AIM: (a) to perform an OSL dose response curve for BeO or aluminum oxide, and (b) to calculate the unknown dose accumulated by another (same) dosimeter, using the dose response curve of the previous step.

Materials: BeO or alumimum oxide

PROTOCOL:

At the beginning, the optimum annealing conditions should be found and followed, according to the reference book below. Annealing should be performed following the exact conditions, depending on the dosimeter used.

Step 1. Irradiation (25 mGy)

Step 2. OSL measurement (Room Temperature, 90%, 100 s)

Step 3. TL measurement (350 °C, HR=1°C/s) for residual TL after OSL

Step 4. Repeat steps 1-3 changing the dose applied in step 1 (50 mGy, 75 mGy, 100 mGy, 125 mGy, 150 mGy, 200 mGy, 250 mGy). Each dose should be applied to another chip dosimeter.

Analysis:

1. Plot the OSL signal of the first s versus dose. Check whether linear or saturation exponential fitting could be performed.
2. Calculate the minimum detectable dose limit for the material/dosimeter applied.
3. You will be given another dosimeter, which has been irradiated with an unknown dose. Measure the signal of this dosimeter and based on the dose response curve that you have plotted previously, calculate this unknown dose that was absorbed by the dosimeter.
4. Repeat steps 1-3 of analysis for the entire OSL integral.

Reference: S.W.S. McKeever, M. Moscovitch, P.D. Townsend, Thermoluminescence

Dosimetry Materials: Properties and Uses, Nuclear Technology Publishing, 1995.

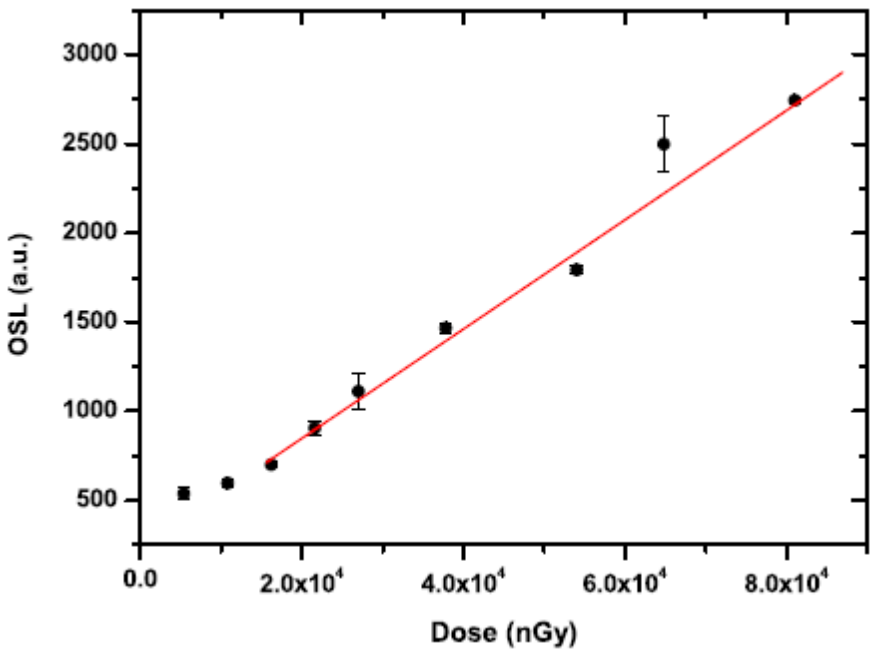

Fig. 1. Dose response curve for very low doses for CaF_2:N dosimeter.