

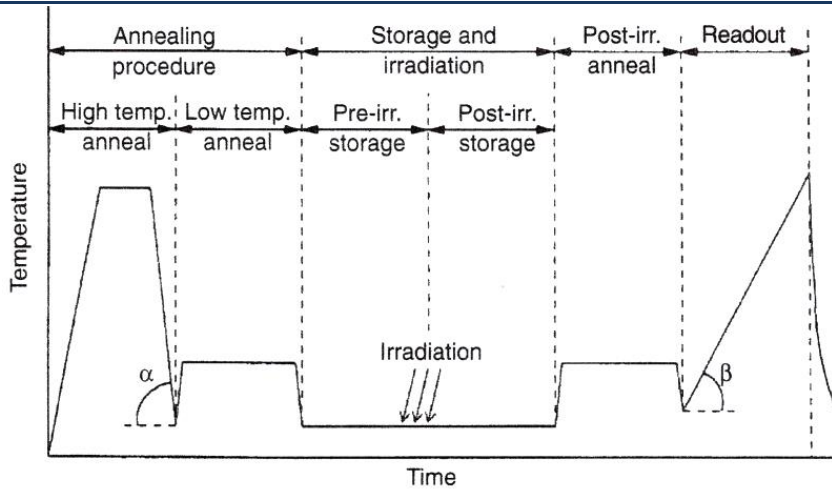
OVEN ANNEALING PROCESS: TLD-3 OVEN

TLD-3 Annealing Oven Characteristics



- Normal working temperature of 50°C to 400°C
- 400°C maximum operating temperature
- Forced air circulation by rear mounted fan and air guide system
- Assisted cooling
- Programmable controller providing automatic activation of the cooling blower
- Over temperature protection with digital set & display
- Stainless steel mesh shelves

Various Stages of TLD Material



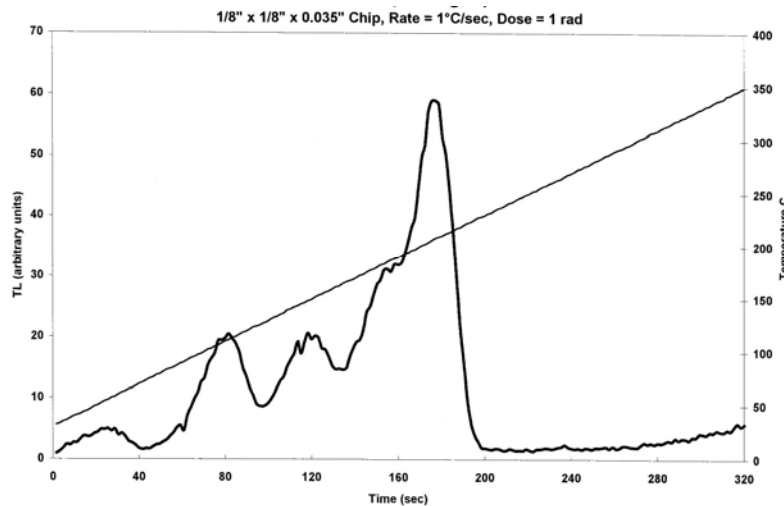
Source: McKeever S.W.S., Moscovitch M., and Townsend P.D., "Thermoluminescence dosimetry materials – properties and uses", Nuclear Technology Publishing, Kent, England. ISBN 1 870965 19 1, (1995).

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TLD-100 (LiF:Mg,Ti)

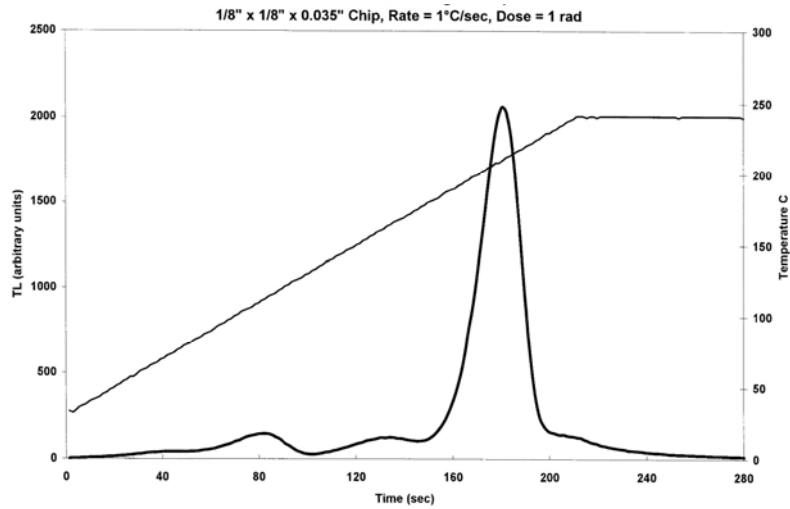


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TLD-700H ($^7\text{LiF:Mg,Cu,P}$)



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LiF:Mg,Ti Glow Curve Post Irradiation

LiF:Mg,Ti glow curves at various elapsed times following irradiation. Curves (a),(c), and (e) show the process of subtraction of Peak 2 by extrapolation of the low temperature tail of Peak 3. Curves (b), (d), and (f) show the resulting glow curves separated into three component glow peaks.

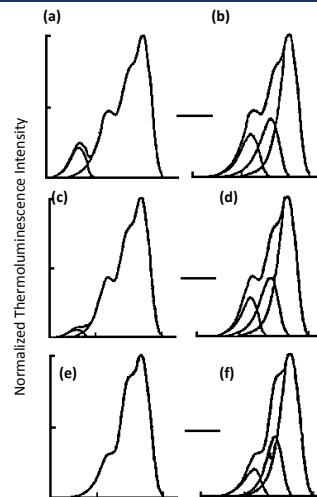
The fraction numbers indicate the integral of the various peaks relative to peak 5 integral(1.00).

The elapsed times are:

(a) and (b) 4.47 h;

(c) and (d) 96.25 h;

(e) and (f) 555 h.

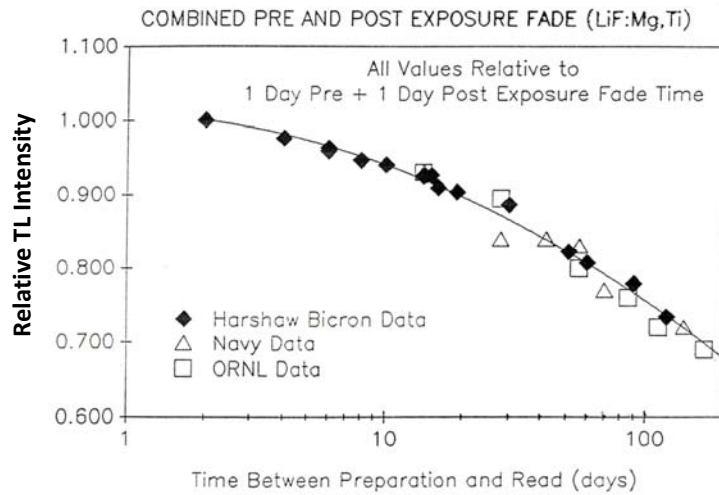


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Pre- and Post- Exposure Fade LiF:Mg,Ti

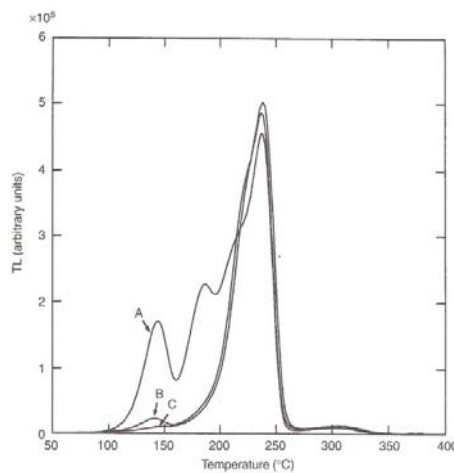


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Thermal Treatment Affects TL



TLD-100 Glow Curves after:

- A – Pre-irradiation anneal at 400 °C for one hour followed by a fast quench to room temperature
- B – Same anneal temperature as (A), followed by 80 °C for 24 h
- C – Same as (A) followed by 100 °C for 2 h
- C is known as the Harshaw Annealing Cycle

Source: McKeever S.W.S., Moscovitch M., and Townsend P.D., "Thermoluminescence dosimetry materials – properties and uses", Nuclear Technology Publishing, Kent, England. ISBN 1 870965 19 1, (1995).

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Oven Annealing Considerations

Single Oven – 2 Temperatures

- Consistent & Repeatable 2 Temperatures
- Consistent Transition from High to Low Temperature
- Consistent Cooling to Ambient Temperature
- No Temperature Excursions when Door is Opened / Closed

Dual Ovens – Fixed Temperatures

- Consistent & Repeatable Temperature on Each Oven with No Temperature Excursions When Door is Opened / Closed
- Consistent Manual Transition from High to Low Temperature Oven
- Consistent Cooling to Ambient Temperature or Use of Cooling Plate / Block

QUESTIONS?