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DOSE RATE EFFECTS IN QUARTZ, SOME OBSERVATIONS

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Recent interest in dose rate effects in quartz and other materials has stimulated the publication of some data collected five years ago in this laboratory.

The quartz grains used were in the size range 90/125 μm , etched for 40 minutes in hydrofluoric acid as routinely prepared here for quartz inclusion dating. The two sherds used had been excavated in N. Africa, and were subsequently dated. The sources used for the artificial irradiations were ^{90}Sr SIP plaque β sources of nominal strengths 2 μCi , 20 μCi and 40 mCi. The natural TL was drained from the quartz and then β doses were administered using the sources as follows

Sample b1, a total dose of 140 rad was given

- a) over 1½ minutes (40 mCi), 93 rads/minute.
- b) over 10 days (2 μCi), .0097 rads/minute. Results in Figure 1.

Sample k3, a total dose of 65 rad was given

- a) over 40 seconds (40 mCi), 97 rads/minute.
- b) over 18 hours (20 μCi), .060 rads/minute. Results in Figure 2.

As can be seen from the figures no dose rate effect was observed, the peak heights being the same in all cases.

One β source in this laboratory was calibrated by comparison with a ^{60}Co γ source of known strength using 100 μm grains of CaF_2 , all other β sources are intercompared to this "standard" source. If there is a dose rate effect in CaF_2 which exactly corresponds to that in quartz then this method of calibration would of course lead to the results obtained.

Fig. 1

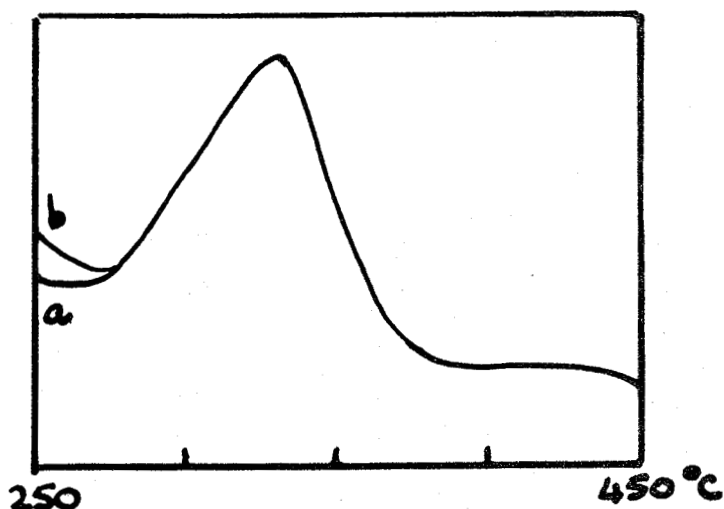


Fig. 2

