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Fission track annealing behaviour of uraninite inclusions in muscovite pegmatite of Bhilwara area, Rajasthan State, India. SURINDER SINGH and H. S. VIRK, *Geochronology Laboratory, Department of Physics, Punjabi University, Patiala-147002, India.*

Correction for thermally lowered fission track ages of uraninite inclusions in muscovite pegmatite of Bhilwara area, Rajasthan State (India) has been estimated to be 2%. It has been observed that the track length decreases easily than the track density reduction at all temperatures.

Fission track (f.t.) ages of minerals are often found to be lower than those determined by other radiometric methods due to the relatively high sensitivity of the fission tracks to thermal effects. In order to apply correction to these thermally lowered ages, annealing experiments have been performed by a number of workers (Fleischer *et al.*, 1975).

The experimental details for the preparation, etching and irradiation of pegmatite samples have been reported in an earlier communication to Mineralogical Journal (Virk and Singh Surinder, 1977). In our present study, the irradiated muscovite samples, impregnated with uranium bearing inclusions were heated in a muffle furnace at different constant temperatures for one hour in each case. There has been no change in density and mean range (track length) of the induced tracks in inclusions at 100°C but at 200°C we have observed a slight decrease of 1% in the mean range of the tracks without any appreciable effect on track density. At 700°C one hour heating at constant temperature reduces the mean range by 73% while the reduction in track density amounts to 59% only. Further heating at 800°C damaged the sample. However the fission tracks in inclusions were still present though in the decomposed state. This state corresponds to the phase change in the mineral and the tracks form nucleation

sites for the decomposition of the material (Price and Walker, 1962). For complete removal of induced fission tracks in inclusions, intense heating is required. These results have been summarized in Table 1.

A linear relation (Fig. 1) has been observed between track length

Table 1. Annealing data of uraninite inclusions in muscovite pegmatite. Heating time 1 hr.

Temperature °C	Percentage reduction track length	Percentage reduction track density
200	1	Negligible
300	8	6
400	15	11
500	29	23
600	36	30
700	73	59

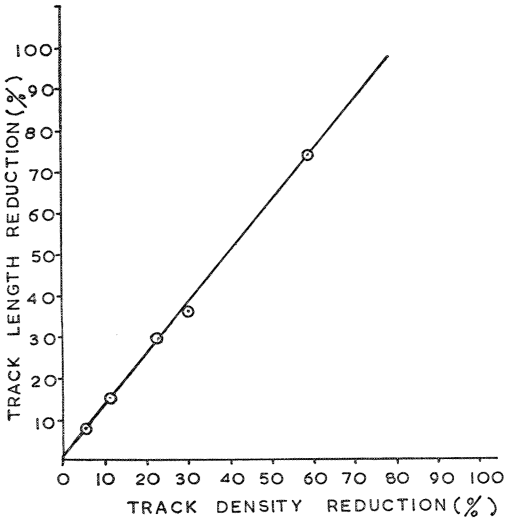

Fig. 1. Percentage reduction in track density *versus* percentage reduction in track length in uraninite inclusions during annealing.

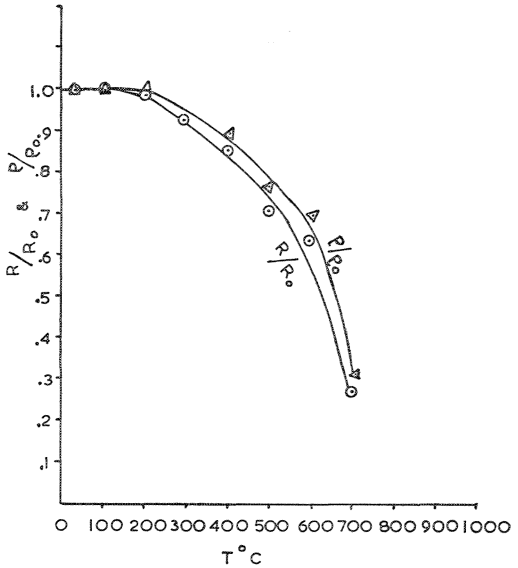

Fig. 2. Relation between mean range and track density of induced fission tracks in uraninite inclusions during annealing.

reduction and track density reduction. Our present study reveals that track density reduction lags behind the track length reduction at all temperatures (Fig. 2).

In our previous communication to Mineralogical Journal (Virk and Singh Surinder, 1978) we have reported the f.t. age of these uraninite inclusions as 133 m.y. The mean range of fossil tracks in the uraninite inclusions was observed to be 20.4 μ while the mean range of induced fission tracks under identical conditions has been found to be 21.02 μ. This much reduction in mean range corresponds to 2% decrease in fossil track density. Hence the correction to f.t. ages of these inclusions is also of the same order. This extremely low value of the annealing correction suggests the occurrence of fairly stable thermal conditions in the region during the last 133 m.y.

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