

OXIDE	WT %	MOL WT	ATOMS
W03	0.07	231.80	0.002 W
Ta205	72.90	220.90	1.754 Ta
Nb205	5.79	132.90	0.232 Nb
Ti02	0.19	79.90	0.013 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	1.92	286.00	0.036 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	0.17	145.70	0.006 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
Mn0	0.08	70.94	0.006 Mn+2
Fe0	0.00	71.85	0.000 Fe+2
Ca0	11.50	56.08	1.090 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	0.17	223.20	0.004 Pb+2
Na20	4.82	30.99	0.827 Na
K20	0.00	47.10	0.000 K
Cs20	0.00	140.90	0.000 Cs
F	2.26	19.00	0.632 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	99.87		6.308 O
LESS O=F	0.95		
TOTAL	98.92		

A B O (O OH F) . 0.00 H2O
 1.97 2.0 6.00 0.31 0.00 0.63

(O + OH + F) = 0.94 Vacancies: 0.03 A 0.06 Y
 Dose (alphas/mg) = 0.776E+17 DPA (displacements/atom) = 9.6

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Mn+2,Pb+2,K ,Ce ,Pr ,Nd ,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
W ₃	0.11	231.80	0.003 W
Ta ₂ O ₅	71.20	220.90	1.741 Ta
Nb ₂ O ₅	5.01	132.90	0.204 Nb
TiO ₂	0.78	79.90	0.053 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	3.04	286.00	0.057 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	0.24	145.70	0.009 Sb+3
Bi ₂ O ₃	0.00	233.00	0.000 Bi+3
MnO	0.21	70.94	0.016 Mn+2
FeO	0.26	71.85	0.020 Fe+2
CaO	12.20	56.08	1.175 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.54	223.20	0.013 Pb+2
Na ₂ O	3.65	30.99	0.636 Na
K ₂ O	0.00	47.10	0.000 K
Cs ₂ O	0.00	140.90	0.000 Cs
F	1.94	19.00	0.552 F
H ₂ O+	0.00	9.01	0.000 OH
H ₂ O-	0.00	18.02	0.000 H ₂ O
TOTAL	99.18		6.427 O
LESS O=F	0.81		
TOTAL	98.37		

A B O (O OH F) . 0.00 H₂O
 1.93 2.0 6.00 0.43 0.00 0.55

(O + OH + F) = 0.98 Vacancies: 0.07 A 0.02 Y
 Dose (alphas/mg) = 0.124E+18 DPA (displacements/atom) = 15.6

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Mn+2,Pb+2,Sb+3,K ,Pr ,Nd ,Sm ,Ce
 Mean A valence = 1.79

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.13	231.80	0.003 W
Ta205	71.70	220.90	1.758 Ta
Nb205	3.88	132.90	0.158 Nb
Ti02	1.19	79.90	0.081 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	3.24	286.00	0.061 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	0.23	145.70	0.009 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
Mn0	0.36	70.94	0.027 Mn+2
Fe0	0.14	71.85	0.011 Fe+2
Ca0	13.20	56.08	1.275 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	0.40	223.20	0.010 Pb+2
Na20	2.86	30.99	0.500 Na
K20	0.00	47.10	0.000 K
Cs20	0.00	140.90	0.000 Cs
F	1.55	19.00	0.442 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	98.88		6.510 O
LESS O=F	0.65		
TOTAL	98.23		

A B O (O OH F) . 0.00 H2O
 1.89 2.0 6.00 0.51 0.00 0.44

(O + OH + F) = 0.95 Vacancies: 0.11 A 0.05 Y
 Dose (alphas/mg) = 0.132E+18 DPA (displacements/atom) = 17.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Fe+2,Pb+2,Sb+3,K ,Pr ,Nd ,Sm ,Ce
 Mean A valence = 1.87

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.07	231.80	0.002 W
Ta2O5	70.50	220.90	1.713 Ta
Nb2O5	4.83	132.90	0.195 Nb
TiO2	1.34	79.90	0.090 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	3.74	286.00	0.070 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	0.38	145.70	0.014 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.62	70.94	0.047 Mn+2
FeO	0.37	71.85	0.028 Fe+2
CaO	12.10	56.08	1.158 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.17	223.20	0.004 Pb+2
Na2O	3.49	30.99	0.605 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.85	19.00	0.523 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.46		6.465 O
LESS O=F	0.78		
TOTAL	98.68		

A B O (O OH F) . 0.00 H2O
 1.93 2.0 6.00 0.47 0.00 0.52

(O + OH + F) = 0.99 Vacancies: 0.07 A 0.01 Y
 Dose (alphas/mg) = 0.152E+18 DPA (displacements/atom) = 19.2

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 = 1.84

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.07	231.80	0.002 W
Ta2O5	71.40	220.90	1.716 Ta
Nb2O5	5.27	132.90	0.211 Nb
TiO2	1.08	79.90	0.072 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	3.27	286.00	0.061 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	0.50	145.70	0.018 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.47	70.94	0.035 Mn+2
FeO	0.34	71.85	0.025 Fe+2
CaO	11.60	56.08	1.098 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.42	223.20	0.010 Pb+2
Na2O	3.23	30.99	0.553 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.53	19.00	0.428 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.18		6.406 O
LESS O=F	0.64		
TOTAL	98.54		

A B O (O OH F) . 0.00 H2O
 1.80 2.0 6.00 0.41 0.00 0.43

(O + OH + F) = 0.83 Vacancies: 0.20 A 0.17 Y
 Dose (alphas/mg) = 0.133E+18 DPA (displacements/atom) = 17.0

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 = 1.84

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.00	231.80	0.000 W
Ta2O5	72.30	220.90	1.748 Ta
Nb2O5	5.43	132.90	0.218 Nb
TiO2	0.51	79.90	0.034 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	2.45	286.00	0.046 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	0.27	145.70	0.010 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.88	70.94	0.066 Mn+2
FeO	0.42	71.85	0.031 Fe+2
CaO	13.90	56.08	1.324 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.23	223.20	0.006 Pb+2
Na2O	2.41	30.99	0.415 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.53	19.00	0.430 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.33		6.554 O
LESS O=F	0.64		
TOTAL	99.68		

A B O (O OH F) . 0.00 H2O
 1.90 2.0 6.00 0.55 0.00 0.43

(O + OH + F) = 0.98 Vacancies: 0.10 A 0.02 Y
 Dose (alphas/mg) = 0.983E+17 DPA (displacements/atom) = 12.6

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,Mn+2,U+6 ,Fe+2,Sb+3,Pb+2,K ,Pr ,Nd ,Sm ,La
 Mean A valence = 1.88

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.37	231.80	0.008 W
Ta205	63.90	220.90	1.535 Ta
Nb205	8.52	132.90	0.340 Nb
Ti02	1.76	79.90	0.117 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	8.62	286.00	0.160 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	0.28	145.70	0.010 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
Mn0	1.44	70.94	0.108 Mn+2
Fe0	0.04	71.85	0.003 Fe+2
Ca0	9.45	56.08	0.894 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	1.28	223.20	0.030 Pb+2
Na20	2.69	30.99	0.460 Na
K20	0.00	47.10	0.000 K
Cs20	0.00	140.90	0.000 Cs
F	1.38	19.00	0.385 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	99.73		6.514 O
LESS O=F	0.58		
TOTAL	99.15		

A B O (O OH F) . 0.00 H2O
 1.67 2.0 6.00 0.51 0.00 0.39

(O + OH + F) = 0.90 Vacancies: 0.33 A 0.10 Y
 Dose (alphas/mg) = 0.348E+18 DPA (displacements/atom) = 45.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Pb+2,Sb+3,Fe+2,K ,Pr ,Nd ,Sm ,La
 Mean A valence = 2.11

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.24	231.80	0.006 W
Ta2O5	65.20	220.90	1.668 Ta
Nb2O5	7.51	132.90	0.319 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	7.67	286.00	0.152 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	0.17	145.70	0.007 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	1.04	70.94	0.083 Mn+2
FeO	0.08	71.85	0.006 Fe+2
CaO	9.19	56.08	0.926 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	3.48	223.20	0.088 Pb+2
Na2O	1.85	30.99	0.337 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	0.17	19.00	0.051 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	96.70		6.710 O
LESS O=F	0.07		
TOTAL	96.63		

A B O (O OH F) . 0.00 H2O
 1.60 2.0 6.00 0.71 0.00 0.05

(O + OH + F) = 0.76 Vacancies: 0.40 A 0.24 Y
 Dose (alphas/mg) = 0.318E+18 DPA (displacements/atom) = 44.8

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 = 2.17

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.53	231.80	0.013 W
Ta2O5	64.10	220.90	1.652 Ta
Nb2O5	7.67	132.90	0.329 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	7.50	286.00	0.149 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	0.17	145.70	0.007 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	1.13	70.94	0.091 Mn+2
FeO	0.05	71.85	0.004 Fe+2
CaO	8.52	56.08	0.865 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	4.27	223.20	0.109 Pb+2
Na2O	2.16	30.99	0.397 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	0.20	19.00	0.060 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	96.39		6.698 O
LESS O=F	0.08		
TOTAL	96.31		

A B O (O OH F) . 0.00 H2O
 1.62 2.0 6.00 0.70 0.00 0.06

(O + OH + F) = 0.76 Vacancies: 0.38 A 0.24 Y
 Dose (alphas/mg) = 0.312E+18 DPA (displacements/atom) = 44.0

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 = 2.13

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.37	231.80	0.009 W
Ta205	62.10	220.90	1.558 Ta
Nb205	10.20	132.90	0.425 Nb
Ti02	0.11	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	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	8.06	286.00	0.156 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	0.005 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	1.20	70.94	0.094 Mn+2
FeO	0.07	71.85	0.005 Fe+2
CaO	10.90	56.08	1.077 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	1.39	223.20	0.035 Pb+2
Na2O	3.50	30.99	0.626 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.35	19.00	0.394 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.37		6.803 O
LESS O=F	0.57		
TOTAL	98.80		

A B O (O OH F) . 0.00 H2O
 2.00 2.0 6.00 0.80 0.00 0.39

(O + OH + F) = 1.20 Vacancies: 0.00 A - .20 Y
 Dose (alphas/mg) = 0.327E+18 DPA (displacements/atom) = 42.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.38	231.80	0.009 W
Ta205	61.70	220.90	1.560 Ta
Nb205	10.10	132.90	0.424 Nb
Ti02	0.09	79.90	0.006 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	8.06	286.00	0.157 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	0.20	145.70	0.008 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
Mn0	1.05	70.94	0.083 Mn+2
Fe0	0.03	71.85	0.002 Fe+2
Ca0	10.60	56.08	1.056 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	1.30	223.20	0.033 Pb+2
Na20	3.69	30.99	0.665 Na
K20	0.00	47.10	0.000 K
Cs20	0.00	140.90	0.000 Cs
F	1.19	19.00	0.350 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	98.39		6.816 O
LESS O=F	0.50		
TOTAL	97.89		

A B O (O OH F) . 0.00 H2O
 2.00 2.0 6.00 0.82 0.00 0.35

(O + OH + F) = 1.17 Vacancies: 0.00 A -.17 Y
 Dose (alphas/mg) = 0.330E+18 DPA (displacements/atom) = 43.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Pb+2,Sb+3,Fe+2,K ,Pr ,Nd ,Sm ,La
 Mean A valence = 1.99

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.41	231.80	0.010 W
Ta205	65.30	220.90	1.669 Ta
Nb205	7.44	132.90	0.316 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	0.00	264.00	0.000 Th
U02	0.00	270.00	0.000 U+4
U03	7.52	286.00	0.148 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	0.19	145.70	0.007 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
Mn0	1.11	70.94	0.088 Mn+2
Fe0	0.09	71.85	0.007 Fe+2
Ca0	10.80	56.08	1.087 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	0.88	223.20	0.022 Pb+2
Na20	3.43	30.99	0.625 Na
K20	0.00	47.10	0.000 K
Cs20	0.00	140.90	0.000 Cs
F	1.32	19.00	0.392 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	98.56		6.780 O
LESS O=F	0.55		
TOTAL	98.01		

A B O (O OH F) . 0.00 H2O
 1.99 2.0 6.00 0.78 0.00 0.39

(O + OH + F) = 1.17 Vacancies: 0.01 A -.17 Y
 Dose (alphas/mg) = 0.307E+18 DPA (displacements/atom) = 40.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Pb+2,Sb+3,Fe+2,K ,Pr ,Nd ,Sm ,La
 Mean A valence = 1.99

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.09	231.80	0.002 W
Ta205	59.60	220.90	1.503 Ta
Nb205	8.36	132.90	0.350 Nb
Ti02	2.07	79.90	0.144 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	9.26	286.00	0.180 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	0.25	145.70	0.010 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
Mn0	1.44	70.94	0.113 Mn+2
Fe0	0.00	71.85	0.000 Fe+2
Ca0	13.10	56.08	1.301 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.00	153.30	0.000 Ba
Pb0	1.51	223.20	0.038 Pb+2
Na20	2.54	30.99	0.457 Na
K20	0.00	47.10	0.000 K
Cs20	0.00	140.90	0.000 Cs
F	1.55	19.00	0.454 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	99.77		6.937 O
LESS O=F	0.65		
TOTAL	99.12		

A B O (O OH F) . 0.00 H2O
 2.10 2.0 6.00 0.94 0.00 0.45

(O + OH + F) = 1.39 Vacancies: -.10 A -.39 Y
 Dose (alphas/mg) = 0.374E+18 DPA (displacements/atom) = 48.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Pb+2,Sb+3,K ,Ce ,Pr ,Nd ,Sm ,La
 Mean A valence = 2.13

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.93

OXIDE	WT %	MOL WT	ATOMS
WO3	0.08	231.80	0.002 W
Ta2O5	59.30	220.90	1.520 Ta
Nb2O5	7.95	132.90	0.339 Nb
TiO2	1.97	79.90	0.140 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	8.89	286.00	0.176 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	0.27	145.70	0.010 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	1.56	70.94	0.124 Mn+2
FeO	0.02	71.85	0.002 Fe+2
CaO	13.10	56.08	1.322 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	1.59	223.20	0.040 Pb+2
Na2O	2.13	30.99	0.389 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.35	19.00	0.402 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.21		6.957 O
LESS O=F	0.57		
TOTAL	97.64		

A B O (O OH F) . 0.00 H2O
 2.06 2.0 6.00 0.96 0.00 0.40

(O + OH + F) = 1.36 Vacancies: -.06 A -.36 Y
 Dose (alphas/mg) = 0.365E+18 DPA (displacements/atom) = 48.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2 ,Pb+2 ,Sb+3 ,Fe+2 ,K ,Pr ,Nd ,Sm ,La
 Mean A valence = 2.16

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.93

OXIDE	WT %	MOL WT	ATOMS
WO3	0.27	231.80	0.007 W
Ta2O5	63.90	220.90	1.670 Ta
Nb2O5	7.34	132.90	0.319 Nb
TiO2	0.06	79.90	0.004 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	7.61	286.00	0.154 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	0.008 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	1.84	70.94	0.150 Mn+2
FeO	0.01	71.85	0.001 Fe+2
CaO	12.40	56.08	1.277 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	1.06	223.20	0.027 Pb+2
Na2O	2.39	30.99	0.445 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.37	19.00	0.416 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.44		6.942 O
LESS O=F	0.58		
TOTAL	97.86		

A B O (O OH F) . 0.00 H2O
 2.06 2.0 6.00 0.94 0.00 0.42

(O + OH + F) = 1.36 Vacancies: -.06 A -.36 Y
 Dose (alphas/mg) = 0.311E+18 DPA (displacements/atom) = 41.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.48	231.80	0.012 W
Ta2O5	65.20	220.90	1.671 Ta
Nb2O5	7.34	132.90	0.313 Nb
TiO2	0.07	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	7.96	286.00	0.157 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	0.17	145.70	0.007 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.75	70.94	0.060 Mn+2
FeO	0.03	71.85	0.002 Fe+2
CaO	11.90	56.08	1.201 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	1.88	30.99	0.343 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	0.53	19.00	0.158 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	97.93		6.883 O
LESS O=F	0.22		
TOTAL	97.70		

A B O (O OH F) . 0.00 H2O
 1.81 2.0 6.00 0.88 0.00 0.16

(O + OH + F) = 1.04 Vacancies: 0.19 A -.04 Y
 Dose (alphas/mg) = 0.326E+18 DPA (displacements/atom) = 45.1

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Pb+2,Sb+3,Fe+2,K ,Pr ,Nd ,Sm ,La
 Mean A valence = 2.16

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.39	231.80	0.010 W
Ta2O5	60.60	220.90	1.551 Ta
Nb2O5	10.20	132.90	0.434 Nb
TiO2	0.07	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	8.23	286.00	0.163 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	1.52	70.94	0.121 Mn+2
FeO	0.01	71.85	0.001 Fe+2
CaO	11.60	56.08	1.170 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	1.27	223.20	0.032 Pb+2
Na2O	2.90	30.99	0.529 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.19	19.00	0.354 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.17		6.913 O
LESS O=F	0.50		
TOTAL	97.67		

A B O (O OH F) . 0.00 H2O
 2.02 2.0 6.00 0.91 0.00 0.35

(O + OH + F) = 1.27 Vacancies: -.02 A -.27 Y
 Dose (alphas/mg) = 0.338E+18 DPA (displacements/atom) = 44.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS	
W03	0.34	231.80	0.008	W
Ta205	64.20	220.90	1.668	Ta
Nb205	7.38	132.90	0.319	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	0.00	264.00	0.000	Th
U02	0.00	270.00	0.000	U+4
U03	7.53	286.00	0.151	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	0.17	145.70	0.007	Sb+3
Bi203	0.00	233.00	0.000	Bi+3
MnO	1.75	70.94	0.142	Mn+2
FeO	0.03	71.85	0.002	Fe+2
CaO	11.60	56.08	1.187	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.00	153.30	0.000	Ba
PbO	0.93	223.20	0.024	Pb+2
Na2O	2.38	30.99	0.441	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	1.25	19.00	0.378	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	97.63		6.852	O
LESS O=F	0.52			
TOTAL	97.11			

A B O (O OH F) . 0.00 H2O
 1.95 2.0 6.00 0.85 0.00 0.38

(O + OH + F) = 1.23 Vacancies: 0.05 A -.23 Y
 Dose (alphas/mg) = 0.311E+18 DPA (displacements/atom) = 41.7

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

Lepidolite-Cleavelandite Subunit

OXIDE	WT %	MOL WT	ATOMS
WO3	0.00	231.80	0.000 W
Ta2O5	59.40	220.90	1.504 Ta
Nb2O5	10.10	132.90	0.425 Nb
TiO2	1.00	79.90	0.070 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	0.07	264.00	0.001 Th
UO2	0.00	270.00	0.000 U+4
UO3	9.40	286.00	0.184 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.03	112.90	0.001 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	0.25	145.70	0.010 Sb+3
Bi2O3	0.01	233.00	0.000 Bi+3
MnO	0.34	70.94	0.027 Mn+2
FeO	0.70	71.85	0.055 Fe+2
CaO	9.83	56.08	0.981 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.03	153.30	0.001 Ba
PbO	0.26	223.20	0.007 Pb+2
Na2O	3.23	30.99	0.583 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.46	19.00	0.430 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	96.27		6.690 O
LESS O=F	0.61		
TOTAL	95.65		

A B O (O OH F) . 0.00 H2O
 1.85 2.0 6.00 0.69 0.00 0.43

(O + OH + F) = 1.12 Vacancies: 0.15 A -.12 Y
 Dose (alphas/mg) = 0.394E+18 DPA (displacements/atom) = 51.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Mn+2,Sb+3,Pb+2,Ce ,Y ,Th ,Ba ,Bi+3
 Mean A valence = 2.09

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

P02.1

OXIDE	WT %	MOL WT	ATOMS
WO3	0.17	231.80	0.004 W
Ta2O5	66.50	220.90	1.684 Ta
Nb2O5	7.30	132.90	0.307 Nb
TiO2	0.07	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	7.00	286.00	0.137 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.01	112.90	0.000 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	0.42	70.94	0.033 Mn+2
FeO	0.20	71.85	0.016 Fe+2
CaO	9.76	56.08	0.973 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.01	153.30	0.000 Ba
PbO	0.23	223.20	0.006 Pb+2
Na2O	3.63	30.99	0.655 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.64	19.00	0.483 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	97.17		6.538 O
LESS O=F	0.69		
TOTAL	96.48		

A B O (O OH F) . 0.00 H2O
 1.83 2.0 6.00 0.54 0.00 0.48

(O + OH + F) = 1.02 Vacancies: 0.17 A -.02 Y
 Dose (alphas/mg) = 0.291E+18 DPA (displacements/atom) = 37.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2 ,Fe+2 ,Pb+2 ,Ce ,Sb+3 ,Y ,Ba ,K ,Pr
 Mean A valence = 1.95

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

P02.1

OXIDE	WT %	MOL WT	ATOMS
WO3	0.39	231.80	0.009 W
Ta2O5	67.60	220.90	1.679 Ta
Nb2O5	7.41	132.90	0.306 Nb
TiO2	0.05	79.90	0.003 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.07	150.70	0.003 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	7.01	286.00	0.135 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.03	112.90	0.001 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	0.11	145.70	0.004 Sb+3
Bi2O3	0.02	233.00	0.000 Bi+3
MnO	0.28	70.94	0.022 Mn+2
FeO	0.30	71.85	0.023 Fe+2
CaO	8.53	56.08	0.834 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.27	223.20	0.007 Pb+2
Na2O	3.92	30.99	0.694 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.61	19.00	0.465 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	97.71		6.420 O
LESS O=F	0.68		
TOTAL	97.04		

A B O (O OH F) . 0.00 H2O
 1.72 2.0 6.00 0.42 0.00 0.46

(O + OH + F) = 0.88 Vacancies: 0.28 A 0.12 Y
 Dose (alphas/mg) = 0.290E+18 DPA (displacements/atom) = 37.7

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.25	231.80	0.006 W
Ta2O5	66.90	220.90	1.679 Ta
Nb2O5	7.45	132.90	0.311 Nb
TiO2	0.05	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	7.44	286.00	0.144 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.03	112.90	0.001 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	0.10	145.70	0.004 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.24	70.94	0.019 Mn+2
FeO	0.29	71.85	0.022 Fe+2
CaO	9.57	56.08	0.946 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.19	223.20	0.005 Pb+2
Na2O	3.42	30.99	0.612 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.62	19.00	0.473 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	97.73		6.511 O
LESS O=F	0.68		
TOTAL	97.05		

A B O (O OH F) . 0.00 H2O
 1.76 2.0 6.00 0.51 0.00 0.47

(O + OH + F) = 0.98 Vacancies: 0.24 A 0.02 Y
 Dose (alphas/mg) = 0.307E+18 DPA (displacements/atom) = 40.2

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Mn+2,Pb+2,Sb+3,Ce ,Y ,Th ,K ,Pr
 Mean A valence = 1.99

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	63.20	220.90	1.613 Ta
Nb2O5	9.04	132.90	0.383 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	7.30	286.00	0.144 U+6
U3O8	0.00	842.00	0.000 U+8
Y2O3	0.03	112.90	0.001 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	0.11	145.70	0.004 Sb+3
Bi2O3	0.01	233.00	0.000 Bi+3
MnO	0.32	70.94	0.025 Mn+2
FeO	0.46	71.85	0.036 Fe+2
CaO	11.10	56.08	1.116 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.27	223.20	0.007 Pb+2
Na2O	2.64	30.99	0.480 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.04	140.90	0.002 Cs
F	1.60	19.00	0.475 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	96.32		6.633 O
LESS O=F	0.67		
TOTAL	95.65		

A B O (O OH F) . 0.00 H2O
 1.82 2.0 6.00 0.63 0.00 0.47

(O + OH + F) = 1.11 Vacancies: 0.18 A - .11 Y
 Dose (alphas/mg) = 0.306E+18 DPA (displacements/atom) = 39.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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	65.90	220.90	1.617 Ta
Nb2O5	9.10	132.90	0.371 Nb
TiO2	0.15	79.90	0.010 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	0.07	264.00	0.001 Th
UO2	0.00	270.00	0.000 U+4
UO3	7.88	286.00	0.149 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	0.14	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	0.12	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	0.08	71.85	0.006 Fe+2
CaO	7.91	56.08	0.764 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.26	223.20	0.006 Pb+2
Na2O	4.81	30.99	0.841 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.05	19.00	0.585 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.68		6.374 O
LESS O=F	0.86		
TOTAL	97.82		

A B O (O OH F) . 0.00 H2O
 1.79 2.0 6.00 0.37 0.00 0.58

(O + OH + F) = 0.96 Vacancies: 0.21 A 0.04 Y
 Dose (alphas/mg) = 0.323E+18 DPA (displacements/atom) = 41.1

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Na ,Ca ,U+6 ,Pb+2,Mn+2,Fe+2,Ce ,Sb+3,Y ,Th ,K ,Pr
 Mean A valence = 1.87

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.01	231.80	0.000 W
Ta205	61.40	220.90	1.579 Ta
Nb205	8.45	132.90	0.361 Nb
Ti02	0.83	79.90	0.059 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	8.71	286.00	0.173 U+6
U308	0.00	842.00	0.000 U+8
Y203	0.04	112.90	0.002 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	0.30	145.70	0.012 Sb+3
Bi203	0.07	233.00	0.002 Bi+3
Mn0	0.54	70.94	0.043 Mn+2
Fe0	0.49	71.85	0.039 Fe+2
Ca0	10.20	56.08	1.034 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.02	153.30	0.001 Ba
Pb0	0.23	223.20	0.006 Pb+2
Na20	3.28	30.99	0.601 Na
K20	0.00	47.10	0.000 K
Cs20	0.00	140.90	0.000 Cs
F	1.96	19.00	0.586 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	96.65		6.649 O
LESS O=F	0.82		
TOTAL	95.82		

A B O (O OH F) . 0.00 H2O
 1.92 2.0 6.00 0.65 0.00 0.59

(O + OH + F) = 1.23 Vacancies: 0.08 A -.23 Y
 Dose (alphas/mg) = 0.364E+18 DPA (displacements/atom) = 47.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.09	231.80	0.002 W
Ta205	68.50	220.90	1.672 Ta
Nb205	6.98	132.90	0.283 Nb
Ti02	0.63	79.90	0.043 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	3.95	286.00	0.074 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	0.19	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	0.21	145.70	0.008 Sb+3
Bi203	0.15	233.00	0.003 Bi+3
MnO	0.03	70.94	0.002 Mn+2
FeO	0.08	71.85	0.006 Fe+2
CaO	9.49	56.08	0.913 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.13	223.20	0.003 Pb+2
Na2O	3.75	30.99	0.653 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.01	140.90	0.000 Cs
F	1.80	19.00	0.511 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	96.07		6.229 O
LESS O=F	0.76		
TOTAL	95.32		

A B O (O OH F) . 0.00 H2O
 1.67 2.0 6.00 0.23 0.00 0.51

(O + OH + F) = 0.74 Vacancies: 0.33 A 0.26 Y
 Dose (alphas/mg) = 0.166E+18 DPA (displacements/atom) = 20.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.14	231.80	0.003 W
Ta2O5	68.40	220.90	1.638 Ta
Nb2O5	7.80	132.90	0.310 Nb
TiO2	0.73	79.90	0.048 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	4.41	286.00	0.082 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	0.13	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	0.21	145.70	0.008 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.04	70.94	0.003 Mn+2
FeO	0.07	71.85	0.005 Fe+2
CaO	11.20	56.08	1.056 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.09	223.20	0.002 Pb+2
Na2O	3.87	30.99	0.661 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.02	140.90	0.001 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	99.40		6.350 O
LESS O=F	0.89		
TOTAL	98.50		

A B O (O OH F) . 0.00 H2O
 1.83 2.0 6.00 0.35 0.00 0.59

(O + OH + F) = 0.94 Vacancies: 0.17 A 0.06 Y
 Dose (alphas/mg) = 0.179E+18 DPA (displacements/atom) = 22.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Sb+3,Fe+2,Y ,Ce ,Mn+2,Pb+2,Th ,K ,U+8
 Mean A valence = 1.83

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.10	231.80	0.002 W
Ta205	68.50	220.90	1.638 Ta
Nb205	7.78	132.90	0.309 Nb
Ti02	0.76	79.90	0.050 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	4.49	286.00	0.083 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	0.16	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	0.16	145.70	0.006 Sb+3
Bi203	0.05	233.00	0.001 Bi+3
MnO	0.33	70.94	0.025 Mn+2
FeO	0.27	71.85	0.020 Fe+2
CaO	9.90	56.08	0.933 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.10	223.20	0.002 Pb+2
Na2O	4.56	30.99	0.777 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.96	19.00	0.545 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.25		6.346 O
LESS O=F	0.82		
TOTAL	98.43		

A B O (O OH F) . 0.00 H2O
 1.86 2.0 6.00 0.35 0.00 0.54

(O + OH + F) = 0.89 Vacancies: 0.14 A 0.11 Y
 Dose (alphas/mg) = 0.183E+18 DPA (displacements/atom) = 22.8

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,Bi+3,Th ,K
 Mean A valence = 1.77

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.13	231.80	0.003 W
Ta2O5	68.10	220.90	1.646 Ta
Nb2O5	7.50	132.90	0.301 Nb
TiO2	0.74	79.90	0.049 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	4.19	286.00	0.078 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	0.16	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	0.15	145.70	0.005 Sb+3
Bi2O3	0.09	233.00	0.002 Bi+3
MnO	0.12	70.94	0.009 Mn+2
FeO	0.27	71.85	0.020 Fe+2
CaO	12.10	56.08	1.152 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	3.57	30.99	0.615 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.10	19.00	0.590 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.44		6.434 O
LESS O=F	0.88		
TOTAL	98.56		

A B O (O OH F) . 0.00 H2O
 1.89 2.0 6.00 0.43 0.00 0.59

(O + OH + F) = 1.02 Vacancies: 0.11 A -.02 Y
 Dose (alphas/mg) = 0.170E+18 DPA (displacements/atom) = 21.3

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,Bi+3,Th ,Ba
 Mean A valence = 1.85

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	68.40	220.90	1.704 Ta
Nb2O5	6.03	132.90	0.250 Nb
TiO2	0.65	79.90	0.045 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	3.93	286.00	0.076 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	0.22	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	0.20	145.70	0.008 Sb+3
Bi2O3	0.06	233.00	0.001 Bi+3
MnO	0.15	70.94	0.012 Mn+2
FeO	0.33	71.85	0.025 Fe+2
CaO	6.10	56.08	0.599 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.05	153.30	0.002 Ba
PbO	0.17	223.20	0.004 Pb+2
Na2O	0.55	30.99	0.098 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	0.67	19.00	0.194 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	87.68		5.830 O
LESS O=F	0.28		
TOTAL	87.40		

A B O (O OH F) . 0.00 H2O
 0.84 2.0 5.83 0.00 0.00 0.19

(O + OH + F) = 0.19 Vacancies: 1.16 A 0.81 Y
 Dose (alphas/mg) = 0.180E+18 DPA (displacements/atom) = 24.4

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,Ba ,Bi+3,K
 Mean A valence = 2.27

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.18	231.80	0.004 W
Ta205	66.60	220.90	1.630 Ta
Nb205	7.29	132.90	0.296 Nb
Ti02	1.02	79.90	0.069 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	0.08	264.00	0.002 Th
U02	0.00	270.00	0.000 U+4
U03	6.76	286.00	0.128 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	0.21	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	0.08	145.70	0.003 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.38	70.94	0.029 Mn+2
FeO	0.19	71.85	0.014 Fe+2
CaO	9.98	56.08	0.962 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.06	153.30	0.002 Ba
PbO	0.20	223.20	0.005 Pb+2
Na2O	3.92	30.99	0.684 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.91	19.00	0.543 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.98		6.458 O
LESS O=F	0.80		
TOTAL	98.18		

A B O (O OH F) . 0.00 H2O
 1.84 2.0 6.00 0.46 0.00 0.54

(O + OH + F) = 1.00 Vacancies: 0.16 A 0.00 Y
 Dose (alphas/mg) = 0.276E+18 DPA (displacements/atom) = 35.1

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.30	231.80	0.007 W
Ta2O5	69.10	220.90	1.702 Ta
Nb2O5	6.70	132.90	0.274 Nb
TiO2	0.23	79.90	0.016 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	5.02	286.00	0.096 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	0.24	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	0.11	145.70	0.004 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.23	70.94	0.018 Mn+2
FeO	0.76	71.85	0.058 Fe+2
CaO	10.90	56.08	1.057 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	3.68	30.99	0.646 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.20	19.00	0.630 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.76		6.451 O
LESS O=F	0.92		
TOTAL	98.84		

A B O (O OH F) . 0.00 H2O
 1.89 2.0 6.00 0.45 0.00 0.63

(O + OH + F) = 1.08 Vacancies: 0.11 A -.08 Y
 Dose (alphas/mg) = 0.204E+18 DPA (displacements/atom) = 25.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Mn+2,Ce ,Y ,Sb+3,Pb+2,Ba ,K ,Pr
 Mean A valence = 1.87

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.30	231.80	0.007 W
Ta205	66.90	220.90	1.631 Ta
Nb205	7.20	132.90	0.292 Nb
Ti02	1.03	79.90	0.069 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	6.67	286.00	0.126 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	0.17	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	0.09	145.70	0.003 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.31	70.94	0.024 Mn+2
FeO	0.28	71.85	0.021 Fe+2
CaO	10.00	56.08	0.960 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.03	153.30	0.001 Ba
PbO	0.26	223.20	0.006 Pb+2
Na2O	3.48	30.99	0.605 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.67	19.00	0.473 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.53		6.443 O
LESS O=F	0.70		
TOTAL	97.83		

A B O (O OH F) . 0.00 H2O
 1.76 2.0 6.00 0.44 0.00 0.47

(O + OH + F) = 0.92 Vacancies: 0.24 A 0.08 Y
 Dose (alphas/mg) = 0.273E+18 DPA (displacements/atom) = 35.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Fe+2,Pb+2,Ce ,Y ,Sb+3,Ba ,K ,Nd
 Mean A valence = 1.95

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.24	231.80	0.006 W
Ta205	63.40	220.90	1.618 Ta
Nb205	7.08	132.90	0.300 Nb
Ti02	1.06	79.90	0.075 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	6.74	286.00	0.133 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	0.10	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	0.16	145.70	0.006 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
Mn0	0.35	70.94	0.028 Mn+2
Fe0	0.63	71.85	0.049 Fe+2
Ca0	12.70	56.08	1.276 Ca
Sr0	0.00	103.60	0.000 Sr
Ba0	0.03	153.30	0.001 Ba
Pb0	0.26	223.20	0.007 Pb+2
Na20	2.26	30.99	0.411 Na
K20	0.00	47.10	0.000 K
Cs20	0.00	140.90	0.000 Cs
F	1.71	19.00	0.507 F
H20+	0.00	9.01	0.000 OH
H20-	0.00	18.02	0.000 H2O
TOTAL	96.87		6.699 O
LESS O=F	0.72		
TOTAL	96.15		

A B O (O OH F) . 0.00 H2O
 1.92 2.0 6.00 0.70 0.00 0.51

(O + OH + F) = 1.21 Vacancies: 0.08 A -.21 Y
 Dose (alphas/mg) = 0.281E+18 DPA (displacements/atom) = 36.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Mn+2,Pb+2,Sb+3,Y ,Ce ,Ba ,K ,Nd
 Mean A valence = 2.07

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.12	231.80	0.003 W
Ta2O5	65.30	220.90	1.635 Ta
Nb2O5	7.33	132.90	0.305 Nb
TiO2	0.81	79.90	0.056 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	0.00	264.00	0.000 Th
UO2	0.00	270.00	0.000 U+4
UO3	6.63	286.00	0.128 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	0.27	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	0.15	145.70	0.006 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.45	70.94	0.035 Mn+2
FeO	0.64	71.85	0.049 Fe+2
CaO	12.50	56.08	1.233 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.04	153.30	0.001 Ba
PbO	0.21	223.20	0.005 Pb+2
Na2O	2.47	30.99	0.441 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.57	19.00	0.457 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.59		6.701 O
LESS O=F	0.66		
TOTAL	97.93		

A B O (O OH F) . 0.00 H2O
 1.91 2.0 6.00 0.70 0.00 0.46

(O + OH + F) = 1.16 Vacancies: 0.09 A - .16 Y
 Dose (alphas/mg) = 0.271E+18 DPA (displacements/atom) = 35.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Mn+2,Ce ,Sb+3,Pb+2,Y ,Ba ,K ,La
 Mean A valence = 2.05

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

P07.1

OXIDE	WT %	MOL WT	ATOMS
W03	0.13	231.80	0.003 W
Ta205	66.10	220.90	1.624 Ta
Nb205	7.54	132.90	0.308 Nb
Ti02	0.94	79.90	0.064 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	0.05	264.00	0.001 Th
U02	0.00	270.00	0.000 U+4
U03	6.50	286.00	0.123 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	0.19	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	0.10	145.70	0.004 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.41	70.94	0.031 Mn+2
FeO	0.46	71.85	0.035 Fe+2
CaO	11.60	56.08	1.123 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.03	153.30	0.001 Ba
PbO	0.22	223.20	0.005 Pb+2
Na2O	2.68	30.99	0.469 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.42	19.00	0.406 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.50		6.592 O
LESS O=F	0.60		
TOTAL	97.91		

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) = 0.266E+18 DPA (displacements/atom) = 34.5

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Mn+2,Ce ,Pb+2,Y ,Sb+3,Ba ,Th ,K
 Mean A valence = 2.02

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.31	231.80	0.008 W
Ta205	63.40	220.90	1.615 Ta
Nb205	7.13	132.90	0.302 Nb
Ti02	1.05	79.90	0.074 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	6.85	286.00	0.135 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	0.15	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
MnO	0.48	70.94	0.038 Mn+2
FeO	0.83	71.85	0.065 Fe+2
CaO	12.40	56.08	1.244 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.01	153.30	0.000 Ba
PbO	0.21	223.20	0.005 Pb+2
Na2O	1.99	30.99	0.361 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.56	19.00	0.462 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	96.62		6.695 O
LESS O=F	0.66		
TOTAL	95.97		

A B O (O OH F) . 0.00 H2O
 1.86 2.0 6.00 0.69 0.00 0.46

(O + OH + F) = 1.16 Vacancies: 0.14 A -.16 Y
 Dose (alphas/mg) = 0.286E+18 DPA (displacements/atom) = 37.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Mn+2,Pb+2,Ce ,Sb+3,Y ,Ba ,K ,Pr
 Mean A valence = 2.10

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

Cleavelandite Unit (in Beryl Zone)

P01.1

OXIDE	WT %	MOL WT	ATOMS
W03	0.10	231.80	0.002 W
Ta205	71.20	220.90	1.724 Ta
Nb205	4.83	132.90	0.194 Nb
Ti02	1.18	79.90	0.079 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	0.13	264.00	0.003 Th
U02	0.00	270.00	0.000 U+4
U03	3.45	286.00	0.065 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	0.22	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	0.00	233.00	0.000 Bi+3
MnO	0.44	70.94	0.033 Mn+2
FeO	0.72	71.85	0.054 Fe+2
CaO	11.20	56.08	1.068 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.09	153.30	0.003 Ba
PbO	0.07	223.20	0.002 Pb+2
Na2O	3.26	30.99	0.563 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.09	140.90	0.003 Cs
F	2.11	19.00	0.594 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.32		6.331 O
LESS O=F	0.89		
TOTAL	98.44		

A B O (O OH F) . 0.00 H2O
 1.81 2.0 6.00 0.33 0.00 0.59

(O + OH + F) = 0.92 Vacancies: 0.19 A 0.08 Y
 Dose (alphas/mg) = 0.141E+18 DPA (displacements/atom) = 17.7

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

P01.1

OXIDE	WT %	MOL WT	ATOMS
WO3	0.12	231.80	0.003 W
Ta2O5	71.90	220.90	1.718 Ta
Nb2O5	5.39	132.90	0.214 Nb
TiO2	0.96	79.90	0.063 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.05	150.70	0.002 Sn
Fe2O3	0.00	159.70	0.000 Fe+3
ThO2	0.15	264.00	0.003 Th
UO2	0.00	270.00	0.000 U+4
UO3	3.41	286.00	0.063 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	0.18	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	0.12	145.70	0.004 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.27	70.94	0.020 Mn+2
FeO	0.41	71.85	0.030 Fe+2
CaO	11.50	56.08	1.082 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.06	153.30	0.002 Ba
PbO	0.08	223.20	0.002 Pb+2
Na2O	3.28	30.99	0.559 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.11	140.90	0.004 Cs
F	1.91	19.00	0.531 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.99		6.338 O
LESS O=F	0.80		
TOTAL	99.19		

A B O (O OH F) . 0.00 H2O
 1.78 2.0 6.00 0.34 0.00 0.53

(O + OH + F) = 0.87 Vacancies: 0.22 A 0.13 Y
 Dose (alphas/mg) = 0.138E+18 DPA (displacements/atom) = 17.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.15	231.80	0.003 W
Ta2O5	71.00	220.90	1.721 Ta
Nb2O5	5.17	132.90	0.208 Nb
TiO2	0.99	79.90	0.066 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	0.19	264.00	0.004 Th
UO2	0.00	270.00	0.000 U+4
UO3	3.55	286.00	0.066 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	0.17	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	0.11	145.70	0.004 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.26	70.94	0.020 Mn+2
FeO	0.38	71.85	0.028 Fe+2
CaO	11.60	56.08	1.107 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.04	153.30	0.001 Ba
PbO	0.07	223.20	0.002 Pb+2
Na2O	3.02	30.99	0.522 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.11	140.90	0.004 Cs
F	1.95	19.00	0.549 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.87		6.341 O
LESS O=F	0.82		
TOTAL	98.05		

A B O (O OH F) . 0.00 H2O
 1.77 2.0 6.00 0.34 0.00 0.55

(O + OH + F) = 0.89 Vacancies: 0.23 A 0.11 Y
 Dose (alphas/mg) = 0.145E+18 DPA (displacements/atom) = 18.4

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

P01.1

OXIDE	WT %	MOL WT	ATOMS
WO3	0.09	231.80	0.002 W
Ta2O5	71.10	220.90	1.721 Ta
Nb2O5	5.10	132.90	0.205 Nb
TiO2	1.06	79.90	0.071 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	0.29	264.00	0.006 Th
UO2	0.00	270.00	0.000 U+4
UO3	3.68	286.00	0.069 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	0.15	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	0.17	145.70	0.006 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.22	70.94	0.017 Mn+2
FeO	0.35	71.85	0.026 Fe+2
CaO	11.60	56.08	1.106 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.02	153.30	0.001 Ba
PbO	0.09	223.20	0.002 Pb+2
Na2O	3.17	30.99	0.547 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.11	140.90	0.004 Cs
F	1.96	19.00	0.552 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	99.27		6.358 O
LESS O=F	0.82		
TOTAL	98.44		

A B O (O OH F) . 0.00 H2O
 1.79 2.0 6.00 0.36 0.00 0.55

(O + OH + F) = 0.91 Vacancies: 0.21 A 0.09 Y
 Dose (alphas/mg) = 0.150E+18 DPA (displacements/atom) = 19.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

P01.1

OXIDE	WT %	MOL WT	ATOMS
WO3	0.03	231.80	0.001 W
Ta2O5	71.70	220.90	1.718 Ta
Nb2O5	5.30	132.90	0.211 Nb
TiO2	1.04	79.90	0.069 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	0.16	264.00	0.003 Th
UO2	0.00	270.00	0.000 U+4
UO3	3.76	286.00	0.070 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	0.17	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	0.14	70.94	0.010 Mn+2
FeO	0.39	71.85	0.029 Fe+2
CaO	10.70	56.08	1.010 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.02	153.30	0.001 Ba
PbO	0.09	223.20	0.002 Pb+2
Na2O	4.28	30.99	0.731 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.10	140.90	0.004 Cs
F	2.36	19.00	0.657 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.53		6.294 O
LESS O=F	0.99		
TOTAL	99.54		

A B O (O OH F) . 0.00 H2O
 1.87 2.0 6.00 0.29 0.00 0.66

(O + OH + F) = 0.95 Vacancies: 0.13 A 0.05 Y
 Dose (alphas/mg) = 0.151E+18 DPA (displacements/atom) = 18.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.08	231.80	0.002 W
Ta205	72.10	220.90	1.728 Ta
Nb205	4.74	132.90	0.189 Nb
Ti02	1.20	79.90	0.080 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	0.17	264.00	0.003 Th
U02	0.00	270.00	0.000 U+4
U03	3.45	286.00	0.064 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	0.13	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	0.13	145.70	0.005 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.27	70.94	0.020 Mn+2
FeO	0.44	71.85	0.032 Fe+2
CaO	11.30	56.08	1.067 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.04	153.30	0.001 Ba
PbO	0.09	223.20	0.002 Pb+2
Na2O	3.57	30.99	0.610 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.12	140.90	0.005 Cs
F	2.15	19.00	0.599 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.13		6.309 O
LESS O=F	0.90		
TOTAL	99.23		

A B O (O OH F) . 0.00 H2O
 1.82 2.0 6.00 0.31 0.00 0.60

(O + OH + F) = 0.91 Vacancies: 0.18 A 0.09 Y
 Dose (alphas/mg) = 0.139E+18 DPA (displacements/atom) = 17.5

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Mn+2,Sb+3,Y ,Ce ,Th ,Pb+2,Ba ,K
 Mean A valence = 1.81

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

P01.1

OXIDE	WT %	MOL WT	ATOMS
W03	0.15	231.80	0.003 W
Ta205	72.10	220.90	1.729 Ta
Nb205	4.53	132.90	0.181 Nb
Ti02	1.30	79.90	0.086 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.03	150.70	0.001 Sn
Fe203	0.00	159.70	0.000 Fe+3
Th02	0.16	264.00	0.003 Th
U02	0.00	270.00	0.000 U+4
U03	3.93	286.00	0.073 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	0.16	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	0.12	145.70	0.004 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.17	70.94	0.013 Mn+2
FeO	0.30	71.85	0.022 Fe+2
CaO	10.90	56.08	1.029 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.07	153.30	0.002 Ba
PbO	0.10	223.20	0.002 Pb+2
Na2O	3.83	30.99	0.655 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.10	140.90	0.004 Cs
F	2.05	19.00	0.571 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.09		6.316 O
LESS O=F	0.86		
TOTAL	99.23		

A B O (O OH F) . 0.00 H2O
 1.82 2.0 6.00 0.32 0.00 0.57

(O + OH + F) = 0.89 Vacancies: 0.18 A 0.11 Y
 Dose (alphas/mg) = 0.159E+18 DPA (displacements/atom) = 20.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Mn+2,Ce ,Sb+3,Y ,Th ,Ba ,Pb+2,K
 Mean A valence = 1.81

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

OXIDE	WT %	MOL WT	ATOMS
W03	0.37	231.80	0.009 W
Ta205	78.00	220.90	1.882 Ta
Nb205	2.55	132.90	0.102 Nb
Ti02	0.09	79.90	0.006 Ti
Zr02	0.00	123.20	0.000 Zr
Sn02	0.03	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	1.12	286.00	0.021 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	0.25	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	0.21	145.70	0.008 Sb+3
Bi203	0.00	233.00	0.000 Bi+3
MnO	0.05	70.94	0.004 Mn+2
FeO	0.09	71.85	0.007 Fe+2
CaO	10.40	56.08	0.989 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.09	153.30	0.003 Ba
PbO	0.22	223.20	0.005 Pb+2
Na2O	4.37	30.99	0.752 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.57	19.00	0.721 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	100.48		6.115 O
LESS O=F	1.08		
TOTAL	99.40		

A B O (O OH F) . 0.00 H2O
 1.80 2.0 6.00 0.11 0.00 0.72

(O + OH + F) = 0.84 Vacancies: 0.20 A 0.16 Y
 Dose (alphas/mg) = 0.453E+17 DPA (displacements/atom) = 5.7

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.25	231.80	0.006 W
Ta2O5	74.50	220.90	1.752 Ta
Nb2O5	5.85	132.90	0.229 Nb
TiO2	0.18	79.90	0.012 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.05	150.70	0.002 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	0.60	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	0.21	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	0.19	145.70	0.007 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.05	70.94	0.004 Mn+2
FeO	0.08	71.85	0.006 Fe+2
CaO	11.30	56.08	1.047 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.00	153.30	0.000 Ba
PbO	0.10	223.20	0.002 Pb+2
Na2O	4.59	30.99	0.770 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	3.07	19.00	0.840 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.19		6.083 O
LESS O=F	1.29		
TOTAL	99.90		

A B O (O OH F) . 0.00 H2O
 1.86 2.0 6.00 0.08 0.00 0.84

(O + OH + F) = 0.92 Vacancies: 0.14 A 0.08 Y
 Dose (alphas/mg) = 0.242E+17 DPA (displacements/atom) = 2.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.35	231.80	0.008 W
Ta2O5	74.60	220.90	1.759 Ta
Nb2O5	5.71	132.90	0.224 Nb
TiO2	0.11	79.90	0.007 Ti
ZrO2	0.00	123.20	0.000 Zr
SnO2	0.06	150.70	0.002 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	0.55	286.00	0.010 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	0.26	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	0.17	145.70	0.006 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.00	70.94	0.000 Mn+2
FeO	0.09	71.85	0.007 Fe+2
CaO	11.40	56.08	1.059 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.03	153.30	0.001 Ba
PbO	0.18	223.20	0.004 Pb+2
Na2O	4.58	30.99	0.770 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.01	140.90	0.000 Cs
F	3.17	19.00	0.869 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.37		6.079 O
LESS O=F	1.33		
TOTAL	100.04		

A B O (O OH F) . 0.00 H2O
 1.87 2.0 6.00 0.08 0.00 0.87

(O + OH + F) = 0.95 Vacancies: 0.13 A 0.05 Y
 Dose (alphas/mg) = 0.221E+17 DPA (displacements/atom) = 2.7

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Ce ,Fe+2,Sb+3,Y ,Pb+2,Ba ,K ,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	0.39	231.80	0.009 W
Ta2O5	75.20	220.90	1.749 Ta
Nb2O5	6.22	132.90	0.240 Nb
TiO2	0.01	79.90	0.001 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	0.13	264.00	0.003 Th
UO2	0.00	270.00	0.000 U+4
UO3	0.64	286.00	0.011 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	0.19	145.70	0.007 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.07	70.94	0.005 Mn+2
FeO	0.11	71.85	0.008 Fe+2
CaO	11.20	56.08	1.026 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.02	153.30	0.001 Ba
PbO	0.17	223.20	0.004 Pb+2
Na2O	4.54	30.99	0.753 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	3.01	19.00	0.814 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	102.24		6.082 O
LESS O=F	1.26		
TOTAL	100.97		

A B O (O OH F) . 0.00 H2O
 1.83 2.0 6.00 0.08 0.00 0.81

(O + OH + F) = 0.90 Vacancies: 0.17 A 0.10 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 ,Fe+2,Sb+3,Ce ,Mn+2,Y ,Pb+2,Th ,Ba ,K
 Mean A valence = 1.63

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

OXIDE	WT %	MOL WT	ATOMS
WO3	0.29	231.80	0.007 W
Ta2O5	74.20	220.90	1.755 Ta
Nb2O5	5.94	132.90	0.234 Nb
TiO2	0.05	79.90	0.003 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	0.08	264.00	0.002 Th
UO2	0.00	270.00	0.000 U+4
UO3	1.66	286.00	0.030 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	0.24	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	0.19	145.70	0.007 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.03	70.94	0.002 Mn+2
FeO	0.10	71.85	0.007 Fe+2
CaO	11.10	56.08	1.034 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.04	153.30	0.001 Ba
PbO	0.18	223.20	0.004 Pb+2
Na2O	4.34	30.99	0.732 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	2.57	19.00	0.707 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	101.14		6.185 O
LESS O=F	1.08		
TOTAL	100.06		

A B O (O OH F) . 0.00 H2O
 1.83 2.0 6.00 0.19 0.00 0.71

(O + OH + F) = 0.89 Vacancies: 0.17 A 0.11 Y
 Dose (alphas/mg) = 0.666E+17 DPA (displacements/atom) = 8.2

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

P05.1

OXIDE	WT %	MOL WT	ATOMS
WO3	0.15	231.80	0.003 W
Ta2O5	60.60	220.90	1.430 Ta
Nb2O5	10.40	132.90	0.408 Nb
TiO2	2.41	79.90	0.157 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	0.05	264.00	0.001 Th
UO2	0.00	270.00	0.000 U+4
UO3	5.97	286.00	0.109 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	0.42	145.70	0.015 Sb+3
Bi2O3	0.00	233.00	0.000 Bi+3
MnO	0.44	70.94	0.032 Mn+2
FeO	0.22	71.85	0.016 Fe+2
CaO	11.90	56.08	1.106 Ca
SrO	0.00	103.60	0.000 Sr
BaO	0.01	153.30	0.000 Ba
PbO	0.78	223.20	0.018 Pb+2
Na2O	3.15	30.99	0.530 Na
K2O	0.00	47.10	0.000 K
Cs2O	0.00	140.90	0.000 Cs
F	1.76	19.00	0.483 F
H2O+	0.00	9.01	0.000 OH
H2O-	0.00	18.02	0.000 H2O
TOTAL	98.58		6.486 O
LESS O=F	0.74		
TOTAL	97.85		

A B O (O OH F) . 0.00 H2O
 1.84 2.0 6.00 0.49 0.00 0.48

(O + OH + F) = 0.97 Vacancies: 0.16 A 0.03 Y
 Dose (alphas/mg) = 0.245E+18 DPA (displacements/atom) = 30.1

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Mn+2,Pb+2,Fe+2,Sb+3,Ce ,Y ,Th ,Ba ,K
 Mean A valence = 1.96

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
 Mean B valence = 4.92