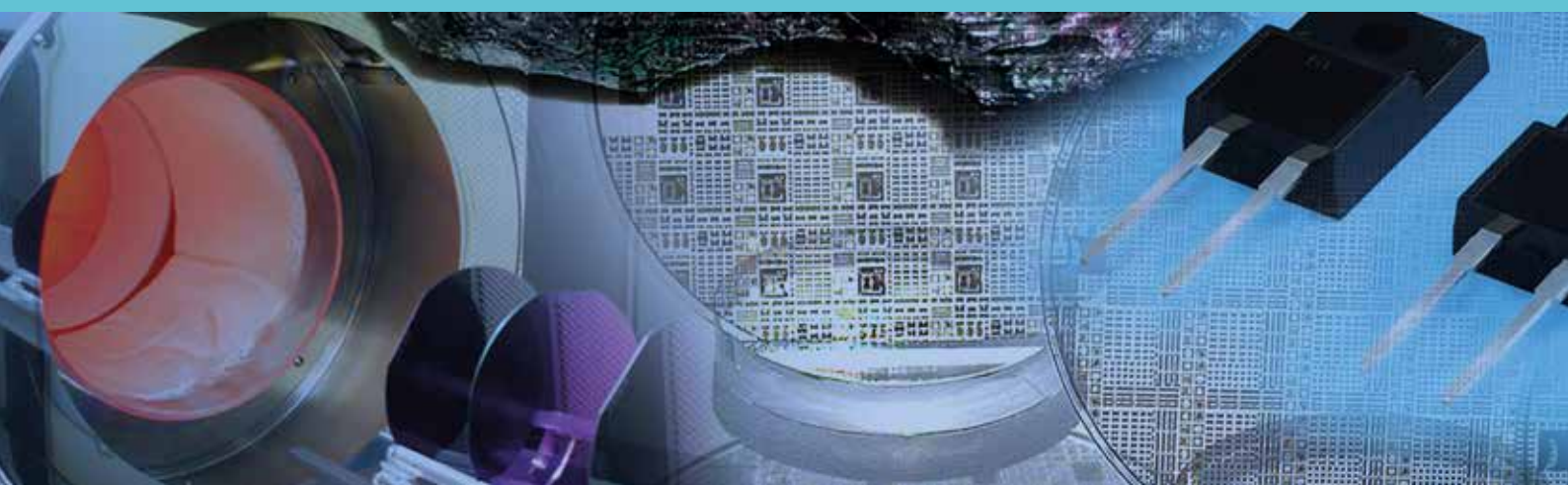
2nd – 6th September 2018

The International Convention Centre, Birmingham, UK

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Programme and Exhibition Guide



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Welcome to the conference!



On behalf of the ECSCRM 2018 Conference Organising Committee I would like to extend a warm welcome to you, and anticipate a rewarding experience over the next few days. ECSCRM is run biannually, across Europe, with

many attendees from all around the world, including the USA and Asia. This year's edition, is held here in Birmingham, UK.

Birmingham is the second city of the UK and is famous for its place in initiating the first industrial revolution in the 18th century. Since then it has grown to a population of over 1 million people, with almost a third of residents of a minority ethnic origin, bringing a rich diversity to the city. Whatever cultural experience you are looking for, I'm sure you will find it here in Birmingham.

This year we have over 300 papers to be presented both in the oral sessions and at the poster sessions. These are accompanied by 15 invited talks. We also

have arranged a number of opportunities to network with other attendees at the conference; this might be through the various coffee breaks, lunch breaks, or indeed at the conference gala dinner and other social events that have been organised throughout the week.

SiC device technology is certainly starting to be taken up by industry. Automotive and aerospace in particular are developing new products that utilise the benefits that SiC brings. Much of this is at an early stage but over the next few years it will emerge into a multi-\$b market with applications throughout the electrical power conversion markets of all sorts. It is indeed a very exciting time to be part of the research community as the fruits of our efforts are finally realised in mass market applications. There are still many challenges ahead, and we expect that many of those issues will be considered and addressed during the days of this conference.

We thank you all for attending and hope you have an excellent stay in Birmingham.

Professor Phil Mawby
ECSCRM2018 Chair

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Important Conference Information

Conference Badge

Badges must be worn at all times within the conference venue, including at meal functions.

Recording/photo policy

Recording or photography of conference presentations, posters or displays is strictly prohibited without explicit prior permission of the presenter.

Organisers and committees

Local Organising Committee

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Professor Nick Wright, University of Newcastle – Treasurer
Dr Mike Jennings, University of Warwick – Tutorial Day and Social Programme
Dr Peter Gammon, University of Warwick – Technical programme and Publishing
Dr Huaping (Stefan) Jiang, University of Warwick – Signage and Publishing
Dr Vishal Shah, University of Warwick – Technical programme and promotion
Dr Alberto Castellazzi, University of Nottingham – Sponsorship
Mrs Faye Padfield – University of Warwick, Project Manager and Secretary

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Adrian Powell, Cree, USA
Adolf Schoner, Ascatron, SWEDEN
Vishal Shah, University of Warwick, UK
Ping Wu, II-VI Incorporated, USA
Rositza Yakimova, Linkoping University, SWEDEN

II. Characterization and modelling

Peder Bergman, Linkoping University, SWEDEN
Michael Dudley, Stony Brook University, USA
Adam Gali, Budapest University of Technology and Economics, HUNGARY
Michael Krieger, Friedrich-Alexander-Universitat Erlangen, Nuremburg - GERMANY
Tsunenobu Kimoto, Kyoto University, JAPAN
Bengt Svernnson, University of Oslo, NORWAY
Patrick Soukiasian, CEA, FRANCE

III. Processing

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Wolfgang Bergner, Infineon Technologies, AUSTRIA
Peter Gammon, University of Warwick, UK
Anders Hallen, KTH, SWEDEN
Roberta Nipoti, CNR-IMM, ITALY
Fabrizio Roccaforte, National Research Council Catania, ITALY
Roland Rupp, Infineon Technologies, GERMANY

Konstantin Vasilevskiy, University of Newcastle, UK

Konstantinos Zekentes, Foundation for Research and Technology, Heraklion, GREECE

IV. Devices and Applications

Olayiwola Alatise, University of Warwick, UK
Gheorghe Brezeanu, University Politehnica of Bucharest, Bucharest, ROMANIA
Matthias Bucher, Technical University of Crete, Chania, GREECE
Alberto Castellazzi, University of Nottingham, UK
Bill Drury, Independent Consultant, UK
Phillipe Godignon, Centro Nacional de Microelectronica, Barcelona, SPAIN
Andrea Irace, University of Naples Federico II, ITALY
Mike Jennings, University of Warwick, UK
Bing Li, University of Leicester, UK
Phil Mawby, University of Warwick, UK
Richard McMahon, University of Warwick, UK
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Dethard Peters, Infineon Technologies, GERMANY
Dominique Planson, National Institute of Applied Sciences, Lyon, FRANCE
Roland Rupp, Infineon Technologies, GERMANY
Mario Saggio, ST, Catania, ITALY
Jun Zeng, MaxPower Semiconductor, USA

Conference Secretariat

Faye Padfield, Project Manager
Eileen Higham, Project Administrator
Sarah Wilson, Project Administrator

Committee chairs in bold

Special thanks

ECSCRM 2018 has been funded in part by the generous contributions of these organisations:

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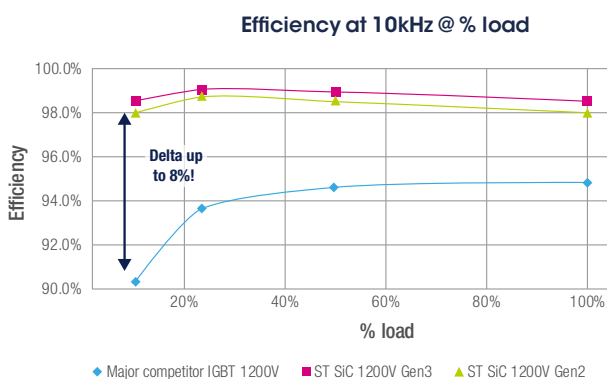
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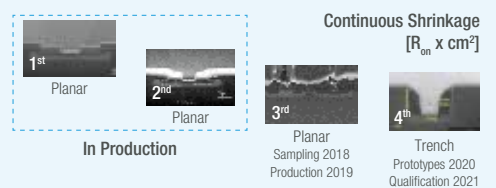
Silicon Carbide MOSFET: ST is driving the "electric car revolution" Through leading edge technology and manufacturing



Key Benefits for the EV/HEV Traction Inverter

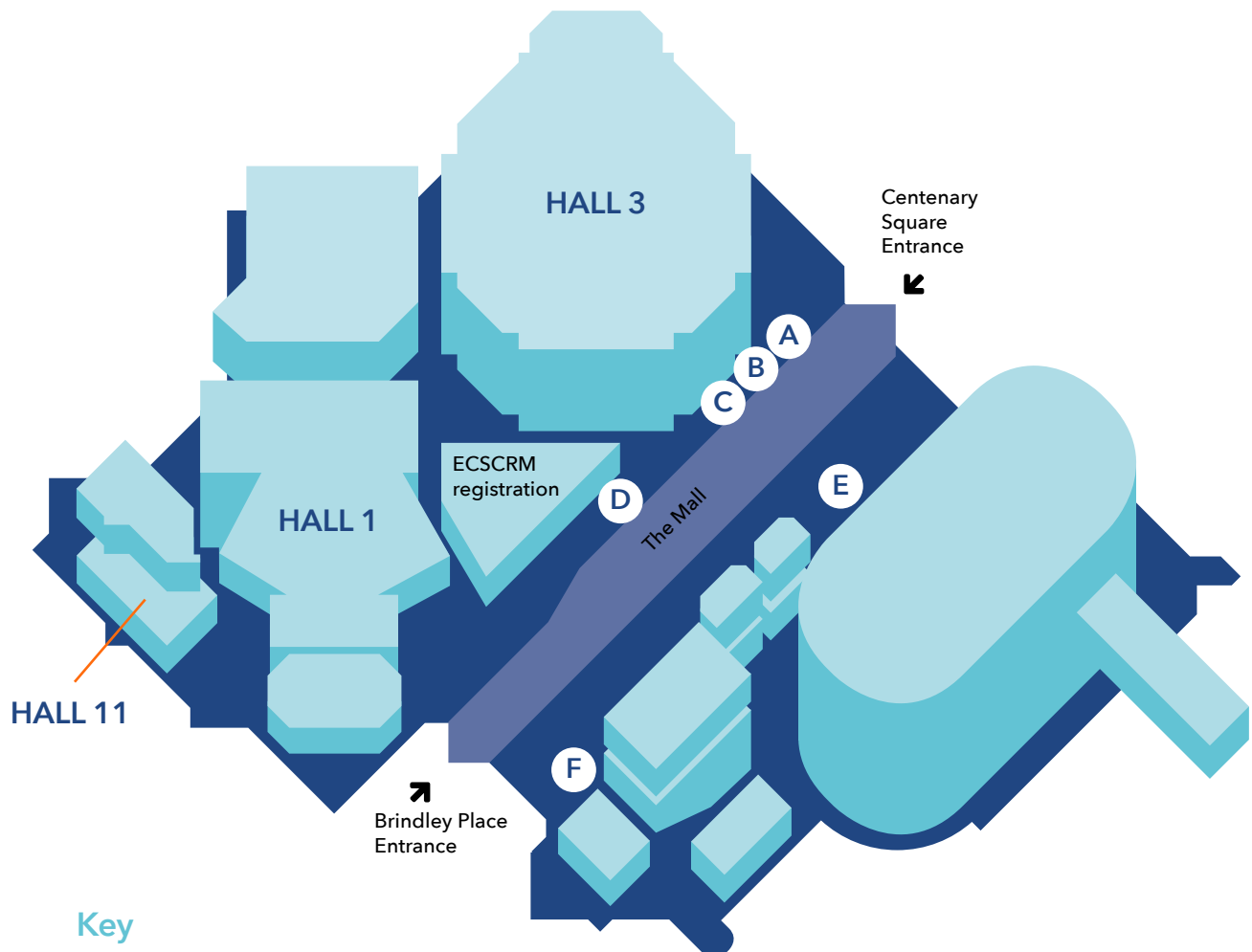
- Better efficiency for Extra mileage
- Lower battery cost
- Cooling System downsizing

ST SiC MOSFET Technology Evolution



ICC floor plan

ECSCRM 2018 takes place in Halls 1, 3 and 11 of the ICC



Key

- A Business Reception
- B Starbucks
- C WH Smiths
- D Oak Kitchen
- E THSH Shop
- F Castle Fine Art

The Conference Secretariat is located in the registration area on level 3 between Halls 1 and 3.

Hours

Sunday: 08.00-20.00
Monday: 08.00-20.00
Tuesday: 08.00-18.00
Wednesday: 08.00-17.00
Thursday: 08.00-17.00

Places to explore in Birmingham

We hope you will have a chance to visit some of the many attractions, restaurants and bars in England's Second City. A few suggestions are given below, but more detailed information can be found on the Visit Birmingham website - visitbirmingham.com

Birmingham Attractions	Distance from ICC	Restaurants and Bars	Distance from ICC
Thinktank, Millennium Point, Curzon Street www.thinktank.ac <i>There are four floors of hands-on science exhibits, plus the UK's first purpose-built digital planetarium, enabling visitors to experience stars and planets, dive under the ocean and even travel through the human body.</i>	1.2 miles	Adam's, 16 Waterloo St., B2 5UG www.adamsrestaurant.co.uk <i>A contemporary British fine dining restaurant serving modern dishes</i>	0.4 miles
Birmingham Art Gallery & Museum, Chamberlain Square www.bmag.org.uk <i>Founded in 1885, today BMAG is home to one of the world's finest collections of Pre-Raphaelite art, many travelling exhibitions, and it also hosts the Staffordshire Hoard.</i>	0.4 miles	The Wilderness, 27 Warstone Lane, B18 6JQ www.werethewilderness.co.uk <i>Modern British Food</i>	0.9 miles
Museum of the Jewellery Quarter, Vyse Street www.bmag.org.uk/museum-of-the-jewellery-quarter <i>The old Smith & Pepper factory is like a time capsule, telling the story of Birmingham's renowned jewellery and metalworking heritage through tours and demonstrations.</i>	1.1 miles	Tapas Revolution, Grand Central, B2 4XJ www.tapasrevolution.com <i>Spanish café/restaurant, specialising in tapas dishes</i>	0.8 miles
The Coffin Works, 13-15 Fleet Street, B3 1JP www.coffinworks.org <i>Birmingham's newest, award-winning independent museum, a truly unique space exploring the social history and cultural changes that have influenced a once highly-prestigious Jewellery Quarter firm.</i>	0.4 miles	Marmalade, Birmingham Repertory Theatre, Broad Street, B1 2EP www.marmaladebirmingham.co.uk <i>Handcrafted cocktails and flexitarian food menu.</i>	0.2 miles
Winterbourne Gardens, 58 Edgbaston Park Rd, B15 2RT www.winterbourne.org.uk <i>One of the area's top rated attractions, Winterbourne is a delightful Edwardian House and Botanic Garden tucked away in leafy Edgbaston, only minutes from the city centre.</i>	2.3 miles	Opheem, 48 Summer Row, B3 1JJ www.opheem.com <i>Fine dining with an Asian twist</i>	0.2 miles
Birmingham Botanical Gardens, Westbourne Rd, B15 3TR www.birminghambotanicalgardens.org.uk <i>15 acre botanical gardens and educational charity, featuring four glasshouses, an Avery, wildlife trails and a seasonal butterfly house.</i>	1.2 miles	Pushkar, 245 Broad Street, B1 2HQ www.pushkardining.com <i>Punjabi and North Indian Cuisine</i>	0.2 miles
National Sea Life Centre The Waters Edge, Brindleyplace, B1 2HL www.visitsealife.com/birmingham <i>Be transported into an amazing underwater world at the Aquarium.</i>	0.2 miles	Ristorante Caffè Gustami, 4 King Edwards Road, B1 2PZ www.ristorantecaffegustami.uk <i>Traditional Italian Cuisine</i>	0.7 miles
The Electric Cinema, 47-49 Station Street, B5 4DY www.theelectric.co.uk <i>Oldest working cinema in the UK.</i>	0.6 miles	The Canal House 12 Bridge Street, B1 2JR thecanalhouse.uk.com <i>Serves food and an extensive range of beers and cocktails. A pleasant outdoor area and terrace if the weather is good.</i>	0.1 miles
		The Wellington thewellingtonrealale.co.uk <i>Specialist real ale pub</i>	0.5 miles
		Purecraft Bar, 30 Waterloo St., B2 5TJ www.purecraftbars.com <i>Food and beer hall</i>	0.4 miles
		The Alchemist, 39 Colmore Row, B3 2DA, thealchemist.uk.com <i>Cocktail Bar. Serves Food.</i>	0.6 miles

Plenary speakers

09:00 - Welcome to ECSCRM 2018

Phil Mawby - ECSCRM 2018 Chairman



09:10 - Plenary Talk: Overview of the UK's Compound Semiconductor Cluster

Dr Andrew W Nelson OBE, BSc, PhD, FEng
President and Chief Executive Officer, IQE



Dr Drew Nelson has over 30 years' experience in the semiconductor industry in a variety of research and managerial positions. Following a PhD in Semiconductor Physics, he joined BT Research Laboratories in 1981, leading the group responsible for the development of advanced optoelectronic devices for optical fibre communications. He subsequently managed the technology transfer from BT to Agilent for mass production. He co-founded EPI in 1988 (which became IQE in 1999) and was appointed Chief Executive Officer of IQE Plc in April 1999.

Dr Nelson has held several Non-Executive Directorship appointments, and served on several Government and Industry bodies. He received an OBE in 2001 for services to the Electronics Industry. He is currently a member of the High Level Group appointed by the EC to oversee the implementation of Key Enabling Technologies (KETs) throughout Europe.



09:25 - Plenary Talk: How silicon carbide technology is enabling the development of "More Electric Aircraft"

Shane O'Donnell
Senior Manager, Systems Design & Aerospace Centre of Excellence, Microsemi



Shane O'Donnell is the Senior Manager of Systems Design and manages the Aerospace Centre of Excellence in Microsemi's Integrated Power Solutions™ business unit. Mr. O'Donnell joined Microsemi Ireland in 2009 as Principal Engineer and in 2011 became the Product Engineering Manager and lead the development of the non-hermetic discrete product range. In 2014, Mr. O'Donnell became the Aerospace Product Development and Technology Manager for the IPS range before transitioning to his current roles.

Prior to Microsemi, Mr. O'Donnell spent 13 years working as an electronics design engineer with medical companies such as Vitalograph, Respironics and Crospon. Mr. O'Donnell holds a B.Eng. degree in Electronic Engineering from the University of Limerick and is completing a PhD in Electrical and Electronic Engineering in the University of Nottingham. The area of Mr. O'Donnell's research is the Reliability of Wide Bandgap Semiconductors and their use in More Electric Aircraft.



09:45 - Plenary Talk: SiC MOSFET developments

Peter Friedrichs - Infineon



Dr. Peter Friedrichs was born in 1968 in Aschersleben, Germany. After achieving his Dipl.-Ing. in microelectronics from the Technical University of Bratislava in 1993, he started a Ph.D work at the Fraunhofer Institut FhG-IIS-B in Erlangen. In 1996 he joined the Corporate Research of the Siemens AG and was involved in the development of power switching devices on SiC, mainly power MOSFETs and vertical junction FETs.

Peter Friedrichs joined SiCED GmbH & Co. KG, a company being a joint venture of Siemens and Infineon and originated from the former Siemens research group, on March the 1st, 2000. Since July 2004 he was the managing director of SiCED, responsible for all technical issues. After the integration of SiCED's activities into Infineon he joined Infineon as Senior Director Silicon Carbide from April 1st, 2011.

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Invited speakers



Dr Rachael Myers-Ward

US Naval Research Laboratory, USA
Session: MO.02 4H-SiC epitaxy new trends

Remote Epitaxy: The Future for Stackable SiC Electronics

Rachael Myers-Ward is an electrical engineer in the Power Electronics Branch/ Power Electronic Materials Section at the U.S. Naval Research Laboratory. She received a Ph.D. in electrical engineering in 2006 and B.S. and M.S. degrees in chemical engineering in 2001 and 2003, respectively, from the University of South Florida. Her research interests include epitaxial growth of SiC via chemical vapor deposition for high power/ high voltage device applications and quantum sciences, investigations to reduce extended and point defects in SiC epitaxial layers, and synthesis of epitaxial graphene for sensor applications.



Dr Mermet- Guyennet

Supergrid Institute SAS, France
Session: MO.03 Applications Potential of SiC devices in MVDC and HVDC converters for Grid: application requirements and reliability validation standards

Michel Mermet Guyennet was born in 1957. He holds PhD (1984) in Applied Physics from Université de Marseille-Luminy and graduated from Ecole Centrale de Paris (1981). He successively worked for Thomson Militaire et Spatial, SGS-Thomson, Advanced Computer Research Institute and Compagnie des Signaux where he was in charge of R&D programmes in the field of electronic components and system hardware. He joined ALSTOM Transport in 1996 in charge of technology development for IGBT power converters for traction. From 2001 to 2010, he was Technical Director of Power Electronics Associated Research Laboratory (PEARL). From 2011 to 2013, he was in charge of development of full SiC converter with high speed motor. He is now with Supergrid-Institute in Villeurbanne as Director of Program Power Electronics & Converters. He supervises development of 10kV SiC BJT and PiN diodes and stability-robustness assessment of SiC MOSFET.



Mr Shunsuke Asaba

Toshiba Corporation, Japan
Session: TU.01a MOS Interface Processing Interface Reaction in the High-temperature N2 Annealing Process for Gate Insulator on SiC with High-Mobility and High-Reliability

Shunsuke Asaba received a master's degree from Nagoya University, Japan in 2014. He joined Toshiba Corporation as a researcher and is involved in R&D of wide-bandgap semiconductor devices. In his current work on SiC-MOSFET, he studies MOS process technology.



Dr Nicolò Piluso

STMicroelectronics, Italy
Session: TU.01b 4H-SiC epitaxy High quality 4H-SiC epitaxial layer by tuning CVD process

Nicolò Piluso was born in Catania, Italy, in 1979. He received a B.S. degree in physics from the University of Catania, Catania, in July 2004. In March 2008 he received a Ph.D. in physics from the University of Catania, studying the magnetic activity in late-type stars. From July 2008 to December 2009, he attended the SiCilab training project, for the "Training of experts in the growth of high gap semiconductors" organized by the Institute of Microelectronics and Microsystems, National Research Council (CNR-IMM), Catania. From April 2010 to December 2011 he worked for CNR-IMM as "post-doctoral fellowship". In 2012, he worked in the R&D department of Epitaxial Technology Center s.r.l. From 2013 to 2014 he worked for CNR-IMM as "post-doctoral fellowship". Starting from 2014 he works for STMicroelectronics s.r.l. in R&D group. His main research activity is dedicated to SiC epitaxial growth and optical characterization. His research also include study of ion implantation process, thermal process, defects characterization and electrical evaluation of power devices. He is member of IEC (International Electrotechnical Commission); he was nominated expert for SiC material in 2017. He published more than 80 articles in scientific journals and International conference proceedings.



Dr Edward Van Brunt

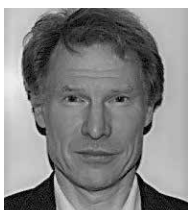
Wolfspeed, A Cree Company, USA
Session: TU.02a Power MOSFET Industrial and Body Diode Qualification of Gen-III Medium Voltage SiC MOSFETs: Challenges and Solutions

Edward Van Brunt joined Cree in 2013 as a Research Scientist. He received his BSEE degree from the University of Texas at Austin in 2007, and received his MS and Ph.D. in electrical engineering from North Carolina State University in 2009 and 2012, respectively. He has authored or co-authored more than 55 papers, and holds 8 US patents. Edward's research interests include high voltage SiC device development and processing, as well as defect analysis in 4H-SiC wafers.

**Professor Antonella Parisini**

University of Parma, Italy
Session: TU.02b Fundamental Properties
 Carrier transport mechanisms in highly-doped p-type 4H-SiC(Al)

Antonella Parisini is Associated Professor of the University of Parma since December 2004. Her main expertises concern the study of basic electronic properties of compound semiconductors, by optical, photoelectrical, transport investigation, in particular: (i) III-V epitaxial single and multi- layers, consisting in both 3D and quantum confined 2D structures, aimed to applications in electronics, optoelectronics, photovoltaics; (ii) bulk structures of wide-bandgap semiconductors, in particular ion-implanted 4H-SiC, finalized to devices for power electronics, and, more recently, group III-sesquioxides, in particular β - and ϵ - Ga₂O₃ polytypes. The physical properties of wide-bandgap semiconductors and their potential applications for power electronics constitute her current main research interest, particularly focused on electrical properties of the materials. She is co-author of more than 100 publications, including articles in international journals and conference proceedings, participated to several research projects and was member of the Organizer Committee of international congresses, in particular, regarding wide-bandgap semiconductors, of the International Workshop on Gallium Oxide and Related Materials IWGO2017 (12-15 September 2017, Parma, Italy).

**Professor Anders Hallén**

Royal Institute of Technology, Sweden
Session: TU.03a Ion Implantation
 Recent advances in the doping of 4H-SiC by channelled ion implantation

Professor Anders Hallén received his M.Sc. degree in electronic engineering in 1985 and PhD in ion physics 1990 from Uppsala University, Sweden. He started at The Royal Institute of Technology, KTH, in 1996. Hallén's major research area involves material modification using ion beams, targeted on the electrical properties of semiconductor materials. He has also been associated with ABB, developing methods for charge carrier lifetime control for Si power devices, and later involved in SiC power device development. Since 2006 he is a professor at KTH, focusing on the development of SiC power devices. He was also highly involved in the formation of the Ion Technology Centre (ICT) in 2001, a Swedish national platform for the application of ion beams. His publication list includes over 200 articles in international journals and he has supervised 13 PhD students.

**Dr Patrick Fiorenza**

NR-IMM Catania, Italy
Session: TU.03b MOS Interface Characterisation
 SiO₂/SiC MOSFETs interface traps probed by nanoscale analyses and transient current and capacitance measurements

Patrick Fiorenza received an M.Sc. in Physics and a PhD in Material Science from the University of Catania in 2003 and 2007, respectively. In 2005, he was visiting scientist at IMEC (Belgium). Since 2011 he is permanent Staff Researcher at CNR-IMM. His research activity is mainly focused on carrier transport, trapping phenomena and reliability at MIS and MS interfaces in SiC and GaN. He has a recognized experience in characterization of advanced materials and devices by scanning probe microscopy. He is co-author of more than 120 papers and three book chapters. He was member of the local organizing committee of Hetero-SiC-WASMPPE 2009, WOCSDICE2011 and ICSCRM 2015, and was involved in several European and national projects (NUOTO, NetFISiC, Last Power, Ambition Power, WinSiC4AP and CHALLENGE). He is principal investigator for the CNR-IMM unit of the project GRIFONE (2015-2018) within the FlagERA call.

**Dr Naoyoshi Komatsu**

Advanced Industrial Science and Technology (AIST)
Session: WE.01a Solution Growth
 Application of defect conversion layer by solution growth for reduction of TSDs in 4H-SiC bulk crystals by PVT growth

Dr Naoyoshi Komatsu is a research scientist at the National Institute of Advanced Industrial Science and Technology (AIST). He received his PhD degree in electrical engineering from Osaka University in 2011, based on his work on SiC devices and material characterization. He joined R&D Partnership for Future Power Electronics Technology (FUPET) in April of 2011, where he conducted solution growth of SiC bulk crystal based on optimization of solvents. Komatsu joined AIST from 2015, where his current research involves high quality SiC crystals by solution growth and related fundamental technologies.

**Naoki Watanabe**

Hitachi, Ltd., Japan
Session: WE.02a High Voltage Devices
 Improvement of Switching Characteristics in 6.5-kV SiC IGBT with Novel Drift Layer Structure

Naoki Watanabe is a researcher in the Center for Technology Innovation Electronics at Hitachi, Ltd. He received his B.S. and M.S. in 2008 and 2010, respectively, and Ph.D. in Engineering in 2013 from Kyoto University, studying MEMS and sensors with

wide bandgap semiconductors. His current research interests include SiC device physics and power electronics.



Dr Kevin Matocha

Monolith Semiconductor, USA
Session: WE.03a Device ruggedness
Reliability and ruggedness of planar Silicon Carbide MOSFETs

Kevin Matocha received a B.S. degree in electrical engineering from Louisiana Tech University, Ruston, LA, in 1995, and M.S. and Ph.D. degrees in electrical engineering from the Rensselaer Polytechnic Institute (RPI), Troy, NY, in 1998 and 2003, respectively. His doctoral work examined the capabilities of GaN MOSFETs for high-voltage switching applications. From 2000 to 2011, he was with the General Electric Global Research Center, developing wide-bandgap devices, including harsh environment sensors and power devices using silicon carbide and gallium nitride. He was a member of the team who received the 2009 Robert N. Hall Award, and was awarded the 2010 Albert Hull Award for his early career research. In 2011, he joined SemiSouth as Vice President of Product Development, commercializing SiC power devices including high-voltage SiC Schottky diodes and SiC JFETs. In 2012, he co-founded Monolith Semiconductor Inc., Austin, TX, a supplier of SiC Schottky diodes and SiC MOSFETs for power electronics applications, where he serves as Chief Technology Officer. His technical interest focuses on the performance and reliability of SiC MOS devices. Dr. Matocha has published 80 journal and conference articles, has authored one book chapter, and has been awarded 33 patents. He is currently an editor of IEEE Electron Device Letters.



Professor Ohtani Noboru

Kwansei Gakuin University, Japan
Session: WE.03b PVT Growth
Key issues in physical vapor transport growth of SiC bulk crystals for power device applications

Noboru Ohtani is Professor of School of Science and Technology and Director of R&D Center for SiC Materials and Processes at Kwansei Gakuin University, Hyogo, Japan. He earned his PhD 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. For more than 25 years, he has pioneered and made seminal contributions to the development and manufacturing of large high-quality SiC single crystals and substrates.



Masashi Nakajima

Dept. of Electronic Sci. Eng., Kyoto University, Japan
Session: TH.01 SiC Integrated Circuit

400°C operation of normally-off n- and p-JFETs with a side-gate structure fabricated by ion

implantation into a high-purity semi-insulating SiC substrate

Masashi Nakajima received a B.E. degree from Kyoto University, Kyoto, Japan, in 2018. He is currently pursuing an M.E. degree with Kyoto University, Kyoto, Japan. His current research interests include fabrication and characterization of SiC JFETs.



Dr Lasse Vines

University of Oslo, Norway
 Lasse Vines

Session: TH02 Contacts and Other Processing

Understanding and control of deep level defects in 4H-SiC: In

Memoriam Bengt G. Svensson

Lasse Vines holds an Associate Professor position at the Department of Physics, University of Oslo. He received his Ph.D. from the University of Oslo in 2008, where he did his work in the group of Prof. Bengt G. Svensson. Vines research activity is focused on doping, defects, diffusion and ion beam modification in semiconductors; both in bulk, thin films and nanostructures, particularly related to materials such as silicon, silicon carbide and oxide semiconductors. His scientific expertise is mainly of experimental character and related deposition, and electrical and chemical characterization. Vines has authored or co-authored >110 technical papers in refereed scientific journals and contributed to one book chapter.



Professor Jose Coutinho

University of Aveiro, Portugal

Session: TH.03 Carrier Lifetime
Carbon vacancies and interstitials in 3C- and 4H-SiC: theoretical milestones and challenges

José Coutinho did his PhD in 2002 at the University of Exeter, United Kingdom, where he studied physics of defects in semiconductors with Bob Jones. He currently holds a position of Principal Researcher at the i3N Laboratory of the University of Aveiro in Portugal. His research interests span several topics, including physical problems in solar power conversion, in bio-functional and two-dimensional materials, in surface science or semiconductor detectors. He has been addressing problems in the above areas by means of atomistic modeling and electronic structure calculations using density functional and many-body perturbation methods.

Invited posters



Daniel Habersat

US Army Research Laboratory
INV.P.01: Influence of High-Temperature Bias Stress on Room-Temperature VT Drift Measurements in SiC Power MOSFETs

Daniel Habersat is a researcher on the Wide Bandgap Device

Physics Team in the Power Conditioning Branch of the U.S. Army Research Laboratory, and has worked on performance and reliability assessment of wide bandgap MIS-based power electronics, particularly SiC/SiO₂, since 2001. Identifying the underlying causes of threshold voltage instability, along with developing methodologies to characterize it, has been his focus for a number of years. Mr. Habersat is currently a PhD candidate in the Reliability Engineering at the University of Maryland and earned his M.S. degree in Applied Physics at Johns Hopkins University in 2007.

Technology, Aichi, Japan. Since 2013, he has worked for Toshiba Corporation. His research interests include reliability of SiC power device and micro electro mechanical systems (MEMS).



Maria Cabello

IMB-CNM

INV.P.04: Evidence of channel mobility anisotropy on 4H-SiC MOSFETs with low interface trap density

Maria Cabello was born in 1988, She received a B.S. degree in physics from the Autonomous

University of Barcelona (UAB), Barcelona, Spain in 2012, and an M.S. degree in biomedical engineering in the University of Barcelona (UB) in 2014. In 2015 she joined the Power Devices and Systems Group, National microelectronics center of Barcelona (CNM), Barcelona, Spain. Her research activity is primarily related to SiO₂/SiC interface and high-k materials. She has co-authored more than 10 papers including regular and conference papers.



Dr. Kazuhiko Kusunoki

Tohoku University

INV.P.02: High quality 4H-SiC substrates grown by solution growth method for power device application
Kazuhiko Kusunoki

Kazuhiko Kusunoki is a senior researcher in the Advanced

Technology Research Laboratories at Nippon Steel & Sumitomo Metal Corporation, Japan.

From 1993 to 2000, he conducted R&D of inorganic materials used for CZ-Si single crystal pulling. In 2000, he started R&D of crystal growth of SiC and related wide bandgap semiconductor from liquid phase. He received the degree of doctor of engineering from the Nagoya University in 2014, based on his work on SiC solution growth. He is a visiting professor at the graduate school of environmental studies, Tohoku University since 2014.



Romain Bange

IMEP-LAHC

INV.P.05: Development of SOI FETs based on cores-shell Si/SiC nanowires for sensing in liquid environments

Romain Bange is currently a Ph.D. student in the IMEP-LAHC laboratory (Grenoble, France)

involved in nanoelectronics and nanotechnology research. His work focuses on developing biosensors based on SiC nanostructures for electrical detection of DNA. He graduated from Grenoble Institute of Technology with majors in Physics, Electronics and Materials in 2014 (French Diplôme d'Ingénieur).



Dr. Akihiro Goryu

Corporate Research
Development Center, Toshiba
Corporation

INV.P.03: The evaluation of the mechanical stress effect for stacking fault expansion in 4H-SiC p-i-n diode

Akihiro Goryu received his M.S.

degree in Electrical and Electronic Engineering in 2010, and Ph.D. degree in Electronic and Information Engineering in 2013, all from Toyohashi University of

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Industrial session schedule

Monday 3rd September

Hall 1, 18:00 - 20:00

Session Chairs: Richard McMahon, University of Warwick; Craig Fisher, UTC

Time	Institution or organisation	Name	Title
18:00	Wolfspeed, A Cree Company	Chris Dimino	Wolfspeed Materials Update
18:08	Dow Chemical Company	Jianwei Dong	Partnering for the Future with DuPont Electronics and Imaging on SiC Materials
18:16	Revasum	Rob Rhoades	Streamlined SiC Substrate Grind and CMP
18:24	AIXTRON SE	Dr Frank Wischmeyer	Accelerated adoption of SiC in power electronics applications
18:32	II-VI Advanced Materials	Dr Andy Souzis	SiC Market Demand, Manufacturing Expansion and Technology Status at II-VI Advanced Materials
18:40	Lasertec US	Eru Yamamura	SICA for High Volume Manufacturing Inspection Solutions
18:48	centrotherm international	Patrick Schmid	SiC Activation and Oxidation Technology Aspects
18:56	Oxford Instruments Plasma Technology (uk) Ltd	Dr Mark Dineen	How plasma process solutions help make the best SiC devices
19:04	LPE	Danilo Crippa	Automated Cassette-to-Cassette Silicon Carbide Epitaxial Reactor for 150mm and 200mm
19:12	Compound Semiconductor Applications Catapult	Alastair McGibbon	Supporting the Challenges of SiC System Integration
19:20	STMicroelectronics	Mario Saggio	
19:28	GT Advanced Technologies	Henry Chou	Enabling Volume Supply of Production Quality Silicon Carbide Crystal for Power Electronics
19:36	Silvaco Europe Ltd	Chris Marnoch	Simulation and Modelling SiC and Related Devices
19:44	CuttingEdge Ions, LLC	Brian Doherty	High temperature implants for SiC

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Industrial Session - Monday 3rd September
The International Convention Centre, Hall 1

As with previous ECSCRM/ICSCRM meetings, we will be hosting an industrial session allowing the top 15 industrial contributors to take to the stage and share their company's vision and latest developments in their field. This evening session will take place once the technical sessions are completed for the day. Drinks and light snacks will be provided.

Social events

As with previous ECSCRM/ICSCRM conferences there are a variety of social events for you to enjoy where you can network and socialise with colleagues.

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Welcome Reception - Sunday 2nd September 2018

The International Convention Centre, Hall 3

17:30 - 19:00

Take a first look around the ECSCRM 2018 exhibition whilst enjoying drinks and canapés. The Welcome Reception will take place from 17:30 - 19:00 allowing delegates plenty of time to venture onwards into the centre of Birmingham to explore the restaurants and bars on offer.



Wolfspeed, A Cree Company

INDUSTRY APPRECIATION EVENT:

Pack the Pub with Wolfspeed

19:30- 00:30

The Bierkeller: 195 - 196 Broad Street

Gala Dinner - Wednesday 5th September

National Conference Centre and Motorcycle Museum

Coaches will leave from the ICC from 17:30 - please assemble at the designated meeting point in the Mall. Pre-dinner drinks will be hosted in the Motorcycle Museum giving you the opportunity with the gala dinner taking place in the Imperial Suite which can accommodate a banquet for 700 people with a stage and dance floor.

Since opening in 1984 with a collection of 350 motorcycles, this magnificent centre has become the largest motorcycle museum in the world with in excess of 1000 display models and attracts around 250,000 visitors a year. One of the biggest attractions for many guests is the comprehensive cross-section of British machines, spanning the "60 Glorious Years" of motorcycle manufacturing in Britain. The museum's aim is to preserve these pieces of history for future generations to come, as a reminder of Great British industry, engineering prowess and work ethic and we are sure you will enjoy your visit.

Entertainment will be provided during and after the 3 course dinner showcasing local produce, and will provide you with the ideal opportunity to relax and socialise with familiar colleagues and new friends.

Return coaches will leave from 23:00 and midnight, taking you back to the ICC where you can either return to your hotels or continue the party in one of Birmingham's many bars and clubs.

Post conference tour - Friday 7th September

Jaguar Land Rover Factory Tour

The post conference tour will take place after the conference has concluded on Friday 7th September. Please assemble at the designated meeting point in the Mall.

The ECSCRM 2018 local organising committee have secured the opportunity for a limited number of delegates to visit the Jaguar Land Rover factory facilities at either Castle Bromwich and Solihull.

Coaches will leave from the ICC at 09:00, please assemble at the designated meeting point in the Mall.

Return coaches will leave the JLR factories at 13:00 for return to the ICC.

IMPORTANT NOTE: It is essential that you wear your conference badge at all times, including the off-site social events.

Daily schedule of events

	Sunday	Monday	Tuesday	
	02-Sep	03-Sep	04-Sep	
08:00	Registration			
08:30	HALL 11A	HALL 1	HALL 1	HALL 11
09:00	Tutorial Day 08:45 - 16:30	MO.01 Welcome 09:00 - 09:25 Plenary 9:25 - 10:05 Invited Posters: 10:05 - 10:30	TU.01a MOS Interface Processing Invited Speaker: Mr Shunsuke Asaba	TU.01b 4H-SiC Epitaxy Invited Speaker: Dr Nicolo Piluso
09:30				
10:00				
10:30		10:30 - 11:00 Coffee Break	10:30 - 11:00 Coffee Break	
11:00		MO.02 4H-SiC Epitaxy New Trends Invited Speaker: Dr Rachael Myers-Wood	TU.02a Power MOSFET Invited Speaker: Dr Edward Van Brunt	TU.02b Fundamental Properties Invited Speaker: Professor Antonella Parisini
11:30				
12:00				
12:30		12:30 - 13:30 Lunch	12:30 - 13:30 Lunch	
13:00				
13:30		MO.03 Applications Invited Speaker: Dr Michel Mermet-Guyennet	TU.03a ION Implantation Invited Speaker: Professor Anders Hallen	TU.03b MOS Interface Characterisation Invited Speaker: Dr Patrick Fiorenza
14:00				
14:30				
15:00		15:00 - 15:30 Coffee Break	15:00 - 15:30 Coffee Break	
15:30		MO.04 Extended Defects	TU.04a MOSFET Interface stability	TU.04b 3C- SiC
16:00				
16:30			MO.P1 Poster Session #1 16:30 - 18:00 Hall 3 - Gallery Level	TU.P2 Poster Session #2 16:30 - 18:00 Hall 3 - Gallery level
17:00				
17:30	HALL 3 WELCOME RECEPTION 17:30 - 19:00	HALL 1 INDUSTRIAL SESSION 18:00 - 20:00	INDUSTRY APPRECIATION EVENT: Pack the Pub with Wolfspeed 19:30- 00:30 The Bierkeller: 195 - 196 Broad Street	
18:00				
18:30				
19:00				
19:30				
20:00				
	HALL 3 EXHIBITION 17:30 - 19:00	HALL 3 EXHIBITION 08:00 - 18:00	HALL 3 EXHIBITION 08:00 - 18:00	

Key

- Materials
- Processing
- Devices and applications
- Characterisation and modelling
- Poster sessions
- Social events
- Exhibition
- Tutorial

Oral presentations at a glance

MONDAY		
HALL 1		
9:00	Welcome/Opening	
9:10	Dr Drew Nelson, IQE	
9:25	Plenary Speaker: Shane O'Donnell, Micosemi	
9:45	Plenary Speaker: Peter Friedrichs, Infineon	
Invited Poster Announcement		
10:05	INV.P.01	Daniel Habersat
10:10	INV.P.02	Kazuhiko Kusunoki
10:15	INV.P.03	Akhiro Goryu
10:20	INV.P.04	Maria Cabello
10:25	INV.P.05	Romain Bange
10:30	Break	
4H-SiC epitaxy new trends		
11:00	MO.02.01	Rachael Myers-Ward*
11:30	MO.02.02	Mark Ramm
11:45	MO.02.03	Shiyang Ji
12:00	MO.02.04	Koichi Murata
12:15	MO.02.05	Christian Heidorn
Lunch 12:30 - 13:30		
Applications		
13:30	MO.03.01	Dr. Mermet-Guyennet*
14:00	MO.03.02	Nima Zabihi
14:15	MO.03.03	Weihua Shao
14:30	MO.03.04	Jianwu Sun
14:45	MO.03.05	Selamnesh Nida
15:00	Break	
Extended Defects		
15:30	MO.04.01	Koji Nakayama
15:45	MO.04.02	Akifumi Iijima
16:00	MO.04.03	Akira Kano
16:15	MO.04.04	Isaho Kamata
Poster Session (16:30 - 18:00) HALL 3 Gallery Level		

TUESDAY					
HALL 1			HALL 11		
MOS Interface Processing			4H-SiC Epitaxy		
9:00	TU.01a.01	Shunsuke Asaba*	9:00	TU.01b.01	Robin Karhu
9:15			9:15	TU.01b.02	Keiji Wada
9:30	TU.01a.02	Yifan Jia	9:30	TU.01b.03	Philip Hens
9:45	TU.01a.03	Ayele Kidist Moges	9:45	TU.01b.04	Birgit Kallinger
10:00	TU.01a.04	Mizuki Nishida	10:00	TU.01b.05	Nicolo Piluso*
10:15	TU.01a.05	Takuma Kobayashi	10:15		
10:30	Break				
Power MOSFET			Fundamental Properties		
11:00	TU.02a.01	Edward Van Brunt*	11:00	TU.02b.01	Takuya Maeda
11:15			11:15	TU.02b.02	Walter M. Klahold
11:30	TU.02a.02	Jimmy Franchi	11:30	TU.02b.03	Anli Yang
11:45	TU.02a.03	Takeru Suto	11:45	TU.02b.04	Tuerxun Ailihumaer
12:00	TU.02a.04	Alexander Bolotnikov	12:00	TU.02b.05	Antonella Parisini*
12:15	TU.02a.05	Shinya Kyogoku	12:15		
Lunch 12:30 - 13:30					
Ion Implantation			MOS Interface Characterisation		
13:30	TU.03a.01	Anders Hallen*	13:30	TU.03b.01	Takahide Umeda
13:45			13:45	TU.03b.02	Judith Berens
14:00	TU.03a.02	Kazuhiro Mochizuki	14:00	TU.03b.03	Yuji Yamagishi
14:15	TU.03a.03	Takahiro Morikawa	14:15	TU.03b.04	Fabian Rasinger
14:30	TU.03a.04	Roberta Nipoti	14:30	TU.03b.05	Patrick Fiorenza*
14:45	TU.03a.05	Johanna Müting	14:45		
15:00	Break				
MOSFET Interface Stability			3C-SiC		
15:30	TU.04a.01	Jose Ortiz Gonzalez	15:30	TU.04b.01	Peter Wellmann
15:45	TU.04a.02	Shintaro Sato	15:45	TU.04b.02	Alessandra Alberti
16:00	TU.04a.03	Keita Tachiki	16:00	TU.04b.03	Marcin Zielinski
16:15	TU.04a.04	Besar Asllani	16:15	TU.04b.04	Massimo Zimbone
Poster Session (16:30 - 18:00) HALL 3 Gallery Level					

Key

- Materials
- Processing
- Devices and applications

- Characterisation and modelling
- Poster sessions
- *Invited speakers

WEDNESDAY					
HALL 1			HALL 11		
Solution Growth			Quantum Defects		
9:00	WE.01a.01	Naoyoshi Komatsu*	9:00	WE.01b.01	Marianne E. Bathen
9:15			9:15	WE.01b.02	Adam Gali
9:30	WE.01a.02	Xinbo Liu	9:30	WE.01b.03	Andras Cs��r��
9:45	WE.01a.03	Yuichiro Hayashi	9:45	WE.01b.04	Ivan G. Ivanov
10:00	WE.01a.04	Sakiko Kawanishi	10:00	WE.01b.05	Yoji Chiba
10:15	WE.01a.05	Takeshi Yoshikawa	10:15	WE.01b.06	Nguyen Tien Son
10:30	Break				
High Voltage Devices			MOS Interface Processing		
11:00	WE.02a.01	Naoki Watanabe*	11:00	WE.02b.01	Judith Woerle
11:15			11:15	WE.02b.02	Adhi Dwi Hatmanto
11:30	WE.02a.02	Andrei Mihaila	11:30	WE.02b.03	Jesus Urresti
11:45	WE.02a.03	Sei-Hyung Ryu	11:45	WE.02b.04	Xingyan Zhou
12:00	WE.02a.04	Koji Nakayama	12:00	WE.02b.05	Mitsuru Sometani
12:15	WE.02a.05	Alexander Bolotnikov	12:15	WE.02b.06	Tetsuo Hatakeyama
Lunch 12:30 - 13:30					
Device Ruggedness			PVT Growth		
13:30	WE.03a.01	Kevin Matocha*	13:30	WE.03b.01	Ian Manning
13:45			13:45	WE.03b.02	Matthias Arzig
14:00	WE.03a.02	Victor Soler	14:00	WE.03b.03	Michael Salamon
14:15	WE.03a.03	Ashish Kumar	14:15	WE.03b.04	Jan Richter
14:30	WE.03a.04	Daniela Cavallaro	14:30	WE.03b.05	Noboru Ohtani*
14:45	WE.03a.05	Siddarth Sundaresan			
15:00	Break				
Poster Session (15:30 - 17:00) HALL 3 Gallery Level					

THURSDAY		
HALL 1		
SiC Integrated Circuits		
9:00	TH.01.01	Masashi Nakajima*
9:15		
9:30	TH.01.02	Mitsuaki Kaneko
9:45	TH.01.03	Shuoben Hou
10:00	TH.01.04	Masahiro Masunaga
10:15	TH.01.05	Jun Inoue
10:30	Break	
Contacts and other processing		
11:00	TH.02.01	Lasse Vines*
11:15		
11:30	TH.02.02	Fabrizio Roccaforte
11:45	TH.02.03	Simone Rascunà
12:00	TH.02.04	Seiki Kawasaki
12:15	TH.02.05	Tomasz Sledziewski
Lunch 12:30 - 13:30		
Carrier Lifetime		
13:30	TH.03.01	Jose Coutinho*
13:45		
14:00	TH.03.02	Lars Knoll
14:15	TH.03.03	Masashi Kato
14:30	TH.03.04	Juergen Erlekampf
14:45	TH.03.05	Shoma Yamashita
15:00	Break	
15:30	Closing	
15:35	Award Announcements	
15:50	Conference Highlights	
16:10	ICSCRM 2019: Mr Dr. Hisayoshi Itoh (QST, Japan)	
16:20	ECSCRM 2020: Daniel Alquier, Univrersity of Tours	

Poster presentations at a glance

Poster Authors Set-up: 12:00 - 15:00 each day

INVITED POSTER PRESENTATIONS (Monday - Wednesday)		
Paper ID	Presenter	Title
INV.P.01	Daniel Habersat	Influence of High-Temperature Bias Stress on Room-Temperature VT Drift Measurements in SiC Power MOSFETs
INV.P.02	Kazuhiko Kusunoki	High quality 4H-SiC substrates grown by solution growth method for power device application
INV.P.03	Akihiro Goryu	Evaluation of effect of mechanical stress on stacking fault expansion in 4H-SiC p-i-n diode
INV.P.04	Maria Cabello	Evidence of channel mobility anisotropy on 4H-SiC MOSFETs with low interface trap density
INV.P.05	Romain Bange	Development of SOI FETs based on coreshell Si/SiC nanowires for sensing in liquid environments

MONDAY

General Viewing: 16:30 - 18:00

Paper ID	Presenter	Title
MO.PCA1	Circuits and Applications	Xiaoli Tian
MO.PCA2	Circuits and Applications	S. Sato
MO.PCA3	Circuits and Applications	Matthaeus Albrecht
MO.PCA4	Circuits and Applications	Philip G. Neudeck
MO.PCA5	Circuits and Applications	Muhammad Shakir
MO.PCA6	Circuits and Applications	Alessandro Borghese
MO.PCA7	Circuits and Applications	Xiangguo Wang
MO.PCA8	Circuits and Applications	Yogesh Sharma
MO.PEP1	Epitaxy	Hitoshi Habuka
MO.PEP2	Epitaxy	Kazuhiro Mochizuki
MO.PEP3	Epitaxy	Yoshiaki Daigo
MO.PEP4	Epitaxy	Yoshiaki Daigo
MO.PEP5	Epitaxy	Kenta Chokawa
MO.PEP6	Epitaxy	Feng Zhang
MO.PEP7	Epitaxy	Tawhid Ahmed Rana
MO.PEP8	Epitaxy	Tobias Höchbauer
MO.PEP9	Epitaxy	Mikhail Dolgoplov
MO.PEP10	Epitaxy	Joerg Pezoldt
MO.PEP11	Epitaxy	Han Seok Seo
MO.FFP1	Fundamental Properties	Masanobu Yoshikawa
MO.FFP2	Fundamental Properties	Margareta Linnarsson
MO.FFP3	Fundamental Properties	Shin-ichiro Sato
MO.FFP4	Fundamental Properties	Abebe Tilahun Tarekeegn
MO.FFP5	Fundamental Properties	Julietta Weisse
MO.FFP6	Fundamental Properties	Teng Zhang
MO.FFP7	Fundamental Properties	Fan Li
MO.FFP8	Fundamental Properties	Xiang Zhou
MO.FFP9	Fundamental Properties	Jonas Vande Pitte
MO.FFP10	Fundamental Properties	Yusuke Yamashita
MO.FFP11	Fundamental Properties	Xilun Chi
MO.FFP12	Fundamental Properties	Yu-ichiro Matsushita
MO.FFP13	Fundamental Properties	Dipanwita Dutta
MO.FFP14	Fundamental Properties	Konstantinos Zekentes
MO.PMI1	MOS Interface	Hiroshi Okada
MO.PMI2	MOS Interface	Dr Jonathon Philip Cottom
MO.PMI3	MOS Interface	Junichiro Sameshima
MO.PMI4	MOS Interface	Ling Guo
MO.PMI5	MOS Interface	Manesh Vinay Mistry
MO.PMI6	MOS Interface	Koji Ito
MO.PMI7	MOS Interface	Mitsuo Okamoto
WE.PIM1	Implantation	Roberta Nipoti
MO.PMO1	MOSFETs	Quentin Molin
MO.PMO2	MOSFETs	Kijeong Han
MO.PMO3	MOSFETs	Ajit Kanale
MO.PMO4	MOSFETs	Shuhe Nakata
MO.PMO5	MOSFETs	Atsushi Sakai
MO.PMO6	MOSFETs	Daniel J. Lichtenwalner
MO.PMO7	MOSFETs	Tomoyasu Ishii
MO.PMO8	MOSFETs	Caiping Wan

Paper ID	Presenter	Title
MO.PMO9	MOSFETs	Tianxiang Dai
MO.PMO10	MOSFETs	Kai Tian
MO.PPVT1	PVT Growth	Hsiao Ta Ching
MO.PPVT2	PVT Growth	subaru komura
MO.PPVT3	PVT Growth	Jeong-Min Choi
MO.PPVT4	PVT Growth	Mark Ramm
MO.PPVT5	PVT Growth	Won-Jae Lee
MO.PPVT6	PVT Growth	Won-Jae Lee
MO.PPVT7	PVT Growth	Pan Gao
MO.PPVT8	PVT Growth	Dr.P.S.Raghavan
MO.PPVT9	PVT Growth	Eunjin Jung
MO.PPVT10	PVT Growth	Rob Rhoades
MO.PPVT11	PVT Growth	Chunjun Liu
MO.PPVT12	PVT Growth	Im-Gyu Yeo
MO.PSG1	Solution Growth	Kazuhiko Kusunoki
MO.PSG2	Solution Growth	Kotaro Kawaguchi
MO.PSG3	Solution Growth	Mai Abe
MO.PSG4	Solution Growth	Tomoki Endo
MO.PSG5	Solution Growth	Kazuaki Seki
MO.PSG6	Solution Growth	Dae-Sung KIM
MO.PSG7	Solution Growth	Minh-Tan HA
MO.PSG8	Solution Growth	Yun-Ji SHIN
MO.PSG9	Solution Growth	Yosuke Tsunooka

TUESDAY

General Viewing: 16:30 - 18:00

Paper ID	Presenter	Title
TU.P.3C1	3C-SiC	Massimo Zimbone
TU.P.3C2	3C-SiC	Philipp Schuh
TU.P.3C3	3C-SiC	Jaweb Ben Messaoud
TU.P.BP1	Bipolar, JFETs and other switching devices	Daniel Johannesson
TU.P.BP2	Bipolar, JFETs and other switching devices	Siva Kotamraju
TU.P.BP3	Bipolar, JFETs and other switching devices	Kui Pu
TU.P.BP4	Bipolar, JFETs and other switching devices	Muhammad Waqar Hussain
TU.P.BP5	Bipolar, JFETs and other switching devices	Herve Morel
TU.P.BP6	Bipolar, JFETs and other switching devices	David Hall
TU.P.BP7	Bipolar, JFETs and other switching devices	Satoshi Asada
TU.P.BP8	Bipolar, JFETs and other switching devices	Luigi Di Benedetto
TU.P.BP9	Bipolar, JFETs and other switching devices	Amit Kumar Tiwari
TU.P.BP10	Bipolar, JFETs and other switching devices	Nikolaos Makris
TU.P.BP11	Bipolar, JFETs and other switching devices	Siva Kotamraju
TU.P.ED1	Extended Defects	Toshiyuki Isshiki
TU.P.ED2	Extended Defects	Yoshitaka Nishihara
TU.P.ED3	Extended Defects	Aoi Okada
TU.P.ED4	Extended Defects	Jason Paul Hadorn
TU.P.ED5	Extended Defects	Kumiko Konishi
TU.P.ED6	Extended Defects	Yuina Mannen
TU.P.ED7	Extended Defects	Hrishikesh Das
TU.P.ED8	Extended Defects	Ryo Hattori
TU.P.ED9	Extended Defects	Balaji Raghothamachar

Paper ID	Presenter	Title
TU.P.ED10	Extended Defects	Nadeem A. Mahadik
TU.P.ED11	Extended Defects	Ruggero Anzalone
TU.P.FP1	Fundamental Properties	Hideharu Matsuura
TU.P.FP2	Fundamental Properties	Paulius Grivickas
TU.P.FP3	Fundamental Properties	Jose Daniel Gouveia
TU.P.FP4	Fundamental Properties	Michael Schöler
TU.P.FP5	Fundamental Properties	Nadine Schüler
TU.P.FP6	Fundamental Properties	Muhammad Haroon Rashid
TU.P.FP7	Fundamental Properties	Matthias Kocher
TU.P.FP8	Fundamental Properties	Hiroki Sakakima
TU.P.FP9	Fundamental Properties	Hong-Ki Kim
TU.P.RQ1	Radiation and Quantum Devices	Pavel Hazdra
TU.P.RQ2	Radiation and Quantum Devices	Abdul Salam Al Atem
TU.P.RQ3	Radiation and Quantum Devices	Francesco La Via
TU.P.RQ4	Radiation and Quantum Devices	Oleg Korolkov
TU.P.RQ5	Radiation and Quantum Devices	Corey Cochran
TU.P.RQ6	Radiation and Quantum Devices	Hiroshi Kono
TU.P.RQ7	Radiation and Quantum Devices	Fumi Hasebe
TU.P.RQ8	Radiation and Quantum Devices	Fan Li
TU.P.RQ9	Radiation and Quantum Devices	Corinna Martinella
TU.P.RQ10	Radiation and Quantum Devices	Shin-Ichiro Kuroki
TU.P.RQ11	Radiation and Quantum Devices	Tatsuya Meguro
TU.P.RQ12	Radiation and Quantum Devices	V.I. Sankin
TU.P.RQ13	Radiation and Quantum Devices	Roland Nagy
TU.P.RQ14	Radiation and Quantum Devices	Alexander Lebedev
TU.P.RQ15	Radiation and Quantum Devices	Alexander Lebedev
TU.P.RM1	Related Materials	Alexander Lebedev
TU.P.RM2	Related Materials	Reina Miyagawa
TU.P.RM3	Related Materials	Yayoi Nakagawa
TU.P.RM4	Related Materials	Yun Bai
TU.P.RM5	Related Materials	Simon Forster
TU.P.RM6	Related Materials	Khaled Driche
TU.P.RM7	Related Materials	YU Wancheng
TU.P.RM8	Related Materials	Liwen Yang
TU.P.RM9	Related Materials	Kazukuni Hara
TU.P.RM10	Related Materials	Shoichi Onda
TU.P.SO1	Sic-Oxide Interface Processing	Kenta Chokawa
TU.P.SO2	Sic-Oxide Interface Processing	Andrea Severino
TU.P.SO3	Sic-Oxide Interface Processing	Razvan Pascu
TU.P.SO4	Sic-Oxide Interface Processing	Jinghua Xia
TU.P.SO5	Sic-Oxide Interface Processing	Patrick Fiorenza
TU.P.SO6	Sic-Oxide Interface Processing	Kosuke Muraoka
TU.P.SO7	Sic-Oxide Interface Processing	So Takamoto
TU.P.SO8	Sic-Oxide Interface Processing	Rabia Yasmin Khosa
TU.P.SO9	Sic-Oxide Interface Processing	Stephan Wirths
TU.P.SO10	Sic-Oxide Interface Processing	Teruaki Kumazawa
TU.P.SO11	Sic-Oxide Interface Processing	Ye Hwan Kang

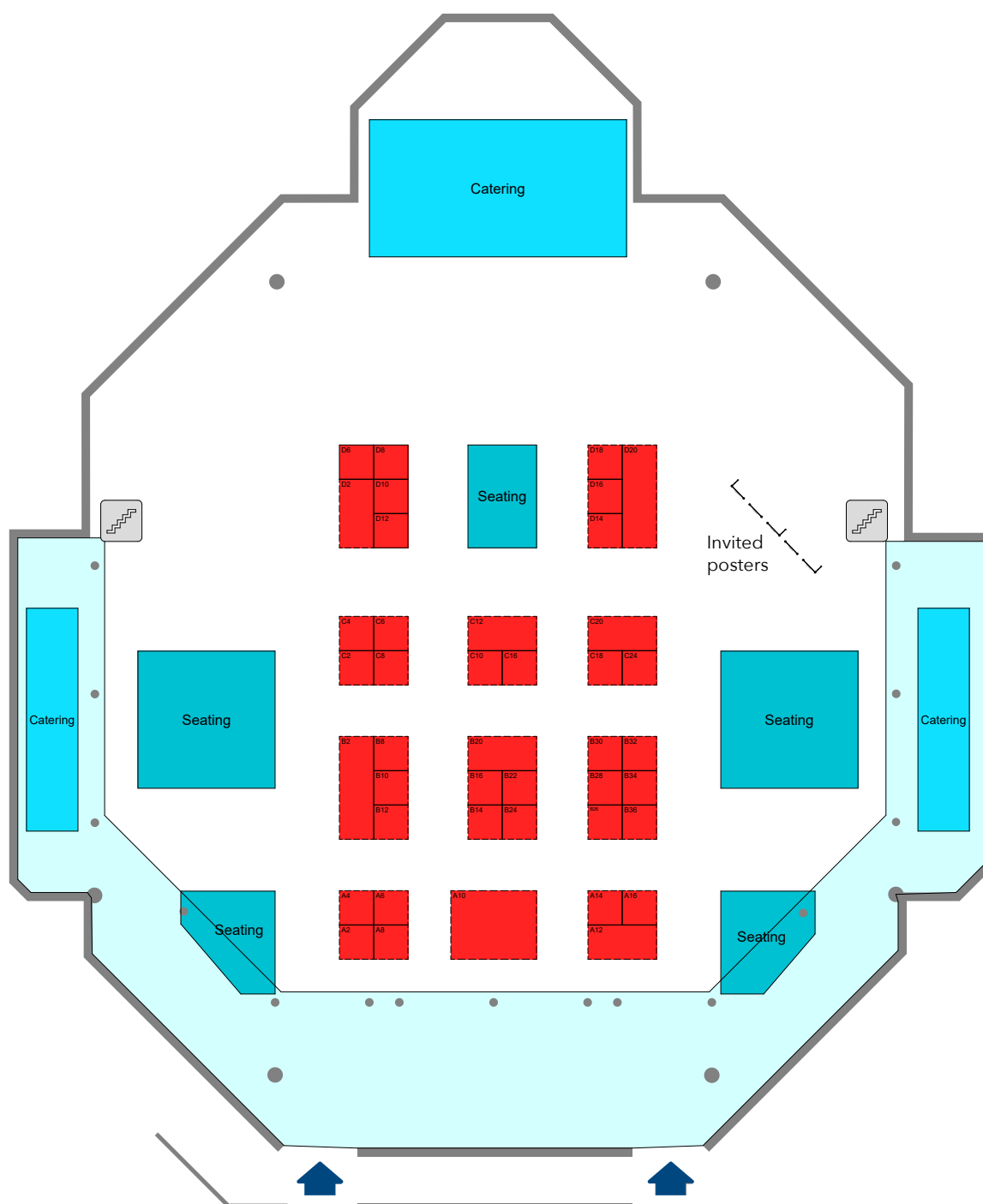
WEDNESDAY

General Viewing: 15:30 - 17:00

Paper ID	Presenter	Title
WE.P.CL1	Carrier Lifetime	Aleaxandre Savtchouk
WE.P.CL2	Carrier Lifetime	Juergen Erlekampf
WE.P.CL3	Carrier Lifetime	Jose Coutinho
WE.P.CL4	Carrier Lifetime	Ryo Hattori
WE.P.CL5	Carrier Lifetime	Xuechao Liu
WE.P.CL6	Carrier Lifetime	Jan Beyer
WE.P.CL7	Carrier Lifetime	Mitsuhiro Kushibe
WE.P.CL8	Carrier Lifetime	Benedikt Lechner
WE.P.CL9	Carrier Lifetime	Sergio Sapienza
WE.P.CL10	Carrier Lifetime	Peter Bonanno
WE.P.CL11	Carrier Lifetime	Zong Wei Xu
WE.P.CO1	Contacts and Other Processing	Hitoshi Habuka

Paper ID	Presenter	Title
WE.P.CO2	Contacts and Other Processing	Guiming Song
WE.P.CO3	Contacts and Other Processing	Vuong Van Cuong
WE.P.CO4	Contacts and Other Processing	Daichi Todo
WE.P.CO5	Contacts and Other Processing	Moonkyong Na
WE.P.CO6	Contacts and Other Processing	Hideka Kida
WE.P.CO7	Contacts and Other Processing	Risa Mukai
WE.P.CO8	Contacts and Other Processing	Michael Schneider
WE.P.CO9	Contacts and Other Processing	Clement Berger
WE.P.CO10	Contacts and Other Processing	Vinoth Kumar Sundaramoorthy
WE.P.CO11	Contacts and Other Processing	Arne Benjamin Renz
WE.P.IM1	Implantation	Roberta Nipoti
WE.P.IM2	Implantation	Peter Pichler
WE.P.IM3	Implantation	Cristiano Calabretta
WE.P.IM4	Implantation	Akihiro Ikeda
WE.P.IM5	Implantation	Andrea Severino
WE.P.IM6	Implantation	Kaname Imokawa
WE.P.IM7	Implantation	Matthias Kocher
WE.P.MI1	MOS Interface	Peyush Pande
WE.P.MI2	MOS Interface	Tomoya Ono
WE.P.MI3	MOS Interface	Daisuke Mori
WE.P.MI4	MOS Interface	Hind Ateeg Alsnani
WE.P.MI5	MOS Interface	Hironori Takeda
WE.P.MI6	MOS Interface	Hiroki Nemoto
WE.P.MI7	MOS Interface	Masahiro Kunisu
WE.P.MI8	MOS Interface	Isanka Udayani Jayawardhena
WE.P.MO1	MOSFETs	Holger Schlichting
WE.P.MO2	MOSFETs	Martin Hauck
WE.P.MO3	MOSFETs	Aditi Agarwal
WE.P.MO4	MOSFETs	In-Hwan Ji
WE.P.MO5	MOSFETs	Ronald Green
WE.P.MO6	MOSFETs	Kai Tian
WE.P.MO7	MOSFETs	Xiang Zhou
WE.P.MO8	MOSFETs	Dinh-Lam Dang
WE.P.MO9	MOSFETs	Ajit Kanale
WE.P.MO10	MOSFETs	Ogyun Seok
WE.P.MO11	MOSFETs	Julietta Weisse
WE.P.PVT1	PVT Growth	Hiromasa Suo
WE.P.PVT2	PVT Growth	Wei Fan
WE.P.PVT3	PVT Growth	Chae-Young Lee
WE.P.PVT4	PVT Growth	Takahiro Nakano
WE.P.PVT5	PVT Growth	Hiroaki Shinya
WE.P.PVT6	PVT Growth	Kentaro Shioura
WE.P.PVT7	PVT Growth	Won-Jae Lee
WE.P.PVT8	PVT Growth	Daiki Tanaka
WE.P.PVT9	PVT Growth	Johannes Steiner
WE.P.PVT10	PVT Growth	Kevin J. Moeggenborg
WE.P.PVT11	PVT Growth	Mark Ramm
WE.P.PVT12	PVT Growth	Pan Gao
WE.P.RD1	Rectifying Devices	K. Hayashi
WE.P.RD2	Rectifying Devices	Dominique Planson
WE.P.RD3	Rectifying Devices	Luigi Di Benedetto
WE.P.RD4	Rectifying Devices	Yidan Tang
WE.P.RD5	Rectifying Devices	Gheorghe Pristavu
WE.P.RD6	Rectifying Devices	Siddarth Sundaresan
WE.P.RD7	Rectifying Devices	Kung-Yen Lee
WE.P.RD8	Rectifying Devices	Beverley Choucoutou
WE.P.RD9	Rectifying Devices	Oleg Rusch
WE.P.RD10	Rectifying Devices	Yaren Huang
WE.P.RD11	Rectifying Devices	Guy Baker
WE.P.RD12	Rectifying Devices	Nick Yun

Exhibition floor plan



ADMAP Inc. (a Ferrotec group company) D10
AIXTRON SE C24
Ascatron AB B28
centrotherm international AG B20
Ceramicforum Co., Ltd. B36
Classone D12
Compound Semiconductor Applications Catapult D8
DISCO Hi-Tec Europe D14
Dow Chemical Company ..D20
EAG Laboratories B14
ECSCRM 2018 C6

Epiluvac AB C2
Fraunhofer Institute IISB.. B10
Freiberg Instruments C4
GT Advanced Technologies B26
II-VI Advanced MaterialsB2
Ion Beam Services C18
JTA Equipment Technology B16
KITEC D6
KLA-Tencor A6
Lasertec US A12
LPE D2
mi2-factory GmbH D18

Mitsui Bussan Electronics Ltd B24
Nanotronics B32
Nissin Ion Equipment Co. Ltd. B22
NOVASiC SA C16
NuFlare Technology Inc. A4
Oxford Instruments Plasma Technology C20
Revasum A14
Rigaku Corporation A16
Semilab B30
Showa Denko A2
Silvaco D16

STR Group B8
Sumitomo Electric Industries, Ltd. C12
Tankeblue semiconductor Co. Ltd. C10
Tokyo Electron Limited B12
Toray Research Center Inc... A8
Ulvac B34
Wolfsped, A Cree Company A10
X-FAB SiC Foundry C8

Exhibitor profiles

Institution or organisation	Booth number	Company synopsis
	D10	Ultra-High Purity, High Heat Resistance and High Wear Resistance Silicon Carbide Products from Original CVD Production Method www.admap.co.jp/en/index.html
	C24	AIXTRON is a leading provider of deposition equipment to the semiconductor industry. The Company's technology solutions are used by a diverse range of customers worldwide to build advanced components for electronic and opto-electronic applications based on compound semiconductor materials, as well as Carbon Nanotubes (CNT) and other nanomaterials. Such components are used in fiber optic communication systems, wireless and mobile telephony applications, optical and electronic storage devices, computing, signalling and lighting, as well as a range of other leading-edge technologies. www.aixtron.com
	B28	Ascatron develops next generation Silicon Carbide power semiconductors radically reducing losses in electrical transformers. The high voltage power device products are based on Ascatron's advanced 3DSiC [®] material technology with buried doping structures to reduce the surface electric field. This gives very robust devices with lower losses and reliable operation at full power. Target applications are high voltage power electronics >10kW. Ascatron also offers SiC epitaxy services for prototyping with flexible specifications and a range of thicknesses for both n- and p-type doping. A Sweden based scale-up company with background in producing advanced SiC epi material for global customers since 2011. www.ascatron.com
	B20	centrotherm has been developing and realizing innovative thermal solutions for over 60 years. As a leading and globally operating technology group, we offer production solutions for the semiconductor and microelectronic industries. Our equipment is designed for all needs from R&D to mass production and applicable for various semiconductor technologies and applications, such as logic and memory devices (e.g. Flash, DRAM) power semiconductors (e.g. Si, SiC), LED, SMT, MEMS or sensor technology: The product portfolio comprises horizontal and vertical batch furnaces (atmospheric or vacuum processes), vertical high temperature furnaces (annealing < 2000°C, oxidation < 1500°C), single wafer systems < 300mm wafer diameter (RTP, low-temperature microwave oxidation). www.centrotherm.world
	B36	Ceramicforum has been involved in the SiC market in Japan since the early 2000s starting out as distributor of SiCrystal substrates, later also taking Norstel and Ascatron amongst others on board. While representing wide bandgap semiconductor-related measurement equipment makers, they also started R&D and sales of their very own line of evaluation equipment - easy-to-use tools to check for crystalline stress/defects in semiconductor materials. www.ceramicforum.co.jp/en

Institution or organisation	Booth number	Company synopsis
	D12	<p>ClassOne Technology designs and manufactures new semiconductor manufacturing equipment including advanced wet-chemical process tools - Electroplating Equipment, Electroplating Tools, Spray Solvent Tools, and Spin Rinse Dryers - especially for the cost- sensitive producers of MEMs, Power Devices, RF, LEDs, Photonics, Sensors, Microfluidics and other emerging technologies. While these market segments have long been underserved or ignored by the larger semiconductor processing equipment manufacturers, ClassOne Technology is focused on providing the high-quality wet process and electroplating equipment you require. We provide innovative new solutions for a range of applications on 3" to 8" substrates of many materials, including silicon, glass, sapphire, GaAs, GaN, Ge, InP and HgCdTe. We make electroplating equipment for development and high-volume production, batch spray solvent processors, spin rinse dryers.</p> <p>www.classone.com</p>
	D8	<p>The Compound Semiconductor Applications Catapult is a world-class, open access R&D facility to help businesses exploit advances in compound semiconductor technologies across key application areas such as energy, transport, defence and security, and space. The development and application of SiC wide bandgap power electronics systems is a key focus area of the Catapult.</p> <p>https://csa.catapult.org.uk/</p>
	D20	<p>Electronics & Imaging (E&I), part of the DowDuPont Specialty Products Division, is a vertically integrated silicon carbide (SiC) manufacturer with locations worldwide to ensure a highly reliable supply of SiC materials. With more than 70 years of proven expertise and renowned customer service, E&I also provides innovative advanced encapsulants, sealants and coatings for its power electronics design partners, providing solutions across the value chain to improve the cost efficiency, durability and performance of the most advanced power electronics components.</p> <p>www.dowelectronicmaterials.com/products/compound-semiconductors</p>
	B14	<p>EAG Laboratories is the global leader in materials characterization for the advanced materials supply chain. We specialize in the determination of material identity, composition, purity, contaminant levels and crystal structure using advanced analytical techniques. We can manage highly complex analytical projects and help you meet your goals quickly and confidently. Ask EAG We Know How.</p> <p>www.eag.com</p>
	C6	<p>Visit the conference organisers' booth for a variety of table top literature displays.</p> <p>www.ecscrm2018.org</p>
	C2	<p>Epiluvac AB is a private Swedish company founded 2013 by a team of engineers with decades of experience from research and development of hot-wall SiC epitaxy reactors. For SiC applications Epiluvac offers CVD reactors and crystal growth furnaces. The company also offers CVD reactors and process chambers for applications like GaN epitaxy, graphene and nanowire manufacturing. Epiluvac provides standard reactors as well as customized solutions and various service/maintenance packages. Features offered with Epiluvac CVD reactors include 150/200 mm capability, automatic hot loading/unloading for high throughput and fine tuning of cell temperature for best possible epitaxial uniformity.</p> <p>www.epiluvac.com</p>




Institution or organisation	Booth number	Company synopsis
	B10	<p>The Fraunhofer Institute for Integrated Systems and Device Technology IISB conducts applied research and development in the fields of power electronics, mechatronics, microelectronics and nanoelectronics. IISB is the leading Fraunhofer institute for SiC research and development in Germany and has been cooperating with international partners for more than 20 years. IISB is offering internationally recognized expertise in terms of SiC services and contract research from materials development and characterization, device manufacturing to module assembly and power electronic systems. IISB operates the P-Fab which is dedicated to technology development and prototype device fabrication on Si and SiC wafers.</p> <p>www.iisb.fraunhofer.de</p>
	C4	<p>Freiberg Instruments is one of the fastest growing, young and dynamic analytical instrumentation companies with products and service covering industries like Crystal Growth & Processing, Microelectronics, Photovoltaic and Research & Development. Key products include: Single crystal diffractometer (XRD), automated sorting and stacking devices, electrical semiconductor characterization devices - μPCD/MDP (QSS).</p> <p>www.freiberginstruments.com</p>
	B26	<p>GT Advanced Technologies is a diversified technology company with crystalline growth expertise in silicon, silicon carbide and sapphire. Our advanced materials deliver sustained value to the world's top manufacturers in the global PV, power electronics and photonics markets. Our innovative technologies and industry experience drive the development and commercialization of products that elevate performance, improve quality and lower manufacturing costs.</p> <p>www.gtat.com</p>
	C18	<p>Since its foundation in 30 years ago, IBS is the European leader for the manufacturing of ion implantation equipment and implantation foundry services. IBS offer includes dedicated equipment solutions specifically designed for SiC applications: High temperature automatic handling and implant, 400 keV energy in single charge, ion sources optimized for multi-charged Al implantation... In parallel, IBS has developed a range of specific technological bricks in its SiC foundry line to meet SiC device manufacturing requirements such as hot implantation, high temperature annealing. With this SiC production line, IBS can design, produce or help you create components based on your requirement.</p> <p>www.ion-beam-services.com</p>
	B2	<p>II-VI Advanced Materials is a leading global supplier of high quality single crystal SiC substrates. These products enable key technologies across a wide variety of fast growing markets, including mobile communications infrastructure, RF and high power electronics. Please visit www.ii-vi.com for more Information.</p>
	B16	<p>The specialists in equipment for production of Silicon Carbide wafer production. Takatori wire saws are the market leader for slicing of SiC and other hard materials such as GaN, AlN. The Takatori single wafer Grinding system is designed for hard wafers such as SiC. Takatori taping systems provide vacuum lamination, Temporary bonding capability and Metal lift off processing for III-V devices. Gigamat Technologies is the leading polishing system supplier for SiC wafers. Gigamat wafer sorters are the perfect choice for sorting SiC wafers for thickness, warp, site flatness.</p> <p>www.JTA-Ltd.com</p>

Institution or organisation	Booth number	Company synopsis
	D6	<p>KITEC is supplying non-contact sheet resistance measurement tools. The M-RES series for semiconductors are available with and without thickness compensation starting from manual R&D tools through mapping systems to fully automated systems. We cover applications such as wafer/substrate measurements and EPI, implant and metallization process monitoring. A bow and warp compensation is integrated in our advanced system.</p> <p>www.kitec-resistance-measurement.com</p>
	A6	<p>With tighter design limits and the escalating need to increase yield and reduce semiconductor manufacturing costs, automated defect inspection to detect and classify defects in compound semiconductor processing is more critical than ever. KLA-Tencor's Candela semiconductor inspection tool combines the elemental principles of scatterometry, ellipsometry, reflectometry, and topographical analysis to detect defects and then to classify defects in substrates, epi-layers, and process films. Candela semiconductor inspection technology is being used to detect and classify defects by industry leaders in Power Device, LED and GaAs, industries to monitor production lines, detect mission-critical defects of interest, and create process-specific recipes to detect and classify killer defects while ignoring nuisance defects.</p> <p>www.kla-tencor.com</p>
	A12	<p>Lasertec Corporation, founded in 1960, has grown into a world leading innovator of inspection and metrology equipment serving the global semiconductor and related industries. Guided by its corporate philosophy, "Create unique solutions; Create new value," Lasertec has created several new tools to help companies developing and manufacturing the next generation of wide band gap semiconductors. Tools being highlighted at ECSCRM2017 are SICA88, and GALOIS. SICA88 is a confocal/DIC based inspection/analysis tool not only capable of detecting all the critical defects at high sensitivity but also automatically classify killer defects optimizing to enable the highest yielding devices. GALOIS is the latest addition to the inspection/analysis tool portfolio for customers who deal with GaN and other transparent substrates.</p> <p>www.lasertec.co.jp/en</p>
	D2-D4	<p>LPE manufacture SiC Single wafer epitaxial reactor (up to 150mm) with load lock loading with smallest footprint on the market. Outstanding throughput, thanks to high temperature wafer loading unloading automated system and growth rate up to 90u/h.</p> <p>www.lpe-epi.com</p>
	D18	<p>mi2-factory GmbH is a German high-tech start-up company with focus on micro-engineering tools for processing semiconductors. We have developed an improved doping technique by means of high-energy ion implantation. The technology is based on an Energy Filter for Ion Implantation (EFII), which allows for very precise, depth-distributed doping of any desired semiconductor material. The EFII technology is offered to semiconductor power device manufacturers who are in particular, but not exclusively, dealing with silicon carbide (SiC) high-voltage Diodes, MOSFETs and Superjunction Devices and also to SiC substrate suppliers. Furthermore, EFII is offered to high-energy ion implantation foundries, ion beam accelerator manufacturers and end-station manufacturers.</p> <p>www.mi2-factory.com</p>

Institution or organisation	Booth number	Company synopsis
	Table top display C6	<p>Founded in 1995 and headquartered in Hsinchu, Taiwan, MPI Corporation is a global technology leader in Semiconductor, Light Emitting Diode (LED), Photo Detectors, Lasers, Materials Research, Aerospace, Automotive, Fiber Optic, Electronic Components and more. MPI™s four main business sectors include Probe Card, Photonics Automation, Advanced Semiconductor Test and Thermal Divisions. MPI products range from various advanced probe card technologies, probers, testers, material handlers, inspection and thermal air systems. Many of these products are accompanied by state-of-the-art Calibration and Test & Measurement software suites. The diversification of product portfolio and industries allows a healthy environment for employee growth and retention. Cross pollination of product technologies allows each new innovation to provide differentiation in areas that are meaningful to our precious customer base.</p> <p>www.mpi-corporation.com/ast</p>
	B24	<p>Mitsui Bussan Electronics Ltd, is a sales distributor of Sumitomo Heavy Industries Ltd., the manufacturer of efficient solid laser annealing system for next generation power devices. The application of this laser annealing system is Ohmic contact for Silicon Carbide Back Side. Metal-Silicon Carbide interface is heated to a high temperature suppressing the temperature rise in non-irradiation side, and the generation of the ohmic contact is achieved by the original high-speed laser annealing method.</p> <p>www.mbel.co.jp/english</p>
	B32	<p>Nanotronics is changing the way materials and electronics are manufactured. We automate industrial microscopes used for inspection of the world's smallest technologies: semiconductors, microchips, hard drives, LEDs, nano-fillers, nanotubes, and more. nSpec® is an integrated part of production processes at many of the world's leading manufacturers. nSpec® is powered by industrial enterprise software that provides scientists + engineers the first set of tools as advanced as the devices they build.</p> <p>www.nanotronics.co</p>
	B22	<p>Nissin Ion Equipment aims at promoting a development-based business through the manufacture of various equipment at the core of which are proprietary ion beam and plasma technologies. IMPHEAT is the only mass production tool for high temperature ion implantation. It features the high throughput operation, the precise angle and dose control, the high temperature doping, and the ability of implant various ion species such as Al, B, N, and P. IMPHEAT is useful to manufacture SiC pn junction at high temperature ion implantation.</p> <p>www.nissin-ion.co.jp/en</p>
	C16	<p>French company NOVASiC, founded in 1995, has a worldwide acknowledged expertise in polishing semiconducting materials like: SiC, GaN, AlN, ZnO, sapphire, diamond, Ge, SiGe, CdZnTe, SiO₂ etc. This expertise includes the polishing and epi-ready preparation of as-cut wafers, planarization of epilayers and reclaim (recycling) of epiwafers. Since 2006, the polishing activity of NOVASiC is certified ISO 9001 (version 2000). In parallel, NOVASiC has acquired a strong know-how in the field of SiC epitaxy including 4H-SiC homoepitaxy, 3C-SiC heteroepitaxy and CVD reactor development. The epitaxial activity, hosted in CRHEA-CNRS site at Valbonne, was certified ISO 9001 in 2012.</p> <p>www.novasic.com</p>

Institution or organisation	Booth number	Company synopsis
	A4	NuFlare's SiC Epitaxial System EPIREVO™ S6 is based on the same concept and key features as NuFlare's Si technology (HT2000FD). These key features consist of Vertical Gas Flow, High Speed Wafer Rotation, Direct Wafer Temperature Measurement, and Multi Zone Controlled Solid Heater. With the combination of vertical gas flow and high speed rotation, EPIREVO™ S6 forms an ultra-thin and uniform concentration boundary layer. The boundary layer becomes thinner as the rotation speed increases. The growth rate increases with the rotation speed as the source gas diffusion rate is accelerated by the thinner boundary layer www.nuflare.co.jp/english
	C20	We provide etch and deposition process solutions for nanometre sized features, nanolayers and the controlled growth of nanostructures. These solutions are based on core technologies in plasma, ion beam and atomic layer deposition and etch. Products range from clustered cassette-to-cassette platforms for high-throughput production processing to compact stand-alone systems for R&D. www.plasma.oxinst.com
	A14	Demand for SiC substrates is growing as the demand for SiC-based power and RF devices increases. Yet the adoption of SiC is slowed by cost and by the difficulty of processing the material. Revasum has developed a streamlined grind and CMP process that eliminates conventional lapping and diamond polishing steps and the associated issues. Revasum's solution reduces the overall cost to manufacture SiC substrates, in addition to improving quality, productivity and yield - removing two barriers to more rapid growth in demand for SiC. www.revasum.com
	A16	Rigaku is a pioneer and world leader in designing and manufacturing X-ray based measurement tools to solve semiconductor manufacturing challenges since its inception in 1951. Rigaku specializes in making TXRF to measure surface metal contamination and X-Ray Topography to analyze crystal dislocations. Also, we offer XRF, XRD and XRR metrology tools to measure critical process parameters like thin film: thickness, composition, roughness, density, porosity, and crystal structure. Products: XRTmicron (X-ray Topography), TXRF3760/3800e, AZX400&3650 (XRF) www.rigaku.com/en
	B30	Semilab USA www.semilab.com
	A2	Showa Denko provides high-quality grade silicon carbide epitaxial wafers (HGE) for high power devices in both 4" and 6". www.sdk.co.jp/english
	D16	Silvaco is a leading EDA and IP provider of software tools used for semiconductor process and device development and for analog/mixed-signal, power IC and memory design. Silvaco delivers a full TCAD-to-Sign-off flow for vertical markets including: displays, power electronics, optical devices, radiation and soft error reliability and advanced CMOS process and IP development. For over 30 years Silvaco has been headquartered in Santa Clara, California and has a global presence with offices in North America, Europe, Japan and Asia. www.silvaco.com

Institution or organisation	Booth number	Company synopsis
	B8	<p>Semiconductor Technology Research (STR) provides software and consulting services for development and optimization of industrial growth equipment, improvement of bulk growth (solution growth, PVT, CVI) and epitaxial techniques, engineering of modeling of following applications: modeling of bulk crystal growth, CVD SiC, coating processes. Offered software products include the semiconductor devices, MOVPE and HVPE of Group-III nitrides, III-V materials and their alloys; simulation of semiconductor devices.</p> <p>www.str-soft.com/contact</p>
	C12	<p>Sumitomo Electric is ready to deliver excellent quality SiC epitaxial wafer globally. "EpiEra" grade wafers are proudly manufactured with our over 40 years of compound semiconductor experience. The mass-production technology MPZ (Multi-Parameter and Zone controlled SiC growth technology) provides extensive ZERO defect area and high uniformity, which take you to the next SiC generation. Also, our unique V-grooved MOSFET has been offered with high channel mobility on (0338) face.</p> <p>www.global-sei.com</p>
	C10	<p>TanKeBlue Semiconductor Co., Ltd. is a pioneering and fast-growing company which is engaged in the R&D and manufacturing of high quality single crystal silicon carbide substrates for all kinds of applications. After more than ten years of fruitful R&D and technology accumulation, it has grasped comprehensive core technology and obtained independent patents on both of the silicon carbide crystal growth equipment and the crystal growth & wafer processing technology. TankeBlue will lead the sustainable development in silicon carbide field and provide customers with high quality products with its strong R&D ability, innovative vision and boldness.</p> <p>www.tankeblue.com</p>
	B12	<p>As a leading global supplier of semiconductor and flat panel display (FPD) production equipment, Tokyo Electron Limited (TEL) engages in development, manufacturing, and sales in a wide range of product fields. All of TEL's semiconductor and FPD production equipment product lines maintain high market shares in their respective global segments. TEL provides outstanding products and services to customers through a global network of approximately 74 locations in 16 countries and regions in the U.S., Europe, and Asia.</p> <p>www.tel.com</p>
	A8	<p>Toray Research Center, Inc. provides you with analysis services using a variety of techniques. Our superior ability to meet the problem-solving requirements of clients is based on a long track record and extensive experience in analysis and material evaluation. We will show you our analytical techniques and some examples of our application results.</p> <p>www.toray-research.co.jp/en</p>

Institution or organisation	Booth number	Company synopsis
	B34	<p>ULVAC - we are ultimate in Vacuum. ULVAC GmbH was established in 1987 as the European subsidiary of ULVAC, Inc. Headquartered in Munich, Germany. ULVAC provides a broad portfolio of manufacturing equipment for the vacuum, materials, and thin film industries. ULVAC's solutions diversely incorporate equipment, materials, analysis, and services for semiconductors, MEMS, flat panel displays, electronic components, PCB, TFB and other equipment. For SiC device applications ULVAC has developed ion implanting technologies for relative high dose implant ($2 \times 10^{20}/\text{cm}^3$) up to 600°C maintaining 4H poly-type structure, activation annealing, oxidation/POA/Nitridization, carbon cap layer sputtering, SiC trench etching, Oxide mask etching, sputtering, evaporation, ashing for both R&D and mass production.</p> <p>www.ulvac.eu</p>
	A10	<p>Wolfspeed, A Cree Company, is liberating power and wireless systems from the limitations of silicon by leading the innovation and commercialization of next-generation systems based on silicon carbide and gallium nitride. Please refer to www.wolfspeed.com for additional product and company information.</p> <p>www.wolfspeed.com</p>
	C8	<p>X-FAB has established a 6-inch Silicon Carbide foundry line fully integrated within our 30,000 wafers/month silicon wafer fab located in Lubbock, Texas. With the support of the PowerAmerica Institute, X-FAB's goal is to accelerate the commercialization of SiC power devices by leveraging the economies of scale, automotive quality system and equipment set that have been established in of its silicon wafer fabrication line.</p> <p>www.xfab.com/technology/sic</p>

Tutorial Day schedule

Time	Title	Speaker	Institution
08:15	Registration		
08:45	Welcome	Professor Phil Mawby	University of Warwick, UK
09:00	Silicon Carbide Bulk and Epitaxy Material; A comparison between 3C-SiC and 4H-SiC	Professor Francesco La Via	Italian National Council of Research, Italy
10:00	Coffee Break		
10:15	Ion Implantation Technologies	Dr Roberta Nipoti	Italian National Council of Research, Italy
11:15	Silicon Carbide Power Device Technology	Professor Paul Chow	Rensselaer Polytechnic Institute, USA
12:15	Lunch		
13:15	Advanced characterisation methodologies for SiC power devices	Professor Andrea Irace	University of Naples, Italy
14:15	Silicon Carbide Converter Integration	Professor Alan Mantooth	University of Arkansas, USA
15:15	Coffee Break		
15:30	Getting the best from today's SiC devices - some practical applications	Professor Richard McMahon	University of Warwick, UK
16:30	Finish		

ECSCRM 2018 Tutors



Professor Francesco La Via
- Italian National Council of Research, Italy



Dr Roberta Nipoti
Italian National Council of Research, Italy



Professor Paul Chow
Rensselaer Polytechnic Institute, USA



Professor Andrea Irace
University of Naples, Italy



Professor Alan Mantooth
University of Arkansas, USA



Professor Richard McMahon
University of Warwick, UK

The tutorial sessions will be recorded and available for purchase via digital download after the conference. See www.ecscrm2018/conferenceprogramme/tutorialday

Oral presentations

Monday | MO.02, 4H-SiC epitaxy new trends

Location: Hall 1

Session Chairs: Vishal Shah (University of Warwick)
Marcin Zielinski (NOVASiC)

- 11:00 MO.02.01 | Rachael Myers-Ward **INVITED**
Remote Epitaxy: The Future for Stackable SiC Electronics
R.L. Myers-Ward¹, J. Kim², M.T. DeJarl¹, K. Qiao², Y. Kim², S.P. Pavunny¹, D.K. Gaskil¹
¹US Naval Research Laboratory, Washington, DC, USA
²Massachusetts Institute of Technology, Cambridge, MA, USA
- 11:30 MO.02.02 | Mark Ramm
Prediction and Effect of the Substrate Bowing in CVD of SiC
M. Ramm¹, M. Bogdanov¹, A. Kulik¹, M. Rudinsky¹
¹STR Group, Inc. - Soft-Impact Ltd., 64 Bolshoi Sampsonievskii pr., Build. ÖEO, St. Petersburg, 194044, Russian Federation
- 11:45 MO.02.03 | Shiyang Ji
A study of CVD growth parameters to fill 50-öm-deep 4H-SiC trench
S.Y. Ji¹, R.Kosugi¹, K.Kojima¹, K.Adachi^{1,2}, Y.Kawada^{1,3}, K. Mochizuki^{1,4}, A.Nagata¹, Y.Matsukawa¹, Y.Yonezawa¹, S.Yoshida¹, H.Okumura¹
¹National Institute of Advanced Industrial Science and Technology (AIST), 1-1-1 Umezono, Tsukuba, Ibaraki, 305-8568, Japan
²Mitsubishi Electric Corp., 8-1-1 Tsukaguchihonmachi, Amagasaki, Hyogo, 661-8661, Japan
³Fuji Electric Co.,Ltd, 4-18-1 Tsukama, Matsumoto, Nagano, 390-0821, Japan
⁴Hitachi Ltd., 1-280 Higashi-koigakubo, Kokubunji, Tokyo, 185-8601, Japan
- 12:00 MO.02.04 | Koichi Murata
Epitaxial growth and carrier lifetime control of p-type 4H-SiC with V doping
K. Murata¹, T. Tawara^{2,3}, A. L. Yang¹, T. Miyazawa¹, H. Tsuchida¹
¹Central Research Institute of Electric Power Industry (CRIEPI), 2-6-1 Nagasaka, Yokosuka, Kanagawa 240-0196, Japan
²National Institute of Advanced Industrial Science and Technology (AIST), 16-1 Onogawa, Tsukuba 305-8569, Japan
³Fuji Electric Co., Ltd., Fuji, Hino, 191-8502, Japan
- 12:15 MO.02.05 | Christian Heidorn
Basal Plane Dislocation Conversion Enhancement in 4H-SiC homo-epitaxial Layers by Ion Implantation into the Wafer Substrate
C. Heidorn^{1,2}, R. Esteve³, T. Höchbauer¹, M. Krieger², H. B. Weber², R. Rupp³
¹Infineon Technologies Austria AG, Siemensstraße 2, Villach, Austria
²Lehrstuhl für Angewandte Physik, Department Physik, Friedrich-Alexander- Universität Erlangen-Nürnberg, Staudtstraße 7, 91058 Erlangen, Germany
³Infineon Technologies, Am Campeon 1-15, 85579 Neubiberg, Germany

Monday | MO.03, Applications

Location: Hall 1

Session Chairs: Alberto Castellazzi (University of Nottingham)
Richard McMahon (University of Warwick)

- 13:30 MO.03.01 | Michel Mermet-Guyennet **INVITED**
Potential of SiC devices in MVDC and HVDC converters for Grid: application requirements and reliability validation standards
Michel Mermet-Guyennet¹
¹Supergrid-Institute
- 14:00 MO.03.02 | Nima Zabihi
SiC Power Devices for Applications in Hybrid and Electric Vehicles
N. Zabihi¹, A. Mumtaz^{1,3}, T. Logan², R. A. McMahon¹, T. Daranagama¹
¹WMG, University of Warwick, United Kingdom,
²Paramita Electronics, Cambridge, United Kingdom
³Stephenson Institute for Renewable Energy, University of Liverpool, U.K.

- 14:15 MO.03.03 | Weihua Shao
Power Loss Comparison in a BOOST PFC Circuit Considering the Reverse Recovery of Forward Diode
W. Shao¹, X. Li¹, H. Jiang², X. Guo³, Z. Zeng¹, L. Ran³, P.A. Mawby³
¹School of Electrical Engineering, Chongqing University, Chongqing, 400040, China
²CRRC Zhuzhou Times Electric Co. Ltd, Zhuzhou, 412000, China
³School of Engineering, University of Warwick, Coventry, CV4 7AL, UK
- 14:30 MO.03.04 | Jianwu Sun
High quality 3C-SiC for unbiased solar water splitting
J. Sun¹, J X Jian¹, Y. Shi¹, V. Jokubavicius¹, R. Yakimova¹, M. Syväjärvi¹
¹Department of Physics, Chemistry and Biology (IFM), Linköping University, SE-58183, Linköping, Sweden
- 14:45 MO.03.05 | Selamnesh Nida
Silicon Carbide X-ray Beam Position Monitors for Synchrotrons
S. Nida¹, A. Tsbizov¹, T. Ziemann¹, J. Woerle^{1,2}, A. Moesch³, C. Schulze-Briesse³, C. Pradervand², S. Tudisco⁴, H. Sigg², O. Bunk², U. Grossner¹, M. Camarda²
¹Advanced Power Semiconductor Laboratory, ETH Zurich, 8092 Zurich, Switzerland
²Paul Scherrer Institute, 5232 Villigen, Switzerland
³DECTRIS Ltd., 5405 Baden-Daettwil, Switzerland
⁴Laboratori Nazionali del Sud, 95125 Catania, Italy

Monday | MO.04, Extended defects

Location: Hall 1

Session Chairs: Michael Dudley (Stonybrook University)
Hidekasu Tsuchida (CRIEPI)

- 15:30 MO.04.01 | Koji Nakayama
Modeling Physical Properties of Single Shockley-type Stacking Fault in 4H-SiC PiN Diode
K. Nakayama¹, T. Kimoto², M. Kato³, Y. Yonezawa¹, H. Okumura¹
¹National Institute of Advanced Industrial Science and Technology, 16-1 Onogawa, Tsukuba, Ibaraki, Japan
²Kyoto University, Katsura, Nishikyō, Kyoto, Japan
³Nagoya Institute of Technology, Gokiso, Showa, Nagoya, Japan
- 15:45 MO.04.02 | Akifumi Iijima
Theoretical and Experimental Investigation of Critical Condition for Expansion/Contraction of a Single Shockley Stacking Fault in 4H-SiC
A. Iijima¹, T. Kimoto¹
¹Dept. of Electronic Sci. & Eng., Kyoto University, Nishikyō, Kyoto 615-8510, Japan
- 16:00 MO.04.03 | Akira Kano
Dynamic analysis of single Shockley stacking fault expansion in 4H-SiC P-i-N diode based on free energy
A. Kano¹, A. Goryu¹, M. Kato¹, C. Ota¹, A. Okada¹, J. Nishio¹, K. Hirohata¹
¹Toshiba Corporation, 1 Komukai Toshiba-cho, Saiwai-ku, Kawasaki, Japan
- 16:15 MO.04.04 | Isaho Kamata
Monitoring of Substrate and Epilayer Surfaces by Mirror Projection Electron Microscope
I. Kamata¹, K. Ohira², K. Kobayashi², M. Hasegawa², M. Miyata², N. Noguchi³, S. Takami³, H. Tsuchida¹
¹Central Research Institute of Electric Power Industry (CRIEPI), 2-6-1 Nagasaka, Yokosuka, Kanagawa 240-0196, Japan
²Hitachi High-Technologies Corporation, 24-14 Nishi-Shimbashi 1-chome, Minato-ku, Tokyo, 105-8717 Japan
³Fujimi Incorporated, 1-8 Techno Plaza, Kakamigahara, Gifu, 509-0109 Japan

Tuesday | TU.01a, MOS Interface Processing

Location: Hall 1

Session Chairs: Wolfgang Bergner (Infineon)
Hiroshi Yano (University of Tsukuba)

- 09:00 TU.01a.01 | Shunsuke Asaba **INVITED**
Interface Reaction in the High-temperature N2 Annealing Process for Gate Insulator on SiC with High-Mobility and High-Reliability
S. Asaba¹, T. Ito¹, S. Fukatsu¹, Y. Nakabayashi¹, T. Shimizu¹, M. Furukawa², T. Suzuki², R. Iijima¹
¹Corporate R&D Center, Toshiba Corporation, 1, Komukai Toshiba-cho, Saiwaiku, Kawasaki, Kanagawa 212-8582, Japan
²Toshiba Electronic Devices & Storage Corporation, 300, Ikaruga Taishi-cho, Ibo-gun, Hyogo 671-1595, Japan

- 09:30 TU.01a.02 | Yifan Jia
Impact of NO Annealing Conditions on Electron and Hole Traps of N-type and P-type 4H-SiC MOS Capacitors
 Y. F. Jia¹, H. L. Lv¹, X. Y. Tang¹, Q. W. Song¹, G. N. Tang¹, Y. M. Zhang¹, Y. M. Zhang¹, S. Dimitrijevic², J. S. Han²
¹School of Microelectronics, Xidian University, Xi'an 710071, China
²Griffith School of Engineering, Griffith University, Queensland 4111, Australia
- 09:45 TU.01a.03 | Ayele Kidist Moges
Sub-nm-scale depth profiling of nitrogen in NO- and N2-annealed SiO2/4H-SiC(0001) structures
 K. Moges¹, M. Sometani², T. Hosoi¹, T. Shimura¹, S. Harada², H. Watanabe¹
¹Osaka University, 2-1 Yamadaoka, Suita, Osaka 565-0871, Japan
²AIST, Tsukuba, Ibaraki 305-8598, Japan
- 10:00 TU.01a.04 | Mizuki Nishida
Combination of NO-annealing with H2O-annealing at low temperature to reduce SiO2/4H-SiC (0001) interface defect density
 M. Nishida¹, R. Sakuta¹, H. Hirai¹, K. Kita¹
¹Department of Materials Engineering, The University of Tokyo, Japan
- 10:15 TU.01a.05 | Takuma Kobayashi
Reduction of interface state density in SiC (0001) MOS structures by very-low-oxygen-partial-pressure annealing
 Keita Tachiki¹, Yu-ichiro Matsushita², K. Ito¹, T. Kimoto²
¹Kyoto University
²Tokyo Institute of Technology

Tuesday | TU.01b, 4H-SiC epitaxy

Location: Hall 11

Session Chairs: Al Burk (Wolfspeed, A Cree Company)
 Francesco La Via (CNR-IMM)

- 09:00 TU.01b.01 | Robin Karhu
4H-SiC on-axis homoepitaxy: Control of growth mode and surface morphology
 R. Karhu¹, J. Ul Hassan¹
¹Department of Physics, Chemistry and Biology, IFM, Linköping University, Sweden
- 09:15 TU.01b.02 | Keiji Wada
Extensive 99% Killer Defect Free 4H-SiC Epitaxial Layer toward High Current Large Chip Devices
 K. Wada¹, T. Miyase¹, H. Itoh¹, T. Hori¹, H. Doi¹, M. Furumai¹
¹Sumitomo Electric Industries, Ltd. 1-1-1, Koyakita, Itami-shi, Hyogo 664-0016, Japan
- 09:30 TU.01b.03 | Philip Hens
Extended in-situ measurement possibilities in a warm-wall Planetary Reactor for the epitaxial growth of silicon carbide
 P. Hens^{1,2}, B. van Well³, H. Kitahata¹, B. O'Neil¹, F. Wischmeyer¹
¹AIXTRON SE, Dornkaulstrasse 2, 52134 Herzogenrath, Germany
²AIXTRON SE, Schottkystrasse 10, 91058 Erlangen, Germany
³AIXTRON Ltd., Buckingway Business Park, Anderson Rd, Swavesey, Cambridge CB24 4FQ, United Kingdom
- 09:45 TU.01b.04 | Birgit Kallinger
Influence of substrate properties on the defectivity and minority carrier lifetime in 4H-SiC homoepitaxial layers
 B. Kallinger¹, J. Erlekampf¹, K. Roßhirt¹, P. Berwian¹, M. Stockmeier², M. Vogel², P. Hens³, F. Wischmeyer³
¹Fraunhofer IISB, Schottkystraße 10, 91058 Erlangen, Germany
²SiCrystal GmbH, Thurn-und-Taxis-Straße 20, 90411 Nürnberg, Germany
³AIXTRON SE, Dornkaulstraße 2, 52134 Herzogenrath, Germany
- 10:00 TU.01b.05 | Nicolo Piluso **INVITED**
High quality 4H-SiC epitaxial layer by tuning CVD process
 N. Piluso¹, A. Campione¹, S. Lorenti¹, A. Severino¹, G. Arena¹, S. Coffa¹
¹STMicroelectronics, Stradale Primosole, 50, 95100 Catania, Italy

Tuesday | TU.02a, Power MOSFET

Location: Hall 1

Session Chairs: **Andrei Mihaila (ABB)**
Mario Saggio (ST Microelectronics)

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- 11:00 TU.02a.01 | Edward Van Brunt **INVITED**
Industrial and Body Diode Qualification of Gen-III Medium Voltage SiC MOSFETs: Challenges and Solutions
E. Van Brunt¹, M. O'Loughlin¹, A. Burk¹, B. Hull¹, S. H. Ryu¹, J. Richmond¹, Y. Klebnikov¹, E. Balkas¹, J. W. Palmour¹
¹Wolfspeed, A Cree Company 3028 E. Cornwallis Rd. United States
- 11:30 TU.02a.02 | Jimmy Franchi
1200 V SiC MOSFETs with stable VTH under high temperature gate bias stress
J. Franchi¹, M. Domeij¹, K. Lee¹
¹ON Semiconductor, Isafjordsgatan 32C, 16440 Kista, Sweden
- 11:45 TU.02a.03 | Takeru Suto
1.2-kV SiC trench-etched double-diffused MOS (TED-MOS) for electric vehicle
T. Suto¹, N. Watanabe¹, Y. Bu¹, H. Miki¹, N. Tega¹, Y. Mori¹, D. Hisamoto¹, A. Shima¹
¹Center for Technology Innovation & Electronics, Research & Development Group, Hitachi, Ltd., 1-280, Higashi-Koigakubo, Kokubunji, Tokyo, 185-8601, Japan.
- 12:00 TU.02a.04 | Alexander Bolotnikov
Optimization of 1700V SiC MOSFET for Short Circuit Ruggedness
A. Bolotnikov¹, P. Losee¹, R. Ghandi¹, A. Halverson¹, L. Stevanovic¹
¹General Electric Global Research Center, USA
- 12:15 TU.02a.05 | Shinya Kyogoku
Improvement of short-circuit ruggedness by JFET designs in SiC trench-gate MOSFETs
S. Kyogoku¹, T. Oshima², K. Tanaka¹, R. Iijima², S. Harada¹
¹National Institute of Advanced Industrial Science and Technology, Tsukuba Central 2, 1-1-1 Tsukuba, Ibaraki 305-8568, Japan
²Toshiba Corporation, 1 Komukai Toshiba-cho, Saiwai-ku, Kawasaki, Kanagawa 212-8582, Japan

Tuesday | TU.02b, Fundamental Properties

Location: Hall 11

Session Chairs: **Adam Gali (HAS Wigner Research Center for Physics)**
Nguyen Son (Linköping University)

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- 11:00 TU.02b.01 | Takuya Maeda
Photocurrent induced by Franz-Keldysh effect in a 4H-SiC p-n junction diode under high reverse bias voltage
T. Maeda¹, X. Chi¹, M. Horita¹, J. Suda^{1,2}, T. Kimoto¹
¹Kyoto University, Nishikyo, Kyoto, 615-8510, Japan
²Nagoya University, Chikusa, Nagoya, 464-8603, Japan
- 11:15 TU.02b.02 | Walter M. Klahold
Newly Resolved Phonon-Assisted Transitions and Fine Structure in the Low Temperature Wavelength Modulated Absorption and Photoluminescence Spectra of 6H SiC
W. M. Klahold¹, W. J. Choyke¹, R. P. Devaty¹
¹University of Pittsburgh, Pittsburgh, PA, USA
- 11:30 TU.02b.03 | Anli Yang
Time-resolved photoluminescence spectral analysis of DAP and e-A recombination in N+B-doped n-type 4H-SiC epilayers
A. L. Yang¹, T. Miyazawa¹, T. Tawara^{2,3}, K. Murata¹, H. Tsuchida¹
¹Central Research Institute of Electric Power Industry (CRIEPI), 2-6-1 Nagasaka, Yokosuka, Kanagawa 240-0196, Japan
²National Institute of Advanced Industrial Science and Technology (AIST), 16-1 Onogawa, Tsukuba 305-8569, Japan
³Fuji Electric Co., Ltd., Fuji, Hino, 191-8502, Japan

11:45 TU.02b.04 | Tuerxun Ailihumaer
Validation of X-ray topographic contour mapping method for measuring nitrogen doping concentrations in N-doped 4H-SiC substrates
 T. Ailihumaer¹, Y. Yang², J. Guo¹, B. Raghothamachar¹, M. Dudley¹,
¹Department of Materials Science & Chemical Engineering, Stony Brook University, Stony Brook, NY, 11794, USA
²CVD Equipment Corporation, 355 Technology Drive, Central Islip, NY 11722, USA

12:00 TU.02b.05 | Antonella Parisini **INVITED**
Carrier transport mechanisms in highly-doped p-type 4H-SiC(Al)
 A. Parisini¹ and R. Nipoti²
¹Università di Parma, Dipartimento di Fisica e Scienze della Terra - CNISM
²CNR-IMM, UOS of Bologna, via Gobetti 101, I-40129 Bologna, Italy

Tuesday | TU.03a, Ion Implantation

Location: Hall 1

Session Chairs: Konstantinos Zekentes (Foundation for Research and Technology Hellas(FORTH), Institute of Electronic Structure and Laser (IESL))
 Peter Gammon (University of Warwick)

13:30 TU.03a.01 | Anders Hallen **INVITED**
Recent advances in the doping of 4H-SiC by channelled ion implantation
 KTH Royal Institute of Technology, Sweden

14:00 TU.03a.02 | Kazuhiro Mochizuki
Comparison of Ranges for Al Implantations into 4H-SiC (0001) Using Channeled Ions and an Ion Energy in the Bethe-Bloch Region
 K. Mochizuki¹, R. Kosugi¹, Y. Yonezawa¹, H. Okumura¹
¹National Institute of Advanced Industrial Science and Technology, 1-1-1 Umezono, Tsukuba, Ibaraki, 305-8568, Japan

14:15 TU.03a.03 | Takahiro Morikawa
Fabrication and characterization of 3.3-kV SiC DMOSFET with self-aligned channels formed by tilted ion implantation
 T. Morikawa¹, S. Sato¹, A. Shima¹
¹Center for Technology Innovation ò Electronics, Research & Development Group, Hitachi, Ltd. 1-280 Higashi-koigakubo, Kokubunji, Tokyo 185-8601, Japan

14:30 TU.03a.04 | Roberta Nipoti
1300°C annealing of 1x10²⁰ Al⁺ ion implanted 3C-SiC
 R. Nipoti¹, M.C. Canino¹, F. Torregrosa², S. Monnoye³, H. Mank³, M. Zielinski³
¹CNR-IMM of Bologna, via Gobetti 101, I-40129 Bologna, Italy
²ION BEAM SERVICES, Rue Gaston Imbert prolongée, 13790 Peynier, France
³NOVA-SiC, Savoie Technolac, BP 267 - F 73375 Le Bourget du Lac cedex, France

14:45 TU.03a.05 | Johanna Müting
Lateral Stragglings of Ion Implantation Distributions in 4H-SiC Investigated by SIMS
 J. Müting¹, V. Bobal², A. Azarov², B. G. Svensson², U. Grossner¹
¹Advanced Power Semiconductor Laboratory, ETH Zurich, 8092 Zurich, Switzerland
²Department of Physics, Centre for Materials Science and Nanotechnology, University of Oslo, 0316 Oslo, Norway

Tuesday | TU.03b, MOS Interface Characterisation

Location: Hall 11

Session Chairs: Michael Krieger (Friedrich-Alexander-University of Erlangen-Nuernberg)
 Naoki Watanabe (Hitachi, Ltd.)

13:30 TU.03b.01 | Takahide Umeda
Electron-spin-resonance characterization on interface carbon defects at 4H-SiC/SiO₂ interfaces formed by ultrahigh-temperature oxidation
 T. Umeda¹, T. Hosoi², T. Okuda³, T. Kimoto³, M. Sometani⁴, S. Harada⁴, H. Watanabe²
¹Institute of Applied Physics, University of Tsukuba, Tsukuba 305-8573, Japan
²Graduate School of Engineering, Osaka University, Osaka 565-0871, Japan
³Graduate School of Engineering, Kyoto University, Kyoto 615-8510, Japan
⁴National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba 305-8569, Japan

- 13:45 TU.03b.02 | Judith Berens
Cryogenic Characterization of NH₃ post oxidation annealed 4H-SiC Trench MOSFETs
 J. Berens^{1, 3}, G. Pobegen¹, T. Aichinger², G. Rescher², T. Grasser³
¹KAI GmbH, Europastraße 8, 9524 Villach, Austria
²Infineon Technologies Austria AG, Siemensstraße 2, 9500 Villach, Austria
³Institute for Microelectronics, TU Wien, Gusshausstraße 27-29, 1040 Vienna, Austria
- 14:00 TU.03b.03 | Yuji Yamagishi
High-resolution observation of defects at nitride SiO₂/4H-SiC interfaces by local deep level transient spectroscopy
 Y. Yamagishi¹, K. Yamasue¹, Y. Cho¹
¹Research Institute of Electrical Communication, Tohoku University, Sendai, Japan
- 14:15 TU.03b.04 | Fabian Rasinger
On the understanding of drain current transients of 4H-SiC trench MOSFETs
 F. Rasinger¹, G. Pobegen¹, G. Rescher², T. Aichinger², H. B. Weber³, M. Krieger³
¹KAI GmbH, Europastraße 8, 9524 Villach, Austria
²Infineon Austria AG, Siemensstraße 2, 9500 Villach, Austria
³Lehrstuhl für Angewandte Physik, Department Physik, Friedrich-Alexander Universität Erlangen-Nürnberg, Staudtstraße 7, 91058 Erlangen, Germany
- 14:30 TU.03b.05 | Patrick Fiorenza **INVITED**
SiO₂/SiC MOSFETs interface traps probed by nanoscale analyses and transient current and capacitance measurements
 P. Fiorenza¹, F. Giannazzo¹, M. Saggio², F. Roccaforte¹
¹1) Consiglio Nazionale delle Ricerche - Istituto per la Microelettronica e Microsistemi (CNR-IMM), Strada VIII, n. 5 - Zona Industriale, 95121 Catania, Italy
²2) STMicroelectronics, Stradale Primosole n. 50 - Zona Industriale, 95121 Catania, Italy

Tuesday | TU.04a, MOSFET Interface Stability

Location: Hall 1

Session Chairs: Jun Zeng (Max Power Semiconductor)
 Fabrizio Roccaforte (CNR-IMM)

- 15:30 TU.04a.01 | Jose Ortiz Gonzalez
Novel method for evaluation of negative bias temperature instability of SiC MOSFETs
 J. Ortiz Gonzalez¹, O. Alatise¹
¹School of Engineering, University of Warwick, United Kingdom
- 15:45 TU.04a.02 | Shintaro Sato
Impact of Interface Trap Density of SiC-MOSFET in High-Temperature Environment
 S. Sato¹, M. Masunaga¹, Y. Mori¹, N. Sugii¹, A. Shima¹
¹Center for Technology Innovation - Electronics, Research & Development Group, Hitachi, Ltd. 1-280 Higashi-koigakubo, Kokubunji-shi, Tokyo 185-8601, Japan.
- 16:00 TU.04a.03 | Keita Tachiki
Influence of interface states on threshold voltage of SiC short-channel MOSFETs
 K. Tachiki¹, T. Ono¹, T. Kobayashi¹, H. Tanaka¹, T. Kimoto¹
¹Department of Electronic Science and Engineering, Kyoto University Nishikyo, Kyoto 615 - 8510, Japan
- 16:15 TU.04a.04 | Besar Asllani
Subthreshold drain current hysteresis of planar SiC MOSFETs
 B. Asllani^{1, 2}, A. Castellazzi¹, D. Planson², H. Morel²
¹PEMC Group, University of Nottingham, Nottingham NG7 2RD, UK
²Univ Lyon, INSA Lyon, CNRS, Ampère, F-69621 Villeurbanne, France

Tuesday | TU.04b, 3C-SiC

Location: Hall 11

Session Chairs: Adolf Schoner (Ascatron AB)
Rositsa Yakimova (Linköping University)

- 15:30 TU.04b.01 | Peter Wellmann
Modeling of the PVT growth process of bulk 3C-SiC - growth process development and challenge of the right materials data base
M. Schöler¹, P. Schuh¹, J. Steiner¹, P.J. Wellmann¹
¹Crystal Growth Lab, Materials Department 6 (i-meet), Friedrich-Alexander University of Erlangen-Nürnberg, Martensstr. 7, D-91058 Erlangen, Germany
- 15:45 TU.04b.02 | Alessandra Alberti
Bulk 3C-SiC growth high resolution investigation of stacking fault structure and density by HRXRD and STEM
A. Alberti¹, E. G. Barbagiovanni¹, C. Bongiorno¹, E. Smecca¹, M. Zimbone¹, R. Anzalone², G. Litrico³, M. Mauceri³, A. La Magna¹, F. La Via¹
¹IMM-CNR, VIII Strada, 5, 95121 Catania, Italy
²STMicroelectronics, Stradale Primosole, 50, 95121 Catania, Italy
³LPE, XVI Strada, 95121, Catania, Italy
- 16:00 TU.04b.03 | Marcin Zielinski
Novel Carbon Treatment to Create an Oriented 3C-SiC Seed on Silicon.
M. Zielinski¹, S. Monnoye¹, H. Mank¹, F. Torregrosa², G. Grosset², Y. Spiegel²
¹Novasic, Rue Bernard Gregory, 6560 Valbonne, France
²Ion Beam Services (IBS): F13790, Peynier, France
- 16:15 TU.04b.04 | Massimo Zimbone
3C-SiC grown on Si1-xGex substrates
M Zimbone¹, M. Zielinski¹, E.G.Barbagiovanni¹, F La Via¹
¹CNR Institute for Microelectronics and Microsystems 95121 - Catania, Italy - Strada VIII, 5, Italy
²Savoie Technolac - Arche Bat.4 Allée du Lac d'Aiguebelette BP 267 73375 Le Bourget du Lac Cedex, France

Wednesday | WE.01a, Solution growth

Location: Hall 1

Session Chairs: Noboru Ohtani (Kwansei Gakuin University, Japan)
Didier Chaussende (CNRS)

- 09:00 WE.01a.01 | Naoyoshi Komatsu **INVITED**
Application of defect conversion layer by solution growth for reduction of TSDs in 4H-SiC bulk crystals by PVT growth
N. Komatsu¹, T. Mitani¹, Y. Hayashi¹, H. Suo^{1,2}, T. Kato¹, H. Okumura¹
¹National Institute of Advanced Industrial Science and Technology, 16-1 Onogawa, Tsukuba, Ibaraki 305-8569, Japan
²Showa Denko K. K., 1-13-9 Shiba Daimon, Minato-ku, Tokyo 105-8518, Japan
- 09:30 WE.01a.02 | Xinbo Liu
Application of C face dislocation conversion technique to 2-inch SiC crystal growth
X. Liu¹, C. Zhu^{1,2}, S. Harada^{1,2}, M. Tagawa^{1,2}, T. Ujihara^{1,2,3}
¹Department of Materials Science and Engineering, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8603, Japan
²Center for Integrated Research of Future Electronics (CIRFE), Institute of Materials and System for Sustainability (IMaSS), Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8601, Japan
³GaN Advanced Device Open Innovation Laboratory (GaN-OIL), National Institute of Advanced Industrial Science and Technology (AIST), Furo-cho, Chikusa-ku, Nagoya 464-8601, Japan
- 09:45 WE.01a.03 | Yuichiro Hayashi
Control of temperature distribution for bulk growth of 4H-SiC single crystals by solution growth technique: Meltback etching and suppression of SiC particle adhesion
Y. Hayashi¹, T. Mitani¹, N. Komatsu¹, T. Kato¹, H. Okumura¹
¹National Institute of Advanced Industrial Science and Technology, 16-1 Onogawa, Tsukuba, Ibaraki 305-8569, Japan

- 10:00 WE.01a.04 | Sakiko Kawanishi
Melt properties of Si-40 mol% Cr solvent and their influence to temperature and flow control in the SiC solution growth
 S. Kawanishi¹, H. Daikoku², T. Ishikawa³, M. Abe¹, H. Shibata¹, T. Yoshikawa²
¹Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, 2-1-1 Katahira, Aoba-ku, Sendai, Miyagi, 980-8577, Japan
²Institute of Industrial Science, The University of Tokyo 4-6-1 Komaba, Meguro-ku, Tokyo 153-8505, Japan
³Japan Aerospace Exploration Agency 2-1-1 Sengen, Tsukuba, Ibaraki, 305-8505, Japan
- 10:15 WE.01a.05 | Takeshi Yoshikawa
Effect of Al addition to Si-Cr based solvent for growing n-type 2" 4H-SiC
 T. Yoshikawa¹, H. Daikoku², S. Kawanishi¹
¹Institute of Industrial Science, The University of Tokyo, Japan
²Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, 2-1-1 Katahira, Aoba-ku, Sendai, Miyagi, 980-8577, Japan

Wednesday | WE.01b, Quantum Defects

Location: Hall 11

Session Chairs: Alexander Lebedev (Ioffe Institute)

Takeshi Ohshima (National Institutes for Quantum and Radiological Science and Technology)

- 09:00 WE.01b.01 | Marianne E. Bathen
by solution growth on concave surface method
 M. E. Bathen¹, A. Galeckas¹, Y. K. Frodason¹, L. Vines¹, B. G. Svensson¹
¹Department of Physics/ Centre for Materials Science and Nanotechnology, University of Oslo, N-0316 Oslo, Norway
- 09:15 WE.01b.02 | Adam Gali
A telecom wavelength quantum emitter: vanadium point defect in 4H SiC
 A.Cs  r  ¹, L. Spindelberger², C. Salter³, N. T. Son⁴, T. Fromherz², A. Gali^{1, 5}, M. Trupke³
¹Department of Atomic Physics, Budapest University of Technology and Economics, Budafok i   t 8, H-1111 Budapest, Hungary
²Johannes Kepler University Linz, Institut f  r Halbleiter und Festk  rperphysik, Altenberger Stra  e 69, 4040 Linz, Austria
³Vienna Center for Quantum Science and Technology, Universit  t Wien, Boltzmanngasse 4, 1090 Vienna
⁴Department of Physics, Chemistry and Biology, Link  ping University, SE-58183 Link  ping, Sweden
⁵Wigner Research Centre for Physics, Hungarian Academy of Sciences, P.O. Box 49, H-1525, Hungary
- 09:30 WE.01b.03 | Andras Cs  r  
First-principles study on photoluminescence quenching of divacancy in 4H SiC
 A.Cs  r  ¹, B. Magnusson^{2, 3}, N. T. Son², A. G  llstr  m⁴, T. Ohshima⁵, I. G. Ivanov², A. Gali^{1, 6}
¹Department of Atomic Physics, Budapest University of Technology and Economics, Budafok i   t 8, H-1111 Budapest, Hungary
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³Norstel AB, Ramsh  llsv  gen 15, SE-60238 Norrk  ping, Sweden
⁴Saab Dynamics AB, SE-58188 Link  ping, Sweden
⁵National Institutes for Quantum and Radiological Science Technology, 1233 Watanuki, Takasaki, Gunma 370-1292, Japan
⁶Wigner Research Centre for Physics, Hungarian Academy of Sciences, P.O. Box 49, H-1525, Hungary
- 09:45 WE.01b.04 | Ivan G. Ivanov
Towards room-temperature optical charge-state control of the divacancy in 4H SiC
 I. G. Ivanov¹, B. Magnusson^{1, 2}, A. G  llstr  m³, A.Cs  r  ⁴, T. Ohshima⁵, A. Gali^{4, 6}, N. T. Son¹
¹Link  ping University, Department of Physics, Chemistry and Biology, SE-58183 Link  ping, Sweden
²Norstel AB, Ramsh  llsv  gen 15, SE-60238 Norrk  ping, Sweden
³Saab Dynamics AB, SE-58188 Link  ping, Sweden
⁴Department of Atomic Physics, Budapest University of Technology and Economics, Budafok i   t 8, H-1111 Budapest, Hungary
⁵National Institutes for Quantum and Radiological Science Technology, 1233 Watanuki, Takasaki, Gunma 370-1292, Japan
⁶Wigner Research Centre for Physics, Hungarian Academy of Sciences, P.O. Box 49, H-1525, Hungary
- 10:00 WE.01b.05 | Yoji Chiba
Creation of electrically controllable radiation centers in SiC using proton beam writing
 Y. Chiba^{1, 2}, Y. Yamazaki², T. Makino², S.-i. Sato², N. Yamada², T. Sato², K. Kojima³, S.-Y. Lee⁴, Y. Hijikata¹, T. Ohshima²
¹Saitama University, Saitama 338-0825, Japan
²National Institute for Radiation Science and Technology (QST), Takasaki, Gunma 370-1207, Japan
³National Institute of Advanced Industrial Science and Technology, Tsukuba, Ibaraki 305-8568 Japan
⁴Center for Quantum Information, Korea Institute of Science and Technology, Seoul, 02792, Republic of Korea

- 10:15 WE.01b.06 | Nguyen Tien Son
Silicon vacancies in 4H-SiC: ligand hyperfine interactions and microscopic model
 N.T. Son¹, P. Stenberg^{1,2}, V. Jokubavicius¹, T. Ohshima³, J. Ul Hassan¹, I.G. Ivanov¹
¹Department of Physics, Chemistry and Biology, Linköping University, SE-58183 Linköping, Sweden
²Ascatron AB, Electrum 207, SE-16440 Kista, Sweden
³National Institutes for Quantum and Radiological Science and Technology, 1233 Watanuki, Takasaki, Gunma 370-1292, Japan

Wednesday | WE.02a, High voltage devices

Location: Hall 1

Session Chairs: Dethard Peters (Infineon)
 Dominique Planson (Ampere Laboratory)

- 11:00 WE.02a.01 | Naoki Watanabe **INVITED**
Improvement of Switching Characteristics in 6.5-kV SiC IGBT with Novel Drift Layer Structure
 N. Watanabe¹, H. Yoshimoto¹, Y. Mori¹, A. Shima¹
¹Center for Technology Innovation - Electronics, Research & Development Group, Hitachi, Ltd., 1-280, Higashi-Koigakubo, Kokubunji, Tokyo, 185-8601, Japan.
- 11:30 WE.02a.02 | Andrei Mihaila
An investigation into the dynamic behavior of 3.3kV MOSFET body diode
 A. Mihaila¹, E. Bianda¹, L. Knoll¹, P. Godignon², V. Soler², L. Kranz¹, G. Alfieri¹, U. Badstübner¹, F. Canales¹, M. Rahimo³
¹ABB Switzerland Ltd, Corporate Research Centre, 5405, Baden-Döttwil, Switzerland
²Centre Nacional de Microelectronica, CNM-CSIC, Barcelona, Spain,
³ABB Switzerland Ltd., Semiconductors CH-5600, Lenzburg, Switzerland
- 11:45 WE.02a.03 | Sei-Hyung Ryu
15 kV n-GTOs in 4H-SiC
 S. Ryu¹, D. J. Lichtenwalner¹, M. O'Loughlin¹, C. Capell¹, J. Richmond¹, E. Van Brunt¹, C. Jona¹, Y. Lemma¹, A. Burk¹, B. Hull¹, M. McCain¹, S. Sabri¹, H. O'Brien², A. Ogunniyi², A. Lelis², J. Casady¹, D. Grider¹, S. Allen¹, J. W. Palmour¹
¹Wolfspeed, a Cree Company, RTP, NC, USA
²U.S. Army Research Laboratory, Adelphi, MD, USA
- 12:00 WE.02a.04 | Koji Nakayama
Static and Dynamic Characteristics of 27.5-kV 4H-SiC PiN Diode with Carrier Injection Control
 K. Nakayama¹, T. Mizushima^{1,2}, K. Takenaka^{1,2}, A. Koyama^{1,3}, Y. Kiuchi^{1,4}, T. Matsunaga^{1,2}, H. Fujisawa^{1,2}, T. Hatakeyama¹, M. Takei^{1,2}, Y. Yonezawa¹, T. Kimoto⁵, H. Okumura¹
¹National Institute of Advanced Industrial Science and Technology, 16-1 Onogawa, Tsukuba, Ibaraki, Japan
²Fuji Electric Co., Ltd., 4-18-1 Tsukama, Matsumoto, Nagano, Japan
³Mitsubishi Electric Corporation, 8-1-1 Tsukaguchi-Honmachi, Amagasaki, Hyogo, Japan
⁴New Japan Radio Co., Ltd., 2-1-1 Fukuoka, Fujimino, Saitama, Japan
⁵Kyoto University, Katsura, Nishikyo, Kyoto, Japan
- 12:15 WE.02a.05 | Alexander Bolotnikov
SiC Charge-Balanced Devices Offering Breakthrough Performance Surpassing the 1-D Ron versus BV Limit
 A. Bolotnikov, R. Ghandi
¹General Electric Global Research Center, USA

Wednesday | WE.02b, MOS Interface Processing

Location: Hall 11

Session Chairs: Patrick Fiorenza (CNR-IMM)
 Phil Mawby (University of Warwick)

- 11:00 WE.02b.01 | Judith Woerle
Surface morphology studies of 4H-SiC after thermal oxidation
 J. Woerle^{1,2}, V. Šimonka³, E. Müller¹, A. Hössinger⁴, H. Sigg¹, S. Selberherr⁵, J. Weinbub³, M. Camarda¹, U. Grossner²
¹Paul Scherrer Institute, 5232 Villigen, Switzerland
²Advanced Power Semiconductor Laboratory, ETH Zurich, Physikstrasse 3, 8092 Zurich, Switzerland
³Christian Doppler Laboratory for HPTCAD, Institute for Microelectronics, TU Wien, Gußhausstraße 27-29 / E360, 1040 Vienna, Austria
⁴Silvaco Europe Ltd., Compass Point, St Ives, Cambridge PE27 5JL, UK
⁵Institute for Microelectronics, TU Wien, Gußhausstraße 27-29 / E360, 1040 Vienna, Austria

- 11:15 WE.02b.02 | Adhi Dwi Hatmanto
Introduction and recovery of local lattice distortion at the surface of thermally-oxidized 4H-SiC (0001)
 A. D. Hatmanto¹, K. Kita¹
¹Department of Materials Engineering, The University of Tokyo 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656 Japan
- 11:30 WE.02b.03 | Jesus Urresti
Temperature Dependence of High Mobility 4H-SiC MOSFETs Fabricated with Thin SiO₂/Al₂O₃ Gate Stacks
 J. Urresti¹, F. Arith^{1,2}, K. Vasilevskiy¹, S. Olsen¹, N. G. Wright¹, A. G. O'Neill¹
¹School of Engineering, Newcastle University, Newcastle upon Tyne, NE1 7RU, United Kingdom
²Faculty of Electronic and Computer Engineering, UTeM, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia
- 11:45 WE.02b.04 | Xingyan Zhou
Mobility limiting mechanisms in p-channel 4H-SiC MOSFETs investigated by Hall-effect measurements
 X. Zhou¹, D. Okamoto¹, T. Hatakeyama², M. Sometani², S. Harada², X. Zhang¹, N. Iwamuro¹, H. Yano¹
¹University of Tsukuba, 1-1-1 Tennodai, Tsukuba, Ibaraki 305-8573, Japan
²National Institute of Advanced Industrial Science and Technology (AIST), 1-1-1 Umezono, Tsukuba, Ibaraki 305-8568, Japan
- 12:00 WE.02b.05 | Mitsuru Sometani
Superiority of pure O₂-based gate oxidation on Hall effect mobility of 4H-SiC (0001) MOSFET revealed by low-doped epitaxial wafers
 M. Sometani¹, T. Hosoi², T. Hatakeyama¹, S. Harada¹, H. Yano³, T. Shimura², H. Watanabe², Y. Yonezawa¹, H. Okumura¹
¹National Institute of Advanced Industrial Science and Technology (AIST), 16-1 Onogawa, Tsukuba, Ibaraki 305-8569, Japan
²Graduate School of Engineering, Osaka University, 2-1 Yamadaoka, Suita, Osaka 565-0871, Japan
³Graduate School of Pure and Applied Sciences, University of Tsukuba, 1-1-1 Tennodai, Tsukuba, Ibaraki 305-8573, Japan
- 12:15 WE.02b.06 | Tetsuo Hatakeyama
Interface Trap Densities near the Band Edge of SiO₂/4H-SiC (0338), (1120) and 0001 and their Impacts on Electron Transport
 T. Hatakeyama¹, T. Masuda^{1,2}, M. Sometani¹, D. Okamoto³, S. Harada¹, H. Yano³, Y. Yonezawa¹, H. Okumura¹
¹Advanced Power Electronics Research Center, National Institute of Advanced Industrial Science and Technology, 16-1 Onogawa, Tsukuba, 305-8569, Japan
²Sumitomo Electric Industries, LTD., 1-1-3 Shimaya, Osaka, 554-0024, Japan
³University of Tsukuba, 1-1-1 Tennodai, Tsukuba, 305-8573, Japan

Wednesday | WE.03a, Device ruggedness

Location: Hall 1

Session Chairs: Andrea Irace (University of Naples)
 Olayiwola Alatise (University of Warwick)

- 13:30 WE.03a.01 | Kevin Matocha **INVITED**
Reliability and Ruggedness of planar Silicon Carbide MOSFETs
 K. Matocha¹, H. Ji¹, S. Choudhary
¹Now at Monolith Semiconductor, Round Rock, Texas, USA
¹On-Semi Conductor, Phoenix, Arizona, USA
- 14:00 WE.03a.02 | Victor Soler
Dynamic characterization and robustness test of high voltage SiC MOSFETs
 V. Soler¹, M. Cabello¹, V. Banu¹, J. Montserrat¹, J. Rebollo¹, P. Godignon¹, E. Bianda², L. Knoll², L. Kranz², A. Mihaila²
¹Centre Nacional de Microelectronica, IMB-CNM CSIC, Barcelona, Spain
²ABB Switzerland Ltd, CRC, 5405, Baden-Döttwil, Switzerland
- 14:15 WE.03a.03 | Ashish Kumar
Avalanche Ruggedness Characterization of 10 kV 4H-SiC MOSFETs
 A. Kumar¹, S. Parashar¹, E. Van Brunt², S. Sabri², S. Ganguly², S. Bhattacharya¹, V. Veliadis¹
¹Dept of Electrical and Computer Engineering, North Carolina State University, Raleigh, NC.
²Wolfspeed, A Cree Company, Research Triangle Park, Raleigh, NC.

- 14:30 WE.03a.04 | Daniela Cavallaro
Capability of SiC MOSFETs under Short-Circuit tests and development of a Thermal Model by Finite Element Analysis
 D.Cavallaro¹, M.Pulvirenti¹, E.Zanetti¹, M. Saggio¹
¹STMicronics s.r.l. – Stradale Primosole 50, Catania, Italy
- 14:45 WE.03a.05 | Siddarth Sundaresan
Avalanche Robustness of 4600 V SiC DMOSFETs
 S. Sundaresan¹, V. Mulpuri¹, S. Jeliakov¹, R. Singh¹
¹GeneSiC Semiconductor, Dulles VA, USA

Wednesday | WE.03b, PVT Growth session

Location: Hall 11

Session Chairs: Adrian Powell (Cree)
 Peter Wellmann (Friedrich-Alexander-University of Erlangen-Nuernberg)

- 13:30 WE.03b.01 | Ian Manning
Influence of dopant concentration on dislocation distributions in 150mm 4H SiC wafers
 I. Manning¹, G. Chung¹, E. Sanchez¹, M. Dudley², J. Guo², O. Goue², B. Raghothamachar²
¹The Dow Chemical Company, Compound Semiconductor Solutions, Auburn, MI 48611, U.S.A.
²Stony Brook University, Stony Brook, NY 11794, U.S.A.
- 13:45 WE.03b.02 | Matthias Arzig
Tracking of the growth interface during PVT-Growth of SiC boules using a X-ray-CT-setup
 M. Arzig¹, M. Salamon², N. Uhlmann², P. J. Wellmann¹
¹Crystal Growth Lab, Materials Department 6 (i-meet), University of ErlangenNürnberg (FAU), 91058 Erlangen, Germany
²Fraunhofer Institute for Integrated Circuits, Development Center for X-Ray Technology (EZRT), 90768 FÜrth, Germany
- 14:00 WE.03b.03 | Michael Salamon
Advances in in-situ SiC growth analysis using cone beam computed tomography
 M. Salamon¹, M. Arzig², N. Uhlmann¹, P.J. Wellmann²
¹Fraunhofer Development Center X-ray Technology, FÜrth, Germany
²Crystal Growth Lab, University Erlangen-Nuremberg, Erlangen, Germany
- 14:15 WE.03b.04 | Jan Richter
COLD SPLIT wafering results for doped 4H-SiC Boules
 M. Swoboda¹, R. Rieske¹, C. Beyer¹, A. Ullrich¹, G. Gesell¹, J. Richter¹
¹Silectra GmbH, Manfred-von-Ardenne Ring 7, 01099 Dresden, Germany
- 14:30 WE.03b.05 | Noboru Ohtani **INVITED**
Key issues in physical vapor transport growth of SiC bulk crystals for power device applications
 Noboru Ohtani^{1,2}
¹Kwansei Gakuin University, School of Science and Technology 2-1 Gakuen, Sanda, Hyogo 669-1337, Japan
²Kwansei Gakuin University, R&D Center for SiC Materials and Processes 2-1 Gakuen, Sanda, Hyogo 669-1337, Japan

Thursday | TH.01, SiC Integrated Circuit

Location: Hall 1

Session Chairs: Gheorghe Breseanu (Polytechnic University of Bucharest)
 Dominique Tournier (CALY Technologies)

- 09:00 TH.01.01 | Masashi Nakajima **INVITED**
400°C operation of normally off N- and P- SFETs with a side-gate structure fabricated by ion implantation into a high-purity semi-insulating SiC substrate
 M. Nakajima¹, M. Kaneko¹, T. Kimoto¹
¹Dept. of Electronic Sci. & Eng., Kyoto University, A1-303, Kyotodaigaku-katsura, Nishikyo, Kyoto 615-8510, Japan
- 09:30 TH.01.02 | Mitsuaki Kaneko
SiC vertical-channel n- and p-JFETs fully fabricated by ion implantation
 M. Kaneko^{1,2}, U. Grossner¹, T. Kimoto²
¹Advanced Power Semiconductor Laboratory, ETH Zurich, Physikstrasse 3, 8092 Zurich, Switzerland
²Dept. of Electronic Sci. & Eng., Kyoto University, Nishikyo, Kyoto 615-8510, Japan

- 09:45 TH.01.03 | Shuoben Hou
High Temperature High Current Gain IC Compatible Phototransistor
 S. Hou¹, P.-E. Hellström¹, C.-M. Zetterling¹, M. Åstling¹
¹KTH Royal Institute of Technology, 164 40 Kista, Sweden
- 10:00 TH.01.04 | Masahiro Masunaga
Improved Offset Voltage Stability of 4H-SiC CMOS Operational Amplifier by Increasing Gamma Irradiation Resistance
 M. Masunaga¹, S. Sato¹, R. Kuwana¹, I. Hara², A. Shima¹
¹Center for Technology Innovation ö Electronics, Research & Development Group, Hitachi, Ltd. 1-280 Higashi-koigakubo, Kokubunji-shi, Tokyo 185ö8601, Japan
²Hitachi Ltd. Services & Platforms Business Unit, 2-1 Omika-cho 5-chome, Hitachi-shi, Ibaraki-ken 319ö1293, Japan
- 10:15 TH.01.05 | Jun Inoue
4H-SiC Trench pMOSFETs for High-Frequency CMOS Inverters
 J. Inoue¹, S.-I. Kuroki¹, S. Ishikawa^{1,2}, T. Maeda^{1,2}, H. Sezaki^{1,2}, T. Makino³, T. Ohshima³, M. Åstling⁴, C.-M. Zetterling⁴
¹Research Institute for Nanodevice and Bio Systems (RNBS), Hiroshima University, 1-4-2 Kagamiyama, Higashi-Hiroshima, 739-8527, Japan
²Phenitex Semiconductor Co., Ltd, Ibara, 715-8602, Japan
³National Institutes for Quantum and Radiological Science and Technology (QST), 1233 Watanuki, Takasaki, 370-1292, Japan
⁴KTH Royal Institute of Technology, Kista SE-16440, Sweden

Thursday | TH.02, Contacts and other processing

Location: Hall 1

Session Chairs: Daniel Alquier (Universite de Tours)
 Roberta Nipoti (CNR-IMM)

- 11:00 TH.02.01 | Lasse Vines **INVITED**
Understanding and control of deep level defects in 4H-SiC: In memoriam Bengt G. Svensson
¹Oslo University
- 11:30 TH.02.02 | Fabrizio Roccaforte
Fabrication and characterization of Ohmic contacts to 3C-SiC layers grown on Silicon
 F. Roccaforte¹, M. Spera^{1,2,3}, G. Greco¹, R. Lo Nigro¹, S. Di Franco¹, D. Corso¹, P. Fiorenza¹, F. Giannazzo¹, M. Zielinski⁴, F. La Via¹
¹Consiglio Nazionale delle Ricerche ö Istituto per la Microelettronica e Microsistemi (CNR-IMM), Strada VIII, n.5 Zona Industriale, I-95121 Catania, Italy
²Department of Physics and Astronomy, University of Catania, Via Santa Sofia, 64, 95123, Catania, Italy
³Department of Physics and Chemistry, University of Palermo, Via Archirafi, 36, 90123, Palermo, Italy
⁴NOVASiC, Savoie Technolac, BP267, F-73375 Le Bourget-du-Lac Cedex, France
- 11:45 TH.02.03 | Simone Rascunà
Ni-based back side ohmic contact formation by laser annealing process
 S. Rascunà¹, P. Badalà¹, C. Bongiorno², E. Smecca², A. Alberti², S. Di Franco², F. Giannazzo², G. Greco², F. Roccaforte², M. Saggio¹
¹STMicroelectronics SRL, Stradale Primosole 50, 95121 Catania, Italy
²IMM-CNR, VIII Strada 5, 95121 Catania, Italy
- 12:00 TH.02.04 | Seiki Kawasaki
Millisecond Annealing of 4H-SiC Wafer for Impurity Activation by Nitrogen-boosted Atmospheric Pressure Thermal Plasma Jet
 S. Kawasaki¹, H. Hanafusa¹, S. Higash¹
¹Graduate School of Advanced Sciences of Matter, Hiroshima University, 1-3-1 Kagamiyama, Higashihiroshima, Hiroshima 739-8530, Japan
- 12:15 TH.02.05 | Tomasz Sledziewski
Comparison between Ni-SALICIDE and self-aligned lift-off used in fabrication of ohmic contacts for SiC Power MOSFET
 T. Sledziewski¹, T. Erbacher^{1,2}, A. J. Bauer¹, L. Frey^{1,2}
¹Fraunhofer Institute for Integrated Systems and Device Technology IISB, Schottkystrasse 10, 91058 Erlangen, Germany
²Chair of Electron Devices, FAU Erlangen-Nuremberg, Cauerstrasse 6, 91058 Erlangen, Germany

Thursday | TH.03, Carrier lifetime

Location: Hall 1

Session Chairs: Peder Bergman (Linköping University)
Isaho Kamata (CRIEPI)

-
- 13:30 TH.03.01 | Jose Coutinho **INVITED**
Carbon vacancies and interstitials in 3C- and 4H-SiC: theoretical milestones and challenges
J. Coutinho¹, J. D. Gouveia¹, K. Demmouche², M. E. Bathen³, B. G. Svensson³
¹Department of Physics & I3N, University of Aveiro, Campus Santiago, 3810-193 Aveiro, Portugal
²Institut des Sciences, Centre Universitaire -Belhadj Bouchaib- Ain Temouchent, Route de Sidi Bel Abbas, B.P. 284, 46000 Ain Temouchent, Algeria
³Department of Physics/Centre for Materials Science and Nanotechnology, University of Oslo, N-0316 Oslo, Norway
- 14:00 TH.03.02 | Lars Knoll
Electrically active levels generated by long oxidation times in 4H-SiC
L. Knoll¹, L. Kranz¹, G. Alfieri¹
¹ABB Corporate Research Center, Segelhofstr.1 K, Baden-Döttwil, Switzerland
- 14:15 TH.03.03 | Masashi Kato
Surface recombination velocity for non-polar faces of 4H-SiC
M. Kato¹, X. Zhang¹, K. Kohama¹, M. Ichimura¹
¹Nagoya Institute of Technology, Gokiso, Showa, Nagoya 466-8555, Japan
- 14:30 TH.03.04 | Juergen Erlekampf
Impact of substrate quality on the minority carrier lifetime in 4H-SiC during epitaxial growth and post-epi processing
J. Erlekampf¹, B. Kallinger¹, P. Berwian¹, J. Friedrich¹, L. Frey¹
¹Fraunhofer IISB, Schottkystr. 10, 91058 Erlangen, Germany
- 14:45 TH.03.05 | Shoma Yamashita
Theoretical Analysis of Carrier Lifetimes in SiC by Using Rate Equations
S. Yamashita¹, T. Kimoto¹
¹Dept. of Electronic Sci & Eng., Kyoto University, A1-303, Kyotodaigaku-katsura, Nishikyo, Kyoto 615-8510, Japan

Poster presentations

INVITED POSTERS

Location: Exhibition Level, Hall 3

INV.P.01 | Daniel Habersat

Influence of High-Temperature Bias Stress on Room-Temperature VT Drift Measurements in SiC Power MOSFETs

D. B. Habersat¹, A. J. Lelis¹, R. Green¹

¹Power Conditioning Branch, Sensors and Electron Devices Directorate, U.S. Army Research Laboratory, 2800 Powder Mill Road, Adelphi, MD 20783, USA

INV.P.02 | Kazuhiko Kusunoki

High quality 4H-SiC substrates grown by solution growth method for power device application

K. Kusunoki¹, K. Seki¹, H. Daikoku², H. Saito², I. Kobayashi³, H. Mihara³

¹Nippon Steel & Sumitomo Metal Corporation, 20-1 Shintomi, Futtsu, Chiba 293-8511, Japan

²Toyota Motor Corporation, 1200 Mishuku, Susono, Shizuoka 410-1193, Japan

³Toyota Motor Corporation, Kirigabara, 543 Nishihirosecho, Toyota, Aichi 470-0309, Japan

INV.P.03 | Akihiro Goryu

Evaluation of effect of mechanical stress on stacking fault expansion in 4H-SiC p-i-n diode

A. Goryu¹, A. Kano¹, M. Kato¹, C. Ota¹, A. Okada¹, J. Nishio¹, S. Izumi², K. Hirohata²

¹Toshiba Corporation 1 Komukai Toshiba-cho, Saiwai-ku, Kawasaki, Japan

²University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo, Japan

INV.P.04 | Maria Cabello

Evidence of channel mobility anisotropy on 4H-SiC MOSFETs with low interface trap density

M. Cabello¹, V. Soler¹, D. Haasmann², J. Montserrat¹, J. Rebollo¹, P. Godignon¹

¹IMB-CNM, Campus UAB 08193 Bellaterra, Spain

²Queensland Micro and Nanotechnology Centre, Griffith University, Australia

INV.P.05 | Romain Bange

Development of SOI FETs based on coreshell Si/SiC nanowires for sensing in liquid environments

R. Bange^{1,2}, E. Bano¹, L. Rapenne², A. Mantoux³, S. E. Saddow⁴, V. Stambouli²

¹IMEP-LAHC, Univ. Grenoble Alpes, CNRS, Grenoble INP, 38000 Grenoble, France

²LMGP, Univ. Grenoble Alpes, CNRS, Grenoble INP, 38000 Grenoble, France

³SIMAP, Univ. Grenoble Alpes, CNRS, Grenoble INP, 38000 Grenoble, France

⁴Electrical Engineering Dept., University of South Florida, Tampa, FL, 33620, USA

Monday Poster Session | Circuits and Applications

Location: Gallery, Hall 3

MO.P.CA1 | Xiaoli Tian

Structural Optimization Design for 15kV 4H-SiC IGBTs

X. Tian¹, B. Tan², Y. Bai¹, J. Hao¹, C. Yang¹, X. Liu¹

¹Institute of Microelectronics of Chinese Academy of Sciences, Beijing, China

²University of Electronic Science and Technology of China, Chengdu, China

MO.P.CA2 | Shinji Sato

Development of High Speed Switching Operation SiC Power Module

S. Sato¹, F. Kato¹, H. Tanisawa^{1,2}, K. Kou^{1,3}, K. Watanabe¹, Y. Murakami^{1,4}, Y. Kobayashi¹, H. Sato¹, H. Yamaguchi¹, S. Harada¹

¹National Institute of Advanced Industrial Science and Technology(AIST), JAPAN

²Sanken Electric Co., Ltd., JAPAN

³Calsonic Kansei Corporation, JAPAN

⁴NISSAN MOTOR CO., LTD., JAPAN

MO.P.CA3 | Matthaeus Albrecht

Improving 5V Digital 4H-SiC CMOS ICs for Operating at 400C Using PMOS Channel Implantation

M. Albrecht¹, T. Erlbacher², A. J. Bauer², L. Frey¹

¹Chair of Electron Devices, Cauerstrasse 6, Erlangen 91058, Germany

²Fraunhofer IISB, Schottkystrasse 10, Erlangen 91058, Germany

MO.P.CA4 | Philip G. Neudeck

Demonstration of 4H-SiC JFET Digital ICs Across 1000 C Temperature Range Without Change to Input Voltages

P. Neudeck¹, D. Spry¹, M. Krasowski¹, N. Prokop¹, L. Chen²

¹NASA Glenn Research Center, 21000 Brookpark Rd., Cleveland, OH 44135 USA

²Ohio Aerospace Institute, NASA Glenn, Cleveland, OH 44135 USA

MO.P.CA5 | Muhammad Shakir

A Monolithic 500 Å°C D-flip flop Realized in Bipolar 4H-SiC TTL Technology

M. Shakir¹, S. Hou¹, C.-M. Zetterling¹

¹KTH Royal Institute of Technology, 16440 Stockholm, Sweden

MO.P.CA6 | Alessandro Borghese

A Design Optimization Procedure for Multi-Chip SiC Power Modules Based on Fast Electrothermal Simulations

A. Borghese¹, A. P. Catalano¹, M. Riccio¹, L. Codecasa², A. Fayyaz³, V. d'Alessandro¹, A. Castellazzi³, L. Maresca¹, G. Breglio¹, A. Irace¹

¹Dept. of Electrical Eng. and Information Technology, University of Naples Federico II, Naples, Italy

²Dept. of Electronics, Information and Bioengineering, Politecnico di Milano, Milan, Italy

³PEMC Group, University of Nottingham, Nottingham, UK

MO.P.CA7 | Xiangguo Wang

A study on fastening the switching speed for wide bandgap semiconductor based Super Cascode

X. Wang¹, M. Yamamoto¹

¹University of Yamanashi, Japan

MO.P.CA8 | Yogesh Sharma

6.5 kV Si/SiC hybrid power module technology

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Monday Poster Session | Epitaxy

Location: Gallery, Hall 3

MO.P.EP1 | Hitoshi Habuka

High temperature SiC reactor cleaning using chlorine trifluoride gas achieved by purified pyrolytic carbon coating film

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MO.P.EP2 | Kazuhiro Mochizuki

Effect of HCl on Surface Free Energy of SiC during CVD Trench Filling

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MO.P.EP3 | Yoshiaki Daigo

Repeatability of epitaxial growth of N-type 4H-SiC films by high speed wafer rotation vertical CVD tool

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MO.P.EP4 | Yoshiaki Daigo

Continuous growth of buffer/drift epitaxial stack based on 4H-SiC by quick change of N₂ flow rate under high growth rate condition

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MO.P.EP5 | Kenta Chokawa

Thermodynamics analysis of high-temperature CVD of SiC

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MO.P.EP6 | Feng Zhang

Homoeptitaxial growth on Si-face (0001) on-axis 4H-SiC substrates

G. Yan¹, F. Zhang^{1,2}, X. Liu¹, Z. Shen¹, Z. Wen¹, L. Wang¹, W. Zhao¹, G. Sun¹, Y. Zeng^{1,2}

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MO.P.EP7 | Tawhid Ahmed Rana

Effect of surface etching conditions on stacking faults in 4H-SiC epitaxy

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MO.P.EP8 | Tobias Höchbauer

New SiC epitaxial growth process with up to 100% BPD to TED defect conversion on 150mm hot-wall CVD reactor

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MO.P.EP9 | Mikhail Dolgoplov

Experimental and mathematical modelling of betavoltaic semiconductor energy converter. C-Beta Energy Converter Efficiency Modelling

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MO.P.EP10 | Joerg Pezoldt

Germanium incorporation in silicon carbide using molecular beam epitaxy on 4H-SiC

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MO.P.EP11 | Han Seok Seo

Improvement of Quality of 100/150mm 4H-SiC Epilayers with Optimized Process Conditions

H. Seok Seo¹, T.-H. Eun¹, S.-S. Lee¹, J.-Y. Kim¹, I.-G. Yeo¹, M.-C. Chun²

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Monday Poster Session | Fundamental Properties

Location: Gallery, Hall 3

MO.P.FP1 | Masanobu Yoshikawa

Stress characterization of 4H-SiC epitaxial substrates by scanning near-field optical Raman microscope, with 250-nm spatial resolution

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MO.P.FP2 | Margareta Linnarsson

Channeled implantations of dopants into 4H-SiC at different temperatures

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MO.P.FP3 | Shin-ichiro Sato

Near Infrared Photoluminescence from Nitrogen-Vacancy Centers in Silicon Carbide

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MO.P.FP4 | Abebe Tilahun Tarekegne

Investigation of photoluminescence emission in Al-N co-doped 6H-SiC by temperature-dependent measurements

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MO.P.FP5 | Julietta Weisse

On the origin of charge compensation in aluminum-implanted n-type 4H-SiC by analysis of Hall Effect measurements

J. Weisse¹, M. Hauck², T. Sledziewski³, M. Krieger², H. Mitlehner³, A. Bauer³, L. Frey^{1,3}, T. Erlbacher^{1,3}

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MO.P.FP6 | Teng ZHANG

Multi-barrier height characterization and DLTS study on Ti/W 4H-SiC Schottky Diode

T. Zhang¹, C. Raynaud¹, D. Planson¹

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MO.P.FP7 | Fan Li

Electrical characterisation of thick 3C-SiC layers grown on off-axis 4H-SiC substrates

F. Li¹, V. Jokubavicius², M. Jennings¹, M. Syvöjörvi², R. Yakimova², A. Pörez-Tomé³, S. Russell¹, F. Roccaforte⁴, P. Mawby¹, F. La Via⁴

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MO.P.FP8 | Xiang Zhou

Deep Level Transient Spectroscopy (DLTS) Study of 4H-SiC Schottky Diodes and PiN Diodes

X. Zhou¹, G. Pandey¹, R. Ghandi², P. Losee², A. Bolotnikov², T. P. Chow¹

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MO.P.FP9 | Jonas Vande Pitte

Characterisation of beta-SiC and potential use as irradiation temperature monitor

J. Vande Pitte¹, C. Detavernier¹, J. Lauwaert¹, A. Gussarov², I. Uytendhouwen², S. Van Dyck², J. Wagemans²

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MO.P.FP10 | Yusuke Yamashita

Identification of Near Interface Trap Distribution by Parameter Estimation

Yusuke Yamashita¹

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MO.P.FP11 | Xilun Chi

Tunneling current in 4H-SiC p-n junctions at high electric field

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MO.P.FP12 | Yu-ichiro Matsushita

Structural stability and electronic levels of carbon-associated defects in SiO₂: First-principles study

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MO.P.FP13 | Dipanwita Dutta

Atomistic Investigations of carbon-related defects and their passivation in SiC-Oxide-Interfaces

MO.P.FP14 | K. Zekentes

4H-SiC p-type doping determination from secondary electrons imaging

M. Kayambaki¹, N. Makris¹, K. Tsagaraki¹, H. Peyré², A. Stavrinidis¹, G. Konstantinidis¹, K. Zekentes^{1,3}

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Monday Poster Session | MOS Interface

Location: Gallery, Hall 3

MO.P.MI1 | Hiroshi Okada

Characterization of near-interface oxide traps with isothermal constant-capacitance deep-level transient spectroscopy

H. Okada¹

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MO.P.MI2 | Dr Jonathon Philip Cottom

Characterising the 4H-SiC SiO₂ interface in MOSFETs with deposited gate oxides using EELS and ab initio calculations.

J. Cottom¹, G. Gruber², M. Mistry¹, G. Pobegen³, T. Aichinger⁴, A. L. Shluger¹

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MO.P.MI3 | Junichiro Sameshima

Optimization of depth resolution on profiling of SiO₂/SiC interface by dual-beam TOF-SIMS combined with etching

J. Sameshima¹, A. Takenaka¹, Y. Muraji¹, S. Ogawa¹, M. Yoshikawa¹

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MO.P.MI4 | Ling Guo

Impact of Pit Defects on the Initial Electrical Characteristics of Planar-MOSFET Devices

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MO.P.MI5 | Manesh Vinay Mistry

First Principles Study of the Influence of the Local Steric Environment on the Incorporation and Migration of NO in a-SiO₂

M. V. Mistry¹, J. Cottom¹, K. Patel¹, A. M. El-Sayed¹, G. Pobegen², T. Aichinger³, A. L. Shluger¹

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MO.P.MI6 | Koji Ito

Modeling of electron trapping in SiC MOSFETs considering interface-state-density distribution extracted from gate characteristics

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MO.P.MI7 | Mitsuo Okamoto

Analysis of oxide traps causing threshold voltage instability in 4H-SiC MOSFETs via capture time map

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WE.P.IM1 | Roberta Nipoti

Thermal activation energy for the electrical activation of 1019 cm⁻³ and 1020 cm⁻³ Al ion implanted 4H SiC

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Monday Poster Session | MOSFETs

Location: Gallery, Hall 3

MO.P.MO1 | Quentin Molin

Repetitive short-circuit measurement on SiC MOSFET

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MO.P.MO2 | Kijeong Han

Achieving Reduced Specific On-Resistance in 1.2 kV SiC Power MOSFETs at Elevated Temperature

K. Han¹, B. J Baliga¹

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MO.P.MO3 | Ajit Kanale

Experimental Study of High-Temperature Switching Performance of 1.2kV SiC JBSFET in Comparison with 1.2kV SiC MOSFET

A. Kanale¹, B. J. Baliga¹, K. Han¹, S. Bhattacharya¹

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MO.P.MO4 | Shuhei Nakata¹

Temperature Dependence of dVdt impact on the SiC-MOSFET

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MO.P.MO5 | Atsushi Sakai¹

Inverse Modeling of 4H-SiC Trench Gate MOSFETs Validated with Electrical and Physical Characterization

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MO.P.MO6 | Daniel J. Lichtenwalner

Gate Oxide Reliability of SiC MOSFETs and Capacitors

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MO.P.MO7 | Tomoyasu Ishii

Suppression of Short-Channel Effects in 4H-SiC Trench MOSFETs

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MO.P.MO8 | Caiping Wan

Reliability of 4H-SiC(0001) MOS Gate Oxide by NO Post-Oxide-Annealing

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MO.P.MO9 | Tianxiang Dai

Design Optimisation of 1200V 4H-SiC trench MOSFET

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MO.P.MO10 | Kai Tian

An Improved 4H-SiC Trench Gate MOSFETs Structure with Low On-resistance and Reduced Gate Charge

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Monday Poster Session | PVT growth

Location: Gallery, Hall 3

MO.P.PVT1 | Hsiao Ta Ching

Major carrier element concentrations in SiC powder and bulk crystal

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MO.P.PVT2 | Subaru Komura

Multi-physics simulations of high-temperature CVD of SiC

S. Komura¹, R. Oshima², K. Kawakami¹, K. Chokawa¹, Y. Yamamoto¹, K. Yoshimatsu^{1,3}, N. Okamoto¹, E. Makino⁴,

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MO.P.PVT3 | Jeong-Min Choi

Crucible structure for homogeneous vanadium incorporation in semi-insulating SiC crystal growth

J.-M. Choi¹, C.-Y. Lee¹, D.-S. Kim¹, M.-S. Park¹, Y.-S. Jang¹, W.-J. Lee¹, K.-H. Jung², T.-H. Kim²

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MO.P.PVT4 | Mark Ramm

Modeling of Heat- and Mass-Transfer and Thermal Stress in Bulk Growth of 4H-SiC by PVT in Industrial Reactor

M. Ramm¹, M. Bogdanov¹, A. Kulik¹, L. L. Zhao^{2,3}, A. L. Song^{2,3}, Y.M.Wang^{4,5}, K. L. Mao^{4,5}, R. S. Wei^{4,5}, B. Li^{4,5}, L. Z. Wang^{4,5}

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MO.P.PVT5 | Won-Jae Lee

Polytype control by pretreatment of SiC source powder for 4H-SiC single crystal growth

J.-W. Choi¹, J.-G. Kim¹, B.-K. Jang¹, S.-K. Ko¹, M.-O. Kyun¹, J.-D. Seo¹, K.-R. Ku¹, C.-Y. Lee², W.-J. Lee²

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MO.P.PVT6 | Won-Jae Lee

Modified hot-zone design for large diameter 4H-SiC single crystal growth

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MO.P.PVT7 | Pan Gao

The 4H polytype control of the semi-insulating SiC crystal growth by PVT method

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MO.P.PVT8 | P.S.Raghavan

A comparative study of the crystal growth techniques of silicon carbide, technology adaption and the road to low cost silicon carbide materials

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MO.P.PVT9 | Eunjin Jung

6H-SiC bulk growth using Al-doped SiC powder via physical vapor transport method

E. Jung^{1,2}, Y.-J. Kwon¹, S.-M. Jeong¹, M.-H. Lee¹, D.-J. Choi², Y. Kim¹

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MO.P.PVT10 | Rob Rhoades

Improved SiC Substrate Processing Using Grind and CMP

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MO.P.PVT11 | Chunjun Liu

Progress in single crystal growth of wide bandgap semiconductor SiC

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MO.P.PVT12 | Im-Gyu Yeo

Study on Dislocation Behaviors during PVT growth of 4H-SiC

I-G. Yeo¹, T-H. Eun¹, J-Y. Kim¹, S-S. Lee¹, H-S Seo¹, M-C. Chun²

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MO.P.SG1 | Kazuhiko Kusunoki

Solution growth of 4inch diameter SiC single crystal using Si-Cr based solvent

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MO.P.SG2 | Kotaro Kawaguchi

Effect of melt-back process on the quality of grown crystal in SiC solution growth

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MO.P.SG3 | Mai Abe

Effect of Thermal Conductivity of Solvent on Heat Flow during Solution Growth of SiC

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MO.P.SG4 | Tomoki Endo

Control of macrostep height by switching solution flow during solution growth of SiC

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MO.P.SG5 | Kazuaki Seki

Evaluation of Basal Plane Dislocation Behavior in the Epitaxial Layer on a 4H-SiC Wafer Fabricated by the Solution Growth Method

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MO.P.SG6 | Dae-Sung Kim

Suppression of Lateral growth of polycrystalline crystal in top seed solution growth of SiC by modifying crucible design

D.-S. Kim^{1,2}, Y.-J. Shin¹, C.-Y. Lee², J.-M. Choi², M.-S. Park², Y.-S. Jang², W.-J. Lee², S.-M. Jeong¹

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MO.P.SG7 | Minh-Tan Ha

Effects of the Temperature Gradient near the Crystal-Melt Interface in Top Seeded Solution Growth of SiC Crystal

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MO.P.SG8 | Yun-Ji Shin

Thermal stress minimization by adopting a stress relaxation layer in top seeded solution growth of 4H-SiC crystal

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MO.P.SG9 | Yosuke Tsunooka

Efficient search technique of ideal conditions in high quality SiC solution growth using prediction model made by machine learning

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Tuesday Poster Session | 3C-SiC

Location: Gallery, Hall 3

TU.P.3C1 | Massimo Zimbone

Protrusion reduction in 3C-SiC thin film on grown on Si

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TU.P.3C2 | Philipp Schuh

Vapor growth of 3C-SiC using the transition layer of 3C-SiC on Si CVD templates

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TU.P.3C3 | Jaweb Ben Messaoud

Effects of aluminum incorporation on the Young's Modulus of 3C-SiC epilayers

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Tuesday Poster Session | Bipolar, JFETs and other switching devices

Location: Gallery, Hall 3

TU.P.BP1 | Daniel Johannesson

TCAD Model Calibration of High Voltage 4H-SiC Bipolar Junction Transistors

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TU.P.BP2 | Siva Kotamraju

Improved device characteristics obtained using a novel high-k dielectric stack for 4H-SiC n-IGBT: HfO₂-SiO₂-AlN

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TU.P.BP3 | Kui Pu

Trench termination structure having P-type SiC layer for improved reliability of high voltage IGBT

Y. Wang^{2,3}, R. Jin^{2,3}, K. Pu¹, W. Zhang¹, Jun Zeng¹, M. N. Darwish¹, J. Liu^{2,3}, T. Zhu^{2,3}

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TU.P.BP4 | Muhammad Waqar Hussain¹

SiC BJT RF Oscillator Design Using S-Parameters

M. W. Hussain¹, H. Elahipanah¹, S. Rodriguez¹, B. G. Malm¹, A. Rusu¹

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TU.P.BP5 | Herve Morel¹

High-Voltage SiC-JFET Fabrication and Full Characterization

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TU.P.BP6 | David Hall

High-voltage photoconductive switching using SiC and diamond

D. Hall¹, P. Grivickas¹, A. M. Conway¹, M. Bora¹, L. F. Voss¹, S. Fulkerson¹, V. Grivickas²

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TU.P.BP7 | Satoshi Asada

Impacts of finger numbers on forced current gain in multi-finger 10 kV-class SiC bipolar junction transistors with reduced base spreading resistance

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TU.P.BP8 | Luigi Di Benedetto

First Experimental Test on Bipolar Mode Field Effect Transistor prototype in 4H-SiC: a Proof of Concept

L. Di Benedetto¹, G. D. Licciardo¹, A. Huerner², T. Erlbacher², A. J. Bauer², A. Rubino¹

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TU.P.BP9 | Amit Kumar Tiwari

Performance improvement of 10kV SiC IGBTs with retrograde p-well

A. K. Tiwari¹, M. Antoniou¹, N. Lophitis², S. Perkins², T. Trajkovic¹, F. Udrea¹

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TU.P.BP10 | Nikolaos Makris

High-temperature compact modeling of Silicon Carbide and Gallium Nitride Junction FETs

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TU.P.BP11 | Siva Kotamraju

Effect of temperature on the electrical characteristics of 4H-SiC planar n/p-type junction less FET: Physics based simulation

P Vudumula, S. Kotamraju

¹Indian Institute of Information Technology

Tuesday Poster Session | Extended defects

Location: Gallery, Hall 3

TU.P.ED1 | Toshiyuki Isshiki

Observation of dislocation conversion in 4H-SiC epitaxial wafer by mirror projection electron microscopy

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TU.P.ED2 | Yoshitaka Nishihara

Detecting basal plane dislocations converted in highly doped epilayers

Y. Nishihara¹, K. Kamei¹, K. Momose¹, H. Osawa¹

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TU.P.ED3 | Aoi Okada

Initiation of stacking fault expansion in 4H-SiC p-i-n diodes

A. Okada¹, C. Ota¹, J. Nishio¹, A. Goryu¹, R. Iijima¹, K. Nakayama², T. Kato², Y. Yonezawa², H. Okumura²

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TU.P.ED4 | Jason Paul Hadorn

Large Angle Convergent Beam Electron Diffraction Analysis of Physical Crystallographic Features of Threading Dislocations in 4H-SiC

J. P. Hadorn¹, R. Tanuma¹, I. Kamata¹, H. Tsuchida¹

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TU.P.ED5 | Kumiko Konishi

Operando X-ray topography of 4H-SiC MOSFETs to investigate stacking fault expansion

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TU.P.ED6 | Yuina Mannen

Effect of the exciton transfer dynamics into Shockley stacking faults on the bipolar degradation of 4H-SiC PiN diodes

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TU.P.ED7 | Hrishikesh Das

Effect of Defects in Silicon Carbide Epitaxial layers on Yield and Reliability

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TU.P.ED8 | Ryo Hattori

Optical discrimination of TSDs and TEDs in 4H-SiC epitaxial layer by phase contrast microscopy method

R. Hattori^{1,4}, O. Oku², R. Sugie³, K. Murakami¹, M. Kuzuhara⁴

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TU.P.ED9 | Balaji Raghothamachar

Analysis of Basal Plane Dislocation Dynamics in 4H-SiC Crystals during High Temperature Treatment

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TU.P.ED10 | Nadeem A. Mahadik

Expansion Mechanism of Shockley Stacking Faults Originating from BPDs in 4H-SiC Substrates

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TU.P.ED11 | Ruggero Anzalone

Dislocations propagation study trough high-resolution 4H-SiC substrate mapping

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Tuesday Poster Session | Fundamental Properties

Location: Gallery, Hall 3

TU.P.FP1 | Hideharu Matsuura

Relationship between Temperature Dependencies of Resistivity and Hall Coefficient in Heavily Al-doped 4H-SiC Epilayer

H. Matsuura¹, R. Nishihata¹, A. Takeshita¹, T. Imamura¹, K. Takano¹, K. Okuda¹, A. Hidaka¹, S. Ji², K. Eto², K. Kojima², T. Kato², S. Yoshida², H. Okumura²

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TU.P.FP2 | Paulius Grivickas

Recombination mechanisms and photo-conducting switching in V-doped SiC

P. Grivickas¹, D. Hall¹, A. M. Conway¹, M. Bora¹, L. F. Voss¹, K. Redeckas², M. Vengris², V. Grivickas²

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TU.P.FP3 | Jose Daniel Gouveia

Theory of carbon self-interstitials in 3C-SiC and 4H-SiC

J. D. Gouveia¹, J. Coutinho¹, K. Demmouche², V. J. B. Torres¹, T. Brodar³, I. Capan³

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TU.P.FP4 | Michael Schöler

Deep electronic levels in n-type and p-type 3C-SiC

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TU.P.FP5 | Nadine Schöler

Ultra-fast and high-precision crystal orientation measurements on 4H-SiC

N. Schöler¹, T. Weißbach¹, H.-A. Bradaczek¹, H. Berger¹, K. Dornich¹

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TU.P.FP6 | Muhammad Haroon Rashid

Nano and Micro-scale Simulations of the Si/4H-SiC and Si/3C-SiC NN-heterojunction Diodes

M. H. Rashid¹, A. Koel¹, T. Rang¹

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TU.P.FP7 | Matthias Kocher

Decoration of Al implantation profiles in 4H-SiC by bevel grinding and dry oxidation

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TU.P.FP8 | Hiroki Sakakima

Evaluation method for stress distribution in 4H-SiC power devices

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TU.P.FP9 | Hong-Ki Kim

Surface Characterization of Ion Implanted 4H-SiC Epitaxial Layers with Ion Energy and Concentration Variations

H.-K. Kim¹, S. Kim¹, J. Buettner², M. Lim², T. Erlbacher², A. J. Bauer², S.-M. Koo³, N.-S. Lee¹, H.-K. Shin¹

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Tuesday Poster Session | Radiation and Quantum Devices

Location: Gallery, Hall 3

TU.P.RQ1 | Pavel Hazdra

Radiation Effects on 1.7kV Class 4H-SiC Power Devices: Development of Compact Simulation Models

P. Hazdra¹, S. Popelka¹

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TU.P.RQ2 | Abdul Salam Al Atem

Combined EPR and photoluminescence study of electron and proton irradiated 3C-SiC

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TU.P.RQ3 | Francesco La Via^{1,2}

Silicon Carbide detectors for high energy ions

F. La Via^{1,2}, S. Tudisco¹, C. Agodi¹, C. Altana¹, S. Cascino³, G. Lanzalone¹, G. Litrico⁴, G. Longo³, M. Mauceri⁴, R. Modica³, M. Moschetti³, N. Piluso³, S. Privitera², V. Puglisi³, A. Santangelo³, M. Zimbone²

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TU.P.RQ4 | Oleg Korolkov¹

Change in the parameters of electron-irradiated 4H-SiC Schottky diodes as a function of the time during isothermal annealing

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TU.P.RQ5 | Corey Cochrane

Space-Rated Magnetometry with Silicon Carbide Quantum Centers

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TU.P.RQ6 | Hiroshi Kono

Impact of device structure on neutron-induced single event effect in SiC MOSFET

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TU.P.RQ7 | Fumi Hasebe

Direct Bonding of 4H-SiC and SOI Wafers for Radiation-Hardened Image Sensors

F. Hasebe¹, T. Meguro¹, T. Makino², T. Ohshima², Y. Tanaka³, S.-I. Kuroki¹

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TU.P.RQ8 | Fan Li

High voltage Si/SiC LDMOSFETs fabrication and characterisation

F. Li¹, P.M. Gammon¹, F. Gity², T. Trajkovic³, V. Kilchytska⁴, V. Pathirana³, K. Ben Ali⁴, C.W. Chan¹, D. Flandre⁴

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TU.P.RQ9 | Corinna Martinella

Radiation Hardness of SiC MOSFETs under Heavy Ion Irradiation

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TU.P.RQ10 | Shin-Ichiro Kuroki

Effects of High Gamma-Ray Radiation on 3C-SiC nMOSFETs

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TU.P.RQ11 | Tatsuya Meguro

Hybrid Pixel Devices with SOI-Si photodiode and 4H-SiC MOSFETs for Radiation-Hardened Image Sensors

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TU.P.RQ12 | V. I. Sankin

The negative differential conductivity and the terahertz emission in SiC natural superlattices

V.I. Sankin¹, A.G. Petrov¹, S.S. Nagalyuk¹, P.P. Shkrebiy¹, E.V. Kalinina¹, A. A. Lebedev¹

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TU.P.RQ13 | Roland Nagy

Spin controlling of single dichroic vacancy centres in silicon carbide

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TU.P.RQ14 | Alexander Lebedev

Electrophysical and optical properties of 4H-SiC UV detectors irradiated with electrons

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TU.P.RQ15 | Alexander Lebedev

Dependence of the Carrier Removal Rate in 4H-SiC PN Structures on the Irradiation Temperature

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Tuesday Poster Session | Related materials

Location: Gallery, Hall 3

TU.P.RM1 | Alexander Lebedev

Transport properties of Graphen films grown on 4H-SiC

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TU.P.RM2 | Reina Miyagawa

Stress evaluation of femtosecond-laser-irradiated GaN

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TU.P.RM3 | Yayoi Nakagawa

Thermodynamic study on growing single crystal of AlN by solution growth in Cr-Ni solvent

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TU.P.RM4 | Yun Bai

Design and Simulation of beta-Ga2O3/4H-SiC Ultraviolet Phototransistor with High Gain

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TU.P.RM5 | Simon Forster

Electron and Optical Characteristics in Bulk Al4SiC4, an Experimental Approach

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TU.P.RM6 | Khaled Driche

Diamond-based field effect transistors activated by light

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TU.P.RM7 | Wancheng Yu

Structural strain in single layer graphene fabricated on SiC

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TU.P.RM8 | Liwen Yang

Sublimation growth of AlN based on SiC substrate

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TU.P.RM9 | Kazukuni Hara

Galium Nitride Epitaxial Crystal Growth by Tri-halide vapor phase epitaxy with High-Speed Wafer Rotation

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TU.P.RM10 | Shoichi Onda

Analysis of threading dislocations in GaN crystal using defocus convergent-beam electron diffraction (CBED)

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Tuesday Poster Session | SiC-Oxide Interface Processing

Location: Gallery, Hall 3

TU.P.SO1 | Kenta Chokawa

Theoretical study of the effects of annealing with CO and CO₂ molecules on amorphous SiO₂

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TU.P.SO2 | Andrea Severino

Study of the Post-Oxidation-Annealing (POA) process on deposited high-temperature oxide (HTO) layers as gate dielectric in SiC MOSFET

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TU.P.SO3 | Razvan Pascu

Using polyoxides as an alternative technological approach to obtain a high quality MOS oxide on SiC

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TU.P.SO4 | Jinghua Xia

Enhancement of Al₂O₃/4H-SiC Interface by Incorporating of AlN

J. Xia^{1,2}, S. Wang³, L. Tian^{1,2}, H. Xu³, J. Wan³, C. Wan³, Y. Pan^{1,2}, R. Jin^{1,2}, F. Yang^{1,2}, Y. Qiu^{1,2}

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TU.P.SO5 | Patrick Fiorenza

Electrical properties of thermal oxide on 3C-SiC layers grown on Silicon

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TU.P.SO6 | Kosuke Muraoka

Characterization of Ba-introduced thin gate oxide on 4H-SiC

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TU.P.SO7 | So Takamoto

Elucidation of the difference of the activation energy of 4H-SiC oxidation between (0001 Si-face and (000-1 C-face by molecular dynamics simulation

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TU.P.SO8 | Rabia Yasmin Khosa

Electrical characterization of MOCVD grown single crystalline AlN thin film on 4H-SiC

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TU.P.SO9 | Stephan Wirths

Improved SiO₂/4H-SiC Interface Defect Density Using Forming Gas Annealing

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TU.P.SO10 | Teruaki Kumazawa

Improved field effect mobility in Si-face 4H-SiC MOSFETs with deposited SiNx interface layer

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TU.P.SO11 | Ye Hwan Kang

Improving electrical characteristic uniformity of the SiO₂/4H-SiC interface by using high temperature oxidation (HTO) and NO Post-oxidation annealing (POA)

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Wednesday Poster Session | Carrier lifetime

Location: Gallery, Hall 3

WE.P.CL1 | Alexandre Savtchouk

Accurate Dopant and Interface Characterization in Oxidized SiC with Refined Non-contact C-V Technique

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WE.P.CL2 | Juergen Erlekampf

Principle of lifetime-engineering in 4H-SiC by ion implantation

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WE.P.CL3 | Jose Coutinho

Migration mechanism of the carbon interstitial in 3C- and 4H-SiC

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WE.P.CL4 | Ryo Hattori

Fine structure Analysis of Nitride Distribution in 4H-SiC substrate

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WE.P.CL5 | Xuechao Liu

Effect of argon ion irradiation on the defect and properties of semi-insulating 4H-SiC

X. Liu¹, T. Xu^{1,2}, S. Zhuo¹, P. Gao¹, J. Xin¹, C. Yan¹, H. Kong¹, E. Shi¹

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WE.P.CL6 | Jan Beyer

Minority carrier lifetime measurements on 4H-SiC epiwafers by time-resolved photoluminescence and microwave detected photoconductivity

J. Beyer¹, N. Schüler², J. Erlekampf³, B. Kallinger³, P. Berwian³, K. Dornich², J. Heitmann¹

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WE.P.CL7 | Mitsuhiro Kushibe

Temperature Dependence of the Internal Carrier Lifetimes in 4H-SiC Epitaxial Layers

M. Kushibe¹, M. Miyasaka^{2,3}, J. Nishio¹, C. Ota¹, R. Iijima¹, K. Kojima², T. Kato², H. Okumura²

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WE.P.CL8 | Benedikt Lechner

Temperature Dependence of SRH Carrier Lifetimes in the Intrinsic Region of a 4H-SiC PiN Rectifier

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WE.P.CL9 | Sergio Sapienza

On the effect of experimental set-up on OCVD carrier lifetime measurements in 4H-SiC vertical p+-i-n diode

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WE.P.CL10 | Peter Bonanno

Practical modeling of 2-Photon Absorption for lifetime profiling in SiC

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WE.P.CL11 | Zong Wei Xu

Raman spectroscopy characterization of ion implanted 4H-SiC and its annealing effects

Z.W. Xu¹, M. Rommel², M. Kocher², Z.D. He¹, H. Wang³, T. Liu¹, B.T. Yao^{1,2}, Y. Song¹, L. Liu¹, F.Z. Fang¹

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Wednesday Poster Session | Contacts and other processing

Location: Gallery, Hall 3

WE.P.CO1 | Hitoshi Habuka

Chlorine trifluoride gas distributor design for single-crystalline C-face 4H-silicon carbide wafer etcher

K. Kurashima¹, R. Kawasaki¹, K. Irikura¹, S. Okuyama¹, H. Habuka¹, Y. Takahashi², K. Kato³

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WE.P.CO2 | Guiming Song

Characterization of the phases formed as CVD SiC contacted Fe-Cr-Ni at elevated temperatures

G. M. Song¹, M. van Munster¹

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WE.P.CO3 | Vuong Van Cuong

Optimization of Ni/Nb Ratio for High-Temperature-Reliable Ni/Nb Silicide Ohmic Contact on 4H-SiC

V. Van Cuong¹, S. Ishikawa^{1,2}, H. Sezaki^{1,2}, T. Maeda^{1,2}, S. Yasuno³, T. Koganezawa³, S-I. Kuroki¹

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WE.P.CO4 | Daichi Todo

Investigation on Contact Property on Silicon-Cap-Annealed n-type 4H-SiC

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WE.P.CO5 | Moonkyong Na

Enhancement of the Interfacial Property of Ni/SiC Ohmic Contact with Titanium as Barrier Layer

M. Na¹, J. Keum^{1,2}, I.H. Kang¹, J.H. Moon¹, S.C. Kim¹, H.W. Kim¹, O. Seok¹, W. Bahng¹

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WE.P.CO6 | Hideka Kida

High-efficiency Planarization of SiC Wafers by Water-CARE (Catalyst-Referred Etching) Employing Photoelectrochemical Oxidation

H. Kida¹, P. V. Bui¹, D. Toh¹, Y. Sano¹, S. Matsuyama¹, K. Yamauchi^{1,2}

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WE.P.CO7 | Risa Mukai

High-speed thinning of 4H-SiC wafer by plasma chemical vaporization machining using a wafer-scale electrode

R. Mukai¹, Y. Inoue¹, S. Matsuyama¹, K. Yamauchi^{1,2}, Y. Sano¹

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WE.P.CO8 | Michael Schneider

Argon bombardment of 4H silicon carbide substrates for tailored Schottky diode barrier heights

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WE.P.CO9 | Clement Berger

Thermal simulation of the ohmic contact by laser annealing on 4H-SiC

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WE.P.CO10 | Vinoth Kumar Sundaramoorthy

Microstructural analysis of Ti/Ni bilayer Ohmic contacts on 4H-SiC layers

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WE.P.CO11 | Arne Benjamin Renz

Surface effects of passivation within Mo/4H-SiC Schottky diodes through MOS analysis

A.B. Renz¹, V.A. Shah¹, Y. Bonyadi¹, F. Li¹, G.W.C. Baker¹, P.A. Mawby¹, P.M. Gammon¹

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Wednesday Poster Session | Implantation

Location: Gallery, Hall 3

WE.P.IM1 | Roberta Nipoti

Thermal activation energy for the electrical activation of 1019 cm⁻³ and 1020 cm⁻³ Al ion implanted 4H SiC

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WE.P.IM2 | Peter Pichler

Channeling in 4H-SiC from an Application Point of View

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WE.P.IM3 | Cristiano Calabretta

Thermal annealing of high dose P implantation in 4H-SiC

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WE.P.IM4 | Akihiro Ikeda

Increasing Laser-Doping Depth of Al in 4H-SiC by Using Expanded-Pulse Excimer Laser

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WE.P.IM5 | Andrea Severino

Effects of thermal annealing processes in Phosphorous implanted 4H-SiC layers

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WE.P.IM6 | Kaname Imokawa

High-concentration, Low-temperature, and Low-cost Excimer Laser Doping for 4H-SiC Power Device Fabrication

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WE.P.IM7 | Matthias Kocher

Determination of compensation ratios of Al-implanted 4H-SiC by TCAD modelling of TLM measurements

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Wednesday Poster Session | MOS Interface

Location: Gallery, Hall 3

WE.P.MI1 | Peyush Pande

A temperature independent effect of near-interface traps in 4H-SiC MOS capacitors

P. Pande¹, S. Dimitrijevic¹, D. Haasmann¹, H. Moghadam¹, P. Tanner¹, J. Han¹

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WE.P.MI2 | Tomoya Ono

DFT calculation for electronic structure of SiC/SiO₂ after nitridization

T. Ono¹

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WE.P.MI3 | Daisuke Mori

Ideal model of a dangling-bond-free structure at the SiO₂/SiC(000-1) interface

D. Mori^{1,2}, T. Hirose¹, F. Matsui²

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WE.P.MI4 | Hind Ateeg Alsnani

The mechanism of carbon-vacancy diffusion at the SiO₂/4H-SiC interface

H. Alsnani¹, J P Goss¹, P R Briddon¹, M J Rayson¹, A B Horsfall¹

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WE.P.MI5 | Hironori Takeda

Evaluation of the impact of Al atoms on SiO₂/SiC interface property by using 4H-SiC n+-channel junctionless MOSFET

H. Takeda¹, T. Hosoi¹, T. Shimura¹, H. Watanabe¹

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WE.P.MI6 | Hiroki Nemoto

Analysis of leakage current conduction mechanisms in thermally grown oxides on p-channel 4H-SiC MOSFETs

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WE.P.MI7 | Masahiro Kunisu

Atomic coordination analysis of nitrogen introduced in SiO₂/SiC interface and SiO₂ layer by XAFS measurement

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WE.P.MI8 | Isanka Udayani Jayawardhena

Characterization of Near-Interface traps at dielectric/SiC interfaces using CCDLTS

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WE.P.MO1 | Holger Schlichting

Design Considerations for Robust Manufacturing and High Yield of 1.2 kV 4H-SiC VDMOS Transistors

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WE.P.MO2 | Martin Hauck

On the influence of interface defects and series resistance on I-V characterization of 4H-SiC power MOSFETs

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WE.P.MO3 | Aditi Agarwal

1.2 kV SiC Trench-Gate MOSFETs with Dual Shielding Regions

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WE.P.MO4 | In-Hwan Ji

Comparative Study on the Repetitive Unclamped-inductive-switching Capability of 1200V 160mOhm SiC Planar Gate MOSFETs

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WE.P.MO5 | Ronald Green

Improved Performance of SiC MOSFETs under Body Diode Forward Conduction

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WE.P.MO6 | Kai Tian

An Optimized p+ Shielding 4H-SiC Trench Gate MOSFETs Structure with Floating Regions

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WE.P.MO7 | Xiang Zhou

Performance Limits of Vertical 4H-SiC and 2H-GaN Superjunction Devices

X. Zhou¹, Z. Guo¹, T. P. Chow¹

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WE.P.MO8 | Dinh-Lam Dang

Temperature dependency of Silicon Carbide MOSFET on-resistance characterization and modeling

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WE.P.MO9 | Ajit Kanale

Superior Short Circuit performance of 1.2kV SiC JBSFETs compared to 1.2kV SiC MOSFETs

A. Kanale¹, K. Han¹, B. J. Baliga¹, S. Bhattacharya¹

¹North Carolina State University, USA

WE.P.MO10 | Ogyun Seok

SiC LDIMOSFETs fabricated on HPSI 4H-SiC substrate with dual field plates

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WE.P.MO11 | Julietta Weisse

Design of a 4H-SiC RESURF n-LDMOS transistor for high voltage integrated circuits

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WE.P.PVT1 | Hiromasa Suo

Bulk Growth of Nitrogen and Boron Co-doped 4H-SiC Crystal using PVT Method

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WE.P.PVT2 | Wei Fan

Impacts of TaC Coating on SiC PVT Process Control and Crystal Quality

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WE.P.PVT3 | Chae-Young Lee

Variation of vanadium incorporation in semi-insulating SiC single crystals grown by PVT method

C.-Y. Lee¹, J.-M. Choi¹, D.-S. Kim¹, M.-S. Park¹, Y.-S. Jang¹, W.-J. Lee¹, K.-H. Jung², T.-H. Kim², X. Chen³, X. Xu³

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WE.P.PVT4 | Takahiro Nakano

Distribution of basal plane dislocations in physical vapor transport-grown 4H-SiC crystals

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WE.P.PVT5 | Hiroaki Shinya

Undulation of step density on the (0001) facet of physical vapor transport-grown 4H-SiC crystals

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WE.P.PVT6 | Kentaro Shioura

Structural characterization of the interface between the seed and grown crystal of physical vapor transport-grown 4H-SiC crystals

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WE.P.PVT7 | Won-Jae Lee

New Materials for Semi-Insulating SiC Single Crystal Growth by PVT method

J.-M. Choi¹, C.-Y. Lee¹, D.-S. Kim¹, M.-S. Park¹, Y.-S. Jang¹, W.-J. Lee¹, W. Fan², H. Qu², X. Chen³, X. Xu³

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WE.P.PVT8 | Daiki Tanaka

Study on co-doping of boron and nitrogen in 6H-SiC by closed sublimation growth

D. Tanaka¹, H. Kurokawa¹, S. Kamiyama¹, M. Iwaya¹, T. Takeuchi¹, I. Akasaki¹

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WE.P.PVT9 | Johannes Steiner

Optimization of the SiC powder source size distribution for the sublimation growth of long crystal boules

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WE.P.PVT10 | Kevin J. Moeggenborg

Impact of Subsurface Damage on SiC Wafer Shape

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WE.P.PVT11 | Mark Ramm

Effect of crucible on stress in bulk crystals grown by PVT

M. Ramm¹, A. Kulik¹, M. Bogdanov¹, O. Bord¹, V. Mamedov¹

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WE.P.PVT12 | Pan Gao

Research on the key problems in the industrialization of SiC substrate materials

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¹The Shanghai Institute of Ceramics of the Chinese Academy of Sciences

Wednesday Poster Session | Rectifying Devices

Location: Gallery, Hall 3

WE.P.RD1 | K. Hayashi

Comparative study of developed 1200V/50A full SiC IEMOS and VMOS power module

K. Hayashi¹, T. Funaki¹, H. Michikoshi², K. Fukuda²

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WE.P.RD2 | Dominique Planson

Advanced electrical characterization of high votlage 4H-SiC bipolar diodes

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WE.P.RD3 | Luigi Di Benedetto

Performance of 4H-SiC bipolar diodes as temperature sensor at low temperatures

L. Di Benedetto¹, C. D. Matthus², T. Erlbacher³, A.J. Bauer³, G. D. Licciardo¹, A. Rubino¹, L. Frey^{2,3}

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WE.P.RD4 | Yidan Tang

Study of the Mechanisms and characteristics of Large-Area High-Current-Density 4H-SiC Trench Junction Barrier Schottky Diodes

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WE.P.RD5 | Gheorghe Pristavu

Series Resistance Effect on Inhomogeneous SiC-Schottky Diode Forward Characteristics - An Ideal Interpretation

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WE.P.RD6 | Siddarth Sundaresan

Surge Current and Avalanche Robustness of Commercial 1200 V SiC Schottky Diodes

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WE.P.RD7 | Kung-Yen Lee

Investigation of 4H-SiC Junction Barrier Schottky Diode Structures with enhanced forward current density

S.-Z. Wang¹, K.-Y. Lee¹, Y.-H. Liu¹, L.-S. Chan¹, Y.-C. Su¹, W.-B. Yeh¹

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WE.P.RD8 | Beverley Choucouthou

Conception and high temperature characterization of 10 kV 50 A 4H-SiC PiN diodes

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WE.P.RD9 | Oleg Rusch

Influence of trench design on the electrical properties of 650 V 4H-SiC JBS diodes

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WE.P.RD10 | Yaren Huang

The Impact of non-ideal Ohmic Contacts on the Performance of High Voltage SiC MPS Diodes

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WE.P.RD11 | Guy Baker

Study of 4H-SiC Superjunction Schottky rectifiers with implanted p pillars

G.W.C. Baker¹, C.W. Chan¹, T. Dai¹, A. B. Renz¹, V.A. Shah¹, P.A. Mawby¹, P.M. Gammon¹

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WE.P.RD12 | Nick Yun

On the development of 1700V SiC JBS diodes in a 6-inch foundry

E. Liu¹, N. Yun¹, W. Sung¹, A-S. Larrea², D. Franca², J. Piccirillo², T. Gorczyca², A. Bialy², W. Collison², J. Prudhomme², P.Y. Hung², S. Valente², S. Dunn², P. Woodin², B. Sapp², J. Hedrick²

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Notes



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