Preprint
UCRL-CR-139056

Durability and Natural Mineral Studies Carried Out to Support Development of Waste Forms for Immobilisation of Plutonium Interim Report: April 30, 1999

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U.S. Department of Energy

Lawrence
Livermore
National
Laboratory

April 30, 1999

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This work was performed under the auspices of the U.S. Department of Energy by University of California, Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.

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DURABILITY AND NATURAL MINERAL STUDIES CARRIED OUT TO SUPPORT DEVELOPMENT OF WASTE FORMS FOR IMMOBILISATION OF PLUTONIUM

INTERIM REPORT: APRIL 30, 1999

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INTRODUCTION

This report details the work undertaken at ANSTO under Project 2 of the Statement of Work with Lawrence Livermore National Laboratory (document B345772). In this Statement of Work, it was detailed that the following tasks would be carried out;

Task 2.1 — Corrosion tests on monoliths. This task was to assess the durability of 'impurity samples' produced in Task 1.4, and 'near-equilibrium processing condition samples' produced in Task 1.2.

Task 2.2 — Corrosion tests on powdered samples. This task was to determine the forward dissolution rate of single-phase materials using a single-pass-flow-through test (SPFT).

Task 2.3 — Physical property measurements. These results have been reported elsewhere and will not be included in this report.

Task 2.4 — Natural mineral analogue studies. These studies were to be undertaken to document the geological durability of natural brannerites.

This reports provides results of the work undertaken in Tasks 2.1, 2.2 and 2.4 until the end of April 1999.

TASK 2.1

EXPERIMENTAL DETAILS

Samples from batches with B1-1, A-7, B1-9, B1-11, B1-13 and B1-15 (see Table 2.1.1 for the composition of these formulations) have been leached at 90 °C in deionised water. The fabrication and preparation of these samples have been detailed separately in reports to LLNL provided under Task 1. Two studies have been made using these samples; the first with batches 68 and 75 was to study the effect of surface finish on the leaching results, and the second with all batches was to study the effect of impurity levels on the matrix-element leach rates.

Leaching samples were about 2 mm thick and 0.9 cm in diameter. In studies of the effect of surface finish on the leach rates the samples were prepared as follows; as sintered without any surface preparation and sintered with surface finish obtained using 1200 grit paper, 240 grit paper, 6 μm diamond paste and 1 μm diamond paste. For all other studies samples were prepared using 1 μm diamond paste. Leaching was carried out in triplicate at 90°C in teflon containers, using MCC procedures. To avoid problems associated with HF generation caused by α-doped samples coming into contact with teflon, the samples were placed on platinum wire sample holders that kept samples at least 2 cm from the vessel walls. Analyses of leachates for inactive elements were carried out by ICP/MS. Plutonium[1] was analysed by α-

[1] The Pu used in this study consisted of (wt%): 93% ^{239}Pu, 5% ^{240}Pu, 0.5% ^{241}Pu and 1.5% ^{241}Am. For the very low activities in solution obtained in this work it was not possible to separate the contribution of the individual Pu isotopes and consequently,the leach rates are based on the combined activity of ^{239}Pu and ^{240}Pu.

TABLE 2.1.1
BATCH COMPOSITIONS AND LEACHING CONDITIONS USED IN THIS STUDY

Element	Composition (wt%)						
LLNL number	B1-1	A-7	B1-9	B1-11	B1-13	B1-15	B3-13
ANSTO number	Pu-68	Pu-75	Pu-97	Pu-99	Pu-101	Pu-103	Pu-118
Ca	7.11	7.13	6.60	4.20	8.63	8.30	6.66
Hf	9.49	8.90	20.53	8.40	9.23	8.22	8.71
Ti	21.49	21.17	20.28	22.16	21.69	19.46	20.24
Gd	6.90	6.80	5.73	5.48	6.65	7.37	5.59
Pu	10.49	10.33	8.44	11.15	10.90	11.49	9.90
U	20.88	20.57	13.58	24.65	18.36	18.82	19.65
Pb							0.48
Ni		0.03					0.07
Nd							0.25
La							0.02
Zn		0.01					0.048
Si		0.09					0.41
Na		0.04					0.17
Mg		0.08					0.26
Fe		0.06					0.15
Al		0.17	0.6				0.29
Ga		0.10					
Cr		0.07					0.03
K		0.06					0.19
Mo		0.08					0.12
Ta		0.05					
P						1.46	0.003
Ba							0.13
Ce							0.15
Sn							0.005
Ta							0.07
W							0.015

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counting. When levels of ^{241}Am interfered with Pu analyses the samples were also counted by γ-spectrometry and the ^{241}Am contribution was subtracted from the α-spectrometry result before the activity was converted to a leach rate. Leach rates have been reported for the unfiltered leachant, in a HNO_3 wall wash solution (used to remove elements plated out on the leaching vessel wall) and total, i.e. unfiltered solution + vessel wash. For a selected number of leachates from the leaching of batches 68 and 75, filtration was also carried out on using 0.45 μm and 5000 nominal molecular weight filters to check the distribution of Pu in the leachants.

Table 2.1.2 summarises the progress of the results for these leaching studies. Detailed results for this work are given in Appendix 2.1. Results for the effect of surface finish, filtration of leachates and the inclusion of the impurity elements into formulations are summarised below.

TABLE 2.1.2
PROGRESS OF LEACHING EXPERIMENTS

Batch	Experimental progress
B1-1	84 days of leaching completed, with the exception of the 6 μm surface finish which is now leaching for 104 days.
A-7	84 days of leaching completed, with the exception of the 6 μm surface finish which is now leaching for 104 days.
B1-9	28 days of leaching completed. Now leaching for 84 days.
B1-11	28 days of leaching completed. Now leaching for 84 days.
B1-13	28 days of leaching completed. Now leaching for 84 days.
B1-15	28 days of leaching completed. Now leaching for 84 days.

Figure 2.1.1 shows the total normalised leach rates for U, Pu, and Gd for all samples and leach periods. The data show that the leach rates for these elements cover similar ranges. For all samples the total leach rates for these elements up to 84 days of leaching are between 10^{-5} and about 10^{-3} g m^{-2} d^{-1} for both the baseline composition and the baseline composition with impurity elements.

Data for the effect of surface finish on the total, normalised U leach rates from the baseline composition and the baseline composition with impurity elements are shown in Figure 2.1.2. The data show that there is very little effect of surface finish on the leach rate of U, although the highest leach rates tend to occur for finely polished samples. Figure 2.1.3 shows that the data for Pu are similar. Preliminary data from filtration for of the leachates (Figure 2.1.4 shows the results for Pu from the filtration of the leachates) suggest that the effect of polishing on leaching may be associated with the presence of fine particles. These particles may have formed during polishing or be associated with 'polishing-induced strains'. In addition, other factors such as different surface phase distributions may contribute to these small variations in leaching behaviour. These effects will be further investigated for the final report.

Preliminary data available for the levels of Pu in the unfiltered leachates from all batches listed in Table 2.1.1 are shown in Figure 2.1.5. There data show that there appears to be no

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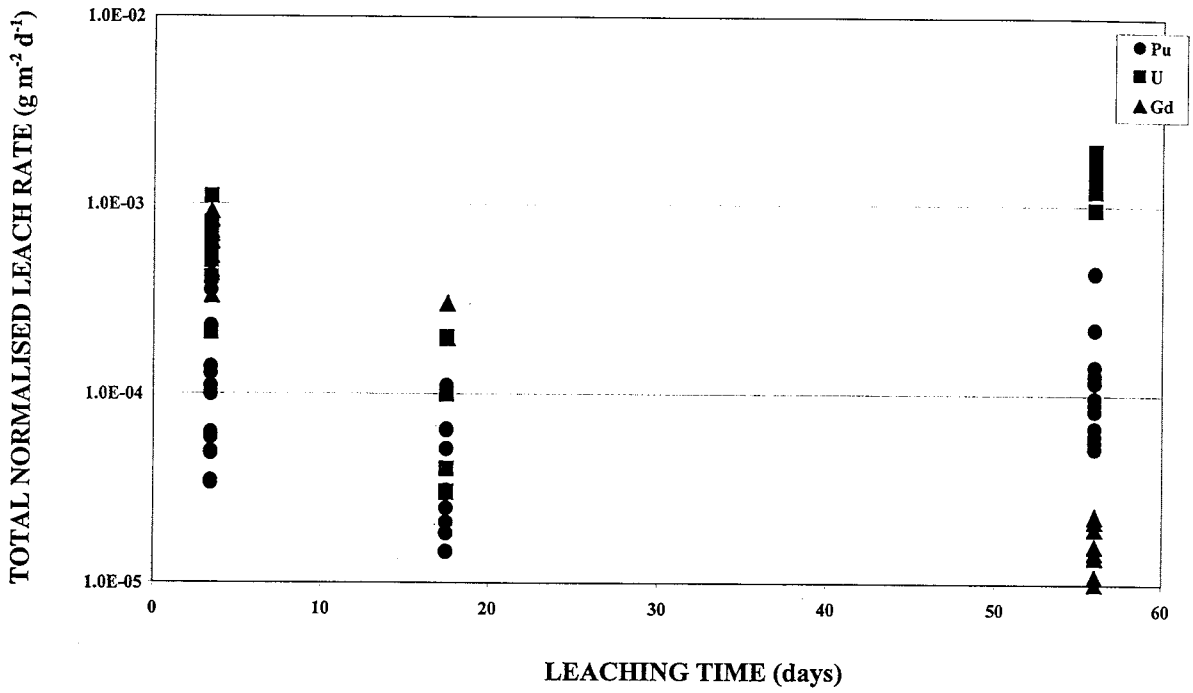
systematic variation of the leach rates with formulation especially for Ca, Hf, Ti, Gd, and Pu. The leach rates of U show some variation but given that all 0 to 7 day leach rates are less than 10^{-2} g $m^{-2}d^{-1}$ this does not appear to be an important effect. Further interpretation of these data will be carried out when further leaching results become available.

Overall, the results collected thus far have established that;

- There is no detrimental effect on the performance of the waste form arising from including impurity elements in the formulations.
- Different surface finishes have only a minor effect on the total, normalised leach rates. Although finely polishing the samples may increase the leach rate based on unfiltered leachates because of the presence of greater levels of particulates.
- Total normalised leach rates of neutron absorbers Gd and Hf, for the 0 to 7 day leach period, are low, $<10^{-3}$ and $<10^{-4}$ g $m^{-2}d^{-1}$ respectively. Hf tends not to be detectable in either the leachates or in the vessel wall strip whilst Gd has similar leach rates to Pu and U.



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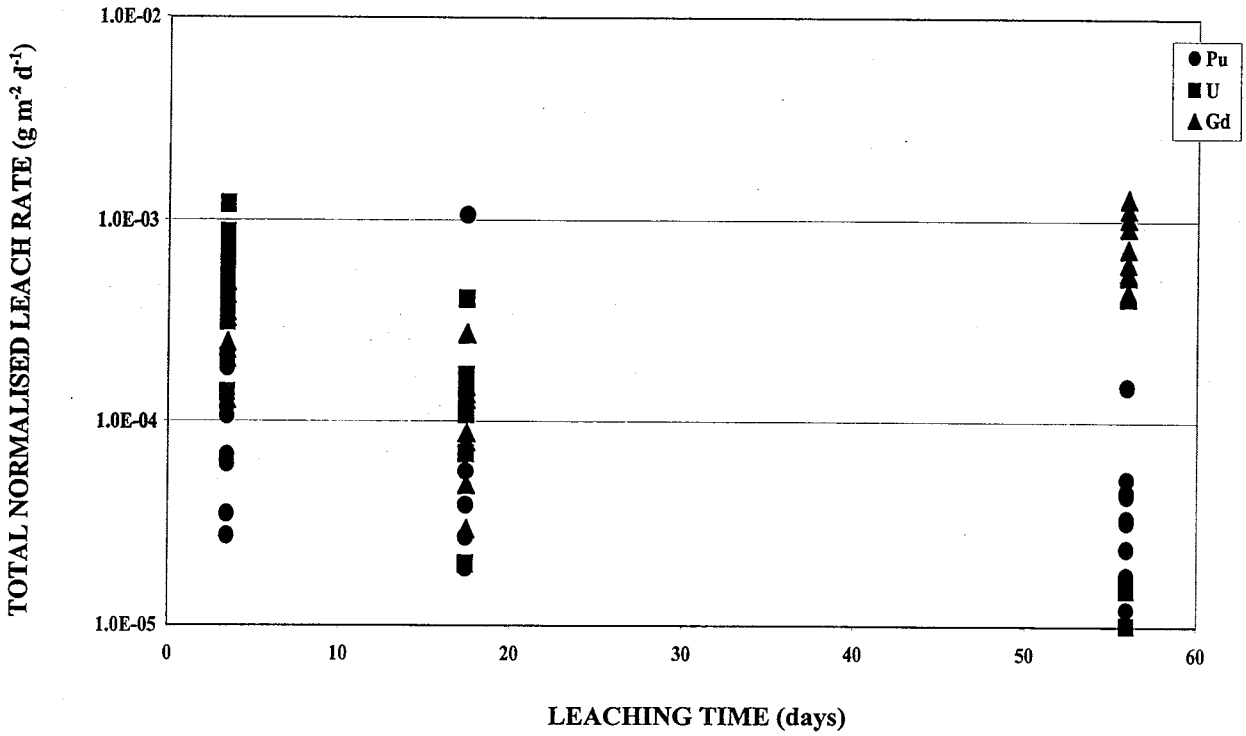
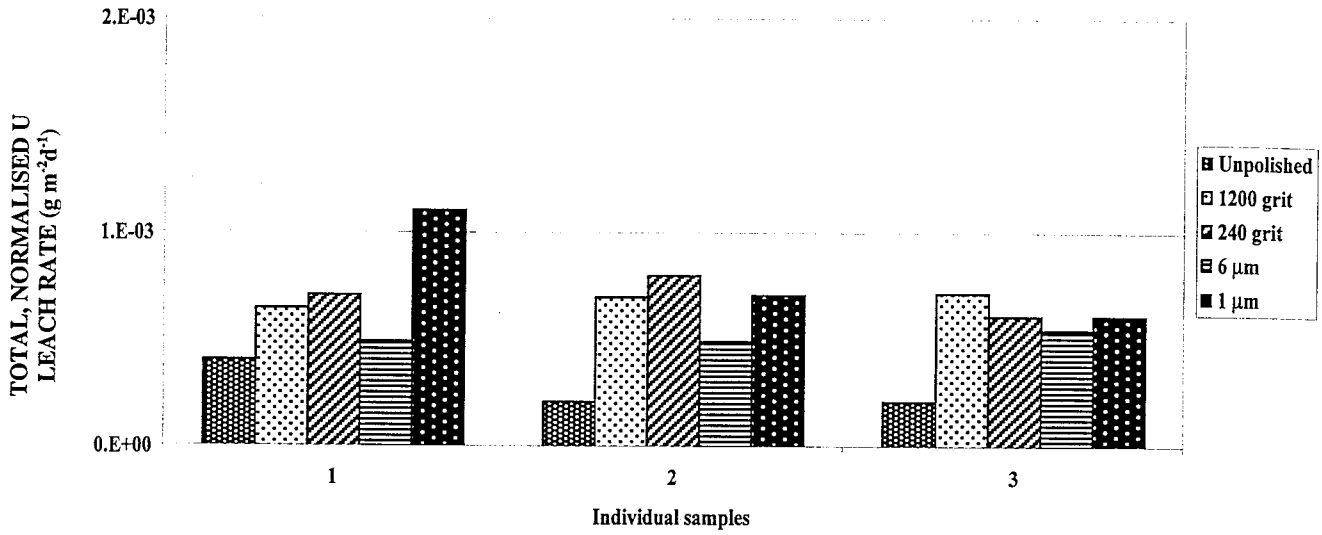


(b)

Figure 2.1.1 Total normalised leach rate Pu, U and Gd from (a) batch B1-1 and (b) batch A-7 measured at 90 °C in deionised water



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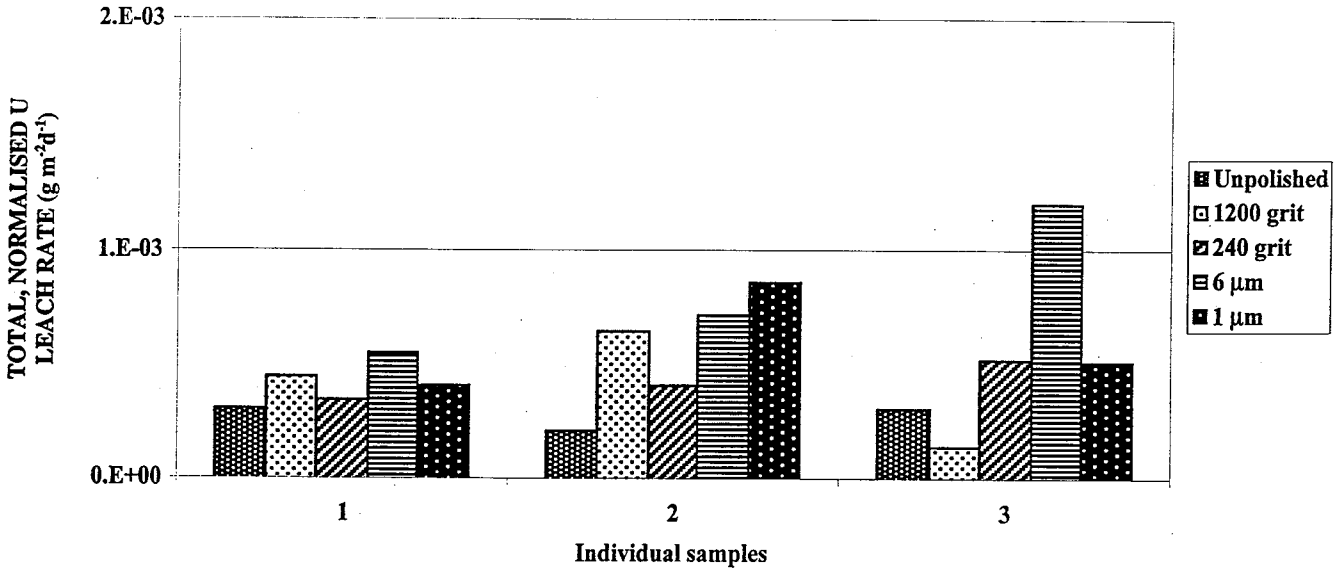
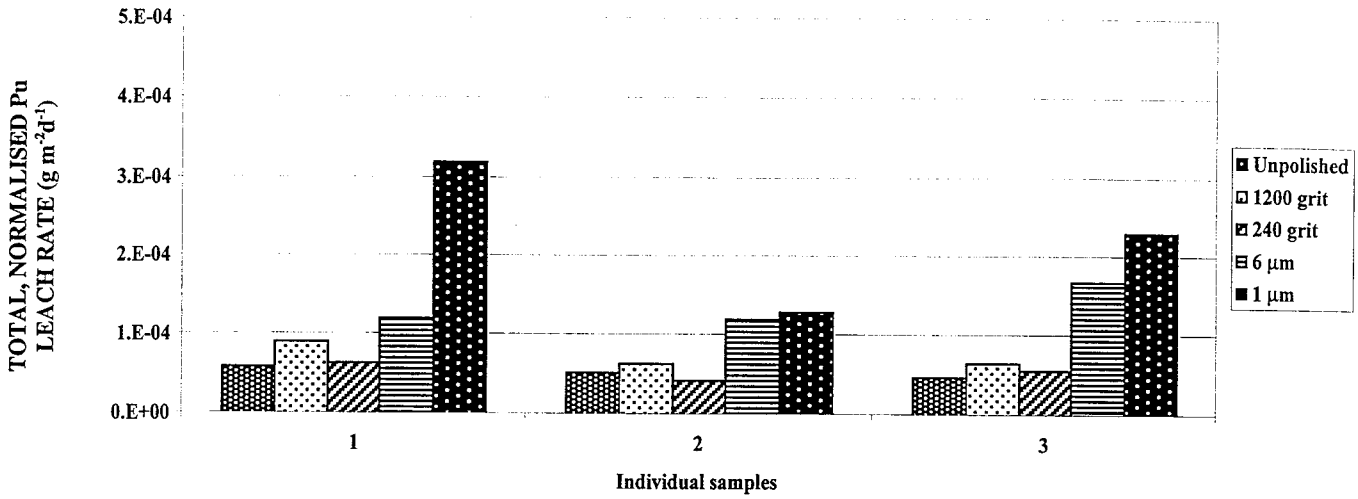


(b)

Figure 2.1.2 Effect of surface finish on the total normalised leach rate of U from (a) batch B1-1 and (b) batch A-7 for 0 to 7 days of leaching



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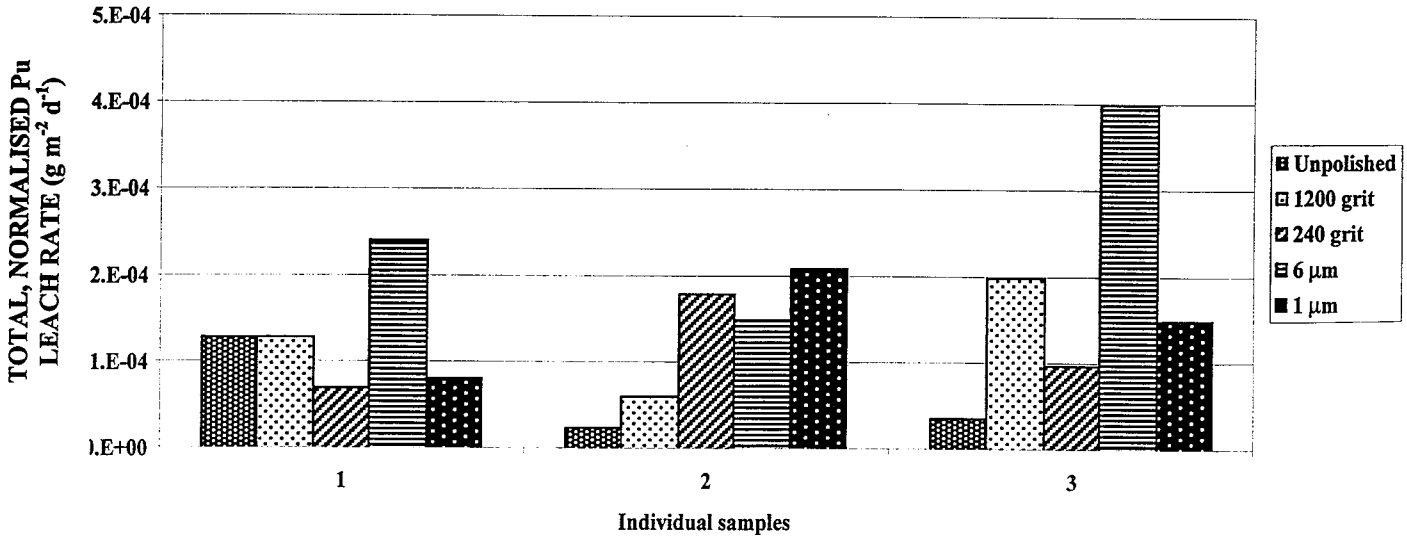
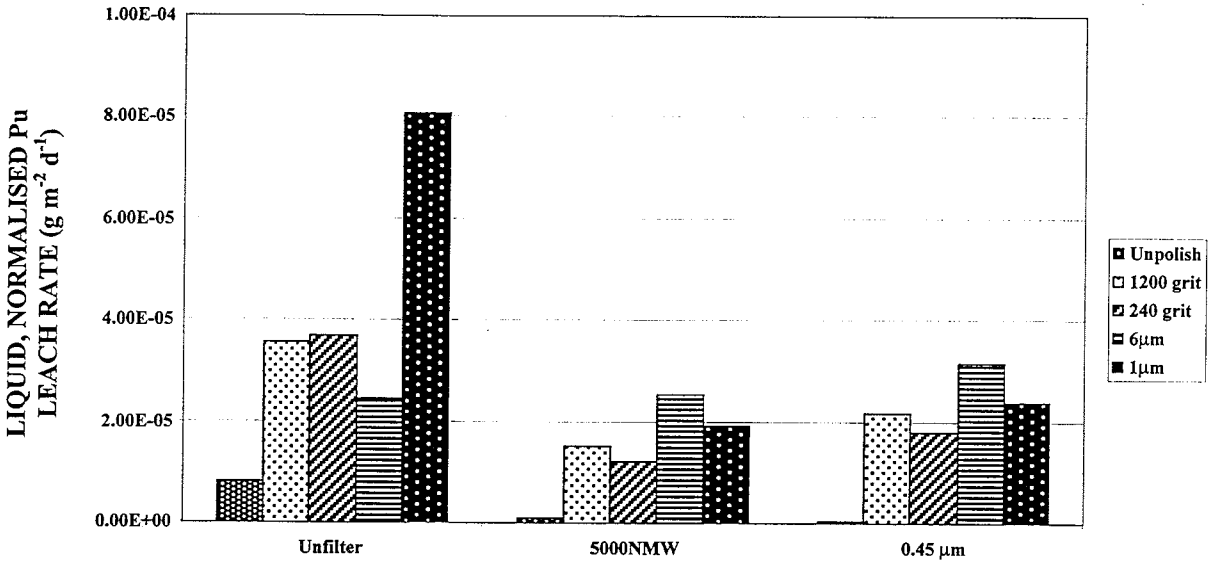
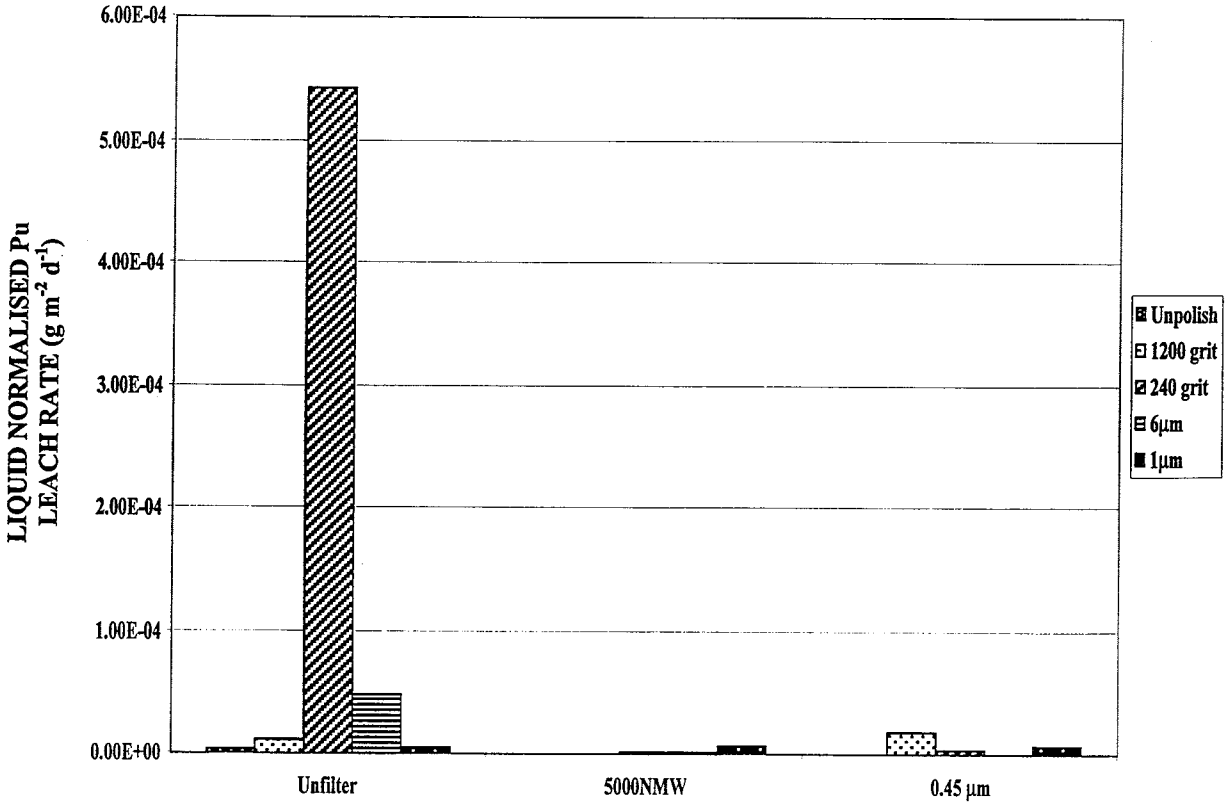


(b)

Figure 2.1.3 Effect of surface finish on the total normalised leach rate of Pu from (a) batch B1-1 and (b) batch A-7 for 0 to 7 days of leaching



(a)



(b)

Figure 2.1.4 Effect of filtration on the solution leach rate of Pu from (a) batch B1-1 and (b) batch A-7 for 7 to 28 days of leaching

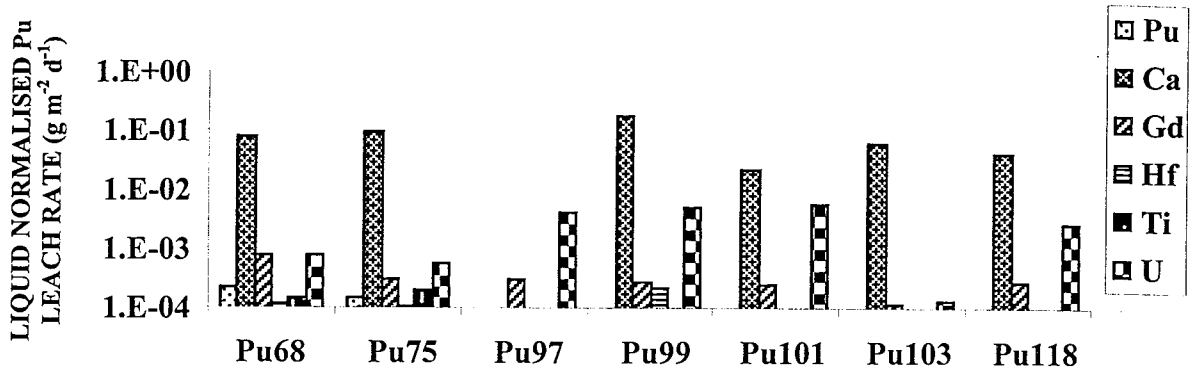


Figure 2.1.5 Average normalised leach rates based on unfiltered leachates measured for samples with 1 μm surface finish on all batches studied in deionised water at 90 °C

TASK 2.2

U-DOPED FORMULATIONS

Single Pass Flow-Through (SPFT) experiments have been conducted at 70 °C for samples of synthetic U-brannerite prepared by HUPing at 1200 °C ANSTO. Leaching has been carried out using different leachants with initial pHs ranging from 2 to 12 in the open laboratory. Concentrations of U and Ti were determined with ICP-MS. The compositions of the leachants are given in Table 2.2.1 and the status of the experiments is summarised in Table 2.2.2.

TABLE 2.2.1
COMPOSITION OF LEACHANTS

Composition	Initial pH
0.05M KHphthalate + 0.05M HCl	2.1
0.05M KHphthalate + 0.03M HCl	3.0
0.05M KHphthalate + 0.04M NaOH	5.6
Deionised water (diw)	5.6
0.05M H_3BO_3 + 0.004M NaOH	7.9
0.05M H_3BO_3 + 0.044M NaOH	9.8
0.05M KCl + 0.012M NaOH	11.9

TABLE 2.2.2
STATUS OF SPFT LEACHING EXPERIMENTS ON U-BRANNERITE

Leachant	Status of leaching experiment
2.1	Completed after 97 days. Preliminary examination of the leached sample has been carried out by SEM.
3.2	On-going with 142 days completed.
5.6	On-going with 105 days completed.
diw	On-going with 142 days completed.
7.9	On-going with 142 days completed.
9.8	On-going with 142 days completed.
11.9	On-going with 105 days completed.

Detailed leaching results are given in Appendix 2.2. Table 2.2.3 summarises the effect of pH on the cumulative, normalised releases of U and Ti from the synthetic brannerite samples after 40 days of leaching. Figure 2.2.1 shows the releases of U, for all leachates, and Ti, for all leachates where the release is significantly greater than the detection limit. For these experiments the pH of the leachates, with the exception of the deionised water, changed by less than 0.2 pH units. The pH of the deionised water leachates changed to between 4.70 and 5.20. The difference between the leach rates measured in the deionised water and in the pH = 5.6 leachate suggests that there may be some enhancement of leaching associated with the Cl^-

and phthalate ions. This is further supported by the data shown in Figure 2.2.2 for the U leach rates in deionised water and pH =5.6 leachate, in both the open laboratory and low O_2 atmosphere. Although the data for the flow-through testing in the low O_2 atmosphere are only available for the first 30 days of leaching, they confirm that the release of U is lowest in deionised water and further that it reduces more rapidly with time than in any of the other leachates. This effect will be further investigated when all data have been collected by calculating U solubilities in each of the leachates.

The results given in Figure 2.2.1 and Table 2.2.3 show that at pHs above 6, i.e. similar to those normally found in ground water samples, the U and Ti releases are small, ~ 10^{-2} to 10^{-1} and < 10^{-3} respectively. These small releases are in agreement with the results from the natural samples (see Task 2.4) which indicate that alteration in this mineral phase is a relatively slow process taking millions of years. Further investigation of the natural samples will be carried out in experiments which are planned to compare the effect of annealing of radiation damage on U releases and to measure the U release kinetics.

The powder leached in the pH = 2.1 leachate was also examined in the SEM. This examination showed that there was no discernible change in the surface morphology of the sample, which is in agreement with the low cumulative U release (2.0 %) after the 97 days of leaching. Further examination of this powder will be undertaken in the TEM.

TABLE 2.2.3
EFFECT OF pH ON THE NORMALISED, CUMULATIVE RELEASES OF U AND TI FROM SYNTHETIC BRANNERITE SAMPLES AFTER 40 DAYS OF LEACHING AT 70 °C

	$g\ m^{-2}$		%	
pH	Ti	U	Ti	U
2.1	8.23×10^{-3}	3.71×10^{-1}	0.09	1.38
3.2	2.1×10^{-3}	2.49×10^{-1}	0.04	1.76
5.6	$< 2 \times 10^{-3}$	4.21×10^{-1}	0.004	0.78
diw*	2.7×10^{-4}	2.7×10^{-3}	0.003	0.053
7.9	$< 2 \times 10^{-3}$	6.5×10^{-3}	-	0.007
9.8	$< 2 \times 10^{-3}$	5.1×10^{-2}	-	0.162
11.9	$< 2 \times 10^{-3}$	5.7×10^{-2}	-	0.156

* initial pH of the deionised water was 5.6 and the final pH ranged between 4.70 and 5.20

Further work to be carried out on the U-brannerite samples includes changing of the rate at which the leachate is flowing through the samples, the temperature of leaching, the carrying out of one experiment in the low O_2 glove box and the examination of leached powders by TEM.

PU-DOPED FORMULATIONS

SPFT tests for Pu-doped samples (Pu-82 [$PuTi_2O_6$ overall stoichiometry], Pu-105 [LLNL batch B1-13] and Pu-84 [~ 90% $CaPuTi_2O_7$ + PuO_2 + TiO_2]) have also commenced at 70 °C in a pH = 5.6 leachant (the composition is of this leachant is given in Table 2.2.1) in the low oxygen (< 20 ppm O_2) glove-box in the actinide suite.

TABLE 2.2.4
STATUS OF SPFT LEACHING EXPERIMENTS ON PU-FORMULATIONS

Formulation	Status of leaching experiment
$PuTi_2O_6$	Stopped because of operational difficulties but will be repeated.
B1-13	Ongoing, 14 days of leaching has elapsed.
$CaPuTi_2O_7$ ~ 90% + PuO_2 + TiO_2	Ongoing, 14 days of leaching has elapsed.

Initial results have been obtained for Pu release under flow-through conditions for these batches. However, there are high levels of ^{241}Am in these leachates and although this contribution has been subtracted from the α-result (as discussed in Task 2.1), for a number of the samples the Pu activity could not be determined using this technique. For future analyses another technique based on removal of the ^{241}Am before analysis will be used for the SPFT leachates. Preliminary results have been obtained for Pu-84 and these are summarised in Table 2.2.5. In view of these departures of the sample stoichiometries from the ideal value insofar as other phases are present, these values are indicative only but conservative in the sense that they represent upper limits for the leachabilities.

TABLE 2.2.5
NORMALISED RELEASES OF PU FROM PU-84 (~ 90% $CaPuTi_2O_7$ + PuO_2 + TiO_2)

Time (days)	Pu $g\ m^{-2}\ d^{-1}$
2	1.4×10^{-4}
5	4.7×10^{-5}
8	8.1×10^{-6}
13	3.4×10^{-6}
16	3.9×10^{-5}

Further results will be obtained for these 3 Pu-doped formulations and included in the final report covering durability studies.

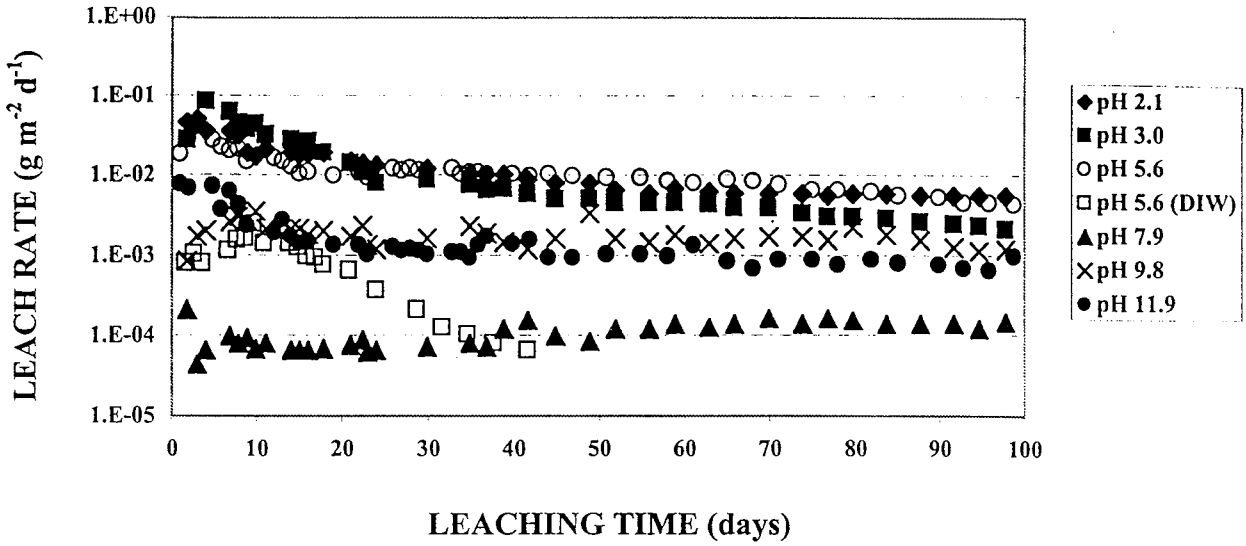


Figure 2.2.1(a) Normalised leach rate of U measured at different pHs under flow-through conditions at 70°C

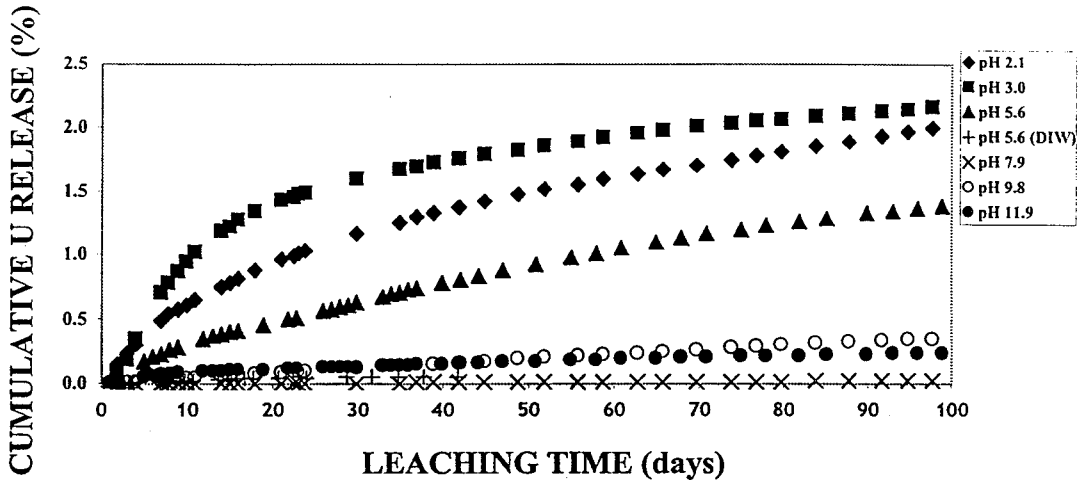


Figure 2.2.1(b) Cumulative normalised release of U measured from U-brannerite at different pHs under flow-through conditions at 70°C

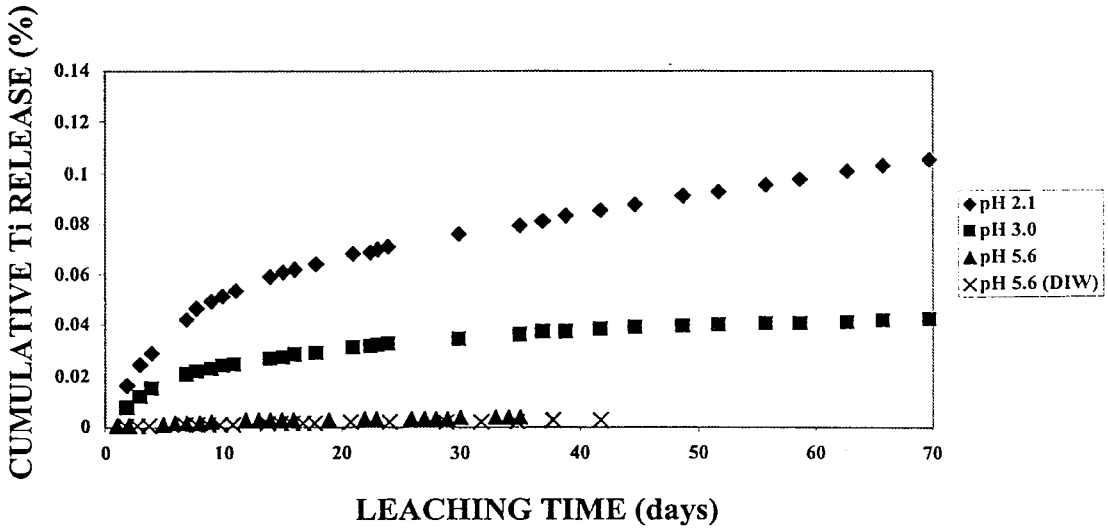


Figure 2.2.1(c) Cumulative normalised release of Ti measured from U-brannerite under flow-through conditions at 70°C at different pHs for which Ti

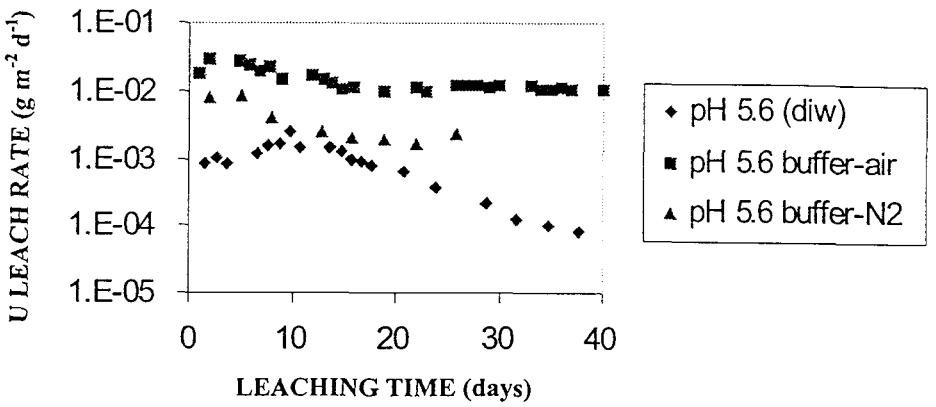


Figure 2.2.2 U leach rates in deionised water and pH = 5.6 leachate measured at 70 °C under flow-through conditions in both open laboratory and low O_2 atmospheres

Task 2.4

The general characteristics of the samples are summarised in Table 2.4.1, including information about the host rock, the geological age, and evidence for alteration. Accurate age dates are only available for the samples from Crocker's Well, South Australia. Minimum age estimates were obtained for the other samples by calculating the chemical U-Th-Pb age from SEM-EDX analyses of unaltered areas of the samples. These are generally considered to be minimum ages due to the propensity of the samples to lose radiogenic Pb. Preliminary SEM-EDX characterisation has been completed for the entire set of eleven samples (detailed results are contained in Appendix 2.4).

TABLE 2.4.1
GENERAL CHARACTERISTICS OF NATURAL BRANNERITE SAMPLES

Locality	Samples	Age (Ma)	Host rock	Alteration
Crocker's Well, SA	B1, B5, B6	1580	granite	major
Cordoba, Spain	B2, B10	> 400	ore deposit	minor
Ticino, Switzerland	B3, B9	> 30	granite	moderate
W. Province, Zambia	B4	> 200	ore deposit	minor
San Bernardino Co., CA	B7	> 65	quartz vein	moderate
Bou-Azzer, Morocco	B8	> 100	quartz vein	minor
Stanley, Idaho	B11	> 30	placer deposit	minor

All of the brannerite samples studied are altered to some extent. Backscattered electron images showing the unaltered and altered regions of samples B1 through B5 are shown in Figures 2.4.1 to 2.4.5. These images give a good representation of the variable nature of the samples. The most severely altered samples are from Crocker's Well, South Australia which is not surprising given that these are the oldest samples in the research collection (see Table 2.4.1). Samples from Ticino, Switzerland are moderately altered, whereas samples from the other localities exhibit only minor alteration, including a sample from a placer deposit. Backscattered electron images indicate that much of the alteration of brannerite is fracture controlled (see Figures 2.4.1 to 2.4.5).

Energy dispersive analyses of the unaltered areas of all eleven samples are presented in Appendix 2.4. The results demonstrate that the major impurities in natural brannerites are consistently Ca, Th, and REEs, with lesser amounts of Si, Fe, and Pb. In some samples, small amounts of Al, Ni, and Nb were detected. The analytical data are summarised in Table 2.4.2,

both as weight percent oxides and as atoms per formula unit (pfu) based on O = 6.000. Large amounts of Ca are incorporated by natural brannerite, presumably at the U-site without charge compensation by smaller high valence cations on the Ti-site, except for small amounts of Nb. Although a statistical analysis is yet to be carried out, notice that the difference between the maximum and minimum amounts of Ca and U are about the same in atoms per formula unit. These results suggest that either 1) substantial amounts of the U may be present in a higher valence state, or 2) some OH is present at the O-site, or 3) there are O-vacancies. All three hypotheses are consistent with the cation totals which range from 3.00 to 3.35 atoms per formula unit.

TABLE 2.4.2
COMPOSITION RANGE OF UNALTERED NATURAL BRANNERITE

Wt% oxides	Minimum	Maximum	Atoms pfu	Minimum	Maximum
Nb_2O_5	0.0	1.7	Nb	0.00	0.05
SiO_2	0.0	2.3	Si	0.00	0.14
TiO_2	36.7	42.5	Ti	1.86	2.10
ThO_2	0.3	14.5	Th	0.00	0.22
UO_2	30.5	56.7	U	0.45	0.86
Al_2O_3	0.0	1.1	Al	0.00	0.09
REE_2O_3	0.5	5.2	REE	0.02	0.14
CaO	0.0	6.8	Ca	0.00	0.48
MnO	0.0	0.6	Ni	0.00	0.03
FeO	0.3	2.6	Fe	0.02	0.15
NiO	0.0	0.6	Ni	0.00	0.03
PbO	0.0	6.2	Pb	0.00	0.11

The alteration products found in the natural brannerite samples are listed in Table 2.4.3. The altered areas of the brannerite samples were found to consist of a Ti-rich phase with variable amounts of Si, P, and Fe, depending on the sample. In the sample from Bou-Azzer, Morocco, significant amounts of As were found in the altered brannerite. It is clear from the SEM-EDX results that the altered phase has lost a large fraction of the original amount of U. Some of the altered brannerite samples also exhibit several stages of U loss. The data in Table 2.4.3 indicate that the amounts of Th, Pb, Ca, and Fe in the altered phase may vary from sample to sample, but this needs to be further quantified. Additional alteration products were found in some of the samples: these include thorite, TiO_2, and galena. In a previous report, evidence for Pb loss in the samples from Crocker's Well, South Australia was presented, based on a comparison of the known age of the host rock and the calculated U-Th-Pb age of the brannerite. The SEM-EDX observations suggest that, in the presence of a S-bearing fluid, some of the radiogenic Pb may be retained within the brannerite as fine-grained precipitates of galena. Similar observations have been reported for metamict samples of betafite and zirconolite (Lumpkin et al., 1994; Lumpkin and Ewing, 1996).

TABLE 2.4.3
SUMMARY OF GEOCHEMICAL ALTERATION EFFECTS

Locality	Altered brannerite phase	Other alteration products
Crocker's Well, SA	Ti-Si ± P, Ca, Fe, Pb, Th, U	thorite, galena, TiO_2
Cordoba, Spain	Ti ± Al, Si, S, Pb, U	?
Ticino, Switzerland	Ti-Si ± Al, P, Ca, Fe, Pb, Th, U	TiO_2
W. Province, Zambia	Ti ± Ca, Fe, Pb, Th, U	galena, TiO_2
San Bernardino Co., CA	?	?
Bou-Azzer, Morocco	Ti-Si-As ± Ca, Fe, Pb, U	TiO_2
Stanley, Idaho	Ti-Fe ± Al, Si, P, Ca, Pb, Th, U	?

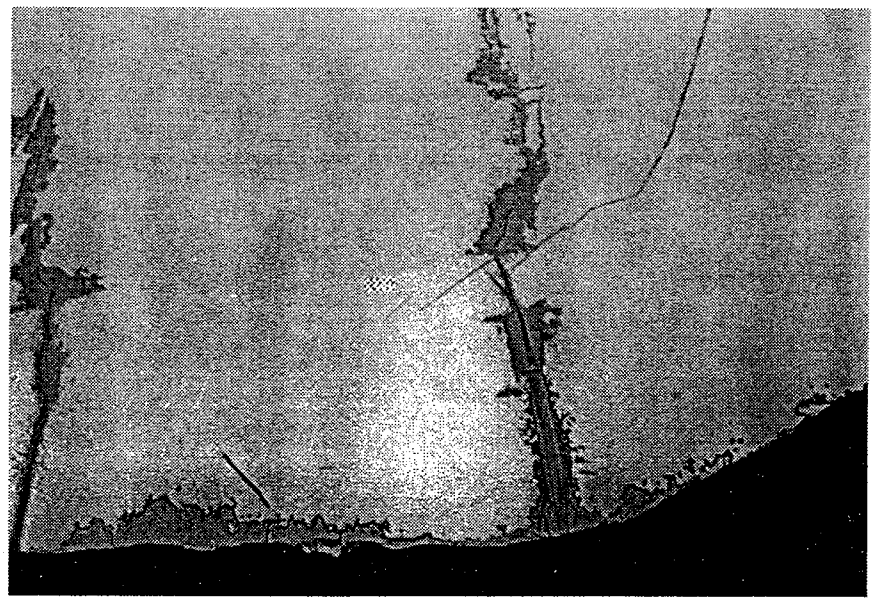
Additional TEM work was completed on sample B10, from Cordoba, Spain. This sample is relatively unaltered and consists of metamict (amorphous) brannerite. However, numerous inclusions were found in the sample, similar to those in sample B4 from the Western Province, Zambia. Microanalysis of one of the larger inclusions demonstrated that it is uranium oxide, but the oxygen stoichiometry is unknown. Selected area diffraction patterns suggest that the inclusions are uraninite, but further work is necessary to confirm this. Using the geological age data from Table 2.4.1, the calculated alpha-decay dose values are listed in Table 2.4.4. Although further TEM work is required for three samples, the available data suggest that critical amorphisation dose (D_C) of natural brannerite is not far removed from the D_C versus age curves of pyrochlore and zirconolite. It is unlikely that any of the remaining samples will be crystalline; therefore, we may not be able to bracket D_C unless we can find samples of younger geological age.

TABLE 2.4.4
SUMMARY OF ALPHA-DECAY DAMAGE EFFECTS IN BRANNERITE SAMPLES

Locality	Structure	Dose (α/mg)	Bubbles
Crocker's Well, SA	metamict	1.7×10^{18}	no
Cordoba, Spain	metamict	$> 6 \times 10^{17}$	no
Ticino, Switzerland	metamict	$> 3 \times 10^{16}$	no
W. Province, Zambia	metamict	$> 2 \times 10^{17}$	yes
San Bernardino Co., CA	?	$> 7 \times 10^{16}$	?
Bou-Azzer, Morocco	?	$> 1 \times 10^{17}$	?
Stanley, Idaho	?	$> 3 \times 10^{16}$	?

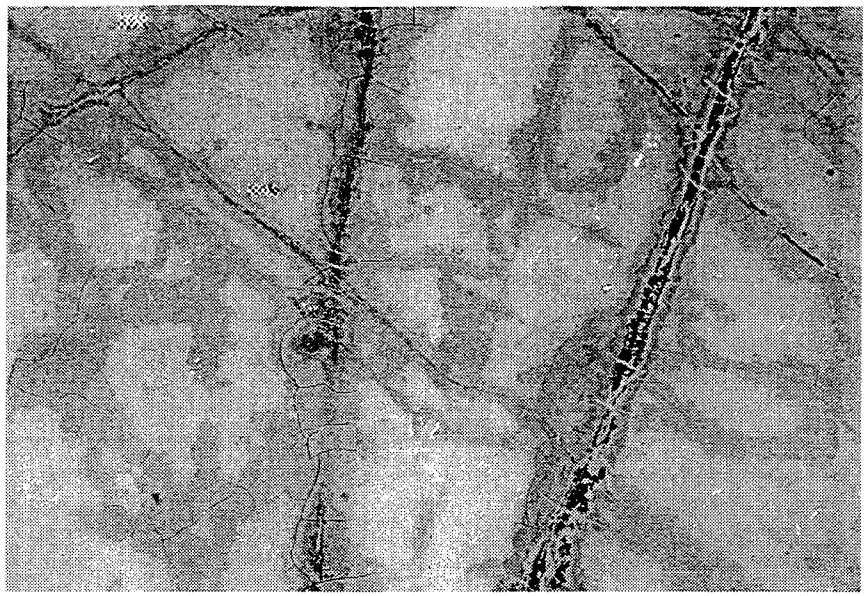
20 μm

Figure 2.4.1 Backscattered electron image of brannerite B1 from Crocker's Well, South Australia. This is the most heavily altered sample in the research collection. Bright phase = thorite, light grey = unaltered brannerite, dark grey = altered brannerite phase, black = TiO_2.



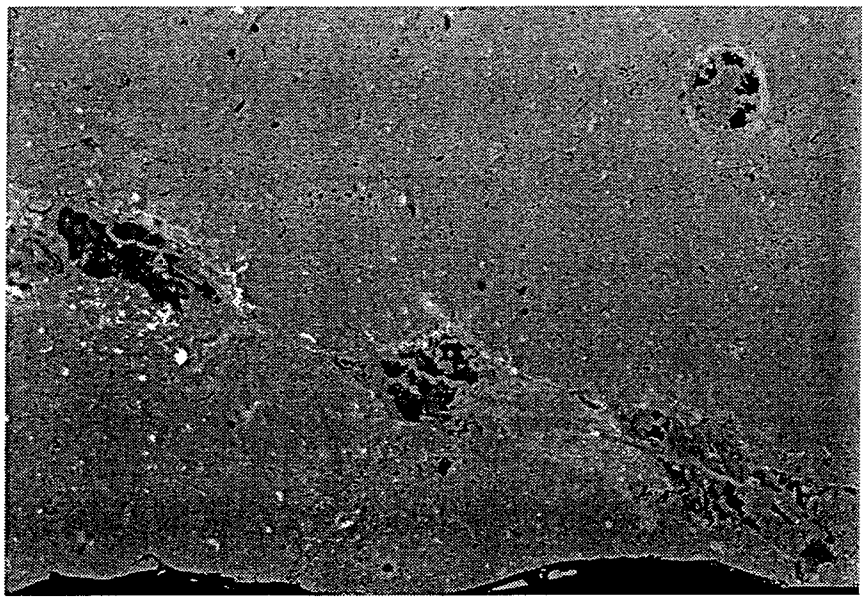
10 μm

Figure 2.4.2 Backscattered electron image of brannerite B2 from Cordoba, Spain. This is one of the least altered samples in the research collection. Alteration (dark grey) is confined to small cracks and parts of the rim of the crystal.



50 μm

Figure 2.4.3 Backscattered electron image of brannerite B3 from Ticino, Switzerland. This sample exhibits fracture controlled alteration (medium to dark grey) throughout the interior of the crystal.



20 μm

Figure 2.4.4 Backscattered electron image of brannerite B4 from the Western Province, Zambia. This sample is also one the least altered samples in the research collection, with alteration (medium to dark grey) confined to small patches within the crystal. Bright spots = galena, light grey matrix = unaltered brannerite, black phase = TiO_2.

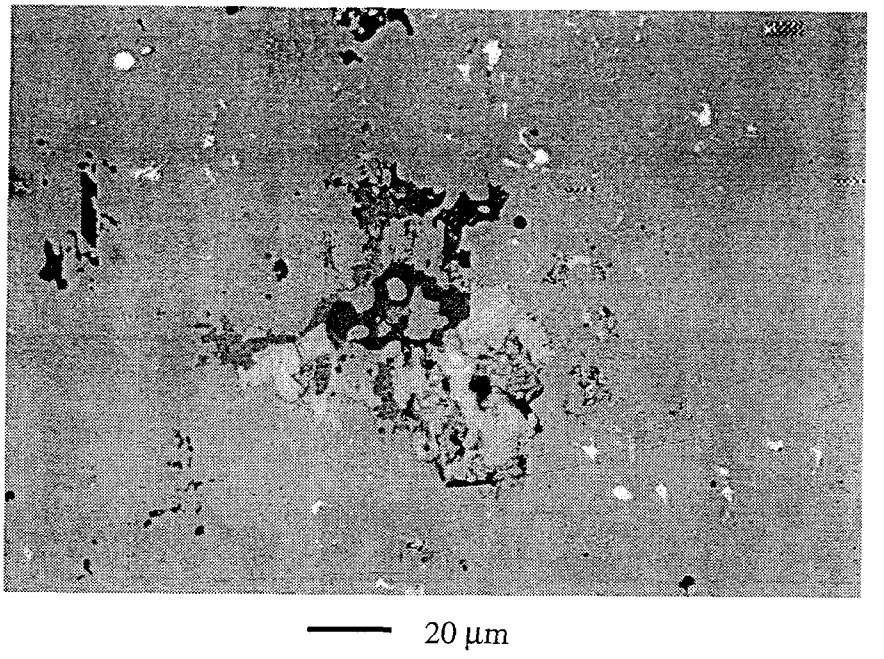


Figure 2.4.5 Backscattered electron image of brannerite B5 from Crocker's Well. Small bright spots = galena, light phase = thorite, light grey matrix = unaltered brannerite, dark grey phase = zircon, black phase = TiO_2.

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APPENDIX 2.1

Table A 2.1.1 LLNL Batch 68 (B1-1) - Unpolished Surface Finish for 0-7 days leach period in de-ionised water at 90°C.

Result	Leach rate ($g\ m^{-2}\ d^{-1}$)			Leach rate ($g\ m^{-2}\ d^{-1}$)			Leach rate ($g\ m^{-2}\ d^{-1}$)		
	Unfiltered			Wall strip			Total		
Sample	L	M	N	L	M	N	L	M	N
Pu	6.00×10^{-6}	2.06×10^{-5}	1.98×10^{-5}	4.23×10^{-5}	1.40×10^{-5}	1.39×10^{-5}	4.83×10^{-5}	3.46×10^{-5}	3.37×10^{-5}
Ca	2.4×10^{-2}	$< 2.4 \times 10^{-2}$	2.4×10^{-2}	5.3×10^{-2}	4.6×10^{-2}	6.2×10^{-2}	7.7×10^{-2}	6.6×10^{-2}	8.6×10^{-2}
Gd	3×10^{-4}	5×10^{-4}	4×10^{-4}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	3×10^{-4}	5.3×10^{-4}	4×10^{-4}
Hf	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$
Ti	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	1×10^{-4}	$< 5 \times 10^{-5}$	$< 5 \times 10^{-5}$	1×10^{-4}	$< 8 \times 10^{-5}$	$< 8 \times 10^{-5}$
U	4×10^{-4}	2×10^{-4}	2×10^{-4}	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	4×10^{-4}	2×10^{-4}	2×10^{-4}

Table A2.1.2 LLNL Batch 68 (B1-1) - 1200 grit Surface Finish for 0-7 days leach period in de-ionised water at 90°C.

Result	Leach rate ($g\ m^{-2}\ d^{-1}$)			Leach rate ($g\ m^{-2}\ d^{-1}$)			Leach rate ($g\ m^{-2}\ d^{-1}$)		
	Unfiltered			Wall strip			Total		
Sample	F	G	H	F	G	H	F	G	H
Pu	8.11×10^{-5}	4.38×10^{-5}	4.61×10^{-5}	2.00×10^{-5}	1.87×10^{-5}	1.56×10^{-5}	1.01×10^{-4}	6.26×10^{-5}	6.17×10^{-5}
Ca	$< 2 \times 10^{-2}$	$< 2 \times 10^{-2}$	$< 2 \times 10^{-2}$	1.1×10^{-1}	4.5×10^{-2}	2.3×10^{-1}	1.3×10^{-1}	6.5×10^{-2}	2.5×10^{-1}
Gd	5×10^{-4}	4×10^{-4}	6×10^{-4}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	5×10^{-4}	4×10^{-4}	6×10^{-4}
Hf	2×10^{-5}	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	4×10^{-5}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$
Ti	4×10^{-5}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	1×10^{-4}	$< 1 \times 10^{-4}$	1×10^{-4}	1×10^{-4}	$< 1 \times 10^{-4}$	2×10^{-4}
U	6×10^{-4}	6×10^{-4}	7×10^{-4}	5×10^{-5}	1×10^{-4}	2×10^{-5}	6×10^{-4}	7×10^{-4}	7×10^{-4}

Table A 2.1.3 LLNL Batch 68 (B1-1) - 240 grit Surface Finish for 0-7 days leach period in de-ionised water at 90°C.

Result	Leach rate ($g\ m^{-2}\ d^{-1}$)			Leach rate ($g\ m^{-2}\ d^{-1}$)			Leach rate ($g\ m^{-2}\ d^{-1}$)		
	Unfiltered			Wall strip			Total		
Sample	I	J	K	I	J	K	I	J	K
Pu	3.76×10^{-5}	6.51×10^{-5}	3.14×10^{-5}	2.09×10^{-5}	4.42×10^{-5}	1.76×10^{-5}	5.85×10^{-5}	1.09×10^{-4}	4.90×10^{-5}
Ca	2.7×10^{-2}	2.7×10^{-2}	2.9×10^{-2}	$< 3 \times 10^{-2}$	5.5×10^{-2}	5.4×10^{-2}	5.7×10^{-2}	8.2×10^{-2}	8.3×10^{-2}
Gd	5×10^{-4}	5×10^{-4}	5×10^{-4}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	5.3×10^{-4}	5×10^{-4}	5×10^{-4}
Hf	$< 1 \times 10^{-5}$	4×10^{-5}	$< 1 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 3 \times 10^{-5}$	6×10^{-5}	$< 3 \times 10^{-5}$
Ti	$< 3 \times 10^{-5}$	1×10^{-4}	$< 3 \times 10^{-5}$	$< 1 \times 10^{-4}$	1×10^{-4}	$< 1 \times 10^{-4}$	$< 1.3 \times 10^{-4}$	2×10^{-4}	$< 1 \times 10^{-4}$
U	7×10^{-4}	7×10^{-4}	6×10^{-4}	$< 1 \times 10^{-5}$	1×10^{-4}	$< 1 \times 10^{-5}$	7×10^{-4}	8×10^{-4}	6×10^{-4}

Table A 2.1.4 LLNL Batch 68 (B1-1) - 6μm Surface Finish for 0-7 days leach period in de-ionised water at 90°C.

Result	Leach rate ($g\ m^{-2}\ d^{-1}$)			Leach rate ($g\ m^{-2}\ d^{-1}$)			Leach rate ($g\ m^{-2}\ d^{-1}$)		
	Unfiltered			Wall strip			Total		
Sample	C	D	E	C	D	E	C	D	E
Pu	6.45×10^{-5}	5.55×10^{-5}	8.51×10^{-5}	3.53×10^{-5}	4.55×10^{-5}	5.32×10^{-5}	9.98×10^{-5}	1.01×10^{-4}	1.38×10^{-4}
Ca	$< 2 \times 10^{-2}$	$< 1.9 \times 10^{-2}$	$< 2 \times 10^{-2}$	4.8×10^{-2}	5.4×10^{-2}	3.8×10^{-2}	6.8×10^{-2}	7.3×10^{-2}	5.8×10^{-2}
Gd	6×10^{-4}	6×10^{-4}	8×10^{-4}	5×10^{-5}	1×10^{-4}	$< 3 \times 10^{-5}$	6×10^{-4}	7×10^{-4}	8×10^{-4}
Hf	$< 1 \times 10^{-5}$	2×10^{-5}	1×10^{-4}	4×10^{-5}	3×10^{-5}	5×10^{-5}	5×10^{-5}	5×10^{-5}	2×10^{-4}
Ti	$< 3 \times 10^{-5}$	4×10^{-5}	1×10^{-4}	1×10^{-4}	1×10^{-4}	1×10^{-4}	1×10^{-4}	1×10^{-4}	2×10^{-4}
U	4×10^{-4}	4×10^{-4}	5×10^{-4}	1×10^{-4}	1×10^{-4}	5×10^{-5}	5×10^{-4}	5×10^{-4}	5×10^{-4}

Table A 2.1.5 LLNL Batch 68 (B1-1) - 1μm Surface Finish for 0-7 days leach period in de-ionised water at 90°C.

Result	Leach rate ($g\ m^{-2}\ d^{-1}$)			Leach rate ($g\ m^{-2}\ d^{-1}$)			Leach rate ($g\ m^{-2}\ d^{-1}$)		
	Unfiltered			Wall strip			Total		
Sample	R	S	T	R	S	T	R	S	T
Pu	3.2×10^{-4}	1.1×10^{-4}	1.9×10^{-4}	3.2×10^{-5}	1.8×10^{-5}	3.4×10^{-5}	3.5×10^{-4}	1.3×10^{-4}	2.3×10^{-4}
Ca	2.7×10^{-2}	2.8×10^{-2}	3.3×10^{-2}	5.9×10^{-2}	4.5×10^{-2}	4.6×10^{-2}	8.6×10^{-2}	7.3×10^{-2}	7.9×10^{-2}
Gd	9×10^{-4}	8×10^{-4}	7×10^{-4}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	9×10^{-4}	8×10^{-4}	7×10^{-4}
Hf	1×10^{-4}	1×10^{-4}	1×10^{-4}	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	1×10^{-4}	1×10^{-4}	1×10^{-4}
Ti	1×10^{-4}	1×10^{-4}	1×10^{-4}	1×10^{-4}	$< 4 \times 10^{-5}$	$< 4 \times 10^{-5}$	2×10^{-4}	1×10^{-4}	1×10^{-4}
U	9×10^{-4}	7×10^{-4}	6×10^{-4}	$< 1 \times 10^{-5}$	1×10^{-5}	1×10^{-5}	1×10^{-3}	7×10^{-4}	6×10^{-4}

Table A 2.1.6 LLNL Batch 75 (A-7) - Unpolished Surface Finish for 0-7 days leach period in de-ionised water at 90°C.

Result	Leach rate ($g\ m^{-2}\ d^{-1}$)			Leach rate ($g\ m^{-2}\ d^{-1}$)			Leach rate ($g\ m^{-2}\ d^{-1}$)		
	Unfiltered			Wall strip			Total		
Sample	L	M	N	L	M	N	L	M	N
Pu	4.30×10^{-5}	1.29×10^{-5}	8.01×10^{-6}	7.62×10^{-5}	1.45×10^{-5}	2.67×10^{-5}	1.19×10^{-4}	2.73×10^{-5}	3.48×10^{-5}
Ca	3.3×10^{-2}	2.7×10^{-2}	3.6×10^{-2}	6.0×10^{-2}	6.5×10^{-2}	7.1×10^{-2}	9.3×10^{-2}	9.2×10^{-2}	1.1×10^{-1}
Gd	1×10^{-4}	1×10^{-4}	1×10^{-4}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	1×10^{-4}	1.3×10^{-4}	1×10^{-4}
Hf	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 4 \times 10^{-5}$	$< 4 \times 10^{-5}$	$< 4 \times 10^{-5}$
Ti	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	1×10^{-4}	1×10^{-4}	1×10^{-4}	1×10^{-4}	1×10^{-4}	1×10^{-4}
U	2×10^{-4}	2×10^{-4}	3×10^{-4}	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	3×10^{-4}	2×10^{-4}	3×10^{-4}

Table A 2.1.7 LLNL Batch 75 (A-7) – 1200 grit Surface Finish for 0-7 days leach period in de-ionised water at 90°C.

Result	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered			Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip			Leach rate ($g\ m^{-2}\ d^{-1}$) Total		
Sample	D	E	F	D	E	F	D	E	F
Pu	8.71×10^{-5}	5.26×10^{-5}	1.42×10^{-4}	4.35×10^{-5}	9.05×10^{-6}	5.83×10^{-5}	1.31×10^{-4}	6.16×10^{-5}	2.01×10^{-4}
Ca	3.5×10^{-2}	3.8×10^{-2}	4.2×10^{-2}	6×10^{-2}	6.5×10^{-2}	2.4×10^{-1}	9.4×10^{-2}	1.03×10^{-1}	1.1×10^{-1}
Gd	3×10^{-4}	1×10^{-4}	3×10^{-4}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	3×10^{-4}	1.3×10^{-4}	3×10^{-4}
Hf	3×10^{-5}	3×10^{-5}	8×10^{-5}	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	5×10^{-5}	5×10^{-5}	1×10^{-4}
Ti	1×10^{-4}	1×10^{-5}	1×10^{-4}	8×10^{-5}	$< 1 \times 10^{-4}$	1×10^{-4}	1×10^{-4}	1×10^{-4}	2×10^{-4}
U	4×10^{-4}	6×10^{-4}	1×10^{-3}	2×10^{-5}	$<1 \times 10^{-5}$	1×10^{-4}	4×10^{-4}	6×10^{-4}	1×10^{-4}

Table A 2.1.8 LLNL Batch 75 (A-7) – 240 grit Surface Finish for 0-7 days leach period in de-ionised water at 90°C.

Result	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered			Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip			Leach rate ($g\ m^{-2}\ d^{-1}$) Total		
Sample	G	H	I	G	H	I	G	H	I
Pu	7.46×10^{-5}	9.46×10^{-5}	5.13×10^{-5}	1.12×10^{-4}	1.32×10^{-5}	1.73×10^{-5}	1.86×10^{-4}	1.08×10^{-4}	6.86×10^{-5}
Ca	4.1×10^{-2}	4.1×10^{-2}	4.3×10^{-2}	7.5×10^{-2}	6.5×10^{-2}	1.2×10^{-1}	1.2×10^{-1}	1.1×10^{-1}	1.7×10^{-1}
Gd	2×10^{-4}	2×10^{-4}	1×10^{-4}	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 3 \times 10^{-5}$	2×10^{-4}	2×10^{-4}	3×10^{-4}
Hf	2×10^{-5}	6×10^{-5}	4×10^{-5}	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	4×10^{-5}	4×10^{-5}	8×10^{-5}
Ti	1×10^{-4}	1×10^{-4}	1×10^{-4}	1×10^{-4}	1×10^{-4}	1×10^{-4}	2×10^{-4}	2×10^{-4}	2×10^{-4}
U	3×10^{-4}	5×10^{-4}	5×10^{-4}	5×10^{-5}	1×10^{-5}	2×10^{-5}	4×10^{-4}	4×10^{-4}	5×10^{-4}

Table A 2.1.9 LLNL Batch 75 (A-7) – 6μm Surface Finish for 0-7 days leach period in de-ionised water at 90°C.

Result	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered			Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip			Leach rate ($g\ m^{-2}\ d^{-1}$) Total		
Sample	C	J	K	C	J	K	C	J	K
Pu	6.14×10^{-5}	1.33×10^{-4}	2.12×10^{-4}	7.30×10^{-5}	nd	1.58×10^{-4}	1.34×10^{-4}	1.33×10^{-4}	3.70×10^{-4}
Ca	3.4×10^{-2}	3.5×10^{-2}	4.7×10^{-2}	4.50×10^{-2}	5.5×10^{-2}	6.5×10^{-2}	7.9×10^{-2}	9×10^{-2}	1.1×10^{-1}
Gd	2×10^{-4}	3×10^{-4}	4×10^{-4}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	1×10^{-4}	3×10^{-4}	4×10^{-4}	5×10^{-4}
Hf	3×10^{-5}	6×10^{-5}	9×10^{-5}	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	$< 2 \times 10^{-5}$	5×10^{-5}	8×10^{-5}	1×10^{-4}
Ti	1×10^{-4}	1×10^{-4}	1×10^{-4}	$< 1 \times 10^{-4}$	$< 1 \times 10^{-4}$	$< 1 \times 10^{-4}$	2×10^{-4}	2×10^{-4}	2×10^{-4}
U	5×10^{-4}	7×10^{-4}	1×10^{-3}	$< 1 \times 10^{-5}$	2×10^{-5}	1×10^{-4}	6×10^{-4}	7×10^{-4}	1×10^{-3}

Table A 2.1.10 LLNL Batch 75 (A-7) – 1μm Surface Finish for 0-7 days leach period in de-ionised water at 90°C.

Result	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered			Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip			Leach rate ($g\ m^{-2}\ d^{-1}$) Total		
Sample	P	Q	R	P	Q	R	P	Q	R
Pu	4.92×10^{-5}	1.55×10^{-4}	1.03×10^{-4}	1.52×10^{-5}	5.33×10^{-5}	3.21×10^{-5}	6.44×10^{-5}	2.09×10^{-4}	1.35×10^{-4}
Ca	4.1×10^{-2}	3.6×10^{-2}	4.1×10^{-2}	6.8×10^{-2}	6.3×10^{-2}	6.4×10^{-2}	1.1×10^{-1}	9.9×10^{-2}	1.1×10^{-1}
Gd	2×10^{-4}	4×10^{-4}	3×10^{-4}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	2×10^{-4}	4×10^{-4}	3×10^{-4}
Hf	4×10^{-5}	1×10^{-4}	5×10^{-5}	$< 3 \times 10^{-5}$	5×10^{-5}	$< 2 \times 10^{-5}$	7×10^{-5}	2×10^{-4}	7×10^{-5}
Ti	1×10^{-4}	1×10^{-4}	1×10^{-4}	$< 1 \times 10^{-4}$	$< 1 \times 10^{-4}$	$< 1 \times 10^{-4}$	2×10^{-4}	2×10^{-4}	2×10^{-4}
U	4×10^{-4}	6×10^{-4}	5×10^{-4}	$< 1 \times 10^{-5}$	2×10^{-5}	$< 1 \times 10^{-5}$	4×10^{-4}	8×10^{-4}	5×10^{-4}

TableA 2.1.11 LLNL Batch 68 (B1-1) - Unpolished Surface Finish for 7-28 days leach period in de-ionised water at 90°C

Results	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered		Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip		Leach rate ($g\ m^{-2}\ d^{-1}$) Total	
Sample	M	N	M	N	M	N
Pu	n.m	1.47×10^{-5}	6.25×10^{-7}	$0.00 \times 10^{+0}$	6.25×10^{-7}	1.47×10^{-5}
Ca	9×10^{-4}	1×10^{-3}	$< 4.8 \times 10^{-2}$	$<4.8 \times 10^{-2}$	9×10^{-4}	1×10^{-3}
Gd	2×10^{-4}	2×10^{-4}	$<1 \times 10^{-3}$	$< 1 \times 10^{-3}$	2×10^{-4}	2×10^{-4}
Hf	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 7 \times 10^{-4}$	$<7 \times 10^{-4}$	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$
Ti	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
U	4×10^{-5}	3×10^{-5}	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	4×10^{-5}	3×10^{-5}

Table A 2.1.12 LLNL Batch 68 (B1-1) - 1200 grit Surface Finish for 7-28 days leach period in de-ionised water at 90°C.

Results	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered		Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip		Leach rate ($g\ m^{-2}\ d^{-1}$) Total	
Sample	G	H	G	H	G	H
Pu	2.21×10^{-5}	1.99×10^{-5}	2.88×10^{-6}	1.26×10^{-6}	2.50×10^{-5}	2.12×10^{-5}
Ca	7×10^{-3}	2×10^{-3}	$< 5.1 \times 10^{-2}$	$< 5.2 \times 10^{-2}$	8×10^{-3}	2×10^{-3}
Gd	3×10^{-4}	3×10^{-4}	$< 1 \times 10^{-3}$	$< 12 \times 10^{-3}$	3×10^{-4}	3×10^{-4}
Hf	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 8 \times 10^{-4}$	$< 8 \times 10^{-4}$	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$
Ti	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
U	1×10^{-4}	1×10^{-4}	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	1×10^{-4}	1×10^{-4}

Table A 2.1.13 LLNL Batch 68 (B1-1) - 240 grit Surface Finish for 7-28 days leach period in de-ionised water at 90°C.

Results	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered		Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip		Leach rate ($g\ m^{-2}\ d^{-1}$) Total	
Sample	J	K	J	K	J	K
Pu	1.47×10^{-5}	9.35×10^{-6}	4.97×10^{-5}	nd	6.44×10^{-5}	9.35×10^{-6}
Ca	2×10^{-3}	5×10^{-4}	2.2×10^{-1}	$< 5.5 \times 10^{-2}$	2×10^{-3}	5×10^{-4}
Gd	3×10^{-4}	3×10^{-4}	$< 1 \times 10^{-3}$	$< 1 \times 10^{-3}$	3×10^{-4}	3×10^{-4}
Hf	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 8 \times 10^{-4}$	$< 8 \times 10^{-4}$	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$
Ti	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
U	2×10^{-4}	2×10^{-4}	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	2×10^{-4}	2×10^{-4}

Table A 2.1.14 LLNL Batch 68 (B1-1) - 6μm Surface Finish for 7-28 leach period in de-ionised water at 90°C.

Results	**Leach rate ($g\ m^{-2}\ d^{-1}$)** Unfiltered		**Leach rate ($g\ m^{-2}\ d^{-1}$)** Wall strip		**Leach rate ($g\ m^{-2}\ d^{-1}$)** Total	
Sample	D	E	D	E	D	E
Pu	2.87×10^{-5}	1.71×10^{-5}	2.25×10^{-6}	1.29×10^{-6}	3.10×10^{-5}	1.84×10^{-5}
Ca	2×10^{-3}	2×10^{-3}	$< 5. \times 10^{-2}$	$< 5. \times 10^{-2}$	2×10^{-3}	2×10^{-3}
Gd	3×10^{-4}	2×10^{-4}	$< 1 \times 10^{-3}$	$< 1 \times 10^{-3}$	3×10^{-4}	2×10^{-4}
Hf	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 8 \times 10^{-4}$	$< 8 \times 10^{-4}$	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$
Ti	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
U	1×10^{-4}	1×10^{-4}	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	1×10^{-4}	1×10^{-4}

Table A 2.1.15 LLNL Batch 68 (B1-1) - 1μm Surface Finish for 7-28 days leach period in de-ionised water at 90°C.

Results	**Leach rate ($g\ m^{-2}\ d^{-1}$)** Unfiltered		**Leach rate ($g\ m^{-2}\ d^{-1}$)** Wall strip		**Leach rate ($g\ m^{-2}\ d^{-1}$)** Total	
Sample	S	T	S	T	S	T
Pu	1.1×10^{-4}	4.4×10^{-5}	nd	7.3×10^{-6}	1.1×10^{-4}	5.1×10^{-5}
Ca	8×10^{-4}	$< 3 \times 10^{-4}$	$<5.2 \times 10^{-2}$	$<5.3 \times 10^{-2}$	8×10^{-4}	$< 3 \times 10^{-4}$
Gd	3×10^{-4}	2×10^{-4}	$<1 \times 10^{-3}$	$<1 \times 10^{-3}$	3×10^{-4}	2×10^{-4}
Hf	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 8 \times 10^{-4}$	$< 8 \times 10^{-4}$	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$
Ti	$<1 \times 10^{-5}$	$<1 \times 10^{-5}$	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
U	1×10^{-4}	1×10^{-4}	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	1×10^{-4}	1×10^{-4}

Table A 2.1.16 LLNL Batch 75 (A-7) - Unpolished Surface Finish for 7-28days leach period in de-ionised water at 90°C.

Results	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered		Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip		Leach rate ($g\ m^{-2}\ d^{-1}$) Total	
Sample	M	N	M	N	M	N
Pu	1.35×10^{-6}	3.08×10^{-7}	2.89×10^{-6}	6.33×10^{-7}	4.24×10^{-6}	9.41×10^{-7}
Ca	5×10^{-3}	6×10^{-3}	$< 4.7 \times 10^{-2}$	$< 5 \times 10^{-2}$	5.2×10^{-3}	6×10^{-3}
Gd	3×10^{-5}	3×10^{-5}	$< 1 \times 10^{-3}$	$< 1 \times 10^{-3}$	3×10^{-5}	3×10^{-5}
Hf	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 8 \times 10^{-4}$	$< 8 \times 10^{-4}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
Ti	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
U	2×10^{-5}	2×10^{-5}	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	2×10^{-5}	2×10^{-5}

Table A 2.1.17 LLNL Batch 75 (A-7) – 1200 grit Surface Finish for 7-28 days leach period in de-ionised water at 90°C.

Result	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered		Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip		Leach rate ($g\ m^{-2}\ d^{-1}$) Total	
Sample	D	E	D	E	D	E
Pu	1.52×10^{-5}	5.28×10^{-6}	4.03×10^{-6}	2.27×10^{-7}	1.92×10^{-5}	5.51×10^{-6}
Ca	3×10^{-3}	8×10^{-3}	5.9×10^{-2}	$< 5.2 \times 10^{-2}$	3×10^{-3}	8×10^{-3}
Gd	1×10^{-4}	5×10^{-5}	$< 1 \times 10^{-3}$	$< 1 \times 10^{-3}$	1×10^{-4}	5×10^{-5}
Hf	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-3}$	$< 1 \times 10^{-3}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
Ti	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
U	2×10^{-4}	1×10^{-4}	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	2×10^{-4}	1×10^{-4}

Table A 2.1.18 LLNL Batch 75 (A-7) – 240 grit Surface Finish for 7-28 days leach period in de-ionised water at 90°C.

Result	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered		Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip		Leach rate ($g\ m^{-2}\ d^{-1}$) Total	
Sample	H	I	H	I	H	I
Pu	9.59×10^{-6}	1.01×10^{-3}	1.73×10^{-5}	4.42E-05	2.69×10^{-5}	1.06×10^{-3}
Ca	$4. \times 10^{-3}$	n.a	$< 5.1 \times 10^{-2}$	n.a	4×10^{-3}	n.a
Gd	3×10^{-4}	n.a	$< 1 \times 10^{-3}$	n.a	3×10^{-4}	n.a
Hf	$< 5 \times 10^{-6}$	n.a	$< 8 \times 10^{-4}$	n.a	$< 5 \times 10^{-6}$	n.a
Ti	1×10^{-5}	n.a	$< 2 \times 10^{-3}$	n.a	1×10^{-5}	n.a
U	4×10^{-4}	n.a	$< 2 \times 10^{-3}$	n.a	4×10^{-4}	n.a

Table A 2.1.19 LLNL Batch 75 (A-7) – 6μm Surface Finish for 7-28 days leach period in de-ionised water at 90°C.

Result	**Leach rate (g m^{-2} d^{-1})** Unfiltered		Leach rate (g m^{-2} d^{-1}) Wall strip		Leach rate (g m^{-2} d^{-1}) Total	
Sample	J	K	J	K	J	K
Pu	3.85×10^{-5}	4.92×10^{-5}	1.25×10^{-7}	7.46×10^{-6}	3.85×10^{-5}	5.67×10^{-5}
Ca	6×10^{-3}	6×10^{-3}	$< 5.1 \times 10^{-2}$	$< 5.2 \times 10^{-2}$	6×10^{-3}	6×10^{-3}
Gd	1×10^{-4}	9×10^{-5}	$< 1 \times 10^{-3}$	$< 1 \times 10^{-3}$	1×10^{-4}	9×10^{-5}
Hf	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 8 \times 10^{-4}$	$< 8 \times 10^{-4}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
Ti	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
U	2×10^{-4}	2×10^{-4}	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	2×10^{-4}	2×10^{-4}

Table A 2.1.20 LLNL Batch 75 (A-7) – 1μm Surface Finish for 7-28 days leach period in de-ionised water at 90°C.

Result	**Leach rate (g m^{-2} d^{-1})** Unfiltered		**Leach rate (g m^{-2} d^{-1})** Wall strip		**Leach rate (g m^{-2} d^{-1})** Total	
Sample	P	Q	P	Q	P	Q
Pu	1.33×10^{-6}	7.17×10^{-6}	7.79×10^{-7}	6.25×10^{-7}	2.11×10^{-6}	7.79×10^{-6}
Ca	3×10^{-3}	4×10^{-3}	$< 5.3 \times 10^{-2}$	$< 5.1 \times 10^{-2}$	3×10^{-3}	4×10^{-3}
Gd	8×10^{-5}	2×10^{-4}	$< 1 \times 10^{-3}$	$< 1 \times 10^{-3}$	8×10^{-5}	2×10^{-4}
Hf	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 9 \times 10^{-4}$	$< 8 \times 10^{-4}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
Ti	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
U	7×10^{-5}	1×10^{-4}	$< 2 \times 10^{-3}$	$< 2 \times 10^{-3}$	7×10^{-5}	1×10^{-4}

Table A 2.1.21 LLNL Batch 68 (B1-1) and Batch 75 (A-7) – 5000NMW filter for 7-28 days leach period in de-ionised water at 90°C.

5000NMW filter	Leach rate (g m^{-2} d^{-1})						
	Sample	Pu	Ca	Gd	Hf	Ti	U
Batch Pu 68-Unpolished	L	7.85×10^{-7}	1.4×10^{-2}	$< 3 \times 10^{-5}$	$<2 \times 10^{-5}$	$< 6 \times 10^{-5}$	$< 6 \times 10^{-5}$
1200 grit	F	1.53×10^{-5}	1.4×10^{-2}	$<3 \times 10^{-5}$	$<2 \times 10^{-5}$	6×10^{-5}	$< 6 \times 10^{-5}$
240 grit	I	1.21×10^{-5}	1.9×10^{-2}	$< 3 \times 10^{-5}$	$< 2 \times 10^{-5}$	9×10^{-5}	$< 6 \times 10^{-5}$
6 µm	C	2.56×10^{-5}	1.7×10^{-2}	$< 3 \times 10^{-5}$	$<2 \times 10^{-5}$	$< 6 \times 10^{-5}$	$< 6 \times 10^{-5}$
1 µm	R	1.93×10^{-5}	2.4×10^{-2}	$<3 \times 10^{-5}$	$<2 \times 10^{-5}$	1×10^{-4}	$< 6 \times 10^{-5}$
Batch Pu 75-Unpolished	L	n.d	1.2×10^{-2}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	9×10^{-5}	$< 6 \times 10^{-5}$
1200 grit	F	n.a	1.9×10^{-2}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	6×10^{-5}	$< 6 \times 10^{-5}$
240 grit	G	9.32×10^{-7}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	6×10^{-5}	$< 6 \times 10^{-5}$	n.a
6 µm	C	1.92×10^{-6}	1.5×10^{-2}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	6.0×10^{-5}	$< 6 \times 10^{-5}$
1 µm	R	6.19×10^{-6}	3.3×10^{-2}	$< 3 \times 10^{-5}$	$< 3 \times 10^{-5}$	1.2×10^{-4}	7×10^{-5}

Table A 2.1.22 LLNL Batch 68 (B1-1) and Batch 75 (A-7) – 0.45µm filter for 7-28 days leach period in de-ionised water at 90°C.

0.45µm filter	Leach rate (g m^{-2} d^{-1})						
	Sample	Pu	Ca	Gd	Hf	Ti	U
Batch Pu 68-Unpolished	L	4.47×10^{-7}	6×10^{-3}	$< 1 \times 10^{-5}$	$< 5 \times 10^{-6}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
1200 grit	F	2.19×10^{-5}	2×10^{-3}	$< 1 \times 10^{-5}$	$< 5 \times 10^{-6}$	$< 1 \times 10^{-5}$	1×10^{-4}
240 grit	I	1.82×10^{-5}	2×10^{-3}	$< 1 \times 10^{-5}$	$< 5 \times 10^{-6}$	$< 1 \times 10^{-5}$	1×10^{-4}
6 µm	C	3.16×10^{-5}	4×10^{-3}	$< 1 \times 10^{-5}$	$< 5 \times 10^{-6}$	$< 1 \times 10^{-5}$	1×10^{-4}
1 µm	R	2.38×10^{-5}	2×10^{-3}	$< 1 \times 10^{-5}$	$< 5 \times 10^{-6}$	$< 1 \times 10^{-5}$	1×10^{-4}
Batch Pu 75-Unpolished	L	8.18×10^{-7}	3×10^{-3}	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	1×10^{-5}
1200 grit	F	1.74×10^{-5}	1×10^{-2}	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
240 grit	G	3.29×10^{-6}	1×10^{-2}	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
6 µm	C	n.d	6×10^{-3}	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$
1 µm	R	5.96×10^{-6}	5×10^{-3}	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	$< 1 \times 10^{-5}$	2×10^{-5}

Table A 2.1.23 LLNL Batch 68 (B1-1) - Unpolished Surface Finish for 28-84 days leach period in de-ionised water at 90°C.

Results	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered			Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip			Leach rate ($g\ m^{-2}\ d^{-1}$) Total		
Sample	L	M	N	L	M	N	L	M	N
Pu	5.78×10^{-5}	1.08×10^{-4}	6.69×10^{-5}	6.96×10^{-5}	3.16×10^{-5}	2.91×10^{-5}	1.27×10^{-4}	1.40×10^{-4}	9.60×10^{-5}
Ca	8.6×10^{-3}	3.8×10^{-3}	3.3×10^{-3}	$< 2.8 \times 10^{-3}$	$< 2.9 \times 10^{-3}$	$< 2.9 \times 10^{-3}$	1.1×10^{-2}	6.7×10^{-3}	6.2×10^{-3}
Gd	7.3×10^{-4}	1.3×10^{-3}	1.0×10^{-3}	2×10^{-4}	1×10^{-4}	1×10^{-4}	9×10^{-4}	1.4×10^{-3}	1.2×10^{-3}
Hf	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$
Ti	5×10^{-6}	$< 4 \times 10^{-6}$	1×10^{-5}	5×10^{-6}	1×10^{-5}	1×10^{-5}	1×10^{-5}	1.8×10^{-5}	$< 2 \times 10^{-5}$
U	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 9 \times 10^{-6}$	< 9e-6	$< 9 \times 10^{-6}$

Table A 2.1.24 LLNL Batch 68 (B1-1) - 1200 grit Surface Finish for 28-84 days leach period in de-ionised water at 90°C.

Results	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered			Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip			Leach rate ($g\ m^{-2}\ d^{-1}$) Total		
Sample	F	G	H	F	G	H	F	G	H
Pu	1.04×10^{-4}	1.03×10^{-4}	5.08×10^{-5}	1.52×10^{-5}	1.38×10^{-5}	1.60×10^{-5}	1.19×10^{-4}	1.17×10^{-4}	6.69×10^{-5}
Ca	5.1×10^{-3}	8.4×10^{-3}	3.7×10^{-3}	$< 3.1 \times 10^{-3}$	$< 3 \times 10^{-3}$	$< 3.1 \times 10^{-3}$	8.2×10^{-3}	1.1×10^{-2}	6.8×10^{-3}
Gd	1.8×10^{-3}	1.8×10^{-3}	1.4×10^{-3}	1×10^{-4}	1×10^{-4}	1×10^{-4}	1.9×10^{-3}	1.9×10^{-3}	1.5×10^{-3}
Hf	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$
Ti	$< 4 \times 10^{-6}$	5×10^{-6}	5×10^{-6}	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	1×10^{-5}	$< 9 \times 10^{-6}$	$< 1 \times 10^{-5}$	1×10^{-5}
U	9×10^{-6}	9×10^{-6}	1×10^{-5}	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	1×10^{-5}	1×10^{-5}	1×10^{-5}

Table A 2.1.25 LLNL Batch 68 (B1-1) - 240 grit Surface Finish for 28-84 days leach period in de-ionised water at 90°C.

Results	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered			Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip			Leach rate ($g\ m^{-2}\ d^{-1}$) Total		
Sample	I	J	K	I	J	K	I	J	K
Pu	5.28×10^{-5}	5.07×10^{-5}	**6.40×10^{-5}**	8.44×10^{-6}	5.87×10^{-6}	1.83×10^{-5}	6.13×10^{-5}	5.65×10^{-5}	8.23×10^{-5}
Ca	5.8×10^{-3}	4.80×10^{-3}	**5.0×10^{-3}**	< 3.1e-3	$< 3.2 \times 10^{-3}$	$< 3.3 \times 10^{-3}$	8.9×10^{-3}	8.0×10^{-3}	8.3×10^{-3}
Gd	1.7×10^{-3}	1.55×10^{-3}	**1.8×10^{-3}**	9×10^{-5}	4×10^{-5}	1×10^{-4}	1.8×10^{-3}	1.6×10^{-3}	1.9×10^{-3}
Hf	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	**$< 2 \times 10^{-6}$**	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$
Ti	5×10^{-6}	5×10^{-6}	**7×10^{-6}**	7×10^{-6}	7×10^{-6}	1×10^{-5}	1×10^{-5}	1×10^{-5}	1×10^{-5}
U	1×10^{-5}	1×10^{-5}	**1×10^{-5}**	< 5e-6	< 5e-6	$< 6 \times 10^{-6}$	2×10^{-5}	2×10^{-5}	2×10^{-5}

Table A 2.1.26 LLNL Batch 68 (B1-1) - 6μm Surface Finish for 28-84 leach period in de-ionised water at 90°C.

Results	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered			Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip			Leach rate ($g\ m^{-2}\ d^{-1}$) Total		
Sample	C	D	E	C	D	E	C	D	E
Pu	4.06×10^{-4}	7.66×10^{-5}	**4.28×10^{-5}**	3.40×10^{-5}	1.33×10^{-5}	9.85×10^{-6}	4.40×10^{-4}	8.99×10^{-5}	5.26×10^{-5}
Ca	8.9×10^{-3}	3.4×10^{-3}	**5.1×10^{-3}**	$< 3.2 \times 10^{-3}$	$< 3.2 \times 10^{-3}$	$< 3.1 \times 10^{-3}$	9.2×10^{-3}	6.6×10^{-3}	8.2×10^{-3}
Gd	1.5×10^{-3}	1.3×10^{-3}	**1.6×10^{-3}**	7×10^{-5}	7×10^{-5}	1×10^{-4}	1.6×10^{-3}	1.4×10^{-3}	1.7×10^{-3}
Hf	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	**$< 2 \times 10^{-6}$**	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$
Ti	8×10^{-6}	6×10^{-6}	**9×10^{-6}**	$< 5 \times 10^{-6}$	5×10^{-6}	8×10^{-6}	1×10^{-5}	< 1.1e-5	1×10^{-5}
U	5×10^{-6}	5×10^{-6}	**9×10^{-6}**	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	1×10^{-5}	1×10^{-5}	1×10^{-5}

Table A 2.1.27 LLNL Batch 68 (B1-1) - 1μm Surface Finish for 28-84 days leach period in de-ionised water at 90°C.

Results	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered			Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip			Leach rate ($g\ m^{-2}\ d^{-1}$) Total		
Sample	R	S	T	R	S	T	R	S	T
Pu	2.9×10^{-4}	1.1×10^{-4}	**1.9×10^{-4}**	3.4×10^{-5}	1.5×10^{-5}	3.2×10^{-5}	value	1.3×10^{-4}	2.2×10^{-4}
Ca	4.1×10^{-3}	5.2×10^{-3}	**5.9×10^{-3}**	$< 3.1 \times 10^{-3}$	$< 3.1 \times 10^{-3}$	1.1×10^{-2}	7.2×10^{-3}	8.3×10^{-3}	1.7×10^{-2}
Gd	1.5×10^{-3}	1.7×10^{-3}	**1.6×10^{-3}**	1.4×10^{-4}	1.5×10^{-4}	8.0×10^{-5}	1.6×10^{-3}	1.9×10^{-3}	1.7×10^{-3}
Hf	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	**$< 2 \times 10^{-6}$**	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$
Ti	1.0×10^{-5}	1.0×10^{-5}	**1.0×10^{-5}**	1.0×10^{-5}	1.0×10^{-5}	1.0×10^{-5}	2.0×10^{-5}	2.0×10^{-5}	2.0×10^{-5}
U	1.1×10^{-5}	6.0×10^{-6}	**6.0×10^{-6}**	$<5 \times 10^{-6}$	$<5 \times 10^{-6}$	$<5 \times 10^{-6}$	1.6×10^{-5}	1.1×10^{-5}	1.1×10^{-5}

Table A 2.1.28 LLNL Batch 75 (A-7) - Unpolished Surface Finish for 28-84 days leach period in de-ionised water at 90°C.

Results	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered			Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip			Leach rate ($g\ m^{-2}\ d^{-1}$) Total		
Sample	L	M	N	L	M	N	L	M	N
Pu	1.35×10^{-5}	1.43×10^{-5}	1.63×10^{-5}	3.36×10^{-6}	3.27×10^{-6}	1.13×10^{-6}	1.69×10^{-5}	1.76×10^{-5}	1.74×10^{-5}
Ca	5.1×10^{-3}	6.6×10^{-3}	1.2×10^{-2}	$< 2.9 \times 10^{-3}$	$< 2.9 \times 10^{-3}$	$< 3.1 \times 10^{-3}$	8×10^{-3}	9.5×10^{-3}	1.5×10^{-2}
Gd	5×10^{-4}	4×10^{-4}	4×10^{-4}	5×10^{-5}	4×10^{-5}	2×10^{-5}	5×10^{-4}	4×10^{-4}	4×10^{-4}
Hf	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$
Ti	4×10^{-6}	1×10^{-5}	1×10^{-5}	2×10^{-5}	1×10^{-5}	$< 1 \times 10^{-5}$	2×10^{-5}	2×10^{-5}	2×10^{-5}
U	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 9 \times 10^{-6}$	$< 9 \times 10^{-6}$	$< 9 \times 10^{-6}$

Table A 2.1.29 LLNL Batch 75 (A-7) – 1200 grit Surface Finish for 28-84 days leach period in de-ionised water at 90°C.

Results	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered			Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip			Leach rate ($g\ m^{-2}\ d^{-1}$) Total		
Sample	D	E	F	D	E	F	D	E	F
Pu	nd	1.49×10^{-5}	2.57×10^{-5}	3.74×10^{-6}	2.31×10^{-6}	1.84×10^{-5}	3.74×10^{-6}	1.72×10^{-5}	4.41×10^{-5}
Ca	3.8×10^{-3}	5.7×10^{-3}	1.3×10^{-2}	$< 3.1 \times 10^{-3}$	$< 3.1 \times 10^{-3}$	$< 3.1 \times 10^{-3}$	6.9×10^{-3}	8.8×10^{-3}	1.7×10^{-2}
Gd	9×10^{-4}	5×10^{-4}	8×10^{-4}	4×10^{-5}	4×10^{-5}	2×10^{-4}	9×10^{-4}	5×10^{-4}	1.0×10^{-3}
Hf	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$
Ti	4×10^{-6}	5×10^{-6}	1×10^{-5}	1×10^{-5}	2×10^{-5}	1×10^{-5}	1×10^{-5}	2×10^{-5}	2×10^{-5}
U	1×10^{-5}	$< 4 \times 10^{-6}$	1×10^{-5}	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	1×10^{-5}	$< 9 \times 10^{-6}$	1×10^{-5}

Table A 2.1.30 LLNL Batch 75 (A-7) – 240 grit Surface Finish for 28-84 days leach period in de-ionised water at 90°C.

Results	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered			Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip			Leach rate ($g\ m^{-2}\ d^{-1}$) Total		
Sample	G	H	I	G	H	I	G	H	I
Pu	1.19×10^{-5}	3.47×10^{-5}	2.73×10^{-5}	4.12×10^{-5}	1.16×10^{-4}	5.11×10^{-6}	5.30×10^{-5}	1.51×10^{-4}	3.24×10^{-5}
Ca	6.4×10^{-3}	4.5×10^{-3}	4.6×10^{-3}	$< 3 \times 10^{-3}$	$< 3.1 \times 10^{-3}$	$< 3.1 \times 10^{-3}$	9.4×10^{-3}	7.6×10^{-3}	7.7×10^{-3}
Gd	5×10^{-4}	1.2×10^{-3}	1.0×10^{-3}	4×10^{-5}	1×10^{-4}	1×10^{-4}	5×10^{-4}	1.3×10^{-3}	1.1×10^{-3}
Hf	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$
Ti	4×10^{-6}	4×10^{-6}	5×10^{-6}	1×10^{-5}	$x\ 10^{-5}$	1×10^{-5}	1×10^{-5}	1×10^{-5}	1.5×10^{-5}
U	1×10^{-5}	1×10^{-5}	1×10^{-5}	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	1×10^{-5}	1×10^{-5}	1.5×10^{-5}

Table A 2.1.31 LLNL Batch 75 (A-7) – 6μm Surface Finish for 28-84 days leach period in de-ionised water at 90°C.

Results	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered			Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip			Leach rate ($g\ m^{-2}\ d^{-1}$) Total		
Sample	C	J	K	C	J	K	C	J	K
Pu	4.00×10^{-5}	nd	3.05×10^{-5}	6.17×10^{-6}	5.62×10^{-6}	3.39×10^{-6}	4.62×10^{-5}	nd	3.39×10^{-5}
Ca	1.7×10^{-2}	9.2×10^{-3}	5.7×10^{-3}	$< 3.1 \times 10^{-3}$	$< 3.1 \times 10^{-3}$	$< 3.1 \times 10^{-3}$	2.0×10^{-2}	1.2×10^{-2}	8.8×10^{-3}
Gd	6×10^{-4}	4×10^{-4}	4×10^{-4}	2×10^{-5}	5×10^{-5}	2×10^{-5}	6×10^{-4}	4×10^{-4}	4×10^{-4}
Hf	4×10^{-6}	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	1×10^{-5}	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	1×10^{-5}	$< 4 \times 10^{-6}$	$< 4 \times 10^{-6}$
Ti	2×10^{-5}	1×10^{-5}	1×10^{-5}	1×10^{-5}	1×10^{-5}	1×10^{-5}	3×10^{-5}	2×10^{-5}	2×10^{-5}
U	1×10^{-5}	5×10^{-6}	1×10^{-5}	$<5 \times 10^{-6}$	$< 5 \times 10^{-6}$	$< 5 \times 10^{-6}$	1×10^{-5}	1×10^{-5}	1×10^{-5}

Table A 2.1.32 LLNL Batch 75 (A-7) – 1μm Surface Finish for 28-84 days leach period in de-ionised water at 90°C.

Results	Leach rate ($g\ m^{-2}\ d^{-1}$) Unfiltered			Leach rate ($g\ m^{-2}\ d^{-1}$) Wall strip			Leach rate ($g\ m^{-2}\ d^{-1}$) Total		
Sample	P	Q	R	P	Q	R	P	Q	R
Pu	nd	9.35×10^{-6}	1.96×10^{-5}	nd	2.60×10^{-6}	4.30×10^{-6}	nd	1.19×10^{-5}	2.39×10^{-5}
Ca	7.3×10^{-3}	5.2×10^{-3}	1.0×10^{-2}	$< 3.2 \times 10^{-3}$	$< 3.1 \times 10^{-3}$	$< 3.1 \times 10^{-3}$	1.0×10^{-2}	8.3×10^{-3}	1.3×10^{-2}
Gd	4×10^{-4}	7×10^{-4}	5×10^{-4}	5×10^{-5}	4×10^{-5}	2×10^{-5}	4×10^{-4}	7.4×10^{-4}	5×10^{-4}
Hf	3×10^{-6}	$< 2 \times 10^{-6}$	$< 2 \times 10^{-6}$	$< 3 \times 10^{-6}$	$< 2 \times 10^{-6}$	1×10^{-5}	6×10^{-6}	$< 4 \times 10^{-6}$	1×10^{-5}
Ti	1×10^{-5}	$< 4 \times 10^{-6}$	1×10^{-5}	1×10^{-5}	2×10^{-5}	1×10^{-5}	2×10^{-5}	2×10^{-5}	2×10^{-5}
U	$< 4 \times 10^{-6}$	4×10^{-6}	$< 4 \times 10^{-6}$	$< 6 \times 10^{-6}$	1×10^{-5}	$<5 \times 10^{-6}$	$<1 \times 10^{-5}$	1×10^{-5}	$< 9 \times 10^{-6}$

APPENDIX 2.2

APPENDIX 2.2

Table 2.2.1 SPFT test for U-brannerite with pH 2.1 buffer solution

Sample No	Cumulative time(d)	Volume(ml)	Flow rate(ml/d)	U leach rate(g/m2.d)	Ti leach rate(g/m2.d)	U leached (%)	Ti leached(%)
1.1	1.86	12.037	6.4715	4.59E-02	2.07E-03	0.1498	0.0168
1.2	2.93	9.191	8.5897	5.03E-02	1.69E-03	0.2442	0.0247
1.3	3.93	7.468	7.4680	3.64E-02	1.05E-03	0.3079	0.0293
1.4	6.81	28.103	9.7580	3.62E-02	1.06E-03	0.4905	0.0425
1.5	7.73	11.813	12.8402	3.32E-02	1.01E-03	0.5440	0.0466
1.6	8.83	14.113	12.8300	1.96E-02	6.52E-04	0.5819	0.0497
1.7	9.82	10.788	11.0082	1.73E-02	4.98E-04	0.6116	0.0518
1.8	10.9	12.777	11.9411	2.12E-02	4.99E-04	0.6512	0.0542
1.9	13.89	34.382	11.4990	1.98E-02	4.23E-04	0.7551	0.0597
1.101	14.92	10.68	10.3689	1.87E-02	3.35E-04	0.7889	0.0612
1.11	15.95	9.746	9.4621	1.87E-02	2.82E-04	0.8227	0.0624
1.12	17.82	18.843	10.1306	1.99E-02	2.82E-04	0.8877	0.0647
1.13	20.98	31.391	9.9339	1.50E-02	2.51E-04	0.9706	0.0682
1.14	22.39	9.549	9.5490	1.41E-02	2.22E-04	0.9953	0.0691
1.15	22.97	7.882	7.9616	1.18E-02	1.79E-04	1.0157	0.0699
1.16	23.82	9.234	10.8635	1.39E-02	2.57E-04	1.0364	0.0709
1.17	29.81	52.813	8.8169	1.24E-02	1.99E-04	1.1671	0.0760
1.18	34.9	44.715	8.8022	1.03E-02	1.59E-04	1.2587	0.0796
1.19	36.85	18.334	9.3541	1.04E-02	1.64E-04	1.2945	0.0810
1.201	38.81	24.725	12.6148	1.06E-02	2.37E-04	1.3309	0.0830
1.21	41.73	31.493	10.7853	8.88E-03	1.97E-04	1.3764	0.0855
1.22	44.73	31.725	10.5750	8.16E-03	1.77E-04	1.4193	0.0878
1.23	48.73	42.751	10.6878	8.13E-03	1.65E-04	1.4763	0.0907
1.24	51.73	34.475	11.4917	6.80E-03	1.56E-04	1.5121	0.0927
1.25	55.73	42.974	10.7435	5.94E-03	1.35E-04	1.5537	0.0951
1.26	58.73	44.779	14.9263	6.91E-03	1.88E-04	1.5900	0.0976
1.27	62.73	56.606	14.1515	6.19E-03	1.79E-04	1.6334	0.1007
1.28	65.73	42.089	13.8451	6.10E-03	1.67E-04	1.6660	0.1029
1.29	69.75	50.62	12.5920	5.89E-03	1.41E-04	1.7074	0.1054
1.301	73.75	51.832	12.9580	6.11E-03	1.36E-04	1.7503	0.1077
1.31	76.75	37.41	12.4700	5.78E-03	1.26E-04	1.7807	0.1094
1.32	79.75	38.144	12.7147	5.85E-03	1.16E-04	1.8114	0.1109

1.33	83.71	49.427	12.4879	6.07E-03	1.20E-04	1.8535	0.1130
1.34	87.71	48.419	12.1048	5.76E-03	1.19E-04	1.8940	0.1150
1.35	91.71	45.132	11.2830	5.82E-03	1.18E-04	1.9348	0.1171
1.36	94.71	36.196	12.0653	5.77E-03	1.23E-04	1.9651	0.1187
1.37	97.71	35.66	11.8867	5.56E-03	1.21E-04	1.9943	0.1203

Table 2.2.2 SPFT test for U-brannerite with pH 3.0 buffer solution

Sample No	Cumulative time(d)	Volume(ml)	Flow rate(ml/d)	U leach rate(g/m2.d)	Ti leach rate(g/m2.d)	U leached(%)	Ti leached(%)
2.1	1.86	12.008	6.4559	2.82E-02	8.81E-04	0.1014	0.0079
2.2	2.93	9.934	9.2841	3.93E-02	8.05E-04	0.1828	0.0120
2.3	3.93	11.481	11.4810	8.73E-02	6.99E-04	0.3517	0.0154
2.4	6.81	26.361	9.1531	6.34E-02	4.11E-04	0.7050	0.0211
2.5	7.73	10.041	10.9141	4.71E-02	2.76E-04	0.7889	0.0223
2.6	8.83	10.039	9.1264	3.76E-02	1.81E-04	0.8689	0.0232
2.7	9.81	12.329	12.5806	4.51E-02	2.12E-04	0.9544	0.0242
2.8	10.88	10.731	10.0290	3.29E-02	1.56E-04	1.0226	0.0250
2.9	13.89	31.525	10.5435	2.82E-02	1.48E-04	1.1857	0.0272
2.101	14.92	9.403	9.1291	1.92E-02	1.28E-04	1.2240	0.0278
2.11	15.95	12.543	12.1777	2.61E-02	1.45E-04	1.2761	0.0285
2.12	17.82	19.691	10.5866	1.95E-02	1.06E-04	1.3463	0.0295
2.13	20.98	34.446	10.9006	1.40E-02	1.45E-04	1.4315	0.0317
2.14	22.39	11.519	11.5190	1.13E-02	1.06E-04	1.4535	0.0322
2.15	22.97	10.753	10.8616	1.16E-02	9.96E-05	1.4757	0.0327
2.16	23.82	7.21	8.4824	8.20E-03	7.39E-05	1.4892	0.0330
2.17	29.81	55.07	9.1937	9.14E-03	7.07E-05	1.5952	0.0350
2.18	34.9	48.862	9.6185	7.62E-03	6.35E-05	1.6700	0.0365
2.19	36.85	17.944	9.1551	6.64E-03	7.04E-05	1.6952	0.0372
2.201	38.81	20.751	10.5872	7.16E-03	5.40E-05	1.7224	0.0377
2.21	41.73	28.999	9.9312	5.96E-03	5.10E-05	1.7560	0.0384
2.22	44.73	28.804	9.6013	5.26E-03	4.53E-05	1.7866	0.0391
2.23	48.73	38.989	9.7473	5.26E-03	4.00E-05	1.8273	0.0399
2.24	51.73	29.65	9.8833	4.71E-03	2.70E-05	1.8546	0.0402
2.25	55.73	40.191	10.0478	4.69E-03	2.18E-05	1.8909	0.0407
2.26	58.73	30.374	10.1247	4.56E-03	2.39E-05	1.9174	0.0410
2.27	62.73	42.984	10.7460	4.50E-03	3.04E-05	1.9522	0.0416
2.28	65.73	30.98	10.1908	4.00E-03	1.63E-05	1.9757	0.0418
2.29	69.75	41.817	10.4022	3.90E-03	1.77E-05	2.0060	0.0422
2.301	73.75	41.341	10.3353	3.38E-03	8.77E-06	2.0322	0.0423
2.31	76.75	30.779	10.2597	3.16E-03	2.90E-05	2.0505	0.0428
2.32	79.75	32.517	10.8390	3.09E-03	1.43E-05	2.0685	0.0430
2.33	83.71	42.417	10.7168	2.88E-03	1.72E-05	2.0905	0.0433
2.34	87.71	41.978	10.4945	2.64E-03	6.93E-06	2.1110	0.0434
2.35	91.71	42.426	10.6065	2.56E-03	1.00E-05	2.1308	0.0436
2.36	94.71	31.833	10.6110	2.39E-03	1.20E-05	2.1447	0.0438
2.37	97.71	31.108	10.3693	2.14E-03	1.56E-05	2.1571	0.0440
2.38	101.71	38.018	9.5045	2.22E-03	1.79E-05	2.1742	0.0444
2.39	104.71	30.278	10.0927	2.20E-03	1.71E-05	2.1870	0.0446
2.401	107.71	30.083	10.0277	1.99E-03	1.99E-05	2.1985	0.0449
2.41	111.71	42.11	10.5275	2.10E-03	1.89E-05	2.2148	0.0453
2.42	114.71	31.125	10.3750	1.95E-03	1.96E-05	2.2261	0.0455
2.43	118.71	41.95	10.4875	1.87E-03	2.08E-05	2.2406	0.0459
2.44	121.939	32.046	9.9244	1.72E-03	1.97E-05	2.2513	0.0462
2.45	126.71	49.993	10.4785	1.77E-03	2.07E-05	2.2677	0.0467
2.46	129.71	29.484	9.8280	1.64E-03	1.76E-05	2.2772	0.0470
2.47	132.71	30.367	10.1223	1.72E-03	2.10E-05	2.2872	0.0473
2.48	135.71	31.746	10.5820	1.79E-03	2.39E-05	2.2976	0.0476
2.49	139.71	39.123	9.7808	1.55E-03	2.12E-05	2.3096	0.0480

Table 2.2.3 SPFT test for U-brannerite with pH 5.6 buffer solution

Sample No	Cumulative time(d)	Volume(ml)	Flow rate(ml/d)	U leach rate(g/m2.d)	Ti leach rate(g/m2.d)	U leached (%)	Ti leached (%)
3.1	1	13.302	13.3020	1.83E-02	8.08E-05	0.0249	0.0003
3.2	1.938	8.9	9.4681	2.95E-02	9.45E-05	0.0627	0.0007
3.3	4.854	27.068	9.2794	2.75E-02	5.01E-05	0.1719	0.0013
3.4	5.854	8.826	8.8260	2.31E-02	4.20E-05	0.2034	0.0014
3.5	6.854	8.617	8.6170	2.00E-02	4.45E-05	0.2306	0.0016
3.6	7.854	10.545	10.5450	2.20E-02	5.08E-05	0.2606	0.0018
3.7	8.854	7.655	7.6550	1.53E-02	9.89E-05	0.2814	0.0022
3.8	11.854	28.127	9.3757	1.65E-02	2.97E-05	0.3489	0.0026
3.9	12.94	10.749	9.9528	1.50E-02	8.53E-06	0.3710	0.0026
3.101	13.854	8.462	9.2279	1.28E-02	2.00E-05	0.3870	0.0027
3.11	14.854	8.538	8.5380	1.07E-02	1.45E-05	0.4015	0.0028
3.12	15.854	9.525	9.5250	1.11E-02	1.98E-05	0.4166	0.0028
3.13	18.854	25.036	8.3453	1.00E-02	1.22E-05	0.4575	0.0030
3.14	21.854	27.297	9.0990	1.11E-02	1.30E-05	0.5027	0.0031
3.15	22.854	8.333	8.3330	9.50E-03	1.66E-05	0.5156	0.0032
3.16	25.854	29.915	9.9717	1.23E-02	1.69E-05	0.5660	0.0034
3.17	26.854	9.837	9.8370	1.19E-02		0.5822	0.0034
3.18	27.854	9.875	9.8750	1.24E-02	2.33E-05	0.5991	0.0035
3.19	28.896	9.661	9.2894	1.15E-02	1.17E-05	0.6154	0.0036
3.201	29.896	8.876	8.8760	1.17E-02	1.61E-05	0.6313	0.0036
3.21	32.917	29.511	9.7686	1.23E-02	1.38E-05	0.6818	0.0038
3.22	33.917	9.118	9.1180	1.05E-02	1.63E-05	0.6962	0.0039
3.23	34.917	9.333	9.3330	1.08E-02	1.60E-05	0.7109	0.0039
3.24	35.917	9.432	9.4320	1.11E-02	1.50E-05	0.7261	
3.25	36.917	9.938	9.9380	1.07E-02		0.7407	
3.26	39.917	29.46	9.8200	1.05E-02		0.7838	
3.27	41.917	18.486	9.2430	1.02E-02		0.8116	
3.28	44.021	20.962	9.9629	1.05E-02		0.8418	
3.29	46.875	28.179	9.8735	1.02E-02		0.8814	
3.301	50.875	39.299	9.8248	9.54E-03		0.9334	
3.31	54.875	39.778	9.9445	9.62E-03		0.9857	
3.32	57.875	29.414	9.8047	8.53E-03		1.0206	
3.33	60.875	29.729	9.9097	8.25E-03		1.0543	
3.34	64.875	48.132	12.0330	8.90E-03	5.41E-06	1.1028	
3.35	67.875	39.527	13.1757	8.50E-03	2.96E-06	1.1375	
3.36	70.875	37.633	12.5443	7.79E-03	5.64E-06	1.1693	
3.37	74.875	51.169	12.7923	6.74E-03	1.15E-05	1.2060	
3.38	77.875	38.791	12.9303	6.56E-03	7.27E-06	1.2328	
3.39	81.875	52.347	13.0868	6.36E-03	1.47E-05	1.2675	
3.401	85.104	42.145	13.0520	5.84E-03	1.03E-05	1.2931	
3.41	89.875	60.926	12.7701	5.40E-03	1.44E-06	1.3282	
3.42	92.875	36.241	12.0803	4.61E-03	5.43E-06	1.3470	
3.43	95.875	36.877	12.2923	4.55E-03	1.11E-05	1.3656	
3.44	98.875	38.865	12.9550	4.49E-03	8.74E-06	1.3840	
3.45	102.875	46.221	11.5553	5.05E-03	1.17E-05	1.4115	

Table 2.2.4 SPFT test for U-brannerite with pH 7.9 buffer solution

Sample No	Cumulative time(d)	Volume(ml)	Flow rate(ml/d)	U leach rate(g/m2.d)	Ti leach rate(g/m2d)	U leached(%)	
4.1	1.86	9.729	5.2306	2.18E-04	< 0.00005	0.0007	
4.2	2.93	11.466	10.7159	4.37E-05	< 0.00005	0.0008	
4.3	3.93	8.619	8.6190	6.61E-05	< 0.00005	0.0009	
4.4	6.81	27.615	9.5885	1.02E-04	< 0.00005	0.0015	
4.5	7.73	9.774	10.6239	7.95E-05	< 0.00005	0.0016	
4.6	8.83	10.885	9.8955	9.61E-05	< 0.00005	0.0018	
4.7	9.81	8.52	8.6939	7.09E-05	< 0.00005	0.0019	
4.8	10.88	11.359	10.6159	8.35E-05	< 0.00005	0.0021	
4.9	13.89	29.513	9.8706	6.81E-05	< 0.00005	0.0025	
4.101	14.92	9.888	9.6000	6.71E-05	< 0.00005	0.0026	
4.11	15.95	10.009	9.7175	6.51E-05	< 0.00005	0.0027	
4.12	17.82	17.697	9.5145	6.84E-05	< 0.00005	0.0029	
4.13	20.98	28.584	9.0456	7.77E-05	< 0.00005	0.0034	
4.14	22.39	10.558	10.5580	8.88E-05	< 0.00005	0.0036	
4.15	22.97	8.823	8.9121	6.22E-05	< 0.00005	0.0037	
4.16	23.82	7.558	8.8918	6.80E-05	< 0.00005	0.0038	
4.17	29.81	56.463	9.4262	7.53E-05	< 0.00005	0.0046	
4.18	34.9	50.048	9.8520	8.13E-05	< 0.00005	0.0054	
4.19	36.85	18.869	9.6270	7.52E-05	< 0.00005	0.0056	
4.201	38.81	21.803	11.1240	1.21E-04	< 0.00005	0.0061	
4.21	41.73	31.886	10.9199	1.56E-04	< 0.00005	0.0069	
4.22	44.73	31.458	10.4860	1.00E-04	< 0.00005	0.0074	
4.23	48.73	41.393	10.3483	8.44E-05	< 0.00005	0.0080	
4.24	51.73	32.237	10.7457	1.25E-04	< 0.00005	0.0087	
4.25	55.73	41.316	10.3290	1.23E-04	< 0.00005	0.0096	
4.26	58.73	33.808	11.2693	1.45E-04	< 0.00005	0.0104	
4.27	62.73	47.98	11.9950	1.32E-04	< 0.00005	0.0114	
4.28	65.73	35.327	11.6207	1.42E-04	< 0.00005	0.0122	
4.29	69.75	48.103	11.9659	1.64E-04	< 0.00005	0.0134	
4.301	73.75	46.529	11.6323	1.42E-04	< 0.00005	0.0144	
4.31	76.75	36.728	12.2427	1.69E-04	< 0.00005	0.0153	
4.32	79.75	35.418	11.8060	1.57E-04	< 0.00005	0.0162	
4.33	83.71	48.032	12.1354	1.44E-04	< 0.00005	0.0172	
4.34	87.71	46.909	11.7273	1.44E-04	< 0.00005	0.0183	
4.35	91.71	47.506	11.8765	1.42E-04	< 0.00005	0.0193	
4.36	94.71	35.108	11.7027	1.25E-04	< 0.00005	0.0200	
4.37	97.71	34.792	11.5973	1.48E-04	< 0.00005	0.0208	
4.38	101.71	38.598	9.6495	1.03E-04	< 0.00005	0.0215	
4.39	104.71	27.97	9.3233	9.60E-05	< 0.00005	0.0221	
4.401	107.71	29.429	9.8097	8.86E-05	< 0.00005	0.0226	
4.41	111.71	38.803	9.7008	9.24E-05	< 0.00005	0.0232	
4.42	114.71	29.526	9.8420	9.37E-05	< 0.00005	0.0237	
4.43	118.71	39.057	9.7643	9.20E-05	< 0.00005	0.0244	
4.44	121.939	31.494	9.7535	9.19E-05	< 0.00005	0.0250	
4.45	126.71	47.085	9.8690	9.20E-05	< 0.00005	0.0258	
4.46	129.71	27.719	9.2397	9.16E-05	< 0.00005	0.0263	
4.47	132.71	29.03	9.6767	9.59E-05	< 0.00005	0.0268	
4.48	135.71	29.372	9.7907	9.80E-05	< 0.00005	0.0273	
4.49	139.71	37.216	9.3040	7.95E-05	< 0.00005	0.0279	

Table 2.2.5 SPFT test for U-brannerite with pH 9.8 buffer solution

Sample No	Cumulative time(d)	Volume(ml)	Flow rate(ml/d)	U leach rate(g/m2.d)	Ti leach rate(g/m2d)	U leached(%)	
5.1	1.86	9.607	5.1651	8.76E-04	< 0.00005	0.0032	
5.2	2.93	11.318	10.5776	1.80E-03	< 0.00005	0.0070	
5.3	3.93	9.87	9.8700	2.01E-03	< 0.00005	0.0110	
5.4	6.81	27.531	9.5594	2.71E-03	< 0.00005	0.0264	
5.5	7.73	7.886	8.5717	3.01E-03	< 0.00005	0.0319	
5.6	8.83	9.982	9.0745	2.75E-03	< 0.00005	0.0378	
5.7	9.82	11.008	11.2327	3.51E-03	< 0.00005	0.0446	
5.8	10.9	8.633	8.0682	2.11E-03	< 0.00005	0.0491	
5.9	13.89	30.056	10.0522	2.14E-03	< 0.00005	0.0617	
5.101	14.92	11.585	11.2476	2.20E-03	< 0.00005	0.0662	
5.11	15.95	10.778	10.4641	1.85E-03	< 0.00005	0.0699	
5.12	17.82	21.505	11.5618	2.09E-03	< 0.00005	0.0776	
5.13	20.98	37.283	11.7984	1.72E-03	< 0.00005	0.0883	
5.14	22.39	11.177	11.1770	2.39E-03	< 0.00005	0.0931	
5.15	22.97	11.063	11.1747	1.33E-03	< 0.00005	0.0957	
5.16	23.82	8.153	9.5918	1.22E-03	< 0.00005	0.0977	
5.17	29.81	58.19	9.7145	1.70E-03	< 0.00005	0.1179	
5.18	34.9	47.652	9.3803	2.39E-03	< 0.00005	0.1418	
5.19	36.85	18.898	9.6418	1.90E-03	< 0.00005	0.1492	
5.201	38.81	17.58	8.9694	1.54E-03	< 0.00005	0.1552	
5.21	41.73	28.247	9.6736	1.22E-03	< 0.00005	0.1622	
5.22	44.73	26.587	8.8623	1.69E-03	< 0.00005	0.1722	
5.23	48.73	37.382	9.3455	3.34E-03	< 0.00005	0.1986	
5.24	51.73	27.603	9.2010	1.67E-03	< 0.00005	0.2084	
5.25	55.73	37.241	9.3103	1.54E-03	< 0.00005	0.2206	
5.26	58.73	30.55	10.1833	1.83E-03	< 0.00005	0.2314	
5.27	62.73	42.352	10.5880	1.42E-03	< 0.00005	0.2427	
5.28	65.73	33.697	11.0845	1.66E-03	< 0.00005	0.2526	
5.29	69.75	42.151	10.4853	1.76E-03	< 0.00005	0.2666	
5.301	73.75	41.408	10.3520	1.75E-03	< 0.00005	0.2804	
5.31	76.75	32.119	10.7063	1.62E-03	< 0.00005	0.2900	
5.32	79.75	34.382	11.4607	2.23E-03	< 0.00005	0.3032	
5.33	83.71	41.921	10.5915	1.85E-03	< 0.00005	0.3176	
5.34	87.71	41.223	10.3058	1.57E-03	< 0.00005	0.3300	
5.35	91.71	42.72	10.6800	1.26E-03	< 0.00005	0.3400	
5.36	94.71	32.32	10.7733	1.19E-03	< 0.00005	0.3470	
5.37	97.71	32.755	10.9183	1.23E-03	< 0.00005	0.3543	
5.38	101.71	46.685	11.6713	7.66E-04	< 0.00005	0.3603	
5.39	104.71	38.92	12.9733	7.87E-04	< 0.00005	0.3650	
5.401	107.71	40.12	13.3733	7.04E-04	< 0.00005	0.3692	
5.41	111.71	53.132	13.2830	7.39E-04	< 0.00005	0.3750	
5.42	114.71	39.722	13.2407	9.45E-04	< 0.00005	0.3806	
5.43	118.71	51.702	12.9255	5.44E-04	< 0.00005	0.3849	
5.44	121.939	43.061	13.3357	5.24E-04	< 0.00005	0.3882	
5.45	126.71	64.546	13.5288	5.29E-04	< 0.00005	0.3932	
5.46	129.71	37.054	12.3513	4.80E-04	< 0.00005	0.3961	
5.47	132.71	38.923	12.9743	6.01E-04	< 0.00005	0.3996	
5.48	135.71	39.514	13.1713	5.61E-04	< 0.00005	0.4029	
5.49	139.71	48.008	12.0020	6.96E-04	< 0.00005		

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Table 2.2.6 SPFT test for U-brannerite with pH 11.9 buffer solution

Sample No	Cumulative time(d)	Volume(ml)	Flow rate(ml/d)	U leach rate(g/m2.d)	Ti leach rate(g/m2d)	U leached(%)	
6.1	1	13.479	13.4790	7.81E-03	< 0.00005	0.0127	
6.2	1.938	9.442	10.0447	6.87E-03	< 0.00005	0.0232	
6.3	4.854	28.118	9.6394	7.21E-03	< 0.00005	0.0574	
6.4	5.854	8.75	8.7500	3.71E-03	< 0.00005	0.0634	
6.5	6.854	9.134	9.1340	6.39E-03	< 0.00005	0.0738	
6.6	7.854	9.312	9.3120	4.42E-03	< 0.00005	0.0810	
6.7	8.854	8.813	8.8130	2.33E-03	< 0.00005	0.0848	
6.8	11.854	28.048	9.3493	1.99E-03	< 0.00005	0.0945	
6.9	12.94	9.211	8.5287	2.79E-03	< 0.00005	0.0994	
6.101	13.854	9.404	10.2552	1.78E-03	< 0.00005	0.1020	
6.11	14.854	8.77	8.7700	1.45E-03	< 0.00005	0.1044	
6.12	15.854	8.965	8.9650	1.48E-03	< 0.00005	0.1068	
6.13	18.854	25.036	8.3453	1.36E-03	< 0.00005	0.1134	
6.14	21.854	27.407	9.1357	1.33E-03	< 0.00005	0.1199	
6.15	22.854	7.223	7.2230	1.06E-03	< 0.00005	0.1216	
6.16	25.854	30.053	10.0177	1.31E-03	< 0.00005	0.1280	
6.17	26.854	9.218	9.2180	1.17E-03	< 0.00005	0.1299	
6.18	27.854	9.693	9.6930	1.21E-03	< 0.00005	0.1319	
6.19	28.896	9.598	9.2288	1.14E-03	< 0.00005	0.1338	
6.201	29.896	8.293	8.2930	1.04E-03	< 0.00005	0.1355	
6.21	32.917	28.835	9.5449	1.13E-03	< 0.00005	0.1410	
6.22	33.917	9.963	9.9630	1.10E-03	< 0.00005	0.1428	
6.23	34.917	8.183	8.1830	9.63E-04	< 0.00005	0.1444	
6.24	35.917	10.245	10.2450	1.36E-03	< 0.00005	0.1466	
6.25	36.917	10.177	10.1770	1.72E-03	< 0.00005	0.1494	
6.26	39.917	27.335	9.1117	1.44E-03	< 0.00005	0.1564	
6.27	41.917	19.456	9.7280	1.56E-03	< 0.00005	0.1615	
6.28	44.021	19.459	9.2486	9.73E-04	< 0.00005	0.1648	
6.29	46.875	27.255	9.5498	9.57E-04	< 0.00005	0.1692	
6.301	50.875	38.334	9.5835	1.04E-03	< 0.00005	0.1760	
6.31	54.875	36.465	9.1163	1.04E-03	< 0.00005	0.1828	
6.32	57.875	29.591	9.8637	1.01E-03	< 0.00005	0.1877	
6.33	60.875	29.871	9.9570	1.34E-03	< 0.00005	0.1943	
6.34	64.875	35.642	8.9105	8.44E-04	< 0.00005	0.1998	
6.35	67.875	28.52	9.5067	6.94E-04	< 0.00005	0.2032	
6.36	70.875	28.705	9.5683	9.18E-04	< 0.00005	0.2077	
6.37	74.875	38.033	9.5083	8.95E-04	< 0.00005	0.2135	
6.38	77.875	28.952	9.6507	7.80E-04	< 0.00005	0.2173	
6.39	81.875	38.166	9.5415	9.06E-04	< 0.00005	0.2232	
6.401	85.104	31.135	9.6423	7.96E-04	< 0.00005	0.2273	
6.41	89.875	46.051	9.6523	7.67E-04	< 0.00005	0.2333	
6.42	92.875	27.435	9.1450	7.05E-04	< 0.00005	0.2367	
6.43	95.875	28.742	9.5807	6.78E-04	< 0.00005	0.2400	
6.44	98.875	28.796	9.5987	9.99E-04	< 0.00005	0.2449	
6.45	102.875	35.94	8.9850	6.50E-04	< 0.00005	0.2491	

Table 2.2.7 SPFT test for U-brannerite with deionised water (pH 5.6)

Sample No	Cumulative time(d)	Volume(ml)	Flow rate(ml/d)	U leach rate(g/m2.d)	Ti leach rate(g/m2.d)	U leached (%)	Ti leached(%)
7.1	1.6458	22.982	13.9640	8.24E-04	3.54E-05	0.0026	0.0003
7.2	2.6458	10.549	10.5490	1.05E-03	2.30E-05	0.0046	0.0004
7.3	3.6458	10.907	10.9070	8.30E-04	3.03E-05	0.0062	0.0005
7.4	6.6458	34.343	11.4477	1.17E-03	2.79E-05	0.0129	0.0009
7.5	7.66	11.001	10.8470	1.61E-03	1.56E-05	0.0160	0.0010
7.6	8.66	9.94	9.9400	1.68E-03	1.57E-05	0.0192	0.0011
7.7	9.66	12.544	12.5440	2.47E-03	2.11E-05	0.0240	0.0012
7.8	10.66	10.893	10.8930	1.44E-03	1.95E-05	0.0267	0.0013
7.9	13.66	32.674	10.8913	1.41E-03	2.20E-05	0.0348	0.0016
7.101	14.74	12.565	11.6343	1.27E-03	1.39E-05	0.0375	0.0017
7.11	15.66	9.525	10.3871	9.75E-04	1.27E-05	0.0392	0.0017
7.12	16.66	12.355	12.3550	9.31E-04	1.01E-05	0.0410	0.0018
7.13	17.66	9.18	9.1800	7.88E-04	1.22E-05	0.0425	0.0018
7.14	20.702	34.669	11.3968	6.50E-04	8.14E-06	0.0463	0.0019
7.15	23.931	35.342	10.9452	3.69E-04	7.92E-06	0.0485	0.0021
7.16	28.702	52.521	11.0084	2.12E-04	6.92E-06	0.0505	0.0022
7.17	31.702	32.174	10.7247	1.28E-04	6.74E-06	0.0512	0.0023
7.18	34.702	32.187	10.7290	1.04E-04	6.64E-06	0.0518	0.0024
7.19	37.702	32.398	10.7993	8.26E-05	6.38E-06	0.0523	0.0025
7.201	41.702	40.236	10.0590	6.57E-05	6.51E-06	0.0528	0.0026

Table 2.2.8 SPFT test for U-brannerite with pH 5.6 buffer solution in nitrogen atmosphere

Sample No	Cumulative time(d)	Volume(ml)	Flow rate(ml/d)	U leach rate(g/m2.d)	Ti leach rate(g/m2.d)	U leached (%)	Ti leached (%)
N1.1	1.9375	12.686	6.5476	8.05E-03	8.02E-05	0.0212	0.0006
N1.2	5	37.764	12.3311	8.55E-03	5.40E-05	0.0569	0.0013
N1.3	7.9583	38.158	12.8986	3.99E-03	4.20E-05	0.0730	0.0018
N1.4	12.7708	63.009	13.0928	2.56E-03	2.65E-05	0.0898	0.0023
N1.5	15.7916	36.004	11.9187	2.06E-03	1.34E-05	0.0982	0.0025
N1.6	18.8254	31.558	10.4227	1.94E-03	1.41E-05	0.1062	0.0026
N1.7	21.9587	40.163	12.8378	1.72E-03	1.15E-05	0.1135	0.0028
N1.8	25.8024	48.818	12.7005	2.36E-03	9.99E-06	0.1259	0.0029

Table 2.2.9 SPFT test for Pu084 ($CaPuTi_2O_7$ + PuO_2 + rutile) with pH 5.6 buffer solution

Sample No	Cumulative time(d)	Volume(ml)	Flow rate(ml/d)	Pu leach rate(g/m2.d)			
N3.1	1.9375	12.531	6.467612903	0.000135536			
N3.2	5	38.774	12.66089796	4.65992E-05			
N3.3	7.9583	38.941	13.16330325	8.0479E-06			
N3.4	12.7708	63.077	13.10690909	3.42709E-06			
N3.5	15.7916	40.226	13.31634004	3.88457E-05			

APPENDIX 2.4

000637

GRAIN 1

Tue Aug 25 13:25:18 1998
98194 P2696 brannerite pt1
PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0018	2.378	0.66	0.42	+/- 0.05	SiO2	0.90	0.061
Ti-K	0.1586	1.461	21.34	23.17	+/- 0.12	TiO2	38.65	1.962
Th-M	0.0579	1.106	1.22	6.41	+/- 0.39	ThO2	7.29	0.112
U -M	0.3235	1.098	6.58	35.52	+/- 0.56	UO2	40.29	0.605
Al-K	0.0003	3.255	0.15	0.09	+/- 0.04	Al2O3	0.17	0.013
Y -L	0.0068	1.755	0.59	1.19	+/- 0.17	Y2O3	1.52	0.054
Ce-L	0.0039	1.399	0.17	0.54	+/- 0.18	Ce2O3	0.63	0.016
Nd-L	0.0058	1.472	0.26	0.86	+/- 0.18	Nd2O3	1.00	0.024
Sm-L	0.0040	1.425	0.17	0.57	+/- 0.16	Sm2O3	0.66	0.015
Gd-L	0.0041	1.383	0.16	0.57	+/- 0.19	Gd2O3	0.66	0.015
Ca-K	0.0101	1.326	1.47	1.34	+/- 0.10	CaO	1.87	0.135
Mn-K	0.0007	1.313	0.08	0.09	+/- 0.08	MnO	0.12	0.007
Fe-K	0.0098	1.212	0.94	1.19	+/- 0.07	FeO	1.53	0.087
Pb-M	0.0342	1.276	0.93	4.36	+/- 0.16	PbO	4.70	0.085
Na-K	0.0000	5.253	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.436	65.28	23.67 S	---	---	---	---
Total			100.00	100.00			100.00	3.192

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry

Tue Aug 25 13:25:07 1998
98194 P2696 brannerite pt2
PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0023	2.362	0.85	0.55	+/- 0.05	SiO2	1.18	0.078
Ti-K	0.1664	1.453	21.85	24.18	+/- 0.14	TiO2	40.33	2.001
Th-M	0.0622	1.102	1.28	6.86	+/- 0.25	ThO2	7.80	0.117
U -M	0.3170	1.093	6.30	34.65	+/- 0.35	UO2	39.31	0.577
Al-K	0.0004	3.236	0.21	0.13	+/- 0.05	Al2O3	0.25	0.019
Y -L	0.0081	1.747	0.69	1.42	+/- 0.09	Y2O3	1.80	0.063
Ce-L	0.0007	1.394	0.03	0.10	+/- 0.21	Ce2O3	0.12	0.003
Nd-L	0.0072	1.474	0.32	1.06	+/- 0.20	Nd2O3	1.24	0.029
Sm-L	0.0039	1.427	0.16	0.56	+/- 0.18	Sm2O3	0.65	0.015
Gd-L	0.0013	1.385	0.05	0.18	+/- 0.21	Gd2O3	0.21	0.005
Ca-K	0.0057	1.322	0.82	0.76	+/- 0.05	CaO	1.06	0.075
Mn-K	0.0006	1.314	0.06	0.08	+/- 0.09	MnO	0.10	0.006
Fe-K	0.0110	1.214	1.04	1.34	+/- 0.08	FeO	1.72	0.095
Pb-M	0.0307	1.275	0.82	3.92	+/- 0.17	PbO	4.22	0.075
Na-K	0.0000	5.187	0.02	0.01	+/- 0.09	Na2O	0.01	0.002
O -K	---	6.474	65.50	24.21 S	---	---	---	---
Total			100.00	100.00			100.00	3.160

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry

Tue Aug 25 13:27:51 1998
98194 P2696 brannerite pt3
PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.399	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1587	1.466	21.83	23.26	+/- 0.20	TiO2	38.79	2.006
Th-M	0.0623	1.113	1.34	6.93	+/- 0.26	ThO2	7.89	0.123
U -M	0.3194	1.108	6.68	35.38	+/- 0.36	UO2	40.14	0.614
Al-K	0.0004	3.236	0.20	0.12	+/- 0.05	Al2O3	0.23	0.019
Y -L	0.0086	1.732	0.75	1.48	+/- 0.09	Y2O3	1.88	0.069
Ce-L	0.0046	1.402	0.21	0.64	+/- 0.21	Ce2O3	0.75	0.019
Nd-L	0.0047	1.473	0.22	0.69	+/- 0.20	Nd2O3	0.81	0.020
Sm-L	0.0021	1.425	0.09	0.30	+/- 0.19	Sm2O3	0.34	0.008
Gd-L	0.0018	1.382	0.07	0.25	+/- 0.22	Gd2O3	0.29	0.007
Ca-K	0.0078	1.337	1.16	1.04	+/- 0.05	CaO	1.45	0.107
Mn-K	0.0006	1.313	0.07	0.08	+/- 0.09	MnO	0.11	0.006
Fe-K	0.0088	1.210	0.86	1.07	+/- 0.08	FeO	1.37	0.079
Pb-M	0.0435	1.268	1.20	5.52	+/- 0.19	PbO	5.94	0.110
Na-K	0.0000	5.175	0.00	0.00	+/- 0.09	Na2O	0.00	0.000
O -K	---	6.440	65.31	23.24 S	---	---	---	---
Total			100.00	100.00			100.00	3.187

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry

Tue Aug 25 14:43:05 1998
98194 P2696 brannerite pt4
PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0005	2.351	0.18	0.11	+/- 0.05	SiO2	0.24	0.016
Ti-K	0.1607	1.466	21.93	23.56	+/- 0.18	TiO2	39.29	2.015
Th-M	0.0594	1.111	1.27	6.60	+/- 0.22	ThO2	7.51	0.117
U -M	0.3207	1.107	6.65	35.50	+/- 0.32	UO2	40.27	0.611
Al-K	0.0002	3.224	0.10	0.06	+/- 0.04	Al2O3	0.12	0.010
Y -L	0.0069	1.728	0.60	1.19	+/- 0.08	Y2O3	1.51	0.055
Ce-L	0.0014	1.402	0.06	0.20	+/- 0.19	Ce2O3	0.23	0.006
Nd-L	0.0058	1.476	0.26	0.85	+/- 0.18	Nd2O3	0.99	0.024
Sm-L	0.0019	1.428	0.08	0.28	+/- 0.16	Sm2O3	0.32	0.008
Gd-L	0.0005	1.384	0.02	0.07	+/- 0.19	Gd2O3	0.08	0.002
Ca-K	0.0086	1.335	1.28	1.15	+/- 0.10	CaO	1.61	0.117
Mn-K	0.0004	1.314	0.05	0.06	+/- 0.08	MnO	0.07	0.004
Fe-K	0.0102	1.212	0.98	1.23	+/- 0.07	FeO	1.58	0.090
Pb-M	0.0454	1.261	1.23	5.73	+/- 0.16	PbO	6.17	0.113
Na-K	0.0000	5.238	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.467	65.30	23.42 S	---	---	---	---
Total			100.00	100.00			100.00	3.189

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry

Tue Aug 25 14:44:49 1998
98194 P2696 brannerite pt5
PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0007	2.356	0.26	0.16	+/- 0.04	SiO2	0.35	0.023
Ti-K	0.1626	1.465	22.10	23.83	+/- 0.12	TiO2	39.74	2.026
Th-M	0.0573	1.106	1.21	6.33	+/- 0.22	ThO2	7.21	0.111
U -M	0.3282	1.099	6.73	36.09	+/- 0.32	UO2	40.94	0.618
Al-K	0.0000	3.234	0.02	0.01	+/- 0.04	Al2O3	0.02	0.002
Y -L	0.0072	1.733	0.62	1.25	+/- 0.08	Y2O3	1.59	0.057
Ce-L	0.0032	1.401	0.14	0.45	+/- 0.18	Ce2O3	0.53	0.013
Nd-L	0.0059	1.477	0.27	0.88	+/- 0.17	Nd2O3	1.02	0.025
Sm-L	0.0005	1.429	0.02	0.07	+/- 0.16	Sm2O3	0.08	0.002
Gd-L	0.0013	1.386	0.05	0.18	+/- 0.18	Gd2O3	0.21	0.005
Ca-K	0.0077	1.330	1.13	1.02	+/- 0.09	CaO	1.43	0.104
Mn-K	0.0001	1.316	0.01	0.01	+/- 0.08	MnO	0.01	0.001
Fe-K	0.0094	1.214	0.90	1.14	+/- 0.07	FeO	1.46	0.083
Pb-M	0.0396	1.264	1.07	5.00	+/- 0.15	PbO	5.39	0.098
Na-K	0.0000	5.184	0.03	0.01	+/- 0.07	Na2O	0.02	0.002
O -K	---	6.468	65.43	23.56 S	---	---	---	---
Total			100.00	100.00			100.00	3.171

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry

G RAIN 1
ALTERED

Tue Sep 8 10:46:06 1998

98194 brannerite grain 1 altered 1 pt6

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0381	2.088	9.21	7.96	+/- 0.08	SiO2	17.04	0.843
Ti-K	0.1936	1.351	17.74	26.16	+/- 0.16	TiO2	43.63	1.623
Th-M	0.1317	1.134	2.09	14.93	+/- 0.21	ThO2	16.99	0.191
U -M	0.0705	1.134	1.09	8.00	+/- 0.21	UO2	9.07	0.100
Al-K	0.0006	2.847	0.22	0.18	+/- 0.04	Al2O3	0.35	0.020
Y -L	0.0000	1.725	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0034	1.333	0.10	0.45	+/- 0.15	Ce2O3	0.53	0.010
Nd-L	0.0037	1.446	0.12	0.53	+/- 0.13	Nd2O3	0.62	0.011
Sm-L	0.0000	1.414	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0000	1.385	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0169	1.305	1.79	2.21	+/- 0.08	CaO	3.09	0.164
Mn-K	0.0000	1.309	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0091	1.223	0.65	1.12	+/- 0.11	FeO	1.44	0.059
Pb-M	0.0446	1.271	0.89	5.67	+/- 0.22	PbO	6.10	0.081
Na-K	0.0000	4.823	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
P -K	0.0026	1.931	0.52	0.50	+/- 0.04	P2O5	1.14	0.048
O -K	---	7.099	65.57	32.29 S	---	---	---	---
Total			100.00	100.00			100.00	3.151

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 8 10:31:41 1998

98194 brannerite grain 1 altered 2 pt7

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0388	2.071	9.21	8.04	+/- 0.08	SiO2	17.21	0.844
Ti-K	0.1938	1.345	17.49	26.06	+/- 0.16	TiO2	43.47	1.604
Th-M	0.1478	1.138	2.33	16.81	+/- 0.22	ThO2	19.13	0.214
U -M	0.0419	1.139	0.64	4.77	+/- 0.21	UO2	5.41	0.059
Al-K	0.0011	2.815	0.38	0.32	+/- 0.04	Al2O3	0.60	0.035
Y -L	0.0000	1.713	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0032	1.330	0.10	0.43	+/- 0.16	Ce2O3	0.50	0.009
Nd-L	0.0027	1.443	0.09	0.39	+/- 0.14	Nd2O3	0.45	0.008
Sm-L	0.0009	1.405	0.03	0.12	+/- 0.13	Sm2O3	0.14	0.002
Gd-L	0.0000	1.383	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0204	1.311	2.14	2.67	+/- 0.08	CaO	3.74	0.196
Mn-K	0.0000	1.306	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0091	1.221	0.64	1.11	+/- 0.06	FeO	1.43	0.059
Pb-M	0.0486	1.267	0.95	6.15	+/- 0.23	PbO	6.63	0.088
Na-K	0.0000	4.776	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
P -K	0.0029	1.921	0.58	0.56	+/- 0.04	P2O5	1.28	0.053
O -K	---	7.172	65.42	32.56 S	---	---	---	---
Total			100.00	100.00			100.00	3.172

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 8 11:02:42 1998

98194 brannerite grain 1 altered 5 pt10

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0356	2.070	8.42	7.38	+/- 0.09	SiO2	15.79	0.774
Ti-K	0.2007	1.337	17.96	26.84	+/- 0.17	TiO2	44.78	1.652
Th-M	0.0931	1.145	1.47	10.66	+/- 0.21	ThO2	12.13	0.135
U -M	0.0746	1.150	1.16	8.58	+/- 0.22	UO2	9.74	0.106
Al-K	0.0011	2.820	0.37	0.31	+/- 0.04	Al2O3	0.59	0.034
Y -L	0.0000	1.697	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0067	1.319	0.20	0.89	+/- 0.17	Ce2O3	1.04	0.019
Nd-L	0.0035	1.438	0.11	0.50	+/- 0.16	Nd2O3	0.58	0.010
Sm-L	0.0000	1.409	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0000	1.384	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0230	1.277	2.35	2.94	+/- 0.05	CaO	4.12	0.216
Mn-K	0.0003	1.304	0.02	0.04	+/- 0.06	MnO	0.05	0.002
Fe-K	0.0107	1.223	0.75	1.30	+/- 0.12	FeO	1.68	0.069
Pb-M	0.0571	1.260	1.11	7.20	+/- 0.16	PbO	7.75	0.102
Na-K	0.0001	4.639	0.04	0.03	+/- 0.07	Na2O	0.03	0.003
P -K	0.0040	1.902	0.78	0.75	+/- 0.04	P2O5	1.72	0.072
O -K	---	7.259	65.25	32.57 S	---	---	---	---
Total			100.00	100.00			100.00	3.195

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 8 11:44:42 1998

98194 brannerite grain 1 rutile pt10

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Ti-K	0.5218	1.091	32.14	56.92	+/- 0.22	TiO2	94.94	0.966
Fe-K	0.0109	1.252	0.66	1.37	+/- 0.11	FeO	1.76	0.020
Nb-L	0.0169	1.237	0.61	2.10	+/- 0.07	Nb2O5	3.00	0.018
Ta-M	0.0016	1.530	0.04	0.25	+/- 0.07	Ta2O5	0.31	0.001
O -K	---	10.383	66.55	39.37 S	---	---	---	---
Total			100.00	100.00			100.00	1.005

The number of cation results are based upon 2 Oxygen atoms

Tue Sep 8 11:52:25 1998

98194 brannerite grain 1 rutile 2 pt11

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Ti-K	0.5172	1.091	31.95	56.44	+/- 0.22	TiO2	94.14	0.961
Fe-K	0.0126	1.251	0.76	1.57	+/- 0.06	FeO	2.03	0.023
Nb-L	0.0173	1.242	0.63	2.15	+/- 0.07	Nb2O5	3.08	0.019
Ta-M	0.0028	1.531	0.06	0.43	+/- 0.07	Ta2O5	0.53	0.002
Cr-K	0.0012	1.362	0.08	0.16	+/- 0.03	Cr2O3	0.23	0.002
O -K	---	10.327	66.51	39.25 S	---	---	---	---
Total			100.00	100.00			100.00	1.007

The number of cation results are based upon 2 Oxygen atoms

000637

Tue Sep 8 10:45:02 1998

98194 brannerite grain 1 altered 3 pt8

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0359	2.059	8.29	7.40	+/- 0.09	SiO2	15.83	0.763
Ti-K	0.2239	1.308	19.23	29.29	+/- 0.12	TiO2	48.85	1.770
Th-M	0.0725	1.142	1.12	8.28	+/- 0.29	ThO2	9.42	0.103
U -M	0.0678	1.147	1.03	7.78	+/- 0.37	UO2	8.82	0.095
Al-K	0.0012	2.804	0.41	0.35	+/- 0.04	Al2O3	0.66	0.037
Y -L	0.0009	1.722	0.05	0.15	+/- 0.10	Y2O3	0.19	0.005
Ce-L	0.0077	1.295	0.22	1.00	+/- 0.16	Ce2O3	1.17	0.021
Nd-L	0.0040	1.432	0.13	0.58	+/- 0.14	Nd2O3	0.68	0.012
Sm-L	0.0005	1.399	0.02	0.08	+/- 0.13	Sm2O3	0.09	0.001
Gd-L	0.0008	1.382	0.02	0.11	+/- 0.15	Gd2O3	0.13	0.002
Ca-K	0.0206	1.244	2.01	2.57	+/- 0.04	CaO	3.59	0.185
Mn-K	0.0004	1.301	0.03	0.05	+/- 0.06	MnO	0.06	0.003
Fe-K	0.0135	1.223	0.93	1.65	+/- 0.06	FeO	2.12	0.085
Pb-M	0.0590	1.249	1.12	7.37	+/- 0.15	PbO	7.94	0.103
Na-K	0.0000	4.756	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
P -K	0.0010	1.894	0.20	0.20	+/- 0.04	P2O5	0.45	0.018
O -K	---	7.458	65.19	33.16 S	---	---	---	---
Total			100.00	100.00			100.00	3.203

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 8 10:58:30 1998

98194 brannerite grain 1 altered 4 pt9

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0387	2.029	8.77	7.86	+/- 0.10	SiO2	16.82	0.806
Ti-K	0.2196	1.312	18.84	28.82	+/- 0.17	TiO2	48.07	1.733
Th-M	0.0741	1.156	1.16	8.57	+/- 0.32	ThO2	9.76	0.106
U -M	0.0588	1.165	0.90	6.85	+/- 0.22	UO2	7.77	0.083
Al-K	0.0012	2.762	0.38	0.33	+/- 0.04	Al2O3	0.62	0.035
Y -L	0.0006	1.714	0.04	0.10	+/- 0.11	Y2O3	0.13	0.003
Ce-L	0.0058	1.299	0.17	0.75	+/- 0.17	Ce2O3	0.88	0.015
Nd-L	0.0024	1.432	0.07	0.34	+/- 0.14	Nd2O3	0.39	0.007
Sm-L	0.0008	1.399	0.02	0.11	+/- 0.13	Sm2O3	0.13	0.002
Gd-L	0.0000	1.382	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0203	1.257	1.99	2.55	+/- 0.08	CaO	3.56	0.183
Mn-K	0.0000	1.303	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0113	1.221	0.77	1.37	+/- 0.12	FeO	1.77	0.071
Pb-M	0.0698	1.247	1.31	8.70	+/- 0.25	PbO	9.37	0.121
Na-K	0.0000	4.692	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
P -K	0.0017	1.886	0.32	0.32	+/- 0.04	P2O5	0.73	0.030
O -K	---	7.457	65.25	33.33 S	---	---	---	---
Total			100.00	100.00			100.00	3.196

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 8 12:01:40 1998

98194 brannerite grain 1 rutile 3 pt13

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Ti-K	0.5184	1.091	32.01	56.57	+/- 0.22	TiO2	94.36	0.962
Fe-K	0.0119	1.251	0.72	1.49	+/- 0.11	FeO	1.92	0.022
Nb-L	0.0167	1.242	0.61	2.07	+/- 0.07	Nb2O5	2.97	0.018
Ta-M	0.0030	1.530	0.07	0.46	+/- 0.07	Ta2O5	0.57	0.002
Cr-K	0.0009	1.362	0.07	0.13	+/- 0.03	Cr2O3	0.19	0.002
O -K	---	10.339	66.53	39.27 S	---	---	---	---
Total			100.00	100.00			100.00	1.006

The number of cation results are based upon 2 Oxygen atoms

GRAIN 2

Tue Aug 25 15:47:45 1998

98194 P2696 brannerite grain2 pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.470	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1576	1.507	22.66	23.75	+/- 0.17	TiO2	39.61	2.048
Th-M	0.0163	1.057	0.34	1.72	+/- 0.21	ThO2	1.96	0.031
U -M	0.4756	1.041	9.50	49.49	+/- 0.53	UO2	56.14	0.859
Al-K	0.0004	3.327	0.23	0.14	+/- 0.04	Al2O3	0.26	0.021
Y -L	0.0030	1.772	0.27	0.53	+/- 0.07	Y2O3	0.67	0.025
Ce-L	0.0000	1.465	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.502	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0013	1.454	0.06	0.19	+/- 0.14	Sm2O3	0.22	0.005
Gd-L	0.0002	1.404	0.01	0.03	+/- 0.17	Gd2O3	0.03	0.001
Ca-K	0.0000	1.345	0.00	0.00	+/- 0.04	CaO	0.00	0.000
Mn-K	0.0002	1.335	0.02	0.03	+/- 0.07	MnO	0.04	0.002
Fe-K	0.0044	1.224	0.44	0.54	+/- 0.06	FeO	0.70	0.040
Pb-M	0.0027	1.271	0.08	0.34	+/- 0.13	PbO	0.37	0.007
Na-K	0.0000	5.401	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.289	66.39	23.25 S	---	---	---	---
Total			100.00	100.00			100.00	3.037

The number of cation results are based upon 6 Oxygen atoms

Tue Aug 25 17:01:19 1998

98194 P2696 brannerite gn2 pt2 mid-grai

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.466	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1586	1.506	22.55	23.88	+/- 0.17	TiO2	39.83	2.043
Th-M	0.0149	1.055	0.31	1.57	+/- 0.19	ThO2	1.78	0.028
U -M	0.4738	1.038	9.35	49.19	+/- 0.34	UO2	55.80	0.847
Al-K	0.0004	3.319	0.22	0.13	+/- 0.04	Al2O3	0.25	0.020
Y -L	0.0040	1.769	0.36	0.70	+/- 0.07	Y2O3	0.89	0.032
Ce-L	0.0000	1.465	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0002	1.504	0.01	0.04	+/- 0.14	Nd2O3	0.04	0.001
Sm-L	0.0003	1.456	0.01	0.05	+/- 0.14	Sm2O3	0.05	0.001
Gd-L	0.0009	1.406	0.03	0.12	+/- 0.14	Gd2O3	0.14	0.003
Ca-K	0.0029	1.304	0.43	0.38	+/- 0.04	CaO	0.53	0.039
Mn-K	0.0000	1.331	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0033	1.226	0.33	0.41	+/- 0.06	FeO	0.53	0.030
Pb-M	0.0001	1.271	0.00	0.02	+/- 0.13	PbO	0.02	0.000
Na-K	0.0002	5.316	0.19	0.10	+/- 0.08	Na2O	0.13	0.017
O -K	---	6.337	66.21	23.42 S	---	---	---	---
Total			100.00	100.00			100.00	3.062

The number of cation results are based upon 6 Oxygen atoms

Tue Aug 25 16:22:30 1998

98194 P2696 brannerite grain2 pt3 dark

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0007	2.408	0.26	0.16	+/- 0.04	SiO2	0.35	0.023
Ti-K	0.1572	1.507	22.11	23.68	+/- 0.12	TiO2	39.50	2.010
Th-M	0.0127	1.055	0.26	1.34	+/- 0.19	ThO2	1.52	0.023
U -M	0.4670	1.039	9.11	48.51	+/- 0.35	UO2	55.03	0.829
Al-K	0.0004	3.309	0.20	0.12	+/- 0.04	Al2O3	0.22	0.018
Y -L	0.0025	1.768	0.22	0.44	+/- 0.08	Y2O3	0.56	0.020
Ce-L	0.0007	1.429	0.03	0.11	+/- 0.16	Ce2O3	0.13	0.003
Nd-L	0.0000	1.504	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0000	1.453	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0013	1.407	0.05	0.19	+/- 0.14	Gd2O3	0.22	0.005
Ca-K	0.0091	1.300	1.32	1.19	+/- 0.05	CaO	1.66	0.120
Mn-K	0.0000	1.333	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0036	1.228	0.35	0.44	+/- 0.06	FeO	0.57	0.032
Pb-M	0.0015	1.267	0.04	0.19	+/- 0.13	PbO	0.20	0.004
Na-K	0.0001	5.303	0.07	0.03	+/- 0.08	Na2O	0.05	0.006
O -K	---	6.384	65.98	23.61 S	---	---	---	---
Total			100.00	100.00			100.00	3.094

The number of cation results are based upon 6 Oxygen atoms

Tue Aug 25 16:37:22 1998

98194 P2696 brannerite grain2 pt4

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.468	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1589	1.502	22.58	23.86	+/- 0.18	TiO2	39.80	2.047
Th-M	0.0177	1.059	0.37	1.88	+/- 0.20	ThO2	2.13	0.033
U -M	0.4643	1.042	9.21	48.37	+/- 0.34	UO2	54.88	0.835
Al-K	0.0002	3.325	0.12	0.07	+/- 0.04	Al2O3	0.14	0.011
Y -L	0.0037	1.772	0.33	0.65	+/- 0.07	Y2O3	0.83	0.030
Ce-L	0.0000	1.462	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0026	1.501	0.12	0.40	+/- 0.14	Nd2O3	0.46	0.011
Sm-L	0.0000	1.450	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0013	1.403	0.05	0.18	+/- 0.14	Gd2O3	0.21	0.005
Ca-K	0.0022	1.305	0.32	0.29	+/- 0.04	CaO	0.40	0.029
Mn-K	0.0000	1.329	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0043	1.225	0.42	0.52	+/- 0.06	FeO	0.67	0.038
Pb-M	0.0024	1.273	0.07	0.31	+/- 0.13	PbO	0.33	0.006
Na-K	0.0002	5.319	0.22	0.11	+/- 0.08	Na2O	0.15	0.020
O -K	---	6.324	66.18	23.36 S	---	---	---	---
Total			100.00	100.00			100.00	3.066

The number of cation results are based upon 6 Oxygen atoms

Tue Aug 25 17:39:27 1998
98194 P2696 brannerite grain2 pt5 L-rim
PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.467	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1599	1.501	22.68	23.99	+/- 0.17	TiO2	40.02	2.051
Th-M	0.0200	1.058	0.41	2.12	+/- 0.19	ThO2	2.41	0.037
U -M	0.4641	1.041	9.19	48.31	+/- 0.34	UO2	54.81	0.831
Al-K	0.0006	3.319	0.33	0.20	+/- 0.04	Al2O3	0.37	0.030
Y -L	0.0042	1.771	0.38	0.74	+/- 0.07	Y2O3	0.94	0.034
Ce-L	0.0006	1.425	0.03	0.08	+/- 0.17	Ce2O3	0.09	0.002
Nd-L	0.0009	1.501	0.04	0.14	+/- 0.15	Nd2O3	0.16	0.004
Sm-L	0.0001	1.453	0.00	0.01	+/- 0.14	Sm2O3	0.01	0.000
Gd-L	0.0012	1.403	0.05	0.17	+/- 0.14	Gd2O3	0.19	0.004
Ca-K	0.0002	1.306	0.03	0.03	+/- 0.04	CaO	0.04	0.003
Mn-K	0.0000	1.329	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0047	1.225	0.47	0.58	+/- 0.06	FeO	0.74	0.042
Pb-M	0.0015	1.274	0.04	0.19	+/- 0.13	PbO	0.20	0.004
Na-K	0.0000	5.388	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.315	66.35	23.44 S	---	---	---	---
Total			100.00	100.00			100.00	3.043

The number of cation results are based upon 6 Oxygen atoms

GRAIN 3

Tue Sep 1 11:28:45 1998

98194 P2715 brannerite grain3 pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0003	2.388	0.11	0.07	+/- 0.04	SiO2	0.15	0.010
Ti-K	0.1552	1.487	21.05	23.07	+/- 0.19	TiO2	38.49	1.942
Th-M	0.0180	1.078	0.37	1.94	+/- 0.21	ThO2	2.21	0.034
U -M	0.4033	1.067	7.90	43.04	+/- 0.35	UO2	48.83	0.729
Al-K	0.0017	3.262	0.88	0.54	+/- 0.08	Al2O3	1.02	0.081
Y -L	0.0033	1.751	0.28	0.57	+/- 0.08	Y2O3	0.73	0.026
Ce-L	0.0010	1.416	0.04	0.14	+/- 0.19	Ce2O3	0.16	0.004
Nd-L	0.0003	1.489	0.01	0.05	+/- 0.18	Nd2O3	0.06	0.001
Sm-L	0.0004	1.443	0.02	0.06	+/- 0.16	Sm2O3	0.07	0.002
Gd-L	0.0021	1.398	0.08	0.30	+/- 0.19	Gd2O3	0.35	0.008
Ca-K	0.0162	1.301	2.29	2.10	+/- 0.11	CaO	2.94	0.211
Mn-K	0.0018	1.328	0.19	0.24	+/- 0.09	MnO	0.30	0.017
Fe-K	0.0127	1.221	1.22	1.56	+/- 0.14	FeO	2.00	0.112
Pb-M	0.0198	1.262	0.53	2.50	+/- 0.15	PbO	2.69	0.049
Na-K	0.0000	5.317	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.448	65.04	23.82 S	---	---	---	---
Total			100.00	100.00			100.00	3.225

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 1 11:34:44 1998

98194 P2715 brannerite grain3 pt2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0005	2.391	0.17	0.11	+/- 0.04	SiO2	0.23	0.016
Ti-K	0.1495	1.498	20.63	22.40	+/- 0.12	TiO2	37.36	1.903
Th-M	0.0214	1.075	0.44	2.30	+/- 0.22	ThO2	2.62	0.040
U -M	0.4157	1.064	8.20	44.21	+/- 0.57	UO2	50.15	0.756
Al-K	0.0018	3.265	0.98	0.60	+/- 0.08	Al2O3	1.14	0.091
Y -L	0.0033	1.754	0.29	0.57	+/- 0.08	Y2O3	0.73	0.026
Ce-L	0.0000	1.458	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.494	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0009	1.446	0.04	0.13	+/- 0.15	Sm2O3	0.15	0.003
Gd-L	0.0002	1.399	0.01	0.03	+/- 0.18	Gd2O3	0.04	0.001
Ca-K	0.0168	1.308	2.41	2.19	+/- 0.11	CaO	3.07	0.223
Mn-K	0.0020	1.329	0.21	0.27	+/- 0.08	MnO	0.34	0.020
Fe-K	0.0114	1.222	1.10	1.39	+/- 0.07	FeO	1.79	0.102
Pb-M	0.0175	1.263	0.47	2.21	+/- 0.23	PbO	2.38	0.043
Na-K	0.0000	5.334	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.412	65.05	23.59 S	---	---	---	---
Total			100.00	100.00			100.00	3.224

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 1 11:56:34 1998

98194 P2715 brannerite grain3 pt3

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.434	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1471	1.504	20.62	22.12	+/- 0.17	TiO2	36.90	1.903
Th-M	0.0205	1.078	0.43	2.21	+/- 0.22	ThO2	2.52	0.039
U -M	0.4188	1.067	8.38	44.69	+/- 0.55	UO2	50.70	0.773
Al-K	0.0017	3.265	0.89	0.54	+/- 0.08	Al2O3	1.02	0.082
Y -L	0.0030	1.752	0.27	0.53	+/- 0.07	Y2O3	0.67	0.024
Ce-L	0.0000	1.461	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.495	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0009	1.446	0.04	0.12	+/- 0.15	Sm2O3	0.14	0.003
Gd-L	0.0009	1.399	0.04	0.13	+/- 0.18	Gd2O3	0.15	0.003
Ca-K	0.0185	1.313	2.71	2.43	+/- 0.05	CaO	3.40	0.250
Mn-K	0.0021	1.329	0.23	0.28	+/- 0.08	MnO	0.36	0.021
Fe-K	0.0085	1.221	0.83	1.04	+/- 0.07	FeO	1.33	0.076
Pb-M	0.0207	1.261	0.56	2.61	+/- 0.15	PbO	2.81	0.052
Na-K	0.0000	5.320	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.418	65.02	23.30 S	---	---	---	---
Total			100.00	100.00			100.00	3.228

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 1 12:01:04 1998

98194 P2715 brannerite grain3 pt4

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0001	2.376	0.04	0.03	+/- 0.04	SiO2	0.06	0.004
Ti-K	0.1522	1.496	20.95	22.77	+/- 0.18	TiO2	37.99	1.937
Th-M	0.0153	1.075	0.31	1.65	+/- 0.20	ThO2	1.87	0.029
U -M	0.4134	1.064	8.14	43.99	+/- 0.35	UO2	49.90	0.753
Al-K	0.0007	3.262	0.36	0.22	+/- 0.05	Al2O3	0.42	0.033
Y -L	0.0036	1.744	0.31	0.63	+/- 0.08	Y2O3	0.80	0.029
Ce-L	0.0000	1.456	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0002	1.493	0.01	0.03	+/- 0.16	Nd2O3	0.04	0.001
Sm-L	0.0003	1.446	0.01	0.05	+/- 0.15	Sm2O3	0.05	0.001
Gd-L	0.0020	1.400	0.08	0.27	+/- 0.19	Gd2O3	0.32	0.007
Ca-K	0.0216	1.301	3.09	2.81	+/- 0.05	CaO	3.93	0.286
Mn-K	0.0024	1.330	0.26	0.32	+/- 0.08	MnO	0.41	0.024
Fe-K	0.0104	1.222	1.00	1.27	+/- 0.07	FeO	1.64	0.093
Pb-M	0.0190	1.258	0.51	2.40	+/- 0.15	PbO	2.58	0.047
Na-K	0.0000	5.314	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.485	64.92	23.57 S	---	---	---	---
Total			100.00	100.00			100.00	3.242

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 1 12:18:38 1998

98194 P2715 brannerite grain3 pt5

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.426	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1551	1.500	21.22	23.27	+/- 0.13	TiO2	38.81	1.956
Th-M	0.0149	1.070	0.30	1.60	+/- 0.20	ThO2	1.82	0.028
U -M	0.4202	1.059	8.17	44.50	+/- 0.35	UO2	50.48	0.753
Al-K	0.0015	3.253	0.79	0.49	+/- 0.08	Al2O3	0.93	0.073
Y -L	0.0025	1.744	0.21	0.43	+/- 0.07	Y2O3	0.55	0.020
Ce-L	0.0000	1.460	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.500	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0002	1.452	0.01	0.03	+/- 0.15	Sm2O3	0.03	0.001
Gd-L	0.0011	1.405	0.04	0.16	+/- 0.18	Gd2O3	0.18	0.004
Ca-K	0.0219	1.300	3.11	2.85	+/- 0.11	CaO	3.99	0.287
Mn-K	0.0010	1.335	0.11	0.14	+/- 0.08	MnO	0.18	0.010
Fe-K	0.0048	1.226	0.46	0.59	+/- 0.07	FeO	0.76	0.043
Pb-M	0.0167	1.255	0.44	2.10	+/- 0.14	PbO	2.26	0.041
Na-K	0.0000	5.225	0.03	0.01	+/- 0.08	Na2O	0.02	0.002
O -K	---	6.534	65.10	23.84 S	---	---	---	---
Total			100.00	100.00			100.00	3.216

The number of cation results are based upon 6 Oxygen atoms

ALTERED.

Tue Sep 8 14:28:48 1998

98194 brannerite grain 3 altered 1 pt7

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0134	2.220	3.95	2.96	+/- 0.07	SiO2	6.34	0.361
Ti-K	0.1954	1.403	21.44	27.41	+/- 0.16	TiO2	45.72	1.957
Th-M	0.0292	1.140	0.54	3.33	+/- 0.32	ThO2	3.78	0.049
U -M	0.2345	1.145	4.23	26.85	+/- 0.28	UO2	30.46	0.386
Al-K	0.0018	3.024	0.75	0.54	+/- 0.07	Al2O3	1.02	0.069
Y -L	0.0000	1.710	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0005	1.357	0.02	0.06	+/- 0.16	Ce2O3	0.07	0.002
Nd-L	0.0013	1.467	0.05	0.19	+/- 0.14	Nd2O3	0.22	0.004
Sm-L	0.0010	1.425	0.03	0.14	+/- 0.13	Sm2O3	0.16	0.003
Gd-L	0.0000	1.387	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0031	1.295	0.38	0.40	+/- 0.07	CaO	0.57	0.034
Mn-K	0.0006	1.315	0.05	0.08	+/- 0.05	MnO	0.10	0.005
Fe-K	0.0082	1.220	0.67	1.00	+/- 0.06	FeO	1.29	0.062
Pb-M	0.0681	1.242	1.53	8.46	+/- 0.23	PbO	9.11	0.140
Na-K	0.0000	5.021	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
P -K	0.0026	1.883	0.60	0.50	+/- 0.04	P2O5	1.14	0.055
O -K	---	6.827	65.75	28.07 S	---	---	---	---
Total			100.00	100.00			100.00	3.126

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 8 13:59:55 1998

98194 brannerite grain 3 altered 2 pt8

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0141	2.228	4.31	3.15	+/- 0.07	SiO2	6.74	0.394
Ti-K	0.1759	1.422	20.07	25.01	+/- 0.15	TiO2	41.72	1.834
Th-M	0.0267	1.165	0.52	3.11	+/- 0.19	ThO2	3.54	0.047
U -M	0.2374	1.172	4.49	27.83	+/- 0.45	UO2	31.57	0.411
Al-K	0.0017	3.028	0.73	0.51	+/- 0.07	Al2O3	0.97	0.067
Y -L	0.0000	1.719	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0020	1.371	0.08	0.28	+/- 0.15	Ce2O3	0.33	0.007
Nd-L	0.0017	1.463	0.07	0.25	+/- 0.14	Nd2O3	0.29	0.006
Sm-L	0.0012	1.420	0.04	0.16	+/- 0.13	Sm2O3	0.19	0.004
Gd-L	0.0011	1.385	0.04	0.15	+/- 0.15	Gd2O3	0.17	0.003
Ca-K	0.0041	1.320	0.52	0.54	+/- 0.07	CaO	0.76	0.048
Mn-K	0.0003	1.311	0.03	0.04	+/- 0.07	MnO	0.06	0.003
Fe-K	0.0049	1.215	0.41	0.60	+/- 0.06	FeO	0.77	0.038
Pb-M	0.0807	1.255	1.88	10.12	+/- 0.23	PbO	10.90	0.171
Na-K	0.0002	4.890	0.14	0.08	+/- 0.06	Na2O	0.11	0.012
P -K	0.0043	1.894	1.02	0.82	+/- 0.04	P2O5	1.89	0.093
O -K	---	6.678	65.66	27.33 S	---	---	---	---
Total			100.00	100.00			100.00	3.137

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 8 14:11:16 1998

98194 brannerite grain 3 altered 3 pt9

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0144	2.183	4.20	3.15	+/- 0.10	SiO2	6.73	0.384
Ti-K	0.1925	1.396	21.03	26.88	+/- 0.12	TiO2	44.83	1.922
Th-M	0.0257	1.179	0.49	3.03	+/- 0.30	ThO2	3.45	0.045
U -M	0.1988	1.192	3.73	23.70	+/- 0.26	UO2	26.88	0.341
Al-K	0.0016	2.970	0.65	0.47	+/- 0.08	Al2O3	0.89	0.060
Y -L	0.0009	1.693	0.06	0.15	+/- 0.10	Y2O3	0.19	0.006
Ce-L	0.0035	1.352	0.13	0.47	+/- 0.15	Ce2O3	0.55	0.011
Nd-L	0.0013	1.457	0.05	0.19	+/- 0.14	Nd2O3	0.22	0.005
Sm-L	0.0000	1.416	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0017	1.382	0.06	0.24	+/- 0.15	Gd2O3	0.27	0.005
Ca-K	0.0030	1.312	0.37	0.39	+/- 0.07	CaO	0.55	0.033
Mn-K	0.0001	1.308	0.01	0.01	+/- 0.07	MnO	0.02	0.001
Fe-K	0.0039	1.214	0.32	0.47	+/- 0.05	FeO	0.60	0.029
Pb-M	0.0964	1.241	2.16	11.96	+/- 0.17	PbO	12.88	0.198
Na-K	0.0002	4.807	0.13	0.08	+/- 0.06	Na2O	0.11	0.012
P -K	0.0043	1.862	0.96	0.80	+/- 0.04	P2O5	1.82	0.088
O -K	---	6.854	65.65	28.02 S	---	---	---	---
Total			100.00	100.00			100.00	3.139

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 8 14:57:06 1998

98194 brannerite grain 3 altered 4 pt10

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0118	2.206	3.50	2.59	+/- 0.07	SiO2	5.55	0.320
Ti-K	0.1903	1.410	21.25	26.83	+/- 0.16	TiO2	44.76	1.938
Th-M	0.0204	1.158	0.39	2.36	+/- 0.19	ThO2	2.69	0.035
U -M	0.2335	1.168	4.35	27.26	+/- 0.45	UO2	30.93	0.396
Al-K	0.0016	3.006	0.66	0.47	+/- 0.07	Al2O3	0.89	0.060
Y -L	0.0000	1.694	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0000	1.381	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0015	1.466	0.06	0.22	+/- 0.13	Nd2O3	0.26	0.005
Sm-L	0.0000	1.425	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0005	1.387	0.02	0.07	+/- 0.14	Gd2O3	0.08	0.001
Ca-K	0.0033	1.306	0.41	0.43	+/- 0.07	CaO	0.61	0.037
Mn-K	0.0003	1.313	0.03	0.04	+/- 0.06	MnO	0.06	0.003
Fe-K	0.0060	1.217	0.50	0.73	+/- 0.06	FeO	0.94	0.045
Pb-M	0.0829	1.240	1.88	10.28	+/- 0.16	PbO	11.07	0.172
Na-K	0.0000	4.882	0.03	0.02	+/- 0.06	Na2O	0.02	0.003
P -K	0.0050	1.863	1.15	0.94	+/- 0.04	P2O5	2.15	0.105
O -K	---	6.810	65.78	27.74 S	---	---	---	---
Total			100.00	100.00			100.00	3.121

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 8 15:09:23 1998

98194 brannerite grain 3 altered 5 pt11

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0118	2.141	2.97	2.53	+/- 0.04	SiO2	5.42	0.272
Ti-K	0.2762	1.298	24.64	35.85	+/- 0.17	TiO2	59.79	2.253
Th-M	0.0126	1.102	0.20	1.39	+/- 0.15	ThO2	1.58	0.018
U -M	0.1572	1.107	2.41	17.40	+/- 0.20	UO2	19.73	0.220
Al-K	0.0032	2.910	1.14	0.94	+/- 0.07	Al2O3	1.77	0.105
Y -L	0.0004	1.645	0.02	0.06	+/- 0.08	Y2O3	0.08	0.002
Ce-L	0.0000	1.292	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0008	1.454	0.03	0.12	+/- 0.12	Nd2O3	0.14	0.002
Sm-L	0.0031	1.419	0.10	0.44	+/- 0.12	Sm2O3	0.50	0.009
Gd-L	0.0001	1.393	0.00	0.02	+/- 0.14	Gd2O3	0.02	0.000
Ca-K	0.0030	1.191	0.29	0.36	+/- 0.06	CaO	0.50	0.027
Mn-K	0.0002	1.313	0.01	0.02	+/- 0.06	MnO	0.03	0.001
Fe-K	0.0167	1.227	1.21	2.05	+/- 0.11	FeO	2.64	0.111
Pb-M	0.0557	1.202	1.06	6.69	+/- 0.14	PbO	7.21	0.097
Na-K	0.0000	4.927	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
P -K	0.0014	1.811	0.27	0.26	+/- 0.03	P2O5	0.59	0.025
O -K	---	7.629	65.64	31.89 S	---	---	---	---
Total			100.00	100.00			100.00	3.141

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 8 15:32:39 1998

98194 brannerite grain 3 rutile 1 pt12

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0017	2.007	0.35	0.35	+/- 0.03	SiO2	0.75	0.011
Ti-K	0.4395	1.142	29.53	50.17	+/- 0.22	TiO2	83.69	0.896
U -M	0.0462	1.001	0.55	4.62	+/- 0.26	UO2	5.24	0.017
Al-K	0.0037	2.757	1.06	1.02	+/- 0.07	Al2O3	1.92	0.032
Y -L	0.0000	1.482	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ca-K	0.0014	1.007	0.10	0.14	+/- 0.03	CaO	0.20	0.003
Fe-K	0.0269	1.242	1.69	3.34	+/- 0.14	FeO	4.30	0.051
Pb-M	0.0214	1.116	0.33	2.39	+/- 0.20	PbO	2.58	0.010
P -K	0.0035	1.647	0.53	0.58	+/- 0.04	P2O5	1.33	0.016
O -K	---	9.349	65.87	37.39 S	---	---	---	---
Total			100.00	100.00			100.00	1.036

The number of cation results are based upon 2 Oxygen atoms

Tue Sep 8 15:39:12 1998

98194 brannerite grain 3 rutile 2 pt13

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0029	2.080	0.66	0.60	+/- 0.09	SiO2	1.28	0.020
Ti-K	0.3474	1.232	27.53	42.82	+/- 0.22	TiO2	71.42	0.835
U -M	0.0993	1.050	1.35	10.42	+/- 0.40	UO2	11.83	0.041
Al-K	0.0030	2.849	0.97	0.85	+/- 0.08	Al2O3	1.61	0.030
Ca-K	0.0032	1.123	0.28	0.36	+/- 0.07	CaO	0.50	0.008
Fe-K	0.0178	1.236	1.22	2.20	+/- 0.13	FeO	2.84	0.037
Pb-M	0.0359	1.157	0.62	4.15	+/- 0.23	PbO	4.47	0.019
P -K	0.0057	1.712	0.97	0.97	+/- 0.10	P2O5	2.23	0.029
Th-M	0.0320	1.048	0.45	3.35	+/- 0.31	ThO2	3.82	0.014
O -K	---	8.357	65.96	34.26 S	---	---	---	---
Total			100.00	100.00			100.00	1.032

The number of cation results are based upon 2 Oxygen atoms

Tue Sep 8 15:49:10 1998

98194 brannerite grain 3 rutile 3 pt14

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0025	2.072	0.56	0.52	+/- 0.03	SiO2	1.11	0.017
Ti-K	0.3794	1.199	28.53	45.51	+/- 0.22	TiO2	75.91	0.867
U -M	0.0954	1.023	1.23	9.77	+/- 0.19	UO2	11.08	0.037
Al-K	0.0027	2.853	0.85	0.76	+/- 0.07	Al2O3	1.44	0.026
Ca-K	0.0014	1.076	0.11	0.15	+/- 0.03	CaO	0.21	0.003
Fe-K	0.0280	1.238	1.87	3.47	+/- 0.14	FeO	4.47	0.057
Pb-M	0.0247	1.143	0.41	2.82	+/- 0.13	PbO	3.04	0.012
P -K	0.0028	1.702	0.46	0.47	+/- 0.04	P2O5	1.08	0.014
Th-M	0.0143	1.024	0.19	1.46	+/- 0.16	ThO2	1.66	0.006
O -K	---	8.614	65.81	35.07 S	---	---	---	---
Total			100.00	100.00			100.00	1.039

The number of cation results are based upon 2 Oxygen atoms

GRAIN 4

Tue Sep 1 14:37:54 1998

98194 P2716 brannerite grain4 pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0046	2.339	1.55	1.07	+/- 0.05	SiO2	2.28	0.143
Ti-K	0.1681	1.468	21.04	24.68	+/- 0.18	TiO2	41.16	1.935
Th-M	0.0033	1.079	0.06	0.36	+/- 0.19	ThO2	0.41	0.006
U -M	0.3836	1.066	7.02	40.91	+/- 0.32	UO2	46.41	0.646
Al-K	0.0016	3.193	0.78	0.52	+/- 0.05	Al2O3	0.98	0.072
Y -L	0.0077	1.744	0.62	1.35	+/- 0.10	Y2O3	1.71	0.057
Ce-L	0.0005	1.403	0.02	0.07	+/- 0.19	Ce2O3	0.09	0.002
Nd-L	0.0023	1.490	0.10	0.34	+/- 0.17	Nd2O3	0.40	0.009
Sm-L	0.0003	1.447	0.01	0.05	+/- 0.16	Sm2O3	0.06	0.001
Gd-L	0.0012	1.405	0.04	0.17	+/- 0.18	Gd2O3	0.19	0.004
Ca-K	0.0203	1.277	2.64	2.59	+/- 0.10	CaO	3.62	0.243
Mn-K	0.0004	1.332	0.04	0.05	+/- 0.08	MnO	0.07	0.004
Fe-K	0.0060	1.230	0.54	0.74	+/- 0.07	FeO	0.95	0.050
Pb-M	0.0122	1.273	0.31	1.56	+/- 0.14	PbO	1.68	0.028
Na-K	0.0000	5.259	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.680	65.23	25.56 S	---	---	---	---
Total			100.00	100.00			100.00	3.198

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 1 14:50:03 1998

98194 P2716 brannerite grain4 pt2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0042	2.350	1.49	1.00	+/- 0.06	SiO2	2.13	0.137
Ti-K	0.1597	1.480	20.74	23.64	+/- 0.13	TiO2	39.43	1.906
Th-M	0.0051	1.085	0.10	0.56	+/- 0.19	ThO2	0.63	0.009
U -M	0.3957	1.073	7.50	42.46	+/- 0.33	UO2	48.17	0.689
Al-K	0.0014	3.211	0.72	0.46	+/- 0.05	Al2O3	0.87	0.066
Y -L	0.0079	1.750	0.65	1.38	+/- 0.18	Y2O3	1.75	0.060
Ce-L	0.0000	1.446	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0030	1.490	0.13	0.45	+/- 0.16	Nd2O3	0.53	0.012
Sm-L	0.0008	1.446	0.03	0.12	+/- 0.15	Sm2O3	0.14	0.003
Gd-L	0.0000	1.397	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0176	1.292	2.38	2.27	+/- 0.10	CaO	3.17	0.219
Mn-K	0.0003	1.330	0.03	0.04	+/- 0.06	MnO	0.05	0.002
Fe-K	0.0056	1.227	0.51	0.68	+/- 0.07	FeO	0.88	0.047
Pb-M	0.0163	1.276	0.42	2.09	+/- 0.15	PbO	2.25	0.039
Na-K	0.0000	5.277	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.577	65.30	24.86 S	---	---	---	---
Total			100.00	100.00			100.00	3.189

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 1 15:11:18 1998

98194 P2716 brannerite grain4 pt3

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0036	2.361	1.27	0.84	+/- 0.05	SiO2	1.80	0.117
Ti-K	0.1616	1.471	21.03	23.78	+/- 0.18	TiO2	39.66	1.932
Th-M	0.0235	1.088	0.47	2.56	+/- 0.20	ThO2	2.91	0.043
U -M	0.3696	1.077	7.08	39.79	+/- 0.33	UO2	45.14	0.651
Al-K	0.0010	3.229	0.49	0.31	+/- 0.05	Al2O3	0.59	0.045
Y -L	0.0068	1.754	0.56	1.18	+/- 0.10	Y2O3	1.50	0.052
Ce-L	0.0019	1.406	0.08	0.27	+/- 0.19	Ce2O3	0.32	0.007
Nd-L	0.0053	1.485	0.23	0.79	+/- 0.17	Nd2O3	0.92	0.021
Sm-L	0.0016	1.440	0.06	0.23	+/- 0.16	Sm2O3	0.26	0.006
Gd-L	0.0014	1.397	0.05	0.20	+/- 0.18	Gd2O3	0.23	0.005
Ca-K	0.0169	1.298	2.32	2.19	+/- 0.10	CaO	3.07	0.213
Mn-K	0.0007	1.326	0.07	0.09	+/- 0.08	MnO	0.12	0.007
Fe-K	0.0050	1.224	0.46	0.61	+/- 0.07	FeO	0.79	0.043
Pb-M	0.0195	1.275	0.51	2.49	+/- 0.23	PbO	2.68	0.047
Na-K	0.0000	5.271	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.565	65.30	24.66 S	---	---	---	---
Total			100.00	100.00			100.00	3.189

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 1 15:24:42 1998

98194 P2716 brannerite grain4 pt4

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0018	2.358	0.63	0.42	+/- 0.05	SiO2	0.89	0.058
Ti-K	0.1631	1.470	21.18	23.97	+/- 0.12	TiO2	39.99	1.952
Th-M	0.0259	1.089	0.51	2.82	+/- 0.36	ThO2	3.20	0.047
U -M	0.3623	1.078	6.95	39.07	+/- 0.34	UO2	44.33	0.640
Al-K	0.0017	3.213	0.87	0.56	+/- 0.08	Al2O3	1.05	0.081
Y -L	0.0083	1.740	0.69	1.44	+/- 0.16	Y2O3	1.83	0.063
Ce-L	0.0000	1.438	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0040	1.485	0.17	0.59	+/- 0.16	Nd2O3	0.69	0.016
Sm-L	0.0018	1.440	0.07	0.26	+/- 0.15	Sm2O3	0.30	0.007
Gd-L	0.0022	1.397	0.08	0.30	+/- 0.18	Gd2O3	0.35	0.007
Ca-K	0.0185	1.298	2.54	2.41	+/- 0.10	CaO	3.37	0.234
Mn-K	0.0005	1.325	0.05	0.07	+/- 0.08	MnO	0.09	0.005
Fe-K	0.0064	1.223	0.60	0.79	+/- 0.07	FeO	1.01	0.055
Pb-M	0.0212	1.272	0.55	2.70	+/- 0.23	PbO	2.91	0.051
Na-K	0.0000	5.250	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.610	65.11	24.61 S	---	---	---	---
Total			100.00	100.00			100.00	3.216

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 1 15:36:38 1998

98194 P2716 brannerite grain4 pt5

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0022	2.341	0.82	0.53	+/- 0.06	SiO2	1.13	0.075
Ti-K	0.1572	1.472	21.01	23.13	+/- 0.18	TiO2	38.58	1.936
Th-M	0.0448	1.113	0.93	4.98	+/- 0.22	ThO2	5.67	0.086
U -M	0.3282	1.107	6.64	36.33	+/- 0.33	UO2	41.22	0.612
Al-K	0.0010	3.197	0.53	0.33	+/- 0.05	Al2O3	0.62	0.049
Y -L	0.0085	1.732	0.72	1.48	+/- 0.18	Y2O3	1.88	0.067
Ce-L	0.0021	1.407	0.09	0.29	+/- 0.19	Ce2O3	0.34	0.008
Nd-L	0.0050	1.480	0.22	0.74	+/- 0.17	Nd2O3	0.87	0.021
Sm-L	0.0005	1.432	0.02	0.07	+/- 0.16	Sm2O3	0.09	0.002
Gd-L	0.0024	1.389	0.09	0.33	+/- 0.18	Gd2O3	0.38	0.008
Ca-K	0.0159	1.326	2.29	2.11	+/- 0.10	CaO	2.96	0.211
Mn-K	0.0003	1.318	0.03	0.04	+/- 0.08	MnO	0.05	0.003
Fe-K	0.0042	1.216	0.39	0.51	+/- 0.07	FeO	0.65	0.036
Pb-M	0.0408	1.269	1.09	5.18	+/- 0.26	PbO	5.58	0.100
Na-K	0.0000	5.194	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.559	65.12	23.95 S	---	---	---	---
Total			100.00	100.00			100.00	3.214

The number of cation results are based upon 6 Oxygen atoms

GRAIN 5

Tue Sep 1 16:26:49 1998

98194 P2717 brannerite grain5 pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0013	2.344	0.44	0.30	+/- 0.04	SiO2	0.63	0.042
Ti-K	0.1542	1.467	19.92	22.62	+/- 0.13	TiO2	37.74	1.863
Th-M	0.1022	1.075	2.00	10.99	+/- 0.41	ThO2	12.50	0.187
U -M	0.2835	1.065	5.35	30.20	+/- 0.57	UO2	34.26	0.501
Al-K	0.0005	3.213	0.27	0.17	+/- 0.05	Al2O3	0.32	0.025
Y -L	0.0060	1.727	0.49	1.03	+/- 0.08	Y2O3	1.31	0.046
Ce-L	0.0007	1.410	0.03	0.10	+/- 0.19	Ce2O3	0.11	0.003
Nd-L	0.0052	1.482	0.22	0.77	+/- 0.18	Nd2O3	0.90	0.021
Sm-L	0.0019	1.435	0.08	0.27	+/- 0.16	Sm2O3	0.31	0.007
Gd-L	0.0020	1.393	0.08	0.28	+/- 0.19	Gd2O3	0.33	0.007
Ca-K	0.0368	1.321	5.12	4.86	+/- 0.12	CaO	6.81	0.479
Mn-K	0.0006	1.321	0.06	0.08	+/- 0.08	MnO	0.11	0.006
Fe-K	0.0146	1.221	1.34	1.78	+/- 0.08	FeO	2.29	0.126
Pb-M	0.0176	1.258	0.45	2.21	+/- 0.15	PbO	2.38	0.042
Na-K	0.0000	5.245	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.689	64.15	24.33 S	---	---	---	---
Total			100.00	100.00			100.00	3.353

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 1 16:38:29 1998

98194 P2717 brannerite grain5 pt2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0007	2.357	0.26	0.17	+/- 0.04	SiO2	0.37	0.024
Ti-K	0.1540	1.466	19.97	22.57	+/- 0.13	TiO2	37.65	1.868
Th-M	0.0855	1.078	1.68	9.22	+/- 0.42	ThO2	10.49	0.158
U -M	0.2973	1.067	5.65	31.74	+/- 0.59	UO2	36.00	0.529
Al-K	0.0006	3.228	0.31	0.20	+/- 0.05	Al2O3	0.37	0.029
Y -L	0.0069	1.733	0.57	1.19	+/- 0.09	Y2O3	1.51	0.053
Ce-L	0.0009	1.408	0.04	0.13	+/- 0.19	Ce2O3	0.15	0.004
Nd-L	0.0085	1.479	0.37	1.25	+/- 0.18	Nd2O3	1.46	0.034
Sm-L	0.0021	1.433	0.08	0.30	+/- 0.17	Sm2O3	0.35	0.008
Gd-L	0.0017	1.392	0.06	0.23	+/- 0.20	Gd2O3	0.27	0.006
Ca-K	0.0363	1.313	5.04	4.77	+/- 0.12	CaO	6.67	0.472
Mn-K	0.0004	1.319	0.04	0.06	+/- 0.09	MnO	0.07	0.004
Fe-K	0.0144	1.221	1.33	1.75	+/- 0.08	FeO	2.26	0.125
Pb-M	0.0174	1.264	0.45	2.19	+/- 0.24	PbO	2.36	0.042
Na-K	0.0000	5.259	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.673	64.14	24.22 S	---	---	---	---
Total			100.00	100.00			100.00	3.355

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 1 16:51:36 1998

98194 P2717 brannerite grain5 pt3

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0009	2.337	0.32	0.21	+/- 0.05	SiO2	0.46	0.030
Ti-K	0.1558	1.467	20.22	22.86	+/- 0.14	TiO2	38.13	1.889
Th-M	0.1070	1.076	2.10	11.51	+/- 0.31	ThO2	13.09	0.196
U -M	0.2823	1.066	5.35	30.08	+/- 0.65	UO2	34.12	0.500
Al-K	0.0003	3.211	0.16	0.10	+/- 0.05	Al2O3	0.19	0.015
Y -L	0.0072	1.720	0.59	1.24	+/- 0.09	Y2O3	1.57	0.055
Ce-L	0.0011	1.411	0.05	0.16	+/- 0.22	Ce2O3	0.19	0.004
Nd-L	0.0056	1.483	0.24	0.83	+/- 0.20	Nd2O3	0.97	0.023
Sm-L	0.0008	1.435	0.03	0.11	+/- 0.19	Sm2O3	0.13	0.003
Gd-L	0.0005	1.393	0.02	0.07	+/- 0.22	Gd2O3	0.08	0.002
Ca-K	0.0340	1.325	4.76	4.51	+/- 0.14	CaO	6.31	0.445
Mn-K	0.0004	1.321	0.04	0.05	+/- 0.10	MnO	0.06	0.003
Fe-K	0.0134	1.221	1.24	1.64	+/- 0.09	FeO	2.11	0.116
Pb-M	0.0181	1.257	0.47	2.28	+/- 0.17	PbO	2.45	0.043
Na-K	0.0002	5.172	0.19	0.10	+/- 0.09	Na2O	0.14	0.018
O -K	---	6.685	64.22	24.26 S	---	---	---	---
Total			100.00	100.00			100.00	3.343

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 1 17:03:01 1998

98194 P2717 brannerite grain5 pt4

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0008	2.320	0.29	0.19	+/- 0.04	SiO2	0.41	0.028
Ti-K	0.1568	1.462	20.49	22.93	+/- 0.13	TiO2	38.24	1.914
Th-M	0.1160	1.098	2.35	12.73	+/- 0.29	ThO2	14.49	0.219
U -M	0.2461	1.095	4.84	26.94	+/- 0.60	UO2	30.56	0.453
Al-K	0.0005	3.181	0.25	0.16	+/- 0.05	Al2O3	0.30	0.024
Y -L	0.0045	1.708	0.37	0.76	+/- 0.09	Y2O3	0.97	0.034
Ce-L	0.0033	1.407	0.14	0.47	+/- 0.20	Ce2O3	0.55	0.013
Nd-L	0.0018	1.478	0.08	0.27	+/- 0.18	Nd2O3	0.32	0.008
Sm-L	0.0024	1.428	0.10	0.35	+/- 0.17	Sm2O3	0.40	0.009
Gd-L	0.0016	1.388	0.06	0.22	+/- 0.20	Gd2O3	0.25	0.006
Ca-K	0.0317	1.343	4.55	4.26	+/- 0.13	CaO	5.96	0.425
Mn-K	0.0007	1.316	0.07	0.09	+/- 0.09	MnO	0.12	0.007
Fe-K	0.0116	1.215	1.08	1.41	+/- 0.15	FeO	1.82	0.101
Pb-M	0.0419	1.243	1.08	5.21	+/- 0.27	PbO	5.61	0.101
Na-K	0.0000	5.181	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.689	64.24	24.01 S	---	---	---	---
Total			100.00	100.00			100.00	3.340

The number of cation results are based upon 6 Oxygen atoms

Tue Sep 1 17:15:20 1998

98194 P2717 brannerite grain5 pt5

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0002	2.347	0.07	0.05	+/- 0.04	SiO2	0.10	0.007
Ti-K	0.1501	1.481	19.96	22.22	+/- 0.13	TiO2	37.07	1.868
Th-M	0.0861	1.075	1.72	9.26	+/- 0.27	ThO2	10.54	0.161
U -M	0.3114	1.067	6.00	33.22	+/- 0.60	UO2	37.69	0.562
Al-K	0.0005	3.225	0.24	0.15	+/- 0.05	Al2O3	0.28	0.022
Y -L	0.0039	1.724	0.33	0.67	+/- 0.09	Y2O3	0.86	0.031
Ce-L	0.0015	1.419	0.06	0.21	+/- 0.20	Ce2O3	0.24	0.006
Nd-L	0.0039	1.486	0.18	0.59	+/- 0.18	Nd2O3	0.68	0.016
Sm-L	0.0011	1.438	0.05	0.16	+/- 0.17	Sm2O3	0.19	0.004
Gd-L	0.0006	1.395	0.02	0.09	+/- 0.20	Gd2O3	0.10	0.002
Ca-K	0.0378	1.321	5.36	5.00	+/- 0.13	CaO	6.99	0.502
Mn-K	0.0010	1.324	0.10	0.13	+/- 0.09	MnO	0.17	0.009
Fe-K	0.0131	1.221	1.23	1.60	+/- 0.08	FeO	2.06	0.116
Pb-M	0.0225	1.249	0.58	2.81	+/- 0.25	PbO	3.03	0.055
Na-K	0.0000	5.263	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
O -K	---	6.653	64.09	23.84 S	---	---	---	---
Total			100.00	100.00			100.00	3.361

The number of cation results are based upon 6 Oxygen atoms

006637

Tue Mar 9 09:27:02 1999

99030 B6 brannerite pt1 edge

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=38.95 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0012	2.046	0.37	0.24	+/- 0.04	SiO2	0.52	0.034
Ti-K	0.1859	1.348	22.05	25.05	+/- 0.15	TiO2	41.78	2.032
Th-M	0.0824	1.106	1.66	9.12	+/- 0.21	ThO2	10.38	0.153
U -M	0.2871	1.099	5.59	31.55	+/- 0.46	UO2	35.79	0.515
Al-K	0.0005	2.766	0.22	0.14	+/- 0.03	Al2O3	0.26	0.020
Y -L	0.0069	1.622	0.53	1.12	+/- 0.06	Y2O3	1.42	0.049
Ce-L	0.0024	1.352	0.10	0.32	+/- 0.15	Ce2O3	0.37	0.009
Nd-L	0.0039	1.421	0.16	0.56	+/- 0.14	Nd2O3	0.65	0.015
Sm-L	0.0011	1.385	0.04	0.15	+/- 0.13	Sm2O3	0.18	0.004
Gd-L	0.0024	1.355	0.09	0.32	+/- 0.16	Gd2O3	0.37	0.008
Ca-K	0.0184	1.221	2.36	2.25	+/- 0.08	CaO	3.14	0.218
Mn-K	0.0003	1.249	0.03	0.04	+/- 0.07	MnO	0.05	0.002
Fe-K	0.0085	1.165	0.75	0.99	+/- 0.11	FeO	1.28	0.069
Pb-M	0.0236	1.251	0.60	2.96	+/- 0.12	PbO	3.19	0.055
Ni-K	0.0045	1.064	0.35	0.48	+/- 0.06	NiO	0.61	0.032
O -K	---	6.293	65.11	24.71 S	---	---	---	---
Total			100.00	100.00			100.00	3.215

The number of cation results are based upon 6 Oxygen atoms

Tue Mar 9 09:50:40 1999

99030 B6 brannerite pt2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=38.95 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0035	2.055	1.10	0.73	+/- 0.07	SiO2	1.56	0.101
Ti-K	0.1772	1.351	21.25	23.95	+/- 0.15	TiO2	39.95	1.956
Th-M	0.0857	1.110	1.74	9.52	+/- 0.21	ThO2	10.83	0.160
U -M	0.2907	1.102	5.72	32.04	+/- 0.47	UO2	36.35	0.527
Al-K	0.0005	2.777	0.22	0.14	+/- 0.04	Al2O3	0.26	0.020
Y -L	0.0058	1.638	0.46	0.95	+/- 0.07	Y2O3	1.21	0.042
Ce-L	0.0034	1.354	0.14	0.46	+/- 0.16	Ce2O3	0.54	0.013
Nd-L	0.0040	1.418	0.17	0.56	+/- 0.15	Nd2O3	0.65	0.015
Sm-L	0.0024	1.382	0.10	0.34	+/- 0.14	Sm2O3	0.39	0.009
Gd-L	0.0014	1.353	0.05	0.19	+/- 0.16	Gd2O3	0.22	0.005
Ca-K	0.0149	1.229	1.95	1.84	+/- 0.08	CaO	2.57	0.179
Mn-K	0.0006	1.247	0.06	0.07	+/- 0.07	MnO	0.09	0.005
Fe-K	0.0100	1.163	0.89	1.16	+/- 0.11	FeO	1.50	0.081
Pb-M	0.0241	1.258	0.62	3.04	+/- 0.12	PbO	3.27	0.057
Ni-K	0.0045	1.062	0.35	0.48	+/- 0.06	NiO	0.61	0.032
O -K	---	6.175	65.19	24.54 S	---	---	---	---
Total			100.00	100.00			100.00	3.203

The number of cation results are based upon 6 Oxygen atoms

Tue Mar 9 10:11:18 1999

99030 B6 brannerite pt3 core

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=38.95 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0020	2.058	0.65	0.42	+/- 0.04	SiO2	0.90	0.060
Ti-K	0.1742	1.357	21.53	23.64	+/- 0.16	TiO2	39.43	1.977
Th-M	0.1031	1.107	2.15	11.41	+/- 0.23	ThO2	12.99	0.197
U -M	0.2913	1.100	5.87	32.03	+/- 0.49	UO2	36.34	0.539
Al-K	0.0001	2.784	0.05	0.03	+/- 0.04	Al2O3	0.06	0.005
Y -L	0.0058	1.634	0.46	0.94	+/- 0.07	Y2O3	1.19	0.042
Ce-L	0.0017	1.359	0.07	0.23	+/- 0.16	Ce2O3	0.27	0.007
Nd-L	0.0052	1.419	0.22	0.74	+/- 0.15	Nd2O3	0.87	0.021
Sm-L	0.0006	1.381	0.02	0.08	+/- 0.14	Sm2O3	0.10	0.002
Gd-L	0.0020	1.350	0.07	0.27	+/- 0.16	Gd2O3	0.31	0.007
Ca-K	0.0132	1.240	1.78	1.64	+/- 0.09	CaO	2.29	0.164
Mn-K	0.0003	1.245	0.03	0.03	+/- 0.07	MnO	0.04	0.003
Fe-K	0.0087	1.160	0.79	1.00	+/- 0.06	FeO	1.29	0.072
Pb-M	0.0251	1.254	0.66	3.15	+/- 0.20	PbO	3.39	0.061
Ni-K	0.0039	1.057	0.31	0.41	+/- 0.07	NiO	0.52	0.028
O -K	---	6.138	65.33	23.96 S	---	---	---	---
Total			100.00	100.00			100.00	3.185

The number of cation results are based upon 6 Oxygen atoms

Tue Mar 9 10:32:09 1999

99030 B6 brannerite pt4

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=38.95 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0014	2.058	0.45	0.29	+/- 0.04	SiO2	0.63	0.041
Ti-K	0.1784	1.352	21.76	24.12	+/- 0.11	TiO2	40.23	1.999
Th-M	0.0986	1.104	2.03	10.88	+/- 0.22	ThO2	12.38	0.186
U -M	0.2942	1.095	5.85	32.22	+/- 0.49	UO2	36.55	0.537
Al-K	0.0005	2.787	0.21	0.13	+/- 0.04	Al2O3	0.24	0.019
Y -L	0.0069	1.630	0.55	1.12	+/- 0.14	Y2O3	1.43	0.050
Ce-L	0.0023	1.355	0.10	0.31	+/- 0.16	Ce2O3	0.36	0.009
Nd-L	0.0046	1.418	0.19	0.65	+/- 0.14	Nd2O3	0.76	0.018
Sm-L	0.0008	1.382	0.03	0.10	+/- 0.13	Sm2O3	0.12	0.003
Gd-L	0.0000	1.345	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0107	1.234	1.43	1.32	+/- 0.08	CaO	1.85	0.131
Mn-K	0.0000	1.241	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0137	1.161	1.23	1.59	+/- 0.07	FeO	2.04	0.113
Pb-M	0.0210	1.255	0.55	2.63	+/- 0.13	PbO	2.84	0.050
Ni-K	0.0042	1.059	0.32	0.44	+/- 0.06	NiO	0.56	0.030
O -K	---	6.134	65.31	24.18 S	---	---	---	---
Total			100.00	100.00			100.00	3.187

The number of cation results are based upon 6 Oxygen atoms

Tue Mar 9 10:44:11 1999

99030 B6 brannerite pt5 edge

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=38.95 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0031	2.065	0.98	0.64	+/- 0.07	SiO2	1.36	0.090
Ti-K	0.1722	1.359	21.26	23.40	+/- 0.11	TiO2	39.03	1.950
Th-M	0.0918	1.107	1.91	10.16	+/- 0.35	ThO2	11.56	0.175
U -M	0.3072	1.099	6.17	33.75	+/- 0.49	UO2	38.29	0.566
Al-K	0.0005	2.791	0.22	0.14	+/- 0.04	Al2O3	0.26	0.020
Y -L	0.0050	1.643	0.41	0.83	+/- 0.09	Y2O3	1.05	0.037
Ce-L	0.0011	1.360	0.05	0.15	+/- 0.16	Ce2O3	0.18	0.004
Nd-L	0.0042	1.419	0.18	0.60	+/- 0.15	Nd2O3	0.70	0.017
Sm-L	0.0015	1.382	0.06	0.21	+/- 0.14	Sm2O3	0.25	0.006
Gd-L	0.0016	1.350	0.06	0.22	+/- 0.17	Gd2O3	0.25	0.005
Ca-K	0.0103	1.237	1.39	1.28	+/- 0.04	CaO	1.78	0.127
Mn-K	0.0007	1.245	0.07	0.09	+/- 0.07	MnO	0.12	0.007
Fe-K	0.0100	1.160	0.90	1.16	+/- 0.06	FeO	1.49	0.083
Pb-M	0.0230	1.258	0.61	2.89	+/- 0.13	PbO	3.11	0.056
Ni-K	0.0043	1.057	0.34	0.45	+/- 0.07	NiO	0.58	0.031
O -K	---	6.084	65.40	24.04 S	---	---	---	---
Total			100.00	100.00			100.00	3.174

The number of cation results are based upon 6 Oxygen atoms

Mon Apr 12 15:19:23 1999

6B brannerite altered litgrey P4130 pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0254	2.170	6.81	5.50	+/- 0.11	SiO2	11.77	0.628
Ti-K	0.1916	1.362	18.92	26.09	+/- 0.13	TiO2	43.52	1.745
Th-M	0.1324	1.133	2.25	15.01	+/- 0.25	ThO2	17.08	0.207
U -M	0.0867	1.134	1.43	9.83	+/- 0.26	UO2	11.16	0.132
Al-K	0.0012	2.952	0.46	0.36	+/- 0.05	Al2O3	0.67	0.042
Y -L	0.0019	1.745	0.13	0.33	+/- 0.20	Y2O3	0.42	0.012
Ce-L	0.0064	1.338	0.21	0.86	+/- 0.19	Ce2O3	1.00	0.020
Nd-L	0.0055	1.446	0.19	0.79	+/- 0.17	Nd2O3	0.92	0.018
Sm-L	0.0024	1.405	0.08	0.34	+/- 0.15	Sm2O3	0.39	0.007
Gd-L	0.0011	2.351	0.06	0.27	+/- 0.30	Gd2O3	0.31	0.005
Ca-K	0.0208	1.311	2.36	2.73	+/- 0.10	CaO	3.82	0.218
Mn-K	0.0009	1.303	0.08	0.12	+/- 0.08	MnO	0.16	0.007
Fe-K	0.0096	1.218	0.73	1.17	+/- 0.07	FeO	1.51	0.067
Pb-M	0.0489	1.267	1.04	6.20	+/- 0.17	PbO	6.68	0.096
Na-K	0.0000	4.915	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Nb-L	0.0000	1.475	0.00	0.00	+/- 0.00	Nb2O5	0.00	0.000
P -K	0.0001	1.920	0.02	0.02	+/- 0.07	P2O5	0.04	0.002
As-L	0.0006	2.940	0.08	0.16	+/- 0.13	As2O3	0.22	0.007
Zr-L	0.0015	1.609	0.09	0.24	+/- 0.18	ZrO2	0.33	0.009
O -K	---	7.057	65.07	29.97 S	---	---	---	---
Total			100.00	100.00			100.00	3.221

The number of cation results are based upon 6 Oxygen atoms

Mon Apr 12 14:29:55 1999

6B brannerite altered dargrey P4130 pt2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0248	2.122	6.24	5.26	+/- 0.09	SiO2	11.25	0.576
Ti-K	0.2175	1.338	20.22	29.10	+/- 0.12	TiO2	48.53	1.869
Th-M	0.0984	1.123	1.59	11.05	+/- 0.20	ThO2	12.57	0.146
U -M	0.0876	1.126	1.38	9.87	+/- 0.21	UO2	11.20	0.128
Al-K	0.0009	2.895	0.32	0.26	+/- 0.04	Al2O3	0.49	0.029
Y -L	0.0015	1.706	0.10	0.26	+/- 0.16	Y2O3	0.33	0.009
Ce-L	0.0044	1.318	0.14	0.58	+/- 0.16	Ce2O3	0.68	0.013
Nd-L	0.0042	1.448	0.14	0.60	+/- 0.14	Nd2O3	0.70	0.013
Sm-L	0.0002	1.410	0.01	0.03	+/- 0.13	Sm2O3	0.03	0.001
Gd-L	0.0017	2.317	0.09	0.41	+/- 0.20	Gd2O3	0.47	0.008
Ca-K	0.0263	1.266	2.77	3.33	+/- 0.09	CaO	4.66	0.256
Mn-K	0.0000	1.311	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0089	1.224	0.65	1.08	+/- 0.11	FeO	1.40	0.060
Pb-M	0.0519	1.241	1.03	6.44	+/- 0.14	PbO	6.94	0.096
Na-K	0.0003	4.710	0.22	0.15	+/- 0.06	Na2O	0.20	0.020
Nb-L	0.0000	1.444	0.00	0.00	+/- 0.00	Nb2O5	0.00	0.000
P -K	0.0002	1.879	0.05	0.04	+/- 0.06	P2O5	0.10	0.004
As-L	0.0007	2.899	0.09	0.20	+/- 0.11	As2O3	0.26	0.008
Zr-L	0.0008	1.574	0.05	0.13	+/- 0.15	ZrO2	0.17	0.004
O -K	---	7.432	64.94	31.20 S	---	---	---	---
Total			100.00	100.00			100.00	3.240

The number of cation results are based upon 6 Oxygen atoms

Mon Apr 12 15:02:53 1999

6B brannerite altered litgrey P4130 pt3

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0280	2.092	6.72	5.86	+/- 0.09	SiO2	12.54	0.620
Ti-K	0.2283	1.312	20.14	29.96	+/- 0.12	TiO2	49.98	1.858
Th-M	0.0876	1.135	1.38	9.94	+/- 0.18	ThO2	11.31	0.127
U -M	0.0617	1.139	0.95	7.03	+/- 0.19	UO2	7.97	0.088
Al-K	0.0016	2.842	0.53	0.44	+/- 0.04	Al2O3	0.83	0.049
Y -L	0.0026	1.702	0.16	0.44	+/- 0.10	Y2O3	0.56	0.015
Ce-L	0.0072	1.299	0.21	0.93	+/- 0.16	Ce2O3	1.09	0.020
Nd-L	0.0047	1.438	0.15	0.68	+/- 0.14	Nd2O3	0.79	0.014
Sm-L	0.0022	1.402	0.07	0.31	+/- 0.13	Sm2O3	0.36	0.006
Gd-L	0.0010	2.290	0.05	0.23	+/- 0.24	Gd2O3	0.27	0.004
Ca-K	0.0258	1.249	2.59	3.22	+/- 0.08	CaO	4.51	0.239
Mn-K	0.0006	1.302	0.05	0.08	+/- 0.06	MnO	0.10	0.004
Fe-K	0.0069	1.223	0.49	0.85	+/- 0.06	FeO	1.09	0.045
Pb-M	0.0566	1.242	1.09	7.03	+/- 0.18	PbO	7.57	0.101
Na-K	0.0002	4.643	0.10	0.07	+/- 0.06	Na2O	0.10	0.009
Nb-L	0.0014	1.469	0.07	0.21	+/- 0.13	Nb2O5	0.30	0.007
P -K	0.0006	1.873	0.11	0.11	+/- 0.06	P2O5	0.25	0.010
As-L	0.0010	2.843	0.12	0.29	+/- 0.11	As2O3	0.38	0.011
Zr-L	0.0000	1.540	0.00	0.00	+/- 0.00	ZrO2	0.00	0.000
O -K	---	7.591	65.03	32.32 S	---	---	---	---
Total			100.00	100.00			100.00	3.227

The number of cation results are based upon 6 Oxygen atoms

Mon Apr 12 15:42:28 1999

6B brannerite altered litgrey P4130 pt4

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0250	2.122	6.27	5.31	+/- 0.09	SiO2	11.36	0.578
Ti-K	0.2212	1.335	20.46	29.53	+/- 0.12	TiO2	49.26	1.885
Th-M	0.0881	1.122	1.41	9.89	+/- 0.21	ThO2	11.25	0.130
U -M	0.0983	1.124	1.54	11.05	+/- 0.41	UO2	12.53	0.142
Al-K	0.0013	2.896	0.47	0.38	+/- 0.04	Al2O3	0.72	0.043
Y -L	0.0019	1.707	0.12	0.32	+/- 0.10	Y2O3	0.40	0.011
Ce-L	0.0079	1.315	0.25	1.04	+/- 0.16	Ce2O3	1.21	0.023
Nd-L	0.0041	1.448	0.14	0.59	+/- 0.14	Nd2O3	0.69	0.013
Sm-L	0.0000	1.416	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0000	2.387	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0224	1.259	2.33	2.81	+/- 0.08	CaO	3.94	0.215
Mn-K	0.0000	1.312	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0087	1.226	0.63	1.06	+/- 0.11	FeO	1.36	0.058
Pb-M	0.0512	1.240	1.02	6.35	+/- 0.14	PbO	6.84	0.094
Na-K	0.0002	4.748	0.11	0.08	+/- 0.06	Na2O	0.11	0.011
Nb-L	0.0000	1.448	0.00	0.00	+/- 0.00	Nb2O5	0.00	0.000
P -K	0.0003	1.880	0.06	0.05	+/- 0.04	P2O5	0.12	0.005
As-L	0.0005	2.901	0.07	0.15	+/- 0.11	As2O3	0.20	0.006
Zr-L	0.0000	1.555	0.00	0.00	+/- 0.00	ZrO2	0.00	0.000
O -K	---	7.397	65.12	31.39 S	---	---	---	---
Total			100.00	100.00			100.00	3.214

The number of cation results are based upon 6 Oxygen atoms

000637

Mon Apr 12 16:00:32 1999

6B brannerite altered litgrey P4130 pt5

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0242	2.147	6.33	5.19	+/- 0.09	SiO2	11.11	0.584
Ti-K	0.2027	1.358	19.68	27.52	+/- 0.12	TiO2	45.91	1.815
Th-M	0.1021	1.126	1.70	11.50	+/- 0.21	ThO2	13.08	0.157
U -M	0.1065	1.129	1.73	12.01	+/- 0.23	UO2	13.63	0.159
Al-K	0.0010	2.929	0.37	0.29	+/- 0.04	Al2O3	0.54	0.034
Y -L	0.0012	1.721	0.08	0.20	+/- 0.10	Y2O3	0.25	0.007
Ce-L	0.0083	1.333	0.27	1.11	+/- 0.16	Ce2O3	1.30	0.025
Nd-L	0.0036	1.451	0.12	0.52	+/- 0.15	Nd2O3	0.60	0.011
Sm-L	0.0000	1.416	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0015	2.346	0.08	0.35	+/- 0.26	Gd2O3	0.40	0.007
Ca-K	0.0256	1.284	2.81	3.28	+/- 0.09	CaO	4.60	0.259
Mn-K	0.0009	1.309	0.07	0.12	+/- 0.07	MnO	0.15	0.007
Fe-K	0.0074	1.224	0.56	0.91	+/- 0.06	FeO	1.16	0.051
Pb-M	0.0517	1.247	1.07	6.45	+/- 0.19	PbO	6.94	0.098
Na-K	0.0000	4.893	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Nb-L	0.0006	1.477	0.03	0.09	+/- 0.14	Nb2O5	0.13	0.003
P -K	0.0004	1.895	0.09	0.08	+/- 0.06	P2O5	0.19	0.008
As-L	0.0000	3.007	0.00	0.00	+/- 0.00	As2O3	0.00	0.000
Zr-L	0.0000	1.570	0.00	0.00	+/- 0.00	ZrO2	0.00	0.000
O -K	---	7.229	65.04	30.39 S	---	---	---	---
Total			100.00	100.00			100.00	3.226

The number of cation results are based upon 6 Oxygen atoms

Fri Mar 12 16:13:18 1999

99030 B7 brannerite pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.41 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0010	2.355	0.36	0.23	+/- 0.04	SiO2	0.50	0.033
Ti-K	0.1556	1.473	20.81	22.93	+/- 0.11	TiO2	38.25	1.909
Th-M	0.0695	1.079	1.41	7.50	+/- 0.21	ThO2	8.54	0.129
U -M	0.3527	1.062	6.84	37.46	+/- 0.49	UO2	42.50	0.628
Al-K	0.0001	3.224	0.05	0.03	+/- 0.04	Al2O3	0.06	0.005
Y -L	0.0066	1.740	0.56	1.14	+/- 0.08	Y2O3	1.45	0.051
Ce-L	0.0005	1.413	0.02	0.07	+/- 0.16	Ce2O3	0.09	0.002
Nd-L	0.0039	1.484	0.18	0.58	+/- 0.15	Nd2O3	0.68	0.016
Sm-L	0.0030	1.437	0.13	0.43	+/- 0.14	Sm2O3	0.50	0.011
Gd-L	0.0036	1.393	0.14	0.51	+/- 0.16	Gd2O3	0.58	0.013
Ca-K	0.0204	1.313	2.90	2.68	+/- 0.09	CaO	3.74	0.266
Mn-K	0.0009	1.320	0.10	0.12	+/- 0.07	MnO	0.16	0.009
Fe-K	0.0045	1.218	0.42	0.55	+/- 0.06	FeO	0.70	0.039
Pb-M	0.0038	1.269	0.10	0.48	+/- 0.15	PbO	0.52	0.009
Nb-L	0.0080	1.507	0.57	1.21	+/- 0.09	Nb2O5	1.73	0.052
O -K	---	6.550	65.41	24.07 S	---	---	---	---
Total			100.00	100.00			100.00	3.174

The number of cation results are based upon 6 Oxygen atoms

Fri Mar 12 16:19:52 1999

99030 B7 brannerite pt 2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.41 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0003	2.304	0.10	0.07	+/- 0.05	SiO2	0.14	0.009
Ti-K	0.1762	1.446	21.96	25.48	+/- 0.16	TiO2	42.50	2.019
Th-M	0.0628	1.083	1.21	6.80	+/- 0.34	ThO2	7.74	0.111
U -M	0.3180	1.068	5.89	33.95	+/- 0.48	UO2	38.52	0.541
Al-K	0.0017	3.140	0.81	0.53	+/- 0.07	Al2O3	0.99	0.074
Y -L	0.0192	1.701	1.51	3.26	+/- 0.08	Y2O3	4.14	0.139
Ce-L	0.0000	1.425	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0015	1.483	0.06	0.22	+/- 0.13	Nd2O3	0.26	0.006
Sm-L	0.0029	1.437	0.11	0.41	+/- 0.13	Sm2O3	0.48	0.010
Gd-L	0.0017	1.396	0.06	0.24	+/- 0.13	Gd2O3	0.28	0.006
Ca-K	0.0186	1.294	2.48	2.41	+/- 0.04	CaO	3.37	0.228
Mn-K	0.0000	1.321	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0035	1.220	0.31	0.43	+/- 0.06	FeO	0.55	0.029
Pb-M	0.0059	1.285	0.15	0.75	+/- 0.14	PbO	0.81	0.014
Nb-L	0.0010	1.527	0.07	0.16	+/- 0.10	Nb2O5	0.22	0.006
O -K	---	6.784	65.27	25.29 S	---	---	---	---
Total			100.00	100.00			100.00	3.192

The number of cation results are based upon 6 Oxygen atoms

Fri Mar 12 16:21:19 1999

99030 B7 brannerite pt3

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.41 deg

Number of Iterations = 4

Eement	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0012	2.288	0.42	0.28	+/- 0.04	SiO2	0.59	0.038
Ti-K	0.1695	1.439	21.69	24.39	+/- 0.11	TiO2	40.69	1.995
Th-M	0.0844	1.120	1.74	9.46	+/- 0.20	ThO2	10.76	0.160
U -M	0.2647	1.112	5.27	29.43	+/- 0.27	UO2	33.39	0.485
Al-K	0.0007	3.126	0.36	0.23	+/- 0.04	Al2O3	0.43	0.033
Y -L	0.0163	1.696	1.32	2.76	+/- 0.08	Y2O3	3.51	0.122
Ce-L	0.0004	1.387	0.02	0.06	+/- 0.16	Ce2O3	0.07	0.002
Nd-L	0.0045	1.469	0.20	0.67	+/- 0.15	Nd2O3	0.78	0.018
Sm-L	0.0020	1.422	0.08	0.28	+/- 0.14	Sm2O3	0.33	0.007
Gd-L	0.0029	1.381	0.11	0.40	+/- 0.16	Gd2O3	0.46	0.010
Ca-K	0.0127	1.329	1.80	1.69	+/- 0.04	CaO	2.37	0.166
Mn-K	0.0001	1.307	0.01	0.01	+/- 0.07	MnO	0.02	0.001
Fe-K	0.0067	1.209	0.62	0.81	+/- 0.06	FeO	1.04	0.057
Pb-M	0.0361	1.275	0.94	4.60	+/- 0.26	PbO	4.95	0.087
Nb-L	0.0029	1.513	0.20	0.44	+/- 0.10	Nb2O5	0.63	0.019
O -K	---	6.676	65.23	24.50 S	---	---	---	---
Total			100.00	100.00			100.00	3.198

The number of cation results are based upon 6 Oxygen atoms

Fri Mar 12 16:22:05 1999

99030 B7 brannerite pt4

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.41 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0009	2.320	0.31	0.21	+/- 0.05	SiO2	0.44	0.029
Ti-K	0.1649	1.459	21.38	24.07	+/- 0.11	TiO2	40.15	1.963
Th-M	0.0851	1.081	1.69	9.20	+/- 0.22	ThO2	10.47	0.155
U -M	0.3173	1.065	6.04	33.79	+/- 0.49	UO2	38.33	0.555
Al-K	0.0002	3.183	0.09	0.06	+/- 0.04	Al2O3	0.11	0.009
Y -L	0.0126	1.716	1.04	2.17	+/- 0.18	Y2O3	2.75	0.095
Ce-L	0.0008	1.404	0.04	0.12	+/- 0.16	Ce2O3	0.14	0.003
Nd-L	0.0036	1.483	0.16	0.53	+/- 0.15	Nd2O3	0.62	0.014
Sm-L	0.0030	1.436	0.12	0.44	+/- 0.14	Sm2O3	0.51	0.011
Gd-L	0.0011	1.394	0.04	0.15	+/- 0.16	Gd2O3	0.17	0.004
Ca-K	0.0203	1.313	2.84	2.67	+/- 0.09	CaO	3.74	0.260
Mn-K	0.0000	1.318	0.00	0.00	+/- 0.07	MnO	0.00	0.000
Fe-K	0.0043	1.219	0.40	0.52	+/- 0.06	FeO	0.67	0.037
Pb-M	0.0055	1.274	0.14	0.69	+/- 0.15	PbO	0.75	0.013
Nb-L	0.0053	1.513	0.36	0.79	+/- 0.11	Nb2O5	1.14	0.033
O -K	---	6.671	65.35	24.58 S	---	---	---	---
Total			100.00	100.00			100.00	3.181

The number of cation results are based upon 6 Oxygen atoms

Fri Mar 12 16:23:09 1999
99030 B7 brannerite pt5
PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.41 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.364	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1744	1.447	22.09	25.25	+/- 0.11	TiO2	42.11	2.028
Th-M	0.0622	1.083	1.22	6.74	+/- 0.20	ThO2	7.67	0.112
U -M	0.3231	1.067	6.07	34.47	+/- 0.29	UO2	39.10	0.557
Al-K	0.0002	3.168	0.11	0.07	+/- 0.04	Al2O3	0.13	0.010
Y -L	0.0170	1.704	1.36	2.89	+/- 0.08	Y2O3	3.67	0.125
Ce-L	0.0012	1.393	0.05	0.17	+/- 0.16	Ce2O3	0.20	0.005
Nd-L	0.0037	1.482	0.16	0.54	+/- 0.15	Nd2O3	0.63	0.015
Sm-L	0.0014	1.435	0.06	0.21	+/- 0.14	Sm2O3	0.24	0.005
Gd-L	0.0038	1.394	0.14	0.53	+/- 0.17	Gd2O3	0.62	0.013
Ca-K	0.0198	1.294	2.68	2.56	+/- 0.09	CaO	3.58	0.246
Mn-K	0.0009	1.320	0.09	0.12	+/- 0.07	MnO	0.15	0.008
Fe-K	0.0025	1.220	0.23	0.30	+/- 0.06	FeO	0.39	0.021
Pb-M	0.0049	1.280	0.13	0.63	+/- 0.15	PbO	0.68	0.012
Nb-L	0.0038	1.521	0.26	0.58	+/- 0.10	Nb2O5	0.82	0.024
O -K	---	6.762	65.36	24.94 S	---	---	---	---
Total			100.00	100.00			100.00	3.180

The number of cation results are based upon 6 Oxygen atoms

000637

Thu Apr 15 11:39:36 1999

B7 altered brannerite white patch

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0001	2.329	0.04	0.03	+/- 0.06	SiO2	0.06	0.004
Ti-K	0.1678	1.353	20.03	22.70	+/- 0.10	TiO2	37.87	1.831
Th-M	0.0706	1.274	1.64	9.00	+/- 0.20	ThO2	10.24	0.150
U -M	0.1184	1.251	2.63	14.81	+/- 0.22	UO2	16.80	0.240
Al-K	0.0015	3.073	0.70	0.45	+/- 0.08	Al2O3	0.85	0.064
Y -L	0.0354	1.786	3.00	6.32	+/- 0.15	Y2O3	8.02	0.274
Ce-L	0.0031	1.316	0.12	0.41	+/- 0.15	Ce2O3	0.48	0.011
Nd-L	0.0102	1.392	0.42	1.42	+/- 0.14	Nd2O3	1.66	0.038
Sm-L	0.0059	1.351	0.22	0.80	+/- 0.14	Sm2O3	0.93	0.021
Gd-L	0.0098	2.213	0.58	2.17	+/- 0.30	Gd2O3	2.50	0.053
Ca-K	0.0003	1.346	0.05	0.05	+/- 0.03	CaO	0.06	0.004
Mn-K	0.0006	1.248	0.06	0.07	+/- 0.07	MnO	0.09	0.005
Fe-K	0.0007	1.167	0.06	0.08	+/- 0.06	FeO	0.11	0.006
Pb-M	0.0388	1.416	1.12	5.49	+/- 0.19	PbO	5.91	0.102
Na-K	0.0000	4.546	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Dy-L	0.0178	1.297	0.60	2.31	+/- 0.17	Dy2O3	2.65	0.055
Ho-L	0.0047	1.284	0.15	0.60	+/- 0.17	Ho2O3	0.69	0.014
Er-L	0.0100	1.272	0.32	1.27	+/- 0.15	Er2O3	1.45	0.029
Yb-L	0.0084	1.266	0.26	1.06	+/- 0.18	Yb2O3	1.21	0.024
W -L	0.0154	1.255	0.45	1.94	+/- 0.24	WO3	2.44	0.041
Nb-L	0.0248	1.684	1.90	4.18	+/- 0.14	Nb2O5	5.97	0.174
O -K	---	6.833	65.64	24.85 S	---	---	---	---
Total			100.00	100.00			100.00	3.141

The number of cation results are based upon 6 Oxygen atoms

Thu Apr 15 12:23:58 1999

B7 brannerite light patch pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations =

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.394	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1673	1.368	20.19	22.89	+/- 0.10	TiO2	38.18	1.830
Th-M	0.0930	1.216	2.06	11.30	+/- 0.23	ThO2	12.86	0.187
U -M	0.1553	1.182	3.26	18.36	+/- 0.43	UO2	20.83	0.295
Al-K	0.0004	3.167	0.19	0.12	+/- 0.04	Al2O3	0.23	0.018
Y -L	0.0293	1.805	2.51	5.29	+/- 0.14	Y2O3	6.71	0.228
Ce-L	0.0029	1.331	0.12	0.39	+/- 0.15	Ce2O3	0.46	0.011
Nd-L	0.0137	1.409	0.56	1.92	+/- 0.14	Nd2O3	2.24	0.051
Sm-L	0.0075	1.367	0.29	1.03	+/- 0.14	Sm2O3	1.19	0.026
Gd-L	0.0095	2.307	0.59	2.18	+/- 0.25	Gd2O3	2.52	0.053
Ca-K	0.0006	1.334	0.09	0.08	+/- 0.03	CaO	0.12	0.008
Mn-K	0.0000	1.271	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0012	1.179	0.10	0.14	+/- 0.06	FeO	0.18	0.010
Pb-M	0.0028	1.402	0.08	0.39	+/- 0.17	PbO	0.42	0.007
Na-K	0.0000	4.653	0.01	0.01	+/- 0.06	Na2O	0.01	0.001
Dy-L	0.0162	1.310	0.55	2.12	+/- 0.17	Dy2O3	2.43	0.050
Ho-L	0.0024	1.297	0.08	0.31	+/- 0.17	Ho2O3	0.36	0.007
Er-L	0.0074	1.285	0.24	0.95	+/- 0.16	Er2O3	1.09	0.022
Yb-L	0.0050	1.277	0.16	0.64	+/- 0.19	Yb2O3	0.73	0.014
W -L	0.0137	1.262	0.40	1.73	+/- 0.24	WO3	2.18	0.036
Nb-L	0.0304	1.668	2.31	5.07	+/- 0.13	Nb2O5	7.25	0.209
O -K	---	6.773	66.20	25.06 S	---	---	---	---
Total			100.00	100.00			100.00	3.063

The number of cation results are based upon 6 Oxygen atoms

Thu Apr 15 12:37:58 1999

B7 brannerite dark patch pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.329	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1690	1.351	20.19	22.83	+/- 0.15	TiO2	38.08	1.843
Th-M	0.0723	1.273	1.68	9.21	+/- 0.21	ThO2	10.48	0.153
U -M	0.1163	1.250	2.59	14.54	+/- 0.23	UO2	16.50	0.236
Al-K	0.0006	3.075	0.29	0.18	+/- 0.05	Al2O3	0.34	0.026
Y -L	0.0370	1.776	3.13	6.58	+/- 0.14	Y2O3	8.36	0.286
Ce-L	0.0035	1.315	0.14	0.46	+/- 0.16	Ce2O3	0.53	0.013
Nd-L	0.0118	1.392	0.48	1.64	+/- 0.15	Nd2O3	1.91	0.044
Sm-L	0.0072	1.351	0.28	0.98	+/- 0.14	Sm2O3	1.14	0.025
Gd-L	0.0104	2.230	0.62	2.32	+/- 0.31	Gd2O3	2.67	0.057
Ca-K	0.0001	1.345	0.01	0.01	+/- 0.03	CaO	0.01	0.001
Mn-K	0.0006	1.248	0.05	0.07	+/- 0.07	MnO	0.09	0.005
Fe-K	0.0018	1.167	0.16	0.21	+/- 0.06	FeO	0.27	0.014
Pb-M	0.0379	1.413	1.10	5.36	+/- 0.20	PbO	5.77	0.100
Na-K	0.0000	4.586	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Dy-L	0.0160	1.297	0.54	2.07	+/- 0.17	Dy2O3	2.38	0.049
Ho-L	0.0031	1.285	0.10	0.40	+/- 0.17	Ho2O3	0.46	0.009
Er-L	0.0091	1.273	0.29	1.15	+/- 0.16	Er2O3	1.32	0.027
Yb-L	0.0057	1.268	0.18	0.73	+/- 0.19	Yb2O3	0.83	0.016
W -L	0.0165	1.256	0.48	2.07	+/- 0.24	WO3	2.61	0.044
Nb-L	0.0260	1.680	1.99	4.37	+/- 0.14	Nb2O5	6.25	0.182
O -K	---	6.848	65.71	24.82 S	---	---	---	---
Total			100.00	100.00			100.00	3.131

The number of cation results are based upon 6 Oxygen atoms

Thu Apr 15 14:31:29 1999

B7 brannerite dark patch pt2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.386	0.00	0.00	+/- 0.07	SiO2	0.00	0.000
Ti-K	0.1528	1.383	18.76	21.13	+/- 0.09	TiO2	35.25	1.714
Th-M	0.0749	1.230	1.69	9.21	+/- 0.31	ThO2	10.48	0.154
U -M	0.1657	1.197	3.54	19.83	+/- 0.41	UO2	22.49	0.324
Al-K	0.0000	3.199	0.00	0.00	+/- 0.00	Al2O3	0.00	0.000
Y -L	0.0279	1.804	2.40	5.02	+/- 0.25	Y2O3	6.38	0.220
Ce-L	0.0000	1.357	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0096	1.407	0.40	1.36	+/- 0.13	Nd2O3	1.58	0.037
Sm-L	0.0094	1.367	0.36	1.28	+/- 0.13	Sm2O3	1.49	0.033
Gd-L	0.0114	2.278	0.70	2.60	+/- 0.29	Gd2O3	3.00	0.064
Ca-K	0.0129	1.337	1.82	1.72	+/- 0.04	CaO	2.41	0.167
Mn-K	0.0002	1.261	0.02	0.02	+/- 0.07	MnO	0.03	0.002
Fe-K	0.0021	1.176	0.19	0.24	+/- 0.06	FeO	0.31	0.017
Pb-M	0.0056	1.398	0.16	0.79	+/- 0.17	PbO	0.85	0.015
Na-K	0.0000	4.709	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Dy-L	0.0175	1.306	0.60	2.29	+/- 0.16	Dy2O3	2.62	0.055
Ho-L	0.0034	1.294	0.11	0.44	+/- 0.16	Ho2O3	0.50	0.010
Er-L	0.0079	1.282	0.26	1.01	+/- 0.15	Er2O3	1.16	0.024
Yb-L	0.0050	1.276	0.16	0.64	+/- 0.17	Yb2O3	0.72	0.014
W -L	0.0141	1.263	0.41	1.78	+/- 0.22	WO3	2.24	0.038
Nb-L	0.0356	1.662	2.71	5.92	+/- 0.25	Nb2O5	8.47	0.248
O -K	---	6.832	65.69	24.71 S	---	---	---	---
Total			100.00	100.00			100.00	3.133

The number of cation results are based upon 6 Oxygen atoms

Thu Apr 15 14:50:49 1999

B7 brannerite light patch pt2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0004	2.394	0.13	0.08	+/- 0.05	SiO2	0.18	0.012
Ti-K	0.1584	1.380	19.70	21.87	+/- 0.09	TiO2	36.47	1.784
Th-M	0.0859	1.225	1.96	10.52	+/- 0.20	ThO2	11.97	0.177
U -M	0.1705	1.190	3.68	20.29	+/- 0.40	UO2	23.02	0.333
Al-K	0.0000	3.223	0.00	0.00	+/- 0.00	Al2O3	0.00	0.000
Y -L	0.0280	1.823	2.48	5.10	+/- 0.12	Y2O3	6.48	0.224
Ce-L	0.0000	1.355	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0080	1.408	0.34	1.13	+/- 0.12	Nd2O3	1.32	0.031
Sm-L	0.0082	1.366	0.32	1.12	+/- 0.12	Sm2O3	1.30	0.029
Gd-L	0.0126	2.281	0.79	2.88	+/- 0.22	Gd2O3	3.32	0.072
Ca-K	0.0000	1.355	0.00	0.00	+/- 0.03	CaO	0.00	0.000
Mn-K	0.0000	1.268	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0016	1.174	0.15	0.19	+/- 0.06	FeO	0.24	0.013
Pb-M	0.0034	1.411	0.10	0.48	+/- 0.15	PbO	0.52	0.009
Na-K	0.0000	4.724	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Dy-L	0.0171	1.303	0.59	2.23	+/- 0.16	Dy2O3	2.56	0.054
Ho-L	0.0037	1.291	0.12	0.47	+/- 0.15	Ho2O3	0.54	0.011
Er-L	0.0090	1.277	0.30	1.15	+/- 0.14	Er2O3	1.31	0.027
Yb-L	0.0080	1.271	0.25	1.02	+/- 0.17	Yb2O3	1.16	0.023
W -L	0.0128	1.257	0.38	1.61	+/- 0.21	WO3	2.03	0.034
Nb-L	0.0315	1.680	2.46	5.29	+/- 0.12	Nb2O5	7.57	0.223
O -K	---	6.696	66.25	24.56 S	---	---	---	---
Total			100.00	100.00			100.00	3.056

The number of cation results are based upon 6 Oxygen atoms

000637

99030 B8 brannerite pt1 gr1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=38.95 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0022	2.074	0.69	0.46	+/- 0.07	SiO2	0.98	0.063
Ti-K	0.1829	1.359	21.89	24.87	+/- 0.11	TiO2	41.48	2.008
Th-M	0.0037	1.095	0.07	0.41	+/- 0.16	ThO2	0.46	0.007
U -M	0.3942	1.082	7.56	42.67	+/- 0.28	UO2	48.41	0.693
Al-K	0.0004	2.804	0.18	0.12	+/- 0.04	Al2O3	0.22	0.017
Y -L	0.0087	1.646	0.68	1.43	+/- 0.08	Y2O3	1.81	0.062
Ce-L	0.0008	1.356	0.03	0.11	+/- 0.15	Ce2O3	0.13	0.003
Nd-L	0.0027	1.425	0.11	0.38	+/- 0.14	Nd2O3	0.45	0.010
Sm-L	0.0032	1.393	0.13	0.45	+/- 0.13	Sm2O3	0.52	0.012
Gd-L	0.0026	1.361	0.09	0.35	+/- 0.16	Gd2O3	0.40	0.009
Ca-K	0.0147	1.190	1.84	1.75	+/- 0.04	CaO	2.45	0.169
Mn-K	0.0014	1.255	0.14	0.18	+/- 0.07	MnO	0.23	0.012
Fe-K	0.0094	1.170	0.83	1.10	+/- 0.06	FeO	1.42	0.076
Pb-M	0.0048	1.268	0.12	0.61	+/- 0.11	PbO	0.66	0.011
Ni-K	0.0028	1.068	0.21	0.29	+/- 0.06	NiO	0.37	0.019
O -K	---	6.207	65.41	24.82 S	---	---	---	---
Total			100.00	100.00			100.00	3.172

The number of cation results are based upon 6 Oxygen atoms

99030 B8 brannerite pt1 gr 2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=38.95 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0012	2.086	0.39	0.25	+/- 0.03	SiO2	0.54	0.036
Ti-K	0.1677	1.377	21.01	23.09	+/- 0.15	TiO2	38.51	1.938
Th-M	0.0027	1.089	0.05	0.29	+/- 0.17	ThO2	0.33	0.005
U -M	0.4243	1.078	8.37	45.74	+/- 0.46	UO2	51.88	0.772
Al-K	0.0005	2.828	0.24	0.15	+/- 0.03	Al2O3	0.28	0.022
Y -L	0.0025	1.649	0.20	0.41	+/- 0.06	Y2O3	0.52	0.019
Ce-L	0.0000	1.384	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0008	1.427	0.03	0.11	+/- 0.13	Nd2O3	0.13	0.003
Sm-L	0.0013	1.394	0.05	0.18	+/- 0.13	Sm2O3	0.21	0.005
Gd-L	0.0001	1.360	0.01	0.02	+/- 0.15	Gd2O3	0.02	0.000
Ca-K	0.0184	1.199	2.40	2.21	+/- 0.04	CaO	3.09	0.222
Mn-K	0.0034	1.255	0.34	0.42	+/- 0.07	MnO	0.55	0.031
Fe-K	0.0141	1.167	1.28	1.64	+/- 0.12	FeO	2.11	0.118
Pb-M	0.0092	1.254	0.24	1.16	+/- 0.18	PbO	1.25	0.022
Ni-K	0.0042	1.063	0.33	0.44	+/- 0.06	NiO	0.56	0.030
O -K	---	6.075	65.05	23.88 S	---	---	---	---
Total			100.00	100.00			100.00	3.224

The number of cation results are based upon 6 Oxygen atom

99030 B8 brannerite pt1 gr3

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=38.95 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0014	2.090	0.45	0.29	+/- 0.03	SiO2	0.62	0.042
Ti-K	0.1651	1.379	20.82	22.78	+/- 0.15	TiO2	37.99	1.921
Th-M	0.0020	1.089	0.04	0.22	+/- 0.16	ThO2	0.25	0.004
U -M	0.4277	1.078	8.48	46.10	+/- 0.30	UO2	52.30	0.782
Al-K	0.0004	2.832	0.17	0.10	+/- 0.03	Al2O3	0.19	0.015
Y -L	0.0033	1.653	0.27	0.54	+/- 0.06	Y2O3	0.68	0.024
Ce-L	0.0000	1.386	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0008	1.427	0.03	0.11	+/- 0.13	Nd2O3	0.13	0.003
Sm-L	0.0013	1.393	0.05	0.18	+/- 0.13	Sm2O3	0.21	0.005
Gd-L	0.0019	1.359	0.07	0.26	+/- 0.16	Gd2O3	0.30	0.007
Ca-K	0.0196	1.200	2.57	2.36	+/- 0.04	CaO	3.30	0.238
Mn-K	0.0037	1.254	0.37	0.46	+/- 0.07	MnO	0.59	0.034
Fe-K	0.0116	1.166	1.06	1.35	+/- 0.06	FeO	1.74	0.098
Pb-M	0.0080	1.258	0.21	1.00	+/- 0.11	PbO	1.08	0.020
Ni-K	0.0044	1.062	0.35	0.47	+/- 0.06	NiO	0.60	0.032
O -K	---	6.072	65.05	23.77 S	---	---	---	---
Total			100.00	100.00			100.00	3.224

The number of cation results are based upon 6 Oxygen atoms

99030 B8 brannerite pt1 gr4

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=38.95 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0003	2.079	0.11	0.07	+/- 0.03	SiO2	0.15	0.010
Ti-K	0.1715	1.382	21.86	23.71	+/- 0.11	TiO2	39.55	2.004
Th-M	0.0039	1.087	0.08	0.43	+/- 0.16	ThO2	0.49	0.007
U -M	0.4342	1.077	8.67	46.74	+/- 0.31	UO2	53.02	0.795
Al-K	0.0000	2.822	0.02	0.01	+/- 0.03	Al2O3	0.02	0.001
Y -L	0.0034	1.641	0.28	0.56	+/- 0.06	Y2O3	0.71	0.025
Ce-L	0.0004	1.372	0.02	0.05	+/- 0.15	Ce2O3	0.06	0.001
Nd-L	0.0012	1.432	0.05	0.17	+/- 0.14	Nd2O3	0.19	0.005
Sm-L	0.0000	1.392	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0007	1.362	0.03	0.10	+/- 0.15	Gd2O3	0.12	0.003
Ca-K	0.0172	1.202	2.28	2.06	+/- 0.04	CaO	2.89	0.209
Mn-K	0.0035	1.257	0.36	0.45	+/- 0.07	MnO	0.58	0.033
Fe-K	0.0023	1.168	0.22	0.27	+/- 0.05	FeO	0.35	0.020
Pb-M	0.0101	1.251	0.27	1.26	+/- 0.11	PbO	1.35	0.025
Ni-K	0.0039	1.059	0.31	0.41	+/- 0.06	NiO	0.52	0.028
O -K	---	6.132	65.46	23.71 S	---	---	---	---
Total			100.00	100.00			100.00	3.166

The number of cation results are based upon 6 Oxygen atoms

Thu Mar 11 11:09:30 1999

99030 B8 brannerite pt1 gr5

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=38.95 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0020	2.081	0.62	0.41	+/- 0.03	SiO2	0.89	0.057
Ti-K	0.1856	1.352	22.03	25.10	+/- 0.11	TiO2	41.86	2.023
Th-M	0.0023	1.098	0.05	0.26	+/- 0.16	ThO2	0.29	0.004
U -M	0.3835	1.086	7.36	41.63	+/- 0.29	UO2	47.23	0.675
Al-K	0.0003	2.812	0.15	0.09	+/- 0.04	Al2O3	0.18	0.013
Y -L	0.0077	1.651	0.60	1.27	+/- 0.07	Y2O3	1.62	0.055
Ce-L	0.0017	1.350	0.07	0.23	+/- 0.16	Ce2O3	0.26	0.006
Nd-L	0.0066	1.422	0.28	0.94	+/- 0.15	Nd2O3	1.10	0.025
Sm-L	0.0025	1.390	0.10	0.34	+/- 0.14	Sm2O3	0.40	0.009
Gd-L	0.0042	1.359	0.15	0.57	+/- 0.17	Gd2O3	0.66	0.014
Ca-K	0.0150	1.186	1.87	1.78	+/- 0.04	CaO	2.49	0.171
Mn-K	0.0036	1.253	0.34	0.45	+/- 0.07	MnO	0.58	0.031
Fe-K	0.0066	1.169	0.58	0.77	+/- 0.06	FeO	1.00	0.054
Pb-M	0.0071	1.269	0.18	0.91	+/- 0.11	PbO	0.98	0.017
Ni-K	0.0035	1.069	0.27	0.37	+/- 0.06	NiO	0.47	0.024
O -K	---	6.212	65.36	24.87 S	---	---	---	---
Total			100.00	100.00			100.00	3.180

The number of cation results are based upon 6 Oxygen atoms

Fri Apr 9 15:09:45 1999

8B brannerite altered midgrey P4188 pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0028	2.134	0.66	0.61	+/- 0.04	SiO2	1.30	0.061
Ti-K	0.3616	1.217	28.29	44.03	+/- 0.13	TiO2	73.44	2.584
Th-M	0.0093	1.020	0.13	0.95	+/- 0.12	ThO2	1.08	0.011
U -M	0.1265	1.016	1.66	12.86	+/- 0.26	UO2	14.58	0.152
Al-K	0.0014	2.950	0.48	0.42	+/- 0.03	Al2O3	0.79	0.044
Y -L	0.0000	1.576	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0000	1.230	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.462	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0006	1.423	0.02	0.09	+/- 0.09	Sm2O3	0.11	0.002
Gd-L	0.0000	2.439	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0051	1.084	0.43	0.56	+/- 0.05	CaO	0.78	0.039
Mn-K	0.0002	1.319	0.01	0.02	+/- 0.04	MnO	0.03	0.001
Fe-K	0.0265	1.237	1.81	3.28	+/- 0.10	FeO	4.22	0.165
Pb-M	0.0134	1.158	0.23	1.56	+/- 0.15	PbO	1.68	0.021
Na-K	0.0000	4.965	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Nb-L	0.0017	1.362	0.08	0.23	+/- 0.05	Nb2O5	0.32	0.007
P -K	0.0000	1.740	0.00	0.00	+/- 0.00	P2O5	0.00	0.000
As-L	0.0043	2.954	0.52	1.27	+/- 0.09	As2O3	1.67	0.048
O -K	---	8.469	65.68	34.14 S	---	---	---	---
Total			100.00	100.00			100.00	3.135

The number of cation results are based upon 6 Oxygen atoms

Fri Apr 9 15:27:44 1999

8B brannerite altered midgrey P4188 pt2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0048	2.186	1.19	1.04	+/- 0.03	SiO2	2.23	0.109
Ti-K	0.3148	1.263	26.66	39.76	+/- 0.12	TiO2	66.33	2.441
Th-M	0.0082	1.044	0.12	0.86	+/- 0.12	ThO2	0.98	0.011
U -M	0.1648	1.041	2.31	17.15	+/- 0.17	UO2	19.46	0.212
Al-K	0.0021	3.000	0.74	0.62	+/- 0.07	Al2O3	1.17	0.068
Y -L	0.0000	1.621	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0000	1.269	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0003	1.455	0.01	0.05	+/- 0.09	Nd2O3	0.06	0.001
Sm-L	0.0000	1.431	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0000	2.449	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0067	1.130	0.61	0.76	+/- 0.05	CaO	1.06	0.055
Mn-K	0.0000	1.324	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0242	1.233	1.72	2.99	+/- 0.10	FeO	3.84	0.157
Pb-M	0.0203	1.186	0.37	2.41	+/- 0.18	PbO	2.60	0.034
Na-K	0.0000	4.997	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Nb-L	0.0007	1.398	0.04	0.10	+/- 0.09	Nb2O5	0.15	0.003
P -K	0.0000	1.798	0.00	0.00	+/- 0.04	P2O5	0.01	0.000
As-L	0.0054	2.966	0.69	1.61	+/- 0.11	As2O3	2.13	0.063
O -K	---	8.006	65.53	32.64 S	---	---	---	---
Total			100.00	100.00			100.00	3.156

The number of cation results are based upon 6 Oxygen atoms

Fri Apr 9 15:37:39 1999

8B brannerite altered litgrey P4188 pt3

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0186	2.303	5.65	4.28	+/- 0.06	SiO2	9.15	0.520
Ti-K	0.1708	1.413	18.68	24.13	+/- 0.10	TiO2	40.25	1.721
Th-M	0.0127	1.143	0.23	1.46	+/- 0.16	ThO2	1.66	0.021
U -M	0.2480	1.142	4.41	28.33	+/- 0.39	UO2	32.13	0.407
Al-K	0.0007	3.131	0.32	0.23	+/- 0.04	Al2O3	0.44	0.030
Y -L	0.0000	1.761	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0027	1.364	0.10	0.37	+/- 0.13	Ce2O3	0.44	0.009
Nd-L	0.0000	1.472	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0000	1.429	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0000	2.434	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0169	1.284	2.01	2.17	+/- 0.04	CaO	3.03	0.185
Mn-K	0.0000	1.318	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0044	1.216	0.36	0.54	+/- 0.05	FeO	0.69	0.033
Pb-M	0.0508	1.285	1.17	6.53	+/- 0.24	PbO	7.03	0.108
Na-K	0.0000	4.755	0.01	0.01	+/- 0.05	Na2O	0.01	0.001
Nb-L	0.0005	1.529	0.03	0.07	+/- 0.11	Nb2O5	0.10	0.003
P -K	0.0003	1.977	0.07	0.06	+/- 0.05	P2O5	0.14	0.007
As-L	0.0127	2.923	1.84	3.73	+/- 0.11	As2O3	4.92	0.170
O -K	---	6.841	65.12	28.10 S	---	---	---	---
Total			100.00	100.00			100.00	3.213

The number of cation results are based upon 6 Oxygen atoms

Fri Apr 9 15:53:03 1999

8B brannerite altered litgrey P4188 pt4

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0186	2.314	5.64	4.31	+/- 0.08	SiO2	9.22	0.520
Ti-K	0.1722	1.408	18.58	24.23	+/- 0.14	TiO2	40.42	1.713
Th-M	0.0134	1.138	0.24	1.53	+/- 0.15	ThO2	1.74	0.022
U -M	0.2448	1.135	4.29	27.78	+/- 0.23	UO2	31.51	0.395
Al-K	0.0003	3.152	0.11	0.08	+/- 0.04	Al2O3	0.16	0.010
Y -L	0.0002	1.809	0.02	0.04	+/- 0.08	Y2O3	0.05	0.002
Ce-L	0.0022	1.361	0.08	0.30	+/- 0.14	Ce2O3	0.35	0.007
Nd-L	0.0006	1.453	0.02	0.09	+/- 0.12	Nd2O3	0.11	0.002
Sm-L	0.0000	1.430	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0000	2.427	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0201	1.275	2.34	2.56	+/- 0.04	CaO	3.58	0.216
Mn-K	0.0000	1.319	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0033	1.216	0.27	0.41	+/- 0.05	FeO	0.52	0.025
Pb-M	0.0438	1.290	1.00	5.65	+/- 0.16	PbO	6.09	0.092
Na-K	0.0000	4.946	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Nb-L	0.0009	1.536	0.06	0.14	+/- 0.11	Nb2O5	0.20	0.005
P -K	0.0004	1.986	0.09	0.08	+/- 0.05	P2O5	0.18	0.008
As-L	0.0153	2.904	2.18	4.45	+/- 0.11	As2O3	5.87	0.201
O -K	---	6.910	65.09	28.36 S	---	---	---	---
Total			100.00	100.00			100.00	3.219

The number of cation results are based upon 6 Oxygen atoms

Fri Apr 9 16:04:44 1999

8B brannerite altered litgrey P4188 pt5

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0206	2.358	6.46	4.87	+/- 0.08	SiO2	10.42	0.597
Ti-K	0.1536	1.420	16.98	21.82	+/- 0.14	TiO2	36.40	1.568
Th-M	0.0154	1.150	0.28	1.77	+/- 0.16	ThO2	2.02	0.026
U -M	0.2521	1.145	4.52	28.86	+/- 0.25	UO2	32.74	0.417
Al-K	0.0009	3.195	0.38	0.28	+/- 0.06	Al2O3	0.52	0.035
Y -L	0.0006	1.854	0.05	0.12	+/- 0.09	Y2O3	0.15	0.005
Ce-L	0.0032	1.371	0.12	0.43	+/- 0.14	Ce2O3	0.51	0.011
Nd-L	0.0022	1.447	0.08	0.31	+/- 0.12	Nd2O3	0.36	0.007
Sm-L	0.0000	1.426	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0000	2.430	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0188	1.292	2.26	2.43	+/- 0.08	CaO	3.40	0.209
Mn-K	0.0000	1.315	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0023	1.212	0.19	0.28	+/- 0.05	FeO	0.36	0.017
Pb-M	0.0419	1.315	0.99	5.51	+/- 0.17	PbO	5.94	0.092
Na-K	0.0000	4.949	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Nb-L	0.0008	1.570	0.05	0.13	+/- 0.12	Nb2O5	0.19	0.005
P -K	0.0000	2.033	0.01	0.01	+/- 0.05	P2O5	0.01	0.001
As-L	0.0183	2.892	2.63	5.29	+/- 0.26	As2O3	6.99	0.243
O -K	---	6.726	64.99	27.89 S	---	---	---	---
Total			100.00	100.00			100.00	3.233

The number of cation results are based upon 6 Oxygen atoms

000637

Wed Mar 17 12:11:11 1999

B9-brannerite-grain1-pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=29.58 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0004	2.423	0.15	0.10	+/- 0.04	SiO2	0.21	0.014
Ti-K	0.1623	1.511	22.75	24.53	+/- 0.17	TiO2	40.91	2.063
Th-M	0.0166	1.046	0.33	1.73	+/- 0.34	ThO2	1.97	0.030
U -M	0.4676	1.031	8.99	48.19	+/- 0.35	UO2	54.67	0.816
Al-K	0.0003	3.337	0.14	0.09	+/- 0.04	Al2O3	0.16	0.013
Ce-L	0.0000	1.470	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.512	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0000	1.460	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0000	1.404	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0082	1.303	1.18	1.06	+/- 0.04	CaO	1.49	0.107
Mn-K	0.0000	1.340	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0028	1.234	0.27	0.34	+/- 0.06	FeO	0.44	0.025
Pb-M	0.0011	1.257	0.03	0.13	+/- 0.12	PbO	0.15	0.003
O -K	---	6.425	66.15	23.82 S	---	---	---	---
Total			100.00	100.00			100.00	3.070

The number of cation results are based upon 6 Oxygen atoms

Wed Mar 17 12:27:54 1999

B9-brannerite-grain2-pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=29.58 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.487	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1609	1.516	23.07	24.40	+/- 0.12	TiO2	40.69	2.084
Th-M	0.0143	1.048	0.29	1.50	+/- 0.19	ThO2	1.70	0.026
U -M	0.4816	1.032	9.46	49.70	+/- 0.34	UO2	56.38	0.854
Al-K	0.0001	3.352	0.05	0.03	+/- 0.04	Al2O3	0.05	0.004
Ce-L	0.0000	1.472	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.511	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0001	1.463	0.00	0.01	+/- 0.14	Sm2O3	0.01	0.000
Gd-L	0.0000	1.402	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0028	1.309	0.42	0.37	+/- 0.04	CaO	0.52	0.038
Mn-K	0.0002	1.345	0.03	0.03	+/- 0.06	MnO	0.04	0.002
Fe-K	0.0021	1.232	0.21	0.26	+/- 0.06	FeO	0.33	0.019
Pb-M	0.0020	1.259	0.05	0.25	+/- 0.13	PbO	0.27	0.005
O -K	---	6.355	66.42	23.46 S	---	---	---	---
Total			100.00	100.00			100.00	3.033

The number of cation results are based upon 6 Oxygen atoms

Wed Mar 17 12:43:04 1999

B9-brannerite-grain3-pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=29.58 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0001	2.442	0.04	0.03	+/- 0.04	SiO2	0.05	0.004
Ti-K	0.1608	1.514	23.14	24.35	+/- 0.18	TiO2	40.61	2.087
Th-M	0.0144	1.048	0.30	1.51	+/- 0.21	ThO2	1.72	0.027
U -M	0.4844	1.031	9.56	49.97	+/- 0.53	UO2	56.68	0.862
Al-K	0.0000	3.431	0.00	0.00	+/- 0.00	Al2O3	0.00	0.000
Ce-L	0.0004	1.432	0.02	0.06	+/- 0.17	Ce2O3	0.07	0.002
Nd-L	0.0011	1.511	0.05	0.16	+/- 0.16	Nd2O3	0.19	0.005
Sm-L	0.0000	1.457	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0009	1.410	0.04	0.13	+/- 0.17	Gd2O3	0.15	0.003
Ca-K	0.0006	1.309	0.08	0.07	+/- 0.04	CaO	0.10	0.008
Mn-K	0.0001	1.343	0.01	0.02	+/- 0.07	MnO	0.02	0.001
Fe-K	0.0019	1.231	0.19	0.24	+/- 0.06	FeO	0.31	0.018
Pb-M	0.0007	1.264	0.02	0.09	+/- 0.13	PbO	0.09	0.002
O -K	---	6.321	66.55	23.39 S	---	---	---	---
Total			100.00	100.00			100.00	3.016

The number of cation results are based upon 6 Oxygen atoms

Wed Mar 17 15:40:32 1999

B9-brannerite-grain5-pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=29.58 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.494	0.00	0.00	+/- 0.04	SiO2	0.00	0.000
Ti-K	0.1627	1.510	23.25	24.56	+/- 0.17	TiO2	40.97	2.098
Th-M	0.0147	1.049	0.30	1.54	+/- 0.18	ThO2	1.75	0.027
U -M	0.4776	1.033	9.40	49.35	+/- 0.33	UO2	55.98	0.848
Al-K	0.0000	3.429	0.00	0.00	+/- 0.00	Al2O3	0.00	0.000
Ce-L	0.0000	1.467	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0005	1.509	0.02	0.07	+/- 0.14	Nd2O3	0.08	0.002
Sm-L	0.0010	1.460	0.04	0.14	+/- 0.14	Sm2O3	0.17	0.004
Gd-L	0.0015	1.409	0.06	0.21	+/- 0.13	Gd2O3	0.25	0.006
Ca-K	0.0002	1.307	0.03	0.02	+/- 0.04	CaO	0.03	0.002
Mn-K	0.0000	1.336	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0034	1.230	0.34	0.41	+/- 0.06	FeO	0.53	0.030
Pb-M	0.0017	1.263	0.05	0.22	+/- 0.12	PbO	0.24	0.004
O -K	---	6.331	66.51	23.47 S	---	---	---	---
Total			100.00	100.00			100.00	3.021

The number of cation results are based upon 6 Oxygen atoms

Thu Apr 29 15:55:07 1999

B9-brannerite-grain4-pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=29.58 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.491	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1614	1.512	23.08	24.40	+/- 0.18	TiO2	40.70	2.084
Th-M	0.0171	1.048	0.35	1.79	+/- 0.20	ThO2	2.04	0.032
U -M	0.4778	1.032	9.38	49.29	+/- 0.35	UO2	55.92	0.847
Al-K	0.0002	3.359	0.09	0.05	+/- 0.04	Al2O3	0.10	0.008
Ce-L	0.0000	1.469	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0016	1.510	0.08	0.24	+/- 0.15	Nd2O3	0.28	0.007
Sm-L	0.0000	1.457	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0000	2.673	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0012	1.309	0.18	0.16	+/- 0.04	CaO	0.22	0.016
Mn-K	0.0004	1.343	0.05	0.06	+/- 0.06	MnO	0.07	0.004
Fe-K	0.0031	1.231	0.31	0.38	+/- 0.06	FeO	0.49	0.028
Pb-M	0.0012	1.262	0.03	0.15	+/- 0.13	PbO	0.17	0.003
O -K	---	6.333	66.45	23.46 S	---	---	---	---
Total			100.00	100.00			100.00	3.029

The number of cation results are based upon 6 Oxygen atoms

Fri Mar 19 09:34:47 1999
B10-brannerite-pt1
PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0001	2.383	0.04	0.02	+/- 0.04	SiO2	0.05	0.003
Ti-K	0.1489	1.511	21.18	22.50	+/- 0.16	TiO2	37.54	1.948
Th-M	0.0124	1.074	0.26	1.33	+/- 0.18	ThO2	1.51	0.024
U -M	0.4347	1.064	8.76	46.25	+/- 0.32	UO2	52.47	0.806
Al-K	0.0003	3.275	0.15	0.09	+/- 0.04	Al2O3	0.17	0.014
Y -L	0.0019	1.749	0.17	0.34	+/- 0.07	Y2O3	0.43	0.016
Ce-L	0.0000	1.467	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0011	1.499	0.05	0.17	+/- 0.14	Nd2O3	0.20	0.005
Sm-L	0.0000	1.449	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0010	2.575	0.07	0.25	+/- 0.29	Gd2O3	0.28	0.006
Ca-K	0.0212	1.309	3.12	2.77	+/- 0.10	CaO	3.88	0.287
Mn-K	0.0001	1.333	0.01	0.02	+/- 0.07	MnO	0.02	0.001
Fe-K	0.0039	1.224	0.39	0.48	+/- 0.06	FeO	0.62	0.036
Pb-M	0.0208	1.256	0.57	2.62	+/- 0.13	PbO	2.82	0.052
O -K	---	6.470	65.23	23.15 S	---	---	---	---
Total			100.00	100.00			100.00	3.199

The number of cation results are based upon 6 Oxygen atoms

Fri Mar 19 09:51:50 1999
B10-brannerite-pt2
PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0002	2.368	0.08	0.05	+/- 0.04	SiO2	0.10	0.007
Ti-K	0.1491	1.511	20.92	22.52	+/- 0.16	TiO2	37.56	1.931
Th-M	0.0072	1.076	0.15	0.78	+/- 0.18	ThO2	0.88	0.014
U -M	0.4298	1.067	8.58	45.86	+/- 0.32	UO2	52.03	0.792
Al-K	0.0007	3.252	0.35	0.21	+/- 0.04	Al2O3	0.40	0.033
Y -L	0.0025	1.739	0.21	0.43	+/- 0.07	Y2O3	0.54	0.020
Ce-L	0.0000	1.466	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.500	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0000	1.450	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0001	2.565	0.00	0.02	+/- 0.29	Gd2O3	0.02	0.000
Ca-K	0.0246	1.306	3.57	3.21	+/- 0.05	CaO	4.49	0.329
Mn-K	0.0002	1.334	0.02	0.03	+/- 0.07	MnO	0.03	0.002
Fe-K	0.0049	1.225	0.48	0.60	+/- 0.06	FeO	0.77	0.044
Pb-M	0.0234	1.252	0.63	2.93	+/- 0.14	PbO	3.16	0.058
O -K	---	6.519	65.01	23.37 S	---	---	---	---
Total			100.00	100.00			100.00	3.230

The number of cation results are based upon 6 Oxygen atoms

Fri Mar 19 13:46:01 1999

B10-brannerite-pt3

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0001	2.380	0.05	0.03	+/- 0.03	SiO2	0.06	0.004
Ti-K	0.1504	1.505	21.19	22.63	+/- 0.11	TiO2	37.75	1.951
Th-M	0.0103	1.079	0.21	1.11	+/- 0.17	ThO2	1.26	0.020
U -M	0.4250	1.070	8.56	45.46	+/- 0.31	UO2	51.58	0.789
Al-K	0.0004	3.269	0.22	0.13	+/- 0.04	Al2O3	0.25	0.020
Y -L	0.0023	1.747	0.20	0.40	+/- 0.07	Y2O3	0.51	0.019
Ce-L	0.0000	1.461	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.497	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0022	1.448	0.10	0.32	+/- 0.13	Sm2O3	0.37	0.009
Gd-L	0.0006	2.574	0.04	0.16	+/- 0.28	Gd2O3	0.18	0.004
Ca-K	0.0203	1.308	2.97	2.66	+/- 0.04	CaO	3.72	0.274
Mn-K	0.0006	1.331	0.07	0.08	+/- 0.06	MnO	0.11	0.006
Fe-K	0.0059	1.222	0.58	0.72	+/- 0.06	FeO	0.93	0.053
Pb-M	0.0242	1.256	0.66	3.04	+/- 0.13	PbO	3.27	0.061
O -K	---	6.472	65.15	23.25 S	---	---	---	---
Total			100.00	100.00			100.00	3.210

The number of cation results are based upon 6 Oxygen atoms

Fri Mar 19 14:07:07 1999

B10-brannerite-pt4

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

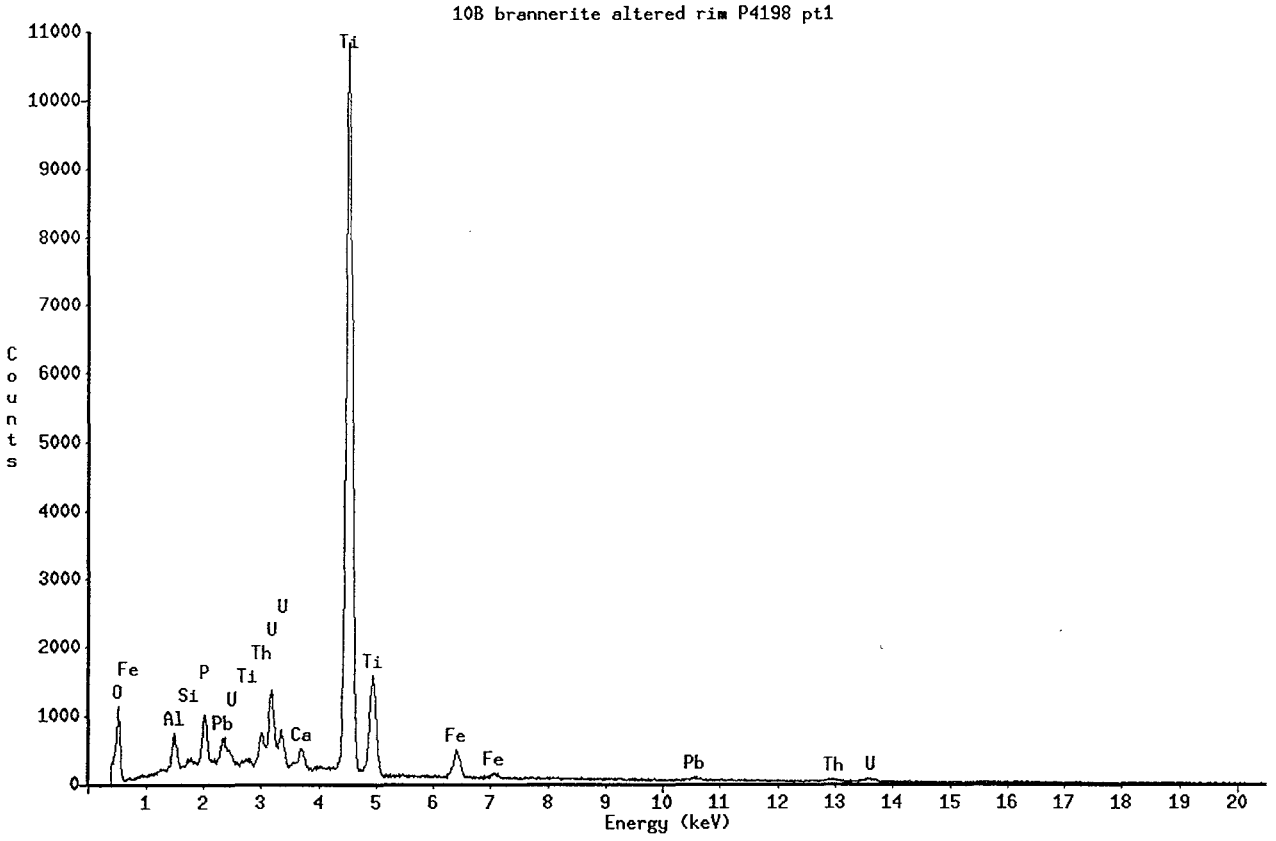
Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.429	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1459	1.510	20.72	22.04	+/- 0.15	TiO2	36.76	1.914
Th-M	0.0067	1.079	0.14	0.73	+/- 0.17	ThO2	0.83	0.013
U -M	0.4310	1.070	8.72	46.11	+/- 0.31	UO2	52.31	0.806
Al-K	0.0005	3.270	0.28	0.17	+/- 0.04	Al2O3	0.32	0.026
Y -L	0.0020	1.747	0.18	0.35	+/- 0.06	Y2O3	0.45	0.016
Ce-L	0.0000	1.465	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.496	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0019	1.448	0.08	0.28	+/- 0.13	Sm2O3	0.32	0.008
Gd-L	0.0002	2.577	0.01	0.04	+/- 0.28	Gd2O3	0.05	0.001
Ca-K	0.0232	1.308	3.41	3.04	+/- 0.05	CaO	4.25	0.315
Mn-K	0.0014	1.331	0.15	0.18	+/- 0.06	MnO	0.24	0.014
Fe-K	0.0071	1.222	0.70	0.86	+/- 0.06	FeO	1.11	0.064
Pb-M	0.0249	1.255	0.68	3.12	+/- 0.13	PbO	3.36	0.063
O -K	---	6.458	64.93	23.07 S	---	---	---	---
Total			100.00	100.00			100.00	3.241

The number of cation results are based upon 6 Oxygen atoms

Fri Mar 19 14:26:18 1999
B10-brannerite-pt5
PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.426	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1488	1.506	20.95	22.40	+/- 0.11	TiO2	37.36	1.934
Th-M	0.0099	1.079	0.21	1.07	+/- 0.17	ThO2	1.22	0.019
U -M	0.4242	1.070	8.54	45.38	+/- 0.31	UO2	51.48	0.788
Al-K	0.0006	3.268	0.30	0.18	+/- 0.04	Al2O3	0.34	0.028
Y -L	0.0017	1.745	0.15	0.30	+/- 0.06	Y2O3	0.39	0.014
Ce-L	0.0000	1.461	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0014	1.495	0.07	0.21	+/- 0.13	Nd2O3	0.25	0.006
Sm-L	0.0007	1.448	0.03	0.10	+/- 0.12	Sm2O3	0.11	0.003
Gd-L	0.0000	2.621	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0217	1.307	3.18	2.84	+/- 0.09	CaO	3.98	0.293
Mn-K	0.0005	1.330	0.05	0.07	+/- 0.05	MnO	0.09	0.005
Fe-K	0.0087	1.223	0.85	1.06	+/- 0.11	FeO	1.37	0.079
Pb-M	0.0253	1.253	0.69	3.18	+/- 0.13	PbO	3.42	0.063
O -K	---	6.463	64.99	23.21 S	---	---	---	---
Total			100.00	100.00			100.00	3.233

The number of cation results are based upon 6 Oxygen atoms



Fri Apr 9 10:33:36 1999
10B brannerite altered rim P4198 pt1
PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0009	2.059	0.19	0.18	+/- 0.03	SiO2	0.39	0.017
Ti-K	0.3643	1.203	26.81	43.81	+/- 0.14	TiO2	73.08	2.440
Th-M	0.0335	1.036	0.44	3.47	+/- 0.22	ThO2	3.95	0.040
U -M	0.0654	1.035	0.83	6.77	+/- 0.15	UO2	7.68	0.076
Al-K	0.0055	2.788	1.65	1.52	+/- 0.06	Al2O3	2.88	0.150
Y -L	0.0000	1.522	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0000	1.216	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.456	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0000	1.423	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0008	2.343	0.04	0.19	+/- 0.16	Gd2O3	0.22	0.003
Ca-K	0.0072	1.091	0.58	0.79	+/- 0.03	CaO	1.10	0.052
Mn-K	0.0000	1.320	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0197	1.237	1.28	2.44	+/- 0.10	FeO	3.14	0.117
Pb-M	0.0249	1.159	0.41	2.89	+/- 0.17	PbO	3.11	0.037
Na-K	0.0000	4.814	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Nb-L	0.0000	1.348	0.00	0.00	+/- 0.00	Nb2O5	0.00	0.000
P -K	0.0115	1.684	1.83	1.94	+/- 0.03	P2O5	4.44	0.167
O -K	---	8.682	65.94	35.99 S	---	---	---	---
Total			100.00	100.00			100.00	3.100

The number of cation results are based upon 6 Oxygen atoms

Fri Apr 9 10:33:36 1999

10B brannerite altered rim P4198 pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0009	2.059	0.19	0.18	+/- 0.03	SiO2	0.39	0.017
Ti-K	0.3643	1.203	26.81	43.81	+/- 0.14	TiO2	73.08	2.440
Th-M	0.0335	1.036	0.44	3.47	+/- 0.22	ThO2	3.95	0.040
U -M	0.0654	1.035	0.83	6.77	+/- 0.15	UO2	7.68	0.076
Al-K	0.0055	2.788	1.65	1.52	+/- 0.06	Al2O3	2.88	0.150
Y -L	0.0000	1.522	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0000	1.216	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.456	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0000	1.423	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0008	2.343	0.04	0.19	+/- 0.16	Gd2O3	0.22	0.003
Ca-K	0.0072	1.091	0.58	0.79	+/- 0.03	CaO	1.10	0.052
Mn-K	0.0000	1.320	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0197	1.237	1.28	2.44	+/- 0.10	FeO	3.14	0.117
Pb-M	0.0249	1.159	0.41	2.89	+/- 0.17	PbO	3.11	0.037
Na-K	0.0000	4.814	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Nb-L	0.0000	1.348	0.00	0.00	+/- 0.00	Nb2O5	0.00	0.000
P -K	0.0115	1.684	1.83	1.94	+/- 0.03	P2O5	4.44	0.167
O -K	---	8.682	65.94	35.99 S	---	---	---	---
Total			100.00	100.00			100.00	3.100

The number of cation results are based upon 6 Oxygen atoms

Fri Apr 9 10:53:45 1999

10B brannerite altered rim P4198 pt2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0007	2.053	0.16	0.15	+/- 0.03	SiO2	0.32	0.014
Ti-K	0.3675	1.200	26.92	44.11	+/- 0.18	TiO2	73.57	2.451
Th-M	0.0271	1.034	0.35	2.80	+/- 0.22	ThO2	3.19	0.032
U -M	0.0682	1.034	0.87	7.06	+/- 0.16	UO2	8.00	0.079
Al-K	0.0053	2.783	1.61	1.48	+/- 0.06	Al2O3	2.80	0.146
Y -L	0.0000	1.517	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0000	1.213	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.456	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0004	1.418	0.01	0.06	+/- 0.10	Sm2O3	0.07	0.001
Gd-L	0.0000	2.377	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0080	1.085	0.63	0.86	+/- 0.03	CaO	1.21	0.057
Mn-K	0.0006	1.317	0.04	0.07	+/- 0.04	MnO	0.09	0.004
Fe-K	0.0200	1.238	1.30	2.47	+/- 0.11	FeO	3.18	0.118
Pb-M	0.0257	1.155	0.42	2.97	+/- 0.18	PbO	3.20	0.038
Na-K	0.0000	4.818	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Nb-L	0.0000	1.344	0.00	0.00	+/- 0.00	Nb2O5	0.00	0.000
P -K	0.0113	1.678	1.80	1.90	+/- 0.04	P2O5	4.36	0.163
O -K	---	8.720	65.90	36.06 S	---	---	---	---
Total			100.00	100.00			100.00	3.104

The number of cation results are based upon 6 Oxygen atoms

Fri Apr 9 11:38:53 1999

10B brannerite altered rim P4198 pt3

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0012	2.047	0.26	0.25	+/- 0.03	SiO2	0.54	0.024
Ti-K	0.3780	1.185	26.80	44.80	+/- 0.18	TiO2	74.72	2.443
Th-M	0.0181	1.027	0.23	1.86	+/- 0.22	ThO2	2.12	0.021
U -M	0.0627	1.026	0.77	6.43	+/- 0.15	UO2	7.30	0.071
Al-K	0.0065	2.762	1.90	1.79	+/- 0.06	Al2O3	3.39	0.173
Y -L	0.0000	1.510	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0000	1.199	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0001	1.443	0.00	0.02	+/- 0.10	Nd2O3	0.02	0.000
Sm-L	0.0000	1.422	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0000	2.375	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0073	1.064	0.56	0.78	+/- 0.05	CaO	1.09	0.051
Mn-K	0.0000	1.319	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0240	1.239	1.53	2.97	+/- 0.10	FeO	3.82	0.139
Pb-M	0.0210	1.154	0.34	2.43	+/- 0.11	PbO	2.61	0.031
Na-K	0.0000	4.808	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Nb-L	0.0000	1.339	0.00	0.00	+/- 0.00	Nb2O5	0.00	0.000
P -K	0.0114	1.676	1.77	1.91	+/- 0.03	P2O5	4.38	0.161
O -K	---	8.851	65.84	36.75 S	---	---	---	---
Total			100.00	100.00			100.00	3.113

The number of cation results are based upon 6 Oxygen atoms

Fri Apr 9 12:02:32 1999

10B brannerite altered vein p4201 pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0011	2.056	0.23	0.23	+/- 0.02	SiO2	0.49	0.021
Ti-K	0.3790	1.184	27.03	44.86	+/- 0.13	TiO2	74.83	2.465
Th-M	0.0219	1.028	0.28	2.25	+/- 0.19	ThO2	2.56	0.026
U -M	0.0602	1.026	0.75	6.17	+/- 0.14	UO2	7.00	0.068
Al-K	0.0054	2.786	1.60	1.50	+/- 0.05	Al2O3	2.83	0.146
Y -L	0.0000	1.515	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0000	1.198	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0008	1.442	0.02	0.12	+/- 0.09	Nd2O3	0.14	0.002
Sm-L	0.0003	1.414	0.01	0.05	+/- 0.09	Sm2O3	0.05	0.001
Gd-L	0.0011	2.348	0.05	0.26	+/- 0.19	Gd2O3	0.30	0.004
Ca-K	0.0066	1.066	0.51	0.70	+/- 0.02	CaO	0.98	0.046
Mn-K	0.0011	1.313	0.08	0.15	+/- 0.05	MnO	0.19	0.007
Fe-K	0.0239	1.237	1.53	2.96	+/- 0.06	FeO	3.81	0.139
Pb-M	0.0210	1.156	0.34	2.42	+/- 0.09	PbO	2.61	0.031
Na-K	0.0001	4.745	0.08	0.06	+/- 0.04	Na2O	0.08	0.007
Nb-L	0.0000	1.340	0.00	0.00	+/- 0.00	Nb2O5	0.00	0.000
P -K	0.0107	1.682	1.68	1.80	+/- 0.03	P2O5	4.14	0.153
O -K	---	8.822	65.81	36.48 S	---	---	---	---
Total			100.00	100.00			100.00	3.117

The number of cation results are based upon 6 Oxygen atoms

Fri Apr 9 12:21:16 1999

10B brannerite altered patch p4202 pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg

Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0073	2.342	2.49	1.70	+/- 0.08	SiO2	3.63	0.228
Ti-K	0.1618	1.458	20.26	23.59	+/- 0.10	TiO2	39.35	1.858
Th-M	0.0076	1.109	0.15	0.85	+/- 0.18	ThO2	0.96	0.014
U -M	0.3498	1.101	6.65	38.51	+/- 0.45	UO2	43.68	0.610
Al-K	0.0017	3.193	0.84	0.55	+/- 0.07	Al2O3	1.04	0.077
Y -L	0.0053	1.763	0.43	0.93	+/- 0.09	Y2O3	1.18	0.039
Ce-L	0.0067	1.395	0.27	0.93	+/- 0.14	Ce2O3	1.09	0.025
Nd-L	0.0048	1.475	0.20	0.71	+/- 0.14	Nd2O3	0.83	0.019
Sm-L	0.0000	1.435	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0006	2.513	0.04	0.15	+/- 0.26	Gd2O3	0.17	0.004
Ca-K	0.0114	1.295	1.52	1.48	+/- 0.08	CaO	2.07	0.139
Mn-K	0.0010	1.322	0.10	0.14	+/- 0.07	MnO	0.18	0.009
Fe-K	0.0063	1.223	0.57	0.77	+/- 0.05	FeO	1.00	0.052
Pb-M	0.0312	1.280	0.79	3.99	+/- 0.16	PbO	4.30	0.073
Na-K	0.0000	5.236	0.00	0.00	+/- 0.00	Na2O	0.00	0.000
Nb-L	0.0005	1.524	0.03	0.07	+/- 0.12	Nb2O5	0.10	0.003
P -K	0.0009	1.937	0.23	0.17	+/- 0.05	P2O5	0.40	0.021
O -K	---	6.527	65.42	25.45 S	---	---	---	---
Total			100.00	100.00			100.00	3.172

The number of cation results are based upon 6 Oxygen atoms

0006337

Wed Mar 24 10:26:11 1999

B11-brannerite-grain1-pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0006	2.410	0.25	0.15	+/- 0.03	SiO2	0.33	0.023
Ti-K	0.1480	1.495	20.74	22.13	+/- 0.10	TiO2	36.91	1.902
Th-M	0.0398	1.068	0.82	4.25	+/- 0.18	ThO2	4.84	0.075
U -M	0.4187	1.051	8.30	44.00	+/- 0.30	UO2	49.92	0.761
Al-K	0.0003	3.309	0.18	0.11	+/- 0.04	Al2O3	0.21	0.017
Y -L	0.0057	1.770	0.51	1.01	+/- 0.07	Y2O3	1.28	0.047
Ce-L	0.0000	1.457	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0014	1.488	0.06	0.21	+/- 0.13	Nd2O3	0.24	0.006
Sm-L	0.0016	1.442	0.07	0.23	+/- 0.13	Sm2O3	0.27	0.006
Gd-L	0.0015	2.598	0.11	0.39	+/- 0.29	Gd2O3	0.45	0.010
Ca-K	0.0110	1.313	1.62	1.45	+/- 0.08	CaO	2.03	0.149
Mn-K	0.0003	1.326	0.04	0.05	+/- 0.07	MnO	0.06	0.003
Fe-K	0.0164	1.219	1.61	2.00	+/- 0.12	FeO	2.58	0.148
Pb-M	0.0024	1.279	0.07	0.30	+/- 0.14	PbO	0.33	0.006
Nb-L	0.0026	1.524	0.19	0.39	+/- 0.08	Nb2O5	0.56	0.017
O -K	---	6.327	65.43	23.32 S	---	---	---	---
Total			100.00	100.00			100.00	3.170

The number of cation results are based upon 6 Oxygen atoms

Wed Mar 24 10:38:11 1999

B11-brannerite-grain1-pt2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0003	2.382	0.12	0.07	+/- 0.05	SiO2	0.16	0.011
Ti-K	0.1573	1.479	21.45	23.27	+/- 0.15	TiO2	38.81	1.961
Th-M	0.0544	1.075	1.11	5.85	+/- 0.20	ThO2	6.66	0.102
U -M	0.3822	1.058	7.50	40.45	+/- 0.47	UO2	45.88	0.686
Al-K	0.0002	3.274	0.13	0.08	+/- 0.04	Al2O3	0.15	0.012
Y -L	0.0091	1.748	0.79	1.59	+/- 0.17	Y2O3	2.01	0.072
Ce-L	0.0019	1.412	0.09	0.27	+/- 0.15	Ce2O3	0.32	0.008
Nd-L	0.0008	1.486	0.04	0.12	+/- 0.14	Nd2O3	0.14	0.003
Sm-L	0.0014	1.439	0.06	0.21	+/- 0.13	Sm2O3	0.24	0.006
Gd-L	0.0012	2.577	0.09	0.32	+/- 0.28	Gd2O3	0.37	0.008
Ca-K	0.0086	1.315	1.25	1.14	+/- 0.08	CaO	1.59	0.114
Mn-K	0.0004	1.324	0.05	0.06	+/- 0.07	MnO	0.07	0.004
Fe-K	0.0131	1.219	1.26	1.59	+/- 0.06	FeO	2.05	0.115
Pb-M	0.0040	1.278	0.11	0.51	+/- 0.14	PbO	0.55	0.010
Nb-L	0.0046	1.522	0.33	0.69	+/- 0.11	Nb2O5	0.99	0.030
O -K	---	6.427	65.63	23.78 S	---	---	---	---
Total			100.00	100.00			100.00	3.141

The number of cation results are based upon 6 Oxygen atoms

Wed Mar 24 10:59:37 1999

B11-brannerite-grain1-pt3

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0002	2.365	0.09	0.06	+/- 0.05	SiO2	0.12	0.008
Ti-K	0.1591	1.478	21.51	23.51	+/- 0.15	TiO2	39.21	1.967
Th-M	0.0569	1.077	1.16	6.13	+/- 0.33	ThO2	6.98	0.106
U -M	0.3739	1.061	7.30	39.66	+/- 0.48	UO2	44.99	0.668
Al-K	0.0003	3.251	0.18	0.11	+/- 0.04	Al2O3	0.21	0.016
Y -L	0.0106	1.736	0.91	1.85	+/- 0.18	Y2O3	2.35	0.083
Ce-L	0.0003	1.410	0.01	0.05	+/- 0.15	Ce2O3	0.05	0.001
Nd-L	0.0019	1.487	0.08	0.28	+/- 0.13	Nd2O3	0.32	0.008
Sm-L	0.0000	1.441	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0008	2.565	0.05	0.19	+/- 0.23	Gd2O3	0.22	0.005
Ca-K	0.0096	1.316	1.39	1.27	+/- 0.08	CaO	1.78	0.127
Mn-K	0.0000	1.323	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0127	1.220	1.22	1.55	+/- 0.06	FeO	2.00	0.111
Pb-M	0.0051	1.276	0.14	0.66	+/- 0.14	PbO	0.71	0.013
Nb-L	0.0049	1.519	0.35	0.74	+/- 0.11	Nb2O5	1.06	0.032
O -K	---	6.478	65.60	23.95 S	---	---	---	---
Total			100.00	100.00			100.00	3.146

The number of cation results are based upon 6 Oxygen atoms

Wed Mar 24 11:15:24 1999

B11-brannerite-grain1-pt4

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0001	2.381	0.04	0.02	+/- 0.04	SiO2	0.05	0.004
Ti-K	0.1553	1.487	21.45	23.09	+/- 0.15	TiO2	38.51	1.961
Th-M	0.0554	1.072	1.14	5.94	+/- 0.20	ThO2	6.76	0.104
U -M	0.3912	1.055	7.72	41.28	+/- 0.48	UO2	46.83	0.706
Al-K	0.0003	3.277	0.17	0.10	+/- 0.04	Al2O3	0.19	0.015
Y -L	0.0094	1.748	0.82	1.64	+/- 0.07	Y2O3	2.08	0.075
Ce-L	0.0016	1.418	0.07	0.22	+/- 0.15	Ce2O3	0.26	0.006
Nd-L	0.0025	1.490	0.12	0.38	+/- 0.14	Nd2O3	0.44	0.011
Sm-L	0.0013	1.442	0.05	0.18	+/- 0.13	Sm2O3	0.21	0.005
Gd-L	0.0000	2.631	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0104	1.318	1.52	1.37	+/- 0.08	CaO	1.91	0.139
Mn-K	0.0000	1.323	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0101	1.221	0.98	1.23	+/- 0.11	FeO	1.58	0.090
Pb-M	0.0044	1.278	0.12	0.56	+/- 0.14	PbO	0.61	0.011
Nb-L	0.0026	1.523	0.19	0.39	+/- 0.09	Nb2O5	0.56	0.017
O -K	---	6.423	65.62	23.59 S	---	---	---	---
Total			100.00	100.00			100.00	3.143

The number of cation results are based upon 6 Oxygen atoms

Wed Mar 24 11:33:50 1999

B11-brannerite-grain1-pt5

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0001	2.386	0.04	0.03	+/- 0.03	SiO2	0.06	0.004
Ti-K	0.1531	1.487	21.04	22.77	+/- 0.11	TiO2	37.98	1.930
Th-M	0.0464	1.071	0.95	4.97	+/- 0.18	ThO2	5.65	0.087
U -M	0.3990	1.054	7.82	42.06	+/- 0.30	UO2	47.71	0.717
Al-K	0.0005	3.280	0.28	0.17	+/- 0.04	Al2O3	0.32	0.026
Y -L	0.0069	1.751	0.60	1.21	+/- 0.07	Y2O3	1.53	0.055
Ce-L	0.0000	1.452	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0024	1.488	0.11	0.35	+/- 0.13	Nd2O3	0.41	0.010
Sm-L	0.0002	1.442	0.01	0.03	+/- 0.13	Sm2O3	0.03	0.001
Gd-L	0.0005	2.587	0.04	0.13	+/- 0.29	Gd2O3	0.15	0.003
Ca-K	0.0117	1.313	1.70	1.54	+/- 0.08	CaO	2.15	0.156
Mn-K	0.0002	1.326	0.02	0.03	+/- 0.07	MnO	0.03	0.002
Fe-K	0.0160	1.220	1.54	1.95	+/- 0.07	FeO	2.50	0.142
Pb-M	0.0037	1.272	0.10	0.47	+/- 0.14	PbO	0.51	0.009
Nb-L	0.0044	1.515	0.32	0.67	+/- 0.08	Nb2O5	0.95	0.029
O -K	---	6.403	65.43	23.64 S	---	---	---	---
Total			100.00	100.00			100.00	3.171

The number of cation results are based upon 6 Oxygen atoms

Wed Mar 24 11:57:07 1999

B11-brannerite-grain2-pt1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.441	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1581	1.478	21.82	23.38	+/- 0.15	TiO2	38.99	1.989
Th-M	0.0534	1.077	1.11	5.75	+/- 0.32	ThO2	6.55	0.101
U -M	0.3890	1.059	7.74	41.20	+/- 0.31	UO2	46.74	0.705
Al-K	0.0001	3.287	0.03	0.02	+/- 0.04	Al2O3	0.04	0.003
Y -L	0.0093	1.755	0.82	1.64	+/- 0.07	Y2O3	2.08	0.075
Ce-L	0.0000	1.445	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0035	1.485	0.16	0.52	+/- 0.13	Nd2O3	0.61	0.015
Sm-L	0.0014	1.438	0.06	0.20	+/- 0.13	Sm2O3	0.23	0.005
Gd-L	0.0015	2.584	0.11	0.40	+/- 0.29	Gd2O3	0.46	0.010
Ca-K	0.0038	1.318	0.56	0.51	+/- 0.08	CaO	0.71	0.051
Mn-K	0.0006	1.322	0.06	0.08	+/- 0.07	MnO	0.10	0.006
Fe-K	0.0130	1.217	1.27	1.58	+/- 0.06	FeO	2.03	0.115
Pb-M	0.0047	1.282	0.13	0.61	+/- 0.14	PbO	0.65	0.012
Nb-L	0.0037	1.528	0.27	0.57	+/- 0.09	Nb2O5	0.81	0.025
O -K	---	6.373	65.84	23.56 S	---	---	---	---
Total			100.00	100.00			100.00	3.113

The number of cation results are based upon 6 Oxygen atoms

Wed Mar 24 12:19:53 1999

B11-brannerite-grain2-pt2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0002	2.379	0.06	0.04	+/- 0.05	SiO2	0.08	0.005
Ti-K	0.1630	1.476	22.09	24.06	+/- 0.11	TiO2	40.13	2.012
Th-M	0.0412	1.079	0.84	4.44	+/- 0.18	ThO2	5.05	0.077
U -M	0.3906	1.062	7.66	41.46	+/- 0.30	UO2	47.04	0.698
Al-K	0.0005	3.265	0.26	0.16	+/- 0.04	Al2O3	0.30	0.023
Y -L	0.0110	1.748	0.95	1.93	+/- 0.18	Y2O3	2.45	0.087
Ce-L	0.0000	1.444	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0031	1.488	0.14	0.47	+/- 0.13	Nd2O3	0.54	0.013
Sm-L	0.0007	1.441	0.03	0.10	+/- 0.13	Sm2O3	0.12	0.003
Gd-L	0.0020	2.561	0.15	0.52	+/- 0.23	Gd2O3	0.60	0.013
Ca-K	0.0059	1.310	0.84	0.77	+/- 0.08	CaO	1.08	0.077
Mn-K	0.0000	1.324	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0075	1.220	0.72	0.92	+/- 0.06	FeO	1.18	0.066
Pb-M	0.0055	1.284	0.15	0.71	+/- 0.14	PbO	0.76	0.014
Nb-L	0.0030	1.530	0.22	0.46	+/- 0.11	Nb2O5	0.66	0.020
O -K	---	6.471	65.88	23.96 S	---	---	---	---
Total			100.00	100.00			100.00	3.108

The number of cation results are based upon 6 Oxygen atoms

Wed Mar 24 12:35:49 1999

B11-brannerite-grain2-pt3

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.432	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1624	1.474	22.05	23.95	+/- 0.15	TiO2	39.95	2.010
Th-M	0.0543	1.075	1.11	5.84	+/- 0.20	ThO2	6.65	0.101
U -M	0.3813	1.057	7.47	40.32	+/- 0.47	UO2	45.73	0.681
Al-K	0.0002	3.273	0.12	0.07	+/- 0.04	Al2O3	0.13	0.011
Y -L	0.0112	1.747	0.97	1.95	+/- 0.14	Y2O3	2.48	0.088
Ce-L	0.0013	1.408	0.06	0.19	+/- 0.15	Ce2O3	0.22	0.005
Nd-L	0.0022	1.486	0.10	0.33	+/- 0.13	Nd2O3	0.38	0.009
Sm-L	0.0017	1.439	0.07	0.25	+/- 0.13	Sm2O3	0.29	0.007
Gd-L	0.0011	2.576	0.08	0.28	+/- 0.23	Gd2O3	0.32	0.007
Ca-K	0.0058	1.313	0.84	0.76	+/- 0.08	CaO	1.06	0.076
Mn-K	0.0000	1.322	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0109	1.219	1.05	1.32	+/- 0.11	FeO	1.70	0.095
Pb-M	0.0036	1.283	0.10	0.46	+/- 0.14	PbO	0.50	0.009
Nb-L	0.0026	1.529	0.19	0.40	+/- 0.09	Nb2O5	0.57	0.017
O -K	---	6.444	65.81	23.88 S	---	---	---	---
Total			100.00	100.00			100.00	3.118

The number of cation results are based upon 6 Oxygen atoms

Wed Mar 24 12:56:53 1999

B11-brannerite-grain2-pt4

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0006	2.379	0.21	0.13	+/- 0.05	SiO2	0.29	0.019
Ti-K	0.1603	1.476	21.86	23.66	+/- 0.11	TiO2	39.46	1.991
Th-M	0.0557	1.079	1.15	6.01	+/- 0.20	ThO2	6.84	0.104
U -M	0.3780	1.062	7.46	40.14	+/- 0.46	UO2	45.54	0.680
Al-K	0.0002	3.266	0.09	0.05	+/- 0.04	Al2O3	0.10	0.008
Y -L	0.0115	1.748	1.00	2.01	+/- 0.17	Y2O3	2.56	0.091
Ce-L	0.0035	1.410	0.16	0.49	+/- 0.15	Ce2O3	0.58	0.014
Nd-L	0.0029	1.486	0.13	0.43	+/- 0.13	Nd2O3	0.50	0.012
Sm-L	0.0003	1.438	0.01	0.05	+/- 0.13	Sm2O3	0.06	0.001
Gd-L	0.0011	2.570	0.08	0.27	+/- 0.22	Gd2O3	0.31	0.007
Ca-K	0.0057	1.318	0.82	0.75	+/- 0.04	CaO	1.04	0.075
Mn-K	0.0000	1.322	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0082	1.219	0.79	1.00	+/- 0.06	FeO	1.28	0.072
Pb-M	0.0057	1.285	0.16	0.73	+/- 0.14	PbO	0.79	0.014
Nb-L	0.0029	1.532	0.21	0.45	+/- 0.11	Nb2O5	0.64	0.020
O -K	---	6.437	65.87	23.81 S	---	---	---	---
Total			100.00	100.00			100.00	3.109

The number of cation results are based upon 6 Oxygen atoms

Wed Mar 24 13:37:08 1999

B11-brannerite-grain2-pt5

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0000	2.427	0.00	0.00	+/- 0.00	SiO2	0.00	0.000
Ti-K	0.1624	1.472	22.01	23.91	+/- 0.16	TiO2	39.88	2.006
Th-M	0.0562	1.078	1.15	6.06	+/- 0.20	ThO2	6.90	0.105
U -M	0.3736	1.061	7.34	39.65	+/- 0.48	UO2	44.98	0.670
Al-K	0.0001	3.265	0.06	0.04	+/- 0.04	Al2O3	0.07	0.006
Y -L	0.0119	1.743	1.03	2.07	+/- 0.15	Y2O3	2.63	0.094
Ce-L	0.0033	1.407	0.15	0.46	+/- 0.16	Ce2O3	0.54	0.013
Nd-L	0.0008	1.485	0.04	0.12	+/- 0.15	Nd2O3	0.13	0.003
Sm-L	0.0025	1.438	0.11	0.36	+/- 0.14	Sm2O3	0.42	0.010
Gd-L	0.0011	2.572	0.08	0.29	+/- 0.30	Gd2O3	0.33	0.007
Ca-K	0.0061	1.315	0.89	0.81	+/- 0.08	CaO	1.13	0.081
Mn-K	0.0002	1.324	0.02	0.02	+/- 0.07	MnO	0.03	0.002
Fe-K	0.0097	1.219	0.93	1.18	+/- 0.06	FeO	1.52	0.085
Pb-M	0.0047	1.284	0.13	0.60	+/- 0.14	PbO	0.65	0.012
Nb-L	0.0036	1.530	0.26	0.55	+/- 0.11	Nb2O5	0.78	0.024
O -K	---	6.460	65.81	23.88 S	---	---	---	---
Total			100.00	100.00			100.00	3.117

The number of cation results are based upon 6 Oxygen atoms

Al TAKED - Brannerite

Fri Mar 26 09:28:06 1999

B11-brannerite-grain1-rim1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0127	2.096	2.96	2.66	+/- 0.04	SiO2	5.69	0.270
Ti-K	0.2466	1.279	20.60	31.53	+/- 0.12	TiO2	52.60	1.879
Th-M	0.1445	1.089	2.12	15.74	+/- 0.19	ThO2	17.91	0.194
U -M	0.0275	1.081	0.39	2.98	+/- 0.17	UO2	3.38	0.036
Al-K	0.0024	2.867	0.79	0.68	+/- 0.04	Al2O3	1.29	0.072
Y -L	0.0000	1.618	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0028	1.276	0.08	0.35	+/- 0.14	Ce2O3	0.41	0.007
Nd-L	0.0007	1.430	0.02	0.11	+/- 0.13	Nd2O3	0.12	0.002
Sm-L	0.0000	1.404	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0003	2.361	0.02	0.08	+/- 0.23	Gd2O3	0.09	0.001
Ca-K	0.0105	1.236	1.01	1.29	+/- 0.06	CaO	1.81	0.092
Mn-K	0.0001	1.299	0.01	0.02	+/- 0.06	MnO	0.02	0.001
Fe-K	0.0373	1.220	2.55	4.55	+/- 0.12	FeO	5.85	0.232
Pb-M	0.0151	1.228	0.28	1.86	+/- 0.25	PbO	2.00	0.026
Nb-L	0.0123	1.451	0.60	1.78	+/- 0.20	Nb2O5	2.54	0.055
P -K	0.0154	1.785	2.77	2.74	+/- 0.07	P2O5	6.29	0.253
O -K	---	7.510	65.79	33.64 S	---	---	---	---
Total			100.00	100.00			100.00	3.119

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry

Wed Mar 24 15:53:09 1999

B11-brannerite-grain1-rim2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0048	2.081	1.04	1.01	+/- 0.03	SiO2	2.16	0.097
Ti-K	0.3433	1.160	24.15	39.83	+/- 0.16	TiO2	66.43	2.238
Th-M	0.0395	1.041	0.51	4.11	+/- 0.22	ThO2	4.68	0.048
U -M	0.0262	1.033	0.33	2.70	+/- 0.14	UO2	3.07	0.031
Al-K	0.0036	2.866	1.12	1.04	+/- 0.06	Al2O3	1.97	0.104
Y -L	0.0000	1.547	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0000	1.174	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.401	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0004	1.379	0.01	0.05	+/- 0.10	Sm2O3	0.06	0.001
Gd-L	0.0005	2.444	0.02	0.11	+/- 0.24	Gd2O3	0.13	0.002
Ca-K	0.0047	1.069	0.36	0.50	+/- 0.02	CaO	0.70	0.034
Mn-K	0.0005	1.284	0.04	0.07	+/- 0.05	MnO	0.09	0.003
Fe-K	0.0884	1.215	5.59	10.75	+/- 0.15	FeO	13.82	0.518
Pb-M	0.0098	1.170	0.16	1.14	+/- 0.21	PbO	1.23	0.015
Nb-L	0.0107	1.377	0.46	1.47	+/- 0.17	Nb2O5	2.11	0.043
P -K	0.0090	1.718	1.45	1.55	+/- 0.05	P2O5	3.55	0.135
O -K	---	8.235	64.74	35.66 S	---	---	---	---
Total			100.00	100.00			100.00	3.267

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry

Wed Mar 24 15:53:58 1999

B11-brannerite-grain1-rim3

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0034	2.069	0.73	0.71	+/- 0.06	SiO2	1.52	0.067
Ti-K	0.3672	1.165	25.68	42.77	+/- 0.18	TiO2	71.34	2.358
Th-M	0.0666	1.013	0.84	6.74	+/- 0.24	ThO2	7.67	0.077
U -M	0.0191	1.005	0.23	1.92	+/- 0.15	UO2	2.18	0.021
Al-K	0.0039	2.840	1.20	1.12	+/- 0.03	Al2O3	2.12	0.110
Y -L	0.0000	1.536	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0000	1.184	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.427	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0000	1.403	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0002	2.420	0.01	0.04	+/- 0.24	Gd2O3	0.05	0.001
Ca-K	0.0041	1.069	0.32	0.44	+/- 0.03	CaO	0.62	0.029
Mn-K	0.0001	1.300	0.01	0.01	+/- 0.05	MnO	0.02	0.001
Fe-K	0.0612	1.227	3.87	7.52	+/- 0.14	FeO	9.67	0.355
Pb-M	0.0000	1.151	0.00	0.00	+/- 0.00	PbO	0.00	0.000
Nb-L	0.0053	1.366	0.22	0.72	+/- 0.09	Nb2O5	1.03	0.020
P -K	0.0097	1.702	1.54	1.66	+/- 0.05	P2O5	3.79	0.141
O -K	---	8.538	65.36	36.35 S	---	---	---	---
Total			100.00	100.00			100.00	3.180

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry

Fri Mar 26 09:30:32 1999

B11-brannerite-grain1-patch1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0031	2.342	1.07	0.72	+/- 0.07	SiO2	1.54	0.097
Ti-K	0.1779	1.452	22.60	25.83	+/- 0.12	TiO2	43.08	2.054
Th-M	0.0492	1.081	0.96	5.32	+/- 0.19	ThO2	6.05	0.087
U -M	0.3472	1.067	6.53	37.05	+/- 0.29	UO2	42.03	0.593
Al-K	0.0000	3.220	0.01	0.01	+/- 0.04	Al2O3	0.01	0.001
Y -L	0.0077	1.737	0.63	1.34	+/- 0.09	Y2O3	1.70	0.057
Ce-L	0.0011	1.392	0.04	0.15	+/- 0.16	Ce2O3	0.17	0.004
Nd-L	0.0035	1.486	0.15	0.52	+/- 0.15	Nd2O3	0.60	0.014
Sm-L	0.0011	1.439	0.05	0.16	+/- 0.14	Sm2O3	0.19	0.004
Gd-L	0.0003	2.547	0.02	0.07	+/- 0.30	Gd2O3	0.09	0.002
Ca-K	0.0033	1.301	0.45	0.43	+/- 0.04	CaO	0.60	0.041
Mn-K	0.0004	1.325	0.05	0.06	+/- 0.07	MnO	0.08	0.004
Fe-K	0.0085	1.223	0.78	1.04	+/- 0.06	FeO	1.34	0.071
Pb-M	0.0124	1.269	0.32	1.57	+/- 0.23	PbO	1.70	0.029
Nb-L	0.0030	1.510	0.21	0.46	+/- 0.12	Nb2O5	0.66	0.019
P -K	0.0004	1.908	0.10	0.07	+/- 0.05	P2O5	0.16	0.009
O -K	---	6.571	66.03	25.20 S	---	---	---	---
Total			100.00	100.00			100.00	3.086

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry

000637

Fri Mar 26 09:31:06 1999

B11-brannerite-grain1-patch2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0034	2.353	1.18	0.79	+/- 0.07	SiO2	1.69	0.107
Ti-K	0.1731	1.456	22.17	25.21	+/- 0.11	TiO2	42.05	2.012
Th-M	0.0447	1.086	0.88	4.85	+/- 0.33	ThO2	5.52	0.080
U -M	0.3528	1.072	6.69	37.81	+/- 0.47	UO2	42.89	0.607
Al-K	0.0001	3.228	0.04	0.02	+/- 0.04	Al2O3	0.05	0.003
Y -L	0.0064	1.747	0.53	1.12	+/- 0.09	Y2O3	1.43	0.048
Ce-L	0.0017	1.395	0.07	0.24	+/- 0.16	Ce2O3	0.28	0.006
Nd-L	0.0020	1.484	0.09	0.30	+/- 0.14	Nd2O3	0.35	0.008
Sm-L	0.0012	1.438	0.05	0.18	+/- 0.13	Sm2O3	0.21	0.005
Gd-L	0.0022	2.536	0.15	0.56	+/- 0.29	Gd2O3	0.65	0.014
Ca-K	0.0031	1.304	0.43	0.41	+/- 0.04	CaO	0.57	0.039
Mn-K	0.0006	1.324	0.06	0.07	+/- 0.07	MnO	0.10	0.005
Fe-K	0.0070	1.222	0.64	0.85	+/- 0.06	FeO	1.10	0.058
Pb-M	0.0127	1.274	0.33	1.62	+/- 0.23	PbO	1.75	0.030
Nb-L	0.0042	1.516	0.29	0.63	+/- 0.12	Nb2O5	0.90	0.026
P -K	0.0011	1.920	0.28	0.21	+/- 0.05	P2O5	0.47	0.025
O -K	---	6.537	66.12	25.11 S	---	---	---	---
Total			100.00	100.00			100.00	3.075

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry

Fri Mar 26 09:47:09 1999

B11-brannerite-grain2-rim1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0082	2.104	1.91	1.73	+/- 0.03	SiO2	3.71	0.177
Ti-K	0.3033	1.221	24.00	37.03	+/- 0.12	TiO2	61.77	2.213
Th-M	0.0952	1.061	1.35	10.11	+/- 0.24	ThO2	11.50	0.125
U -M	0.0355	1.056	0.49	3.75	+/- 0.29	UO2	4.25	0.045
Al-K	0.0017	2.910	0.56	0.48	+/- 0.06	Al2O3	0.91	0.051
Y -L	0.0008	1.595	0.04	0.12	+/- 0.08	Y2O3	0.16	0.004
Ce-L	0.0000	1.233	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0006	1.417	0.02	0.08	+/- 0.10	Nd2O3	0.10	0.002
Sm-L	0.0000	1.396	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0001	2.432	0.01	0.03	+/- 0.22	Gd2O3	0.04	0.001
Ca-K	0.0032	1.158	0.29	0.37	+/- 0.02	CaO	0.52	0.026
Mn-K	0.0002	1.292	0.01	0.02	+/- 0.05	MnO	0.03	0.001
Fe-K	0.0666	1.216	4.50	8.09	+/- 0.13	FeO	10.41	0.415
Pb-M	0.0195	1.184	0.35	2.31	+/- 0.14	PbO	2.49	0.032
Nb-L	0.0099	1.395	0.46	1.38	+/- 0.17	Nb2O5	1.98	0.043
P -K	0.0053	1.758	0.93	0.93	+/- 0.05	P2O5	2.13	0.086
O -K	---	7.805	65.08	33.54 S	---	---	---	---
Total			100.00	100.00			100.00	3.219

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry

Fri Mar 26 10:04:49 1999

B11-brannerite-grain2-rim2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0083	2.131	1.95	1.78	+/- 0.03	SiO2	3.80	0.182
Ti-K	0.2977	1.200	22.96	35.72	+/- 0.15	TiO2	59.58	2.141
Th-M	0.0990	1.055	1.39	10.44	+/- 0.15	ThO2	11.88	0.129
U -M	0.0157	1.050	0.21	1.65	+/- 0.14	UO2	1.88	0.020
Al-K	0.0020	2.952	0.68	0.60	+/- 0.03	Al2O3	1.13	0.064
Y -L	0.0000	1.604	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0000	1.213	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.401	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0000	1.380	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0006	2.476	0.03	0.16	+/- 0.24	Gd2O3	0.18	0.003
Ca-K	0.0031	1.144	0.27	0.35	+/- 0.02	CaO	0.49	0.025
Mn-K	0.0008	1.279	0.06	0.10	+/- 0.05	MnO	0.13	0.005
Fe-K	0.0981	1.207	6.53	11.84	+/- 0.15	FeO	15.23	0.609
Pb-M	0.0189	1.192	0.33	2.25	+/- 0.20	PbO	2.43	0.031
Nb-L	0.0048	1.406	0.22	0.67	+/- 0.11	Nb2O5	0.96	0.021
P -K	0.0057	1.777	1.01	1.02	+/- 0.05	P2O5	2.33	0.094
O -K	---	7.577	64.36	33.44 S	---	---	---	---
Total			100.00	100.00			100.00	3.323

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry

Fri Mar 26 10:21:19 1999

B11-brannerite-grain2-rim3

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0045	2.051	0.94	0.92	+/- 0.03	SiO2	1.96	0.086
Ti-K	0.3752	1.158	26.06	43.43	+/- 0.16	TiO2	72.44	2.393
Th-M	0.0510	1.025	0.65	5.23	+/- 0.21	ThO2	5.95	0.059
U -M	0.0179	1.018	0.22	1.82	+/- 0.25	UO2	2.07	0.020
Al-K	0.0037	2.819	1.11	1.04	+/- 0.06	Al2O3	1.97	0.102
Y -L	0.0000	1.524	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0000	1.175	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.424	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0002	1.395	0.01	0.03	+/- 0.10	Sm2O3	0.03	0.000
Gd-L	0.0002	2.407	0.01	0.05	+/- 0.17	Gd2O3	0.06	0.001
Ca-K	0.0029	1.062	0.22	0.31	+/- 0.05	CaO	0.43	0.020
Mn-K	0.0000	1.302	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0606	1.226	3.82	7.43	+/- 0.12	FeO	9.55	0.351
Pb-M	0.0073	1.151	0.12	0.84	+/- 0.13	PbO	0.90	0.011
Nb-L	0.0102	1.351	0.43	1.38	+/- 0.15	Nb2O5	1.97	0.039
P -K	0.0069	1.694	1.08	1.17	+/- 0.05	P2O5	2.67	0.099
O -K	---	8.657	65.34	36.37 S	---	---	---	---
Total			100.00	100.00			100.00	3.182

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry

Fri Mar 26 10:42:16 1999

B11-brannerite-grain2-vein1

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 4

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0083	2.130	1.94	1.77	+/- 0.03	SiO2	3.78	0.180
Ti-K	0.2950	1.222	23.22	36.04	+/- 0.15	TiO2	60.11	2.147
Th-M	0.0905	1.046	1.26	9.47	+/- 0.25	ThO2	10.78	0.116
U -M	0.0515	1.039	0.69	5.35	+/- 0.16	UO2	6.07	0.064
Al-K	0.0019	2.949	0.63	0.55	+/- 0.06	Al2O3	1.03	0.058
Y -L	0.0000	1.612	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0000	1.234	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.420	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0000	1.395	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0001	2.465	0.01	0.03	+/- 0.18	Gd2O3	0.03	0.000
Ca-K	0.0036	1.148	0.32	0.42	+/- 0.03	CaO	0.59	0.030
Mn-K	0.0000	1.294	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0789	1.216	5.30	9.60	+/- 0.13	FeO	12.35	0.490
Pb-M	0.0087	1.198	0.15	1.04	+/- 0.13	PbO	1.12	0.014
Nb-L	0.0055	1.413	0.26	0.78	+/- 0.10	Nb2O5	1.12	0.024
P -K	0.0074	1.778	1.31	1.32	+/- 0.05	P2O5	3.02	0.121
O -K	---	7.633	64.90	33.64 S	---	---	---	---
Total			100.00	100.00			100.00	3.246

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry

Fri Mar 26 10:58:35 1999

B11-brannerite-grain1-vein2

PROZA Correction Acc.Volt.= 25 kV Take-off Angle=30.00 deg
Number of Iterations = 5

Element	k-ratio (calc.)	ZAF	Atom %	Element Wt %	Wt % Err. (1-Sigma)	Compound Formula	Compound Wt %	No. of Cations
Si-K	0.0177	2.076	3.54	3.68	+/- 0.04	SiO2	7.86	0.328
Ti-K	0.3474	1.143	22.42	39.71	+/- 0.15	TiO2	66.23	2.079
Th-M	0.0073	1.031	0.09	0.75	+/- 0.10	ThO2	0.85	0.008
U -M	0.0334	1.021	0.39	3.41	+/- 0.10	UO2	3.87	0.036
Al-K	0.0112	2.746	3.08	3.07	+/- 0.07	Al2O3	5.81	0.286
Y -L	0.0000	1.577	0.00	0.00	+/- 0.00	Y2O3	0.00	0.000
Ce-L	0.0000	1.154	0.00	0.00	+/- 0.00	Ce2O3	0.00	0.000
Nd-L	0.0000	1.401	0.00	0.00	+/- 0.00	Nd2O3	0.00	0.000
Sm-L	0.0000	1.389	0.00	0.00	+/- 0.00	Sm2O3	0.00	0.000
Gd-L	0.0000	2.433	0.00	0.00	+/- 0.00	Gd2O3	0.00	0.000
Ca-K	0.0029	1.030	0.20	0.30	+/- 0.04	CaO	0.42	0.019
Mn-K	0.0000	1.294	0.00	0.00	+/- 0.00	MnO	0.00	0.000
Fe-K	0.0776	1.222	4.60	9.49	+/- 0.12	FeO	12.21	0.426
Pb-M	0.0000	1.166	0.00	0.00	+/- 0.00	PbO	0.00	0.000
Nb-L	0.0021	1.417	0.09	0.30	+/- 0.07	Nb2O5	0.43	0.008
P -K	0.0056	1.793	0.88	1.00	+/- 0.04	P2O5	2.30	0.081
O -K	---	8.440	64.71	38.28 S	---	---	---	---
Total			100.00	100.00			100.00	3.272

The number of cation results are based upon 6 Oxygen atoms
Table Symbols: S -- Wt.% calculated by Stoichiometry