

Bias enhanced deposition of highly oriented β -SiC thin films using low pressure hot filament chemical vapour deposition technique

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Abstract

Highly oriented cubic silicon carbide (β -SiC) thin films are deposited on Si(111) substrates using bias assisted low-pressure hot filament chemical vapour deposition technique. Methane (CH_4) is used as the source for carbon, while the substrate itself acts as the source for silicon. The technique is quite simple, cheap, has one step, and requires no stringent reaction conditions; the substrate temperature used being in the range of ~ 750 °C and the chamber pressure ~ 1 torr. The films have been characterised by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), X-ray photoelectron spectroscopy (XPS), atomic force microscopy (AFM) and Raman spectroscopy. Bombardment of negatively biased substrate by high-energy positive ions under relatively low chamber pressure is believed to facilitate the growth of highly oriented SiC films.

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