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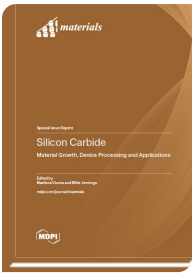
Special Issue Reprint

Silicon Carbide: Material Growth, Device Processing and Applications



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Edited by
Marilena Vivona
Mike Jennings

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The continuous demand for electronic devices operating at increasing current and power levels has driven research into wide-bandgap (WBG) semiconductors in recent decades. In particular, the 4H hexagonal polytype of silicon carbide (4H-SiC) is the most promising for use in power electronic applications in the medium- to high-voltage range. However, to achieve the optimised performance of these 4H-SiC devices, a full understanding of the fundamental material properties, processing technology, and carrier transport mechanisms is required with wide margins for the progress of the related scientific and technological research into this material. On the one hand, an improvement in the existing power device performances in terms of efficiency and reliability is targeted; on the other hand, the 4H-SiC applications are desirably extendable toward new cutting-edge technologies, e.g., quantum technologies. This Special Issue collated 11 regular and 1 review papers. These papers can be summarized into three parts: the investigation of conventional 4H-SiC devices, the suggestion of new approaches for improved devices, and the use of SiC devices in emerging technology fields. Clearly, due to the broadness of 4H-SiC technology, the present collection cannot include all prominent issues. However, we are confident that fundamental properties and novel approaches have been discussed, hoping that this Special Issue will provide interesting inputs for 4H-SiC-based technology advancement.

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