Abstract

Is CVD diamond the real solution as a dosimeter ? New Developments

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Diamond has very attractive properties to act as a radiation detector. The radiation hardness, the atomic number very close to human tissue, less variation in the mass energy absorption coefficients over the therapeutic radiation energies and good sensitivity compared to gas ionisation chamber are some of the interesting properties. Eventhough silicon diode offers good sensitivity and spatial resolution, it is affected by radiation and requires energy dependent correction factors.

Recent advancements in radiotherapy and radiosurgery would require detectors having radiation hardness, good sensitivity and spatial resolution. Natural diamond detectors suffer from the polarisation effect, high cost and long delivery time. Hence we tried using CVD diamond as a radiation detector. Recent advancement in the technology of cvd has helped us to have diamond of good quality viable.

Diamond detectors function like a solid state ionisation chamber. Electrical contacts were made using the thermal evaporation of Gold/Chromium. When characterised in radiation, we could observe stable response over time when compared to our previous investigations. These samples showed very little priming. The sensitivity was very much better compared to gas ionisation chamber even at an applied voltage of 10 V.

The response of these special types of diamonds at various voltages, dose rate and dose will be discussed.