UV INDUCED THERMOLUMINESCENCE IN PRASEODIMIUM-DOPED ZIRCONIUM OXIDE FILMS

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Body of Abstract: The monitoring of ultraviolet radiation (UVR) using different thermoluminescent (TL) materials has been acquired great interest to UVR measuring. UV dosimetry using thermoluminescence (TL) has been suggested in the past by several authors. This technique has an advantage over others methods due to the readout of the samples. Another advantages of these dosemeters are their small size, portability, lack of any power requirements, linear response to in increasing radiation dose and high sensitivity. The new material studied to be used as thermoluminescent dosimeter is undoped and rare earth doped zirconium oxide (ZrO2:RE). Research on this material has been increased due to its high sensitivity compared to that commercially available aluminum oxide response. Rare earth doped zirconium oxide (ZrO2:RE) in thin films deposited on glass substrate have been proposed for UV radiation dosimetry determining.

This paper presents the results of studying the thermoluminescent (TL) characteristics of Praseodimium-doped Zirconium oxide (ZrO2:Pr) films. Samples were prepared by the spray pyrolysis method depositing them on glass substrates and exposing to UV radiation of different wavelengths in the range from 200 to 400 nm. TL response of ZrO2:Pr films as a function of wavelength shows three maximum at 240, 270 and 330nm. ZrO2:Nd films presented a glow curve exhibiting two peaks at 140°C and 290°C. TL response of ZrO2:Pr as a function of spectral irradiance shows a broad range linear and a fading of the order of 25% in two hours, after this period the fading was 1 % during a month. These results suggest that ZrO2:Nd films could be used in UV radiation dosimetry.