Chapter-5
Thermoluminescence Dosimetry of Minerals
Used as base materials of Ceramic Tiles

(5.1) Introduction:

In the present scientific world, ionizing radiations have been found very useful in engineering, medicine, science and technology. Professionals used them at every walk of life. In all the applications, the exact amount of absorption of radiation energy in the exposed material is important factor to get the desired results. The better use can be achieved mostly by accurate determination of energy absorbed from the radiation field and it possible the distribution of this absorbed energy within the material. Measurements of these quantities form the basis of radiation dosimetry and systems used for this purpose are referred as dosimeters.

In TSL dosimetry the relationship between the TSL signal and the absorbed dose to be measured must be determined by an appropriate calibration. Thermoluminescence Dosimeters (TLD) have found increasing application with the progress made in the development of solid thermoluminesce dosimeters and instrumentation for reading them. Many TLD based systems are now commercially available, and are widely used in routine personal dosimetry, environmental monitoring and clinical radiation dosimetry. The extreme sensitivity of TSL for detecting the presence of defects, as few as $10^9$ within a specimen is beneficial for detecting low radiation levels which are encountered in personal and environmental monitoring.

The application potential of TL-dosimeter is very high. They have been found very useful in many fields on account of several favorable characteristics such as high sensitivity, small size, ability to cover wide range of exposure / dose, reusability, insensitive to environmental conditions. In the past professionals had used the film budge technique in real practice. Later on they found that TLD technique is better for many reasons. And hence during last three to four decades they have developed and established the TLD technique. This is became popular now-a-days prominent applications of thermoluminescence dosimetry and radiation protection. The dosimeters have been widely used for
in-phantom and in-vivo dosimetry, in medical applications. Another area, where thermoluminescence dosimeters have found use is personal monitoring of radiation workers.

This chapter deals with the Thermoluminescence (TL) dosimetry work. This chapter is divided into two part (1) Growth (2) Decay. The first part deals with the comparative TL study and discussion of glow curve of five ceramic tiles raw materials specimens as Quartz, Feldspar, Zircon, Alumina, and Mixture, treated with as received, annealing and quenching at $400^\circ C$, $800^\circ C$ by applying different beta radiation dose as $2.5Gy$, $5Gy$, $10Gy$, $25Gy$, $50Gy$, $75Gy$, $150Gy$, $300Gy$, $600Gy$. The tables indicating peak temperature and peak intensity will also furnish. Second part deals with the comparative TL study and discussion of glow curve of samples Quartz, Feldspar, Zircon, Alumina, and Mixture, treated with as received, annealing and quenching at $400^\circ C$, annealing and quenching at $800^\circ C$, with fixed dose $25Gy$. The TL of above samples are recorded at different hours as immediately after irradiation and after storage of 24hr, 48hr, 96hr, 198hr, 336hr, 504hr. The tables indicating peak temperature and peak intensity will also furnished for better understanding.

**The following characteristic are required for phosphors used in TL dosimeters:**

1) High concentration of electron or hole traps
2) High emission efficiency of electrons or holes thermally released from the trap.
3) Large trap depth and small frequency factor.
4) Trap depth distribution to have a small energy range.
5) Thermal emission spectrum that is in a relatively short wavelength region.
6) Trap luminescence center and crystalline lattice that are not damaged.
   Or
7) Otherwise changed by radiation.

The dose response glow curve shape, super linearity, fading and sensitivity are some of the properties to be examined for practical used of the dosimeters.
(5.2) TL Growth study of as Received Quartz Sample:

**Fig.1.12**

Fig.1.12 shows the TL Glow curve of as received sample of quartz irradiated with beta dose of 2.5Gy by Sr\(^{90}\). Here glow curve exhibits numbers of glow peaks at different temperature with intensity of 0.11 au. Here no significant result is recorded.

**Fig.1.13**

Fig.1.13 shows the TL Glow curve of as received sample of quartz irradiated with beta dose of 5Gy by Sr\(^{90}\). Here glow curve exhibits two glow peaks at temperature 53\(^{0}\)C, and 83\(^{0}\)C with intensity of 0.11 au and 0.13 au. The glow curve looked as humpy.

**Fig.1.14**

Fig.1.14 shows the TL Glow curve of as received sample of quartz irradiated with beta dose of 10Gy by Sr\(^{90}\). Here glow curve exhibits three glow peaks at temperature 51\(^{0}\)C, 79\(^{0}\)C and 95\(^{0}\)C with intensity of 0.11 au, 0.13 au, and 0.19 au so many humps and kinks are developed in to the glow curve.
Fig. 1.15 shows the TL Glow curve of as received sample of quartz irradiated with beta dose of 25Gy by Sr$^{90}$. Here glow curve exhibits one kink at temperature 53°C and one glow peak at temperature 104°C with intensity of 0.11au and 0.75au.

**Fig. 1.16**

![Glow curve of quartz irradiated with beta dose of 50Gy by Sr$^{90}$](image1)

Fig. 1.16 shows the TL Glow curve of as received sample of quartz irradiated with beta dose of 50Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature 108°C with intensity of 1.86au.

**Fig. 1.17**

![Glow curve of quartz irradiated with beta dose of 75Gy by Sr$^{90}$](image2)

Fig. 1.17 shows the TL Glow curve of as received sample of quartz irradiated with beta dose of 75Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature 112°C with intensity of 2.22au.

**Fig. 1.18**

![Glow curve of quartz irradiated with beta dose of 150Gy by Sr$^{90}$](image3)

Fig. 1.18 shows the TL Glow curve of as received sample of quartz irradiated with beta dose of 150Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature 105°C with intensity of 5.01au.

**Fig. 1.19**

![Glow curve of quartz irradiated with beta dose of 300Gy by Sr$^{90}$](image4)

Fig. 1.19 shows the TL Glow curve of as received sample of quartz irradiated with beta dose of 300Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature 107°C with intensity of 11.86au.
Fig. 1.20 shows the TL Glow curve of an as-received sample of quartz irradiated with beta dose of 600 Gy by Sr$^{90}$. The glow curve exhibits one well-resolved glow peak at temperature 109°C with intensity of 23.61 au.

From the above result, we note that the TL intensity of the material is increasing continuously with increasing dose, which indicates the radiation sensitivity of the material. Additionally, it is noted that the peak temperature remains constant with minor variation with increasing dose, showing the stability of the material against temperature. It is a remarkable property of refractory material for ceramic tiles.

Fig. 1.21 shows combined TL glow curve of as-received Quartz sample irradiated with different beta doses. Curve S1 shows the glow curve of the sample irradiated with beta dose of 2.5 Gy. This glow curve exhibits one stable peak at temperature at 118°C with intensity of 0.11 au. and other small peaks are also formed. Curve S2 shows the glow curve of the sample irradiated with beta dose of 5 Gy, this glow curve exhibits two peaks at temperature at 53°C and 83°C with intensity of 0.11 au. and 0.13 au other small peaks are also formed. Curve S3 shows the glow curve of the sample irradiated with beta dose of 10 Gy, this glow curve exhibits three peaks at temperature at 51°C, 79°C, and 95°C with intensity of 0.11 au, 0.13 au, and 0.19 au. Curve S4 shows the glow curve of the sample irradiated with beta dose of 25 Gy, this
The glow curve exhibits two peaks at temperature at 53°C, and 104°C with intensity of 0.11au, 0.75au. The peak 104°C is stable.

**Fig.1.21**

Curve S5 shows the glow curve of the sample irradiated with beta dose of 50Gy, this glow curve exhibits one well resolved peak at temperature at 108°C with intensity of 1.86au. The peak 108°C is a stable peak. Curve S6 shows the glow curve of the sample irradiated with beta dose of 75Gy, this glow curve exhibits one well resolved peaks at temperature at 112°C with intensity of 2.22au, the peak 112°C is a stable peak. Curve S7 shows the glow curve of the sample irradiated with beta dose of 150Gy, this glow curve exhibits one well resolved peak at temperature at 105°C with intensity of 5.01au, the peak 105°C is a stable peak. Curve S8 shows the glow curve of the sample irradiated with beta dose of 300Gy, this glow curve exhibits one well resolved peaks at temperature at 107°C with intensity of 11.86au, the peak 107°C is a stable peak. Curve S9 shows the glow curve of the sample irradiated with beta dose of 600Gy, this glow curve exhibits one well resolved peaks at temperature at 109°C with intensity of 23.61au, the peak 109°C is a stable peak. Here from the study it is note that the intensity of the material is
increasing with dose but the peak temperature remain unchanged with minor variation. It shows the stability and radiation sensitivity of the material.

**Fig.1.22**

Fig.1.22 shows the growth graph of as received Quartz, it clearly indicate that intensity is increased with radiation dose.

**Table-12**

<table>
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<tr>
<th>Sr.No.</th>
<th>Dose Gy</th>
<th>Peak Temperature °C</th>
<th>Peak Intensity (Arb.Unit)</th>
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Table -12 shows the peak temperature and peak intensity of the as received Quartz at different irradiation dose of beta source by Sr	extsuperscript{90}. 
(5.3) TL growth study of Quartz sample treated with AQ 400°C:

Fig.1.23 shows the TL Glow curve of sample treated with annealing and quenching temperature at 400°C and irradiated with beta dose of 2.5Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature 100°C with intensity of 5.42au.

Fig.1.24 shows the TL Glow curve of sample treated with annealing and quenching temperature at 400°C and irradiated with beta dose of 5Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature 102°C with intensity of 10.72au.

Fig.1.25 shows the TL Glow curve of sample treated with annealing and quenching temperature at 400°C and irradiated with beta dose of 10Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature 102°C with intensity of 13.42au.

Fig.1.26 shows the TL Glow curve of sample treated with annealing and quenching temperature at 400°C and irradiated with beta dose of 25Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature 98°C with intensity of 17.08au.
Fig. 1.27 shows the TL Glow curve of sample treated with annealing and quenching temperature at 400°C and irradiated with beta dose of 50Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature 98°C with intensity of 42.72 au.

Fig. 1.28 shows the TL Glow curve of sample treated with annealing and quenching temperature at 400°C and irradiated with beta dose of 75Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature 101°C with intensity of 34.52 au.

Fig. 1.29 shows the TL Glow curve of sample treated with annealing and quenching temperature at 400°C and irradiated with beta dose of 150Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature 100°C with intensity of 21.41 au. Here it is noted that the intensity is decreased with increasing dose it shows fading effect.

Fig. 1.30 shows the TL Glow curve of sample treated with annealing and quenching temperature at 400°C and irradiated with beta dose of 300Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature 100°C with intensity of 14.21 au.
Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature $100^{0}C$ with intensity of $12.69$au, here it is noted that the intensity is decreased with increasing dose it shows fading effect.

**Fig.1.31**

![Fig.1.31](image)

Dose $600$Gy beta

Fig.1.31 shows the TL Glow curve of sample treated with annealing and quenching temperature at $400^{0}C$ and irradiated with beta dose of $600$Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature $105^{0}C$ with intensity of $32.27$au.

From the result it is noted that the After heat treatment of AQ $400^{0}C$ the material shows significant TL result and the intensity of the TL is increased with dose, accept dose at $75$Gy, $150$Gy, and $300$Gy TL shows fading effect. i.e. intensity is decreased with radiation dose.

Fig.1.32 shows combined TL glow curve of Quartz sample treated with annealing and quenching temperature at $400^{0}C$ and irradiated with different beta dose by Sr$^{90}$, here curve S1 shows the glow curve of the sample irradiated with beta dose of $2.5$Gy. This glow curve exhibits one stable peak at temperature at $95^{0}C$ with intensity of $5.42$au. Curve S2 shows the glow curve of the sample irradiated with beta dose of $5$Gy, this glow curve exhibits one peak at temperature at $102^{0}C$ with intensity of $10.72$au. Curve S3 shows the glow curve of the sample irradiated with beta dose of $10$Gy, this glow curve exhibits one peak at temperature at $101^{0}C$ with intensity of $13.42$au. Curve S4 shows the glow curve of the sample irradiated with beta dose of $25$Gy, this
glow curve exhibits two peaks at temperature at $98^\circ$C with intensity of 17.8 au. The peak $98^\circ$C is stable. 

**Fig.1.32**

Curve S5 shows the glow curve of the sample irradiated with beta dose of 50Gy, this glow curve exhibits one well resolved peak at temperature at $98^\circ$C with intensity of 42.72 au. The peak $98^\circ$C is stable peak. Curve S6 shows the glow curve of the sample irradiated with beta dose of 75Gy, this glow curve exhibits one well resolved peak at temperature at $101^\circ$C with intensity of 34.52 au, the peak $101^\circ$C is stable peak, here intensity is decreased than previous fig. it indicate fading effect. Curve S7 shows the glow curve of the sample irradiated with beta dose of 150Gy, this glow curve exhibits one well resolved peak at temperature at $100^\circ$C with intensity of 21.41 au, the peak $100^\circ$C is stable peak. Here also the peak intensity decreased due to fading effect. Curve S8 shows the glow curve of the sample irradiated with beta dose of 300Gy, this glow curve exhibits one well resolved peak at temperature at $100^\circ$C with intensity of 12.69 au, the peak $100^\circ$C is stable peak., intensity is
decreased. Curve S9 shows the glow curve of the sample irradiated with beta dose of 600Gy, this glow curve exhibits one well resolved peaks at temperature at 105°C with intensity of 32.27 au, the peak 105°C is stable peak. From the result it is noted that the after heat treatment of AQ 400°C the material shows significant TL result and the intensity of the TL is increased with dose, accept dose at 75Gy, 150Gy, and 300Gy TL shows fading effect i.e. intensity is decreased with radiation dose.

Fig. 1.33 shows the growth graph of Quartz sample treated with annealing and quenching temperature at 400°C and irradiated with different beta dose by Sr90.

Table 13

<table>
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<th>Sr.No.</th>
<th>Dose Gy</th>
<th>Peak Temperature °C</th>
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<td>32.27</td>
</tr>
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</table>
Table -13 shows the peak temperature and peak intensity of the Quartz sample treated with annealing and quenching temperature at 400°C and irradiated with different beta dose by Sr^{90}.

**(5.4) TL growth study of Quartz sample treated with AQ 800°C:**

Fig.1.34 shows the TL Glow curve of sample treated with annealing and quenching temperature at 800°C and irradiated with beta dose of 2.5Gy by Sr^{90}. here glow curve exhibits one well resolved glow peak at temperature 100°C with intensity of 1.5au.

Fig.1.35 shows the TL Glow curve of sample treated with annealing and quenching temperature at 800°C and irradiated with beta dose of 5Gy by Sr^{90}. here glow curve exhibits one well resolved glow peak at temperature 97°C with intensity of 1.6au.

Fig.1.36 shows the TL Glow curve of sample treated with annealing and quenching temperature at 800°C and irradiated with beta dose of 10Gy by Sr^{90}. here glow curve exhibits one well resolved glow peak at temperature 99°C with intensity of 3au.

Fig.1.37 shows the TL Glow curve of sample treated with annealing and quenching temperature at 800°C and irradiated with beta dose of 25Gy by Sr^{90}. here glow curve exhibits one well resolved glow peak at temperature 101°C with intensity of 20au.
Sr\textsuperscript{90}. Here glow curve exhibits one well resolved glow peak at temperature 99\textdegree C with intensity of 2.49 au.

Fig. 1.37 shows the TL Glow curve of sample treated with annealing and quenching temperature at 800\textdegree C and irradiated with beta dose of 25 Gy by Sr\textsuperscript{90}. Here glow curve exhibits one well resolved glow peak at temperature 101\textdegree C with intensity of 17.19 au.

**Fig. 1.38**

![Graph showing TL Glow curve for a beta dose of 50 Gy at 101\textdegree C](image)

**Fig. 1.39**

![Graph showing TL Glow curve for a beta dose of 75 Gy at 101\textdegree C](image)

Fig. 1.38 shows the TL Glow curve of sample treated with annealing and quenching temperature at 800\textdegree C and irradiated with beta dose of 50 Gy by Sr\textsuperscript{90}. Here glow curve exhibits one well resolved glow peak at temperature 101\textdegree C with intensity of 12.54 au. Here intensity is decreased it indicate fading effect.

Fig. 1.39 shows the TL Glow curve of sample treated with annealing and quenching temperature at 800\textdegree C and irradiated with beta dose of 75 Gy by Sr\textsuperscript{90}. Here glow curve exhibits one well resolved glow peak at temperature 101\textdegree C with intensity of 15.84 au.

**Fig. 1.40**

![Graph showing TL Glow curve for a beta dose of 150 Gy at 97\textdegree C](image)

**Fig. 1.41**

![Graph showing TL Glow curve for a beta dose of 300 Gy at 99\textdegree C](image)
Fig. 1.40 shows the TL Glow curve of sample treated with annealing and quenching temperature at 400°C and irradiated with beta dose of 150Gy by Sr\textsuperscript{90}. Here glow curve exhibits one well resolved glow peak at temperature 97°C with intensity of 16.42 au.

Fig. 1.41 shows the TL Glow curve of sample treated with annealing and quenching temperature at 800°C and irradiated with beta dose of 300Gy by Sr\textsuperscript{90}. Here glow curve exhibits one well resolved glow peak at temperature 99°C with intensity of 20.68 au.

**Fig. 1.42**

Fig. 1.42 shows the TL Glow curve of sample treated with annealing and quenching temperature at 400°C and irradiated with beta dose of 600Gy by Sr\textsuperscript{90}. Here glow curve exhibits one well resolved glow peak at temperature 105°C with intensity of 51 au.

From the result it is noted that the after heat treatment of AQ 800°C the material shows significant TL result and the intensity of the TL is increased with dose. Here peak temperature is remain constant with minor variation it indicate the stability of material.

Fig. 1.43 shows combined TL glow curve of Quartz sample treated with annealing and quenching temperature at 800°C and irradiated with different beta dose by Sr\textsuperscript{90}, here curve S1 shows the glow curve of the sample irradiated with beta dose of 2.5Gy. This glow curve exhibits one stable peak at temperature at 100°C with intensity of 1.5 au. Curve S2 shows the glow curve
of the sample irradiated with beta dose of 5Gy, this glow curve exhibits one peak at temperature at 97°C with intensity of 1.6au. Curve S3 shows the glow curve of the sample irradiated with beta dose of 10Gy, this glow curve exhibits one peak at temperature at 99°C with intensity of 2.49au. Curve S4 shows the glow curve of the sample irradiated with beta dose of 25Gy, this glow curve exhibits two peaks at temperature at 101°C with intensity of 17.9au. The peak 101°C is stable.

Curve S5 shows the glow curve of the sample irradiated with beta dose of 50Gy, this glow curve exhibits one well resolved peak at temperature at 101°C with intensity of 12.54au. Here peak intensity is decreased it show fading effect. The peak 101°C is stable peak. Curve S6 shows the glow curve of the sample irradiated with beta dose of 75Gy, this glow curve exhibits one well
resolved peak at temperature at 101°C with intensity of 15.84au, the peak 101°C is stable peak, Curve S7 shows the glow curve of the sample irradiated with beta dose of 150Gy, this glow curve exhibits one well resolved peak at temperature at 97°C with intensity of 16.42au, the peak 97°C is stable peak. Curve S8 shows the glow curve of the sample irradiated with beta dose of 300Gy, this glow curve exhibits one well resolved peak at temperature at 99°C with intensity of 20.68au, the peak 99°C is stable peak. Curve S9 shows the glow curve of the sample irradiated with beta dose of 600Gy, this glow curve exhibits one well resolved peaks at temperature at 105°C with intensity of 51au, the peak 105°C is stable peak. From the result it is noted that the after heat treatment of AQ 800°C the material shows significant TL result and the intensity of the TL is increased with dose. Here peak temperature is remain constant with minor variation it indicate the stability of material.

**Fig.1.44**

![Growth AQ800°C Quartz](image)

Fig.1.44 shows the growth curve of Quartz sample treated with annealing and quenching temperature at 800°C and irradiated with different beta dose by Sr$^{90}$. 
Table-14

<table>
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<th>Sr.No.</th>
<th>Dose Gy</th>
<th>Peak Temperature °C</th>
<th>Peak Intensity(Arb.Unit)</th>
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Table -14 shows the peak temperature and peak intensity of the Quartz sample treated with annealing and quenching temperature at 800°C and irradiated with different beta dose by Sr$^{90}$. 

Fig.1.45

( X RD pattern of quartz treated with AQ 800°C)

Fig.1.45 shows the X RD pattern of quartz treated with AQ 800°C.
(5.5) TL Growth Study of as received Feldspar:

Fig. 2.11 shows the glow curve of as received Feldspar sample irradiated with beta dose of 2.5Gy by Sr\(^{90}\). Here glow curve exhibits one broad peak at temperature 116\(^{0}\)C and intensity 2.79au and one well resolved peak at temperature 298\(^{0}\)C, with intensity of 22.55au.

Fig. 2.12 shows the glow curve of as received Feldspar sample irradiated with beta dose of 5Gy by Sr\(^{90}\). Here glow curve exhibits one broad peak at temperature 157\(^{0}\)C and intensity 4.23au and one well resolved peak at temperature 299\(^{0}\)C, with intensity of 19.36au. Here the intensity of first peak is increased but the intensity of second peak is slightly decreased.

Fig. 2.13 shows the glow curve of as received Feldspar sample irradiated with beta dose of 10Gy by Sr\(^{90}\). Here glow curve exhibits one broad peak at temperature 129\(^{0}\)C and intensity 6.72au and one well resolved peak at temperature 299\(^{0}\)C, with intensity of 24.57au. Here the intensity of both the peaks are increased.
Fig. 2.14 shows the glow curve of as received Feldspar sample irradiated with beta dose of 25Gy by Sr$^{90}$. Here glow curve exhibits one sharp peak at temperature 129°C and intensity 15.95 and one well resolved broad peak at temperature 292°C, with intensity of 17.45 au. Here the intensity of both the peaks are increased but the first peak become sharp and second peak become broad, here shape of the peaks are changed.

Fig. 2.15 shows the glow curve of as received Feldspar sample irradiated with beta dose of 50Gy by Sr$^{90}$. Here glow curve exhibits one broad peak at temperature 157°C and intensity 33.43 au and one well resolved broad peak at temperature 289°C, with intensity of 30.40 au. Here the intensity of both the peaks are increased but the first peak become broad as compare to previous fig. 2.14.

Fig. 2.16 shows the glow curve of as received Feldspar sample irradiated with beta dose of 75Gy by Sr$^{90}$. Here glow curve exhibits one well resolved peak at temperature 128°C and intensity 85.55 and one well resolved broad peak at temperature 291°C, with intensity of 50.74 au. Here the intensity of both the peaks are increased the intensity of first peak is increased at high level.

Fig. 2.17 shows the glow curve of as received Feldspar sample irradiated with beta dose of 150Gy by Sr$^{90}$. Here glow curve exhibits one well resolved peak at temperature 125°C and intensity 132°C and one well resolved broad peak at temperature 270°C, with intensity of 160 au. Here the intensity of first peak is increased at high level.
Fig. 2.17 shows the glow curve of as received Feldspar sample irradiated with beta dose of 150Gy by Sr\textsuperscript{90}. Here glow curve exhibits one well resolved peak at temperature 125\degree C and intensity 111.73 and one well resolved broad peak at temperature 270\degree C with intensity of 42.44 au. The intensity of second peak is decreased with compare to previous fig. 2.16.

Fig. 2.18 shows the glow curve of as received Feldspar sample irradiated with beta dose of 300Gy by Sr\textsuperscript{90}. Here glow curve exhibits one well resolved peak at temperature 132\degree C and intensity 141 au. Here one remarkable change is occurs the second peak is vanished and the intensity of first peak is increased.

Fig. 2.19 shows the TL glow curve of as received Feldspar sample irradiated with beta dose of 600Gy by Sr\textsuperscript{90}. Here glow curve exhibits one well resolved peak at temperature 132\degree C and intensity 262 au. Here intensity of peak is increased but the peak temperature remain constant it shows that more carriers are associated with the trap at this dose.

From the above results it is noted that at dose of 2.5 Gy two glow peaks are generated out of two first peak is broad with low intensity and second is well resolved and sharp with high intensity, but when increasing the irradiation
dose and record the TL of the material, the intensity of the second peak is increased slowly and intensity of broad peak increased fast. At dose of 75 Gy irradiation, the shape of the both the peak are changed, broad peak converted into sharp and sharp peak is converted into broad peak. At dose 150 Gy, the second peak is vanished, but the intensity of first peak is continue increasing with increasing dose of irradiation.

Fig. 2.20 shows combined TL glow curve of as received Feldspar sample irradiated with different dose of beta radiation by Sr$^{90}$. Curve S1 shows the TL glow curve of the material irradiated with dose of 2.5 Gy, the glow curve exhibits two peaks at temperature 116°C, 298°C with intensity of 2.79 au, and 22.55 au. Curve S2 shows the TL glow curve of the material irradiated with dose of 255 Gy, the glow curve exhibits two peaks at temperature 1570°C, 299°C with intensity of 4.23 au, 19.36 au. Curve S3 shows the TL glow curve of the material irradiated with dose of 10 Gy, the glow curve exhibits two peaks at temperature 129°C, 299°C with intensity of 6.73 au, 24.57 au. Curve S4 shows the TL glow curve of the material irradiated with dose of 25 Gy, the glow curve exhibits two peaks at temperature 129°C and 292°C with intensity of 15.95 and 17.45 au. Curve S5 shows the TL glow curve of the material irradiated with dose of 50 Gy, the glow curve exhibits two peaks at temperature 157°C and 289°C with intensity of 33.43 and 30.40 au. Curve S6 shows the TL glow curve of the material irradiated with dose of 75 Gy, the glow curve exhibits two peaks at temperature 128°C and 291°C with intensity of 85.55 and 50.74 au. Curve S7 shows the TL glow curve of the material irradiated with dose of 150 Gy, the glow curve exhibits one well resolved peak at temperature 125°C with intensity of 111.73 au. Curve S8 shows the TL glow curve of the material irradiated with dose of 3000 Gy, the glow curve exhibits one well resolved peak at temperature 132°C with intensity of 141 au. Curve S9 shows the TL glow curve of the material irradiated with dose of 600 Gy, the glow curve exhibits one well resolved peak at temperature 132°C with intensity of 262 au.
Table-15

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Table-15 shows the peak temperature and peak intensity of as received Feldspar at different beta dose.
Fig. 2.21 shows the growth graph of as received Feldspar sample.

(5.6) TL growth study of Feldspar sample treated with AQ 400°C:

Fig. 2.22 shows the glow curve of Feldspar sample treated with AQ400°C and irradiated with beta dose of 2.5Gy by Sr$^{90}$. Here glow curve exhibits one kink at temperature 55°C and one broad peak at temperature 109°C and intensity 1.0 au. Also humps are developed into the glow curve.

Fig. 2.23 shows the glow curve of Feldspar sample treated with AQ400°C and irradiated with beta dose of 5Gy by Sr$^{90}$. Here glow curve exhibits one kink at...
temperature 58°C and one peak at temperature 115°C and intensity 1.08 au. also humps are developed in to the glow curve.

**Fig. 2.24**

![Fig. 2.24](image)

Fig. 2.24 shows the glow curve of Feldspar sample treated with AQ400°C and irradiated with beta dose of 10 Gy by Sr^{90}. Here glow curve exhibits one kink at temperature 52°C and one peak at temperature 124°C and intensity 2.32 au. also humps are developed in to the glow curve.

**Fig. 2.25**

![Fig. 2.25](image)

Fig. 2.25 shows the glow curve of Feldspar sample treated with AQ400°C and irradiated with beta dose of 25 Gy by Sr^{90}. Here glow curve exhibits one well resolved glow peak at temperature 127°C and intensity of 8.31 and one broad peak at temperature 283°C and intensity 5 au.

**Fig. 2.26**

![Fig. 2.26](image)

Fig. 2.26 shows the glow curve of Feldspar sample treated with AQ400°C and irradiated with beta dose of 50 Gy by Sr^{90}. Here glow curve exhibits one well resolved glow peak at temperature 125°C and intensity of 11.37 and one broad peak at temperature 271°C and intensity 5.67 au.

**Fig. 2.27**

![Fig. 2.27](image)

Fig. 2.27 shows the glow curve of Feldspar sample treated with AQ400°C and irradiated with beta dose of 75 Gy by Sr^{90}. Here glow curve exhibits one well
resolved glow peak at temperature 120°C and intensity of 39.4 and one broad peak at temperature 259°C and intensity 17.8au.

Fig. 2.28

Fig. 2.29

Fig. 2.28 shows the glow curve of Feldspar sample treated with AQ400°C and irradiated with beta dose of 150Gy by Sr90. Her glow curve exhibits one well resolved glow peak at temperature 139°C and intensity of 108au, here second peak is vanished and the intensity of first peak is increased high level.

Fig. 2.29 shows the glow curve of Feldspar sample treated with AQ400°C and irradiated with beta dose of 300Gy by Sr90. Here glow curve exhibits one well resolved glow peak at temperature 133°C and intensity of 65au. Here intensity is decreased it exhibits fading effect.

Fig. 2.30 shows the TL glow curve of Feldspar sample treated with AQ400°C and irradiated with beta dose of 600Gy by Sr90. Here glow curve exhibits one well resolved glow peak at temperature 133°C and intensity of 351.36au. Here intensity is increased but peak temperature remain constant.

Fig. 2.30
From the results of above TL growth study of Feldspar sample treated with AQ400°C shows that irradiated sample of 2.5Gy, 5Gy, and 10Gy, dose exhibits one kink and one peak also some humps are formed into the glow curve. Irradiated sample of 25Gy, 50Gy, and 75Gy, dose exhibits one well resolved peak and one broad peak with increasing in intensity, irradiated sample of 300Gy exhibits one peak at temperature 139°C and intensity of 65au. Here intensity is decreased, at irradiation dose of 600Gy highest intensity 351.36au is recorded.

Fig.2.31 shows combined TL glow curve of Feldspar sample treated with AQ400°C and irradiated with different dose of beta radiation by Sr90. Curve S1 shows the TL glow curve of the material irradiated with dose of 2.5Gy, the glow curve exhibits one peak at temperature 109°C with intensity of 0.13au. Curve S2 shows the TL glow curve of the material irradiated with dose of 5Gy, the glow curve exhibits two peaks at temperature 58°C, 115°C with intensity of 0.11, 1.08au.

Fig.2.31
Curve S3 shows the TL glow curve of the material irradiated with dose of 10Gy, the glow curve exhibits one peak at temperature 124°C with intensity of 2.32au. Curve S4 shows the TL glow curve of the material irradiated with dose of 25Gy, the glow curve exhibits one peak at temperature 127°C with intensity of 8.31. Curve S5 shows the TL glow curve of the material irradiated with dose of 50Gy, the glow curve exhibits one peak at temperature 125°C with intensity of 11.37au. Curve S6 shows the TL glow curve of the material irradiated with dose of 75Gy, the glow curve exhibits one peak at temperature 120°C with intensity of 39.4au. Curve S7 shows the TL glow curve of the material irradiated with dose of 150Gy, the glow curve exhibits one well resolved peak at temperature 139°C with intensity of 108au. Curve S8 shows the TL glow curve of the material irradiated with dose of 3000Gy, the glow curve exhibits one well resolved peak at temperature 133°C with intensity of 65au. Curve S9 shows the TL glow curve of the material irradiated with dose of 6000Gy, the glow curve exhibits one well resolved peak at temperature 133°C with intensity of 351.36au.

**Table-16**

<table>
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<th>Peak Intensity(Arb.Unit)</th>
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Table-16 shows the peak temperature and peak intensity of Feldspar treated with temperature AQ400°C at different beta dose.
Fig. 2.32 shows the growth graph of Feldspar sample treated with temperature AQ400°C at different beta dose.

**Fig. 2.32**

(Growth graph of Feldspar AQ400°C)

(5.7) TL growth study of Feldspar sample treated with AQ800°C:

**Fig. 2.33**

Fig. 2.33 shows the glow curve of Feldspar sample treated with AQ800°C and irradiated with beta dose of 2.5Gy by Sr²⁺. Here glow curve exhibits one kink at temperature 55°C and one broad peak at temperature 118°C and intensity 1.14 au, also humps are developed in to the glow curve.
Fig. 2.34 shows the glow curve of Feldspar sample treated with AQ800°C and irradiated with beta dose of 5Gy by Sr$^{90}$. Here glow curve exhibits one broad peak at temperature 124°C and intensity 2.03 au, also humps are developed in to the glow curve.

**Fig. 2.35**

![Glow Curve 10Gy Beta](image1)

Fig. 2.35 shows the glow curve of Feldspar sample treated with AQ800°C and irradiated with beta dose of 10Gy by Sr$^{90}$. Here glow curve exhibits one peak at temperature 137°C and intensity 3.73 au, also humps are developed in to the glow curve.

**Fig. 2.36**

![Glow Curve 25Gy Beta](image2)

Fig. 2.36 shows the glow curve of Feldspar sample treated with AQ800°C and irradiated with beta dose of 25Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at temperature 132°C and intensity of 6.96 au.

**Fig. 2.37**

![Glow Curve 50Gy Beta](image3)

Fig. 2.37 shows the glow curve of Feldspar sample treated with AQ400°C and irradiated with beta dose of 50Gy by Sr$^{90}$. Her glow curve exhibits one well resolved glow peak at temperature 140°C and intensity of 13.81 au.
Fig. 2.38 shows the glow curve of Feldspar sample treated with AQ800°C and irradiated with beta dose of 75Gy by Sr⁹⁰. Here glow curve exhibits one well resolved glow peak at temperature 129°C and intensity of 24.23 au.

**Fig. 2.39**

![Glow curve of Feldspar sample treated with AQ800°C and irradiated with beta dose of 150Gy by Sr⁹⁰.](image)

Here glow curve exhibits one well resolved glow peak at temperature 160°C and intensity of 172.27 au. Here it is noted that the peak 129°C is shifted to 160°C with high intensity.

**Fig. 2.40**

![Glow curve of Feldspar sample treated with AQ800°C and irradiated with beta dose of 300Gy by Sr⁹⁰.](image)

Here glow curve exhibits one well resolved glow peak at temperature 142°C and intensity of 60.65 au. Here intensity is decreased it exhibits fading effect.

**Fig. 2.41**

![Glow curve of Feldspar sample treated with AQ800°C and irradiated with beta dose of 600Gy by Sr⁹⁰.](image)

Here glow curve exhibits one well resolved glow peak at temperature 135°C and intensity of 221.41 au. Here
intensity is increased but peak temperature remain constant with minor variation.
From the results of above TL growth study of Feldspar sample treated with AQ800°C shows that irradiated sample of 2.5Gy, 5Gy, and 10Gy, dose exhibits one kink and one peak also some humps are formed into the glow curve. Irradiated sample of 25Gy, 50Gy, and 75Gy, dose exhibits one well resolved peak and one broad peak with increasing in intensity, irradiated sample of 300Gy exhibits one peak at temperature 142°C and intensity of 60.65au. Here intensity is decreased, at irradiation dose of 600Gy highest intensity 221.41au is recorded.

Fig.2.42 shows combined TL glow curve of Feldspar sample treated with AQ800°C and irradiated with different dose of beta radiation by Sr90. Curve S1 shows the TL glow curve of the material irradiated with dose of 2.5Gy, the glow curve exhibits one peak at temperature 118°C with intensity of 1.14au. Curve S2 shows the TL glow curve of the material irradiated with dose of 5Gy, the glow curve exhibits one peak at temperature 124°C with intensity of 2.03au. Curve S3 shows the TL glow curve of the material irradiated with dose of 10Gy, the glow curve exhibits one peak at temperature 137°C with intensity of 3.73au. Curve S4 shows the TL glow curve of the material irradiated with dose of 25Gy, the glow curve exhibits one peak at temperature 132°C with intensity of 6.96au. Curve S5 shows the TL glow curve of the material irradiated with dose of 50Gy, the glow curve exhibits one peak at temperature 140°C with intensity of 13.81au. Curve S6 shows the TL glow curve of the material irradiated with dose of 75Gy, the glow curve exhibits one peak at temperature 129°C with intensity of 24.23au. Curve S7 shows the TL glow curve of the material irradiated with dose of 150Gy, the glow curve exhibits one well resolved peak at temperature 160°C with intensity of 172.27au. Curve S8 shows the TL glow curve of the material irradiated with dose of 300Gy, the glow curve exhibits one well resolved peak at temperature 142°C with intensity of 60.65au. Curve S9 shows the TL glow curve of the material irradiated with dose of 600°C, the glow curve exhibits one well resolved peak at temperature 135°C with intensity of 221.41au.
Table-17 shows the peak temperature and peak intensity of Feldspar treated with temperature AQ800°C at different beta dose.
Fig. 2.43 shows the growth graph of Feldspar sample treated with temperature AQ800°C at different beta dose.

Fig. 2.44 shows the X RD pattern of Feldspar treated with annealing and quenching temperature of 800°C.
(5.8) TL Growth Study of as received Zircon:

**Fig. 3.12**

Dose 2.5 Gy beta

**Fig. 3.13**

Dose 5 Gy beta

Fig. 3.12 shows the glow curve of as received Zircon sample irradiated with beta dose of 2.5 Gy by Sr$^{90}$. Here glow curve exhibits three glow peaks at 60°C, 129°C, and 160°C with intensity of 0.11 au. Here no significant TL is recorded.

Fig. 3.13 shows the glow curve of as received Zircon sample irradiated with beta dose of 5 Gy by Sr$^{90}$. Here glow curve exhibits two glow peaks at 117°C and 144°C with intensity of 0.11 au. Here no significant TL is recorded.

**Fig. 3.14**

Dose 10 Gy beta

**Fig. 3.15**

Dose 25 Gy beta

Fig. 3.14 shows the glow curve of as received Zircon sample irradiated with beta dose of 10 Gy by Sr$^{90}$. Here glow curve exhibits two glow peaks at 63°C, and 307°C with intensity of 0.11 au. and 1.2 au here peak 307°C is broad peak.

Fig. 3.15 shows the glow curve of as received Zircon sample irradiated with beta dose of 25 Gy by Sr$^{90}$. Here glow curve exhibits two glow peaks at 134°C, and 308°C with intensity of 0.48 au. and 2.5 au here peak 307°C is broad peak.
Fig. 3.16 shows the glow curve of as received Zircon sample irradiated with beta dose of 50Gy by Sr$^{90}$. Here glow curve exhibits two glow peaks at 137$^0$C, and 291$^0$C with intensity of 0.72au, and 1.2au here peak 291$^0$C is broad peak.

Fig. 3.17 shows the glow curve of as received Zircon sample irradiated with beta dose of 75Gy by Sr$^{90}$. Here glow curve exhibits two glow peaks at 135$^0$C, and 293$^0$C with intensity of 1.35au, and 1.2au here peak 293$^0$C is broad peak.

Fig. 3.18 shows the glow curve of as received Zircon sample irradiated with beta dose of 150Gy by Sr$^{90}$. Here glow curve exhibits two glow peaks at 135$^0$C, and 286$^0$C with intensity of 1.33au, and 1.2au here peak 286$^0$C is broad peak.

Fig. 3.19 shows the glow curve of as received Zircon sample irradiated with beta dose of 300Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peaks at 131$^0$C, with intensity of 2.42au.
Fig. 3.20 shows the glow curve of as received Zircon sample irradiated with beta dose of 600Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peaks at 131°C, with intensity of 2.42 au.

From the above results it is noted that 2.5Gy and 5Gy irradiated sample of the material not exhibits significant TL. But if increased the dose as 10Gy, 25Gy, 50Gy, 75Gy, and 150Gy two peaks are generated one well resolved and one broad peak, it exhibits minor variation in reading of temperature but the intensity is increased. At irradiation dose of 300Gy and 600Gy the glow curve exhibits one well resolved and sharp peak with increasing in intensity. Here, TL of the material exhibits notable variation in shape of the glow curve, no of peaks, and intensity and temperature.

Fig. 3.21 shows combined TL glow curve of as received Zircon irradiated with different dose of beta radiation by Sr$^{90}$. Curve S1 shows the TL glow curve of the material irradiated with dose of 2.5Gy, the glow curve exhibits three peaks at temperature 60°C, 129°C, and 160°C with intensity of 0.11 au. Curve S2 shows the TL glow curve of the material irradiated with dose of 5Gy, the glow curve exhibits two peaks at temperature 117°C and 144°C with intensity of 0.11 au. Curve S3 shows the TL glow curve of the material irradiated with dose of 10Gy, the glow curve exhibits two peaks at temperature 63°C and 307°C with intensity of 0.11 au and 1.2 au. Curve S4 shows the TL glow curve of the material irradiated with dose of 25Gy, the glow curve exhibits two peaks at temperature 134°C and 308°C with intensity of 0.48 au and 2.5 au. Curve S5
shows the TL glow curve of the material irradiated with dose of 50Gy, the glow curve exhibits two peaks at temperature 137°C and 291°C with intensity of 0.72 au and 1.2 au. Curve S6 shows the TL glow curve of the material irradiated with dose of 75Gy, the glow curve exhibits two peaks at temperature 135°C and 293°C with intensity of 1.35 au and 1.2 au.

Fig. 3.21

Curve S7 shows the TL glow curve of the material irradiated with dose of 150Gy, the glow curve exhibits two peaks at temperature 135°C and 286°C with intensity of 1.35 au and 1.2 au. Curve S8 shows the TL glow curve of the material irradiated with dose of 300Gy, the glow curve exhibits one peak at temperature 131°C with intensity of 2.42. Curve S9 shows the TL glow curve of the material irradiated with dose of 600Gy, the glow curve exhibits one peak at temperature 126°C with intensity of 6.9 au.
Table-18

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Table-18 shows the peak temperature and peak intensity of as received sample of Zircon irradiated with different beta dose Sr$^{90}$. 

Fig.3.22

(Growth graph of as received Zircon sample)

Fig.3.22 shows the TL growth graph of as received Zircon sample.
(5.9) TL Growth Study of Zircon treated with AQ 400°C:

Fig. 3.23

Fig. 3.24

Fig. 3.23 shows the glow curve of Zircon sample treated with AQ400°C and irradiated with beta dose of 2.5Gy by Sr\(^{90}\). Here glow curve exhibits four glow peaks at 84°C, 137°C, 201°C and 239°C with intensity of 0.11au. Here no significant TL is recorded.

Fig. 3.24 shows the glow curve of Zircon sample treated with AQ400°C and irradiated with beta dose of 5Gy by Sr\(^{90}\). Here glow curve exhibits four glow peaks at 72°C, 134°C, 191°C and 234°C with intensity of 0.11au. Here no significant TL is recorded.

Fig. 3.25

Fig. 3.26

Fig. 3.25 shows the glow curve of Zircon sample treated with AQ400°C and irradiated with beta dose of 10Gy by Sr\(^{90}\). Here glow curve exhibits four glow peaks at 57°C, 116°C, 151°C and 197°C with intensity of 0.11au. Here no significant TL is recorded.
Fig. 3.26 shows the glow curve of Zircon sample treated with AQ400°C and irradiated with beta dose of 25Gy by Sr\textsuperscript{90}. Here glow curve exhibits three glow peaks at 54°C, 72°C, 112°C with intensity of 0.19au, 0.13au and 0.33au. Here intensity is increased with compare to previous results.

![Fig. 3.27](image1)

![Fig. 3.28](image2)

Fig. 3.27 shows the glow curve of Zircon sample treated with AQ 400°C and irradiated with beta dose of 50Gy by Sr\textsuperscript{90}. Here glow curve exhibits two glow peaks at 58°C, and 104°C with intensity of 0.19au, and 0.75au. Here intensity is increased with compare to previous results.

Fig. 3.28 shows the glow curve of Zircon sample treated with AQ400°C and irradiated with beta dose of 75Gy by Sr\textsuperscript{90}. Here glow curve exhibits three glow peaks at 62°C, 105°C, 131°C with intensity of 0.11au, 0.5au and 0.54au.

![Fig. 3.29](image3)

![Fig. 3.30](image4)

Fig. 3.29 shows the glow curve of Zircon sample treated with AQ400°C and irradiated with beta dose of 150Gy by Sr\textsuperscript{90}. Here glow curve exhibits one well resolved glow peak at 130°C, with intensity of 1.33au.
Fig. 3.30 shows the glow curve of Zircon sample treated with AQ400°C and irradiated with beta dose of 300Gy by Sr\textsuperscript{90}. Here glow curve exhibits one well resolved glow peaks at 129°C, with intensity of 2.94au.

**Fig. 3.31**

![Glow curve of Zircon sample treated with AQ400°C and irradiated with beta dose of 600Gy by Sr\textsuperscript{90}. Here glow curve exhibits one well resolved glow peak at 127°C, with intensity of 5.89au.](image)

Fig. 3.31 shows the glow curve of Zircon sample treated with AQ400°C and irradiated with beta dose of 600Gy by Sr\textsuperscript{90}. Here glow curve exhibits one well resolved glow peak at 127°C, with intensity of 5.89au.

From the above results it is noted that 2.5Gy 5Gy and 10Gy irradiated sample of the material not exhibits significant TL. But if increased the dose as 25Gy, 50Gy, and 75Gy, exhibits TL with increasing intensity. At irradiation dose of 150Gy, 300Gy and 600Gy the glow curve exhibits one well resolved and sharp peak with increasing in intensity. Here, TL of the material exhibits notable variation in shape of the glow curve, no of peaks, and intensity and temperature, here less radiation sensitivity of material is recorded.

**Fig.3.32** shows combined TL glow curve of Zircon treated with AQ 400°C and irradiated with different dose of beta radiation by Sr\textsuperscript{90}. Curve S1 shows the TL glow curve of the material irradiated with dose of 2.5Gy, the glow curve exhibits four peaks at temperature 84°C, 137°C, 201°C and 239°C with intensity of 0.11au. Curve S2 shows the TL glow curve of the material irradiated with dose of 5Gy, the glow curve exhibits four peaks at temperature 72°C, 134°C, 191°C and 234°C with intensity of 0.11au. Curve S3 shows the TL glow curve of the material irradiated with dose of 10Gy, the glow curve exhibits four peaks at temperature 57°C, 116°C, 151°C and 234°C with
intensity of 0.11 au. Curve S4 shows the TL glow curve of the material irradiated with dose of 25 Gy, the glow curve exhibits three peaks at temperature 54°C, 72°C, and 112°C with intensity of 0.19 au, 0.13 au and 0.33 au. Curve S5 shows the TL glow curve of the material irradiated with dose of 50 Gy, the glow curve exhibits two peaks at temperature 58°C, and 104°C with intensity of 0.19 au and 0.75 au. Curve S6 shows the TL glow curve of the material irradiated with dose of 75 Gy, the glow curve exhibits three peaks at temperature 62°C, 105°C, and 131°C with intensity of 0.11 au, 0.5 au and 0.54 au respectively. Curve S7 shows the TL glow curve of the material irradiated with dose of 150 Gy, the glow curve exhibits one well resolved peak at temperature 130°C with intensity of 1.33 au. Curve S8 shows the TL glow curve of the material irradiated with dose of 300 Gy, the glow curve exhibits one well resolved peak at temperature 129°C with intensity of 2.94 au. Curve S9 shows the TL glow curve of the material irradiated with dose of 600 Gy, the glow curve exhibits one well resolved peak at temperature 127°C with intensity of 5.89 au.

**Fig.3.32**
Table-19

<table>
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<th>Sr.No.</th>
<th>Dose Gy</th>
<th>Peak Temperature °C</th>
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Table-19 shows the peak temperature and peak intensity of Zircon treated with AQ400°C irradiated with different beta dose Sr$^{90}$.

**Fig.3.33**

![Growth Zircon AQ4](image)

(TL growth graph of Zircon treated with AQ 400°C)

Fig.3.33 shows the TL growth graph of Zircon treated with AQ 400°C sample.
(5.10) TL Growth Study of Zircon treated with AQ 800°C:

Fig. 3.34 shows the glow curve of Zircon sample treated with AQ 800°C and irradiated with beta dose of 2.5Gy by Sr$^{90}$. Here glow curve exhibits four glow peaks at 108°C, 140°C, 173°C and 205°C with intensity of 0.11au. Here no significant TL is recorded.

Fig. 3.35 shows the glow curve of Zircon sample treated with AQ800°C and irradiated with beta dose of 5Gy by Sr$^{90}$. Here glow curve exhibits four glow peaks at 60°C, 127°C, 170°C and 205°C with intensity of 0.11au. Here no significant TL is recorded.

Fig. 3.36 shows the glow curve of Zircon sample treated with AQ800°C and irradiated with beta dose of 10Gy by Sr$^{90}$. Here glow curve exhibits two glow peaks at 60°C, 112°C, with intensity of 0.11au. Here no significant TL is recorded.

Fig. 3.37 shows the glow curve of Zircon sample treated with AQ800°C and irradiated with beta dose of 25Gy by Sr$^{90}$. Here glow curve exhibits two glow peaks at 137°C.
peaks at 54°C, 137°C, with intensity of 0.11au, and 0.67au. here intensity is increased with compare to previous results.

**Fig. 3.38** shows the glow curve of Zircon sample treated with AQ800°C and irradiated with beta dose of 50Gy by Sr⁹⁰. Here glow curve exhibits two glow peaks at 58°C, and 134°C with intensity of 0.11au, and 1.0au. here intensity is increased with compare to previous results.

**Fig. 3.39** shows the glow curve of Zircon sample treated with AQ800°C and irradiated with beta dose of 75Gy by Sr⁹⁰. Here glow curve exhibits one well resolved glow peaks at 131°C with intensity of 1.27au.

**Fig. 3.40** shows the glow curve of Zircon sample treated with AQ800°C and irradiated with beta dose of 150Gy by Sr⁹⁰. Here glow curve exhibits one well resolved glow peaks at 131°C with intensity of 2.71au.

**Fig. 3.41** shows the glow curve of Zircon sample treated with AQ800°C and irradiated with beta dose of 300Gy by Sr⁹⁰. Here glow curve exhibits one well resolved glow peaks at 134°C with intensity of 6.35au.
Fig. 3.42 shows the glow curve of Zircon sample treated with AQ800°C and irradiated with beta dose of 600Gy by Sr90. Here glow curve exhibits one well resolved glow peaks at 133°C with intensity of 14.99au.

From the above results it is noted that 2.5Gy, 5Gy, 10Gy, 25Gy and 50Gy irradiated sample of the material not exhibits significant TL. But if increased the dose as 75Gy, exhibits TL with increasing intensity. At irradiation dose of 150Gy, 300Gy and 600Gy the glow curve exhibits one well resolved and sharp peak with increasing in intensity. Here, TL of the material exhibits notable variation in shape of the glow curve, no of peaks, and intensity and temperature, here less radiation sensitivity of material is recorded.

Fig.3.43 shows combined TL glow curve of Zircon treated with AQ 800°C and irradiated with different dose of beta radiation by Sr90. Curve S1 shows the TL glow curve of the material irradiated with dose of 2.5Gy, the glow curve exhibits four peaks at temperature 108°C, 140°C, 173°C and 205°C with intensity of 0.11au. Curve S2 shows the TL glow curve of the material irradiated with dose of 5Gy, the glow curve exhibits four peaks at temperature 60°C, 127°C, 170°C and 205°C with intensity of 0.11au. Curve S3 shows the TL glow curve of the material irradiated with dose of 10Gy, the glow curve exhibits two peaks at temperature 60°C, 112°C, with intensity of 0.11au. Curve S4 shows the TL glow curve of the material irradiated with dose of 25Gy, the glow curve exhibits two peaks at temperature 54°C, 137°C, with intensity of 0.1au., and 0.67au. Curve S5 shows the TL glow curve of the
material irradiated with dose of 50Gy, the glow curve exhibits two peaks at temperature $58^0C$, and $134^0C$ with intensity of 0.11au. and 1.00au. Curve S6 shows the TL glow curve of the material irradiated with dose of 75Gy, the glow curve exhibits one well resolved glow peak at $131^0C$ with intensity of 1.27au. Curve S7 shows the TL glow curve of the material irradiated with dose of 150Gy, the glow curve exhibits one well resolved peak at temperature $131^0C$ with intensity of 2.71au. Curve S8 shows the TL glow curve of the material irradiated with dose of 300Gy, the glow curve exhibits one well resolved peak at temperature $134^0C$ with intensity of 6.35au. Curve S9 shows the TL glow curve of the material irradiated with dose of 600Gy, the glow curve exhibits one well resolved peak at temperature $133^0C$ with intensity of 14.99au.

Fig.3.43
Table-20

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<th>Dose Gy</th>
<th>Peak Temperature °C</th>
<th>Peak Intensity (Arb.Unit)</th>
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Table-20 shows the peak temperature and peak intensity of Zircon treated with AQ800°C irradiated with different beta dose Sr$^{90}$.

Fig.3.44

Growth Zircon AQ8

(TL growth graph of Zircon treated with AQ 800°C)

Fig.3.44 shows the TL growth graph of Zircon treated with AQ 800°C sample.
Fig. 3.45 shows the XRD pattern of Zircon treated with AQ 800°C sample.

(5.11) TL Growth Study of as received Alumina:

Fig. 4.12 shows the TL glow curve of as received sample of Alumina irradiated with beta dose of 2.5 Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 262°C and intensity of 1.98 au. This material exhibits significant TL low dose it indicate highly radiation sensitivity of the material.

Fig. 4.13 shows the TL glow curve of as received sample of Alumina irradiated with beta dose of 5 Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 252°C and intensity of 3.38 au. This material exhibits significant TL it indicate highly radiation sensitivity of the material.
Fig. 4.14 shows the TL glow curve of as received sample of Alumina irradiated with beta dose of 10Gy by Sr^{90}. The glow curve exhibits one hump and one well resolved glow peak at temperature 257°C and intensity of 6.05au; this material exhibits significant TL with increasing in intensity with compare to previous result it indicate highly radiation sensitivity of the material.

**Fig.4.14**

![Glow curve for 10Gy](image1)

**Fig.4.15**

![Glow curve for 25Gy](image2)

Fig. 4.15 shows the TL glow curve of as received sample of Alumina irradiated with beta dose of 25Gy by Sr^{90}. The glow curve exhibits one hump and one well resolved glow peak at temperature 250°C and intensity of 12.55au; this material exhibits significant TL with increasing in intensity with compare to previous result it indicate highly radiation sensitivity of the material.

**Fig.4.16**

![Glow curve for 50Gy](image3)

**Fig.4.17**

![Glow curve for 75Gy](image4)

Fig. 4.16 shows the TL glow curve of as received sample of Alumina irradiated with beta dose of 50Gy by Sr^{90}. The glow curve exhibits one hump and one well resolved glow peak at temperature 254°C and intensity of 15.70au; this material exhibits significant TL with increasing in intensity with compare to previous result it indicate highly radiation sensitivity of the material.
Fig. 4.17 shows the TL glow curve of as received sample of Alumina irradiated with beta dose of 75Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 256°C and intensity of 27.33au this material exhibits significant TL with increasing in intensity with compare to previous result it indicate highly radiation sensitivity of the material.

Fig. 4.18 shows the TL glow curve of as received sample of Alumina irradiated with beta dose of 150Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 256°C and intensity of 135.18au this material exhibits significant TL with increasing in intensity in higher level with compare to previous result it indicate that at this radiation dose more carriers are associated with the particular trap.

Fig. 4.18

![Fig.4.18](image1)

Fig.4.19

![Fig.4.19](image2)

Fig. 4.19 shows the TL glow curve of as received sample of Alumina irradiated with beta dose of 300Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 256°C and intensity of 297.50au this material exhibits significant TL with increasing in intensity in higher level with compare to previous result it indicate that at this radiation dose more carriers are associated with the particular trap.

Fig. 4.20 shows the TL glow curve of as received sample of Alumina irradiated with beta dose of 600Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 256°C and intensity of 797.19au this material exhibits significant TL with increasing in intensity in higher level with compare to previous result it indicate that at this radiation dose more carriers are associated with the particular trap.
From the result it is noted that the material exhibits remarkable TL at lowest dose, and the intensity become almost double at each increasing dose till 75Gy. But then after irradiation dose of 150Gy, 300Gy the intensity increased at higher level and the highest intensity recorded 797.19au of this material at irradiation dose of 600Gy. The peak temperature $256^0$C remain constant with minor variation and intensity continue increased with dose it indicate the material is stable and radiation sensitive this material is key material for TL study of ceramic tiles.

Fig.4.21 shows combined TL glow curve of as received Alumina sample irradiated with different dose of beta radiation by Sr$^{90}$. Curve S1 shows the TL glow curve of the material irradiated with dose of 2.5Gy, the glow curve exhibits one hump and one peak at temperature $262^0$C with intensity of 1.68au. Curve S2 shows the TL glow curve of the material irradiated with dose of 5Gy, the glow curve exhibits one hump and one peak at temperature $252^0$C with intensity of 3.38au. Curve S3 shows the TL glow curve of the material irradiated with dose of 10Gy, the glow curve exhibits one hump and one peak at temperature $257^0$C with intensity of 6.05au. Curve S4 shows the TL glow curve of the material irradiated with dose of 25Gy, the glow curve exhibits one hump and one peak at temperature $250^0$C with intensity of 12.55au. Curve S5 shows the TL glow curve of the material irradiated with dose of 50Gy, the glow curve exhibits one hump and one peak at temperature...
254°C with intensity of 15.70 au. Curve S6 shows the TL glow curve of the material irradiated with dose of 75 Gy, the glow curve exhibits one hump and one peak at temperature 256°C with intensity of 27.73 au. Curve S7 shows the TL glow curve of the material irradiated with dose of 150 Gy, the glow curve exhibits one hump and one peak at temperature 256°C with intensity of 135.18 au. Curve S8 shows the TL glow curve of the material irradiated with dose of 300 Gy, the glow curve exhibits one hump and one peak at temperature 256°C with intensity of 297.50 au. Curve S9 shows the TL glow curve of the material irradiated with dose of 600 Gy, the glow curve exhibits one hump and one peak at temperature 256°C with intensity of 797.19 au.
Table-21

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Table-21 shows the peak temperature and peak intensity of as received sample of Alumina irradiated with different beta dose $^{90}$Sr.

Fig.4.22

Fig.4.22 shows the TL growth graph of as received Alumina sample.
(5.12) TL Growth Study of Alumina treated with AQ 400°C:

**Fig. 4.23**

**Fig. 4.24**

![Graph](image1)

![Graph](image2)

Fig. 4.23 shows the TL glow curve of AQ 400°C treated sample of Alumina irradiated with beta dose of 2.5Gy by Sr⁹⁰. The glow curve exhibits one hump and one well resolved glow peak at temperature 251°C and intensity of 1.8au this material exhibits significant TL low dose it indicate highly radiation sensitivity of the material.

Fig. 4.24 shows the TL glow curve of AQ 400°C treated Alumina irradiated with beta dose of 5Gy by Sr⁹⁰. The glow curve exhibits one hump and one well resolved glow peak at temperature 264°C and intensity of 2.24au this material exhibits significant TL it indicate highly radiation sensitivity of the material.

**Fig. 4.25**

**Fig. 4.26**

![Graph](image3)

![Graph](image4)

Fig. 4.25 shows the TL glow curve of AQ 400°C treated Alumina irradiated with beta dose of 10Gy by Sr⁹⁰. The glow curve exhibits one hump and one well resolved glow peak at temperature 254°C and intensity of 3.67au this
material exhibits significant TL with increasing in intensity with compared to previous result it indicate highly radiation sensitivity of the material.

Fig. 4.26 shows the TL glow curve of AQ 400°C treated Alumina irradiated with beta dose of 25Gy by Sr⁹⁰. The glow curve exhibits one hump and one well resolved glow peak at temperature 256°C and intensity of 20.52au this material exhibits significant TL with increasing in intensity with compare to previous result it indicate highly radiation sensitivity of the material.

Fig. 4.27 shows the TL glow curve of AQ 400°C treated Alumina irradiated with beta dose of 50Gy by Sr⁹⁰. The glow curve exhibits one hump and one well resolved glow peak at temperature 250°C and intensity of 16.58au this material exhibits significant TL with increasing in intensity with compare to previous result it indicate highly radiation sensitivity of the material.

Fig. 4.27

![Fig.4.27](Image)

Fig.4.28

![Fig.4.28](Image)

Fig. 4.28 shows the TL glow curve of AQ 400°C treated Alumina irradiated with beta dose of 75Gy by Sr⁹⁰. The glow curve exhibits one hump and one well resolved glow peak at temperature 256°C and intensity of 19.74au this material exhibits significant TL with increasing in intensity with compare to previous result it indicate highly radiation sensitivity of the material.

Fig. 4.29 shows the TL glow curve of AQ 400°C treated Alumina irradiated with beta dose of 150Gy by Sr⁹⁰. The glow curve exhibits one hump and one well resolved glow peak at temperature 256°C and intensity of 112.62au this material exhibits significant TL with increasing in intensity in higher level with compare to previous result it indicate that at this radiation dose more carriers are associated with the particular trap.
Fig. 4.30 shows the TL glow curve of AQ 400°C treated Alumina irradiated with beta dose of 300Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 256°C and intensity of 275 au; this material exhibits significant TL with increasing in intensity in higher level with compare to previous result it indicate that at this radiation dose more carriers are associated with the particular trap.

Fig. 4.31 shows the TL glow curve of AQ 400°C treated Alumina irradiated with beta dose of 600Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 256°C and intensity of 577.58 au; this material exhibits significant TL with increasing in intensity in higher level with compare to previous result it indicate that at this radiation dose more carriers are associated with the particular trap.

From the result it is noted that the material exhibits remarkable TL at lowest dose, and the intensity become almost double at each increasing dose till
75Gy. But then after irradiation dose of 150Gy, 300Gy the intensity increased at higher level and the highest intensity recorded 577.58au of this material at irradiation dose of 600Gy. The peak temperature 256°C remain constant with minor variation and intensity continue increased with dose it indicate the material is stable and radiation sensitive this material is key material for TL study of ceramic tiles.

Fig.4.32 shows combined TL glow curve of Alumina sample treated with AQ400°C and irradiated with different dose of beta radiation by Sr⁹⁰. Curve S1 shows the TL glow curve of the material irradiated with dose of 2.5Gy, the glow curve exhibits one hump and one peak at temperature 251°C with intensity of 1.8au. Curve S2 shows the TL glow curve of the material irradiated with dose of 5Gy, the glow curve exhibits one hump and one peak at temperature 264°C with intensity of 2.24au. Curve S3 shows the TL glow curve of the material irradiated with dose of 10Gy, the glow curve exhibits one hump and one peak at temperature 254°C with intensity of 3.67au.

**Fig.4.32**
Curve S4 shows the TL glow curve of the material irradiated with dose of 25Gy, the glow curve exhibits one hump and one peak at temperature 256°C with intensity of 20.52au. Curve S5 shows the TL glow curve of the material irradiated with dose of 50Gy, the glow curve exhibits one hump and one peak at temperature 250°C with intensity of 16.58au. Curve S6 shows the TL glow curve of the material irradiated with dose of 75Gy, the glow curve exhibits one hump and one peak at temperature 256°C with intensity of 19.74au. Curve S7 shows the TL glow curve of the material irradiated with dose of 150Gy, the glow curve exhibits one hump and one peak at temperature 256°C with intensity of 112.62au. Curve S8 shows the TL glow curve of the material irradiated with dose of 300Gy, the glow curve exhibits one hump and one peak at temperature 256°C with intensity of 275au. Curve S9 shows the TL glow curve of the material irradiated with dose of 600Gy, the glow curve exhibits one hump and one peak at temperature 259°C with intensity of 577.58au.

Table-22

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Table-22 shows the peak temperature and peak intensity of AQ 400°C treated Alumina irradiated with different beta dose Sr$^{90}$. 
Fig. 4.33 shows the TL growth graph of AQ 400°C treated Alumina sample.

(5.13) TL Growth Study of Alumina treated with AQ 800°C:

Fig. 4.34 shows the TL glow curve of AQ 800°C treated sample of Alumina irradiated with beta dose of 2.5Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 262°C and intensity of 1.98 au. This material exhibits significant TL low dose rate sensitivity of the material.

Fig. 4.35 shows the TL glow curve of sample of AQ 800°C treated Alumina irradiated with beta dose of 5Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 260°C and intensity of 3.96 au.
this material exhibits significant TL it indicate highly radiation sensitivity of the material.

**Fig. 4.36**

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**Fig. 4.37**

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Fig. 4.36 shows the TL glow curve of sample of AQ 800°C treated Alumina irradiated with beta dose of 10 Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 258°C and intensity of 6.49 au, this material exhibits significant TL with increasing in intensity with compare to previous result it indicate highly radiation sensitivity of the material.

Fig. 4.37 shows the TL glow curve of sample of AQ 800°C treated Alumina irradiated with beta dose of 25 Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 250°C and intensity of 8.56 au, this material exhibits significant TL with increasing in intensity with compare to previous result it indicate highly radiation sensitivity of the material.

**Fig. 4.38**

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**Fig. 4.39**

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Fig. 4.38 shows the TL glow curve of sample of AQ 800°C treated Alumina irradiated with beta dose of 50 Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 255°C and intensity of 23.15 au, this material exhibits significant TL with increasing in intensity with compare to previous result it indicate highly radiation sensitivity of the material.
Fig. 4.39 shows the TL glow curve of sample of AQ 800°C treated Alumina irradiated with beta dose of 75Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 256°C and intensity of 36.35 au; this material exhibits significant TL with increasing in intensity with compare to previous result it indicate highly radiation sensitivity of the material.

Fig. 4.40 shows the TL glow curve of sample of AQ 800°C treated Alumina irradiated with beta dose of 150Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 257°C and intensity of 287.38 au; this material exhibits significant TL with increasing in intensity in higher level with compare to previous result it indicate that at this radiation dose more carriers are associated with the particular trap.

Fig. 4.41 shows the TL glow curve of sample of AQ 800°C treated Alumina irradiated with beta dose of 300Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 256°C and intensity of 446.65 au; this material exhibits significant TL with increasing in intensity in higher level with compare to previous result it indicate that at this radiation dose more carriers are associated with the particular trap.

Fig. 4.42 shows the TL glow curve of sample of AQ 800°C treated Alumina irradiated with beta dose of 600Gy by Sr$^{90}$. The glow curve exhibits one hump and one well resolved glow peak at temperature 260°C and intensity of 789 au; this material exhibits significant TL with increasing in intensity in higher level with compare to previous result it indicate that at this radiation dose more carriers are associated with the particular trap.
From the result it is noted that the material exhibits remarkable TL at lowest dose, and the intensity become almost double at each increasing dose till 50Gy but then after irradiation dose of 75Gy, 150Gy, and 300Gy the intensity increased at higher level and the highest intensity recorded 789au of this material at irradiation dose of 600Gy. The peak temperature 256°C remain constant with minor variation and intensity continue increased with dose it indicate the material is stable and radiation sensitive this material is key material for TL study of ceramic tiles.

Fig. 4.43 shows combined TL glow curve of AQ 800°C treated Alumina sample irradiated with different dose of beta radiation by Sr⁹⁰. Curve S1 shows the TL glow curve of the material irradiated with dose of 2.5Gy, the glow curve exhibits one hump and one peak at temperature 262°C with intensity of 1.98au. Curve S2 shows the TL glow curve of the material irradiated with dose of 5Gy, the glow curve exhibits one hump and one peak at temperature 260°C with intensity of 3.96au. Curve S3 shows the TL glow curve of the material irradiated with dose of 10Gy, the glow curve exhibits one hump and one peak at temperature 258°C with intensity of 4.46au. Curve S4 shows the TL glow curve of the material irradiated with dose of 25Gy, the glow curve exhibits one hump and one peak at temperature 250°C with intensity of 8.56au. Curve S5 shows the TL glow curve of the material irradiated with dose of 50Gy, the glow curve exhibits one hump and one peak at temperature 250°C.
255°C with intensity of 23.15 au. Curve S6 shows the TL glow curve of the material irradiated with dose of 75 Gy, the glow curve exhibits one hump and one peak at temperature 256°C with intensity of 36.35 au.

Fig. 4.43

Curve S7 shows the TL glow curve of the material irradiated with dose of 150 Gy, the glow curve exhibits one hump and one peak at temperature 257°C with intensity of 287.38 au. Curve S8 shows the TL glow curve of the material irradiated with dose of 300 Gy, the glow curve exhibits one hump and one peak at temperature 256°C with intensity of 446.65 au. Curve S9 shows the TL glow curve of the material irradiated with dose of 600 Gy, the glow curve exhibits one hump and one peak at temperature 260°C with intensity of 789 au.
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Table-23 shows the peak temperature and peak intensity AQ 800°C treated Alumina sample of Alumina irradiated with different beta dose Sr$^{90}$. 

**Fig 4.44**

(TL growth graph of AQ 800°C Alumina)

Fig.4.44 shows the TL growth graph of AQ 800°C treated Alumina sample.

**Fig 4.45**

(X RD pattern of AQ 800°C Alumina)

Fig.4.45 shows the X RD pattern of AQ 800°C treated Alumina sample.
(5.14) TL Growth study of as received sample of Mixture:

**Fig. 10.12**

![Figure 10.12](image)

Fig. 10.12 shows the glow curve of as received Mixture irradiated with beta dose of 2.5Gy by Sr$^{90}$. Here glow curve exhibits three glow peaks at 92$^0$C, 158$^0$C, and 131$^0$C with intensity of 0.11au. Here no significant TL is recorded.

**Fig. 10.13**

![Figure 10.13](image)

Fig. 10.13 shows the glow curve of as received Mixture irradiated with beta dose of 5Gy by Sr$^{90}$. Here glow curve exhibits four glow peaks at 61$^0$C, 111$^0$C, 139$^0$C, and 202$^0$C with intensity of 0.11au. Here no significant TL is recorded.

**Fig. 10.14**

![Figure 10.14](image)

Fig10.14 shows the glow curve of as received Mixture irradiated with beta dose of 10Gy by Sr$^{90}$. Here glow curve exhibits four glow peaks at 70$^0$C, 110$^0$C, 170$^0$C, and 211$^0$C with intensity of 0.11au. Here no significant TL is recorded.

**Fig. 10.15**

![Figure 10.15](image)

Fig. 10.15 shows the glow curve of as received Mixture irradiated with beta dose of 25Gy by Sr$^{90}$. Here glow curve exhibits one glow peaks at 123$^0$C with intensity of 0.5au.
Fig. 10.16 shows the glow curve of as received Mixture irradiated with beta dose of 50Gy by Sr$^{90}$. Here glow curve exhibits one glow peaks at $124^0$C with intensity of 2.51 au.

Fig. 10.17 shows the glow of as received Mixture irradiated with beta dose of 75Gy by Sr$^{90}$. Here glow curve exhibits one glow peaks at $116^0$C with intensity of 2.85 au.

Fig. 10.18 shows the glow curve of as received Mixture irradiated with beta dose of 150Gy by Sr$^{90}$. Here glow curve exhibits one glow peaks at $116^0$C with intensity of 6.17 au, here intensity is decreased it indicate fading effect.

Fig. 10.19 shows the glow of as received Mixture irradiated with beta dose of 300Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peaks at $109^0$C, with intensity of 10.91 au.
Fig. 10.20 shows the glow curve of as received Mixture irradiated with beta dose of 600Gy by Sr\(^{90}\). Here glow curve exhibits one well resolved glow peaks at 110\(^{0}\)C, with intensity of 24.11au.

From the above results it is noted that 2.5Gy, 5Gy, 10Gy, 25Gy, and 50Gy irradiated sample of the material not exhibits significant TL. But if increased the dose as 75Gy, 150Gy, and 300Gy, one well resolved peak is exhibits with significant TL intensity, at dose of 600Gy one well resolve glow peak is developed with highest intensity of 9.46au but peak temperature 118\(^{0}\)C remain constant with minor variation. Here, TL of the material exhibits notable variation in shape of the glow curve, no of peaks, and intensity and temperature.

Fig.10.21 shows combined TL glow curve of as received Mixture irradiated with different beta dose by Sr\(^{90}\). Curve S1 shows the TL glow curve of the material irradiated with dose of 2.5Gy, the glow curve exhibits four peaks at temperature 41\(^{0}\)C, 140\(^{0}\)C, 131\(^{0}\)C and 206\(^{0}\)C with intensity of 0.11au. Curve S2 shows the TL glow curve of the material irradiated with dose of 5Gy, the glow curve exhibits four peaks at temperature 80\(^{0}\)C, 116\(^{0}\)C, 108\(^{0}\)C and 234\(^{0}\)C with intensity of 0.11au. Curve S3 shows the TL glow curve of the material irradiated with dose of 10Gy, the glow curve exhibits four peaks at temperature 65\(^{0}\)C, 115\(^{0}\)C, 149\(^{0}\)C and 205\(^{0}\)C with intensity of 0.11au. Curve S4 shows the TL glow curve of the material irradiated with dose of 25Gy, the glow curve exhibits one peaks at temperature 117\(^{0}\)C with intensity of 0.7au.
Curve S5 shows the TL glow curve of the material irradiated with dose of 50Gy, the glow curve exhibits one peak at temperature $113^\circ C$ and 1.3au. Curve S6 shows the TL glow curve of the material irradiated with dose of 75Gy, the glow curve exhibits one peak at temperature $117^\circ C$ with intensity of 7.24au. Curve S7 shows the TL glow curve of the material irradiated with dose of 150Gy, the glow curve exhibits one peak at temperature $118^\circ C$ with intensity of 3.14au. Curve S8 shows the TL glow curve of the material irradiated with dose of 300Gy, the glow curve exhibits one peak at temperature $110^\circ C$ with intensity of 7.54au. Curve S9 shows the TL glow curve of the material irradiated with dose of 600Gy, the glow curve exhibits one peak at temperature $112^\circ C$ with intensity of 9.46au.
Table-24

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Table-24 shows the peak temperature and peak intensity of as received Mixture irradiated with different beta dose by Sr\(^{90}\)

Fig.10.22

Fig.10.22 shows the TL growth graph of as received Mixture

(Growth graph of as received Mixture)
(5.15) TL Growth study of Mixture treated with AQ400°C:

**Fig. 10.23**

![Fig.10.23](image_url)

**Fig. 10.24**

![Fig.10.24](image_url)

Fig. 10.23 shows the glow curve of Mixture treated with AQ400°C and irradiated with beta dose of 2.5Gy by Sr\(^{90}\). Here glow curve exhibits four glow peaks at 41°C, 140°C, 131°C and 206°C with intensity of 0.11au. here no significant TL is recorded.

Fig. 10.24 shows the glow curve of Mixture treated with AQ400°C and irradiated with beta dose of 5Gy by Sr\(^{90}\). Here glow curve exhibits four glow peaks at 80°C, 116°C, 108°C, and 234°C with intensity of 0.11au. here no significant TL is recorded.

**Fig. 10.25**

![Fig.10.25](image_url)

**Fig. 10.26**

![Fig.10.26](image_url)

Fig. 10.25 shows the glow curve of Mixture treated with AQ400°C and irradiated with beta dose of 10Gy by Sr\(^{90}\). Here glow curve exhibits four glow peaks at 65°C, 115°C, 149°C, and 205°C with intensity of 0.11au. here no significant TL is recorded.
Fig. 10.26 shows the glow curve of Mixture treated with AQ400°C and irradiated with beta dose of 25Gy by Sr⁹⁰. Here glow curve exhibits one glow peaks at 117°C with intensity of 0.7au.

**Fig. 10.27**

![Glow Curve](image1)

**Fig. 10.28**

![Glow Curve](image2)

Fig. 10.27 shows the glow curve of Mixture treated with AQ400°C and irradiated with beta dose of 50Gy by Sr⁹⁰. Here glow curve exhibits one glow peaks at 113°C with intensity of 1.3au.

Fig. 10.28 shows the glow of Mixture treated with AQ400°C and irradiated with beta dose of 75Gy by Sr⁹⁰. Here glow curve exhibits one glow peaks at 117°C with intensity of 7.24au.

**Fig. 10.29**

![Glow Curve](image3)

**Fig. 10.30**

![Glow Curve](image4)

Fig. 10.29 shows the glow curve of Mixture treated with AQ400°C and irradiated with beta dose of 150Gy by Sr⁹⁰. Here glow curve exhibits one glow peaks at 118°C with intensity of 3.14au, here intensity is decreased it indicate fading effect.

Fig. 10.30 shows the glow of Mixture treated with AQ400°C and irradiated with beta dose of 300Gy by Sr⁹⁰. Here glow curve exhibits one well resolved glow peaks at 110°C, with intensity of 7.54au.
Fig. 10.31 shows the glow curve of Mixture treated with AQ400°C and irradiated with beta dose of 600Gy by Sr⁹⁰. Here glow curve exhibits one well resolved glow peaks at 114°C, with intensity of 9.46 au.

From the above results it is noted that 2.5Gy, 5Gy, 10Gy, 25Gy, and 50Gy irradiated sample of the material not exhibits significant TL. But if increased the dose as 75Gy, 150Gy, and 300Gy, one well resolved peak is exhibits with significant TL intensity, at dose of 600Gy one well resolve glow peak is developed with highest intensity of 9.46 au but peak temperature 118°C remain constant with minor variation. Here, TL of the material exhibits notable variation in shape of the glow curve, no of peaks, and intensity and temperature.

Fig.10.32 shows combined TL glow curve of Mixture treated with AQ400°C and irradiated with different beta dose by Sr⁹⁰. Curve S1 shows the TL glow curve of the material irradiated with dose of 2.5Gy, the glow curve exhibits four peaks at temperature 41°C, 140°C, 131°C and 206°C with intensity of 0.11 au. Curve S2 shows the TL glow curve of the material irradiated with dose of 5Gy, the glow curve exhibits four peaks at temperature 80°C, 116°C, 108°C and 234°C with intensity of 0.11 au. Curve S3 shows the TL glow curve of the material irradiated with dose of 10Gy, the glow curve exhibits four peaks at temperature 65°C, 115°C, 149°C and 205°C with intensity of 0.11 au. Curve S4 shows the TL glow curve of the material irradiated with dose of 25Gy, the glow curve exhibits one peaks at temperature 117°C with intensity of 0.7 au.
Curve S5 shows the TL glow curve of the material irradiated with dose of 50Gy, the glow curve exhibits one peak at temperature 113°C and 1.3au. Curve S6 shows the TL glow curve of the material irradiated with dose of 75Gy, the glow curve exhibits one peak at temperature 117°C with intensity of 7.24au. Curve S7 shows the TL glow curve of the material irradiated with dose of 150Gy, the glow curve exhibits one peak at temperature 118°C with intensity of 3.14au. Curve S8 shows the TL glow curve of the material irradiated with dose of 300Gy, the glow curve exhibits one peak at temperature 110°C with intensity of 7.54au. Curve S9 shows the TL glow curve of the material irradiated with dose of 600Gy, the glow curve exhibits one peak at temperature 112°C with intensity of 9.46au.
### Table-25

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<th>Sr.No.</th>
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<th>Peak Temperature °C</th>
<th>Peak Intensity(Arb.Unit)</th>
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Table-25 shows the peak temperature and peak intensity of Mixture treated with AQ400°C and irradiated with different beta dose by Sr⁹⁰.

### Fig.10.33

Fig.10.33 shows the TL growth graph of Mixture treated with AQ400°C.
(5.16) TL Growth study of Mixture treated with AQ800°C:

Fig. 10.34 shows the glow curve of Mixture treated with AQ800°C and irradiated with beta dose of 2.5Gy by Sr$^{90}$. Here glow curve exhibits four glow peaks at 79°C, 117°C, 179°C and 249°C with intensity of 0.11au. Here no significant TL is recorded.

Fig. 10.35 shows the glow curve of Mixture treated with AQ800°C and irradiated with beta dose of 5Gy by Sr$^{90}$. Here glow curve exhibits four glow peaks at 80°C, 116°C, 168°C, and 234°C with intensity of 0.11au. Here no significant TL is recorded.

Fig. 10.36 shows the glow curve of Mixture treated with AQ800°C and irradiated with beta dose of 10Gy by Sr$^{90}$. Here glow curve exhibits four glow peaks at 67°C, 114°C, 164°C, and 207°C with intensity of 0.11au. Here no significant TL is recorded.
Fig. 10.37 shows the glow curve of Mixture treated with AQ800°C and irradiated with beta dose of 25Gy by Sr$^{90}$. Here glow curve exhibits two glow peaks at 64°C and 116°C with intensity of 0.11 au and 0.65 au.

**Fig. 10.38**

![Glow curve of Mixture treated with AQ800°C and irradiated with beta dose of 50Gy by Sr$^{90}$. Here glow curve exhibits two glow peaks at 65°C and 124°C with intensity of 0.11 and 0.49 au.](image)

**Fig. 10.39**

![Glow curve of Mixture treated with AQ800°C and irradiated with beta dose of 75Gy by Sr$^{90}$. Here glow curve exhibits one glow peak at 127°C with intensity of 1.67 au.](image)

Fig. 10.38 shows the glow curve of Mixture treated with AQ800°C and irradiated with beta dose of 50Gy by Sr$^{90}$. Here glow curve exhibits two glow peaks at 65°C and 124°C with intensity of 0.11 and 0.49 au.

Fig. 10.39 shows the glow of Mixture treated with AQ800°C and irradiated with beta dose of 75Gy by Sr$^{90}$. Here glow curve exhibits one glow peak at 127°C with intensity of 1.67 au.

**Fig. 10.40**

![Glow curve of Mixture treated with AQ800°C and irradiated with beta dose of 150Gy by Sr$^{90}$. Here glow curve exhibits one glow peak at 123°C with intensity of 3.37 au, here intensity is decreased it indicate fading effect.](image)

**Fig. 10.41**

![Glow curve of Mixture treated with AQ800°C and irradiated with beta dose of 300Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at 114°C, with intensity of 9.2 au.](image)

Fig. 10.40 shows the glow curve of Mixture treated with AQ800°C and irradiated with beta dose of 150Gy by Sr$^{90}$. Here glow curve exhibits one glow peak at 123°C with intensity of 3.37 au, here intensity is decreased it indicate fading effect.

Fig. 10.41 shows the glow of Mixture treated with AQ800°C and irradiated with beta dose of 300Gy by Sr$^{90}$. Here glow curve exhibits one well resolved glow peak at 114°C, with intensity of 9.2 au.
Fig. 10.42 shows the glow curve of Mixture treated with AQ800°C and irradiated with beta dose of 600Gy by Sr\(^{90}\). Here glow curve exhibits one well resolved glow peaks at 114°C, with intensity of 14.49au.

From the above results it is noted that 2.5Gy, 5Gy, 10Gy, 25Gy, and 50Gy irradiated sample of the material not exhibits significant TL. But if increased the dose as 75Gy, 150Gy, and 300Gy, one well resolved peak is exhibits with significant TL intensity, at dose of 600Gy one well resolve glow peak is developed with highest intensity of 14.49au but peak temperature 114°C remain constant with minor variation. Here, TL of the material exhibits notable variation in shape of the glow curve, no of peaks, and intensity and temperature.

Fig. 10.43 shows combined TL glow curve of Mixture treated with AQ800°C and irradiated with different beta dose by Sr\(^{90}\). Curve S1 shows the TL glow curve of the material irradiated with dose of 2.5Gy, the glow curve exhibits four peaks at temperature 79°C, 117°C, 179°C and 249°C with intensity of 0.11au. Curve S2 shows the TL glow curve of the material irradiated with dose of 5Gy, the glow curve exhibits four peaks at temperature 80°C, 116°C, 168°C and 234°C with intensity of 0.11au. Curve S3 shows the TL glow curve of the material irradiated with dose of 10Gy, the glow curve exhibits four peaks at temperature 67°C, 114°C, 164°C and 207°C with intensity of 0.11au. Curve S4 shows the TL glow curve of the material irradiated with dose of 25Gy, the
glow curve exhibits two peaks at temperature $64^\circ C$ and $116^\circ C$ with intensity of 0.11au. and 0.7au.  

**Fig.10.43**

Curve S5 shows the TL glow curve of the material irradiated with dose of 50Gy, the glow curve exhibits two peaks at temperature $65^\circ C$ and $114^\circ C$ with intensity of 0.11au and 0.49au. Curve S6 shows the TL glow curve of the material irradiated with dose of 75Gy, the glow curve exhibits one peaks at temperature $127^\circ C$ with intensity of 1.67au. Curve S7 shows the TL glow curve of the material irradiated with dose of 150Gy, the glow curve exhibits one peaks at temperature $123^\circ C$ with intensity of 3.37au. Curve S8 shows the TL glow curve of the material irradiated with dose of 300Gy, the glow curve exhibits one peak at temperature $114^\circ C$ with intensity of 9.2au. Curve S9 shows the TL glow curve of the material irradiated with dose of 600Gy, the glow curve exhibits one peak at temperature $114^\circ C$ with intensity of 14.49au.
Table-26 shows the peak temperature and peak intensity of Mixture treated with AQ800°C and irradiated with different beta dose by Sr$^{90}$.

**Fig.10.44**

![Growth graph of Mixture treated with AQ 800°C](image)

Fig.10.44 shows the TL growth graph of Mixture treated with AQ800°C.

**Fig.10.45**

![X RD pattern of Mixture treated with AQ 800°C](image)

(X RD pattern of Mixture treated with AQ 800°C)
TL Dosimetry : (Section-2)

TL Decay Study

(5.17) TL decay study of as received Quartz:

Fig.1.46 shows the TL glow curve of as received Quartz sample initially irradiated with beta dose of 25Gy by Sr\textsuperscript{90}. The TL is measured immediately after applying dose of radiation. The glow curve exhibits one glow peak at temperature $135^\circ$C with intensity of 0.8au also small humps are developed in to the glow curve.

Fig.1.47 shows the TL glow curve of as received Quartz sample initially irradiated with beta dose of 25Gy by Sr\textsuperscript{90}. The TL is measured after 24 hours of radiation dose. The glow curve exhibits one glow peak at temperature $153^\circ$C with intensity of 0.8au also small humps are developed in to the glow curve.

Fig.1.48

Fig.1.49
Fig.1.48 shows the TL glow curve of as received Quartz sample initially irradiated with beta dose of 25Gy by Sr$^{90}$. The TL is measured after 48 hours of radiation dose. The glow curve exhibits one glow peak at temperature 88$^0$C with intensity of 0.11au also other small peaks are developed at different temperatures in to the glow curve.

Fig.1.49 shows the TL glow curve of as received Quartz sample initially irradiated with beta dose of 25Gy by Sr$^{90}$. The TL is measured after 96 hours of radiation dose. The glow curve exhibits one glow peak at temperature 72$^0$C with intensity of 0.11au also small humps are developed in to the glow curve.

Fig.1.50 shows the TL glow curve of as received Quartz sample initially irradiated with beta dose of 25Gy by Sr$^{90}$. The TL is measured after 198 hours of radiation dose. The glow curve exhibits one glow peak at temperature 72$^0$C with intensity of 0.11au also small humps are developed in to the glow curve.

Fig.1.51 shows the TL glow curve of as received Quartz sample initially irradiated with beta dose of 25Gy by Sr$^{90}$. The TL is measured after 336 hours of radiation dose. The glow curve exhibits one glow peak at temperature 111$^0$C with intensity of 0.11au also small humps are developed in to the glow curve.

Fig.1.52 shows the TL glow curve of as received Quartz sample initially irradiated with beta dose of 25Gy by Sr$^{90}$. The TL is measured after 504 hours of radiation dose. The glow curve exhibits one glow peak at temperature 82$^0$C with intensity of 0.11au also small humps are developed in to the glow curve.
Fig.1.53 shows the combo TL glow curves of as received quartz sample initially irradiated with beta dose of 25Gy by Sr$^{90}$. Curve S1 shows the TL measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the
TL measurement result after 198 hours of irradiation dose. Curve S6 shows the TL measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose.

From the above TL decay study of the material it is clear that the TL intensity is decreasing continue with time and the shape and form of the glow curve is changed with each decay measurement this result is remarkable for investigation point of view.

Table-27

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Table 27 shows the peak temperature and peak intensity at different hours of as received Quartz sample initially irradiated by 25 Gy beta dose.

Fig.1.54

Fig.1.54 shows the TL decay curve of the as received Quartz initially irradiated with 25Gy dose of beta radiation by Sr\(^{90}\).
(5.18) TL decay study of Quartz treated with AQ400°C:

**Fig.1.55**

[TL glow curve graph showing a peak at 97°C with intensity of 0.39 au and some smaller peaks at different temperatures.]

**Fig.1.56**

[TL glow curve graph showing a peak at 87°C with intensity of 0.11 au and some smaller peaks at different temperatures.]

Fig.1.55 shows the TL glow curve of Quartz sample treated with annealing and quenching temperature of 400°C and initially irradiated with beta dose of 25Gy by Sr^{90}. The TL is measured immediately after applying dose of radiation. The glow curve exhibits one glow peak at temperature 97°C with intensity of 0.39 au also small peaks are developed at different temperature in the glow curve.

Fig.1.56 shows the TL glow curve of Quartz sample treated with annealing and quenching temperature of 400°C and initially irradiated with beta dose of 25Gy by Sr^{90}. The TL is measured after 24 hours of radiation dose. The glow curve exhibits one glow peak at temperature 87°C with intensity of 0.11 au also small peaks are developed at different temperature in the glow curve.

**Fig.1.57**

[TL glow curve graph showing a peak at 94°C with intensity of 0.36 au and some smaller peaks at different temperatures.]

**Fig.1.58**

[TL glow curve graph showing a peak at 90°C with intensity of 0.35 au and some smaller peaks at different temperatures.]

Fig.1.57 shows the TL glow curve of Quartz sample treated with annealing and quenching temperature of 400°C and initially irradiated with beta dose of 25Gy by Sr^{90}. The TL is measured after 48 hours of radiation dose. The glow
curve exhibits one glow peak at temperature $94^\circ C$ with intensity of 0.11au also small peaks are developed at different temperature in to the glow curve.

Fig.1.58 shows the TL glow curve of Quartz sample treated with annealing and quenching temperature of $400^\circ C$ and initially irradiated with beta dose of 25Gy by Sr$^{90}$. The TL is measured after 96 hours of radiation dose. The glow curve exhibits one glow peak at temperature $90^\circ C$ with intensity of 0.11au also small peaks are developed at different temperature in to the glow curve.

![Fig.1.59](image1)

![Fig.1.60](image2)

Fig.1.59 shows the TL glow curve of Quartz sample treated with annealing and quenching temperature of $400^\circ C$ and initially irradiated with beta dose of 25Gy by Sr$^{90}$. The TL is measured after 198 hours of radiation dose. The glow curve exhibits one glow peak at temperature $83^\circ C$ with intensity of 0.11au also small peaks are developed at different temperature in to the glow curve.

Fig.1.60 shows the TL glow curve of Quartz sample treated with annealing and quenching temperature of $400^\circ C$ and initially irradiated with beta dose of 25Gy by Sr$^{90}$. The TL is measured after 336 hours of radiation dose. The glow curve exhibits one glow peak at temperature $68^\circ C$ with intensity of 0.11au also small peaks are developed at different temperature in to the glow curve.

Fig.1.61 shows the TL glow curve of Quartz sample treated with annealing and quenching temperature of $400^\circ C$ and initially irradiated with beta dose of 25Gy by Sr$^{90}$. The TL is measured after 504 hours of radiation dose. The glow curve exhibits one glow peak at temperature $67^\circ C$ with intensity of 0.11au also small peaks are developed at different temperature in to the glow curve.
Fig. 1.61 shows the combo TL glow curves of quartz sample treated with AQ 400°C and initially irradiated with beta dose of 25Gy by Sr\textsuperscript{90}. Curve S1 shows the TL measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5
shows the TL measurement result after 198 hours of irradiation dose. Curve S6 shows the TL measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose.

From the above TL decay study of the material it is clear that the TL intensity is decreasing continue with time and the shape and form of the glow curve is changed with each decay measurement this result is remarkable for investigation point of view.

Table-28

<table>
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<th>Sr.No.</th>
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Table 28 shows the peak temperature and peak intensity at different hours of Quartz sample treated with AQ400°C and initially irradiated by 25 Gy beta dose.

Fig.1.63

(Decay curve of the AQ 400°C Quartz)

Fig.1.63 shows the TL decay curve of the Quartz sample treated with AQ 400°C and initially irradiated with 25Gy dose of beta radiation by Sr⁹⁰.
(5.19) TL decay study of Quartz treated with AQ800°C:

Fig.1.64 shows the TL glow curve of Quartz sample treated with annealing and quenching temperature of 800°C and initially irradiated with beta dose of 25Gy by Sr90. The TL is measured immediately after applying dose of radiation. The glow curve exhibits two glow peaks at temperature 57°C and 102°C with intensity of 0.11au and 0.44au also small peaks are developed at different temperature in to the glow curve.

Fig.1.65 shows the TL glow curve of Quartz sample treated with annealing and quenching temperature of 800°C and initially irradiated with beta dose of 25Gy by Sr90. The TL is measured after 24 hours of radiation dose. The glow curve exhibits one glow peak at temperature 115°C with intensity of 0.11au also small peaks are developed at different temperature in to the glow curve.

Fig.1.66 shows the TL glow curve of Quartz sample treated with annealing and quenching temperature of 800°C and initially irradiated with beta dose of 25Gy by Sr90. The TL is measured after 48 hours of radiation dose. The glow curve exhibits multiple glow peaks at different temperatures.
curve exhibits one glow peak at temperature 55°C with intensity of 0.11au also small peaks are developed at different temperature in to the glow curve.

Fig.1.67 shows the TL glow curve of Quartz sample treated with annealing and quenching temperature of 800°C and initially irradiated with beta dose of 25Gy by Sr⁹⁰. The TL is measured after 96 hours of radiation dose. The glow curve exhibits one glow peak at temperature 104°C with intensity of 0.11au also small peaks are developed at different temperature in to the glow curve.

Fig.1.68 shows the TL glow curve of Quartz sample treated with annealing and quenching temperature of 800°C and initially irradiated with beta dose of 25Gy by Sr⁹⁰. The TL is measured after 198 hours of radiation dose. The glow curve exhibits one glow peak at temperature 65°C with intensity of 0.11au also small peaks are developed at different temperature in to the glow curve.

Fig.1.69 shows the TL glow curve of Quartz sample treated with annealing and quenching temperature of 800°C and initially irradiated with beta dose of 25Gy by Sr⁹⁰. The TL is measured after 336 hours of radiation dose. The glow curve exhibits one glow peak at temperature 111°C with intensity of 0.11au also small peaks are developed at different temperature in to the glow curve.

Fig.1.70 shows the TL glow curve of Quartz sample treated with annealing and quenching temperature of 800°C and initially irradiated with beta dose of 25Gy by Sr⁹⁰. The TL is measured after 504 hours of radiation dose. The glow curve exhibits one glow peak at temperature 93°C with intensity of 0.11au also small peaks are developed at different temperature in to the glow curve.
Fig. 1.70

Fig. 1.70 shows the combo TL glow curves of quartz sample treated with AQ 800°C and initially irradiated with beta dose of 25 Gy by Sr\textsuperscript{90}. Curve S1 shows the TL measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the TL measurement result after 198 hours of irradiation dose.

Fig. 1.71

Fig. 1.71 shows the combo TL glow curves of quartz sample treated with AQ 800°C and initially irradiated with beta dose of 25 Gy by Sr\textsuperscript{90}. Curve S1 shows the TL measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the TL measurement result after 198 hours of irradiation dose.
Curve S6 shows the TL measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose.

From the above TL decay study of the material it is clear that the TL intensity is remain constant with small variation and the shape and form of the glow curve is changed with each decay measurement this result is remarkable for investigation point of view.

**Table-29**

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Hours</th>
<th>Peak Temperature °C</th>
<th>Peak Intensity (Arb. Unit)</th>
</tr>
</thead>
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<tr>
<td>7</td>
<td>504</td>
<td>111</td>
<td>0.11</td>
</tr>
</tbody>
</table>

Table 29 shows the peak temperature and peak intensity at different hours of Quartz sample treated with AQ 800°C and initially irradiated by 25Gy beta dose.

**Fig.1.72**

(Decay curve of the Quartz sample treated with AQ 800°C)

Fig.1.72 shows the TL decay curve of the Quartz sample treated with AQ 800°C and initially irradiated with 25Gy dose of beta radiation by Sr⁹⁰.
(5.20) TL decay study of as received Feldspar:

Fig.2.45 shows the TL glow curve of as received Feldspar sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured immediately after dose of irradiation, the glow curve exhibits two well resolved glow peak at temperature 140$^0$C and 275$^0$C with intensity of 14.37au and 36.48au.

Fig.2.46 shows the TL glow curve of as received Feldspar sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 24 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 152$^0$C and 270$^0$C with intensity of 28au and 71au.

Fig.2.47 shows the TL glow curve of as received Feldspar sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 48 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 151$^0$C and 260$^0$C with intensity of 14au and 42au.

Fig.2.48 shows the TL glow curve of as received Feldspar sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 96 hours of
radiation dose, the glow curve exhibits one well resolved glow peak at temperature $290^0\text{C}$ with intensity of 60au.

**Fig.2.49**

![Fig.2.49](image1)

**Fig.2.50**

![Fig.2.50](image2)

Fig.2.49 shows the TL glow curve of as received Feldspar sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 198 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature $252^0\text{C}$ with intensity of 11.88au.

Fig.2.50 shows the TL glow curve of as received Feldspar sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 336 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature $257^0\text{C}$ with intensity of 31.66au.

**Fig.2.51**

![Fig.2.51](image3)

Fig.2.51 shows the TL glow curve of as received Feldspar sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 504 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature $285^0\text{C}$ with intensity of 109.29au.
Fig. 2.52 shows the combo TL glow curves of as received Feldspar sample initially irradiated with beta dose of 25Gy by Sr$^{90}$. Curve S1 shows the TL measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the TL measurement result after 198 hours of irradiation dose. Curve S6 shows the TL measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose.

From the above result it is noted that in first three result 0hr, 24hr, and 48hr exhibits two well resolved peak with significant TL intensity at reading of 96hr the TL intensity is increased at reading of 198hr the intensity is decreased and then in 336hr and 504 reading the intensity once again increased with time. Into the result of 504hr the highest intensity is recorded 109.29 au. The result are interesting the material exhibits highly variable TL It shows radiation sensitivity of the material.
Table-30

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Hours</th>
<th>Peak Temperature °C</th>
<th>Peak Intensity (Arb. Unit)</th>
</tr>
</thead>
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<td>504</td>
<td>285</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 30 shows the peak temperature and peak intensity of as received Feldspar sample at different hours, the sample is irradiated with 25Gy beta dose by Sr$^{90}$.

**Fig.2.53**

(TL decay graph of the as received Feldspar sample)

Fig.2.53 shows the TL decay graph of the as received Feldspar sample.
(5.21) TL decay study of AQ400°C Feldspar:

Fig.2.54

![Fig.2.54](image1)

Fig.2.55

![Fig.2.55](image2)

Fig.2.54 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25 Gy beta dose by Sr⁹⁰. The TL is measured immediately after dose of irradiation, the glow curve exhibits two well resolved glow peak at temperature 134°C and 253°C with intensity of 8.7au and 5.81au.

Fig.2.55 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25 Gy beta dose by Sr⁹⁰. The TL is measured after 24 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 149°C and 239°C with intensity of 1.68au and 1.4au.

Fig.2.56

![Fig.2.56](image3)

Fig.2.57

![Fig.2.57](image4)

Fig.2.56 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25 Gy beta dose by Sr⁹⁰. The TL is measured after 48 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 158°C and 229°C with intensity of 4.3au and 3.91au.
Fig.2.57 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr\(^{90}\). The TL is measured after 96 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 177°C and 265°C with intensity of 3.18au and 4.0au.

Fig.2.58 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr\(^{90}\). The TL is measured after 198 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 177°C with intensity of 6.58au.

Fig.2.59 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr\(^{90}\). The TL is measured after 336 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 232°C with intensity of 4.0au.

Fig.2.60 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25 Gy beta dose by Sr\(^{90}\). The TL is measured after 504 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 224°C with intensity of 5.54au.
Fig. 2.60 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of $400^\circ$C and initially irradiated with 25 Gy beta dose by $^{90}$Sr$^{90}$. The TL is measured after 504 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature $224^\circ$C with intensity of 5.54au.

Fig. 2.61 shows the combo TL glow curves of Feldspar sample treated with annealing and quenching temperature of $400^\circ$C and initially irradiated with 25Gy beta dose by $^{90}$Sr$^{90}$. Curve S1 shows the TL measurement result.
immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the TL measurement result after 198 hours of irradiation dose. Curve S6 shows the TL measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose.

From the above TL decay study the variation found in intensity clearly indicate that the material have highly sensitivity of the radiation.

Table-31

<table>
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<th>Hours</th>
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<th>Peak Intensity (Arb. Unit)</th>
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</thead>
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</table>

Table 31 shows the peak temperature and peak intensity of as received Feldspar sample at different hours, the sample is irradiated with 25Gy beta dose by Sr$^{90}$.

**Fig.2.62**

![TL decay graph of the AQ400°C Feldspar sample](image-url)
Fig.2.62 shows the TL decay graph of the Feldspar sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr$^{90}$.

(5.22) TL decay study of AQ800°C Feldspar:

Fig.2.63 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured immediately after dose of irradiation, the glow curve exhibits one well resolved glow peak at temperature 140°C and intensity of 19.84au.

Fig.2.64 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 24 hours of radiation dose the glow curve exhibits one well resolved glow peak at temperature 161°C and intensity of 11.98au.
Fig.2.65 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 48 hours of radiation dose the glow curve exhibits one well resolved glow peak at temperature 161°C and intensity of 9.76au.

Fig.2.66 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 96 hours of radiation dose the glow curve exhibits one well resolved glow peak at temperature 164°C and intensity of 4.38au.

Fig.2.67 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 198 hours of radiation dose the glow curve exhibits one well resolved broad glow peak at temperature 227°C and intensity of 3.38au.

Fig.2.68 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 336 hours of radiation dose the glow curve exhibits one well resolved broad glow peak at temperature 204°C and intensity of 7.16au.

Fig.2.69 shows the TL glow curve of Feldspar sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 504 hours of radiation dose the glow curve exhibits one well resolved broad glow peak at temperature 204°C and intensity of 7.16au.
Fig.2.70 shows the combo TL glow curves of Feldspar sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25Gy beta dose by Sr$^{90}$. Curve S1 shows the TL measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the TL measurement result after 198 hours of irradiation dose. Curve S6 shows the TL
measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose.

From the above TL decay study it is clearly noted that the intensity is continue decreased with time and the form of the glow curve gives the variation in each measurement it is useful tools for quality control point of view, also the variation found in intensity clearly indicate that the material have highly sensitivity of the radiation.

Table-32

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Hours</th>
<th>Peak Temperature °C</th>
<th>Peak Intensity (Arb. Unit)</th>
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</thead>
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Table 32 shows the peak temperature and peak intensity of Feldspar sample treated with AQ800°C, at different hours, the sample is irradiated with 25Gy beta dose by Sr²⁵⁺⁻.

Fig.2.71

(TL decay graph of the AQ800°C Feldspar sample)
Fig. 2.71 shows the TL decay graph of the Feldspar sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25Gy beta dose by Sr\textsuperscript{90}.

(5.23) **TL decay study of as received Zircon:**

**Fig. 3.46**

![Fig. 3.46](image1)

Fig. 3.46 shows the TL glow curve of as received Zircon sample initially irradiated with 25Gy beta dose by Sr\textsuperscript{90}. The TL is measured immediately after dose of irradiation, the glow curve exhibits one well resolved broad peak at temperature 288°C with intensity of 2.75 au.

**Fig. 3.47**

![Fig. 3.47](image2)

Fig. 3.47 shows the TL glow curve of as received Zircon sample initially irradiated with 25Gy beta dose by Sr\textsuperscript{90}. The TL is measured after 24 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 267°C with intensity of 2.46 au.

**Fig. 3.48**

![Fig. 3.48](image3)

Fig. 3.48 shows the TL glow curve of as received Zircon sample initially irradiated with 25Gy beta dose by Sr\textsuperscript{90}. The TL is measured after 48 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 67°C and 275°C with intensity of 0.11 au and 3.11 au.
Fig. 3.49 shows the TL glow curve of as received Zircon sample initially irradiated with 25Gy beta dose by Sr\textsuperscript{90}. The TL is measured after 96 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 294\textdegree C with intensity of 2.45au.

Fig. 3.50 shows the TL glow curve of as received Zircon sample initially irradiated with 25Gy beta dose by Sr\textsuperscript{90}. The TL is measured after 198 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 271\textdegree C with intensity of 1.97au.

Fig. 3.51 shows the TL glow curve of as received Zircon sample initially irradiated with 25Gy beta dose by Sr\textsuperscript{90}. The TL is measured after 336 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 121\textdegree C with intensity of 0.11au.

Fig. 3.52
Fig. 3.52 shows the TL glow curve of as received Zircon sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 504 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 68$^\circ$C with intensity of 0.11au.

Fig. 3.53 shows the combo TL glow curves of as received Zircon sample initially irradiated with beta dose of 25Gy by Sr$^{90}$. Curve S1 shows the TL measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the TL measurement result after 198 hours of irradiation dose. Curve S6 shows the TL measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose.

From the result of TL intensity it is noted that the intensity is slightly decreased with time and no significant TL is recorded and no major change is occurs in shape of glow curve. the material have less TL sensitivity.

**Fig.3.53**

![Combo decacy as Zircon](image-url)
Table 33 shows the peak temperature and peak intensity of as received Zircon sample at different hours, the sample is irradiated with 25Gy beta dose by Sr$^{90}$.

**Fig. 3.54**

Fig. 3.54 shows the TL decay graph of the as received Zircon sample.
(5.24) TL decay study of AQ400°C Zircon:

Fig.3.55 shows the TL glow curve of Zircon sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr^{90}. The TL is measured immediately after dose of irradiation, the glow curve exhibits two well resolved glow peak at temperature 96°C and 137°C with intensity of 0.012au and 0.24au and also so many humps are produced in to the glow curve.

Fig.3.56 shows the TL glow curve of Zircon sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr^{90}. The TL is measured after 24 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 112°C and 141°C with intensity of 0.12au and 0.17au.

Fig.3.57 shows the TL glow curve of Zircon sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr^{90}. The TL is measured after 48 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 75°C and 132°C with intensity of 0.05au and 0.17au.
intensity of 0.11au and 0.13au. and also no of small peaks are developed at different temperature.

Fig. 3.58 shows the TL glow curve of Zircon sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr\textsuperscript{90}. The TL is measured after 96 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 126°C and 154°C with intensity of 0.11au and also no of small peaks are developed at different temperature.

Fig. 3.59 shows the TL glow curve of Zircon sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr\textsuperscript{90}. The TL is measured after 198 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 86°C with intensity of 0.11au. also no of peaks are developed at different temperature with same intensity.

Fig. 3.60 shows the TL glow curve of Zircon sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr\textsuperscript{90}. The TL is measured after 336 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 117°C with intensity of 0.11au also no of peaks are developed at different temperature with same intensity.

Fig. 3.61 shows the TL glow curve of Zircon sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr\textsuperscript{90}. The TL is measured after 504 hours of radiation dose, the glow curve
exhibits one well resolved glow peak at temperature 98°C with intensity of 0.11 au.

Fig.3.61

![Fig.3.61](image1)

Fig.3.62

![Fig.3.62](image2)

Fig.3.62 shows the combo TL glow curves of Zircon sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr⁹⁰. Curve S1 shows the TL measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement...
result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the TL measurement result after 198 hours of irradiation dose. Curve S6 shows the TL measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose.

From the above TL decay study, no much variation found in intensity clearly indicate that the material have no TL and radiation sensitivity.

Table-34

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Hours</th>
<th>Peak Temperature °C</th>
<th>Peak Intensity (Arb. Unit)</th>
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</thead>
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<tr>
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<td>98, 184</td>
<td>0.11</td>
</tr>
</tbody>
</table>

Table 34 shows the peak temperature and peak intensity of Zircon sample treated with AQ400°C at different hours, the sample is irradiated by 25Gy beta dose by Sr⁹⁰.

Fig.3.63
Fig. 3.63 shows the TL decay graph of the Zircon sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr$^{90}$.

(5.25) TL decay study of AQ800°C Zircon:

**Fig. 3.64**

Fig. 3.64 shows the TL glow curve of Zircon sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25 Gy beta dose by Sr$^{90}$. The TL is measured immediately after dose of irradiation, the glow curve exhibits one well resolved glow peak at temperature 135°C and intensity of 0.6au.

**Fig. 3.65**

Fig. 3.65 shows the TL glow curve of Zircon sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25 Gy beta dose by Sr$^{90}$. The TL is measured after 24 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 141°C and intensity of 0.24au.

**Fig. 3.66**

Fig. 3.66 shows the TL glow curve of Zircon sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 48 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 138°C and intensity of 0.15au.
curve exhibits two glow peak at temperature 113°C, and 138°C and intensity of 0.11au. and 0.16au. also number of small peaks are developed at different temperature.

Fig. 3.67 shows the TL glow curve of Zircon sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25 Gy beta dose by Sr\textsuperscript{90}. The TL is measured after 96 hours of radiation dose the glow curve exhibits two glow peak at temperature 110°C, and 141°C and intensity of 0.11au. and 0.13au. also number of small peaks are developed at different temperature.

**Fig. 3.68**

Fig. 3.68 shows the TL glow curve of Zircon sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25 Gy beta dose by Sr\textsuperscript{90}. The TL is measured after 198 hours of radiation dose the glow curve exhibits two glow peak at temperature 102°C, and 144°C and intensity of 0.11au. also number of small peaks are developed at different temperature.

**Fig. 3.69**

Fig. 3.69 shows the TL glow curve of Zircon sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25 Gy beta dose by Sr\textsuperscript{90}. The TL is measured after 336 hours of radiation dose the glow curve exhibits two glow peak at temperature 92°C, and 136°C and intensity of 0.11au. also number of small peaks are developed at different temperature.

Fig. 3.70 shows the TL glow curve of Zircon sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25 Gy beta dose by Sr\textsuperscript{90}. The TL is measured after 504 hours of radiation dose the glow curve exhibits two glow peak at temperature 104°C, and 148°C and intensity of 0.11au. also number of small peaks are developed at different temperature.
Fig. 3.70 shows the combo TL glow curves of Zircon sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25Gy beta dose by Sr$^{90}$. Curve S1 shows the TL measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the TL measurement
result after 198 hours of irradiation dose. Curve S6 shows the TL measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose.

From the above TL study it is noted that the material not exhibits significant TL and also number of peaks are developed with same intensity the material have no TL and radiation sensitivity.

**Table-35**

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Hours</th>
<th>Peak Temperature °C</th>
<th>Peak Intensity (Arb. Unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>113, 138</td>
<td>0.11, 0.16</td>
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<td>96</td>
<td>110, 141</td>
<td>0.11, 0.13</td>
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<tr>
<td>5</td>
<td>198</td>
<td>102, 144</td>
<td>0.11</td>
</tr>
<tr>
<td>6</td>
<td>336</td>
<td>92, 136</td>
<td>0.11</td>
</tr>
<tr>
<td>7</td>
<td>504</td>
<td>104, 148</td>
<td>0.11</td>
</tr>
</tbody>
</table>

Table 35 shows the peak temperature and peak intensity of Zircon sample treated with AQ800°C, at different hours, the sample is irradiated with 25Gy beta dose by Sr$^{90}$.  

**Fig.3.72**

(TL decay graph of the AQ800°C Zircon sample)
Fig. 3.72 shows the TL decay graph of the Zircon sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25Gy beta dose by Sr\(^{90}\).

(5.26) TL decay study of as received Alumina:

Fig. 4.46 shows the TL glow curve of as received Alumina sample initially irradiated with 25Gy beta dose by Sr\(^{90}\). The TL is measured immediately after dose of irradiation, the glow curve exhibits one well resolved broad peak at temperature 260°C with intensity of 8.88 au.

Fig. 4.47 shows the TL glow curve of as received Alumina sample initially irradiated with 25Gy beta dose by Sr\(^{90}\). The TL is measured after 24 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 251°C with intensity of 8.61 au.

Fig. 4.48

Fig. 4.49
Fig. 4.48 shows the TL glow curve of as received Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 48 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature $244^\circ$C with intensity of 10.12 au.

Fig. 4.49 shows the TL glow curve of as received Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 96 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature $263^\circ$C with intensity of 8.33 au.

**Fig. 4.50**

![Fig. 4.50](image)

Fig. 4.50 shows the TL glow curve of as received Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 198 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature $251^\circ$C with intensity of 4.5 au.

**Fig. 4.51**

![Fig. 4.51](image)

Fig. 4.51 shows the TL glow curve of as received Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 336 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature $251^\circ$C with intensity of 10.1 au.

Fig. 4.52 shows the TL glow curve of as received Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 504 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature $270^\circ$C with intensity of 12.26 au.
Fig. 4.52

Fig. 4.52 shows the combo TL glow curves of as received Alumina sample initially irradiated with beta dose of 25Gy by Sr$^{90}$. Curve S1 shows the TL measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the TL measurement result after 198 hours of irradiation dose. Curve S6 shows...
the TL measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose. From the above result it is noted that the intensity is decreased continue with time till 198hr after irradiation but then after it is increased. It indicate that after 198hr of irradiation some carriers oriented traps are developed in to the material this result is remarkable for investigation point of view.

Table-37

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Hours</th>
<th>Peak Temperature °C</th>
<th>Peak Intensity (Arb. Unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>96</td>
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<td>5</td>
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</tr>
<tr>
<td>7</td>
<td>504</td>
<td>270</td>
<td>6.66</td>
</tr>
</tbody>
</table>

Table 37 shows the peak temperature and peak intensity of as received Alumina sample at different hours , the sample is irradiated with 25Gy beta dose by Sr$^{90}$. 

Fig.4.54

(TL decay graph of the as received Alumina sample)
(5.27) TL decay study of aq400°C Alumina:

Fig.4.55 shows the TL glow curve of AQ400°C Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured immediately after dose of irradiation, the glow curve exhibits one well resolved broad peak at temperature 261°C with intensity of 9.94au.

Fig.4.56 shows the TL glow curve of AQ400°C Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 24 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 251°C with intensity of 15.62au.

Fig.4.57 shows the TL glow curve of AQ400°C Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 48 hours of radiation dose; the glow curve exhibits one well resolved glow peak at temperature 241°C with intensity of 13.26au.

Fig.4.58 shows the TL glow curve of AQ 400°C Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 96 hours of
radiation dose; the glow curve exhibits one well resolved glow peak at temperature 256°C with intensity of 5.75 au.

**Fig.4.59**

![Fig.4.59 with a glow peak at 248°C](image)

**Fig.4.60**

![Fig.4.60 with a glow peak at 257°C](image)

Fig.4.59 shows the TL glow curve of AQ 400°C Alumina sample initially irradiated with 25 Gy beta dose by Sr90. The TL is measured after 198 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 251°C with intensity of 4.5 au.

Fig.4.60 shows the TL glow curve of AQ 400°C Alumina sample initially irradiated with 25 Gy beta dose by Sr90. The TL is measured after 336 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 257°C with intensity of 10.20 au.

**Fig.4.61**

![Fig.4.61 with a glow peak at 274°C](image)

Fig.4.61 shows the TL glow curve of AQ 400°C Alumina sample initially irradiated with 25 Gy beta dose by Sr90. The TL is measured after 504 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 274°C with intensity of 11.77 au.
Fig. 4.62 shows the combo TL glow curves of AQ 400°C Alumina sample initially irradiated with beta dose of 25Gy by Sr\(^{90}\). Curve S1 shows the TL measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the TL measurement result after 198 hours of irradiation dose. Curve S6 shows the TL measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose.

From the above result it is noted that the significant TL intensity is recorded in each result but it shows up and down value of intensity with particular time after irradiation and the peak temperature remain constant with minor variation it shows the temperature stability of the material and the result of intensity are interesting for quality control and research point of view.
Table 38

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Hours</th>
<th>Peak Temperature °C</th>
<th>Peak Intensity (Arb. Unit)</th>
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</thead>
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<td>261</td>
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<td>274</td>
<td>9.77</td>
</tr>
</tbody>
</table>

Table 38 shows the peak temperature and peak intensity of AQ 400°C Alumina sample at different hours, the sample is irradiated with 25Gy beta dose by Sr$^{90}$. 

Fig.4.63

(TL decay graph of the Alumina sample heated with AQ 400°C)
(5.28) TL decay study of AQ800°C Alumina:

Fig.4.64 shows the TL glow curve of AQ800°C Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured immediately after dose of irradiation, the glow curve exhibits one well resolved broad peak at temperature 258°C with intensity of 6.29au.

Fig.4.65 shows the TL glow curve of AQ800°C Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 24 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 248°C with intensity of 2.33au.

Fig.4.66 shows the TL glow curve of AQ800°C Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 48 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature 242°C with intensity of 11.81au.

Fig.4.67 shows the TL glow curve of AQ 800°C Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 96 hours of...
radiation dose, the glow curve exhibits one well resolved glow peak at temperature $252^\circ C$ with intensity of 5.88au.

**Fig.4.68**

Fig.4.68 shows the TL glow curve of AQ 800$^0$C Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 198 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature $247^\circ C$ with intensity of 5.61au.

**Fig.4.69**

Fig.4.69 shows the TL glow curve of AQ 800$^0$C Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 336 hours of radiation dose, the glow curve exhibits one well resolved glow peak at temperature $251^\circ C$ with intensity of 5.94au.

**Fig.4.70**

Fig.4.70 shows the TL glow curve of AQ 800$^0$C Alumina sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 504 hours of
radiation dose, the glow curve exhibits one well resolved glow peak at temperature $263^0C$ with intensity of 8.26au.

Fig.4.71

![Combo decay aq8 Alumina](image)

Fig.4.71 shows the combo TL glow curves of AQ $800^0C$ Alumina sample initially irradiated with beta dose of $25Gy$ by $Sr^{90}$. Curve S1 shows the TL measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the TL measurement result after 198 hours of irradiation dose. Curve S6 shows the TL measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose.

From the above result it is noted that the significant TL intensity is recorded in each result but it is shows up and down value of intensity with particular time after irradiation and the peak temperature remain constant with minor variation it shows the temperature stability of the material and the result of intensity are interesting for quality control and research point of view.
Table-39

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Hours</th>
<th>Peak Temperature °C</th>
<th>Peak Intensity (Arb. Unit)</th>
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</thead>
<tbody>
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<tr>
<td>7</td>
<td>504</td>
<td>263</td>
<td>5.26</td>
</tr>
</tbody>
</table>

Table 39 shows the peak temperature and peak intensity of AQ 800°C Alumina sample at different hours, the sample is irradiated with 25Gy beta dose by Sr$^{90}$.  

Fig.4.72

(TL decay graph AQ 800°CAlumina sample)
(5.29) TL decay study of as received Mixture:

Fig.10.46 shows the TL glow curve of as received Mixture sample initially irradiated with 25Gy beta dose by Sr\(^{90}\). The TL is measured immediately after dose of irradiation, the glow curve exhibits one well resolved peak at temperature 60\(^{0}\)C with intensity of 0.13au, other small peaks are developed at different temperature with same intensity.

Fig.10.47 shows the TL glow curve of as received Mixture sample initially irradiated with 25Gy beta dose by Sr\(^{90}\). The TL is measured after 24 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 147\(^{0}\)C and 212\(^{0}\)C with intensity of 0.11au other small peaks are developed at different temperature with same intensity.

Fig.10.48 shows the TL glow curve of as received Mixture sample initially irradiated with 25Gy beta dose by Sr\(^{90}\). The TL is measured after 48 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 127\(^{0}\)C and 172\(^{0}\)C with intensity of 0.11au other small peaks are developed at different temperature with same intensity.
Fig. 10.49 shows the TL glow curve of as received Mixture sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 96 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 138$^{0}$C and 190$^{0}$C with intensity of 0.11au other small peaks are developed at different temperature with same intensity.

Fig. 10.50 shows the TL glow curve of as received Mixture sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 198 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 101$^{0}$C and 169$^{0}$C with intensity of 0.11au other small peaks are developed at different temperature with same intensity.

Fig. 10.51 shows the TL glow curve of as received Mixture sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 336 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 67$^{0}$C and 147$^{0}$C with intensity of 0.11au other small peaks are developed at different temperature with same intensity.

Fig. 10.52 shows the TL glow curve of as received Mixture sample initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 504 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 90$^{0}$C and 170$^{0}$C with intensity of 0.11au other small peaks are developed at different temperature with same intensity.
Fig. 10.53 shows the combo TL glow curves of as received Mixture sample initially irradiated with beta dose of 25Gy by Sr$^{90}$. Curve S1 shows the TL Measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the TL measurement result after 198 hours of irradiation dose. Curve S6 shows
the TL measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose. From the above result it is noted that here no much TL is observed but the variation occurs in development of small intensity peaks and shape of the glow curve. Numbers of peaks are developed or vanished in each result but the intensity remain same it is related to TL of China clay and Bikaner Clay.

Table-40

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Hours</th>
<th>Peak Temperature °C</th>
<th>Peak Intensity (Arb. Unit)</th>
</tr>
</thead>
<tbody>
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<td>60, 169, 195</td>
<td>0.13</td>
</tr>
<tr>
<td>2</td>
<td>24</td>
<td>147, 212</td>
<td>0.11</td>
</tr>
<tr>
<td>3</td>
<td>48</td>
<td>127, 172</td>
<td>0.11</td>
</tr>
<tr>
<td>4</td>
<td>96</td>
<td>138, 190</td>
<td>0.11</td>
</tr>
<tr>
<td>5</td>
<td>198</td>
<td>101, 169</td>
<td>0.11</td>
</tr>
<tr>
<td>6</td>
<td>336</td>
<td>67, 147</td>
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</tr>
<tr>
<td>7</td>
<td>504</td>
<td>90, 170</td>
<td>0.11</td>
</tr>
</tbody>
</table>

Table 40 shows the peak temperature and peak intensity of as received Mixture sample at different hours the sample is irradiated with 25Gy beta dose by Sr$^{90}$.

Fig.10.54

(TL decay graph of the as received Mixture sample)

Fig.10.54 shows the TL decay graph of the as received Mixture sample
Fig. 10.55 shows the TL glow curve of Mixture sample heated at AQ 400°C and initially irradiated with 25Gy beta dose by Sr\(^{90}\). The TL is measured immediately after radiation dose, the glow curve exhibits two well resolved glow peak at temperature 71°C and 115°C with intensity of 0.13au other small peaks are developed at different temperature with same intensity.

Fig. 10.56 shows the TL glow curve of Mixture sample heated at AQ 400°C and initially irradiated with 25Gy beta dose by Sr\(^{90}\). The TL is measured after 24 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 64°C and 180°C with intensity of 0.11au other small peaks are developed at different temperature with same intensity.

Fig. 10.57 shows the TL glow curve of Mixture sample heated at AQ 400°C and initially irradiated with 25Gy beta dose by Sr\(^{90}\). The TL is measured after 48 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 149°C and 227°C with intensity of 0.11au other small peaks are developed at different temperature with same intensity.

Fig. 10.58 shows the TL glow curve of Mixture sample heated at AQ 400°C and initially irradiated with 25Gy beta dose by Sr\(^{90}\). The TL is measured after
24 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature $148^\circ$C and $211^\circ$C with intensity of 0.11au other small peaks are developed at different temperature with same intensity.

**Fig.10.59**

**Fig.10.60**

Fig.10.59 shows the TL glow curve of Mixture sample heated at AQ $400^\circ$C and initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 198 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature $151^\circ$C and $213^\circ$C with intensity of 0.11au other small peaks are developed at different temperature with same intensity.

Fig.10.60 shows the TL glow curve of Mixture sample heated at AQ $400^\circ$C and initially irradiated with 25Gy beta dose by Sr$^{90}$. The TL is measured after 336 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature $73^\circ$C and $152^\circ$C with intensity of 0.11au other small peaks are developed at different temperature with same intensity.

**Fig.10.61**
Fig. 10.61 shows the TL glow curve of Mixture sample heated at AQ 400°C and initially irradiated with 25Gy beta dose by Sr\textsuperscript{90}. The TL is measured after 504 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 79°C and 175°C with intensity of 0.11au other small peaks are developed at different temperature with same intensity.

**Fig. 10.62**

Fig. 10.62 shows the combo TL glow curves of Mixture sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr\textsuperscript{90}. Curve S1 shows the TL measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the TL measurement result after 198 hours of irradiation dose. Curve S6 shows the TL measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose.

From the above result it is noted that here no much TL is observed but the variation occurs in development of small intensity peaks and shape of the
glow curve. Numbers of peaks are developed or vanished in each result but the intensity remain same it is related to TL of China clay and Bikaner Clay.

**Table-41**

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Hours</th>
<th>Peak Temperature °C</th>
<th>Peak Intensity (Arb. Unit)</th>
</tr>
</thead>
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</tr>
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<tr>
<td>7</td>
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<td>79, 175</td>
<td>0.11</td>
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</table>

Table 41 shows the peak temperature and peak intensity of AQ400°C Mixture sample at different hours the sample is irradiated with 25Gy beta dose by Sr⁹⁰.

**Fig.10.63**

(TL decay graph of the AQ400°C Mixture sample)

Fig.10.63 shows the TL decay graph of the Mixture sample treated with annealing and quenching temperature of 400°C and initially irradiated with 25Gy beta dose by Sr⁹⁰. .
(5.31) TL decay study of AQ800°C Mixture:

Fig.10.64

Fig.10.65

Fig.10.66

Fig.10.67

Fig.10.64 shows the TL glow curve of Mixture sample heated at AQ 800°C and initially irradiated with 25Gy beta dose by Sr90. The TL is measured immediately after radiation dose, the glow curve exhibits two well resolved glow peak at temperature 91°C and 120°C with intensity of 0.25au other small peaks are developed at different temperature with same intensity.

Fig.10.65 shows the TL glow curve of Mixture sample heated at AQ 800°C and initially irradiated with 25Gy beta dose by Sr90. The TL is measured after 24 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 122°C and 168°C with intensity of 0.11au other small peaks are developed at different temperature with same intensity.

Fig.10.66 shows the TL glow curve of Mixture sample heated at AQ 800°C and initially irradiated with 25Gy beta dose by Sr90. The TL is measured after 48 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 51°C and 101°C with intensity of 0.11au other small peaks are developed at different temperature with same intensity.
Fig. 10.67 shows the TL glow curve of Mixture sample heated at AQ 800{°}C and initially irradiated with 25Gy beta dose by Sr{superscript}90. The TL is measured after 96 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 57{°}C and 138{°}C with intensity of 0.11 au other small peaks are developed at different temperature with same intensity.

Fig. 10.68 shows the TL glow curve of Mixture sample heated at AQ 800{°}C and initially irradiated with 25Gy beta dose by Sr{superscript}90. The TL is measured after 198 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 67{°}C and 129{°}C with intensity of 0.11 au other small peaks are developed at different temperature with same intensity.

Fig. 10.69 shows the TL glow curve of Mixture sample heated at AQ 800{°}C and initially irradiated with 25Gy beta dose by Sr{superscript}90. The TL is measured after 336 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 58{°}C and 95{°}C with intensity of 0.11 au other small peaks are developed at different temperature with same intensity.

Fig. 10.70 shows the TL glow curve of Mixture sample heated at AQ 800{°}C and initially irradiated with 25Gy beta dose by Sr{superscript}90. The TL is measured after 504 hours of radiation dose, the glow curve exhibits two well resolved glow peak at temperature 76{°}C and 156{°}C with intensity of 0.11 au other small peaks are developed at different temperature with same intensity.
Fig.10.70 shows the combo TL glow curves of Mixture sample treated with annealing and quenching temperature of $800^\circ$C and initially irradiated with 25Gy beta dose by Sr$^{90}$. Curve S1 shows the TL measurement result immediately after irradiation dose. Curve S2 shows the TL measurement result after 24 hours of irradiation dose. Curve S3 shows the TL measurement result after 48 hours of irradiation dose. Curve S4 shows the TL measurement result after 96 hours of irradiation dose. Curve S5 shows the TL measurement result after 198 hours of irradiation dose. Curve S6 shows the TL
measurement result after 336 hours of irradiation dose. Curve S7 shows the TL measurement result after 504 hours of irradiation dose. From the above result it is noted that here no much TL is observed but the variation occurs in development of small intensity peaks and shape of the glow curve. Numbers of peaks are developed or vanished in each result but the intensity remain same it is related to TL of China clay and Bikaner Clay.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Hours</th>
<th>Peak Temperature °C</th>
<th>Peak Intensity (Arb. Unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>95,120</td>
<td>0.13, 0.25</td>
</tr>
<tr>
<td>2</td>
<td>24</td>
<td>122,168</td>
<td>0.11</td>
</tr>
<tr>
<td>3</td>
<td>48</td>
<td>51,101</td>
<td>0.11</td>
</tr>
<tr>
<td>4</td>
<td>96</td>
<td>57,138</td>
<td>0.11</td>
</tr>
<tr>
<td>5</td>
<td>198</td>
<td>67,129</td>
<td>0.11</td>
</tr>
<tr>
<td>6</td>
<td>336</td>
<td>58,95</td>
<td>0.11</td>
</tr>
<tr>
<td>7</td>
<td>504</td>
<td>76,156</td>
<td>0.11</td>
</tr>
</tbody>
</table>

Table 42 shows the peak temperature and peak intensity of Mixture sample treated with AQ800°C, at different hours, the sample is irradiated with 25Gy beta dose by Sr⁹⁰.

**Fig.10.72**

(TL decay graph of the AQ800°C Mixture sample)

Fig.10.72 shows the TL decay graph of the Mixture sample treated with annealing and quenching temperature of 800°C and initially irradiated with 25Gy beta dose by Sr⁹⁰.
References:

2. A study of ceramic India .in Global era by -S.N Ramsariya , research paper 2003
10. S.K. Guha, Ceramic raw Materials of India – A Directory , Indian, Institute of Ceramics, 1928
30. References Gandhi


