AbstractID: 1792 Title: Sensitivity of Semiconductor dosimeters in mixed Neutron/Gamma beam

The aim of this study was to investigate the sensitivity of planar circular ion implanted miniature *p-i-n* diodes to separate neutron and gamma components in d(48.5)+Be neutron beam. The voltage drop across the diode is proportional to neutron damage and may be used for detection of neutron fluence. The current produced in the diode by the secondary charged particles originating from both neutron and gamma interactions represents the total neutron plus gamma dose. Thus, operating the diode in the dual mode, i.e. voltage drop and charge, it may be regarded as twin detector and used in mixed neutron/gamma beam. Dedicated circuitry was developed to monitor the voltage drop as a result of neutron irradiation of the diode. The Keithley electrometer was used to measure charge collected. The sensitivity of the diodes to gamma radiation was measured in ^{60}Co beam. The neutron sensitivity was derived from the measurements in the neutron beam, at locations where the neutron and gamma components were predetermined using ion chamber paired with miniature Geiger-Muller counter. Two planar circular diodes with radial base-length of 0.5 and 1.45 mm (C-1 and C-2) were included in this study. The sensitivities of C-1 and C-2 diodes measured in the ^{60}Co beam were 0.066±0.0004 and 0.188±0.003 nC/cGy, respectively. The neutron sensitivities of the diodes in the voltage drop mode of operation were 0.55±0.03 and 0.95±0.05 mV/cGy for C-1 and C-2 diodes, respectively, and 0.032±0.002 and 0.073±0.0037 nC/cGy in the charge mode.