

APPENDIX

Tables included in this Appendix present complete data on specimen compositions, unit-cell parameters, and etch-figure size (Appendix Table 1); on annealing kinetics in comprehensive sets of experiments performed on apatites B3, DR, RN, and HS (Appendix Table 2); and on annealing kinetics in less-comprehensive sets of experiments on apatites AY, B2, FC, KP, OL, PC, PQ, SC, TI, UN, and WK (Appendix Table 3). Asterisks denote experiments that showed evidence of accelerated length reduction of fission tracks at high angles to the crystallographic c axis, as defined in Carlson et al. 1999, Sept., vol. 84, 1213-1223. Experiments for which reliable values of l_c and l_a could be fitted are denoted by a single asterisk (*). Experiments in which there were insufficient tracks to define reliable ellipses are denoted by double asterisks (**).

Symbols in Appendix Tables 2 and 3 have these meanings: l_m = arithmetic mean track length; σ_m = standard deviation of track-length measurements; l_c = mean track length parallel to the c axis; l_a = mean track length perpendicular to the c axis; σ = standard deviation of track lengths about their best-fit ellipse; $l_{c,mod}$ = modeled c -axis projected track length; and $\sigma_{c,mod}$ = standard deviation of modeled c -axis projected track length.

Appendix Table 1. Compositions, cell parameters, and etch-figure sizes for apatites used in experiments

wt%	AY	B2	B3	DR	FC	HS	KP	OL	PC	PQ
P ₂ O ₅	41.74 (17)	41.79 (14)	41.23 (21)	41.07 (30)	41.53 (38)	42.49 (56)	39.99 (18)	38.98 (22)	41.80 (14)	42.32 (34)
SiO ₂	0.22 (01)	0.00 (00)	0.05 (07)	0.19 (02)	0.36 (12)	0.03 (06)	0.24 (01)	1.04 (04)	0.02 (01)	0.02 (01)
La ₂ O ₃	0.16 (02)	0.11 (02)	0.06 (02)	0.35 (05)	0.23 (04)	0.00 (00)	1.49 (03)	0.26 (02)	0.00 (01)	0.00 (00)
Ce ₂ O ₃	0.32 (01)	0.34 (01)	0.32 (01)	0.55 (03)	0.65 (09)	0.05 (01)	2.49 (03)	0.86 (05)	0.02 (01)	0.02 (01)
CaO	54.20 (70)	53.63 (18)	52.73 (22)	54.04 (48)	54.19 (55)	55.13 (91)	44.69 (18)	54.00 (69)	48.56 (50)	55.74 (24)
SrO	0.02 (02)	0.07 (02)	0.06 (05)	0.02 (02)	0.05 (03)	0.03 (03)	9.15 (11)	0.16 (02)	0.00 (00)	0.15 (07)
MnO	0.08 (03)	0.06 (02)	0.01 (02)	0.01 (02)	0.18 (06)	0.05 (03)	0.15 (06)	0.07 (06)	7.04 (15)	0.12 (06)
FeO	0.04 (04)	0.15 (03)	0.08 (03)	0.03 (02)	0.07 (06)	0.02 (02)	0.02 (04)	0.04 (05)	0.02 (03)	0.06 (03)
Na ₂ O	0.07 (03)	0.31 (01)	0.40 (03)	0.26 (01)	0.09 (07)	0.03 (10)	0.77 (02)	0.08 (02)	0.00 (01)	0.06 (03)
F	2.59 (15)	0.28 (13)	0.08 (09)	3.33 (29)	2.09 (75)	0.12 (12)	3.38 (20)	3.14 (18)	3.44 (16)	3.52 (20)
Cl	0.82 (03)	2.95 (04)	6.37 (19)	0.43 (02)	0.81 (28)	0.35 (05)	0.01 (01)	0.03 (02)	0.01 (01)	0.01 (01)
Total*	98.97	98.91	99.92	98.78	99.18	98.17	100.96	97.33	99.44	100.54
Symmetry	Hex	Hex	Mono	Hex	Hex	Hex	Hex	Hex	Hex	Hex
β			120.0 (1)							
a (Å)	9.399 (6)	9.509 (6)	19.235 (5)	9.397 (5)	9.422 (6)	9.429 (6)	9.421 (5)	9.383 (5)	9.347 (5)	9.371 (5)
b (Å)			6.775 (1)							
c (Å)	6.877 (6)	9.509 (6)	9.618 (8)	6.884 (6)	6.875 (6)	6.883 (6)	6.928 (6)	6.898 (6)	6.830 (5)	6.888 (6)
V (Å ³)	526.10 (66)	536.21 (67)	1085.75 (96)	526.39 (61)	528.64 (66)	529.90 (66)	532.51 (61)	525.94 (61)	516.80 (54)	523.85 (60)
Z (%)	36.88 (13)	36.15 (13)	34.32 (15)	37.21 (18)	37.17 (13)	37.47 (12)	37.82 (13)	37.53 (13)	36.85 (12)	37.29 (13)
$D_{par}\dagger$ (μm)	1.95 (3)	4.58 (6)	4.99 (6)	1.83 (2)	2.43 (4)	3.00 (6)	2.06 (4)	2.35 (2)	2.15 (3)	1.59 (2)

Note: All cations are reported as oxides.

* Totals are adjusted to account for F and Cl in place of O.

† D_{par} = etch figure diameter measured parallel to c axis.

RN	SC	TI	UN	WK
41.38 (21)	41.31 (07)	42.03 (27)	41.16 (21)	41.70 (30)
0.17 (02)	0.19 (01)	0.08 (07)	0.24 (04)	0.22 (09)
0.11 (03)	0.10 (01)	0.04 (02)	0.06 (01)	0.07 (01)
0.38 (01)	0.41 (02)	0.18 (02)	0.13 (01)	0.20 (01)
54.33 (32)	54.11 (46)	53.32 (56)	53.86 (46)	54.95 (23)
0.10 (03)	0.13 (01)	0.00 (01)	0.28 (01)	0.43 (01)
0.06 (05)	0.09 (01)	0.47 (08)	0.01 (01)	0.03 (04)
0.00 (00)	0.02 (01)	0.82 (18)	0.00 (00)	0.01 (02)
0.18 (02)	0.20 (01)	0.17 (02)	0.21 (02)	0.17 (05)
3.62 (17)	4.15 (24)	1.63 (42)	2.75 (18)	3.22 (13)
0.03 (01)	0.00 (00)	0.58 (09)	0.08 (02)	0.04 (02)
98.81	98.96	98.51	97.61	99.67
Hex	Hex	Hex	Hex	Hex
9.372 (5)	9.358 (5)	9.403 (5)	9.373 (5)	9.375 (5)
6.892 (6)	6.878 (6)	6.869 (6)	6.881 (6)	6.884 (6)
524.25 (60)	521.67 (60)	526.03 (61)	523.56 (60)	524.05 (60)
37.35 (13)	37.19 (12)	37.03 (13)	37.21 (13)	37.26 (13)
1.65 (3)	1.71 (3)	2.45 (4)	1.89 (2)	1.87 (3)