AbstractID: 1728 Title: Characteristics of a new very high sensitivity radiochromic film

We present the characterization of a new formulation of radiochromic film with greatly increased absorbed dose sensitivity. This new film is based on a novel polymerizing microcrystalline sensitive layer with improved sensitivity relative to the existing GAFCHROMIC dosimetry films. Densitometry of this new film would be optimally conducted at wavelengths close to 635nm. The sensitivity of the film has been reduced to range between 1 and 400 cGy, corresponding to approximately 0.01 to 3.6 OD. This new dose range is comparable to those obtained with radiographic films without the inherent beam quality limitations caused by the use of silver halides. The film was available in a larger 10 x 10 inch format. We characterized the film using uniform field irradiation by 6MV photon beams at 5 cm depth in a large solid water phantom. Due to the new formulation of the sensitive layer of the film a pre-irradiation coloration of the film was observed in all scans. The post-irradiation sensitivity inhomogeneity was found to be similar to those reported for MD-55-2, with up to ± 20% variations being observed. Subtraction of pre-irradiation scans followed by a double exposure technique to account for the sensitivity inhomogeneity produced precise results. The sensitometric curve of the film demonstrated an approximately linear response for doses above 50 cGy, with a super-linear response at lower doses. The temporal evolution of OD was found to be less than 2% OD growth within 2 hours of irradiation and 2% more growth in the next 18 hours.