

International Conference on Silicon Carbide and Related Materials 2022

Selected peer-reviewed extended articles
based on abstracts presented at the
19th International Conference on
Silicon Carbide and Related Materials
(ICSCRM) 2022
11-16 September 2022, Davos, Switzerland

Edited by

Juraj Marek, Gregor Pobegen and Ulrike Grossner

■
■ *Scientific.Net* ■
■

Copyright © 2023 Trans Tech Publications Ltd, Switzerland

Trans Tech Publications Ltd
Seestrasse 24c
CH-8806 Baech
Switzerland
<https://www.scientific.net>

ISBN 978-3-0364-0167-6

Full text available online at <https://www.scientific.net>

Distributed worldwide by
Trans Tech Publications Ltd
Seestrasse 24c
CH-8806 Baech
Switzerland
Phone: +41 (44) 922 10 22
e-mail: sales@scientific.net

Printed with permission by
Curran Associates Inc. (2023)

CURRAN ASSOCIATES INC.
proceedings
.com

Additional copies of this
publication are available from:

Web: www.proceedings.com/70279.html

Table of Contents

Preface	v
Committees, Sponsors	vi
Chapter 1: Growth and Wafer Manufacturing	
Epitaxial Growth of Boron Carbide on 4H-SiC Y. Benamra, L. Auvray, J. Andrieux, F. Cauwet, M. Alegre, F. Lloret, D. Araujo, M. Gutierrez and G. Ferro.....	3
Transfer of Heteroepitaxial Grown 3C-SiC Layers for Application in Optical Frequency Combs M. Kollmuss, X.D. Shi, H.Y. Ou and P.J. Wellmann.....	9
Prevention of Bunched Basal Plane Dislocation Arrays in 4H-SiC PVT-Growth J. Steiner, B.D. Nguyen, S. Sandfeld and P.J. Wellmann.....	15
Suppression of In-Grown SF Formation and BPD Propagation in 4H-SiC Epitaxial Layer by Sublimating Sub-Surface Damage before the Growth K. Toda, D. Dojima, K. Kojima, H. Mihara, S. Mitani and T. Kaneko.....	21
Improvement of the Conformational Stability of 150 mm 4H SiC Wafers I. Manning, J. Searson, K. Moeggenborg, M. Gave, G. Chung and E. Sanchez	27
Ni-Silicide Ohmic Contacts on 4H-SiC Formed by Multi Pulse Excimer Laser Annealing P. Badalà, I. Deretzis, S. Sanzaro, F.M. Pennisi, C. Bongiorno, G. Fiscaro, S. Rascunà, G. Bellocchi, A. Bassi, M. Boscaglia, D. Pagano, P. Vasquez, M. Enachescu, A. Alberti and A. La Magna.....	32
High Quality Single Crystal Recrystallization of Thin 4H-SiC Films Deposited by PVD Techniques, a way for New Emerging Fields E. Usureau, E. Vuillermet, M. Lazar, A. Andrieux and A. Jacquemot.....	40
<i>In Situ</i> Monitoring of the Ambient Gas Phase during PVT Growth of Nominally Undoped High Resistivity SiC Boules J. Ihle and P.J. Wellmann.....	48
Effect of Sub-Surface Damage Layer Removal by Sublimation Etching of 4H-SiC Bulk Wafers on PL Imaging of Crystal Defect Visibility D. Dojima, M. Maki, D. Dansako, K. Toda and T. Kaneko	54
Study of GHz-Burst Femtosecond Laser Micro-Punching of 4H-SiC Wafers H. Mir, F. Meyer, A.A. Brand, K. Erath-Dulitz and J.F. Nekarda.....	62
3C-SiC Island Growth on 4H-SiC Terraces: Statistical Evidence for the Orientation Selection Rule B.J. Van Zeghbroeck and D.C. Bobela.....	67
Temperature Gradient Control with an Air-Pocket Design for Growth of High Quality SiC Crystal S. Lee, S. Kim, J. Choi, J. Park, J. Seo, M. Kyun, J. Kim, K. Ku, Y.S. Jang and W.J. Lee.....	72

Development of High Quality 8 Inch 4H-SiC Substrates X.L. Yang, Y.N. Pan, C. Gao, Q.R. Liang, L.P. Wang, J.Y. Zhang, Y.H. Gao, X.X. Ning and H.Y. Zhang	78
4H-SiC Full Wafer Mapping Image of CMP-Finished Sub-Surface Damage by Laser Light Scattering D. Dojima, D. Dansako, M. Maki, K. Toda and T. Kaneko	84
Tailored Polycrystalline Substrate for SmartSiC™ Substrates Enabling High Performance Power Devices H. Biard, S. Odoul, W. Schwarzenbach, I. Radu, C. Maleville, A. Potier, M. Ferrato and E. Guajioty	92
Investigation of the Nucleation Process during the Initial Stage of PVT Growth of 4H-SiC S. Strüber, M. Arzig, J. Steiner, M. Salamon, N. Uhlmann and P.J. Wellmann.....	98
Study on Estimation of Device Yield in Non-Epitaxial 4H-SiC Material Relating to Defect Densities Influencing Bipolar Degradation with XRT- Measurements H. Jayaprakash, C. Csato, T. Erlbacher, C. Kranert, F. Krippendorf, P. Wimmer, C. Reimann and M. Rueb.....	104
Al Implantation in SiC; Where Will the Ions Come to Rest? M.K. Linnarsson, L. Vines and A. Hallén	109
High-Speed Plasma Etching of Gallium Oxide Substrates Using Atmospheric- Pressure Plasma with Hydrogen-Helium Mixed Gas Y. Sano, T. Sai, G. Nakaue, D. Toh and K. Yamauchi.....	117
Transport Phenomena during Liquid Si-Induced 4H-SiC Surface Structuring in a Sandwich Configuration Y. Jousseau, F. Cauwet and G. Ferro.....	121
Surface-Localized 15R Formation on 4H-SiC (0001) Si-Face by Laser Annealing for Power N-Type MOSFETs F. Rozé, T. Tabata, S. Kerdilès, L. M. Rubin, P. Raynal, P. Acosta-Alba, D. Roh, M. Opprecht and F. Mazzamuto	127
Exploring UV-Laser Effects on Al-Implanted 4H-SiC M. Vivona, F. Giannazzo, G. Bellocchi, S. Panasci, S. Agnello, P. Badalà, A. Bassi, C. Bongiorno, S. Di Franco, S. Rascunà and F. Roccaforte	132
Benchmarking Experiment of Substrate Quality including SmartSiC™ Wafers by Epitaxy in a Batch Reactor B. Kallinger, P. Hens, C. Kranert, K.M. Albrecht and J. Erlekampf.....	137
Optimizing Non-Contact Doping and Electrical Defect Metrology for Production of SiC Epitaxial Wafers V. Pushkarev, T. Rana, M. Gave, E. Sanchez, A. Savtchouk, M. Wilson, D. Marinskiy and J. Lagowski	145
Quality Evaluation of 150 mm 4H-SiC Grown at over 1.5 mm/h by High- Temperature Chemical Vapor Deposition Method T. Okamoto, H. Uehigashi, T. Kanda, N. Ohya, A. Horiai, S. Sakakibara, T. Kanemura, K. Betsuyaku, N. Hoshino, I. Kamata and H. Tsuchida	151
Deep Level Reduction in 4H-SiC Treated by Plasma Immersion G. Alfieri and L. Knoll.....	159

Improving the Polishing Speed and Surface Quality of 4H-SiC Wafers with an MnO₂- Based Slurry	
T. Nakamura, A. Kumagai, Y. Saruwatari and S. Hara	164
 Chapter 2: Material Characterization	
Temperature Dependent Electrical Properties of N-Type 4H-SiC Substrates	
D.J. Lichtenwalner, J.H. Park, S. Rogers, H. Dixit, A. Scholtze, S. Bubel and S.H. Ryu.....	171
Controlled Macrostepping of Si-Face 4°off 4H-SiC over a Large Area via Liquid Si-Induced Reconstruction	
Y. Jousseau, F. Cauwet, J. Woerle, U. Grossner, S. Aslanidou, G. Rius, P. Godignon and G. Ferro	176
Evaluation of Hysteresis Response in Achiral Edges of Graphene Nanoribbons on Semi-Insulating SiC	
S. Mathew, S. Abedin, V. Kurtash, S.P. Lebedev, A.A. Lebedev, B. Hähnlein, J. Stauffenberg, H.O. Jacobs and J. Pezoldt.....	182
Quantification of Secondary Electron Doping Contrast in the Scanning Electron Microscope on 4H-SiC	
M. Moser, G. Pobegen and J. Smoliner	190
PL Signatures from Decoration of Dislocations in SiC Substrates and Epitaxial Wafers	
G. Chung, C. Lee, A. Soukhojak and T. Rana	197
Light Extraction from 4H Silicon Carbide by Nanostructuring the Surface with High Temperature Annealing	
E. Vuillermet, E. Usureau, M. Lazar and R. Deturche	202
Characterization of Prismatic Slip in SiC Crystals by Chemical Etching Method	
S.S. Hu, S. Fang, Y.F. Liu, Q.Y. Cheng, H.Y. Peng, Z.Y. Chen, Y.H. Gao, C. Gao, B. Raghochamachar and M. Dudley.....	210
Recent Progress in Non-Contact Electrical Characterization for SiC and Related Compounds	
A. Savtchouk, M. Wilson, D. Marinskiy, B. Schrayner, C. Almeida and J. Lagowski	216
Correlation between Q-Factor and Residual Stress in Epitaxial 3C-SiC Double-Clamped Beam Resonators	
S. Sapienza, M. Ferri, L. Belsito, D. Marini, M. Zielinski, F. La Via and A. Roncaglia	222
Selective Oxidation during AFM Electrical Characterization of Doped SiC Layers	
R.C. Germanicus, A. Boumaarouf, C. Villeneuve-Faure, V.A. Shah, P.M. Gammon and U. Lüders.....	227
Evaluation of Crystal Quality and Dopant Activation of Smart Cut™ - Transferred 4H-SiC Thin Film	
G. Gelineau, J. Widiez, E. Rolland, K. Vladimirova, A. Moulin, V. Prudkovskiy, N. Troutot, P. Gergaud, D. Mariolle, S. Barbet, V. Amalbert, G. Lapertot, K. Mony, S. Rouchier, R. Boulet, G. Berre, W. Schwarzenbach and Y. Bogumilowicz.....	234
Accurate Determination of the Temperature Dependence of the Refractive Index of 4H-SiC at the Wavelength of 632 nm	
E.D. Malmemace, S. Rao, M. Casalino, M. Iodice, G. Faggio, G. Messina and F.G. Della Corte.....	243

Chapter 3: Defects

Correlation of Extended Defects with Electrical Yield of SiC MOSFET Devices
 D. Baierhofer, B. Thomas, F. Staiger, B. Marchetti, C. Förster and T. Erlbacher..... 251

Strain-Dependent Photoluminescence Line Shifts of the TS Color Center in 4H-SiC
 J.A.F. Lehmeyer, A. Fuchs, T. Borntträger, M. Popp, H.B. Weber and M. Krieger..... 257

Minority Carrier Traps Induced by Neutron Reactions with 4H-SiC
 M. Belanche, M.E. Bathen, P. Kumar, C. Dorfer, C. Martinella and U. Grossner..... 262

Stacking Faults Originating from Star-Defects in 4H-SiC
 S. El Hageali, N. Mahadik, R. Stahlbush, H. Guthrey, S. Johnston, J. Soto, B. Odekirk,
 B. Gorman and M. Al-Jassim 268

P-Type Impurities in 4H-SiC Calculated Using Density Functional Theory
 N. Smith, M. Weger, G. Pobegen and A.L. Shluger..... 273

Charge State Control over Point Defects in SiC Devices
 M.E. Bathen, G.M. Selnesaunet, M.J. Enga, S.B. Kjeldby, J. Müting, L. Vines
 and U. Grossner..... 281

**Investigation of Defect Generation and Propagation in Electrically and Photonically
 Stressed Silicon Carbide**
 H.Y. Peng, Y.F. Liu, Z.Y. Chen, Q.Y. Cheng, S.S. Hu, J. Watson, K. Sampayan,
 S. Sampayan, B. Raghathamachar and M. Dudley..... 289

**The Optical Properties of the Carbon Di-Vacancy-Antisite Complex in the Light of
 the TS Photoluminescence Center**
 M. Schober, N. Jungwirth, T. Kobayashi, J.A.F. Lehmeyer, M. Krieger, H.B. Weber
 and M. Bockstedte..... 296

**Basal Plane Dislocation Slip Band Characterization and Epitaxial Propagation in
 4H SiC**
 G. Chung, R. Viveros, C. Lee, A. Soukhovjak, V. Pushkarev, Q.Y. Cheng,
 B. Raghathamachar and M. Dudley..... 302

**High Sensitivity Surface Defect Inspection of SiC and SmartSiC™ Substrates Using
 a DUV Laser-Based System**
 E. Cela, S. Shahidi, P. Parangi, R. Shrestha, G. Simpson, J. Widiez, N. Daval,
 A. Chapelle, S. Rouchier and W. Schwarzenbach..... 308

Study of Defects in 4H-SiC Epitaxy at Various Buffer Layer Growth Conditions
 T. Rana, J. Wu, G. Chung, K. Moeggenborg and M. Gave..... 313

S-EVC Method for Sorting Wafers with Defects that Extend to Bar Shaped SSFs
 K. Takano, Y. Matsushita and Y. Igarashi..... 319

**Analysis of Basal Plane Dislocation Motion Induced by p+ Ion Implantation Using
 Synchrotron X-Ray Topography**
 Z.Y. Chen, Y.F. Liu, H.Y. Peng, Q.Y. Cheng, S.S. Hu, B. Raghathamachar,
 M. Dudley, S.A. Mancini, S.Y. Jang and W. Sung..... 325

**The Development of the Advanced Inspection System to Screen out the BPDs that
 Extend to Bar Shaped SSFs under Forward Biasing**
 Y. Igarashi, K. Takano, Y. Matsushita and C. Shibata..... 333

Chapter 4: X-ray Analysis**Implementation of Large Scale Deep Learning Non-Destructive Methods for Characterizing 4H-SiC Materials**

R. Leonard, M. Conrad, E. Van Brunt, J. Witry and E. Balkas 343

Analysis of Strain in Ion Implanted 4H-SiC by Fringes Observed in Synchrotron X-Ray Topography

Z.Y. Chen, Y.F. Liu, H.Y. Peng, Q.Y. Cheng, S.S. Hu, B. Raghathamachar, M. Dudley, R. Ghandi, S. Kennerly and P. Thieberger 350

Effective Penetration Depth Investigation for Frank Type Dislocation (Deflected TSDs/TMDs) on Grazing Incidence Synchrotron X-Ray Topographs of 4H-SiC Wafers

Q.Y. Cheng, H.Y. Peng, Z.Y. Chen, S.S. Hu, Y.F. Liu, B. Raghathamachar and M. Dudley 356

Evaluation of Strain in 3C-SiC/Si Epiwafers from X-Ray Diffraction Measurements

M. Zielinski, M. Bussel, H. Mank, S. Monnoye, M. Portail, A. Michon, Y. Cordier, V. Scuderi and F. La Via 364

Chapter 5: MOS Interfaces and Processes**Outlook for Dielectric/SiC Interfaces for Future Generation MOSFETs**

D.J. Lichtenwalner, S.H. Ryu, B. Hull, S. Allen and J.W. Palmour 371

Passivation of Very Fast Near-Interface Traps at the 4H-SiC/SiO₂ Interface Using Sodium Enhanced Oxidation

A.M. Vidarsson, D. Haasmann, S. Dimitrijevic and E.Ö. Sveinbjörnsson 379

Influence of Post-Ion-Implantation Annealing Temperature on the Characteristics of Gate Oxide on 4H Silicon Carbide

L.J. Lin and B.Y. Tsui 384

Evolution of Interface State Density and Near Interface Oxide Traps under Controlled Nitric Oxide Annealing in SiO₂/SiC Lateral MOSFETs

P. Fiorenza, M. Camalleri, L. Scalia, E. Zanetti, M. Saggio, F. Giannazzo and F. Roccaforte 389

Oxide and Interface Defect Analysis of lateral 4H-SiC MOSFETs through CV Characterization and TCAD Simulations

A. Vasilev, M.W. Feil, C. Schleich, B. Stampfer, G. Rzepa, G. Pobegen, T. Grasser and M. Wältl 394

The Influence of Extended Defects in 4H-SiC Epitaxial Layers on Gate Oxide Performance and Reliability

H. Schlichting, M. Lim, T. Becker, B. Kallinger and T. Erlbacher 402

NO Annealing Simulation of 4H-SiC/SiO₂ by Charge-Transfer Type Molecular Dynamics

Y. Ohuchi, H. Saeki, H. Sakakima and S. Izumi 409

Improvement of Interface Properties for Thermally Oxidized SiC/SiO₂ MOS Capacitor by Post Oxidation Annealing Treatment

U. Chand, L.K. Bera, N. Singh, K.M. Han, V.Q.G. Roth, C.H.M. Chua and S. Chung 414

High Mobility Silicon Dioxide Layers on 4H-SiC Deposited by Means of Atomic Layer Deposition

A.B. Renz, Q.Z. Cao, O.J. Vavasour, J. Gott, P.M. Gammon, T.X. Dai, G.W.C. Baker, P. Mawby and V. Shah 419

Chapter 6: MOSFET Physics**Temperature Dependent Mobility Model for Predictive TCAD Simulations of 4H-SiC**

H. Dixit, D.J. Lichtenwalner, A. Scholtze, J.H. Park, S. Rogers, S. Bubel and S.H. Ryu..... 427

Hypothesis to Explain Threshold Drift due to Dynamic Bipolar Gate Stress

D. Scholten, J. Baringhaus, D. Krebs and S. Noll 432

Gate Dielectric Current Transport Mechanisms in N-SiC Metal Oxide Semiconductor Capacitor

U. Chand, L.K. Bera, N. Singh, K.M. Han, V.Q.G. Roth, C.H.M. Chua and S. Chung 438

Complications of Charge Pumping Analysis for Silicon Carbide MOSFETs

J. Lettens, F. Allerstam, J. Franchi, S. Cambré, E. Goovaerts, H. Vrielinck and P. Moens..... 443

Heavy-Ion-Induced Defects in Degraded SiC Power MOSFETs

C. Martinella, M.E. Bathen, A. Javanainen and U. Grossner 451

Physical Modelling of Charge Trapping Effects in SiC MOSFETs

M. Walzl, C. Schleich, A. Vasilev, D. Waldhoer, B. Stampfer and T. Grasser 457

Chapter 7: Devices and Optimization**A Modeling of 4H-SiC Super-Junction MOSFETs with Filtered High Energy Implantation**

M. Lim, C. Csato, J. Förthner, O. Rusch, K. Ehrensberger, B. Kupfer, S. Beuer, S. Oertel, D.W. Byun, S.J. Kim, S.M. Koo, H.K. Shin and T. Erlbacher..... 467

Threshold Voltage Adjustment on 4H-SiC MOSFETs Using P-Doped Polysilicon as a Gate Material

A. May, M. Rommel, A. Abbasi and T. Erlbacher 472

Fabrication of Quasi-Vertical GaN-On-SiC Trench MOSFETs

J. Evans, J. Patel, A. Ben Khaial, N. Burrige, R. Hyndman, F. Monaghan, M. Jennings, H. Ashraf, R. Harper and M. Elwin..... 478

Demonstration of SiC Trench Gate MOSFETs with Narrow Cell Pitch Using Source Self-Aligned Process

S. Kimoto, R. Iijima and S. Harada 484

Optimized 750V SiC MOSFETs for Electric Vehicle Inverter Operation

A. Salemi, B. Zhu, P. Bui-Quang, Y. Ding, K. Chatty, A. Liu and D. Sheridan..... 490

Assessing, Controlling and Understanding Parameter Variations of SiC Power MOSFETs in Switching Operation

T. Aichinger, M.W. Feil and P. Salmen..... 494

Influence of Cell Design and Gate-to-Source Voltage on Avalanche Robustness of SiC MOSFET Integrated JBS Diode

C.Y. Jiang, H. Xu, S.L. Yang, H.Y. Wang, N. Ren and K. Sheng 501

Towards SiC-Based VUV Pin-Photodiodes - Investigations on 4H-SiC Photodiodes with Shallow Implanted Al Emitters

M. Schraml, N. Papathanasiou, A. May, T. Weiss and T. Erlbacher..... 507

Enhanced Device Performance with Vertical SiC Gate-All-Around Nanowire Power MOSFETs

D. Yang, S. Wirths, L. Knoll, Y. Han, D.M. Buca and Q.T. Zhao..... 513

Optimizing PECVD a-SiC:H Films for Neural Interface Passivation S. Greenhorn, K. Zekentes, E. Bano, V. Stambouli and A. Uvarov	519
Suppression of Short Channel Effects for a SiC MOSFET Based on the S-MOS Cell Concept M. Rahimo, I. Nistor and D. Green.....	525
High Density 65W AC-DC Adaptor Enabled by SiC MOSFET with Ultralow $V_{GS(on)}$ F.J. Hsu, C.T. Yen, H.T. Hung, J.W. Hu and C.F. Huang.....	532
Effect of Termination Region on Unclamped Inductive Switching Failure for 4H-SiC VDMOS S.Y. Liu, X.H. Cheng, L. Zheng, J.H. Feng and Y.H. Yu	537
650V Vertical SiC MOSFETs and Diodes with Improved Terrestrial-Neutron Single-Event Burnout D.J. Lichtenwalner, S. Ganguly, B. Fetzer, C. Woods, D.A. Gajewski, S.H. Ryu, B. Hull, S. Allen and J.W. Palmour.....	543
Numerical Analysis of the Schottky Contact Properties on the Forward Conduction of MPS/JBS SiC Diodes M. Boccarossa, A. Borghese, L. Maresca, M. Riccio, G. Breglio and A. Irace	548
A Fully Self-Aligned SiC Trench MOSFET with 0.5 μm Channel Pitch M. Sampath, D. Morissette and J.A. Cooper.....	556
Investigations on 4H-SiC Low Voltage nMOSFETs with Thin Thermal SiO₂/Deposited Oxide Gate Dielectric K. Cho, B. Lee, K.M. Kim, D. Choi and K.S. Park.....	564
Highly Efficient Floating Field Rings for SiC Power Electronic Devices - A Systematic Experimental Study L.Z. Broderick, J. Moulton, O. Rusch, T. Tong, T. Erlbacher and Y.L. Corcoran.....	569
Reduction of Forward Bias Degradation in 4H-SiC PiN Diodes Fabricated on 4H-SiC Bonded Substrates N. Hatta, S. Ishikawa, K. Ozono, K. Masumoto, K. Yagi, M. Kobayashi, S. Kurihara, S. Harada and K. Kojima	577
Fabrication of an Open Gate-4H-SiC Junction Field Effect Transistor for Bio-Related and Chemical Sensing Applications O. Karker, K. Zekentes, N. Makris, V. Stambouli and E. Bano	584
Tailoring the Charge Carrier Lifetime Distribution of 10 kV SiC PiN Diodes by Physical Simulations Z. Yuan, A. Schöner, S. Reshanov, W. Kaplan, M. Bakowski and A. Hallén	592
10kV+ Rated SiC n-IGBTs: Novel Collector-Side Design Approach Breaking the Trade-Off between dV/dt and Device Efficiency I. Almpanis, P. Evans, M. Antoniou, P.M. Gammon, L. Empringham, F. Udrea, P. Mawby and N. Lophithis	598
A Scalable SPICE Electrothermal Compact Model for SiC MOSFETs: A Comparative Study between the LEVEL-3 and the BSIM A. Borghese, M. Riccio, L. Maresca, G. Breglio and A. Irace	607
Chapter 8: JFETs Device	
Impact of Dimensions and Doping on the Breakdown Voltage of a Trench 4H-SiC Vertical JFET F. Monaghan, A. Martinez, F. Craig and M. Jennings.....	615

Early Burn-In Parasitic Conduction in 500 °C Durable SiC JFET ICs P.G. Neudeck, D.J. Spry, D. Lukco and L.Y. Chen.....	622
Optimization of TaSi₂ Processing for 500 °C Durable SiC JFET-R Integrated Circuits D.J. Spry, P.G. Neudeck, C.W. Chang, S. Rajgopal and J.M. Gonzalez.....	628
 Chapter 9: Device Characterization	
A Novel Non-Invasive Cryostatic Spectrometry Technique to Characterize the Carriers' Multiplication Factor in Silicon Carbide Power Devices M. Pocaterra and M. Ciappa	637
Electroluminescence Spectra of a Gate Switched MOSFET at Cryogenic and Room Temperatures Agree with Ab Initio Calculations of 4H-SiC/SiO₂-Interface Defects M. Weger, D. Biermeier, M.W. Feil, J. Cottom, M. Bockstedte and G. Pobegen.....	648
Comparison of the Performance-Degrading Near-Interface Traps in Commercial SiC MOSFETs M. Chaturvedi, S. Dimitrijević, D. Haasmann, H.A. Moghadam, P. Pande and U. Jadli	657
SiC MOSFETs Biased C-V Curves: A Temperature Investigation I. Maticena, L. Maresca, M. Riccio, A. Irace, G. Breglio, A. Castellazzi and S. Daliento.....	662
Body Diode of 1.2kV SiC MOSFET: Unipolar and Bipolar Operation T.T. Pham, J. Franchi and M. Domeij	668
Pulsed Forward Bias Body Diode Stress of 1200 v SiC MOSFETs with Individual Mapping of Basal Plane Dislocations S. Kochoska, M. Domeij, T.T. Pham, S. Maslougkas, S. Sunkari, J. Justice and H. Das	673
Investigation on Switching Characteristics of 3.3kV SiC Power MOSFETs with SiO₂/ SiN Gate Stack G. Romano, A. Mihaila, Y. Arango, A. Ruiz and L. Knoll	678
Measurement and Analysis of Body Diode Stress of 3.3 kV SiC-Mosfets with Intrinsic Body Diode and Embedded SBD G.H. Lee, J.K. Lim, S.M. Koo and M. Bakowski.....	683
Impact of Turn-Off Gate Voltage and Temperature on Threshold Voltage Instability in Pulsed Gate Voltage Stresses of SiC MOSFETs A. Deb, J. Ortiz-Gonzalez, M. Taha, S. Jahdi, P. Mawby and O. Alatise	688
Small-Signal Impedance and Split C-V Characterization of High-κ SiC Power MOSFETs S. Race, I. Kovacevic-Badstubner, R. Stark, A. Tsibizov, M. Belanche, Y. Arango, G. Romano, L. Knoll and U. Grossner.....	694
Lifetime Projection of Bipolar Operation of SiC DMOSFET C. Schleich, M.W. Feil, D. Waldhoer, A. Vasilev, T. Grasser and M. Wältl.....	699
 Chapter 10: Reliability	
Bias-Induced Instability of 4H-SiC CMOS Y.X. Wen and B.Y. Tsui.....	707

On the Frequency Dependence of the Gate Switching Instability in Silicon Carbide MOSFETs M.W. Feil, K. Waschneck, H. Reisinger, P. Salmen, G. Rescher, T. Aichinger, W. Gustin and T. Grasser.....	712
Robustness of SiC MOSFETs under Repetitive High Current Pulses B. Findenig, M. Sievers, I. Voss and T. Aichinger.....	721
Reliability of SiC MOSFET Power Modules under Consecutive H3TRB and Power Cycling Stress F. Hoffmann, S. Schmitt and N. Kaminski.....	728
Chip-Top Packaging Technology for SiC Devices Operational at 250°C with Power-Cycling Durability of over 300,000 Cycles S. Tanaka, J. Shinkai, M. Ikegawa, F. Kato, H. Sato, H. Kurashima and Y. Mikamura.....	735
Avalanche Robustness Investigation of SiC Avalanche Diodes at High Temperatures T. Sekiguchi, M. Mochizuki, M. Yamamoto, K. Nakayama and Y. Tanaka.....	745
AC-Stress Degradation in SiC MOSFETs A.J. Lelis and D.B. Habersat.....	750
Power Cycling on Lateral GaN and β-Ga₂O₃ Transistors S. Rugen, A. Brunko, F. Hoffmann and N. Kaminski.....	755
Temperature Dependence of the Channel and Drift Resistance of SiC Power MOSFETs Extracted from I-V and C-V Measurements R. Stark, A. Tsibizov, S. Race, T. Ziemann, I. Kovacevic-Badstubner and U. Grossner.....	763
Humidity Robustness of 3.3kV SiC-MOSFETs for Traction Applications - Compared to Standard Silicon IGBTs in Identical Packages M. Hanf, J. Peters, F. Hoffmann and N. Kaminski.....	769
Reliability and Standardization for SiC Power Devices D.A. Gajewski, S. Ganguly, D.J. Lichtenwalner, E. Van Brunt, B. Hull, S. Allen and J.W. Palmour.....	776
Energy-Dependent Impact of Proton Irradiation on 4H-SiC Schottky Diodes P. Kumar, M. Belanche, N. Für, L. Guzenko, J. Woerle, M.E. Bathen and U. Grossner.....	784
Impact of Bias Temperature Instabilities on the Performance of Power Electronics Employing SiC MOSFETs Y. Hernandez, C. Schleich, B. Stampfer, T. Grasser and M. Watl.....	790
Proven Power Cycling Reliability of Ohmic Annealing Free SiC Power Device through the Use of SmartSiC™ Substrate E. Guiot, F. Allibert, J. Leib, T. Becker, W. Schwarzenbach, C. Hellinger, T. Erlbacher and S. Rouchier.....	798
Keyword Index	805
Author Index	811