

Optical and Electrical studies on RF Sputter Deposited SiC Thin Films

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SiC film finds several applications in the field of high temperature electronics and optical devices because of its high stability. SiC is more stable than Si because of its high melting point and mechanical strength. In the present work, RF sputter deposition of SiC was carried out in a cryo-pumped vacuum system containing a water cooled RF magnetron-sputtering gun. Powder pressed SiC target used was of 99.95% purity. Deposition rates were studied as a function of deposition power and pressure.

For optical studies, the SiC films were deposited onto fused quartz (silica) substrates. The films were deposited at pressure of 5-30m Torr. The sputtering power was varied between 75-150 Watts. The thicknesses of the deposited films were measured using profilometer. The optical absorption edge of the film is found to be dependent on the deposition pressure. At higher pressures, the absorption edges shifted to higher values.

Electrical resistivity was measured from a test structure fabricated onto a glass slide. For resistivity studies, the films were deposited at different conditions by changing the deposition pressure from 10 to 30 mTorr, while the sputtering power was varied over a range of 75 to 125 watts.