FISSION TRACK DATING OF SOME APATITES FROM RAJASTHAN STATE, INDIA

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ABSTRACT

Fission track geochronology of apatite samples from Rajasthan pegmatitic belt is discussed. The apatite ages vary from 591± 15 m.y to 691 ± 19 m.y in the belt. It is concluded that the Delhi orogenic cycle is the last major metamorphic episode in the geological history of the samples. The uranium concentration in these samples varies from 12 to 72 ppm. The effect of geothermal events on fission track age of apatite is studied through annealing experiments performed with the mineral. Annealing correction to fission track ages of apatite from the belt is estimated to be 20 percent.

1. INTRODUCTION

Fission track (f.t.) technique developed by Price and Walker (1963) is an established method of dating minerals and rocks. The technique has gained popularity because of its simplicity, versatility, rapidness and low cost as compared to other radiometric methods of age determination. It has been applied by a large number of laboratories to discuss the geochronology of the geological eras (Fleischer et al, 1975., Nagpaul. 1974., Singh and Virk 1978, 79). The method is based on the detection of fission fragment tracks in minerals due to fission of uranium which is present as an impurity in almost all minerals and rocks since their time of solidification.

The present work reports the use of fission track method in revealing geochronology of Rajasthan pegmatitic belt. The large single crystals of apatite were collected from pegmatitic mines of Jaipur, Bhilwara and Udaipur districts of Rajasthan State. The Rajasthan pegmatitic belt extends for about 320 km from Jaipur district to Udaipur district with an average width of 96 km covering approximately a total