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Thermoluminescence of annealed synthetic quartz

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Abstract content
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Thermoluminescence from synthetic quartz annealed at 1000&deg for 10 minutes has been studied. The sample was exposed to beta irradiation of 10Gy then heated at linear heating rate of 1&deg/s. The glow curve obtained has three peaks. One known as the main peak, has the highest intensity component while the other two have weaker intensities. This study focuses on the properties of this main peak whose peak position was found at 76&deg. Kinetic analyses were carried out to determine kinetic parameters such as activation energy (E), frequency factor (s) and order of kinetics (b); using a variety of methods namely initial rise, peak shape and variable heating rate. Observations indicate that the behaviour of this peak is consistent with first-order kinetics. The activation energy was found to be about 1.17eV using the initial rise method and 0.89eV using the variable heating rate method. The frequency factor, a measure of the number of times a trapped electron attempts to escape from its trap was found to be about 4x10^11 Hz. Further work which includes dose dependence study of the main peak is in progress.
Key words: Thermoluminescence, synthetic quartz, annealed, glow curve.

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