

## Investigation of Polymer Composite for High Dose Dosimetry

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**Abstract :** In this work we have prepared nanocomposites made by mixing Poli (vinilidene fluoride) (PVDF), zirconium oxide ( $ZrO_2$ ) and multi-walled carbon nanotubes (MWCNTs) aiming to find dosimetric properties for applications in high dose dosimetry. The samples were irradiated with a Co-60 source at constant dose rate (16.7 kGy/h), with doses ranging from 100 to 2750 kGy. The UV-Vis and FTIR spectrophotometry have been used to monitor the appearing of C=C conjugated bonds and radio-oxidation of carbon (C=O). FTIR spectrometry has that the absorbance intensities at  $1715\text{ cm}^{-1}$  and  $1730\text{ cm}^{-1}$  can be used for high dosimetry purposes for gamma doses ranging from 500 to 2750 kGy. In this range, it is possible to observe a linear relationship between Abs & Dose. Fading of signal was evaluated for one month and reproducibility in 2000 kGy dose. Scanning Electron Microscopy (SEM) and Energy-dispersive X-ray spectroscopy (EDX) was used for evaluated the dispersion  $ZrO_2$  and MWCNT in the matrix of the PVDF.

**Keywords :** polymer, composite, high dose dosimetry, PVDF/ $ZrO_2$ /MWCNT