Study of the Dosimetric Properties of CaSO₄:Dy using 

OSL technique

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Calcium sulfate phosphor doped with dysprosium has been used for personal dosimetry using thermoluminescence (TL) technique for decades and its TL properties are well-known [1]. In fact, TL properties of CaSO₄ with different impurities have been extensively studied [2-5]. V.Guckan et al. [6] investigated the optically stimulated luminescence (OSL) dosimetric properties of CaSO₄:Eu and Junot et al. studied the potential of new CaSO₄ based detectors with different combination of impurities, using TL and OSL techniques [7]. However, there is a lack of essential informations of OSL signal from CaSO₄:Dy, as, for example, dose response and correlation between OSL and TL intensities. The aim of this study was to investigate the dosimetric properties of Calcium sulfate doped with dysprosium using OSL technique and to evaluate the possibility of its usage as OSL dosimeter.

The present study was carried using CaSO₄:Dy pellets prepared in IPEN irradiated and read in TL/OSL Risoe Reader with blue light stimulation and Hoya U-340 filter. OSL dosimetric properties essentially dose response, reproducibility and fading characteristics were evaluated. Moreover, TL and OSL signals were compared to study the correlation between OSL signal and TL peaks. CaSO₄:Dy OSL response is linear from 1 to 5 Gy, shows reproducibility lower than 3% and while the lower TL peak is unstable, the OSL signal seems to be associated with higher temperature peaks.

Keywords: optically stimulated luminescence, dosimetry, CaSO₄:Dy