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CERTIFICATE OF ANALYSIS FOR

NICKEL LATERITE ORE REFERENCE MATERIAL

OREAS 190

Constituent	Certified Value	1SD
Fusion XRF		
Nickel, Ni (wt.%)	1.64	0.03
Cobalt, Co (ppm)	889	24
Aluminium oxide, Al_2O_3 (wt.%)	6.00	0.07
Calcium oxide, CaO (wt.%)	0.133	0.010
Chlorine, Cl (ppm)	*<50*	IND
Copper, Cu (ppm)	*~70*	IND
Chromium oxide, Cr_2O_3 (wt.%)	1.73	0.03
Iron oxide, Fe_2O_3 (wt.%)	35.48	0.31
Potassium oxide, K_2O (wt.%)	*<0.01*	IND
Magnesium oxide, MgO (wt.%)	6.91	0.08
Manganese oxide, MnO (wt.%)	0.577	0.009
Sodium oxide, Na_2O (wt.%)	*~0.02*	IND
Phosphorus oxide, P_2O_5 (wt.%)	*<0.01*	IND
Silicon dioxide, SiO_2 (wt.%)	38.22	0.34
Sulphur oxide, SO_3 (wt.%)	*<0.01*	IND
Titanium oxide, TiO_2 (wt.%)	0.064	0.006
Zinc, Zn (ppm)	353	21
Loss on ignition, LOI (wt.%)	8.38	0.42
Fusion ICP		
Nickel, Ni (wt.%)	1.62	0.04
Cobalt, Co (ppm)	875	50
Aluminium oxide, Al_2O_3 (wt.%)	5.86	0.18
Calcium oxide, CaO (wt.%)	0.133	0.028
Copper, Cu (ppm)	68	11
Chromium oxide, Cr_2O_3 (wt.%)	1.71	0.05
Iron oxide, Fe_2O_3 (wt.%)	35.40	1.01
Potassium oxide, K_2O (wt.%)	*<0.01*	IND
Magnesium oxide, MgO (wt.%)	6.85	0.21
Manganese oxide, MnO (wt.%)	0.574	0.020
Sodium oxide, Na_2O (wt.%)	*~0.01*	IND
Phosphorus oxide, P_2O_5 (wt.%)	*<0.02*	IND
Silica dioxide, SiO_2 (wt.%)	38.06	0.95
Sulphur oxide, SO_3 (wt.%)	*<0.02*	IND
Titanium oxide, TiO_2 (wt.%)	0.062	0.006
Zinc, Zn (ppm)	327	60
IR Combustion Furnace		
Carbon, C (wt.%)	0.07	0.01
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 190 is one of a suite of thirteen nickel laterite CRMs (OREAS 182 to OREAS 195) prepared from transitional 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 190 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 190

OREAS 190 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.

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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 190

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).

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

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

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).

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Table 1. Certified Values and 95% Confidence Intervals for OREAS 190.

Constituent	Certified Value	95% Confidence Interval	
		Low	High
Fusion XRF			
Nickel, Ni (wt.%)	1.64	1.62	1.65
Cobalt, Co (ppm)	889	874	904
Aluminium oxide, Al_2O_3 (wt.%)	6.00	5.97	6.03
Calcium oxide, CaO (wt.%)	0.133	0.128	0.138
Chlorine, Cl (ppm)	*<50*	IND	IND
Copper, Cu (ppm)	*~70*	IND	IND
Chromium oxide, Cr_2O_3 (wt.%)	1.73	1.71	1.74
Iron oxide, Fe_2O_3 (wt.%)	35.48	35.31	35.64
Potassium oxide, K_2O (wt.%)	*<0.01*	IND	IND
Magnesium oxide, MgO (wt.%)	6.91	6.88	6.94
Manganese oxide, MnO (wt.%)	0.577	0.573	0.582
Sodium oxide, Na_2O (wt.%)	*~0.02*	IND	IND
Phosphorus oxide, P_2O_5 (wt.%)	*<0.01*	IND	IND
Silicon dioxide, SiO_2 (wt.%)	38.22	38.06	38.38
Sulphur oxide, SO_3 (wt.%)	*<0.01*	IND	IND
Titanium oxide, TiO_2 (wt.%)	0.064	0.062	0.066
Zinc, Zn (ppm)	353	341	364
Loss on ignition, LOI (wt.%)	8.38	8.14	8.62
Fusion ICP			
Nickel, Ni (wt.%)	1.62	1.60	1.65
Cobalt, Co (ppm)	875	857	892
Aluminium oxide, Al_2O_3 (wt.%)	5.86	5.76	5.95
Calcium oxide, CaO (wt.%)	0.133	0.114	0.152
Copper, Cu (ppm)	68	63	73
Chromium oxide, Cr_2O_3 (wt.%)	1.71	1.69	1.73
Iron oxide, Fe_2O_3 (wt.%)	35.40	34.83	35.98
Potassium oxide, K_2O (wt.%)	*<0.02*	IND	IND
Magnesium oxide, MgO (wt.%)	6.85	6.77	6.93
Manganese oxide, MnO (wt.%)	0.574	0.564	0.584
Sodium oxide, Na_2O (wt.%)	*~0.01*	IND	IND
Phosphorus oxide, P_2O_5 (wt.%)	*<0.02*	IND	IND
Silica dioxide, SiO_2 (wt.%)	38.06	37.54	38.57
Sulphur oxide, SO_3 (wt.%)	*<0.02*	IND	IND
Titanium oxide, TiO_2 (wt.%)	0.062	0.058	0.066
Zinc, Zn (ppm)	327	287	368
IR Combustion Furnace			
Carbon, C (wt.%)	0.07	0.06	0.08
Sulphur, S (wt.%)	*<0.01*	IND	IND

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

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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 1.63 and 1.64 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

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

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.

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Table 2. Certified Values and Tolerance Limits for OREAS 190.

Constituent	Certified Value	Tolerance limits 1-α=0.99, ρ=0.95	
		Low	High
Fusion XRF			
Nickel, Ni (wt.%)	1.64	1.63	1.64
Cobalt, Co (ppm)	889	877	900
Aluminium oxide, Al_2O_3 (wt.%)	6.00	5.97	6.04
Calcium oxide, CaO (wt.%)	0.133	0.130	0.136
Chlorine, Cl (ppm)	*<50*	IND	IND
Copper, Cu (ppm)	*~70*	IND	IND
Chromium oxide, Cr_2O_3 (wt.%)	1.73	1.72	1.74
Iron oxide, Fe_2O_3 (wt.%)	35.48	35.37	35.58
Potassium oxide, K_2O (wt.%)	*<0.01*	IND	IND
Magnesium oxide, MgO (wt.%)	6.91	6.87	6.94
Manganese oxide, MnO (wt.%)	0.577	0.575	0.580
Sodium oxide, Na_2O (wt.%)	*~0.02*	IND	IND
Phosphorus oxide, P_2O_5 (wt.%)	*<0.01*	IND	IND
Silicon dioxide, SiO_2 (wt.%)	38.22	38.11	38.32
Sulphur oxide, SO_3 (wt.%)	*<0.01*	IND	IND
Titanium oxide, TiO_2 (wt.%)	0.064	0.059	0.068
Zinc, Zn (ppm)	353	343	362
Loss on ignition, LOI (wt.%)	8.38	8.31	8.45
Fusion ICP			
Nickel, Ni (wt.%)	1.62	1.59	1.66
Cobalt, Co (ppm)	875	852	898
Aluminium oxide, Al_2O_3 (wt.%)	5.86	5.78	5.93
Calcium oxide, CaO (wt.%)	0.133	0.120	0.145
Copper, Cu (ppm)	68	61	75
Chromium oxide, Cr_2O_3 (wt.%)	1.71	1.68	1.74
Iron oxide, Fe_2O_3 (wt.%)	35.40	34.95	35.86
Potassium oxide, K_2O (wt.%)	*<0.02*	IND	IND
Magnesium oxide, MgO (wt.%)	6.85	6.77	6.93
Manganese oxide, MnO (wt.%)	0.574	0.568	0.580
Sodium oxide, Na_2O (wt.%)	*~0.01*	IND	IND
Phosphorus oxide, P_2O_5 (wt.%)	*<0.02*	IND	IND
Silica dioxide, SiO_2 (wt.%)	38.06	37.60	38.51
Sulphur oxide, SO_3 (wt.%)	*<0.02*	IND	IND
Titanium oxide, TiO_2 (wt.%)	0.062	0.060	0.064
Zinc, Zn (ppm)	327	313	342
IR Combustion Furnace			
Carbon, C (wt.%)	0.07	IND	IND
Sulphur, S (wt.%)	*<0.01*	IND	IND

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

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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 190 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 190. 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 190. 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 1.00 for nickel, 0.944 for cobalt, 1.00 for iron oxide and 0.816 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 190 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 190

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.%)	1.64	0.03	1.58	1.69	1.56	1.71	1.60%	3.20%	4.81%
Co (ppm)	889	24	840	938	816	962	2.74%	5.49%	8.23%
Al_2O_3 (wt.%)	6.00	0.07	5.86	6.14	5.80	6.21	1.15%	2.30%	3.45%
CaO (wt.%)	0.133	0.010	0.113	0.153	0.104	0.163	7.39%	14.79%	22.18%
Cl (ppm)	*<50*	IND	IND	IND	IND	IND	IND	IND	IND
Cu (ppm)	*~70*	IND	IND	IND	IND	IND	IND	IND	IND
Cr_2O_3 (wt.%)	1.73	0.03	1.67	1.78	1.65	1.80	1.48%	2.97%	4.45%
Fe_2O_3 (wt.%)	35.48	0.31	34.86	36.09	34.55	36.40	0.87%	1.73%	2.60%
K_2O (wt.%)	*<0.01*	IND	IND	IND	IND	IND	IND	IND	IND
MgO (wt.%)	6.91	0.08	6.75	7.07	6.67	7.15	1.16%	2.31%	3.47%
MnO (wt.%)	0.577	0.009	0.559	0.595	0.550	0.604	1.56%	3.12%	4.69%
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.%)	38.22	0.34	37.54	38.90	37.19	39.24	0.89%	1.78%	2.68%
SO_3 (wt.%)	*<0.01*	IND	IND	IND	IND	IND	IND	IND	IND
TiO_2 (wt.%)	0.064	0.006	0.052	0.075	0.047	0.081	8.88%	17.77%	26.65%
Zn (ppm)	353	21	311	394	290	415	5.90%	11.81%	17.71%
LOI (wt.%)	8.38	0.42	7.55	9.22	7.13	9.63	4.99%	9.97%	14.96%
Fusion ICP									
Ni (wt.%)	1.62	0.04	1.53	1.71	1.49	1.75	2.73%	5.45%	8.18%
Co (ppm)	875	50	775	974	725	1024	5.70%	11.40%	17.10%
Al_2O_3 (wt.%)	5.86	0.18	5.50	6.21	5.32	6.39	3.05%	6.09%	9.14%
CaO (wt.%)	0.133	0.028	0.077	0.189	0.049	0.216	20.96%	41.92%	62.89%
Cu (ppm)	68	11	45	91	34	102	16.77%	33.55%	50.32%
Cr_2O_3 (wt.%)	1.71	0.05	1.60	1.82	1.55	1.87	3.16%	6.32%	9.47%
Fe_2O_3 (wt.%)	35.40	1.01	33.39	37.42	32.38	38.43	2.85%	5.70%	8.55%
K_2O (wt.%)	*<0.01*	IND	IND	IND	IND	IND	IND	IND	IND
MgO (wt.%)	6.85	0.21	6.43	7.27	6.21	7.49	3.10%	6.20%	9.30%
MnO (wt.%)	0.574	0.020	0.534	0.614	0.514	0.634	3.47%	6.94%	10.40%
Na_2O (wt.%)	*~0.01*	IND	IND	IND	IND	IND	IND	IND	IND
P_2O_5 (wt.%)	*<0.02*	IND	IND	IND	IND	IND	IND	IND	IND
SiO_2 (wt.%)	38.06	0.95	36.16	39.95	35.21	40.90	2.49%	4.98%	7.46%
SO_3 (wt.%)	*<0.02*	IND	IND	IND	IND	IND	IND	IND	IND
TiO_2 (wt.%)	0.062	0.006	0.050	0.074	0.044	0.080	9.78%	19.55%	29.33%
Zn (ppm)	327	60	206	448	146	509	18.47%	36.95%	55.42%
IR Combustion Furnace									
C (wt.%)	0.07	0.01	0.04	0.09	0.02	0.11	21.99%	43.98%	65.96%
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

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PARTICIPATING LABORATORIES

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Activation Laboratories, Ancaster, Ontario, Canada
ALS, Callao, Lima, Peru
ALS, Malaga, WA, Australia
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BV Amdel, Cardiff, NSW, Australia
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PREPARER AND SUPPLIER OF THE REFERENCE MATERIAL

Nickel laterite ore reference material OREAS 190 has been prepared and certified and is supplied by:

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

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OREAS 190 is packaged in unit sizes of 10g (single-use laminated foil pouches) and 1kg (wide mouthed plastic jars).

INTENDED USE

OREAS 190 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

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STABILITY AND STORAGE INSTRUCTIONS

OREAS 190 has been sourced from a sample of transitional 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.

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APPENDIX

Analytical Data for OREAS 190

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 190 (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	1.62	1.66	1.61	1.62	1.70	1.60	1.62	1.68	1.63	1.69	1.61	1.64	1.59	1.65	1.64	1.66	1.61
2	1.61	1.65	1.62	1.62	1.70	1.61	1.62	1.67	1.64	1.69	1.60	1.62	**1.64**	1.66	1.65	1.65	1.60
3	1.63	1.65	1.62	1.62	1.69	1.62	1.64	1.67	1.64	**1.66**	1.61	1.62	1.59	1.64	1.64	1.65	1.60
4	1.62	1.66	1.61	1.61	1.68	1.61	1.63	1.69	1.64	1.70	1.62	1.63	1.61	1.65	1.65	1.67	1.60
5	1.63	1.64	1.62	1.62	1.68	1.63	1.61	1.65	1.63	**1.71**	1.60	1.62	1.65	1.65	NR	NR	NR
6	1.62	1.64	1.63	1.63	1.67	1.63	1.61	1.66	1.63	1.67	1.59	1.61	1.64	1.65	NR	NR	NR
7	1.61	1.65	1.63	1.61	1.68	1.62	1.63	1.67	1.63	1.67	1.60	1.62	1.64	1.65	NR	NR	NR
8	1.65	1.64	1.63	1.62	1.69	1.61	**1.51**	1.66	1.63	1.66	1.61	1.60	1.65	1.65	NR	NR	NR
9	1.65	1.64	1.61	1.60	1.70	1.61	1.64	1.66	1.63	1.69	1.60	1.62	1.65	1.62	NR	NR	NR
10	1.65	1.64	1.62	1.61	1.67	1.61	1.64	1.67	1.64	1.68	1.59	1.62	1.65	1.63	NR	NR	NR
11	1.65	1.64	1.63	1.61	1.68	1.60	1.63	1.69	1.63	1.68	1.60	1.61	1.65	1.63	NR	NR	NR
12	1.64	1.64	1.62	1.61	1.68	1.61	1.63	1.67	1.65	1.66	**1.63**	1.60	1.65	1.62	NR	NR	NR
Mean	1.63	1.64	1.62	1.62	1.68	1.61	1.62	1.67	1.64	1.68	1.60	1.62	1.63	1.64	1.65	1.66	1.60
Median	1.63	1.64	1.62	1.62	1.68	1.61	1.63	1.67	1.63	1.68	1.60	1.62	1.64	1.65	1.65	1.66	1.60
Std.Dev.	0.02	0.01	0.01	0.01	0.01	0.01	0.04	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.01
Rel.Std.Dev.	0.94%	0.41%	0.41%	0.49%	0.61%	0.52%	2.19%	0.70%	0.41%	0.99%	0.68%	0.70%	1.43%	0.79%	0.35%	0.69%	0.31%
PDM[3]	-0.35%	0.52%	-0.91%	-1.27%	2.91%	-1.45%	-1.11%	2.00%	-0.04%	2.61%	-2.01%	-1.11%	-0.06%	0.19%	0.57%	1.19%	-2.03%

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Table A3. Fusion XRF results for Co in OREAS 190 (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	890	900	860	910	920	860	NR	**1070**	910	860	870	900	**530**	910	800	882	900
2	880	900	860	900	930	880	NR	**1050**	910	860	870	900	**550**	910	900	876	800
3	880	1000	860	890	930	880	NR	**1060**	920	**950**	870	900	**540**	900	800	902	900
4	880	900	850	890	920	880	NR	**1060**	920	890	890	900	**520**	910	800	893	800
5	880	900	870	890	950	880	NR	**1050**	920	**760**	890	900	**540**	900	NR	NR	NR
6	880	900	860	890	950	880	NR	**1040**	910	860	870	900	**550**	900	NR	NR	NR
7	880	900	870	890	940	870	NR	**1060**	910	830	880	900	**560**	900	NR	NR	NR
8	890	900	870	890	930	870	NR	**1040**	920	870	880	900	**580**	900	NR	NR	NR
9	900	900	860	880	940	870	NR	**1050**	900	880	870	900	**560**	870	NR	NR	NR
10	900	950	860	880	930	870	NR	**1060**	920	**760**	860	900	**550**	870	NR	NR	NR
11	890	950	870	880	940	870	NR	**1070**	920	860	870	900	**540**	880	NR	NR	NR
12	870	900	870	890	930	870	NR	**1060**	910	940	870	900	**560**	870	NR	NR	NR
Mean	885	**917**	863	890	934	873		**1056**	914	860	874	**900**	**548**	893	**825**	888	**850**
Median	880	900	860	890	930	870		1060	915	860	870	900	550	900	800	888	850
Std.Dev.	9	33	7	9	10	7		10	7	58	9	0	16	16	50	12	58
Rel.Std.Dev.	1.02%	3.55%	0.75%	0.96%	1.07%	0.75%		0.94%	0.73%	6.73%	1.03%	0.00%	2.89%	1.81%	6.06%	1.30%	6.79%
PDM[3]	-0.43%	3.14%	-2.86%	0.14%	5.10%	-1.74%		18.79%	2.85%	-3.24%	-1.65%	1.26%	-38.31%	0.51%	-7.18%	-0.06%	-4.37%

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Table A4. Fusion XRF results for Al_2O_3 in OREAS 190 (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	5.96	**5.74**	5.97	6.02	6.08	5.92	5.90	6.01	6.02	5.92	6.01	6.02	5.82	6.10	6.03	5.98	5.94
2	5.92	**5.76**	5.95	6.01	6.02	5.94	5.92	5.99	6.03	5.84	6.03	6.01	6.06	6.10	6.06	6.06	6.01
3	6.03	**5.79**	5.96	5.98	6.04	5.94	5.99	6.07	6.17	5.92	6.03	6.05	5.91	6.09	6.05	6.01	5.99
4	6.01	**5.78**	5.94	6.01	6.04	5.95	5.97	6.07	6.19	5.93	6.00	6.04	5.93	6.10	6.02	6.00	5.96
5	6.00	**5.80**	5.99	5.97	**6.15**	5.98	5.89	5.98	6.14	5.94	5.95	6.03	**6.15**	6.09	NR	NR	NR
6	6.01	**5.79**	5.98	5.97	**6.16**	5.99	5.85	6.02	6.11	6.14	5.92	6.04	5.99	6.09	NR	NR	NR
7	5.98	**5.73**	6.02	5.99	**6.14**	5.96	5.93	6.01	6.10	6.15	5.98	6.01	6.02	6.09	NR	NR	NR
8	5.99	**5.78**	5.96	5.96	**6.17**	5.95	**4.34**	5.95	6.07	5.94	5.95	5.94	5.98	6.08	NR	NR	NR
9	6.04	**5.77**	5.94	5.99	6.08	5.92	5.93	6.03	6.05	5.86	5.97	6.04	5.98	6.12	NR	NR	NR
10	6.03	**5.77**	5.97	5.99	6.13	5.91	5.90	6.00	6.06	5.81	5.96	6.07	5.98	6.10	NR	NR	NR
11	6.03	**5.78**	5.97	5.98	6.09	5.92	5.91	6.06	6.12	5.93	5.95	6.00	6.03	6.13	NR	NR	NR
12	6.04	**5.76**	6.01	5.99	6.07	5.90	5.89	6.03	6.02	5.99	5.92	6.02	6.04	6.08	NR	NR	NR
Mean	6.00	**5.77**	5.97	5.99	6.10	5.94	5.79	6.02	6.09	5.95	5.97	6.02	5.99	6.10	6.04	6.01	5.98
Median	6.01	5.77	5.97	5.99	6.09	5.94	5.91	6.02	6.09	5.93	5.97	6.03	5.99	6.10	6.04	6.00	5.98
Std.Dev.	0.04	0.02	0.03	0.02	0.05	0.03	0.46	0.04	0.06	0.11	0.04	0.03	0.08	0.01	0.02	0.03	0.03
Rel.Std.Dev.	0.60%	0.36%	0.42%	0.30%	0.84%	0.46%	7.89%	0.61%	0.95%	1.78%	0.64%	0.54%	1.37%	0.24%	0.30%	0.56%	0.52%
PDM[3]	0.01%	-3.89%	-0.51%	-0.24%	1.58%	-1.06%	-3.62%	0.26%	1.46%	-0.92%	-0.50%	0.33%	-0.20%	1.58%	0.62%	0.17%	-0.46%

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Table A5. Fusion XRF results for CaO in OREAS 190 (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	0.140	0.110	0.130	0.140	0.120	0.134	0.130	0.120	0.150	0.148	0.140	0.130	**0.098**	0.140	0.130	**0.106**	0.140
2	0.140	0.110	0.130	0.140	0.120	0.135	0.130	0.130	0.150	0.140	0.140	0.130	**0.099**	0.150	0.130	**0.099**	0.130
3	0.140	0.115	0.130	0.140	0.120	**0.138**	0.130	0.130	0.150	0.145	0.140	0.130	**0.097**	0.150	0.130	**0.109**	0.120
4	0.140	0.115	0.140	0.140	0.130	0.134	0.130	0.130	0.150	0.139	0.140	0.130	**0.093**	0.140	0.130	**0.101**	0.120
5	0.140	0.115	0.130	0.140	0.130	0.136	0.130	0.130	0.150	0.144	0.130	0.130	**0.102**	0.140	NR	NR	NR
6	0.140	0.115	0.130	0.140	0.130	0.136	0.130	0.120	0.150	0.140	0.130	0.130	**0.101**	0.140	NR	NR	NR
7	0.140	0.110	0.130	0.140	0.130	0.136	0.130	0.120	0.150	0.141	0.130	0.130	**0.101**	0.140	NR	NR	NR
8	0.140	0.115	0.130	0.140	0.130	0.138	**0.240**	0.130	0.150	0.138	0.140	0.150	**0.100**	0.140	NR	NR	NR
9	0.140	0.110	0.130	0.140	0.110	0.136	0.130	0.130	0.140	0.132	0.130	0.140	**0.103**	0.140	NR	NR	NR
10	0.140	0.110	0.130	0.140	0.110	0.135	0.130	0.130	0.150	**0.148**	0.130	0.140	**0.102**	0.140	NR	NR	NR
11	0.140	0.120	0.130	0.150	0.120	0.136	0.130	0.130	0.140	0.136	0.130	0.140	**0.102**	0.140	NR	NR	NR
12	0.140	0.110	0.130	0.150	0.120	0.134	0.130	0.130	0.150	0.132	0.130	0.140	**0.100**	0.140	NR	NR	NR
Mean	0.140	0.113	0.131	0.142	0.123	0.136	0.139	0.128	0.148	0.140	0.134	0.135	**0.100**	0.142	0.130	0.104	0.128
Median	0.140	0.113	0.130	0.140	0.120	0.136	0.130	0.130	0.150	0.140	0.130	0.130	0.101	0.140	0.130	0.104	0.125
Std.Dev.	0.000	0.003	0.003	0.004	0.008	0.001	0.032	0.005	0.004	0.005	0.005	0.007	0.003	0.004	0.000	0.005	0.010
Rel.Std.Dev.	0.00%	2.96%	2.21%	2.75%	6.15%	1.01%	22.82%	3.55%	2.62%	3.84%	3.84%	4.99%	2.80%	2.75%	0.00%	4.35%	7.51%
PDM[3]	5.15%	-15.19%	-1.73%	6.41%	-7.99%	1.90%	4.53%	-4.24%	11.41%	5.34%	0.77%	1.40%	-25.02%	6.41%	-2.36%	-22.09%	-4.24%

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Table A6. Fusion XRF results for Cl in OREAS 190 (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	30	NR	NR	NR	NR	NR	<50	<50	NR	NR	<50	<50	NR
4	<50	NR	NR	50	40	NR	NR	NR	NR	NR	<50	<50	NR	NR	<50	<50	NR
5	<50	NR	NR	50	20	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
6	<50	NR	NR	50	30	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
7	<50	NR	NR	50	30	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
8	<50	NR	NR	50	20	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
9	<50	NR	NR	50	20	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
10	<50	NR	NR	<50	**120**	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
11	<50	NR	NR	50	50	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
12	<50	NR	NR	<50	40	NR	NR	NR	NR	NR	<50	NR	NR	NR	NR	NR	NR
Mean				50	37												
Median				50	30												
Std.Dev.				0	30												
Rel.Std.Dev.				0.00%	79.67%												
PDM[3]				26.58%	-5.64%												

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Table A7. Fusion XRF results for Cu in OREAS 190 (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	80	36	60	80	100	64	80	60	**130**	<100	60	110	NR	70	<100	69	NR
2	80	39	60	75	110	63	50	80	**110**	<100	60	110	NR	80	<100	62	NR
3	70	34	50	80	90	66	60	60	**110**	<100	50	100	NR	80	<100	77	NR
4	80	34	50	70	90	64	60	50	**110**	<100	50	110	NR	70	<100	77	NR
5	80	35	60	70	**110**	64	80	40	**120**	<100	50	90	NR	80	NR	NR	NR
6	90	31	<50	75	**110**	65	70	60	**110**	<100	30	90	NR	70	NR	NR	NR
7	80	33	60	75	**120**	65	70	50	**110**	<100	40	80	NR	70	NR	NR	NR
8	80	36	60	70	**100**	64	40	70	**110**	<100	50	90	NR	90	NR	NR	NR
9	90	36	60	80	**120**	61	**130**	50	60	<100	50	90	NR	80	NR	NR	NR
10	90	39	60	75	**100**	62	70	90	60	<100	50	80	NR	80	NR	NR	NR
11	80	37	50	85	**120**	64	60	60	60	<100	50	80	NR	70	NR	NR	NR
12	80	45	50	85	**110**	62	70	60	50	<100	60	80	NR	70	NR	NR	NR
Mean	82	36	56	77	107	64	70	61	95		50	93		76		71	
Median	80	36	60	75	110	64	70	60	110		50	90		75		73	
Std.Dev.	6	4	5	5	11	1	22	14	28		9	12		7		7	
Rel.Std.Dev.	7.07%	9.84%	8.95%	7.00%	10.06%	2.04%	31.65%	22.67%	29.94%		17.06%	13.14%		8.82%		10.15%	
PDM[3]	20.06%	-47.01%	-17.14%	12.71%	56.81%	-6.54%	2.91%	-10.57%	39.66%		-26.49%	35.99%		11.48%		4.75%	

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Table A8. Fusion XRF results for Cr_2O_3 in OREAS 190 (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	1.74	1.70	1.72	1.73	1.70	1.73	**2.51**	1.80	1.71	**1.84**	**1.69**	1.75	1.66	1.75	1.71	1.75	1.76
2	1.73	1.70	1.72	1.72	1.69	1.73	**2.51**	1.76	1.71	**1.86**	1.72	1.73	1.72	1.75	1.72	1.74	1.73
3	1.74	1.69	1.72	1.73	1.73	1.74	**2.53**	1.79	1.74	**1.83**	1.72	1.73	1.67	1.75	1.71	1.75	1.75
4	1.76	1.70	1.72	1.72	1.73	1.75	**2.53**	1.79	1.72	**1.84**	1.72	1.74	1.69	1.75	1.71	1.76	1.74
5	1.73	1.69	1.72	1.73	1.70	1.74	1.70	1.78	1.70	**1.84**	**1.69**	1.76	1.73	1.75	NR	NR	NR
6	1.73	1.70	1.72	1.74	1.70	1.76	1.69	1.77	1.70	**1.80**	1.72	1.75	1.71	1.75	NR	NR	NR
7	1.70	1.70	1.73	1.73	1.68	1.74	1.71	1.78	1.69	**1.80**	1.72	1.72	1.70	1.75	NR	NR	NR
8	1.74	1.70	1.72	1.73	1.72	1.73	**1.35**	1.78	1.69	**1.81**	1.72	1.71	1.72	1.75	NR	NR	NR
9	1.76	1.70	1.72	1.73	**1.67**	1.73	1.73	**1.79**	1.69	**1.82**	1.69	1.72	1.71	1.73	NR	NR	NR
10	1.77	1.71	1.72	1.73	**1.64**	1.72	1.73	**1.78**	1.70	**1.84**	1.72	1.72	1.73	1.72	NR	NR	NR
11	1.77	1.70	1.73	1.73	**1.65**	1.73	1.72	**1.81**	1.68	**1.83**	1.73	1.66	1.71	1.72	NR	NR	NR
12	1.78	1.69	1.73	1.73	**1.66**	1.72	1.74	**1.80**	1.69	**1.79**	1.71	1.67	1.71	1.73	NR	NR	NR
Mean	1.74	1.70	1.72	1.73	1.69	1.73	1.96	1.79	1.70	**1.83**	1.71	1.72	1.71	1.74	1.71	1.75	1.75
Median	1.74	1.70	1.72	1.73	1.69	1.73	1.73	1.79	1.70	1.83	1.72	1.73	1.71	1.75	1.71	1.75	1.75
Std.Dev.	0.02	0.01	0.01	0.00	0.03	0.01	0.43	0.01	0.02	0.02	0.01	0.03	0.02	0.01	0.01	0.01	0.01
Rel.Std.Dev.	1.30%	0.34%	0.31%	0.28%	1.71%	0.59%	22.04%	0.77%	0.97%	1.16%	0.88%	1.77%	1.28%	0.60%	0.29%	0.44%	0.74%
PDM[3]	1.03%	-1.72%	-0.26%	0.10%	-2.30%	0.48%	13.27%	3.47%	-1.41%	5.79%	-0.95%	-0.25%	-1.21%	0.91%	-0.78%	1.33%	1.10%

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Table A9. Fusion XRF results for Fe_2O_3 in OREAS 190 (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	34.80	35.55	35.80	35.75	35.40	34.99	35.33	35.90	35.40	34.83	35.30	35.52	**34.25**	35.60	36.10	35.62	35.90
2	34.60	35.56	35.86	35.66	35.40	35.20	35.35	35.54	35.55	35.05	35.40	35.50	**35.22**	35.70	36.10	35.71	35.70
3	35.10	35.61	35.78	35.66	35.00	35.41	35.74	35.70	35.36	34.52	35.40	35.55	**34.33**	35.60	36.10	35.74	35.90
4	35.00	35.52	35.88	35.62	35.00	35.32	35.58	35.78	35.52	34.88	35.40	35.62	**34.48**	35.60	36.10	35.66	35.80
5	35.10	35.68	35.89	35.68	35.20	35.50	35.18	35.24	35.26	**34.98**	35.20	35.67	35.25	35.70	NR	NR	NR
6	35.10	35.64	35.94	35.71	35.20	35.55	35.07	35.22	35.22	**34.25**	35.10	35.63	35.12	35.60	NR	NR	NR
7	34.90	35.67	35.96	35.68	35.20	35.35	35.41	35.43	35.36	**34.16**	35.20	35.59	35.01	35.50	NR	NR	NR
8	35.40	35.63	35.89	35.78	35.10	35.22	**27.68**	35.32	35.29	**34.20**	35.30	35.36	35.20	35.60	NR	NR	NR
9	35.50	35.70	35.72	35.60	35.40	35.20	35.57	35.47	35.35	34.71	35.10	35.56	35.22	35.50	NR	NR	NR
10	35.40	35.71	35.89	35.67	35.10	35.15	35.44	35.60	35.41	34.82	35.00	35.54	35.31	35.40	NR	NR	NR
11	35.40	35.81	35.96	35.66	35.10	35.18	35.47	35.95	35.42	34.79	35.10	35.62	35.21	35.60	NR	NR	NR
12	35.50	35.80	35.82	35.60	35.30	35.14	35.31	35.56	35.31	**34.34**	35.10	35.41	35.25	35.50	NR	NR	NR
Mean	35.15	35.65	35.87	35.67	35.20	35.27	34.76	35.56	35.37	34.63	35.22	35.55	34.99	35.58	36.10	35.68	35.83
Median	35.10	35.65	35.89	35.67	35.20	35.21	35.38	35.55	35.36	34.75	35.20	35.56	35.20	35.60	36.10	35.69	35.85
Std.Dev.	0.29	0.09	0.07	0.05	0.15	0.16	2.24	0.24	0.10	0.32	0.14	0.09	0.39	0.09	0.00	0.05	0.10
Rel.Std.Dev.	0.84%	0.26%	0.21%	0.15%	0.42%	0.46%	6.44%	0.68%	0.28%	0.92%	0.40%	0.26%	1.12%	0.24%	0.00%	0.15%	0.27%
PDM[3]	-0.92%	0.50%	1.10%	0.56%	-0.78%	-0.59%	-2.01%	0.24%	-0.30%	-2.39%	-0.73%	0.20%	-1.38%	0.28%	1.76%	0.58%	0.98%

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Table A10. Fusion XRF results for K_2O in OREAS 190 (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	0.010	<0.01	0.010	0.009	0.005	NR	0.003	0.010	0.010	0.027	0.010	<0.01	NR	0.010	0.010	**0.017**	0.010
2	0.010	0.010	0.010	0.008	0.006	NR	0.002	0.020	0.010	0.016	0.010	<0.01	NR	0.010	0.010	0.013	<0.01
3	0.010	0.005	0.010	0.009	0.005	NR	0.002	0.020	0.010	0.015	0.010	<0.01	NR	0.010	0.010	0.013	<0.01
4	0.010	0.005	0.010	0.009	0.006	NR	0.002	0.010	0.010	0.016	0.010	<0.01	NR	0.010	<0.01	0.011	<0.01
5	0.010	<0.01	0.010	0.007	0.003	NR	0.004	<0.01	0.020	<0.01	<0.01	<0.01	NR	0.010	NR	NR	NR
6	0.010	0.005	0.010	0.008	0.004	NR	0.003	0.010	0.020	<0.01	<0.01	<0.01	NR	0.010	NR	NR	NR
7	0.010	0.010	0.010	0.009	0.004	NR	0.003	0.010	0.020	<0.01	<0.01	<0.01	NR	0.010	NR	NR	NR
8	0.010	0.010	0.010	0.008	0.003	NR	<0.001	0.010	0.020	<0.01	<0.01	<0.01	NR	0.010	NR	NR	NR
9	0.010	0.005	0.010	0.008	0.004	NR	0.003	0.020	0.010	<0.01	<0.01	0.010	NR	0.010	NR	NR	NR
10	0.010	0.005	0.010	0.009	0.003	NR	0.003	0.010	0.030	<0.01	<0.01	0.010	NR	0.010	NR	NR	NR
11	0.010	0.005	0.010	0.008	0.005	NR	0.003	0.020	0.020	<0.01	<0.01	0.010	NR	0.010	NR	NR	NR
12	0.010	0.010	<0.01	0.010	0.005	NR	0.003	0.020	0.020	<0.01	<0.01	0.010	NR	0.010	NR	NR	NR
Mean	0.010	0.007	0.010	0.009	0.004		0.003	0.015	0.017	0.019	0.010	0.010		0.010	0.010	0.013	0.010
Median	0.010	0.005	0.010	0.009	0.005		0.003	0.010	0.020	0.016	0.010	0.010		0.010	0.010	0.013	0.010
Std.Dev.	0.000	0.003	0.000	0.001	0.001		0.001	0.005	0.007	0.006	0.000	0.000		0.000	0.000	0.002	
Rel.Std.Dev.	0.00%	36.89%	0.00%	9.38%	24.53%		21.40%	35.90%	39.08%	30.74%	0.00%	0.00%		0.00%	0.00%	18.24%	
PDM[3]	5.46%	-26.18%	5.46%	-10.36%	-53.42%		-70.28%	53.40%	75.77%	95.11%	5.46%	5.46%		5.46%	5.46%	41.58%	5.46%

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Table A11. Fusion XRF results for MgO in OREAS 190 (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	6.82	6.92	6.88	6.95	6.85	**6.63**	**6.70**	7.09	6.93	7.04	6.90	6.90	6.68	6.96	6.86	6.85	6.89
2	6.78	6.96	6.90	6.92	6.80	**6.70**	**6.55**	7.01	6.95	7.07	6.87	6.90	6.97	7.02	6.86	6.82	6.83
3	6.85	7.00	6.91	6.94	6.82	**6.72**	**6.64**	7.06	7.01	7.03	6.87	6.92	6.73	6.95	6.84	6.91	6.85
4	6.80	7.04	6.91	6.94	6.79	**6.65**	**6.61**	7.07	7.01	7.08	6.88	6.94	6.81	6.98	6.87	6.87	6.87
5	6.80	6.90	6.90	6.93	6.85	**6.70**	6.81	7.04	6.98	6.80	6.85	6.95	**7.20**	6.98	NR	NR	NR
6	6.80	6.94	6.90	6.91	6.84	**6.71**	6.81	7.05	6.95	6.96	6.82	6.95	6.87	6.98	NR	NR	NR
7	6.75	**6.81**	6.93	6.91	6.85	**6.69**	6.88	7.05	6.96	6.89	6.85	6.94	6.91	6.98	NR	NR	NR
8	6.89	6.94	6.90	6.91	6.87	**6.67**	**12.39**	6.96	6.95	6.82	6.84	6.87	6.89	7.02	NR	NR	NR
9	6.92	6.98	6.87	6.90	7.08	**6.68**	6.89	7.03	6.89	6.93	6.82	6.89	6.92	7.05	NR	NR	NR
10	6.91	6.98	6.88	6.91	7.09	**6.66**	6.88	7.00	6.91	6.95	6.81	6.89	6.88	6.98	NR	NR	NR
11	6.91	7.01	6.90	6.89	7.03	**6.64**	6.88	7.06	6.92	7.01	6.80	6.90	7.00	7.03	NR	NR	NR
12	6.92	7.03	6.90	6.89	7.06	**6.65**	6.83	7.04	6.93	6.88	6.80	6.88	6.90	7.02	NR	NR	NR
Mean	6.85	6.96	6.90	6.92	6.91	**6.67**	7.24	7.04	6.95	6.95	6.84	6.91	6.90	7.00	6.86	6.87	6.86
Median	6.84	6.97	6.90	6.91	6.85	6.67	6.82	7.05	6.95	6.95	6.85	6.90	6.89	6.98	6.86	6.86	6.86
Std.Dev.	0.06	0.06	0.02	0.02	0.12	0.03	1.63	0.03	0.04	0.10	0.03	0.03	0.13	0.03	0.01	0.04	0.03
Rel.Std.Dev.	0.90%	0.92%	0.23%	0.28%	1.69%	0.43%	22.47%	0.50%	0.53%	1.37%	0.48%	0.41%	1.93%	0.44%	0.18%	0.57%	0.38%
PDM[3]	-0.91%	0.70%	-0.15%	0.12%	0.03%	-3.38%	4.78%	1.88%	0.59%	0.66%	-0.96%	0.03%	-0.19%	1.26%	-0.74%	-0.62%	-0.70%

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Table A12. Fusion XRF results for MnO in OREAS 190 (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	0.560	0.565	0.570	0.570	0.585	0.568	0.590	0.580	0.576	**0.597**	0.582	0.580	**0.535**	0.595	0.570	0.582	0.580
2	0.555	0.565	0.570	0.570	0.585	0.574	0.590	0.580	0.573	**0.606**	0.577	0.580	**0.547**	0.594	0.570	0.580	0.590
3	0.561	0.560	0.570	0.570	0.575	0.574	0.600	0.570	0.575	**0.595**	0.576	0.590	**0.533**	0.594	0.570	0.579	0.590
4	0.568	0.560	0.570	0.570	0.574	0.572	0.590	0.590	0.573	**0.592**	0.580	0.590	**0.532**	0.590	0.570	0.580	0.580
5	0.573	0.555	0.580	0.570	**0.596**	0.577	0.590	0.580	0.571	**0.602**	0.580	0.580	**0.551**	**0.598**	NR	NR	NR
6	0.571	0.565	0.570	0.580	**0.591**	0.578	0.580	0.570	0.570	0.587	0.570	0.580	**0.558**	**0.593**	NR	NR	NR
7	0.571	0.565	0.570	0.580	**0.596**	0.573	0.590	0.580	0.578	0.589	0.574	0.580	**0.546**	**0.595**	NR	NR	NR
8	0.573	0.565	0.570	0.580	**0.594**	0.569	**0.480**	0.580	0.570	0.585	0.575	0.570	**0.553**	**0.593**	NR	NR	NR
9	0.569	0.560	0.570	0.570	0.582	0.571	0.590	0.570	0.571	**0.592**	0.577	0.570	**0.558**	0.597	NR	NR	NR
10	0.565	0.560	0.570	0.570	0.577	0.572	0.590	0.580	0.581	**0.601**	0.571	0.570	**0.557**	0.589	NR	NR	NR
11	0.565	0.560	0.570	0.570	0.579	0.570	0.590	0.580	0.573	**0.595**	0.571	0.580	**0.553**	0.594	NR	NR	NR
12	0.572	0.575	0.570	0.570	0.576	0.568	0.590	0.580	0.572	**0.591**	0.577	0.580	**0.546**	0.591	NR	NR	NR
Mean	0.567	0.563	0.571	0.573	0.584	0.572	0.581	0.578	0.574	0.594	0.576	0.579	**0.547**	0.594	0.570	0.580	0.585
Median	0.569	0.563	0.570	0.570	0.584	0.572	0.590	0.580	0.573	0.594	0.577	0.580	0.549	0.594	0.570	0.580	0.585
Std.Dev.	0.006	0.005	0.003	0.005	0.008	0.003	0.032	0.006	0.003	0.006	0.004	0.007	0.009	0.003	0.000	0.001	0.006
Rel.Std.Dev.	1.02%	0.88%	0.51%	0.79%	1.42%	0.57%	5.52%	1.00%	0.59%	1.06%	0.67%	1.15%	1.72%	0.44%	0.00%	0.25%	0.99%
PDM[3]	-1.80%	-2.49%	-1.12%	-0.83%	1.19%	-0.89%	0.61%	0.18%	-0.64%	2.95%	-0.25%	0.32%	-5.19%	2.81%	-1.26%	0.54%	1.33%

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Table A13. Fusion XRF results for Na_2O in OREAS 190 (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	0.046	0.020	0.010	NR	**0.060**	NR	<0.01	<0.01	<0.01	<0.1	0.007	<0.01	NR	0.020	<0.01	0.075	<0.01
2	0.051	0.020	<0.01	NR	**0.063**	NR	<0.01	0.030	<0.01	<0.1	0.009	<0.01	NR	0.020	<0.01	0.043	<0.01
3	0.046	0.015	<0.01	NR	**0.057**	NR	<0.01	0.010	<0.01	<0.1	0.008	0.020	NR	0.020	<0.01	0.018	<0.01
4	0.042	0.020	0.010	NR	**0.061**	NR	<0.01	0.010	<0.01	<0.1	0.006	0.020	NR	0.020	<0.01	0.038	<0.01
5	0.007	0.020	0.010	NR	**0.128**	NR	<0.01	<0.01	<0.01	<0.1	<0.005	0.020	NR	0.020	NR	NR	NR
6	0.010	0.015	<0.05	NR	**0.126**	NR	<0.01	<0.01	0.010	<0.1	0.006	0.020	NR	0.020	NR	NR	NR
7	0.008	0.020	<0.05	NR	**0.129**	NR	<0.01	<0.01	<0.01	<0.1	0.006	0.010	NR	0.020	NR	NR	NR
8	**0.057**	0.020	<0.05	NR	**0.118**	NR	<0.01	<0.01	0.010	<0.1	0.008	<0.01	NR	0.020	NR	NR	NR
9	0.011	0.015	0.010	NR	**0.089**	NR	<0.01	0.020	<0.01	<0.1	0.008	0.040	NR	0.030	NR	NR	NR
10	0.020	0.020	<0.01	NR	**0.122**	NR	<0.01	<0.01	<0.01	<0.1	0.009	0.030	NR	0.030	NR	NR	NR
11	0.011	0.015	0.020	NR	**0.088**	NR	<0.01	<0.01	<0.01	<0.1	0.012	0.020	NR	0.030	NR	NR	NR
12	0.007	0.020	<0.01	NR	**0.088**	NR	<0.01	0.020	<0.01	<0.1	0.011	0.030	NR	0.030	NR	NR	NR
Mean	0.026	0.018	0.012		**0.094**			0.018	0.010		0.008	0.023		0.023		0.043	
Median	0.016	0.020	0.010		0.089			0.020	0.010		0.008	0.020		0.020		0.040	
Std.Dev.	0.020	0.002	0.004		0.029			0.008	0.000		0.002	0.009		0.005		0.023	
Rel.Std.Dev.	76.20%	13.43%	37.27%		31.13%			46.48%	0.00%		24.33%	37.12%		21.10%		53.87%	
PDM[3]	31.59%	-8.39%	-40.03%		370.15%			-10.05%	-50.03%		-59.11%	16.60%		16.60%		116.75%	

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Table A14. Fusion XRF results for P_2O_5 in OREAS 190 (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	0.007	<0.01	0.006	0.007	0.003	NR	0.010	<0.01	0.010	0.015	0.004	<0.01	NR	0.010	<0.01	0.004	<0.01
2	0.006	<0.01	0.004	0.007	0.003	NR	0.010	<0.01	0.010	0.016	0.004	<0.01	NR	0.010	<0.01	0.005	<0.01
3	0.006	0.005	0.005	0.006	0.003	NR	0.010	<0.01	0.010	**0.024**	0.003	<0.01	NR	0.010	<0.01	0.003	<0.01
4	0.007	0.005	0.005	0.008	0.004	NR	0.010	<0.01	0.010	0.015	0.003	<0.01	NR	0.010	<0.01	0.006	<0.01
5	0.008	0.010	0.007	0.007	0.003	NR	0.010	<0.01	0.010	0.010	0.006	<0.01	NR	0.010	NR	NR	NR
6	0.009	0.005	0.007	0.008	0.003	NR	0.010	<0.01	0.010	0.010	0.005	<0.01	NR	0.010	NR	NR	NR
7	0.009	<0.01	0.006	0.007	0.003	NR	0.010	<0.01	0.010	<0.01	0.006	<0.01	NR	0.010	NR	NR	NR
8	0.007	0.005	0.006	0.009	0.004	NR	0.010	<0.01	0.010	<0.01	0.006	<0.01	NR	0.010	NR	NR	NR
9	0.009	0.005	0.005	0.007	0.003	NR	0.010	<0.01	0.010	<0.01	0.004	<0.01	NR	0.010	NR	NR	NR
10	0.009	0.005	0.005	0.007	0.004	NR	0.010	<0.01	0.010	<0.01	0.004	<0.01	NR	0.010	NR	NR	NR
11	0.009	0.005	0.006	0.006	0.004	NR	0.010	<0.01	0.010	<0.01	0.004	<0.01	NR	0.010	NR	NR	NR
12	0.006	0.005	0.006	0.005	0.004	NR	0.010	<0.01	0.010	<0.01	0.004	<0.01	NR	0.010	NR	NR	NR
Mean	0.008	0.006	0.006	0.007	0.003		0.010		0.010	0.015	0.004			0.010		0.005	
Median	0.008	0.005	0.006	0.007	0.003		0.010		0.010	0.015	0.004			0.010		0.005	
Std.Dev.	0.001	0.002	0.001	0.001	0.001		0.000		0.000	0.005	0.001			0.000		0.001	
Rel.Std.Dev.	16.99%	30.00%	15.66%	14.92%	15.07%		0.00%		0.00%	34.25%	24.53%			0.00%		28.69%	
PDM[3]	3.58%	-24.95%	-23.44%	-5.43%	-53.84%		35.10%		35.10%	102.65%	-40.33%			35.10%		-39.21%	

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Table A15. Fusion XRF results for SiO_2 in OREAS 190 (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	38.00	38.36	38.30	38.39	37.80	37.61	38.62	38.40	38.17	37.89	38.60	38.17	**37.10**	**39.10**	38.00	38.18	38.20
2	37.80	38.37	38.36	38.37	37.40	37.85	38.68	38.30	38.09	37.94	38.50	38.25	**38.43**	**39.20**	38.10	38.19	38.10
3	38.20	38.47	38.24	38.39	37.70	37.89	38.48	38.60	38.44	37.63	38.50	38.33	**37.26**	**39.00**	38.00	38.45	38.20
4	38.00	38.43	38.32	38.42	37.70	37.77	39.02	38.60	38.19	37.81	38.50	38.38	**37.51**	**39.00**	38.00	38.23	38.10
5	37.90	38.37	38.44	38.33	37.90	37.99	38.67	38.10	38.07	37.62	38.10	38.19	38.16	39.10	NR	NR	NR
6	37.90	38.42	38.45	38.33	37.90	38.12	38.33	38.20	38.06	37.77	37.90	38.16	37.93	39.00	NR	NR	NR
7	37.70	38.36	38.46	38.26	37.90	37.90	38.71	38.20	38.17	37.53	38.20	38.13	38.03	38.90	NR	NR	NR
8	38.40	38.44	38.53	38.31	38.00	37.80	**42.09**	38.10	38.08	37.35	38.20	38.49	38.11	39.00	NR	NR	NR
9	38.60	38.38	38.26	38.26	38.10	37.86	38.78	38.50	38.08	37.38	38.10	38.25	37.98	39.00	NR	NR	NR
10	38.60	38.58	38.42	38.30	38.10	37.76	38.66	38.20	38.11	37.75	38.10	38.25	38.07	38.80	NR	NR	NR
11	38.60	38.43	38.24	38.33	37.90	37.67	38.76	38.40	38.09	37.52	38.10	38.25	38.18	38.80	NR	NR	NR
12	38.50	38.42	38.24	38.31	37.90	37.77	38.53	38.40	38.01	37.27	38.10	38.16	38.26	39.00	NR	NR	NR
Mean	38.18	38.42	38.36	38.33	37.86	37.83	38.94	38.33	38.13	37.62	38.24	38.25	37.92	38.99	38.03	38.26	38.15
Median	38.10	38.42	38.34	38.33	37.90	37.83	38.68	38.35	38.09	37.62	38.15	38.25	38.05	39.00	38.00	38.21	38.15
Std.Dev.	0.34	0.06	0.10	0.05	0.19	0.14	1.01	0.18	0.11	0.22	0.22	0.11	0.41	0.12	0.05	0.13	0.06
Rel.Std.Dev.	0.89%	0.16%	0.27%	0.13%	0.51%	0.36%	2.58%	0.46%	0.29%	0.57%	0.58%	0.27%	1.08%	0.30%	0.13%	0.33%	0.15%
PDM[3]	-0.09%	0.52%	0.36%	0.30%	-0.94%	-1.00%	1.90%	0.30%	-0.23%	-1.56%	0.06%	0.09%	-0.79%	2.03%	-0.50%	0.12%	-0.18%

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Table A16. Fusion XRF results for SO_3 in OREAS 190 (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	0.002	<0.001	NR	0.002	<0.002	NR	NR	0.006	NR	NR	NR	<0.01	0.002	NR
2	0.004	<0.01	0.002	0.002	<0.001	NR	<0.001	<0.002	NR	NR	0.009	NR	NR	NR	<0.01	<0.002	NR
3	<0.001	<0.01	<0.002	0.004	<0.001	NR	<0.001	<0.002	NR	NR	0.007	NR	NR	NR	<0.01	<0.002	NR
4	0.005	<0.01	0.002	0.004	<0.001	NR	<0.001	<0.002	NR	NR	0.004	NR	NR	NR	<0.01	<0.002	NR
5	0.001	<0.01	0.002	0.004	**0.023**	NR	<0.001	**0.054**	NR	NR	0.001	NR	NR	NR	NR	NR	NR
6	<0.001	<0.01	<0.002	0.003	**0.022**	NR	<0.001	**0.045**	NR	NR	0.003	NR	NR	NR	NR	NR	NR
7	0.001	<0.01	<0.002	0.004	**0.023**	NR	<0.001	**0.024**	NR	NR	0.004	NR	NR	NR	NR	NR	NR
8	0.006	<0.01	0.003	0.004	**0.023**	NR	0.001	**<0.002**	NR	NR	0.008	NR	NR	NR	NR	NR	NR
9	0.005	<0.01	0.003	0.002	**0.027**	NR	**0.016**	<0.002	NR	NR	0.008	NR	NR	NR	NR	NR	NR
10	0.005	<0.01	0.002	0.004	**0.027**	NR	**0.023**	<0.002	NR	NR	0.008	NR	NR	NR	NR	NR	NR
11	0.005	<0.01	0.003	0.003	**0.027**	NR	**0.020**	<0.002	NR	NR	0.005	NR	NR	NR	NR	NR	NR
12	0.004	<0.01	0.004	0.002	**0.026**	NR	**0.016**	<0.002	NR	NR	0.004	NR	NR	NR	NR	NR	NR
Mean	0.004		0.003	0.003	0.025		0.013	0.041			0.006					0.002	
Median	0.005		0.002	0.004	0.025		0.016	0.045			0.006					0.002	
Std.Dev.	0.002		0.001	0.001	0.002		0.009	0.015			0.002						
Rel.Std.Dev.	44.33%		28.43%	29.60%	8.84%		71.50%	37.55%			44.18%						
PDM[3]	25.10%		-18.03%	1.57%	693.88%		316.99%	1215.12%			79.09%					-35.85%	

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Table A17. Fusion XRF results for TiO_2 in OREAS 190 (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	0.070	0.070	0.060	0.065	0.060	NR	0.060	0.050	0.070	0.063	0.080	0.060	NR	0.060	0.070	0.064	0.060
2	0.070	0.070	0.060	0.062	0.060	NR	0.060	0.060	0.070	0.059	0.060	0.070	NR	0.060	0.060	0.060	0.060
3	0.080	0.065	0.060	0.063	0.060	NR	0.060	0.070	0.070	0.061	0.070	0.060	NR	0.060	0.070	0.053	0.060
4	0.070	0.065	0.060	0.063	0.060	NR	0.060	0.060	0.070	0.061	0.070	0.070	NR	0.060	0.070	0.070	0.060
5	0.070	0.070	0.070	0.064	0.060	NR	0.060	**0.090**	0.070	0.064	0.060	0.070	NR	0.060	NR	NR	NR
6	0.070	0.070	0.060	0.065	0.060	NR	0.060	**0.100**	0.070	0.061	0.070	0.070	NR	0.050	NR	NR	NR
7	0.070	0.060	0.060	0.066	0.070	NR	0.060	**0.080**	0.070	0.063	0.080	0.070	NR	0.060	NR	NR	NR
8	0.070	0.065	0.070	0.064	0.060	NR	0.050	**0.070**	0.070	0.060	0.060	0.060	NR	0.060	NR	NR	NR
9	0.070	0.065	0.060	0.062	0.060	NR	0.060	0.070	0.060	0.068	0.070	0.060	NR	0.060	NR	NR	NR
10	0.070	0.060	0.060	0.065	0.060	NR	0.060	0.050	0.070	0.071	0.060	0.060	NR	0.060	NR	NR	NR
11	0.070	0.060	0.060	0.064	0.070	NR	0.060	**0.040**	0.070	0.065	0.070	0.060	NR	0.060	NR	NR	NR
12	0.070	0.060	0.060	0.063	0.070	NR	0.060	0.060	0.070	0.061	0.060	0.070	NR	0.050	NR	NR	NR
Mean	0.071	0.065	0.062	0.064	0.063		0.059	0.067	0.069	0.063	0.068	0.065		0.058	0.068	0.062	0.060
Median	0.070	0.065	0.060	0.064	0.060		0.060	0.065	0.070	0.062	0.070	0.065		0.060	0.070	0.062	0.060
Std.Dev.	0.003	0.004	0.004	0.001	0.005		0.003	0.017	0.003	0.004	0.008	0.005		0.004	0.005	0.007	0.000
Rel.Std.Dev.	4.08%	6.56%	6.31%	1.99%	7.24%		4.88%	25.85%	4.17%	5.55%	11.17%	8.03%		6.67%	7.41%	11.53%	0.00%
PDM[3]	11.22%	2.06%	-3.17%	0.23%	-1.86%		-7.10%	4.68%	8.60%	-0.95%	5.99%	2.06%		-8.41%	5.99%	-3.08%	-5.79%

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Table A18. Fusion XRF results for Zn in OREAS 190 (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	320	341	350	350	400	357	**260**	370	360	320	320	400	NR	360	**300**	354	NR
2	330	356	340	345	410	354	**280**	350	360	320	330	400	NR	370	**300**	353	NR
3	330	352	350	350	390	362	**280**	340	360	340	320	400	NR	360	**200**	367	NR
4	340	340	350	340	400	361	**300**	360	360	340	320	400	NR	370	**300**	377	NR
5	340	335	360	340	**420**	362	**220**	360	360	340	320	320	NR	360	NR	NR	NR
6	340	345	350	345	**420**	365	**270**	380	360	300	320	320	NR	370	NR	NR	NR
7	340	344	350	345	**420**	362	**270**	360	360	330	320	320	NR	360	NR	NR	NR
8	340	357	350	340	**410**	359	**170**	360	**220**	310	340	310	NR	360	NR	NR	NR
9	340	345	350	345	**420**	358	**260**	360	360	340	340	320	NR	380	NR	NR	NR
10	350	352	350	345	**410**	359	**270**	360	360	320	330	310	NR	360	NR	NR	NR
11	340	349	350	340	**420**	359	**260**	370	360	330	330	310	NR	370	NR	NR	NR
12	340	346	360	340	**420**	358	**290**	360	360	320	340	310	NR	380	NR	NR	NR
Mean	338	347	351	344	412	360	**261**	361	348	326	328	343		367	275	363	
Median	340	345	350	345	415	359	270	360	360	325	325	320		365	300	361	
Std.Dev.	8	7	5	4	10	3	35	10	40	13	9	42		8	50	11	
Rel.Std.Dev.	2.23%	1.88%	1.47%	1.10%	2.50%	0.74%	13.33%	2.76%	11.60%	4.02%	2.64%	12.25%		2.12%	18.18%	3.15%	
PDM[3]	-4.31%	-1.76%	-0.53%	-2.54%	16.72%	1.98%	-26.05%	2.30%	-1.24%	-7.62%	-7.15%	-2.66%		3.96%	-22.03%	2.85%	

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Table A19. Results for LOI at 1000°C in OREAS 190 (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	8.10	8.53	8.22	8.25	**7.36**	9.03	NR	8.28	7.75	**9.53**	8.46	8.20	9.03	7.53	8.95	8.53	7.65
2	7.97	8.53	8.20	8.22	7.85	9.18	NR	8.34	7.69	**9.58**	8.47	8.20	9.20	7.54	8.74	8.55	7.67
3	7.99	8.55	8.19	8.24	7.92	9.25	NR	8.33	7.69	**9.61**	8.45	8.30	9.27	7.69	8.86	8.58	7.79
4	8.06	8.59	8.25	8.22	7.96	9.02	NR	8.24	7.60	**9.58**	8.48	8.40	9.31	7.66	8.90	8.56	7.82
5	8.09	8.59	8.15	8.23	8.49	**9.60**	8.43	8.09	7.93	**9.66**	9.22	8.10	**9.62**	7.55	NR	NR	NR
6	8.09	8.59	8.16	8.30	8.55	**9.78**	8.38	8.10	7.95	**9.49**	9.48	8.00	**9.32**	7.59	NR	NR	NR
7	8.08	8.55	8.16	8.26	8.46	**9.96**	8.50	8.07	7.87	**9.55**	9.06	8.30	**9.39**	7.77	NR	NR	NR
8	8.15	8.55	8.16	8.25	8.45	**10.00**	8.43	8.22	7.87	**9.67**	9.02	8.30	**9.49**	7.68	NR	NR	NR
9	8.24	8.58	8.24	8.29	8.07	8.92	8.48	8.80	7.98	**10.11**	**9.24**	8.40	**10.43**	7.58	NR	NR	NR
10	8.20	8.59	8.20	8.31	8.39	8.90	8.41	8.75	7.99	**10.60**	**9.49**	8.40	**10.59**	7.57	NR	NR	NR
11	8.23	8.59	8.16	8.31	8.57	8.89	8.51	8.21	8.09	**10.28**	**9.33**	8.40	**10.60**	7.52	NR	NR	NR
12	8.32	8.60	8.17	8.27	8.38	8.85	8.45	8.07	7.91	**10.56**	**9.29**	8.40	**10.78**	7.56	NR	NR	NR
Mean	8.13	8.57	8.19	8.26	8.20	9.28	8.45	8.29	7.86	**9.85**	9.00	8.28	9.75	7.60	8.86	8.56	7.73
Median	8.10	8.58	8.18	8.26	8.39	9.10	8.44	8.23	7.89	9.64	9.14	8.30	9.44	7.58	8.88	8.56	7.73
Std.Dev.	0.10	0.03	0.03	0.03	0.37	0.44	0.05	0.25	0.15	0.42	0.42	0.13	0.65	0.08	0.09	0.02	0.09
Rel.Std.Dev.	1.29%	0.32%	0.42%	0.40%	4.54%	4.70%	0.53%	2.96%	1.87%	4.23%	4.64%	1.61%	6.63%	1.03%	1.01%	0.22%	1.10%
PDM[3]	-3.04%	2.21%	-2.30%	-1.42%	-2.11%	10.73%	0.81%	-1.07%	-6.22%	17.54%	7.37%	-1.17%	16.36%	-9.28%	5.74%	2.08%	-7.74%

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Table A20. Fusion ICP results for Ni in OREAS 190 (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	1.61	1.67	1.59	1.65	1.65	1.61	1.66	**1.64**	1.67	1.63	1.58	1.58
2	1.59	1.67	1.60	1.65	1.64	1.60	1.66	**1.45**	1.64	1.62	1.61	1.58
3	1.61	1.68	1.57	1.68	1.68	1.60	1.67	**1.41**	1.59	1.64	1.59	1.56
4	**1.52**	1.69	1.58	1.67	1.66	1.60	1.67	**1.16**	1.67	1.66	1.53	1.56
5	1.63	1.68	1.52	1.66	1.60	1.59	1.71	**1.35**	1.67	1.65	NR	NR
6	1.60	1.69	1.56	1.66	1.63	1.59	1.73	**1.68**	1.71	1.67	NR	NR
7	1.64	1.67	1.56	1.64	1.64	1.60	1.73	**1.54**	1.74	1.63	NR	NR
8	1.63	1.66	1.56	1.61	1.63	1.59	1.73	**1.13**	1.59	1.65	NR	NR
9	1.63	1.59	1.59	1.60	1.63	1.60	1.65	**1.34**	1.65	1.62	NR	NR
10	**1.58**	1.63	1.60	1.66	1.59	1.60	1.67	**1.36**	1.59	1.62	NR	NR
11	1.62	1.63	1.51	1.66	1.65	1.61	1.66	**1.34**	1.62	1.61	NR	NR
12	1.63	1.68	1.55	1.63	1.65	1.62	1.66	**1.64**	1.69	1.62	NR	NR
Mean	1.61	1.66	1.57	1.64	1.64	1.60	1.68	**1.42**	1.65	1.63	1.58	1.57
Median	1.62	1.67	1.57	1.65	1.64	1.60	1.67	1.38	1.66	1.63	1.59	1.57
Std.Dev.	0.03	0.03	0.03	0.02	0.02	0.01	0.03	0.18	0.05	0.02	0.03	0.01
Rel.Std.Dev.	2.09%	1.84%	1.86%	1.37%	1.50%	0.51%	1.88%	12.60%	2.94%	1.12%	2.16%	0.63%
PDM[3]	-1.00%	2.47%	-3.47%	1.36%	0.88%	-1.36%	3.77%	-12.49%	1.85%	0.64%	-2.75%	-3.10%

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Table A21. Fusion ICP results for Co in OREAS 190 (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	780	870	880	780	881	870	900	983	828	880	850	868
2	770	861	860	840	878	830	910	973	825	890	833	883
3	780	868	880	800	899	870	900	962	821	890	847	862
4	830	898	860	780	877	850	910	910	848	900	814	892
5	940	933	840	880	893	810	910	929	875	890	NR	NR
6	880	962	880	880	874	820	910	950	883	910	NR	NR
7	910	934	880	930	891	850	940	932	875	880	NR	NR
8	930	910	880	910	887	850	920	873	875	890	NR	NR
9	830	925	920	870	982	860	850	755	839	870	NR	NR
10	770	950	920	900	985	870	820	791	808	880	NR	NR
11	890	913	860	900	969	880	820	762	821	880	NR	NR
12	820	979	860	910	992	870	820	873	857	890	NR	NR
Mean	844	917	877	865	917	853	884	891	846	888	836	876
Median	830	919	880	880	892	855	905	919	844	890	840	876
Std.Dev.	64	38	24	53	49	22	44	82	26	11	16	14
Rel.Std.Dev.	7.53%	4.13%	2.72%	6.09%	5.29%	2.61%	4.95%	9.15%	3.09%	1.19%	1.97%	1.60%
PDM[3]	-3.47%	4.85%	0.25%	-1.09%	4.90%	-2.52%	1.10%	1.90%	-3.21%	1.49%	-4.40%	0.20%

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Table A22. Fusion ICP results for Al_2O_3 in OREAS 190 (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	5.79	5.92	5.67	**4.97**	6.01	6.00	5.99	5.79	**6.62**	5.89	5.68	5.92
2	5.78	5.91	5.59	**5.44**	6.10	5.98	6.09	5.84	**6.70**	5.85	5.78	5.93
3	5.81	5.91	5.63	**5.30**	6.22	5.98	5.86	5.75	**6.88**	5.87	5.77	5.89
4	**5.56**	6.02	5.56	**5.05**	6.15	5.97	6.32	5.61	**6.36**	5.86	5.72	5.91
5	5.93	5.94	5.80	5.64	5.89	5.98	6.21	5.77	5.87	5.77	NR	NR
6	5.87	**6.15**	5.76	5.66	5.86	6.03	6.18	**5.96**	5.94	5.80	NR	NR
7	5.90	5.97	5.73	5.71	6.00	5.98	6.02	5.77	5.89	5.82	NR	NR
8	5.95	5.96	5.84	5.59	5.89	6.02	5.95	5.68	5.98	5.75	NR	NR
9	5.93	5.72	5.76	**5.29**	6.23	5.93	6.13	5.47	5.89	5.86	NR	NR
10	5.82	5.87	5.73	5.70	6.21	5.96	5.96	5.85	5.89	5.78	NR	NR
11	5.93	5.85	5.40	5.61	6.20	5.99	6.06	5.33	5.90	5.83	NR	NR
12	**6.14**	5.98	5.33	5.54	6.14	5.97	5.83	5.85	5.94	5.83	NR	NR
Mean	5.87	5.93	5.65	5.46	6.08	5.98	6.05	5.72	6.15	5.83	5.74	5.91
Median	5.89	5.93	5.70	5.57	6.12	5.98	6.04	5.77	5.94	5.83	5.75	5.91
Std.Dev.	0.14	0.10	0.16	0.25	0.14	0.03	0.14	0.18	0.38	0.04	0.05	0.02
Rel.Std.Dev.	2.34%	1.73%	2.79%	4.63%	2.30%	0.44%	2.39%	3.07%	6.14%	0.74%	0.81%	0.30%
PDM[3]	0.20%	1.33%	-3.51%	-6.78%	3.75%	2.17%	3.32%	-2.27%	5.11%	-0.51%	-2.02%	0.99%

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Table A23. Fusion ICP results for CaO in OREAS 190 (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	0.190	0.130	0.100	0.080	0.140	0.130	0.170	0.157	0.112	0.120	<0.3	**0.239**
2	**0.250**	0.130	0.100	0.050	0.140	0.130	0.160	0.134	0.110	0.090	<0.3	**0.233**
3	0.180	0.120	0.100	0.080	0.140	0.130	0.150	0.134	0.100	0.150	<0.3	**0.263**
4	0.200	0.150	0.100	<0.05	0.130	0.130	0.150	0.156	0.114	0.150	<0.3	**0.231**
5	0.210	0.140	0.100	0.090	0.130	0.130	0.150	0.139	0.148	0.130	NR	NR
6	0.150	0.160	0.100	0.080	0.140	0.130	0.150	0.151	0.148	0.130	NR	NR
7	0.180	0.180	0.100	**0.130**	0.140	0.130	0.160	0.135	0.148	0.100	NR	NR
8	**0.260**	0.190	0.100	0.080	0.140	0.130	0.140	0.133	0.148	0.090	NR	NR
9	**0.300**	0.080	0.100	0.120	0.130	0.130	0.160	**0.177**	0.115	**0.240**	NR	NR
10	**0.300**	0.120	0.100	0.110	0.130	0.130	0.170	0.137	0.115	0.170	NR	NR
11	**0.290**	0.110	0.100	0.110	0.130	0.130	0.150	0.137	0.115	0.160	NR	NR
12	**0.290**	0.130	0.100	0.130	0.130	0.130	0.160	0.151	0.115	0.110	NR	NR
Mean	0.233	0.137	0.100	0.096	0.135	0.130	0.156	0.145	0.124	0.137		0.241
Median	0.230	0.130	0.100	0.090	0.135	0.130	0.155	0.138	0.115	0.130		0.236
Std.Dev.	0.054	0.030	0.000	0.025	0.005	0.000	0.009	0.014	0.018	0.042		0.015
Rel.Std.Dev.	23.28%	22.14%	0.00%	26.36%	3.87%	0.00%	5.78%	9.32%	14.64%	30.78%		6.13%
PDM[3]	75.61%	2.86%	-24.74%	-27.47%	1.60%	-2.16%	17.28%	9.19%	-6.88%	2.86%		81.73%

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Table A24. Fusion ICP results for Cu in OREAS 190 (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	76	100	60	<50	80	60	**21**	86	70	63	73
2	<50	75	50	70	70	70	60	**50**	88	70	56	79
3	<50	75	50	70	60	80	70	**40**	86	60	63	85
4	<50	79	50	60	60	70	50	**<10**	85	60	**139**	97
5	<50	59	50	70	60	70	60	**33**	61	80	NR	NR
6	<50	65	50	70	70	70	50	**34**	67	70	NR	NR
7	<50	61	50	70	60	70	60	**37**	67	70	NR	NR
8	<50	63	50	70	60	80	50	**38**	60	70	NR	NR
9	<50	67	100	60	70	60	60	**36**	82	70	NR	NR
10	<50	74	100	70	80	70	60	**32**	71	70	NR	NR
11	<50	66	50	70	70	60	60	**34**	70	70	NR	NR
12	<50	71	50	60	70	60	50	**31**	78	70	NR	NR
Mean		69	63	67	66	70	58	**35**	75	69	80	84
Median		69	50	70	70	70	60	34	74	70	63	82
Std.Dev.		7	23	5	7	7	6	7	10	5	39	10
Rel.Std.Dev.		9.52%	36.18%	7.39%	10.16%	10.55%	10.81%	20.22%	13.80%	7.44%	48.98%	12.23%
PDM[3]		1.75%	-8.17%	-2.04%	-2.49%	2.85%	-15.51%	-48.58%	10.13%	1.63%	17.91%	22.72%

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Table A25. Fusion ICP results for Cr_2O_3 in OREAS 190 (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	1.71	1.81	1.78	**1.49**	1.70	1.69	1.70	1.76	**1.53**	1.72	1.68	1.74
2	1.68	1.80	1.77	**1.59**	1.69	1.68	1.70	1.77	**1.50**	1.72	1.72	1.74
3	1.70	1.80	1.74	**1.52**	1.73	1.70	1.69	1.76	**1.47**	1.75	1.69	1.75
4	1.67	1.83	1.75	**1.49**	1.69	1.68	1.71	1.72	**1.56**	1.75	**1.60**	1.75
5	1.74	1.72	1.65	1.62	1.65	1.68	**1.93**	1.68	1.73	1.72	NR	NR
6	1.72	1.74	1.68	1.62	1.66	1.69	**1.93**	1.74	1.76	1.75	NR	NR
7	1.72	1.72	1.68	1.72	**1.73**	1.65	**1.95**	1.72	1.72	1.74	NR	NR
8	1.72	1.68	1.67	1.70	1.66	1.66	**1.96**	1.67	1.71	1.74	NR	NR
9	1.77	1.72	1.65	1.56	1.73	1.71	1.82	1.55	1.70	1.72	NR	NR
10	**1.68**	1.78	1.68	1.65	1.73	1.73	1.83	1.70	1.67	1.74	NR	NR
11	1.75	1.77	1.58	1.61	1.68	1.71	1.83	1.60	1.69	1.72	NR	NR
12	1.77	1.79	1.58	1.65	1.68	1.73	1.81	1.74	1.67	1.75	NR	NR
Mean	1.72	1.76	1.68	1.60	1.69	1.69	1.82	1.70	1.64	1.74	1.67	1.75
Median	1.72	1.77	1.68	1.62	1.69	1.69	1.83	1.72	1.68	1.74	1.69	1.75
Std.Dev.	0.03	0.04	0.07	0.08	0.03	0.03	0.10	0.07	0.10	0.01	0.05	0.01
Rel.Std.Dev.	1.96%	2.54%	3.93%	4.71%	1.73%	1.48%	5.70%	3.93%	6.02%	0.76%	3.06%	0.31%
PDM[3]	0.42%	2.90%	-1.63%	-6.45%	-1.01%	-1.10%	6.41%	-0.61%	-4.11%	1.52%	-2.31%	2.05%

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Table A26. Fusion ICP results for Fe_2O_3 in OREAS 190 (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	34.70	36.61	35.50	**30.50**	35.42	36.19	33.88	36.60	34.14	36.00	**32.90**	36.64
2	34.30	36.86	35.30	**32.60**	35.35	36.33	33.82	37.18	33.80	36.00	**32.40**	37.04
3	34.60	36.98	35.30	**31.00**	35.40	36.29	34.66	36.55	33.33	36.30	**32.30**	37.11
4	**32.60**	37.36	35.30	**30.70**	34.83	36.53	34.23	35.89	34.70	36.60	**32.40**	36.86
5	35.70	35.69	34.70	33.90	35.33	35.64	34.59	35.26	36.16	35.10	NR	NR
6	35.30	35.95	35.00	33.50	35.56	35.75	34.24	36.36	35.96	35.50	NR	NR
7	35.60	35.84	34.70	35.40	35.33	35.76	34.63	35.38	36.14	34.60	NR	NR
8	35.60	35.50	34.70	34.70	35.56	35.66	**35.58**	34.00	35.68	35.10	NR	NR
9	34.80	36.12	34.70	**33.00**	35.15	35.94	35.68	34.20	34.51	35.60	NR	NR
10	**33.30**	37.05	35.50	34.50	34.76	36.24	34.68	36.33	34.15	35.90	NR	NR
11	34.50	37.04	33.20	34.40	34.74	36.63	34.75	33.24	34.28	35.70	NR	NR
12	34.80	37.88	33.00	34.70	34.75	36.54	33.74	36.36	33.96	35.90	NR	NR
Mean	34.65	36.57	34.74	33.24	35.18	36.13	34.54	35.61	34.74	35.69	32.50	36.91
Median	34.75	36.74	34.85	33.70	35.33	36.22	34.61	36.11	34.39	35.80	32.40	36.95
Std.Dev.	0.93	0.74	0.83	1.70	0.32	0.36	0.62	1.22	0.99	0.56	0.27	0.21
Rel.Std.Dev.	2.69%	2.03%	2.39%	5.12%	0.92%	1.00%	1.80%	3.43%	2.85%	1.56%	0.83%	0.57%
PDM[3]	-2.13%	3.30%	-1.87%	-6.11%	-0.63%	2.03%	-2.44%	0.58%	-1.89%	0.81%	-8.20%	4.26%

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Table A27. Fusion ICP results for K_2O in OREAS 190 (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	0.020	<0.01	0.010	<0.1	0.023	**0.120**	<0.2	**0.091**
2	**<0.1**	<0.1	<0.02	<0.1	0.020	0.010	0.010	<0.1	**0.045**	**0.120**	<0.2	**0.092**
3	**<0.1**	<0.1	<0.02	<0.1	0.020	0.020	0.010	<0.1	0.039	**0.120**	<0.2	**0.097**
4	**0.100**	<0.1	<0.02	<0.1	0.020	0.010	<0.01	<0.1	0.032	**0.120**	<0.2	**0.092**
5	**0.200**	<0.1	**<0.1**	<0.1	0.010	0.010	0.020	<0.1	0.012	**0.120**	NR	NR
6	**0.200**	<0.1	**0.100**	<0.1	0.020	0.010	0.010	<0.1	0.012	**0.120**	NR	NR
7	**0.200**	<0.1	**<0.1**	<0.1	0.020	0.010	0.020	<0.1	0.012	**0.120**	NR	NR
8	**0.300**	<0.1	**<0.1**	<0.1	0.010	0.010	<0.01	<0.1	0.011	**<0.1**	NR	NR
9	**<0.1**	**0.157**	<0.1	<0.1	0.020	0.010	<0.01	<0.1	0.011	**0.120**	NR	NR
10	**0.100**	**0.193**	<0.1	<0.1	0.020	0.010	0.020	<0.1	0.012	**0.120**	NR	NR
11	**<0.1**	**0.157**	<0.1	<0.1	0.030	0.010	0.010	<0.1	0.011	**0.120**	NR	NR
12	**<0.1**	**0.169**	<0.1	<0.1	0.020	<0.01	0.020	<0.1	0.012	**0.120**	NR	NR
Mean	**0.183**	0.169	0.100		0.019	0.011	0.014		0.019	**0.120**		0.093
Median	0.200	0.163	0.100		0.020	0.010	0.010		0.012	0.120		0.092
Std.Dev.	0.075	0.017			0.005	0.003	0.005		0.012	0.000		0.003
Rel.Std.Dev.	41.06%	10.10%			26.87%	28.75%	36.49%		63.77%	0.00%		2.83%
PDM[3]	1087.72%	992.56%	547.85%		24.17%	-28.74%	-6.42%		26.12%	680.40%		500.94%

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Table A28. Fusion ICP results for MgO in OREAS 190 (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	6.57	6.78	6.62	**5.66**	6.90	6.99	**6.59**	**7.66**	7.25	6.79	6.57	6.94
2	6.52	6.78	6.63	**6.16**	6.99	6.95	7.00	7.30	7.31	6.78	6.87	6.94
3	6.57	6.82	6.50	**5.79**	7.11	6.96	6.85	7.23	7.47	6.81	6.84	6.84
4	**6.30**	6.87	6.60	**5.73**	7.03	7.00	6.93	7.10	7.06	6.84	6.70	6.90
5	6.87	**7.29**	6.80	6.63	6.81	6.92	6.91	7.34	6.79	6.95	NR	NR
6	6.79	**7.33**	6.83	6.62	6.76	6.92	6.87	7.45	6.81	6.92	NR	NR
7	6.84	**7.31**	**6.58**	6.73	**6.98**	6.92	6.79	7.22	6.73	6.91	NR	NR
8	6.87	**7.19**	6.78	6.68	6.76	6.94	6.66	7.08	6.89	6.90	NR	NR
9	6.81	6.93	6.67	**6.55**	6.97	7.08	6.78	6.40	6.70	6.65	NR	NR
10	6.61	7.07	6.76	6.88	6.89	7.06	6.84	6.61	6.53	6.72	NR	NR
11	6.79	7.09	6.38	6.83	6.87	7.09	6.75	6.67	6.72	6.66	NR	NR
12	6.91	7.32	6.30	6.88	6.89	7.11	6.64	**7.41**	6.68	6.67	NR	NR
Mean	6.70	7.07	6.62	6.43	6.91	7.00	6.80	7.12	6.91	6.80	6.75	6.90
Median	6.79	7.08	6.63	6.63	6.90	6.98	6.82	7.23	6.80	6.80	6.77	6.92
Std.Dev.	0.19	0.22	0.17	0.46	0.11	0.07	0.12	0.38	0.29	0.11	0.14	0.05
Rel.Std.Dev.	2.79%	3.14%	2.50%	7.23%	1.55%	1.03%	1.83%	5.30%	4.25%	1.58%	2.05%	0.67%
PDM[3]	-2.12%	3.14%	-3.34%	-6.15%	0.93%	2.12%	-0.71%	3.96%	0.90%	-0.72%	-1.53%	0.80%

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Table A29. Fusion ICP results for MnO in OREAS 190 (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	0.550	0.585	0.560	**0.470**	0.580	0.560	0.561	0.572	0.535	0.590	0.555	0.589
2	0.550	0.586	0.556	**0.500**	0.580	0.560	0.578	0.569	0.528	0.590	0.556	0.596
3	0.550	0.589	0.558	**0.470**	0.590	0.570	0.564	0.560	0.519	0.590	0.556	0.595
4	0.560	0.590	0.560	**0.470**	0.580	0.570	0.587	0.551	0.540	0.600	**0.531**	0.597
5	0.600	0.589	0.568	0.530	0.560	0.570	0.613	0.571	0.596	0.600	NR	NR
6	0.590	0.591	0.570	0.530	0.560	0.570	0.611	0.592	0.596	0.600	NR	NR
7	0.590	0.585	0.566	0.560	0.580	0.570	0.586	0.570	0.593	0.590	NR	NR
8	0.590	0.581	0.570	0.550	0.560	0.570	0.607	0.558	0.592	0.590	NR	NR
9	0.580	0.588	0.574	0.530	0.590	0.590	0.597	0.553	0.562	0.590	NR	NR
10	0.550	0.602	0.578	0.550	0.580	0.590	0.595	0.586	0.571	0.590	NR	NR
11	0.570	0.600	0.550	0.550	0.580	0.590	0.570	0.543	0.589	0.590	NR	NR
12	0.580	0.612	0.542	0.560	0.580	0.590	0.580	0.605	0.575	0.590	NR	NR
Mean	0.572	0.592	0.563	0.523	0.577	0.575	0.587	0.569	0.566	0.593	0.550	0.594
Median	0.575	0.589	0.563	0.530	0.580	0.570	0.587	0.570	0.573	0.590	0.556	0.596
Std.Dev.	0.019	0.009	0.010	0.036	0.011	0.012	0.018	0.018	0.029	0.005	0.012	0.004
Rel.Std.Dev.	3.32%	1.50%	1.84%	6.83%	1.86%	2.03%	3.01%	3.17%	5.09%	0.76%	2.25%	0.62%
PDM[3]	-0.40%	3.06%	-1.97%	-8.97%	0.47%	0.18%	2.34%	-0.84%	-1.35%	3.23%	-4.27%	3.53%

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Table A30. Fusion ICP results for Na_2O in OREAS 190 (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	0.010	<0.01	0.010	<0.01	0.007	NR	NR	NR
2	NR	NR	NR	NR	0.010	<0.01	<0.01	<0.01	0.007	NR	NR	NR
3	NR	NR	NR	NR	0.010	<0.01	0.010	<0.01	0.007	NR	NR	NR
4	NR	NR	NR	NR	0.010	<0.01	<0.01	<0.01	0.007	NR	NR	NR
5	NR	NR	NR	NR	0.010	<0.01	0.010	<0.01	0.007	NR	NR	NR
6	NR	NR	NR	NR	0.010	<0.01	0.010	0.010	0.007	NR	NR	NR
7	NR	NR	NR	NR	**0.020**	<0.01	0.010	0.011	0.007	NR	NR	NR
8	NR	NR	NR	NR	0.010	<0.01	<0.01	<0.01	0.007	NR	NR	NR
9	NR	NR	NR	NR	0.010	<0.01	<0.01	**0.021**	0.008	NR	NR	NR
10	NR	NR	NR	NR	0.010	<0.01	**0.020**	**0.018**	0.009	NR	NR	NR
11	NR	NR	NR	NR	0.010	<0.01	0.010	**0.033**	0.008	NR	NR	NR
12	NR	NR	NR	NR	0.010	<0.01	<0.01	**0.025**	**0.015**	NR	NR	NR
Mean					0.011		0.011	0.020	0.008			
Median					0.010		0.010	0.020	0.007			
Std.Dev.					0.003		0.004	0.009	0.002			
Rel.Std.Dev.					26.65%		33.07%	44.29%	25.76%			
PDM[3]					13.78%		20.04%	106.56%	-14.23%			

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Table A31. Fusion ICP results for P_2O_5 in OREAS 190 (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	0.020	<0.01	0.010	<0.01	**0.026**	NR	NR	<0.006
2	NR	<0.03	<0.02	<0.02	0.010	<0.01	<0.01	<0.01	**0.032**	NR	NR	0.012
3	NR	<0.03	<0.02	<0.02	0.010	<0.01	<0.01	<0.01	**<0.01**	NR	NR	0.015
4	NR	<0.03	<0.02	<0.02	0.010	<0.01	0.010	<0.01	**0.009**	NR	NR	0.004
5	NR	<0.03	<0.02	<0.02	0.010	0.010	0.010	<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	<0.02	**<0.01**	0.010	0.020	<0.01	<0.01	NR	NR	NR
8	NR	<0.03	<0.02	<0.02	0.010	0.010	<0.01	<0.01	<0.01	NR	NR	NR
9	NR	<0.03	**0.040**	0.020	0.020	<0.01	<0.01	<0.01	<0.01	NR	NR	NR
10	NR	<0.03	**0.020**	<0.02	0.020	<0.01	<0.01	<0.01	<0.01	NR	NR	NR
11	NR	<0.03	**0.020**	0.020	0.020	<0.01	0.010	<0.01	0.007	NR	NR	NR
12	NR	<0.03	**0.020**	<0.02	0.020	<0.01	<0.01	<0.01	<0.01	NR	NR	NR
Mean			0.025	0.020	0.015	0.010	0.012		0.019			0.010
Median			0.020	0.020	0.010	0.010	0.010		0.018			0.012
Std.Dev.			0.010	0.000	0.005	0.000	0.004		0.012			0.006
Rel.Std.Dev.			40.00%	0.00%	35.90%	0.00%	37.27%		65.67%			55.03%
PDM[3]			102.62%	62.09%	17.89%	-18.95%	-2.74%		50.68%			-16.25%

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Table A32. Fusion ICP results for SiO_2 in OREAS 190 (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	38.90	37.90	37.90	**32.50**	38.10	37.63	37.90	37.92	38.71	38.90	37.60	39.79
2	38.40	38.10	37.60	**34.90**	38.56	37.52	38.57	37.68	38.93	38.80	37.20	39.83
3	39.00	38.10	37.60	**33.50**	38.55	37.54	38.10	37.17	39.14	38.90	37.60	39.52
4	**36.70**	38.80	37.00	**32.50**	37.98	37.37	39.57	36.34	38.07	39.00	**35.20**	39.69
5	39.70	39.10	37.00	**35.20**	37.58	38.45	39.32	38.41	37.71	37.70	NR	NR
6	39.30	39.80	36.10	**35.00**	37.11	38.29	39.19	39.37	37.93	38.20	NR	NR
7	39.30	39.30	36.40	**36.30**	36.98	38.40	38.72	38.06	37.61	37.50	NR	NR
8	39.10	39.00	37.00	**35.20**	38.08	38.27	38.22	37.29	38.15	37.50	NR	NR
9	37.20	**41.80**	36.60	35.50	39.55	37.28	38.57	**29.93**	37.40	37.60	NR	NR
10	**36.10**	**43.30**	37.40	37.90	38.97	37.04	38.88	**31.67**	37.70	37.20	NR	NR
11	37.30	**43.30**	35.90	37.60	38.63	37.09	37.87	**29.17**	37.73	37.20	NR	NR
12	37.70	**44.00**	35.30	36.90	38.91	37.29	38.16	**32.08**	37.65	37.30	NR	NR
Mean	38.23	40.21	36.82	35.25	38.25	37.68	38.59	35.42	38.06	37.98	36.90	39.71
Median	38.65	39.20	37.00	35.20	38.33	37.53	38.57	37.23	37.83	37.65	37.40	39.74
Std.Dev.	1.18	2.25	0.78	1.78	0.77	0.53	0.57	3.63	0.57	0.73	1.15	0.14
Rel.Std.Dev.	3.09%	5.61%	2.12%	5.05%	2.00%	1.40%	1.46%	10.24%	1.49%	1.91%	3.11%	0.35%
PDM[3]	0.45%	5.66%	-3.25%	-7.37%	0.51%	-0.98%	1.40%	-6.92%	0.01%	-0.19%	-3.04%	4.34%

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Table A33. Fusion ICP results for SO_3 in OREAS 190 (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	0.020	<0.05	<0.1	<0.02	<0.01	NR	NR	NR	NR	0.100	0.050	NR
2	0.030	<0.05	<0.1	<0.02	<0.01	NR	NR	NR	NR	0.050	0.025	NR
3	<0.02	<0.05	<0.1	<0.02	<0.01	NR	NR	NR	NR	0.050	<0.01	NR
4	0.040	<0.05	<0.1	<0.02	<0.01	NR	NR	NR	NR	0.075	0.075	NR
5	<0.02	<0.05	<0.02	<0.02	NR	NR	NR	NR	NR	0.100	NR	NR
6	0.020	<0.05	<0.02	<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	<0.02	<0.05	<0.02	<0.02	NR	NR	NR	NR	NR	<0.01	NR	NR
9	<0.02	<0.05	0.080	<0.02	<0.02	NR	NR	NR	NR	0.050	NR	NR
10	<0.02	<0.05	0.040	<0.02	<0.02	NR	NR	NR	NR	0.050	NR	NR
11	<0.02	<0.05	0.020	<0.02	<0.02	NR	NR	NR	NR	0.025	NR	NR
12	0.090	<0.05	0.020	<0.02	<0.02	NR	NR	NR	NR	0.050	NR	NR
Mean	0.040		0.040							0.061	0.050	
Median	0.030		0.030							0.050	0.050	
Std.Dev.	0.029		0.028							0.025	0.025	
Rel.Std.Dev.	72.89%		70.71%							41.47%	50.00%	
PDM[3]	-16.22%		-16.22%							27.84%	4.60%	

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Table A34. Fusion ICP results for TiO_2 in OREAS 190 (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	**0.020**	0.060	0.070	0.050	0.066	0.060	0.066	0.056	0.057	0.060	0.050	0.069
2	**0.030**	0.060	0.070	0.060	0.067	0.060	0.067	0.056	0.055	0.060	0.050	0.070
3	**0.030**	0.060	0.070	0.050	0.066	0.060	0.066	0.054	0.055	0.060	0.050	0.069
4	**<0.01**	0.060	0.070	0.050	0.065	0.060	0.066	0.053	0.059	0.060	0.050	0.069
5	**0.030**	0.070	0.070	0.050	0.065	0.060	0.065	0.064	0.066	0.070	NR	NR
6	**0.060**	0.070	0.070	0.050	0.065	0.060	0.065	0.066	0.064	0.060	NR	NR
7	**0.020**	0.070	0.070	0.060	0.066	0.060	0.065	0.064	0.065	0.070	NR	NR
8	**<0.01**	0.070	0.070	0.050	0.066	0.060	0.064	0.062	0.064	0.060	NR	NR
9	**0.010**	0.060	0.070	0.050	0.069	0.060	0.064	0.061	0.070	0.060	NR	NR
10	**<0.01**	0.060	0.070	0.060	0.067	0.060	0.063	0.065	0.065	0.060	NR	NR
11	**0.020**	0.060	0.070	0.050	0.067	0.060	0.065	0.053	0.065	0.060	NR	NR
12	**0.020**	0.060	0.070	0.060	0.067	0.060	0.061	0.060	**0.079**	0.060	NR	NR
Mean	**0.027**	0.063	0.070	0.053	0.066	0.060	0.065	0.060	0.064	0.062	0.050	0.069
Median	0.020	0.060	0.070	0.050	0.066	0.060	0.065	0.061	0.064	0.060	0.050	0.069
Std.Dev.	0.014	0.005	0.000	0.005	0.001	0.000	0.002	0.005	0.007	0.004	0.000	0.001
Rel.Std.Dev.	53.03%	7.77%	0.00%	9.23%	1.74%	0.00%	2.47%	8.19%	10.62%	6.31%	0.00%	1.20%
PDM[3]	-56.90%	2.37%	13.14%	-13.80%	7.22%	-3.02%	4.66%	-3.83%	3.05%	-0.33%	-19.18%	11.97%

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Table A35. Fusion ICP results for Zn in OREAS 190 (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	354	350	300	220	NR	300	357	313	400	**194**	NR
2	300	357	350	300	210	NR	300	345	268	400	**145**	NR
3	300	357	300	300	210	NR	400	332	292	400	**161**	NR
4	300	363	300	300	210	NR	400	333	309	400	**201**	NR
5	400	355	350	400	220	NR	300	329	200	400	NR	NR
6	400	369	350	400	220	NR	300	341	216	400	NR	NR
7	400	352	350	400	220	NR	300	326	221	400	NR	NR
8	400	364	350	400	220	NR	300	318	221	400	NR	NR
9	400	352	400	300	210	NR	300	287	337	400	NR	NR
10	300	350	400	300	210	NR	300	298	317	400	NR	NR
11	400	355	350	300	230	NR	300	310	355	400	NR	NR
12	400	371	400	300	220	NR	300	334	346	400	NR	NR
Mean	358	358	354	333	217		317	326	283	400	175	
Median	400	356	350	300	220		300	330	300	400	178	
Std.Dev.	51	7	33	49	7		39	20	56	0	27	
Rel.Std.Dev.	14.37%	1.92%	9.44%	14.77%	3.01%		12.29%	6.08%	19.63%	0.00%	15.21%	
PDM[3]	9.46%	9.44%	8.19%	1.82%	-33.81%		-3.27%	-0.48%	-13.53%	22.19%	-46.47%	

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Table A36. Results for C in OREAS 190 (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	0.060	0.070	0.060	0.050	**0.100**	0.070	**0.125**	0.040	**0.100**	0.065	0.050
2	0.060	0.080	0.050	0.040	**0.090**	0.060	**0.087**	0.040	**0.120**	0.059	0.050
3	0.060	0.070	0.070	0.060	**0.120**	0.060	**0.094**	0.040	**0.110**	0.061	0.050
4	0.070	0.080	0.070	0.060	**0.120**	0.050	**0.135**	0.040	**0.110**	0.057	0.060
5	0.060	0.070	0.060	0.040	0.090	0.070	0.082	0.050	**0.100**	0.076	0.080
6	0.050	0.070	0.060	0.040	0.070	0.060	0.079	0.050	**0.110**	0.059	0.050
7	0.050	0.080	0.060	0.040	0.080	0.070	0.083	0.050	**0.110**	0.060	0.060
8	0.050	0.080	0.060	0.040	0.080	0.050	0.075	0.050	**0.110**	0.061	0.050
9	0.060	0.070	0.040	0.050	0.090	0.060	**0.114**	0.050	0.100	0.056	0.050
10	0.070	0.080	0.040	0.060	0.070	0.060	**0.090**	0.050	0.090	0.061	0.050
11	0.070	0.090	0.040	0.060	0.080	0.060	**0.119**	0.040	0.090	0.061	0.070
12	0.070	0.060	0.040	0.060	0.060	0.050	**0.114**	0.050	0.100	0.061	0.050
Mean	0.061	0.075	0.054	0.050	0.088	0.060	0.100	0.046	0.104	0.061	0.056
Median	0.060	0.075	0.060	0.050	0.085	0.060	0.092	0.050	0.105	0.061	0.050
Std.Dev.	0.008	0.008	0.012	0.010	0.019	0.007	0.020	0.005	0.009	0.005	0.010
Rel.Std.Dev.	13.03%	10.64%	21.50%	19.07%	21.31%	12.31%	20.47%	11.23%	8.64%	8.36%	17.84%
PDM[3]	-6.46%	15.32%	-16.71%	-23.12%	34.55%	-7.74%	53.38%	-29.52%	60.17%	-5.50%	-14.15%

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Table A37. Results for S in OREAS 190 (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	<0.01	<0.005	<0.01	<0.01	<0.02	<0.01	0.010	<0.01	<0.01	<0.003	<0.01
2	<0.01	<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	0.010	<0.01	<0.01	<0.003	<0.01
5	<0.01	0.014	<0.01	<0.01	<0.02	<0.01	0.020	0.010	<0.01	0.024	<0.01
6	<0.01	0.017	<0.01	<0.01	<0.02	<0.01	0.010	0.010	<0.01	0.019	<0.01
7	<0.01	0.019	<0.01	<0.01	<0.02	<0.01	0.010	<0.01	<0.01	0.020	<0.01
8	0.010	0.017	<0.01	0.020	<0.02	<0.01	0.010	0.010	<0.01	0.012	<0.01
9	<0.01	<0.005	<0.01	<0.01	<0.02	<0.01	0.010	<0.01	<0.01	0.017	<0.01
10	<0.01	<0.005	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	0.021	<0.01
11	<0.01	<0.005	<0.01	0.010	<0.02	<0.01	<0.01	<0.01	<0.01	0.016	<0.01
12	0.010	<0.005	<0.01	<0.01	<0.02	<0.01	0.010	<0.01	<0.01	0.019	<0.01
Mean	0.010	0.017		0.015			0.011	0.010		0.018	
Median	0.010	0.017		0.015			0.010	0.010		0.019	
Std.Dev.	0.000	0.002		0.007			0.003	0.000		0.004	
Rel.Std.Dev.	0.00%	12.31%		47.14%			28.75%	0.00%		20.64%	
PDM[3]	-26.01%	23.94%		10.99%			-18.61%	-26.01%		35.70%	

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