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Structural and electrical properties of ruthenium thin films on 6H-SiC annealed in the air

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Abstract content ** ** (Max 300 words)**
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Ruthenium (Ru) Schottky contacts and thin films on n-type 6H-SiC were fabricated and characterised by physical and electrical methods. The characterisation was done after annealing the samples in air at various temperatures. Rutherford backscattering spectroscopy (RBS) analysis of the thin films indicated the oxidation of Ru, after annealing at a temperature of 400 oC, and interdiffusion of Ru and Si at the Ru-6H-SiC interface at 500 C. XRD analysis of the thin films indicated the formation of RuO₂ and RuSi in Ru-6H-SiC after annealing at a temperature of 600 C. The formation of the oxide was also corroborated by Raman spectroscopy. The ideality factor of the Schottky barrier diodes (SBD) was seen to generally decrease with annealing temperature. The series resistance increased astronomically after annealing at 700 C which was an indication that the SBD had broken down. The failure mechanism of the SBD is attributed to deep inter-diffusions of Ru and Si at the Ru-6H-SiC interface as evidenced from the RBS of the thin films.

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