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Title:Stopping power of He, C and O in GaN

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Abstract:GaN and other group III nitrides based alloys are important materials in optoelectronic and electronic devices, including high-brightness blue and white LEDs, multi-junction solar cells, high-frequency transistors, and THz emitters. Unintentional impurities can be present, with a strong influence in the properties of these materials. These impurities are often light elements such as H, C, or O, and an ion beam analysis technique such as heavy ion elastic recoil detection analysis can play a fundamental role in their quantification. However, to our knowledge stopping powers in GaN have not yet been measured, and data analysis relies on using the Bragg rule, which is often inaccurate. We have used a bulk method, previously developed by us and applied successfully to other systems, to determine experimentally the stopping power of  $^4\text{He}$ ,  $^{12}\text{C}$  and  $^{16}\text{O}$  in GaN, in the energy ranges 0.6-2.3, 0.9-14.9, and 0.6-14.9 MeV, respectively. The results of our measurements and bulk method analysis are presented. [All rights reserved Elsevier].

Number of references:19

Inspected controlled terms:gallium compounds - III-V semiconductors - ion microprobe analysis - Rutherford backscattering - wide band gap semiconductors

Uncontrolled terms:stopping power - group III nitrides based alloys - ion beam analysis - heavy ion elastic recoil detection analysis - electron volt energy 0.6 MeV to 2.3 MeV - electron volt energy 0.6 MeV to 14.9 MeV - GaN

Inspected classification codes:A8280 Chemical analysis and related physical methods of analysis - A7920N Atom-, molecule-, and ion-surface impact and interactions

Numerical data indexing:electron volt energy 6.0E+05 2.3E+06 eV;electron volt energy 6.0E+05 1.49E+07 eV

Chemical indexing:GaN/bin Ga/bin N/bin

Treatment:Theoretical or Mathematical (THR); Experimental (EXP)

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