AbstractID: 3142 Title: Characterization of a Novel Diamond Detector

Purpose:
Test a novel diamond detector performance and applicability for radiation dosimetry. Detector sensitivity, stability and dependence on bias voltage, dose rate, energy and hardening have been studied.
Method and Material:
Detector was irradiated in a mini-phantom. A modified electrometer and an external high power supply were used to collect the charge generated at the sensitive volume of the detector. Readings in the electrometer were collected by a computer via a hyperterminal connection at a rate of 10 values per second. Beam parameters SDD=100 cm, 10x10 cm^2 field size were used. Dose rate was varied by altering the SDD.
Results:
Optimal charge collection stability was observed after a short pre-irradiation and at +100 V bias. External bias voltages up to 225 V applied to the detector resulted in proportional charge collection rates. Signal is proportional to dose rate. No substantial variation in charge collection was observed when the detector was hardened to 10 kGy.
Conclusion:
The tested diamond detector has most of the characteristics needed for radiation dosimetry. Its performance is stable and the uncertainties in the charge collection will not affect the calculation of parameters in dosimetry. Therefore, this novel diamond detector is suitable for clinical use.
Conflict of Interest:
Research was supported in part by Standard Imaging Inc.