

ETCHING AND ANNEALING STUDIES OF FISSION TRACKS IN PHLOGOPITE MICA AND THEIR APPLICATION IN DATING

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ABSTRACT

Etching and annealing characteristics of fission fragment tracks in phlogopite mica collected from Borramines, Vishakhapatnam district (Andhra Pradesh), have been studied. From the annealing data, a temperature of 282°C has been found to erase all fission tracks in 1 m.y. A complete erasure of fission tracks in phlogopite occurs for 4 hours annealing at 500°C . A correction for thermally lowered fission track age has been determined by age plateau method. A mean fission track age of 687 ± 33 m.y. has been determined for phlogopite. Uranium content in phlogopite is quite low (~ 0.03 ppm). The mean value of activation energy for phlogopite is found to be 1.98 eV.

1. INTRODUCTION

Fission track (f.t.) technique developed by Price and Walker (1963) is an established method for dating minerals and rocks and is being widely used in geochronology for more than a decade [Fleischer et. al. 1975]. In the present work f.t. technique has been used to determine the age of phlogopite mica collected from Eastern Ghat Belt of India. The Eastern Ghats are composed of parallel layers of khondalites and their variants, granitic, gneisses and charnockites, which are characterized by granulite facies metamorphism. The dominant trend of Eastern Ghat in India is North-East to

South-West (Fig. 1).

The etching condition for phlogopite was determined in the laboratory using 48% HF acid at 25°C , and at various annealing temperature and times. Fission track ages are generally found to be lower than those determined by other radiometric methods due to fading of fossil fission tracks during geological history of the samples. Hence attempts have been made in the present work to estimate the annealing correction.

2. EXPERIMENTAL PROCEDURE