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Solid state reaction between zirconium and silicon carbide at elevated temperatures

Thursday 12 Jul 2012 at 17:30 (02h00')

Abstract :

The solid state reactions between a Zr thin film (150nm) and a single crystalline bulk 6H-SiC substrate induced by vacuum annealing at temperatures of 600 – 800 ^{0}C for durations of 30, 45 and 60 minutes, were investigated by 1.6 MeV He^{+} backscattering spectrometry, X-ray diffraction and secondary electron microscopy.Zr was found not to react with SiC at a temperature of 600 ^{0}C. The backscattered spectra were simulated using RUMP and the as-deposited spectra fit with the 600 ^{0}C annealed spectra thus showing there were no reactions taking place. At higher temperatures, Zr reacts with the SiC substrate and forms a mixed layer of Zr carbide (ZrCx) and Zr silicide (Zr2Si) at annealing temperatures above 700^{0}C. The formation of these phases was also confirmed by XRD.

Award :

yes

Level :

PhD

Supervisor :

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Paper :

No

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