

AbstractID: 1295 Title: Dosimetry of d(48.5)+Be Fast Neutron Beam with Gafchromic HS Films

The use of Gafchromic HS film for dosimetry of d (48.5)+Be neutron beam was investigated. The VXR-16 Digitizer in combination with IMAQ software was employed to read and analyze the irradiated films. To achieve a maximum response of the film to neutrons the readout was performed 5 days after irradiation using a red mask filter. The sensitivity of the film was defined as the slope of the response curve (Net Optical Density vs. Dose). It was measured in the mixed (neutron + gamma) radiation beam and compared to that in Co-60 and 4MV photons. In addition, the sensitivity of the film to neutrons alone was derived from measurements at specific depths and off axis distances in a water phantom, where the neutron and gamma components were predetermined using the pair detector method. The measured average sensitivity of Gafchromic HS film to the total (neutron + gamma) dose is $2.49 \times 10^{-2} \pm 0.003 \text{ Gy}^{-1}$, while the sensitivities of the film to separate beam components are $2.11 \times 10^{-2} \pm 0.0013 \text{ Gy}^{-1}$ and $4.97 \times 10^{-2} \pm 0.00065 \text{ Gy}^{-1}$ for neutrons and gamma, respectively. The lateral and depth dose profiles in the d (48.5)+Be fast neutron beams were measured using the film and compared with the ion chamber measured data. The results show that the Gafchromic HS film is suitable for relative dose measurements in fast neutron beam. However, due to the difference between neutron and gamma film sensitivities, it has limitation in applications where the gamma component is changing rapidly.