

Radiochromic film dosimetry for Ir-192 HDR source: Determination of TG43 parameters

Sou-Tung Chiu-Tsao
Quality MediPhys LLC, Denville, NJ 07834
soutung@optonline.net

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Radiochromic film (GAFCHROMIC[®] EBT) was used to measure 2-dimensional dose distributions for Ir-192 HDR v2 source in solid water out to 5cm. A multiple film technique was employed. Each film (EBT lot #35076) was in contact geometry with a 6F catheter, in which an Ir-192 HDR source (Nucletron v2 microSelectron) was driven to the center of a solid water phantom, 30x30x20 cm. Totally 4 experimental films were separately exposed, with exposure times of 5s, 20s, 200s, and 300s. The source activity was 9.75 Ci at the time of experiment. 17 calibration films were exposed to the same source at about 1 cm above, with exposure times ranging from 2s to 420s and the film center doses from 0.2 to 38 Gy. All experimental, calibration and background films were scanned (pixel resolution 0.2mm) using a PeC CCD100 densitometer, with red and green light sources at least two days after exposures. Conversion from optical densities to doses was achieved based on the calibration curve established for each light source used in scanning. The 2-d dose rate values in cylindrical coordinates were converted to polar coordinates, and the TG43 parameters were generated. The radial dose function and anisotropy function were plotted. They agree with the Monte Carlo results by Daskalov et al. This study confirms the feasibility of radiochromic EBT film dosimetry in characterization of the dose distributions and in determination of the TG43 parameters for Ir-192 HDR source. This method is more efficient than TLD dosimetry at discrete positions.