

OXIDE	WT %	MOL WT	ATOMS
WO3	0.25	231.80	0.006 W
Ta2O5	74.40	220.90	1.772 Ta
Nb2O5	5.47	132.90	0.216 Nb
TiO2	0.09	79.90	0.006 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	0.36	286.00	0.007 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	0.04	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	0.09	145.70	0.003 Sb+3
Bi2O3	0.16	233.00	0.004 Bi+3
MnO	0.06	70.94	0.004 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.70	56.08	1.097 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	4.23	30.99	0.718 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.82	19.00	0.781 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.80		6.109 O
LESS O=F	1.18		
TOTAL	98.62		

A B O (O OH F) . 0.00 H2O
 1.84 2.0 6.00 0.11 0.00 0.78

(O + OH + F) = 0.89 Vacancies: 0.16 A 0.11 Y
 Dose (alphas/mg) = 0.146E+17 DPA (displacements/atom) = 1.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Y ,Bi+3,Sb+3,Ce ,Pb+2,K ,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	0.37	231.80	0.008 W
Ta205	74.40	220.90	1.764 Ta
Nb205	5.66	132.90	0.223 Nb
Ti02	0.07	79.90	0.005 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	0.03	264.00	0.001 Th
U02	0.00	270.00	0.000 U+4
U03	0.31	286.00	0.006 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	0.00	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	0.11	145.70	0.004 Sb+3
Bi203	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	11.70	56.08	1.093 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	4.38	30.99	0.740 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.94	19.00	0.810 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.22		6.094 O
LESS O=F	1.23		
TOTAL	98.98		

A B O (O OH F) . 0.00 H2O
 1.85 2.0 6.00 0.09 0.00 0.81

(O + OH + F) = 0.90 Vacancies: 0.15 A 0.10 Y
 Dose (alphas/mg) = 0.124E+17 DPA (displacements/atom) = 1.5

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.28	231.80	0.006 W
Ta205	75.20	220.90	1.768 Ta
Nb205	5.63	132.90	0.220 Nb
Ti02	0.06	79.90	0.004 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.06	150.70	0.002 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	0.31	286.00	0.006 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	0.05	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	0.07	145.70	0.002 Sb+3
Bi203	0.07	233.00	0.002 Bi+3
Mn0	0.11	70.94	0.008 Mn+2
Fe0	0.00	71.85	0.000 Fe+2
Ca0	12.00	56.08	1.111 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.01	153.30	0.000 Ba
Pb0	0.00	223.20	0.000 Pb+2
Na20	4.29	30.99	0.719 Na
K20	0.00	47.10	0.000 K
Cs20	0.01	140.90	0.000 Cs
F	2.82	19.00	0.771 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	101.07		6.125 O
LESS O=F	1.18		
TOTAL	99.88		

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

(O + OH + F) = 0.90 Vacancies: 0.15 A 0.10 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,Th ,Ba ,K ,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	0.40	231.80	0.009 W
Ta205	74.80	220.90	1.758 Ta
Nb205	5.60	132.90	0.219 Nb
Ti02	0.19	79.90	0.012 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	0.40	286.00	0.007 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	0.11	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	0.12	145.70	0.004 Sb+3
Bi203	0.02	233.00	0.000 Bi+3
Mn0	0.05	70.94	0.004 Mn+2
Fe0	0.00	71.85	0.000 Fe+2
Ca0	12.10	56.08	1.120 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	0.04	223.20	0.001 Pb+2
Na20	4.19	30.99	0.702 Na
K20	0.00	47.10	0.000 K
Cs20	0.03	140.90	0.001 Cs
F	2.95	19.00	0.806 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	101.11		6.110 O
LESS O=F	1.24		
TOTAL	99.87		

A B O (O OH F) . 0.00 H2O
 1.85 2.0 6.00 0.11 0.00 0.81

(O + OH + F) = 0.92 Vacancies: 0.15 A 0.08 Y
 Dose (alphas/mg) = 0.161E+17 DPA (displacements/atom) = 2.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Mn+2,Ce ,Y ,Pb+2,Bi+3,K ,Sm ,U+8
 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	0.29	231.80	0.007 W
Ta2O5	76.50	220.90	1.823 Ta
Nb2O5	3.68	132.90	0.146 Nb
TiO2	0.37	79.90	0.024 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	0.47	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	0.08	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	0.16	145.70	0.006 Sb+3
Bi2O3	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	1.201 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	0.518 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.01	140.90	0.000 Cs
F	2.45	19.00	0.679 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.06		6.164 O
LESS O=F	1.03		
TOTAL	99.03		

A B O (O OH F) . 0.00 H2O
 1.75 2.0 6.00 0.16 0.00 0.68

(O + OH + F) = 0.84 Vacancies: 0.25 A 0.16 Y
 Dose (alphas/mg) = 0.189E+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
WO3	0.14	231.80	0.003 W
Ta2O5	74.90	220.90	1.788 Ta
Nb2O5	5.01	132.90	0.199 Nb
TiO2	0.16	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	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	0.08	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	0.14	145.70	0.005 Sb+3
Bi2O3	0.16	233.00	0.004 Bi+3
MnO	0.06	70.94	0.004 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.70	56.08	1.100 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	4.27	30.99	0.726 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.47	19.00	0.685 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.96		6.187 O
LESS O=F	1.04		
TOTAL	98.93		

A B O (O OH F) . 0.00 H2O
 1.86 2.0 6.00 0.19 0.00 0.69

(O + OH + F) = 0.87 Vacancies: 0.14 A 0.13 Y
 Dose (alphas/mg) = 0.317E+17 DPA (displacements/atom) = 3.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Mn+2,Y ,Bi+3,Ce ,Pb+2,K ,Sm ,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	0.16	231.80	0.004 W
Ta2O5	75.00	220.90	1.788 Ta
Nb2O5	5.27	132.90	0.209 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	0.11	264.00	0.002 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.39	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	0.22	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	0.08	145.70	0.003 Sb+3
Bi2O3	0.08	233.00	0.002 Bi+3
MnO	0.09	70.94	0.007 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.70	56.08	1.098 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	4.29	30.99	0.729 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.67	19.00	0.740 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.12		6.149 O
LESS O=F	1.12		
TOTAL	99.00		

A B O (O OH F) . 0.00 H2O
 1.86 2.0 6.00 0.15 0.00 0.74

(O + OH + F) = 0.89 Vacancies: 0.14 A 0.11 Y
 Dose (alphas/mg) = 0.159E+17 DPA (displacements/atom) = 1.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Ce ,Mn+2,Sb+3,Y ,Th ,Bi+3,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	0.21	231.80	0.005 W
Ta205	75.70	220.90	1.794 Ta
Nb205	5.12	132.90	0.202 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	0.02	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.18	286.00	0.003 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.03	112.90	0.001 Y
La203	0.00	162.90	0.000 La
Ce203	0.16	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	0.10	145.70	0.004 Sb+3
Bi203	0.15	233.00	0.003 Bi+3
MnO	0.20	70.94	0.015 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.90	56.08	1.111 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	4.44	30.99	0.750 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.80	19.00	0.771 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.02		6.148 O
LESS O=F	1.18		
TOTAL	99.84		

A B O (O OH F) . 0.00 H2O
 1.89 2.0 6.00 0.15 0.00 0.77

(O + OH + F) = 0.92 Vacancies: 0.11 A 0.08 Y
 Dose (alphas/mg) = 0.723E+16 DPA (displacements/atom) = 0.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS
W ₃	0.14	231.80	0.003 W
Ta ₂ O ₅	74.70	220.90	1.787 Ta
Nb ₂ O ₅	5.27	132.90	0.210 Nb
TiO ₂	0.00	79.90	0.000 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	0.07	264.00	0.001 Th
UO ₂	0.00	270.00	0.000 U+4
UO ₃	0.03	286.00	0.001 U+6
U ₃ O ₈	0.00	842.00	0.000 U+8
Y ₂ O ₃	0.05	112.90	0.002 Y
La ₂ O ₃	0.00	162.90	0.000 La
Ce ₂ O ₃	0.12	164.10	0.004 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	0.09	145.70	0.003 Sb+3
Bi ₂ O ₃	0.09	233.00	0.002 Bi+3
MnO	0.20	70.94	0.015 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.80	56.08	1.112 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
Na ₂ O	4.34	30.99	0.740 Na
K ₂ O	0.00	47.10	0.000 K
Cs ₂ O	0.00	140.90	0.000 Cs
F	3.03	19.00	0.843 F
H ₂ O+	0.00	9.01	0.000 OH
H ₂ O-	0.00	18.02	0.000 H ₂ O
TOTAL	99.93		6.099 O
LESS O=F	1.27		
TOTAL	98.66		

A B O (O OH F) . 0.00 H₂O
 1.88 2.0 6.00 0.10 0.00 0.84

(O + OH + F) = 0.94 Vacancies: 0.12 A 0.06 Y
 Dose (alphas/mg) = 0.129E+16 DPA (displacements/atom) = 0.2

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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	75.20	220.90	1.785 Ta
Nb205	5.37	132.90	0.212 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	0.06	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	0.08	112.90	0.004 Y
La203	0.00	162.90	0.000 La
Ce203	0.14	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	0.08	145.70	0.003 Sb+3
Bi203	0.12	233.00	0.003 Bi+3
Mn0	0.17	70.94	0.013 Mn+2
Fe0	0.00	71.85	0.000 Fe+2
Ca0	12.00	56.08	1.122 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	4.51	30.99	0.763 Na
K20	0.00	47.10	0.000 K
Cs20	0.00	140.90	0.000 Cs
F	2.90	19.00	0.800 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	100.76		6.141 O
LESS O=F	1.22		
TOTAL	99.54		

A B O (O OH F) . 0.00 H2O
 1.91 2.0 6.00 0.14 0.00 0.80

(O + OH + F) = 0.94 Vacancies: 0.09 A 0.06 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 ,Sb+3,Bi+3,Th ,K ,Nd ,Sm ,La
 Mean A valence = 1.61

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

OXIDE	WT %	MOL WT	ATOMS
W ₃	0.16	231.80	0.004 W
Ta ₂ O ₅	74.80	220.90	1.791 Ta
Nb ₂ O ₅	5.15	132.90	0.205 Nb
TiO ₂	0.00	79.90	0.000 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	0.02	286.00	0.000 U+6
U ₃ O ₈	0.00	842.00	0.000 U+8
Y ₂ O ₃	0.05	112.90	0.002 Y
La ₂ O ₃	0.00	162.90	0.000 La
Ce ₂ O ₃	0.08	164.10	0.003 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	0.09	145.70	0.003 Sb+3
Bi ₂ O ₃	0.21	233.00	0.005 Bi+3
MnO	0.13	70.94	0.010 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.80	56.08	1.113 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
Na ₂ O	4.39	30.99	0.749 Na
K ₂ O	0.00	47.10	0.000 K
Cs ₂ O	0.01	140.90	0.000 Cs
F	3.11	19.00	0.866 F
H ₂ O+	0.00	9.01	0.000 OH
H ₂ O-	0.00	18.02	0.000 H ₂ O
TOTAL	100.00		6.087 O
LESS O=F	1.31		
TOTAL	98.69		

A B O (O OH F) . 0.00 H₂O
 1.89 2.0 6.00 0.09 0.00 0.87

(O + OH + F) = 0.95 Vacancies: 0.11 A 0.05 Y
 Dose (alphas/mg) = 0.860E+15 DPA (displacements/atom) = 0.1

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Mn+2,Bi+3,Sb+3,Ce ,Y ,U+6 ,K ,Nd ,Sm ,La
 Mean A valence = 1.61

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.12	231.80	0.003 W
Ta2O5	73.80	220.90	1.768 Ta
Nb2O5	5.52	132.90	0.220 Nb
TiO2	0.15	79.90	0.010 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	0.83	286.00	0.015 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	0.09	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	0.12	145.70	0.004 Sb+3
Bi2O3	0.12	233.00	0.003 Bi+3
MnO	0.13	70.94	0.010 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	11.80	56.08	1.113 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	4.35	30.99	0.743 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.03	140.90	0.001 Cs
F	2.43	19.00	0.677 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.58		6.220 O
LESS O=F	1.02		
TOTAL	98.56		

A B O (O OH F) . 0.00 H2O
 1.90 2.0 6.00 0.22 0.00 0.68

(O + OH + F) = 0.90 Vacancies: 0.10 A 0.10 Y
 Dose (alphas/mg) = 0.336E+17 DPA (displacements/atom) = 4.1

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Sb+3,Y ,Ce ,Bi+3,K ,Nd ,Sm ,La
 Mean A valence = 1.65

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

Clevelandite Unit

OXIDE	WT %	MOL WT	ATOMS
W03	0.25	231.80	0.006 W
Ta205	62.00	220.90	1.474 Ta
Nb205	10.50	132.90	0.415 Nb
TiO2	1.59	79.90	0.105 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.02	150.70	0.001 Sn
Fe203	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	4.23	286.00	0.078 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	0.11	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
Sb203	0.48	145.70	0.017 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.36	70.94	0.027 Mn+2
FeO	0.34	71.85	0.025 Fe+2
CaO	13.10	56.08	1.227 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.01	153.30	0.000 Ba
PbO	0.10	223.20	0.002 Pb+2
Na2O	2.90	30.99	0.491 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.12	19.00	0.586 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.22		6.455 O
LESS O=F	0.89		
TOTAL	97.33		

A B O (O OH F) . 0.00 H2O
 1.88 2.0 6.00 0.45 0.00 0.59

(O + OH + F) = 1.04 Vacancies: 0.12 A -.04 Y
 Dose (alphas/mg) = 0.174E+18 DPA (displacements/atom) = 21.2

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Fe+2,Sb+3,Ce ,Y ,Pb+2,Th ,Ba ,K
 Mean A valence = 1.92

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.95

P03.1

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.33	231.80	0.007	W
Ta2O5	72.00	220.90	1.682	Ta
Nb2O5	7.37	132.90	0.286	Nb
TiO2	0.37	79.90	0.024	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	2.62	286.00	0.047	U+6
U3O8	0.00	842.00	0.000	U+8
Y2O3	0.13	112.90	0.006	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	0.24	145.70	0.008	Sb+3
Bi2O3	0.20	233.00	0.004	Bi+3
MnO	0.06	70.94	0.004	Mn+2
FeO	0.12	71.85	0.009	Fe+2
CaO	10.50	56.08	0.966	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.04	153.30	0.001	Ba
PbO	0.12	223.20	0.003	Pb+2
Na2O	3.99	30.99	0.664	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.05	140.90	0.002	Cs
F	1.82	19.00	0.494	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	100.19		6.240	O
LESS O=F	0.76			
TOTAL	99.42			

A B O (O OH F) . 0.00 H2O
 1.72 2.0 6.00 0.24 0.00 0.49

(O + OH + F) = 0.73 Vacancies: 0.28 A 0.27 Y
 Dose (alphas/mg) = 0.105E+18 DPA (displacements/atom) = 13.2

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Sb+3,Ce ,Y ,Bi+3,Mn+2,Pb+2,Ba ,K
 Mean A valence = 1.74

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.28	231.80	0.006 W
Ta2O5	70.10	220.90	1.700 Ta
Nb2O5	6.96	132.90	0.281 Nb
TiO2	0.18	79.90	0.012 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	2.09	286.00	0.039 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	0.21	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	0.25	145.70	0.009 Sb+3
Bi2O3	0.11	233.00	0.003 Bi+3
MnO	0.37	70.94	0.028 Mn+2
FeO	0.10	71.85	0.007 Fe+2
CaO	10.80	56.08	1.032 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.06	223.20	0.001 Pb+2
Na2O	4.99	30.99	0.863 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.05	140.90	0.002 Cs
F	2.74	19.00	0.773 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.43		6.265 O
LESS O=F	1.15		
TOTAL	98.28		

A B O (O OH F) . 0.00 H2O
 2.00 2.0 6.00 0.27 0.00 0.77

(O + OH + F) = 1.04 Vacancies: 0.00 A -.04 Y
 Dose (alphas/mg) = 0.851E+17 DPA (displacements/atom) = 10.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Sb+3,Fe+2,Ce ,Y ,Bi+3,Pb+2,Th ,K
 Mean A valence = 1.66

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

P03.1

OXIDE	WT %	MOL WT	ATOMS
WO3	0.48	231.80	0.011 W
Ta2O5	72.80	220.90	1.697 Ta
Nb2O5	7.49	132.90	0.290 Nb
TiO2	0.03	79.90	0.002 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	1.28	286.00	0.023 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	0.21	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	0.27	145.70	0.010 Sb+3
Bi2O3	0.12	233.00	0.003 Bi+3
MnO	0.00	70.94	0.000 Mn+2
FeO	0.14	71.85	0.010 Fe+2
CaO	10.40	56.08	0.955 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.06	223.20	0.001 Pb+2
Na2O	5.09	30.99	0.846 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.01	140.90	0.000 Cs
F	2.88	19.00	0.780 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.36		6.107 O
LESS O=F	1.21		
TOTAL	100.15		

A B O (O OH F) . 0.00 H2O
 1.86 2.0 6.00 0.11 0.00 0.78

(O + OH + F) = 0.89 Vacancies: 0.14 A 0.11 Y
 Dose (alphas/mg) = 0.513E+17 DPA (displacements/atom) = 6.2

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Sb+3,Ce ,Y ,Bi+3,Pb+2,K ,Sm ,La
 Mean A valence = 1.61

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

P03.1

OXIDE	WT %	MOL WT	ATOMS
W03	0.30	231.80	0.007 W
Ta205	72.40	220.90	1.695 Ta
Nb205	7.56	132.90	0.294 Nb
Ti02	0.07	79.90	0.005 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	0.06	264.00	0.001 Th
U02	0.00	270.00	0.000 U+4
U03	1.78	286.00	0.032 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.12	112.90	0.005 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	0.23	145.70	0.008 Sb+3
Bi203	0.08	233.00	0.002 Bi+3
MnO	0.04	70.94	0.003 Mn+2
FeO	0.07	71.85	0.005 Fe+2
CaO	10.10	56.08	0.931 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
Na2O	5.12	30.99	0.854 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.04	140.90	0.001 Cs
F	2.71	19.00	0.737 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.90		6.130 O
LESS O=F	1.14		
TOTAL	99.76		

A B O (O OH F) . 0.00 H2O
 1.85 2.0 6.00 0.13 0.00 0.74

(O + OH + F) = 0.87 Vacancies: 0.15 A 0.13 Y
 Dose (alphas/mg) = 0.715E+17 DPA (displacements/atom) = 8.7

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Y ,Fe+2,Ce ,Mn+2,Bi+3,Pb+2,Th ,K
 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	0.42	231.80	0.009 W
Ta2O5	75.50	220.90	1.788 Ta
Nb2O5	4.61	132.90	0.181 Nb
TiO2	0.30	79.90	0.020 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	0.02	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	2.12	286.00	0.039 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	0.20	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	0.27	145.70	0.010 Sb+3
Bi2O3	0.07	233.00	0.002 Bi+3
MnO	0.27	70.94	0.020 Mn+2
FeO	0.07	71.85	0.005 Fe+2
CaO	10.70	56.08	0.998 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	4.61	30.99	0.778 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.04	140.90	0.001 Cs
F	2.41	19.00	0.664 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.78		6.227 O
LESS O=F	1.01		
TOTAL	100.77		

A B O (O OH F) . 0.00 H2O
 1.87 2.0 6.00 0.23 0.00 0.66

(O + OH + F) = 0.89 Vacancies: 0.13 A 0.11 Y
 Dose (alphas/mg) = 0.842E+17 DPA (displacements/atom) = 10.5

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Sb+3,Ce ,Fe+2,Y ,Bi+3,Pb+2,Th ,K
 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	0.43	231.80	0.010 W
Ta2O5	72.30	220.90	1.758 Ta
Nb2O5	4.67	132.90	0.189 Nb
TiO2	0.64	79.90	0.043 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	0.02	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	2.47	286.00	0.046 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	0.31	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	0.32	145.70	0.012 Sb+3
Bi2O3	0.07	233.00	0.002 Bi+3
MnO	0.77	70.94	0.058 Mn+2
FeO	0.65	71.85	0.049 Fe+2
CaO	11.50	56.08	1.101 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.01	153.30	0.000 Ba
PbO	0.07	223.20	0.002 Pb+2
Na2O	2.68	30.99	0.464 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.02	140.90	0.001 Cs
F	1.68	19.00	0.475 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.70		6.370 O
LESS O=F	0.71		
TOTAL	97.99		

A B O (O OH F) . 0.00 H2O
 1.75 2.0 6.00 0.37 0.00 0.47

(O + OH + F) = 0.84 Vacancies: 0.25 A 0.16 Y
 Dose (alphas/mg) = 0.101E+18 DPA (displacements/atom) = 12.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Mn+2,Fe+2,U+6 ,Sb+3,Ce ,Y ,Pb+2,Bi+3,Th ,Ba
 Mean A valence = 1.86

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	70.20	220.90	1.703 Ta
Nb205	5.20	132.90	0.210 Nb
Ti02	1.23	79.90	0.082 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	3.69	286.00	0.069 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	0.23	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	0.23	145.70	0.008 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.29	70.94	0.022 Mn+2
FeO	0.30	71.85	0.022 Fe+2
CaO	11.80	56.08	1.127 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.08	223.20	0.002 Pb+2
Na2O	2.54	30.99	0.439 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.02	140.90	0.001 Cs
F	1.58	19.00	0.446 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	97.69		6.369 O
LESS O=F	0.66		
TOTAL	97.02		

A B O (O OH F) . 0.00 H2O
 1.70 2.0 6.00 0.37 0.00 0.45

(O + OH + F) = 0.81 Vacancies: 0.30 A 0.19 Y
 Dose (alphas/mg) = 0.152E+18 DPA (displacements/atom) = 19.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Mn+2,Sb+3,Ce ,Y ,Pb+2,Th ,K ,La
 Mean A valence = 1.92

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.96

OXIDE	WT %	MOL WT	ATOMS
W03	0.20	231.80	0.005 W
Ta205	71.20	220.90	1.739 Ta
Nb205	5.28	132.90	0.214 Nb
Ti02	0.62	79.90	0.042 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	3.07	286.00	0.058 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	0.17	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	0.14	145.70	0.005 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.16	70.94	0.012 Mn+2
FeO	0.12	71.85	0.009 Fe+2
CaO	11.90	56.08	1.145 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.06	223.20	0.001 Pb+2
Na2O	3.09	30.99	0.538 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.65	19.00	0.469 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	97.78		6.381 O
LESS O=F	0.69		
TOTAL	97.09		

A B O (O OH F) . 0.00 H2O
 1.78 2.0 6.00 0.38 0.00 0.47

(O + OH + F) = 0.85 Vacancies: 0.22 A 0.15 Y
 Dose (alphas/mg) = 0.127E+18 DPA (displacements/atom) = 16.1

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Fe+2,Ce ,Sb+3,Y ,Pb+2,Th ,K ,La
 Mean A valence = 1.84

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.06	231.80	0.001 W
Ta2O5	71.90	220.90	1.739 Ta
Nb2O5	4.86	132.90	0.195 Nb
TiO2	0.95	79.90	0.064 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	0.06	264.00	0.001 Th
UO2	0.00	270.00	0.000 U+4
UO3	3.31	286.00	0.062 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	0.13	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	0.14	145.70	0.005 Sb+3
Bi2O3	0.03	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	10.80	56.08	1.029 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
Na2O	4.18	30.99	0.721 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.01	140.90	0.000 Cs
F	2.27	19.00	0.638 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.00		6.258 O
LESS O=F	0.95		
TOTAL	98.04		

A B O (O OH F) . 0.00 H2O
 1.84 2.0 6.00 0.26 0.00 0.64

(O + OH + F) = 0.90 Vacancies: 0.16 A 0.10 Y
 Dose (alphas/mg) = 0.135E+18 DPA (displacements/atom) = 16.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.17	231.80	0.004 W
Ta2O5	73.60	220.90	1.784 Ta
Nb2O5	4.46	132.90	0.180 Nb
TiO2	0.48	79.90	0.032 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	0.09	264.00	0.002 Th
UO2	0.00	270.00	0.000 U+4
UO3	2.50	286.00	0.047 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	0.15	164.10	0.005 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	0.06	233.00	0.001 Bi+3
MnO	0.26	70.94	0.020 Mn+2
FeO	0.13	71.85	0.010 Fe+2
CaO	11.50	56.08	1.098 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.01	153.30	0.000 Ba
PbO	0.06	223.20	0.001 Pb+2
Na2O	3.88	30.99	0.670 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.01	140.90	0.000 Cs
F	2.34	19.00	0.660 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.92		6.288 O
LESS O=F	0.98		
TOTAL	98.94		

A B O (O OH F) . 0.00 H2O
 1.86 2.0 6.00 0.29 0.00 0.66

(O + OH + F) = 0.95 Vacancies: 0.14 A 0.05 Y
 Dose (alphas/mg) = 0.101E+18 DPA (displacements/atom) = 12.7

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Fe+2,Sb+3,Ce ,Y ,Th ,Pb+2,Bi+3,Ba
 Mean A valence = 1.75

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

P04

OXIDE	WT %	MOL WT	ATOMS
WO3	0.29	231.80	0.007 W
Ta2O5	73.40	220.90	1.768 Ta
Nb2O5	4.48	132.90	0.179 Nb
TiO2	0.67	79.90	0.045 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	0.01	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	2.61	286.00	0.048 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	0.21	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	0.23	145.70	0.008 Sb+3
Bi2O3	0.06	233.00	0.001 Bi+3
MnO	0.02	70.94	0.002 Mn+2
FeO	0.11	71.85	0.008 Fe+2
CaO	10.50	56.08	0.996 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.01	153.30	0.000 Ba
PbO	0.07	223.20	0.002 Pb+2
Na2O	4.68	30.99	0.804 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.02	140.90	0.001 Cs
F	2.41	19.00	0.675 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.88		6.229 O
LESS O=F	1.01		
TOTAL	98.86		

A B O (O OH F) . 0.00 H2O
 1.88 2.0 6.00 0.23 0.00 0.68

(O + OH + F) = 0.90 Vacancies: 0.12 A 0.10 Y
 Dose (alphas/mg) = 0.106E+18 DPA (displacements/atom) = 13.1

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Fe+2,Ce ,Y ,Pb+2,Mn+2,Bi+3,Ba ,Th
 Mean A valence = 1.69

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.39	231.80	0.009 W
Ta2O5	72.40	220.90	1.734 Ta
Nb2O5	6.32	132.90	0.252 Nb
TiO2	0.07	79.90	0.005 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	0.08	264.00	0.002 Th
UO2	0.00	270.00	0.000 U+4
UO3	1.42	286.00	0.026 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	0.18	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	0.18	145.70	0.007 Sb+3
Bi2O3	0.07	233.00	0.002 Bi+3
MnO	0.00	70.94	0.000 Mn+2
FeO	0.14	71.85	0.010 Fe+2
CaO	9.93	56.08	0.937 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.01	153.30	0.000 Ba
PbO	0.07	223.20	0.002 Pb+2
Na2O	5.12	30.99	0.874 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.04	140.90	0.002 Cs
F	2.90	19.00	0.808 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.43		6.095 O
LESS O=F	1.22		
TOTAL	98.21		

A B O (O OH F) . 0.00 H2O
 1.87 2.0 6.00 0.10 0.00 0.81

(O + OH + F) = 0.90 Vacancies: 0.13 A 0.10 Y
 Dose (alphas/mg) = 0.579E+17 DPA (displacements/atom) = 7.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Sb+3,Ce ,Y ,Pb+2,Th ,Bi+3,Ba ,K
 Mean A valence = 1.60

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.48	231.80	0.011 W
Ta2O5	74.00	220.90	1.723 Ta
Nb2O5	6.82	132.90	0.264 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	0.06	264.00	0.001 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	0.10	112.90	0.005 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	0.19	145.70	0.007 Sb+3
Bi2O3	0.06	233.00	0.001 Bi+3
MnO	0.00	70.94	0.000 Mn+2
FeO	0.02	71.85	0.001 Fe+2
CaO	10.40	56.08	0.954 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	5.21	30.99	0.864 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.02	140.90	0.001 Cs
F	3.26	19.00	0.882 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.39		6.008 O
LESS O=F	1.37		
TOTAL	100.02		

A B O (O OH F) . 0.00 H2O
 1.85 2.0 6.00 0.01 0.00 0.88

(O + OH + F) = 0.89 Vacancies: 0.15 A 0.11 Y
 Dose (alphas/mg) = 0.204E+17 DPA (displacements/atom) = 2.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Ce ,Y ,Fe+2,Bi+3,Th ,Pb+2,K ,U+8
 Mean A valence = 1.56

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

P04

OXIDE	WT %	MOL WT	ATOMS
W03	0.38	231.80	0.008 W
Ta205	76.00	220.90	1.771 Ta
Nb205	5.64	132.90	0.218 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	0.03	264.00	0.001 Th
U02	0.00	270.00	0.000 U+4
U03	0.05	286.00	0.001 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	0.14	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	0.14	145.70	0.005 Sb+3
Bi203	0.07	233.00	0.002 Bi+3
Mn0	0.00	70.94	0.000 Mn+2
Fe0	0.05	71.85	0.004 Fe+2
Ca0	10.40	56.08	0.955 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	0.03	223.20	0.001 Pb+2
Na20	5.24	30.99	0.870 Na
K20	0.00	47.10	0.000 K
Cs20	0.03	140.90	0.001 Cs
F	3.35	19.00	0.908 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	101.64		5.969 O
LESS O=F	1.41		
TOTAL	100.24		

A B O (O OH F) . 0.00 H2O
 1.85 2.0 5.97 0.00 0.00 0.91

(O + OH + F) = 0.91 Vacancies: 0.15 A 0.09 Y
 Dose (alphas/mg) = 0.212E+16 DPA (displacements/atom) = 0.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Sb+3,Ce ,Fe+2,Y ,Bi+3,U+6 ,Pb+2,Th ,K ,Pr
 Mean A valence = 1.54

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

P04

OXIDE	WT %	MOL WT	ATOMS
WO3	0.44	231.80	0.010 W
Ta2O5	75.90	220.90	1.778 Ta
Nb2O5	5.39	132.90	0.210 Nb
TiO2	0.03	79.90	0.002 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	0.02	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	0.10	112.90	0.005 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	0.15	145.70	0.005 Sb+3
Bi2O3	0.11	233.00	0.002 Bi+3
MnO	0.04	70.94	0.003 Mn+2
FeO	0.07	71.85	0.005 Fe+2
CaO	10.30	56.08	0.950 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	5.34	30.99	0.892 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.03	140.90	0.001 Cs
F	3.01	19.00	0.820 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.66		6.055 O
LESS O=F	1.26		
TOTAL	100.39		

A B O (O OH F) . 0.00 H2O
 1.88 2.0 6.00 0.05 0.00 0.82

(O + OH + F) = 0.87 Vacancies: 0.12 A 0.13 Y
 Dose (alphas/mg) = 0.199E+17 DPA (displacements/atom) = 2.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Ce ,Sb+3,Fe+2,Y ,Mn+2,Bi+3,Pb+2,Th ,K
 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	0.49	231.80	0.011 W
Ta205	75.00	220.90	1.779 Ta
Nb205	5.25	132.90	0.207 Nb
Ti02	0.04	79.90	0.003 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	0.01	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	1.04	286.00	0.019 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.10	112.90	0.005 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	0.15	145.70	0.005 Sb+3
Bi203	0.06	233.00	0.001 Bi+3
MnO	0.02	70.94	0.001 Mn+2
FeO	0.07	71.85	0.005 Fe+2
CaO	9.97	56.08	0.931 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	5.33	30.99	0.901 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.04	140.90	0.001 Cs
F	2.86	19.00	0.789 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.72		6.085 O
LESS O=F	1.20		
TOTAL	99.52		

A B O (O OH F) . 0.00 H2O
 1.88 2.0 6.00 0.09 0.00 0.79

(O + OH + F) = 0.87 Vacancies: 0.12 A 0.13 Y
 Dose (alphas/mg) = 0.418E+17 DPA (displacements/atom) = 5.1

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Ce ,Sb+3,Fe+2,Y ,Mn+2,Bi+3,Pb+2,Th ,K
 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	0.46	231.80	0.010 W
Ta205	74.70	220.90	1.774 Ta
Nb205	5.06	132.90	0.200 Nb
Ti02	0.23	79.90	0.015 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	0.06	264.00	0.001 Th
U02	0.00	270.00	0.000 U+4
U03	1.95	286.00	0.036 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	0.26	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	0.17	145.70	0.006 Sb+3
Bi203	0.13	233.00	0.003 Bi+3
MnO	0.06	70.94	0.004 Mn+2
FeO	0.12	71.85	0.009 Fe+2
CaO	9.64	56.08	0.902 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.03	153.30	0.001 Ba
PbO	0.10	223.20	0.002 Pb+2
Na2O	5.34	30.99	0.904 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.04	140.90	0.001 Cs
F	2.64	19.00	0.729 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.09		6.146 O
LESS O=F	1.11		
TOTAL	99.98		

A B O (O OH F) . 0.00 H2O
 1.88 2.0 6.00 0.15 0.00 0.73

(O + OH + F) = 0.88 Vacancies: 0.12 A 0.12 Y
 Dose (alphas/mg) = 0.781E+17 DPA (displacements/atom) = 9.6

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Na ,Ca ,U+6 ,Fe+2,Ce ,Sb+3,Mn+2,Y ,Bi+3,Pb+2,Th ,Ba
 Mean A valence = 1.61

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.03	231.80	0.001 W
Ta205	69.80	220.90	1.683 Ta
Nb205	5.82	132.90	0.233 Nb
Ti02	1.25	79.90	0.083 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	3.05	286.00	0.057 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	0.23	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	0.30	145.70	0.011 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
Mn0	0.15	70.94	0.011 Mn+2
Fe0	0.20	71.85	0.015 Fe+2
Ca0	12.00	56.08	1.140 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.04	153.30	0.001 Ba
Pb0	0.06	223.20	0.001 Pb+2
Na20	3.01	30.99	0.517 Na
K20	0.00	47.10	0.000 K
Cs20	0.00	140.90	0.000 Cs
F	1.55	19.00	0.434 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	97.58		6.372 O
LESS O=F	0.65		
TOTAL	96.93		

A B O (O OH F) . 0.00 H2O
 1.76 2.0 6.00 0.37 0.00 0.43

(O + OH + F) = 0.81 Vacancies: 0.24 A 0.19 Y
 Dose (alphas/mg) = 0.126E+18 DPA (displacements/atom) = 15.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Mn+2,Sb+3,Ce ,Y ,Pb+2,Ba ,Th ,K
 Mean A valence = 1.85

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.96

P08.1

OXIDE	WT %	MOL WT	ATOMS
WO3	0.15	231.80	0.003 W
Ta2O5	73.00	220.90	1.759 Ta
Nb2O5	5.52	132.90	0.221 Nb
TiO2	0.23	79.90	0.015 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	1.66	286.00	0.031 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	0.16	164.10	0.005 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	0.18	145.70	0.007 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.04	70.94	0.003 Mn+2
FeO	0.02	71.85	0.001 Fe+2
CaO	10.70	56.08	1.016 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	4.46	30.99	0.766 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.01	140.90	0.000 Cs
F	2.08	19.00	0.583 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.31		6.220 O
LESS O=F	0.87		
TOTAL	97.44		

A B O (O OH F) . 0.00 H2O
 1.83 2.0 6.00 0.22 0.00 0.58

(O + OH + F) = 0.80 Vacancies: 0.17 A 0.20 Y
 Dose (alphas/mg) = 0.684E+17 DPA (displacements/atom) = 8.5

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Ce ,Mn+2,Y ,Fe+2,Pb+2,K ,Sm ,U+8
 Mean A valence = 1.66

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.26	231.80	0.006 W
Ta205	73.40	220.90	1.774 Ta
Nb205	5.45	132.90	0.219 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	0.07	264.00	0.001 Th
U02	0.00	270.00	0.000 U+4
U03	1.14	286.00	0.021 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	0.25	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	0.13	145.70	0.005 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.04	70.94	0.003 Mn+2
FeO	0.11	71.85	0.008 Fe+2
CaO	11.00	56.08	1.047 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.02	153.30	0.001 Ba
PbO	0.04	223.20	0.001 Pb+2
Na2O	4.06	30.99	0.699 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.14	19.00	0.601 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.19		6.202 O
LESS O=F	0.90		
TOTAL	97.30		

A B O (O OH F) . 0.00 H2O
 1.80 2.0 6.00 0.20 0.00 0.60

(O + OH + F) = 0.80 Vacancies: 0.20 A 0.20 Y
 Dose (alphas/mg) = 0.471E+17 DPA (displacements/atom) = 5.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Ce ,Sb+3,Mn+2,Y ,Th ,Pb+2,Ba ,K
 Mean A valence = 1.67

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

P08.1

OXIDE	WT %	MOL WT	ATOMS
WO3	0.12	231.80	0.003 W
Ta2O5	73.40	220.90	1.763 Ta
Nb2O5	5.85	132.90	0.234 Nb
TiO2	0.01	79.90	0.001 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	1.11	286.00	0.021 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	0.18	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	0.08	145.70	0.003 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.08	70.94	0.006 Mn+2
FeO	0.01	71.85	0.001 Fe+2
CaO	11.10	56.08	1.050 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.01	153.30	0.000 Ba
PbO	0.04	223.20	0.001 Pb+2
Na2O	4.22	30.99	0.723 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.42	19.00	0.676 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.68		6.161 O
LESS O=F	1.02		
TOTAL	97.67		

A B O (O OH F) . 0.00 H2O
 1.81 2.0 6.00 0.16 0.00 0.68

(O + OH + F) = 0.84 Vacancies: 0.19 A 0.16 Y
 Dose (alphas/mg) = 0.456E+17 DPA (displacements/atom) = 5.6

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,Ba ,K ,La
 Mean A valence = 1.65

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

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.05	231.80	0.001	W
Ta2O5	74.20	220.90	1.765	Ta
Nb2O5	5.86	132.90	0.232	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	0.02	264.00	0.000	Th
UO2	0.00	270.00	0.000	U+4
UO3	0.97	286.00	0.018	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	0.19	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	0.00	233.00	0.000	Bi+3
MnO	0.08	70.94	0.006	Mn+2
FeO	0.01	71.85	0.001	Fe+2
CaO	11.00	56.08	1.031	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	4.28	30.99	0.726	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	2.39	19.00	0.661	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	99.29		6.144	O
LESS O=F	1.00			
TOTAL	98.29			

A B O (O OH F) . 0.00 H2O
 1.80 2.0 6.00 0.14 0.00 0.66

(O + OH + F) = 0.81 Vacancies: 0.20 A 0.19 Y
 Dose (alphas/mg) = 0.397E+17 DPA (displacements/atom) = 4.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.18	231.80	0.004 W
Ta2O5	76.10	220.90	1.787 Ta
Nb2O5	5.34	132.90	0.208 Nb
TiO2	0.01	79.90	0.001 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	0.13	286.00	0.002 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	0.16	164.10	0.005 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	10.70	56.08	0.990 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.01	153.30	0.000 Ba
PbO	0.01	223.20	0.000 Pb+2
Na2O	5.11	30.99	0.855 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.94	19.00	0.803 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.91		6.045 O
LESS O=F	1.23		
TOTAL	99.67		

A B O (O OH F) . 0.00 H2O
 1.86 2.0 6.00 0.04 0.00 0.80

(O + OH + F) = 0.85 Vacancies: 0.14 A 0.15 Y
 Dose (alphas/mg) = 0.511E+16 DPA (displacements/atom) = 0.6

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Ce ,Sb+3,U+6 ,Y ,Th ,Mn+2,Ba ,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	0.03	231.80	0.001 W
Ta2O5	75.70	220.90	1.788 Ta
Nb2O5	5.31	132.90	0.208 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	0.03	264.00	0.001 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.18	286.00	0.003 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	0.23	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	0.11	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	0.07	71.85	0.005 Fe+2
CaO	10.90	56.08	1.014 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	5.19	30.99	0.874 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.90	19.00	0.796 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.80		6.091 O
LESS O=F	1.22		
TOTAL	99.58		

A B O (O OH F) . 0.00 H2O
 1.91 2.0 6.00 0.09 0.00 0.80

(O + OH + F) = 0.89 Vacancies: 0.09 A 0.11 Y
 Dose (alphas/mg) = 0.724E+16 DPA (displacements/atom) = 0.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Ce ,Fe+2,Sb+3,U+6 ,Mn+2,Y ,Bi+3,Th ,Ba ,K
 Mean A valence = 1.56

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.06	231.80	0.001 W
Ta2O5	76.20	220.90	1.796 Ta
Nb2O5	5.14	132.90	0.201 Nb
TiO2	0.01	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	0.10	264.00	0.002 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.07	286.00	0.001 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	0.16	164.10	0.005 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	0.09	70.94	0.007 Mn+2
FeO	0.05	71.85	0.004 Fe+2
CaO	10.70	56.08	0.993 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.02	153.30	0.001 Ba
PbO	0.01	223.20	0.000 Pb+2
Na2O	5.01	30.99	0.842 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.74	19.00	0.751 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.51		6.073 O
LESS O=F	1.15		
TOTAL	99.36		

A B O (O OH F) . 0.00 H2O
 1.86 2.0 6.00 0.07 0.00 0.75

(O + OH + F) = 0.82 Vacancies: 0.14 A 0.18 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 ,Mn+2,Ce ,Fe+2,Y ,Sb+3,Th ,U+6 ,Ba ,Pb+2,K
 Mean A valence = 1.56

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

P10.1

OXIDE	WT %	MOL WT	ATOMS
W03	0.23	231.80	0.005 W
Ta205	75.70	220.90	1.785 Ta
Nb205	5.32	132.90	0.209 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	0.02	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	0.14	286.00	0.003 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	0.12	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	0.09	145.70	0.003 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.03	70.94	0.002 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	10.80	56.08	1.003 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	5.10	30.99	0.857 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.89	19.00	0.792 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.54		6.063 O
LESS O=F	1.21		
TOTAL	99.32		

A B O (O OH F) . 0.00 H2O
 1.88 2.0 6.00 0.06 0.00 0.79

(O + OH + F) = 0.86 Vacancies: 0.12 A 0.14 Y
 Dose (alphas/mg) = 0.555E+16 DPA (displacements/atom) = 0.7

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Ce ,Sb+3,Y ,U+6 ,Mn+2,Pb+2,Th ,K ,Sm ,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
W03	0.12	231.80	0.003 W
Ta205	75.10	220.90	1.778 Ta
Nb205	5.55	132.90	0.218 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	0.05	264.00	0.001 Th
U02	0.00	270.00	0.000 U+4
U03	0.12	286.00	0.002 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.02	112.90	0.001 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	0.09	145.70	0.003 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.02	70.94	0.001 Mn+2
FeO	0.05	71.85	0.004 Fe+2
CaO	10.90	56.08	1.017 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	5.14	30.99	0.868 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	3.04	19.00	0.837 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.42		6.063 O
LESS O=F	1.28		
TOTAL	99.14		

A B O (O OH F) . 0.00 H2O
 1.90 2.0 6.00 0.06 0.00 0.84

(O + OH + F) = 0.90 Vacancies: 0.10 A 0.10 Y
 Dose (alphas/mg) = 0.471E+16 DPA (displacements/atom) = 0.6

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Ce ,Fe+2,Sb+3,U+6 ,Mn+2,Th ,Y ,K ,Sm ,Nd
 Mean A valence = 1.56

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.00	231.80	0.000 W
Ta2O5	69.20	220.90	1.763 Ta
Nb2O5	4.81	132.90	0.204 Nb
TiO2	0.47	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	8.77	286.00	0.173 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	0.32	164.10	0.011 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	0.11	233.00	0.003 Bi+3
MnO	0.43	70.94	0.034 Mn+2
FeO	0.64	71.85	0.050 Fe+2
CaO	10.70	56.08	1.074 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	1.84	223.20	0.046 Pb+2
Na2O	1.99	30.99	0.361 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.05	140.90	0.002 Cs
F	1.00	19.00	0.296 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.43		6.766 O
LESS O=F	0.42		
TOTAL	100.01		

A B O (O OH F) . 0.00 H2O
 1.76 2.0 6.00 0.77 0.00 0.30

(O + OH + F) = 1.06 Vacancies: 0.24 A -0.06 Y
 Dose (alphas/mg) = 0.351E+18 DPA (displacements/atom) = 49.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Pb+2,Mn+2,Ce ,Sb+3,Bi+3,K ,Sm ,Pr
 Mean A valence = 2.20

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

OXIDE	WT %	MOL WT	ATOMS
W ₃	0.03	231.80	0.001 W
Ta ₂ O ₅	69.50	220.90	1.767 Ta
Nb ₂ O ₅	4.76	132.90	0.201 Nb
TiO ₂	0.43	79.90	0.030 Ti
ZrO ₂	0.00	123.20	0.000 Zr
SnO ₂	0.02	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	9.08	286.00	0.178 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	0.10	164.10	0.003 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	0.02	145.70	0.001 Sb+3
Bi ₂ O ₃	0.22	233.00	0.005 Bi+3
MnO	0.68	70.94	0.054 Mn+2
FeO	0.17	71.85	0.013 Fe+2
CaO	10.40	56.08	1.042 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	1.46	223.20	0.037 Pb+2
Na ₂ O	2.93	30.99	0.531 Na
K ₂ O	0.00	47.10	0.000 K
Cs ₂ O	0.02	140.90	0.001 Cs
F	1.81	19.00	0.535 F
H ₂ O+	0.00	9.01	0.000 OH
H ₂ O-	0.00	18.02	0.000 H ₂ O
TOTAL	101.63		6.678 O
LESS O=F	0.76		
TOTAL	100.87		

A B O (O OH F) . 0.00 H₂O
 1.87 2.0 6.00 0.68 0.00 0.54

(O + OH + F) = 1.21 Vacancies: 0.13 A -.21 Y
 Dose (alphas/mg) = 0.361E+18 DPA (displacements/atom) = 48.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Pb+2,Fe+2,Bi+3,Ce ,Sb+3,K ,Sm ,Nd
 Mean A valence = 2.10

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.00	231.80	0.000 W
Ta205	67.60	220.90	1.774 Ta
Nb205	4.56	132.90	0.199 Nb
Ti02	0.37	79.90	0.027 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	0.01	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	8.79	286.00	0.178 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	0.20	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	0.10	145.70	0.004 Sb+3
Bi203	0.13	233.00	0.003 Bi+3
Mn0	0.91	70.94	0.074 Mn+2
Fe0	0.81	71.85	0.065 Fe+2
Ca0	11.80	56.08	1.219 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	1.19	223.20	0.031 Pb+2
Na20	1.89	30.99	0.353 Na
K20	0.00	47.10	0.000 K
Cs20	0.00	140.90	0.000 Cs
F	1.49	19.00	0.454 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	99.87		6.882 O
LESS O=F	0.63		
TOTAL	99.25		

A B O (O OH F) . 0.00 H2O
 1.94 2.0 6.00 0.88 0.00 0.45

(O + OH + F) = 1.34 Vacancies: 0.06 A -.34 Y
 Dose (alphas/mg) = 0.355E+18 DPA (displacements/atom) = 48.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Fe+2,Pb+2,Ce ,Sb+3,Bi+3,Th ,K ,Pr
 Mean A valence = 2.19

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.22	231.80	0.005 W
Ta205	68.10	220.90	1.761 Ta
Nb205	4.63	132.90	0.199 Nb
Ti02	0.49	79.90	0.035 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	8.76	286.00	0.175 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	0.13	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	0.08	145.70	0.003 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
Mn0	1.08	70.94	0.087 Mn+2
Fe0	0.75	71.85	0.060 Fe+2
Ca0	12.10	56.08	1.232 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	1.22	223.20	0.031 Pb+2
Na20	2.17	30.99	0.400 Na
K20	0.00	47.10	0.000 K
Cs20	0.03	140.90	0.001 Cs
F	1.50	19.00	0.451 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	101.26		6.907 O
LESS O=F	0.63		
TOTAL	100.63		

A B O (O OH F) . 0.00 H2O
 1.99 2.0 6.00 0.91 0.00 0.45

(O + OH + F) = 1.36 Vacancies: 0.01 A - .36 Y
 Dose (alphas/mg) = 0.349E+18 DPA (displacements/atom) = 47.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Fe+2,Pb+2,Ce ,Sb+3,K ,Nd ,Sm ,Pr
 Mean A valence = 2.15

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.05	231.80	0.001 W
Ta205	70.00	220.90	1.791 Ta
Nb205	4.19	132.90	0.178 Nb
Ti02	0.40	79.90	0.028 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	8.57	286.00	0.169 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	0.14	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	0.03	145.70	0.001 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.90	70.94	0.072 Mn+2
FeO	0.50	71.85	0.039 Fe+2
CaO	11.30	56.08	1.139 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	1.62	223.20	0.041 Pb+2
Na2O	2.77	30.99	0.505 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.04	140.90	0.002 Cs
F	1.72	19.00	0.512 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	102.25		6.792 O
LESS O=F	0.72		
TOTAL	101.53		

A B O (O OH F) . 0.00 H2O
 1.97 2.0 6.00 0.79 0.00 0.51

(O + OH + F) = 1.30 Vacancies: 0.03 A -.30 Y
 Dose (alphas/mg) = 0.338E+18 DPA (displacements/atom) = 46.1

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Pb+2,Fe+2,Ce ,Sb+3,K ,Nd ,Sm ,Pr
 Mean A valence = 2.09

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.19	231.80	0.004 W
Ta2O5	71.50	220.90	1.774 Ta
Nb2O5	4.70	132.90	0.194 Nb
TiO2	0.41	79.90	0.028 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	8.61	286.00	0.165 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	0.14	164.10	0.005 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	0.09	145.70	0.003 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.01	70.94	0.001 Mn+2
FeO	0.03	71.85	0.002 Fe+2
CaO	8.97	56.08	0.876 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	1.71	223.20	0.042 Pb+2
Na2O	3.81	30.99	0.674 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.01	140.90	0.000 Cs
F	1.53	19.00	0.441 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.71		6.533 O
LESS O=F	0.64		
TOTAL	101.07		

A B O (O OH F) . 0.00 H2O
 1.77 2.0 6.00 0.53 0.00 0.44

(O + OH + F) = 0.97 Vacancies: 0.23 A 0.03 Y
 Dose (alphas/mg) = 0.341E+18 DPA (displacements/atom) = 46.1

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Pb+2,Ce ,Sb+3,Fe+2,Mn+2,K ,Nd ,Sm ,La
 Mean A valence = 2.00

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.01	231.80	0.000 W
Ta2O5	70.30	220.90	1.770 Ta
Nb2O5	4.81	132.90	0.201 Nb
TiO2	0.41	79.90	0.029 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	9.23	286.00	0.179 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	0.11	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	0.01	145.70	0.000 Sb+3
Bi2O3	0.24	233.00	0.006 Bi+3
MnO	0.05	70.94	0.004 Mn+2
FeO	0.09	71.85	0.007 Fe+2
CaO	8.25	56.08	0.818 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	2.19	223.20	0.055 Pb+2
Na2O	3.51	30.99	0.630 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.02	140.90	0.001 Cs
F	1.25	19.00	0.366 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.48		6.555 O
LESS O=F	0.52		
TOTAL	99.95		

A B O (O OH F) . 0.00 H2O
 1.70 2.0 6.00 0.55 0.00 0.37

(O + OH + F) = 0.92 Vacancies: 0.30 A 0.08 Y
 Dose (alphas/mg) = 0.370E+18 DPA (displacements/atom) = 50.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Pb+2,Fe+2,Bi+3,Mn+2,Ce ,Sb+3,K ,Sm ,Nd
 Mean A valence = 2.06

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.05	231.80	0.001 W
Ta205	70.00	220.90	1.763 Ta
Nb205	4.89	132.90	0.205 Nb
Ti02	0.42	79.90	0.029 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	9.43	286.00	0.183 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	0.19	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	0.06	145.70	0.002 Sb+3
Bi203	0.20	233.00	0.005 Bi+3
MnO	0.11	70.94	0.009 Mn+2
FeO	0.05	71.85	0.004 Fe+2
CaO	9.09	56.08	0.902 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	1.95	223.20	0.049 Pb+2
Na2O	3.29	30.99	0.591 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.01	140.90	0.000 Cs
F	1.22	19.00	0.357 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.00		6.636 O
LESS O=F	0.51		
TOTAL	100.49		

A B O (O OH F) . 0.00 H2O
 1.75 2.0 6.00 0.64 0.00 0.36

(O + OH + F) = 0.99 Vacancies: 0.25 A 0.01 Y
 Dose (alphas/mg) = 0.376E+18 DPA (displacements/atom) = 51.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Pb+2,Mn+2,Ce ,Bi+3,Fe+2,Sb+3,K ,Sm ,Nd
 Mean A valence = 2.09

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.10	231.80	0.002 W
Ta205	70.10	220.90	1.773 Ta
Nb205	4.71	132.90	0.198 Nb
Ti02	0.37	79.90	0.026 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	0.03	264.00	0.001 Th
U02	0.00	270.00	0.000 U+4
U03	9.05	286.00	0.177 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	0.19	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	0.04	145.70	0.002 Sb+3
Bi203	0.19	233.00	0.005 Bi+3
Mn0	0.00	70.94	0.000 Mn+2
Fe0	0.01	71.85	0.001 Fe+2
Ca0	9.11	56.08	0.908 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	1.73	223.20	0.043 Pb+2
Na20	3.35	30.99	0.604 Na
K20	0.00	47.10	0.000 K
Cs20	0.05	140.90	0.002 Cs
F	1.39	19.00	0.409 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	100.44		6.588 O
LESS O=F	0.58		
TOTAL	99.85		

A B O (O OH F) . 0.00 H2O
 1.75 2.0 6.00 0.59 0.00 0.41

(O + OH + F) = 1.00 Vacancies: 0.25 A 0.00 Y
 Dose (alphas/mg) = 0.363E+18 DPA (displacements/atom) = 49.7

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Pb+2,Ce ,Bi+3,Sb+3,Fe+2,Th ,K ,Sm ,Y
 Mean A valence = 2.07

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.11	231.80	0.003 W
Ta2O5	70.00	220.90	1.779 Ta
Nb2O5	4.53	132.90	0.191 Nb
TiO2	0.39	79.90	0.027 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	0.03	264.00	0.001 Th
UO2	0.00	270.00	0.000 U+4
UO3	8.91	286.00	0.175 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	0.11	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	0.31	233.00	0.007 Bi+3
MnO	0.06	70.94	0.005 Mn+2
FeO	0.00	71.85	0.000 Fe+2
CaO	8.52	56.08	0.853 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	2.16	223.20	0.054 Pb+2
Na2O	3.85	30.99	0.697 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.03	140.90	0.001 Cs
F	1.38	19.00	0.408 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.47		6.592 O
LESS O=F	0.58		
TOTAL	99.89		

A B O (O OH F) . 0.00 H2O
 1.80 2.0 6.00 0.59 0.00 0.41

(O + OH + F) = 1.00 Vacancies: 0.20 A 0.00 Y
 Dose (alphas/mg) = 0.357E+18 DPA (displacements/atom) = 48.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Pb+2,Bi+3,Mn+2,Ce ,Sb+3,Th ,K ,Sm ,Pr
 Mean A valence = 2.01

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.18	231.80	0.004 W
Ta2O5	64.80	220.90	1.517 Ta
Nb2O5	11.30	132.90	0.440 Nb
TiO2	0.61	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	0.19	264.00	0.004 Th
UO2	0.00	270.00	0.000 U+4
UO3	3.10	286.00	0.056 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	0.22	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	0.18	145.70	0.006 Sb+3
Bi2O3	0.03	233.00	0.001 Bi+3
MnO	0.31	70.94	0.023 Mn+2
FeO	0.01	71.85	0.001 Fe+2
CaO	11.60	56.08	1.070 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.12	223.20	0.003 Pb+2
Na2O	4.06	30.99	0.677 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.66	19.00	0.724 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.43		6.256 O
LESS O=F	1.12		
TOTAL	98.32		

A B O (O OH F) . 0.00 H2O
 1.85 2.0 6.00 0.26 0.00 0.72

(O + OH + F) = 0.98 Vacancies: 0.15 A 0.02 Y
 Dose (alphas/mg) = 0.126E+18 DPA (displacements/atom) = 15.1

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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