SUPPLEMENTS

Supplement Table S1: Variables and measured quantities in the manuscript text and supplement table 2. Those in the manuscript figures and tables are explained in their captions.

Symbol	Unit	Definition	Principal occurrence
ϕ	(degrees)	angle between the track axis and the apatite *c*-axis (track angle)	figure 2
ϕ_{30}	(degrees)	measured track angle ϕ after 30 s immersion in 5.5 M HNO_3 at 21 °C	supplement 2
ϕ_{45}	(degrees)	measured track angle ϕ after 45 s immersion in 5.5 M HNO_3 at 21 °C	supplement 2
ϕ_M	(degrees)	average of measured track angles (ϕ_{30} and ϕ_{45})	supplement 2
ϕ'_M	(degrees)	orientation perpendicular to the track (90- ϕ_M)	supplement 2
θ	(degrees)	angle between facing edges of the etched track channel	figure 2; equation 3
θ_{30}	(degrees)	measured cone angle θ after 30 s immersion in 5.5 M HNO_3 at 21 °C	supplement 2
θ_{45}	(degrees)	measured cone angle θ after 45 s immersion in 5.5 M HNO_3 at 21 °C	supplement 2
θ_M	(degrees)	average of measured cone angles (θ_{30} and θ_{45})	supplement 2
η_E	-	traditional track etching efficiency	equation 1
l_{30}	μm	track length measured after 30 s immersion in 5.5 M HNO_3 at 21°C	figure 2; supplement 2
l_{45}	μm	track length measured after 45 s immersion in 5.5 M HNO_3 at 21°C	figure 2; supplement 2
Δl	μm	track length increase from 30 s to 45 s ($\Delta l = l_{45} - l_{30}$)	figure 2; equation 4; supplement 2
w_{30}	μm	track width measured after 30 s immersion in 5.5 M HNO_3 at 21 °C	figure 2; supplement 2
w_{45}	μm	track width measured after 45 s immersion in 5.5 M HNO_3 at 21 °C	figure 2; supplement 2
Δw	μm	track width increase from 30 s to 45 s ($\Delta w = w_{45} - w_{30}$)	figure 2; equation 2; supplement 2
t_{E30}	s	effective track etch time after 30 s immersion in 5.5 M HNO_3 at 21°C	equation 5; supplement 2
t_{E45}	s	effective track etch time after 45 s immersion in 5.5 M HNO_3 at 21°C	equation 6; supplement 2
Δt_E	s	etch time increment ($\Delta t_E = t_{E45} - t_{E30} = 15$ s)	equations 2 and 4; supplement 2
v_B	μm/min	traditional bulk etch rate of "undamaged" apatite (i.e. outside the track core)	equation 1; supplement 2
v_T	μm/min	etch rate of the disordered track core along the track axis (track etch rate)	figure 2c; equation 3; supplement 2
v_R	μm/min	etch rate of the plane perpendicular to the etch rate vector (apatite etch rate)	figure 2c; equation 2; supplement 2
v_L	μm/min	measured rate of track length increase resulting from intermittent damage	figure 2c; equation 4; supplement 2
v_S	μm/min	apatite etch rate perpendicular to the polished surface (surface etch rate)	figure 9
ρ_L	cm^{-2}	number of unetched (latent) tracks intersecting 1 cm^2 of the mineral surface	manuscript text
ρ_E	cm^{-2}	counted number of track etch channels intersecting 1 cm^2 of mineral surface	manuscript text

Supplement Table S2: AM 7614 supplement table 2.xls