

AM-86-297

Mineralogy and radiation effects of microlite from the Harding pegmatite,
Taos County, New Mexico

G. R. Lumpkin, B. C. Chakoumakos, and R. C. Ewing

Table 1 for deposit

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Table 1. Structural formulas, calculated dose and displacements per atom for 217 Harding pegmatite microlites, arranged by lithologic unit. All Fe and U are assumed to be Fe²⁺ and U⁶⁺, respectively. ZrO₂, Fe₂O₃, UO₂, U₃O₈, La₂O₃, Pr₂O₃, Nd₂O₃, Sm₂O₃, SrO, K₂O, OH, and H₂O were not determined. See text for further explanation.

Quartz-Lath Spodumene Zone

OXIDE	WT %	MOL WT	ATOMS
WO3	0.27	231.80	0.006 W
Ta2O5	75.10	220.90	1.763 Ta
Nb2O5	5.66	132.90	0.221 Nb
TiO2	0.13	79.90	0.008 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.04	150.70	0.001 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.12	264.00	0.002 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.00	286.00	0.000 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.12	112.90	0.006 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.26	164.10	0.008 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.05	145.70	0.002 Sb+3
Bi2O3	0.11	233.00	0.002 Bi+3
MnO	0.12	70.94	0.009 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.90	56.08	1.101 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.00	223.20	0.000 Pb+2
Na2O	4.12	30.99	0.690 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.02	140.90	0.001 Cs
F	2.97	19.00	0.811 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.99		6.079 O
LESS O=F	1.25		
TOTAL	99.74		

A B O (O OH F) . 0.00 H2O
 1.82 2.0 6.00 0.08 0.00 0.81

(O + OH + F) = 0.89 Vacancies: 0.18 A 0.11 Y
 Dose (alphas/mg) = 0.000E+00 DPA (displacements/atom) = 0.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Mn+2,Ce ,Y ,Bi+3,Th ,Sb+3,K ,Nd ,Sm ,Pr
 Mean A valence = 1.63

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
W03	0.27	231.80	0.006 W
Ta205	75.80	220.90	1.771 Ta
Nb205	5.69	132.90	0.221 Nb
Ti02	0.03	79.90	0.002 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.07	264.00	0.001 Th
U02	0.00	270.00	0.000 U+4
U03	0.00	286.00	0.000 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.13	112.90	0.006 Y
La203	0.00	162.90	0.000 La
Ce203	0.11	164.10	0.003 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.06	145.70	0.002 Sb+3
Bi203	0.06	233.00	0.001 Bi+3
MnO	0.11	70.94	0.008 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.90	56.08	1.095 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.00	223.20	0.000 Pb+2
Na2O	4.20	30.99	0.700 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.05	140.90	0.002 Cs
F	2.73	19.00	0.742 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.21		6.107 O
LESS O=F	1.15		
TOTAL	100.06		

A B O (O OH F) . 0.00 H2O
 1.82 2.0 6.00 0.11 0.00 0.74

(O + OH + F) = 0.85 Vacancies: 0.18 A 0.15 Y
 Dose (alphas/mg) = 0.000E+00 DPA (displacements/atom) = 0.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Mn+2,Y ,Ce ,Sb+3,Th ,Bi+3,K ,Nd ,Sm ,La
 Mean A valence = 1.62

B = Ta ,Nb ,W ,Ti ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.13	231.80	0.003	W
Ta2O5	74.70	220.90	1.764	Ta
Nb2O5	5.89	132.90	0.231	Nb
TiO2	0.01	79.90	0.001	Ti
ZrO2	0.00	123.20	0.000	Zr
SnO2	0.03	150.70	0.001	Sn
Fe2O3	0.00	159.70	0.000	Fe+3
ThO2	0.04	264.00	0.001	Th
UO2	0.00	270.00	0.000	U+4
UO3	0.00	286.00	0.000	U+6
U3O8	0.00	842.00	0.000	U+8
Y2O3	0.07	112.90	0.003	Y
La2O3	0.00	162.90	0.000	La
Ce2O3	0.14	164.10	0.004	Ce
Pr2O3	0.00	164.90	0.000	Pr
Nd2O3	0.00	168.20	0.000	Nd
Sm2O3	0.00	174.40	0.000	Sm
Sb2O3	0.08	145.70	0.003	Sb+3
Bi2O3	0.21	233.00	0.005	Bi+3
MnO	0.18	70.94	0.013	Mn+2
FeO	0.00	71.85	0.000	Fe+2
CaO	11.90	56.08	1.107	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.00	153.30	0.000	Ba
PbO	0.03	223.20	0.001	Pb+2
Na2O	4.19	30.99	0.705	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.03	140.90	0.001	Cs
F	2.70	19.00	0.741	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	100.33		6.129	O
LESS O=F	1.13			
TOTAL	99.20			

A B O (O OH F) . 0.00 H2O
 1.84 2.0 6.00 0.13 0.00 0.74

(O + OH + F) = 0.87 Vacancies: 0.16 A 0.13 Y
 Dose (alphas/mg) = 0.000E+00 DPA (displacements/atom) = 0.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Mn+2,Bi+3,Ce ,Y ,Sb+3,Th ,Pb+2,K ,Sm ,La
 Mean A valence = 1.63

B = Ta ,Nb ,W ,Sn ,Ti ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
W03	0.13	231.80	0.003 W
Ta205	74.70	220.90	1.761 Ta
Nb205	5.74	132.90	0.225 Nb
Ti02	0.17	79.90	0.011 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.04	264.00	0.001 Th
U02	0.00	270.00	0.000 U+4
U03	0.00	286.00	0.000 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.09	112.90	0.004 Y
La203	0.00	162.90	0.000 La
Ce203	0.25	164.10	0.008 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.07	145.70	0.003 Sb+3
Bi203	0.23	233.00	0.005 Bi+3
Mn0	0.06	70.94	0.004 Mn+2
Fe0	0.00	71.85	0.000 Fe+2
Ca0	11.90	56.08	1.105 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	0.00	223.20	0.000 Pb+2
Na20	4.20	30.99	0.706 Na
K20	0.00	47.10	0.000 K
Cs20	0.02	140.90	0.001 Cs
F	2.75	19.00	0.754 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	100.35		6.113 O
LESS O=F	1.15		
TOTAL	99.19		

A B O (O OH F) . 0.00 H2O
 1.84 2.0 6.00 0.11 0.00 0.75

(O + OH + F) = 0.87 Vacancies: 0.16 A 0.13 Y
 Dose (alphas/mg) = 0.000E+00 DPA (displacements/atom) = 0.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Ce ,Bi+3,Mn+2,Y ,Sb+3,Th ,K ,Nd ,Sm ,U+6
 Mean A valence = 1.63

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.07	231.80	0.002 W
Ta2O5	76.00	220.90	1.820 Ta
Nb2O5	3.88	132.90	0.154 Nb
TiO2	0.36	79.90	0.024 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.02	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.68	286.00	0.013 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.09	112.90	0.004 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.19	164.10	0.006 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.10	145.70	0.004 Sb+3
Bi2O3	0.06	233.00	0.001 Bi+3
MnO	0.11	70.94	0.008 Mn+2
FeO	0.03	71.85	0.002 Fe+2
CaO	12.30	56.08	1.160 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.04	153.30	0.001 Ba
PbO	0.02	223.20	0.000 Pb+2
Na2O	3.39	30.99	0.579 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.13	19.00	0.593 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.47		6.216 O
LESS O=F	0.89		
TOTAL	98.57		

A B O (O OH F) . 0.00 H2O
 1.78 2.0 6.00 0.22 0.00 0.59

(O + OH + F) = 0.81 Vacancies: 0.22 A 0.19 Y
 Dose (alphas/mg) = 0.276E+17 DPA (displacements/atom) = 3.5

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Ce ,Y ,Sb+3,Fe+2,Ba ,Bi+3,Pb+2,Th
 Mean A valence = 1.71

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.99

OXIDE	WT %	MOL WT	ATOMS
W03	0.10	231.80	0.002 W
Ta205	76.90	220.90	1.809 Ta
Nb205	4.45	132.90	0.174 Nb
Ti02	0.22	79.90	0.014 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.72	286.00	0.013 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.11	112.90	0.005 Y
La203	0.00	162.90	0.000 La
Ce203	0.13	164.10	0.004 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.12	145.70	0.004 Sb+3
Bi203	0.02	233.00	0.000 Bi+3
MnO	0.06	70.94	0.004 Mn+2
FeO	0.02	71.85	0.001 Fe+2
CaO	12.40	56.08	1.149 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.02	153.30	0.001 Ba
PbO	0.02	223.20	0.000 Pb+2
Na2O	3.29	30.99	0.552 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.02	140.90	0.001 Cs
F	2.29	19.00	0.626 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.89		6.173 O
LESS O=F	0.96		
TOTAL	99.93		

A B O (O OH F) . 0.00 H2O
 1.74 2.0 6.00 0.17 0.00 0.63

(O + OH + F) = 0.80 Vacancies: 0.26 A 0.20 Y
 Dose (alphas/mg) = 0.289E+17 DPA (displacements/atom) = 3.6

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Y ,Mn+2,Sb+3,Ce ,Fe+2,Ba ,Pb+2,Bi+3,K
 Mean A valence = 1.72

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.99

OXIDE	WT %	MOL WT	ATOMS
WO3	0.03	231.80	0.001 W
Ta2O5	75.90	220.90	1.772 Ta
Nb2O5	5.70	132.90	0.221 Nb
TiO2	0.09	79.90	0.006 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.60	286.00	0.011 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.11	112.90	0.005 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.11	164.10	0.003 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.11	145.70	0.004 Sb+3
Bi2O3	0.03	233.00	0.001 Bi+3
MnO	0.03	70.94	0.002 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	12.10	56.08	1.113 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.03	223.20	0.001 Pb+2
Na2O	3.58	30.99	0.596 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.50	19.00	0.679 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.92		6.124 O
LESS O=F	1.05		
TOTAL	99.87		

A B O (O OH F) . 0.00 H2O
 1.74 2.0 6.00 0.12 0.00 0.68

(O + OH + F) = 0.80 Vacancies: 0.26 A 0.20 Y
 Dose (alphas/mg) = 0.242E+17 DPA (displacements/atom) = 3.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Y ,Sb+3,Ce ,Mn+2,Pb+2,Bi+3,K ,Sm ,U+8
 Mean A valence = 1.69

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
W03	0.02	231.80	0.000 W
Ta205	74.90	220.90	1.797 Ta
Nb205	5.00	132.90	0.199 Nb
Ti02	0.04	79.90	0.003 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.56	286.00	0.010 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.11	112.90	0.005 Y
La203	0.00	162.90	0.000 La
Ce203	0.14	164.10	0.005 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.06	145.70	0.002 Sb+3
Bi203	0.02	233.00	0.000 Bi+3
MnO	0.05	70.94	0.004 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.70	56.08	1.106 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.05	153.30	0.002 Ba
PbO	0.03	223.20	0.001 Pb+2
Na2O	4.04	30.99	0.691 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.01	140.90	0.000 Cs
F	2.74	19.00	0.764 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.47		6.124 O
LESS O=F	1.15		
TOTAL	98.32		

A B O (O OH F) . 0.00 H2O
 1.83 2.0 6.00 0.12 0.00 0.76

(O + OH + F) = 0.89 Vacancies: 0.17 A 0.11 Y
 Dose (alphas/mg) = 0.229E+17 DPA (displacements/atom) = 2.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Y ,Ce ,Mn+2,Sb+3,Ba ,Pb+2,Bi+3,K ,U+8
 Mean A valence = 1.65

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.00	231.80	0.000 W
Ta2O5	74.80	220.90	1.774 Ta
Nb2O5	5.13	132.90	0.202 Nb
TiO2	0.37	79.90	0.024 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.88	286.00	0.016 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.10	112.90	0.005 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.03	164.10	0.001 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.12	145.70	0.004 Sb+3
Bi2O3	0.04	233.00	0.001 Bi+3
MnO	0.13	70.94	0.010 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	12.60	56.08	1.177 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.02	223.20	0.000 Pb+2
Na2O	3.05	30.99	0.515 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.21	19.00	0.609 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.48		6.192 O
LESS O=F	0.93		
TOTAL	98.55		

A B O (O OH F) . 0.00 H2O
 1.73 2.0 6.00 0.19 0.00 0.61

(O + OH + F) = 0.80 Vacancies: 0.27 A 0.20 Y
 Dose (alphas/mg) = 0.357E+17 DPA (displacements/atom) = 4.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Y ,Sb+3,Ce ,Bi+3,Pb+2,K ,Sm ,La
 Mean A valence = 1.75

B = Ta ,Nb ,Ti ,Sn ,W ,Zr ,Fe+3
 Mean B valence = 4.99

OXIDE	WT %	MOL WT	ATOMS
WO3	0.00	231.80	0.000 W
Ta2O5	74.90	220.90	1.764 Ta
Nb2O5	5.86	132.90	0.229 Nb
TiO2	0.10	79.90	0.007 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.78	286.00	0.014 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.08	112.90	0.004 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.24	164.10	0.008 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.08	145.70	0.003 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.05	70.94	0.004 Mn+2
FeO	0.01	71.85	0.001 Fe+2
CaO	11.40	56.08	1.058 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.01	223.20	0.000 Pb+2
Na2O	4.41	30.99	0.740 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.70	19.00	0.739 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.62		6.124 O
LESS O=F	1.13		
TOTAL	99.49		

A B O (O OH F) . 0.00 H2O
 1.83 2.0 6.00 0.12 0.00 0.74

(O + OH + F) = 0.86 Vacancies: 0.17 A 0.14 Y
 Dose (alphas/mg) = 0.316E+17 DPA (displacements/atom) = 3.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Ce ,Y ,Mn+2,Sb+3,Fe+2,Pb+2,K ,Sm ,U+8
 Mean A valence = 1.63

B = Ta ,Nb ,Ti ,Sn ,W ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
W03	0.00	231.80	0.000 W
Ta205	75.10	220.90	1.769 Ta
Nb205	5.88	132.90	0.230 Nb
Ti02	0.02	79.90	0.001 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.62	286.00	0.011 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.09	112.90	0.004 Y
La203	0.00	162.90	0.000 La
Ce203	0.11	164.10	0.003 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.09	145.70	0.003 Sb+3
Bi203	0.06	233.00	0.001 Bi+3
MnO	0.00	70.94	0.000 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.50	56.08	1.067 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.01	153.30	0.000 Ba
PbO	0.02	223.20	0.000 Pb+2
Na2O	4.32	30.99	0.725 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.68	19.00	0.734 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.50		6.115 O
LESS O=F	1.13		
TOTAL	99.38		

A B O (O OH F) . 0.00 H2O
 1.82 2.0 6.00 0.11 0.00 0.73

(O + OH + F) = 0.85 Vacancies: 0.18 A 0.15 Y
 Dose (alphas/mg) = 0.252E+17 DPA (displacements/atom) = 3.1

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Y ,Ce ,Sb+3,Bi+3,Pb+2,Ba ,K ,Sm ,La
 Mean A valence = 1.63

B = Ta ,Nb ,Ti ,Sn ,W ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
W ₃	0.00	231.80	0.000 W
Ta ₂ O ₅	75.30	220.90	1.767 Ta
Nb ₂ O ₅	5.91	132.90	0.231 Nb
TiO ₂	0.02	79.90	0.001 Ti
ZrO ₂	0.00	123.20	0.000 Zr
SnO ₂	0.03	150.70	0.001 Sn
Fe ₂ O ₃	0.00	159.70	0.000 Fe+3
ThO ₂	0.00	264.00	0.000 Th
UO ₂	0.00	270.00	0.000 U+4
UO ₃	0.55	286.00	0.010 U+6
U ₃ O ₈	0.00	842.00	0.000 U+8
Y ₂ O ₃	0.06	112.90	0.003 Y
La ₂ O ₃	0.00	162.90	0.000 La
Ce ₂ O ₃	0.03	164.10	0.001 Ce
Pr ₂ O ₃	0.00	164.90	0.000 Pr
Nd ₂ O ₃	0.00	168.20	0.000 Nd
Sm ₂ O ₃	0.00	174.40	0.000 Sm
Sb ₂ O ₃	0.05	145.70	0.002 Sb+3
Bi ₂ O ₃	0.01	233.00	0.000 Bi+3
MnO	0.06	70.94	0.004 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.50	56.08	1.063 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.02	223.20	0.000 Pb+2
Na ₂ O	4.37	30.99	0.731 Na
K ₂ O	0.00	47.10	0.000 K
Cs ₂ O	0.00	140.90	0.000 Cs
F	2.86	19.00	0.780 F
H ₂ O+	0.00	9.01	0.000 OH
H ₂ O-	0.00	18.02	0.000 H ₂ O
TOTAL	100.77		6.081 O
LESS O=F	1.20		
TOTAL	99.57		

A B O (O OH F) . 0.00 H₂O
 1.81 2.0 6.00 0.08 0.00 0.78

(O + OH + F) = 0.86 Vacancies: 0.19 A 0.14 Y
 Dose (alphas/mg) = 0.222E+17 DPA (displacements/atom) = 2.7

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Y ,Sb+3,Ce ,Pb+2,Bi+3,K ,Sm ,La
 Mean A valence = 1.62

B = Ta ,Nb ,Ti ,Sn ,W ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
W03	0.05	231.80	0.001 W
Ta205	75.80	220.90	1.885 Ta
Nb205	2.56	132.90	0.106 Nb
Ti02	0.12	79.90	0.008 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.03	264.00	0.001 Th
U02	0.00	270.00	0.000 U+4
U03	3.24	286.00	0.062 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.08	112.90	0.004 Y
La203	0.00	162.90	0.000 La
Ce203	0.15	164.10	0.005 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.12	145.70	0.005 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
Mn0	0.56	70.94	0.043 Mn+2
Fe0	0.01	71.85	0.001 Fe+2
Ca0	10.70	56.08	1.048 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	0.05	223.20	0.001 Pb+2
Na20	3.88	30.99	0.688 Na
K20	0.00	47.10	0.000 K
Cs20	0.04	140.90	0.002 Cs
F	1.87	19.00	0.541 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	99.26		6.372 O
LESS O=F	0.79		
TOTAL	98.48		

A B O (O OH F) . 0.00 H2O
 1.86 2.0 6.00 0.37 0.00 0.54

(O + OH + F) = 0.91 Vacancies: 0.14 A 0.09 Y
 Dose (alphas/mg) = 0.132E+18 DPA (displacements/atom) = 17.1

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Ce ,Sb+3,Y ,Pb+2,Fe+2,Th ,K ,La
 Mean A valence = 1.77

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.00	231.80	0.000 W
Ta2O5	73.10	220.90	1.868 Ta
Nb2O5	3.04	132.90	0.129 Nb
TiO2	0.04	79.90	0.003 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	2.74	286.00	0.054 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.08	112.90	0.004 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.19	164.10	0.007 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.13	145.70	0.005 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.72	70.94	0.057 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	12.60	56.08	1.268 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.02	223.20	0.001 Pb+2
Na2O	3.28	30.99	0.597 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.03	140.90	0.001 Cs
F	2.00	19.00	0.594 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	97.97		6.513 O
LESS O=F	0.84		
TOTAL	97.13		

A B O (O OH F) . 0.00 H2O
 1.99 2.0 6.00 0.51 0.00 0.59

(O + OH + F) = 1.11 Vacancies: 0.01 A -.11 Y
 Dose (alphas/mg) = 0.113E+18 DPA (displacements/atom) = 14.6

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Mn+2,U+6 ,Ce ,Sb+3,Y ,Pb+2,K ,Nd ,Sm ,La
 Mean A valence = 1.82

B = Ta ,Nb ,Ti ,Sn ,W ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.10	231.80	0.002 W
Ta2O5	74.60	220.90	1.835 Ta
Nb2O5	3.99	132.90	0.163 Nb
TiO2	0.00	79.90	0.000 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.07	264.00	0.001 Th
UO2	0.00	270.00	0.000 U+4
UO3	2.27	286.00	0.043 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.07	112.90	0.003 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.07	164.10	0.002 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.11	145.70	0.004 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.14	70.94	0.011 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.80	56.08	1.143 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.02	223.20	0.000 Pb+2
Na2O	3.88	30.99	0.680 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.03	140.90	0.001 Cs
F	1.92	19.00	0.549 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.07		6.368 O
LESS O=F	0.81		
TOTAL	98.26		

A B O (O OH F) . 0.00 H2O
 1.89 2.0 6.00 0.37 0.00 0.55

(O + OH + F) = 0.92 Vacancies: 0.11 A 0.08 Y
 Dose (alphas/mg) = 0.924E+17 DPA (displacements/atom) = 11.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Sb+3,Y ,Ce ,Th ,Pb+2,K ,Sm ,La
 Mean A valence = 1.74

B = Ta ,Nb ,W ,Sn ,Ti ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.00	231.80	0.000 W
Ta2O5	72.90	220.90	1.764 Ta
Nb2O5	5.81	132.90	0.234 Nb
TiO2	0.02	79.90	0.001 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.02	150.70	0.001 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	1.90	286.00	0.035 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.08	112.90	0.004 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.06	164.10	0.002 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.07	145.70	0.003 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.55	70.94	0.041 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.90	56.08	1.134 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.01	223.20	0.000 Pb+2
Na2O	3.82	30.99	0.659 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.03	140.90	0.001 Cs
F	2.06	19.00	0.580 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.23		6.334 O
LESS O=F	0.87		
TOTAL	98.36		

A B O (O OH F) . 0.00 H2O
 1.88 2.0 6.00 0.33 0.00 0.58

(O + OH + F) = 0.91 Vacancies: 0.12 A 0.09 Y
 Dose (alphas/mg) = 0.772E+17 DPA (displacements/atom) = 9.7

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Mn+2,U+6 ,Y ,Sb+3,Ce ,Pb+2,K ,Nd ,Sm ,La
 Mean A valence = 1.73

B = Ta ,Nb ,Ti ,Sn ,W ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.05	231.80	0.001 W
Ta2O5	73.80	220.90	1.796 Ta
Nb2O5	5.01	132.90	0.203 Nb
TiO2	0.00	79.90	0.000 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.06	264.00	0.001 Th
UO2	0.00	270.00	0.000 U+4
UO3	2.38	286.00	0.045 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.07	112.90	0.003 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.04	164.10	0.001 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.11	145.70	0.004 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.02	70.94	0.002 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	10.40	56.08	0.997 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.01	223.20	0.000 Pb+2
Na2O	4.50	30.99	0.781 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.05	140.90	0.002 Cs
F	1.98	19.00	0.560 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.48		6.260 O
LESS O=F	0.83		
TOTAL	97.65		

A B O (O OH F) . 0.00 H2O
 1.84 2.0 6.00 0.26 0.00 0.56

(O + OH + F) = 0.82 Vacancies: 0.16 A 0.18 Y
 Dose (alphas/mg) = 0.978E+17 DPA (displacements/atom) = 12.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Y ,Mn+2,Ce ,Th ,Pb+2,K ,Sm ,U+8
 Mean A valence = 1.68

B = Ta ,Nb ,W ,Sn ,Ti ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.15	231.80	0.003 W
Ta2O5	73.40	220.90	1.773 Ta
Nb2O5	5.54	132.90	0.222 Nb
TiO2	0.01	79.90	0.001 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.01	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.03	264.00	0.001 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.86	286.00	0.016 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.07	112.90	0.003 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.05	164.10	0.002 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.10	145.70	0.004 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.01	70.94	0.001 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.20	56.08	1.066 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.00	223.20	0.000 Pb+2
Na2O	4.91	30.99	0.845 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.02	140.90	0.001 Cs
F	2.41	19.00	0.677 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.77		6.214 O
LESS O=F	1.01		
TOTAL	97.76		

A B O (O OH F) . 0.00 H2O
 1.94 2.0 6.00 0.21 0.00 0.68

(O + OH + F) = 0.89 Vacancies: 0.06 A 0.11 Y
 Dose (alphas/mg) = 0.352E+17 DPA (displacements/atom) = 4.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Y ,Ce ,Mn+2,Th ,K ,Nd ,Sm ,U+8
 Mean A valence = 1.60

B = Ta ,Nb ,W ,Ti ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
W03	0.08	231.80	0.002 W
Ta205	72.80	220.90	1.762 Ta
Nb205	5.87	132.90	0.236 Nb
Ti02	0.00	79.90	0.000 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.01	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.90	286.00	0.017 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.07	112.90	0.003 Y
La203	0.00	162.90	0.000 La
Ce203	0.10	164.10	0.003 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.10	145.70	0.004 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.02	70.94	0.002 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.30	56.08	1.077 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.01	223.20	0.000 Pb+2
Na2O	4.71	30.99	0.813 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.03	140.90	0.001 Cs
F	2.38	19.00	0.670 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.38		6.218 O
LESS O=F	1.00		
TOTAL	97.38		

A B O (O OH F) . 0.00 H2O
 1.92 2.0 6.00 0.22 0.00 0.67

(O + OH + F) = 0.89 Vacancies: 0.08 A 0.11 Y
 Dose (alphas/mg) = 0.370E+17 DPA (displacements/atom) = 4.5

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Y ,Ce ,Mn+2,Pb+2,Th ,K ,Sm ,U+8
 Mean A valence = 1.62

B = Ta ,Nb ,W ,Sn ,Ti ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.16	231.80	0.004 W
Ta2O5	67.70	220.90	1.608 Ta
Nb2O5	9.35	132.90	0.369 Nb
TiO2	0.30	79.90	0.020 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	2.18	286.00	0.040 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.00	112.90	0.000 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.21	164.10	0.007 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.31	145.70	0.011 Sb+3
Bi2O3	0.20	233.00	0.005 Bi+3
MnO	0.10	70.94	0.007 Mn+2
FeO	0.04	71.85	0.003 Fe+2
CaO	11.00	56.08	1.029 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.03	223.20	0.001 Pb+2
Na2O	4.68	30.99	0.792 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.33	19.00	0.643 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.59		6.260 O
LESS O=F	0.98		
TOTAL	97.61		

A B O (O OH F) . 0.00 H2O
 1.89 2.0 6.00 0.26 0.00 0.64

(O + OH + F) = 0.90 Vacancies: 0.11 A 0.10 Y
 Dose (alphas/mg) = 0.896E+17 DPA (displacements/atom) = 10.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Mn+2,Ce ,Bi+3,Fe+2,Pb+2,K ,Sm ,U+8
 Mean A valence = 1.68

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.99

OXIDE	WT %	MOL WT	ATOMS
WO3	0.31	231.80	0.007 W
Ta2O5	73.30	220.90	1.781 Ta
Nb2O5	4.97	132.90	0.201 Nb
TiO2	0.17	79.90	0.011 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	1.86	286.00	0.035 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.00	112.90	0.000 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.12	164.10	0.004 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.19	145.70	0.007 Sb+3
Bi2O3	0.25	233.00	0.006 Bi+3
MnO	0.13	70.94	0.010 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	10.10	56.08	0.966 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.00	223.20	0.000 Pb+2
Na2O	4.88	30.99	0.845 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.04	140.90	0.002 Cs
F	2.28	19.00	0.644 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.60		6.205 O
LESS O=F	0.96		
TOTAL	97.65		

A B O (O OH F) . 0.00 H2O
 1.87 2.0 6.00 0.21 0.00 0.64

(O + OH + F) = 0.85 Vacancies: 0.13 A 0.15 Y
 Dose (alphas/mg) = 0.765E+17 DPA (displacements/atom) = 9.5

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2 ,Sb+3 ,Bi+3 ,Ce ,K ,Pr ,Nd ,Sm ,Y
 Mean A valence = 1.63

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.30	231.80	0.007 W
Ta2O5	72.80	220.90	1.785 Ta
Nb2O5	4.96	132.90	0.202 Nb
TiO2	0.08	79.90	0.005 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	1.62	286.00	0.031 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.00	112.90	0.000 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.19	164.10	0.006 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.20	145.70	0.007 Sb+3
Bi2O3	0.28	233.00	0.007 Bi+3
MnO	0.12	70.94	0.009 Mn+2
FeO	0.15	71.85	0.011 Fe+2
CaO	10.30	56.08	0.995 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.00	223.20	0.000 Pb+2
Na2O	4.89	30.99	0.855 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.03	140.90	0.001 Cs
F	2.37	19.00	0.676 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.29		6.229 O
LESS O=F	1.00		
TOTAL	97.30		

A B O (O OH F) . 0.00 H2O
 1.92 2.0 6.00 0.23 0.00 0.68

(O + OH + F) = 0.90 Vacancies: 0.08 A 0.10 Y
 Dose (alphas/mg) = 0.667E+17 DPA (displacements/atom) = 8.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Mn+2,Sb+3,Bi+3,Ce ,K ,Nd ,Sm ,La
 Mean A valence = 1.63

B = Ta ,Nb ,W ,Ti ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
W03	0.20	231.80	0.005 W
Ta205	73.50	220.90	1.749 Ta
Nb205	6.21	132.90	0.246 Nb
Ti02	0.02	79.90	0.001 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	1.28	286.00	0.024 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.00	112.90	0.000 Y
La203	0.00	162.90	0.000 La
Ce203	0.24	164.10	0.008 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.19	145.70	0.007 Sb+3
Bi203	0.16	233.00	0.004 Bi+3
MnO	0.00	70.94	0.000 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	10.00	56.08	0.937 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.00	223.20	0.000 Pb+2
Na2O	5.21	30.99	0.884 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.02	140.90	0.001 Cs
F	2.36	19.00	0.653 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.39		6.152 O
LESS O=F	0.99		
TOTAL	98.40		

A B O (O OH F) . 0.00 H2O
 1.86 2.0 6.00 0.15 0.00 0.65

(O + OH + F) = 0.81 Vacancies: 0.14 A 0.19 Y
 Dose (alphas/mg) = 0.522E+17 DPA (displacements/atom) = 6.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Ce ,Sb+3,Bi+3,K ,U+8 ,Pr ,Nd ,Sm ,Y
 Mean A valence = 1.59

B = Ta ,Nb ,W ,Ti ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
W03	0.37	231.80	0.008 W
Ta205	73.60	220.90	1.747 Ta
Nb205	6.16	132.90	0.243 Nb
Ti02	0.02	79.90	0.001 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.58	286.00	0.011 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.00	112.90	0.000 Y
La203	0.00	162.90	0.000 La
Ce203	0.21	164.10	0.007 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.20	145.70	0.007 Sb+3
Bi203	0.19	233.00	0.004 Bi+3
MnO	0.04	70.94	0.003 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	10.30	56.08	0.963 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.03	223.20	0.001 Pb+2
Na2O	5.09	30.99	0.861 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.05	140.90	0.002 Cs
F	2.65	19.00	0.731 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.49		6.096 O
LESS O=F	1.11		
TOTAL	98.38		

A B O (O OH F) . 0.00 H2O
 1.86 2.0 6.00 0.10 0.00 0.73

(O + OH + F) = 0.83 Vacancies: 0.14 A 0.17 Y
 Dose (alphas/mg) = 0.237E+17 DPA (displacements/atom) = 2.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Ce ,Bi+3,Mn+2,Pb+2,K ,Nd ,Sm ,U+8
 Mean A valence = 1.57

B = Ta ,Nb ,W ,Ti ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
W03	0.07	231.80	0.002 W
Ta205	74.60	220.90	1.754 Ta
Nb205	6.23	132.90	0.244 Nb
Ti02	0.01	79.90	0.001 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.01	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.07	286.00	0.001 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.00	112.90	0.000 Y
La203	0.00	162.90	0.000 La
Ce203	0.23	164.10	0.007 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.23	145.70	0.008 Sb+3
Bi203	0.25	233.00	0.006 Bi+3
Mn0	0.05	70.94	0.004 Mn+2
Fe0	0.00	71.85	0.000 Fe+2
Ca0	10.60	56.08	0.982 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	0.00	223.20	0.000 Pb+2
Na20	5.33	30.99	0.893 Na
K20	0.00	47.10	0.000 K
Cs20	0.04	140.90	0.001 Cs
F	2.84	19.00	0.776 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	100.56		6.081 O
LESS O=F	1.19		
TOTAL	99.37		

A B O (O OH F) . 0.00 H2O
 1.90 2.0 6.00 0.08 0.00 0.78

(O + OH + F) = 0.86 Vacancies: 0.10 A 0.14 Y
 Dose (alphas/mg) = 0.299E+16 DPA (displacements/atom) = 0.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Sb+3,Ce ,Bi+3,Mn+2,U+6 ,Th ,K ,Nd ,Sm ,U+8
 Mean A valence = 1.54

B = Ta ,Nb ,W ,Ti ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.14	231.80	0.003 W
Ta2O5	75.10	220.90	1.758 Ta
Nb2O5	6.08	132.90	0.237 Nb
TiO2	0.03	79.90	0.002 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.06	286.00	0.001 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.00	112.90	0.000 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.25	164.10	0.008 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.17	145.70	0.006 Sb+3
Bi2O3	0.12	233.00	0.003 Bi+3
MnO	0.03	70.94	0.002 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	10.70	56.08	0.987 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.00	223.20	0.000 Pb+2
Na2O	5.28	30.99	0.881 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.04	140.90	0.001 Cs
F	3.23	19.00	0.879 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.23		6.020 O
LESS O=F	1.36		
TOTAL	99.88		

A B O (O OH F) . 0.00 H2O
 1.89 2.0 6.00 0.02 0.00 0.88

(O + OH + F) = 0.90 Vacancies: 0.11 A 0.10 Y
 Dose (alphas/mg) = 0.255E+16 DPA (displacements/atom) = 0.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Ce ,Sb+3,Bi+3,Mn+2,U+6 ,K ,Pr ,Nd ,Sm ,U+8
 Mean A valence = 1.54

B = Ta ,Nb ,W ,Ti ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.22	231.80	0.005 W
Ta2O5	73.30	220.90	1.731 Ta
Nb2O5	6.57	132.90	0.258 Nb
TiO2	0.10	79.90	0.007 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.66	286.00	0.012 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.10	112.90	0.005 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.10	164.10	0.003 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.20	145.70	0.007 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.06	70.94	0.004 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	10.90	56.08	1.014 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.04	223.20	0.001 Pb+2
Na2O	4.90	30.99	0.825 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.41	19.00	0.662 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.56		6.158 O
LESS O=F	1.01		
TOTAL	98.54		

A B O (O OH F) . 0.00 H2O
 1.87 2.0 6.00 0.16 0.00 0.66

(O + OH + F) = 0.82 Vacancies: 0.13 A 0.18 Y
 Dose (alphas/mg) = 0.267E+17 DPA (displacements/atom) = 3.2

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Y ,Mn+2,Ce ,Pb+2,K ,Nd ,Sm ,U+8
 Mean A valence = 1.59

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.13	231.80	0.003 W
Ta2O5	73.70	220.90	1.735 Ta
Nb2O5	6.62	132.90	0.259 Nb
TiO2	0.04	79.90	0.003 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.01	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.57	286.00	0.010 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.06	112.90	0.003 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.31	164.10	0.010 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.16	145.70	0.006 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.13	70.94	0.010 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	10.80	56.08	1.002 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.04	223.20	0.001 Pb+2
Na2O	4.99	30.99	0.837 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.59	19.00	0.709 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.15		6.135 O
LESS O=F	1.09		
TOTAL	99.06		

A B O (O OH F) . 0.00 H2O
 1.88 2.0 6.00 0.13 0.00 0.71

(O + OH + F) = 0.84 Vacancies: 0.12 A 0.16 Y
 Dose (alphas/mg) = 0.231E+17 DPA (displacements/atom) = 2.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Ce ,Mn+2,Sb+3,Y ,Pb+2,K ,Nd ,Sm ,La
 Mean A valence = 1.59

B = Ta ,Nb ,W ,Ti ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.44	231.80	0.010 W
Ta2O5	74.50	220.90	1.743 Ta
Nb2O5	6.28	132.90	0.244 Nb
TiO2	0.03	79.90	0.002 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.02	150.70	0.001 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.49	286.00	0.009 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.04	112.90	0.002 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.30	164.10	0.009 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.14	145.70	0.005 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.08	70.94	0.006 Mn+2
FeO	0.06	71.85	0.004 Fe+2
CaO	10.60	56.08	0.977 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.00	223.20	0.000 Pb+2
Na2O	5.19	30.99	0.866 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.01	140.90	0.000 Cs
F	2.56	19.00	0.696 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.74		6.126 O
LESS O=F	1.08		
TOTAL	99.66		

A B O (O OH F) . 0.00 H2O
 1.88 2.0 6.00 0.13 0.00 0.70

(O + OH + F) = 0.82 Vacancies: 0.12 A 0.18 Y
 Dose (alphas/mg) = 0.196E+17 DPA (displacements/atom) = 2.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Ce ,U+6 ,Mn+2,Sb+3,Fe+2,Y ,K ,Nd ,Sm ,La
 Mean A valence = 1.57

B = Ta ,Nb ,W ,Ti ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
W03	0.24	231.80	0.005 W
Ta205	75.00	220.90	1.764 Ta
Nb205	5.86	132.90	0.229 Nb
Ti02	0.01	79.90	0.001 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.01	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.32	286.00	0.006 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.07	112.90	0.003 Y
La203	0.00	162.90	0.000 La
Ce203	0.29	164.10	0.009 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.12	145.70	0.004 Sb+3
Bi203	0.05	233.00	0.001 Bi+3
MnO	0.09	70.94	0.007 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	10.40	56.08	0.964 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.03	223.20	0.001 Pb+2
Na2O	5.20	30.99	0.872 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.60	19.00	0.711 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.29		6.098 O
LESS O=F	1.09		
TOTAL	99.20		

A B O (O OH F) . 0.00 H2O
 1.87 2.0 6.00 0.10 0.00 0.71

(O + OH + F) = 0.81 Vacancies: 0.13 A 0.19 Y
 Dose (alphas/mg) = 0.128E+17 DPA (displacements/atom) = 1.6

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Ce ,Mn+2,U+6 ,Sb+3,Y ,Bi+3,Pb+2,K ,Sm ,La
 Mean A valence = 1.55

B = Ta ,Nb ,W ,Ti ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
W03	0.33	231.80	0.007 W
Ta205	74.90	220.90	1.750 Ta
Nb205	6.22	132.90	0.242 Nb
Ti02	0.02	79.90	0.001 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.05	264.00	0.001 Th
U02	0.00	270.00	0.000 U+4
U03	0.08	286.00	0.002 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.05	112.90	0.002 Y
La203	0.00	162.90	0.000 La
Ce203	0.20	164.10	0.006 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.21	145.70	0.007 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
Mn0	0.06	70.94	0.004 Mn+2
Fe0	0.01	71.85	0.001 Fe+2
Ca0	10.60	56.08	0.975 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	0.01	223.20	0.000 Pb+2
Na20	5.10	30.99	0.849 Na
K20	0.00	47.10	0.000 K
Cs20	0.02	140.90	0.001 Cs
F	3.16	19.00	0.858 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	101.02		6.010 O
LESS O=F	1.33		
TOTAL	99.70		

A B O (O OH F) . 0.00 H2O
 1.85 2.0 6.00 0.01 0.00 0.86

(O + OH + F) = 0.87 Vacancies: 0.15 A 0.13 Y
 Dose (alphas/mg) = 0.341E+16 DPA (displacements/atom) = 0.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Sb+3,Ce ,Mn+2,Y ,U+6 ,Th ,Fe+2,Pb+2,K ,U+8
 Mean A valence = 1.55

B = Ta ,Nb ,W ,Ti ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.08	231.80	0.002 W
Ta2O5	66.10	220.90	1.526 Ta
Nb2O5	10.80	132.90	0.414 Nb
TiO2	0.91	79.90	0.058 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	1.75	286.00	0.031 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.00	112.90	0.000 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.00	164.10	0.000 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.12	145.70	0.004 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.03	70.94	0.002 Mn+2
FeO	0.09	71.85	0.006 Fe+2
CaO	11.80	56.08	1.073 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.36	223.20	0.008 Pb+2
Na2O	4.53	30.99	0.745 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.28	19.00	0.612 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.85		6.228 O
LESS O=F	0.96		
TOTAL	97.89		

A B O (O OH F) . 0.00 H2O
 1.87 2.0 6.00 0.23 0.00 0.61

(O + OH + F) = 0.84 Vacancies: 0.13 A 0.16 Y
 Dose (alphas/mg) = 0.715E+17 DPA (displacements/atom) = 8.5

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Pb+2,Fe+2,Sb+3,Mn+2,K ,Pr ,Nd ,Sm ,La
 Mean A valence = 1.67

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.97

OXIDE	WT %	MOL WT	ATOMS
W03	0.14	231.80	0.003 W
Ta205	68.10	220.90	1.569 Ta
Nb205	10.10	132.90	0.387 Nb
Ti02	0.65	79.90	0.041 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	1.48	286.00	0.026 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.00	112.90	0.000 Y
La203	0.00	162.90	0.000 La
Ce203	0.00	164.10	0.000 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.15	145.70	0.005 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
Mn0	0.00	70.94	0.000 Mn+2
Fe0	0.00	71.85	0.000 Fe+2
Ca0	13.50	56.08	1.225 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	0.21	223.20	0.005 Pb+2
Na20	3.20	30.99	0.525 Na
K20	0.00	47.10	0.000 K
Cs20	0.00	140.90	0.000 Cs
F	2.05	19.00	0.549 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	99.58		6.286 O
LESS O=F	0.86		
TOTAL	98.72		

A B O (O OH F) . 0.00 H2O
 1.79 2.0 6.00 0.29 0.00 0.55

(O + OH + F) = 0.83 Vacancies: 0.21 A 0.17 Y
 Dose (alphas/mg) = 0.602E+17 DPA (displacements/atom) = 7.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Pb+2,K ,La ,Ce ,Pr ,Nd ,Sm ,U+8
 Mean A valence = 1.77

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.98

OXIDE	WT %	MOL WT	ATOMS
W03	0.30	231.80	0.007 W
Ta205	69.30	220.90	1.618 Ta
Nb205	9.03	132.90	0.350 Nb
Ti02	0.39	79.90	0.025 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	1.75	286.00	0.032 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.00	112.90	0.000 Y
La203	0.00	162.90	0.000 La
Ce203	0.00	164.10	0.000 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.09	145.70	0.003 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
Mn0	0.10	70.94	0.007 Mn+2
Fe0	0.01	71.85	0.001 Fe+2
Ca0	12.50	56.08	1.149 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	0.35	223.20	0.008 Pb+2
Na20	4.56	30.99	0.759 Na
K20	0.00	47.10	0.000 K
Cs20	0.00	140.90	0.000 Cs
F	2.47	19.00	0.670 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	100.85		6.300 O
LESS O=F	1.04		
TOTAL	99.81		

A B O (O OH F) . 0.00 H2O
 1.96 2.0 6.00 0.30 0.00 0.67

(O + OH + F) = 0.97 Vacancies: 0.04 A 0.03 Y
 Dose (alphas/mg) = 0.702E+17 DPA (displacements/atom) = 8.5

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Pb+2,Mn+2,Sb+3,Fe+2,K ,Pr ,Nd ,Sm ,La
 Mean A valence = 1.68

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.99

OXIDE	WT %	MOL WT	ATOMS
W03	0.24	231.80	0.005 W
Ta205	70.90	220.90	1.654 Ta
Nb205	8.05	132.90	0.312 Nb
Ti02	0.44	79.90	0.028 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	1.18	286.00	0.021 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.00	112.90	0.000 Y
La203	0.00	162.90	0.000 La
Ce203	0.00	164.10	0.000 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.12	145.70	0.004 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.03	70.94	0.002 Mn+2
FeO	0.09	71.85	0.006 Fe+2
CaO	11.80	56.08	1.084 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.34	223.20	0.008 Pb+2
Na2O	4.12	30.99	0.685 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.24	19.00	0.608 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.55		6.198 O
LESS O=F	0.94		
TOTAL	98.61		

A B O (O OH F) . 0.00 H2O
 1.81 2.0 6.00 0.20 0.00 0.61

(O + OH + F) = 0.81 Vacancies: 0.19 A 0.19 Y
 Dose (alphas/mg) = 0.478E+17 DPA (displacements/atom) = 5.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Pb+2,Fe+2,Sb+3,Mn+2,K ,Pr ,Nd ,Sm ,La
 Mean A valence = 1.67

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.99

OXIDE	WT %	MOL WT	ATOMS
WO3	0.21	231.80	0.005 W
Ta2O5	71.90	220.90	1.689 Ta
Nb2O5	6.94	132.90	0.271 Nb
TiO2	0.54	79.90	0.035 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	1.17	286.00	0.021 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.00	112.90	0.000 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.00	164.10	0.000 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.19	145.70	0.007 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.11	70.94	0.008 Mn+2
FeO	0.06	71.85	0.004 Fe+2
CaO	11.50	56.08	1.064 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.11	223.20	0.003 Pb+2
Na2O	3.97	30.99	0.665 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.38	19.00	0.650 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.08		6.145 O
LESS O=F	1.00		
TOTAL	98.08		

A B O (O OH F) . 0.00 H2O
 1.77 2.0 6.00 0.14 0.00 0.65

(O + OH + F) = 0.80 Vacancies: 0.23 A 0.20 Y
 Dose (alphas/mg) = 0.476E+17 DPA (displacements/atom) = 5.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Sb+3,Fe+2,Pb+2,K ,Pr ,Nd ,Sm ,Y
 Mean A valence = 1.68

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.98

OXIDE	WT %	MOL WT	ATOMS
W03	0.25	231.80	0.006 W
Ta2O5	72.80	220.90	1.727 Ta
Nb2O5	5.96	132.90	0.235 Nb
TiO2	0.50	79.90	0.033 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	1.29	286.00	0.024 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.00	112.90	0.000 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.00	164.10	0.000 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.19	145.70	0.007 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.14	70.94	0.010 Mn+2
FeO	0.05	71.85	0.004 Fe+2
CaO	11.80	56.08	1.102 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.22	223.20	0.005 Pb+2
Na2O	3.97	30.99	0.671 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.95	19.00	0.538 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.12		6.256 O
LESS O=F	0.82		
TOTAL	98.30		

A B O (O OH F) . 0.00 H2O
 1.82 2.0 6.00 0.26 0.00 0.54

(O + OH + F) = 0.79 Vacancies: 0.18 A 0.21 Y
 Dose (alphas/mg) = 0.527E+17 DPA (displacements/atom) = 6.5

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Sb+3,Pb+2,Fe+2,K ,Pr ,Nd ,Sm ,Y
 Mean A valence = 1.69

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.99

OXIDE	WT %	MOL WT	ATOMS
WO3	0.23	231.80	0.005 W
Ta2O5	75.30	220.90	1.773 Ta
Nb2O5	4.68	132.90	0.183 Nb
TiO2	0.60	79.90	0.039 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	1.27	286.00	0.023 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.00	112.90	0.000 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.00	164.10	0.000 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.15	145.70	0.005 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.09	70.94	0.007 Mn+2
FeO	0.06	71.85	0.004 Fe+2
CaO	11.20	56.08	1.039 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.32	223.20	0.007 Pb+2
Na2O	4.05	30.99	0.680 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.33	19.00	0.638 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.28		6.138 O
LESS O=F	0.98		
TOTAL	99.30		

A B O (O OH F) . 0.00 H2O
 1.77 2.0 6.00 0.14 0.00 0.64

(O + OH + F) = 0.78 Vacancies: 0.23 A 0.22 Y
 Dose (alphas/mg) = 0.513E+17 DPA (displacements/atom) = 6.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Pb+2,Mn+2,Sb+3,Fe+2,K ,Pr ,Nd ,Sm ,La
 Mean A valence = 1.67

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.98

OXIDE	WT %	MOL WT	ATOMS
W ₃	0.11	231.80	0.002 W
Ta ₂ O ₅	74.90	220.90	1.785 Ta
Nb ₂ O ₅	4.29	132.90	0.170 Nb
TiO ₂	0.65	79.90	0.043 Ti
ZrO ₂	0.00	123.20	0.000 Zr
SnO ₂	0.00	150.70	0.000 Sn
Fe ₂ O ₃	0.00	159.70	0.000 Fe+3
ThO ₂	0.00	264.00	0.000 Th
UO ₂	0.00	270.00	0.000 U+4
UO ₃	1.39	286.00	0.026 U+6
U ₃ O ₈	0.00	842.00	0.000 U+8
Y ₂ O ₃	0.00	112.90	0.000 Y
La ₂ O ₃	0.00	162.90	0.000 La
Ce ₂ O ₃	0.00	164.10	0.000 Ce
Pr ₂ O ₃	0.00	164.90	0.000 Pr
Nd ₂ O ₃	0.00	168.20	0.000 Nd
Sm ₂ O ₃	0.00	174.40	0.000 Sm
Sb ₂ O ₃	0.12	145.70	0.004 Sb+3
Bi ₂ O ₃	0.00	233.00	0.000 Bi+3
MnO	0.10	70.94	0.007 Mn+2
FeO	0.09	71.85	0.007 Fe+2
CaO	12.20	56.08	1.145 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.07	223.20	0.002 Pb+2
Na ₂ O	4.24	30.99	0.720 Na
K ₂ O	0.00	47.10	0.000 K
Cs ₂ O	0.00	140.90	0.000 Cs
F	2.35	19.00	0.651 F
H ₂ O+	0.00	9.01	0.000 OH
H ₂ O-	0.00	18.02	0.000 H ₂ O
TOTAL	100.51		6.258 O
LESS O=F	0.99		
TOTAL	99.52		

A B O (O OH F) . 0.00 H₂O
 1.91 2.0 6.00 0.26 0.00 0.65

(O + OH + F) = 0.91 Vacancies: 0.09 A 0.09 Y
 Dose (alphas/mg) = 0.559E+17 DPA (displacements/atom) = 6.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Fe+2,Sb+3,Pb+2,K ,Pr ,Nd ,Sm ,La
 Mean A valence = 1.68

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.98

OXIDE	WT %	MOL WT	ATOMS
W03	0.22	231.80	0.005 W
Ta205	76.10	220.90	1.825 Ta
Nb205	3.66	132.90	0.146 Nb
Ti02	0.36	79.90	0.024 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.02	150.70	0.001 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.64	286.00	0.012 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.06	112.90	0.003 Y
La203	0.00	162.90	0.000 La
Ce203	0.09	164.10	0.003 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.19	145.70	0.007 Sb+3
Bi203	0.01	233.00	0.000 Bi+3
Mn0	0.10	70.94	0.007 Mn+2
Fe0	0.00	71.85	0.000 Fe+2
Ca0	12.20	56.08	1.152 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.01	153.30	0.000 Ba
Pb0	0.02	223.20	0.000 Pb+2
Na20	2.69	30.99	0.460 Na
K20	0.00	47.10	0.000 K
Cs20	0.02	140.90	0.001 Cs
F	2.40	19.00	0.669 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	98.79		6.101 O
LESS O=F	1.01		
TOTAL	97.78		

A B O (O OH F) . 0.00 H2O
 1.65 2.0 6.00 0.10 0.00 0.67

(O + OH + F) = 0.77 Vacancies: 0.35 A 0.23 Y
 Dose (alphas/mg) = 0.260E+17 DPA (displacements/atom) = 3.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Sb+3,Ce ,Y ,Pb+2,Ba ,Bi+3,K ,La
 Mean A valence = 1.76

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.99

OXIDE	WT %	MOL WT	ATOMS
WO3	0.21	231.80	0.005 W
Ta2O5	74.40	220.90	1.768 Ta
Nb2O5	5.55	132.90	0.219 Nb
TiO2	0.13	79.90	0.009 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.00	150.70	0.000 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.50	286.00	0.009 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.05	112.90	0.002 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.04	164.10	0.001 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.14	145.70	0.005 Sb+3
Bi2O3	0.11	233.00	0.002 Bi+3
MnO	0.03	70.94	0.002 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.30	56.08	1.057 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.00	223.20	0.000 Pb+2
Na2O	4.24	30.99	0.718 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.95	19.00	0.815 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.65		6.053 O
LESS O=F	1.24		
TOTAL	98.41		

A B O (O OH F) . 0.00 H2O
 1.80 2.0 6.00 0.05 0.00 0.81

(O + OH + F) = 0.87 Vacancies: 0.20 A 0.13 Y
 Dose (alphas/mg) = 0.203E+17 DPA (displacements/atom) = 2.5

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Bi+3,Y ,Mn+2,Ce ,K ,Nd ,Sm ,U+8
 Mean A valence = 1.63

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
W03	0.33	231.80	0.008 W
Ta205	74.90	220.90	1.787 Ta
Nb205	4.58	132.90	0.182 Nb
Ti02	0.37	79.90	0.024 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.71	286.00	0.013 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.09	112.90	0.004 Y
La203	0.00	162.90	0.000 La
Ce203	0.03	164.10	0.001 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.17	145.70	0.006 Sb+3
Bi203	0.02	233.00	0.000 Bi+3
MnO	0.19	70.94	0.014 Mn+2
FeO	0.03	71.85	0.002 Fe+2
CaO	12.90	56.08	1.212 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.04	223.20	0.001 Pb+2
Na2O	2.38	30.99	0.405 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.23	19.00	0.618 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.97		6.171 O
LESS O=F	0.94		
TOTAL	98.03		

A B O (O OH F) . 0.00 H2O
 1.66 2.0 6.00 0.17 0.00 0.62

(O + OH + F) = 0.79 Vacancies: 0.34 A 0.21 Y
 Dose (alphas/mg) = 0.290E+17 DPA (displacements/atom) = 3.6

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Mn+2,U+6 ,Sb+3,Y ,Fe+2,Ce ,Pb+2,Bi+3,K ,La
 Mean A valence = 1.79

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.99

OXIDE	WT %	MOL WT	ATOMS
W03	0.23	231.80	0.005 W
Ta205	75.50	220.90	1.785 Ta
Nb205	4.68	132.90	0.184 Nb
Ti02	0.40	79.90	0.026 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.00	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.68	286.00	0.012 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.08	112.90	0.004 Y
La203	0.00	162.90	0.000 La
Ce203	0.06	164.10	0.002 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.16	145.70	0.006 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.08	70.94	0.006 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	12.20	56.08	1.136 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.00	223.20	0.000 Pb+2
Na2O	3.25	30.99	0.548 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.65	19.00	0.728 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.97		6.095 O
LESS O=F	1.11		
TOTAL	98.85		

A B O (O OH F) . 0.00 H2O
 1.71 2.0 6.00 0.10 0.00 0.73

(O + OH + F) = 0.82 Vacancies: 0.29 A 0.18 Y
 Dose (alphas/mg) = 0.275E+17 DPA (displacements/atom) = 3.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Sb+3,Y ,Ce ,K ,Pr ,Nd ,Sm ,La
 Mean A valence = 1.72

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.99

OXIDE	WT %	MOL WT	ATOMS
WO3	0.24	231.80	0.005 W
Ta2O5	78.90	220.90	1.876 Ta
Nb2O5	2.51	132.90	0.099 Nb
TiO2	0.28	79.90	0.018 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.04	150.70	0.001 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.51	286.00	0.009 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.06	112.90	0.003 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.09	164.10	0.003 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.10	145.70	0.004 Sb+3
Bi2O3	0.15	233.00	0.003 Bi+3
MnO	0.05	70.94	0.004 Mn+2
FeO	0.01	71.85	0.001 Fe+2
CaO	11.70	56.08	1.096 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.02	223.20	0.000 Pb+2
Na2O	4.13	30.99	0.700 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.02	140.90	0.001 Cs
F	2.91	19.00	0.804 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.72		6.088 O
LESS O=F	1.22		
TOTAL	100.50		

A B O (O OH F) . 0.00 H2O
 1.82 2.0 6.00 0.09 0.00 0.80

(O + OH + F) = 0.89 Vacancies: 0.18 A 0.11 Y
 Dose (alphas/mg) = 0.203E+17 DPA (displacements/atom) = 2.5

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Sb+3,Bi+3,Ce ,Y ,Fe+2,Pb+2,K ,Pr
 Mean A valence = 1.64

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.99

OXIDE	WT %	MOL WT	ATOMS
W03	0.22	231.80	0.005 W
Ta205	75.50	220.90	1.786 Ta
Nb205	5.01	132.90	0.197 Nb
Ti02	0.17	79.90	0.011 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.02	150.70	0.001 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.40	286.00	0.007 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.06	112.90	0.003 Y
La203	0.00	162.90	0.000 La
Ce203	0.08	164.10	0.003 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.10	145.70	0.004 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.05	70.94	0.004 Mn+2
FeO	0.02	71.85	0.001 Fe+2
CaO	11.50	56.08	1.072 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.02	223.20	0.000 Pb+2
Na2O	4.07	30.99	0.686 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.92	19.00	0.803 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.14		6.051 O
LESS O=F	1.23		
TOTAL	98.92		

A B O (O OH F) . 0.00 H2O
 1.78 2.0 6.00 0.05 0.00 0.80

(O + OH + F) = 0.85 Vacancies: 0.22 A 0.15 Y
 Dose (alphas/mg) = 0.163E+17 DPA (displacements/atom) = 2.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Sb+3,Y ,Ce ,Fe+2,Pb+2,K ,Sm ,La
 Mean A valence = 1.64

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
WO3	0.28	231.80	0.006 W
Ta2O5	75.30	220.90	1.769 Ta
Nb2O5	5.63	132.90	0.220 Nb
TiO2	0.06	79.90	0.004 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.04	150.70	0.001 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.31	286.00	0.006 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.06	112.90	0.003 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.05	164.10	0.002 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.07	145.70	0.002 Sb+3
Bi2O3	0.07	233.00	0.002 Bi+3
MnO	0.11	70.94	0.008 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	12.00	56.08	1.110 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.01	153.30	0.000 Ba
PbO	0.00	223.20	0.000 Pb+2
Na2O	4.29	30.99	0.718 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.01	140.90	0.000 Cs
F	2.82	19.00	0.770 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.11		6.123 O
LESS O=F	1.18		
TOTAL	99.92		

A B O (O OH F) , 0.00 H2O
 1.85 2.0 6.00 0.12 0.00 0.77

(O + OH + F) = 0.89 Vacancies: 0.15 A 0.11 Y
 Dose (alphas/mg) = 0.123E+17 DPA (displacements/atom) = 1.5

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Mn+2,U+6 ,Y ,Sb+3,Ce ,Bi+3,Ba ,K ,Sm ,La
 Mean A valence = 1.63

B = Ta ,Nb ,W ,Ti ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00

OXIDE	WT %	MOL WT	ATOMS
W03	0.29	231.80	0.007 W
Ta205	76.60	220.90	1.823 Ta
Nb205	3.68	132.90	0.146 Nb
Ti02	0.37	79.90	0.024 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.01	150.70	0.000 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.47	286.00	0.009 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.06	112.90	0.003 Y
La203	0.00	162.90	0.000 La
Ce203	0.08	164.10	0.003 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.16	145.70	0.006 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.12	70.94	0.009 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	12.80	56.08	1.200 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.01	223.20	0.000 Pb+2
Na2O	3.05	30.99	0.517 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.01	140.90	0.000 Cs
F	2.54	19.00	0.703 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.25		6.150 O
LESS O=F	1.07		
TOTAL	99.18		

A B O (O OH F) . 0.00 H2O
 1.75 2.0 6.00 0.15 0.00 0.70

(O + OH + F) = 0.85 Vacancies: 0.25 A 0.15 Y
 Dose (alphas/mg) = 0.188E+17 DPA (displacements/atom) = 2.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Mn+2,U+6 ,Sb+3,Y ,Ce ,Pb+2,K ,Nd ,Sm ,La
 Mean A valence = 1.73

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.99

OXIDE	WT %	MOL WT	ATOMS
W03	0.28	231.80	0.006 W
Ta205	77.30	220.90	1.856 Ta
Nb205	2.72	132.90	0.109 Nb
Ti02	0.42	79.90	0.028 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.04	150.70	0.001 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.66	286.00	0.012 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.05	112.90	0.002 Y
La203	0.00	162.90	0.000 La
Ce203	0.05	164.10	0.002 Ce
Pr203	0.00	164.90	0.000 Pr
Nd203	0.00	168.20	0.000 Nd
Sm203	0.00	174.40	0.000 Sm
Sb203	0.19	145.70	0.007 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.12	70.94	0.009 Mn+2
FeO	0.01	71.85	0.001 Fe+2
CaO	12.80	56.08	1.210 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.03	223.20	0.001 Pb+2
Na2O	2.25	30.99	0.385 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.02	140.90	0.001 Cs
F	2.45	19.00	0.684 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.39		6.113 O
LESS O=F	1.03		
TOTAL	98.36		

A B O (O OH F) . 0.00 H2O
 1.63 2.0 6.00 0.11 0.00 0.68

(O + OH + F) = 0.80 Vacancies: 0.37 A 0.20 Y
 Dose (alphas/mg) = 0.267E+17 DPA (displacements/atom) = 3.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Sb+3,Y ,Ce ,Fe+2,Pb+2,K ,Sm ,La
 Mean A valence = 1.80

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.99

OXIDE	WT %	MOL WT	ATOMS
WO3	0.22	231.80	0.005 W
Ta2O5	75.40	220.90	1.786 Ta
Nb2O5	5.01	132.90	0.197 Nb
TiO2	0.17	79.90	0.011 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.02	150.70	0.001 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.40	286.00	0.007 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.06	112.90	0.003 Y
La2O3	0.00	162.90	0.000 La
Ce2O3	0.08	164.10	0.003 Ce
Pr2O3	0.00	164.90	0.000 Pr
Nd2O3	0.00	168.20	0.000 Nd
Sm2O3	0.00	174.40	0.000 Sm
Sb2O3	0.10	145.70	0.004 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.05	70.94	0.004 Mn+2
FeO	0.02	71.85	0.001 Fe+2
CaO	11.50	56.08	1.073 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.02	223.20	0.000 Pb+2
Na2O	4.17	30.99	0.704 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.92	19.00	0.804 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.14		6.061 O
LESS O=F	1.23		
TOTAL	98.92		

A B O (O OH F) . 0.00 H2O
 1.80 2.0 6.00 0.06 0.00 0.80

(O + OH + F) = 0.86 Vacancies: 0.20 A 0.14 Y
 Dose (alphas/mg) = 0.163E+17 DPA (displacements/atom) = 2.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Sb+3,Y ,Ce ,Fe+2,Pb+2,K ,Sm ,La
 Mean A valence = 1.63

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 5.00