

# Thermoluminescence of magnesium doped zirconium oxide ( $ZrO_2:Mg$ ) UV irradiated

Teodoro Rivera Montalvo<sup>\*1</sup> Juan Azorín Nieton<sup>2</sup>, Ana Maria Soto<sup>2</sup> and Claudio Furetta<sup>3</sup>

<sup>1</sup>*Centro de Investigación en Ciencia Aplicada Y Tecnología Avanzada-Legaria, IPN, Av. Legaria 694, 11500 México D.F. México*

<sup>2</sup>*Universidad Autónoma Metropolitana-Iztapalapa, Av. San Rafael Atlixco 186, 11500 México D.F. Depart, México.*

<sup>3</sup>*Department of Physics, University of Rome, Italy*

## Abstract

The monitoring of ultraviolet radiation (UVR) different thermoluminescent (TL) materials have been used to measure UVR. UV dosimetry using thermoluminescence phenomena has been suggested in the past by several authors. This technique has an advantage over others methods due to the readout of the samples. Other advantages of these phosphors are their small size, portability, lack of any power requirements, linear response to increasing radiation dose and high sensitivity. Zirconium oxide, recently received full attention in view of their possible use as thermoluminescent dosimeter (TLD), if doped with suitable activators, in radiation dosimetry. In the present investigation thermoluminescent (TL) properties of magnesium doped zirconium oxide ( $ZrO_2:Mg$ ) under ultraviolet radiation (UVR) were studied. The  $ZrO_2:Mg$  powder of size 30-40 nm, having monoclinical structure, exhibit a thermoluminescent glow curve with one peak centered at 180°C. The TL response of  $ZrO_2:Mg$  as a function ultraviolet radiation exhibits four maxima centered at 230, 260, 310 and 350 nm. TL response of  $ZrO_2:Mg$  as a function of spectral irradiance of UV Light was linear in a wide range. Fading and reusability of the phosphor were also studied. The results showed that  $ZrO_2:Mg$  nanopowder has the potential to be used as a UV dosimeter in UVR dosimetry.

**KEYWORDS:** *Thermoluminescence, UV radiation,  $ZrO_2:Mg$ .*

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\* Presenting author, E-mail: trivera@ipn.mx