

# Abstract

In the light of the scarcity of the dosimeters, their high cost and the monopoly of few companies of the sale and supply process in addition to the lengthy period required to obtain them, it has been mandatory to search for and attempt to produce an alternative glass matter.

This study is an attempt to prepare and produce glass samples from lithium phosphate to be used as a dosimeter and compare it with standard dosimeter, namely TL-800. It is the lithium borate. A trace ratio of both magnesium and copper, as impurities was added to the manufactured crystal to serve as electron traps which perform the thermal scintillation. The addition was made by 10-3 % of weight with changing the concentration of lithium and phosphate till we reached the best results i.e. 70% lithium and 30% phosphate. We adopted the gradual irradiation of the prepared glass samples from 0.5Kg Gray up to 20Kg gray. It has been noticed that the diagrammatic relationship between the irradiated dose and the intensity of the thermoluminescence was in the range less than one 1KGy, which the linearity relationship, which the relationship in the range from one 1K Gy up to 10KGy was ultra linear. The range above 10KGy was something like the irradiation state. The boosted elements (i.e. Mg & Cu) where used.

The fading rate of the manufactured crystal was measured within 0, 15, 30, 60, 120 and 200 days so that the real radioactive dose value can be determined after the lapse of a period of time.

By the end of the study, the activation energy of the substance used as a dosimeter within the range of 0.5 KGy up to 20 KGy was computed. Comparative radioactive measurements for the standard samples TL-800 were taken as it was irradiated for all the previous radioactive samples for all the previous radiation samples from 0.5KGy up to 20 KGy on the prepared samples.

According to the findings of this study, we can recommend as follows:

\* Perform more profound study for improving the properties of the reason substance matter with respect to,

A - Sensitivity.

B - Efficiency.

C - Fading rate.

