



Large Area Vertical Gallium Oxide Schottky Diodes

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Abstract:

Abstract-Gallium oxide represents a novel wide band gap material that shows promise as a possible harsh environment radiation detector. A first step towards realizing a detector from this material is the fabrication of Schottky barrier diodes. In this work, we have demonstrated large-size vertical β -Ga₂O₃ Schottky barrier diodes (SBDs) with various device areas on a Si-doped n-type drift layer grown by hydride vapor phase epitaxy (HVPE) on bulk Sn-doped (001) n-type β -Ga₂O₃ substrate. These devices were characterized using forward current-voltage (FIV), reverse current-voltage (RIV) and capacitance-voltage measurements (CV). The initial devices included both circular contacts with diameters ranging from 50 μm to 1500 μm and square contacts with dimensions of 100 \times 100 μm^2 and 1600 \times 1600 μm^2 . The tested contacts exhibited breakdown voltages over -500V and ideality factors as low as 1.07. The devices were also tested as radiation detectors with X-ray and Am-241 source.