
Impact of thermal annealing on radiation induced attenuation for radiophotoluminescence glass dosimeters at high X-ray doses

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Abstract

Commercial radiophotoluminescence (RPL) FD7 glasses used as passive dosimeters for personal and medical applications are stable at room temperature, and can be regenerated with thermal treatments at about 400 °C. However, the validity of those regeneration techniques when RPLs are used for high doses up the kGy and MGy range has to be proven. At such doses the dosimeters darken with dose and so Radiation Induced Attenuation (RIA) becomes relevant for the readout process. This work focuses on the online RIA dependence on both pristine and pre-treated RPL (400°C for 7 hours). Preliminary results collected using X-ray tubes operated at 100 kV up to a maximum dose of 7 kGy allow the possible impact of temperature and of annealing procedures on the RPL readout to be evaluated at high doses.

Keywords: radiophotoluminescence, x, rays, temperature, high level dosimetry, annealing

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