

AbstractID: 13199 Title: Light scattering properties of EBT/EBT2 radiochromic films and its application in radiation dosimetry

Purpose: EBT/EBT2 film has been used as a point dosimeter. Some spatial variation in sensitivity has been observed, possibly due to variation in active layer thickness. Although it is well known that EBT/EBT2 films scatter light, the light scattering has not been directly studied and is not explicitly utilized in measurements. Since the amount of scattered light may be related to the thickness of the active layer and thus the sensitivity of the film to radiation, we attempt to quantify the angular distribution of light scattered from the film and the variation of this distribution within a batch of the film sample. **Method and Materials:** We used a Panasonic Lumix DMC-GF1 digital camera body as the light detector. The sensor of this camera was exposed and was very accessible when the lens was removed. A 1 mm hole was drilled on the camera body cap to define the aperture for the incident light. The film sample was placed behind the 1 mm aperture facing the light sensor of the camera. Data were obtained with the film in landscape and portrait orientations. We used a red LED at 626 nm, and a blue LED at 430 nm as light sources. They were mounted at 25 cm from the aperture. The red pixel images and blue pixel images from the camera were extracted from the raw images with dcrw and analyzed with ImageJ. **Results:** Light scattering was observed on EBT/EBT2 films for red and blue light. The angular scattering showed significant anisotropy which followed the film orientation as the films were rotated. Quantitative analysis of the light scatter will be reported. **Conclusion:** Angular distribution of light scatter from EBT/EBT2 film can be measured with a consumer digital camera. There is significant anisotropy in the scattered light distribution.