

Semiconductor detectors have frequently been used in vivo dosimetry (IVD) to confirm the dose given to a patient in external radiotherapy, due to the high mechanical stability, small size, high signal and no need of external bias. As it is important that the complexity of these measurements should be as low as possible, semiconductor detectors from three different manufactures have been compared with respect to the need of correction factors, where effects of radiation damage has been studied.

Detectors from Sun Nuclear (SN), PTW and Scanditronix Wellhöfer (SW) have been investigated in 15 MV x-rays. The sensitivity drop, dose rate linearity, the sensitivity variation with temperature (SVWT) and "dark current" have been studied after different doses of irradiation. Parameters, which are related to the mechanical construction, the field size and directional dependence have also been studied.

It was shown that the SW and SN detectors showed small variations in the sensitivity drop and the linearity properties did not change after moderate doses, about 1 kGy of 15 MV x-rays. PTW, however, showed a three times larger sensitivity drop and an increasingly non-linear response. The SVWT was stable for the SW, 0,2% per centigrade, and for the SN detectors, 0,5 % respectively. The PTW detector showed a low value in the beginning, but increased after irradiation. Also the "dark current" changed after irradiation, and was in favour for the SW detector.

The directional dependence was about the same for all detectors, but the field size dependence deviated for the PTW detector.

To obtain an accuracy better than 1,5% in each parameter the complexity is rather low for the SW and SN, except for the temperature dependence for SN. It is, however, rather complicated for the PTW detector, as large corrections must be applied for some parameters. "Research sponsored by Scanditronix-Wellhoepher corporation."