P05.1

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.16	231.80	0.004	W
Ta2O5	59.80	220.90	1.432	Ta
Nb2O5	9.39	132.90	0.374	Nb
TiO2	2.87	79.90	0.190	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	6.45	286.00	0.119	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	0.26	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	0.28	145.70	0.010	Sb+3
Bi2O3	0.00	233.00	0.000	Bi+3
MnO	0.62	70.94	0.046	Mn+2
FeO	0.53	71.85	0.039	Fe+2
CaO	11.90	56.08	1.123	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.00	153.30	0.000	Ba
PbO	0.99	223.20	0.023	Pb+2
Na2O	3.00	30.99	0.512	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	1.74	19.00	0.485	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	98.21		6.550	O
LESS O=F	0.73			
TOTAL	97.48			

A	B	O	(O	OH	F	) . 0.00 H2O
1.89	2.0	6.00	0.55	0.00	0.48	

(O + OH + F) = 1.03 Vacancies: 0.11 A -.03 Y
Dose (alphas/mg) = 0.265E+18 DPA (displacements/atom) = 32.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
Mean B valence = 4.91

P05.1

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.21	231.80	0.005	W
Ta2O5	58.70	220.90	1.368	Ta
Nb2O5	10.90	132.90	0.422	Nb
TiO2	3.18	79.90	0.205	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	7.39	286.00	0.133	U+6
U3O8	0.00	842.00	0.000	U+8
Y2O3	0.12	112.90	0.005	Y
La2O3	0.00	162.90	0.000	La
Ce2O3	0.35	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	0.34	145.70	0.012	Sb+3
Bi2O3	0.00	233.00	0.000	Bi+3
MnO	1.25	70.94	0.091	Mn+2
FeO	0.62	71.85	0.044	Fe+2
CaO	10.90	56.08	1.001	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.01	153.30	0.000	Ba
PbO	1.02	223.20	0.024	Pb+2
Na2O	2.40	30.99	0.399	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	0.99	19.00	0.268	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	98.47		6.570	O
LESS O=F	0.42			
TOTAL	98.06			

A	B	O	(O	OH	F	) . 0.00 H2O
1.72	2.0	6.00	0.57	0.00	0.27	

(O + OH + F) = 0.84 Vacancies: 0.28 A 0.16 Y
Dose (alphas/mg) = 0.302E+18 DPA (displacements/atom) = 38.0

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
Mean B valence = 4.90

P05.1

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.31	231.80	0.007	W
Ta2O5	59.10	220.90	1.386	Ta
Nb2O5	10.20	132.90	0.397	Nb
TiO2	3.23	79.90	0.209	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	0.06	264.00	0.001	Th
UO2	0.00	270.00	0.000	U+4
UO3	7.26	286.00	0.131	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	0.23	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	0.38	145.70	0.014	Sb+3
Bi2O3	0.00	233.00	0.000	Bi+3
MnO	0.70	70.94	0.051	Mn+2
FeO	0.43	71.85	0.031	Fe+2
CaO	11.40	56.08	1.053	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.00	153.30	0.000	Ba
PbO	1.19	223.20	0.028	Pb+2
Na2O	2.76	30.99	0.461	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	1.35	19.00	0.368	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	98.70		6.541	O
LESS O=F	0.57			
TOTAL	98.13			

A	B	O	(O	OH	F	) . 0.00 H2O
1.78	2.0	6.00	0.54	0.00	0.37	

(O + OH + F) = 0.91 Vacancies: 0.22 A 0.09 Y
Dose (alphas/mg) = 0.296E+18 DPA (displacements/atom) = 36.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
Mean B valence = 4.90

P05.1

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.13	231.80	0.003	W
Ta2O5	60.50	220.90	1.421	Ta
Nb2O5	10.10	132.90	0.394	Nb
TiO2	2.79	79.90	0.181	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	0.15	264.00	0.003	Th
UO2	0.00	270.00	0.000	U+4
UO3	6.65	286.00	0.121	U+6
U3O8	0.00	842.00	0.000	U+8
Y2O3	0.12	112.90	0.006	Y
La2O3	0.00	162.90	0.000	La
Ce2O3	0.23	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	0.26	145.70	0.009	Sb+3
Bi2O3	0.00	233.00	0.000	Bi+3
MnO	0.56	70.94	0.041	Mn+2
FeO	0.82	71.85	0.059	Fe+2
CaO	11.60	56.08	1.073	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.09	153.30	0.003	Ba
PbO	0.83	223.20	0.019	Pb+2
Na2O	3.26	30.99	0.546	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	1.63	19.00	0.445	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	99.75		6.557	O
LESS O=F	0.68			
TOTAL	99.07			

A	B	O	(O	OH	F	) . 0.00 H2O
1.89	2.0	6.00	0.56	0.00	0.45	

(O + OH + F) = 1.00 Vacancies: 0.11 A 0.00 Y
Dose (alphas/mg) = 0.269E+18 DPA (displacements/atom) = 33.3

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 ,Ba ,Th ,K
Mean A valence = 1.98

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
Mean B valence = 4.91

P21.1

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.00	231.80	0.000	W
Ta2O5	69.80	220.90	1.702	Ta
Nb2O5	6.68	132.90	0.271	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	0.05	264.00	0.001	Th
UO2	0.00	270.00	0.000	U+4
UO3	2.75	286.00	0.052	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	0.03	164.10	0.001	Ce
Pr2O3	0.00	164.90	0.000	Pr
Nd2O3	0.00	168.20	0.000	Nd
Sm2O3	0.00	174.40	0.000	Sm
Sb2O3	0.09	145.70	0.003	Sb+3
Bi2O3	0.00	233.00	0.000	Bi+3
MnO	0.21	70.94	0.016	Mn+2
FeO	0.27	71.85	0.020	Fe+2
CaO	11.90	56.08	1.143	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	3.00	30.99	0.521	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.04	140.90	0.002	Cs
F	1.95	19.00	0.553	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	97.33		6.322	O
LESS O=F	0.82			
TOTAL	96.52			

A	B	O	(O	OH	F	) . 0.00 H2O
1.76	2.0	6.00	0.32	0.00	0.55	

(O + OH + F) = 0.87 Vacancies: 0.24 A 0.13 Y

Dose (alphas/mg) = 0.114E+18 DPA (displacements/atom) = 14.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Fe+2,Mn+2,Y ,Sb+3,Pb+2,Th ,Ce ,K ,Sm

Mean A valence = 1.83

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

Mean B valence = 4.99

P21.1

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.00	231.80	0.000	W
Ta2O5	70.30	220.90	1.668	Ta
Nb2O5	8.38	132.90	0.331	Nb
TiO2	0.02	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	2.17	286.00	0.040	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	0.06	164.10	0.002	Ce
Pr2O3	0.00	164.90	0.000	Pr
Nd2O3	0.00	168.20	0.000	Nd
Sm2O3	0.00	174.40	0.000	Sm
Sb2O3	0.05	145.70	0.002	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	11.20	56.08	1.047	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	4.28	30.99	0.724	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.02	140.90	0.001	Cs
F	2.63	19.00	0.726	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	99.33		6.184	O
LESS O=F	1.10			
TOTAL	98.23			

A	B	O	(O	OH	F	) . 0.00 H2O
1.83	2.0	6.00	0.18	0.00	0.73	

(O + OH + F) = 0.91 Vacancies: 0.17 A 0.09 Y
Dose (alphas/mg) = 0.886E+17 DPA (displacements/atom) = 10.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

P21.1

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.10	231.80	0.002	W
Ta2O5	73.20	220.90	1.761	Ta
Nb2O5	5.21	132.90	0.208	Nb
TiO2	0.43	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	2.32	286.00	0.043	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	0.07	164.10	0.002	Ce
Pr2O3	0.00	164.90	0.000	Pr
Nd2O3	0.00	168.20	0.000	Nd
Sm2O3	0.00	174.40	0.000	Sm
Sb2O3	0.09	145.70	0.003	Sb+3
Bi2O3	0.00	233.00	0.000	Bi+3
MnO	0.21	70.94	0.016	Mn+2
FeO	0.27	71.85	0.020	Fe+2
CaO	11.70	56.08	1.109	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	3.41	30.99	0.585	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	2.04	19.00	0.571	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	99.22		6.283	O
LESS O=F	0.86			
TOTAL	98.36			

A	B	O	(O	OH	F	) . 0.00 H2O
1.78	2.0	6.00	0.28	0.00	0.57	

(O + OH + F) = 0.85 Vacancies: 0.22 A 0.15 Y
Dose (alphas/mg) = 0.945E+17 DPA (displacements/atom) = 11.9

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

P21.1

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.10	231.80	0.002	W
Ta2O5	75.20	220.90	1.833	Ta
Nb2O5	3.44	132.90	0.139	Nb
TiO2	0.37	79.90	0.025	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	0.01	264.00	0.000	Th
UO2	0.00	270.00	0.000	U+4
UO3	2.27	286.00	0.043	U+6
U3O8	0.00	842.00	0.000	U+8
Y2O3	0.03	112.90	0.001	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	0.12	145.70	0.004	Sb+3
Bi2O3	0.03	233.00	0.001	Bi+3
MnO	0.33	70.94	0.025	Mn+2
FeO	0.30	71.85	0.022	Fe+2
CaO	10.90	56.08	1.047	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.02	153.30	0.001	Ba
PbO	0.06	223.20	0.001	Pb+2
Na2O	3.53	30.99	0.613	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.01	140.90	0.000	Cs
F	2.32	19.00	0.658	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	99.17		6.208	O
LESS O=F	0.97			
TOTAL	98.19			

A	B	O	(O	OH	F	) . 0.00 H2O
1.76	2.0	6.00	0.21	0.00	0.66	

(O + OH + F) = 0.87 Vacancies: 0.24 A 0.13 Y
Dose (alphas/mg) = 0.925E+17 DPA (displacements/atom) = 11.7

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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

P21.1

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.05	231.80	0.001	W
Ta2O5	68.70	220.90	1.681	Ta
Nb2O5	7.52	132.90	0.306	Nb
TiO2	0.17	79.90	0.012	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	2.39	286.00	0.045	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	0.07	164.10	0.002	Ce
Pr2O3	0.00	164.90	0.000	Pr
Nd2O3	0.00	168.20	0.000	Nd
Sm2O3	0.00	174.40	0.000	Sm
Sb2O3	0.09	145.70	0.003	Sb+3
Bi2O3	0.00	233.00	0.000	Bi+3
MnO	0.43	70.94	0.033	Mn+2
FeO	0.48	71.85	0.036	Fe+2
CaO	11.70	56.08	1.128	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.00	153.30	0.000	Ba
PbO	0.21	223.20	0.005	Pb+2
Na2O	3.01	30.99	0.525	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.01	140.90	0.000	Cs
F	2.03	19.00	0.578	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	96.92		6.319	O
LESS O=F	0.85			
TOTAL	96.07			

A	B	O	(O	OH	F	) . 0.00 H2O
1.78	2.0	6.00	0.32	0.00	0.58	

(O + OH + F) = 0.90 Vacancies: 0.22 A 0.10 Y

Dose (alphas/mg) = 0.998E+17 DPA (displacements/atom) = 12.5

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 ,K ,Sm ,Nd

Mean A valence = 1.81

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

Mean B valence = 4.99

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.22	231.80	0.005	W
Ta2O5	61.80	220.90	1.473	Ta
Nb2O5	10.10	132.90	0.400	Nb
TiO2	1.85	79.90	0.122	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	5.14	286.00	0.095	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	0.32	145.70	0.012	Sb+3
Bi2O3	0.00	233.00	0.000	Bi+3
MnO	0.10	70.94	0.007	Mn+2
FeO	0.07	71.85	0.005	Fe+2
CaO	11.40	56.08	1.070	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.00	153.30	0.000	Ba
PbO	0.75	223.20	0.018	Pb+2
Na2O	3.49	30.99	0.593	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	1.72	19.00	0.477	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	96.96		6.401	O
LESS O=F	0.72			
TOTAL	96.24			

A	B	O	(O	OH	F	) . 0.00 H2O
1.80	2.0	6.00	0.40	0.00	0.48	

(O + OH + F) = 0.88 Vacancies: 0.20 A 0.12 Y
Dose (alphas/mg) = 0.214E+18 DPA (displacements/atom) = 26.3

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

A = Ca ,Na ,U+6 ,Pb+2,Sb+3,Mn+2,Fe+2,K ,Pr ,Nd ,Sm ,Y
Mean A valence = 1.89

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
Mean B valence = 4.94

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.37	231.80	0.008	W
Ta2O5	63.60	220.90	1.496	Ta
Nb2O5	9.67	132.90	0.378	Nb
TiO2	1.81	79.90	0.118	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	4.78	286.00	0.087	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	0.69	70.94	0.051	Mn+2
FeO	0.46	71.85	0.033	Fe+2
CaO	11.20	56.08	1.038	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.00	153.30	0.000	Ba
PbO	0.45	223.20	0.010	Pb+2
Na2O	4.00	30.99	0.671	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	2.08	19.00	0.569	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	99.49		6.409	O
LESS O=F	0.87			
TOTAL	98.61			

A	B	O	(O	OH	F	) . 0.00 H2O
1.90	2.0	6.00	0.41	0.00	0.57	

(O + OH + F) = 0.98 Vacancies: 0.10 A 0.02 Y
Dose (alphas/mg) = 0.194E+18 DPA (displacements/atom) = 23.7

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 = 4.95

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.14	231.80	0.003	W
Ta2O5	64.00	220.90	1.526	Ta
Nb2O5	7.62	132.90	0.302	Nb
TiO2	2.56	79.90	0.169	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	5.73	286.00	0.106	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	0.43	145.70	0.016	Sb+3
Bi2O3	0.00	233.00	0.000	Bi+3
MnO	0.42	70.94	0.031	Mn+2
FeO	0.34	71.85	0.025	Fe+2
CaO	11.40	56.08	1.071	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.00	153.30	0.000	Ba
PbO	0.85	223.20	0.020	Pb+2
Na2O	3.95	30.99	0.671	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	1.69	19.00	0.469	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	99.13		6.505	O
LESS O=F	0.71			
TOTAL	98.42			

A	B	O	(O	OH	F	) . 0.00 H2O
1.94	2.0	6.00	0.51	0.00	0.47	

(O + OH + F) = 0.97 Vacancies: 0.06 A 0.03 Y
Dose (alphas/mg) = 0.233E+18 DPA (displacements/atom) = 28.9

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 = 1.88

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

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.32	231.80	0.007	W
Ta2O5	64.50	220.90	1.513	Ta
Nb2O5	8.79	132.90	0.343	Nb
TiO2	2.11	79.90	0.137	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	4.52	286.00	0.082	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	0.43	145.70	0.015	Sb+3
Bi2O3	0.00	233.00	0.000	Bi+3
MnO	0.43	70.94	0.031	Mn+2
FeO	0.19	71.85	0.014	Fe+2
CaO	11.70	56.08	1.081	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.00	153.30	0.000	Ba
PbO	0.78	223.20	0.018	Pb+2
Na2O	4.04	30.99	0.676	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	2.17	19.00	0.592	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	99.98		6.390	O
LESS O=F	0.91			
TOTAL	99.07			

A	B	O	(O	OH	F	) . 0.00 H2O
1.92	2.0	6.00	0.39	0.00	0.59	

(O + OH + F) = 0.98 Vacancies: 0.08 A 0.02 Y

Dose (alphas/mg) = 0.183E+18 DPA (displacements/atom) = 22.3

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 = 1.83

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
Mean B valence = 4.94

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.21	231.80	0.005	W
Ta2O5	63.00	220.90	1.514	Ta
Nb2O5	9.10	132.90	0.364	Nb
TiO2	1.77	79.90	0.118	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	4.64	286.00	0.086	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	0.32	145.70	0.012	Sb+3
Bi2O3	0.00	233.00	0.000	Bi+3
MnO	0.55	70.94	0.041	Mn+2
FeO	0.26	71.85	0.019	Fe+2
CaO	12.50	56.08	1.183	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.00	153.30	0.000	Ba
PbO	0.53	223.20	0.013	Pb+2
Na2O	2.95	30.99	0.505	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	1.81	19.00	0.506	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	97.64		6.476	O
LESS O=F	0.76			
TOTAL	96.88			

A	B	O	(O	OH	F	) . 0.00 H2O
1.86	2.0	6.00	0.48	0.00	0.51	

(O + OH + F) = 0.98 Vacancies: 0.14 A 0.02 Y
Dose (alphas/mg) = 0.192E+18 DPA (displacements/atom) = 23.7

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 = 1.92

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
Mean B valence = 4.94

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.37	231.80	0.008	W
Ta2O5	59.90	220.90	1.405	Ta
Nb2O5	10.40	132.90	0.406	Nb
TiO2	2.79	79.90	0.181	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	6.28	286.00	0.114	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	0.51	70.94	0.037	Mn+2
FeO	0.61	71.85	0.044	Fe+2
CaO	11.00	56.08	1.016	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.00	153.30	0.000	Ba
PbO	0.87	223.20	0.020	Pb+2
Na2O	2.73	30.99	0.457	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	1.48	19.00	0.404	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	97.32		6.420	O
LESS O=F	0.62			
TOTAL	96.70			

A	B	O	(O	OH	F	) . 0.00 H2O
1.70	2.0	6.00	0.42	0.00	0.40	

(O + OH + F) = 0.82 Vacancies: 0.30 A 0.18 Y

Dose (alphas/mg) = 0.260E+18 DPA (displacements/atom) = 32.1

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 = 2.01

B = Ta ,Nb ,Ti ,W ,Sn ,Zr ,Fe+3
Mean B valence = 4.91

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.28	231.80	0.006	W
Ta2O5	62.40	220.90	1.491	Ta
Nb2O5	8.74	132.90	0.347	Nb
TiO2	2.35	79.90	0.155	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	5.61	286.00	0.104	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	0.30	145.70	0.011	Sb+3
Bi2O3	0.00	233.00	0.000	Bi+3
MnO	0.45	70.94	0.033	Mn+2
FeO	0.27	71.85	0.020	Fe+2
CaO	12.20	56.08	1.148	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.00	153.30	0.000	Ba
PbO	0.92	223.20	0.022	Pb+2
Na2O	2.76	30.99	0.470	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	1.62	19.00	0.450	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	97.90		6.486	O
LESS O=F	0.68			
TOTAL	97.22			

A	B	O	(O	OH	F	) . 0.00 H2O
1.81	2.0	6.00	0.49	0.00	0.45	

(O + OH + F) = 0.94 Vacancies: 0.19 A 0.06 Y
Dose (alphas/mg) = 0.231E+18 DPA (displacements/atom) = 28.8

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 = 1.98

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

OXIDE	WT %	MOL WT	ATOMS	
WO3	0.25	231.80	0.006	W
Ta2O5	66.60	220.90	1.579	Ta
Nb2O5	6.35	132.90	0.250	Nb
TiO2	2.52	79.90	0.165	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	4.49	286.00	0.082	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	0.37	145.70	0.013	Sb+3
Bi2O3	0.00	233.00	0.000	Bi+3
MnO	0.78	70.94	0.058	Mn+2
FeO	1.34	71.85	0.098	Fe+2
CaO	11.50	56.08	1.074	Ca
SrO	0.00	103.60	0.000	Sr
BaO	0.00	153.30	0.000	Ba
PbO	0.55	223.20	0.013	Pb+2
Na2O	3.36	30.99	0.568	Na
K2O	0.00	47.10	0.000	K
Cs2O	0.00	140.90	0.000	Cs
F	1.47	19.00	0.405	F
H2O+	0.00	9.01	0.000	OH
H2O-	0.00	18.02	0.000	H2O
TOTAL	99.58		6.510	O
LESS O=F	0.62			
TOTAL	98.96			

A	B	O	(O	OH	F	) . 0.00 H2O
1.91	2.0	6.00	0.51	0.00	0.41	

(O + OH + F) = 0.92 Vacancies: 0.09 A 0.08 Y
Dose (alphas/mg) = 0.182E+18 DPA (displacements/atom) = 22.8

microlite Age = 0.130E+10 years

Cation abundances (decreasing order):

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

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