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Kinetic analysis and dosimetric features of thermoluminescence of tanzanite

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Tanzanite is a rare gem mineral of high commercial value and sensitive to optical and thermal stimulation of luminescence. Kinetic analysis and dosimetric features of thermoluminescence from tanzanite are reported. A glow curve measured at 1 °C/s following beta irradiation to 70 Gy reveals a high intensity peak at 74 °C and two distinct lower intensity peaks at 138 and 186 °C. The peaks are respectively referenced as I, II and III. The dependence of the peak position on partial heating and irradiation dose shows that all peaks are of first order kinetics. Kinetic analysis of peak I was carried out using various analytical methods including initial rise, whole glow peak, curve fitting, phosphorescence, phosphorescence area and variable heating rate. The activation energy was averagely evaluated as 0.83 eV. The dose response of all peaks is sublinear from the supralinearity index analysis. Phosphorescence measurement at room temperature shows that peak I is affected by thermal fading unlike peaks II and III which are stable.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

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