It is found that the condition (16) is satisfied if x_0, where $f(x)$ is maximum, occurs in the interval

$$0 < x_0 \leq \frac{\pi}{|3b|}.$$

Thus the solution is always physically plausible if

$$x_1 \leq \frac{\pi}{|3b|}.$$

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CORRECTION FOR THERMALLY AFFECTED FISSION TRACKS IN GLASS (OBSIDIAN) BY AGE PLATEAU METHOD

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A correction of 22·55% for thermally lowered fission track ages of glass (obsidian) from Osham hill, Gujarat State, India has been determined by the age plateau method using fission track technique.

The fading of fission tracks in minerals due to geothermal events results in lowering of the fission track ages and thus needs a correction for the same to be applied. Annealing experiments have been performed by a number of workers[1-5] for correcting tha fission track ages.

In the present investigation, age plateau method developed by Storzer *et al.*[2] and Burchart *et al.*[3] has been applied on the (obsidian) glass of Osham hills, Gujarat State, India. Eight pairs of obsidian samples (each pair consisting of one sample of fossil tracks and the other of freshly induced neutron fission tracks) were annealed at a series of increasing temperature from 50° to 700° C for a period of one hour in each case. The annealed samples were then etched in 48% HF for 30 sec. at 20° C and the tracks were counted using an optical microscope at a magnification of 600 ×.

The f.t. age of obsidian was calculated by using the simplified version of the formula[6]

$$T = 6\cdot57 \times 10^9 \ln\left(1 + 9\cdot25 \times 10^{-18} \times \frac{\rho_s}{\rho_i} \times \phi\right) \quad (1)$$

where :

ρ_s = fossil track density;
ρ_i = induced track density,
ϕ = total thermal neutron dose (5×10^{16} nvt).

The value of ϕ was determined by irradiating a calibrated glass slide along with obsidian samples[7].

The f.t. ages calculated by using equation (1) are summarised in Table I.

From annealing data (Table II) it has been observed that in both the samples, in a pair the track density decreases with the increasing temperature but in the samples containing induced tracks, the rate of decrease is faster than in the sample containing fossil tracks.

F.T. ages for the annealed samples are calculated by using equation (1) and are summarised in Table II.

Table I
Fission track age data for glass (obsidian)
Total thermal neutron dose (ϕ) = 5×10^{16} (*nvt*)

Sample location	Lab. symbol	ρ_s tracks/cm² × 10⁴	ρ_i tracks/cm² × 10⁴	F.T. age (m.y.) T
Obsidian	OGI-1	2·10	410·70	15·52±0·89**
Osham hills,		(400)*	(1290)*	
Gujarat State,	OGI-2	2·16	413·84	15·84±0·89
India		(413)	(1300)	
	OGI-3	2·20	418·60	15·95±0·89
		(420)	(1315)	mean
				15·77±0·89

* Brackets shows the number of tracks counted, *i.e.*, N_s and N_i.

$$** \ \sigma_s = \frac{100}{\sqrt{N_s}}, \quad \sigma_i = \frac{100}{\sqrt{N_i}}, \quad \sigma = \sqrt{\sigma_s^2 + \sigma_i^2}.$$

Table II
Annealing data for glass (obsidian)
Heating time = 1 hr.

Temperature (° C)	Fossil track density (ρ_s/cm²) × 10⁴	Induced track dansity (ρ_i/cm²) × 10⁴	F.T. age (m.y.) T
30	2·10	410·70	15·52
50	2·10	410·70	15·52
100	1·93	369·63	15·84
200	1·70	313·13	16·57
300	1·36	237·19	17·40
400	0·82	135·39	18·37
500	0·46	73·93	18·88
600	0·25	39·98	18·97
700	·02	3·19	19·02

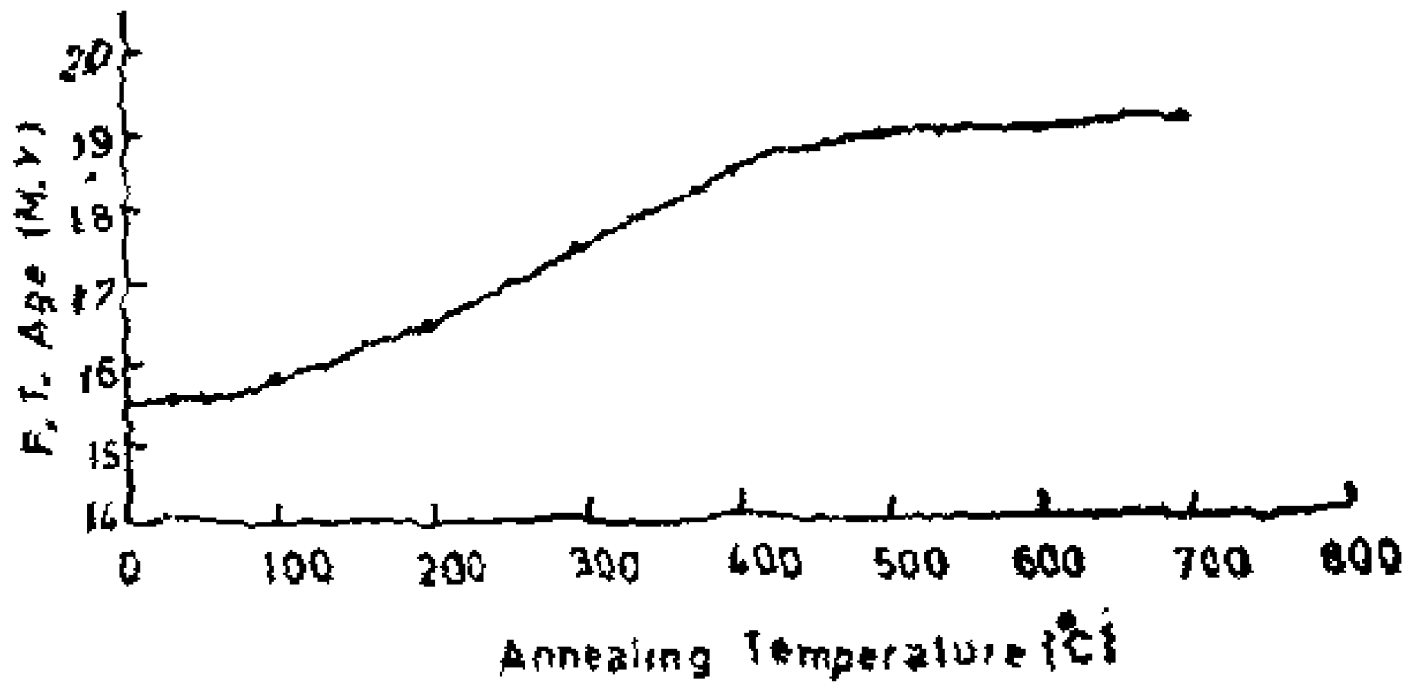

FIG. 1. Fission track age (m.y.) *versus* annealing temperature (°C) for obsidian (glass).

The apparent age increases at low temperatures but reaches a plateau at temperatures above 500° C which correspond to previous heating event or the temperature at which the tracks faded naturally (Fig. 1). The plateau age of 19·02 m.y. for obsidian glass is the corrected age. Hence the annealing correction to the fission track ages of glass (obsidian) is 22·55%.

Lower age of the obsidian (19·02 m.y.) occurring in the Deccan basalts (139–70 m.y.) of Osham hill, Gujarat State, India may be due to the phasual eruption of Deccan basalts. Eruption of Deccan basalts started at the end of cretaceous and continued upto Eocene[8]. This eruption took place in a series of phases. The obsidian glass occurring in Deccan basalts might have been affected by some eruption phase which affected the tracks present in them and resulted in resetting of the geological clock, thus remarkably lowering the fission track ages.

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MECHANISM OF INHIBITION OF ELECTRODE REACTIONS—Cu^{2+}, Cd^{2+} AND Zn^{2+} IONS DISCHARGE FROM AQUEOUS SODIUM SULPHATE IN THE PRESENCE OF SURFACE-ACTIVE SUBSTANCES

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RECENTLY, we have propesed a quantitative theory for inhibition of electrode reactions[1] and discussed its validity to Cu^{2+}, Cd^{2+} and Zn^{2+} discharge reactions[2] in the presence of various alcohols acting as surface-active substances (SAS). In this communication, we present our results on the kinetic parameters (applying double-layer effects) obtained for the uninhibited electrode reactions of Cu^{2+}, Cd^{2+} and Zn^{2+} ions in the presence of various SAS using Satyanarayana's extrapolation procedure[3]. The kinetic parameters were calculated from the analysis of current-time (i–t) curves[4].

The true cathodic transfer coefficients (α_t) obtained for the discharge of Zn^{2+} ions in the presence and in the absence of various SAS are presented in Table I. It is seen that α_t values (within the limits of experimental error) for Zn^{2+} ion reduction are not changed in the presence of various SAS, which suggests that the mechanism of reduction with and without SAS remains unaltered. Due to the limitation of the dc polarographic method, the values of apparent standard rate constant ($k_{s,a}$) and α_t for the reductions of Cd^{2+} and Cu^{2+} ions in the absence of SAS could not be found out. However, it is inferred here that for these systems too, the various SAS examined do not affect the mechanism, the reasons for this conclusion being the following: (i) α_t values obtained for the reductions of Cd^{2+} and Cu^{2+} ions in the presence of various SAS agree with each other (Table I). If SAS had affected the mechanism, it would be unlikely that the changed mchanism would be the same in the case of all SAS. Therefore, it is reasonable to conclude that SAS studied in this work does not alter the mechanism; (ii) The possibility of various SAS forming complexes with depolariser ions, which would eventually change the mechanism of reduction, is ruled out on the basis of the fact that same standard formal potential values (E_r^0) were obtained for the three discharge reactions in the presence and in the absence of SAS[5,6] (iii) Satyanarayana[3] showed that standard rate constants for fast reactions could be calculated from dc polaro-