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Microstructure evolution of ruthenium with 6H-SiC interface under vacuum annealing and the implications for the performance of its Schottky contact for high temperature operating diodes.

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Abstract :

Thin films and Schottky diodes dots of ruthenium (Ru) on bulk-grown n-type-6-hexagonal-silicon carbide (6H-SiC) were annealed isochronally in a vacuum furnace at temperatures ranging from 500 -1000C. Rutherford backscattering spectroscopy analysis of the thin films showed formation of ruthenium silicide (Ru_2Si_3) at 800C, while diffusion of Ru into 6H-SiC commenced at 800C. Raman analysis of the thin films annealed at 1000C showed clear D and G carbon peaks which was evidence of formation of graphite . At this annealing temperature the Schottky contact was observed to convert to an ohmic contact, as evidenced by the linearity of current-voltage characteristic , thereby rendering the diode unusable. The transformation from Schottky contact to ohmic contact is attributed to graphite formation at the interface.

Award :

Yes

Level :

PhD

Supervisor :

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Paper :

Yes

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