Calibration of TLD Chips using Cs-137

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Plot

Introduction to project

Procedure

Conclusion
Introduction
Medical Pack

Dental Pack
Thermoluminescence Dosimeters

Light output is proportional to exposure.
Calibration using X-Ray Machine
Calibration using Cs-137
X-Ray Exposure

X-Ray Machine

Dental X-Ray Machine

X-Ray Tube
Analysis

Reader Wheel

Pre-heating oven

TLD Reader
Anneal Wheel

Annealing oven

Refrigerator
Cs-137 Exposure:

Cs-137 Source (6GBq)

Pack being exposed

Beam profile
At 21 cm from the source

<table>
<thead>
<tr>
<th>Time (mins)</th>
<th>Exposure (mR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>104.09</td>
</tr>
<tr>
<td>14</td>
<td>208.18</td>
</tr>
<tr>
<td>21</td>
<td>312.27</td>
</tr>
</tbody>
</table>
Glow Curves:

Exposed Chip

Blank Chip
Exposure = \( \frac{ECC_j \times Q_j}{RCF} \)

\( ECC_j = \frac{\langle Q \rangle}{Q_j} \)

\( RCF = \frac{\langle Q \rangle}{Exposure} \)
- Has similar shape for both type of radiation
Slope of
X-Ray: $0.1275 \pm 0.004931$
Cs-137: $0.07721 \pm 0.002782$

$$K = \frac{RCF_{Cs-137}}{RCF_{X-Ray}}$$

$$K = 0.6056 \pm 0.0057$$

$Slope = RCF = \frac{<Q>}{Exposure}$
Conclusion:

• Filtration does not affect RCF.

• \( K = 0.6056 \pm 0.0057 \)

• Can calibrate TLD Chips with Cs-137 and get a sensible data from X-Ray exposure.
Thank You

• Jason
• Octavian
• Pam
• Lab Members
• Prof. Chary