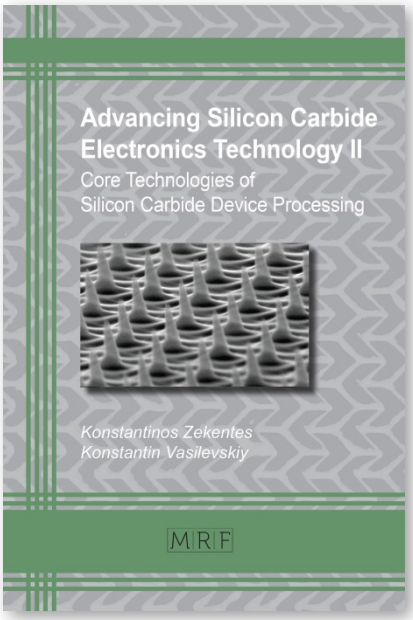
eBook Information

Materials Research
Solid State Physics and Engineering

Advancing Silicon Carbide Electronics Technology II

Core Technologies of Silicon Carbide Device Processing



Eds. Konstantinos Zekentes and Konstantin Vasilevskiy

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The book presents an in-depth review and analysis of Silicon Carbide device processing.

*Keyword: S*ilicon Carbide, SiC, Technology, Processing, Semiconductor Devices, Material Properties, Polytypism, Thermal Oxidation, Post Oxidation Annealing, Surface Passivation, Dielectric Deposition, Field Effect Mobility, Ion Implantation, Post Implantation Annealing, Channeling, Surface Roughness, Dry Etching, Plasma Etching, Ion Etching, Sputtering, Chemical Etching, Plasma Chemistry, Micromasking, Microtrenching, Nanocrystal, Nanowire, Nanotube, Nanopillar, Nanoelectromechanical Systems (NEMS)

ISBN 13: 978-1-64490-067-3, **Publication Date:** 2020 (3/15/2020)
Direct URL: https://www.mrforum.com/product/advancing-silicon-carbide-electronics-technology-II
292 pages, PDF eBook DRM Free, USD 125.00
Materials Research Foundations Vol. 69 / **BISAC:** TEC021000 / **BIC/Thema:** TGM
Imprint: Materials Research Forum LLC, *Publisher's sales rights are Wordwide*

Summary:
The present volume is the second part of the book "Advancing Silicon Carbide Electronics Technology." In addition to SiC surface cleaning, SiC wet etching, SiC metallization, status and prospects of SiC power devices, covered by the first volume, this volume provides a detailed review and in-depth analysis of core SiC device processing technologies and includes the following topics:
- commonly used dielectrics in SiC devices and methods of their deposition; SiC thermal oxidation and post oxidation annealing; review of various efforts to improve the electron mobility in SiC MOSFETs; SiC surface passivation by dielectrics;
- application of ion implantation in SiC device processing; channelling and straggling effects; different post implantation annealing techniques; defects formation issues; low defect surface doping by implantation; implantation simulation; physical characterization methods of the implanted SiC material;
- SiC dry etching; fluorine chemistry; effect of addition of various gases; etch rate control through various plasma parameters; morphology of etched surfaces; hard masking materials and their selectivity with SiC; electrical properties of etched SiC surfaces; SiC deep etching for via-hole and MEMS applications;
- SiC nanostructure fabrication; different methods of SiC nanocrystals fabrication including chemical vapour deposition, electrochemical and chemical etching; nanoscale UV light emitters; laser ablation; top-down and bottom-up formation of SiC nanowires (NW); vapour-liquid-solid, vapour-solid and solid-liquid-solid SiC NW growth techniques; ohmic contacts to SiC NW; SiC NW application in field effect transistors.
The volume also includes a historical overview of SiC synthesis and its discovery in the nature; development of SiC bulk and epitaxial growth; emergence of industrial SiC electronics. SiC polytypism and material properties are described in the scope required for reading and understanding other chapters in this book.

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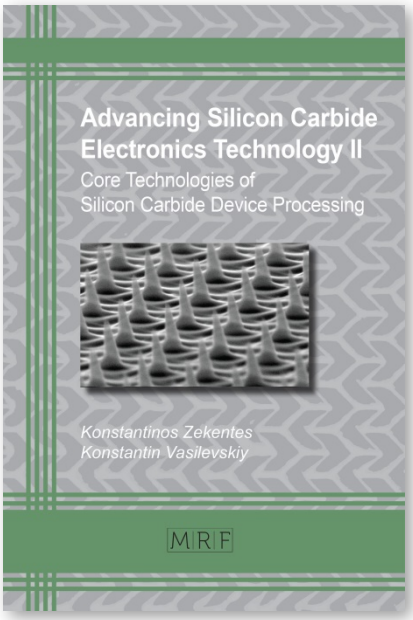

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Handbook / color print, paperback

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