

## ABSTRACT

### TERBİYUM KATKILI $Mg_2SiO_4$ FOSFORUNUN TERMOLÜMİNESANS KİNETİK PARAMETRELERİNİN IŞIMA EĞRİSİ AYRIŞTIRMA YÖNTEMİ İLE İNCELENMESİ

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The aim of this study is to determine the kinetic parameters of glow curve of  $Mg_2SiO_4:Tb$  dosimeter. The kinetic parameters of terbium doped  $Mg_2SiO_4$  dosimeter such as activation energy (E), frequency factor (s) and kinetic order (b) are obtained by peak shape, isothermal decay and glow curve deconvolution methods. Glow curve deconvolution analyses are carried out by using Mathematica and PeakFit softwares.

It is observed that  $Mg_2SiO_4:Tb$  dosimeter consists of combination of 3 individual glow curves for the given temperature range. Activation energy and frequency factor values are determined by experimentally and by glow curve deconvolution method. The activation energy values obtained by Mathematica and PeakFit are 1.05 ve 1.1 eV range, respectively while frequency factor is  $2.2 \times 10^{10} s^{-1}$  range. Finally, the figure of merit (FOM) and  $r^2$  values, that shows the accuracy of the fit, are calculated. The FOM value calculated by using Mathematica and the  $r^2$  value calculated by using PeakFit are % 3.4 and 0.9988, respectively for fit with 3 peaks. The FOM and  $r^2$  values indicate that the experimental data and the theoretically fit are in good agreement. According to these results, it can be stated that the glow curve of  $Mg_2SiO_4:Tb$  dosimeter consists of three individual peaks as being one main dosimetric peak at about two high temperature peaks at  $195^\circ C$ , and  $275^\circ C$ , and  $350^\circ C$ . All these three peaks obeys second order kinetics.

**Keywords:** Thermoluminescence, Dosimeter, Kinetic Parameter, Glow Curve Deconvolution Method.