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Kinetic Analysis of Thermoluminescence of α-Al2O3:C Annealed at 1200 ^{0}C

Kinetic analysis of thermoluminescence of α-Al2O3:C, an ultra-sensitive luminescence dosimeter, annealed at 1200 ^{0}C for 1 hour is reported. The sample was annealed to modify the distribution of electron centres within it. Thermoluminescence was measured by heating the sample to 500 ^{0}C at 1 ^{0}C/s after 4 Gy beta irradiation. The glow curve reveals three peaks at 52 ^{0}C (peak I), 188 ^{0}C (peak II) and 308 ^{0}C (peak III). The Tm-Tstop method and the dependence of Tm on irradiation dose has been used to determine the orders of kinetics of the three peaks. The secondary peaks of weaker intensity, peaks I and II, have been observed to follow first order kinetics while the dominant peak II follows second order kinetics. Kinetic analysis of thermoluminescence has been carried out using the variable heating rate (VHR), whole glow peak, phosphorescence and curve fitting methods. The activation energies have been determined to be approximately 0.7 eV, 1.1 eV and 1.5 eV for peaks I, II and III respectively. Thermoluminescence intensity of the main peak decreases with heating rate in a manner consistent with thermal quenching

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

No

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

N/A

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