ULTRAVIOLET AND LASER RADIATION DOSIMETRY USING PHOTOSTIMULATED THERMOLUMINESCENCE IN $CaSO_4$:Dy

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The photostimulated thermoluminescence (PSTL) is a technique that was developed through the study of light effects in thermoluminescent materials. In its applications are included the possibility of making high dose dosimetry, dose reevaluation, ultraviolet (UV) and laser radiation dosimetry. The objective of this work is to study the PSTL in $CaSO_4$:Dy in serveral UV wavelengths of interest and laser radiation. The $CaSO_4$:Dy is an extremely sensitive thermoluminescent material that has a dosimetric peak at 220 °C and is successfully used in gamma radiation dosimetry. The $CaSO_4$:Dy produced at IPEN was used in teflon pellet form. The teflon pellets were annealed at 300 °C for 15 min before the irradiations and exposure to UV light. A 15.0 TBq source of ^{60}Co was used for sample irradiation. A system containing a Hg lamp, Bausch & Lomb SP-200, under high pressure and a Kratos GM-200 monochromator were used for UV radiaion exposure. For the thermoluminescent measurement, a TL reader, Harshaw model 2000 AB with temperature range from 200 to 360 °C and heating rate of 10 °C/s, was used. The PSTL response was observed for gamma irradiation from 2.58 x 10^{-1} C/kg (10^3 R) to 2.58 C/kg (10^4 R). The PSTL response dependence with light wavelength was studied from 230 to 570 nm. The time of exposure and the wavelength was determined in order to obtain better resolution. The PSTL response linearity with exposure time for light wavelength was verified. The obtained results show that $CaSO_4$:Dy teflon pellets presents a good performance to PSTL to be used in UV and laser dosimetry.

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