irradiation source with 40 mCi activity and a Hoya U340 optical filter for detection. OSL emission spectrum was measured with a Lexsyg research TL/OSL reader, using green or infrared LEDs for stimulation and an external X-ray source for irradiation. It was observed that Ag doping increased the OSL response by a factor of 1000, with linear growth in the dose range of 0.8 to 1.8 Gy. The linearly modulated OSL (LM-OSL) results showed the same tendency for increase in sensitivity with doping, with linear growth observed up to 18 Gy and sublinear dose response up to 50 Gy. OSL spectrum stimulated with green light showed a band between 300 and 450 nm, with a peak at ~330 nm and a tail possibly composed of smaller bands, while no spectrum above signal noise could be detected for the undoped sample. In the case of the OSL emission spectrum measured with infrared light stimulation, there was a small band between 550 and 600 nm for the doped sample, with a peak at ~580 nm, while, the undoped sample again did not show a signal above detection limit. It can be concluded that the effect of silver was observed in the OSL emission of the magnesium borate sample, with the appearance of a UV band at 330 nm. In the literature it is known that the Ag+ ion emits a band at 280 nm, which it is not close to the value found in this work but also below the spectral range of the spectroscopic setup used. More studies will therefore be needed to find the origin of this band. Another effect found was the substantial increase in the dose response of the OSL signal by doping.

ID_237

Title of the abstract: Study of radioluminescence from CaSO4:Eu films for real-time dosimetry

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Abstract: Active detectors based on semiconductors and diodes are largely applied for clinical dosimetry, however they present limitations mainly related to complex electronic structure, limited spatial resolution and high cost. Several materials which exhibit thermoluminescence (TL) and optically stimulated luminescence (OSL) also present radioluminescence (RL), as Al2O3:C,Mg. In principle, RL materials can be used in real-time dosimetry as active detectors if the intensity of the RL signal can be associated with the absorbed dose. The sensitive material can be coupled to optical fibers, CCD devices, or other device to collect its light emission. The phosphor CaSO4:Eu has been studied as TL and OSL detector and literature reports good reproducibility, linear dose-response and negligible fading. Previously, CaSO4:Eu OSL films were produced and applied for two-dimensional dose mapping in radiotherapy. Considering the potential application of CaSO4:Eu films for medical applications, in this work we studied the RL emission of CaSO4:Eu films. Firstly we used a Horiba Absorbance and Fluorescence Spectrometer, model Duetta, and obtained the emission spectra of the CaSO4:Eu films, exciting with different wavelenghts and observed two emission centre groups. The first group is at 385 nm, related to Eu2+ and the second group, related to Eu3+ is at 580 nm, 600 nm and 700 nm. Secondly, to study the RL emission from the CaSO4:Eu film, we used a custom made equipment named LUMI22, which has an X-ray tube (Moxtek 50kV) powered and controlled by a standard controller (FTC-200) to irradiate the samples, and a miniature fiber optic spectrometer (Ocean Optics, FLAME-S-XR1-ES) that is used to identify the wavelength of the emitted light (range 200-1050 nm). Results showed a radioluminescent peak at 390 nm, which should be related to Eu^{2+}. The RL sensitivity is (46.1 ± 1.3) 103 counts/Gy. The film does not need thermal or optical treatment and the radioluminescent peak is reproducible. Comparing the RL intensity after 10 consecutive irradiations with the same conditions, the maximum coeficient of variation is 2.5%. The dose response of the RL is linear (R-square 0.9959) from 0.04 to 0.3 Gy. Results show that the $CaSO_4$:Eu film is promissing for use with the RL technique in real-time clinical dosimetry. It should be possible to evaluate dose distributions in real time using the film and a reader with several fiber optics, for example.

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Title of the abstract: Assessment of the Efficacy of 280 nm UVC Radiation as a Microbial Disinfection Technique: Determination of the UV Rate Constant for Staphylococcus aureus and Methicillin-Resistant Staphylococcus aureus (MRSA)

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Abstract: Ultraviolet Germicidal Irradiation (UVGI) involves utilizing ultraviolet (UV) wavelengths within the germicidal range (200-320 nm) to disinfect air and surfaces. The 200-280 nm range within UVGI, known as UV-C, is highly effective in germicidal applications due to its ability to damage the genetic material (DNA and RNA) of microorganisms, although less energetic than Vacuum Ultraviolet (VUV) radiation, which is below 200 nm. The prevailing literature suggests that the germicidal peak at around 260-265 nm is the most effective wavelength for inactivating bacteria due to its actions on bacterial DNA. However, this claim is not entirely accurate since it overlooks other deleterious effects. For example, the optimal wavelength for inactivating Bacillus subtilis is 270 nm, and for Cryptosporidium parvum oocysts, it is 271 nm, which lies outside this range. Proteins exhibit a significant UV absorbance peak at 280 nm due to the absorption of the aromatic amino acids' tryptophan and tyrosine, as well as the cystine disulfide bond. Therefore, LEDs emitting light specifically at 280 nm could potentially damage proteins, leading to increased germicidal efficacy, despite not directly acting on DNA. Furthermore, LEDs emitting at 280 nm are readily available in the market. The objective of the present study is to determine a set of coefficients for the bactericidal action of UVC at 280 nm. Previous studies conducted by Gates established an exponential single stage decay model, associated with as specific UV rate constant (cm^2/mJ) for Staphylococcus aureus exposed to UVC radiation of 266 nm. Our findings indicate a much slower UV rate constant compared to Gates' earlier study, which suggests a more rapid decay and swift disinfection. The investigation is conducted on both methicillin-resistant Staphylococcus aureus (MRSA) and Staphylococcus aureus to provide a quantitative and standardized approach to assess the efficacy of 280 nm UVC radiation as a microbial disinfection technique.

ID_239

Title of the abstract: Estimation of ambient dose and air activation for radiation protection in proton therapy centers using passive detectors

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