

ICSCRM 2026 Technical Program

Sunday, September 27

Tutorial (9:30-17:30, 4th Floor, G403+G404)

09:30-9:40

Tutorial Introduction

○ Yoshiyuki Yonezawa

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

09:40-10:40 Tut-01

Fundamentals of SiC Power Semiconductors: Material and Device Physics

○ Tsunenobu Kimoto

Kyoto University (Japan)

10:40-11:00 Break

11:00-12:00 Tut-02

How SiC Power Devices Can Re-Shape Modern Power Electronics

○ Peter Friedrichs

Infineon Technologies (Germany)

Lunch

13:30-14:30 Tut-03

Next Generation SiC Power Devices

○ Shinsuke Harada

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

14:30-14:50 Break

14:50-15:50 Tut-04

From Material Perturbation to Device Degradation in SiC

○ Ulrike Grossner

ETH Zürich (Switzerland)

15:50-16:10 Break

16:10-17:10 Tut-05

SiC Power Modules : From the Basics to the Latest Trends

○ Yoshikazu Takahashi

Tohoku University (Japan)

17:10-17:30

Wrap up

Welcome Reception (18:00-20:00, 1st Floor)

Opening (9:00-9:10, 1st Floor)

Plenary Lectures and Invited Poster Short Presentations (9:10-11:10, 1st Floor)

Session Chair: Hidekazu Tsuchida (Central Research Institute of Electric Power Industry, Japan), Hiroshi Yano (University of Tsukuba, Japan)

09:10 Mo-PL-01 (Invited)

From Wafer to Inverter: The MIRISE Power Device Journey

○ Yoshifumi Kato¹

1.MIRISE Technologies Corp. (Japan)

09:55 Mo-PL-02 (Invited)

Point Defects in Silicon Carbide: From the Characterization of Dopants and Deep Traps to Quantum Systems and F.A.I.R. Research Data

○ Michael Krieger¹

1.Friedrich-Alexander-Universität Erlangen-Nürnberg (Germany)

10:40 IP-01 (Invited)

Development of n-type Epitaxial Growth on 300 mm 4H-SiC Wafers

○ Weining Qian^{1, 2}, Feihong Huang¹, Kai Yang¹, Gan Feng¹, Yongqiang Sun¹, Junyong Kang², Jianhui Zhao^{1, 2}

1.Epiworld International Co., Ltd. (China), 2.Xiamen University (China)

10:45 IP-02 (Invited)

Thermal response of threading dislocations in SiC substrates using UV-excited lock-in thermography

○ JUHYEONG Sun¹, Ryohei Fujita¹, Michio Kawase², Hosei Nagano¹, Masashi Kato³, Kenta Murayama⁴, Kentaro Kutsukake^{1, 2}, Toru Ujihara^{1, 2}, Shunta Harada^{1, 2}

1.Nagoya university (Japan), 2.Inst. of Materials and Systems for Sustainability (IMaSS) (Japan), 3.Nagoya Institute of Technology (Japan), 4.Mipox Corporation (Japan)

10:50 IP-03 (Invited)

Gate-Oxide Protection for Enhanced Single-Event Robustness in SiC Power MOSFETs

○ Heng WANG^{1, 2}, Yun XIA¹, LyuZhang PENG³, ChangWei Zheng¹, SiRui FENG¹, XinPeng LIN¹, Pengwei ZHOU², YingChen YANG², Gang CHEN¹, YuXi WAN¹, Gang Lyu³, Kevin Jing CHEN²

1.Shenzhen Pinghu Lab. (China), 2.The Hong Kong Univ. of Sci. and Tech. (Hong Kong), 3.Beihang Univ. (China)

10:55 IP-04 (Invited)

Evolution of color centers at SiO₂/SiC interfaces during repeated thermal annealing tracked in pre-defined observation windows

○ Kentaro Onishi¹, Masahiro Hara¹, Heiji Watanabe¹, Takuma Kobayashi¹

1.The University of Osaka (Japan)

11:00 Announcement

Lunch

Poster Session (13:00-15:00, 1st & 4th Floors)

Invited Poster (1st Floor)

13:00 Mo-IP (Invited)

Development of n-type Epitaxial Growth on 300 mm 4H-SiC Wafers

○ Weining Qian^{1, 2}, Feihong Huang¹, Kai Yang¹, Gan Feng¹, Yongqiang Sun¹, Junyong Kang², Jianhui Zhao^{1, 2}

1.Epiworld International Co., Ltd. (China), 2.Xiamen University (China)

Detailed poster program is provided in the following pages.

Oral Sessions (15:10-16:40)

Mo-1A: MOS Interface Processing <i>Oral-A(1st Floor, G7+G8) (15:10-16:40)</i> Session Chair: Fabrizio Roccaforte (CNR-IMM, Italy), Hirohisa Hirai (National Institute of Advanced Industrial Science and Technology, Japan)	Mo-1B: Bulk Growth I <i>Oral-B(3rd Floor, G303+G304) (15:10-16:40)</i> Session Chair: Didier Chaussende (CNRS / Université Grenoble Alpes, France), Chao Gao (SICC, China)
15:10 Mo-1A-01 (Invited) Advanced interface design through two-step hydrogen annealing for high-reliability SiC MOS devices ○ Takuma Kobayashi ¹ , Masahiro Hara ¹ , Heiji Watanabe ¹ 1.UOsaka	15:10 Mo-1B-01 (Invited) Development of fast 4H-SiC Bulk Crystal Growth by high-temperature gas-source method ○ Takeshi Okamoto ¹ , S. Sakakibara ¹ , D. Uematsu ¹ , H. Uehigashi ¹ , T. Kanda ¹ 1.MIRISE Technologies Corp. (Japan)
15:40 Mo-1A-02 The vital role of pre-deposition annealing in diluted hydrogen for achieving high-quality SiC MOS structures ○ Shoto Sawada ¹ , Takuma Kobayashi ¹ , Hiroki Fujimoto ¹ , Masahiro Hara ¹ , Heiji Watanabe ¹ 1.Univ. of Osaka	15:40 Mo-1B-02 Scaling Laws for Stress-Driven Prismatic Slip Activation in 2-inch to 18-inch SiC Boules ○ Kevin Kayang ¹ , Zeyu Chen ¹ , Balaji Raghothamachar ¹ , Michael Dudley ¹ , ○ Dilip Gersappe ¹ 1.Stony Brook University
16:00 Mo-1A-03 Enhanced Interface Properties and Channel Mobility in ALD SiO₂/4H-SiC MOS Devices via High-Temperature Surface Pretreatment in Hydrogen Ambient ○ Mustafa Akif YILDIRIM ¹ , Vishal Ajit Shah ¹ , Hidekazu Tsuchida ² , Koichi Murata ² , Nikolaos Iosifidis ¹ , Peter Gammon ¹ , Marina Antoniou ¹ , Arne Benjamin Renz ¹ 1.Univ. of Warwick, 2.Central Research Institute of Electric Power Indus. (CRIEPI)	16:00 Mo-1B-03 Realistic Simulation of SiC Crystal Growth with Hybrid Molecular Dynamics and Monte Carlo Approaches ○ Alexander Reichmann ¹ , Lorenz Romaner ¹ 1.Montanuniversität Leoben
16:20 Mo-1A-04 Insights on the role of NO annealing in the Dit generation in lateral MOSFETs during Gate Switching stress ○ Patrick Fiorenza ¹ , Marco Zignale ¹ , Simone Milazzo ¹ , Cateno Marco Camalleri ² , Laura Scalia ² , Mario Saggio ² , Marilena Vivona ¹ , Filippo Giannazzo ¹ , Fabrizio Roccaforte ¹ 1.CNR-IMM, 2.STMicroelectronics	16:20 Mo-1B-04 Efficient and interpretable optimization of cooling conditions for dislocation density reduction in SiC crystal growth ○ Ryo Fukasawa ¹ , Toru Asahi ¹ , Fumihiro Fujie ² , Hidekazu Tsuchida ² 1.Waseda Univ., 2.Central Res. Inst. of Electric Power Indus.

Oral Sessions (17:00-18:30)	
Mo-2A: Metal Contacts and Interface Engineering <i>Oral-A(1st Floor, G7+G8) (17:00-18:30)</i> <i>Session Chair: Shin-Ichiro Kuroki (Hiroshima University, Japan),</i> <i>Arash Salemi (Navitas Semiconductor, USA)</i>	Mo-2B: Emerging Quantum Color Centers <i>Oral-B(3rd Floor, G303+G304) (17:00-18:30)</i> <i>Session Chair: Takuma Kobayashi (The University of Osaka, Japan),</i> <i>Vytautas Žalandauskas (University of Oslo, Norway)</i>
17:00 Mo-2A-01 (Invited) Status and Prospects for Reduced Specific On-Resistance in Planar and Trench 4H-SiC MOSFETs ○ Dallas Morissette ¹ , Koushik Ramadoss ¹ , James A Cooper ¹ <i>1.Purdue Univ.</i>	17:00 Mo-2B-01 (Invited) Quantum Sensing from 2-nm Shallow Divacancy-related Qubits in 4H-SiC Pei Li ^{2, 3, 1} , Ji-Yang Zhou ⁴ , Song Li ¹ , Péter Udvarhelyi ¹ , Jin-Shi Xu ⁴ , Chuan-Feng Li, Guang-Can Guo ⁴ , Bing Huang ^{3, 6} , ○ Adam Gali ^{1, 5, 7} <i>1.HUN-REN Wigner Research Centre for Physics, 2.Tianjin University of Technology, 3.Beijing Computational Science Research Center, 4.University of Science and Technology of China and Hefei National Laboratory, 5.Budapest University of Technology and Economics, 6.Beijing Normal University, 7.MTA-WFK "Lendület" Momentum Semiconductor Nanostructures Research Group</i>
17:30 Mo-2A-02 Surface Morphology Evolution During Hydrogen Etching of 4H-SiC (0001) in limited regions ○ Alfio Samuele Mancuso ^{1, 2} , Francesco La Via ² , Marco Mauceri ³ , Massimo Camarda ⁴ , Corrado Bongiorno ² , Salvatore Pannitteri ² , Simona Boninelli ² <i>1.Univ. of Catania, 2.Inst. of CNR-IMM, 3.Manufac. of ASM International, 4.Res. of STLab</i>	17:30 Mo-2B-02 Chlorine-Related Defects in 4H-SiC as a Platform for Telecom Quantum Memories ○ Andrei N. Anisimov ¹ , Ashin Varghese Mathews, Kalliopi Mavridou, Manfred Helm, Georgy V. Astakhov <i>1.Helmholtz-Zentrum Dresden-Rossendorf</i>
17:50 Mo-2A-03 Processing and characterization of Mo-nitride Schottky contacts on 4H-SiC ○ Marilena Vivona ¹ , Davide Schiera ^{1, 2} , Simone Milazzo ¹ , Marco Zignale ¹ , Valerio Votadoro ¹ , Salvatore Di Franco ¹ , Markus Italia ¹ , Raffaella Lo Nigro ¹ , Giuseppe Greco ¹ , Isodiana Crupi ² , Patrick Fiorenza ¹ , Fabrizio Roccaforte ¹ <i>1.CNR-IMM, 2.Univ. of Palermo</i>	17:50 Mo-2B-03 Quantum Emitters at the Telecom C-band ○ Danial Shafizadeh ¹ , Misagh Ghezellou ¹ , Viktor Mihály Bobal ² , Lasse Vines ² , Jawad UlHassan ¹ , Valdas Jokubavicius ^{1, 3} , Nguyen Tien Son ¹ , Ivan Gueorguiev Ivanov ¹ <i>1.Linköping University, 2.University of Oslo, 3.TekSiC</i>
18:10 Mo-2A-04 A Novel Non-Alloyed Sc-Based Low Work-Function Metal Scheme for Ohmic Contacts to N-type 4H-SiC ○ Abdul Hannan Yeo ^{1, 2} , Jay Sin Jie Liew ¹ , Yu-Chieh Chien ¹ , Qin Gui Roth Voo ¹ , Zijie Zheng ^{1, 2} , Xiaolin Wang ^{1, 2} , Leming Jiao ^{1, 2} , Runze Wang ¹ , Liyuan Liu ¹ , Lakshmi Kanta Bera ¹ , Shiv Kumar ¹ , Umesh Chand ¹ , Navab Singh ¹ , Xiao Gong ^{1, 2} , Yee Chia Yeo ^{1, 2} <i>1.Inst. of Microelectronics (IME), A*STAR, 2.National Univ. of Singapore</i>	18:10 Mo-2B-04 First-principles strain engineering of telecom V4+ in 4H-SiC for quantum devices ○ Petros Panagis Filippatos ¹ , Gergő Thiering ¹ , Adam Gali ^{1, 2} <i>1.hun-ren wigner research centre for physics, 2.Budapest University of Technology and Economics, Budapest, Hungary</i>

Industrial Sessions (18:50-20:20)	
Industrial Session-A <i>Oral-A(1st Floor, G7+G8) (18:50-20:20)</i>	Industrial Session-B <i>Oral-B(3rd Floor, G303+G304) (18:50-20:20)</i>

Oral Sessions (08:40-10:20)

Tu-1A: Novel Architectures

Oral-A(1st Floor, G7+G8) (08:40-10:20)

Session Chair: Yoshiyuki Yonezawa (National Institute of Advanced Industrial Science and Technology, Japan), Victor Veliadis (PowerAmerica, USA)

08:40 Tu-1A-01

Low Negative Bias Temperature Instability in Vertical 4H-SiC FinFETs

○ Hitoshi Fujioka¹, Eiji Kagoshima¹, Teruaki Kumazawa¹, Masahiro Kumita¹, Yuta Furumura¹, Tsuyoshi Nishiwaki¹, Hirokazu Fujiwara¹, Qian Wang², Tsunenobu Kimoto³, Florin Udrea²
1.MIRISE Technologies Corp., 2.Univ. of Cambridge, 3.Kyoto Univ.

09:00 Tu-1A-02

Investigation and Improvement of the Trade Off Between Reverse Recovery and Conduction Performance in SiC MOSFETs

○ Jeff Joohyung Kim¹, Jae-Hyung Park¹, Arman Ur Rashid¹, Sei-Hyung Ryu¹
1.WolfSpeed, Inc.

09:20 Tu-1A-03

Improving Conduction-Switching Correlation by Split-Gate Structure in 4H-SiC Hexagonal MOSFETs

○ Chih-Yen Teng¹, Kung-Yen Lee^{1, 2}, Pei-Chun Liao², Jung-Chieh Chen¹, Lu-Heng Wang², Yen-Lin Chiu¹, Ruei-Ci Wu³
1.Department of Engineering Science and Ocean Engineering, National Taiwan University, 2.Graduate School of Advanced Technology, National Taiwan University, 3.SiCEV Electronics Co., Ltd

09:40 Tu-1A-04

Investigation of Saturation Current Characteristics and Short-Circuit Behavior of Monolithically Integrated 1.2 kV SiC Bi-Directional MOSFETs

○ Seung Yup Jang^{1, 4}, Stephen A Mancini¹, Daixin Chen², Andrew Binder³, Richard Floyd², Robert Kaplar³, Jack Flicker³, Stan Atcity³, Adam J Morgan⁴, Xiaoqing Song², Woongje Sung¹
1.Univ. at Albany, 2.Univ. of Arkansas, 3.Sandia National Labs., 4.NoMIS Power Corp.

10:00 Tu-1A-05

Host element (Si) deep implanted 1.2kV 4H-SiC UMOSFET without bipolar degradation

○ Kensuke Takenaka^{1, 2}, Takeshi Tawara¹, Shinichiro Matsunaga¹, Shinsuke Harada¹
1.AIST, 2.Fuji Electric Co., Ltd.

Tu-1B: Bulk Growth II

Oral-B(3rd Floor, G303+G304) (08:40-10:10)

Session Chair: Seong-Min Jeong (Korea Institute of Ceramic Engineering and Technology, Korea), Shunta Harada (Nagoya University, Japan)

08:40 Tu-1B-01 (Invited)

Continuous Quality Enhancement of P-type 4H-SiC Substrates through Solution Growth

Yifan Dang¹, ○ Can Zhu¹, Penglei Chen¹, pengfei Liu¹, Huiqin Zhou¹, Tianyu Shu¹, Chao Gao¹
1.SICC Co. Ltd.

09:10 Tu-1B-02

Growth and Defect Analysis of Low-Doped 4H-SiC Bulk Crystals Grown by High-Temperature CVD

○ Satoshi Matsuzawa^{1, 2}, Fumihiro Fujie¹, Satoshi Asada¹, Dai Kutsuzawa¹, Tomohiro Shonai², Hidekazu Tsuchida¹
1.Central Res. Inst. of Electric Power Indus., 2.Resonac Corp.

09:30 Tu-1B-03

Dynamics of step morphology evolution during SiC solution growth under switching flow conditions

○ Zhicheng Guan¹, Xin Liu², Kentaro Kutsukake^{1, 3}, Shunta Harada^{1, 3}, Toru Ujihara^{1, 2, 3}
1.Graduate School of Engineering, Nagoya University, 2.D-center, Nagoya University, 3.Institute of Materials and Systems for Sustainability (IMaSS), Nagoya University

09:50 Tu-1B-04

Application of Close Space Physical Vapor Transport for Large Area Growth of n-type 4H-SiC Thin Crystals using a TableTop Setup

○ Peter J Wellmann¹, Philipp Wunder¹, Ole Schneider¹, Cristina Grazzi¹
1.Universität Erlangen-Nürnberg (FAU)

Oral Sessions (10:40-12:30)

Tu-2A: FinFET and Trench Interfaces

Oral-A(1st Floor, G7+G8) (10:40-12:30)

Session Chair: Edward Robert Van Brunt (onsemi, USA), Takuji Hosoi (National Institute for Materials Science, Japan)

10:40 Tu-2A-01 (Invited)

Unique Threshold-Voltage Behavior in SiC n-Channel FinFETs with Fin Widths from 26 to 530 nm

○ Eiji Kagoshima¹, Aiko Ichimura¹, Hitoshi Fujioka¹, Jun Saito¹, Tsuyoshi Nishiwaki¹, Hirokazu Fujiwara¹, Tsunenobu Kimoto²
1.MIRISE Technologies Corp., 2.Kyoto Univ.

11:10 Tu-2A-02

Demonstration of a SiC P-Channel FinFET with Enhanced Mobility

○ Shion Toshimitsu¹, Eiji Kagoshima², Hirokazu Fujiwara², Kyota Mikami¹, Mitsuaki Kaneko¹, Tsunenobu Kimoto¹
1.Kyoto Univ., 2.MIRISE Technologies Corp.

11:30 Tu-2A-03

Separated Source Sum-Difference (S3D) Extraction Method for Accurate Trench Sidewall Mobility Evaluation in SiC Trench MOSFETs

○ Leming Jiao^{1, 2}, Yu-Chieh Chien¹, Zijie Zheng^{1, 2}, Xiaolin Wang^{1, 2}, Weijie Wang¹, Abdul Hannan Yeo¹, Qin Gui Voo¹, Liyuan Liu¹, Xinghua Wang¹, Umesh Chand¹, Xiao Gong^{1, 2}, Navab Singh¹, Yee Chia Yeo^{1, 2}
1.Inst. of Microelectronics (IME), A*STAR, 2.National Univ. of Singapore

11:50 Tu-2A-04

Unveiling Face-Dependent Mobility-Limiting Scattering Mechanisms in 4H-SiC Trench Sidewall Channels

○ Xiaolin Wang^{1, 2}, Yu-Chieh Chien¹, Leming Jiao^{1, 2}, Zijie Zheng^{1, 2}, Weijie Wang¹, Runze Wang¹, Xinghua Wang¹, Abdul Hannan Yeo¹, Qin Gui Voo Roth¹, Liyuan Liu¹, Umesh Chand¹, Xiao Gong^{1, 2}, Navab Singh¹, Yee Chia Yeo^{1, 2}
1.Inst. of Microelectronics (IME), A*STAR, 2.National Univ. of Singapore

12:10 Tu-2A-05

Mobility Enhancement Mechanism of 4H-SiC Trench Sidewall MOS Channels Evaluated by 3D-VDP

○ Kana Hiramatsu¹, Hirohisa Hirai¹, Eiji Kagoshima², Mitsuru Sometani¹, Keisuke Nagaya¹, Jun Saito², Takaya Shimono², Tsuyoshi Nishiwaki², Hirokazu Fujiwara², Mitsuo Okamoto¹
1.National Inst. of Advanced Indus. Science and Technology (AIST), 2.MIRISE Technologies Corp.

Tu-2B: Extended Defects I

Oral-B(3rd Floor, G303+G304) (10:40-12:30)

Session Chair: Nadeemullah A. Mahadik (United States Naval Research Laboratory, USA), Soon-Ku Hong (Chungnam National University, Korea)

10:40 Tu-2B-01 (Invited)

Interactions between point defects/impurities and extended defects during 4H-SiC crystal growth

○ Noboru Ohtani¹
1.Kwansei Gakuin University, Japan

11:10 Tu-2B-02

Synchrotron X-ray Topography Observation of BPD Loops in Thick 4H-SiC Epilayers (60um-110um) Originating from Prismatic Slip Dislocations in 4H-SiC Substrates

Kaixuan Zhang¹, Zeyu Chen¹, Jianpei Zhang¹, Haochi Wang¹, Jaehyun Suh¹, Alecsander Imhof², Nadeem Mahadik², ○ Balaji Raghothamachar¹, Michael Dudley¹
1.Stony Brook University, 2.U.S. Naval Research Laboratory

11:30 Tu-2B-03

Wafer-scale characterization of threading mixed dislocations in 4H-SiC using commercial X-ray topography and polarized light microscopy

○ Shunta Harada^{1, 2}, Kosei Takahashi¹, Kota Tsujimori², Michio Kawase¹, Kenta Shimamoto³, Yuya Mizutani⁴, Seiya Mizutani⁴, Seiji Mizutani⁴, Kenta Murayama⁴
1.Nagoya Univ., 2.SSR Corp., 3.Rigaku Corp., 4.Mipox Corp.

11:50 Tu-2B-04

Analysis of Defect Configurations in 4H-SiC Epilayers Obtained by Multi-Epitaxial Process by Synchrotron Monochromatic Beam X-ray Topography

○ Zeyu Chen¹, Balaji Raghothamachar¹, Reza Ghandi², Stacey Kennerly², Michael Dudley¹
1.Stony Brook University, 2.GE Research

12:10 Tu-2B-05

Estimation of Dislocation Structures at Both Ends of Short Basal Plane Dislocations in 4H-SiC Epitaxial Layers by Multi-Photon Excited Photoluminescence

○ Johji Nishio¹, Yuto Sasaki¹, Jeongseung Pak², Keisuke Kurashima¹
1.NuFlare Technology, Inc., 2.Nikon Corp.

Lunch

Oral Sessions (14:00-15:50)	
Tu-3A: Implantation and Trench Process Optimization <i>Oral-A(1st Floor, G7+G8) (14:00-15:50)</i> <i>Session Chair: Michael Robert Jennings (Swansea University, UK), Mathias Rommel (Fraunhofer IISB, Germany)</i>	Tu-3B: Rad-Hard Devices and High-Temp. ICs <i>Oral-B(3rd Floor, G303+G304) (14:00-15:50)</i> <i>Session Chair: Sang-Mo Koo (Kwangwoon University, Korea), Mitsuaki Kaneko (Kyoto University, Japan)</i>
14:00 Tu-3A-01 (Invited) Dopant activation and compensation in P+-implanted n-type layers formed in a V-doped semi-insulating 4H-SiC substrate ○ Yuki Yoshimura ¹ , Kyoto Mikami ¹ , Tsunenobu Kimoto ¹ , Mitsuaki Kaneko ¹ <i>1.Kyoto University</i>	14:00 Tu-3B-01 (Invited) Reliability of SiC Power Devices in Space and Atmospheric Radiation Environments ○ Corinna Martinella ¹ <i>1.Institute of Electronics and Systems (IES) - University of Montpellier</i>
14:30 Tu-3A-02 Geometrical Engineering of Trench Corners via High Temperature Annealing: Mitigating Field Crowding and Enhancing Dielectric Reliability in 8 Inch SiC Trench MOSFETS ○ Minghua Zhu ¹ , Cen Tang ¹ , Da Wang ¹ , Tianlin Yang ¹ , Ziting Tan ¹ , Zijing Huang ¹ , Bin Hu ¹ , Yuting Tang ¹ , Wentao Yang ¹ , Jin Rao ¹ <i>1.Huawei Technologies Co., Ltd., Shenzhen, China</i>	14:30 Tu-3B-02 Effects of Cosmic Ray Irradiation on Commercial-Grade Silicon Carbide Power Devices ○ Niamh Claire Arnold ¹ , Virendra Malin Kotagama ^{1, 2} , Arne Benjamin Renz ^{1, 5} , Gabriel Scott Parkinson ³ , Kimmo H Niskanen ⁴ , James Gott ⁵ , Christopher Frost ⁶ , Maria Kastriotou ⁶ , Carlo Cazzaniga ⁶ , Peter Michael Gammon ^{1, 5} <i>1.School of Engineering, Univ. of Warwick, 2.Radtest Ltd., 3.PEMC, Univ. of Nottingham, 4.Accelerator Lab., Univ. of Jyväskylä, 5.Warwick Manufacturing Group, Univ. of Warwick, 6.ISIS Neutron and Muon Source, Rutherford Appleton Lab.</i>
14:50 Tu-3A-03 XPS Evaluation of Etch Damage and Nitrogen Incorporation in 4H-SiC Trenches ○ Runze Wang ¹ , Mingsheng Zhang ² , Hwee Leng Seng ² , Rong Ji ² , Jisheng Pan ² , Zijie Zheng ^{1, 3} , Yu-Chieh Chien ¹ , Xiaolin Wang ^{1, 3} , Leming Jiao ^{1, 3} , Liyuan Liu ¹ , Abdul Hannan Yeo ¹ , Qin Gui Voo ¹ , Umesh Chand ¹ , Xiao Gong ^{1, 3} , Navab Singh ¹ , Yee Chia Yeo ^{1, 3} <i>1.Inst. of Microelectronics (IME), A*STAR, 2.Inst. of Materials Res. and Eng. (IMRE), A*STAR, 3.National Univ. of Singapore</i>	14:50 Tu-3B-03 Investigation of Microdose Effects on Device Characteristics of 4H-SiC Trench MOSFET under Heavy-Ion Irradiation ○ Tomoya Kimura ¹ , Takahiro Suzuki ² , Eiji Kagoshima ¹ , Kiyoka Yuge ¹ , Tsuyoshi Nishiwaki ¹ , Hirokazu Fujiwara ¹ , Hiroyuki Shindou ² <i>1.MIRISE Technologies Corp., 2.Japan Aerospace Exploration Agency</i>
15:10 Tu-3A-04 Optical Critical Dimension Metrology for Monitoring High-Volume Manufacturing of SiC Trench MOSFETS ○ Emeric Balogh ¹ , Boglárka Dikó ¹ , Julien Körfer ² , Oleg Rusch ² , Alfréd Hajtman ¹ , Zsófia Kiss ¹ , Bence Nagy ¹ , Attila Sütő ¹ , Péter Basa ¹ <i>1.Semilab Semiconductor Physics Laboratory, 2.Fraunhofer Institute for Integrated Systems and Device Technology IISB</i>	15:10 Tu-3B-04 Demonstration of Higher-Current 500 °C Durable 4H-SiC JFET Chips ○ Philip Neudeck ¹ , David Spry ¹ , Robert Macdonald ² , Robert Gossman ² , Christopher Collazo-Davila ² , Stacey Kennerly ² , Liangyu Chen ³ , Carl Chang ⁴ , Mohamed Lababidi ⁴ , Sean McDarby ⁵ <i>1.NASA Glenn Research Center, 2.GE Aerospace, 3.Ohio Aerospace Institute, 4.HX5 LLC, 5.E Street Technologies</i>
15:30 Tu-3A-05 Comparative Study of Orthogonal P+ Implant Frequencies with Co-optimization of N+ and P-well Profiles in 1.2 kV 4H-SiC MOSFETs ○ Dinuth Chamila Yapa Bandara Yapa Mudiyansele ¹ , Skylar deBoer ¹ , Stephen A. Mancini ¹ , Justin Lynch ² , Seung Yup Jang ² , Adam J. Morgan ² , Woongje Sung ¹ <i>1.State Univ. of New York, Univ. at Albany, 2.NoMIS Power Corp.</i>	15:30 Tu-3B-05 Demonstration of 500°C non-volatile Memory of AlScN Ferroelectric Capacitors Controlled by SiC Lateral MOSFET ○ Emad Andarawis ¹ , Collin Hitchcock ¹ , Lucy Broderick ¹ , Robert Gossman ¹ , Tammy Johnson ¹ , Shubhodeep Goswami ¹ , Mehrnegar Aghayan ¹ , Brendan Hanrahan ² , Daniel Drury ² , Nastazia Moshirfatemi ² <i>1.GE Aerospace Res., 2.Army Res. Lab.</i>

Poster Session (16:00-18:00, 1st & 4th Floors)

Invited Poster (1st Floor)

16:00 Tu-IP (Invited) Thermal response of threading dislocations in SiC substrates using UV-excited lock-in thermography ○ JUHYEONG Sun ¹ , Ryohei Fujita ¹ , Michio Kawase ² , Hosei Nagano ¹ , Masashi Kato ³ , Kenta Murayama ⁴ , Kentaro Kutsukake ^{1, 2} , Toru Ujihara ^{1, 2} , Shunta Harada ^{1, 2} <i>1.Nagoya university (Japan), 2.Inst. of Materials and Systems for Sustainability (IMaSS) (Japan), 3.Nagoya Institute of Technology (Japan), 4.Mipox Corporation (Japan)</i>

Detailed poster program is provided in the following pages.

Wednesday, September 30

Oral Sessions (08:40-10:10)

We-1A: Robustness

Oral-A(1st Floor, G7+G8) (08:40-10:00)

Session Chair: Dominique Planson (Institute National des Sciences Appliquées de Lyon, France), Donald Gajewski (Wolfspeed, USA)

08:40 We-1A-01

Influence of Cell Design on Short-Circuit Robustness of SiC MOSFETs with Measurements and Simulations

o Madhu Lakshman Mysore¹, Rahul Vijaybhai Chavda¹, Josef Lutz¹, Thomas Basler¹
1.Chemnitz University of Technology

09:00 We-1A-02

Differentiating the Impact of Device Design, Circuit Layout and Components on the Stability of Multichip SiC Power MOSFET Modules

o Ivana Kovacevic-Badtuebner¹, Alessandro Ilardi¹, Michel Nagel¹, Anja Brandl¹, Ulrike Grossner¹
1.APS-ETH Zurich

09:20 We-1A-03

Investigating Thermal and Degradation Effects in Parallel SiC-MOSFETs Using Differential Kelvin-Source-Current Measurements

o Jonas Müller¹, Hauke Lutzen¹, Kazune Idei², Wataru Saito², Nando Kaminski¹
1.Univ. Bremen, 2.Univ. Kyushu

09:40 We-1A-04

Electro-thermal Stress on 3.5 kV SiC Diodes with Different Transition Layer between Active and Termination Regions

o Philippe Godignon¹, Romain Lavieville¹, Jérôme Biscarrat¹, Cyrille Le Royer¹
1.CEA-Leti

We-1B: Optimizing Access to Si Vacancies

Oral-B(3rd Floor, G303+G304) (08:40-10:10)

Session Chair: Takeshi Ohshima (National Institutes for Quantum Science and Technology, Japan), Rachael L. Myers-Ward (United States Naval Research Laboratory, USA)

08:40 We-1B-01 (Invited)

Spin and Charge Properties and Quantum Functionalities of SiC Color Centers

o Naoya Morioka^{1, 2}
1.Institute for Chemical Research, Kyoto Univ., 2.Center for Spintronics Research Network, Institute for Chemical Research, Kyoto Univ.

09:10 We-1B-02

Oxide-based Surface Passivation for Silicon Vacancy Colour Centres in Silicon Carbide

o Jonah Heiler^{1, 2}, Leonard Kurt Sidney Zimmermann^{1, 2}, Nien-Hsuan Lee^{1, 2}, Kevin Menguelti¹, Stephan Kucera¹, Jean-Nicolas Audinot¹, Wolfgang Knolle³, Jawad Ul-Hassan⁴, Florian Kaiser^{1, 2}
1.Luxembourg Inst. of Sci. and Tech., 2.Univ. of Luxembourg, 3.Leibniz Inst. of Surface Engineering, 4.Linköping Univ.

09:30 We-1B-03

Generation of Single Solid-state Defects within 4H-SiC Solid Immersion Lenses through Femtosecond Laser Writing

Alexander Jones¹, Xingrui Cheng², Shravan Kumar Parthasarathy³, Muhammad Junaid Arshad¹, Pasquale Cilibizzi¹, Roland Nagy³, Patrick Salter², Jason Smith², Cristian Bonato¹, o Christiaan Bekker¹
1.Heriot-Watt Univ., 2.Univ. of Oxford, 3.Friedrich-Alexander-Univ. Erlangen-Nürnberg

09:50 We-1B-04

Optical polarization characterization of silicon vacancies in 4H-SiC

o Tetsuri Nishikawa^{1, 2}, Naoya Morioka^{1, 2}, Hiroshi Abe³, Takeshi Ohshima^{3, 4}, Noriokazu Mizuochi^{1, 2, 5}
1.Institute for Chemical Research, Kyoto Univ., 2.Center for Spintronic Research Network, Kyoto Univ., 3.National Institutes of Quantum Science and Technology (QST), 4.Department of Materials Science, Tohoku Univ., 5.International Center for Quantum-field Measurement Systems for Studies of the Universe and Particles, KEK

Oral Sessions (10:30/10:40–12:40)

We-2A: MOSFETs

Oral-A(1st Floor, G7+G8) (10:30-12:40)

Session Chair: Kungyen Lee (National Taiwan University, Taiwan), Hiroki Niwa (Mitsubishi Electric, Japan)

10:30 We-2A-01 (Invited)

Column Design for High Avalanche Withstanding Capability in 1.2kV-class SiC Superjunction MOSFET

o Shinichiro Matsunaga¹, Takeshi Tawara¹, Kensuke Takenaka², Shunki Narita², Shinsuke Harada¹
1.AIIST, 2.Fujielectric. Co, Ltd

11:00 We-2A-02

1200V SiC Trench-Gate Superjunction MOSFET: Design Considerations for different Applications

o Andreas Korzenietz¹, Caspar Leendertz¹, Martin Weidl¹, Kristijan Luka Mletschnig², Paolo Paletti², Andreas Vörckel², Matteo Dainese², Walia Sandeep², Nico Fontana², Markus Beninger-Bina¹, Frank Hille¹
1.Infinion Technologies AG, Germany, 2.Infinion Technologies AG, Austria

11:20 We-2A-03

Impact of Distributed Gate Resistance on Switching Dynamics in a Segmented 4H-SiC MOSFET Model

o Jae-Hyung Jeremiah Park¹, Arman Rashid¹, Toby Schaffer¹, Jeff Joohyung Kim¹, Sei-Hyung Ryu¹
1.Wolfspeed Inc.

11:40 We-2A-04

Safe Operating Area for Reverse Recovery of SiC MOSFET Body Diodes in Single and Parallel Operation

o Abhishek Maitra¹, Marius Löbner¹, Christian Bäuml¹, Christoph Hornstein², Toni Zimmermann², Olga Siwak², Josef Lutz¹, Thomas Basler¹
1.Chemnitz Univ. of Tech., 2.Vitesco Technologies GmbH

12:00 We-2A-05

Quantitative Extraction of Channel and JFET Resistances in SiC MOSFETs and Their Impact on the Ron-SCWT Trade-off

o So Uchiyama¹, Noriyuki Iwamuro¹, Hiroshi Yano¹
1.Univ. of Tsukuba

We-2B: Stacking Fault Expansion

Oral-B(3rd Floor, G303+G304) (10:40-12:30)

Session Chair: Ulrike Grossner (ETH Zürich, Switzerland), Tsunenobu Kimoto (Kyoto University, Japan)

10:40 We-2B-01 (Invited)

The Role of Temperature and Carrier Lifetime in Electronically-induced Expansion of Single Shockley Stacking Faults in 4H-SiC

o Koji Maeda¹, Satoshi Asada¹, Koichi Murata¹, Hidekazu Tsuchida¹
1.CRIEPI

11:10 We-2B-02

Investigation of Extended Defects and Electrical Performance of 6.5 kV SiC IGBTs Fabricated on P-type SiC Substrate

o Nadeemullah A Mahadik¹, Alecsander N Imhof¹, James C Gallagher¹, Youngsang Kim², Justin Lynch³, Seung Yup Jang³, Woongje Sung³, Adam Morgan³, Michael Owen², Douglas Dukes⁴, Anant A Agarwal³
1.US Naval Research Laboratory, 2.Defense Microelectronics Activity, 3.NoMIS Power, 4.Pallidus Inc.

11:30 We-2B-03

Atomic and Electronic View of Stacking Fault Expansion and Its Suppression Recipes in 4H-SiC

o Kenji Shiraishi^{2, 6}, Masaki Sano¹, Yuansheng Zhao^{2, 3, 4}, Takashi Yoda⁵, Takayuki Oba⁵, Jun Kojima², Shoichi Onda², Atsushi Oshiyama^{2, 6}
1.Graduate School of Engineering, Nagoya University, 2.Institute of Materials and Systems for Sustainability, Nagoya University, 3.Quemix Inc., 4.Department of Physics, The University of Tokyo, 5.WOW Alliance, Institute of Science Tokyo, 6.Center for Innovative Integrated Electronic Systems, Tohoku University

11:50 We-2B-04

Characterization of Triangular Defect Stacking Faults in 180 um Thick SiC Epitaxial Layers

o Alecsander Imhof¹, Nadeemullah Mahadik², Shanthi Subramanian³, Srujana Prayakara³, Dong Lee³
1.NRC Post Doc at U.S. Naval Res. Lab., 2.U.S. Naval Res. Lab., 3.Coherent Corp.

12:10 We-2B-05LN

Moved to We-P-98LN (Poster)

12:20 We-2A-06LN Transition of Mobility-Limiting Mechanism from Trench to Fin MOS Channels Observed by Systematic Scaling in 4H-SiC FinFETs ○ Tomoka Suematsu ^{1,2,3} , Hirohisa Hirai ¹ , Mitsuru Sometani ¹ , Mitsuo Okamoto ¹ , Shinsuke Harada ¹ , Haruka Shimizu ² , Naoki Watanabe ² , Yuki Mori ² , Akio Shima ² , Tsunenobu Kimoto ³ <i>1. National Institute of Advanced Industrial Science and Technology (Japan), 2. Hitachi, Ltd. (Japan), 3. Kyoto Univ. (Japan)</i>	
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Lunch

Oral Sessions (14:00-15:50)	
We-3A: High Voltage Devices <i>Oral-A (1st Floor, G7+G8) (14:00-15:50)</i> <i>Session Chair: Yoshiyuki Yonezawa (National Institute of Advanced Industrial Science and Technology, Japan), Andrea Irace (University of Naples Federico II, Italy)</i>	We-3B: SiC and Related Material Epitaxy <i>Oral-B (3rd Floor, G303+G304) (14:00-15:50)</i> <i>Session Chair: Rachael L. Myers-Ward (United States Naval Research Laboratory, USA), Jawad Ul Hassan (Linköping University, Sweden)</i>
14:00 We-3A-01 (Invited) High Voltage MOS Devices in 4H-SiC: From Lab to Reality ○ Sei-Hyung Ryu ¹ <i>1. Wolfspeed, Inc.</i>	14:00 We-3B-01 (Invited) Thick Epitaxy on 200mm Silicon Carbide for Ultra-High Voltage Devices ○ Thomas A. Kuhr ¹ , Lianghong (Ryan) Liu ¹ , Derrick Kamber ¹ , Denis Tsvetkov ¹ , Scott Ustin ¹ <i>1. Wolfspeed, USA</i>
14:30 We-3A-02 Optimization of JFET Implantation Profiles for 12-kV 4H-SiC JBSFETs and JBS Diodes Using Shallow and Deep Designs ○ Soo Young Moon ¹ , Stephen A. Mancini ¹ , Justin Lynch ¹ , Miguel Hinojosa ² , Aivars Lelis ² , Woongie Sung ¹ <i>1. Univ. at Albany, State Univ. of New York, 2. U.S. Army Research Laboratory (ARL)</i>	14:30 We-3B-02 Investigation of Nitrogen Incorporation under High HCl/SiH₄ Ratios during CVD Trench Filling Growth ○ Shiyang Ji ¹ , Kazutoshi Kojima ¹ , Mitsuru Sometani ¹ , Shinsuke Harada ¹ , Yasunori Tanaka ¹ <i>1. AIST</i>
14:50 We-3A-03 A Novel 6.5kV 4H-SiC Split-Gate One-Channel JBSFET with Superior Third-Quadrant and Dynamic Performance ○ Mohamed Torky ¹ , Justin M Lynch ¹ , Stephen A Mancini ¹ , Adam J Morgan ² , Woongie Sung ¹ <i>1. University at Albany, State University of New York, 2. NoMIS Power Corporation</i>	14:50 We-3B-03LN Enhanced Carrier Lifetime in Thick 4H-SiC Epitaxial Layers Grown by Close-Spaced Sublimation on A p-Type Substrate ○ Sota Uoya ¹ , Heiji Kitano ² , Shuto Sugimoto ³ , Tsutomu Sonoda ³ , Daisuke Nakamura ⁴ , Toru Ujihara ^{2,3} , Masashi Kato ¹ <i>1. Nagoya Inst. of Tech. (Japan), 2. Nagoya Univ. (Japan), 3. Inst. of Materials and Systems for Sustainability (Japan), 4. TOYOTA CENTRAL R&D LABS, INC. (Japan)</i>
15:10 We-3A-04 Short-Circuit Robustness in SiC MOSFETs: Discrepancy Between Stepwise and Single-Shot Measurements ○ Madhu Lakshman Mysore ¹ , Rahu Vijaybhai Chavda ¹ , Josef Lutz ¹ , Thomas Basler ¹ <i>1. Chemnitz University of Technology</i>	15:10 We-3B-04 Void-Free 3C-SiC by Single 2-Temperature Heteroepitaxy Process ○ Gerard Colston ¹ , Vishal A Shah ¹ <i>1. Univ. of Warwick</i>
15:30 We-3A-05 Design and Experimental Demonstration of 20 kV Rated SiC MOSFETs ○ Yun Xia ¹ , ChangWei Zheng ¹ , Wei Liu ¹ , Yitian Jiang ¹ , Zheng Ye ¹ , Ying Dai ¹ , Jinliang He ² , Zhongqing Peng ² , Zhijie Xue ² , Jinwang Bai ² , Kaiju Liao ² , Shangqian Tan ² , Rudai Quan ¹ , Hongyao Zhu ¹ , Qin Hu ¹ , Gang Chen ¹ , Menglong Zhang ¹ , Yuxi Wan ¹ <i>1. Shenzhen Pinghu Lab., 2. Shenzhen Pengjin High-Tech Co., Ltd.</i>	15:30 We-3B-05 Low-Temperature Epitaxial Growth of Boron Carbide (B₄C) on Si-Face 4H-SiC by Direct Growth Process ○ Darole Alida MEKOAGNE SOUOP ¹ , Laurent AUVRAY ¹ , François CAUWET ¹ , Stephane COINDEAU ² , Jean-Marie BLUET ³ , Gabriel FERRO ¹ <i>1. Univ. of Lyon 1, CNRS, lab. LMI, UMR 5615, 2. Univ. of Grenoble Alpes, CNRS, Grenoble INP, lab. SIMAP, 3. Univ. of Lyon 1, CPE Lyon, Ecole Centrale Lyon, INSA Lyon, CNRS, lab. INL, UMR 5270</i>

Poster Session (16:00-18:00, 1st & 4th Floors)

Invited Poster (1st Floor)

16:00 We-IP (Invited) Gate-Oxide Protection for Enhanced Single-Event Robustness in SiC Power MOSFETs ○ Heng WANG ^{1, 2} , Yun XIA ¹ , LyuZhang PENG ³ , ChangWei Zheng ¹ , SiRui FENG ¹ , XinPeng LIN ¹ , Pengwei ZHOU ² , YingChen YANG ² , Gang CHEN ¹ , YuXi WAN ¹ , Gang Lyu ³ , Kevin Jing CHEN ² <i>1. Shenzhen Pinghu Lab. (China), 2. The Hong Kong Univ. of Sci. and Tech. (Hong Kong), 3. Beihang Univ. (China)</i>

Detailed poster program is provided in the following pages.

Thursday, October 1

Plenary Lecture (8:40-9:25, 1st Floor)

Session Chair: Hidekazu Tsuchida (Central Research Institute of Electric Power Industry, Japan), Hiroshi Yano (University of Tsukuba, Japan)

08:40 Th-PL-01 (Invited)

Emerging Applications of Silicon Carbide Power Devices in Medium Voltage Power Conversion

○ Rajib Datta¹, Samir Soua²

1. GE Vernova Advanced Research Center (USA), 2. GE Vernova Electrification (France)

Oral Sessions (09:50-12:00)

Th-1A: Reliability <i>Oral-A (1st Floor, G7+G8) (09:50-12:00)</i> Session Chair: Shiori Idaka (Mitsubishi Electric Europe, Japan), Sangwon Yoon (Seoul National University, Korea)	Th-1B: Point Defects and Material Properties <i>Oral-B (3rd Floor, G303+G304) (09:50-12:00)</i> Session Chair: Hrishikesh Das (Indichip Semiconductors, USA), Masashi Kato (Nagoya Institute of Technology, Japan)
09:50 Th-1A-01 (Invited) Bipolar Degradation in SiC Power Devices: Still an Issue? Recent Findings and Perspectives for Applications and Standardization ○ Thomas Basler ¹ , Clemens Herrmann ¹ 1. Chemnitz University of Technology, Germany	09:50 Th-1B-01 (Invited) Impact of Pre-Oxidation on Intrinsic Point Defect Formation in Electron-Irradiated 4H-SiC ○ Kotaro Yamanaka ¹ , Kyota Mikami ¹ , Tsunenobu Kimoto ¹ , Mitsuaki Kaneko ¹ 1. Kyoto Univ.
10:20 Th-1A-02 Bipolar Degradation in 1.2 kV SiC MOSFETs under Microsecond Pulsed Stress: Influence of Accumulated Injected Charge and Thermal Boundary Condition Md Hasibul Hasan ¹ , ○ Rijuta Bagchi ¹ , Lukas Farnbacher ¹ , Jürgen Leib ¹ , Bernd Eckardt ¹ , Martin März ² 1. Fraunhofer IISB, 2. FAU Erlangen-Nürnberg	10:20 Th-1B-02 Evaluation of sub-nanosecond carrier lifetimes in 4H-SiC crystals using time-resolved photoluminescence ○ Koichi Murata ¹ , Satoshi Asada ¹ , Hidekazu Tsuchida ¹ 1. Central Research Institute of Electric Power Industry (CRIEPI)
10:40 Th-1A-03 Body Diode Reliability Studies of SiC-MOSFETs Containing Micropipe Defects ○ Lucile C. Teague Sheridan ¹ , Callie M. Woods ¹ , Michael Pannone ¹ , Ayan Biswas ¹ , Brett Hull ¹ , Jared Langan ¹ , Keith Boom ¹ , Keval Patel ¹ , Don Gajewski ¹ , Elif Balkas ¹ 1. Wolfspeed, Inc	10:40 Th-1B-03 Quantitative Evaluation of Stacking Fault-Induced Non-Linear Resistance in Schottky Barrier Diodes Do Yeon Park ^{1, 2} , ○ Moonkyong Na ¹ , Taswar Iqbal ³ , Soon-Ku Hong ³ , Sung Yun Woo ² , Hyundon Jung ⁴ , Dohyung Kim ⁴ , In Ho Kang ¹ , Jae Hwa Seo ¹ , Byoung Hoon Noh ⁵ , Kyung Seok Oh ⁵ 1. Korea Electrotech. Res. Inst., 2. Kyungpook National Univ., 3. Chungnam National Univ., 4. Horiba STEC Korea, 5. ARCHE Co., Ltd.
11:00 Th-1A-04 Recombination-Enhanced Interface State Generation in SiC-MOSFETs under AC Gate Stress Evaluated by Charge Pumping ○ Tsuyoshi Hidaka ¹ , Noriyuki Iwamuro ¹ , Hiroshi Yano ¹ 1. Univ. of Tsukuba	11:00 Th-1B-04 Revealing the Origin of Boron-related Deep Levels in 4H-SiC ○ Rishi Kupper ¹ , Manuel Belanche ¹ , Helton Goncalves de Medeiros ¹ , Natalija Für ¹ , Ulrike Grossner ¹ 1. APS - ETH Zurich
11:20 Th-1A-05 High-Dose Total Ionizing Dose Effects in Commercial 4H-SiC MOSFETs and Alternative Power Devices Virendra Kotagama ¹ , Sami Kibal ² , Rachel A Oliver ² , Arne B Renz ¹ , Vishal A Shah ¹ , Marina Antoniou ¹ , ○ Peter M Gammon ¹ 1. University of Warwick, 2. University of Cambridge	11:20 Th-1B-05 Optical-Pump Terahertz-Probe Spectroscopy of Carrier Lifetimes in 4H-SiC ○ Nikolaos Iosifidis ¹ , Arne Benjamin Renz ¹ , Mustafa Akif Yildirim ¹ , Kyrylo Melnyk ¹ , Vishal Shah ¹ , Qizhe Cao ¹ , Jack Woolley ¹ , James Lloyd-Hughes ¹ , Peter Michael Gammon ¹ 1. Univ. of Warwick
11:40 Th-1A-06 Discern Failure Mechanisms in Dynamic HV-H²TRB Testing ○ Jan-Hendrik Peters ¹ , Felix Hoffmann ² , Stefan Schmitt ² , Nando Kaminski ¹ 1. University of Bremen, 2. Semikron Danfoss Elektronik GmbH & Co. KG	11:40 Th-1B-06 Analysis of Deep-Level Effects on Switching Characteristics of SJ-MOSFETs ○ Takeshi Tawara ¹ , Kensuke Taknaka ² , Shinichiro Matsunaga ¹ , Shinsuke Harada ¹ 1. National Inst. of Advanced Industrial Science and Technology (AIST), 2. Fuji Electric Corp., Ltd.

Lunch

Oral Sessions (13:30-14:50)

Th-2A: Interface Charge <i>Oral-A (1st Floor, G7+G8) (13:30-14:50)</i> Session Chair: Hirohisa Hirai (National Institute of Advanced Industrial Science and Technology, Japan), Patrick Fiorenza (CNR-IMM, Italy)	Th-2B: Si Vacancies towards Quantum Applications <i>Oral-B (3rd Floor, G303+G304) (13:30-14:50)</i> Session Chair: Takeshi Ohshima (National Institutes for Quantum Science and Technology, Japan), Michael Krieger (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany)
13:30 Th-2A-01 Quantum Mechanical Effects on Threshold Voltage in 4H-SiC MOSFETs ○ Ryuta Kajiwar ¹ , Shion Toshimitsu ¹ , Kyota Mikami ¹ , Mitsuaki Kaneko ¹ , Tsunenobu Kimoto ¹ 1. Kyoto Univ.	13:30 Th-2B-01 Defects in silicon carbide for quantum reservoir computing ○ Tien Son Nguyen ¹ , Danial Shafizadeh ¹ , Oscar Balanca-Lindvall ¹ , Jawad Ul-Hassan ¹ , Hiroshi Abe ² , Takeshi Ohshima ^{2, 3} , Igor Abrikosov ¹ , Ivan Ivanov ¹ 1. Linköping University, 2. National Institutes for Quantum Science and Technology, 3. Tohoku University
13:50 Th-2A-02 Breaking trade-off relationship between channel mobility and threshold voltage in SiC MOSFETs by shallow counter doping ○ Kyota Mikami ¹ , Ryuta Kajiwar ¹ , Mitsuaki Kaneko ¹ , Tsunenobu Kimoto ¹ 1. Kyoto Univ.	13:50 Th-2B-02 High electric field detection in a SiC power device by silicon vacancy-based quantum sensor ○ Yuichi Yamazaki ¹ , Akira Kiyoi ² , Naoyuki Kawabata ² , Yuki Watanabe ² , Ryosuke Akashi ¹ , Shunsuke Daimon ¹ , Nobumasa Miyawaki ¹ , Yu-ichiro Matsushita ^{1, 3, 4} , Makoto Kohda ^{1, 5, 6} , Takeshi Ohshima ^{1, 5} 1. QST, 2. Mitsubishi Electric Corporation, 3. The University of Tokyo, 4. Quemix Inc., 5. Tohoku University, 6. University of Washington
14:10 Th-2A-03 Split C-V Measurements for the Separate Extraction of Interface Trap Density and Fixed Charge in (0001) 4H-SiC MOSFETs ○ Shane Stein ¹ , Daniel Lichtenwalner ¹ , Sei-Hyung Ryu ¹ 1. Wolfspeed	14:10 Th-2B-03 Spectator-transition crosstalk in a spin-3/2 silicon-vacancy qudit in silicon carbide revealed by broadband Ramsey interferometry ○ Seung-Jae Hwang ¹ , Jun-Jae Choi ¹ , Seoyoung Paik ¹ , Juhwan Kim ² , Jawad Ul-Hassan ³ , Nguyen Tien Son ³ , Hiroshi Abe ⁴ , Takeshi Ohshima ^{4, 5} , Jaekwon Suk ⁶ , Hyeon-Ho Jeong ² , Dong-Hee Kim ¹ , Sang-Yun Lee ¹ 1. Department of Physics and Photon Sci., Gwangju Inst. of Sci. and Tech., 2. Department of Electrical Eng., Gwangju Inst. of Sci. and Tech., 3. Department of Physics, Chemistry and Biology, Linköping Univ., 4. National Inst. for Quantum Sci. and Tech. (QST), 5. Department of Materials Sci., Tohoku Univ., 6. Korea Multi-purpose Accelerator Complex, Korea Atomic Energy Res. Inst.

14:30 Th-2A-04

Decoupling Effective Field, Screening, and Temperature Dependencies of Inversion Layer Mobility in SiC MOSFETs: Physical Insight into Dominant Scattering Mechanisms

○ Tetsuo Hatakeyama¹, Hirohisa Hirai², Mitsuru Sometani², Mitsuo Okamoto², Shinsuke Harada²
1. Toyama Prefectural Univ., 2. AIST

14:30 Th-2B-04

Magnetometry using Dressed States with Silicon Vacancies in 4H-SiC

○ Ignas Lekavicius¹, Samuel White², Daniel Pennachio¹, Jenifer Hajzus³, Andrew Purdy¹, Rachael Myers-Ward¹
1. US Naval Research Laboratory, 2. JNRC Research Associate at the US Naval Research Laboratory, 3. ASEE Research Associate at the US Naval Research Laboratory

Poster Session (15:00-17:00, 1st & 4th Floors)

Invited Poster (1st Floor)

15:00 Th-IP (Invited)

Evolution of color centers at SiO₂/SiC interfaces during repeated thermal annealing tracked in pre-defined observation windows

○ Kentaro Onishi¹, Masahiro Hara¹, Heiji Watanabe¹, Takuma Kobayashi¹
1. The University of Osaka (Japan)

Detailed poster program is provided in the following pages.

Banquet (18:00-21:30, Osanbashi Yokohama International Terminal)

Oral Sessions (08:40-10:20)

Fr-1A: SiC Epitaxy

Oral-A(1st Floor, G7+G8) (08:40-10:10)

Session Chair: Bernd Thomas (Robert Bosch, Germany), Kazutoshi Kojima (National Institute of Advanced Industrial Science and Technology, Japan)

08:40 Fr-1A-01 (Invited)

Statistical Correlation Between Substrate Dislocations and Stacking Faults in SiC Epitaxial Growth

○ Fumihiro Fujie¹, Yugo Yamagishi², Yuichiro Mabuchi², Hidekazu Tsuchida¹

1. Central Research Institute of Electric Power Industry, 2. Resonac Corporation

09:10 Fr-1A-02

Comparative Epitaxy of 4H-SiC on Prismatic and Basal Planes: Morphology, Doping, and Defect Incorporation

○ Misagh Ghezellou¹, Robert Karsthof², Lasse Vines², Vadim Vorobyov³, Florian Kaiser⁴, Jörg Wrachtrup³, Jawad Ul-Hassan¹

1. Linköping University, 2. University of Oslo, 3. University of Stuttgart, 4. Luxembourg Institute of Technology

09:30 Fr-1A-03

Suppression of Stacking Fault Expansion in SiC Epitaxial Layers via Substrate Implantation

○ Rachael L. Myers-Ward¹, Alec N. Imhof¹, Nadeemullah A. Mahadik¹, Benjamin J. Sekely¹, Jenifer R. Hajzus¹, Atul Gupta², Hank Chen², Fulvio Mazzamuto², Christopher Lamontagne²

1. U.S. Naval Research Laboratory, 2. Axcelis Technologies

09:50 Fr-1A-04

Correlative Multi-Channel Defect Evolution of 200 mm SiC Epitaxial Layers Under Various Thicknesses

○ Cristiano Calabretta¹, Nicolò Piluso¹, Chiara Nania¹, Fabiana Vento¹, Domenica Raciti¹, Romain Mermet-Guyenet¹, Alice Lombardo¹, Nicoletta Spampinato¹, Giuseppe Arena¹, Andrea Severino¹, Dmitrii Rusakov³, Federico Giuffrida³, Matteo Salamone³, Kaushik Sah³, Parikshit Sharma³, Paolo Parisi³, Corrado Bongiorno²

1. Indus. STMICROELECTRONICS, 2. CNR-IMM, 3. KLA Corporation

Fr-1B: Super-Junction Process Technology

Oral-B(3rd Floor, G303+G304) (08:40-10:20)

Session Chair: Navab Singh (A*STAR IME, Singapore), Shin-Ichiro Kuroki (Hiroshima University, Japan)

08:40 Fr-1B-01

Channeling Ion Implantation in 4H-SiC: A Comprehensive Raman Study of Damage, Recovery, and Dopant Activation

○ Dhruva Das¹, Jerome Biscarrat¹, Max Pujade¹, Philippe Godignon¹, F. Torregrossa², A. Llopez², S. Morata², G. Grosset²

1. Univ. Grenoble Alpes, CEA, Leti, F-38000 Grenoble, France, 2. IBS - Ion Beam Services, Z.I. de Peynier-Rousset, 13790 Peynier, France

09:00 Fr-1B-02

Manufacturability of Single Epi Step 1200V SiC Superjunction Pillars Using Channeling Ion Implantation

○ Christopher Lamontagne¹, Fulvio Mazzamuto¹, Jan Prominski¹, Leonard Rubin¹, Atul Gupta¹, Shioh-Hwei Hwang², Beniyam Woldekidan², Dénes Ullrich^{3, 4}, Zoltán Bozók³, János Szivós³, László Balogh³, Enrico Sangregorio⁵, Francesco La Via⁵, Simona Boninelli⁵, Corrado Bongiorno⁵

1. Axcelis Technologies Inc., 2. Veeco Instruments Inc., 3. Semilab Semiconductor Physics Lab. Ltd., 4. Department of Atomic Physics, Inst. of Physics, 5. CNR-IMM

09:20 Fr-1B-03

Optical Characterization of Channeling Angles in 4H-SiC

○ Helton Goncalves de Medeiros¹, Manuel Belanche Guadas¹, Rene Heller², Ulrike Grossner¹

1. APS - ETH Zurich, 2. Helmholtz-Zentrum Dresden-Rossendorf

09:40 Fr-1B-04

Deep SiC Superjunction Doping Profiles Enabled by Single-Step Energy-Filtered Ion Implantation

○ Christian T. Plass¹, Manuel Belanche², Constantin Csato¹, Yoshiyuki Yonezawa³, Ulrike Grossner², Michael Rüb^{1, 4}

1. mi2-factory, 2. Advanced Power Semiconductor Lab., ETH Zurich, 3. National Inst. of Advanced Indus. Sci. and Tech., Tsukuba, 4. Ernst-Abbe-Hochschule Jena

10:00 Fr-1B-05

Sensitivity of SiC Superjunction MOSFET Performance to High-Energy Implantation of p-Pillars

Jan Prominski¹, ○ Fulvio Mazzamuto¹, Christopher Lamontagne¹, Atul Gupta¹, David Green², Alexandros Kyrtos², Andreas Scholze²

1. Axcelis Technologies Inc., 2. Silvaco Inc.

Oral Sessions (10:40/10:50–12:30)

Fr-2A: Bipolar Devices

Oral-A(1st Floor, G7+G8) (10:40-12:30)

Session Chair: Peter Friedrichs (Infineon Technologies, Germany), Sei-Hyung Ryu (Wolfspeed, USA)

10:40 Fr-2A-01 (Invited)

Ultra-high Voltage SiC Bipolar Devices: Empowering the Green Power Grids

○ Naoki Watanabe¹, Haruka Shimizu¹, Akio Shima¹

1. Hitachi, Ltd.

11:10 Fr-2A-02

Stable operation of 3.3 kV SiC PiN Diodes at Extreme Pulsed Current Densities >3000 A/cm² with Engineered Buffer Layer

○ Tolen Nelson¹, Nadeem Mahadik², Alecsander Imhof¹, Andrew Koehler², Rachael Myers-Ward², Youngsang Kim³, Michael Owen³, Justin Lynch⁴, Woongje Sung⁴, Karl Hobart², Michael Mastro²

1. National Research Council Postdoctoral Fellow Residing at U.S. Naval Research Laboratory, 2. U.S. Naval Research Laboratory, 3. Defense Microelectronics Activity, 4. NoMIS Power

11:30 Fr-2A-03

Experimental Evaluation of 15 kV SiC IGBTs and PNDs with Thick Epitaxial Layers for High Voltage Power Conversion

Kumiko Konishi¹, Naoki Watanabe¹, ○ AKIO SHIMA¹, Giovanni Alfieri², Boksteen Boksteen², Tobias Keller²

1. Hitachi, Ltd., 2. Hitachi Energy, Ltd.

11:50 Fr-2A-04

Gate Design Impact on (6.5-kV-Class) Optically Triggered 4H-SiC Thyristors with Etched Junction Termination Extension

Kamil Kotra^{1, 3}, ○ Ralf Hassdorf¹, Sigo Scharnholz¹, Milan Zuvic¹, Rabei Barhoumi², Dominique Planson², Klaus Hoffmann³

1. French-German Res. Inst. of Saint-Louis (ISL), 2. Univ. Lyon, INSA Lyon, Ampere, 3. Helmut-Schmidt Univ. Hamburg

Fr-2B: Extended Defects and Si Vacancies II

Oral-B(3rd Floor, G303+G304) (10:50-12:30)

Session Chair: Isaho Kamata (Central Research Institute of Electric Power Industry, Japan), Michael Dudley (Stony Brook University, USA)

10:50 Fr-2B-01

Spontaneous Formation of Interfaces and Atomic Interfacial Mechanisms Mediated by Regular Array of Stacking Faults and Dislocations at 4H/3C-SiC Vertical Interfaces in Polytype Transition

○ Soon-Ku Hong¹, Taswar Iqbal¹, Moonkyong Na², Jeong Eun Chae³

1. Chungnam National Univ., 2. Korea Electrotech. Res. Inst., 3. Gumi Electronics & Info. Tech. Res. Inst.

11:10 Fr-2B-02

Complexity and Multiple Transformation of Unexplored Shockley-type Stacking Faults with Emission Wavelengths of 500 ~ 540 nm in 4H-SiC Epitaxial Layer

○ Moonkyong Na¹, Soon-Ku Hong², Taswar Iqbal², Hyundon Jung³, Dohyung Kim³, Chanhyoung Oh³, Donghyun Jang³, Jeong Eun Chae⁴, Hye Ran Kim⁴

1. Korea Electrotech. Res. Inst., 2. Chungnam National Univ., 3. Horiba STEC Korea, 4. Gumi Electronics & Info. Tech. Res. Inst.

11:30 Fr-2B-03

Dislocation dynamics analysis to elucidate the mechanism of BPD contraction near the surface in 4H-SiC

○ Atsuo Hirano¹, Noboru Takahashi¹, Akiyuki Takahashi¹

1. Tokyo University of Science

11:50 Fr-2B-04LN

Experimental Determination of the Silicon-Vacancies Negative Charge States in 4H-SiC

○ Ivan G. Ivanov¹, Danial Shafizadeh¹, Jayanta Bauri¹, Takeshi Ohshima^{2, 3}, Igor A. Abrikosov¹, Tien Son Nguyen¹

1. Linköping Univ. (Sweden), 2. National Inst. for Quantum Science and Technology (Japan), 3. Tohoku Univ. (Japan)

12:10 Fr-2A-05 Static Characteristics and Area Scaling Effects of ~15 kV 4H-SiC IGBTs ○ Hujung Lee ¹ , Justin Lynch ¹ , Stephen Mancini ¹ , Dinuth Yapa Mudiyansele ¹ , Miguel Hinojosa ² , Aivars Lelis ² , Reza Ghandi ³ , Robert Gossman ³ , Adam Morgan ⁴ , Youngsang Kim ⁵ , Stephanie Wasmuth ⁵ , Michael Owen ⁵ , Woongje Sung ¹ <i>1.Univ. at Albany, 2.US Army Res. Labs., 3.GE Aerospace Res., 4.Nomis Power Corp., 5.Defense Microelectronics Activity</i>	12:10 Fr-2B-05LN Investigating Modified Silicon Vacancies in 4H-SiC via Temperature-Dependent Photoluminescence Spectroscopy ○ Linus Hollnagel ¹ , Helton Goncalves de Medeiros ¹ , Markus Kirchbaumer ¹ , Efe Eden ¹ , Agatha Ulibarri ² , Ulrike Grossner ¹ <i>1. APS - ETH Zurich (Switzerland), 2. School of Physics - Univ. of Melbourne (Australia)</i>
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Lunch

Oral Sessions (14:00-15:30)	
Fr-3A: Mobility and Vth Drift <i>Oral-A(1st Floor, G7+G8) (14:00-15:30)</i> <i>Session Chair: Chih-Fang Huang (National Tsing Hua University, Taiwan), Takuji Hosoi (National Institute for Materials Science, Japan)</i>	Fr-3B: Materials and Wafer Processing <i>Oral-B(3rd Floor, G303+G304) (14:00-15:20)</i> <i>Session Chair: Yun Ji Shin (Korea Institute of Ceramic Engineering and Technology, Korea), Takeshi Mitani (National Institute of Advanced Industrial Science and Technology, Japan)</i>
14:00 Fr-3A-01 (Invited) MOS Channel Mobility Enhancement and Hole Trap Reduction in 4H-SiC (0-33-4) beyond (0-33-8) ○ Hirohisa HIRAI ¹ , Mitsuru SOMETANI ¹ , Mitsuo OKAMOTO ¹ , Shinsuke HARADA ¹ <i>1.AIST</i>	14:00 Fr-3B-01 Engineered 4H-SiC Wafers via Mechanical Spalling Process ○ Connor Horn ¹ , Xella Doi ¹ , Kazuo Doi ¹ , Sagar Kumar Seth ² , Supratik Guha ² <i>1.K1 Semiconductor, Inc., 2.Univ. of Chicago</i>
14:30 Fr-3A-02 Temperature-Dependent Gated Hall Measurements of 4H-SiC Planar MOSFETs and Coulomb Scattering Effects on Mobility Daniel Jenner Lichtenwalner ¹ , Shane R Stein ¹ , ○ Sei-Hyung Ryu ¹ <i>1.WolfSpeed, Inc.</i>	14:20 Fr-3B-02 Using multi-spectral linear absorption imaging for volumetric defect tracking and classification in optically transparent 4H-SiC wafers at industrial scale. ○ Jimmy Thörnberg ¹ , Torben L. Purz ² , Anton Vakulenko ² , Eric W. Martin ² , Björn Magnusson ¹ <i>1.STMicroelectronics Silicone Carbide AB, 2.MONSTR Sense Technologies</i>
14:50 Fr-3A-03 Evaluation of CO₂ Post-nitridation Annealing Effects on SiC-MOS Interface Using a Mass-Production-Compatible Hot-Wall Furnace ○ Mitsuru Sometani ^{1, 2} , Hirohisa Hirai ¹ , Naoki Kumagai ¹ , Hiroshi Yano ³ , Takanori Isobe ³ , Takuji Hosoi ^{2, 4} , Heiji Watanabe ² <i>1.AIST, 2.The University of Osaka, 3.Univ. of Tsukuba, 4.NIMS</i>	14:40 Fr-3B-03 Quantitative Modelling of Hot-Zone Degradation and Its Impact on PVT Growth of SiC Crystal ○ Andrey Smirnov ¹ , Laura Ristić ¹ , Aleksa Crnobraja ¹ , Maxim Bogdanov ¹ , Daria Zimina ² , Łukasz Kantor ³ <i>1.STR Europe, 2.STR US, Inc., 3.ON Semiconductor Czech Republic, s.r.o.</i>
15:10 Fr-3A-04 Suppression of the Long-Term Component of Threshold Voltage Shift under AC Stress in 4H-SiC DMOSFETs by CO₂ Post-Nitridation Annealing ○ Ryuki Momota ¹ , Mitsuru Sometani ² , Hirohisa Hirai ² , Heiji Watanabe ³ , Takanori Isobe ¹ , Noriyuki Iwamuro ¹ , Hiroshi Yano ¹ <i>1.Univ. of Tsukuba, 2.AIST, 3.Univ. of Osaka</i>	15:00 Fr-3B-04 Bayesian Optimisation for SiC Polishing Simulations Using SSIM ○ Roberto Iaconi Iaconi ¹ , Kevin Richard G. Operiano ¹ , Susumu Maeda ¹ , Fumiya Kawate ¹ , Saeed Sepasy ² , Yoshifumi Watanabe ² <i>1.Aixtal, 2.Mipox</i>

Plenary Lecture (15:30-16:15, 1st Floor) <i>Session Chair: Hidekazu Tsuchida (Central Research Institute of Electric Power Industry, Japan), Hiroshi Yano (University of Tsukuba, Japan)</i>
15:30 Fr-PL-01 (Invited) Pioneering Next-Generation Power Devices in AIST ○ Yasunori Tanaka ¹ <i>1.National Institute of Advanced Industrial Science and Technology (AIST) (Japan)</i>

Closing (16:15-16:45, 1st Floor)

Detailed Poster Program

Monday, September 28

Track 01 Bulk Growth and Wafer Processing (Poster-A, 1st Floor)

Mo-P-01

Canceled

Mo-P-02

A New Understanding of Sublimation Growth in SiC and a Proposed Furnace Structure Based on Si-C Phase Relations

○ Takehisa Minowa¹, Taichi Abe²

1.Minowa Material Inspiring, 2.National Inst. for Materials Sci. (NIMS)

Mo-P-03

Effect of off-axis seed orientation on surface morphology during physical vapor transport growth of 4H-SiC crystals

○ Shunta Sueda¹, Noboru Ohtani¹

1.Kwansei Gakuin University

Mo-P-04

Withdrawn

Mo-P-05

Rapid Assessment of Threading Screw Dislocation Suppression During 4H-SiC Growth Initiation Using Few-Millimeter Boules

John M. Woods¹, Juan Wei¹, Ever Velasco¹, James Fischer¹, ○ Xueping Xu¹, Rajan Rengarajan¹

1.Coherent Corp.

Mo-P-06

Distinctive photoluminescence properties of the as-grown surface of physical vapor transport-grown 4H-SiC crystals

○ Daichi Iijima¹, Shugo Kawakami¹, Noboru Ohtani¹

1.Kwansei Gakuin University

Mo-P-07

Dislocation-Induced local property modifications in 4H-SiC crystals grown by physical vapor transport

○ Mitsuki Saragai¹, Daito Kamikawa¹, Noboru Ohtani¹

1.Kwansei Gakuin University

Mo-P-08

Effect of stress on warpage of 4H-SiC substrate

○ Hiromasa Suo¹, Masato Ito¹, Tamotsu Yamashita¹, Rimpei Kindaichi¹

1.Resonac Corp.

Mo-P-09

Effect of dual-zone heat treatment on residual stress and defect conversion in bare 4H-SiC wafers

○ Chan-Ho Park¹, Sang-Jin Bae¹, Ho-Gyun Yun¹, Mi-Seon Park¹, Kwang-Hee Jung¹, Jong-Gon Kim¹, Kap-Ryeol Ku², Yun-Ji Shin³, Seong-Min Jeong³, Won-Jae Lee¹

1.Dong-Eui University, 2.Ein Crystal, 3.Korea Institute of Ceramic Engineering and Technology (KICET)

Mo-P-10

Numerical Modeling of Residual Stress-Induced Wafer Warpage in 4H-SiC Substrates

○ Magdalena Lang¹, Paul Wimmer¹, Marc Hainke¹, Christian Kranert¹, Jochen Friedrich¹

1.Fraunhofer Inst. for Integrated Systems and Device Technology IISB

Mo-P-11

Influence of Residual Stress on Dislocation Behavior in 4H-SiC during High-Temperature Annealing

○ Paul Wimmer¹, Philip Keller², Christian Kranert¹

1.Fraunhofer IISB, 2.PVA Technology Hub GmbH

Mo-P-12

Investigation of Graphite Etching by SiC Vapors in the PVT Process

○ Yann Gallou^{1, 2}, Fernanda Leite de Azevedo², Abdelmagid El Bakali², Alexandre Potier¹, Andy Covac³, Megan Kephart³, Didier Chaussende²

1.Mersen France, 2.Univ. Grenoble Alpes, CNRS, Grenoble INP, SIMaP, 3.Mersen US

Mo-P-94

Refurbishment of TaC-Coated Wafer Carriers by Parasitic Deposit Removal and Restorative Recoating

Jeff Lennartz¹, ○ Wei Fan¹, Yani Sun¹, Jon Leist¹, Bowen Dong¹

1.Momentive Technologies

Track 02 Epitaxial and Thin-Film Growth (Poster-A, 1st Floor)

Mo-P-13

Comparative Study of Warm-Wall Batch and Hot-Wall Single-Wafer Platforms for 4H-SiC Homoepitaxy on 200 mm Wafers for 1200 V Trench-MOSFETs

○ Daniel Baierhofer¹, Frank Staiger¹, Bernd Thomas¹, Christian Bierhoff¹, Udo Bischof¹

1.Robert Bosch GmbH

Mo-P-14

Thick SiC Epitaxial Layers grown on Engineered Substrates

○ Rachael L. Myers-Ward¹, Nadeemullah A. Mahadik¹, Alec N. Imhof¹, Benjamin J. Sekely¹, Jenifer R. Hajzus¹, Walter Schwarzenbach², Alexis Drouin²

1.U.S. Naval Research Laboratory, 2.Soitec

Mo-P-15

Optimization of Closed Sublimation Growth for Thick and Smooth Fluorescent 4H-SiC Epilayers

○ Aoto Hashiguchi¹, Ryuya Matsumoto¹, Shoki Ohara¹, Kyoya Okawa¹, Motoaki Iwaya¹, Tetsuya Takeuchi¹, Atsushi Suzuki², Eri Akazawa², Weifang Lu³, Satoshi Kamiyama¹

1.Meijo Univ., 2.E&E Evolution Ltd., 3.Xiamen Univ.

Mo-P-16

Alternative Silicon and Carbon Precursors for 4H-SiC Epitaxy

○ Maximilian Titl¹, Christian Wissgott¹, Michael Pfeffer², Johannes Koehler², Kevin Albrecht², Birgit Kallinger¹

1.Fraunhofer Inst. for Integrated Systems and Device Technology IISB, 2. AIXTRON SE

Mo-P-17

Epitaxial Thickness and Surface Roughness Process Control as Enablers for Zero Defect Automotive SiC Power Devices

○ Nicolo Piluso¹, Cristiano Calabretta¹, Fabiana Vento¹, Andrea Severino¹, Antonio Rossitto¹, Alice Lombardo¹, Nicoletta Spampinato¹, Antonio Criscuolo¹, Simone Rosin¹, Anna Martiniello¹, Antonio Volzone¹, Dmitrii Rusakov², Sah Kaushik², Pauline Begoc², Federico Buja², Matteo Salamone², Federico Giuffrida², Parikshit Sharma², Paolo Parisi², Giuseppe Arena¹, Salvatore Ethan Panasci³, Marco Zignale³, Patrick Fiorenza³, Fabrizio Roccaforte³

1.Indus. STmicroelectronics, 2.Indus. KLA Corporation, 3.CNR-IMM, VIII Strada, 5, 95121 Catania, Italy

Mo-P-18

Defect Reduction in 8-inch 4H-SiC Wafers by Integrated Multi-Wafer Dynamic AGE-ing® Etching/Growth Process

○ Taizo Fujiwara¹, Kohei Toda¹, Daichi Dojima¹, Hiroshi Mihara¹, Tadaaki Kaneko¹, ²

1.QureDA Research, Inc., 2.Kwansei Gakuin University

Mo-P-19

Comparative Study of Hydrogen Etching Kinetics on Si (0001) and C (000-1) Terminated 4° Off-Cut 4H-SiC

○ An Min Amanda Lee¹, ², Shiv Kumar¹, Eng Soon Tok², Umesh Chand¹, Tanmay Ghosh¹, Xuan Sang Nguyen¹, Xiao Gong¹, Navab Singh¹, Yee-Chia Yeo¹, ³

*1.Inst. of Microelectronics (IME), A*STAR, 2.Department of Physics, National Univ. of Singapore, 3.Department of Electrical and Computer Eng., National Univ. of Singapore*

Mo-P-20

Towards Thick and Highly p-Doped 4H-SiC Epitaxial Structures

○ Marco Mauceri¹, Mario Lizzio¹, Vincent Lafage¹, Chiara Cuccia¹, Maria Luisa Alonzo¹, Silvio Preti¹, Marco Zignale², Patrick Fiorenza², Fabrizio Roccaforte²

1.ASM International, 2.CNR-IMM

Mo-P-86

Enabling Next Generation High Voltage Power Applications Through Thick 4H-SiC Epitaxy

Tawhid Rana¹, ○ Dong Lee¹, Taye Tareegn¹, Srujana Prayakara¹, Nadeemullah Mahadik², Alecsander Imhof², Shanthi Subramanian¹

1.Coherent Corp., 2.US Naval Res. Lab.

Track 04 Point Defects and Material Properties (Poster-A, 1st Floor)

Mo-P-21

DFT-validated machine-learning potential for predictive SiC polytype, surface and deformation simulations

○ Mohammed Hassan¹, Christopher Künne², Alfred Kersch¹

1.Munich University of Applied Sciences, 2.University of Bayreuth

Mo-P-22

Canceled

Mo-P-23

Polarity-Driven Phase Transformation and Giant Stress Divergence in UV Nanosecond Laser-Irradiated 4H-SiC

○ Ping-Yu Lin¹, Hsiang-En Weng¹, Chiao-Yang Cheng¹, Yi-Chi Lee², Yi-Chang Wu³, Zi-Hao Wang¹, Yan-Kuin Su¹

1.National Cheng Kung Univ., 2.Indus. Technology and Research Inst., 3.GeChi Compound Semiconductor Corp. Ltd

Mo-P-24

Semi-Insulating 4H-SiC: Can V4+ Photoluminescence Be Used as a Characterization Tool for V Concentration?

○ Harmke Dorian van Dijk¹, Matthieu Paillet¹, Marcin Zielinski², Rafal Jakieła³, Ahmed Azmi Zahab¹, Jean Roch Huntzinger¹, Hervé Peyre¹, Sandrine Juillaguet¹, Thomas Cohen¹, Olivier Briot¹

1.L2C CNRS Université de Montpellier, 2.Soitec S.A., 3.Inst. of Physics of the Polish Academy of Sciences

Mo-P-25

Withdrawn

Mo-P-26

Annihilation and Local Unfaulting Inside a Triangular Double Shockley-type Stacking Fault in 4H-SiC Epitaxial layer

Soon-Ku Hong¹, Moonkyong Na², Dohyung Kim³, Hyundon Jung³, Natsuko ASANO Asano⁴, ○ shunsuke asahina⁴, ⁵

1.Chungnam National University, 2.Korea Electrotechnology Research Institute, 3.Horiba STEC Korea, 4.JEOL Ltd, 5.Tohoku University

Mo-P-27

Low-Temperature Cathodoluminescence Characterization of Residual Defects in High-Dose Al-Implanted 4H-SiC

○ Tomoyuki Uchida¹, Shinya Honda¹, Ryuichi Sugie²

1.Toray Research Center, Inc., 2.Univ. of Ritsumeikan

Mo-P-87

Evaluation of Thermal Conductivity in Single-Crystal Silicon Carbide

Abdullah Khan¹, ○ Xueping Xu¹, Rajan Rengarajan¹, Ilya Zwieback¹, Elijah Allridge¹

1.Coherent Corp.

Track 05 MOS Gate Stack Processing and Characterization (Poster-C, G403+G404)

Mo-P-62

Simultaneous reduction of SiC/SiO₂ interface states near the conduction and valence band edges by NO annealing

○ Shuya Hiraiwa¹, Kyota Mikami¹, Mitsuaki Kaneko¹, Tsunenobu Kimoto¹

1.Kyoto Univ.

Mo-P-63

Effects of Post-Oxidation Annealing in N₂ and Ar on the SiO₂/4H-SiC interface properties

○ Patrick Fiorenza¹, Valerio Votadoro¹, Salvatore Ethan Panasci¹, Salvatore Di Franco¹, Marilena Vivona¹, Simone Milazzo¹, Marco Zignale¹, Filippo Giannazzo¹, Fabrizio Roccaforte¹

1.CNR-IMM

Mo-P-64

Impact of Nitrogen Profiles on Interface Passivation, Charge Trapping, and Breakdown Reliability in Thermal and Deposited Gate Oxides

○ Runze Wang¹, Yu-Chieh Chien¹, Zijie Zheng¹, ², Xiaolin Wang¹, ², Leming Jiao¹, ², Liyuan Liu¹, Abdul Hannan Yeo¹, Qin Gui Voo¹, Weijie Wang¹, Umesh Chand¹, Xiao Gong¹, ², Navab Singh¹, Yee Chia Yeo¹, ²

*1.Inst. of Microelectronics (IME), A*STAR, 2.Electrical and Computer Engineering, National University of Singapore (NUS)*

Mo-P-65

High Quality SiO₂ Growth on SiC using Pulsed Rapid Thermal Oxidation

○ Max Pujade¹, Jérôme Biscarrat¹, Jean-Manuel Decams², Philippe Godignon¹

1.CEA-Leti, 2.AnealSys

Mo-P-66

Wafer-Scale Reliability of SiC MOSCAPs With Post-Oxidation NO Rapid Thermal Processing

○ Hyeon-Do Kang², Xiaofan Ma¹, Efe Akman¹, Mattias Ekström¹, Ye-Jin Kim², Per-Erik Hellström¹, Sang-Mo Koo², Carl-Mikael Zetterling¹

1.KTH Royal Inst. of Tech., 2.Kwangwoon Univ.

Mo-P-67

Physical insight into the channel mobility in 4H-SiC MOSFETs with different post-oxidation annealing steps based on experiments

○ QIAN WANG¹, Nazareno Donato¹, Florin Udrea¹, Kyota Mikami², Tsunenobu Kimoto²

1.University of Cambridge, 2.University of Kyoto

Mo-P-68

Investigation of the Two-stage Annealed Al-doped HfO₂/SiO₂/SiC MOS Interfaces for Enhanced MOSFET Short Circuit Robustness

○ XINKAI TIAN¹, Arne Benjamin Renz¹, Mustafa Akif Yildirim¹, James Andrew Gott¹, Marina Antoniou¹, Nereus Agbo², Paul Taylor², Philip Andrew Mawby¹, Peter Michael Gammon¹

1.Univ. of Warwick, 2.Dynex Semiconductor Ltd.

Mo-P-69

Polysilicon Gate and Silicon Nitride Dielectric Interactions in SiC Power MOSFETs: Implications for Reliable Operation

○ Sami Bolat¹, Pooria Asadollahi¹, Edoardo Ceccarelli¹, Marco Pocaterra¹, Giovanni Alfieri¹, Arne Benjamin Renz², Mustafa Akif Yildirim², Marina Antoniou², Elizabeth Buitrago¹

1.Hitachi Energy, 2.Univ. of Warwick

Mo-P-90LN

Defect removal mechanisms in SiC MOS structures by two-step hydrogen annealing

○ Satoshi Iga¹, Takuma Kobayashi¹, Masahiro Hara¹, Heiji Watanabe¹

1. The University of Osaka (Japan)

Mo-P-91LN

Visualization of multiple interface states in n-ch and p-ch 4H-SiC MOSFETs by time-domain charge-pumping technique.

○ Yoshiki Yokoyama¹, Masahiro Hori², Yukinori Ono², Mitsuru Sometani³, Hiroshisa Hirai³, Bunta Shimabukuro¹, Heiji Watanabe⁴, Takahide Umeda¹

1. Univ. of Tsukuba (Japan), 2. Shizuoka Univ. (Japan), 3. AIST (Japan), 4. Univ. of Osaka (Japan)

Track 06 Implantation, Contacts, Etching, and Other Processes (Poster-B, G401+G402)

Mo-P-37

Impact of Process Simulation and Analytical Doping Profile Simulation for 6.5 kV 4H-SiC JBS Diodes

○ Xiangzhen Li¹, Yumeng Cai¹, Xiaoguang Wei², Zhibin Zhao^{1, 2}, Guang Zeng³, Feng Yu³, Arne Renz⁴, Kyrro Melnyk⁴, Zhaoxue Yuan⁴, Marina Antoniou⁴

1.North China Electric Power University, 2.Huairou Laboratory, 3.Greenel Semiconductor Co., 4.University of Warwick

Mo-P-38

Canceled

Mo-P-39

TCAD-Based Optimization and Experimental Validation of a 3.3kV 4H-SiC MOSFET Utilizing an Epitaxially Grown Current-Spreading Layer

○ Stephen A Mancini¹, Seung Yup Jang^{1, 3}, Andrew Binder², Richard Floyd², Robert Kaplar², Jack Flicker², Stan Attcity², Adam Morgan³, Woongje Sung¹

1.Univ. at Albany, 2.Sandia National Labs, 3.NoMIS Power Corp.

Mo-P-40

Dual Densification Routes for Additively Manufactured Silicon Carbide Components Used in Semiconductor Processing Equipment

○ Youngsuk Jung¹, Ji-Won Oh, Shinhu Cho

1.MADDE Inc.

Mo-P-41

Thermal History Driven PEB Behavior on Si and 4H SiC Substrates in a KrF Lithography Process Using a Production Coater Developer Track

○ Yuji Tanaka¹, Naser Belmiloud¹, Pierre Sixt², Raphaël Feougier², Béatrice Hemard²

1.SCREEN SPE Germany GmbH, 2.Univ. Grenoble Alpes, CEA, Leti

Mo-P-42

Improving Surface Roughness and Internal Stress by UV Nanosecond Laser Treatment for Laser-Structured 4H-SiC with Micro Pin-Fin Arrays

○ Hsiang-En Weng¹, Ping-Yu Lin¹, Chiao-Yang Cheng¹, Di-Hua Huang², Yi-Chang Wu³, Zi-Hao Wang¹, Yang-Kuin Su¹

1.National Cheng Kung Univ., 2.JUMBO LASER CO Ltd., 3.GeChi Compound Semiconductor Crop Ltd.

Mo-P-43

Evaluation of Processing Stability and Kerf Width Reduction in BPD-free Dicing of SiC Wafer Using Water Jet Guided Laser

○ Hyuk Kim¹, Shunya Hirano¹, Satoru Takahashi², Shuzo Masui², Noboru Ohtani³, Kozo Abe³

1.MAKINO MILLING MACHINE CO., LTD., 2.The University of Tokyo, 3.Kwansei Gakuin University

Mo-P-44

Characterization of 6-inch 4H-SiC Non-Epitaxial Engineered Substrates

○ Hitesh Jayaprakash^{1, 2, 3}, Alexander Schmid⁴, Thomas Behm⁴, Constantin Csato², Florian Krippendorf², Michael Rueb^{2, 3}

1.Freidrich Alexander Universität, Erlangen, 2.mi2-factory GmbH, 3.Ernst-Abbe-Hochschule, Jena, 4.Technische Universität Bergakademie Freiberg

Mo-P-45

Mitigation of bipolar degradation in 4H-SiC power devices using SmartSiCTM engineered substrates

○ Endong Zhang¹, Alexis Drouin², Frederic Allibert², Marcin Zielinski², Shunta Harada³, Masashi Kato¹

1.Nagoya Inst. of Tech., 2.SOITEC, 3.Nagoya Univ.

Mo-P-46

Trade-Off Between Forward Conduction and Reverse Leakage in O₂ Annealed Ga₂O₃/SiC Schottky Barrier Diodes

○ In-Sung Ku¹, Hyeon-Do Kang¹, Minseok Kim¹, Jin-Woo Choi¹, Sabeen Hwang¹, Tae-Yeong Yoon¹, Sang-Mo Koo¹

1.Kwangwoon University

Mo-P-47

Sequential surface engineering using UV/O₃ and O₂ plasma for defect control in Ga₂O₃/4H-SiC Heterojunctions

○ juhyeon Son¹

1.Kwangwoon University

Mo-P-48

Effects of N₂ Post-Annealing on the Electrical Characteristics of p-Cu₂O/β-Ga₂O₃ Heterojunction Diodes

○ Tae-Yeong Yoon¹, Jin-Woo Choi¹, Minseok Kim¹, Sabeen Hwang¹, Chang-Jun Park¹, JuHyeon Son¹, Sang-Mo Koo¹

1.Kwangwoon Univ.

Track 07 Power Devices (Poster-B, G401+G402)

Mo-P-49

Structural Origin of Inversion Layer Formation via Stacking-Fault-Mediated Hole Transport in 3C/4H-SiC MOS Structures

○ Kota Gejo¹, Tetsuo Hatakeyama¹, Hiroyuki Nagasawa²

1.Univ. of Toyama Pref, 2.Cusic Inc

Mo-P-50

Analytical Method for Parameter Extraction From Hall Measurement Data in Aluminum Implanted SiC Test Structures

○ Edmund K Banghart¹, Daniel J Lichtenwalner¹, Hemant Dixit¹, Sei-Hyung Ryu¹

1.Wolfspeed

Mo-P-51

Dual-Path Current in Accumulation-Type SiC MOSFETs

○ AMJED ALI^{1, 2}, Daniel Haasmann, Philip Tanner, Jordan Nicholls, Sima Dimitrijevic

1.School of Engineering and Built Environment, Griffith University, Nathan, Qld, 2.Queensland Quantum and Advanced Technologies Research Institute, Griffith University, Nathan, Qld

Mo-P-52

Measurement of Temperature-Dependent Large-Signal Hysteresis in Output Capacitance of SiC MOSFETs

○ Taiki Nishioka¹, Hajime Takayama¹, Kazutaka Kanegae¹, Hiroyuki Nishinaka¹, Michihiro Shintani¹

1.Kyoto Inst. of Tech.

Mo-P-53

Curve Tracer Approach for Accurate Characterization of Output Characteristics of SiC MOSFETs in 1st and 3rd Quadrant

Maximilian Paul Goller¹, ○ Mohamed Alaluss¹, Madhu Lakshman Mysore¹, Gengqi Li¹, Dezhi Yang¹, Josef Lutz¹, Thomas Basler¹

1.Chemnitz University of Technology

Mo-P-54

Impact of P+ Body Layout on Capacitance and Third Quadrant Characteristics of Tri-Gate SiC MOSFETs

Pei-Chi Liao¹, ○ Kung-Yen Lee^{1, 2}, Pei-Chun Liao¹, Ruei-Ci Wu², Yu-Ying Li¹, Yung-Mei Lin¹

1.National Taiwan University, 2.SiCEV Electronics Co., Hsinchu

Mo-P-55

Variation of Dynamic Characteristics in SiC MOSFETs induced by Edge Termination Topology

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Mo-P-56

Dynamic C-V Characterization of Commercial SiC Power MOSFETs

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Mo-P-57

Miller Capacitance Characterization of SiC Power MOSFETs Beyond Datasheets

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Mo-P-58

3D vs. 2D TCAD: The Right Choice for Simulating 4H-SiC MOSFETs?

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1.Wolfspeed

Mo-P-59

Physics-based Compact Model of SiC Power MOSFET for Process Corner Analysis

○ Arman Ur Rashid¹, Jeff Joohyung Kim¹, Edmund Banghart¹, Sei-Hyung Ryu¹

1.Wolfspeed, Inc.

Mo-P-60

Robust and Universal SPICE Model Structure for Variable Capacitance with Negative-Feedback Configuration

○ Yuichiro Nanen¹

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Mo-P-61

A Modified Coupled Charge-driven Reverse Recovery SPICE Model for Describing the Dynamic Behavior of SiC MOSFETs' Intrinsic Body Diode

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Mo-P-88LN

Simulation of Reverse Recovery Characteristics in SiC PiN Diodes with a Carrier-Trapping Layer Formed in the Anode Region

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Mo-P-89LN

An Efficient Quasi-Static Electrothermal TCAD Modeling Method for Pulsed I-V Prediction of SiC Power Devices

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Track 08 RF, High-Temp., and Rad-Hard Devices and ICs (Poster-C, G403+G404)

Mo-P-70

Dual-functional Ni/4H-SiC Schottky interfaces: Robust UV and X-ray detection, imaging in extreme environments

○ Chowdam Venkata Prasad¹, Sunjae Kim², Beomjun Park³, Geon-Hee Lee¹, Jin-Woo Choi¹, Jeongho Kim⁴, Wan Sik Hwang¹, Jong-Min Oh¹, Sang-Mo Koo¹

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Mo-P-71

Modelling and Verification of Silicon Carbide-based Neutron Detectors

Asim Mumtaz¹, ○ Ibtisam Alanazi¹, Julien Bordes¹, Jamie Brown¹, Pankaj Joshi¹, David Jenkins¹, Vlado Lazarov¹

1.University of York

Mo-P-72

Temperature-Dependent Output Characteristics of Ni-63-Driven 4H-SiC Betavoltaic Cells

○ Young Jo Kim¹, Ha Bin Jeong¹, Jeong Hyun Moon¹, Sung Yun Woo², Young Jun Yoon³, Jae Hwa Seo¹

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Mo-P-73

VNA S-Parameter-Derived Capacitance of SiC MOSFETs Under 900 V Bias Over Temperature

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Mo-P-74

Asymmetric Dynamic CGD During Turn-on and Turn-off of p-GaN HEMTs

○ Tachyun Jang¹, Hyemin Kang¹

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Mo-P-75

Investigation of π -gate AlGaIn/GaN High Electron Mobility Transistor for Enhanced Breakdown Voltage: A Simulation Study

○ Ju-Hwan JEONG¹, Young-Hyun Won¹, Hyun-Seok Kim¹

1.Dongguk Univ.-Seoul

Mo-P-76

Impact of p-GaN Back Barrier Thickness on DC Performance in GaN-on-SiC HEMTs: A Simulation Study

○ Young-Hyun Won¹, Ju-Hwan Jeong¹, Hyun-Seok Kim¹

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Mo-P-77

AlGaIn/GaN HEMTs on 3C-SiC/Si-substrates with all TiN contact system

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Track 09 Device and Module Reliability, Packaging, and Applications (Poster-C, G403+G404)

Mo-P-78

Electric Field Concentration Analysis and Design Optimization of Double-Sided Cooling SiC MOSFET Power Modules via Gaussian Process Regression - Bayesian Optimization Workflow

○ Jeong Hun Song¹, Sang Won Yoon¹

1.Seoul National Univ.

Mo-P-79

Impact of Surge Current Stress on Asymmetric Trench SiC MOSFETs under Positive Gate Bias

○ Wangchen Li¹, Qihong Feng¹, Shuiyou Zheng¹, Huaxing Jiang¹

1.South China Univ. of Tech.

Mo-P-80

Comparative Evaluation of Switching Performance and dV/dt Robustness in 1.2 kV SiC MOSFETs with Embedded SBDs and Cascode JFET Devices

○ Gyuhyeok Kang¹, seungwan Jung¹, Jinwoo Park¹, Jonghyeon Ryu¹, Ogyun Seok¹

1.Pusan National University

Mo-P-81

Reliability Analysis and Test Results of Novel Die-Attach Technologies for SiC Baseless Power Modules in EV Charging Application

○ Stefano Carboni¹, Andrea Bianchi¹

1.ABB e-Mobility s.p.a.

Mo-P-82

Electrothermal Stability of SiC DMOSFET Under High-Frequency Half-Bridge Operation

○ Geon-Hee Lee¹, Jin-Woo Choi¹, Jin-Woo Kim¹, ², Sang Gi Kim², Weon Chan Kim², Gwon Je Kim², Sang-Mo Koo¹

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Mo-P-83

Impact of the AI Variable Load Profile on SiC MOSFETs Reliability

○ Elena Mengotti¹, Enea Bianda¹, Till Riemenschneider¹

1.ABB Switzerland Ltd.

Mo-P-84

Thermal Structure Analysis of SiC JFETs Using Gate-Source Voltage Measurements

○ Su Ik Park¹, Joosun Yun², Byongjin Ma³, Guesuk Lee³, Tae-Hee Jung³, Yu-Na Jung¹, Gyu-Hyung Cho¹, Youngbeom Kim¹, Hyundon Jung¹

1.HORIBA STEC KOREA Ltd., 2.ComPhysics, 3.Korea Electronics Tech. Inst.

Mo-P-85

GaN/SiC Hybrid Switch with Synchronous-Gate-Control Technique for High-Frequency and High-Reliability Applications

○ Weihao Lu¹, Sheng Li¹, Yanfeng Ma¹, Mingfei Li¹, Siyang Liu¹, Weifeng Sun¹

1.Univ. of Southeast

Mo-P-92LN

HV-H3TRB Reliability and Failure Analysis of 13 kV SiC Devices

○ Kohei Ebihara¹, Kazuya Konishi¹, Yukiyasu Nakao¹, Katsutoshi Sugawara¹, Tatsuro Watahiki¹

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Mo-P-93LN

Reliability Enhancement of 1.7 kV SiC MOSFETs Through Optimized Passivation Process

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1. Navitas Semiconductor (USA)

Track 10 Quantum Applications and Sensors (Poster-A, 1st Floor)

Mo-P-28

PL6 centers in 4H-SiC for spin-based quantum technologies

○ Raphael Wörmle¹, ², ³, Jonathan Körber¹, ², Timo Steidl¹, ², Georgy Astakhov⁴, Durga Dasari¹, ², Vadim Vorobyov¹, ², Florian Kaiser⁵, ⁶, Jörg Wrachtrup¹, ², ³

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Mo-P-29

Withdrawn

Mo-P-30

Toward Scalable Telecom-Band Quantum Emitters: Integration of Chlorine-Defect Centers in 4H-SiC Nanostructures

○ Ashin Varghese Mathews^{1, 2}, Andrei N. Anisimov¹, Kalliopi Mavridou¹, Ulrich Kentsch¹, Manfred Helm^{1, 2}, Georgy V. Astakhov¹

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Mo-P-31

Theory of Strained Quantum Emitters

○ Vytautas Žalandauskas¹, Rokas Silkinis², Lukas Razinkovas², Ali Tayefeh Younesi³, Minh Tuan Luu³, Ronald Ulbricht³, Ulrike Grossner⁴, Lasse Vines¹, Marianne Etzelmüller Bathen^{1, 4}

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Mo-P-32

High-Fidelity Nuclear Spin Quantum Control in Silicon Carbide Color Centers

○ Irene Carrión López¹, Pierre Kuna¹, Erik Hesselmeier-Hüttman¹, Jawad Ul-Hassan², Vadim Vorobyov¹, Jörg Wrachtrup^{1, 3}

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Mo-P-33

Finite-Time Photoluminescence Readout for Spin-3/2 Ground States in 4H-SiC Silicon Vacancies

○ Jun-Jae Choi¹, Seung-Jae Hwang¹, Seoyoung Paik¹, Sang-Yun Lee¹

1. Gwangju Inst. of Sci. and Tech.

Mo-P-34

Structural Relaxation and Aggregation of Vacancy Defects in Monolayer Silicon Carbide

○ Peter Udvarhelyi¹

1. National Inst. for Materials Sci.

Mo-P-35

Photoluminescence study of Vanadium in 4H- and 6H- Silicon Carbide

Ibrahim Boulares¹, Jeremy L. Smith¹, ○ Brenda VanMil¹

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Track 01 Bulk Growth and Wafer Processing (Poster-A, 1st Floor)

Tu-P-01

Growth and Characterization of Heavily Nitrogen-Doped 150 mm 4H-SiC Wafers with Resistivity Near $0.01 \Omega \cdot \text{cm}$

○ Xueping Xu¹, Ever Velasco¹, Rajan Rengarajan¹

1.Coherent Corp.

Tu-P-02

Enhanced Doping Uniformity and Morphological Stability in 8-inch 4H-SiC Single Crystal Growth via Hot-Zone Structural Modification

○ SUHO KIM¹, Jung Gyu Kim¹, Myung Ok Kyun¹, Yeon Suk Jang¹, Kap Ryeol Ku¹, Jung Gon Kim², Mi Seon Park², Won Jae Lee²

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Tu-P-03

Growth of thick Al-doped 4H-SiC layers using Close Space Physical Vapor Transport Growth

Ole Schneider¹, Cristina Grazi¹, Lucrezia Tana¹, Mikael Syväjärvi², ○ Peter J Wellmann¹

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Tu-P-04

Evaluation of Defect Generation in P-type 4H-SiC PVT Growth under Al-N Co-Doping Conditions

○ Kazuma Eto¹, Shigeyuki Kuboya¹, Takeshi Mitani¹, Tomohisa Kato¹

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

Tu-P-05

Growth of High-quality P-type Substrates by TSSG Method

○ Yu Guo¹, Chunjun Liu¹, Yuxin Li¹, Xu Sui¹, Yue Shi¹, Yuhui liu¹, Tonghua Peng¹, Jian Yang¹

1.TanKeBlue Semiconductor Co., Ltd

Tu-P-06

Cross-Sectional Analysis of Macrostep Evolution Leading to Solvent Inclusion Formation in Al-Doped Solution-Grown 4H-SiC

Takahiro Ito¹, Kentaro Kutsukake¹, Shunta Harada¹, ○ TORU UJIHARA¹

1.Nagoya Univ.

Tu-P-07

Optimization of temperature distribution for suppressing SiC inclusions during SiC solution growth

○ Kazuki Shibayama¹, Takeshi Mitani², Tsukasa Washio¹, Daisuke Tahara¹, Shigeyuki Kuboya², Kazuma Eto², Tomohisa Kato²

1.Sumitomo Metal Mining Co., Ltd., 2.National Institute of Advanced Industrial Science and Technology

Tu-P-08

Thermodynamic Evaluation of the Al-C-Cr-Si System for SiC Solution Growth

○ Kazuhisa Kurashige¹, Yoshihisa Abe¹, Akihisa Kawabe¹, Junya Osada¹, Hideo Nakanishi¹, Hiroyuki Ishibashi¹, Toru Ujihara²

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Tu-P-09

Carbon/Graphite: The Hot Zone Hero

○ Joe Abrahamson Abrahamson¹, Fernando Vallejos-Burgos¹, Ievgen Izvarin¹, Patrick Rondonanski¹, Linsea Foster¹, Mathias Yost^{1, 2}, Thomas Connolly¹, Anirban Phukan², Randy Vander Wal², Dave Fecko², Adri van Duin², Josh Robinson²

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Tu-P-10

High Temperature Emissivity Measurement Of Metal Carbide Coating

Bowen Dong¹, Creighton Tomek¹, Jeffrey Lennartz¹, ○ Wei Fan¹, Jon Leist¹

1.Momentive Technologies

Tu-P-12

TEM Analysis of Process-Induced Subsurface Damage in β -Ga₂O₃ (001) Substrates for Kerf-Loss Reduction

○ Taekyung Lee¹, Hanchul Cho¹

1.Korea Institute of Industrial Technology

Track 02 Epitaxial and Thin-Film Growth (Poster-A, 1st Floor)

Tu-P-13

Characterization of High Quality Thick Epitaxial SiC Wafers for High kV Applications

○ Dong Seung Lee¹, Tawhid Rana¹, Kirby Schmidt¹, Srujana Prayakarao¹, Shanthi Subramanian¹

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Tu-P-14

Kinetic Modeling and Simulation of 4H-SiC Trench Growth

○ Angela Garofalo^{1, 2}, Kelly Turner³, Gerard Colston³, Vishal Shah³, Roberto Bergamaschini¹, Stefano Sanguinetti¹

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Tu-P-15

n-p and p-n Junctions Grown in a Single Epitaxy Process

○ Philip Hens¹, Michael Pfeffer¹, Johannes Koehler¹, Felix Beier², Birgit Kallinger², Jürgen Erlekamp¹

1.AIXTRON SE, 2.Fraunhofer IISB

Tu-P-16

Influence of Technological Surface Structures for Super Junction Devices on 4H SiC Epitaxial Overgrowth

○ Nikolas Schabert¹, Janina Engelhardt¹, Rupert Ullmann², Philip Hens², Birgit Kallinger¹, Oleg Rusch¹

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Tu-P-17

Influence of Ion Implantation and Epitaxial Overgrowth on the Charge Carrier Lifetime in 4H-SiC Epilayer Stacks

○ Christian Wißgott¹, Birgit Kallinger¹, Mauro Emilio Keck¹, Norman Böttcher¹

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Tu-P-18

Canceled

Tu-P-19

3C-SiC formation by solid state reaction of Si and C multilayers deposited on silicon substrates

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Tu-P-20

In-situ surface preparation of various alpha-SiC surfaces for 3C-SiC growth

○ Gabriel Ferro¹, Ahmed Jabbouja¹, François Cauwet¹

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Track 03 Extended Defects (Poster-A, 1st Floor)

Tu-P-21

Multiphoton-excited photoluminescence analysis of micropipes and related defect structures in 4H-SiC substrates

○ Hirofumi Hoshida¹, Shota Fujiki¹, Mari Yamamoto¹, Takeshi Mitani², Junji Senzaki²

1.LaserTec Corp., 2.National Inst. of Advanced Indus. Sci. and Tech.

Tu-P-22

Physical Revelation and Analysis of Dislocation Densities in Sub-Micron SmartSiC™ Substrates and Direct Correlation with Donor Bulk Crystals

○ Alexis DROUIN¹, Vanessa OROZCO¹, Walter Schwarzenbach¹

1.SOITEC S.A.

Tu-P-23

Impact of Buffer Thickness on Bipolar Degradation in SiC Power MOSFETs and Diodes under Transient Surge Current Pulses

○ Alexander Brunko¹, Tobias Erlbacher¹, Firas Faisal¹

1.Nexperia Germany

Tu-P-24

Photoluminescence characterization of Shockley Stacking Faults triggered in high power 4H-SiC devices

○ Nicolo Piluso¹, Cristiano Calabretta¹, Fabiana Vento¹, Salvatore Adamo¹, Ketty Bottari¹, Beatrice Carbone¹, Giovanni Maira¹, Enzo Fontana¹, Angela TERRACINA¹, Laura ANOLDO¹, Giuseppe TOSTO¹, Santina BEVILACQUA¹, Marco IACOBUCCI¹, Santi ALESSANDRINO¹, Giuseppe Arena¹, Andrea Severino¹

1.Indus. - STmicroelectronics

Tu-P-25

Conversion of Substrate Dislocations to Stacking Faults and Influence of Aluminum Implantation on Stacking Faults

○ Nadja Kölbel¹, Birgit Kallinger², Christian Kallinger Kranert², Tobias Erlbacher³, Firas Faisal³, Jörg Schulze^{1, 2}

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Tu-P-26

Influence of annealing temperature and orientation of basal plane dislocations on their conversion to threading edge dislocations in a 4H-SiC substrate

○ Aoi Okada¹, Chiharu Ota¹, Ryoichi Ohara²

1.Toshiba Corp., 2.Toshiba Electronic Devices & Storage Corp.

Tu-P-27

Carrier-induced reduction in basal-plane slip barriers in 4H-SiC

○ Hiroki Sakakima¹, Satoshi Izumi¹

1.Univ. of Tokyo

Track 04 Point Defects and Material Properties (Poster-A, 1st Floor)

Tu-P-28

Differences in the Distribution of Nonradiative Recombination in PVT- and Solution-Grown SiC Wafers by Laser Heterodyne Photothermal Displacement Method

○ Kouyou Harada¹, Masashi Kato², Atsuhiko Fukuyama¹

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Tu-P-29

Improving of Lithium-Ion Battery Capacity with Heteroepitaxial 3C-SiC

○ Jade Croft¹, Gerard Colston¹, Nicholas Grant¹, Claire Hurley¹, Luke Wilkins¹, Vishal Shah¹

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Tu-P-30

Quantitative Photoelastic Imaging of Residual Strains in Commercial Off-Axis SiC Wafers

○ Naoto Tsuji¹, Ryoya Watanabe¹, Masayuki Fukuzawa¹

1.Kyoto Institute of Technology

Tu-P-32

Enhanced Emission of Silicon Vacancy in SiC Thin Film by Al₂O₃ Passivation

○ Yurong Ren¹, Shuangyou Zhang¹, Mingjun Chi¹, Karsten Rottwitz¹, Haiyan Ou¹

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Tu-P-33

Carrier Lifetime Observation in 4H-SiC PiN Diodes Evaluated by Time-Resolved Electroluminescence

○ Tong Li¹, Masashi Kato¹

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Tu-P-34

Detailed μ -PCD Decay Curve Characterization for Defect-Related Recombination in 4H-SiC Epitaxial Layers

○ Takumi Wakabayashi¹, Kazushi Hayashi², Hideo Fujii², Yoshihiro Yokota¹, Naoki Okano¹, Junji Senzaki³

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Tu-P-35

Enhanced methodology for minority charge carrier lifetime measurements using EBID and frequency-dependent EBIC

○ Christian Stefan Gruber^{1, 2}, Gregor Pobegen², Jürgen Smoliner¹

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Tu-P-86LN

Carrier Lifetime Enhancement by Channeled Ion Implantation in 4H-SiC

○ Ben J. Sekely¹, Christopher Lamontagne², Youngsang Kim³, Alecsander N Imhof¹, Nadeemullah Mahadek¹, Jenifer R Hajzus¹, Rachael L Myers-Ward¹, Atul Gupta², Hank Chen², Fulvio Mazzamuto²

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Tu-P-87LN

Thermal-Response PL/TR-PL Fingerprinting of B/Al-Dependent Lifetime Stability in n-Type 4H-SiC Wafers

○ Rio Kishimoto¹, Koji Ashida², Daichi Dojima², Hiroshi Mihara², Tadaaki Kaneko^{1,2}

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Tu-P-99LN

Substrate-Integrated Point-Defect Engineering by Dynamic AGE-ing for Suppressing Bipolar Degradation and Reverse-Recovery Loss in 4H-SiC MOSFETs

○ Koji Ashida¹, Daichi Dojima¹, Kohei Toda¹, Hiroshi Mihara¹, Tadaaki Kaneko^{1,2}

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Track 05 MOS Gate Stack Processing and Characterization (Poster-C, G403+G404)

Tu-P-62

Interface Engineered ALD SiO₂ / SiC MOS oxide stack using PEALD-enabled controlled nitridation

○ Andrii Voznyi¹, Tatiana Ivanova¹, Mikko Söderlund¹, Patrick Rabinzohn¹, Tamara Fidler², Patrick Schmid², Alexander Schmid³, Franziska Beyer³

1. *Beneq Oy*, 2. *Centrotherm International AG*, 3. *Fraunhofer IISB*

Tu-P-63

Enhanced electrical characteristics of 4H-SiC MOSFETs with atomic layer deposited SiO₂ gate dielectrics via ultrathin interfacial passivation

○ Bongmook Lee¹, Veena Misra²

1. *SUNY Polytechnic Institute*, 2. *North Carolina State University*

Tu-P-64

Process Optimization of SiO₂/AlON Gate Stack for Reliable 4H-SiC MOS-Channel Devices

○ Pengwei Zhou¹, Heng Wang¹, Yangming Du¹, Yingchen Yang¹, Kevin Jing CHEN¹

1. *The Hong Kong University of Science and Technology*

Tu-P-65

Impact of Atomic Layer Etching Surface Pretreatment on ALD SiO₂/4H-SiC MOS Interface and Channel Transport Properties

○ Mustafa Akif YILDIRIM¹, Vishal Ajit Shah¹, Sean Cho², Katarzyna Stokeley², Harriet van der Vliet², Sami Bolat³, Peter M Gammon¹, Marina Antoniou¹, Arne Benjamin Renz¹

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Tu-P-66

Impact of nitrogen-based pre-ALD treatments and post-deposition annealing on SiO₂/4H-SiC and Al₂O₃/4H-SiC MOS capacitors

Emanuela Schilirò¹, Raffaella Lo Nigro¹, Marco Zignale¹, Patrick Fiorenza¹, Giuseppe Greco¹, Valerio Votadoro¹, Salvatore Di Franco¹, Filippo Giannazzo¹, Arpita Saha², Yi Shu², ○ Fabrizio Roccaforte¹

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Tu-P-67

Enhancing Performance of 4H-SiC CMOS Integrated Circuits via Atomic Layer Deposition Gate oxide

○ Po-Han Wang¹, I-Chen Tsai¹, Cheng-Shu Chang¹, Yun-Ting Huang¹, Nai-Quan Sun¹, Bing-Yue Tsui¹

1. *National Yang Ming Chiao Tung University*

Tu-P-68

Effects of Wet and Nitric Oxide Post-Deposition Annealing on the Interface Quality and Long-term Reliability of LPCVD SiO₂ on 4H-SiC

○ I-Chen Tsai¹, Bing-Yue Tsui¹, Shih-Lung Tsai², Kuan-Wei Chu², Tien-Min Yuan²

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Tu-P-69

Reducing Cover Wafer Effect in Dry Oxidation of 4H-SiC in Thermal Oxidation Furnace

○ Tamara Fidler¹, Silvan Schick¹, Patrick Schmid¹

1. *centrotherm international AG*

Tu-P-95LN

TCAD Validation of C–V Interface-Trap Extraction in 4H-SiC MOS Capacitors Across Four Gate Oxide Processes

○ Michael Mawby¹, Philip Mawby¹, David Mawby¹, Arne Renz², Miriam John², Peter Gammon²

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Tu-P-96LN

Interface Trap Density Estimation by Forward Modelling of Quasi-Static and High Frequency C–V characteristics in 4H-SiC MOS Capacitors

○ James Lobry¹, Rhys Washer¹, Jon Evans¹, Owen Guy¹, Saptarsi Ghosh¹, Tim Mottram², Mike Jennings¹

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Track 06 Implantation, Contacts, Etching, and Other Processes (Poster-B, G401+G402)

Tu-P-37

Predicting Electronic Stopping Powers along 4H-SiC <11-23> Direction

○ Kazuhiro Mochizuki¹, Tomoaki Nishimura¹, Tomoyoshi Mishima¹, Fumimasa Horikiri¹, Hiroshi Ohta^{1,2}

1. *Hosei Univ.*, 2. *Devise Tech Inc.*

Tu-P-38

Damage Accumulation During High-energy Channeling Implantation of Phosphorus into 4H-SiC

○ Manuel Belanche Guadas¹, Helton Goncalves de Medeiros¹, René Heller², Hitesh Jayaprakash³, Ulrike Grossner¹

1. *APS - ETH Zurich*, 2. *Helmholtz-Zentrum Dresden-Rossendorf*, 3. *mi2-factory GmbH*

Tu-P-39

Process Simulations of Channeling Implantation for Silicon Carbide Superjunction Power Devices

○ Enrico Sangregorio¹, Francesco La Via¹

1. *National Research Council of Italy - Institute for Microelectronics and Microsystems*

Tu-P-40

Effect of Intermediate Annealing on Channeling Implantation in 4H-SiC

○ Takeyoshi Masuda^{1,2}, Yu Saito¹, Heiji Watanabe²

1. *MITSUMI ELECTRIC Corp.*, 2. *Osaka Univ.*

Tu-P-41

Multilayer Metallization Strategies for Low-Resistivity Ohmic Contacts to n and p-type 4H-SiC

○ Alisha Arora¹, Adrian Holm Dubré¹, Haiyan Ou¹

1. *Technical Univ. of Denmark*

Tu-P-42

n-Type 4H-SiC contact engineering by implantation-annealing co-optimization

Pierre-Edouard Raynal¹, sami bolat¹, Giovanni Alfieri¹, Pooria Asadollahi¹, ○ Fulvio Mazzamuto², Mike Ameen², Dwight Roh²

1.Hitachi Energy, 2.Axcelis

Tu-P-43

Comparison of Laser-Annealed Ni and Ti Silicide Ohmic Contacts and Device Performance in 4H-SiC SBDs

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Tu-P-44

Comparison of Nanosecond and Femtosecond UV Laser Annealing for Ohmic Contact Formation of Ni/4H-SiC

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Tu-P-45

High-Stability Low-on-resistance 4H-SiC Power Devices by Warpage Control and Roughness-Engineered Backside Contacts

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Tu-P-46

Doping- and Annealing-Dependent Evolution of Transport Mechanisms in Ti/n-4H-SiC Contacts from Rectifying to Ohmic Behavior

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Tu-P-47

High-Temperature Stability of Silicide-Free Mo/SiCA Ohmic Contacts and SBDs on 4H-SiC

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Tu-P-48

WN Diffusion Barrier for Low Gate Leakage Current GaN HEMT Device

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1.STMicroelectronics

Track 07 Power Devices (Poster-B, G401+G402)

Tu-P-49

Impact of Substrate Dislocations on the Leakage Characteristics of 650V SiC Power MOSFETs

○ Fabiana Vento¹, Giovanni Maira¹, Andrea Russo¹, Nicolo Piluso¹, Enzo Fontana¹, Cristiano Calabretta¹, Nicoletta Spampinato¹, Alice Lombardo¹, Damiana Spagnuolo¹, Giuseppe Arena¹, Andrea Severino¹

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Tu-P-50

Impact of micro-pits defects on the low temperature electrical characteristics of 650 V 4H-SiC power MOSFETs

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1.CNR-IMM, 2.STMicroelectronics

Tu-P-51

Mitigation of process-induced variations in highly-scaled trench MOSFETs

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Tu-P-52

Impact of Double-Epitaxial Drift Layer on JFET-Width-Dependent Characteristics in 1.2-kV 4H-SiC MOSFETs

○ Junki Jung¹, Sumin Park¹, Seungri Yang¹, Hyun Park², Sangik Cheon², Yehwan Kang², Jaejin Song³, Derek D. Lee³, Ogyun Seok¹

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Tu-P-53

Non-Monotonic Reverse Recovery Behavior in 1.2 kV SBD-Embedded SiC MOSFETs with Different SBD-P-well Ratios

○ Wonyoung Shin¹, Gyuhyeok Kang¹, Jeongtae Kim¹, Jinwoo Park¹, Juhui Kim¹, Sihyun Kwon¹, Hyejoon Seo², Soontak Kwon², Ogyun Seok¹

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Tu-P-54

Design optimization for switching performance characteristics in 1.2kV SiC trench MOSFET

○ Juyun Ha¹, Kwangwon Lee¹, Taeseop Lee¹, Seunghyun Hong¹, Bongyong Lee¹

1.onsemi

Tu-P-55

Short-Circuit and Surge-Current Robustness Limit of SiC MOSFETs at Negative and Elevated Temperatures

○ Mohamed Alaluss¹, Dominik-Tommi Suszek¹, Madhu Lakshman Mysore¹, Maximilian Goller¹, Josef Lutz¹, Thomas Basler¹

1.Chemnitz Univ. of Tech.

Tu-P-56

Investigation of Drain-Induced Threshold Voltage Shifts in 1200V SiC MOSFETs

○ Woongsun Kim¹, Naeem Islam¹, Shane Stein¹, Sei-Hyung Ryu¹, Adam Barkley¹, Elif Balkas¹

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Tu-P-57

Enhanced High-Temperature Body Diode Stability and Low Switching Losses in 1.2 kV 4H-SiC Planar MOSFETs via Optimized Current Spreading Layer (CSL)

○ Yeongeun Park¹, Sangik Cheon², Kyungeun Park², In-Hwan Ji¹, Derek D Lee¹

1.SK Keyfoundry, 2.SK Powetech

Tu-P-58

Cell Pitch Optimization for Ron,sp < 2 mΩ-cm2 for 1200V Planar SiC MOSFETs

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Tu-P-59

Investigation of the Short-Circuit Failure Mechanisms in 1700 V 4H-SiC VDMOSFETs

Yu-Jen Chen¹, ○ Shih-Chiang Shen¹, Chih-Ming Tzeng¹, Chih-Ming Lai¹, Tao-Chih Chang¹

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Tu-P-60

Comprehensive Experimental Analysis on SmartSiC™ On-state Benefits for 1700V Power Components from Room to High temperature

Francesco Serra di Santa Maria¹, Cyrille Le Royer¹, Jérôme Biscarrat¹, Romain Lavieville¹, Walter Gonçalves Filho¹, Walter Schwarzenbach², Frédéric Allibert², ○ Philippe Godignon¹

1.CEA-Leti, 2.Soitec

Tu-P-61

Design Study of Asymmetric Pillar for Robustness Enhancement in 4H-SiC Semi-Superjunction Geometry

○ Yuzuki Hayakawa¹, Daisuke Iizasa¹, Seigo Mori¹, Yuki Nakano¹

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Tu-P-88LN

Experimental Demonstration of a Self-Aligned Shielding-Gate 1.2 kV 4H-SiC VDMOSFET with Low Reverse Transfer Capacitance

○ Fu-Chen Liang¹, Wei-Jhe Liao¹, Han-Wei Chen¹, Li-Jung Lin², Chun-Hao Lai², Shih-Lung Tsai³, Chien-Chih Lu³, Bing-Yue Tsui¹

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Track 08 RF, High-Temp., and Rad-Hard Devices and ICs (Poster-C, G403+G404)

Tu-P-70

Device-to-Circuit Stability of SiC CMOS Current Mirrors Under 15 MeV Proton Irradiation and 180 °C Operation

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Tu-P-71

Radiation Hardness of implanted 4H-SiC LGADs after 23 MeV protons

Francesco Moscatelli^{1, 2}, Arianna Morozzi², Valentina Sola^{3, 8}, Daniele Passeri^{4, 2}, Peter Svihra^{5, 6}, Radek Novotny⁵, Vojtech Kracmar⁵, Jiri Kroll⁶, Alexander Dierlamm⁷, Brendan Regnery⁷, Robert White⁸, Marco Ferrero⁸, Sebastian Onder⁹, Thomas Bergauer⁹, ○ Adam Klimsza¹⁰

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Tu-P-72

Design of 650 V Multi-Channel SiC LDMOSFET with Enhanced Radiation Hardness

○ Subin Choi¹, Hyerin Ju¹, Sihyun Kwon¹, Jeemin Hyun¹, Ogyun Seok¹

1.Pusan National Univ.

Tu-P-73

4H-SiC Active Pixel Sensors with a 4-pixel Sharing Circuit Structure

○ Sho Suzuki¹, Tatsuya Meguro¹, Akinori Takeyama², Takeshi Ohshima², Kazutoshi Kojima³, Yasunori Tanaka³, Shin-Ichiro Kuroki¹

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Tu-P-74

4H-SiC Neutron Sensors Based on Active Pixel Sensing Structure for Boron Neutron Capture Therapy

○ Vu Thi Ha¹, Tatsuya Meguro¹, Kazutoshi Kojima², Hiroki Tanaka³, Shin-Ichiro Kuroki¹

1.RISE, Hiroshima Univ., 2.AIST, 3.KURNS, Kyoto Univ.

Tu-P-75

Logic Circuit Designs, Processes, and Characterization toward 6-inch 4H-SiC CMOS Platform

○ Chihon Saito¹, Shunto Higashi¹, Kota Shimizu¹, Kosuke Muraoka¹, Tatsuya Meguro¹, Tomonori Maeda^{1, 2}, Hiroshi Sezaki^{1, 2}, Akinori Takeyama³, Takeshi Ohshima³, Kazutoshi Kojima⁴, Yasunori Tanaka⁴, Shin-Ichiro Kuroki¹

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Tu-P-76

Memory Characteristics of 4H-SiC Floating-Gate MOS Capacitors

○ Ryosuke Namba¹, Kosuke Muraoka¹, Takeyama Akinori², Takeshi Ohshima^{3, 2}, Kazutoshi Kojima³, Yasunori Tanaka³, Shin-Ichiro Kuroki¹

1.Hiroshima Univ., 2.QST, 3.AIST

Tu-P-77

Impact of Single-Stage Amplifier Load Resistance on Regenerative Characteristics of Monolithically Integrated SiC JFET NOT Gates

○ Haizhao Zhi¹, Sirui Feng¹, Ling Li¹, Rongxin Du¹, Xinpeng Lin¹, Jinghan Xu¹, Xinyue Dai¹, Xiaoping Wang¹, Yuxi Wan¹

1.Shenzhen Pinghu Laboratory

Track 09 Device and Module Reliability, Packaging, and Applications (Poster-C, G403+G404)

Tu-P-78

Distance-Metric-Based Evaluation of Charge-Trap-Induced Degradation in Id-Vgs Characteristics of SiC MOSFETs

○ Sanshiro Yoichi¹, Koichi Endo², Hiroki Nagasawa¹, Junji Senzaki², Shinji Yokogawa¹

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Tu-P-79

Experimental and Theoretical Study of P-Channel Mobility Including Temperature and Active Body Bias Effects in 4H-SiC MOSFETs

○ Hemant Dixit¹, Daniel J. Lichtenwalner¹, Sei-Hyung Ryu¹

1.WolfSpeed

Tu-P-80

Revealing AC-BTI Mechanisms in SiC MOSFETs through Bias-, Geometry-, and Process-Dependent Characterization

○ Jack Chien¹, Weijie Wang¹, Zijie Zheng^{1, 2}, Xiaolin Wang^{1, 2}, Leming Jiao^{1, 2}, Runze Wang¹, Abdul Hannan Yeo¹, Qin Gui Roth Voo¹, Liyuan Liu¹, Xinghua Wang¹, Umesh Chand¹, Xiao Gong^{1, 2}, Navab Singh¹, Yee Chia Yeo^{1, 2}

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Tu-P-81

High-Frequency Gate Switching Stress-Induced Threshold Voltage Drift in DMOS and UMOS Devices for Accelerated Reliability Assessment

○ Koichi Endo¹, Asuka Yaguchi¹, Masaki Hasegawa¹, Junji Senzaki¹

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

Tu-P-82

Influence of Gate Oxide Nitridation on Vth Instability under Gate Switching Stress in SiC Trench MOSFETs

○ Ryoya Takemura¹, Kaito Miyashita¹, Katsuhisa Tanaka¹, Takuma Suzuki¹

1.Toshiba Electronic Devices & Storage Corp.

Tu-P-83

Canceled

Tu-P-84

Long-term H-Bridge Switching Operation of 1.2 kV SiC MOSFETs Under High VDS Bias, Load Current, and Temperature

○ Sara Kuzmanoska¹, Nirali Patel¹, Jaume Roig¹, Sotirios Maslougkas¹

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Tu-P-85

Withdrawn

Tu-P-97LN

Comparative Repetitive Short-Circuit Degradation of Commercial 650V SiC MOSFETs

○ Haiyong Wan¹, Nikolaos Iosifidis¹, Olayiwola Alatise¹, Peter Michael Gammon¹

1. Univ. of Warwick (UK)

Tu-P-98LN

Negative Threshold Voltage Shifts in 4H-SiC MOSFETs under Bipolar AC Gate Stress: Influence of Channel Length and Nitridation Time

○ Aoi Koyasu¹, Noriyuki Iwamuro¹, Hiroshi Yano¹

1. Univ. of Tsukuba (Japan)

Track 10 Quantum Applications and Sensors (Poster-B, G401+G402)

Tu-P-89LN

Oxygen-vacancy origin of spin centers with surface-robust charge stability in 4H-SiC

○ Yu Chen^{1,2}, Qi Zhang^{1,3,4}, Mingzhe Liu¹, Junda Wu^{1,3}, Jinpeng Liu^{1,3}, Xin Zhao¹, Jingyang Zhou¹, Pei Yu¹, Shaochun Lin¹, Yuanhong Teng¹, Wancheng Yu⁵, Ya Wang^{1,2,6}, Chang-Kui Duan^{1,2,6}, Fazhan Shi^{1,2,3,6}

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Tu-P-90LN

Insights into local atomic environment of color centers at SiO₂/SiC interfaces

○ Yu Kaneko¹, Masahiro Hara¹, Heiji Watanabe¹, Takuma Kobayashi¹

1. The University of Osaka (Japan)

Tu-P-91LN

Frequency-Resolved Nanoscale Noise Spectroscopy of the SiC/SiO₂ Interface Using Individual Quantum Sensors

○ Jinpeng Liu¹, Yuanhong Teng¹, Yu Chen¹, Qi Zhang¹, Fazhan Shi¹

1. Univ. of Sci. and Tech. of China (China)

Tu-P-92LN

Room-Temperature Optical Charge State Control of Native Defects in HPSI 4H-SiC for Power Electronics Device Diagnostics

○ Agatha C. Ulibarri^{1,2}, Brett C. Johnson³, Helton G. de Medeiros², Daniel J. McCloskey¹, Nikolai Donschuk¹, Alexander A. Wood¹, Ulrike Grossner²

1. Univ. of Melbourne (Australia), 2. APS Lab. ETH Zurich (Switzerland), 3. RMIT Univ. (Australia)

Tu-P-93LN

Cathodoluminescence mapping of band bending effects from different 4H-SiC Schottky diodes for defect spin control

○ Aurora Teien¹, Maria Martins², Andreas Gottscholl³, Axel Erlebach², Erlend Lemva Ousdal¹, Augustinas Galeckas¹, Ulrike Grossner², Corey Cochrane³, Hannes Kraus³, Lasse Vines¹, Marianne Etzelmüller Bathen¹

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Tu-P-94LN

Canceled

Track 01 Bulk Growth and Wafer Processing (We-P-57–We-P-60: Poster-B, G401+G402; remaining posters: Poster-C, G403+G404)

We-P-57

Significant Reduction of Crystallographic Defects in 8-inch 4H-SiC Crystals via Optimization of Seed-Adhesion Interface Structure

○ SUHO KIM¹, Jung Gyu Kim¹, Myung Ok Kyun¹, Yeon Suk Jang¹, Kap Ryeol Ku¹, Jung Gon Kim², Gwang Hee Jung², Won Jae Lee²

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We-P-58

Optimization of SiC Bulk Growth via the PVT Process with a Physics-Informed Approach Combining Multi-Agent Design and Bayesian Optimization

○ Tae-Yong Park¹, Chang-Jae Yoon¹, Hoang-Linh Nguyen¹, Yun-Ji Shin¹, Yeon-Suk Jang², Kap-Ryeol Ku², Seong-Min Jeong¹

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We-P-59

Optimization of Process Condition Sequences for Long-Duration SiC Solution Growth under Time-Evolving Physical Fields

Takanao Sakamoto, Kentaro Kutsukake, Shunta Harada, ○ TORU UJIHARA¹

1.Nagoya Univ.

We-P-60

Advancing the SiC Roadmap: Achieving 200mm Volume Production and 300mm Development

○ Chunjun Liu¹, Yanfang Lou¹, Yu Guo¹, Liwei Fan¹, Jing Yao¹, Jian Yang¹

1.TanKeBlue Semiconductor Corp., Ltd.

We-P-61

SiC Growth Rate Profile Using Multi-Wafer Close-Space Sublimation

○ Hiroyuki Nagasawa¹

1.CUSIC Inc.

We-P-62

Novel approaches for volumetric information in 4H-SiC wafers and boules at an industrial scale in a production environment.

○ Jimmy Thörnberg¹, Torben L. Purz², Anton Vakulenko², Eric W. Martin², Björn Magnusson¹

1.STMicroelectronics Silicon Carbide AB, 2.MONSTR Sense Technologies

We-P-64

Multiscale Atomistic Investigation of Polytype Stability and Growth Kinetics in SiC PVT Growth

Kevin Kayang¹, Aakash Kumar¹, Zeyu Chen¹, Balaji Raghothamachar¹, Michael Dudley¹, ○ Dilip Gersappe¹

1.Stony Brook University

We-P-65

PVT-Reactor Structure Optimization through a Comprehensive Parameter Sweep by High-Precision Surrogate Models

○ Kenji Hayashida¹, Yohei Fujikawa²

1.Research Center for Computational Science and Informatics, Resonac Corp., 2.Resonac Corp.

We-P-66

Utilization of Anisotropic Graphite for Thermal Distribution Control toward SiC Sublimation Growth with Higher Growth Rate

○ Shigeyuki Kuboya¹, Kazuma Eto¹, Yukio Nagahata², Takeshi Mitani¹, Shunsuke Noguchi², Yohei Fujikawa², Kenji Momose², Tomohisa Kato¹

1.National Institute of Advanced Industrial Science and Technology (AIST), 2.Resonac Corporation

We-P-67

Elucidating the Effects of CeO₂ on the PVT Growth of 4H-SiC

○ Katherine Thompson^{1, 2}, Riasat Islam^{1, 2}, Mathias Yost^{1, 2, 3}, Anirban Phukan^{1, 2}, Stanislav Udovenko^{1, 2}, Ian Binnie^{1, 2}, Yuan Xuan^{1, 2}, Adri van Duin^{1, 2}, Randy Vander Wal^{1, 2}, Darren Pagan^{1, 2}, Joshua Robinson^{1, 2}

1.The Pennsylvania State Univ., 2.Silicon Carbide Innovation Alliance, 3.Morgan Advanced Materials

We-P-68

Sparse Sensing-Based Response-Surface Modeling of PVT Reactor Characteristics: Methods and Use Cases

○ Lorenz Taucher¹, Zaher Ramadan¹, Shaukat Lone², Ben Depuydt², Lorenz Romaner¹

1.Montanuniversität Leoben, 2.EEMCO GmbH

We-P-90LN

Porous TaC Filter for SiC PVT Crystal Growth

Riasat Islam^{1,2}, Yuan Xuan^{1,2}, Katherine Thompson^{1,2}, Yani Sun³, Jeff Lennartz, Jon Leist³, ○ Wei Fan³

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We-P-91LN

Thermodynamics of SiC sublimation in PVT crystal growth

○ Fernando Vallejos-Burgos¹, Mathias Yost¹, Joe Abrahamson¹, Ievgen Izvarin¹, Patrick Rondomanski¹, Jesse Gill¹, Linsea Foster¹, Ron Sherant¹, Thomas Connolly¹

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We-P-92LN

Canceled

Track 03 Extended Defects (Poster-C, G403+G404)

We-P-69

Unveiling a New Class of Triangular Defects in 4H-SiC Through Multi Scale Analysis

○ Cristiano Calabretta¹, Beatrice Carbone¹, Corrado Bongiorno², Nicolò Piluso¹, Cettina Bottari¹, Fabiana Vento¹, Giuseppe Arena¹, Mario Santi Alessandrino¹, Andrea Severino¹

1.Indus. STMICROELECTRONICS, 2.Inst. CNR-IMM

We-P-70

Toward Multiscale Evaluation of 4H-SiC Wafer Quality by Integrating Wafer-Scale Signatures and Microscopic Defect Inspection

○ Koji Ashida¹, Daichi Dojima¹, Mariko Takahara¹, Shota Fujiki³, Kohei Toda¹, Hiroshi Mihara¹, Mari Yamamoto³, Tadaaki Kaneko^{1, 2}

1.QureDA Research, Inc., 2.Kwansei Gakuin University, 3.Lasertec Corporation

We-P-71

Reducing Annotation Cost in Semiconductor Wafer Defect Classification through Self-Supervised Domain Pre-Training

○ Alvin Kiptoo Chirchir¹, Matt Roach¹, Owen Guy¹, Mike Jennings¹, Jacob Mitchell², Justin Lach²

1.Swansea University, 2.KLA Corp.

We-P-72

Rapid Evaluation of Threading Dislocations during Initial-Stage PVT Growth of 4H-SiC Crystals

Govindhan Dhanaraj¹, ○ Xueping Xu¹, Rajan Rengarajan¹

1. Coherent Corporation

We-P-73

Multi-channel defect inspection of 4H-SiC epitaxial wafers by using a single convolutional neural network trained on composite images from different inspection techniques

○ Masaki Hasegawa¹, Koichi Endo¹, Junji Senzaki¹

1. Nat. Inst. of Adv. Indus. Sci. and Tech.

We-P-74

Scan-Based UV Wafer Screening of Bipolar-Degradation Susceptibility in 4H-SiC via Practical Irradiance-Threshold Mapping

○ Takuya Morita¹, Kaoru Sugihara¹

1. ITES CO., LTD.

We-P-75

Demonstration of Synchrotron X-ray Topography over an Entire 200-mm 4H-SiC Wafer

○ Shunta Harada¹, Juheyong Sun¹, Kota Tsujimori¹, Kentaro Kajiwar², Takayoshi Shimura³

1. Nagoya Univ., 2. JASRI, 3. Waseda Univ.

We-P-76

Whole-Wafer Imaging of 6-inch 4H-SiC Wafers using Synchrotron X-ray Topography and Automated Defect Classification

○ Yuhui Huang¹, Rui Zhou¹, Weiyuan Xia¹, Kentaro Kajiwar², Takashi Kameshima^{2, 3}, Taito Osaka³, Makina Yabashi³, Takayoshi Shimura^{1, 3}

1. Waseda Univ., 2. Japan Synchrotron Radiation Research Inst., 3. RIKEN Spring-8 Center

We-P-77

Investigation of the Formation and Propagation of Polytype Inclusions in PVT-Grown 4H-SiC Crystals by Synchrotron X-ray Topography

○ Jianpei Zhang¹, Zeyu Chen¹, Haochi Wang¹, Kaixuan Zhang¹, Jaehyun Suh¹, Balaji Raghothamachar¹, Evan Moe², Yafei Liu², Michael Dudley¹

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We-P-78

Algorithm for automated multimodal characterization of dislocations in 4H-SiC wafers using X-ray topography and polarized light microscopy

○ Kosei Takahashi¹, Kota Tsujimori², Michio Kawase¹, Keisuke Seo¹, Seiya Mizutani³, Yuya Mizutani³, Seiji Mizutani³, Kenta Shimamoto⁴, Kenta Murayama³, Shunta Harada^{1, 2}

1. Nagoya Univ., 2. SSR Corp., 3. Mipox Corp., 4. Rigaku Corp.

We-P-93LN

Basal Plane Dislocation Mapping and Conversion on 200mm Silicon Carbide Epitaxial Wafers

○ Thomas A. Kuhr¹, Scott A. Ustin¹, Howard Sin², YuChang Wang², Leo Jin²

1. Wolfspeed (USA), 2. Visiontec (Singapore)

We-P-94LN

Correlation Photoluminescence and 3D Raman Imaging Analysis of Threading Dislocations in Free-standing HVPE GaN Substrate

○ Olga Milikofu¹, Toshihiro Asada¹

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We-P-98LN

Ion-Species Effects on Implantation-Induced Lattice Damage for Bipolar Degradation Suppression in 4H-SiC PiN Diodes

Atsushi Shimbori¹, ○ Ryota Wada², Nobuhiro Tokoro², Takashi Kuroi², Chiho Sung³, Hiu Yung Wong⁴, Alex Q. Huang¹

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Track 04 Point Defects and Material Properties (Poster-C, G403+G404)

We-P-79

Impact of Material Crystal Point Defects and Technology Generation on Switching Losses of 3.3kV SiC MOSFETs

○ Nadja Isabelle Desiree Klipfel¹, Clement Bongini¹, Giovanni Alfieri¹, Eduardo Ceccarelli¹, Sami Bolat¹, Moritz Wehrle¹, Elizabeth Buitrago¹, Matthieu Lecroq², Walter Schwarzenbach², Eric Guiot

1. Corp. Hitachi Energy, 2. Corp. SOITEC

We-P-80

Electrical characterization of a 15 kV 4H-SiC p+-i-n diode

○ Giovanni Alfieri¹, Nadja Klipfel¹, Marco Pocaterra¹, Boni Boksteen¹, Stephanie Fernandez¹, Pierre-Edouard Raynal¹, Nazareno Donato², Martin Kah², Giulio Pellegrini³, Luis Figueras³, Adolf Schöner⁴

1. Hitachi Energy, 2. Cambridge University, 3. CSIC, 4. RISE

We-P-81

Impact of High-Energy Proton-Irradiation on Charge Carrier Dynamics in 4H-SiC

○ Natalija Für¹, Rishi Kupper¹, Helton Goncalves de Medeiros¹, Efe Eden¹, Ulrike Grossner¹

1. APS - ETH Zurich

We-P-82

Characterization of defects induced by heavy ion irradiation in 4H-SiC with low-energy muon spin spectroscopy

○ Maria Mendes Martins¹, Helton Goncalves de Medeiros¹, Gianluca Janka², Natalija Für¹, Efe Eden¹, Thomas Prokscha², Ulrike Grossner¹

1. APS - ETH Zurich, 2. PSI CNM Sci.

We-P-83

Deep-Level Characterization of Electron-Irradiated Diamond Device Using Alpha-Particle Charge Transient Spectroscopy

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We-P-84

Conduction-band-side interface states at the wet-oxidized 4H-SiC(0001)/SiO₂ interface revealed by Electrically-Detected-Magnetic-Resonance (EDMR) spectroscopy

○ Bunta Shimabukuro¹, Keigo Adachi¹, Mitsuru Sometani², Hirohisa Hirai², Heiji Watanabe³, Takahide Umeda¹

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We-P-85

Canceled

We-P-95LN

Novel Approach to Electrical Classification of Killer Defects in Epitaxial 4H-SiC

Joanna Wincukiewicz¹, ○ Marshall Wilson¹, Ivan Shekerov¹, Carlos Almeida¹, Jacek Lagowski¹

1. Onto Innovation (USA)

We-P-97LN

Advanced Raman Metrology Platform for Wide-Bandgap Power Semiconductors: Submicron Homoepitaxial Uniformity and High-Resolution Thermal Analysis

○ Jung-Hoon Song¹, Youngboon Moon^{2,3}, Seungyoung Lim², GyeongEun Choi², Jaesun Kim²

1. Kongju Nat'l Univ. /AccuOptoTec (Korea), 2. AccuOptoTec (Korea), 3. UJL Ltd. (Korea)

Track 05 MOS Gate Stack Processing and Characterization (Poster-B, G401+G402)

We-P-29

Characterization of Trench Sidewall Channel Mobility in 4H-SiC using Lateral Trench MOSFETs

○ Woongsun Kim¹, Naeem Islam¹, Shane Stein¹, Sei-Hyung Ryu¹, Adam Barkley¹, Elif Balkas¹

1. Wolfsped

We-P-30

Sidewall Orientation Effects on Channel Mobility in SiC Vertical Trench Power MOSFETs Extracted by Four-Terminal Transcharacteristic Method

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1. STMicroelectronics

We-P-31

An investigation of m-face SiC loss rate on thermal oxidation process

○ Youngbin Im¹, Helen Jeong¹, Bokyun Seo¹, Junghye Lee¹, Youngkwon Kang¹, MK Ko¹

1. onsemi

We-P-32

Crystal-Orientation-Dependent Electrical Characteristics and Bias-Stress Reliability of 4H-SiC Trench MOSFETs

○ Zijie Zheng^{1, 2}, Yu-Chieh Chien¹, Xiaolin Wang^{1, 2}, Leming Jiao^{1, 2}, Runze Wang¹, Liyuan Liu¹, Weijie Wang¹, Xinghua Wang¹, Abdul Hannan Yeo¹, Qin Gui Voo¹, Umesh Chand¹, Xiao Gong^{1, 2}, Navab Singh¹, Yee Chia Yeo^{1, 2}

1. Agency for Sci., Tech. and Res., 2. National Univ. of Singapore

We-P-33

Impact of NO Annealing on Gate Switching Instability of SiC Trench MOSFETs

○ Matteo Nigris¹, Dick Scholten¹, Johannes Ziegler¹, Ingmar Kallfass²

1. Indus. of Robert Bosch GmbH, 2. Univ. of Stuttgart

We-P-34

Pulsed gate voltage transfer characteristic of SiC MOSFETs for improved VTH extraction

○ Enea Bianda¹, Elena Mengotti¹, Gerd Schlottig¹

1. ABB Corporate Research

We-P-35

Influence of Interface Traps on Gate-Capacitance Peak Under Drain Bias in SiC Trench MOSFET

○ Ilaria Maticena¹, Luca Maresca¹, Andrea Irace¹, Santolo Daliento¹

1. University of Naples Federico II

We-P-36

High Sensitivity Temperature Sensors with SiC MOS Capacitors Fabricated Using Grown Polyoxides

○ Razvan Pascu¹, Gheorghe Pristavu², Gheorghe Brezeanu², Mihaela Kusko¹

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Track 06 Implantation, Contacts, Etching, and Other Processes (Poster-B, G401+G402)

We-P-37

4H-SiC Deep Trench Development for Superjunction Devices

○ Oleg Rusch¹, Stephan Kuehn², Maximilian Szabo¹

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We-P-38

Corners shaping of low dimension SiC trenches by plasma processing

Katarzyna Izabela Stokeley¹, ○ Zareena Hassanbee Mohammed Sheikh Allawudeen¹

1. Oxford Instruments Plasma Technology

We-P-39

CD-SEM Enabled Measurement of Etched Trench Sidewall Roughness

○ Paul Smith¹, Daniel Fischer¹, Shimon Levi², Oleg Rusch³, Alesa Fuchs³

1. Applied Materials GmbH, 2. Applied Materials Ltd., 3. Fraunhofer IISB

We-P-40

Multi-Scale Modeling and Experimental Analysis of SiC Gate Trench Profile Control in ICP-RIE Chamber

○ Yuri Shustrov¹, Ivan Petras¹, Andrey Smirnov¹, Oleg Rusch²

1. Semiconductor Technology Research d.o.o. Beograd, 2. Fraunhofer IISB

We-P-41

Damage-free Dicing of SiC Substrate Using High-Pressure SF6 Plasma – Effect of bias voltage on etching characteristics –

○ Yuken Matsumura¹, Takeshi Ishikawa¹, Nene Yoshimi¹, Daisetsu Toh¹, Jumpei Yamada¹, Yasuhisa Sano¹

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We-P-42

Canceled

We-P-43

Canceled

We-P-44

Enhanced Anodic Oxidation Behavior in 4H-SiC by Pulsed Voltage Control with Negative Base Bias

○ Shoki Ohara¹, Ryuya Matsumoto¹, Aoto Hashiguchi¹, Kyoya Okawa¹, Motoaki Iwaya¹, Tetsuya Takeuchi¹, Atsushi Suzuki², Eri Akazawa², Yiyu Ou³, Haiyan Ou³, Satoshi Kamiyama¹

1. Meijo Univ., 2. E&E Evolution Ltd., 3. Technical Univ. of Denmark

We-P-45

Effects of pulsed anodic oxidation conditions on the optical properties of porous fluorescent 4H-SiC

○ Ryuya Matsumoto¹, Shoki Ohara¹, Aoto Hashiguchi¹, Kyoya Okawa¹, Motoaki Iwaya¹, Tetsuya Takeuchi¹, Satoshi Kamiyama¹, Eri Akazawa², Atsushi Suzuki², Yiyu Ou³, Haiyan Ou³

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We-P-46

Effect of Facet on Electrochemical Etching Behavior of n-type 4H-SiC

○ Sahand Dadashi Radvar^{1, 2}, Tingqiang Yang^{1, 2}, Florentine Scholz^{3, 4}, Georg Pfusterschmied^{1, 2}, Ulrich Schmid¹

1.TU Wien, Institute of Sensor and Actuator Systems, Gußhausstraße 27-29, 1040, Vienna, 2.Christian Doppler Laboratory for Sustainable Silicon Carbide Technology, Gußhausstraße 27-29, 3.Analytical Instrumentation Center, TU Wien, 4.Institute of Chemical Technologies and Analytics, TU Wien, 1060 Vienna

We-P-47

Surface Modifications in Silicon Carbide by Electrochemical Etching

○ Athul Rathnakar¹, Sofia Bekau², G Colston¹, P M Gammon¹, A B Renz¹, M A Antoniou¹, Vishal A Shah¹

1.University of Warwick, School of Engineering, 2.University of Warwick, Nanofabrication RTP

We-P-48

Influence of SiC consumption on SiC MOSFET electrical parameter

dario tenaglia¹, ○ massimo davide pirciaci¹

1.STMicroelectronics

Track 07 Power Devices (Poster-A, 1st Floor)

We-P-01

Demonstration of 4H-SiC JBSFETs with Split-Gate Architecture for Improved High Voltage Performance

○ Anas Malek Moumani¹, Justin Lynch¹, Stephen Mancini¹, Woongie Sung¹, Miguel Hinojosa², Ronald Green², Aivars Lelis²

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We-P-02

Suppression of Forward Bias Degradation in 3.3kV DMOSFET Fabricated on 4H-SiC Bonded Substrates

○ Seiji Ishikawa¹, Yuta Higashi², Motoki Kobayashi³, Mitsuo Okamoto¹, Kazutoshi Kojima¹, Shinsuke Harada¹

1.Advanced Power Electronics Research Center, National Institute of Advanced Industrial Science and Tech., 2.PHENITEC SEMICONDUCTOR Corp., 3.Sumitomo Metal Mining Co., Ltd.

We-P-03

Experimental Demonstration of Improved On-State Performance in 3.3 kV 3D Quasi-Planar Trench SiC MOSFET

○ Mansha Kansal¹, Munaf Rahimo², Kyrlo Melnyk³, Giuseppe Capasso¹, Alessandro Borghese¹, Michele Riccio¹, Arne Benjamin Renz³, Giovanni Breglio¹, Neophytos Lophitis⁴, Andrea Irace¹, Marina Antoniou³, Iulian Nistor², Luca Maresca¹

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We-P-04

Demonstration of a 3.3 kV-rating VDMOSFET with Ultra-low Specific on-Resistance

○ Han-Wei Chen¹, Yun-Ting Huang¹, I-Chen Tsai¹, Yu-Xin Wen¹, Bing-Yue Tsui¹

1.Univ. of National Yang Ming Chiao Tung

We-P-05

3.3 kV-Class 4H-SiC TMBS Diodes and TMBS-Embedded UMOSFETs

○ Jun-Kai Huang¹, Jia-Wei Hu¹, Te-Jui Lee¹, Chih-Chun Ouyang¹, Guan-Min Kang¹, Chih-Fang Huang¹

1.National Tsing Hua Univ.

We-P-06

Characterization and Modeling of Third Quadrant Operation in High Voltage 4H-SiC Superjunction DMOSFET

Zhaowen He¹, Collin Hitchcock², Stacey Kennerly², Reza Ghandi², ○ Tat-sing Paul Chow¹

1.Rensselaer Polytechnic Institute, 2.GE Aerospace

We-P-07

Multi-Epitaxy with Channeling Implantation and Deep Trench Design for 3.3 kV Semi-Superjunction MOSFET

○ Kyrlo Melnyk¹, Arne Benjamin Renz¹, Mustafa Akif Yildirim¹, Vishal Ajit Shah¹, Peter Michael Gammon¹, Marina Antoniou¹

1.University of Warwick

We-P-08

Design Considerations for 3.3 kV and 6.5 kV 4H-SiC MOSFETs

Justin Lynch¹, ○ Seung Yup Jang¹, Adam J. Morgan¹, Woongie Sung¹, Youngsang Kim², Michael Owen², Nadeemullah A. Mahadik³, Alecsander N. Imhof³, Rachel L. Myers-Ward³

1.NoMIS Power Corporation, 2.Defense Microelectronics Activity, 3.U.S. Naval Research Laboratory

We-P-09

Robust 4H-SiC 6.5 kV Edge Termination Based on Floating Field Rings and JTE Termination Design and Optimization

○ Zhaoxue Yuan¹, Arne Renz¹, Nikolaos Iosifidis¹, Xinghua Wang², Xiao Gong^{2, 3}, Umesh Chand², Abhishek Mishra², Xiaolin Wang^{2, 3}, Marina Antoniou¹, Peter Gammon¹

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We-P-10

Comparison of On-State and Switching Performance of High-Voltage 4H-SiC n-Channel IGBTs and DMOSFETs

Thomas Gonzaga¹, ○ Dallas Morissette¹, James Cooper²

1.Purdue Univ., 2.Sonrisa Res.

We-P-11

Wafer-Level Testing of SiC Power Devices > 10 kV: Methods, Limitations and Challenges

○ Marcel Dinse¹, Nadja Klipfel², Nazareno Donato³, Jan-Hendrik Peters¹, Giovanni Alfieri², Marco Pocater², Sami Bolat², Nando Kaminski¹

1.Univ. of Bremen, 2.Hitachi Energy Ltd., 3.Univ. of Cambridge

We-P-12

OBIC Measurements On 4H-SiC Thyristors Protected by Etched Junction Termination Extension

○ Rabei Barhoumi¹, Luong-Viet Phung¹, Camille Sonnevill¹, Sigo Scharnholtz², Milan Zuvic², Ralf Hassdorf², Dominique Planson¹

1.Univ. of Lyon , 2.French-German Research Institute of Saint-Louis (ISL)

We-P-86LN

Design of the Robust Edge Termination Applied to 10 kV SiC SBD Embedded MOSFET Against Humidity

○ Tetsuya Abe¹, Toshikazu Tanioka¹, Daichi Dansako¹, Minoru Matsuoka¹, Yasuhiro Kagawa¹, Tetsuya Nitta¹

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We-P-87LN

Normally-Off 1.2-kV-Class β -Ga₂O₃ LDMOS with an N-Implanted Current-Blocking Layer and a NiO-Assisted Pseudo-RESURF Structure

○ Seungwon Son¹, Taceun Lee¹, Sola Woo¹

1. Pukyong National Univ. (Korea)

Track 08 RF, High-Temp., and Rad-Hard Devices and ICs (Poster-A, 1st Floor)

We-P-13

Electrical Response and SEB of Trench-MOSFETs after Heavy-Ion Irradiation

○ Axel Erlebach¹, Helton Goncalves de Medeiros¹, Natalija Für¹, Manuel Belanche¹, Ulrike Grossner¹

1.APS - ETH Zurich

We-P-14

3D Investigation of Heavy Ion Induced Single Event Effects in a Double RESURF SiC Power Device

○ Zhaoxue Yuan¹, Bailing Zhou¹, Peter Gammon¹, Marina Antoniou¹

1.Univ. of Warwick

We-P-15

Influence of Buffer Profile on the Single Event Immunity of 4H-SiC Epitaxial Stacks under Heavy-Ion Irradiation

○ Gabriel Scott Parkinson¹, Peter Gammon², Niamh Arnold², Virendra Kotagama², Rishad Ahmed¹, Paul Evans¹, Neophytos Lophitis³

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We-P-16

Single Event Transient Suppression in 4H-SiC MOSFETs on V-doped Semi-Insulating Substrates

○ Taisei Ozaki¹, Takahiro Makino², Kazutoshi Kojima³, Takeshi Ohshima², Shin-Ichiro Kuroki¹

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We-P-17

Leakage current instability of Gamma-ray-irradiated SiC junction field effect transistors

○ Akinori Takeyama¹, Takahiro Makino¹, Yasunori Tanaka², Shin-Ichiro Kuroki³, Takeshi Ohshima¹

1.National Institutes for Quantum Science and Technology (QST), 2.National Institute of Advanced Industrial Science and Technology (AIST), 3.Research Institute for Semiconductor Engineering, Hiroshima University

We-P-18

Effect of gamma-ray irradiation on the I-V characteristics of level shifting diodes in SiC JFET analog circuits

○ Masayuki Yamamoto^{1, 2}, Ryuya Hirose^{1, 2}, Daisuke Watanabe^{1, 2}, Akinori Takeyama³, Hitoshi Umezawa¹, Takahide Sato², Takahiro Makino³, Takeshi Ohshima³, Shin-ichiro Kuroki⁴, Yasunori Tanaka¹

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We-P-19

A Monolithically Integrated SiC JFET Differential Amplifier: From MPW Fabrication and Low-Voltage Verification to Common-Mode Rejection Optimization

○ Haizhao Zhi¹, Sirui Feng¹, Ronxin Du¹, Ling Li¹, Xinpeng Lin¹, Mengqi Fan¹, Xinyue Dai¹, Xiaoping Wang¹, Yuxi Wan¹

1.Shenzhen Pinghu Laboratory

We-P-88LN

From lab to fab: Wafer-scale fabrication of SiC ion-implantation-based side-gate p- and n-JFETs toward CJFET ICs

○ Mitsuyuki Kaneko¹, Yoshimori Okamura², Kunihide Oozono², Tetsuro Akasaki², Kazuki Ariura², Kyota Mikami¹, Tsunenobu Kimoto¹

1. Kyoto Univ. (Japan), 2. Phenitex Semiconductor Corp. (Japan)

We-P-89LN

Total Ionizing Dose Effects of SiC MOSFETs with Different Gate Oxidation Post-treatments

○ Yeonjun Kim^{1, 2}, Junhyuk Lee², Dong-Seok Kim^{1, 3}, Hyemin Kang²

1. Korea Atomic Energy Research Institute (KAERI) (Korea), 2. Korea Institute of Energy Technology (KENTECH) (Korea), 3. University of Science and Technology (UST) (Korea)

Track 09 Device and Module Reliability, Packaging, and Applications (Poster-A, 1st Floor)

We-P-20

Thermal Degradation Behavior in a Double-Sided Cooling SiC Power Module Revealed by Structure Function Analysis

○ Jonghyeon Ryu¹, Gyuhyeok Kang¹, Yeonghyeon Kim¹, Jeongwoo Choi², Junho Lee², Ogyun Seok¹

1.Pusan National University, 2.JMJ Korea

We-P-21

Comparative Study of Gate Oxide Screening With Adjustment Pulse Technique using Commercial and In-House 4H-SiC MOSFETs

○ Monikuntala Bhattacharya¹, Michael Jin², Marvin H White², Atsushi Shimbori³, Anant K Agarwal²

1.L&T Semiconductor Technologies, 2.The Ohio State University, 3.Ford Motor Company

We-P-22

Achieving Extrinsic-Free Gate Oxide Reliability in 1200 V SiC MOSFETs: A Large-Scale Statistical Study Validating the Thermo-Chemical E-Model at 175 °C

○ DAHUI YOO¹, Chang-Heon Yang¹, Wonchul Baek², Soochang Kang², Lorenzo Marchesi³, Alessandro Polpetta³, In-Hwan Ji², Derek Lee²

1.SK-powertech Inc., 2.SK-Keyfoundry Inc., 3.EDA Indus.

We-P-23

Gate Oxide Integrity and Lifetime Prediction of 1.2 kV SiC MOSFETs under Step-Wise Increased Gate Bias

○ Roman Boldyrjew-Mast¹, Thomas Basler¹

1.Chemnitz Univ. of Technology

We-P-24

Experimental Identification of Continuous Field-Driven Degradation Mechanism Transition in SiC MOSFETs under DC TDDDB Stress

○ Sota Sugimori¹, Shuhei Nakata¹

1.Kanazawa Institute of Technology

We-P-25

Investigation of Electro-Thermal TDDDB Degradation in 1.2 kV SiC MOSFETs

Ahmed A. Ibrahim¹, Mohammad Monfared¹, Saeed Jahdi², Mohamed Amer Karout³, Craig Fisher¹, ○ Mike Jennings¹

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We-P-26

Canceled

We-P-27

Impact of Gate-Voltage Rise Time on AC-TDDDB Lifetime Statistics in SiC MOSFETs

○ Kosei Yokoyama¹, SHUHEI NAKATA¹

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Track 10 Quantum Applications and Sensors (Poster-B, G401+G402)

We-P-49

Focused Ion Beam Nanopillar Milling to Enhance Light Collection Efficiency from Color Centers in 4H-SiC

○ Efe Eden¹, Helton Goncalves de Medeiros¹, Sarah Sofia Saldanha Faria¹, Joakim Reuteler², Ulrike Grossner¹

1.APS - ETH Zurich, 2.ScopeM - ETH Zurich

We-P-50

Integrated Entangled Photon Source with On-Chip Filtering on Silicon-Carbide-on-Insulator

○ Lijun Ma¹, Wenhan Sun², Anouar Rahmouni¹, Oliver Slattery¹, Qing Li²

1.National Institute of Standards and Technology, 2.Carnegie Mellon University

We-P-51

High-Efficiency Photonic Interfaces for Colour Centres in Silicon Carbide

○ Nien-Hsuan Lee^{1, 2}, Erlend Ousdal¹, Jonas Schmid^{1, 2}, Leonard Zimmermann^{1, 2}, Berke Demiralp³, Felix David³, Stephan Kucera¹, Kevin Mengueli¹, Eva Weig^{3, 4, 5}, Florian Kaiser^{1, 2}

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We-P-52

Design and Fabrication of SiC Flat Optics for Scalable Sensors

Matthew Traub¹, ○ Behrooz Semnani¹, John Viane¹, Petr Siyushev^{1, 2}, Iakov Goldberg¹, Xavier Rottenberg¹

1.imec, 2.University of Hasselt

We-P-53

A High-Throughput Technique for Color Center Quantification with Neural Networks and its Practical Application in a Surface Passivation Study

Christian Gobert¹, Glenn Held¹, Oskar Reichenberger¹, Sarah Saarmann¹, Marina Scharin-Mehlmann¹, Patrick Berwian¹, Peter Evanschitzky¹, Michael Krieger², ○ Jochen Friedrich¹, Jörg Schulze^{1, 3}

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We-P-54

Photoluminescence Properties of Patterned Ion-Implanted Vanadium Centers in 4H-SiC

○ Yoshitaro Uchida¹, Shinichiro Sato², Hidetsugu Tsuchida^{1, 3}

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We-P-55

The Role of Fermi-level Tuning on the Charge Stabilization of Heavy-Ion Induced Color Centers in 4H-SiC

○ Sarah Sofia Saldanha Faria¹, Helton Goncalves de Medeiros¹, Efe Eden¹, Ulrike Grossner¹

1.APS - ETH Zurich

We-P-56

FIB fabrication and integration of NIR quantum emitters in 4H-SiC

○ Elena Nieto Hernandez¹, Matteo Ziino^{2, 3}, Alessandro Cian¹, Gioele Piccoli¹, Elia Scattolo¹, Greta Andriani³, Paolo Olivero^{2, 3}, Jacopo Forneris^{2, 3}, Damiano Giubertoni¹

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Track 01 Bulk Growth and Wafer Processing (Th-P-58–Th-P-61: Poster-B, G401+G402; remaining posters: Poster-C, G403+G404)

Th-P-58

Study and Optimisation of Electrical Resistivity of Chemically Vapour Deposited Polycrystalline SiC

○ Lucile Girod^{1, 2}, Yann Gallou², Alexandre Potier², Fabien Volpi¹, Roman Reboud¹, Gustavo Adolfo Ardila³, Xavier Mescot³, Marie Amandine Pinault-Thaury⁴, Estelle Loire⁴, Didier Chaussende¹

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Th-P-59

Unified Planarization and Thinning of Extracted 4H-SiC Layers for Engineered Substrate Applications

○ Hitesh Jayaprakash^{1, 2, 3}, Masum SM^{3, 2}, Michael Rueb^{2, 3}, Sileno Carmine⁴

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Th-P-60

Influence of Plasma Activation on Surface Chemistry and Wafer Bonding of 4H-SiC

○ Jimmy Thörnberg¹, Peter Kerepsi², Joseph Halim¹, Michael Dornetshumer², Björn Magnusson¹

1.STMicroelectronics Silicon Carbide AB, 2.EV Group

Th-P-61

The influence of surface properties on poly 3C-SiC to mono 4H-SiC wafer bonding using covalent- and fusion-bonding, with and without plasma activation.

○ Jimmy Thörnberg¹, Peter Kerepsi², Cristiano Calabretta³, Kouya Shimizu⁴, Michael Dornetshumer², Björn Magnusson¹

1.STMicroelectronics Silicon Carbide AB, 2.EV Group, 3.STMicroelectronics - SiC Campus, 4.Sumitomo Metal Mining Co.

Th-P-62

The stripe growth of heteroepitaxial 3C-SiC crystals on 4H-SiC substrate using Gibbs-Thomson solvent and the focused laser irradiation

○ Yoya Tsuji¹, Yasunari Koeda¹, Masanori Suzuki¹, Masashi Nakamoto¹, Kazuhito Kamei¹, Takeshi Yoshikawa¹

1.The Univ. of Osaka

Th-P-63

Simulation of Ablation Phenomena in Laser Processing -Proposal of a New Method:the Normalization Group MD for SiC Wafers-

○ Mariko Tachibana¹, Daiji Ichishima¹, Ryunosuke Kitahara¹, Hirotaka Miyazaki¹, Shuji Miyazaki¹, Sachi Yawaka¹, Yoshiyuki Tomita¹

1.Sumitomo Heavy Industries, Ltd.

Th-P-64

Dopant-selective Photoelectrochemical Etching of 4H-SiC

○ Michael Seidel¹, Martin Hofmann¹, Carlos Hansen¹, Maximilian Titl¹, Patrick Berwian¹, Jochen Friedrich¹

1.Fraunhofer Inst. for Integrated Systems and Device Technology IISB

Th-P-65

Exploring CMP Machine Parameters via a U-Net model and Genetic Algorithm

○ Kevin Operiano¹, Roberto Iaconi¹, Fumiya Kawate¹, Saeed Sepasy², Yoshifumi Watanabe²

1.Aixtal Corp., 2.Mipox Corp.

Th-P-66

Voltage-Controlled Anodic Oxidation and CMP Removal Characteristics of 4H-SiC Substrates in K₂CO₃ Electrolyte

○ Jiyeon Oh¹, Doyeon Kim¹

1.Korea Institute of Industrial Technology (KITECH)

Th-P-67

Canceled

Th-P-68

Development of Electrochemical Oxidation-Assisted SiC Grinding Process

○ Shinya Hirano¹, Tomohisa Kato¹, Takeshi Mitani¹

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

Th-P-69

Subsurface Damage Generation and Control during SiC Polishing

○ Michael A Robison^{1, 2}, William Gemmill³, Caroline Wattinez³, Evan Krohn^{1, 2}, Matthew Krohn^{1, 2}, Joshua A Robinson^{1, 2}

1.The Pennsylvania State Univ., 2.Silicon Carbide Innovation Alliance, 3.Pureon Inc.

Th-P-87

Electronic Structure Theory for Polytype Nucleus Stability

○ Kenji Hayashida¹

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Th-P-89LN

Canceled

Track 02 Epitaxial and Thin-Film Growth (Poster-C, G403+G404)

Th-P-70

Evaluation of the Effective C/Si ratios during Thermal Etching and Growth on 4H-SiC(0001) Based on Macrostep Morphology

○ Kohei Toda¹, Hibiki Tanaka², Riku Maeda², Koji Ashida¹, Daichi Dojima¹, Hiroshi Mihara¹, Tadaaki Kaneko^{1, 2}

1.QureDA Research, Inc., 2.Kwansei Gakuin university

Th-P-71

Elucidating Differing Crystal Growth Mechanisms for On-Axis and Off-Axis CVD-Grown SiC on 4H-SiC Substrate Through Photoluminescence Cartography

○ Harmke Dorien van Dijk¹, Rafał Jakiela², Matthieu Paillet¹, Ahmed Azmi Zahab¹, Jean Roch Huntzinger¹, Sandrine Juillaguet¹, Hervé Peyre¹, Thomas Cohen¹, Olivier Briot¹, Marcin Zielinski³

1.L2C CNRS Université de Montpellier, 2.Inst. of Physics of the Polish Academy of Sciences, 3.Soitec S. A.

Th-P-72

Short Basal Plane Dislocations in 4H-SiC Epilayers and Their Relationship to the Growth Mode at the Upstream Part of the Step-Flow

○ Johji Nishio^{1, 2}, Yuto Sasaki¹, Yohei Harada¹, Chiharu Ota², Keisuke Kurashima¹

1.NuFlare Technology, Inc., 2.Toshiba Corp.

Th-P-73

Systematic Investigation and Reduction of Triangle-Shaped Defects (TriDs) in Thick SiC Epitaxial Layers

○ Bumjoon Kim¹, Michael Coco¹, Hyun-Don Jung², Soo Min Lee¹, Drew Hanser¹

1. Veeco Instruments Inc., 2. HORIBA STEC KOREA, Ltd.

Th-P-74

Epitaxial Wafer Engineering for Free-Standing 4H-SiC Membrane Beam Monitors and Harsh-Environment Detector Platforms

○ Marco Mauzeri¹, Gabriele Trovato^{2, 3, 6, 4}, Mario Lizzio¹, Maria Luisa Alonzo¹, Silvio Preti¹, Massimo Camarda^{2, 5, 4}

1. ASM International, 2. Sensic, 3. INFN, 4. IMM-CT, 5. STlab, 6. Dipartimento di Fisica e Astronomia "Ettore Majorana"

Th-P-75

High-aspect ratio CVD coating of TaC reaching deep recesses and channels in graphite components used in SiC- and GaN-epitaxy

○ Charles Wijayawardhana¹

1. SGL Carbon GmbH

Th-P-76

Scalable Large Area Diamond Growth with High Uniformity for Thermal Management Applications

○ Tasya Muhamad Yasser¹, Alexandre Fiori¹, Satoshi Ihida¹, Masami Shibagaki¹, Kazuo Tsugawa¹, Manabu Ikemoto¹

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Th-P-90LN

Development of ultra-thick and heavily p-type-doped SiC epitaxial wafers for SiC IGBTs

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Th-P-91LN

Influence of CVD conditions on N incorporation on 4H-SiC(000-1) with surface steps: Ab initio-based approach

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Th-P-92LN

Canceled

Track 03 Extended Defects (Poster-C, G403+G404)

Th-P-77

Dislocation Engineering of Basal Plane Dislocations in 4H-SiC Substrates using High-Temperature Annealing

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Th-P-78

Formation Mechanism of Duple-Basal Plane Dislocations in 4H-SiC Epitaxial Layers

○ Lin Dong¹, Valeria Dellien Roempler¹, Stefan Nufer¹

1. Robert Bosch GmbH

Th-P-79

Structural Analysis of Unconverted Basal Plane Dislocations at 4H-SiC Epitaxial/Substrate Interface

○ Hideki Sako¹, Shohei Hayashi¹, Ohira Kentaro², Daisuke Bizen², Kenji Kobayashi², Noriyuki Hasuie³, Toshiyuki Isshiki³

1. Toray Research Center, Inc., 2. Hitachi High-Tech Corp., 3. Kyoto Institute of Technology

Th-P-80

On the Critical Threshold for the Expansion of a Single Shockley-Type Stacking Fault in n-Type 4H-SiC

○ Yasuyuki Igarashi¹, Hiroumi Matsui¹

1. ITES Co., Ltd.

Th-P-81

Structural Analysis of Stacking Fault Complexes with Different Characteristics in 4H-SiC Epitaxial Wafer

○ Shohei Hayashi¹, Junji Senzaki²

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Th-P-82

Half-loop Arrays Induced by the Close-up Micropipe-Twins Including a-component in 4H-SiC Substrate

○ Ryo Hattori¹, Tomoyuki Uchida², Ryuichi Sugie³

1. Ceramic Forum, Inc., 2. Toray Research Center, Inc., 3. Ritsumeikan University

Th-P-83

Dislocation Strain Energy and Micropipe Formation by MD Simulation

○ Georg Holub^{1, 2}, Lorenz Romaner^{1, 2}

1. Technical Univ. of Leoben, 2. Christian Doppler Lab. for Advanced Computational Design of Crystal Growth

Th-P-84

Thermal Annealing Induced Dislocation Phenomena in 4H-SiC Substrates Using 2D&3D XRT Analysis

Gyeong-Mi Hwang¹, Jae-Hwan Kim^{1, 2}, Shunta Harada³, Paul Wimmer⁴, Christian Kranert⁴, Won-Jae Lee⁵, Jung-Gyu Kim⁶, Yeon-Suk Jang⁶, Seong-Min Jeong¹, ○ Yun-Ji Shin¹

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Th-P-85

Comparative Study of Crystal Defect Imaging in 4H-SiC Wafers Using Synchrotron X-ray Topography, Optical Inspection, and Multiphoton Photoluminescence

○ Jiayi Liang¹, Yuhui Huang¹, Hirofumi Hoshida², Shota Fujiki², Takayoshi Shimura^{1, 3}

1. Waseda Univ., 2. Lasertec Corp., 3. RIKEN SPring-8 Center

Th-P-86

A SWB-XRT study of defects within trench refill epitaxy for 4H-SiC superjunctions

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Th-P-93LN

Effect of Post Epi Processing on Changes in Lattice Distortion in Thick 4H-SiC Epitaxial Wafers for High-Voltage Power Devices

Kaixuan Zhang¹, Zeyu Chen¹, Jianpei Zhang¹, Haochi Wang¹, Jaehyun Suh¹, Aleksander Imhof², Nadeem Mahadik², Ryan Branco³, Dong Lee³, Shanthi Subramanian³, Mehrnegar Aghayan⁴, Robert Gossman⁴, ○ Balaji Raghothamachar¹, Michael Dudley¹

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Th-P-94LN

Contrasting Effects of Stopped and Through-Wafer Proton Implantation on Shockley Stacking-Fault Expansion in 4H-SiC

○ Kazumi Takano¹, Yasuyuki Igarashi¹, Yohsuke Matsushita¹, Takuya Morita¹, Hiroumi Matsui¹

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Track 05 MOS Gate Stack Processing and Characterization (Poster-A, 1st Floor)

Th-P-01

A Correction Method for Interface-State Analysis in TCAD Modeling of 4H-SiC MOSFET Transfer Characteristics

○ Sozo Kanie¹, Shunsuke Asaba¹, Rintaro Miyata¹, Katsuhisa Tanaka¹

1. *Toshiba Electronic Devices & Storage Corporation*

Th-P-02

TCAD Modelling of the SiO₂/4H-SiC Interface and Threshold-Voltage Degradation in SiC Planar MOSFETs

Xiao Xiong¹, Huang Zhongtian², Konstantinos Zaoskoufis¹, Solon A. Christodoulou¹, Asad Fayyaz², Paul Evans², Ke Li², Munaf Rahimo³, Iulian Nistor³, ○ Neophytos Lophitis¹

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Th-P-03

TCAD Simulations of 4H-SiC MOS Transistors: Dependence on Oxide Interface and Temperature

○ Axel Hartmann¹, Christophe Pixius¹, Mathias Rommel¹

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Th-P-04

Conduction-Band-Side Interface States and Their Reactions with NO Post-Oxidation Anneal Revealed by Electrically-Detected -Magnetic-Resonance (EDMR) Spectroscopy

○ Keigo Adachi¹, Bunta Shimabukuro¹, Mitsuru Sometani², Hirohisa Hira², Heiji Watanabe³, Takahide Umeda¹

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Th-P-05

Surface Sensitive Raman and Photoluminescence Study of the SiO₂/SiC Interface

○ Immo Erdmann¹, Helton Goncalves de Medeiros¹, Pietro Marabotti², Marianne Etzelmüller Bathen³, Sebastian Heeg², Ulrike Grossner¹

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Th-P-06

Non-contact Electrical Characterization of Oxidized p-type 4H SiC Using Corona C-V Metrology

○ Marshall Wilson¹, Robin Karhu², Mathias Rommel², Jannik Schwarberg³, Bradley Wilson¹, Joanna Wincukiewicz¹, Adam Wincukiewicz¹, Ivan Shekerov¹

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Th-P-07

Capacitive response of deep traps in implanted p-MOS by frequency-dependent and quasi-static measurements at low temperature or under UV illumination

Marco Zignale¹, ○ Patrick Fiorenza¹, Valeria Puglisi², Paola Mancuso², Simone Rascunà², Mario Saggio², Marilena Vivona¹, Filippo Giannazzo¹, Fabrizio Roccaforte¹

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Th-P-08

Fabrication and Characterization of p-Channel MOSFETs on a Solution-Grown 4H-SiC Wafer

○ Kota Mano¹, Taisei Ozaki², Shunto Higashi², Yu Matsuda¹, Tomonori Umezaki¹, Shin-ichiro Kuroki²

1. *Central Glass Corp. Ltd.*, 2. *Hiroshima Univ.*

Track 06 Implantation, Contacts, Etching, and Other Processes (Poster-A, 1st Floor)

Th-P-09

High-Voltage 4H-SiC PiN Diodes: Ion Implantation vs. Epitaxial Growth for Wide-Temperature Operation

○ Alfio Samuele Mancuso^{1, 2}, Saverio De Luca², Enrico Sangregorio², Annamaria Muoio², Erik Gallo³, Eleonora Quadri³, Silvia Vanellone³, Antonio Trotta³, Marco Mauceri⁴, Salvatore Tudisco⁵, Francesco La Via²

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Th-P-10

Optimization of Ion Implantation for Suppressing Stacking Fault Expansion in 4H-SiC

○ Tong Li¹, Hitoshi Sakane², Shunta Harada³, Masashi Kato¹

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Th-P-11

Structural and Electrical Characterization of He Ion Implanted 4H-SiC

○ Ben J. Sekely¹, Cory D. Cress¹, Jeffery M. Woodward¹, Daniel J. Pennachio¹, Ignas Lekavicius¹, Jenifer R. Hajzus¹, Rachael L. Myers-Ward¹

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Th-P-12

Implant Annealing of 4H SiC Using a Standard RTP Platform System

○ Peter Benkart¹, David Mendler², Thorsten Hülsmann³, Philipp Fricker³, Michael Storek³

1. *Mattson International GmbH*, 2. *Infineon Technologies Austria AG*, 3. *Mattson Thermal Products GmbH*

Th-P-13

Medeor™ Non-Uniform Ion Implantation for Device Performance and Yield Enhancement in SiC Power Devices

○ Nan Zheng¹, Supakit Charnvanichborikarn¹, Tyler Wills¹, Scott Oleson¹, Hans Gossmann¹, Xiangdong He¹, Shan Tang¹, William Bogiages¹, Pratim Palit¹, Jonathan Lowder¹, Shardul Patel¹, Wei Zou¹, Jay Scheuer¹

1. *Applied Materials, Inc.*

Th-P-14

Technology Development of Implantation Masks for a Multi Epitaxy, Multi Implant Approach for 4H-SiC Superjunction Drift Zones

○ Janina Engelhardt¹, Oleg Rusch¹, Volker Häublein¹, Nikolas Schabert¹, Rupert Ullmann², Philip Hens², Birgit Kallinger¹, Michael Jank¹

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Th-P-15

Monitoring Low-Dose Ion Implantation in 4H-SiC Wafers Using Photomodulated Reflectance Technique

○ Laszlo Balogh¹, Denes Ullrich^{1, 2}, Janos Szivos¹, Zoltan Bozoki¹, Gaszton Vizsnyiczai¹, Bence Mate Kovacs¹, Ors Seps¹, Jeong Hyun Moon³

1. *Semilab Corp.*, 2. *Budapest University of Technology and Economics*, 3. *Korea Electrotechnology Research Inst.*

Th-P-16

Effect of Sputter-Deposited Carbon Capping on Surface Stability and Interface Trap Suppression in 4H-SiC

○ Jaeyoon Kim¹, Yehwan Kang¹, Junghyun Moon², Denes Ullrich³, Janos Szivos³, Laszlo Balogh³, Zoltan Bozoki³, Changheon Yang¹

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Th-P-17

Formation of highly doped p-type junctions in SiC via laser-assisted implantation, followed by microsecond (μ s) UV laser annealing

Zeinab CHEHAD¹, [○] Shintaro Hirano², Tae-Hoon Huh², Akichika Oono², Anthony Albanese¹, Yoshiaki Inda², Junichiro Mitsui², Abderazek Talbi¹, Yoji Kawasaki², Louis Thuries¹
1. Sumitomo (SHI) Material Solutions Europe SASU, 2. Sumitomo Heavy Industries Material Solutions Co., Ltd.

Th-P-18

Effect of Ion Implantation on Thermal Oxidation in n-Type 4H-SiC

[○] An Min Amanda Lee^{1, 2}, Jinlong Liu^{2, 1}, Zirui Tan^{2, 1}, Shiv Kumar¹, Eng Soon Tok², Umesh Chand¹, Woo Bin Song¹, Xiao Gong¹, Navab Singh¹, Yee-Chia Yeo^{1, 3}
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Th-P-19

Thermal Probe (TP) Measurements for Ion Implantation Monitoring on Silicon Carbide Substrates

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Th-P-88LN

Canceled

Track 07 Power Devices (Poster-B, G401+G402)

Th-P-30

A Novel Process for Fabricating Thick Bottom OXide (TBOX) UMOSFET on 4H-SiC

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1. National Yang Ming Chiao Tung Univ., 2. Hon Hai Research Inst.

Th-P-31

Interface Engineering of 4H-SiC Schottky Barrier Diodes using Molecular Surface Modification for Superior Electrical Performance

[○] Shivansh Tiwari¹, Tejas R. Naik¹, Kamlesh Bhatt¹, Manish Singh Rautela¹, Satwik Mahasha¹, Rajendra Singh¹
1. Indian Institute of Technology Delhi

Th-P-32

Edge Termination Optimization in 1200V 4H-SiC Devices

[○] Naeem Islam¹, Jae-Hyung Park¹, Woongsun Kim¹, Jeff Joohyung Kim¹, Ayan Biswas¹, Sei-Hyung Ryu¹
1. WolfSpeed Inc.

Th-P-33

A Robust Trench Ring-Assisted Junction Termination Extension on a PN Multi-Epitaxial Layer for 6.5 kV-class SiC PiN Diodes

[○] Jeongtae Kim¹, Sumin Park¹, Wonyoung Shin¹, Juhui Kim¹, Sihyun Kwon¹, Ogyun Seok¹
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Th-P-34

Canceled

Th-P-35

Correlation Between Forward Voltage Drift and 1SSF in 4H-SiC Power Diodes

[○] Cristiano Calabretta¹, Camille Vuylstecker¹, Adrien Marchadier¹, Alice Lombardo¹, Nicolò Piluso¹, Giuseppe Arena¹, Andrea Severino¹
1. Ind. STMicroelectronics

Th-P-36

Performance Optimization and Tradeoffs of 30kV-rated 4H-SiC Epitaxial-Anode and Implanted-Anode PiN Junction Diodes

[○] Giorgian Borca-Tasciuc¹, Zhaowen He¹, Collin Hitchcock¹, Nick LaBry¹, T. Paul Chow¹
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Th-P-37

First Demonstration of 200mm Wafer Level 6.5 kV-Class 4-H SiC PiN Diodes

[○] Xinghua Wang¹, Zhaoxue Yuan^{2, 3}, Xiaolin Wang^{1, 3}, Abhishek Mishra¹, Yu-Chieh Chieh¹, Peter Gammon², Marina Antoniou², Weijie Wang¹, Nikolaos Iosifidis², Zijie Zheng^{1, 3}, Arne Renz², Qin Gui Voo¹, Shiv Kumar¹, Umesh Chand¹, Leming Jiao^{1, 3}, Runze Wang¹, Arvind Sundaram¹, Liyuan Liu¹, Xiao Gong^{1, 3}, Navab Singh¹, Yee Chia Yeo^{1, 3}
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Th-P-38

Bevel Angle Design Method Based on Fabrication Limits of Vertical GaN PIN Diodes

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1. Pusan National University

Th-P-39

Si-content effects on aerosol-deposited Ga₂O₃/4H-SiC Schottky diodes

Chang-Jun Park¹, [○] Geon-Hee Lee¹, Jin-Woo Choi¹, Hyeon-Do Kang¹, Sabeen Hwang¹, Tae-Yeong Yoon¹, Sang-Mo Koo¹
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Th-P-40

Effects of Powder Sintering Temperature and Tin (Sn) Ratio on Electrical Characteristics and Leakage Mechanism in Vertical Ga₂O₃/4H-SiC Schottky Diodes Fabricated by Aerosol Deposition

[○] Jin-Woo Choi¹, Minseok Kim¹, Hyeon-Do Kang¹, Chang-Jun Park¹, Sa-Been Hwang¹, Chowdam Venkata Prasad¹, Sang-Mo Koo¹
1. Kwangwoon Univ.

Th-P-41

Annealing-Driven Interface Engineering of Ni/(Al_{0.4}Ga_{0.6})₂O₃/4H-SiC Heterojunction Power Diodes

[○] Minseok Kim¹, Chowdam Venkata Prasad¹, Hyeon-Do Kang¹, Jin-Woo Choi¹, Chang-Jun Park¹, Geon-Hee Lee¹, Kung-Yen Lee², Sang-Mo Koo¹
1. Kwangwoon Univ., 2. National Taiwan Univ.

Th-P-42

Optically-Switched 4H-SiC Power Bipolar Junction Transistor (BJT) - Influence of the device design

[○] Dominique Planson¹, Camille Sonnevill¹, Pascal Bevilacqua¹, Enora Vuillermet¹, Luong Viet Phung¹, Pierre Brosselard¹, Mihai Lazar², Bertrand Vergne³, Sigo Scharnholz², Herve Morel¹
1. Lab. Ampere, 2. Lab. L2n, 3. Inst. Saint-Louis

Track 08 RF, High-Temp., and Rad-Hard Devices and ICs (Poster-B, G401+G402)

Th-P-43

Radiation Hardening of 4H-SiC Photodiode by Dummy Interconnects

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Th-P-44

Towards the development of SiC Low-Gain Avalanche Diodes for fast timing applications in harsh environment

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Th-P-45

256-Pixel 4H-SiC UV CMOS Image Sensor for Harsh Environment Applications

○ Tatsuya Meguro¹, Taketo Yamamoto¹, Tomonori Maeda^{1, 2}, Hiroshi Sezaki^{1, 2}, Akinori Takeyama³, Takeshi Ohshima³, Kazutoshi Kojima⁴, Yasunori Tanaka⁴, Shin-Ichiro Kuroki¹

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Th-P-46

On-Wafer 25 °C Comparison Study of IC-Processed 4H-SiC Extreme Environment Resistive Sensor Bridge Designs

○ Philip Neudeck¹, David Spry¹, Carl Chang²

1.NASA Glenn Research Center, 2.HX5 LLC

Th-P-47

773 K Operation Characteristics of 4H-SiC Phorodiodes

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Th-P-48

400oC High Temperature and 125 hours Operation of 4H-SiC CMOS Operational Amplifier Circuits

○ Dung Anh Nguyen¹, Kazutoshi Kojima², Seiji Ishikawa^{1, 3}, Tomonori Maeda^{1, 3}, Hiroshi Sezaki^{1, 3}, Shin-Ichiro Kuroki¹

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Th-P-49

Suppression of short channel effects by the LDD structure in 4H-SiC n-MOSFETs up to 500 °C environments

○ Kota Shimizu¹, Kosuke Muraoka¹, Akinori Takeyama², Takeshi Ohshima², Kazutoshi Kojima³, Yasunori Tanaka³, Shin-Ichiro Kuroki¹

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Track 09 Device and Module Reliability, Packaging, and Applications (Poster-B, G401+G402)

Th-P-50

Evolution of Bipolar Degradation over Time and Its Influence on Short Circuit Behavior

○ Clemens Herrmann¹, Jonas Prenzel¹, Christian Bäumler¹, Rudolf Elpelt², Larissa Wehrhahn-Kilian², Thomas Basler¹

1.Chemnitz Univ. of Tech., 2 Infineon Tech. AG

Th-P-51

Combining Optical Binning and Engineered SmartSiCTM Substrates for Superior MOSFET Ruggedness to Bipolar Degradation

○ Tommaso Stecconi¹, Roger Stark¹, Paula Diaz Reigosa¹, Nick Schneider¹, Nicolo Oliva¹, Coris Li², Leon Liang², Eric Guiot³, Alexandre Vaufredaz³, Ngosse Top³, Lars Knoll¹

1.SwissSEM Technologies AG, 2.Sun.King Pacific Semiconductor Technology, 3.SOITEC

Th-P-52

Short Circuit of Bipolar Degraded Devices: Lateral Temperature Profile, Metallization Imprint, and Saturation-Current Decrease

○ Christian Bäumler¹, Clemens Herrmann¹, Jonas Prenzel¹, Thomas Basler¹

1.Chemnitz University of Technology

Th-P-53

Accurate Temperature-Dependent SiC MOSFET Model for Short Circuit Simulation of Parallel Devices

○ Giuseppe Strollo¹, Anja Brandl¹, Michel Nagel¹, Ivana Kovacevic¹, Ulrike Grossner¹

1.APS - ETH Zurich

Th-P-54

Comparison of Ruggedness of Surge-, Unclamped Inductive Switching- and Short Circuit-Stress in 4H-SiC MOSFETs

○ Philipp Steinmann¹, Ramona Buckreus¹, Sabrina Ulmer¹, Tugrul Sahin¹

1.Robert Bosch GmbH

Th-P-55

Reliability Impact of Laser-Sawing-Induced Sidewall Damage and Backside Recast Residue in SiC MOSFET Packaging

○ Pei-Huan Lee¹, Hong-Rui Huang¹, Chien-Hsiung Huang¹, Cheng-Yen Lin¹, Yu-Hsien Lai¹, Hsin-Chung Tsai¹, Hyper Chang¹

1.ACTRON TECHNOLOGY Corp.

Th-P-56

A Novel 4H-SiC-Based ESD NPN Protection Circuit with Reduced Trigger Voltage and Improved Second breakdown Current

○ bobae Song¹, youngchul Kim¹, jongmin Kim¹, hyunchul Nah¹, heebae Lee¹, sanggi Lee¹

1.DB Hitek

Th-P-57

Surface Features Associated with Body Diode Current

○ Sujitra Pookpanratana¹, Muhammad Waqas Khaliq^{1, 2}, Andrew J. Winchester¹, Valerie Hoang^{1, 3}, Tyler Gervasio¹, Michael Lloyd¹, Gelu Comanescu¹, Albert Davydov¹, Behrang Hamadani¹

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Track 10 Quantum Applications and Sensors (Poster-A, 1st Floor)

Th-P-20

Large Area 4H-SiC Schottky Barrier Diodes for the Detection of Fast Neutrons

○ Jarod Remy¹, Ethan Schieb¹, Raymond Cao¹

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Th-P-21

Integrated ΔE/E detector realization and testing for nuclear physics experiments

○ Francesco La Via¹, G. M. Falciglia², Alfio Samuele Mancuso¹, Carmen Altana², Saverio De Luca¹, Enrico Sangregorio¹, Giuseppe Sapienza², Marco Mauceri³, Salvatore Tudisco²

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Th-P-22

Multi-Source Reverse-Bias Study of a 100- μ m 4H-SiC P-i-N Detector: From UV-TCT to D-T Neutron Response

○ Alfio Samuele Mancuso^{1, 2}, Ivan Lopez Paz³, Matteo Hakeem Kushoro^{4, 5}, Saverio De Luca², Erik Gallo⁶, Marcio Jiménez³, Neil Moffat³, Annamaria Muoio², Giulio Pellegrini³, Martín Pérez^{7, 8}, Eleonora Quadri⁶, Enrico Sangregorio², Antonio Trotta⁶, Salvatore Tudisco⁹, Silvia Vanellone⁶, Francesco La Via²

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Th-P-23

Transient Charge Collection in Ultra-Thin SiC Membranes for Single-Ion Detection

○ Enrico Sangregorio¹, Alfio Samuele Mancuso², Saverio De Luca¹, Annamaria Muoio¹, Lucia Calcagno², Francesco La Via¹

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Th-P-24

Canceled

Th-P-25

Canceled

Th-P-26

Characterization of Fluence-Dependent Defect Formation in Diamond Toward Fluorescence-Based Fast-Neutron Dosimetry

○ Luke Shoen¹, Andrew Tong², Jack Lanza¹, Jennifer Choy², Raymond Cao¹

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Th-P-27

Magnetic Field Imaging of Electrical Signals using quantum SiC microscope (QSiCM)

○ Andrei N. Anisimov¹, Ayisha Suhana, Tatiana Aureliia Uaman Svetikova, Christof Schneider, Manfred Helm, Georgy V. Astakhov

1.Helmholtz-Zentrum Dresden-Rossendorf

Th-P-28

Optically Detected Magnetic Resonance of Silicon Vacancies in 4H-SiC Formed by High Fluence Electron Irradiation

○ Akinori Nishimoto^{1, 2}, Shin-ichiro Sato², Koichi Murata³, Masafumi Hanawa³, Hidekazu Tsuchida³, Seiichi Saiki², Yuichi Yamazaki², Takeshi Ohshima^{2, 4}, Yasuto Hijikata¹

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