

THE OSL RESPONSE OF THE CaF₂:Dy AND THE CaF₂:Mn

Medeiros, Beatriz; Alencar, Marcus

Instituto de Radioproteção e Dosimetria - IRD/CNEN. Brasil.

* Responsible author, email: vallim@ird.gov.br

The OSL dosimetry has become, in recent years, a successful technique in personal and environmental dosimetry due to high luminescence efficiency, excellent reproducibility, fast readout of signal and repeated and successive OSL measurements of the same dosimeter. Another factor that contributes to the increased use of OSL dosimetry is the use of the Al₂O₃:C as dosimeter. Developed initially as thermoluminescent dosimeter, the Al₂O₃:C has an excellent OSL sensitivity, high efficiency, good linearity, low fading and excellent stability with respect to environmental conditions. However, the use of only one type of dosimeter tends to create limitations on the use of OSL dosimetry because of the characteristics of this dosimeter, such as the OSL dose response for Al₂O₃:C to be linear only for low doses. For intermediate doses (doses in radiotherapy), the response is supralinear. Furthermore, the degree of supralinearity and the saturation value vary from sample to sample (~ 30-300 Gy). The objective of this work is the study of the OSL properties of other dosimetric materials. The dosimetric materials used in this work are the CaF₂:Dy and the CaF₂:Mn produced by Harshaw and known commercially as TLD-200 and TLD-400 respectively. The results demonstrate that both the CaF₂:Dy as the CaF₂:Mn have OSL signal and the OSL dose responses are linear from 10 Gy to 250 Gy for the CaF₂:Dy, and from 3 Gy to 120 Gy for the CaF₂:Mn. Therefore, the OSL dosimetry with these dosimeters can be used in the evaluation of doses of the order of grays to hundreds of grays.