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CERTIFICATE OF ANALYSIS FOR

NICKEL LATERITE ORE REFERENCE MATERIAL

OREAS 191

Constituent	Certified Value	1SD
Fusion XRF		
Nickel, Ni (wt.%)	1.75	0.03
Cobalt, Co (ppm)	665	22
Aluminium oxide, Al_2O_3 (wt.%)	4.27	0.05
Calcium oxide, CaO (wt.%)	0.276	0.007
Chlorine, Cl (ppm)	*<50*	IND
Copper, Cu (ppm)	*~50*	IND
Chromium oxide, Cr_2O_3 (wt.%)	1.224	0.020
Iron oxide, Fe_2O_3 (wt.%)	24.86	0.28
Potassium oxide, K_2O (wt.%)	*<0.01*	IND
Magnesium oxide, MgO (wt.%)	10.06	0.13
Manganese oxide, MnO (wt.%)	0.397	0.007
Sodium oxide, Na_2O (wt.%)	*~0.02*	IND
Phosphorus oxide, P_2O_5 (wt.%)	*<0.01*	IND
Silicon dioxide, SiO_2 (wt.%)	47.97	0.44
Sulphur oxide, SO_3 (wt.%)	*<0.01*	IND
Titanium oxide, TiO_2 (wt.%)	0.052	0.007
Zinc, Zn (ppm)	302	17
Loss on ignition, LOI (wt.%)	8.10	0.40
Fusion ICP		
Nickel, Ni (wt.%)	1.73	0.04
Cobalt, Co (ppm)	652	29
Aluminium oxide, Al_2O_3 (wt.%)	4.19	0.11
Calcium oxide, CaO (wt.%)	0.287	0.015
Copper, Cu (ppm)	*~50*	IND
Chromium oxide, Cr_2O_3 (wt.%)	1.21	0.04
Iron oxide, Fe_2O_3 (wt.%)	24.63	0.78
Potassium oxide, K_2O (wt.%)	*~0.1*	IND
Magnesium oxide, MgO (wt.%)	9.95	0.38
Manganese oxide, MnO (wt.%)	0.397	0.010
Sodium oxide, Na_2O (wt.%)	0.018	0.004
Phosphorus oxide, P_2O_5 (wt.%)	*<0.02*	IND
Silica dioxide, SiO_2 (wt.%)	47.67	1.40
Sulphur oxide, SO_3 (wt.%)	*<0.05*	IND
Titanium oxide, TiO_2 (wt.%)	0.050	0.001
Zinc, Zn (ppm)	297	11
IR Combustion Furnace		
Carbon, C (wt.%)	0.09	0.02
Sulphur, S (wt.%)	*<0.01*	IND

Note: italics - indicative values only; IND - indeterminate.

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INTRODUCTION

OREAS reference materials (RM) are intended to provide a low cost method of evaluating and improving the quality of analysis of geological samples. To the explorationist, they provide an important control in analytical data sets related to exploration from the grass roots level through to resource definition. To the mine geologist, they provide a tool for grade control in routine mining operations. To the analyst, they provide an effective means of calibrating analytical equipment, assessing new techniques and routinely monitoring in-house procedures.

SOURCE MATERIAL

Reference material OREAS 191 is one of a suite of thirteen nickel laterite CRMs (OREAS 182 to OREAS 195) prepared from saprolitic ore source materials. These were supplied by Anglo American Brazil Limitada from the Codemin Nickel Mine located in the state of Goiás and ~300 kms from the port of Santos, Brazil.

COMMINUTION AND HOMOGENISATION PROCEDURES

The material constituting OREAS 191 was prepared in the following manner:

a) drying to constant mass at 105°C;
b) crushing;
c) milling to 99.5% minus 75 microns;
d) homogenisation and bagging into 20kg sublots;
e) collection of 20 representative 300g samples during the bagging stage for the round robin program;
f) packaging into 10g units in laminated foil pouches and 1kg units in wide mouth jars.

ANALYTICAL PROGRAM FOR OREAS 191

OREAS 191 is a nickel laterite reference material prepared by Ore Research & Exploration and has been certified for Ni, Co, Al_2O_3, C, CaO, Cl, Cu, Cr_2O_3, Fe_2O_3, K_2O, MgO, MnO, Na_2O, P_2O_5, SiO_2, S, SO_3, TiO_2, Zn and LOI. Nineteen commercial analytical laboratories participated in the certification program with characterization of this suite of 20 analytes on a dry basis by the following methods:

- Ni, Co, Al_2O_3, CaO, Cl, Cu, Cr_2O_3, Fe_2O_3, K_2O, MgO, MnO, Na_2O, P_2O_5, SiO_2, SO_3, TiO_2 and Zn by lithium borate fusion with X-ray fluorescence (17 laboratories)
- Ni, Co, Al_2O_3, CaO, Cu, Cr_2O_3, Fe_2O_3, K_2O, MgO, MnO, Na_2O, P_2O_5, SiO_2, SO_3, TiO_2 and Zn by lithium borate or sodium peroxide fusion with ICP-OES (12 laboratories)*
- carbon and sulphur by infra-red combustion furnace (11 laboratories)
- loss on ignition (LOI) at 1000°C (18 laboratories)

*Departures from a fusion ICP method were Lab G, which used a modified aqua regia digestion with ICP to determine Ni, Co, Cu, SO_3 and Zn, and Lab H, which used 4-acid digestion ICP to determine Co and Cu.

Due to the hygroscopic nature of nickel laterites, the laboratories were instructed to dry all samples thoroughly at 105°C prior to analysis and place in a desiccator with fresh desiccant. The samples were then to be cooled to room temperature before weighing for analysis. Alternatively, all samples could be corrected to dry basis by allowing the samples to equilibrate to lab atmosphere before weighing for analysis and correction for moisture by determination at 105°C of this property on a separate portion.
For the evaluation program a total of twenty 300g test units were taken at predetermined intervals during the bagging stage and are considered representative of the entire batch. To evaluate and compensate for the effects of batch-to-batch variation at individual laboratories, samples were submitted to the laboratories in three batches of four 20g sample pulps at weekly intervals. The four samples received by each laboratory were obtained by taking two 20g scoop splits from each of two separate 300g test units.
All results, together with uncorrected means, medians, standard deviations, relative standard deviations and percent deviation of lab means from the corrected mean of means (PDM^3) are presented in the Appendix (Tables A2 to A37). The analytical methods employed by each laboratory are given in the table captions and described in Table A1 of the Appendix. The parameter PDM^3 is a measure of laboratory accuracy while the relative standard deviation is an effective measure of analytical precision where homogeneity of the test material has been confirmed.

STATISTICAL EVALUATION OF ANALYTICAL DATA FOR OREAS 191

Certified Value and Confidence Interval

Each batch of results is treated as a separate data set in testing for outliers. The certified value is determined from the mean of lab means after filtering of individual and batch outliers. It is computed according to the formulae

$$\bar{x}_i = \frac{1}{n_i} \sum_{j=1}^{n_i} x_{ij}$$

$$\ddot{x} = \frac{1}{p} \sum_{i=1}^{p} \bar{x}_i$$

where

x_{ij} *is the jth result reported by laboratory i;*
p *is the number of participating laboratories;*
n_i *is the number of results reported by laboratory i;*
$\bar{x}_i$ *is the mean for laboratory i;*
$\ddot{x}$ *is the mean of means.*

The confidence intervals are obtained by calculation of the variance ($\hat{V}$) of the consensus value $(\ddot{x})$ (mean of means) and reference to Student's-*t* distribution with degrees of freedom (p-1).

$$\hat{V}(\ddot{x}) = \frac{1}{p(p-1)} \sum_{i=1}^{p} (\bar{x}_i - \ddot{x})^2$$

$$\text{Confidence Interval} = \ddot{x} \pm t_{1-x/2}(p-1)(\hat{V}(\ddot{x}))^{1/2}$$

where

$t_{1-x/2}(p-1)$ *is the 1-x/2 fractile of the t-distribution with (p-1) degrees of freedom.*

The distribution of the values is assumed to be symmetrical about the mean in the calculation of the confidence interval.

The test for rejection of individual outliers from each laboratory data set is based on *z* scores (rejected if $|z_i| > 2.5$) computed from the robust estimators of location and scale, *T* and *S*, respectively, according to the formulae

$$S = 1.483 \underset{j=1.....n}{\text{median}} / x_j - \underset{i=1.....n}{\text{median}} (x_i) /$$

$$z_i = \frac{x_i - T}{S}$$

where

T is the median value in a data set;
S is the median of all absolute deviations from the sample median multiplied by 1.483, a correction factor to make the estimator consistent with the usual parameter of a normal distribution.

The z-score test is used in combination with a second method of individual outlier detection that determines the percent deviation of the individual value from the median. Outliers in general are selected on the basis of z-scores > 2.5 and with percent deviations > 1.5% (XRF) and > 3.0% (other methods). In certain instances statistician's prerogative has been employed in discriminating outliers.

Each laboratory data set is tested for outlying status based on z-score discrimination and rejected if $|z_i| > 2.5$. After individual and laboratory data set (batch) outliers have been eliminated a non-iterative 3 standard deviation filter is applied, with individual values lying outside this window also relegated to outlying status. Individual outliers and, more rarely, laboratory data sets (batches) deemed to be outlying are shown left justified and in bold in the tabulated results (see Appendix) and have been omitted in the determination of certified values.

The magnitude of the confidence interval is inversely proportional to the number of participating laboratories and interlaboratory agreement. It is a measure of the reliability of the certified value, i.e. the narrower the confidence interval the greater the certainty in the certified value (see Table 1).

Table 1. Certified Values and 95% Confidence Intervals for OREAS 191.

Constituent	Certified Value	95% Confidence Interval	
		Low	High
Fusion XRF			
Nickel, Ni (wt.%)	1.75	1.74	1.77
Cobalt, Co (ppm)	665	655	675
Aluminium oxide, Al_2O_3 (wt.%)	4.27	4.25	4.29
Calcium oxide, CaO (wt.%)	0.276	0.273	0.279
Chlorine, Cl (ppm)	*<50*	IND	IND
Copper, Cu (ppm)	*~50*	IND	IND
Chromium oxide, Cr_2O_3 (wt.%)	1.224	1.215	1.233
Iron oxide, Fe_2O_3 (wt.%)	24.86	24.72	25.00
Potassium oxide, K_2O (wt.%)	*<0.01*	IND	IND
Magnesium oxide, MgO (wt.%)	10.06	9.99	10.12
Manganese oxide, MnO (wt.%)	0.397	0.393	0.401
Sodium oxide, Na_2O (wt.%)	*~0.02*	IND	IND
Phosphorus oxide, P_2O_5 (wt.%)	*<0.01*	IND	IND
Silicon dioxide, SiO_2 (wt.%)	47.97	47.78	48.15
Sulphur oxide, SO_3 (wt.%)	*<0.01*	IND	IND
Titanium oxide, TiO_2 (wt.%)	0.052	0.049	0.055
Zinc, Zn (ppm)	302	291	313
Loss on ignition, LOI (wt.%)	8.10	7.88	8.32
Fusion ICP			
Nickel, Ni (wt.%)	1.73	1.71	1.76
Cobalt, Co (ppm)	652	639	664
Aluminium oxide, Al_2O_3 (wt.%)	4.19	4.14	4.24
Calcium oxide, CaO (wt.%)	0.287	0.278	0.296
Copper, Cu (ppm)	*~50*	IND	IND
Chromium oxide, Cr_2O_3 (wt.%)	1.21	1.20	1.23
Iron oxide, Fe_2O_3 (wt.%)	24.63	24.21	25.06
Potassium oxide, K_2O (wt.%)	*~0.1*	IND	IND
Magnesium oxide, MgO (wt.%)	9.95	9.76	10.13
Manganese oxide, MnO (wt.%)	0.397	0.392	0.402
Sodium oxide, Na_2O (wt.%)	0.018	0.015	0.020
Phosphorus oxide, P_2O_5 (wt.%)	*<0.02*	IND	IND
Silica dioxide, SiO_2 (wt.%)	47.67	46.92	48.43
Sulphur oxide, SO_3 (wt.%)	*<0.05*	IND	IND
Titanium oxide, TiO_2 (wt.%)	0.050	0.049	0.051
Zinc, Zn (ppm)	297	288	305
IR Combustion Furnace			
Carbon, C (wt.%)	0.09	0.07	0.10
Sulphur, S (wt.%)	*<0.01*	IND	IND

Note - italics: indicative value; IND: indeterminate; intervals may appear asymmetric due to rounding.

Statement of Homogeneity

The standard deviation of each laboratory data set includes error due to both the imprecision of the analytical method employed and to possible inhomogeneity of the material analysed. The standard deviation of the pooled individual analyses of all participating laboratories includes error due to the imprecision of each analytical method, to possible inhomogeneity of the material analysed and, in particular, to deficiencies in accuracy of each analytical method. In determining tolerance intervals that component of error attributable to measurement inaccuracy was eliminated by transformation of the individual results of each data set to a common mean (the uncorrected grand mean) according to the formula

$$x'_{ij} = x_{ij} - \bar{x}_i + \frac{\sum_{i=1}^{p} \sum_{j=1}^{n_i} x_{ij}}{\sum_{i=1}^{p} n_i}$$

where

x_{ij} *is the jth raw result reported by laboratory i*;
x'_{ij} *is the jth transformed result reported by laboratory i*;
n_i *is the number of results reported by laboratory i*;
p *is the number of participating laboratories*;
$\bar{x}_i$ *is the raw mean for laboratory i.*

The homogeneity of each constituent was determined from tables of factors for two-sided tolerance limits for normal distributions (ISO 3207) in which

$$\text{Lower limit is } \ddot{x} - k'_2(n, p, 1-\alpha)s''_g$$
$$\text{Upper limit is } \ddot{x} + k'_2(n, p, 1-\alpha)s''_g$$

where

n *is the number of results*;
$1-\alpha$ *is the confidence level*;
p *is the proportion of results expected within the tolerance limits*;
k'_2 *is the factor for two – sided tolerance limits* (m, α *unknown*);
s''_g *is the corrected grand standard deviation.*

The meaning of these tolerance limits may be illustrated for nickel by lithium borate fusion XRF, where 99% of the time at least 95% of subsamples will have concentrations lying between 1.74 and 1.76 wt.%. Put more precisely, this means that if the same number of subsamples were taken and analysed in the same manner repeatedly, 99% of the tolerance intervals so constructed would cover at least 95% of the total population, and 1% of the tolerance intervals would cover less than 95% of the total population (IS0 Guide 35).
The corrected grand standard deviation, s_g'', used to compute the tolerance intervals is the weighted means of standard deviations of all data sets for a particular constituent according to the formula

$$s''_g = \frac{\sum_{i=1}^{p}(s_i(1 - \frac{s_i}{s'_g}))}{\sum_{i=1}^{p}(1 - \frac{s_i}{s'_g})}$$

where

$$1 - (\frac{s_i}{2s'_g}) \text{ is the weighting factor for laboratory } i \text{ ;}$$

$$s'_g \text{ is the grand standard deviation computed from the transformed (i.e. means - adjusted) results}$$

according to the formula

$$s'_g = \left[\frac{\sum_{i=j}^{p} \sum_{j=i}^{n_i} (x'_{ij} - \bar{x}'_i)^2}{\sum_{i=1}^{p} n_i - 1} \right]^{1/2}$$

$$\text{where } \bar{x}'_i \text{ is the transformed mean for laboratory } i$$

The weighting factors were applied to compensate for the considerable variation in analytical precision amongst participating laboratories. Hence, weighting factors for each data set have been constructed so as to be inversely proportional to the standard deviation of that data set. Individual outliers (shown in bold in Tables A2 to A37) were removed prior to the calculation of tolerance intervals and a weighting factor of zero was applied to those data sets where $s_I / 2s_g'$ >1 (i.e. where the weighting factor 1- $s_I / 2s_g'$ < 0). Data sets displaying poor resolution (i.e. where the ratio of the reading increment divided by the measured value is < $^1/_{20}$) were also omitted.

It should be noted that estimates of tolerance by this method are considered conservative as a significant proportion of the observed variance, even in those laboratories exhibiting the best analytical precision, can presumably be attributed to measurement error. Despite the limitations of this method, the tolerance intervals presented in Table 2 are considered to confirm a high level of homogeneity for this CRM.

Table 2. Certified Values and Tolerance Limits for OREAS 191.

Constituent	Certified Value	Tolerance limits 1-α=0.99, ρ=0.95	
		Low	High
Fusion XRF			
Nickel, Ni (wt.%)	1.75	1.74	1.76
Cobalt, Co (ppm)	665	651	679
Aluminium oxide, Al_2O_3 (wt.%)	4.27	4.25	4.30
Calcium oxide, CaO (wt.%)	0.276	0.275	0.277
Chlorine, Cl (ppm)	*<50*	IND	IND
Copper, Cu (ppm)	*~50*	IND	IND
Chromium oxide, Cr_2O_3 (wt.%)	1.224	1.215	1.233
Iron oxide, Fe_2O_3 (wt.%)	24.86	24.77	24.95
Potassium oxide, K_2O (wt.%)	*<0.01*	IND	IND
Magnesium oxide, MgO (wt.%)	10.06	10.02	10.09
Manganese oxide, MnO (wt.%)	0.397	0.396	0.399
Sodium oxide, Na_2O (wt.%)	*~0.02*	IND	IND
Phosphorus oxide, P_2O_5 (wt.%)	*<0.01*	IND	IND
Silicon dioxide, SiO_2 (wt.%)	47.97	47.78	48.15
Sulphur oxide, SO_3 (wt.%)	*<0.01*	IND	IND
Titanium oxide, TiO_2 (wt.%)	0.052	IND	IND
Zinc, Zn (ppm)	302	298	306
Loss on ignition, LOI (wt.%)	8.10	8.05	8.16
Fusion ICP			
Nickel, Ni (wt.%)	1.73	1.71	1.76
Cobalt, Co (ppm)	652	633	670
Aluminium oxide, Al_2O_3 (wt.%)	4.19	4.12	4.26
Calcium oxide, CaO (wt.%)	0.287	0.276	0.298
Copper, Cu (ppm)	*~50*	IND	IND
Chromium oxide, Cr_2O_3 (wt.%)	1.21	1.19	1.24
Iron oxide, Fe_2O_3 (wt.%)	24.63	24.28	24.99
Potassium oxide, K_2O (wt.%)	*~0.1*	IND	IND
Magnesium oxide, MgO (wt.%)	9.95	9.80	10.10
Manganese oxide, MnO (wt.%)	0.397	0.393	0.400
Sodium oxide, Na_2O (wt.%)	0.018	IND	IND
Phosphorus oxide, P_2O_5 (wt.%)	*<0.02*	IND	IND
Silica dioxide, SiO_2 (wt.%)	47.67	47.05	48.30
Sulphur oxide, SO_3 (wt.%)	*<0.05*	IND	IND
Titanium oxide, TiO_2 (wt.%)	0.050	0.049	0.052
Zinc, Zn (ppm)	297	288	305
IR Combustion Furnace			
Carbon, C (wt.%)	0.09	IND	IND
Sulphur, S (wt.%)	*<0.01*	IND	IND

Note - intervals may appear asymmetric due to rounding; IND = indeterminate; italics = indicative value

ANOVA Study

All laboratories and all 3 rounds of sample submission were included in the ANOVA study for nickel, cobalt, iron oxide and magnesium oxide. The sampling format for OREAS 191 was structured to enable nested ANOVA treatment of the round robin results. During the bagging stage, immediately following homogenization, twenty 300g samples were taken at regular intervals representative of the entire batch of OREAS 191. For each round of sample submissions, each laboratory received paired samples from two different, non-adjacent 300g samples. For example, the samples that any one of the seventeen (XRF) laboratories could have received are:

Round 1 (week 1)	Round 2 (week 2)	Round 3 (week 3)
Sample 1: Unit 1	Sample 1: Unit 10	Sample 1: Unit 6
Sample 2: Unit 11	Sample 2: Unit 20	Sample 2: Unit 16
Sample 3: Unit 1	Sample 3: Unit 10	Sample 3: Unit 6
Sample 4: Unit 11	Sample 4: Unit 20	Sample 4: Unit 16

The purpose of the ANOVA investigation was to compare the within-unit variance with that of the between-unit variance. This approach permitted an assessment of homogeneity across the entire batch of OREAS 191. The test was performed using the following parameters:

- Significance Level α = P (type I error) = 0.05
- Null Hypothesis, H_0: Between-unit variance is no greater than within-unit variance (reject H_0 if p-value < 0.05)
- Alternative Hypothesis, H_1: Between-unit variance is greater than within-unit variance

P-values are a measure of probability whereby values less than 0.05 indicate a greater than 95% probability that the observed differences in within-unit and between-unit variances are real. The dataset was filtered for both individual and batch (lab round) outliers prior to the calculation of the p-value. This process derived p-values of 0.999 for nickel, 0.738 for cobalt, 1.00 for iron oxide and 1.00 for magnesium oxide and indicates no evidence that between-unit variance is greater than within-unit variance. Conclusion: do not reject H_o.

Note that ANOVA is not an absolute measure of homogeneity. Rather, it establishes that the metals are distributed in a similar manner throughout OREAS 191 and that the variance between two subsamples from the same unit is statistically indistinguishable to the variance from two subsamples taken from any two separate units.

Performance Gates

Performance gates provide an indication of a level of performance that might reasonably be expected from a laboratory being monitored by this CRM in a QA/QC program. They take into account errors attributable to measurement and CRM variability. For an effective CRM the contribution of the latter should be negligible in comparison to measurement errors. Sources of measurement error include inter-lab bias, analytical precision (repeatability) and inter-batch bias (reproducibility).

Two methods have been employed to calculate performance gates. The first method uses the same filtered data set used to determine the certified value, i.e. after removal of all individual, lab dataset (batch) and 3SD outliers (single iteration). These outliers can only be removed after the absolute homogeneity of the CRM has been independently established, i.e. the outliers must be confidently deemed to be analytical rather than arising from inhomogeneity of the CRM. The standard deviation is then calculated for each analyte from the pooled individual analyses generated from the certification program. Table 3 shows performance gates calculated for two and three standard deviations. As a guide these intervals may be regarded as warning or rejection for multiple 2SD outliers, or rejection for

individual 3SD outliers in QC monitoring, although their precise application should be at the discretion of the QC manager concerned.
Standard deviation is also shown in relative percent for one, two and three relative standard deviations (1RSD, 2RSD and 3RSD) to facilitate an appreciation of the magnitude of these numbers.

Table 3. Performance Gates for OREAS 191

Constituent	Certified Value	Absolute Standard Deviations					Relative Standard Deviations		
		1SD	2SD Low	2SD High	3SD Low	3SD High	1RSD	2RSD	3RSD
Fusion XRF									
Ni (wt.%)	1.75	0.03	1.70	1.81	1.67	1.84	1.61%	3.23%	4.84%
Co (ppm)	665	22	621	710	598	732	3.34%	6.69%	10.03%
Al_2O_3 (wt.%)	4.27	0.05	4.18	4.37	4.13	4.41	1.11%	2.22%	3.33%
CaO (wt.%)	0.276	0.007	0.261	0.291	0.254	0.298	2.65%	5.30%	7.94%
Cl (ppm)	*<50*	IND	IND	IND	IND	IND	IND	IND	IND
Cu (ppm)	*~50*	IND	IND	IND	IND	IND	IND	IND	IND
Cr_2O_3 (wt.%)	1.224	0.020	1.185	1.264	1.165	1.283	1.61%	3.23%	4.84%
Fe_2O_3 (wt.%)	24.86	0.28	24.29	25.43	24.01	25.71	1.14%	2.29%	3.43%
K_2O (wt.%)	*<0.01*	IND	IND	IND	IND	IND	IND	IND	IND
MgO (wt.%)	10.06	0.13	9.79	10.32	9.66	10.45	1.31%	2.62%	3.93%
MnO (wt.%)	0.397	0.007	0.382	0.412	0.375	0.420	1.89%	3.78%	5.66%
Na_2O (wt.%)	*~0.02*	IND	IND	IND	IND	IND	IND	IND	IND
P_2O_5 (wt.%)	*<0.01*	IND	IND	IND	IND	IND	IND	IND	IND
SiO_2 (wt.%)	47.97	0.44	47.09	48.84	46.65	49.28	0.91%	1.83%	2.74%
SO_3 (wt.%)	*<0.01*	IND	IND	IND	IND	IND	IND	IND	IND
TiO_2 (wt.%)	0.052	0.007	0.038	0.065	0.032	0.072	12.84%	25.68%	38.51%
Zn (ppm)	302	17	268	335	252	352	5.54%	11.07%	16.61%
LOI (wt.%)	8.10	0.40	7.31	8.90	6.91	9.30	4.92%	9.85%	14.77%
Fusion ICP									
Ni (wt.%)	1.73	0.04	1.65	1.82	1.60	1.87	2.54%	5.08%	7.62%
Co (ppm)	652	29	593	710	564	739	4.47%	8.95%	13.42%
Al_2O_3 (wt.%)	4.19	0.11	3.97	4.41	3.86	4.52	2.62%	5.24%	7.86%
CaO (wt.%)	0.287	0.015	0.257	0.317	0.242	0.332	5.21%	10.43%	15.64%
Cu (ppm)	*~50*	IND	IND	IND	IND	IND	IND	IND	IND
Cr_2O_3 (wt.%)	1.21	0.04	1.13	1.30	1.09	1.34	3.34%	6.68%	10.03%
Fe_2O_3 (wt.%)	24.63	0.78	23.07	26.20	22.28	26.99	3.19%	6.37%	9.56%
K_2O (wt.%)	*~0.1*	IND	IND	IND	IND	IND	IND	IND	IND
MgO (wt.%)	9.95	0.38	9.19	10.71	8.81	11.09	3.82%	7.64%	11.45%
MnO (wt.%)	0.397	0.010	0.376	0.418	0.366	0.428	2.60%	5.19%	7.79%
Na_2O (wt.%)	0.018	0.004	0.009	0.026	0.005	0.031	24.54%	49.08%	73.62%
P_2O_5 (wt.%)	*<0.02*	IND	IND	IND	IND	IND	IND	IND	IND
SiO_2 (wt.%)	47.67	1.40	44.87	50.47	43.47	51.87	2.94%	5.87%	8.81%
SO_3 (wt.%)	*<0.05*	IND	IND	IND	IND	IND	IND	IND	IND
TiO_2 (wt.%)	0.050	0.001	0.048	0.053	0.046	0.054	2.66%	5.33%	7.99%
Zn (ppm)	297	11	275	318	264	329	3.69%	7.39%	11.08%
IR Combustion Furnace									
C (wt.%)	0.09	0.02	0.04	0.13	0.02	0.15	25.11%	50.22%	75.33%
S (wt.%)	*<0.01*	IND	IND	IND	IND	IND	IND	IND	IND

Note - intervals may appear asymmetric due to rounding; IND = indeterminate; italics = indicative value

PARTICIPATING LABORATORIES

Acme Analytical Laboratories, Vancouver, BC, Canada
Activation Laboratories, Ancaster, Ontario, Canada
ALS, Callao, Lima, Peru
ALS, Malaga, WA, Australia
ALS, Stafford, QLD, Australia
ALS, Vancouver, BC, Canada
BV Amdel, Cardiff, NSW, Australia
BV Amdel, Stirling, SA, Australia
BV Ultra Trace, Canning Vale, WA, Australia
Inspectorate Kendari Laboratory, Kendari, Sulawesi, Indonesia
Intertek Genalysis Laboratory Services, Maddington, WA, Australia
Intertek Testing Services, Jakarta, Indonesia
Ni Lab, Pouembout, New Caledonia
SGS Geosol Laboratorios Ltda, Vespasiano, Minas Gerais, Brazil
SGS Mineral Services, Lakefield, Ontario, Canada
SGS Mineral Services, Don Mills, Ontario, Canada
SGS Mineral Services, Welshpool, WA, Australia
Société le Nickel SLN, Noumea, New Caledonia
UIS Analytical Services, Centurion, South Africa

PREPARER AND SUPPLIER OF THE REFERENCE MATERIAL

Nickel laterite ore reference material OREAS 191 has been prepared and certified and is supplied by:

Ore Research & Exploration Pty Ltd
6-8 Gatwick Road
Bayswater North VIC 3153
AUSTRALIA

Telephone	*(03) 9729 0333*	*International*	*+613-9729 0333*
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Email	*info@ore.com.au*	*Web*	*www.ore.com.au*

OREAS 191 is packaged in unit sizes of 10g (single-use laminated foil pouches) and 1kg (wide mouthed plastic jars).

INTENDED USE

OREAS 191 is intended for the following uses:

i) for the monitoring of laboratory performance in the analysis of Ni, Co, Al_2O_3, CaO, Cl, Cu, Cr_2O_3, Fe_2O_3, K_2O, MgO, MnO, Na_2O, P_2O_5, SiO_2, SO_3, TiO_2, Zn, LOI, C and S in geological samples
ii) for the verification of analytical methods for Ni, Co, Al_2O_3, CaO, Cl, Cu, Cr_2O_3, Fe_2O_3, K_2O, MgO, MnO, Na_2O, P_2O_5, SiO_2, SO_3, TiO_2, Zn, LOI, C and S
iii) for the calibration of instruments used in the determination of the concentration of Ni, Co, Al_2O_3, CaO, Cl, Cu, Cr_2O_3, Fe_2O_3, K_2O, MgO, MnO, Na_2O, P_2O_5, SiO_2, SO_3, TiO_2, Zn, LOI, C and S

STABILITY AND STORAGE INSTRUCTIONS

OREAS 191 has been sourced from a sample of saprolitic nickel ore. It has been packaged in robust laminated foil pouches and plastic jars. In its unopened state and under normal conditions of storage it has a shelf life beyond ten years. Once opened the jars should be re-sealed after sampling and the contents consumed within two years.

INSTRUCTIONS FOR THE CORRECT USE OF THE REFERENCE MATERIAL

All certified values are reported on a dry basis after removal of hygroscopic moisture by drying in air at 105°C to constant mass. Users departing from these conventions should correct for moisture content.

LEGAL NOTICE

Ore Research & Exploration Pty Ltd has prepared and statistically evaluated the property values of this reference material to the best of its ability. The Purchaser by receipt hereof releases and indemnifies Ore Research & Exploration Pty Ltd from and against all liability and costs arising from the use of this material and information.

CERTIFYING OFFICER

Craig Hamlyn (B.Sc. Hons - Geology), Technical Manager

REFERENCES

ISO Guide 35 (2006), Certification of reference materials - General and statistical principals.

ISO Guide 31 (2000), Reference materials – Contents of certificates and labels.

ISO Guide 3207 (1975), Statistical interpretation of data - Determination of a statistical tolerance interval.

APPENDIX

Analytical Data for OREAS 191

Table A1. Key to abbreviations used in Tables A2 – A37.

Abbreviation	Explanation
Std.Dev.	one sigma standard deviation
Rel.Std.Dev.	one sigma relative standard deviation
PDM[3]	percent deviation of lab mean from corrected mean of means
NR	not reported
BF	lithium metaborate fusion
PF	sodium peroxide fusion
4A	four acid ($HF–HNO_3–HClO_4–HCl$) digestion
MAR	modified aqua regia digestion
ICP	inductively coupled plasma OES or MS (unspecified)
OES	inductively coupled plasma optical emission spectrometry
XRF	x-ray fluorescence
LOI	loss on ignition
IRC	infra-red combustion furnace

Individual and batch outliers are left justified and in bold. Replicates 1 – 4 correspond to the first batch of samples submitted to labs, replicates 5 – 8 correspond to the second batch and replicates 9 – 12 correspond to the third batch.

Table A2. Fusion XRF results for Ni in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	1.73	1.80	1.74	1.73	**1.82**	1.74	1.77	1.79	1.77	**1.85**	1.72	1.74	1.72	1.77	1.79	1.76	1.73
2	1.73	1.80	1.73	1.74	**1.81**	1.72	1.77	1.80	1.76	**1.85**	1.74	1.74	1.75	1.78	1.79	1.77	1.72
3	1.73	1.80	1.74	1.74	**1.84**	1.75	1.77	1.80	1.76	**1.85**	1.73	1.74	1.73	1.78	1.78	1.78	1.72
4	1.75	1.81	1.74	1.73	**1.85**	1.73	1.77	1.81	1.76	**1.86**	1.73	1.74	1.71	1.78	1.79	1.79	1.72
5	1.75	1.79	1.75	1.74	1.81	1.74	1.72	1.79	1.76	**1.88**	1.73	1.74	1.72	1.77	NR	NR	NR
6	1.75	1.78	1.75	1.75	1.82	1.74	1.72	1.76	1.76	**1.86**	1.72	1.74	1.73	1.78	NR	NR	NR
7	1.74	1.79	1.74	1.74	1.80	1.74	1.72	1.79	1.77	**1.85**	1.72	1.75	1.69	1.78	NR	NR	NR
8	1.75	1.79	1.75	1.74	1.82	1.73	1.71	1.77	1.76	**1.85**	1.72	1.75	1.71	1.78	NR	NR	NR
9	1.72	1.79	1.74	1.73	1.70	1.72	1.74	1.82	1.76	**1.84**	1.71	1.74	1.76	1.74	NR	NR	NR
10	1.74	1.79	1.74	1.73	1.71	1.73	1.76	1.78	1.77	**1.87**	1.71	1.74	1.75	1.74	NR	NR	NR
11	1.73	1.79	1.75	1.74	1.71	1.72	1.76	1.80	1.77	**1.84**	1.71	1.74	1.74	1.74	NR	NR	NR
12	1.75	1.78	1.75	1.73	**1.82**	1.72	1.75	1.81	1.75	**1.86**	1.70	1.74	1.74	1.75	NR	NR	NR
Mean	1.74	1.79	1.74	1.74	1.79	1.73	1.75	1.79	1.76	**1.85**	1.72	1.74	1.73	1.76	1.79	1.77	1.72
Median	1.74	1.79	1.74	1.74	1.81	1.73	1.76	1.80	1.76	1.85	1.72	1.74	1.73	1.77	1.79	1.78	1.72
Std.Dev.	0.01	0.01	0.01	0.01	0.05	0.01	0.02	0.02	0.01	0.01	0.01	0.00	0.02	0.02	0.01	0.01	0.01
Rel.Std.Dev.	0.56%	0.47%	0.34%	0.38%	2.93%	0.50%	1.34%	0.89%	0.35%	0.58%	0.65%	0.22%	1.05%	1.06%	0.28%	0.69%	0.29%
PDM[3]	-0.88%	2.19%	-0.55%	-0.90%	2.09%	-1.24%	-0.33%	2.30%	0.57%	5.81%	-2.05%	-0.62%	-1.41%	0.69%	2.00%	1.27%	-1.71%

Table A3. Fusion XRF results for Co in OREAS 191 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	650	700	650	670	690	660	NR	**780**	680	**860**	640	700	660	680	**600**	644	**600**
2	660	700	640	670	690	640	NR	**780**	690	660	650	700	680	690	**600**	670	**600**
3	640	700	640	680	710	660	NR	**800**	680	610	640	700	670	680	**600**	658	**600**
4	670	700	650	680	700	650	NR	**780**	680	750	640	700	670	680	**600**	666	**600**
5	660	700	650	670	690	650	NR	**770**	670	620	660	600	660	680	NR	NR	NR
6	660	700	650	660	**710**	650	NR	**770**	670	640	650	700	670	670	NR	NR	NR
7	660	700	640	660	680	650	NR	**770**	680	**560**	660	700	650	680	NR	NR	NR
8	660	700	650	660	680	650	NR	**770**	680	740	650	700	650	680	NR	NR	NR
9	640	700	650	660	670	650	NR	**790**	670	640	640	700	690	670	NR	NR	NR
10	650	700	650	670	680	650	NR	**770**	690	750	650	700	680	680	NR	NR	NR
11	650	700	640	660	690	650	NR	**790**	660	**570**	640	600	680	670	NR	NR	NR
12	660	700	640	660	700	640	NR	**790**	680	710	640	700	660	670	NR	NR	NR
Mean	655	**700**	646	667	691	650		**780**	678	676	647	**683**	668	678	**600**	660	**600**
Median	660	700	650	665	690	650		780	680	650	645	700	670	680	600	662	600
Std.Dev.	9	0	5	8	12	6		10	9	88	8	39	13	6	0	11	0
Rel.Std.Dev.	1.38%	0.00%	0.80%	1.17%	1.80%	0.93%		1.34%	1.28%	13.01%	1.20%	5.70%	1.90%	0.92%	0.00%	1.74%	0.00%
PDM[3]	-1.52%	5.25%	-2.90%	0.24%	3.87%	-2.27%		17.28%	1.86%	1.61%	-2.77%	2.74%	0.49%	1.86%	-9.79%	-0.84%	-9.79%

Table A4. Fusion XRF results for Al_2O_3 in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	4.21	**4.11**	4.29	4.30	4.34	4.23	4.25	**4.22**	4.35	4.21	4.29	4.29	4.22	4.31	4.33	4.30	4.29
2	4.23	**4.11**	4.25	4.29	4.36	4.20	4.24	4.29	4.39	4.25	4.28	4.30	4.27	4.31	4.32	4.25	4.25
3	4.29	**4.08**	4.25	4.29	4.33	4.24	4.24	4.30	4.36	4.31	4.29	4.31	4.27	4.31	4.32	4.23	4.26
4	4.27	**4.10**	4.28	4.30	4.41	4.20	4.24	4.30	4.31	4.15	4.28	4.30	4.17	4.30	4.34	4.24	4.26
5	4.27	**4.11**	4.26	4.26	4.23	4.23	**4.13**	4.28	**4.43**	4.28	4.23	4.27	4.21	4.33	NR	NR	NR
6	4.31	**4.14**	4.24	4.28	**4.41**	4.23	**4.12**	4.30	**4.38**	4.29	4.23	4.27	4.30	4.29	NR	NR	NR
7	4.28	**4.13**	4.25	4.27	4.25	4.24	**4.12**	4.30	**4.38**	**4.45**	4.23	4.29	4.24	4.31	NR	NR	NR
8	4.27	**4.09**	4.27	4.24	4.23	4.23	**4.13**	4.25	**4.39**	4.15	4.26	4.29	4.27	4.34	NR	NR	NR
9	4.20	**4.13**	4.27	4.29	**4.44**	4.21	4.16	4.31	4.36	4.16	4.22	4.29	4.30	4.31	NR	NR	NR
10	4.28	**4.14**	4.23	4.30	**4.45**	4.22	4.19	4.23	4.27	4.30	4.21	4.31	4.24	4.35	NR	NR	NR
11	4.19	**4.10**	4.22	4.28	**4.42**	4.21	4.21	4.33	4.30	4.17	4.21	4.30	4.29	4.33	NR	NR	NR
12	4.23	**4.15**	4.27	4.27	**4.31**	4.23	4.18	4.27	4.30	4.24	4.23	4.30	4.26	4.32	NR	NR	NR
Mean	4.25	**4.11**	4.26	4.28	4.35	4.22	4.18	4.28	4.35	4.25	4.25	4.29	4.25	4.32	4.33	4.26	4.27
Median	4.27	4.11	4.26	4.29	4.35	4.23	4.19	4.30	4.36	4.24	4.23	4.30	4.26	4.31	4.33	4.25	4.26
Std.Dev.	0.04	0.02	0.02	0.02	0.08	0.01	0.05	0.03	0.05	0.09	0.03	0.01	0.04	0.02	0.01	0.03	0.02
Rel.Std.Dev.	0.91%	0.54%	0.48%	0.43%	1.85%	0.34%	1.23%	0.78%	1.09%	2.09%	0.73%	0.30%	0.94%	0.40%	0.22%	0.66%	0.41%
PDM[3]	-0.43%	-3.69%	-0.33%	0.23%	1.81%	-1.15%	-2.03%	0.25%	1.89%	-0.59%	-0.57%	0.53%	-0.45%	1.09%	1.33%	-0.36%	-0.14%

Table A5. Fusion XRF results for CaO in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	0.280	**0.255**	0.270	0.280	0.270	0.274	0.270	0.270	0.290	0.285	0.280	0.270	0.277	0.280	0.270	**0.247**	0.270
2	0.280	**0.260**	0.270	0.280	0.270	0.271	0.270	0.270	0.290	0.282	0.270	0.270	0.278	0.280	0.270	**0.246**	0.270
3	0.270	**0.250**	0.280	0.290	0.270	0.274	0.270	0.270	0.290	0.270	0.280	0.270	0.276	0.290	0.280	**0.247**	0.270
4	0.280	**0.250**	0.270	0.280	0.270	0.272	0.270	0.260	0.290	0.272	0.280	0.270	0.277	0.280	0.270	**0.259**	0.280
5	0.280	**0.250**	0.270	0.280	0.270	0.275	0.270	0.270	**0.290**	0.279	0.270	0.290	0.277	0.290	NR	NR	NR
6	0.280	**0.250**	0.270	0.280	0.280	0.273	0.260	0.270	**0.300**	0.270	0.280	0.280	0.282	0.280	NR	NR	NR
7	0.280	**0.255**	0.270	0.280	0.280	0.275	0.270	0.270	**0.300**	0.280	0.280	0.280	0.272	0.290	NR	NR	NR
8	0.280	**0.255**	0.270	0.280	0.270	0.274	0.270	0.260	**0.300**	0.269	0.280	0.280	0.276	0.290	NR	NR	NR
9	0.270	**0.250**	0.270	0.280	0.270	0.272	0.270	0.270	**0.290**	0.269	0.270	0.280	0.285	0.280	NR	NR	NR
10	0.280	**0.255**	0.270	0.280	0.270	0.274	0.270	0.260	**0.300**	0.293	0.280	0.290	0.283	0.280	NR	NR	NR
11	0.280	**0.250**	0.280	0.290	0.260	0.274	0.270	0.270	**0.290**	0.262	0.270	0.290	0.280	0.280	NR	NR	NR
12	0.280	**0.250**	0.270	0.290	0.260	0.277	0.270	0.270	**0.290**	0.277	0.270	0.290	0.279	0.270	NR	NR	NR
Mean	0.278	**0.253**	0.272	0.283	0.270	0.274	0.269	0.268	0.293	0.276	0.276	0.280	0.279	0.283	0.273	0.250	0.273
Median	0.280	0.250	0.270	0.280	0.270	0.274	0.270	0.270	0.290	0.275	0.280	0.280	0.278	0.280	0.270	0.247	0.270
Std.Dev.	0.004	0.003	0.004	0.005	0.006	0.002	0.003	0.005	0.005	0.009	0.005	0.009	0.004	0.006	0.005	0.006	0.005
Rel.Std.Dev.	1.40%	1.34%	1.43%	1.60%	2.23%	0.59%	1.07%	1.69%	1.68%	3.12%	1.87%	3.05%	1.28%	2.20%	1.83%	2.38%	1.83%
PDM[3]	0.84%	-8.52%	-1.58%	2.34%	-2.18%	-0.83%	-2.49%	-3.09%	6.27%	-0.13%	-0.07%	1.44%	0.90%	2.34%	-1.28%	-9.57%	-1.28%

Table A6. Fusion XRF results for Cl in OREAS 191 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	<50	NR	NR	<50	<10	NR	NR	NR	NR	NR	<50	<50	NR	NR	<50	<50	NR
2	<50	NR	NR	<50	<10	NR	NR	NR	NR	NR	<50	<50	NR	NR	<50	<50	NR
3	<50	NR	NR	<50	<10	NR	NR	NR	NR	NR	<50	<50	NR	NR	<50	70	NR
4	<50	NR	NR	50	<10	NR	NR	NR	NR	NR	<50	<50	NR	NR	<50	70	NR
5	80	NR	NR	<50	**130**	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
6	<50	NR	NR	50	**40**	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
7	<50	NR	NR	<50	**180**	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
8	<50	NR	NR	50	**120**	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
9	<50	NR	NR	<50	80	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
10	<50	NR	NR	<50	60	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
11	<50	NR	NR	50	80	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
12	<50	NR	NR	50	30	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
Mean	80			50	90											70	
Median	80			50	80											70	
Std.Dev.				0	50											0	
Rel.Std.Dev.				0.00%	56.03%											0.00%	
PDM[3]	21.90%			-23.81%	37.14%											6.67%	

Table A7. Fusion XRF results for Cu in OREAS 191 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	60	<30	<50	50	50	49	50	30	**100**	<100	20	90	NR	60	<100	74	NR
2	60	<30	<50	50	50	**44**	50	40	**100**	<100	20	60	NR	60	<100	65	NR
3	60	<30	<50	55	70	47	40	30	**100**	<100	20	90	NR	60	<100	48	NR
4	70	<30	<50	55	60	48	40	60	**100**	<100	20	80	NR	60	<100	49	NR
5	60	<30	<50	50	80	46	40	**20**	**100**	<100	30	70	NR	70	NR	NR	NR
6	60	<30	<50	45	70	48	40	**10**	**100**	<100	30	70	NR	60	NR	NR	NR
7	60	<30	<50	45	60	47	40	**10**	**100**	<100	40	80	NR	60	NR	NR	NR
8	60	<30	<50	45	70	45	50	**<10**	**100**	<100	20	80	NR	60	NR	NR	NR
9	50	<30	<50	55	50	47	30	30	<50	<100	30	90	NR	60	NR	NR	NR
10	50	<30	<50	60	70	47	50	30	<50	<100	40	80	NR	70	NR	NR	NR
11	50	<30	<50	50	70	46	50	10	<50	<100	50	70	NR	70	NR	NR	NR
12	60	<30	<50	55	70	45	40	**130**	<50	<100	30	70	NR	50	NR	NR	NR
Mean	58			51	64	47	43	36	100		29	78		62		59	
Median	60			50	70	47	40	30	100		30	80		60		57	
Std.Dev.	6			5	10	1	7	34	0		10	10		6		13	
Rel.Std.Dev.	9.90%			9.42%	15.53%	3.20%	15.03%	94.68%	0.00%		34.16%	12.46%		9.36%		21.48%	
PDM[3]	11.31%			-2.20%	22.45%	-11.20%	-17.31%	-30.61%	90.82%		-44.34%	47.89%		17.67%		12.59%	

Table A8. Fusion XRF results for Cr_2O_3 in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	**1.24**	1.21	1.22	1.23	1.25	1.23	**1.80**	**1.24**	1.20	**1.30**	1.21	1.24	1.23	1.22	1.23	1.24	1.23
2	1.21	1.20	1.22	1.22	1.20	1.23	**1.81**	1.27	1.21	**1.30**	1.22	1.24	1.24	1.23	1.21	1.25	1.24
3	1.21	1.21	1.22	1.23	1.23	1.24	**1.80**	1.27	1.21	**1.29**	1.22	1.24	1.25	1.23	1.22	1.26	1.25
4	1.20	1.20	1.22	1.22	1.22	1.22	**1.80**	1.26	1.20	**1.30**	1.21	1.25	1.23	1.23	1.22	1.24	1.24
5	1.22	1.22	1.21	1.23	1.24	1.23	1.20	1.25	1.21	**1.32**	1.20	**1.21**	1.25	1.22	NR	NR	NR
6	1.22	1.21	1.22	1.22	1.21	1.24	1.20	1.25	1.20	**1.30**	1.19	1.24	1.25	1.23	NR	NR	NR
7	1.23	1.20	1.22	1.24	1.23	1.24	1.19	1.26	1.21	**1.30**	1.21	1.26	1.22	1.23	NR	NR	NR
8	1.21	1.21	1.23	1.23	1.22	1.23	1.19	1.25	1.22	**1.31**	1.20	1.26	1.23	1.22	NR	NR	NR
9	1.19	1.22	1.22	1.23	1.23	1.22	1.21	1.27	1.20	**1.28**	1.19	1.21	1.26	1.20	NR	NR	NR
10	1.23	1.20	1.22	1.22	1.24	1.23	1.23	1.25	1.20	**1.31**	1.19	1.21	1.26	1.20	NR	NR	NR
11	1.21	1.22	1.22	1.22	1.24	1.22	1.23	1.26	1.19	**1.29**	1.19	1.20	1.25	1.21	NR	NR	NR
12	1.21	1.21	1.23	1.23	**1.19**	1.22	1.22	1.27	1.20	**1.30**	1.19	1.21	1.26	1.20	NR	NR	NR
Mean	1.21	1.21	1.22	1.23	1.22	1.23	1.41	1.26	1.20	**1.30**	1.20	1.23	1.24	1.22	1.22	1.25	1.24
Median	1.21	1.21	1.22	1.23	1.23	1.23	1.22	1.26	1.20	1.30	1.20	1.24	1.25	1.22	1.22	1.24	1.24
Std.Dev.	0.01	0.01	0.01	0.01	0.02	0.01	0.29	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01
Rel.Std.Dev.	1.02%	0.51%	0.48%	0.50%	1.46%	0.58%	20.84%	0.82%	0.66%	0.82%	1.06%	1.75%	1.06%	0.89%	0.67%	0.81%	0.66%
PDM[3]	-0.96%	-1.40%	-0.42%	0.19%	-0.17%	0.36%	14.79%	2.79%	-1.64%	6.24%	-2.11%	0.54%	1.51%	-0.41%	-0.35%	1.81%	1.29%

Table A9. Fusion XRF results for Fe_2O_3 in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	24.20	25.02	25.20	25.07	24.60	24.71	25.06	24.78	24.95	24.43	24.80	24.77	24.61	25.00	25.60	24.87	25.10
2	24.30	24.97	25.22	25.06	24.60	24.45	25.14	24.79	24.95	24.47	24.70	24.85	24.94	24.90	25.50	24.94	25.10
3	24.50	25.01	25.22	25.13	24.70	24.76	25.20	24.90	24.85	24.27	24.80	24.80	24.82	25.00	25.50	24.93	25.00
4	24.60	24.96	25.20	25.09	25.00	24.55	25.13	24.91	24.85	24.51	24.80	24.84	24.58	24.90	25.50	24.94	25.10
5	24.80	24.88	25.26	25.17	24.40	24.60	24.50	24.63	24.81	24.67	24.70	24.90	24.76	25.00	NR	NR	NR
6	24.70	24.82	25.21	25.19	24.60	24.69	24.57	24.40	24.73	24.46	24.60	24.81	24.87	24.90	NR	NR	NR
7	24.60	24.85	25.25	25.15	24.30	24.64	24.50	24.61	24.88	24.58	24.70	24.95	24.30	24.90	NR	NR	NR
8	24.60	24.83	25.28	25.11	24.40	24.53	24.45	24.53	24.78	24.42	24.70	24.99	24.54	24.90	NR	NR	NR
9	24.20	24.96	25.21	25.05	24.50	24.51	24.78	25.15	24.82	24.27	24.50	24.90	25.19	24.90	NR	NR	NR
10	24.50	24.98	25.17	25.08	24.60	24.59	25.02	**24.64**	25.00	24.42	24.60	24.95	25.03	24.90	NR	NR	NR
11	24.30	24.95	25.32	25.15	24.60	24.47	25.04	24.97	24.77	24.31	24.50	24.91	24.99	24.80	NR	NR	NR
12	24.50	25.03	25.32	25.19	24.50	24.39	24.94	25.13	24.70	24.47	24.50	24.90	24.90	24.90	NR	NR	NR
Mean	24.48	24.94	25.24	25.12	24.57	24.57	24.86	24.79	24.84	24.44	24.66	24.88	24.79	24.92	25.53	24.92	25.08
Median	24.50	24.96	25.22	25.12	24.60	24.57	24.98	24.79	24.84	24.45	24.70	24.90	24.84	24.90	25.50	24.93	25.10
Std.Dev.	0.19	0.07	0.05	0.05	0.18	0.11	0.28	0.23	0.09	0.12	0.12	0.07	0.25	0.06	0.05	0.03	0.05
Rel.Std.Dev.	0.79%	0.30%	0.19%	0.20%	0.72%	0.45%	1.14%	0.95%	0.37%	0.48%	0.47%	0.27%	1.00%	0.23%	0.20%	0.14%	0.20%
PDM[3]	-1.52%	0.30%	1.52%	1.04%	-1.18%	-1.16%	0.00%	-0.30%	-0.08%	-1.69%	-0.81%	0.08%	-0.27%	0.23%	2.67%	0.23%	0.86%

Table A10. Fusion XRF results for K_2O in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	<0.01	<0.01	<0.01	0.00	<0.001	NR	<0.001	<0.01	0.01	<0.01	<0.01	<0.01	NR	0.01	<0.01	0.01	<0.01
2	<0.01	<0.01	<0.01	0.00	0.00	NR	<0.001	<0.01	0.01	0.01	<0.01	<0.01	NR	0.01	<0.01	0.01	<0.01
3	<0.01	<0.01	<0.01	0.00	0.00	NR	<0.001	<0.01	0.02	<0.01	<0.01	<0.01	NR	0.01	<0.01	0.01	<0.01
4	<0.01	<0.01	<0.01	0.00	<0.001	NR	<0.001	<0.01	0.01	<0.01	<0.01	<0.01	NR	0.01	<0.01	0.01	<0.01
5	<0.01	<0.01	<0.05	0.00	0.01	NR	<0.001	<0.01	0.01	<0.01	<0.01	<0.01	NR	0.01	NR	NR	NR
6	<0.01	<0.01	<0.05	0.00	<0.001	NR	<0.001	0.01	0.03	<0.01	<0.01	<0.01	NR	0.01	NR	NR	NR
7	<0.01	<0.01	<0.05	0.00	0.01	NR	<0.001	<0.01	0.01	<0.01	<0.01	<0.01	NR	0.01	NR	NR	NR
8	<0.01	<0.01	<0.05	0.00	0.01	NR	<0.001	<0.01	0.01	<0.01	<0.01	<0.01	NR	0.01	NR	NR	NR
9	<0.01	<0.01	<0.01	0.01	<0.001	NR	<0.001	<0.01	0.01	<0.01	<0.01	<0.01	NR	0.01	NR	NR	NR
10	<0.01	<0.01	<0.01	0.01	0.00	NR	<0.001	<0.01	0.01	<0.01	<0.01	<0.01	NR	0.01	NR	NR	NR
11	<0.01	<0.01	<0.01	0.01	<0.001	NR	<0.001	0.01	0.01	<0.01	<0.01	<0.01	NR	0.01	NR	NR	NR
12	<0.01	<0.01	<0.01	0.00	<0.001	NR	<0.001	<0.01	0.01	<0.01	<0.01	<0.01	NR	0.01	NR	NR	NR
Mean				0.00	0.00			0.01	0.01	0.01				0.01		0.01	
Median				0.00	0.00			0.01	0.01	0.01				0.01		0.01	
Std.Dev.				0.001	0.003			0.000	0.006					0.00		0.00	
Rel.Std.Dev.				17.74%	81.53%			0.00%	49.73%					0.00%		8.58%	
PDM[3]				-52.56%	-57.21%			11.61%	39.52%	22.77%				11.61%		-7.36%	

Table A11. Fusion XRF results for MgO in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	9.85	10.16	10.04	10.07	9.98	9.77	**9.64**	10.26	10.08	10.30	10.05	10.10	9.98	10.30	10.10	9.96	10.00
2	9.88	10.13	10.04	10.08	9.98	9.68	**9.68**	10.30	10.14	10.25	10.05	10.09	10.09	10.30	10.10	9.95	10.00
3	9.99	10.16	10.05	10.08	9.93	9.86	**9.70**	10.33	10.10	10.15	10.05	10.11	10.10	10.30	10.10	9.98	9.99
4	10.00	10.15	10.03	10.03	10.10	9.78	**9.67**	10.29	10.12	10.21	10.00	10.10	9.92	10.30	10.10	10.00	10.10
5	9.96	10.13	10.07	10.06	9.83	**9.71**	9.82	10.23	10.14	**10.46**	9.98	10.07	10.05	10.25	NR	NR	NR
6	9.96	10.07	10.04	10.07	**10.05**	**9.75**	9.82	10.26	10.04	**10.33**	9.99	10.16	10.05	10.30	NR	NR	NR
7	9.93	10.14	10.05	10.07	9.86	**9.75**	9.81	10.33	10.20	**10.39**	9.95	10.16	9.92	10.30	NR	NR	NR
8	9.91	10.08	10.02	10.04	9.83	**9.73**	9.81	10.17	10.12	**9.90**	10.00	10.14	10.01	10.30	NR	NR	NR
9	9.88	10.17	10.02	10.04	10.30	**9.71**	9.99	10.33	10.10	10.05	9.90	10.05	10.18	10.20	NR	NR	NR
10	10.00	10.17	10.03	10.10	10.25	**9.70**	10.06	10.17	10.09	10.21	9.92	10.07	10.06	10.25	NR	NR	NR
11	9.89	10.16	10.05	10.09	10.25	**9.69**	10.06	10.29	10.06	10.06	9.89	10.06	10.08	10.20	NR	NR	NR
12	9.95	10.14	10.09	10.08	10.30	**9.76**	10.05	10.29	9.99	9.98	9.96	10.03	10.05	10.20	NR	NR	NR
Mean	9.93	10.14	10.04	10.07	10.06	9.74	9.84	10.27	10.10	10.19	9.98	10.10	10.04	10.27	10.10	9.97	10.02
Median	9.94	10.15	10.04	10.07	10.02	9.74	9.82	10.29	10.10	10.21	9.99	10.10	10.05	10.30	10.10	9.97	10.00
Std.Dev.	0.05	0.03	0.02	0.02	0.18	0.05	0.16	0.06	0.05	0.17	0.06	0.04	0.07	0.04	0.00	0.02	0.05
Rel.Std.Dev.	0.52%	0.32%	0.20%	0.21%	1.81%	0.51%	1.62%	0.55%	0.53%	1.66%	0.57%	0.42%	0.74%	0.43%	0.00%	0.25%	0.52%
PDM[3]	-1.21%	0.82%	-0.11%	0.12%	0.00%	-3.12%	-2.11%	2.15%	0.43%	1.33%	-0.76%	0.40%	-0.13%	2.10%	0.45%	-0.81%	-0.32%

Table A12. Fusion XRF results for MnO in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	0.378	0.380	0.390	0.400	0.396	0.391	0.410	0.390	0.397	**0.413**	0.395	0.400	0.395	**0.414**	0.400	0.394	0.400
2	0.384	0.380	0.390	0.400	0.395	0.388	0.410	0.390	0.396	**0.411**	0.396	0.400	0.400	**0.418**	0.400	0.397	0.410
3	0.393	0.390	0.390	0.400	0.403	0.393	0.410	0.400	0.395	**0.415**	0.395	0.400	0.398	**0.417**	0.400	0.397	0.400
4	0.389	0.390	0.390	0.400	0.404	0.390	0.410	0.400	0.396	**0.417**	0.394	0.400	0.395	**0.420**	0.400	0.397	0.400
5	0.392	0.385	0.390	0.390	0.395	0.389	0.400	0.390	0.395	**0.415**	0.396	0.400	0.395	**0.414**	NR	NR	NR
6	0.396	0.385	0.390	0.400	**0.412**	0.391	0.400	0.390	0.393	**0.421**	0.394	0.390	0.399	**0.416**	NR	NR	NR
7	0.392	0.385	0.390	0.390	0.394	0.391	0.400	0.390	0.395	**0.412**	0.393	0.400	**0.385**	**0.416**	NR	NR	NR
8	0.391	0.380	0.390	0.400	0.398	0.389	0.400	0.390	0.394	**0.410**	0.391	0.400	0.395	**0.416**	NR	NR	NR
9	0.379	0.390	0.390	0.390	0.384	0.388	0.400	0.400	0.397	0.414	0.391	0.390	0.408	0.411	NR	NR	NR
10	0.384	0.385	0.390	0.400	0.389	0.389	0.400	0.400	0.394	0.412	0.395	0.400	0.404	0.417	NR	NR	NR
11	0.381	0.390	0.390	0.390	0.390	0.388	0.410	0.400	0.391	0.412	0.391	0.390	0.402	0.414	NR	NR	NR
12	0.385	0.390	0.400	0.390	0.395	0.385	0.400	0.400	0.391	0.410	0.392	0.390	0.402	0.411	NR	NR	NR
Mean	0.387	0.386	0.391	0.396	0.396	0.389	0.404	0.395	0.395	0.414	0.394	0.397	0.398	0.415	0.400	0.396	0.403
Median	0.387	0.385	0.390	0.400	0.395	0.389	0.400	0.395	0.395	0.413	0.394	0.400	0.398	0.416	0.400	0.397	0.400
Std.Dev.	0.006	0.004	0.003	0.005	0.007	0.002	0.005	0.005	0.002	0.003	0.002	0.005	0.006	0.003	0.000	0.001	0.005
Rel.Std.Dev.	1.54%	1.08%	0.74%	1.30%	1.88%	0.53%	1.27%	1.32%	0.51%	0.77%	0.49%	1.24%	1.47%	0.65%	0.00%	0.36%	1.24%
PDM[3]	-2.55%	-2.84%	-1.58%	-0.32%	-0.22%	-1.96%	1.78%	-0.53%	-0.66%	4.13%	-0.89%	-0.11%	0.25%	4.59%	0.73%	-0.22%	1.36%

Table A13. Fusion XRF results for Na_2O in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	**0.050**	0.010	0.020	NR	**0.074**	NR	<0.01	**0.150**	0.010	<0.1	0.011	0.030	NR	0.020	0.010	0.021	<0.01
2	**0.054**	0.015	0.020	NR	**0.062**	NR	<0.01	**0.010**	<0.01	<0.1	0.009	0.020	NR	0.020	0.020	**0.051**	0.020
3	**0.011**	0.015	0.020	NR	**0.077**	NR	<0.01	**0.010**	0.010	<0.1	0.011	0.030	NR	0.020	0.020	0.021	<0.01
4	**0.058**	0.015	0.020	NR	**0.075**	NR	<0.01	**0.010**	<0.01	<0.1	0.010	0.030	NR	0.020	0.020	0.029	<0.01
5	**0.036**	0.010	0.020	NR	**0.086**	NR	<0.01	<0.01	0.020	<0.1	0.009	0.030	NR	0.020	NR	NR	NR
6	0.015	0.020	0.020	NR	**0.141**	NR	<0.01	0.010	**0.050**	<0.1	0.015	**0.050**	NR	0.020	NR	NR	NR
7	0.012	0.020	0.020	NR	**0.085**	NR	<0.01	<0.01	0.040	<0.1	0.011	**0.050**	NR	0.020	NR	NR	NR
8	0.021	0.020	0.030	NR	**0.085**	NR	<0.01	0.010	0.010	<0.1	0.014	0.020	NR	0.020	NR	NR	NR
9	0.015	0.020	0.020	NR	**0.114**	NR	<0.01	0.020	<0.01	<0.1	0.018	**0.040**	NR	0.030	NR	NR	NR
10	**0.053**	0.020	0.030	NR	**0.126**	NR	<0.01	0.010	<0.01	<0.1	0.013	**0.060**	NR	0.030	NR	NR	NR
11	0.017	0.020	0.010	NR	**0.118**	NR	<0.01	0.020	0.010	<0.1	0.016	**0.040**	NR	0.020	NR	NR	NR
12	0.020	0.020	0.020	NR	**0.094**	NR	<0.01	<0.01	0.010	<0.1	0.011	**0.040**	NR	0.030	NR	NR	NR
Mean	0.030	0.017	0.021		**0.095**			0.028	0.020		0.012	0.037		0.023	0.018	0.031	0.020
Median	0.021	0.020	0.020		0.086			0.010	0.010		0.011	0.035		0.020	0.020	0.025	0.020
Std.Dev.	0.019	0.004	0.005		0.024			0.046	0.016		0.003	0.012		0.005	0.005	0.014	
Rel.Std.Dev.	61.69%	23.21%	24.72%		25.66%			165.73%	80.18%		23.28%	33.57%		20.10%	28.57%	46.04%	
PDM[3]	60.23%	-9.26%	10.66%		403.27%			47.54%	6.23%		-34.49%	94.76%		19.51%	-7.05%	62.53%	6.23%

Table A14. Fusion XRF results for P_2O_5 in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	0.006	0.005	0.006	0.006	0.001	NR	<0.01	<0.01	0.010	0.017	0.003	<0.01	NR	<0.01	<0.01	**0.008**	<0.01
2	0.005	<0.01	0.006	0.007	0.002	NR	<0.01	<0.01	0.010	0.016	0.003	<0.01	NR	0.010	<0.01	0.003	<0.01
3	0.005	0.005	0.005	0.005	0.003	NR	<0.01	<0.01	0.010	0.016	0.003	<0.01	NR	0.010	<0.01	0.004	<0.01
4	0.006	0.010	0.005	0.006	0.002	NR	0.010	<0.01	0.010	0.016	0.002	<0.01	NR	0.010	<0.01	0.003	<0.01
5	0.007	0.005	0.005	0.006	0.005	NR	<0.01	<0.01	0.010	<0.01	0.005	<0.01	NR	0.010	NR	NR	NR
6	0.007	<0.01	0.006	0.007	0.002	NR	<0.01	<0.01	0.010	<0.01	0.005	<0.01	NR	<0.01	NR	NR	NR
7	0.007	0.010	0.005	0.007	0.006	NR	0.010	<0.01	0.010	<0.01	0.005	<0.01	NR	<0.01	NR	NR	NR
8	0.007	0.010	0.005	0.006	0.005	NR	0.010	<0.01	0.010	<0.01	0.005	<0.01	NR	<0.01	NR	NR	NR
9	0.008	0.005	0.005	0.007	0.003	NR	<0.01	<0.01	0.010	<0.01	0.004	<0.01	NR	0.010	NR	NR	NR
10	0.005	<0.01	0.005	0.006	0.003	NR	<0.01	<0.01	0.010	<0.01	0.003	<0.01	NR	<0.01	NR	NR	NR
11	0.008	0.005	0.006	0.006	0.004	NR	<0.01	<0.01	0.010	<0.01	0.003	<0.01	NR	0.010	NR	NR	NR
12	0.008	0.005	0.006	0.008	0.004	NR	<0.01	<0.01	0.010	<0.01	0.003	<0.01	NR	0.010	NR	NR	NR
Mean	0.007	0.007	0.005	0.006	0.003		0.010		0.010	0.016	0.004			0.010		0.005	
Median	0.007	0.005	0.005	0.006	0.003		0.010		0.010	0.016	0.003			0.010		0.004	
Std.Dev.	0.001	0.003	0.001	0.001	0.001		0.000		0.000	0.001	0.001			0.000		0.002	
Rel.Std.Dev.	17.69%	37.50%	9.51%	12.36%	44.92%		0.00%		0.00%	3.08%	29.27%			0.00%		52.90%	
PDM[3]	0.64%	1.91%	-17.20%	-1.91%	-49.04%		52.87%		52.87%	148.41%	-43.95%			52.87%		-31.21%	

Table A15. Fusion XRF results for SiO_2 in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	47.40	48.34	48.33	48.23	47.40	47.67	**48.98**	47.90	47.86	47.55	48.30	48.05	46.94	48.70	48.00	48.05	48.10
2	47.60	48.36	48.08	48.28	47.40	47.38	**49.15**	48.10	47.85	47.82	48.40	48.06	47.61	48.90	48.00	48.11	47.90
3	48.60	48.38	48.28	48.25	47.30	47.88	**49.14**	48.20	47.76	47.21	48.40	48.05	47.51	48.70	48.10	48.19	47.80
4	48.20	48.15	48.19	48.26	47.80	47.50	**49.05**	48.10	47.67	47.50	48.40	47.96	46.70	49.10	48.00	47.91	48.00
5	48.00	48.21	48.38	48.16	46.90	47.64	47.40	47.90	47.80	47.82	47.90	48.49	**46.33**	48.70	NR	NR	NR
6	48.00	48.25	48.35	48.25	**47.80**	47.78	47.90	48.00	47.59	48.10	47.70	48.13	47.82	48.80	NR	NR	NR
7	47.80	48.21	48.22	48.21	47.10	47.75	47.87	48.10	48.06	47.76	47.80	48.09	46.83	48.80	NR	NR	NR
8	47.70	48.21	48.25	48.11	47.00	47.60	47.91	47.80	47.99	47.24	48.00	48.22	47.14	49.00	NR	NR	NR
9	47.40	48.34	48.04	48.10	48.00	47.40	48.36	48.20	47.76	47.15	47.60	48.05	47.82	48.60	NR	NR	NR
10	48.00	48.36	48.15	48.15	48.00	47.62	48.65	47.70	47.69	47.34	47.60	48.16	47.62	49.00	NR	NR	NR
11	47.70	48.31	48.19	48.24	48.00	47.53	48.50	48.70	47.59	47.23	47.50	48.15	47.54	48.70	NR	NR	NR
12	48.00	48.24	48.26	48.15	47.50	47.47	48.57	48.10	47.54	47.43	47.70	47.99	47.49	48.70	NR	NR	NR
Mean	47.87	48.28	48.23	48.20	47.52	47.60	48.46	48.07	47.76	47.51	47.94	48.12	47.28	48.81	48.03	48.07	47.95
Median	47.90	48.28	48.24	48.22	47.45	47.61	48.54	48.10	47.76	47.46	47.85	48.08	47.50	48.75	48.00	48.08	47.95
Std.Dev.	0.34	0.08	0.10	0.06	0.40	0.16	0.58	0.25	0.16	0.30	0.35	0.14	0.48	0.16	0.05	0.12	0.13
Rel.Std.Dev.	0.71%	0.16%	0.22%	0.13%	0.84%	0.33%	1.20%	0.53%	0.34%	0.64%	0.73%	0.29%	1.02%	0.32%	0.10%	0.24%	0.27%
PDM[3]	-0.21%	0.65%	0.54%	0.49%	-0.94%	-0.76%	1.02%	0.21%	-0.42%	-0.95%	-0.05%	0.31%	-1.43%	1.76%	0.12%	0.21%	-0.03%

Table A16. Fusion XRF results for SO_3 in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	0.003	<0.01	0.002	0.004	<0.001	NR	<0.001	0.007	NR	NR	0.012	NR	NR	NR	<0.01	0.003	NR
2	0.005	<0.01	<0.002	0.003	<0.001	NR	0.001	<0.002	NR	NR	0.003	NR	NR	NR	<0.01	<0.002	NR
3	0.006	<0.01	0.002	0.003	<0.001	NR	<0.001	<0.002	NR	NR	0.005	NR	NR	NR	<0.01	<0.002	NR
4	0.006	<0.01	0.002	0.003	<0.001	NR	<0.001	<0.002	NR	NR	0.006	NR	NR	NR	<0.01	<0.002	NR
5	<0.001	<0.01	0.002	0.005	**<0.001**	NR	<0.001	0.007	NR	NR	0.004	NR	NR	NR	NR	NR	NR
6	<0.001	<0.01	<0.002	0.006	**0.023**	NR	<0.001	0.004	NR	NR	0.006	NR	NR	NR	NR	NR	NR
7	<0.001	<0.01	<0.002	0.004	**<0.001**	NR	<0.001	**0.015**	NR	NR	0.006	NR	NR	NR	NR	NR	NR
8	<0.001	<0.01	<0.002	0.005	**<0.001**	NR	<0.001	0.006	NR	NR	0.004	NR	NR	NR	NR	NR	NR
9	0.007	<0.01	0.003	0.005	0.011	NR	0.002	<0.002	NR	NR	0.007	NR	NR	NR	NR	NR	NR
10	<0.001	<0.01	0.005	0.003	0.012	NR	<0.001	<0.002	NR	NR	0.007	NR	NR	NR	NR	NR	NR
11	0.005	<0.01	0.004	0.004	0.011	NR	<0.001	<0.002	NR	NR	0.007	NR	NR	NR	NR	NR	NR
12	0.005	<0.01	0.004	0.005	**0.028**	NR	0.002	<0.002	NR	NR	0.006	NR	NR	NR	NR	NR	NR
Mean	0.005		0.003	0.004	0.017		0.002	0.008			0.006					0.003	
Median	0.005		0.003	0.004	0.012		0.002	0.007			0.006					0.003	
Std.Dev.	0.001		0.001	0.001	0.008		0.001	0.004			0.002						
Rel.Std.Dev.	23.72%		39.84%	24.72%	46.87%		34.64%	53.94%			37.39%						
PDM[3]	4.32%		-40.79%	-17.77%	235.51%		-67.11%	53.94%			20.06%					-40.79%	

Table A17. Fusion XRF results for TiO_2 in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R BF*XRF
1	0.060	0.055	0.050	0.047	0.050	NR	0.050	0.060	0.050	0.055	0.060	0.070	NR	0.050	0.050	0.045	0.050
2	0.070	0.055	0.050	0.048	0.050	NR	0.050	0.060	0.060	0.047	0.050	0.050	NR	0.040	0.050	0.045	0.050
3	0.060	0.050	0.050	0.049	0.060	NR	0.050	0.070	0.050	0.051	0.050	0.070	NR	0.050	0.050	0.041	0.040
4	0.060	0.050	0.050	0.050	0.060	NR	0.050	0.060	0.050	0.043	0.060	0.060	NR	0.050	0.050	0.047	0.040
5	0.060	0.050	0.050	0.049	0.050	NR	0.050	**0.080**	0.050	0.054	0.040	0.060	NR	0.050	NR	NR	NR
6	0.060	0.050	0.050	0.049	0.050	NR	0.050	**0.120**	0.050	0.047	0.060	0.070	NR	0.050	NR	NR	NR
7	0.060	0.055	0.050	0.050	0.050	NR	0.050	**0.110**	0.050	0.052	0.060	0.070	NR	0.050	NR	NR	NR
8	0.060	0.050	0.050	0.048	0.050	NR	0.050	**0.090**	0.050	0.045	0.070	0.060	NR	0.040	NR	NR	NR
9	0.060	0.050	0.050	0.046	0.050	NR	0.040	0.040	0.050	0.052	0.050	0.050	NR	0.050	NR	NR	NR
10	0.070	0.050	0.050	0.048	0.050	NR	0.050	0.060	0.050	0.045	0.050	0.070	NR	0.050	NR	NR	NR
11	0.060	0.050	0.050	0.047	0.050	NR	0.050	0.060	0.050	0.049	0.050	0.050	NR	0.050	NR	NR	NR
12	0.060	0.050	0.050	0.050	0.050	NR	0.050	**0.030**	0.050	0.050	0.060	0.050	NR	0.050	NR	NR	NR
Mean	0.062	0.051	0.050	0.048	0.052		0.049	0.070	0.051	0.049	0.055	0.061		0.048	0.050	0.045	0.045
Median	0.060	0.050	0.050	0.049	0.050		0.050	0.060	0.050	0.050	0.055	0.060		0.050	0.050	0.045	0.045
Std.Dev.	0.004	0.002	0.000	0.001	0.004		0.003	0.026	0.003	0.004	0.008	0.009		0.004	0.000	0.002	0.006
Rel.Std.Dev.	6.31%	4.41%	0.00%	2.71%	7.53%		5.87%	37.55%	5.68%	7.75%	14.50%	14.80%		8.05%	0.00%	5.58%	12.83%
PDM[3]	19.44%	-0.74%	-3.16%	-6.22%	0.07%		-4.77%	35.58%	-1.54%	-4.77%	6.53%	17.82%		-6.39%	-3.16%	-13.71%	-12.84%

Table A18. Fusion XRF results for Zn in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A BF*XRF	Lab B BF*XRF	Lab C BF*XRF	Lab D BF*XRF	Lab E BF*XRF	Lab F BF*XRF	Lab G BF*XRF	Lab H BF*XRF	Lab I BF*XRF	Lab J BF*XRF	Lab K BF*XRF	Lab L BF*XRF	Lab N BF*XRF	Lab O BF*XRF	Lab P BF*XRF	Lab Q BF*XRF	Lab R -
1	270	297	300	300	320	303	**230**	300	320	290	270	**360**	NR	**340**	**200**	**402**	NR
2	270	299	300	300	320	296	**240**	320	310	300	270	**360**	NR	**340**	**200**	306	NR
3	290	**290**	290	300	340	303	**230**	320	310	300	270	**360**	NR	**350**	**200**	323	NR
4	280	299	310	305	330	298	**230**	300	290	300	270	**360**	NR	**350**	**200**	303	NR
5	290	293	300	295	**340**	299	**220**	300	310	300	270	270	NR	340	NR	NR	NR
6	290	299	300	300	**350**	303	**200**	310	310	300	280	270	NR	340	NR	NR	NR
7	290	296	300	295	**330**	300	**210**	310	290	310	280	280	NR	330	NR	NR	NR
8	290	299	300	290	**330**	298	**210**	300	**130**	310	270	280	NR	330	NR	NR	NR
9	280	297	300	295	310	299	**200**	310	320	300	290	270	NR	**340**	NR	NR	NR
10	280	290	300	305	330	298	**230**	300	310	320	290	270	NR	**350**	NR	NR	NR
11	280	305	300	295	330	296	**230**	320	310	300	290	270	NR	**350**	NR	NR	NR
12	290	294	310	305	350	296	**220**	330	290	300	290	270	NR	**340**	NR	NR	NR
Mean	283	296	301	299	332	299	**221**	310	292	303	278	302		342	200	334	
Median	285	297	300	300	330	298	225	310	310	300	275	275		340	200	315	
Std.Dev.	8	4	5	5	12	3	13	10	52	8	9	43		7	0	47	
Rel.Std.Dev.	2.75%	1.47%	1.71%	1.62%	3.60%	0.84%	5.94%	3.37%	17.84%	2.49%	3.37%	14.33%		2.10%	0.00%	13.95%	
PDM[3]	-6.11%	-1.86%	-0.31%	-1.00%	9.91%	-0.86%	-26.82%	2.73%	-3.35%	0.24%	-7.77%	-0.03%		13.22%	-33.72%	10.52%	

Table A19. Results for LOI at 1000°C in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A LOI	Lab B LOI	Lab C LOI	Lab D LOI	Lab E LOI	Lab F LOI	Lab G LOI	Lab H LOI	Lab I LOI	Lab J LOI	Lab K LOI	Lab L LOI	Lab M LOI	Lab O LOI	Lab P LOI	Lab Q LOI	Lab R LOI
1	7.86	8.28	7.86	8.02	7.51	8.54	NR	7.80	7.44	**9.37**	8.28	8.10	**10.30**	7.57	8.03	8.52	7.61
2	7.68	8.29	7.87	8.02	7.70	8.35	NR	7.83	7.44	**9.62**	8.26	8.10	**9.92**	7.41	8.10	8.45	7.59
3	7.78	8.28	7.86	8.01	7.53	8.45	NR	7.78	7.50	**9.66**	8.22	8.10	**10.32**	7.56	8.06	8.50	7.49
4	7.79	8.28	7.83	8.04	**6.51**	8.67	NR	7.88	7.51	**9.94**	8.22	8.10	**8.71**	7.48	8.16	8.55	7.52
5	7.92	8.45	7.95	8.01	8.43	**9.49**	8.30	8.06	7.62	**9.38**	9.00	7.60	8.83	7.37	NR	NR	NR
6	7.90	8.45	7.92	8.01	8.23	**9.59**	8.12	7.93	7.68	**9.28**	9.17	7.80	9.04	7.43	NR	NR	NR
7	7.99	8.42	7.93	7.98	8.41	**9.27**	8.15	8.02	7.68	**9.29**	9.08	7.80	8.90	7.32	NR	NR	NR
8	7.76	8.46	7.93	8.04	8.37	**9.38**	8.11	8.09	7.63	**9.19**	8.76	7.70	8.79	7.35	NR	NR	NR
9	8.18	8.43	8.08	8.02	8.10	8.72	8.10	8.03	7.79	**10.01**	**9.56**	8.00	**10.33**	7.26	NR	NR	NR
10	8.17	8.48	8.06	7.98	7.96	**9.22**	8.17	8.01	7.78	**10.07**	**9.50**	8.00	**10.46**	7.29	NR	NR	NR
11	8.12	8.46	8.09	8.00	8.02	8.71	8.15	8.02	7.84	**10.18**	**9.60**	8.10	**10.34**	7.29	NR	NR	NR
12	8.07	8.45	7.93	8.00	**8.54**	8.88	8.24	8.05	**8.08**	**10.02**	**9.37**	8.10	**10.40**	7.28	NR	NR	NR
Mean	7.94	8.39	7.94	8.01	7.94	8.94	8.17	7.96	7.67	**9.67**	8.92	7.96	9.69	7.38	8.09	8.50	7.55
Median	7.91	8.44	7.93	8.01	8.06	8.80	8.15	8.02	7.66	9.64	9.04	8.05	10.11	7.36	8.08	8.51	7.56
Std.Dev.	0.17	0.08	0.09	0.02	0.57	0.43	0.07	0.11	0.19	0.36	0.55	0.18	0.76	0.11	0.06	0.04	0.06
Rel.Std.Dev.	2.14%	0.99%	1.12%	0.24%	7.18%	4.82%	0.85%	1.38%	2.45%	3.74%	6.19%	2.30%	7.81%	1.45%	0.69%	0.50%	0.75%
PDM[3]	-2.09%	3.54%	-2.00%	-1.16%	-2.00%	10.29%	0.77%	-1.81%	-5.42%	19.29%	10.04%	-1.81%	19.61%	-8.89%	-0.21%	4.92%	-6.81%

Table A20. Fusion ICP results for Ni in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	1.70	1.79	1.73	1.71	1.79	1.71	1.76	**1.50**	1.79	1.72	1.74	1.69
2	1.69	1.81	1.73	1.73	1.81	1.69	1.77	**1.67**	1.76	1.73	1.68	1.69
3	1.70	1.82	1.74	1.75	1.81	**1.50**	1.76	**1.66**	1.76	1.73	1.72	1.71
4	1.72	1.79	1.71	1.77	1.77	1.71	1.77	**1.52**	1.77	1.75	1.72	1.69
5	1.73	**1.94**	1.64	1.71	1.76	1.73	**1.86**	**1.48**	**1.77**	1.79	NR	NR
6	1.71	1.83	1.69	1.80	1.77	1.75	**1.85**	**1.57**	**1.90**	1.79	NR	NR
7	1.72	1.81	1.70	1.72	1.77	1.74	**1.85**	**1.60**	**1.85**	1.74	NR	NR
8	1.73	1.81	1.68	1.78	1.74	1.73	**1.85**	**1.59**	**1.85**	1.77	NR	NR
9	**1.59**	1.72	1.69	1.64	1.73	1.68	1.75	**1.43**	1.85	1.72	NR	NR
10	1.61	1.74	1.72	1.68	1.70	1.68	1.74	**1.51**	1.81	1.72	NR	NR
11	1.73	1.73	1.69	1.78	1.74	1.63	1.72	**1.40**	1.75	1.73	NR	NR
12	1.74	1.73	1.69	1.70	1.73	1.69	1.75	**1.40**	1.76	1.75	NR	NR
Mean	1.70	1.79	1.70	1.73	1.76	1.69	1.79	**1.53**	1.80	1.74	1.72	1.70
Median	1.71	1.80	1.70	1.72	1.76	1.70	1.77	1.51	1.78	1.74	1.72	1.69
Std.Dev.	0.05	0.06	0.03	0.05	0.03	0.07	0.05	0.09	0.05	0.03	0.03	0.01
Rel.Std.Dev.	2.81%	3.37%	1.61%	2.79%	1.92%	3.95%	2.86%	6.21%	2.66%	1.48%	1.47%	0.75%
PDM[3]	-2.16%	3.46%	-1.89%	-0.26%	1.46%	-2.64%	3.01%	-11.97%	3.97%	0.58%	-1.07%	-2.23%

Table A21. Fusion ICP results for Co in OREAS 191 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	**590**	654	660	570	678	650	680	**737**	617	650	624	670
2	**600**	645	660	610	661	640	660	**745**	622	650	635	660
3	**520**	652	660	660	666	660	670	**757**	605	660	633	675
4	**560**	657	680	620	655	640	670	**727**	624	660	600	661
5	670	**764**	660	670	667	650	690	**706**	661	680	NR	NR
6	700	691	640	660	654	620	670	**725**	661	670	NR	NR
7	640	700	640	**580**	666	630	670	**731**	661	660	NR	NR
8	620	714	660	670	665	660	680	**732**	650	670	NR	NR
9	580	708	720	630	**724**	650	610	**604**	655	650	NR	NR
10	620	687	700	590	**713**	650	620	**593**	643	650	NR	NR
11	590	710	680	630	**735**	630	610	**578**	616	640	NR	NR
12	630	701	700	690	**728**	640	620	**593**	615	660	NR	NR
Mean	610	690	672	632	684	643	654	**686**	636	658	623	666
Median	610	696	660	630	667	645	670	726	634	660	629	666
Std.Dev.	48	34	25	39	31	12	30	70	21	11	16	7
Rel.Std.Dev.	7.91%	4.95%	3.69%	6.18%	4.53%	1.91%	4.58%	10.28%	3.33%	1.69%	2.58%	1.08%
PDM[3]	-6.39%	5.93%	3.08%	-3.06%	5.02%	-1.27%	0.39%	5.22%	-2.44%	1.03%	-4.39%	2.28%

Table A22. Fusion ICP results for Al_2O_3 in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	4.14	4.24	4.10	4.16	4.33	4.30	4.45	4.10	**4.59**	4.23	4.16	4.19
2	4.03	4.28	4.12	4.10	4.30	4.30	4.29	4.03	**4.60**	4.17	4.23	4.20
3	4.08	4.25	4.10	4.02	4.32	4.29	4.31	4.08	**4.68**	4.11	4.12	4.26
4	4.08	4.20	4.12	4.03	4.32	4.28	4.43	4.00	**4.83**	4.17	**3.91**	4.21
5	4.20	**4.63**	4.14	4.25	4.24	4.26	4.34	4.11	4.29	4.18	NR	NR
6	4.20	4.34	4.08	4.19	4.34	4.29	4.26	4.17	4.19	4.11	NR	NR
7	4.20	4.26	4.12	4.02	4.25	4.26	4.30	4.16	4.21	4.09	NR	NR
8	4.23	4.34	4.02	4.04	4.18	4.29	4.30	4.21	4.23	4.12	NR	NR
9	**3.78**	4.14	4.04	**4.56**	4.34	4.18	4.39	4.06	4.17	4.11	NR	NR
10	3.84	4.16	4.23	4.14	4.30	4.24	4.34	4.04	4.19	4.12	NR	NR
11	4.21	4.16	4.12	4.42	4.36	4.21	4.31	3.90	4.12	4.14	NR	NR
12	4.19	4.10	4.08	4.02	4.27	4.21	4.20	3.96	4.19	4.17	NR	NR
Mean	4.10	4.26	4.11	4.16	4.30	4.26	4.33	4.07	4.36	4.14	4.11	4.21
Median	4.17	4.25	4.11	4.12	4.31	4.27	4.31	4.07	4.22	4.13	4.14	4.20
Std.Dev.	0.15	0.14	0.05	0.17	0.05	0.04	0.07	0.09	0.24	0.04	0.14	0.03
Rel.Std.Dev.	3.64%	3.28%	1.28%	4.17%	1.21%	0.95%	1.62%	2.22%	5.61%	0.98%	3.35%	0.73%
PDM[3]	-2.15%	1.67%	-1.97%	-0.62%	2.57%	1.69%	3.30%	-2.87%	4.08%	-1.08%	-1.99%	0.58%

Table A23. Fusion ICP results for CaO in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	**0.390**	0.280	0.300	**0.190**	0.280	0.270	0.290	0.292	**0.231**	0.300	<0.3	**0.358**
2	**0.420**	0.300	0.300	**0.210**	0.280	0.270	0.300	0.290	**0.220**	0.260	0.300	**0.362**
3	**0.320**	0.290	0.300	**0.260**	0.280	0.270	0.280	**0.330**	**0.219**	0.320	0.300	**0.353**
4	**0.310**	0.310	0.300	**0.230**	0.280	0.280	0.290	0.302	**0.224**	0.270	<0.3	**0.367**
5	**0.430**	0.320	0.300	**0.260**	0.280	0.260	0.290	0.291	**0.373**	**0.280**	NR	NR
6	**0.390**	0.300	0.300	**0.210**	0.290	0.270	0.290	0.285	0.266	**0.190**	NR	NR
7	**0.330**	0.300	0.300	**0.170**	0.280	0.270	0.290	0.288	0.266	**0.230**	NR	NR
8	**0.390**	0.280	0.300	**0.200**	0.270	0.270	0.290	0.289	0.277	**0.200**	NR	NR
9	**0.350**	0.250	0.300	**0.240**	0.260	0.270	0.300	0.286	**0.230**	0.300	NR	NR
10	**0.360**	0.300	0.300	**0.200**	0.270	0.270	0.290	**0.305**	**0.230**	0.290	NR	NR
11	**0.420**	0.270	0.300	**0.220**	0.270	0.270	0.300	0.287	**0.230**	0.320	NR	NR
12	**0.380**	0.260	0.300	**0.240**	0.270	0.280	0.300	0.289	**0.230**	0.290	NR	NR
Mean	**0.374**	0.288	0.300	**0.219**	0.276	0.271	0.293	0.295	0.250	0.271	0.300	0.360
Median	0.385	0.295	0.300	0.215	0.280	0.270	0.290	0.290	0.230	0.285	0.300	0.360
Std.Dev.	0.040	0.021	0.000	0.028	0.008	0.005	0.006	0.013	0.044	0.043	0.000	0.006
Rel.Std.Dev.	10.78%	7.22%	0.00%	12.68%	2.87%	1.90%	2.13%	4.33%	17.45%	16.01%	0.00%	1.59%
PDM[3]	30.47%	0.54%	4.61%	-23.58%	-3.82%	-5.56%	1.99%	2.69%	-12.90%	-5.56%	4.61%	25.56%

Table A24. Fusion ICP results for Cu in OREAS 191 (abbreviations as in Table A1; values in ppm).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	<50	58	50	50	<50	60	**<50**	**30**	69	50	49	53
2	<50	57	50	50	<50	60	**<50**	**<10**	60	50	48	54
3	<50	56	50	50	<50	70	**130**	**19**	**85**	50	40	58
4	<50	58	50	50	<50	70	**<50**	**27**	63	50	43	60
5	<50	50	<50	60	<50	70	**<50**	**20**	44	60	NR	NR
6	<50	47	50	50	<50	40	**90**	**24**	47	50	NR	NR
7	<50	38	50	50	50	60	**<50**	**24**	50	50	NR	NR
8	<50	52	<50	50	50	70	**<50**	**26**	52	50	NR	NR
9	<50	46	**100**	60	50	60	<50	**20**	62	60	NR	NR
10	<50	50	**100**	50	50	60	<50	**22**	57	50	NR	NR
11	<50	51	**50**	60	50	50	<50	**22**	57	60	NR	NR
12	<50	43	**100**	60	50	60	<50	**19**	60	60	NR	NR
Mean		51	65	53	50	61	110	**23**	59	53	45	56
Median		51	50	50	50	60	110	22	58	50	46	56
Std.Dev.		6	24	5	0	9	28	3	11	5	4	4
Rel.Std.Dev.		12.42%	37.16%	9.23%	0.00%	14.80%	25.71%	15.00%	18.62%	9.23%	9.43%	6.27%
PDM[3]		-4.43%	23.01%	0.93%	-5.37%	15.13%	108.18%	-56.45%	11.17%	0.93%	-14.84%	6.38%

Table A25. Fusion ICP results for Cr_2O_3 in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	1.17	1.29	1.27	1.15	1.18	1.20	1.17	1.25	**1.08**	1.21	1.22	1.24
2	1.14	1.29	1.27	**1.08**	1.17	1.22	1.18	1.22	**1.08**	1.20	1.20	1.26
3	1.21	1.30	1.28	1.17	1.16	1.20	1.18	1.23	**1.09**	**1.27**	1.21	1.26
4	1.21	1.28	1.26	1.13	1.18	1.21	1.17	**1.19**	**1.05**	1.21	1.22	1.25
5	1.17	1.31	1.16	1.14	1.20	1.21	**1.37**	1.22	1.20	1.27	NR	NR
6	1.17	1.25	1.17	1.13	1.23	1.19	**1.35**	1.24	1.21	1.23	NR	NR
7	1.23	1.17	1.18	**1.01**	1.20	1.19	**1.36**	1.24	1.26	1.23	NR	NR
8	1.23	1.21	1.15	1.17	1.16	1.19	**1.37**	1.25	1.25	1.23	NR	NR
9	1.15	1.22	1.18	1.26	1.21	1.21	1.27	1.19	1.20	1.20	NR	NR
10	1.16	1.23	1.18	1.15	1.20	1.24	1.29	1.19	1.21	1.23	NR	NR
11	1.23	1.25	1.14	1.23	1.23	1.23	1.27	1.16	1.19	1.21	NR	NR
12	1.24	1.25	1.18	1.20	1.21	1.25	1.28	1.16	1.19	1.24	NR	NR
Mean	1.19	1.25	1.20	1.15	1.19	1.21	1.27	1.21	1.17	1.23	1.21	1.25
Median	1.19	1.25	1.18	1.15	1.20	1.21	1.28	1.22	1.19	1.23	1.22	1.25
Std.Dev.	0.04	0.04	0.05	0.07	0.02	0.02	0.08	0.03	0.07	0.02	0.01	0.01
Rel.Std.Dev.	3.02%	3.29%	4.34%	5.69%	2.01%	1.67%	6.33%	2.74%	6.18%	1.97%	0.79%	0.74%
PDM[3]	-1.76%	3.29%	-1.01%	-5.12%	-1.64%	-0.33%	4.76%	-0.17%	-3.90%	1.14%	-0.11%	3.16%

Table A26. Fusion ICP results for Fe_2O_3 in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	23.90	25.63	24.70	**21.80**	25.05	25.42	24.12	25.55	23.82	24.80	24.50	25.57
2	23.40	25.94	24.70	**23.80**	24.87	25.44	25.17	24.64	23.69	24.90	23.90	25.64
3	24.30	26.11	24.90	**21.80**	24.57	25.37	23.28	25.16	23.79	24.90	23.30	26.07
4	24.40	25.59	24.90	**22.70**	25.04	25.44	23.89	24.55	23.45	25.20	22.70	25.73
5	24.60	**26.87**	23.70	23.10	25.14	24.95	24.68	24.49	25.14	24.90	NR	NR
6	24.40	25.51	23.90	22.90	25.46	25.13	24.45	24.59	25.63	24.70	NR	NR
7	25.00	25.11	23.70	**20.30**	24.83	25.02	24.74	24.50	25.71	24.30	NR	NR
8	24.90	25.28	23.60	23.40	24.78	25.08	**25.51**	24.87	25.61	24.50	NR	NR
9	22.30	25.52	24.30	25.60	24.86	25.19	24.87	24.57	24.00	24.90	NR	NR
10	22.50	25.85	24.50	23.50	24.61	25.30	24.75	24.25	23.99	24.90	NR	NR
11	23.90	25.72	24.00	24.80	24.75	25.28	25.17	23.40	23.84	25.00	NR	NR
12	24.10	25.71	24.60	24.20	24.74	25.33	**23.48**	23.89	23.89	25.40	NR	NR
Mean	23.98	25.74	24.29	23.16	24.89	25.25	24.51	24.54	24.38	24.87	23.60	25.75
Median	24.20	25.67	24.40	23.25	24.85	25.29	24.71	24.56	23.94	24.90	23.60	25.68
Std.Dev.	0.86	0.45	0.49	1.43	0.25	0.17	0.69	0.55	0.87	0.29	0.77	0.22
Rel.Std.Dev.	3.58%	1.74%	2.01%	6.17%	1.00%	0.67%	2.82%	2.24%	3.55%	1.15%	3.28%	0.86%
PDM[3]	-2.68%	4.47%	-1.39%	-5.99%	1.04%	2.48%	-0.51%	-0.39%	-1.03%	0.94%	-4.20%	4.54%

Table A27. Fusion ICP results for K_2O in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	<0.1	<0.1	<0.02	<0.1	0.010	<0.01	<0.01	<0.1	<0.01	0.120	<0.2	0.073
2	0.100	<0.1	<0.02	<0.1	0.020	<0.01	<0.01	<0.1	0.024	0.120	<0.2	0.083
3	<0.1	<0.1	<0.02	<0.1	0.020	<0.01	0.020	<0.1	0.081	0.120	<0.2	0.079
4	<0.1	<0.1	<0.02	<0.1	0.020	<0.01	<0.01	<0.1	0.047	0.120	<0.2	0.081
5	0.100	0.100	0.100	<0.1	0.020	<0.01	0.010	<0.1	0.007	0.120	NR	NR
6	0.100	0.100	<0.1	<0.1	0.020	<0.01	0.030	<0.1	0.006	<0.1	NR	NR
7	0.100	<0.1	<0.1	<0.1	0.010	<0.01	<0.01	<0.1	0.006	<0.1	NR	NR
8	0.100	<0.1	0.100	<0.1	0.020	<0.01	<0.01	0.119	0.006	<0.1	NR	NR
9	0.100	0.181	<0.1	<0.1	0.020	<0.01	<0.01	0.108	0.006	0.120	NR	NR
10	0.100	**0.253**	<0.1	<0.1	0.010	<0.01	0.020	0.130	0.006	0.120	NR	NR
11	<0.1	0.193	<0.1	<0.1	0.010	<0.01	<0.01	0.113	0.006	0.120	NR	NR
12	<0.1	0.181	<0.1	<0.1	0.010	<0.01	0.010	<0.1	0.006	0.120	NR	NR
Mean	0.100	0.168	0.100		0.016		0.018	0.118	0.018	0.120		0.079
Median	0.100	0.181	0.100		0.020		0.020	0.116	0.006	0.120		0.080
Std.Dev.	0.000	0.059	0.000		0.005		0.008	0.009	0.024	0.000		0.004
Rel.Std.Dev.	0.00%	35.15%	0.00%		32.52%		46.48%	8.06%	132.95%	0.00%		5.63%
PDM[3]	25.04%	109.87%	25.04%		-80.20%		-77.49%	46.92%	-76.99%	50.62%		-1.52%

Table A28. Fusion ICP results for MgO in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	9.27	9.90	9.83	8.97	10.26	10.37	10.16	10.62	10.39	9.76	9.43	10.05
2	9.09	9.98	9.77	9.88	10.23	10.33	9.89	10.41	10.27	9.74	9.91	10.01
3	9.53	10.05	9.85	9.83	10.18	10.40	9.75	10.61	10.44	9.72	9.60	10.27
4	9.57	9.81	9.75	9.02	10.18	10.37	9.98	10.28	**10.79**	9.85	8.89	10.12
5	9.85	**11.45**	9.68	9.56	9.94	10.04	9.99	10.67	9.80	10.25	NR	NR
6	9.82	10.77	9.70	9.45	10.18	10.10	9.75	10.82	9.61	10.20	NR	NR
7	9.91	10.63	9.80	**8.38**	10.08	10.07	9.77	10.71	9.73	10.05	NR	NR
8	9.89	10.70	9.62	9.58	9.87	10.07	9.82	10.87	9.74	10.10	NR	NR
9	8.98	10.18	10.00	10.85	10.04	10.00	9.90	10.34	9.87	9.65	NR	NR
10	9.15	10.32	9.80	9.83	9.96	10.01	9.92	10.37	9.91	9.65	NR	NR
11	9.89	10.23	9.80	10.45	10.12	10.04	9.73	9.99	9.79	9.63	NR	NR
12	9.92	10.25	9.80	10.05	10.06	10.05	9.82	10.05	9.94	9.81	NR	NR
Mean	9.57	10.36	9.78	9.65	10.09	10.15	9.87	10.48	10.02	9.87	9.46	10.11
Median	9.70	10.24	9.80	9.71	10.10	10.07	9.86	10.51	9.89	9.79	9.52	10.09
Std.Dev.	0.36	0.46	0.10	0.67	0.12	0.16	0.13	0.28	0.36	0.22	0.43	0.12
Rel.Std.Dev.	3.77%	4.47%	0.98%	6.90%	1.21%	1.58%	1.29%	2.72%	3.62%	2.26%	4.52%	1.15%
PDM[3]	-3.77%	4.10%	-1.65%	-2.95%	1.45%	2.07%	-0.75%	5.35%	0.76%	-0.81%	-4.93%	1.67%

Table A29. Fusion ICP results for MnO in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	0.380	0.404	0.384	**0.340**	0.390	0.390	0.403	0.389	**0.361**	0.400	0.391	0.408
2	0.370	0.405	0.390	**0.370**	0.390	0.390	0.405	0.381	**0.361**	0.400	0.375	0.404
3	0.380	0.407	0.392	**0.350**	0.390	0.400	0.392	0.387	**0.365**	0.400	0.393	0.414
4	0.380	0.402	0.380	**0.340**	0.390	0.400	0.401	0.384	**0.363**	0.400	0.378	0.406
5	0.400	**0.431**	0.382	**0.360**	0.400	0.390	0.405	0.401	0.401	0.410	NR	NR
6	0.400	0.410	0.388	**0.370**	0.410	0.400	0.400	0.399	0.409	0.410	NR	NR
7	0.400	0.398	0.390	**0.320**	0.400	0.390	0.401	0.399	0.417	0.400	NR	NR
8	0.400	0.404	0.374	**0.370**	0.390	0.400	0.417	0.405	0.417	0.410	NR	NR
9	0.370	0.405	0.390	0.410	0.400	0.390	0.412	0.404	0.401	0.400	NR	NR
10	0.380	0.410	0.398	0.380	0.400	0.390	0.402	0.403	0.402	0.400	NR	NR
11	0.390	0.408	0.384	0.400	0.400	0.390	0.408	0.386	0.399	0.400	NR	NR
12	0.390	0.410	0.398	0.380	0.400	0.400	0.401	0.394	0.401	0.410	NR	NR
Mean	0.387	0.408	0.388	0.366	0.397	0.394	0.404	0.394	0.391	0.403	0.384	0.408
Median	0.385	0.406	0.389	0.370	0.400	0.390	0.403	0.397	0.401	0.400	0.385	0.407
Std.Dev.	0.012	0.008	0.007	0.026	0.007	0.005	0.006	0.009	0.022	0.005	0.009	0.004
Rel.Std.Dev.	2.99%	2.01%	1.83%	7.04%	1.64%	1.31%	1.57%	2.17%	5.68%	1.22%	2.36%	1.02%
PDM[3]	-2.59%	2.78%	-2.38%	-7.84%	-0.07%	-0.70%	1.76%	-0.66%	-1.40%	1.61%	-3.20%	2.83%

Table A30. Fusion ICP results for Na_2O in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	NR	NR	NR	NR	0.020	0.010	0.020	<0.01	0.016	NR	NR	NR
2	NR	NR	NR	NR	0.020	0.010	0.020	<0.01	0.016	NR	NR	NR
3	NR	NR	NR	NR	0.020	0.020	0.030	<0.01	0.016	NR	NR	NR
4	NR	NR	NR	NR	0.020	0.010	0.020	<0.01	0.016	NR	NR	NR
5	NR	NR	NR	NR	0.020	0.010	0.010	<0.01	**0.022**	NR	NR	NR
6	NR	NR	NR	NR	0.020	0.020	0.030	0.012	0.018	NR	NR	NR
7	NR	NR	NR	NR	0.020	0.010	0.020	0.017	0.017	NR	NR	NR
8	NR	NR	NR	NR	0.020	0.010	0.010	<0.01	0.017	NR	NR	NR
9	NR	NR	NR	NR	0.020	0.020	0.020	0.016	0.018	NR	NR	NR
10	NR	NR	NR	NR	0.020	0.020	0.020	0.019	0.018	NR	NR	NR
11	NR	NR	NR	NR	0.020	0.020	0.020	0.015	0.018	NR	NR	NR
12	NR	NR	NR	NR	0.020	0.020	0.020	0.017	0.018	NR	NR	NR
Mean					0.020	0.015	0.020	0.016	0.018			
Median					0.020	0.015	0.020	0.017	0.017			
Std.Dev.					0.000	0.005	0.006	0.002	0.002			
Rel.Std.Dev.					0.00%	34.82%	30.15%	14.79%	9.96%			
PDM[3]					13.56%	-14.83%	13.56%	-9.15%	-0.62%			

Table A31. Fusion ICP results for P_2O_5 in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	NR	<0.03	<0.02	<0.02	0.010	<0.01	<0.01	<0.01	0.012	NR	NR	0.001
2	NR	<0.03	<0.02	<0.02	0.010	0.020	<0.01	<0.01	0.032	NR	NR	0.007
3	NR	<0.03	<0.02	<0.02	0.020	0.020	<0.01	<0.01	0.009	NR	NR	0.004
4	NR	<0.03	<0.02	<0.02	0.020	<0.01	<0.01	<0.01	0.023	NR	NR	0.015
5	NR	<0.03	<0.02	**0.050**	0.010	<0.01	<0.01	<0.01	<0.01	NR	NR	NR
6	NR	<0.03	<0.02	<0.02	0.010	<0.01	<0.01	<0.01	<0.01	NR	NR	NR
7	NR	<0.03	<0.02	0.020	**<0.01**	<0.01	0.020	<0.01	<0.01	NR	NR	NR
8	NR	<0.03	<0.02	0.020	**<0.01**	<0.01	0.010	<0.01	<0.01	NR	NR	NR
9	NR	<0.03	<0.02	<0.02	0.020	<0.01	<0.01	<0.01	0.007	NR	NR	NR
10	NR	<0.03	0.020	<0.02	0.010	<0.01	0.020	<0.01	<0.01	NR	NR	NR
11	NR	<0.03	0.020	<0.02	0.010	<0.01	0.010	<0.01	<0.01	NR	NR	NR
12	NR	<0.03	0.040	<0.02	0.020	<0.01	0.020	<0.01	<0.01	NR	NR	NR
Mean			0.027	0.030	0.014	0.020	0.016		0.017			0.007
Median			0.020	0.020	0.010	0.020	0.020		0.012			0.006
Std.Dev.			0.012	0.017	0.005	0.000	0.005		0.011			0.006
Rel.Std.Dev.			43.30%	57.74%	36.89%	0.00%	34.23%		63.99%			89.20%
PDM[3]			55.52%	74.96%	-18.35%	16.64%	-6.69%		-3.11%			-60.63%

Table A32. Fusion ICP results for SiO_2 in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	45.50	48.20	46.20	48.80	47.80	47.59	49.25	48.49	47.15	48.70	47.80	49.69
2	**44.30**	48.20	46.60	44.60	47.46	47.55	49.17	47.25	47.88	48.30	45.60	49.58
3	46.00	48.00	46.40	47.30	47.10	47.81	48.22	48.44	47.10	47.60	48.70	50.45
4	46.00	48.10	46.40	43.90	47.44	47.43	49.00	46.22	48.49	48.50	46.10	50.03
5	47.50	**53.20**	45.80	**47.40**	47.52	48.18	49.10	49.52	47.60	**48.30**	NR	NR
6	48.90	50.40	45.80	**46.00**	48.14	48.02	47.87	49.64	47.23	47.10	NR	NR
7	49.60	49.70	**47.30**	**40.50**	47.26	48.12	48.42	49.25	47.53	46.70	NR	NR
8	47.20	49.80	45.30	**43.20**	46.50	47.96	48.22	49.56	47.43	47.00	NR	NR
9	43.70	**53.60**	45.10	48.10	48.48	48.12	48.96	**40.96**	47.22	46.30	NR	NR
10	44.10	**54.50**	46.40	43.80	48.07	47.90	48.46	**39.72**	47.18	46.40	NR	NR
11	46.50	**53.70**	44.90	46.70	48.68	47.98	48.48	**38.32**	47.49	46.60	NR	NR
12	47.10	**54.00**	46.00	46.30	47.71	47.85	48.45	**38.81**	47.48	47.00	NR	NR
Mean	46.37	50.95	46.02	45.55	47.68	47.88	48.63	45.51	47.48	47.38	47.05	49.94
Median	46.25	50.10	46.10	46.15	47.62	47.93	48.47	47.84	47.45	47.05	46.95	49.86
Std.Dev.	1.83	2.64	0.68	2.40	0.61	0.24	0.45	4.63	0.39	0.87	1.45	0.39
Rel.Std.Dev.	3.95%	5.18%	1.49%	5.27%	1.27%	0.50%	0.92%	10.16%	0.82%	1.83%	3.08%	0.78%
PDM[3]	-2.74%	6.88%	-3.47%	-4.45%	0.02%	0.43%	2.02%	-4.52%	-0.40%	-0.62%	-1.30%	4.75%

Table A33. Fusion ICP results for SO_3 in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	<0.02	<0.05	<0.1	<0.02	<0.01	NR	NR	NR	NR	0.075	0.100	NR
2	<0.02	<0.05	<0.1	<0.02	<0.01	NR	NR	NR	NR	0.075	0.125	NR
3	0.040	<0.05	<0.1	<0.02	<0.01	NR	NR	NR	NR	0.100	<0.01	NR
4	0.030	<0.05	<0.1	<0.02	<0.01	NR	NR	NR	NR	0.050	0.050	NR
5	<0.02	<0.05	**<0.02**	<0.02	NR	NR	NR	NR	NR	<0.01	NR	NR
6	<0.02	<0.05	**0.020**	<0.02	NR	NR	NR	NR	NR	<0.01	NR	NR
7	<0.02	<0.05	**<0.02**	<0.02	NR	NR	NR	NR	NR	<0.01	NR	NR
8	0.020	<0.05	**0.220**	<0.02	NR	NR	NR	NR	NR	<0.01	NR	NR
9	<0.02	<0.05	0.040	0.020	<0.02	NR	NR	NR	NR	<0.01	NR	NR
10	<0.02	<0.05	0.040	0.020	<0.02	NR	NR	NR	NR	0.025	NR	NR
11	<0.02	<0.05	0.040	0.020	<0.02	NR	NR	NR	NR	0.150	NR	NR
12	0.020	<0.05	0.040	<0.02	<0.02	NR	NR	NR	NR	0.025	NR	NR
Mean	0.028		0.067	0.020						0.071	0.092	
Median	0.025		0.040	0.020						0.075	0.100	
Std.Dev.	0.010		0.076	0.000						0.044	0.038	
Rel.Std.Dev.	34.82%		113.31%	0.00%						62.05%	41.66%	
PDM[3]	-45.09%		33.12%	-60.06%						42.46%	82.82%	

Table A34. Fusion ICP results for TiO_2 in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	**<0.01**	0.050	0.050	**0.040**	0.050	0.050	0.050	**0.041**	**0.044**	0.050	**0.040**	0.053
2	**<0.01**	0.050	0.050	**0.040**	0.050	0.050	0.051	**0.039**	**0.043**	0.050	**0.040**	0.053
3	**0.020**	0.050	0.050	**0.050**	0.051	0.050	0.049	**0.040**	**0.043**	0.050	**0.050**	0.056
4	**0.010**	0.050	0.050	**0.040**	0.051	0.050	0.050	**0.049**	**0.043**	0.050	**0.040**	0.054
5	**<0.01**	**0.060**	0.050	0.050	0.051	0.050	0.050	0.051	0.047	0.050	NR	NR
6	**<0.01**	0.050	0.050	0.050	0.052	0.050	0.048	0.050	0.052	0.050	NR	NR
7	**0.020**	0.050	0.050	**0.040**	0.051	**0.060**	0.049	0.053	0.050	0.050	NR	NR
8	**<0.01**	0.050	0.050	**0.040**	0.050	0.050	0.050	0.052	0.051	0.050	NR	NR
9	**<0.01**	0.050	0.050	0.050	0.052	0.050	0.049	0.048	**0.061**	0.050	NR	NR
10	**<0.01**	0.050	0.050	**0.040**	0.053	0.050	0.049	0.047	**0.057**	0.050	NR	NR
11	**<0.01**	0.050	0.050	0.050	0.052	0.050	0.049	0.047	**0.058**	0.050	NR	NR
12	**0.030**	0.050	0.050	**0.040**	0.052	0.050	0.049	0.049	**0.053**	0.050	NR	NR
Mean	0.020	0.051	0.050	0.044	0.051	0.051	0.049	0.047	0.050	0.050	0.043	0.054
Median	0.020	0.050	0.050	0.040	0.051	0.050	0.049	0.049	0.051	0.050	0.040	0.054
Std.Dev.	0.008	0.003	0.000	0.005	0.001	0.003	0.001	0.005	0.006	0.000	0.005	0.001
Rel.Std.Dev.	40.82%	5.68%	0.00%	11.66%	1.88%	5.68%	1.60%	9.98%	12.55%	0.00%	11.76%	2.18%
PDM[3]	-60.36%	0.75%	-0.90%	-12.46%	1.58%	0.75%	-2.05%	-6.51%	-0.70%	-0.90%	-15.76%	7.34%

Table A35. Fusion ICP results for Zn in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A PF*OES	Lab C PF*OES	Lab D PF*OES	Lab E PF*OES	Lab G MAR*OES	Lab H BF*OES	Lab I PF*ICP	Lab J BF*OES	Lab M PF*OES	Lab O PF*OES	Lab P PF*OES	Lab S PF*OES
1	300	**321**	**250**	300	**220**	NR	300	296	259	300	**171**	NR
2	300	301	300	300	**220**	NR	300	283	259	300	**392**	NR
3	300	303	300	300	**210**	NR	300	301	**250**	300	**206**	NR
4	300	298	300	300	**200**	NR	300	282	**221**	300	**189**	NR
5	300	338	300	300	**220**	NR	300	291	**213**	300	NR	NR
6	300	314	**350**	300	**210**	NR	300	299	**213**	300	NR	NR
7	300	312	300	300	**210**	NR	300	293	**213**	300	NR	NR
8	300	336	300	300	**210**	NR	300	297	**213**	300	NR	NR
9	300	293	**350**	300	**200**	NR	300	289	295	300	NR	NR
10	300	278	**350**	300	**190**	NR	300	298	285	300	NR	NR
11	300	303	**350**	300	**200**	NR	300	277	277	300	NR	NR
12	300	298	**400**	300	**200**	NR	300	283	272	300	NR	NR
Mean	300	308	321	300	**208**		300	291	248	300	240	
Median	300	303	300	300	210		300	292	254	300	198	
Std.Dev.	0	17	40	0	10		0	8	31	0	103	
Rel.Std.Dev.	0.00%	5.65%	12.36%	0.00%	4.65%		0.00%	2.71%	12.70%	0.00%	42.87%	
PDM[3]	1.18%	3.85%	8.21%	1.18%	-30.02%		1.18%	-1.94%	-16.51%	1.18%	-19.22%	

Table A36. Results for C in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A IRC	Lab C IRC	Lab D IRC	Lab E IRC	Lab H IRC	Lab I IRC	Lab J IRC	Lab K IRC	Lab L IRC	Lab M IRC	Lab O IRC
1	0.090	0.090	0.080	0.050	0.110	0.110	0.117	0.060	0.110	0.081	0.080
2	0.100	0.090	0.070	0.050	0.110	0.070	0.107	0.060	0.110	0.084	0.070
3	0.100	0.080	0.070	0.060	0.130	0.070	0.096	0.060	0.100	0.086	0.080
4	0.080	0.080	0.080	0.060	**0.210**	0.090	0.121	0.050	0.110	0.093	0.070
5	0.080	0.080	0.080	0.060	0.120	0.070	**0.123**	0.070	0.120	0.088	0.070
6	0.070	0.090	0.070	0.060	0.120	0.070	0.106	0.070	0.120	0.086	0.080
7	0.070	0.090	0.080	0.060	0.120	0.070	0.109	0.070	0.130	0.090	0.080
8	0.070	0.100	0.080	0.050	0.110	0.090	0.104	0.070	0.110	0.091	0.080
9	0.070	0.100	0.050	0.080	0.120	0.070	0.121	0.060	0.130	0.076	0.060
10	0.120	0.100	0.050	0.080	0.110	0.070	0.120	0.060	0.120	0.086	0.070
11	0.090	0.100	0.050	0.070	0.100	0.060	0.116	0.060	0.120	0.089	0.060
12	0.090	0.110	0.060	0.070	0.100	0.070	0.112	0.060	0.110	0.081	0.060
Mean	0.086	0.093	0.068	0.063	0.122	0.076	0.113	0.063	0.116	0.086	0.072
Median	0.085	0.090	0.070	0.060	0.115	0.070	0.114	0.060	0.115	0.086	0.070
Std.Dev.	0.016	0.010	0.013	0.011	0.029	0.014	0.008	0.006	0.009	0.005	0.008
Rel.Std.Dev.	18.22%	10.44%	18.55%	16.88%	23.98%	18.18%	7.44%	9.95%	7.77%	5.48%	11.65%
PDM[3]	-0.23%	7.52%	-20.57%	-27.35%	41.43%	-11.85%	30.96%	-27.35%	34.65%	-0.09%	-16.69%

Table A37. Results for S in OREAS 191 (abbreviations as in Table A1; values in wt.%).

Replicate No.	Lab A IRC	Lab C IRC	Lab D IRC	Lab E IRC	Lab H IRC	Lab I IRC	Lab J IRC	Lab K IRC	Lab L IRC	Lab M IRC	Lab O IRC
1	0.010	<0.005	<0.01	<0.01	<0.02	<0.01	0.020	<0.01	<0.01	0.005	<0.01
2	0.010	<0.005	<0.01	<0.01	<0.02	<0.01	0.010	<0.01	<0.01	<0.003	<0.01
3	<0.01	<0.005	<0.01	<0.01	<0.02	<0.01	0.010	<0.01	<0.01	<0.003	<0.01
4	<0.01	<0.005	<0.01	<0.01	<0.02	<0.01	0.020	<0.01	<0.01	<0.003	<0.01
5	<0.01	0.019	<0.01	<0.01	<0.02	<0.01	0.020	<0.01	<0.01	0.017	<0.01
6	0.010	0.018	<0.01	0.010	<0.02	<0.01	0.010	<0.01	<0.01	0.015	<0.01
7	0.010	0.017	<0.01	0.020	<0.02	<0.01	0.020	<0.01	<0.01	0.016	<0.01
8	<0.01	0.017	<0.01	0.010	<0.02	<0.01	0.010	<0.01	<0.01	0.019	<0.01
9	<0.01	<0.005	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	0.016	<0.01
10	<0.01	<0.005	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	0.014	<0.01
11	<0.01	<0.005	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	0.018	<0.01
12	<0.01	<0.005	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	0.023	<0.01
Mean	0.010	0.018		0.013			0.015			0.016	
Median	0.010	0.018		0.010			0.015			0.016	
Std.Dev.	0.000	0.001		0.006			0.005			0.005	
Rel.Std.Dev.	0.00%	5.39%		43.30%			35.63%			30.96%	
PDM[3]	-31.74%	21.16%		-8.99%			2.39%			7.94%	