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A Statistical Review of the Chemical Composition Measurements and PCT Results for the Glasses Fabricated as Part of the US Test Matrix

1.0 EXECUTIVE SUMMARY

The Savannah River National Laboratory (SRNL) is part of a consortium that is looking to improve the retention of aluminum, chromium, and sulfate in high level radioactive waste (HLW) glass. Such glass has been produced by the Defense Waste Processing Facility (DWPF) at the Savannah River Site (SRS) in South Carolina since it began operating in 1996 and is planned to be produced by the River Protection Project - Waste Treatment Plant (WTP) at the Hanford Site in Washington. The consortium conducting this study, which is designated as Task #6 by the Department of Energy (DOE) Environmental Management (EM) program sponsoring this effort, is made up of personnel from SRNL, the Pacific Northwest National Laboratory (PNNL), and the V.G. Khlopin Radium Institute (KRI). Coordinated glass experimental work will be performed by each member of the consortium. The glasses that are being studied were selected to further the understanding of composition-property relationships within the glass regions of interest to both DWPF and WTP.

Forty-five (45) glasses, making up the US test matrix, were batched and fabricated to support the study. The chemical compositions of these glasses were measured by SRNL's Process Science Analytical Laboratory (PSAL) under the auspices of an analytical plan. In addition, two heat treatments (quenched and centerline canister cooled, ccc) of each glass were subjected to the 7-day Product Consistency Test (PCT) to assess their durabilities. More specifically, the Method A of the PCT (ASTM C-1285-2002) was used for these tests. Measurements of the resulting leachate solutions were conducted by PSAL under the auspices of three analytical plans.

A statistical review of the PSAL measurements of the chemical compositions and of the PCT results for the glasses making up the US test matrix is provided in this memorandum. Target, measured, and measured bias-corrected compositional views were determined for these glasses. The durability results for the US study glasses are compared to those of the Environmental Assessment (EA) glass. All of the US glasses yielded PCTs that are lower than those of the EA glass. The largest PCT values are those measured for the ccc versions of US-27 and US-18 whose boron normalized leachate (NL[B]) values in grams per liter (g/L) were 16.4 g/L (based on the targeted composition) and 10.7 g/L (based on the targeted composition), respectively. The 16.4 g/L is just below the value of 16.695 g/L for EA's NL[B] that was reported by Jantzen et al. in WSRC-TR-92-0346, Revision 1. For the quenched version of the glasses, the largest NL[B] value is 0.67 g/L (based on the targeted composition). Thus, some statistically significant differences were seen between the quenched and ccc versions for some of the glasses. It should be noted that the thirty (30) glasses making up the KRI test matrix were not included in these analyses.

2.0 INTRODUCTION

The Savannah River National Laboratory (SRNL) is part of a consortium that is looking to improve the retention of aluminum, chromium, and sulfate in high level radioactive waste (HLW) glass. Such glass has been produced by the Defense Waste Processing Facility (DWPF) at the Savannah River Site (SRS) in South Carolina since it began operating in 1996 and is planned to be produced by the River Protection Project - Waste Treatment Plant (WTP) at the Hanford Site in Washington. The consortium conducting this study, which is designated as Task #6 by the Department of Energy (DOE) Environmental Management (EM) program sponsoring this effort, is made up of personnel from SRNL, the Pacific Northwest National Laboratory (PNNL), and the V. R. Khlopin Radium Institute (KRI). Coordinated glass experimental work is being performed by each member of the consortium. The glasses that are being studied were selected to further the understanding of composition-property relationships within the glass regions of interest to both DWPF and WTP [1].

Forty-five (45) glasses, making up the US portion of the test matrix, were batched and fabricated to support the study. The chemical compositions of these glasses were measured by SRNL's Process Science Analytical Laboratory (PSAL) under the auspices of an analytical plan [2]. The first objective of this memorandum is to provide a statistical analysis of the chemical composition measurements that were generated by PSAL for the US glasses. More specifically, assessments of measured compositions against their targeted values are made. The results from this analysis are presented in Section 3.

The durability of these 45 US glasses was measured using the Product Consistency Test (PCT) as defined in ASTM C-1285-2002 [3]. Two heat treatments were utilized during the fabrication of each of these glasses. Specifically, each of the glasses was quenched (i.e., rapidly cooled) and a sample of each glass was cooled in accordance with the centerline canister cooling (ccc) regime. Both heat treatments of each glass were subjected to the PCT. SRNL's PSAL measured the elemental concentrations of the resulting leachate solutions from the PCTs.

Due to the large number of PCTs needed to complete the testing for the two heat treatments of the 45 glasses, the PCTs were submitted to PSAL in three sets. PSAL completed these measurements under the auspices of three analytical plans ([4], [5], and [6]). The second objective of this memorandum is to provide a review of the PCT measurements and a comparison of these durability results to the acceptance criteria for durability that relies on PCT measurements of the Environmental Assessment (EA) standard glass. The results from these efforts are presented in Section 4.

Section 5 provides a summary of the overall conclusions from these investigations and analyses, which were conducted using JMP Version 6.0.2 [7].

3.0 A STATISTICAL REVIEW OF THE CHEMICAL COMPOSITION MEASUREMENTS FOR THE US GLASSES

In this section, the measured and targeted compositions of the US glasses are presented and compared. The targeted compositions for these glasses are provided in Table A1 of Appendix A.

Chemical composition measurements for these glasses were conducted by PSAL following an analytical plan [2]. Two dissolution methods were utilized in measuring these chemical compositions: samples prepared by lithium metaborate (LM) dissolution were measured for calcium (Ca), chromium (Cr), potassium (K), magnesium (Mg), manganese (Mn), sodium (Na), lead (Pb), sulfur (S), strontium (Sr), titanium (Ti), zinc (Zn), and zirconium (Zr) concentrations. Samples prepared by the sodium peroxide fusion (PF) method were measured for aluminum (Al),

boron (B), iron (Fe), lithium (Li), nickel (Ni), and silicon (Si) concentrations. All of the prepared samples were analyzed (twice for each element of interest) by Inductively Coupled Plasma – Emission Spectroscopy (ICP-ES) (with the instrumentation being re-calibrated between the duplicate analyses).

Table A2 in Appendix A provides the elemental concentration measurements derived from the samples prepared using LM, and Table A3 in Appendix A provides the measurements derived from the samples prepared using PF. Measurements for samples of the Batch 1 and Low-Activity Reference Material (LRM) standards that were included in the PSAL analytical plan along with the study glasses are also provided in these two tables.

The elemental concentrations were converted to oxide concentrations by multiplying the values for each element by the gravimetric factor for the corresponding oxide. During this process, each elemental concentration that was determined to be below the detection limit of the analytical procedures used by the PSAL was reduced to half of that detection limit as the oxide concentration was determined.

In the sections that follow, the analytical sequences of the measurements are explored, the measurements of the standards are investigated and used for bias correction, the measurements for each glass are reviewed including an analysis of their components of variation, the average chemical compositions (measured and bias-corrected) for each glass are determined, and comparisons are made between the measurements and the targeted composition for the glasses of this study.

3.1 Measurements in Analytical Sequence

Exhibit A1 in Appendix A provides plots of the measurements generated by the PSAL for samples prepared using the LM method. The plots are in analytical sequence with different symbols and colors being used to represent each of the study and standard glasses. Similar plots for the samples prepared using the PF method are provided in Exhibit A2 in Appendix A. These plots include the oxide values derived from all of the measurement data from Tables A2 and A3. While no problems are readily apparent in these preliminary plots of the results, additional reviews of these results are presented in the sections that follow.

3.2 Batch 1 and LRM Standard Results

In this section, the PSAL measurements of the chemical compositions of the Batch 1 and LRM glasses are reviewed. These measurements are investigated across the ICP analytical blocks, and the results are used to bias correct the measurements for the US study glasses.

Exhibit A3 in Appendix A provides statistical analyses of the Batch 1 and LRM results generated by the LM prep method by block for each oxide of interest. The results include analysis of variance (ANOVA) investigations looking for statistically significant differences between the block means for each of the oxides for each of the standards. The results from the statistical tests for the Batch 1 standard may be summarized as follows: CaO, Cr_2O_3, K_2O, MgO, and NiO have measurements that indicate a significant ICP calibration effect on the block averages at the 5% significance level. The results from the statistical tests for the LRM standard may be summarized as follows: CaO, K_2O, MgO, NiO, TiO_2, and ZrO_2 have measurements that indicate a significant ICP calibration effect on the block averages at the 5% significance level. The reference values for the oxide concentrations of the standards are given in the header for each set of measurements in the exhibit.

Exhibit A4 in Appendix A provides a similar set of analyses for the measurements derived from samples prepared via the PF method. The results from the statistical tests for the Batch 1 standard

may be summarized as follows: Li_2O, MnO, and SiO_2 have measurements that indicate a significant ICP calibration effect on the block averages at the 5% significance level. The results from the statistical tests for the LRM standard may be summarized as follows: B_2O_3, Li_2O, and SiO_2 have measurements that indicate a significant ICP calibration effect on the block averages at the 5% significance level. The reference values for the oxide concentrations of the standards are given in the headers for each set of measurements in the exhibit.

Thus, some of these results provide incentive for adjusting the measurements by the effect of the ICP calibration as revealed through the Batch 1 measurements. Therefore, the oxide measurements of the study glasses are to be bias corrected for the effect of the ICP calibration on each of the analytical blocks. The basis for this bias correction is presented as part of Exhibits A3 and A4 – the average measurement for Batch 1 for each ICP block for Al_2O_3, B_2O_3, CaO, Cr_2O_3, Fe_2O_3, K_2O, Li_2O, MgO, MnO, Na_2O, NiO, SiO_2, and TiO_2. The Batch 1 results were used to conduct the bias correction as long as the reference value for the oxide concentration in the Batch 1 glass was greater than or equal to 0.1 wt%. Thus, applying this approach and based upon the information in the exhibits, the Batch 1 results were used to bias correct the Al_2O_3, B_2O_3, CaO, Cr_2O_3, Fe_2O_3, K_2O, Li_2O, MgO, MnO, Na_2O, NiO, SiO_2, and TiO_2 measurements. No bias correction was conducted for PbO, SO_3, SrO, ZnO, or ZrO_2 given that little if any of these oxides are present in the Batch 1 standard.

The bias correction was conducted as follows. For each oxide, let $\bar{a}_{ij}$ be the average measurement for the i^{th} oxide at analytical block j for Batch 1, and let t_i be the reference value for the i^{th} oxide for Batch 1. (The averages and reference values are provided in Exhibits A3 and A4.) Let $\bar{c}_{ijk}$ be the average measurement for the i^{th} oxide at analytical block j for the k^{th} glass. The bias adjustment was conducted as follows

$$\bar{c}_{ijk} \bullet \left(1 - \frac{\bar{a}_{ij} - t_i}{\bar{a}_{ij}}\right) = \bar{c}_{ijk} \bullet \frac{t_i}{\bar{a}_{ij}}$$

Bias-corrected measurements are indicated by a "bc" suffix, and such adjustments were performed for all of the oxides of this study except for PbO, SO_3, SrO, ZnO, and ZrO_2. Both measured and measured "bc" values are included in the discussion that follows. In these discussions bias-corrected values for PbO, SO_3, SrO, ZnO, and ZrO_2 are included for completeness (e.g., to allow a sum of oxides to be computed for the bias-corrected results). These bias-corrected values are the same as the original PbO, SO_3, SrO, ZnO, and ZrO_2 values (i.e., once again, no bias correction was performed for this group of oxides).

3.3 Composition Measurements by Glass Number

Exhibits A5 and A6 in Appendix A provide plots of the oxide concentration measurements by Glass ID in groups of 15 (with the measurements for the glass standards, Batch 1 and LRM, being provided in the fourth group) for the measured and bias-corrected (bc) values for the LM and PF preparation methods, respectively. The results by Lab ID, which indicates the preparation number and the ICP block number, are shown for each of the Glass ID's along with the targeted concentrations. Different symbols and colors are used to represent the different glasses. These plots show the individual measurements across each preparation method for the two ICP calibrations. A review of the plots presented in these exhibits reveals the repeatability of the individual, oxide values for each glass. From such a review, the following observations are offered. For the LM results, there is a great deal of scatter in the Na_2O values for US-01, US-06, US-09, US-11, US-14, US-18, and US-38; in the SrO, ZnO, and ZrO_2 values for US-08 and US-27; and in the CaO for US-36. For the PF results, there is a great deal of scatter in the Fe_2O_3

values for US-14 and US-17, in the SiO_2 values for US-01, US-04, US-05, US-15, US-16, US-17, US-19, and US-23. For some of the other study glasses, bias-correcting the SiO_2 measurements resulted in increasing the scatter of the values. In the next section, there is an attempt to average out the scatter that was noted for some of these measurements, and the resulting average compositions are then compared to their targeted compositions.

3.4 Measured versus Targeted Compositions

The four measurements for each oxide for each glass (over both preparation methods) were averaged to determine a representative chemical composition for each glass. These determinations were conducted both for the measured and for the bias-corrected data. A sum of oxides was also computed for each glass based upon both the measured and bias-corrected values. Exhibit A7 in Appendix A provides plots showing results for each glass for each oxide to help highlight the comparisons among the measured, bias-corrected, and target value for each oxide.

Some observations from the plots of Exhibit A7 are offered: The most significant observation from this exhibit is the strong indication that two glass samples were switched as they were introduced into the PSAL analytical process. These two glasses are US-28 and US-37.

Another observation of interest relates to the behavior of the Cr_2O_3 measurements. The Cr_2O_3 measurements are consistently below the targeted values for study glasses whose targeted Cr_2O_3 concentrations are 0.4 wt% or greater.

Although not the primary objective of this task, the compositional data do provide some insight into SO_3 solubility in high-level waste glasses. Given the SO_3 measurements on the LRM glass suggest that the analytical techniques provide a "true" measurement of the SO_3 retained in the glass, the results of the US test matrix glasses suggest that there is a dependence of SO_3 retention with composition. For select US test matrix glasses, full retention of SO_3 is shown (i.e., target equal measured) while other glasses show a significant reduction in the SO_3 retained in glass (i.e., measured values significantly lower than targeted values).

Table A4 in Appendix A provides a summary of the average compositions as well as the targeted composition and some associated differences and relative differences. Notice that the targeted sums of oxides for the Batch 1 and LRM standards do not sum to 100% due to an incomplete coverage of the oxides in the standard glasses. All of the sums of oxides (both measured and bias-corrected) for the study glasses fall within the interval of 95 to 105 wt%. Entries in Table A4 show the absolute differences and percent relative differences (when the targeted concentration for the oxide is at least 0.5 wt%) between the measured or bias-corrected values and the targeted values. These differences are shaded when the percent relative differences are greater than or equal to 5%. Also note that in addition to the entries in this table for US-28 and US-37 (showing the measured and measured-bias corrected values as originally reported), there are entries labeled US-28* and US-37* (showing the measured and measured-biased corrected values arranged properly). Thus, the US-28* and US-37* compositions should be used to represent these glasses along with the information for the other US glasses in Table A4 in providing the three views of the composition of these study glasses.

Display 1 provides a comparison between the measurements and bias-corrected measurements for US-44 and US-45. These glasses were duplicates; that is, they had the same targeted compositions. The comparisons indicate a measure of the repeatability of the batching process which appears to be acceptable (the percent differences for most of the oxides are less than 5% and percent differences for all of the oxides are less than 10 wt%). The largest percent difference between the two sets of measurements is the 8.1% difference for Li_2O with US-44's value of 4.3919 wt% and US-45's value of 4.0636 wt%. Considering the targeted value of 4.0488 wt%

for this oxide, it appears that the Li_2O value for US-44 would be the more unusual of the two glasses.

Display 1. Comparison Between the Chemical Composition Measurements for Replicates US-44 and US-45

						US-44	US-45	Difference	
	US-44					Measured	Measured	Measured	%
	US-45	US-44	US-45	Difference	%	Bias-	Bias-	Bias-	Difference
	Targeted	Measured	Measured	Measured	Difference	Corrected	Corrected	Corrected (BC)	Measured
Oxide	(wt%)	(wt%)	(wt%)	(wt%)	Measured	(wt%)	(wt%)	(wt%)	BC
Al2O3	12.8029	13.6327	13.2123	0.4204	3.2%	13.8261	13.4881	0.3380	2.5%
B2O3	12.5864	12.4610	12.8635	-0.4025	-3.2%	12.3775	12.7786	-0.4011	-3.2%
CaO	0.5553	0.5439	0.5422	0.0017	0.3%	0.6064	0.5837	0.0227	3.9%
Cr2O3	0.3051	0.2616	0.2558	0.0058	2.3%	0.2548	0.2502	0.0046	1.8%
Fe2O3	8.8598	8.7426	8.9321	-0.1894	-2.2%	8.7753	8.9240	-0.1486	-1.7%
K2O	0.6397	0.6445	0.6640	-0.0196	-3.0%	0.5672	0.5892	-0.0220	-3.9%
Li2O	4.0488	4.3919	4.0636	0.3283	8.1%	4.4618	4.1216	0.3402	8.3%
MgO	0.2525	0.2550	0.2467	0.0083	3.4%	0.2748	0.2661	0.0087	3.3%
MnO	1.8339	1.7560	1.7915	-0.0355	-2.0%	1.8655	1.8984	-0.0330	-1.8%
Na2O	12.7286	13.9181	13.4396	0.4785	3.6%	13.3541	12.9576	0.3966	3.1%
NiO	0.3587	0.3394	0.3321	0.0073	2.2%	0.3736	0.3664	0.0073	2.0%
PbO	0.6665	0.6070	0.5911	0.0159	2.7%	0.6070	0.5911	0.0159	2.7%
SiO2	39.5480	37.4378	39.6305	-2.1928	-5.9%	38.2395	40.3297	-2.0902	-5.5%
SO3	0.2222	0.2278	0.2222	0.0056	2.5%	0.2278	0.2222	0.0056	2.5%
SrO	1.6195	1.4073	1.4339	-0.0266	-1.9%	1.4073	1.4339	-0.0266	-1.9%
TiO2	0.4650	0.4487	0.4529	-0.0042	-0.9%	0.4880	0.4876	0.0005	0.1%
ZnO	1.0237	0.9653	0.9607	0.0047	0.5%	0.9653	0.9607	0.0047	0.5%
ZrO2	1.4636	1.3076	1.3130	-0.0054	-0.4%	1.3076	1.3130	-0.0054	-0.4%
Sum	99.9800	99.3483	100.9477	-1.5993	-1.6%	99.9798	101.5621	-1.5823	-1.6%

4.0 A STATISTICAL REVIEW OF THE PCT RESULTS

The study glasses, after being batched and fabricated, were subjected to the 7-day PCT to assess their durabilities. More specifically, Method A of the PCT (ASTM C-1285-2002 [3]) was used for these measurements. Durability is the critical product quality metric for DWPF glass studies. Two heat treatments (quenching and a ccc regime) were used during the fabrication of each of the study glasses. Both heat treatments for each study glass were subjected to the PCT (in triplicate). PCTs were also conducted in triplicate for samples of the EA glass and for samples of the Approved Reference Material (ARM) glass. Blanks (samples consisting only of ASTM Type I water) were also submitted for the PCT.

Analytical plans (see [4], [5], and [6]) were provided to the PSAL to support the measurement of the compositions of the solutions resulting from the PCTs which were conducted in three sets. Samples of a multi-element, standard solution were also included in the analytical plans (as a check on the accuracy of the ICP-ES used for these measurements). In this and the following sections, the measurements generated by the PSAL for these PCTs are presented and reviewed.

Table B1 in Appendix B provides the elemental leachate concentration measurements determined by the PSAL for the solution samples generated by the PCTs. One of the quality control checkpoints for the PCT procedure is solution-weight loss over the course of the 7-day test. None of these PCT results indicated a solution-weight loss problem. Any measurement in Table B1 below the detection limit of the analytical procedure (indicated by a "<") was replaced by ½ of the detection limit in subsequent analyses. In addition to adjustments for detection limits, the values were adjusted for the dilution factors: the values for the study glasses, the blanks, and the ARM glass in Table B1 were multiplied by 1.6667 to determine the values in parts per million (ppm) and the values for EA were multiplied by 16.6667. Table B2 in Appendix B provides the resulting measurements.[1]

In the sections that follow, the analytical sequence of the measurements is explored, the measurements of the standards are investigated and used to assess the overall accuracy of the ICP measurement process, the measurements for each glass are reviewed, plots are provided that explore the effects of heat treatment on the PCTs for these glasses, the PCTs are normalized using the compositions (targeted, measured, and bias-corrected) presented in Table A4, and the normalized PCTs are compared to those of the EA glass.

4.1 Measurements in Analytical Sequence

Exhibits B1 and B2 in Appendix B provide plots of the leachate (ppm) concentrations in analytical sequence as generated by the PSAL for all of the data and for the data from only the study glasses, respectively. A different color and symbol are used for each study glass or standard. No problems are seen in these plots.

4.2 Results for the Samples of the Multi-Element Solution Standard

Exhibit B3 in Appendix B provides analyses of the PSAL measurements of the samples of the multi-element solution standard by ICP analytical (or calibration) block by analytical set. An analysis of variance (ANOVA) investigating for statistically significant differences among the set/block averages for these samples for each element of interest is included in these exhibits. These results indicate a statistically significant (at a 5% significance level) difference among the average measurements over these sets/blocks for all of the elements of interest. However, no bias correction of the PCT results for the study glasses was conducted. This approach was taken since the triplicate PCTs for a single study glass were placed in different ICP blocks. Averaging the ppm's for each set of triplicates helps to minimize the impact of the ICP effects.

Display 2 summarizes the average measurements and the reference values for the 4 primary elements of interest. By in large, the results indicate consistent and accurate measurements from the PSAL processes used to conduct these analyses. The exceptions to this are the 17.60 ppm Si measurement and the 77.27 ppm Na measurement for the standard in Set/Block 3/1. While each of these measurements is low compared to its reference value for the standard, this is not seen to be a significant problem, and no other issues are evident in these results.

[1] Note that the switching of glasses US-28 and US-37 that was identified for the chemical compositions is not thought to have affected the PCT measurements for this pair of glasses. Thus, no switching of the PCT measurements was deemed necessary.

Display 2: Results from Samples of the Multi-Element Solution Standard

Analytical Set/Block	B (ppm)	Li (ppm)	Na (ppm)	Si (ppm)
1/1	20.13	9.83	82.80	49.37
1/2	19.93	9.66	82.30	48.67
1/3	20.33	9.81	82.27	49.80
1/4	20.57	9.71	82.30	50.07
1/5	20.63	9.78	82.87	49.77
1/6	20.80	9.90	81.10	50.30
2/1	20.77	9.98	81.07	49.93
2/2	20.30	9.82	81.17	49.47
2/3	20.73	9.92	80.87	51.07
2/4	21.23	10.03	82.07	51.13
2/5	20.70	10.03	81.97	50.70
2/6	20.23	9.74	80.77	50.93
3/1	17.60	9.85	77.27	49.30
3/2	20.13	9.84	81.50	49.43
3/3	20.23	9.90	80.63	49.13
3/4	20.20	9.82	81.93	49.57
3/5	20.47	9.84	80.17	49.67
3/6	20.10	9.92	80.87	49.27
Grand Average	**20.28**	**9.86**	**81.33**	**49.86**
Reference Value	**20**	**10**	**81**	**50**
% difference	**1.42%**	**-1.44%**	**0.40%**	**-0.27%**

4.3 Measurements by Glass Number

Exhibit B4 in Appendix B provides plots of the leachate concentrations for each type of submitted sample: the study glasses and the standards (EA (101), ARM (102), the multi-element solution standard (100), and blanks (103)). Exhibit B5 in Appendix B provides plots of the leachate concentrations for the PCT results of the study glasses (in the three sets of 15 glasses each) by heat treatment. These plots allow for the assessment of the repeatability of the measurements, which suggests some scatter in the triplicate values for some analytes for some of the glasses. Also, note that some differences between the values for the two heat treatments for some glasses are evident. Specifically, glass #18, glass #27, and glass #42 show the biggest differences between their quenched and ccc counterparts for B, Li, Na, and Si.

4.4 Normalized PCT Results

PCT leachate concentrations are typically normalized using the cation composition (expressed as a weight percent) in the glass to obtain a grams-per-liter (g/L) leachate concentration. The normalization of the PCTs is usually conducted using the measured compositions of the glasses. This is the preferred normalization process for the PCTs. For completeness, the targeted cation and the bias-corrected cation compositions were also used to conduct this normalization.

As is the usual convention, the common logarithm of the normalized PCT (normalized leachate, NL) for each element of interest was determined and used for comparison. To accomplish this computation, one must

1. Determine the common logarithm of the elemental parts per million (ppm) leachate concentration for each of the triplicates and each of the elements of interest (these values are provided in Table B2 of Appendix B),

2. Average the common logarithms over the triplicates for each element of interest, and then

Normalizing Using Measured Composition (preferred method)

3. Subtract a quantity equal to 1 plus the common logarithm of the average cation measured concentration (expressed as a weight percent of the glass) from the average computed in step 2.

Or Normalizing Using Target Composition

3. Subtract a quantity equal to 1 plus the common logarithm of the target cation concentration (expressed as a weight percent of the glass) from the average computed in step 2.

Or Normalizing Using Measured Bias-Corrected Composition

3. Subtract a quantity equal to 1 plus the common logarithm of the measured bias-corrected cation concentration (expressed as a weight percent of the glass) from the average computed in step 2.

Exhibit B6 in Appendix B provides scatter plots for these results for each analytical set of PCTs and offers an opportunity to investigate the consistency in the leaching across the elements for the glasses of this study. All combinations of the normalizations of the PCTs (i.e., those generated using the targeted, measured, and bias-corrected compositional views) and both heat treatments are represented in the series of scatter plots. Consistency in the leaching across the elements is typically demonstrated by a high degree of linear correlation among the values for pairs of these elements. For each set of PCTs, the Si results appear to yield the smallest correlations were paired with each of the other elements. The smallest is the 0.3747 correlation between Si and B for the Set #3 results. The reason for some of these correlations being this low is not known.

Display 3 summarizes the normalized PCTs for the glasses of this study. The results are listed by glass identifier and show the PCTs for both heat treatments normalized using measured, bias-corrected, and targeted compositions. Note that the PCT results for ARM and EA are also provided. In comparing the results for the US study glasses to the results for EA, note that all of the US glasses yielded PCTs that are lower than those of the EA glass. The largest PCT values are for the ccc versions of US-27 and US-18 with NL[B] values of 16.4 g/L (based on the targeted composition) and 10.7 g/L (based on the targeted composition), respectively. The 16.4 g/L is just below the value of 16.695 g/L for EA's NL[B] that was reported in [8]. For the quenched version of the glasses, the largest NL[B] value is 0.67 g/L (based on the targeted composition). Also note the similarity of PCT results for US-44 and US-45. These two glasses had the same targeted composition, and their PCT results differ by less than 0.1 g/L for any of the four elements over all of the compositional views and heat treatments. A closer comparison between the quenched and ccc versions of the study glasses is presented in the next section.

Display 3: Normalized PCTs by Glass ID, Heat Treatment, and Compositional View

Glass ID	Heat Treatment	Comp View	log NL[B (g/L)]	log NL [Li(g/L)]	log NL [Na (g/L)]	log NL [Si (g/L)]	NL B (g/L)	NL Li (g/L)	NL Na (g/L)	NL Si (g/L)
ARM		reference	-0.2928	-0.2463	-0.2935	-0.5555	0.510	0.567	0.509	0.278
ARM		reference	-0.2956	-0.2500	-0.2982	-0.5556	0.506	0.562	0.503	0.278
ARM		reference	-0.2738	-0.2349	-0.3096	-0.5531	0.532	0.582	0.490	0.280
EA		reference	1.2551	0.9846	1.1272	0.5952	17.995	9.652	13.403	3.937
EA		reference	1.2529	0.9886	1.1348	0.6010	17.903	9.741	13.640	3.990
EA		reference	1.2615	1.0010	1.1345	0.6081	18.260	10.023	13.630	4.056
US-01	ccc	measured	-0.3594	-0.2682	-0.3536	-0.3779	0.437	0.539	0.443	0.419
US-01	ccc	measured bc	-0.3511	-0.2737	-0.3432	-0.3899	0.446	0.533	0.454	0.407
US-01	ccc	target	-0.3349	-0.2663	-0.2958	-0.4043	0.462	0.542	0.506	0.394
US-01	quenched	measured	-0.3517	-0.2584	-0.3306	-0.3666	0.445	0.552	0.467	0.430
US-01	quenched	measured bc	-0.3434	-0.2639	-0.3202	-0.3787	0.454	0.545	0.478	0.418
US-01	quenched	target	-0.3272	-0.2565	-0.2728	-0.3931	0.471	0.554	0.534	0.405
US-02	ccc	measured	0.1447	0.1046	-0.1454	-0.4496	1.395	1.272	0.716	0.355
US-02	ccc	measured bc	0.1668	0.1017	-0.1296	-0.4504	1.468	1.264	0.742	0.354
US-02	ccc	target	0.1453	0.0888	-0.1182	-0.4633	1.397	1.227	0.762	0.344
US-02	quenched	measured	0.2383	0.1966	-0.0757	-0.4505	1.731	1.573	0.840	0.354
US-02	quenched	measured bc	0.2604	0.1937	-0.0599	-0.4513	1.821	1.562	0.871	0.354
US-02	quenched	target	0.2389	0.1808	-0.0485	-0.4643	1.734	1.516	0.894	0.343
US-03	ccc	measured	-0.5032	-0.3178	-0.8219	-0.5739	0.314	0.481	0.151	0.267
US-03	ccc	measured bc	-0.4864	-0.3232	-0.8039	-0.5910	0.326	0.475	0.157	0.256
US-03	ccc	target	-0.4888	-0.3231	-0.7831	-0.5919	0.325	0.475	0.165	0.256
US-03	quenched	measured	-0.4625	-0.3639	-0.6523	-0.5500	0.345	0.433	0.223	0.282
US-03	quenched	measured bc	-0.4456	-0.3693	-0.6344	-0.5672	0.358	0.427	0.232	0.271
US-03	quenched	target	-0.4480	-0.3692	-0.6136	-0.5680	0.356	0.427	0.243	0.270
US-04	ccc	measured	-0.4919	-0.3401	-0.5970	-0.5875	0.322	0.457	0.253	0.259
US-04	ccc	measured bc	-0.4750	-0.3456	-0.5791	-0.6048	0.335	0.451	0.264	0.248
US-04	ccc	target	-0.4800	-0.3403	-0.5476	-0.6129	0.331	0.457	0.283	0.244
US-04	quenched	measured	-0.4689	-0.3012	-0.5928	-0.5730	0.340	0.500	0.255	0.267
US-04	quenched	measured bc	-0.4520	-0.3066	-0.5749	-0.5903	0.353	0.494	0.266	0.257
US-04	quenched	target	-0.4570	-0.3013	-0.5434	-0.5984	0.349	0.500	0.286	0.252
US-05	ccc	measured	-0.3233	-0.1697	-0.4726	-0.5479	0.475	0.677	0.337	0.283
US-05	ccc	measured bc	-0.3012	-0.1727	-0.4709	-0.5488	0.500	0.672	0.338	0.283
US-05	ccc	target	-0.3098	-0.1685	-0.4454	-0.5636	0.490	0.679	0.359	0.273
US-05	quenched	measured	-0.4812	-0.1597	-0.7310	-0.6033	0.330	0.692	0.186	0.249
US-05	quenched	measured bc	-0.4591	-0.1626	-0.7294	-0.6042	0.347	0.688	0.186	0.249
US-05	quenched	target	-0.4678	-0.1584	-0.7038	-0.6189	0.341	0.694	0.198	0.240
US-06	ccc	measured	-0.5276	-0.3501	-0.5554	-0.6405	0.297	0.447	0.278	0.229
US-06	ccc	measured bc	-0.5108	-0.3556	-0.5541	-0.6577	0.308	0.441	0.279	0.220
US-06	ccc	target	-0.5132	-0.3487	-0.5628	-0.6504	0.307	0.448	0.274	0.224
US-06	quenched	measured	-0.4873	-0.2951	-0.5297	-0.6309	0.326	0.507	0.295	0.234
US-06	quenched	measured bc	-0.4705	-0.3005	-0.5284	-0.6481	0.338	0.501	0.296	0.225
US-06	quenched	target	-0.4730	-0.2936	-0.5371	-0.6408	0.337	0.509	0.290	0.229
US-07	ccc	measured	-0.4830	-0.3290	-0.5976	-0.6550	0.329	0.469	0.253	0.221
US-07	ccc	measured bc	-0.4801	-0.3350	-0.5872	-0.6627	0.331	0.462	0.259	0.217
US-07	ccc	target	-0.4923	-0.3453	-0.5707	-0.6468	0.322	0.452	0.269	0.226
US-07	quenched	measured	-0.4423	-0.2719	-0.5590	-0.6377	0.361	0.535	0.276	0.230
US-07	quenched	measured bc	-0.4394	-0.2780	-0.5486	-0.6453	0.364	0.527	0.283	0.226
US-07	quenched	target	-0.4516	-0.2883	-0.5321	-0.6294	0.354	0.515	0.294	0.235
US-08	ccc	measured	-0.4121	-0.2754	-0.5052	-0.4309	0.387	0.530	0.312	0.371
US-08	ccc	measured bc	-0.3899	-0.2783	-0.5036	-0.4317	0.407	0.527	0.314	0.370
US-08	ccc	target	-0.3890	-0.2728	-0.4893	-0.4484	0.408	0.534	0.324	0.356
US-08	quenched	measured	-0.3861	-0.2192	-0.5041	-0.4021	0.411	0.604	0.313	0.396
US-08	quenched	measured bc	-0.3639	-0.2221	-0.5025	-0.4030	0.433	0.600	0.314	0.395
US-08	quenched	target	-0.3629	-0.2166	-0.4882	-0.4196	0.434	0.607	0.325	0.381
US-09	ccc	measured	-0.3588	-0.2858	-0.5453	-0.6097	0.438	0.518	0.285	0.246
US-09	ccc	measured bc	-0.3560	-0.2927	-0.5436	-0.6189	0.441	0.510	0.286	0.240
US-09	ccc	target	-0.3545	-0.2742	-0.5823	-0.6113	0.442	0.532	0.262	0.245
US-09	quenched	measured	-0.3682	-0.2653	-0.3588	-0.5521	0.428	0.543	0.438	0.280
US-09	quenched	measured bc	-0.3653	-0.2721	-0.3571	-0.5613	0.431	0.534	0.439	0.275
US-09	quenched	target	-0.3639	-0.2536	-0.3958	-0.5537	0.433	0.558	0.402	0.279
US-10	ccc	measured	-0.4703	-0.3323	-0.4482	-0.5979	0.339	0.465	0.356	0.252
US-10	ccc	measured bc	-0.4620	-0.3377	-0.4324	-0.6100	0.345	0.460	0.369	0.245
US-10	ccc	target	-0.4576	-0.3198	-0.4217	-0.6229	0.349	0.479	0.379	0.238
US-10	quenched	measured	-0.4620	-0.3168	-0.4349	-0.5875	0.345	0.482	0.367	0.259
US-10	quenched	measured bc	-0.4538	-0.3223	-0.4191	-0.5996	0.352	0.476	0.381	0.251
US-10	quenched	target	-0.4494	-0.3044	-0.4083	-0.6125	0.355	0.496	0.391	0.244
US-11	ccc	measured	-0.1158	-0.0460	-0.3124	-0.6397	0.766	0.900	0.487	0.229
US-11	ccc	measured bc	-0.0989	-0.0515	-0.3059	-0.6568	0.796	0.888	0.494	0.220
US-11	ccc	target	-0.0982	-0.0393	-0.2913	-0.6377	0.798	0.914	0.511	0.230

Display 3: Normalized PCTs by Glass ID, Heat Treatment, and Compositional View

Glass ID	Heat Treatment	Comp View	log NL[B (g/L)]	log NL [Li(g/L)]	log NL [Na (g/L)]	log NL [Si (g/L)]	NL B (g/L)	NL Li (g/L)	NL Na (g/L)	NL Si (g/L)
US-11	quenched	measured	-0.5008	-0.2459	-0.6159	-0.7140	0.316	0.568	0.242	0.193
US-11	quenched	measured bc	-0.4839	-0.2514	-0.6094	-0.7311	0.328	0.561	0.246	0.186
US-11	quenched	target	-0.4832	-0.2392	-0.5948	-0.7120	0.329	0.577	0.254	0.194
US-12	ccc	measured	0.2300	0.1752	-0.0158	-0.4142	1.698	1.497	0.964	0.385
US-12	ccc	measured bc	0.2468	0.1698	-0.0092	-0.4314	1.765	1.478	0.979	0.370
US-12	ccc	target	0.2415	0.1746	0.0395	-0.4158	1.744	1.495	1.095	0.384
US-12	quenched	measured	0.0923	0.0490	-0.1036	-0.4484	1.237	1.120	0.788	0.356
US-12	quenched	measured bc	0.1091	0.0436	-0.0971	-0.4656	1.286	1.106	0.800	0.342
US-12	quenched	target	0.1038	0.0484	-0.0483	-0.4500	1.270	1.118	0.895	0.355
US-13	ccc	measured	-0.5268	-0.3686	-0.5594	-0.6560	0.297	0.428	0.276	0.221
US-13	ccc	measured bc	-0.5239	-0.3754	-0.5530	-0.6652	0.299	0.421	0.280	0.216
US-13	ccc	target	-0.5244	-0.3625	-0.5353	-0.6503	0.299	0.434	0.292	0.224
US-13	quenched	measured	-0.4561	-0.3071	-0.5058	-0.6231	0.350	0.493	0.312	0.238
US-13	quenched	measured bc	-0.4532	-0.3140	-0.4993	-0.6323	0.352	0.485	0.317	0.233
US-13	quenched	target	-0.4537	-0.3010	-0.4817	-0.6174	0.352	0.500	0.330	0.241
US-14	ccc	measured	0.4150	0.3479	0.1962	-0.4660	2.600	2.228	1.571	0.342
US-14	ccc	measured bc	0.4232	0.3424	0.1977	-0.4780	2.650	2.200	1.577	0.333
US-14	ccc	target	0.4180	0.3478	0.1953	-0.4710	2.618	2.227	1.568	0.338
US-14	quenched	measured	0.4917	0.4233	0.2648	-0.4640	3.103	2.651	1.840	0.344
US-14	quenched	measured bc	0.5000	0.4179	0.2663	-0.4760	3.162	2.618	1.846	0.334
US-14	quenched	target	0.4948	0.4232	0.2638	-0.4690	3.124	2.650	1.836	0.340
US-15	ccc	measured	0.5566	0.4905	0.2961	-0.6260	3.603	3.094	1.977	0.237
US-15	ccc	measured bc	0.5595	0.4845	0.3024	-0.6337	3.627	3.051	2.007	0.232
US-15	ccc	target	0.5619	0.4909	0.3216	-0.6337	3.647	3.097	2.097	0.232
US-15	quenched	measured	0.6620	0.5934	0.3936	-0.6550	4.592	3.921	2.475	0.221
US-15	quenched	measured bc	0.6649	0.5874	0.4000	-0.6626	4.623	3.867	2.512	0.217
US-15	quenched	target	0.6673	0.5938	0.4192	-0.6626	4.649	3.925	2.625	0.217
US-16	ccc	measured	-0.0663	-0.0277	-0.3805	-0.5622	0.858	0.938	0.416	0.274
US-16	ccc	measured bc	-0.0634	-0.0337	-0.3702	-0.5697	0.864	0.925	0.426	0.269
US-16	ccc	target	-0.0632	-0.0265	-0.3440	-0.5751	0.865	0.941	0.453	0.266
US-16	quenched	measured	-0.1970	-0.0974	-0.5446	-0.5871	0.635	0.799	0.285	0.259
US-16	quenched	measured bc	-0.1941	-0.1034	-0.5343	-0.5946	0.640	0.788	0.292	0.254
US-16	quenched	target	-0.1939	-0.0962	-0.5081	-0.6000	0.640	0.801	0.310	0.251
US-17	ccc	measured	-0.3066	-0.2322	-0.5261	-0.3865	0.494	0.586	0.298	0.411
US-17	ccc	measured bc	-0.2984	-0.2376	-0.5194	-0.3986	0.503	0.579	0.302	0.399
US-17	ccc	target	-0.3168	-0.2488	-0.5052	-0.4242	0.482	0.564	0.312	0.377
US-17	quenched	measured	-0.2969	-0.1875	-0.5616	-0.3696	0.505	0.649	0.274	0.427
US-17	quenched	measured bc	-0.2887	-0.1929	-0.5549	-0.3817	0.514	0.641	0.279	0.415
US-17	quenched	target	-0.3071	-0.2042	-0.5407	-0.4073	0.493	0.625	0.288	0.391
US-18	ccc	measured	1.0042	0.9158	0.5477	-0.0638	10.097	8.238	3.530	0.863
US-18	ccc	measured bc	1.0211	0.9104	0.5490	-0.0810	10.498	8.136	3.540	0.830
US-18	ccc	target	1.0277	0.9145	0.5223	-0.0644	10.659	8.213	3.329	0.862
US-18	quenched	measured	-0.3042	-0.2235	-0.2092	-0.3932	0.496	0.598	0.618	0.404
US-18	quenched	measured bc	-0.2873	-0.2289	-0.2079	-0.4103	0.516	0.590	0.620	0.389
US-18	quenched	target	-0.2807	-0.2248	-0.2346	-0.3937	0.524	0.596	0.583	0.404
US-19	ccc	measured	-0.3920	-0.2707	-0.4997	-0.5049	0.405	0.536	0.316	0.313
US-19	ccc	measured bc	-0.3699	-0.2736	-0.4839	-0.5058	0.427	0.533	0.328	0.312
US-19	ccc	target	-0.3834	-0.2725	-0.4664	-0.5251	0.414	0.534	0.342	0.298
US-19	quenched	measured	-0.3608	-0.2345	-0.4979	-0.4741	0.436	0.583	0.318	0.336
US-19	quenched	measured bc	-0.3387	-0.2374	-0.4820	-0.4751	0.458	0.579	0.330	0.335
US-19	quenched	target	-0.3521	-0.2363	-0.4645	-0.4943	0.444	0.580	0.343	0.320
US-20	ccc	measured	-0.3892	-0.2552	-0.4923	-0.5054	0.408	0.556	0.322	0.312
US-20	ccc	measured bc	-0.3671	-0.2582	-0.4764	-0.5063	0.429	0.552	0.334	0.312
US-20	ccc	target	-0.3789	-0.2597	-0.4629	-0.5239	0.418	0.550	0.344	0.299
US-20	quenched	measured	-0.3616	-0.2225	-0.4796	-0.4869	0.435	0.599	0.331	0.326
US-20	quenched	measured bc	-0.3394	-0.2254	-0.4637	-0.4879	0.458	0.595	0.344	0.325
US-20	quenched	target	-0.3512	-0.2269	-0.4502	-0.5055	0.445	0.593	0.355	0.312
US-21	ccc	measured	-0.4031	-0.2581	-0.5525	-0.5238	0.395	0.552	0.280	0.299
US-21	ccc	measured bc	-0.4002	-0.2650	-0.5345	-0.5330	0.398	0.543	0.292	0.293
US-21	ccc	target	-0.4020	-0.2515	-0.5112	-0.5220	0.396	0.560	0.308	0.301
US-21	quenched	measured	-0.3811	-0.2244	-0.5392	-0.4468	0.416	0.596	0.289	0.357
US-21	quenched	measured bc	-0.3781	-0.2313	-0.5212	-0.4560	0.419	0.587	0.301	0.350
US-21	quenched	target	-0.3800	-0.2178	-0.4979	-0.4450	0.417	0.606	0.318	0.359
US-22	ccc	measured	-0.2793	-0.2584	-0.2932	-0.3712	0.526	0.552	0.509	0.425
US-22	ccc	measured bc	-0.2710	-0.2638	-0.2869	-0.3832	0.536	0.545	0.517	0.414
US-22	ccc	target	-0.2742	-0.2615	-0.2434	-0.3805	0.532	0.548	0.571	0.416
US-22	quenched	measured	-0.2521	-0.2397	-0.3379	-0.4349	0.560	0.576	0.459	0.367
US-22	quenched	measured bc	-0.2439	-0.2451	-0.3316	-0.4470	0.570	0.569	0.466	0.357
US-22	quenched	target	-0.2471	-0.2428	-0.2881	-0.4442	0.566	0.572	0.515	0.360

Display 3: Normalized PCTs by Glass ID, Heat Treatment, and Compositional View

Glass ID	Heat Treatment	Comp View	log NL[B (g/L)]	log NL [Li(g/L)]	log NL [Na (g/L)]	log NL [Si (g/L)]	NL B (g/L)	NL Li (g/L)	NL Na (g/L)	NL Si (g/L)
US-23	ccc	measured	-0.3596	-0.2418	-0.4930	-0.4790	0.437	0.573	0.321	0.332
US-23	ccc	measured bc	-0.3513	-0.2473	-0.4751	-0.4911	0.445	0.566	0.335	0.323
US-23	ccc	target	-0.3582	-0.2486	-0.4473	-0.4925	0.438	0.564	0.357	0.322
US-23	quenched	measured	-0.3486	-0.2089	-0.4885	-0.4404	0.448	0.618	0.325	0.363
US-23	quenched	measured bc	-0.3403	-0.2143	-0.4706	-0.4525	0.457	0.610	0.338	0.353
US-23	quenched	target	-0.3472	-0.2157	-0.4428	-0.4539	0.450	0.609	0.361	0.352
US-24	ccc	measured	-0.4068	-0.2773	-0.4907	-0.4981	0.392	0.528	0.323	0.318
US-24	ccc	measured bc	-0.3899	-0.2827	-0.4748	-0.5154	0.407	0.522	0.335	0.305
US-24	ccc	target	-0.3897	-0.2623	-0.4519	-0.5278	0.408	0.547	0.353	0.297
US-24	quenched	measured	-0.4200	-0.2690	-0.5102	-0.5073	0.380	0.538	0.309	0.311
US-24	quenched	measured bc	-0.4031	-0.2744	-0.4944	-0.5245	0.395	0.532	0.320	0.299
US-24	quenched	target	-0.4028	-0.2540	-0.4715	-0.5369	0.396	0.557	0.338	0.290
US-25	ccc	measured	0.1503	0.0960	-0.0735	-0.3551	1.413	1.247	0.844	0.441
US-25	ccc	measured bc	0.1532	0.0891	-0.0631	-0.3643	1.423	1.228	0.865	0.432
US-25	ccc	target	0.1500	0.0923	-0.0346	-0.3723	1.413	1.237	0.924	0.424
US-25	quenched	measured	0.0595	0.0179	-0.1467	-0.4490	1.147	1.042	0.713	0.356
US-25	quenched	measured bc	0.0624	0.0110	-0.1363	-0.4582	1.155	1.026	0.731	0.348
US-25	quenched	target	0.0592	0.0142	-0.1078	-0.4662	1.146	1.033	0.780	0.342
US-26	ccc	measured	0.5451	0.4143	0.0667	-0.4871	3.509	2.596	1.166	0.326
US-26	ccc	measured bc	0.5672	0.4114	0.0732	-0.4880	3.691	2.579	1.184	0.325
US-26	ccc	target	0.5566	0.4058	0.0836	-0.4814	3.603	2.546	1.212	0.330
US-26	quenched	measured	-0.3891	-0.2753	-0.3950	-0.5817	0.408	0.531	0.403	0.262
US-26	quenched	measured bc	-0.3670	-0.2782	-0.3885	-0.5827	0.430	0.527	0.409	0.261
US-26	quenched	target	-0.3776	-0.2838	-0.3781	-0.5760	0.419	0.520	0.419	0.265
US-27	ccc	measured	1.1808	0.8651	0.8372	0.3655	15.164	7.330	6.874	2.320
US-27	ccc	measured bc	1.2031	0.8622	0.8475	0.3648	15.962	7.281	7.039	2.316
US-27	ccc	target	1.2158	0.8534	0.8725	0.3622	16.435	7.136	7.457	2.302
US-27	quenched	measured	0.0616	0.0240	0.1585	-0.0775	1.152	1.057	1.441	0.836
US-27	quenched	measured bc	0.0839	0.0210	0.1689	-0.0783	1.213	1.050	1.475	0.835
US-27	quenched	target	0.0966	0.0123	0.1939	-0.0809	1.249	1.029	1.563	0.830
US-28	ccc	target	0.1388	0.0994	-0.0420	-0.5552	1.376	1.257	0.908	0.278
US-28	quenched	target	0.2322	0.1773	0.0211	-0.5743	1.707	1.504	1.050	0.267
US-28*	ccc	measured	0.1384	0.0938	-0.0637	-0.5541	1.375	1.241	0.864	0.279
US-28*	ccc	measured bc	0.1466	0.0884	-0.0534	-0.5662	1.402	1.226	0.884	0.272
US-28*	quenched	measured	0.2317	0.1718	-0.0006	-0.5732	1.705	1.485	0.999	0.267
US-28*	quenched	measured bc	0.2400	0.1663	0.0098	-0.5853	1.738	1.467	1.023	0.260
US-29	ccc	measured	0.1732	0.1456	0.2236	-0.1183	1.490	1.398	1.673	0.762
US-29	ccc	measured bc	0.1954	0.1427	0.2394	-0.1189	1.568	1.389	1.736	0.760
US-29	ccc	target	0.1862	0.1379	0.2424	-0.1299	1.535	1.374	1.748	0.742
US-29	quenched	measured	0.2491	0.1748	0.3010	-0.1012	1.774	1.496	2.000	0.792
US-29	quenched	measured bc	0.2713	0.1719	0.3168	-0.1019	1.868	1.486	2.074	0.791
US-29	quenched	target	0.2621	0.1672	0.3198	-0.1129	1.828	1.469	2.088	0.771
US-30	ccc	measured	-0.2011	-0.2033	-0.4079	-0.6040	0.629	0.626	0.391	0.249
US-30	ccc	measured bc	-0.1982	-0.2101	-0.3921	-0.6132	0.634	0.616	0.405	0.244
US-30	ccc	target	-0.1938	-0.2061	-0.3544	-0.5958	0.640	0.622	0.442	0.254
US-30	quenched	measured	-0.2476	-0.2399	-0.4624	-0.6508	0.565	0.576	0.345	0.223
US-30	quenched	measured bc	-0.2447	-0.2467	-0.4466	-0.6600	0.569	0.567	0.358	0.219
US-30	quenched	target	-0.2403	-0.2427	-0.4088	-0.6426	0.575	0.572	0.390	0.228
US-31	ccc	measured	-0.5119	-0.3082	-0.7651	-0.6059	0.308	0.492	0.172	0.248
US-31	ccc	measured bc	-0.5036	-0.3136	-0.7492	-0.6179	0.314	0.486	0.178	0.241
US-31	ccc	target	-0.5126	-0.3062	-0.6960	-0.6021	0.307	0.494	0.201	0.250
US-31	quenched	measured	-0.3022	-0.1986	-0.5976	-0.5487	0.499	0.633	0.253	0.283
US-31	quenched	measured bc	-0.2939	-0.2041	-0.5817	-0.5608	0.508	0.625	0.262	0.275
US-31	quenched	target	-0.3029	-0.1967	-0.5285	-0.5450	0.498	0.636	0.296	0.285
US-32	ccc	measured	0.4486	0.3600	0.1532	-0.4691	2.810	2.291	1.423	0.340
US-32	ccc	measured bc	0.4515	0.3538	0.1596	-0.4768	2.828	2.258	1.444	0.334
US-32	ccc	target	0.4498	0.3728	0.1781	-0.4713	2.817	2.360	1.507	0.338
US-32	quenched	measured	0.5509	0.4608	0.2458	-0.4642	3.556	2.889	1.761	0.343
US-32	quenched	measured bc	0.5537	0.4546	0.2522	-0.4720	3.579	2.849	1.787	0.337
US-32	quenched	target	0.5520	0.4737	0.2707	-0.4664	3.565	2.976	1.865	0.342
US-33	ccc	measured	-0.5102	-0.2586	-0.0699	-0.4316	0.309	0.551	0.851	0.370
US-33	ccc	measured bc	-0.4931	-0.2641	-0.0635	-0.4488	0.321	0.544	0.864	0.356
US-33	ccc	target	-0.4632	-0.2450	-0.0702	-0.4314	0.344	0.569	0.851	0.370
US-33	quenched	measured	-0.4883	-0.2973	-0.0467	-0.4494	0.325	0.504	0.898	0.355
US-33	quenched	measured bc	-0.4712	-0.3028	-0.0403	-0.4665	0.338	0.498	0.911	0.342
US-33	quenched	target	-0.4413	-0.2838	-0.0470	-0.4491	0.362	0.520	0.897	0.356
US-34	ccc	measured	0.5703	0.5064	0.4473	-0.3492	3.718	3.209	2.801	0.448
US-34	ccc	measured bc	0.5871	0.5009	0.4489	-0.3664	3.865	3.169	2.811	0.430
US-34	ccc	target	0.5849	0.5049	0.4344	-0.3481	3.845	3.198	2.719	0.449

Display 3: Normalized PCTs by Glass ID, Heat Treatment, and Compositional View

Glass ID	Heat Treatment	Comp View	log NL[B (g/L)]	log NL [Li(g/L)]	log NL [Na (g/L)]	log NL [Si (g/L)]	NL B (g/L)	NL Li (g/L)	NL Na (g/L)	NL Si (g/L)
US-34	quenched	measured	0.6039	0.5356	0.4851	-0.3293	4.017	3.432	3.056	0.469
US-34	quenched	measured bc	0.6208	0.5301	0.4867	-0.3465	4.176	3.389	3.067	0.450
US-34	quenched	target	0.6186	0.5341	0.4722	-0.3282	4.155	3.420	2.966	0.470
US-35	ccc	measured	0.6005	0.5435	0.3564	-0.6589	3.985	3.495	2.272	0.219
US-35	ccc	measured bc	0.6034	0.5366	0.3743	-0.6681	4.012	3.440	2.367	0.215
US-35	ccc	target	0.5976	0.5497	0.4011	-0.6592	3.959	3.546	2.518	0.219
US-35	quenched	measured	-0.0931	-0.0470	-0.2424	-0.6837	0.807	0.897	0.572	0.207
US-35	quenched	measured bc	-0.0902	-0.0538	-0.2245	-0.6929	0.812	0.883	0.596	0.203
US-35	quenched	target	-0.0960	-0.0407	-0.1977	-0.6840	0.802	0.910	0.634	0.207
US-36	ccc	measured	-0.0935	-0.0994	-0.3528	-0.6137	0.806	0.796	0.444	0.243
US-36	ccc	measured bc	-0.0906	-0.1062	-0.3349	-0.6229	0.812	0.783	0.463	0.238
US-36	ccc	target	-0.0956	-0.1033	-0.3068	-0.6223	0.803	0.788	0.493	0.239
US-36	quenched	measured	-0.1850	-0.1553	-0.4211	-0.6371	0.653	0.699	0.379	0.231
US-36	quenched	measured bc	-0.1821	-0.1622	-0.4032	-0.6463	0.658	0.688	0.395	0.226
US-36	quenched	target	-0.1870	-0.1592	-0.3751	-0.6457	0.650	0.693	0.422	0.226
US-37	ccc	target	0.3280	0.2203	0.1507	-0.2831	2.128	1.661	1.415	0.521
US-37	quenched	target	-0.1392	-0.1799	-0.0308	-0.3998	0.726	0.661	0.932	0.398
US-37*	ccc	measured	0.2941	0.2158	0.1343	-0.2911	1.968	1.644	1.362	0.512
US-37*	ccc	measured bc	0.2971	0.2098	0.1446	-0.2988	1.982	1.621	1.395	0.503
US-37*	quenched	measured	-0.1731	-0.1844	-0.0472	-0.4079	0.671	0.654	0.897	0.391
US-37*	quenched	measured bc	-0.1702	-0.1904	-0.0368	-0.4155	0.676	0.645	0.919	0.384
US-38	ccc	measured	-0.1084	-0.1017	0.0802	-0.3000	0.779	0.791	1.203	0.501
US-38	ccc	measured bc	-0.1001	-0.1071	0.0816	-0.3121	0.794	0.781	1.207	0.487
US-38	ccc	target	-0.0974	-0.0894	0.0500	-0.3073	0.799	0.814	1.122	0.493
US-38	quenched	measured	-0.1135	-0.1567	0.0646	-0.3555	0.770	0.697	1.160	0.441
US-38	quenched	measured bc	-0.1052	-0.1622	0.0659	-0.3675	0.785	0.688	1.164	0.429
US-38	quenched	target	-0.1025	-0.1444	0.0344	-0.3627	0.790	0.717	1.082	0.434
US-39	ccc	measured	-0.3680	-0.2824	-0.7405	-0.5409	0.429	0.522	0.182	0.288
US-39	ccc	measured bc	-0.3459	-0.2853	-0.7391	-0.5418	0.451	0.518	0.182	0.287
US-39	ccc	target	-0.3593	-0.2856	-0.7385	-0.5587	0.437	0.518	0.183	0.276
US-39	quenched	measured	-0.3134	-0.2553	-0.6593	-0.5444	0.486	0.556	0.219	0.285
US-39	quenched	measured bc	-0.2913	-0.2582	-0.6579	-0.5453	0.511	0.552	0.220	0.285
US-39	quenched	target	-0.3047	-0.2586	-0.6573	-0.5623	0.496	0.551	0.220	0.274
US-40	ccc	measured	0.1856	0.1414	-0.1182	-0.5407	1.533	1.385	0.762	0.288
US-40	ccc	measured bc	0.1885	0.1353	-0.1003	-0.5484	1.543	1.366	0.794	0.283
US-40	ccc	target	0.1876	0.1426	-0.0781	-0.5347	1.540	1.389	0.835	0.292
US-40	quenched	measured	0.0369	0.0302	-0.2343	-0.5296	1.089	1.072	0.583	0.295
US-40	quenched	measured bc	0.0398	0.0242	-0.2164	-0.5372	1.096	1.057	0.608	0.290
US-40	quenched	target	0.0389	0.0314	-0.1943	-0.5236	1.094	1.075	0.639	0.299
US-41	ccc	measured	-0.5450	-0.3003	-0.7809	-0.6671	0.285	0.501	0.166	0.215
US-41	ccc	measured bc	-0.5421	-0.3072	-0.7705	-0.6763	0.287	0.493	0.170	0.211
US-41	ccc	target	-0.5514	-0.3092	-0.7469	-0.6864	0.281	0.491	0.179	0.206
US-41	quenched	measured	-0.4808	-0.3000	-0.7143	-0.6551	0.331	0.501	0.193	0.221
US-41	quenched	measured bc	-0.4778	-0.3069	-0.7039	-0.6643	0.333	0.493	0.198	0.217
US-41	quenched	target	-0.4872	-0.3089	-0.6803	-0.6743	0.326	0.491	0.209	0.212
US-42	ccc	measured	-0.0501	0.3044	0.5460	-0.7134	0.891	2.015	3.516	0.193
US-42	ccc	measured bc	-0.0472	0.2982	0.5640	-0.7211	0.897	1.987	3.664	0.190
US-42	ccc	target	-0.0338	0.3014	0.5617	-0.7080	0.925	2.002	3.645	0.196
US-42	quenched	measured	0.0970	0.0430	0.2031	-0.1532	1.250	1.104	1.596	0.703
US-42	quenched	measured bc	0.0999	0.0368	0.2211	-0.1609	1.259	1.088	1.664	0.690
US-42	quenched	target	0.1133	0.0400	0.2188	-0.1478	1.298	1.097	1.655	0.712
US-43	ccc	measured	0.2388	0.2504	-0.3189	-0.4463	1.733	1.780	0.480	0.358
US-43	ccc	measured bc	0.2417	0.2443	-0.3086	-0.4540	1.745	1.755	0.491	0.352
US-43	ccc	target	0.2441	0.2498	-0.2793	-0.4632	1.754	1.778	0.526	0.344
US-43	quenched	measured	-0.3981	-0.2252	-0.4843	-0.5352	0.400	0.595	0.328	0.292
US-43	quenched	measured bc	-0.3951	-0.2314	-0.4739	-0.5429	0.403	0.587	0.336	0.287
US-43	quenched	target	-0.3928	-0.2259	-0.4446	-0.5521	0.405	0.594	0.359	0.280
US-44	ccc	measured	-0.2867	-0.2805	-0.3445	-0.5120	0.517	0.524	0.452	0.308
US-44	ccc	measured bc	-0.2838	-0.2874	-0.3266	-0.5212	0.520	0.516	0.471	0.301
US-44	ccc	target	-0.2911	-0.2452	-0.3058	-0.5358	0.512	0.569	0.495	0.291
US-44	quenched	measured	-0.2772	-0.2826	-0.3398	-0.5257	0.528	0.522	0.457	0.298
US-44	quenched	measured bc	-0.2743	-0.2895	-0.3218	-0.5349	0.532	0.514	0.477	0.292
US-44	quenched	target	-0.2815	-0.2473	-0.3010	-0.5496	0.523	0.566	0.500	0.282
US-45	ccc	measured	-0.3537	-0.2633	-0.3606	-0.5490	0.443	0.545	0.436	0.282
US-45	ccc	measured bc	-0.3509	-0.2695	-0.3447	-0.5566	0.446	0.538	0.452	0.278
US-45	ccc	target	-0.3443	-0.2617	-0.3370	-0.5481	0.453	0.547	0.460	0.283
US-45	quenched	measured	-0.3340	-0.2465	-0.3305	-0.5445	0.463	0.567	0.467	0.285
US-45	quenched	measured bc	-0.3311	-0.2527	-0.3147	-0.5521	0.467	0.559	0.485	0.280
US-45	quenched	target	-0.3245	-0.2450	-0.3069	-0.5436	0.474	0.569	0.493	0.286

4.5 Effects of Heat Treatment on PCTs

Exhibit B7 in Appendix B provides a series of plots and statistical comparisons that show the effects of heat treatment on the common logarithm ppm-responses of interest of the triplicate PCTs for each element for each study glass. The ccc version of a given glass yielded measurements indicating a significantly (at the 5% significance level) different mean log(ppm) response than the quenched version of the glass for a given element if the **Prob>|t|** value in the exhibit is 0.05 or smaller. For example, the first glass that shows a statistically significant PCT difference between its quenched and ccc versions is US-03, and for this glass, all four of the elements of interest (i.e., B, Li, Na, and Si), show a statistically significant difference between their average quenched PCT result versus their average ccc PCT result at the 5% significance level.

Exhibit B8 in Appendix B provides a series of plots that show the effects of heat treatment on the PCT response based on the three different compositional views: measured, measured bias-corrected, and targeted. These plots allow for an assessment of the differences in PCT responses from a practical perspective. Note the differences in the quenched and ccc versions of US-18, US-27, and US-42 that were highlighted earlier. Also, note similar differences for US-26 in some of the plots. Figure 1 provides a summary plot of the PCT results (based upon the targeted compositional view) for these glasses. From the information in Exhibit B7, the ccc version of the US-18 glass is statistically less durable than its quenched counterpart for all four elements of interest. For US-26, none of the differences are statistically significant (at the 5% level). For US-27, the ccc version of the glass is statistically less durable than its quenched counterpart for all four elements of interest. For US-42, there is a statistically significant difference between the durability of the quenched and ccc versions of this glass for each element of interest: the quenched version is more durable for boron and silicon, but less durable for lithium and sodium.

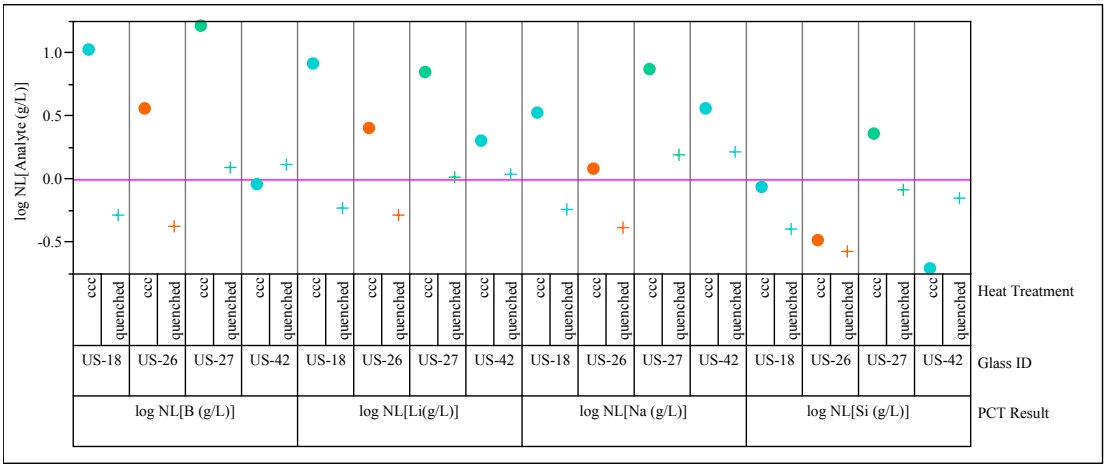

Figure 1. Normalized PCT Results for US-18, US-26, US-27, and US-42 Based Upon Targeted Compositions

5.0 CONCLUSIONS

A statistical review of the PSAL measurements of the chemical compositions and of the PCT results for the glasses making up the US test matrix is provided in this memorandum. Target, measured, and measured bias-corrected compositional views were determined for these glasses. While some statistically significant differences were seen between the quenched and ccc versions for some of the glasses, all of the PCTs for the study glasses were less than the PCT measured for the EA standard glass.

6.0 REFERENCES

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Appendix A:

Tables and Exhibits Supporting the Analysis of the Chemical Composition Measurements for the US Study Glasses

Table A1. Targeted Oxide Concentrations (in mass fractions) for the US Study Glass

Glass ID	Al_2O_3	B_2O_3	CaO	Cr_2O_3	Fe_2O_3	K_2O	Li_2O	MgO	MnO	Na_2O	NiO	PbO	RuO_2	SO_3	SiO_2	SrO	TiO_2	ZnO	ZrO_2	Sum
US-01	0.14929	0.07891	0.00000	0.00300	0.08589	0.01000	0.05616	0.00500	0.02498	0.12372	0.00057	0.00100	0.00020	0.00000	0.45530	0.00100	0.00000	0.00000	0.00500	1.00000
US-02	0.15997	0.16855	0.00000	0.00000	0.06589	0.00000	0.05291	0.00000	0.00634	0.12334	0.00000	0.00000	0.00020	0.00000	0.41679	0.00000	0.00000	0.00100	0.00500	1.00000
US-03	0.15997	0.17309	0.01000	0.00000	0.06526	0.01000	0.04070	0.00499	0.00000	0.07884	0.00293	0.00099	0.00020	0.00000	0.44206	0.00100	0.00998	0.00000	0.00000	1.00000
US-04	0.15996	0.11286	0.00999	0.00001	0.08265	0.00999	0.03742	0.00499	0.02189	0.10333	0.00001	0.00099	0.00020	0.00499	0.43378	0.00099	0.00999	0.00099	0.00499	1.00000
US-05	0.15994	0.16700	0.00702	0.00001	0.08156	0.00999	0.02001	0.00499	0.02408	0.09581	0.00001	0.00100	0.00020	0.00498	0.40642	0.00100	0.00998	0.00100	0.00500	1.00000
US-06	0.15997	0.14065	0.00999	0.00000	0.08154	0.00999	0.02473	0.00499	0.02998	0.10778	0.00001	0.00000	0.00020	0.00500	0.41420	0.00099	0.00999	0.00000	0.00000	1.00000
US-07	0.15996	0.13488	0.00999	0.00001	0.07300	0.00999	0.02660	0.00499	0.02998	0.10668	0.00202	0.00099	0.00020	0.00499	0.41878	0.00099	0.00999	0.00099	0.00499	1.00000
US-08	0.15193	0.09555	0.00000	0.00000	0.09747	0.01000	0.04864	0.00000	0.02437	0.09814	0.00001	0.00099	0.00020	0.00499	0.45772	0.00000	0.01000	0.00000	0.00000	1.00000
US-09	0.13366	0.15048	0.01000	0.00300	0.10880	0.00000	0.02000	0.00500	0.00000	0.14115	0.00000	0.00100	0.00020	0.00500	0.41172	0.00000	0.01000	0.00000	0.00000	1.00000
US-10	0.14123	0.10992	0.00999	0.00001	0.10685	0.00999	0.02001	0.00499	0.02737	0.12674	0.00001	0.00099	0.00020	0.00499	0.41976	0.00099	0.00999	0.00099	0.00499	1.00000
US-11	0.13703	0.19976	0.01000	0.00000	0.07761	0.01000	0.02000	0.00500	0.02999	0.06686	0.00000	0.00100	0.00020	0.00500	0.43657	0.00000	0.00000	0.00100	0.00000	1.00000
US-12	0.13239	0.16081	0.01000	0.00145	0.08743	0.01000	0.05999	0.00000	0.00000	0.11158	0.01837	0.00000	0.00020	0.00500	0.39129	0.00100	0.00498	0.00100	0.00452	1.00000
US-13	0.15997	0.14569	0.00999	0.00000	0.07300	0.00999	0.02155	0.00499	0.02800	0.11528	0.00282	0.00099	0.00020	0.00000	0.41654	0.00000	0.01000	0.00100	0.00000	1.00000
US-14	0.13016	0.17898	0.00397	0.00000	0.09415	0.01000	0.05739	0.00499	0.02599	0.11224	0.00000	0.00071	0.00020	0.00000	0.36522	0.00000	0.01000	0.00100	0.00500	1.00000
US-15	0.09998	0.17796	0.00500	0.00300	0.04999	0.01000	0.02000	0.00000	0.00000	0.14997	0.00000	0.00100	0.00020	0.00500	0.46591	0.00100	0.01000	0.00100	0.00000	1.00000
US-16	0.13316	0.18807	0.01000	0.00080	0.09026	0.01000	0.02555	0.00000	0.02483	0.06298	0.00003	0.00000	0.00020	0.00000	0.43911	0.00000	0.01000	0.00000	0.00500	1.00000
US-17	0.11656	0.11775	0.00000	0.00107	0.06223	0.00000	0.05363	0.00500	0.02999	0.08582	0.01085	0.00000	0.00020	0.00000	0.49990	0.00100	0.01000	0.00100	0.00500	1.00000
US-18	0.15997	0.09128	0.01000	0.00000	0.09746	0.00000	0.04951	0.00000	0.02999	0.13407	0.00000	0.00100	0.00020	0.00000	0.41452	0.00100	0.01000	0.00100	0.00000	1.00000
US-19	0.14473	0.14401	0.00700	0.00069	0.08228	0.00777	0.03638	0.00333	0.01988	0.10802	0.00209	0.00070	0.00020	0.00277	0.42809	0.00061	0.00805	0.00066	0.00275	1.00000
US-20	0.14473	0.14401	0.00700	0.00069	0.08228	0.00777	0.03638	0.00333	0.01988	0.10802	0.00209	0.00070	0.00020	0.00277	0.42809	0.00061	0.00805	0.00066	0.00275	1.00000
US-21	0.14219	0.13755	0.00376	0.00080	0.08452	0.00749	0.03000	0.00374	0.01779	0.10753	0.00501	0.00079	0.00020	0.00125	0.44955	0.00080	0.00543	0.00030	0.00130	1.00000
US-22	0.13340	0.11687	0.00749	0.00080	0.09467	0.00749	0.04998	0.00374	0.02249	0.11777	0.00918	0.00030	0.00020	0.00125	0.42401	0.00079	0.00749	0.00079	0.00130	1.00000
US-23	0.14497	0.13321	0.00750	0.00080	0.07623	0.00250	0.03499	0.00125	0.02250	0.11681	0.00500	0.00080	0.00020	0.00374	0.44460	0.00030	0.00250	0.00080	0.00130	1.00000
US-24	0.14496	0.12250	0.00749	0.00081	0.07787	0.00749	0.03000	0.00374	0.02249	0.11573	0.00501	0.00079	0.00020	0.00374	0.44432	0.00079	0.00749	0.00079	0.00379	1.00000
US-25	0.11585	0.16247	0.00750	0.00218	0.08540	0.00287	0.04999	0.00375	0.02165	0.10883	0.01449	0.00030	0.00020	0.00375	0.40788	0.00080	0.00750	0.00080	0.00380	1.00000
US-26	0.18829	0.10685	0.01000	0.00548	0.04999	0.00000	0.05999	0.00500	0.00000	0.11017	0.00000	0.00000	0.00020	0.00000	0.38054	0.02999	0.01000	0.02000	0.02349	1.00000
US-27	0.10403	0.06484	0.00000	0.01000	0.15183	0.01000	0.05999	0.00500	0.00000	0.16868	0.00000	0.00000	0.00020	0.00500	0.40044	0.00000	0.00000	0.02000	0.00000	1.00000
US-28	0.17472	0.17958	0.00000	0.00000	0.05722	0.01000	0.02000	0.00000	0.00000	0.13355	0.00000	0.00000	0.00020	0.00500	0.35974	0.02999	0.01000	0.02000	0.00000	1.00000
US-29	0.09998	0.08726	0.01000	0.00671	0.04999	0.01000	0.05999	0.00500	0.00000	0.18684	0.00000	0.01000	0.00020	0.00000	0.45263	0.01176	0.00964	0.00000	0.00000	1.00000
US-30	0.12646	0.18190	0.01000	0.00818	0.05328	0.01000	0.05998	0.00000	0.03497	0.04999	0.00000	0.00000	0.00020	0.00500	0.37524	0.02999	0.01000	0.00481	0.03999	1.00000
US-31	0.12668	0.14521	0.00000	0.00000	0.15448	0.00000	0.04908	0.00500	0.00741	0.07097	0.00000	0.01000	0.00020	0.00500	0.38598	0.02999	0.01000	0.00000	0.00000	1.00000
US-32	0.09998	0.19012	0.01000	0.00000	0.04999	0.00000	0.05999	0.00000	0.03999	0.07503	0.00000	0.01000	0.00020	0.00500	0.43971	0.00000	0.00000	0.02000	0.00000	1.00000
US-33	0.11345	0.04999	0.00000	0.01000	0.04999	0.00000	0.02000	0.00500	0.03999	0.19761	0.00965	0.01000	0.00020	0.00500	0.45914	0.02999	0.00000	0.00000	0.00000	1.00000
US-34	0.09998	0.13691	0.00000	0.00000	0.06385	0.01000	0.02420	0.00500	0.03999	0.19996	0.00000	0.00000	0.00020	0.00000	0.34993	0.02999	0.00000	0.00000	0.03999	1.00000
US-35	0.10016	0.19958	0.01000	0.00518	0.11352	0.00000	0.02000	0.00500	0.03999	0.07941	0.00000	0.00000	0.00020	0.00000	0.37995	0.02703	0.00000	0.02000	0.00000	1.00000
US-36	0.12858	0.15512	0.00207	0.00511	0.09761	0.00518	0.02422	0.00045	0.01206	0.12519	0.00558	0.01000	0.00020	0.00000	0.38841	0.00007	0.00007	0.00007	0.03999	1.00000
US-37	0.09998	0.05770	0.01000	0.00000	0.16997	0.00000	0.02000	0.00000	0.00000	0.18886	0.00000	0.01000	0.00020	0.00000	0.37331	0.00000	0.01000	0.02000	0.03999	1.00000
US-38	0.09998	0.07314	0.00789	0.00000	0.04999	0.01000	0.02000	0.00000	0.03999	0.19725	0.02905	0.01000	0.00020	0.00500	0.39753	0.02999	0.01000	0.02000	0.00000	1.00000
US-39	0.11545	0.16348	0.00000	0.00000	0.07502	0.01000	0.05998	0.00500	0.00000	0.04999	0.01828	0.01000	0.00020	0.00000	0.42465	0.00797	0.00000	0.02000	0.03999	1.00000
US-40	0.15518	0.17000	0.00000	0.00425	0.11416	0.01000	0.02512	0.00000	0.02759	0.10131	0.00001	0.00999	0.00020	0.00000	0.37297	0.00000	0.00922	0.00000	0.00000	1.00000
US-41	0.09998	0.15554	0.01000	0.00000	0.15532	0.00999	0.03724	0.00000	0.00000	0.06519	0.00000	0.01000	0.00020	0.00000	0.42654	0.02999	0.00000	0.00000	0.00000	1.00000
US-42	0.19996	0.06187	0.01000	0.00000	0.04999	0.01000	0.05999	0.00000	0.03999	0.18820	0.00000	0.01000	0.00020	0.00000	0.35492	0.00000	0.00000	0.01489	0.00000	1.00000
US-43	0.17167	0.08645	0.01000	0.00000	0.08857	0.00999	0.04905	0.00500	0.00812	0.10295	0.00198	0.01000	0.00020	0.00500	0.39701	0.00472	0.00477	0.00453	0.03999	1.00000
US-44	0.12803	0.12586	0.00555	0.00305	0.08860	0.00640	0.04049	0.00252	0.01834	0.12729	0.00359	0.00666	0.00020	0.00222	0.39548	0.01619	0.00465	0.01024	0.01464	1.00000
US-45	0.12803	0.12586	0.00555	0.00305	0.08860	0.00640	0.04049	0.00252	0.01834	0.12729	0.00359	0.00666	0.00020	0.00222	0.39548	0.01619	0.00465	0.01024	0.01464	1.00000

Table A2. Measured Elemental Concentrations (wt%) for Samples Prepared Using Lithium Metaborate

Glass ID	Block/ Sub-Block	Sequence	Lab ID	Ca (wt%)	Cr (wt%)	K (wt%)	Mg (wt%)	Na (wt%)	Ni (wt%)	Pb (wt%)	S (wt%)	Sr (wt%)	Ti (wt%)	Zn (wt%)	Zr (wt%)
Batch 1	1-1	1	BCHLM111	0.854	0.075	3.24	0.79	6.69	0.533	0.001	<0.050	<0.010	0.383	<0.010	0.062
LRM	1-1	2	LRMLM111	0.384	0.135	1.26	0.059	14.9	0.135	0.082	0.084	<0.010	0.058	<0.010	0.656
US-38	1-1	3	Z07LM21	0.536	0.011	0.816	<0.010	14.6	2.2	0.806	0.19	2.19	0.555	1.391	0.011
US-39	1-1	4	Z31LM11	0.019	0.01	0.87	0.296	4.07	1.34	0.839	<0.050	0.604	<0.010	1.42	2.58
US-18	1-1	5	Z12LM11	0.641	0.011	<0.100	<0.010	10.3	<0.010	0.083	<0.050	0.083	0.568	0.096	<0.010
US-09	1-1	6	Z14LM21	0.656	0.15	<0.100	0.296	10.6	<0.010	0.081	0.155	0.011	0.557	<0.010	<0.010
US-38	1-1	7	Z07LM11	0.557	0.011	0.853	<0.010	15.2	2.18	0.827	0.193	2.29	0.57	1.433	0.011
US-14	1-1	8	Z24LM21	0.293	0.009	0.839	0.302	8.78	<0.010	0.059	<0.050	<0.010	0.582	0.093	0.345
US-06	1-1	9	Z39LM21	0.69	0.013	0.839	0.299	8.71	<0.010	<0.010	0.14	0.092	0.55	0.019	0.02
US-18	1-1	10	Z12LM21	0.65	0.01	<0.100	<0.010	10.6	<0.010	0.084	<0.050	0.082	0.583	0.084	0.002
US-05	1-1	11	Z30LM11	0.49	0.013	0.841	0.297	7.62	<0.010	0.084	0.111	0.094	0.586	0.078	0.361
Batch 1	1-1	12	BCHLM112	0.822	0.073	3.11	0.769	6.82	0.514	<0.010	<0.050	<0.010	0.369	<0.010	0.065
LRM	1-1	13	LRMLM112	0.399	0.134	1.2	0.058	15.2	0.134	0.081	0.085	<0.010	0.058	<0.010	0.664
US-14	1-1	14	Z24LM11	0.354	<0.010	0.827	0.294	8.64	<0.010	0.059	<0.050	<0.010	0.569	0.079	0.333
US-08	1-1	15	Z34LM11	0.068	0.023	0.792	0.013	7.6	<0.010	0.078	0.152	0.108	0.522	0.08	0.085
US-06	1-1	16	Z39LM11	0.68	0.013	0.855	0.299	8.68	<0.010	<0.010	0.143	0.092	0.554	0.012	0.018
US-34	1-1	17	Z27LM11	0.016	<0.010	0.911	0.297	14.4	<0.010	<0.010	<0.050	2.34	<0.010	<0.010	2.62
US-34	1-1	18	Z27LM21	0.033	0.011	0.899	0.296	14.8	<0.010	<0.010	<0.050	2.29	<0.010	<0.010	2.62
US-05	1-1	19	Z30LM21	0.485	0.012	0.867	0.303	7.59	<0.010	0.085	0.112	0.1	0.609	0.079	0.383
US-08	1-1	20	Z34LM21	0.117	0.033	0.806	0.046	7.71	<0.010	0.075	0.147	0.197	0.529	0.135	0.149
US-39	1-1	21	Z31LM21	0.014	0.01	0.912	0.295	4.02	1.3	0.833	<0.050	0.629	<0.010	1.415	2.63
US-09	1-1	22	Z14LM11	0.69	0.159	<0.100	0.303	8.51	<0.010	0.085	0.159	0.018	0.581	<0.010	<0.010
Batch 1	1-1	23	BCHLM113	0.837	0.073	3.15	0.769	6.44	0.514	<0.010	<0.050	<0.010	0.372	<0.010	0.067
LRM	1-1	24	LRMLM113	0.403	0.135	1.22	0.058	14.7	0.134	0.081	0.084	<0.010	0.058	<0.010	0.672
Batch 1	1-2	1	BCHLM121	0.835	0.074	3.15	0.794	6.72	0.532	<0.010	<0.050	<0.010	0.376	<0.010	0.06
LRM	1-2	2	LRMLM121	0.383	0.133	1.22	0.056	15.2	0.133	0.079	0.083	<0.010	0.056	<0.010	0.651
US-39	1-2	3	Z31LM12	0.017	<0.010	0.871	0.307	3.45	1.41	0.868	<0.050	0.622	<0.010	1.473	2.65
US-14	1-2	4	Z24LM22	0.283	<0.010	0.795	0.303	8.9	<0.010	0.059	<0.050	<0.010	0.575	0.093	0.34
US-18	1-2	5	Z12LM12	0.623	<0.010	<0.100	<0.010	8.28	<0.010	0.082	<0.050	0.08	0.568	0.096	<0.010
US-39	1-2	6	Z31LM22	0.012	<0.010	0.853	0.298	3.36	1.34	0.843	<0.050	0.609	<0.010	1.429	2.58
US-09	1-2	7	Z14LM22	0.642	0.151	<0.100	0.299	8.35	<0.010	0.081	0.151	0.01	0.554	<0.010	<0.010
US-05	1-2	8	Z30LM12	0.47	0.011	0.798	0.297	7.46	<0.010	0.083	0.114	0.09	0.574	0.077	0.356
US-09	1-2	9	Z14LM12	0.647	0.157	<0.100	0.305	11	<0.010	0.085	0.16	0.016	0.565	<0.010	<0.010
US-34	1-2	10	Z27LM22	0.03	<0.010	0.843	0.301	14.2	<0.010	<0.010	<0.050	2.21	<0.010	<0.010	2.57
US-38	1-2	11	Z07LM12	0.558	0.01	0.844	<0.010	12.2	2.23	0.826	0.196	2.24	0.565	1.429	0.021
Batch 1	1-2	12	BCHLM122	0.84	0.074	3.1	0.802	6.86	0.537	<0.010	<0.050	<0.010	0.379	<0.010	0.063
LRM	1-2	13	LRMLM122	0.384	0.134	1.17	0.057	15.3	0.134	0.081	0.084	<0.010	0.057	<0.010	0.659
US-38	1-2	14	Z07LM22	0.55	<0.010	0.838	<0.010	12.6	2.3	0.818	0.194	2.24	0.562	1.416	0.014
US-05	1-2	15	Z30LM22	0.473	0.01	0.842	0.302	7.6	<0.010	0.084	0.118	0.098	0.596	0.077	0.365
US-18	1-2	16	Z12LM22	0.637	<0.010	<0.100	<0.010	8.34	<0.010	0.084	<0.050	0.081	0.576	0.083	<0.010
US-06	1-2	17	Z39LM12	0.662	0.012	0.814	0.297	7.13	<0.010	<0.010	0.14	0.089	0.543	0.01	0.016
US-06	1-2	18	Z39LM22	0.68	0.011	0.821	0.298	6.92	<0.010	<0.010	0.14	0.09	0.54	0.017	0.016
US-08	1-2	19	Z34LM12	0.065	0.022	0.767	0.011	7.37	<0.010	0.077	0.157	0.107	0.52	0.079	0.081
US-08	1-2	20	Z34LM22	0.113	0.032	0.781	0.043	7.53	<0.010	0.074	0.152	0.195	0.52	0.134	0.141
US-14	1-2	21	Z24LM12	0.351	<0.010	0.81	0.298	6.91	<0.010	0.058	<0.050	<0.010	0.57	0.079	0.341
US-34	1-2	22	Z27LM12	0.014	<0.010	0.86	0.299	14.2	<0.010	<0.010	<0.050	2.24	<0.010	<0.010	2.57
Batch 1	1-2	23	BCHLM123	0.857	0.075	3.12	0.809	6.7	0.541	<0.010	<0.050	<0.010	0.384	<0.010	0.074
LRM	1-2	24	LRMLM123	0.397	0.135	1.19	0.057	14.8	0.135	0.081	0.091	<0.010	0.058	<0.010	0.671
Batch 1	2-1	1	BCHLM211	0.815	0.076	3.25	0.792	6.78	0.532	<0.010	<0.050	<0.010	0.373	0.01	0.064

Table A2. Measured Elemental Concentrations (wt%) for Samples Prepared Using Lithium Metaborate

Glass ID	Block/ Sub-Block	Sequence	Lab ID	Ca (wt%)	Cr (wt%)	K (wt%)	Mg (wt%)	Na (wt%)	Ni (wt%)	Pb (wt%)	S (wt%)	Sr (wt%)	Ti (wt%)	Zn (wt%)	Zr (wt%)
LRM	2-1	2	LRMLM211	0.378	0.135	1.31	0.058	15.2	0.136	0.083	0.088	<0.010	0.058	<0.010	0.644
US-33	2-1	3	Z09LM21	0.016	0.488	<0.100	0.298	14.7	0.694	0.834	0.193	2.19	<0.010	0.097	<0.010
US-11	2-1	4	Z20LM11	0.7	0.011	0.816	0.309	4.53	<0.010	0.087	0.107	<0.010	<0.010	0.084	0.011
US-22	2-1	5	Z17LM11	0.498	0.055	0.611	0.229	9.67	0.671	0.029	0.06	0.06	0.435	0.069	0.089
US-15	2-1	6	Z42LM11	0.438	0.162	0.814	<0.010	12	<0.010	0.085	0.168	0.078	0.561	0.082	0.013
US-26	2-1	7	Z37LM11	0.664	0.258	<0.100	0.29	8.66	<0.010	<0.010	<0.050	2.16	0.555	1.35	1.52
US-13	2-1	8	Z04LM21	0.66	0.015	0.807	0.302	9.05	0.208	0.083	<0.050	<0.010	0.568	0.082	0.053
US-26	2-1	9	Z37LM21	0.674	0.312	<0.100	0.295	8.75	<0.010	<0.010	<0.050	2.18	0.565	1.401	1.54
US-11	2-1	10	Z20LM21	0.659	0.011	0.828	0.306	6.14	<0.010	0.087	0.097	<0.010	<0.010	0.08	0.015
US-12	2-1	11	Z01LM11	0.698	0.086	0.876	<0.010	9.59	1.4	0.003	0.187	0.081	0.305	0.09	0.333
Batch 1	2-1	12	BCHLM212	0.795	0.075	3.17	0.788	6.87	0.529	<0.010	<0.050	<0.010	0.374	<0.010	0.072
LRM	2-1	13	LRMLM212	0.384	0.136	1.24	0.059	15.3	0.135	0.083	0.086	<0.010	0.058	0.018	0.655
US-17	2-1	14	Z02LM11	0.057	0.062	<0.100	0.295	7.41	0.774	<0.010	<0.050	0.074	0.562	0.085	0.32
US-15	2-1	15	Z42LM21	0.356	0.152	0.778	<0.010	11.8	<0.010	0.079	0.158	0.073	0.524	0.074	0.021
US-17	2-1	16	Z02LM21	0.056	0.062	<0.100	0.295	6.74	0.773	<0.010	<0.050	0.073	0.561	0.084	0.304
US-22	2-1	17	Z17LM21	0.526	0.055	0.64	0.233	9.94	0.665	0.029	0.059	0.063	0.449	0.072	0.095
US-12	2-1	18	Z01LM21	0.698	0.078	0.867	<0.010	9.76	1.36	<0.010	0.183	0.081	0.299	0.088	0.32
US-13	2-1	19	Z04LM11	0.66	0.014	0.821	0.299	9.4	0.207	0.081	<0.050	<0.010	0.563	0.082	<0.010
US-32	2-1	20	Z06LM21	0.671	0.011	<0.100	<0.010	6.06	<0.010	0.825	0.167	<0.010	<0.010	1.411	0.034
US-33	2-1	21	Z09LM11	0.035	0.5	<0.100	0.34	15	0.702	0.832	0.216	2.24	<0.010	0.096	<0.010
US-32	2-1	22	Z06LM11	0.671	0.013	<0.100	<0.010	5.93	<0.010	0.839	0.166	<0.010	<0.010	1.438	0.033
Batch 1	2-1	23	BCHLM213	0.811	0.076	3.18	0.792	6.97	0.532	<0.010	<0.050	<0.010	0.379	<0.010	0.07
LRM	2-1	24	LRMLM213	0.382	0.135	1.28	0.058	15.5	0.134	0.082	0.082	<0.010	0.058	<0.010	0.648
Batch 1	2-2	1	BCHLM221	0.789	0.073	3.08	0.78	6.56	0.525	<0.010	<0.050	<0.010	0.371	<0.010	0.065
LRM	2-2	2	LRMLM221	0.373	0.134	1.17	0.058	14.7	0.134	0.082	0.084	<0.010	0.057	<0.010	0.639
US-17	2-2	3	Z02LM22	0.053	0.06	<0.100	0.293	6.18	0.77	<0.010	<0.050	0.069	0.556	0.083	0.296
US-26	2-2	4	Z37LM22	0.639	0.297	<0.100	0.282	8.28	<0.010	<0.010	<0.050	2.07	0.541	1.341	1.47
US-15	2-2	5	Z42LM22	0.371	0.161	0.791	<0.010	11.7	<0.010	0.082	0.162	0.075	0.555	0.079	0.017
US-33	2-2	6	Z09LM12	0.034	0.501	<0.100	0.341	14.6	0.705	0.84	0.214	2.2	<0.010	0.096	0.004
US-12	2-2	7	Z01LM12	0.692	0.085	0.847	<0.010	9.19	1.36	<0.010	0.179	0.079	0.307	0.09	0.328
US-13	2-2	8	Z04LM22	0.648	0.014	0.777	0.302	8.84	0.208	0.083	<0.050	<0.010	0.567	0.081	0.044
US-22	2-2	9	Z17LM12	0.49	0.054	0.594	0.227	9.62	0.667	0.026	0.05	0.058	0.434	0.068	0.087
US-12	2-2	10	Z01LM22	0.683	0.078	0.821	<0.010	9.06	1.36	<0.010	0.181	0.078	0.3	0.088	0.319
US-22	2-2	11	Z17LM22	0.508	0.054	0.606	0.233	9.96	0.667	0.028	0.055	0.06	0.446	0.071	0.092
Batch 1	2-2	12	BCHLM222	0.794	0.075	3.06	0.792	6.82	0.533	<0.010	<0.050	<0.010	0.376	<0.010	0.068
LRM	2-2	13	LRMLM222	0.377	0.135	1.18	0.058	15.3	0.135	0.082	0.086	<0.010	0.057	0.017	0.645
US-17	2-2	14	Z02LM12	0.025	0.059	<0.100	0.3	6.39	0.777	<0.010	<0.050	0.07	0.569	0.083	0.292
US-33	2-2	15	Z09LM22	0.015	0.49	<0.100	0.3	14.3	0.696	0.834	0.187	2.19	<0.010	0.096	<0.010
US-32	2-2	16	Z06LM22	0.657	0.01	<0.100	<0.010	5.78	<0.010	0.83	0.163	<0.010	<0.010	1.424	0.031
US-11	2-2	17	Z20LM12	0.694	0.01	0.793	0.308	4.19	<0.010	0.087	0.098	<0.010	<0.010	0.083	<0.010
US-13	2-2	18	Z04LM12	0.651	0.012	0.789	0.3	8.87	0.207	0.081	<0.050	<0.010	0.563	0.081	<0.010
US-26	2-2	19	Z37LM12	0.662	0.258	<0.100	0.292	8.3	<0.010	<0.010	<0.050	2.14	0.557	1.359	1.51
US-15	2-2	20	Z42LM12	0.438	0.161	0.802	<0.010	11.7	<0.010	0.084	0.165	0.077	0.565	0.081	0.019
US-11	2-2	21	Z20LM22	0.673	0.01	0.832	0.308	5.97	<0.010	0.086	0.097	<0.010	<0.010	0.08	<0.010
US-32	2-2	22	Z06LM12	0.669	0.011	<0.100	<0.010	5.81	<0.010	0.827	0.163	<0.010	<0.010	1.425	0.032
Batch 1	2-2	23	BCHLM223	0.812	0.074	3.08	0.778	6.67	0.525	<0.010	<0.050	<0.010	0.375	<0.010	0.067
LRM	2-2	24	LRMLM223	0.384	0.133	1.19	0.057	15.2	0.133	0.081	0.086	<0.010	0.057	<0.010	0.651
Batch 1	3-1	1	BCHLM311	0.816	0.075	3.11	0.787	6.75	0.534	<0.010	<0.050	<0.010	0.374	0.01	0.062
LRM	3-1	2	LRMLM311	0.367	0.135	1.2	0.058	15.4	0.135	0.083	0.088	<0.010	0.058	<0.010	0.64
US-37	3-1	3	Z32LM11	0.017	<0.010	0.782	<0.010	10.7	<0.010	<0.010	0.152	2.09	0.557	1.406	0.012

Table A2. Measured Elemental Concentrations (wt%) for Samples Prepared Using Lithium Metaborate

Glass ID	Block/ Sub-Block	Sequence	Lab ID	Ca (wt%)	Cr (wt%)	K (wt%)	Mg (wt%)	Na (wt%)	Ni (wt%)	Pb (wt%)	S (wt%)	Sr (wt%)	Ti (wt%)	Zn (wt%)	Zr (wt%)
US-16	3-1	4	Z44LM21	0.624	0.056	0.807	<0.010	4.99	0.016	<0.010	<0.050	<0.010	0.552	<0.010	0.346
US-25	3-1	5	Z08ILM11	0.504	0.102	0.246	0.224	8.77	1.01	0.031	0.132	0.067	0.435	0.087	0.263
US-07	3-1	6	Z19LM21	0.634	0.011	0.781	0.298	8.01	0.148	0.083	0.144	0.072	0.554	0.079	0.315
US-27	3-1	7	Z36LM21	0.014	0.57	0.835	0.288	13.6	<0.010	0.031	0.188	<0.010	0.01	1.374	0.518
US-27	3-1	8	Z36LM11	0.025	0.58	0.833	0.299	13.4	<0.010	<0.010	0.198	<0.010	<0.010	1.408	0.092
US-07	3-1	9	Z19LM11	0.636	0.011	0.789	0.297	8.61	0.147	0.083	0.142	0.073	0.553	0.078	0.308
US-43	3-1	10	Z21LM11	0.629	<0.010	0.791	0.288	8.32	0.142	0.815	0.161	0.342	0.268	0.348	2.45
US-25	3-1	11	Z08LM21	0.501	0.101	0.249	0.225	8.74	1	0.028	0.136	0.067	0.434	0.081	0.273
Batch 1	3-1	12	BCHLM312	0.791	0.075	3.06	0.786	6.8	0.532	<0.010	<0.050	<0.010	0.374	<0.010	0.07
LRM	3-1	13	LRMLM312	0.369	0.135	1.2	0.058	15.2	0.135	0.083	0.084	<0.010	0.057	0.01	0.649
US-41	3-1	14	Z29LM11	0.665	0.011	0.823	<0.010	5.21	<0.010	0.834	<0.050	2.18	<0.010	<0.010	<0.010
US-37	3-1	15	Z32LM21	0.033	<0.010	0.782	<0.010	10.3	<0.010	0.003	0.155	2.1	0.559	1.404	<0.010
US-16	3-1	16	Z44LM11	0.651	0.056	0.821	<0.010	5.08	<0.010	<0.010	<0.050	<0.010	0.567	<0.010	0.365
US-28	3-1	17	Z33LM21	0.664	0.01	<0.100	<0.010	14.7	<0.010	0.815	<0.050	0.041	0.567	1.415	2.53
US-28	3-1	18	Z33LM11	0.657	<0.010	<0.100	<0.010	14.3	0.014	0.811	<0.050	0.027	0.549	1.374	2.53
US-41	3-1	19	Z29LM21	0.65	0.011	0.808	<0.010	5.07	0.014	0.815	<0.050	2.17	<0.010	<0.010	0.013
US-01	3-1	20	Z43LM21	0.015	0.177	0.785	0.297	9.94	0.043	0.052	<0.050	0.071	0.01	<0.010	0.321
US-01	3-1	21	Z43LM11	0.149	0.186	0.804	0.307	10.4	0.044	0.056	<0.050	0.075	<0.010	<0.010	0.336
US-43	3-1	22	Z21LM21	0.636	<0.010	0.795	0.294	8.33	0.144	0.828	0.167	0.347	0.271	0.356	2.49
Batch 1	3-1	23	BCHLM313	0.758	0.075	3.12	0.776	6.87	0.528	<0.010	<0.050	<0.010	0.366	<0.010	0.067
LRM	3-1	24	LRMLM313	0.362	0.134	1.18	0.057	15.4	0.134	0.082	0.085	<0.010	0.057	<0.010	0.645
Batch 1	3-2	1	BCHLM321	0.81	0.075	3.11	0.793	6.79	0.536	<0.010	<0.050	<0.010	0.375	<0.010	0.06
LRM	3-2	2	LRMLM321	0.372	0.135	1.2	0.057	14.5	0.136	0.082	0.087	<0.010	0.057	<0.010	0.647
US-37	3-2	3	Z32LM22	0.032	<0.010	0.777	<0.010	9.86	<0.010	<0.010	0.152	2.06	0.563	1.418	<0.010
US-43	3-2	4	Z21LM22	0.662	<0.010	0.828	0.3	8.57	0.147	0.841	0.166	0.357	0.279	0.362	2.54
US-01	3-2	5	Z43LM22	0.016	0.18	0.822	0.304	10.2	0.043	0.053	<0.050	0.074	0.01	<0.010	0.338
US-37	3-2	6	Z32LM12	0.017	<0.010	0.81	<0.010	10.8	<0.010	<0.010	0.152	2.14	0.567	1.422	0.016
US-07	3-2	7	Z19LM22	0.651	0.01	0.813	0.301	8.54	0.148	0.083	0.142	0.075	0.56	0.078	0.319
US-28	3-2	8	Z33LM22	0.662	<0.010	<0.100	<0.010	14.7	<0.010	0.823	<0.050	0.042	0.571	1.424	2.54
US-41	3-2	9	Z29LM22	0.665	0.01	0.823	<0.010	5.21	0.014	0.829	<0.050	2.16	<0.010	<0.010	0.014
US-28	3-2	10	Z33LM12	0.667	<0.010	<0.100	<0.010	14.5	0.014	0.824	<0.050	0.029	0.562	1.398	2.56
US-27	3-2	11	Z36LM22	0.014	0.571	0.869	0.289	13.4	<0.010	0.031	0.19	<0.010	<0.010	1.379	0.543
Batch 1	3-2	12	BCHLM322	0.812	0.075	3.16	0.79	6.91	0.534	<0.010	<0.050	<0.010	0.377	<0.010	0.07
LRM	3-2	13	LRMLM322	0.387	0.135	1.24	0.057	15.4	0.135	0.083	0.087	<0.010	0.058	<0.010	0.667
US-07	3-2	14	Z19LM12	0.647	<0.010	0.8	0.3	8.52	0.147	0.084	0.148	0.075	0.561	0.078	0.31
US-41	3-2	15	Z29LM12	0.687	0.01	0.853	<0.010	5.43	<0.010	0.842	<0.050	2.26	<0.010	<0.010	<0.010
US-25	3-2	16	Z08LM12	0.514	0.102	0.256	0.225	9.01	0.995	0.03	0.135	0.07	0.438	0.087	0.264
US-27	3-2	17	Z36LM12	0.025	0.573	0.854	0.298	13.9	<0.010	<0.010	0.198	<0.010	<0.010	1.406	0.092
US-16	3-2	18	Z44LM12	0.678	0.056	0.868	<0.010	5.29	<0.010	<0.010	<0.050	<0.010	0.583	<0.010	0.373
US-25	3-2	19	Z08LM22	0.526	0.1	0.26	0.225	8.8	0.995	0.027	0.137	0.072	0.441	0.081	0.268
US-16	3-2	20	Z44LM22	0.656	0.055	0.854	<0.010	4.97	0.015	<0.010	<0.050	<0.010	0.566	<0.010	0.356
US-43	3-2	21	Z21LM12	0.656	<0.010	0.829	0.29	8.25	0.141	0.814	0.161	0.36	0.272	0.35	2.49
US-01	3-2	22	Z43LM12	0.164	0.198	0.901	0.329	11.4	0.046	0.06	<0.050	0.083	<0.010	<0.010	0.377
Batch 1	3-2	23	BCHLM323	0.802	0.074	3.13	0.781	6.92	0.528	<0.010	<0.050	<0.010	0.373	<0.010	0.07
LRM	3-2	24	LRMLM323	0.38	0.134	1.21	0.057	15.8	0.135	0.082	0.086	<0.010	0.057	<0.010	0.654
Batch 1	4-1	1	BCHLM411	0.782	0.075	3.08	0.787	6.55	0.532	<0.010	<0.050	<0.010	0.372	<0.010	0.068
LRM	4-1	2	LRMLM411	0.363	0.134	1.24	0.058	15.5	0.135	0.082	0.083	<0.010	0.057	<0.010	0.636
US-42	4-1	3	Z15LM11	0.616	<0.010	0.808	<0.010	14.7	<0.010	0.812	0.02	<0.010	<0.010	1.096	<0.010
US-03	4-1	4	Z26LM21	0.644	0.011	0.782	0.298	6.41	0.215	0.083	<0.050	0.072	0.556	<0.010	<0.010
US-40	4-1	5	Z22LM21	0.018	0.183	0.837	<0.010	8.33	<0.010	0.853	<0.050	<0.010	0.514	<0.010	<0.010

Table A2. Measured Elemental Concentrations (wt%) for Samples Prepared Using Lithium Metaborate

Glass ID	Block/ Sub-Block	Sequence	Lab ID	Ca (wt%)	Cr (wt%)	K (wt%)	Mg (wt%)	Na (wt%)	Ni (wt%)	Pb (wt%)	S (wt%)	Sr (wt%)	Ti (wt%)	Zn (wt%)	Zr (wt%)
US-35	4-1	6	Z11LM21	0.65	0.302	<0.100	0.302	6.63	<0.010	<0.010	<0.050	1.96	<0.010	1.42	<0.010
US-04	4-1	7	Z10LM11	0.62	0.011	0.766	0.295	8.57	<0.010	0.082	0.152	0.072	0.545	0.075	0.312
US-44	4-1	8	Z25LM21	0.4	0.178	0.533	0.155	10.6	0.268	0.561	0.093	1.19	0.267	0.774	0.965
US-35	4-1	9	Z11LM11	0.655	0.295	<0.100	0.297	6.8	0.012	<0.010	<0.050	1.98	<0.010	1.384	0.012
US-36	4-1	10	Z41LM11	0.159	0.264	0.461	0.027	10.4	0.385	0.84	<0.050	<0.010	0.013	0.012	2.55
US-21	4-1	11	Z16LM11	0.254	0.044	0.605	0.225	9.01	0.369	0.068	0.052	0.062	0.308	0.028	0.085
Batch 1	4-1	12	BCHLM412	0.789	0.075	3.13	0.793	6.8	0.535	<0.010	<0.050	<0.010	0.374	<0.010	0.07
LRM	4-1	13	LRMLM412	0.371	0.135	1.23	0.058	15.8	0.136	0.083	0.088	<0.010	0.057	<0.010	0.643
US-44	4-1	14	Z25LM11	0.376	0.178	0.534	0.152	10.2	0.263	0.56	0.089	1.18	0.269	0.771	0.955
US-03	4-1	15	Z26LM11	0.656	0.011	0.804	0.307	6.65	0.221	0.087	<0.050	0.075	0.571	<0.010	<0.010
US-21	4-1	16	Z16LM21	0.266	0.037	0.6	0.225	8.76	0.327	0.069	0.051	0.063	0.306	0.03	0.064
US-36	4-1	17	Z41LM21	0.334	0.268	0.472	0.027	10.5	0.397	0.851	<0.050	<0.010	0.013	0.01	2.56
US-42	4-1	18	Z15LM21	0.633	<0.010	0.817	<0.010	14.2	<0.010	0.823	<0.050	<0.010	<0.010	1.09	0.021
US-40	4-1	19	Z22LM11	0.046	0.246	0.823	<0.010	8.34	<0.010	0.843	<0.050	<0.010	0.519	0.014	<0.010
US-23	4-1	20	Z28LM11	0.476	0.047	0.211	0.077	9.91	0.371	0.072	0.134	0.025	0.149	0.071	0.1
US-04	4-1	21	Z10LM21	0.637	0.013	0.798	0.3	8.96	<0.010	0.084	0.163	0.075	0.556	0.076	0.317
US-23	4-1	22	Z28LM21	0.482	0.043	0.211	0.075	9.87	0.346	0.073	0.132	0.024	0.15	0.074	0.103
Batch 1	4-1	23	BCHLM413	0.766	0.074	3.14	0.792	7.37	0.534	<0.010	<0.050	<0.010	0.37	<0.010	0.067
LRM	4-1	24	LRMLM413	0.358	0.136	1.23	0.058	16.4	0.136	0.084	0.088	<0.010	0.056	<0.010	0.642
Batch 1	4-2	1	BCHLM421	0.784	0.075	3.12	0.794	7.23	0.534	<0.010	<0.050	<0.010	0.37	<0.010	0.06
LRM	4-2	2	LRMLM421	0.362	0.136	1.21	0.058	16.3	0.137	0.084	0.083	<0.010	0.058	<0.010	0.642
US-23	4-2	3	Z28LM22	0.476	0.044	0.208	0.076	9.51	0.349	0.074	0.132	0.025	0.152	0.075	0.103
US-44	4-2	4	Z25LM22	0.399	0.178	0.532	0.155	10.3	0.269	0.562	0.095	1.19	0.268	0.776	0.964
US-36	4-2	5	Z41LM22	0.331	0.271	0.463	0.027	10	0.4	0.855	<0.050	<0.010	0.014	0.01	2.56
US-21	4-2	6	Z16LM12	0.253	0.045	0.603	0.226	8.64	0.371	0.07	0.049	0.063	0.309	0.029	0.086
US-36	4-2	7	Z41LM12	0.163	0.272	0.468	0.028	10.4	0.396	0.864	<0.050	<0.010	0.014	0.012	2.61
US-44	4-2	8	Z25LM12	0.38	0.182	0.541	0.153	10.2	0.267	0.571	0.088	1.2	0.272	0.781	0.988
US-21	4-2	9	Z16LM22	0.266	0.038	0.601	0.227	8.68	0.33	0.07	0.052	0.064	0.308	0.031	0.07
US-04	4-2	10	Z10LM22	0.639	0.013	0.799	0.304	8.69	<0.010	0.086	0.16	0.076	0.565	0.078	0.323
US-04	4-2	11	Z10LM12	0.634	0.012	0.795	0.298	8.13	<0.010	0.083	0.159	0.077	0.555	0.077	0.322
Batch 1	4-2	12	BCHLM422	0.782	0.076	3.18	0.8	6.75	0.542	<0.010	<0.050	<0.010	0.376	<0.010	0.07
LRM	4-2	13	LRMLM422	0.361	0.136	1.21	0.058	14.9	0.136	0.084	0.086	<0.010	0.057	<0.010	0.643
US-03	4-2	14	Z26LM22	0.636	0.011	0.773	0.301	6.05	0.219	0.086	<0.050	0.073	0.56	<0.010	<0.010
US-42	4-2	15	Z15LM22	0.628	<0.010	0.804	<0.010	14.1	<0.010	0.831	<0.050	<0.010	<0.010	1.1	<0.010
US-23	4-2	16	Z28LM12	0.479	0.048	0.212	0.078	9.22	0.377	0.072	0.132	0.026	0.151	0.073	0.101
US-03	4-2	17	Z26LM12	0.655	0.011	0.805	0.308	6.47	0.222	0.088	<0.050	0.076	0.572	<0.010	<0.010
US-35	4-2	18	Z11LM22	0.659	0.305	<0.100	0.303	6.3	<0.010	0.006	<0.050	1.97	<0.010	1.435	<0.010
US-35	4-2	19	Z11LM12	0.658	0.301	<0.100	0.299	6.39	0.012	0.002	<0.050	2	<0.010	1.405	<0.010
US-40	4-2	20	Z22LM12	0.047	0.249	0.827	<0.010	8.02	<0.010	0.855	<0.050	<0.010	0.525	0.014	<0.010
US-40	4-2	21	Z22LM22	0.019	0.187	0.859	<0.010	8.28	<0.010	0.87	<0.050	<0.010	0.525	<0.010	<0.010
US-42	4-2	22	Z15LM12	0.622	<0.010	0.818	<0.010	14.9	<0.010	0.828	<0.050	<0.010	<0.010	1.114	<0.010
Batch 1	4-2	23	BCHLM423	0.79	0.076	3.18	0.797	7.07	0.54	<0.010	<0.050	<0.010	0.377	<0.010	0.067
LRM	4-2	24	LRMLM423	0.331	0.132	1.21	0.059	15.8	0.136	0.08	0.079	<0.010	0.058	0.012	0.651
Batch 1	5-1	1	BCHLM511	0.795	0.074	3.15	0.787	6.97	0.531	<0.010	<0.050	<0.010	0.372	<0.010	0.065
LRM	5-1	2	LRMLM511	0.374	0.134	1.23	0.057	15.4	0.135	0.082	0.083	<0.010	0.056	<0.010	0.64
US-10	5-1	3	Z05LM21	0.658	0.011	0.817	0.301	9.71	<0.010	0.081	0.16	0.076	0.567	0.08	0.319
US-20	5-1	4	Z40LM21	0.484	0.046	0.642	0.204	8.73	0.155	0.062	0.105	0.049	0.471	0.058	0.202
US-24	5-1	5	Z45LM11	0.503	0.041	0.622	0.223	9.51	0.363	0.075	0.13	0.059	0.419	0.068	0.349
US-20	5-1	6	Z40LM11	0.584	0.043	0.605	0.2	8.54	0.149	0.058	0.099	0.046	0.453	0.056	0.197
US-24	5-1	7	Z45LM21	0.493	0.038	0.603	0.222	9.05	0.35	0.067	0.126	0.059	0.417	0.063	0.21

Table A2. Measured Elemental Concentrations (wt%) for Samples Prepared Using Lithium Metaborate

Glass ID	Block/ Sub-Block	Sequence	Lab ID	Ca (wt%)	Cr (wt%)	K (wt%)	Mg (wt%)	Na (wt%)	Ni (wt%)	Pb (wt%)	S (wt%)	Sr (wt%)	Ti (wt%)	Zn (wt%)	Zr (wt%)
US-30	5-1	8	Z03LM11	0.73	0.447	0.858	<0.010	4.32	<0.010	<0.010	0.193	2.37	0.616	0.388	2.8
US-31	5-1	9	Z13LM21	0.033	0.008	<0.100	0.29	6.22	<0.010	0.817	0.145	2.14	0.571	<0.010	0.018
US-19	5-1	10	Z18LM11	0.479	0.035	0.634	0.203	8.64	0.138	0.061	0.105	0.049	0.461	0.054	0.164
US-02	5-1	11	Z35LM11	0.044	0.02	<0.100	<0.010	9.68	0.019	<0.010	<0.050	0.031	0.038	0.1	0.346
Batch 1	5-1	12	BCHLM512	0.792	0.074	3.1	0.792	6.85	0.533	<0.010	<0.050	<0.010	0.373	<0.010	0.07
LRM	5-1	13	LRMLM512	0.368	0.136	1.24	0.058	15.4	0.137	0.083	0.083	<0.010	0.057	<0.010	0.649
US-30	5-1	14	Z03LM21	0.65	0.348	0.763	<0.010	3.95	<0.010	<0.010	0.17	2.14	0.546	0.34	2.46
US-45	5-1	15	Z38LM21	0.373	0.174	0.542	0.148	9.92	0.263	0.547	0.087	1.19	0.268	0.763	0.968
US-45	5-1	16	Z38LM11	0.388	0.176	0.537	0.15	9.89	0.26	0.555	0.089	1.2	0.272	0.784	0.981
US-02	5-1	17	Z35LM21	0.045	0.013	<0.100	<0.010	9.46	0.011	<0.010	<0.050	0.028	0.037	0.098	0.334
US-29	5-1	18	Z23LM11	0.663	0.376	0.8	0.303	14.1	<0.010	1.23	<0.050	0.9	0.543	<0.010	<0.010
US-10	5-1	19	Z05LM11	0.651	0.012	0.809	0.304	9.87	<0.010	0.083	0.157	0.075	0.567	0.079	0.319
US-19	5-1	20	Z18LM21	0.475	0.041	0.635	0.204	8.6	0.16	0.061	0.107	0.049	0.464	0.053	0.172
US-29	5-1	21	Z23LM21	0.66	0.384	0.804	0.299	14.5	<0.010	1.2	<0.050	0.902	0.542	<0.010	<0.010
US-31	5-1	22	Z13LM11	0.047	0.011	<0.100	0.29	6.12	0.03	0.82	0.146	2.12	0.57	<0.010	<0.010
Batch 1	5-1	23	BCHLM513	0.795	0.075	3.16	0.797	7.17	0.537	<0.010	<0.050	<0.010	0.376	<0.010	0.067
LRM	5-1	24	LRMLM513	0.328	0.13	1.26	0.058	16	0.135	0.079	0.083	<0.010	0.056	0.011	0.653
Batch 1	5-2	1	BCHLM521	0.81	0.075	3.07	0.799	6.65	0.537	<0.010	<0.050	<0.010	0.382	<0.010	0.067
LRM	5-2	2	LRMLM521	0.341	0.132	1.18	0.058	15.2	0.135	0.079	0.081	<0.010	0.058	0.012	0.657
US-30	5-2	3	Z03LM22	0.675	0.35	0.791	<0.010	4.16	<0.010	<0.010	0.174	2.19	0.559	0.344	2.53
US-20	5-2	4	Z40LM12	0.606	0.045	0.626	0.201	8.38	0.151	0.059	0.101	0.05	0.464	0.057	0.222
US-20	5-2	5	Z40LM22	0.493	0.047	0.642	0.204	8.65	0.156	0.062	0.102	0.05	0.471	0.059	0.203
US-31	5-2	6	Z13LM12	0.049	0.012	<0.100	0.29	6.17	0.03	0.812	0.152	2.15	0.57	<0.010	<0.010
US-24	5-2	7	Z45LM22	0.51	0.039	0.622	0.222	9.23	0.351	0.068	0.13	0.062	0.424	0.064	0.213
US-02	5-2	8	Z35LM22	0.049	0.014	<0.100	<0.010	9.72	0.012	<0.010	<0.050	0.032	0.038	0.099	0.334
US-29	5-2	9	Z23LM12	0.688	0.371	0.838	0.299	14.6	<0.010	1.2	<0.050	0.922	0.547	<0.010	<0.010
US-10	5-2	10	Z05LM12	0.676	0.013	0.834	0.301	10.1	<0.010	0.082	0.158	0.077	0.573	0.079	0.322
US-02	5-2	11	Z35LM12	0.045	0.021	<0.100	<0.010	10.1	0.019	<0.010	<0.050	0.031	0.039	0.099	0.343
Batch 1	5-2	12	BCHLM522	0.816	0.075	3.12	0.789	6.98	0.534	<0.010	<0.050	<0.010	0.378	<0.010	0.07
LRM	5-2	13	LRMLM522	0.343	0.131	1.2	0.058	15.9	0.135	0.079	0.086	<0.010	0.058	0.012	0.661
US-19	5-2	14	Z18LM12	0.496	0.036	0.657	0.202	8.63	0.138	0.062	0.105	0.052	0.468	0.055	0.164
US-45	5-2	15	Z38LM22	0.389	0.175	0.566	0.148	9.87	0.263	0.543	0.089	1.23	0.273	0.762	0.958
US-31	5-2	16	Z13LM22	0.035	<0.010	<0.100	0.289	6.18	<0.010	0.809	0.147	2.17	0.577	<0.010	<0.010
US-29	5-2	17	Z23LM22	0.676	0.384	0.827	0.3	14.7	<0.010	1.2	<0.050	0.916	0.548	0.01	<0.010
US-19	5-2	18	Z18LM22	0.488	0.042	0.654	0.204	8.74	0.16	0.061	0.105	0.052	0.47	0.054	0.171
US-30	5-2	19	Z03LM12	0.742	0.446	0.879	<0.010	4.35	<0.010	<0.010	0.197	2.4	0.618	0.388	2.8
US-10	5-2	20	Z05LM22	0.666	0.012	0.831	0.302	10.3	<0.010	0.082	0.163	0.076	0.57	0.081	0.334
US-45	5-2	21	Z38LM12	0.4	0.175	0.56	0.149	10.2	0.258	0.55	0.091	1.23	0.273	0.778	0.981
US-24	5-2	22	Z45LM12	0.534	0.042	0.658	0.224	9.76	0.365	0.075	0.135	0.064	0.43	0.069	0.364
Batch 1	5-2	23	BCHLM523	0.852	0.076	3.08	0.795	6.95	0.538	<0.010	<0.050	<0.010	0.381	0.01	0.067
LRM	5-2	24	LRMLM523	0.388	0.137	1.19	0.058	16.1	0.136	0.082	0.084	<0.010	0.058	<0.010	0.659

Table A3. Measured Elemental Concentrations (wt%) for Samples Prepared Using Peroxide Fusion

Glass ID	Block/ Sub-Block	Sequence	Lab ID	Al (wt%)	B (wt%)	Fe (wt%)	Li (wt%)	Mn (wt%)	Si (wt%)
Batch 1	1/1	1	BCHPF111	2.59	2.64	9.12	2.08	1.3	23
LRM	1/1	2	LRMPF111	5.42	2.61	1.14	0.09	<0.100	25.3
US-27	1/1	3	Z36PF21	5.54	2.13	10.6	2.69	<0.100	18
US-27	1/1	4	Z36PF11	5.59	2.08	10.3	2.71	<0.100	18.2
US-29	1/1	5	Z23PF11	5.35	2.69	3.44	2.7	<0.100	19.8
US-20	1/1	6	Z40PF21	7.61	4.45	5.65	1.65	1.47	19.2
US-20	1/1	7	Z40PF11	7.71	4.51	5.77	1.67	1.49	19.2
US-02	1/1	8	Z35PF11	8.52	5.15	4.49	2.37	0.443	18.7
US-29	1/1	9	Z23PF21	5.43	2.72	3.25	2.75	<0.100	20.1
US-39	1/1	10	Z31PF21	6.14	5.03	5.01	2.7	<0.100	19.1
US-08	1/1	11	Z34PF11	8.2	3.06	6.26	2.26	1.71	20.4
Batch 1	1/1	12	BCHPF112	2.5	2.39	8.77	2.01	1.24	22.9
LRM	1/1	13	LRMPF112	5.17	2.42	0.912	0.069	<0.100	24.6
US-26	1/1	14	Z37PF21	10.1	3.41	3.58	2.76	<0.100	18
US-26	1/1	15	Z37PF11	9.87	3.34	3.51	2.71	<0.100	18
US-05	1/1	16	Z30PF11	8.56	5.28	5.43	0.934	1.84	18.2
US-08	1/1	17	Z34PF21	8.14	3.05	6.24	2.27	1.7	20.4
US-05	1/1	18	Z30PF21	8.45	5.21	5.39	0.919	1.81	18.5
US-39	1/1	19	Z31PF11	6.32	5.18	5.03	2.79	<0.100	19
US-19	1/1	20	Z18PF11	7.68	4.48	5.36	1.66	1.43	19
US-19	1/1	21	Z18PF21	7.68	4.49	5.48	1.68	1.45	19.4
US-02	1/1	22	Z35PF21	8.38	5.17	4.45	2.34	0.424	18.6
Batch 1	1/1	23	BCHPF113	2.5	2.44	8.72	2.03	1.22	23.1
LRM	1/1	24	LRMPF113	5.17	2.45	0.907	0.07	<0.100	25.4
Batch 1	1/2	1	BCHPF121	2.52	2.65	8.99	2.04	1.28	24
LRM	1/2	2	LRMPF121	5.21	2.61	0.973	0.072	<0.100	25.3
US-19	1/2	3	Z18PF22	7.75	4.6	5.65	1.69	1.52	19.3
US-29	1/2	4	Z23PF12	5.39	2.86	3.54	2.73	<0.100	20.8
US-39	1/2	5	Z31PF22	6.17	5.13	5.11	2.72	<0.100	18.8
US-26	1/2	6	Z37PF12	9.7	3.37	3.52	2.67	<0.100	18
US-02	1/2	7	Z35PF22	8.41	5.28	4.66	2.36	0.462	18.8
US-27	1/2	8	Z36PF12	5.63	2.26	10.6	2.73	<0.100	19.1
US-20	1/2	9	Z40PF22	7.68	4.6	5.81	1.67	1.54	19.2
US-26	1/2	10	Z37PF22	10.2	3.51	3.73	2.79	<0.100	18.1
US-27	1/2	11	Z36PF22	5.69	2.26	10.97	2.72	<0.100	19
Batch 1	1/2	12	BCHPF122	2.53	2.52	9.15	2.04	1.31	23.7
LRM	1/2	13	LRMPF122	5.21	2.54	1	0.073	<0.100	25.5
US-08	1/2	14	Z34PF12	8.18	3.17	6.39	2.26	1.76	20.9
US-39	1/2	15	Z31PF12	6.45	5.38	5.39	2.85	<0.100	19.3
US-19	1/2	16	Z18PF12	7.78	4.68	5.73	1.7	1.55	18.7
US-05	1/2	17	Z30PF22	8.5	5.39	5.77	0.93	1.94	18.5
US-20	1/2	18	Z40PF12	7.83	4.76	6.12	1.7	1.6	19.1
US-05	1/2	19	Z30PF12	8.66	5.52	5.7	0.945	1.95	18.1
US-29	1/2	20	Z23PF22	5.51	2.9	3.44	2.77	<0.100	21.7
US-08	1/2	21	Z34PF22	8.34	3.24	6.58	2.3	1.83	20.5
US-02	1/2	22	Z35PF12	8.65	5.37	4.8	2.41	0.501	19.4
Batch 1	1/2	23	BCHPF123	2.55	2.61	9.25	2.06	1.32	23.9
LRM	1/2	24	LRMPF123	5.29	2.64	1.03	0.074	<0.100	26.5
Batch 1	2/1	1	BCHPF211	2.57	2.58	9.18	2.09	1.26	22.4
LRM	2/1	2	LRMPF211	5.42	2.58	1.15	0.098	<0.100	25.1
US-11	2/1	3	Z20PF11	7.75	6.45	4.95	0.945	2.42	20.6
US-34	2/1	4	Z27PF21	5.53	4.5	4.57	1.14	3.22	16.7
US-06	2/1	5	Z39PF21	8.63	4.52	5.48	1.16	2.34	19
US-18	2/1	6	Z12PF11	8.9	2.99	6.73	2.34	2.4	19.5
US-12	2/1	7	Z01PF21	7.25	5.1	6.3	2.8	<0.100	18.1
US-34	2/1	8	Z27PF11	5.38	4.27	4.34	1.12	3.09	16.2
US-06	2/1	9	Z39PF11	8.56	4.5	5.63	1.16	2.38	18.6
US-18	2/1	10	Z12PF21	8.67	2.92	6.81	2.3	2.38	19
US-04	2/1	11	Z10PF11	8.69	3.6	5.75	1.76	1.72	19.4
Batch 1	2/1	12	BCHPF212	2.53	2.39	8.99	2.03	1.24	21.9
LRM	2/1	13	LRMPF212	5.21	2.41	0.9	0.071	<0.100	25.1
US-12	2/1	14	Z01PF11	7.27	5.19	6.35	2.83	<0.100	18.3
US-11	2/1	15	Z20PF21	7.47	6.38	4.93	0.945	2.38	19.7
US-03	2/1	16	Z26PF21	8.55	5.55	4.63	1.9	<0.100	19.6
US-33	2/1	17	Z09PF21	6.41	1.72	3.58	0.981	3.31	21.6
US-33	2/1	18	Z09PF11	6.3	1.63	3.43	0.958	3.22	21.1

Table A3. Measured Elemental Concentrations (wt%) for Samples Prepared Using Peroxide Fusion

Glass ID	Block/ Sub-Block	Sequence	Lab ID	Al (wt%)	B (wt%)	Fe (wt%)	Li (wt%)	Mn (wt%)	Si (wt%)
US-03	2/1	19	Z26PF11	8.5	5.49	4.64	1.87	<0.100	19.6
US-24	2/1	20	Z45PF21	7.97	3.89	5.11	1.41	1.72	19.6
US-04	2/1	21	Z10PF21	8.71	3.55	5.59	1.76	1.67	19.3
US-24	2/1	22	Z45PF11	7.97	3.98	5.65	1.51	1.88	19.5
Batch 1	2/1	23	BCHPF213	2.53	2.41	9.17	2.06	1.27	22.5
LRM	2/1	24	LRMPF213	5.27	2.42	0.89	0.074	<0.100	24.4
Batch 1	2/2	1	BCHPF221	2.53	2.63	9.03	2.01	1.3	22.8
LRM	2/2	2	LRMPF221	5.2	2.6	0.993	0.069	<0.100	25.2
US-12	2/2	3	Z01PF12	7.17	5.12	6.19	2.75	<0.100	18.3
US-03	2/2	4	Z26PF12	8.45	5.6	4.8	1.85	<0.100	20
US-06	2/2	5	Z39PF22	8.6	4.54	5.59	1.15	2.39	19.6
US-33	2/2	6	Z09PF12	6.26	1.78	3.54	0.939	3.26	21.5
US-11	2/2	7	Z20PF12	7.75	6.5	4.95	0.945	2.47	21.2
US-24	2/2	8	Z45PF12	7.8	3.98	5.58	1.47	1.89	19
US-34	2/2	9	Z27PF12	5.35	4.34	4.44	1.09	3.13	16.8
US-34	2/2	10	Z27PF22	5.54	4.48	4.7	1.13	3.23	15.9
US-03	2/2	11	Z26PF22	8.49	5.59	4.69	1.85	<0.100	20.1
Batch 1	2/2	12	BCHPF222	2.53	2.58	9.13	2.01	1.3	23.2
LRM	2/2	13	LRMPF222	5.21	2.58	1	0.07	<0.100	25.4
US-11	2/2	14	Z20PF22	7.6	6.51	4.96	0.938	2.42	20.5
US-18	2/2	15	Z12PF12	8.88	3.08	6.67	2.29	2.42	19.9
US-24	2/2	16	Z45PF22	7.95	3.98	5.11	1.38	1.75	19.5
US-18	2/2	17	Z12PF22	8.59	2.98	6.72	2.24	2.36	19
US-06	2/2	18	Z39PF12	8.54	4.5	5.66	1.14	2.4	18.5
US-33	2/2	19	Z09PF22	6.39	1.79	3.65	0.955	3.37	21.7
US-12	2/2	20	Z01PF22	7.27	5.1	6.37	2.75	<0.100	18.2
US-04	2/2	21	Z10PF22	8.67	3.64	5.62	1.72	1.71	18.9
US-04	2/2	22	Z10PF12	8.58	3.62	5.55	1.71	1.68	18.9
Batch 1	2/2	23	BCHPF223	2.51	2.48	8.84	1.99	1.27	22.6
LRM	2/2	24	LRMPF223	5.17	2.49	0.964	0.069	<0.100	24.8
Batch 1	3/1	1	BCHPF311	2.51	2.5	9.03	2.01	1.23	23.1
LRM	3/1	2	LRMPF311	5.25	2.47	0.993	0.04	<0.100	25.3
US-07	3/1	3	Z19PF21	8.37	4.01	4.73	1.13	2.2	19.8
US-45	3/1	4	Z38PF11	7.08	4.05	6.57	1.9	1.44	19.2
US-42	3/1	5	Z15PF21	11	2.01	3.56	2.78	3.41	16.8
US-32	3/1	6	Z06PF11	5.44	6	3.88	2.96	3.71	19.8
US-28	3/1	7	Z33PF11	5.57	1.97	12.8	0.908	<0.100	18.3
US-28	3/1	8	Z33PF21	5.51	1.83	12.1	0.889	<0.100	17.6
US-43	3/1	9	Z21PF11	9.35	2.65	6.39	2.26	0.518	18.5
US-16	3/1	10	Z44PF21	7.25	5.89	6.42	1.16	1.96	20.5
US-15	3/1	11	Z42PF11	5.5	5.63	3.68	0.897	<0.100	22.1
Batch 1	3/1	12	BCHPF312	2.51	2.34	9.25	2	1.26	23.6
LRM	3/1	13	LRMPF312	5.24	2.44	0.95	0.035	<0.100	26.1
US-45	3/1	14	Z38PF21	6.85	3.92	6.05	1.84	1.3	18.5
US-16	3/1	15	Z44PF11	7.19	5.86	6.14	1.15	1.88	20.6
US-15	3/1	16	Z42PF21	5.41	5.54	3.53	0.887	<0.100	21.3
US-07	3/1	17	Z19PF11	8.54	4.16	4.8	1.18	2.27	20.1
US-32	3/1	18	Z06PF21	5.56	5.91	3.35	2.76	3.14	20.9
US-43	3/1	19	Z21PF21	9.3	2.74	6.47	2.24	0.525	17.5
US-40	3/1	20	Z22PF21	8.41	5.32	7.99	1.15	2.16	18
US-42	3/1	21	Z15PF11	10.7	1.95	3.55	2.72	3.12	16.8
US-40	3/1	22	Z22PF11	8.23	5.2	7.66	1.11	2.08	17.5
Batch 1	3/1	23	BCHPF313	2.53	2.36	8.95	2	1.22	23.4
LRM	3/1	24	LRMPF313	5.22	2.36	0.925	0.034	<0.100	25.3
Batch 1	3/2	1	BCHPF321	2.52	2.55	8.77	2.03	1.27	22.2
LRM	3/2	2	LRMPF321	5.14	2.51	0.989	0.134	<0.100	24.3
US-16	3/2	3	Z44PF22	7.22	5.94	6.2	1.24	1.94	18.8
US-32	3/2	4	Z06PF12	5.52	5.9	3.55	2.96	3.41	20.8
US-28	3/2	5	Z33PF12	5.53	2.01	12.2	0.986	<0.100	18
US-43	3/2	6	Z21PF22	9.26	2.73	6.37	2.29	0.583	17.1
US-32	3/2	7	Z06PF22	5.57	5.87	3.35	2.8	3.16	20.3
US-15	3/2	8	Z42PF22	5.47	5.6	3.55	0.965	<0.100	20.7
US-15	3/2	9	Z42PF12	5.47	5.61	3.61	0.97	<0.100	21.5
US-16	3/2	10	Z44PF12	7.14	5.84	6.04	1.21	1.92	19.8
US-07	3/2	11	Z19PF22	8.39	4.07	4.67	1.2	2.24	20.1
Batch 1	3/2	12	BCHPF322	2.56	2.47	9.05	2.07	1.31	23.1

Table A3. Measured Elemental Concentrations (wt%) for Samples Prepared Using Peroxide Fusion

Glass ID	Block/ Sub-Block	Sequence	Lab ID	Al (wt%)	B (wt%)	Fe (wt%)	Li (wt%)	Mn (wt%)	Si (wt%)
LRM	3/2	13	LRMPF322	5.24	2.46	0.987	0.137	<0.100	25.1
US-40	3/2	14	Z22PF22	8.44	5.41	7.9	1.22	2.21	17.9
US-45	3/2	15	Z38PF22	6.97	4.02	6.19	1.9	1.41	18.5
US-28	3/2	16	Z33PF22	5.6	1.94	12.1	0.971	<0.100	17.2
US-45	3/2	17	Z38PF12	7.07	3.99	6.18	1.91	1.4	17.9
US-42	3/2	18	Z15PF12	10.7	2.03	3.61	2.78	3.22	16.8
US-40	3/2	19	Z22PF12	8.28	5.29	7.69	1.2	2.16	17.3
US-07	3/2	20	Z19PF12	8.51	4.16	4.75	1.25	2.31	19.8
US-43	3/2	21	Z21PF12	9.34	2.75	6.25	2.31	0.575	18.3
US-42	3/2	22	Z15PF22	10.8	1.99	3.62	2.79	3.15	16.8
LRM	3/2	23	LRMPF323	5.31	2.41	1.02	0.141	<0.100	24.6
Batch 1	3/2	24	BCHPF323	2.54	2.37	8.88	2.06	1.28	23
Batch 1	4/1	1	BCHPF411	2.52	2.52	8.77	2.01	1.26	22.5
LRM	4/1	2	LRMPF411	5.21	2.49	0.98	0.124	<0.100	24.7
US-01	4/1	3	Z43PF21	8.05	2.54	5.96	2.61	1.95	19.7
US-31	4/1	4	Z13PF21	6.97	4.46	10.3	2.28	0.572	18.1
US-22	4/1	5	Z17PF21	7.25	3.66	6.57	2.3	1.71	19.2
US-37	4/1	6	Z32PF21	9.26	5.6	3.89	0.947	<0.100	16.9
US-01	4/1	7	Z43PF11	8.03	2.59	6.17	2.61	1.99	20.4
US-10	4/1	8	Z05PF21	7.59	3.45	7.12	0.943	2.14	18.4
US-23	4/1	9	Z28PF21	7.82	4.18	4.78	1.62	1.76	20.4
US-23	4/1	10	Z28PF11	7.71	4.06	4.72	1.57	1.69	19.6
US-14	4/1	11	Z24PF21	7.03	5.53	6.46	2.64	1.99	17
Batch 1	4/1	12	BCHPF412	2.57	2.42	8.93	2.03	1.28	23.1
LRM	4/1	13	LRMPF412	5.16	2.39	0.949	0.122	<0.100	24.7
US-38	4/1	14	Z07PF21	5.49	2.32	3.98	0.958	3.05	18.1
US-17	4/1	15	Z02PF21	6.34	3.64	4.2	2.45	2.32	21.9
US-14	4/1	16	Z24PF11	7.17	5.62	7.37	2.67	2.02	16.8
US-10	4/1	17	Z05PF11	7.76	3.49	6.95	0.968	2.11	18.8
US-17	4/1	18	Z02PF11	6.18	3.46	5.81	2.34	2.19	20.9
US-38	4/1	19	Z07PF11	5.48	2.26	3.44	0.955	3.08	18.3
US-22	4/1	20	Z17PF11	7.25	3.6	6.41	2.3	1.7	19.5
US-31	4/1	21	Z13PF11	7.09	4.42	10.1	2.28	0.562	18.2
US-37	4/1	22	Z32PF11	9.29	5.5	3.75	0.939	<0.100	16.5
Batch 1	4/1	23	BCHPF413	2.54	2.37	8.63	2.01	1.24	22.5
LRM	4/1	24	LRMPF413	5.16	2.37	0.94	0.123	<0.100	24.5
Batch 1	4/2	1	BCHPF421	2.55	2.48	8.97	2.03	1.3	22.7
LRM	4/2	2	LRMPF421	5.24	2.5	0.995	0.116	<0.100	25
US-37	4/2	3	Z32PF12	9.33	5.61	3.94	0.939	<0.100	16.9
US-38	4/2	4	Z07PF22	5.49	2.38	4.18	0.956	3.17	18.2
US-22	4/2	5	Z17PF22	7.26	3.65	6.56	2.29	1.72	19.1
US-38	4/2	6	Z07PF12	5.49	2.36	3.55	0.953	3.17	18.5
US-23	4/2	7	Z28PF12	7.75	4.11	4.85	1.59	1.73	19.6
US-17	4/2	8	Z02PF22	6.33	3.66	4.24	2.46	2.34	22
US-23	4/2	9	Z28PF22	7.88	4.25	4.85	1.62	1.79	21
US-10	4/2	10	Z05PF12	7.79	3.55	7.11	0.963	2.16	18.6
US-37	4/2	11	Z32PF22	9.27	5.62	3.96	0.938	<0.100	16.8
Batch 1	4/2	12	BCHPF422	2.58	2.52	9.05	2.06	1.31	23.1
LRM	4/2	13	LRMPF422	5.22	2.48	1	0.116	<0.100	25.1
US-10	4/2	14	Z05PF22	7.67	3.57	7.19	0.951	2.17	18.3
US-31	4/2	15	Z13PF12	7.15	4.57	10.4	2.31	0.584	18.4
US-31	4/2	16	Z13PF22	7.04	4.56	10.3	2.29	0.586	18.1
US-14	4/2	17	Z24PF22	7.07	5.54	6.46	2.64	1.99	16.9
US-01	4/2	18	Z43PF22	8.1	2.62	6.02	2.63	1.98	19.5
US-17	4/2	19	Z02PF12	6.19	3.53	5.95	2.34	2.26	20.9
US-14	4/2	20	Z24PF12	7.22	5.7	7.51	2.71	2.06	16.8
US-22	4/2	21	Z17PF12	7.34	3.78	6.57	2.33	1.74	19.8
US-01	4/2	22	Z43PF12	8.09	2.62	6.22	2.63	2.01	20.5
Batch 1	4/2	23	BCHPF423	2.58	2.46	8.92	2.05	1.29	23.1
LRM	4/2	24	LRMPF423	5.3	2.49	1.02	0.116	<0.100	25.3
Batch 1	5/1	1	BCHPF511	2.54	2.5	8.88	2.03	1.26	22.7
LRM	5/1	2	LRMPF511	5.2	2.47	0.989	0.127	<0.100	25
US-41	5/1	3	Z29PF11	5.22	4.63	10	1.68	<0.100	18.8
US-36	5/1	4	Z41PF21	6.82	4.85	6.88	1.13	0.878	18.1
US-35	5/1	5	Z11PF11	5.41	6.14	7.99	0.946	3.15	17.7
US-09	5/1	6	Z14PF21	7.33	4.74	7.34	0.969	<0.100	19.1

Table A3. Measured Elemental Concentrations (wt%) for Samples Prepared Using Peroxide Fusion

Glass ID	Block/ Sub-Block	Sequence	Lab ID	Al (wt%)	B (wt%)	Fe (wt%)	Li (wt%)	Mn (wt%)	Si (wt%)
US-21	5/1	7	Z16PF21	7.89	4.21	5.38	1.43	1.32	20.7
US-09	5/1	8	Z14PF11	7.31	4.66	7.41	0.96	<0.100	19.1
US-21	5/1	9	Z16PF11	8.04	4.25	5.53	1.42	1.38	21.4
US-36	5/1	10	Z41PF11	6.86	4.67	6.64	1.12	0.853	17.4
US-30	5/1	11	Z03PF21	7	5.66	3.75	2.77	2.73	17.9
Batch 1	5/1	12	BCHPF512	2.54	2.32	8.96	2.02	1.27	22.9
LRM	5/1	13	LRMPF512	5.19	2.34	0.945	0.126	<0.100	24.8
US-25	5/1	14	Z08PF21	6.47	5.05	5.88	2.33	1.64	18.6
US-13	5/1	15	Z04PF21	8.68	4.52	4.87	1.03	2.18	19.7
US-30	5/1	16	Z03PF11	6.83	5.69	3.71	2.78	2.71	17.7
US-41	5/1	17	Z29PF21	5.47	4.8	10.7	1.71	<0.100	19.2
US-44	5/1	18	Z25PF21	7.41	3.76	6.14	2.21	1.38	17.5
US-13	5/1	19	Z04PF11	8.69	4.5	4.88	1.02	2.15	19.6
US-35	5/1	20	Z11PF21	5.53	6.06	7.7	0.963	3.08	17.6
US-44	5/1	21	Z25PF11	7.08	3.9	5.98	1.89	1.34	17.4
US-25	5/1	22	Z08PF11	6.36	4.94	5.74	2.28	1.58	18.1
Batch 1	5/1	23	BCHPF513	2.58	2.38	8.78	2.03	1.24	22.9
LRM	5/1	24	LRMPF513	5.24	2.34	0.918	0.126	<0.100	24.7
Batch 1	5/2	1	BCHPF521	2.52	2.51	9	2.01	1.26	22.8
LRM	5/2	2	LRMPF521	5.15	2.46	0.956	0.1	<0.100	25
US-13	5/2	3	Z04PF22	8.54	4.59	4.97	1.01	2.21	19.9
US-36	5/2	4	Z41PF12	6.87	4.81	6.82	1.1	0.853	17.7
US-41	5/2	5	Z29PF12	5.26	4.72	10.1	1.69	<0.100	19
US-21	5/2	6	Z16PF22	7.86	4.39	5.64	1.41	1.34	21
US-35	5/2	7	Z11PF12	5.45	6.21	8.01	0.92	3.15	17.9
US-09	5/2	8	Z14PF12	7.32	4.74	7.45	0.94	<0.100	19.2
US-44	5/2	9	Z25PF22	7.39	3.91	6.26	2.19	1.38	17.6
US-35	5/2	10	Z11PF22	5.49	6.22	7.92	0.94	3.17	17.8
US-30	5/2	11	Z03PF22	6.88	5.77	3.8	2.75	2.75	18
Batch 1	5/2	12	BCHPF522	2.54	2.45	9.05	2.03	1.26	23.3
LRM	5/2	13	LRMPF522	5.22	2.45	0.99	0.102	<0.100	25.5
US-30	5/2	14	Z03PF12	6.77	5.86	3.8	2.77	2.75	17.9
US-21	5/2	15	Z16PF12	7.85	4.28	5.51	1.4	1.35	21.3
US-13	5/2	16	Z04PF12	8.63	4.59	4.93	1	2.17	19.7
US-41	5/2	17	Z29PF22	5.42	4.89	10.5	1.7	<0.100	19.3
US-25	5/2	18	Z08PF22	6.42	5.09	5.91	2.31	1.62	18.4
US-44	5/2	19	Z25PF12	6.98	3.91	6.08	1.87	1.34	17.5
US-36	5/2	20	Z41PF22	6.83	4.85	6.79	1.11	0.84	18
US-25	5/2	21	Z08PF12	6.38	5.09	5.98	2.29	1.63	18.2
US-09	5/2	22	Z14PF22	7.34	4.74	7.35	0.947	<0.100	19.3
Batch 1	5/2	23	BCHPF523	2.55	2.43	9.01	2.03	1.26	23.3
LRM	5/2	24	LRMPF523	5.21	2.4	0.96	0.101	<0.100	25.4

Table A4. Measured, Measured Bias-Corrected, and Targeted Compositions by Glass Number

Glass #	GlassID	Oxide	Measured (wt%)	Measured Bias-Corrected (wt%)	Targeted (wt%)	Diff of Measured	Diff of Meas BC	% Diff of Measured	% Diff of Meas BC
100	Batch 1	Al2O3	4.7974	4.8770	4.8770	-0.0796	0.0000	-1.6%	0.0%
100	Batch 1	B2O3	7.9714	7.7770	7.7770	0.1944	0.0000	2.5%	0.0%
100	Batch 1	CaO	1.1288	1.2200	1.2200	-0.0912	0.0000	-7.5%	0.0%
100	Batch 1	Cr2O3	0.1092	0.1070	0.1070	0.0022	0.0000		
100	Batch 1	Fe2O3	12.8301	12.8390	12.8390	-0.0089	0.0000	-0.1%	0.0%
100	Batch 1	K2O	3.7700	3.3270	3.3270	0.4430	0.0000	13.3%	0.0%
100	Batch 1	Li2O	4.3747	4.4290	4.4290	-0.0543	0.0000	-1.2%	0.0%
100	Batch 1	MgO	1.3095	1.4190	1.4190	-0.1095	0.0000	-7.7%	0.0%
100	Batch 1	MnO	1.6403	1.7260	1.7260	-0.0857	0.0000	-5.0%	0.0%
100	Batch 1	Na2O	9.2239	9.0030	9.0030	0.2209	0.0000	2.5%	0.0%
100	Batch 1	NiO	0.6772	0.7510	0.7510	-0.0738	0.0000	-9.8%	0.0%
100	Batch 1	PbO	0.0052	0.0052	0.0000	0.0052	0.0052		
100	Batch 1	SiO2	49.1540	50.2200	50.2200	-1.0660	0.0000	-2.1%	0.0%
100	Batch 1	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
100	Batch 1	SrO	0.0059	0.0059	0.0000	0.0059	0.0059		
100	Batch 1	TiO2	0.6256	0.6770	0.6770	-0.0514	0.0000	-7.6%	0.0%
100	Batch 1	ZnO	0.0068	0.0068	0.0000	0.0068	0.0068		
100	Batch 1	ZrO2	0.0902	0.0902	0.0980	-0.0078	-0.0078		
100	Batch 1	Sum	97.7828	98.5427	98.4700	-0.6872	0.0727	-0.7%	0.1%
200	LRM	Al2O3	9.8789	10.0430	10.0000	-0.1211	0.0430	-1.2%	0.4%
200	LRM	B2O3	7.9617	7.7675	8.0000	-0.0383	-0.2325	-0.5%	-2.9%
200	LRM	CaO	0.5202	0.5622	0.5000	0.0202	0.0622	4.0%	12.4%
200	LRM	Cr2O3	0.1964	0.1924	0.2000	-0.0036	-0.0076		
200	LRM	Fe2O3	1.3994	1.4005	1.0000	0.3994	0.4005	39.9%	40.1%
200	LRM	K2O	1.4652	1.2929	1.5000	-0.0348	-0.2071	-2.3%	-13.8%
200	LRM	Li2O	0.2023	0.2046	0.1000	0.1023	0.1046		
200	LRM	MgO	0.0958	0.1038	0.1000	-0.0042	0.0038		
200	LRM	MnO	0.0646	0.0680	0.1000	-0.0354	-0.0320		
200	LRM	Na2O	20.7457	20.2492	20.0000	0.7457	0.2492	3.7%	1.2%
200	LRM	NiO	0.1718	0.1906	0.1000	0.0718	0.0906		
200	LRM	PbO	0.0881	0.0881	0.1000	-0.0119	-0.0119		
200	LRM	SiO2	53.6964	54.8662	54.3700	-0.6736	0.4962	-1.2%	0.9%
200	LRM	SO3	0.2120	0.2120	0.2000	0.0120	0.0120		
200	LRM	SrO	0.0059	0.0059	0.0000	0.0059	0.0059		
200	LRM	TiO2	0.0956	0.1035	0.1000	-0.0044	0.0035		
200	LRM	ZnO	0.0086	0.0086	0.0000	0.0086	0.0086		
200	LRM	ZrO2	0.8795	0.8795	1.0000	-0.1205	-0.1205	-12.0%	-12.0%
200	LRM	Sum	97.6883	98.2385	97.3700	0.3183	0.8685	0.3%	0.9%
1	US-01	Al2O3	15.2435	15.3894	14.9289	0.3146	0.4605	2.1%	3.1%
1	US-01	B2O3	8.3476	8.1903	7.8908	0.4568	0.2995	5.8%	3.8%
1	US-01	CaO	0.1203	0.1314	0.0000	0.1203	0.1314		
1	US-01	Cr2O3	0.2708	0.2649	0.2999	-0.0292	-0.0350		
1	US-01	Fe2O3	8.7104	8.8111	8.5893	0.1212	0.2218	1.4%	2.6%
1	US-01	K2O	0.9974	0.8842	0.9998	-0.0024	-0.1156	-0.2%	-11.6%
1	US-01	Li2O	5.6406	5.7117	5.6159	0.0247	0.0958	0.4%	1.7%
1	US-01	MgO	0.5128	0.5586	0.4999	0.0129	0.0587		
1	US-01	MnO	2.5598	2.6737	2.4975	0.0623	0.1762	2.5%	7.1%
1	US-01	Na2O	14.1338	13.7990	12.3719	1.7619	1.4271	14.2%	11.5%
1	US-01	NiO	0.0560	0.0621	0.0568	-0.0008	0.0054		
1	US-01	PbO	0.0595	0.0595	0.1000	-0.0405	-0.0405		
1	US-01	SiO2	42.8395	44.0451	45.5296	-2.6901	-1.4844	-5.9%	-3.3%
1	US-01	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
1	US-01	SrO	0.0896	0.0896	0.1000	-0.0104	-0.0104		
1	US-01	TiO2	0.0125	0.0136	0.0000	0.0125	0.0136		
1	US-01	ZnO	0.0062	0.0062	0.0000	0.0062	0.0062		
1	US-01	ZrO2	0.4633	0.4633	0.4999	-0.0366	-0.0366		
1	US-01	Sum	100.1261	101.2161	99.9800	0.1461	1.2361	0.1%	1.2%
2	US-02	Al2O3	16.0419	16.3551	15.9968	0.0451	0.3583	0.3%	2.2%
2	US-02	B2O3	16.8803	16.0425	16.8552	0.0251	-0.8127	0.1%	-4.8%
2	US-02	CaO	0.0640	0.0689	0.0000	0.0640	0.0689		
2	US-02	Cr2O3	0.0248	0.0243	0.0000	0.0248	0.0243		
2	US-02	Fe2O3	6.5766	6.5608	6.5893	-0.0127	-0.0285	-0.2%	-0.4%
2	US-02	K2O	0.0602	0.0534	0.0000	0.0602	0.0534		
2	US-02	Li2O	5.1024	5.1370	5.2913	-0.1889	-0.1543	-3.6%	-2.9%
2	US-02	MgO	0.0083	0.0089	0.0000	0.0083	0.0089		
2	US-02	MnO	0.5907	0.6173	0.6342	-0.0435	-0.0169	-6.9%	-2.7%
2	US-02	Na2O	13.1295	12.6600	12.3340	0.7955	0.3260	6.4%	2.6%
2	US-02	NiO	0.0194	0.0214	0.0000	0.0194	0.0214		

Table A4. Measured, Measured Bias-Corrected, and Targeted Compositions by Glass Number

Glass #	GlassID	Oxide	Measured (wt%)	Measured Bias-Corrected (wt%)	Targeted (wt%)	Diff of Measured	Diff of Meas BC	% Diff of Measured	% Diff of Meas BC
2	US-02	PbO	0.0054	0.0054	0.0000	0.0054	0.0054		
2	US-02	SiO2	40.3793	40.4559	41.6792	-1.3000	-1.2233	-3.1%	-2.9%
2	US-02	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
2	US-02	SrO	0.0361	0.0361	0.0000	0.0361	0.0361		
2	US-02	TiO2	0.0634	0.0682	0.0000	0.0634	0.0682		
2	US-02	ZnO	0.1232	0.1232	0.1000	0.0233	0.0233		
2	US-02	ZrO2	0.4583	0.4583	0.4999	-0.0416	-0.0416		
2	US-02	Sum	99.6262	98.7593	99.9800	-0.3538	-1.2207	-0.4%	-1.2%
3	US-03	Al2O3	16.0560	16.3588	15.9968	0.0592	0.3620	0.4%	2.3%
3	US-03	B2O3	17.8946	17.2129	17.3085	0.5861	-0.0957	3.4%	-0.6%
3	US-03	CaO	0.9063	1.0104	0.9998	-0.0935	0.0106	-9.3%	1.1%
3	US-03	Cr2O3	0.0161	0.0157	0.0000	0.0161	0.0157		
3	US-03	Fe2O3	6.7053	6.6494	6.5259	0.1794	0.1236	2.7%	1.9%
3	US-03	K2O	0.9528	0.8386	0.9998	-0.0470	-0.1612	-4.7%	-16.1%
3	US-03	Li2O	4.0205	4.0714	4.0701	-0.0496	0.0013	-1.2%	0.0%
3	US-03	MgO	0.5033	0.5425	0.4989	0.0044	0.0436		
3	US-03	MnO	0.0646	0.0678	0.0000	0.0646	0.0678		
3	US-03	Na2O	8.6205	8.2721	7.8841	0.7363	0.3879	9.3%	4.9%
3	US-03	NiO	0.2790	0.3071	0.2929	-0.0139	0.0142		
3	US-03	PbO	0.0926	0.0926	0.0990	-0.0063	-0.0063		
3	US-03	SiO2	42.4116	44.1198	44.2064	-1.7948	-0.0866	-4.1%	-0.2%
3	US-03	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
3	US-03	SrO	0.0875	0.0875	0.1000	-0.0125	-0.0125		
3	US-03	TiO2	0.9420	1.0246	0.9978	-0.0558	0.0268	-5.6%	2.7%
3	US-03	ZnO	0.0062	0.0062	0.0000	0.0062	0.0062		
3	US-03	ZrO2	0.0068	0.0068	0.0000	0.0068	0.0068		
3	US-03	Sum	99.6282	100.7465	99.9800	-0.3518	0.7665	-0.4%	0.8%
4	US-04	Al2O3	16.3678	16.6764	15.9958	0.3720	0.6806	2.3%	4.3%
4	US-04	B2O3	11.5997	11.1576	11.2862	0.3135	-0.1286	2.8%	-1.1%
4	US-04	CaO	0.8850	0.9865	0.9988	-0.1138	-0.0123	-11.4%	-1.2%
4	US-04	Cr2O3	0.0179	0.0174	0.0010	0.0169	0.0164		
4	US-04	Fe2O3	8.0456	7.9777	8.2655	-0.2199	-0.2878	-2.7%	-3.5%
4	US-04	K2O	0.9510	0.8369	0.9988	-0.0478	-0.1619	-4.8%	-16.2%
4	US-04	Li2O	3.7407	3.7878	3.7417	-0.0010	0.0461	0.0%	1.2%
4	US-04	MgO	0.4962	0.5349	0.4989	-0.0027	0.0360		
4	US-04	MnO	2.1886	2.2980	2.1886	0.0000	0.1094	0.0%	5.0%
4	US-04	Na2O	11.5760	11.1081	10.3325	1.2434	0.7756	12.0%	7.5%
4	US-04	NiO	0.0064	0.0070	0.0010	0.0054	0.0060		
4	US-04	PbO	0.0902	0.0902	0.0990	-0.0088	-0.0088		
4	US-04	SiO2	40.9141	42.5750	43.3777	-2.4636	-0.8027	-5.7%	-1.9%
4	US-04	SO3	0.3958	0.3958	0.4989	-0.1031	-0.1031		
4	US-04	SrO	0.0887	0.0887	0.0990	-0.0103	-0.0103		
4	US-04	TiO2	0.9262	1.0073	0.9988	-0.0726	0.0085	-7.3%	0.9%
4	US-04	ZnO	0.0952	0.0952	0.0990	-0.0038	-0.0038		
4	US-04	ZrO2	0.4302	0.4302	0.4989	-0.0687	-0.0687		
4	US-04	Sum	98.8153	100.0708	99.9800	-1.1648	0.0908	-1.2%	0.1%
5	US-05	Al2O3	16.1411	16.4562	15.9938	0.1473	0.4624	0.9%	2.9%
5	US-05	B2O3	17.2265	16.3702	16.6999	0.5266	-0.3297	3.2%	-2.0%
5	US-05	CaO	0.6709	0.6958	0.7025	-0.0316	-0.0067	-4.5%	-1.0%
5	US-05	Cr2O3	0.0168	0.0166	0.0011	0.0157	0.0155		
5	US-05	Fe2O3	7.9670	7.9478	8.1562	-0.1892	-0.2084	-2.3%	-2.6%
5	US-05	K2O	1.0083	0.8854	0.9988	0.0094	-0.1134	0.9%	-11.4%
5	US-05	Li2O	2.0065	2.0201	2.0006	0.0059	0.0195	0.3%	1.0%
5	US-05	MgO	0.4971	0.5394	0.4989	-0.0018	0.0405		
5	US-05	MnO	2.4339	2.5445	2.4080	0.0259	0.1365	1.1%	5.7%
5	US-05	Na2O	10.2010	10.1622	9.5815	0.6195	0.5807	6.5%	6.1%
5	US-05	NiO	0.0064	0.0071	0.0010	0.0054	0.0061		
5	US-05	PbO	0.0905	0.0905	0.1000	-0.0095	-0.0095		
5	US-05	SiO2	39.2027	39.2867	40.6422	-1.4396	-1.3555	-3.5%	-3.3%
5	US-05	SO3	0.2840	0.2840	0.4979	-0.2139	-0.2139		
5	US-05	SrO	0.1129	0.1129	0.1000	0.0130	0.0130		
5	US-05	TiO2	0.9862	1.0614	0.9978	-0.0116	0.0636	-1.2%	6.4%
5	US-05	ZnO	0.0968	0.0968	0.1000	-0.0032	-0.0032		
5	US-05	ZrO2	0.4947	0.4947	0.4999	-0.0052	-0.0052		
5	US-05	Sum	99.4432	99.0724	99.9800	-0.5368	-0.9076	-0.5%	-0.9%
6	US-06	Al2O3	16.2166	16.5226	15.9968	0.2198	0.5258	1.4%	3.3%
6	US-06	B2O3	14.5378	13.9856	14.0647	0.4732	-0.0790	3.4%	-0.6%
6	US-06	CaO	0.9487	0.9838	0.9988	-0.0501	-0.0150	-5.0%	-1.5%

Table A4. Measured, Measured Bias-Corrected, and Targeted Compositions by Glass Number

Glass #	GlassID	Oxide	Measured (wt%)	Measured Bias-Corrected (wt%)	Targeted (wt%)	Diff of Measured	Diff of Meas BC	% Diff of Measured	% Diff of Meas BC
6	US-06	Cr2O3	0.0179	0.0177	0.0000	0.0179	0.0177		
6	US-06	Fe2O3	7.9920	7.9252	8.1540	-0.1620	-0.2288	-2.0%	-2.8%
6	US-06	K2O	1.0025	0.8803	0.9988	0.0037	-0.1185	0.4%	-11.9%
6	US-06	Li2O	2.4812	2.5127	2.4731	0.0081	0.0396	0.3%	1.6%
6	US-06	MgO	0.4946	0.5367	0.4989	-0.0043	0.0378		
6	US-06	MnO	3.0698	3.2229	2.9984	0.0714	0.2245	2.4%	7.5%
6	US-06	Na2O	10.5953	10.5638	10.7776	-0.1823	-0.2138	-1.7%	-2.0%
6	US-06	NiO	0.0064	0.0071	0.0010	0.0054	0.0061		
6	US-06	PbO	0.0054	0.0054	0.0000	0.0054	0.0054		
6	US-06	SiO2	40.4863	42.1195	41.4202	-0.9340	0.6993	-2.3%	1.7%
6	US-06	SO3	0.3514	0.3514	0.4999	-0.1485	-0.1485		
6	US-06	SrO	0.1073	0.1073	0.0990	0.0083	0.0083		
6	US-06	TiO2	0.9120	0.9815	0.9988	-0.0868	-0.0173	-8.7%	-1.7%
6	US-06	ZnO	0.0180	0.0180	0.0000	0.0180	0.0180		
6	US-06	ZrO2	0.0236	0.0236	0.0000	0.0236	0.0236		
6	US-06	Sum	99.2669	100.7653	99.9800	-0.7131	0.7853	-0.7%	0.8%
7	US-07	Al2O3	15.9710	16.3047	15.9958	-0.0248	0.3089	-0.2%	1.9%
7	US-07	B2O3	13.2016	13.1143	13.4875	-0.2859	-0.3732	-2.1%	-2.8%
7	US-07	CaO	0.8983	0.9813	0.9988	-0.1005	-0.0175	-10.1%	-1.8%
7	US-07	Cr2O3	0.0135	0.0132	0.0010	0.0125	0.0122		
7	US-07	Fe2O3	6.7732	6.7674	7.3001	-0.5269	-0.5327	-7.2%	-7.3%
7	US-07	K2O	0.9586	0.8499	0.9988	-0.0402	-0.1489	-4.0%	-14.9%
7	US-07	Li2O	2.5620	2.5979	2.6601	-0.0981	-0.0622	-3.7%	-2.3%
7	US-07	MgO	0.4958	0.5401	0.4989	-0.0031	0.0412		
7	US-07	MnO	2.9117	3.0856	2.9984	-0.0867	0.0872	-2.9%	2.9%
7	US-07	Na2O	11.3502	11.0822	10.6678	0.6823	0.4144	6.4%	3.9%
7	US-07	NiO	0.1877	0.2082	0.2017	-0.0140	0.0065		
7	US-07	PbO	0.0897	0.0897	0.0990	-0.0093	-0.0093		
7	US-07	SiO2	42.6790	43.4419	41.8776	0.8015	1.5643	1.9%	3.7%
7	US-07	SO3	0.3596	0.3596	0.4989	-0.1393	-0.1393		
7	US-07	SrO	0.0872	0.0872	0.0990	-0.0118	-0.0118		
7	US-07	TiO2	0.9291	1.0105	0.9988	-0.0697	0.0117	-7.0%	1.2%
7	US-07	ZnO	0.0974	0.0974	0.0990	-0.0016	-0.0016		
7	US-07	ZrO2	0.4228	0.4228	0.4989	-0.0761	-0.0761		
7	US-07	Sum	99.9882	101.0538	99.9800	0.0082	1.0738	0.0%	1.1%
8	US-08	Al2O3	15.5222	15.8253	15.1931	0.3292	0.6322	2.2%	4.2%
8	US-08	B2O3	10.0783	9.5765	9.5552	0.5231	0.0213	5.5%	0.2%
8	US-08	CaO	0.1270	0.1317	0.0000	0.1270	0.1317		
8	US-08	Cr2O3	0.0402	0.0398	0.0000	0.0402	0.0398		
8	US-08	Fe2O3	9.1036	9.0831	9.7466	-0.6430	-0.6636	-6.6%	-6.8%
8	US-08	K2O	0.9474	0.8320	0.9998	-0.0524	-0.1678	-5.2%	-16.8%
8	US-08	Li2O	4.8925	4.9257	4.8638	0.0287	0.0619	0.6%	1.3%
8	US-08	MgO	0.0468	0.0509	0.0000	0.0468	0.0509		
8	US-08	MnO	2.2596	2.3626	2.4374	-0.1778	-0.0749	-7.3%	-3.1%
8	US-08	Na2O	10.1808	10.1428	9.8137	0.3671	0.3291	3.7%	3.4%
8	US-08	NiO	0.0064	0.0071	0.0010	0.0054	0.0061		
8	US-08	PbO	0.0819	0.0819	0.0990	-0.0171	-0.0171		
8	US-08	SiO2	43.9626	44.0498	45.7717	-1.8091	-1.7219	-4.0%	-3.8%
8	US-08	SO3	0.3795	0.3795	0.4989	-0.1194	-0.1194		
8	US-08	SrO	0.1795	0.1795	0.0000	0.1795	0.1795		
8	US-08	TiO2	0.8719	0.9384	0.9998	-0.1279	-0.0614	-12.8%	-6.1%
8	US-08	ZnO	0.1332	0.1332	0.0000	0.1332	0.1332		
8	US-08	ZrO2	0.1540	0.1540	0.0000	0.1540	0.1540		
8	US-08	Sum	98.9674	98.8936	99.9800	-1.0126	-1.0864	-1.0%	-1.1%
9	US-09	Al2O3	13.8406	14.0371	13.3663	0.4743	0.6709	3.5%	5.0%
9	US-09	B2O3	15.1979	15.0973	15.0479	0.1500	0.0494	1.0%	0.3%
9	US-09	CaO	0.9217	0.9559	0.9998	-0.0781	-0.0439	-7.8%	-4.4%
9	US-09	Cr2O3	0.2255	0.2230	0.2999	-0.0745	-0.0769		
9	US-09	Fe2O3	10.5619	10.6021	10.8800	-0.3181	-0.2779	-2.9%	-2.6%
9	US-09	K2O	0.0602	0.0529	0.0000	0.0602	0.0529		
9	US-09	Li2O	2.0539	2.0865	1.9996	0.0543	0.0869	2.7%	4.3%
9	US-09	MgO	0.4987	0.5411	0.4999	-0.0012	0.0412		
9	US-09	MnO	0.0646	0.0686	0.0000	0.0646	0.0686		
9	US-09	Na2O	12.9610	12.9106	14.1149	-1.1539	-1.2044	-8.2%	-8.5%
9	US-09	NiO	0.0064	0.0071	0.0000	0.0064	0.0071		
9	US-09	PbO	0.0894	0.0894	0.1000	-0.0106	-0.0106		
9	US-09	SiO2	41.0211	41.8993	41.1719	-0.1509	0.7273	-0.4%	1.8%
9	US-09	SO3	0.3901	0.3901	0.4999	-0.1098	-0.1098		

Table A4. Measured, Measured Bias-Corrected, and Targeted Compositions by Glass Number

Glass #	GlassID	Oxide	Measured (wt%)	Measured Bias-Corrected (wt%)	Targeted (wt%)	Diff of Measured	Diff of Meas BC	% Diff of Measured	% Diff of Meas BC
9	US-09	SrO	0.0163	0.0163	0.0000	0.0163	0.0163		
9	US-09	TiO2	0.9412	1.0129	0.9998	-0.0586	0.0131	-5.9%	1.3%
9	US-09	ZnO	0.0062	0.0062	0.0000	0.0062	0.0062		
9	US-09	ZrO2	0.0068	0.0068	0.0000	0.0068	0.0068		
9	US-09	Sum	98.8634	100.0032	99.9800	-1.1166	0.0232	-1.1%	0.0%
10	US-10	Al2O3	14.5539	14.6931	14.1233	0.4306	0.5698	3.0%	4.0%
10	US-10	B2O3	11.3179	11.1044	10.9925	0.3255	0.1119	3.0%	1.0%
10	US-10	CaO	0.9273	0.9984	0.9988	-0.0715	-0.0004	-7.2%	0.0%
10	US-10	Cr2O3	0.0175	0.0172	0.0010	0.0165	0.0162		
10	US-10	Fe2O3	10.1401	10.2569	10.6855	-0.5453	-0.4286	-5.1%	-4.0%
10	US-10	K2O	0.9911	0.8793	0.9988	-0.0077	-0.1195	-0.8%	-12.0%
10	US-10	Li2O	2.0587	2.0847	2.0006	0.0581	0.0841	2.9%	4.2%
10	US-10	MgO	0.5008	0.5403	0.4989	0.0019	0.0414		
10	US-10	MnO	2.7696	2.8927	2.7369	0.0327	0.1558	1.2%	5.7%
10	US-10	Na2O	13.4733	12.9919	12.6736	0.7997	0.3183	6.3%	2.5%
10	US-10	NiO	0.0064	0.0070	0.0010	0.0054	0.0060		
10	US-10	PbO	0.0883	0.0883	0.0990	-0.0106	-0.0106		
10	US-10	SiO2	39.6305	40.7465	41.9756	-2.3451	-1.2291	-5.6%	-2.9%
10	US-10	SO3	0.3983	0.3983	0.4989	-0.1006	-0.1006		
10	US-10	SrO	0.0899	0.0899	0.0990	-0.0091	-0.0091		
10	US-10	TiO2	0.9495	1.0223	0.9988	-0.0493	0.0235	-4.9%	2.4%
10	US-10	ZnO	0.0993	0.0993	0.0990	0.0003	0.0003		
10	US-10	ZrO2	0.4370	0.4370	0.4989	-0.0619	-0.0619		
10	US-10	Sum	98.4494	99.3474	99.9800	-1.5306	-0.6326	-1.5%	-0.6%
11	US-11	Al2O3	14.4405	14.7133	13.7027	0.7378	1.0106	5.4%	7.4%
11	US-11	B2O3	20.8006	20.0080	19.9755	0.8250	0.0325	4.1%	0.2%
11	US-11	CaO	0.9536	1.0359	0.9998	-0.0462	0.0361	-4.6%	3.6%
11	US-11	Cr2O3	0.0153	0.0150	0.0000	0.0153	0.0150		
11	US-11	Fe2O3	7.0734	7.0141	7.7607	-0.6873	-0.7467	-8.9%	-9.6%
11	US-11	K2O	0.9845	0.8671	0.9998	-0.0153	-0.1327	-1.5%	-13.3%
11	US-11	Li2O	2.0307	2.0566	1.9996	0.0311	0.0570	1.6%	2.9%
11	US-11	MgO	0.5103	0.5549	0.4999	0.0104	0.0550		
11	US-11	MnO	3.1279	3.2839	2.9994	0.1285	0.2845	4.3%	9.5%
11	US-11	Na2O	7.0197	6.9156	6.6861	0.3336	0.2295	5.0%	3.4%
11	US-11	NiO	0.0064	0.0071	0.0000	0.0064	0.0071		
11	US-11	PbO	0.0934	0.0934	0.1000	-0.0065	-0.0065		
11	US-11	SiO2	43.8557	45.6185	43.6565	0.1991	1.9620	0.5%	4.5%
11	US-11	SO3	0.2491	0.2491	0.4999	-0.2508	-0.2508		
11	US-11	SrO	0.0059	0.0059	0.0000	0.0059	0.0059		
11	US-11	TiO2	0.0083	0.0090	0.0000	0.0083	0.0090		
11	US-11	ZnO	0.1018	0.1018	0.1000	0.0018	0.0018		
11	US-11	ZrO2	0.0122	0.0122	0.0000	0.0122	0.0122		
11	US-11	Sum	101.2893	102.5613	99.9800	1.3093	2.5813	1.3%	2.6%
12	US-12	Al2O3	13.6800	13.9380	13.2389	0.4411	0.6991	3.3%	5.3%
12	US-12	B2O3	16.5100	15.8844	16.0809	0.4291	-0.1965	2.7%	-1.2%
12	US-12	CaO	0.9693	1.0529	0.9998	-0.0305	0.0531	-3.1%	5.3%
12	US-12	Cr2O3	0.1195	0.1169	0.1446	-0.0252	-0.0277		
12	US-12	Fe2O3	9.0107	8.9348	8.7434	0.2673	0.1914	3.1%	2.2%
12	US-12	K2O	1.0272	0.9045	0.9998	0.0274	-0.0953	2.7%	-9.5%
12	US-12	Li2O	5.9904	6.0660	5.9988	-0.0084	0.0672	-0.1%	1.1%
12	US-12	MgO	0.0083	0.0090	0.0000	0.0083	0.0090		
12	US-12	MnO	0.0646	0.0678	0.0000	0.0646	0.0678		
12	US-12	Na2O	12.6712	12.4824	11.1579	1.5133	1.3245	13.6%	11.9%
12	US-12	NiO	1.7433	1.9437	1.8369	-0.0936	0.1068	-5.1%	5.8%
12	US-12	PbO	0.0048	0.0048	0.0000	0.0048	0.0048		
12	US-12	SiO2	38.9887	40.5644	39.1293	-0.1406	1.4351	-0.4%	3.7%
12	US-12	SO3	0.4557	0.4557	0.4999	-0.0442	-0.0442		
12	US-12	SrO	0.0943	0.0943	0.1000	-0.0057	-0.0057		
12	US-12	TiO2	0.5050	0.5471	0.4979	0.0071	0.0492		
12	US-12	ZnO	0.1108	0.1108	0.1000	0.0108	0.0108		
12	US-12	ZrO2	0.4390	0.4390	0.4519	-0.0129	-0.0129		
12	US-12	Sum	102.3929	103.6165	99.9800	2.4129	3.6365	2.4%	3.6%
13	US-13	Al2O3	16.3158	16.5472	15.9968	0.3190	0.5504	2.0%	3.4%
13	US-13	B2O3	14.6505	14.5527	14.5690	0.0816	-0.0163	0.6%	-0.1%
13	US-13	CaO	0.9161	0.9952	0.9988	-0.0827	-0.0036	-8.3%	-0.4%
13	US-13	Cr2O3	0.0201	0.0197	0.0000	0.0201	0.0197		
13	US-13	Fe2O3	7.0234	7.0498	7.3003	-0.2769	-0.2505	-3.8%	-3.4%
13	US-13	K2O	0.9619	0.8470	0.9988	-0.0369	-0.1518	-3.7%	-15.2%

Table A4. Measured, Measured Bias-Corrected, and Targeted Compositions by Glass Number

Glass #	GlassID	Oxide	Measured (wt%)	Measured Bias-Corrected (wt%)	Targeted (wt%)	Diff of Measured	Diff of Meas BC	% Diff of Measured	% Diff of Meas BC
13	US-13	Li2O	2.1852	2.2200	2.1547	0.0305	0.0653	1.4%	3.0%
13	US-13	MgO	0.4987	0.5423	0.4989	-0.0002	0.0434		
13	US-13	MnO	2.8116	2.9868	2.8000	0.0116	0.1868	0.4%	6.7%
13	US-13	Na2O	12.1859	12.0059	11.5281	0.6578	0.4778	5.7%	4.1%
13	US-13	NiO	0.2640	0.2944	0.2816	-0.0176	0.0128		
13	US-13	PbO	0.0883	0.0883	0.0990	-0.0106	-0.0106		
13	US-13	SiO2	42.1977	43.1011	41.6543	0.5434	1.4468	1.3%	3.5%
13	US-13	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
13	US-13	SrO	0.0059	0.0059	0.0000	0.0059	0.0059		
13	US-13	TiO2	0.9428	1.0214	0.9998	-0.0570	0.0216	-5.7%	2.2%
13	US-13	ZnO	0.1015	0.1015	0.1000	0.0015	0.0015		
13	US-13	ZrO2	0.0361	0.0361	0.0000	0.0361	0.0361		
13	US-13	Sum	101.2681	102.4774	99.9800	1.2881	2.4974	1.3%	2.5%
14	US-14	Al2O3	13.4580	13.5867	13.0164	0.4416	0.5704	3.4%	4.4%
14	US-14	B2O3	18.0234	17.6850	17.8983	0.1250	-0.2134	0.7%	-1.2%
14	US-14	CaO	0.4481	0.4647	0.3970	0.0511	0.0676		
14	US-14	Cr2O3	0.0088	0.0087	0.0000	0.0088	0.0087		
14	US-14	Fe2O3	9.9364	10.0512	9.4148	0.5216	0.6363	5.5%	6.8%
14	US-14	K2O	0.9851	0.8650	0.9998	-0.0147	-0.1348	-1.5%	-13.5%
14	US-14	Li2O	5.7375	5.8098	5.7387	-0.0013	0.0711	0.0%	1.2%
14	US-14	MgO	0.4962	0.5384	0.4989	-0.0027	0.0395		
14	US-14	MnO	2.6018	2.7176	2.5993	0.0025	0.1183	0.1%	4.6%
14	US-14	Na2O	11.1985	11.1599	11.2237	-0.0252	-0.0638	-0.2%	-0.6%
14	US-14	NiO	0.0064	0.0071	0.0000	0.0064	0.0071		
14	US-14	PbO	0.0633	0.0633	0.0710	-0.0077	-0.0077		
14	US-14	SiO2	36.1007	37.1167	36.5224	-0.4217	0.5943	-1.2%	1.6%
14	US-14	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
14	US-14	SrO	0.0059	0.0059	0.0000	0.0059	0.0059		
14	US-14	TiO2	0.9574	1.0304	0.9998	-0.0424	0.0306	-4.2%	3.1%
14	US-14	ZnO	0.1071	0.1071	0.1000	0.0071	0.0071		
14	US-14	ZrO2	0.4589	0.4589	0.4999	-0.0410	-0.0410		
14	US-14	Sum	100.6558	101.7388	99.9800	0.6758	1.7588	0.7%	1.8%
15	US-15	Al2O3	10.3214	10.5370	9.9980	0.3234	0.5390	3.2%	5.4%
15	US-15	B2O3	18.0153	17.8966	17.7964	0.2189	0.1002	1.2%	0.6%
15	US-15	CaO	0.5607	0.6092	0.4999	0.0608	0.1093		
15	US-15	Cr2O3	0.2324	0.2274	0.2999	-0.0675	-0.0725		
15	US-15	Fe2O3	5.1362	5.1319	4.9990	0.1372	0.1329	2.7%	2.7%
15	US-15	K2O	0.9592	0.8449	0.9998	-0.0406	-0.1549	-4.1%	-15.5%
15	US-15	Li2O	2.0017	2.0295	1.9996	0.0021	0.0299	0.1%	1.5%
15	US-15	MgO	0.0083	0.0090	0.0000	0.0083	0.0090		
15	US-15	MnO	0.0646	0.0684	0.0000	0.0646	0.0684		
15	US-15	Na2O	15.9064	15.6740	14.9970	0.9094	0.6770	6.1%	4.5%
15	US-15	NiO	0.0064	0.0071	0.0000	0.0064	0.0071		
15	US-15	PbO	0.0889	0.0889	0.1000	-0.0111	-0.0111		
15	US-15	SiO2	45.7810	46.5908	46.5907	-0.8097	0.0001	-1.7%	0.0%
15	US-15	SO3	0.4076	0.4076	0.4999	-0.0923	-0.0923		
15	US-15	SrO	0.0896	0.0896	0.1000	-0.0104	-0.0104		
15	US-15	TiO2	0.9195	0.9961	0.9998	-0.0803	-0.0037	-8.0%	-0.4%
15	US-15	ZnO	0.0983	0.0983	0.1000	-0.0016	-0.0016		
15	US-15	ZrO2	0.0236	0.0236	0.0000	0.0236	0.0236		
15	US-15	Sum	100.6210	101.3300	99.9800	0.6410	1.3500	0.6%	1.4%
16	US-16	Al2O3	13.6044	13.8888	13.3159	0.2885	0.5729	2.2%	4.3%
16	US-16	B2O3	18.9411	18.8164	18.8074	0.1336	0.0090	0.7%	0.0%
16	US-16	CaO	0.9126	0.9968	0.9998	-0.0872	-0.0030	-8.7%	-0.3%
16	US-16	Cr2O3	0.0815	0.0797	0.0798	0.0017	-0.0001		
16	US-16	Fe2O3	8.8641	8.8559	9.0262	-0.1620	-0.1703	-1.8%	-1.9%
16	US-16	K2O	1.0089	0.8944	0.9998	0.0091	-0.1054	0.9%	-10.5%
16	US-16	Li2O	2.5620	2.5979	2.5552	0.0068	0.0427	0.3%	1.7%
16	US-16	MgO	0.0083	0.0090	0.0000	0.0083	0.0090		
16	US-16	MnO	2.4856	2.6344	2.4833	0.0023	0.1511	0.1%	6.1%
16	US-16	Na2O	6.8512	6.6896	6.2985	0.5527	0.3911	8.8%	6.2%
16	US-16	NiO	0.0130	0.0145	0.0035	0.0096	0.0110		
16	US-16	PbO	0.0054	0.0054	0.0000	0.0054	0.0054		
16	US-16	SiO2	42.6256	43.3697	43.9110	-1.2855	-0.5413	-2.9%	-1.2%
16	US-16	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
16	US-16	SrO	0.0059	0.0059	0.0000	0.0059	0.0059		
16	US-16	TiO2	0.9458	1.0286	0.9998	-0.0540	0.0288	-5.4%	2.9%
16	US-16	ZnO	0.0062	0.0062	0.0000	0.0062	0.0062		

Table A4. Measured, Measured Bias-Corrected, and Targeted Compositions by Glass Number

Glass #	GlassID	Oxide	Measured (wt%)	Measured Bias-Corrected (wt%)	Targeted (wt%)	Diff of Measured	Diff of Meas BC	% Diff of Measured	% Diff of Meas BC
16	US-16	ZrO2	0.4863	0.4863	0.4999	-0.0136	-0.0136		
16	US-16	Sum	99.4702	100.4419	99.9800	-0.5098	0.4619	-0.5%	0.5%
17	US-17	Al2O3	11.8283	11.9417	11.6559	0.1723	0.2857	1.5%	2.5%
17	US-17	B2O3	11.5031	11.2868	11.7751	-0.2720	-0.4882	-2.3%	-4.1%
17	US-17	CaO	0.0668	0.0725	0.0000	0.0668	0.0725		
17	US-17	Cr2O3	0.0888	0.0869	0.1071	-0.0184	-0.0203		
17	US-17	Fe2O3	7.2200	7.3030	6.2230	0.9970	1.0800	16.0%	17.4%
17	US-17	K2O	0.0602	0.0531	0.0000	0.0602	0.0531		
17	US-17	Li2O	5.1616	5.2268	5.3635	-0.2019	-0.1367	-3.8%	-2.5%
17	US-17	MgO	0.4904	0.5333	0.4999	-0.0095	0.0334		
17	US-17	MnO	2.9407	3.0713	2.9994	-0.0587	0.0719	-2.0%	2.4%
17	US-17	Na2O	9.0046	8.8668	8.5818	0.4228	0.2849	4.9%	3.3%
17	US-17	NiO	0.9843	1.0974	1.0845	-0.1002	0.0129	-9.2%	1.2%
17	US-17	PbO	0.0054	0.0054	0.0000	0.0054	0.0054		
17	US-17	SiO2	45.8345	47.1238	49.9900	-4.1555	-2.8662	-8.3%	-5.7%
17	US-17	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
17	US-17	SrO	0.0846	0.0846	0.1000	-0.0154	-0.0154		
17	US-17	TiO2	0.9374	1.0155	0.9998	-0.0624	0.0157	-6.2%	1.6%
17	US-17	ZnO	0.1043	0.1043	0.1000	0.0043	0.0043		
17	US-17	ZrO2	0.4093	0.4093	0.4999	-0.0906	-0.0906		
17	US-17	Sum	96.7867	98.3447	99.9800	-3.1933	-1.6353	-3.2%	-1.6%
18	US-18	Al2O3	16.5520	16.8642	15.9968	0.5552	0.8674	3.5%	5.4%
18	US-18	B2O3	9.6356	9.2674	9.1275	0.5080	0.1398	5.6%	1.5%
18	US-18	CaO	0.8923	0.9254	0.9998	-0.1075	-0.0744	-10.7%	-7.4%
18	US-18	Cr2O3	0.0113	0.0112	0.0000	0.0113	0.0112		
18	US-18	Fe2O3	9.6255	9.5442	9.7464	-0.1210	-0.2022	-1.2%	-2.1%
18	US-18	K2O	0.0602	0.0529	0.0000	0.0602	0.0529		
18	US-18	Li2O	4.9355	4.9977	4.9510	-0.0154	0.0468	-0.3%	0.9%
18	US-18	MgO	0.0083	0.0090	0.0000	0.0083	0.0090		
18	US-18	MnO	3.0860	3.2402	2.9994	0.0866	0.2408	2.9%	8.0%
18	US-18	Na2O	12.6442	12.6074	13.4069	-0.7627	-0.7995	-5.7%	-6.0%
18	US-18	NiO	0.0064	0.0071	0.0000	0.0064	0.0071		
18	US-18	PbO	0.0897	0.0897	0.1000	-0.0103	-0.0103		
18	US-18	SiO2	41.3955	43.0662	41.4524	-0.0569	1.6138	-0.1%	3.9%
18	US-18	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
18	US-18	SrO	0.0964	0.0964	0.1000	-0.0036	-0.0036		
18	US-18	TiO2	0.9570	1.0299	0.9998	-0.0428	0.0301	-4.3%	3.0%
18	US-18	ZnO	0.1117	0.1117	0.1000	0.0117	0.0117		
18	US-18	ZrO2	0.0057	0.0057	0.0000	0.0057	0.0057		
18	US-18	Sum	100.1757	101.9889	99.9800	0.1957	2.0089	0.2%	2.0%
19	US-19	Al2O3	14.5917	14.8766	14.4727	0.1190	0.4039	0.8%	2.8%
19	US-19	B2O3	14.6908	13.9613	14.4010	0.2898	-0.4397	2.0%	-3.1%
19	US-19	CaO	0.6779	0.7298	0.6996	-0.0217	0.0302	-3.1%	4.3%
19	US-19	Cr2O3	0.0563	0.0550	0.0686	-0.0124	-0.0136		
19	US-19	Fe2O3	7.9420	7.9234	8.2281	-0.2861	-0.3047	-3.5%	-3.7%
19	US-19	K2O	0.7770	0.6894	0.7773	-0.0003	-0.0879	0.0%	-11.3%
19	US-19	Li2O	3.6223	3.6468	3.6377	-0.0154	0.0092	-0.4%	0.3%
19	US-19	MgO	0.3370	0.3636	0.3328	0.0042	0.0308		
19	US-19	MnO	1.9207	2.0079	1.9878	-0.0671	0.0201	-3.4%	1.0%
19	US-19	Na2O	11.6636	11.2450	10.8018	0.8618	0.4432	8.0%	4.1%
19	US-19	NiO	0.1896	0.2092	0.2090	-0.0194	0.0001		
19	US-19	PbO	0.0660	0.0660	0.0703	-0.0043	-0.0043		
19	US-19	SiO2	40.8606	40.9512	42.8088	-1.9482	-1.8576	-4.6%	-4.3%
19	US-19	SO3	0.2634	0.2634	0.2774	-0.0140	-0.0140		
19	US-19	SrO	0.0597	0.0597	0.0609	-0.0012	-0.0012		
19	US-19	TiO2	0.7769	0.8364	0.8048	-0.0280	0.0315	-3.5%	3.9%
19	US-19	ZnO	0.0672	0.0672	0.0665	0.0007	0.0007		
19	US-19	ZrO2	0.2266	0.2266	0.2749	-0.0483	-0.0483		
19	US-19	Sum	98.7892	98.1785	99.9800	-1.1908	-1.8015	-1.2%	-1.8%
20	US-20	Al2O3	14.5633	14.8477	14.4727	0.0906	0.3750	0.6%	2.6%
20	US-20	B2O3	14.7471	14.0135	14.4010	0.3461	-0.3876	2.4%	-2.7%
20	US-20	CaO	0.7580	0.8161	0.6996	0.0584	0.1165	8.4%	16.7%
20	US-20	Cr2O3	0.0661	0.0647	0.0686	-0.0025	-0.0039		
20	US-20	Fe2O3	8.3459	8.3266	8.2281	0.1178	0.0985	1.4%	1.2%
20	US-20	K2O	0.7574	0.6720	0.7773	-0.0199	-0.1053	-2.6%	-13.5%
20	US-20	Li2O	3.6007	3.6252	3.6377	-0.0369	-0.0125	-1.0%	-0.3%
20	US-20	MgO	0.3354	0.3618	0.3328	0.0026	0.0290		
20	US-20	MnO	1.9691	2.0587	1.9878	-0.0187	0.0709	-0.9%	3.6%

Table A4. Measured, Measured Bias-Corrected, and Targeted Compositions by Glass Number

Glass #	GlassID	Oxide	Measured (wt%)	Measured Bias-Corrected (wt%)	Targeted (wt%)	Diff of Measured	Diff of Meas BC	% Diff of Measured	% Diff of Meas BC
20	US-20	Na2O	11.5591	11.1431	10.8018	0.7573	0.3413	7.0%	3.2%
20	US-20	NiO	0.1944	0.2144	0.2090	-0.0147	0.0054		
20	US-20	PbO	0.0649	0.0649	0.0703	-0.0054	-0.0054		
20	US-20	SiO2	41.0211	41.1090	42.8088	-1.7877	-1.6998	-4.2%	-4.0%
20	US-20	SO3	0.2541	0.2541	0.2774	-0.0233	-0.0233		
20	US-20	SrO	0.0577	0.0577	0.0609	-0.0032	-0.0032		
20	US-20	TiO2	0.7752	0.8346	0.8048	-0.0296	0.0298	-3.7%	3.7%
20	US-20	ZnO	0.0716	0.0716	0.0665	0.0051	0.0051		
20	US-20	ZrO2	0.2783	0.2783	0.2749	0.0034	0.0034		
20	US-20	Sum	99.4193	98.8137	99.9800	-0.5607	-1.1663	-0.6%	-1.2%
21	US-21	Al2O3	14.9459	15.1578	14.2189	0.7270	0.9389	5.1%	6.6%
21	US-21	B2O3	13.7892	13.6965	13.7549	0.0343	-0.0584	0.2%	-0.4%
21	US-21	CaO	0.3634	0.4052	0.3761	-0.0126	0.0291		
21	US-21	Cr2O3	0.0599	0.0584	0.0803	-0.0203	-0.0219		
21	US-21	Fe2O3	7.8848	7.9142	8.4520	-0.5672	-0.5378	-6.7%	-6.4%
21	US-21	K2O	0.7255	0.6385	0.7489	-0.0234	-0.1104	-3.1%	-14.7%
21	US-21	Li2O	3.0464	3.0948	3.0004	0.0460	0.0944	1.5%	3.1%
21	US-21	MgO	0.3744	0.4035	0.3739	0.0004	0.0296		
21	US-21	MnO	1.7399	1.8483	1.7789	-0.0390	0.0694	-2.2%	3.9%
21	US-21	Na2O	11.8253	11.3467	10.7534	1.0720	0.5933	10.0%	5.5%
21	US-21	NiO	0.4444	0.4892	0.5009	-0.0565	-0.0117	-11.3%	-2.3%
21	US-21	PbO	0.0746	0.0746	0.0790	-0.0044	-0.0044		
21	US-21	SiO2	45.1392	46.1060	44.9546	0.1846	1.1514	0.4%	2.6%
21	US-21	SO3	0.1273	0.1273	0.1250	0.0024	0.0024		
21	US-21	SrO	0.0745	0.0745	0.0800	-0.0055	-0.0055		
21	US-21	TiO2	0.5133	0.5583	0.5430	-0.0297	0.0153	-5.5%	2.8%
21	US-21	ZnO	0.0367	0.0367	0.0300	0.0067	0.0067		
21	US-21	ZrO2	0.1030	0.1030	0.1300	-0.0270	-0.0270		
21	US-21	Sum	101.2679	102.1336	99.9800	1.2879	2.1536	1.3%	2.2%
22	US-22	Al2O3	13.7461	13.8776	13.3397	0.4064	0.5379	3.0%	4.0%
22	US-22	B2O3	11.8251	11.6021	11.6875	0.1376	-0.0853	1.2%	-0.7%
22	US-22	CaO	0.7073	0.7683	0.7489	-0.0416	0.0194	-5.5%	2.6%
22	US-22	Cr2O3	0.0797	0.0779	0.0800	-0.0003	-0.0021		
22	US-22	Fe2O3	9.3324	9.4401	9.4674	-0.1350	-0.0273	-1.4%	-0.3%
22	US-22	K2O	0.7381	0.6499	0.7489	-0.0107	-0.0989	-1.4%	-13.2%
22	US-22	Li2O	4.9624	5.0251	4.9980	-0.0356	0.0271	-0.7%	0.5%
22	US-22	MgO	0.3822	0.4156	0.3739	0.0083	0.0417		
22	US-22	MnO	2.2176	2.3162	2.2486	-0.0309	0.0677	-1.4%	3.0%
22	US-22	Na2O	13.2070	13.0155	11.7767	1.4303	1.2388	12.1%	10.5%
22	US-22	NiO	0.8494	0.9470	0.9181	-0.0688	0.0289	-7.5%	3.1%
22	US-22	PbO	0.0302	0.0302	0.0300	0.0002	0.0002		
22	US-22	SiO2	41.5024	42.6695	42.4006	-0.8982	0.2689	-2.1%	0.6%
22	US-22	SO3	0.1398	0.1398	0.1250	0.0149	0.0149		
22	US-22	SrO	0.0713	0.0713	0.0790	-0.0077	-0.0077		
22	US-22	TiO2	0.7356	0.7969	0.7489	-0.0133	0.0480	-1.8%	6.4%
22	US-22	ZnO	0.0871	0.0871	0.0790	0.0082	0.0082		
22	US-22	ZrO2	0.1226	0.1226	0.1300	-0.0074	-0.0074		
22	US-22	Sum	100.7363	102.0527	99.9800	0.7563	2.0727	0.8%	2.1%
23	US-23	Al2O3	14.7192	14.8601	14.4971	0.2221	0.3630	1.5%	2.5%
23	US-23	B2O3	13.3626	13.1112	13.3214	0.0412	-0.2102	0.3%	-1.6%
23	US-23	CaO	0.6692	0.7460	0.7499	-0.0807	-0.0039	-10.8%	-0.5%
23	US-23	Cr2O3	0.0665	0.0648	0.0800	-0.0135	-0.0152		
23	US-23	Fe2O3	6.8626	6.9414	7.6227	-0.7602	-0.6814	-10.0%	-8.9%
23	US-23	K2O	0.2536	0.2232	0.2500	0.0036	-0.0268		
23	US-23	Li2O	3.4446	3.4881	3.4993	-0.0547	-0.0112	-1.6%	-0.3%
23	US-23	MgO	0.1269	0.1367	0.1250	0.0019	0.0118		
23	US-23	MnO	2.2499	2.3499	2.2496	0.0004	0.1003	0.0%	4.5%
23	US-23	Na2O	12.9779	12.4540	11.6811	1.2968	0.7729	11.1%	6.6%
23	US-23	NiO	0.4591	0.5053	0.4999	-0.0408	0.0054		
23	US-23	PbO	0.0784	0.0784	0.0800	-0.0016	-0.0016		
23	US-23	SiO2	43.1069	44.3178	44.4603	-1.3534	-0.1425	-3.0%	-0.3%
23	US-23	SO3	0.3308	0.3308	0.3739	-0.0431	-0.0431		
23	US-23	SrO	0.0296	0.0296	0.0300	-0.0004	-0.0004		
23	US-23	TiO2	0.2510	0.2730	0.2500	0.0011	0.0231		
23	US-23	ZnO	0.0912	0.0912	0.0800	0.0112	0.0112		
23	US-23	ZrO2	0.1374	0.1374	0.1300	0.0075	0.0075		
23	US-23	Sum	99.2173	100.1388	99.9800	-0.7628	0.1588	-0.8%	0.2%
24	US-24	Al2O3	14.9696	15.2517	14.4961	0.4735	0.7556	3.3%	5.2%

Table A4. Measured, Measured Bias-Corrected, and Targeted Compositions by Glass Number

Glass #	GlassID	Oxide	Measured (wt%)	Measured Bias-Corrected (wt%)	Targeted (wt%)	Diff of Measured	Diff of Meas BC	% Diff of Measured	% Diff of Meas BC
24	US-24	B2O3	12.7428	12.2576	12.2496	0.4932	0.0080	4.0%	0.1%
24	US-24	CaO	0.7136	0.7681	0.7489	-0.0353	0.0192	-4.7%	2.6%
24	US-24	Cr2O3	0.0585	0.0572	0.0810	-0.0225	-0.0238		
24	US-24	Fe2O3	7.6668	7.6022	7.7875	-0.1207	-0.1853	-1.6%	-2.4%
24	US-24	K2O	0.7544	0.6694	0.7489	0.0055	-0.0795	0.7%	-10.6%
24	US-24	Li2O	3.1056	3.1447	3.0004	0.1052	0.1443	3.5%	4.8%
24	US-24	MgO	0.3694	0.3985	0.3739	-0.0045	0.0246		
24	US-24	MnO	2.3371	2.4537	2.2486	0.0885	0.2051	3.9%	9.1%
24	US-24	Na2O	12.6544	12.2011	11.5734	1.0810	0.6278	9.3%	5.4%
24	US-24	NiO	0.4546	0.5015	0.5009	-0.0463	0.0006	-9.2%	0.1%
24	US-24	PbO	0.0768	0.0768	0.0790	-0.0022	-0.0022		
24	US-24	SiO2	41.5024	43.1849	44.4324	-2.9299	-1.2474	-6.6%	-2.8%
24	US-24	SO3	0.3252	0.3252	0.3739	-0.0487	-0.0487		
24	US-24	SrO	0.0721	0.0721	0.0790	-0.0068	-0.0068		
24	US-24	TiO2	0.7047	0.7587	0.7489	-0.0441	0.0098	-5.9%	1.3%
24	US-24	ZnO	0.0822	0.0822	0.0790	0.0032	0.0032		
24	US-24	ZrO2	0.3836	0.3836	0.3789	0.0047	0.0047		
24	US-24	Sum	98.9735	100.1892	99.9800	-1.0065	0.2092	-1.0%	0.2%
25	US-25	Al2O3	12.1070	12.2788	11.5849	0.5221	0.6939	4.5%	6.0%
25	US-25	B2O3	16.2363	16.1278	16.2468	-0.0104	-0.1190	-0.1%	-0.7%
25	US-25	CaO	0.7153	0.7814	0.7499	-0.0345	0.0316	-4.6%	4.2%
25	US-25	Cr2O3	0.1480	0.1448	0.2176	-0.0697	-0.0729		
25	US-25	Fe2O3	8.4031	8.4343	8.5402	-0.1371	-0.1058	-1.6%	-1.2%
25	US-25	K2O	0.3045	0.2699	0.2871	0.0174	-0.0172		
25	US-25	Li2O	4.9571	5.0359	4.9990	-0.0419	0.0369	-0.8%	0.7%
25	US-25	MgO	0.3727	0.4060	0.3749	-0.0022	0.0311		
25	US-25	MnO	2.0885	2.2186	2.1645	-0.0760	0.0541	-3.5%	2.5%
25	US-25	Na2O	11.9028	11.6221	10.8831	1.0197	0.7390	9.4%	6.8%
25	US-25	NiO	1.2725	1.4117	1.4494	-0.1769	-0.0377	-12.2%	-2.6%
25	US-25	PbO	0.0312	0.0312	0.0300	0.0012	0.0012		
25	US-25	SiO2	39.2027	40.0433	40.7880	-1.5853	-0.7447	-3.9%	-1.8%
25	US-25	SO3	0.3371	0.3371	0.3749	-0.0378	-0.0378		
25	US-25	SrO	0.0816	0.0816	0.0800	0.0016	0.0016		
25	US-25	TiO2	0.7289	0.7928	0.7499	-0.0209	0.0430	-2.8%	5.7%
25	US-25	ZnO	0.1046	0.1046	0.0800	0.0246	0.0246		
25	US-25	ZrO2	0.3607	0.3607	0.3799	-0.0193	-0.0193		
25	US-25	Sum	99.3545	100.4826	99.9800	-0.6255	0.5026	-0.6%	0.5%
26	US-26	Al2O3	18.8336	19.2014	18.8291	0.0045	0.3724	0.0%	2.0%
26	US-26	B2O3	10.9718	10.4286	10.6853	0.2865	-0.2567	2.7%	-2.4%
26	US-26	CaO	0.9231	1.0027	0.9998	-0.0767	0.0029	-7.7%	0.3%
26	US-26	Cr2O3	0.4111	0.4021	0.5484	-0.1373	-0.1463	-25.0%	-26.7%
26	US-26	Fe2O3	5.1255	5.1144	4.9990	0.1265	0.1154	2.5%	2.3%
26	US-26	K2O	0.0602	0.0531	0.0000	0.0602	0.0531		
26	US-26	Li2O	5.8828	5.9228	5.9988	-0.1160	-0.0760	-1.9%	-1.3%
26	US-26	MgO	0.4805	0.5224	0.4999	-0.0194	0.0225		
26	US-26	MnO	0.0646	0.0675	0.0000	0.0646	0.0675		
26	US-26	Na2O	11.4546	11.2848	11.0175	0.4371	0.2673	4.0%	2.4%
26	US-26	NiO	0.0064	0.0071	0.0000	0.0064	0.0071		
26	US-26	PbO	0.0054	0.0054	0.0000	0.0054	0.0054		
26	US-26	SiO2	38.5609	38.6416	38.0544	0.5065	0.5872	1.3%	1.5%
26	US-26	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
26	US-26	SrO	2.5278	2.5278	2.9994	-0.4716	-0.4716	-15.7%	-15.7%
26	US-26	TiO2	0.9249	1.0019	0.9998	-0.0749	0.0021	-7.5%	0.2%
26	US-26	ZnO	1.6964	1.6964	1.9996	-0.3032	-0.3032	-15.2%	-15.2%
26	US-26	ZrO2	2.0397	2.0397	2.3491	-0.3094	-0.3094	-13.2%	-13.2%
26	US-26	Sum	100.0316	99.9822	99.9800	0.0516	0.0022	0.1%	0.0%
27	US-27	Al2O3	10.6048	10.8119	10.4035	0.2014	0.4084	1.9%	3.9%
27	US-27	B2O3	7.0274	6.6760	6.4837	0.5438	0.1923	8.4%	3.0%
27	US-27	CaO	0.0273	0.0298	0.0000	0.0273	0.0298		
27	US-27	Cr2O3	0.8382	0.8200	0.9998	-0.1616	-0.1798	-16.2%	-18.0%
27	US-27	Fe2O3	15.1798	15.1462	15.1827	-0.0028	-0.0365	0.0%	-0.2%
27	US-27	K2O	1.0212	0.9054	0.9998	0.0214	-0.0944	2.1%	-9.4%
27	US-27	Li2O	5.8397	5.8794	5.9988	-0.1591	-0.1194	-2.7%	-2.0%
27	US-27	MgO	0.4867	0.5302	0.4999	-0.0132	0.0303		
27	US-27	MnO	0.0646	0.0675	0.0000	0.0646	0.0675		
27	US-27	Na2O	18.2991	17.8677	16.8681	1.4310	0.9996	8.5%	5.9%
27	US-27	NiO	0.0064	0.0071	0.0000	0.0064	0.0071		
27	US-27	PbO	0.0194	0.0194	0.0000	0.0194	0.0194		

Table A4. Measured, Measured Bias-Corrected, and Targeted Compositions by Glass Number

Glass #	GlassID	Oxide	Measured (wt%)	Measured Bias-Corrected (wt%)	Targeted (wt%)	Diff of Measured	Diff of Meas BC	% Diff of Measured	% Diff of Meas BC
27	US-27	SiO2	39.7375	39.8029	40.0442	-0.3068	-0.2414	-0.8%	-0.6%
27	US-27	SO3	0.4832	0.4832	0.4999	-0.0167	-0.0167		
27	US-27	SrO	0.0059	0.0059	0.0000	0.0059	0.0059		
27	US-27	TiO2	0.0104	0.0114	0.0000	0.0104	0.0114		
27	US-27	ZnO	1.7325	1.7325	1.9996	-0.2671	-0.2671	-13.4%	-13.4%
27	US-27	ZrO2	0.4204	0.4204	0.0000	0.4204	0.4204		
27	US-27	Sum	101.8045	101.2167	99.9800	1.8245	1.2367	1.8%	1.2%
28	US-28	Al2O3	10.4914	10.7106	17.4724	-6.9810	-6.7619	-40.0%	-38.7%
28	US-28	B2O3	6.2386	6.1960	17.9582	-11.7196	-11.7622	-65.3%	-65.5%
28	US-28	CaO	0.9270	1.0127	0.0000	0.9270	1.0127		
28	US-28	Cr2O3	0.0091	0.0089	0.0000	0.0091	0.0089		
28	US-28	Fe2O3	17.5853	17.5690	5.7221	11.8632	11.8469	207.3%	207.0%
28	US-28	K2O	0.0602	0.0534	0.9998	-0.9396	-0.9464	-94.0%	-94.7%
28	US-28	Li2O	2.0205	2.0485	1.9996	0.0209	0.0489	1.0%	2.4%
28	US-28	MgO	0.0083	0.0090	0.0000	0.0083	0.0090		
28	US-28	MnO	0.0646	0.0684	0.0000	0.0646	0.0684		
28	US-28	Na2O	19.6134	19.1513	13.3553	6.2581	5.7960	46.9%	43.4%
28	US-28	NiO	0.0121	0.0134	0.0000	0.0121	0.0134		
28	US-28	PbO	0.8814	0.8814	0.0000	0.8814	0.8814		
28	US-28	SiO2	38.0261	38.7008	35.9739	2.0521	2.7269	5.7%	7.6%
28	US-28	SO3	0.0624	0.0624	0.4999	-0.4375	-0.4375		
28	US-28	SrO	0.0411	0.0411	2.9994	-2.9583	-2.9583	-98.6%	-98.6%
28	US-28	TiO2	0.9378	1.0200	0.9998	-0.0620	0.0202	-6.2%	2.0%
28	US-28	ZnO	1.7461	1.7461	1.9996	-0.2535	-0.2535	-12.7%	-12.7%
28	US-28	ZrO2	3.4310	3.4310	0.0000	3.4310	3.4310		
28	US-28	Sum	102.1565	102.7242	99.9800	2.1765	2.7442	2.2%	2.7%
28*	[2]US-28*	Al2O3	17.5487	17.7168	17.4724	0.0763	0.2444	0.4%	1.4%
28*	US-28*	B2O3	17.9751	17.6372	17.9582	0.0169	-0.3209	0.1%	-1.8%
28*	US-28*	CaO	0.0346	0.0378	0.0000	0.0346	0.0378		
28*	US-28*	Cr2O3	0.0073	0.0071	0.0000	0.0073	0.0071		
28*	US-28*	Fe2O3	5.5544	5.6178	5.7221	-0.1677	-0.1043	-2.9%	-1.8%
28*	US-28*	K2O	0.9489	0.8414	0.9998	-0.0509	-0.1584	-5.1%	-15.8%
28*	US-28*	Li2O	2.0253	2.0510	1.9996	0.0257	0.0514	1.3%	2.6%
28*	US-28*	MgO	0.0083	0.0090	0.0000	0.0083	0.0090		
28*	US-28*	MnO	0.0646	0.0674	0.0000	0.0646	0.0674		
28*	US-28*	Na2O	14.0394	13.7094	13.3553	0.6841	0.3541	5.1%	2.7%
28*	US-28*	NiO	0.0064	0.0071	0.0000	0.0064	0.0071		
28*	US-28*	PbO	0.0048	0.0048	0.0000	0.0048	0.0048		
28*	US-28*	SiO2	35.8868	36.8955	35.9739	-0.0872	0.9216	-0.2%	2.6%
28*	US-28*	SO3	0.3814	0.3814	0.4999	-0.1185	-0.1185		
28*	US-28*	SrO	2.4805	2.4805	2.9994	-0.5189	-0.5189	-17.3%	-17.3%
28*	US-28*	TiO2	0.9366	1.0187	0.9998	-0.0632	0.0189	-6.3%	1.9%
28*	US-28*	ZnO	1.7583	1.7583	1.9996	-0.2413	-0.2413	-12.1%	-12.1%
28*	US-28*	ZrO2	0.0128	0.0128	0.0000	0.0128	0.0128		
28*	US-28*	Sum	99.6742	100.2541	99.9800	-0.3058	0.2741	-0.3%	0.3%
29	US-29	Al2O3	10.2411	10.4410	9.9980	0.2431	0.4430	2.4%	4.4%
29	US-29	B2O3	8.9916	8.5426	8.7260	0.2656	-0.1834	3.0%	-2.1%
29	US-29	CaO	0.9399	1.0119	0.9998	-0.0599	0.0121	-6.0%	1.2%
29	US-29	Cr2O3	0.5536	0.5416	0.6709	-0.1173	-0.1293	-17.5%	-19.3%
29	US-29	Fe2O3	4.8860	4.8748	4.9990	-0.1130	-0.1242	-2.3%	-2.5%
29	US-29	K2O	0.9845	0.8735	0.9998	-0.0153	-0.1263	-1.5%	-12.6%
29	US-29	Li2O	5.8936	5.9336	5.9988	-0.1052	-0.0652	-1.8%	-1.1%
29	US-29	MgO	0.4979	0.5372	0.4999	-0.0020	0.0373		
29	US-29	MnO	0.0646	0.0675	0.0000	0.0646	0.0675		
29	US-29	Na2O	19.5123	18.8136	18.6845	0.8278	0.1291	4.4%	0.7%
29	US-29	NiO	0.0064	0.0070	0.0000	0.0064	0.0070		
29	US-29	PbO	1.3007	1.3007	0.9998	0.3009	0.3009	30.1%	30.1%
29	US-29	SiO2	44.0696	44.1372	45.2634	-1.1939	-1.1262	-2.6%	-2.5%
29	US-29	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
29	US-29	SrO	1.0762	1.0762	1.1759	-0.0998	-0.0998	-8.5%	-8.5%
29	US-29	TiO2	0.9091	0.9787	0.9642	-0.0551	0.0145	-5.7%	1.5%
29	US-29	ZnO	0.0078	0.0078	0.0000	0.0078	0.0078		
29	US-29	ZrO2	0.0068	0.0068	0.0000	0.0068	0.0068		
29	US-29	Sum	100.0038	99.2140	99.9800	0.0238	-0.7660	0.0%	-0.8%

[2] Note that the compositional views with the label US-28* are considered to be representative of study glass #28 due to an inadvertent switching of the samples for US-28 and US-37 that were used for measuring chemical composition.

Table A4. Measured, Measured Bias-Corrected, and Targeted Compositions by Glass Number

Glass #	GlassID	Oxide	Measured (wt%)	Measured Bias-Corrected (wt%)	Targeted (wt%)	Diff of Measured	Diff of Meas BC	% Diff of Measured	% Diff of Meas BC
30	US-30	Al2O3	12.9809	13.1649	12.6458	0.3351	0.5191	2.6%	4.1%
30	US-30	B2O3	18.4983	18.3740	18.1904	0.3079	0.1835	1.7%	1.0%
30	US-30	CaO	0.9784	1.0533	0.9998	-0.0214	0.0535	-2.1%	5.4%
30	US-30	Cr2O3	0.5814	0.5687	0.8185	-0.2371	-0.2497	-29.0%	-30.5%
30	US-30	Fe2O3	5.3828	5.4030	5.3285	0.0544	0.0745	1.0%	1.4%
30	US-30	K2O	0.9911	0.8794	0.9998	-0.0087	-0.1204	-0.9%	-12.0%
30	US-30	Li2O	5.9582	6.0530	5.9980	-0.0398	0.0550	-0.7%	0.9%
30	US-30	MgO	0.0083	0.0089	0.0000	0.0083	0.0089		
30	US-30	MnO	3.5314	3.7515	3.4970	0.0344	0.2544	1.0%	7.3%
30	US-30	Na2O	5.6549	5.4525	4.9990	0.6559	0.4535	13.1%	9.1%
30	US-30	NiO	0.0064	0.0070	0.0000	0.0064	0.0070		
30	US-30	PbO	0.0054	0.0054	0.0000	0.0054	0.0054		
30	US-30	SiO2	38.2400	39.0586	37.5242	0.7158	1.5343	1.9%	4.1%
30	US-30	SO3	0.4582	0.4582	0.4999	-0.0417	-0.0417		
30	US-30	SrO	2.6904	2.6904	2.9994	-0.3090	-0.3090	-10.3%	-10.3%
30	US-30	TiO2	0.9754	1.0501	0.9998	-0.0244	0.0503	-2.4%	5.0%
30	US-30	ZnO	0.4544	0.4544	0.4808	-0.0264	-0.0264		
30	US-30	ZrO2	3.5762	3.5762	3.9992	-0.4230	-0.4230	-10.6%	-10.6%
30	US-30	Sum	100.9719	102.0093	99.9800	0.9919	2.0293	1.0%	2.0%
31	US-31	Al2O3	13.3446	13.4722	12.6677	0.6769	0.8045	5.3%	6.4%
31	US-31	B2O3	14.4976	14.2239	14.5213	-0.0237	-0.2974	-0.2%	-2.0%
31	US-31	CaO	0.0574	0.0617	0.0000	0.0574	0.0617		
31	US-31	Cr2O3	0.0132	0.0129	0.0000	0.0132	0.0129		
31	US-31	Fe2O3	14.6902	14.8594	15.4482	-0.7581	-0.5888	-4.9%	-3.8%
31	US-31	K2O	0.0602	0.0534	0.0000	0.0602	0.0534		
31	US-31	Li2O	4.9301	4.9923	4.9084	0.0218	0.0839	0.4%	1.7%
31	US-31	MgO	0.4805	0.5184	0.4999	-0.0194	0.0185		
31	US-31	MnO	0.7437	0.7767	0.7410	0.0027	0.0357	0.4%	4.8%
31	US-31	Na2O	8.3205	8.0216	7.0969	1.2236	0.9247	17.2%	13.0%
31	US-31	NiO	0.0223	0.0246	0.0000	0.0223	0.0246		
31	US-31	PbO	0.8774	0.8774	0.9998	-0.1224	-0.1224	-12.2%	-12.2%
31	US-31	SiO2	38.9353	40.0301	38.5976	0.3377	1.4325	0.9%	3.7%
31	US-31	SO3	0.3683	0.3683	0.4999	-0.1316	-0.1316		
31	US-31	SrO	2.5367	2.5367	2.9994	-0.4627	-0.4627	-15.4%	-15.4%
31	US-31	TiO2	0.9541	1.0272	0.9998	-0.0457	0.0274	-4.6%	2.7%
31	US-31	ZnO	0.0062	0.0062	0.0000	0.0062	0.0062		
31	US-31	ZrO2	0.0111	0.0111	0.0000	0.0111	0.0111		
31	US-31	Sum	100.8493	101.8742	99.9800	0.8693	1.8942	0.9%	1.9%
32	US-32	Al2O3	10.4348	10.6526	9.9980	0.4368	0.6546	4.4%	6.5%
32	US-32	B2O3	19.0618	18.9381	19.0122	0.0496	-0.0741	0.3%	-0.4%
32	US-32	CaO	0.9333	1.0138	0.9998	-0.0665	0.0140	-6.7%	1.4%
32	US-32	Cr2O3	0.0164	0.0161	0.0000	0.0164	0.0161		
32	US-32	Fe2O3	5.0504	5.0452	4.9990	0.0514	0.0462	1.0%	0.9%
32	US-32	K2O	0.0602	0.0531	0.0000	0.0602	0.0531		
32	US-32	Li2O	6.1788	6.2675	5.9988	0.1800	0.2687	3.0%	4.5%
32	US-32	MgO	0.0083	0.0090	0.0000	0.0083	0.0090		
32	US-32	MnO	4.3320	4.5935	3.9992	0.3328	0.5943	8.3%	14.9%
32	US-32	Na2O	7.9465	7.8294	7.5029	0.4436	0.3266	5.9%	4.4%
32	US-32	NiO	0.0064	0.0071	0.0000	0.0064	0.0071		
32	US-32	PbO	0.8943	0.8943	0.9998	-0.1055	-0.1055	-10.5%	-10.5%
32	US-32	SiO2	43.7487	44.5335	43.9709	-0.2222	0.5626	-0.5%	1.3%
32	US-32	SO3	0.4114	0.4114	0.4999	-0.0885	-0.0885		
32	US-32	SrO	0.0059	0.0059	0.0000	0.0059	0.0059		
32	US-32	TiO2	0.0083	0.0090	0.0000	0.0083	0.0090		
32	US-32	ZnO	1.7732	1.7732	1.9996	-0.2264	-0.2264	-11.3%	-11.3%
32	US-32	ZrO2	0.0439	0.0439	0.0000	0.0439	0.0439		
32	US-32	Sum	100.9146	102.0966	99.9800	0.9346	2.1166	0.9%	2.1%
33	US-33	Al2O3	11.9794	12.2054	11.3446	0.6348	0.8608	5.6%	7.6%
33	US-33	B2O3	5.5704	5.3554	4.9990	0.5714	0.3564	11.4%	7.1%
33	US-33	CaO	0.0350	0.0380	0.0000	0.0350	0.0380		
33	US-33	Cr2O3	0.7231	0.7075	0.9998	-0.2767	-0.2923	-27.7%	-29.2%
33	US-33	Fe2O3	5.0754	5.0332	4.9990	0.0764	0.0342	1.5%	0.7%
33	US-33	K2O	0.0602	0.0531	0.0000	0.0602	0.0531		
33	US-33	Li2O	2.0630	2.0890	1.9996	0.0634	0.0894	3.2%	4.5%
33	US-33	MgO	0.5302	0.5765	0.4999	0.0303	0.0766		
33	US-33	MnO	4.2480	4.4599	3.9992	0.2488	0.4607	6.2%	11.5%
33	US-33	Na2O	19.7482	19.4583	19.7605	-0.0123	-0.3022	-0.1%	-1.5%
33	US-33	NiO	0.8898	0.9921	0.9652	-0.0755	0.0268	-7.8%	2.8%

Table A4. Measured, Measured Bias-Corrected, and Targeted Compositions by Glass Number

Glass #	GlassID	Oxide	Measured (wt%)	Measured Bias-Corrected (wt%)	Targeted (wt%)	Diff of Measured	Diff of Meas BC	% Diff of Measured	% Diff of Meas BC
33	US-33	PbO	0.8995	0.8995	0.9998	-0.1003	-0.1003	-10.0%	-10.0%
33	US-33	SiO2	45.9415	47.7953	45.9140	0.0275	1.8813	0.1%	4.1%
33	US-33	SO3	0.5056	0.5056	0.4999	0.0057	0.0057		
33	US-33	SrO	2.6076	2.6076	2.9994	-0.3918	-0.3918	-13.1%	-13.1%
33	US-33	TiO2	0.0083	0.0090	0.0000	0.0083	0.0090		
33	US-33	ZnO	0.1198	0.1198	0.0000	0.1198	0.1198		
33	US-33	ZrO2	0.0064	0.0064	0.0000	0.0064	0.0064		
33	US-33	Sum	101.0117	102.9118	99.9800	1.0317	2.9317	1.0%	2.9%
34	US-34	Al2O3	10.2978	10.4921	9.9980	0.2998	0.4941	3.0%	4.9%
34	US-34	B2O3	14.1595	13.6212	13.6905	0.4690	-0.0694	3.4%	-0.5%
34	US-34	CaO	0.0325	0.0337	0.0000	0.0325	0.0337		
34	US-34	Cr2O3	0.0095	0.0094	0.0000	0.0095	0.0094		
34	US-34	Fe2O3	6.4515	6.3978	6.3853	0.0662	0.0125	1.0%	0.2%
34	US-34	K2O	1.0579	0.9289	0.9998	0.0581	-0.0709	5.8%	-7.1%
34	US-34	Li2O	2.4112	2.4418	2.4196	-0.0084	0.0221	-0.3%	0.9%
34	US-34	MgO	0.4946	0.5366	0.4999	-0.0053	0.0367		
34	US-34	MnO	4.0899	4.2940	3.9992	0.0907	0.2948	2.3%	7.4%
34	US-34	Na2O	19.4112	19.3388	19.9960	-0.5848	-0.6572	-2.9%	-3.3%
34	US-34	NiO	0.0064	0.0071	0.0000	0.0064	0.0071		
34	US-34	PbO	0.0054	0.0054	0.0000	0.0054	0.0054		
34	US-34	SiO2	35.0845	36.5046	34.9930	0.0915	1.5116	0.3%	4.3%
34	US-34	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
34	US-34	SrO	2.6845	2.6845	2.9994	-0.3149	-0.3149	-10.5%	-10.5%
34	US-34	TiO2	0.0083	0.0090	0.0000	0.0083	0.0090		
34	US-34	ZnO	0.0062	0.0062	0.0000	0.0062	0.0062		
34	US-34	ZrO2	3.5053	3.5053	3.9992	-0.4939	-0.4939	-12.3%	-12.3%
34	US-34	Sum	99.7788	100.8789	99.9800	-0.2012	0.8989	-0.2%	0.9%
35	US-35	Al2O3	10.3356	10.4823	10.0161	0.3195	0.4663	3.2%	4.7%
35	US-35	B2O3	19.8265	19.6940	19.9577	-0.1311	-0.2637	-0.7%	-1.3%
35	US-35	CaO	0.9172	1.0224	0.9998	-0.0826	0.0226	-8.3%	2.3%
35	US-35	Cr2O3	0.4396	0.4281	0.5175	-0.0779	-0.0894	-15.1%	-17.3%
35	US-35	Fe2O3	11.3018	11.3442	11.3518	-0.0500	-0.0076	-0.4%	-0.1%
35	US-35	K2O	0.0602	0.0530	0.0000	0.0602	0.0530		
35	US-35	Li2O	2.0286	2.0608	1.9996	0.0290	0.0612	1.4%	3.1%
35	US-35	MgO	0.4979	0.5367	0.4999	-0.0020	0.0368		
35	US-35	MnO	4.0511	4.3035	3.9992	0.0519	0.3043	1.3%	7.6%
35	US-35	Na2O	8.8024	8.4472	7.9410	0.8614	0.5061	10.8%	6.4%
35	US-35	NiO	0.0108	0.0119	0.0000	0.0108	0.0119		
35	US-35	PbO	0.0048	0.0048	0.0000	0.0048	0.0048		
35	US-35	SiO2	37.9726	38.7851	37.9950	-0.0224	0.7901	-0.1%	2.1%
35	US-35	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
35	US-35	SrO	2.3386	2.3386	2.7028	-0.3642	-0.3642	-13.5%	-13.5%
35	US-35	TiO2	0.0083	0.0091	0.0000	0.0083	0.0091		
35	US-35	ZnO	1.7564	1.7564	1.9996	-0.2432	-0.2432	-12.2%	-12.2%
35	US-35	ZrO2	0.0091	0.0091	0.0000	0.0091	0.0091		
35	US-35	Sum	100.4240	101.3497	99.9800	0.4440	1.3697	0.4%	1.4%
36	US-36	Al2O3	12.9336	13.1173	12.8579	0.0757	0.2594	0.6%	2.0%
36	US-36	B2O3	15.4394	15.3366	15.5118	-0.0724	-0.1752	-0.5%	-1.1%
36	US-36	CaO	0.3453	0.3849	0.2074	0.1378	0.1774		
36	US-36	Cr2O3	0.3928	0.3826	0.5109	-0.1181	-0.1284	-23.1%	-25.1%
36	US-36	Fe2O3	9.6969	9.7337	9.7610	-0.0641	-0.0274	-0.7%	-0.3%
36	US-36	K2O	0.5613	0.4940	0.5181	0.0432	-0.0241	8.3%	-4.6%
36	US-36	Li2O	2.4005	2.4387	2.4222	-0.0217	0.0165	-0.9%	0.7%
36	US-36	MgO	0.0452	0.0487	0.0455	-0.0003	0.0032		
36	US-36	MnO	1.1053	1.1742	1.2055	-0.1003	-0.0314	-8.3%	-2.6%
36	US-36	Na2O	13.9181	13.3547	12.5191	1.3990	0.8356	11.2%	6.7%
36	US-36	NiO	0.5020	0.5526	0.5580	-0.0560	-0.0054	-10.0%	-1.0%
36	US-36	PbO	0.9183	0.9183	0.9998	-0.0815	-0.0815	-8.2%	-8.2%
36	US-36	SiO2	38.0795	38.8950	38.8410	-0.7615	0.0540	-2.0%	0.1%
36	US-36	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
36	US-36	SrO	0.0059	0.0059	0.0075	-0.0016	-0.0016		
36	US-36	TiO2	0.0225	0.0245	0.0075	0.0150	0.0170		
36	US-36	ZnO	0.0137	0.0137	0.0075	0.0062	0.0062		
36	US-36	ZrO2	3.4716	3.4716	3.9992	-0.5276	-0.5276	-13.2%	-13.2%
36	US-36	Sum	99.9144	100.4092	99.9800	-0.0656	0.4292	-0.1%	0.4%
37	US-37	Al2O3	17.5487	17.7168	9.9980	7.5507	7.7188	75.5%	77.2%
37	US-37	B2O3	17.9751	17.6372	5.7703	12.2048	11.8669	211.5%	205.7%
37	US-37	CaO	0.0346	0.0378	0.9998	-0.9652	-0.9620	-96.5%	-96.2%

Table A4. Measured, Measured Bias-Corrected, and Targeted Compositions by Glass Number

Glass #	GlassID	Oxide	Measured (wt%)	Measured Bias-Corrected (wt%)	Targeted (wt%)	Diff of Measured	Diff of Meas BC	% Diff of Measured	% Diff of Meas BC
37	US-37	Cr2O3	0.0073	0.0071	0.0000	0.0073	0.0071		
37	US-37	Fe2O3	5.5544	5.6178	16.9966	-11.4422	-11.3788	-67.3%	-66.9%
37	US-37	K2O	0.9489	0.8414	0.0000	0.9489	0.8414		
37	US-37	Li2O	2.0253	2.0510	1.9996	0.0257	0.0514	1.3%	2.6%
37	US-37	MgO	0.0083	0.0090	0.0000	0.0083	0.0090		
37	US-37	MnO	0.0646	0.0674	0.0000	0.0646	0.0674		
37	US-37	Na2O	14.0394	13.7094	18.8862	-4.8468	-5.1768	-25.7%	-27.4%
37	US-37	NiO	0.0064	0.0071	0.0000	0.0064	0.0071		
37	US-37	PbO	0.0048	0.0048	0.9998	-0.9950	-0.9950	-99.5%	-99.5%
37	US-37	SiO2	35.8868	36.8955	37.3311	-1.4443	-0.4356	-3.9%	-1.2%
37	US-37	SO3	0.3814	0.3814	0.0000	0.3814	0.3814		
37	US-37	SrO	2.4805	2.4805	0.0000	2.4805	2.4805		
37	US-37	TiO2	0.9366	1.0187	0.9998	-0.0632	0.0189	-6.3%	1.9%
37	US-37	ZnO	1.7583	1.7583	1.9996	-0.2413	-0.2413	-12.1%	-12.1%
37	US-37	ZrO2	0.0128	0.0128	3.9992	-3.9864	-3.9864	-99.7%	-99.7%
37	US-37	Sum	99.6742	100.2541	99.9800	-0.3058	0.2741	-0.3%	0.3%
37*	[3]US-37*	Al2O3	10.4914	10.7106	9.9980	0.4934	0.7126	4.9%	7.1%
37*	US-37*	B2O3	6.2386	6.1960	5.7703	0.4682	0.4257	8.1%	7.4%
37*	US-37*	CaO	0.9270	1.0127	0.9998	-0.0728	0.0129	-7.3%	1.3%
37*	US-37*	Cr2O3	0.0091	0.0089	0.0000	0.0091	0.0089		
37*	US-37*	Fe2O3	17.5853	17.5690	16.9966	0.5887	0.5724	3.5%	3.4%
37*	US-37*	K2O	0.0602	0.0534	0.0000	0.0602	0.0534		
37*	US-37*	Li2O	2.0205	2.0485	1.9996	0.0209	0.0489	1.0%	2.4%
37*	US-37*	MgO	0.0083	0.0090	0.0000	0.0083	0.0090		
37*	US-37*	MnO	0.0646	0.0684	0.0000	0.0646	0.0684		
37*	US-37*	Na2O	19.6134	19.1513	18.8862	0.7272	0.2650	3.9%	1.4%
37*	US-37*	NiO	0.0121	0.0134	0.0000	0.0121	0.0134		
37*	US-37*	PbO	0.8814	0.8814	0.9998	-0.1184	-0.1184	-11.8%	-11.8%
37*	US-37*	SiO2	38.0261	38.7008	37.3311	0.6950	1.3697	1.9%	3.7%
37*	US-37*	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
37*	US-37*	SrO	0.0411	0.0411	0.0000	0.0411	0.0411		
37*	US-37*	TiO2	0.9378	1.0200	0.9998	-0.0620	0.0202	-6.2%	2.0%
37*	US-37*	ZnO	1.7461	1.7461	1.9996	-0.2535	-0.2535	-12.7%	-12.7%
37*	US-37*	ZrO2	3.4310	3.4310	3.9992	-0.5682	-0.5682	-14.2%	-14.2%
37*	US-37*	Sum	102.1565	102.7242	99.9800	2.1765	2.7442	2.2%	2.7%
38	US-38	Al2O3	10.3686	10.4680	9.9980	0.3706	0.4700	3.7%	4.7%
38	US-38	B2O3	7.5024	7.3605	7.3139	0.1885	0.0466	2.6%	0.6%
38	US-38	CaO	0.7699	0.7984	0.7894	-0.0194	0.0090	-2.5%	1.1%
38	US-38	Cr2O3	0.0135	0.0134	0.0000	0.0135	0.0134		
38	US-38	Fe2O3	5.4150	5.4766	4.9990	0.4160	0.4776	8.3%	9.6%
38	US-38	K2O	1.0092	0.8863	0.9998	0.0094	-0.1135	0.9%	-11.4%
38	US-38	Li2O	2.0571	2.0831	1.9996	0.0575	0.0835	2.9%	4.2%
38	US-38	MgO	0.0083	0.0090	0.0000	0.0083	0.0090		
38	US-38	MnO	4.0253	4.2037	3.9992	0.0261	0.2045	0.7%	5.1%
38	US-38	Na2O	18.4002	18.3433	19.7246	-1.3244	-1.3813	-6.7%	-7.0%
38	US-38	NiO	2.8345	3.1652	2.9054	-0.0709	0.2598	-2.4%	8.9%
38	US-38	PbO	0.8825	0.8825	0.9998	-0.1173	-0.1173	-11.7%	-11.7%
38	US-38	SiO2	39.0957	40.1947	39.7527	-0.6569	0.4421	-1.7%	1.1%
38	US-38	SO3	0.4825	0.4825	0.4999	-0.0174	-0.0174		
38	US-38	SrO	2.6490	2.6490	2.9994	-0.3504	-0.3504	-11.7%	-11.7%
38	US-38	TiO2	0.9391	1.0106	0.9998	-0.0607	0.0108	-6.1%	1.1%
38	US-38	ZnO	1.7642	1.7642	1.9996	-0.2354	-0.2354	-11.8%	-11.8%
38	US-38	ZrO2	0.0192	0.0192	0.0000	0.0192	0.0192		
38	US-38	Sum	98.2362	99.8102	99.9800	-1.7438	-0.1698	-1.7%	-0.2%
39	US-39	Al2O3	11.8472	12.0785	11.5453	0.3018	0.5331	2.6%	4.6%
39	US-39	B2O3	16.6791	15.8517	16.3478	0.3313	-0.4962	2.0%	-3.0%
39	US-39	CaO	0.0217	0.0225	0.0000	0.0217	0.0225		
39	US-39	Cr2O3	0.0110	0.0109	0.0000	0.0110	0.0109		
39	US-39	Fe2O3	7.3415	7.3245	7.5019	-0.1604	-0.1774	-2.1%	-2.4%
39	US-39	K2O	1.0558	0.9272	0.9998	0.0560	-0.0726	5.6%	-7.3%
39	US-39	Li2O	5.9528	5.9932	5.9978	-0.0450	-0.0046	-0.8%	-0.1%
39	US-39	MgO	0.4958	0.5379	0.4999	-0.0041	0.0380		
39	US-39	MnO	0.0646	0.0675	0.0000	0.0646	0.0675		
39	US-39	Na2O	5.0213	5.0055	4.9990	0.0223	0.0065	0.4%	0.1%

[3] Note that the compositional views with the label US-37* are considered to be representative of study glass #37 due to an inadvertent switching of the samples for US-28 and US-37 that were used for measuring chemical composition.

Table A4. Measured, Measured Bias-Corrected, and Targeted Compositions by Glass Number

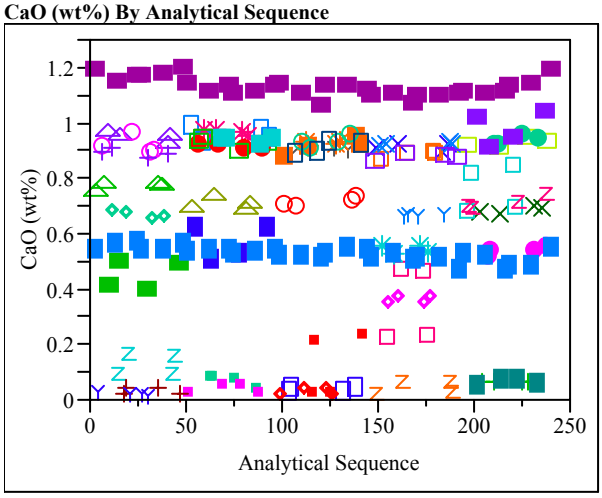
Glass #	GlassID	Oxide	Measured (wt%)	Measured Bias-Corrected (wt%)	Targeted (wt%)	Diff of Measured	Diff of Meas BC	% Diff of Measured	% Diff of Meas BC
39	US-39	NiO	1.7147	1.9147	1.8280	-0.1133	0.0866	-6.2%	4.7%
39	US-39	PbO	0.9110	0.9110	0.9998	-0.0888	-0.0888	-8.9%	-8.9%
39	US-39	SiO2	40.7537	40.8400	42.4650	-1.7113	-1.6249	-4.0%	-3.8%
39	US-39	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
39	US-39	SrO	0.7285	0.7285	0.7968	-0.0684	-0.0684	-8.6%	-8.6%
39	US-39	TiO2	0.0083	0.0090	0.0000	0.0083	0.0090		
39	US-39	ZnO	1.7854	1.7854	1.9996	-0.2142	-0.2142	-10.7%	-10.7%
39	US-39	ZrO2	3.5256	3.5256	3.9992	-0.4736	-0.4736	-11.8%	-11.8%
39	US-39	Sum	97.9803	97.5959	99.9800	-1.9997	-2.3841	-2.0%	-2.4%
40	US-40	Al2O3	15.7584	16.0875	15.5178	0.2406	0.5697	1.6%	3.7%
40	US-40	B2O3	17.0816	16.9675	17.0004	0.0812	-0.0329	0.5%	-0.2%
40	US-40	CaO	0.0455	0.0507	0.0000	0.0455	0.0507		
40	US-40	Cr2O3	0.3161	0.3078	0.4253	-0.1092	-0.1174		
40	US-40	Fe2O3	11.1660	11.1567	11.4159	-0.2499	-0.2592	-2.2%	-2.3%
40	US-40	K2O	1.0076	0.8868	0.9998	0.0078	-0.1130	0.8%	-11.3%
40	US-40	Li2O	2.5189	2.5541	2.5119	0.0070	0.0422	0.3%	1.7%
40	US-40	MgO	0.0083	0.0089	0.0000	0.0083	0.0089		
40	US-40	MnO	2.7793	2.9450	2.7589	0.0204	0.1861	0.7%	6.7%
40	US-40	Na2O	11.1109	10.6610	10.1312	0.9797	0.5298	9.7%	5.2%
40	US-40	NiO	0.0064	0.0070	0.0010	0.0054	0.0060		
40	US-40	PbO	0.9213	0.9213	0.9988	-0.0775	-0.0775	-7.8%	-7.8%
40	US-40	SiO2	37.8121	38.4858	37.2966	0.5155	1.1893	1.4%	3.2%
40	US-40	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
40	US-40	SrO	0.0059	0.0059	0.0000	0.0059	0.0059		
40	US-40	TiO2	0.8686	0.9447	0.9224	-0.0538	0.0223	-5.8%	2.4%
40	US-40	ZnO	0.0118	0.0118	0.0000	0.0118	0.0118		
40	US-40	ZrO2	0.0068	0.0068	0.0000	0.0068	0.0068		
40	US-40	Sum	101.4878	102.0719	99.9800	1.5078	2.0919	1.5%	2.1%
41	US-41	Al2O3	10.0947	10.2380	9.9980	0.0967	0.2400	1.0%	2.4%
41	US-41	B2O3	15.3267	15.2242	15.5542	-0.2275	-0.3300	-1.5%	-2.1%
41	US-41	CaO	0.9329	1.0191	0.9998	-0.0669	0.0193	-6.7%	1.9%
41	US-41	Cr2O3	0.0153	0.0150	0.0000	0.0153	0.0150		
41	US-41	Fe2O3	14.7617	14.8183	15.5320	-0.7703	-0.7137	-5.0%	-4.6%
41	US-41	K2O	0.9959	0.8830	0.9988	-0.0029	-0.1158	-0.3%	-11.6%
41	US-41	Li2O	3.6492	3.7072	3.7243	-0.0751	-0.0171	-2.0%	-0.5%
41	US-41	MgO	0.0083	0.0090	0.0000	0.0083	0.0090		
41	US-41	MnO	0.0646	0.0686	0.0000	0.0646	0.0686		
41	US-41	Na2O	7.0500	6.8835	6.5193	0.5308	0.3642	8.1%	5.6%
41	US-41	NiO	0.0121	0.0134	0.0000	0.0121	0.0134		
41	US-41	PbO	0.8941	0.8941	0.9998	-0.1057	-0.1057	-10.6%	-10.6%
41	US-41	SiO2	40.8071	41.6808	42.6545	-1.8473	-0.9737	-4.3%	-2.3%
41	US-41	SO3	0.0624	0.0624	0.0000	0.0624	0.0624		
41	US-41	SrO	2.5929	2.5929	2.9994	-0.4065	-0.4065	-13.6%	-13.6%
41	US-41	TiO2	0.0083	0.0091	0.0000	0.0083	0.0091		
41	US-41	ZnO	0.0062	0.0062	0.0000	0.0062	0.0062		
41	US-41	ZrO2	0.0125	0.0125	0.0000	0.0125	0.0125		
41	US-41	Sum	97.2949	98.1372	99.9800	-2.6851	-1.8428	-2.7%	-1.8%
42	US-42	Al2O3	20.4066	20.8334	19.9960	0.4106	0.8374	2.1%	4.2%
42	US-42	B2O3	6.4237	6.3809	6.1871	0.2366	0.1938	3.8%	3.1%
42	US-42	CaO	0.8742	0.9745	0.9998	-0.1256	-0.0253	-12.6%	-2.5%
42	US-42	Cr2O3	0.0073	0.0071	0.0000	0.0073	0.0071		
42	US-42	Fe2O3	5.1255	5.1218	4.9990	0.1265	0.1228	2.5%	2.5%
42	US-42	K2O	0.9778	0.8606	0.9998	-0.0220	-0.1392	-2.2%	-13.9%
42	US-42	Li2O	5.9582	6.0435	5.9988	-0.0406	0.0447	-0.7%	0.7%
42	US-42	MgO	0.0083	0.0089	0.0000	0.0083	0.0089		
42	US-42	MnO	4.1641	4.4147	3.9992	0.1649	0.4155	4.1%	10.4%
42	US-42	Na2O	19.5123	18.7203	18.8199	0.6924	-0.0995	3.7%	-0.5%
42	US-42	NiO	0.0064	0.0070	0.0000	0.0064	0.0070		
42	US-42	PbO	0.8871	0.8871	0.9998	-0.1127	-0.1127	-11.3%	-11.3%
42	US-42	SiO2	35.9402	36.5826	35.4919	0.4483	1.0907	1.3%	3.1%
42	US-42	SO3	0.0593	0.0593	0.0000	0.0593	0.0593		
42	US-42	SrO	0.0059	0.0059	0.0000	0.0059	0.0059		
42	US-42	TiO2	0.0083	0.0091	0.0000	0.0083	0.0091		
42	US-42	ZnO	1.3693	1.3693	1.4887	-0.1195	-0.1195	-8.0%	-8.0%
42	US-42	ZrO2	0.0122	0.0122	0.0000	0.0122	0.0122		
42	US-42	Sum	101.7466	102.2982	99.9800	1.7666	2.3182	1.8%	2.3%
43	US-43	Al2O3	17.5960	17.9637	17.1673	0.4286	0.7964	2.5%	4.6%
43	US-43	B2O3	8.7501	8.6917	8.6447	0.1054	0.0470	1.2%	0.5%

Table A4. Measured, Measured Bias-Corrected, and Targeted Compositions by Glass Number

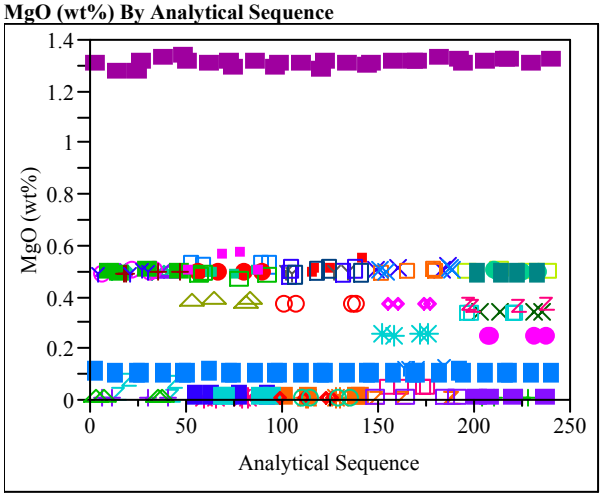
Glass #	GlassID	Oxide	Measured (wt%)	Measured Bias-Corrected (wt%)	Targeted (wt%)	Diff of Measured	Diff of Meas BC	% Diff of Measured	% Diff of Meas BC
43	US-43	CaO	0.9035	0.9869	0.9998	-0.0963	-0.0129	-9.6%	-1.3%
43	US-43	Cr2O3	0.0073	0.0071	0.0000	0.0073	0.0071		
43	US-43	Fe2O3	9.1072	9.0990	8.8568	0.2504	0.2423	2.8%	2.7%
43	US-43	K2O	0.9766	0.8658	0.9988	-0.0222	-0.1330	-2.2%	-13.3%
43	US-43	Li2O	4.8978	4.9677	4.9049	-0.0070	0.0628	-0.1%	1.3%
43	US-43	MgO	0.4859	0.5293	0.4999	-0.0140	0.0294		
43	US-43	MnO	0.7105	0.7523	0.8120	-0.1016	-0.0598	-12.5%	-7.4%
43	US-43	Na2O	11.2794	11.0135	10.2945	0.9849	0.7190	9.6%	7.0%
43	US-43	NiO	0.1826	0.2026	0.1981	-0.0155	0.0044		
43	US-43	PbO	0.8882	0.8882	0.9998	-0.1116	-0.1116	-11.2%	-11.2%
43	US-43	SiO2	38.1865	38.8648	39.7012	-1.5146	-0.8364	-3.8%	-2.1%
43	US-43	SO3	0.4089	0.4089	0.4999	-0.0910	-0.0910		
43	US-43	SrO	0.4157	0.4157	0.4724	-0.0567	-0.0567		
43	US-43	TiO2	0.4545	0.4944	0.4773	-0.0228	0.0170		
43	US-43	ZnO	0.4407	0.4407	0.4534	-0.0127	-0.0127		
43	US-43	ZrO2	3.3669	3.3669	3.9992	-0.6323	-0.6323	-15.8%	-15.8%
43	US-43	Sum	99.0582	99.9591	99.9800	-0.9218	-0.0209	-0.9%	0.0%
44	US-44	Al2O3	13.6327	13.8261	12.8029	0.8299	1.0233	6.5%	8.0%
44	US-44	B2O3	12.4610	12.3775	12.5864	-0.1253	-0.2088	-1.0%	-1.7%
44	US-44	CaO	0.5439	0.6064	0.5553	-0.0113	0.0511	-2.0%	9.2%
44	US-44	Cr2O3	0.2616	0.2548	0.3051	-0.0434	-0.0502		
44	US-44	Fe2O3	8.7426	8.7753	8.8598	-0.1172	-0.0845	-1.3%	-1.0%
44	US-44	K2O	0.6445	0.5672	0.6397	0.0048	-0.0725	0.8%	-11.3%
44	US-44	Li2O	4.3919	4.4618	4.0488	0.3431	0.4130	8.5%	10.2%
44	US-44	MgO	0.2550	0.2748	0.2525	0.0025	0.0224		
44	US-44	MnO	1.7560	1.8655	1.8339	-0.0778	0.0316	-4.2%	1.7%
44	US-44	Na2O	13.9181	13.3541	12.7286	1.1895	0.6255	9.3%	4.9%
44	US-44	NiO	0.3394	0.3736	0.3587	-0.0192	0.0150		
44	US-44	PbO	0.6070	0.6070	0.6665	-0.0595	-0.0595	-8.9%	-8.9%
44	US-44	SiO2	37.4378	38.2395	39.5480	-2.1103	-1.3085	-5.3%	-3.3%
44	US-44	SO3	0.2278	0.2278	0.2222	0.0057	0.0057		
44	US-44	SrO	1.4073	1.4073	1.6195	-0.2122	-0.2122	-13.1%	-13.1%
44	US-44	TiO2	0.4487	0.4880	0.4650	-0.0163	0.0230		
44	US-44	ZnO	0.9653	0.9653	1.0237	-0.0584	-0.0584	-5.7%	-5.7%
44	US-44	ZrO2	1.3076	1.3076	1.4636	-0.1560	-0.1560	-10.7%	-10.7%
44	US-44	Sum	99.3483	99.9798	99.9800	-0.6317	-0.0002	-0.6%	0.0%
45	US-45	Al2O3	13.2123	13.4881	12.8029	0.4095	0.6853	3.2%	5.4%
45	US-45	B2O3	12.8635	12.7786	12.5864	0.2771	0.1923	2.2%	1.5%
45	US-45	CaO	0.5422	0.5837	0.5553	-0.0131	0.0284	-2.4%	5.1%
45	US-45	Cr2O3	0.2558	0.2502	0.3051	-0.0493	-0.0548		
45	US-45	Fe2O3	8.9321	8.9240	8.8598	0.0722	0.0642	0.8%	0.7%
45	US-45	K2O	0.6640	0.5892	0.6397	0.0244	-0.0505	3.8%	-7.9%
45	US-45	Li2O	4.0636	4.1216	4.0488	0.0148	0.0728	0.4%	1.8%
45	US-45	MgO	0.2467	0.2661	0.2525	-0.0058	0.0136		
45	US-45	MnO	1.7915	1.8984	1.8339	-0.0423	0.0645	-2.3%	3.5%
45	US-45	Na2O	13.4396	12.9576	12.7286	0.7109	0.2289	5.6%	1.8%
45	US-45	NiO	0.3321	0.3664	0.3587	-0.0265	0.0077		
45	US-45	PbO	0.5911	0.5911	0.6665	-0.0754	-0.0754	-11.3%	-11.3%
45	US-45	SiO2	39.6305	40.3297	39.5480	0.0825	0.7816	0.2%	2.0%
45	US-45	SO3	0.2222	0.2222	0.2222	0.0000	0.0000		
45	US-45	SrO	1.4339	1.4339	1.6195	-0.1856	-0.1856	-11.5%	-11.5%
45	US-45	TiO2	0.4529	0.4876	0.4650	-0.0121	0.0226		
45	US-45	ZnO	0.9607	0.9607	1.0237	-0.0631	-0.0631	-6.2%	-6.2%
45	US-45	ZrO2	1.3130	1.3130	1.4636	-0.1506	-0.1506	-10.3%	-10.3%
45	US-45	Sum	100.9477	101.5621	99.9800	0.9677	1.5821	1.0%	1.6%

Exhibit A1. PSAL Oxide Measurements in Analytical Sequence for Samples Prepared Using the LM Method

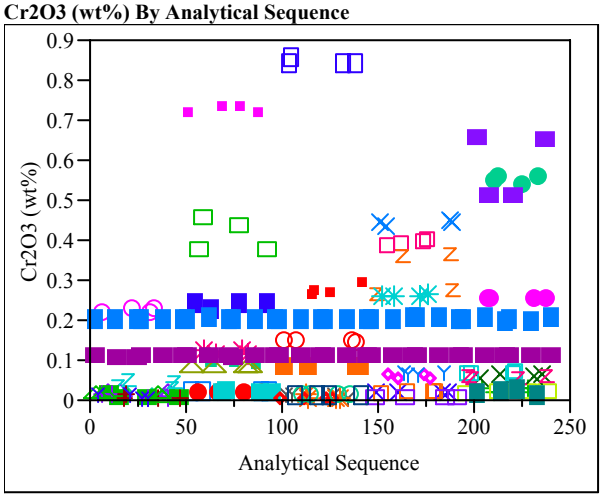
CaO (wt%) By Analytical Sequence



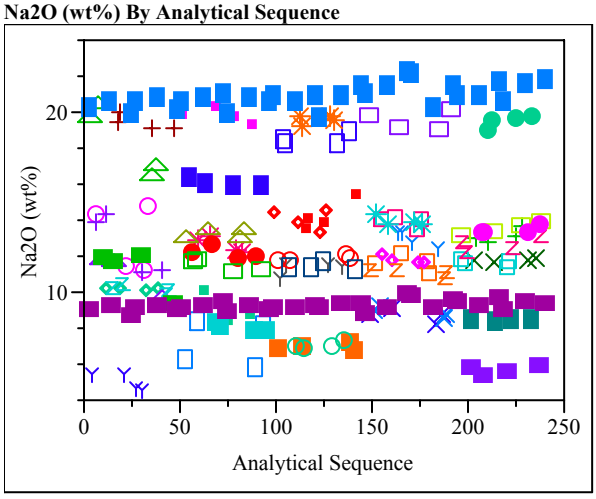
MgO (wt%) By Analytical Sequence



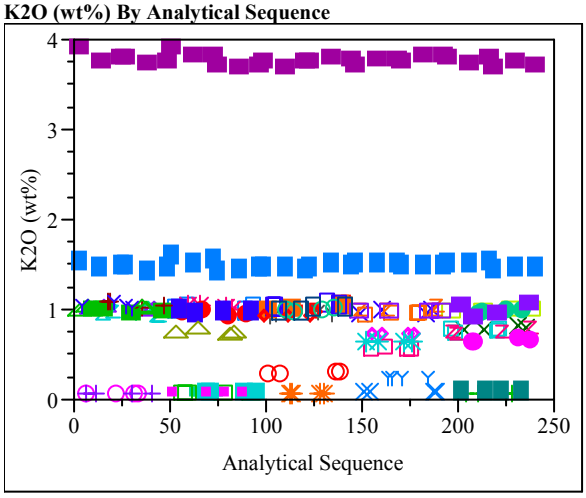
Cr2O3 (wt%) By Analytical Sequence



Na2O (wt%) By Analytical Sequence



K2O (wt%) By Analytical Sequence



NiO (wt%) By Analytical Sequence

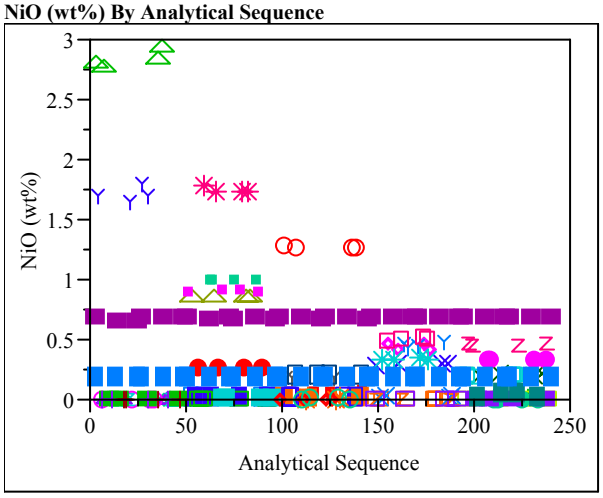
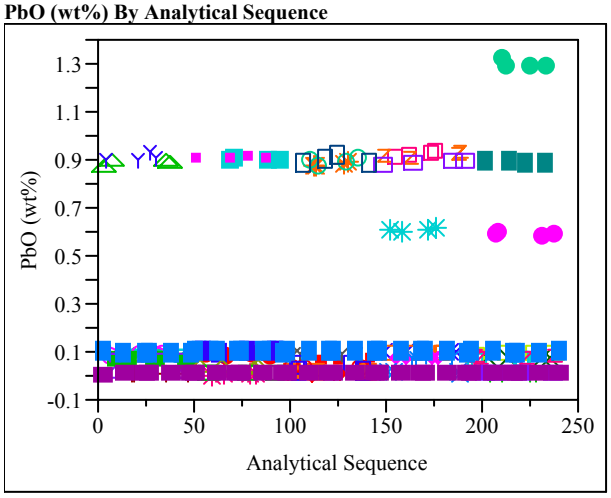
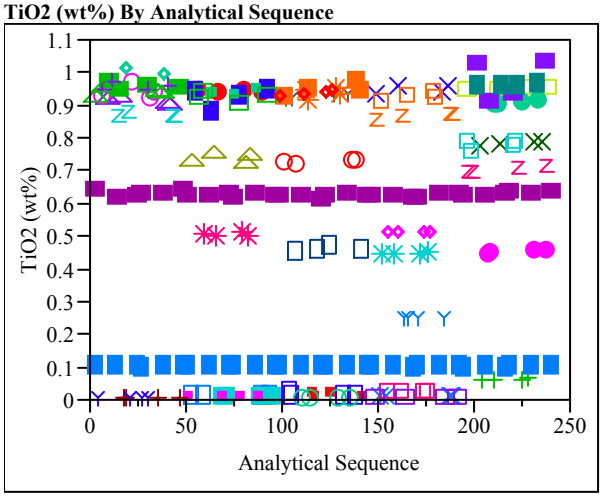


Exhibit A1. PSAL Oxide Measurements in Analytical Sequence for Samples Prepared Using the LM Method

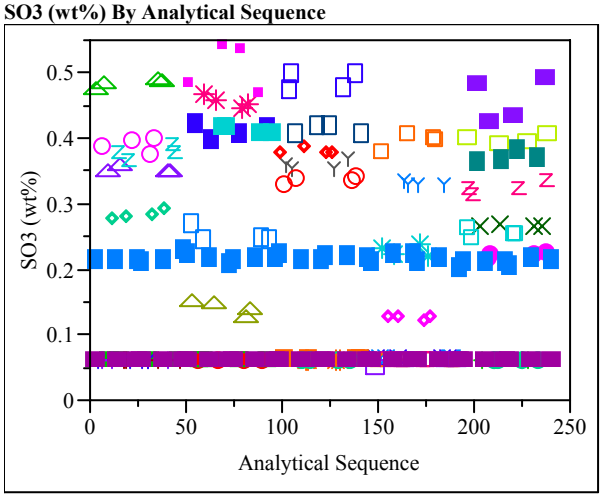
PbO (wt%) By Analytical Sequence



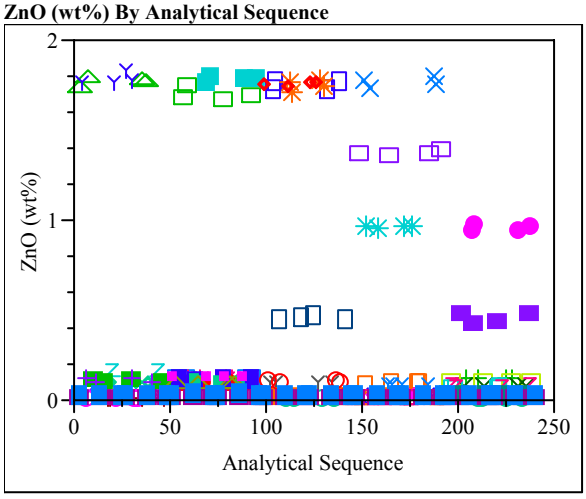
TiO2 (wt%) By Analytical Sequence



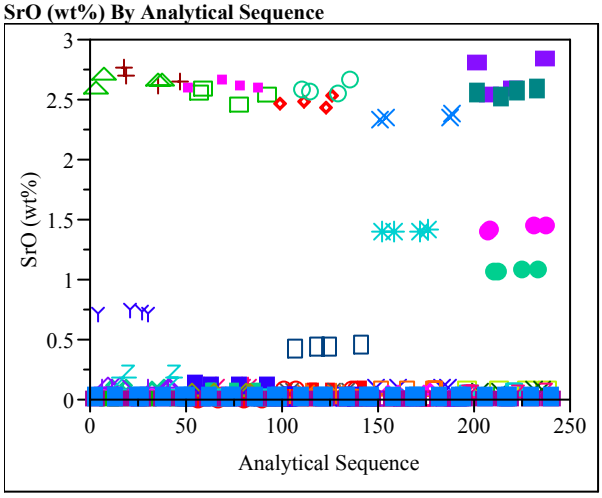
SO3 (wt%) By Analytical Sequence



ZnO (wt%) By Analytical Sequence



SrO (wt%) By Analytical Sequence



ZrO2 (wt%) By Analytical Sequence

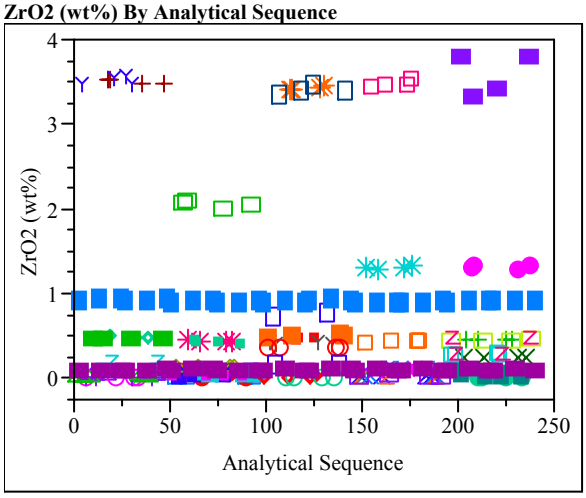
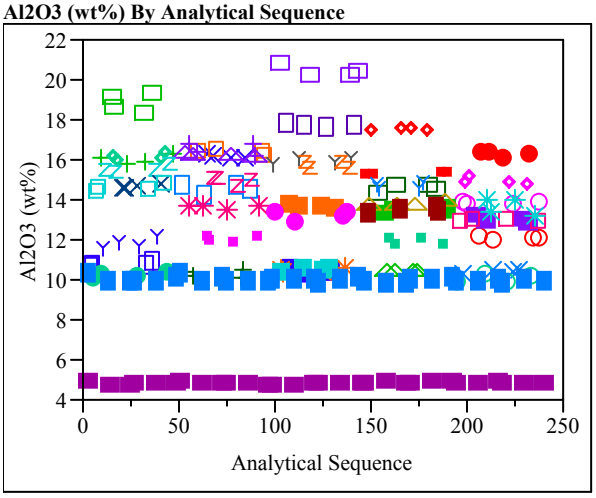
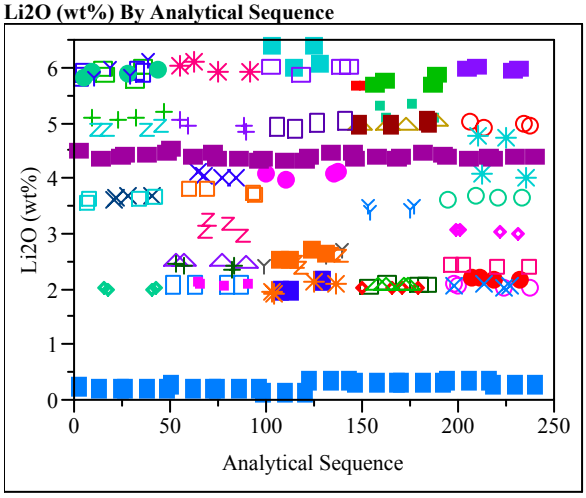


Exhibit A2. PSAL Oxide Measurements in Analytical Sequence for Samples Prepared Using the PF Method

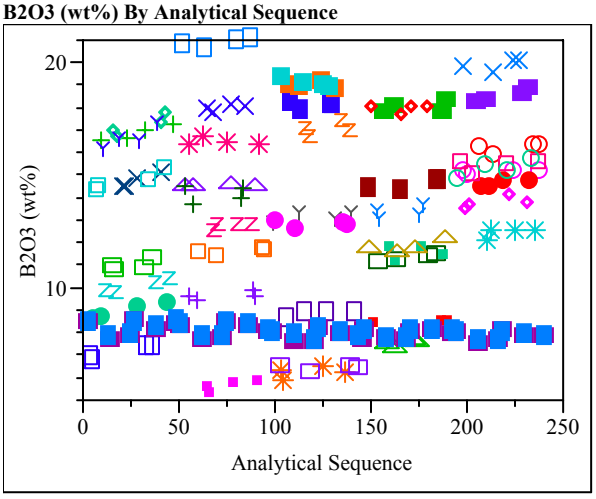
Al2O3 (wt%) By Analytical Sequence



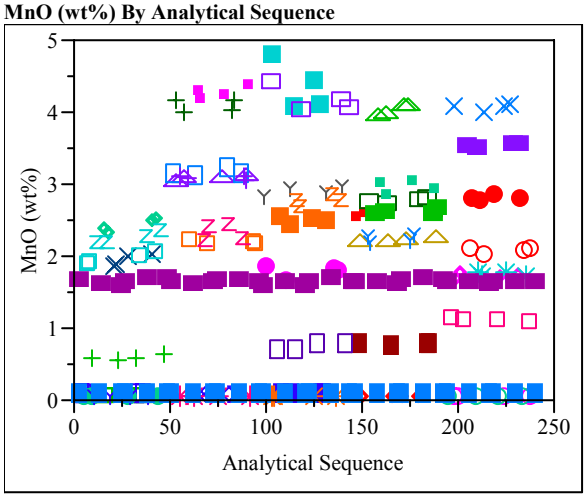
Li2O (wt%) By Analytical Sequence



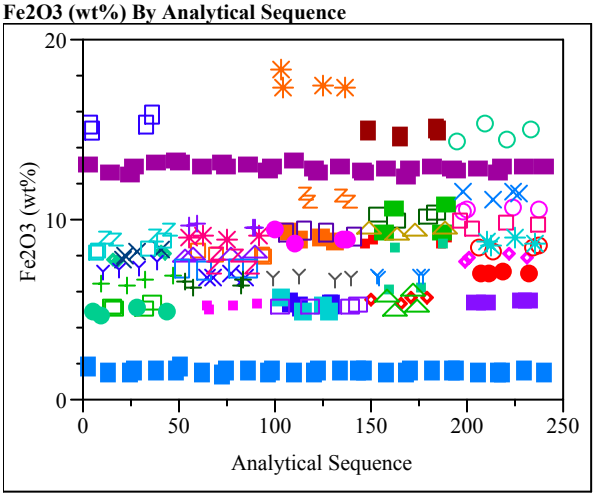
B2O3 (wt%) By Analytical Sequence



MnO (wt%) By Analytical Sequence



Fe2O3 (wt%) By Analytical Sequence



SiO2 (wt%) By Analytical Sequence

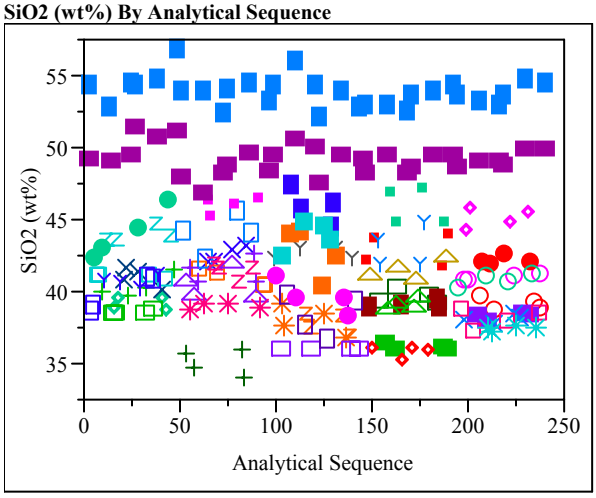
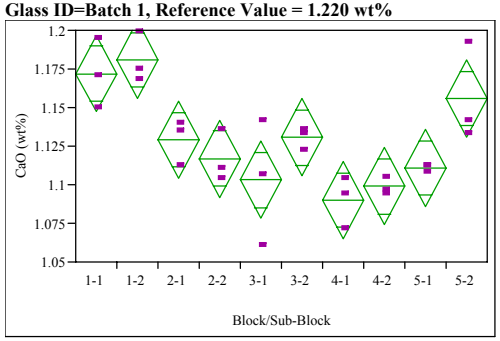


Exhibit A3. PSAL Oxide Measurements by Analytical Block for Samples of the Standard Glasses Prepared Using the LM Method

Oneway Analysis of CaO (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 1.220 wt%



Oneway Anova
Summary of Fit

Rsquare	0.755109
Adj Rsquare	0.644907
Root Mean Square Error	0.020741
Mean of Response	1.128828
Observations (or Sum Wgts)	30

Analysis of Variance

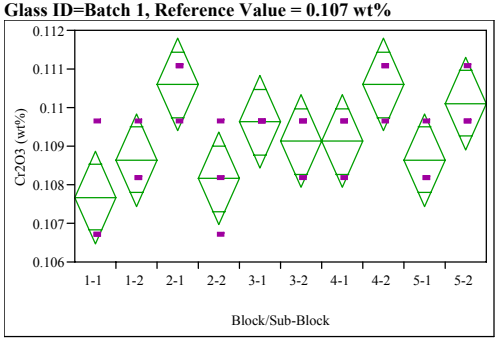
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.02652903	0.002948	6.8521	0.0002
Error	20	0.00860371	0.000430		
C. Total	29	0.03513273			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	1.17206	0.01197	1.1471	1.1970
1-2	3	1.18092	0.01197	1.1559	1.2059
2-1	3	1.12915	0.01197	1.1042	1.1541
2-2	3	1.11703	0.01197	1.0920	1.1420
3-1	3	1.10304	0.01197	1.0781	1.1280
3-2	3	1.13055	0.01197	1.1056	1.1555
4-1	3	1.08998	0.01197	1.0650	1.1150
4-2	3	1.09884	0.01197	1.0739	1.1238
5-1	3	1.11096	0.01197	1.0860	1.1359
5-2	3	1.15574	0.01197	1.1308	1.1807

Std Error uses a pooled estimate of error variance

Oneway Analysis of Cr2O3 (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 0.107 wt%



Oneway Anova
Summary of Fit

Rsquare	0.573171
Adj Rsquare	0.381098
Root Mean Square Error	0.000998
Mean of Response	0.10923
Observations (or Sum Wgts)	30

Analysis of Variance

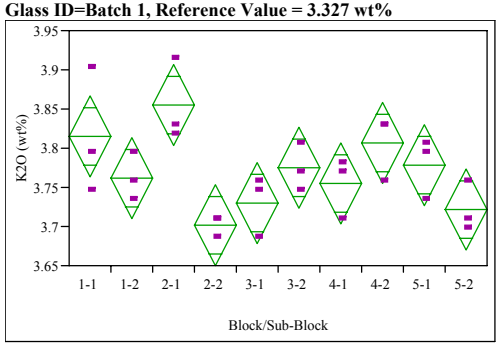
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00002677	2.975e-6	2.9841	0.0200
Error	20	0.00001994	9.9693e-7		
C. Total	29	0.00004671			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.107671	0.00058	0.10647	0.10887
1-2	3	0.108646	0.00058	0.10744	0.10985
2-1	3	0.110594	0.00058	0.10939	0.11180
2-2	3	0.108158	0.00058	0.10696	0.10936
3-1	3	0.109620	0.00058	0.10842	0.11082
3-2	3	0.109133	0.00058	0.10793	0.11034
4-1	3	0.109133	0.00058	0.10793	0.11034
4-2	3	0.110594	0.00058	0.10939	0.11180
5-1	3	0.108646	0.00058	0.10744	0.10985
5-2	3	0.110107	0.00058	0.10890	0.11131

Std Error uses a pooled estimate of error variance

Oneway Analysis of K2O (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 3.327 wt%



Oneway Anova
Summary of Fit

Rsquare	0.611176
Adj Rsquare	0.436205
Root Mean Square Error	0.042985
Mean of Response	3.769996
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.05808598	0.006454	3.4930	0.0095
Error	20	0.03695369	0.001848		
C. Total	29	0.09503967			

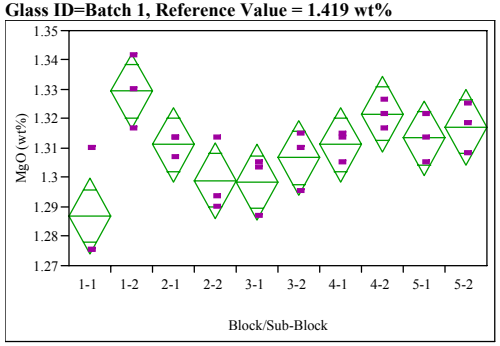
Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	3.81457	0.02482	3.7628	3.8663
1-2	3	3.76237	0.02482	3.7106	3.8141
2-1	3	3.85472	0.02482	3.8030	3.9065
2-2	3	3.70214	0.02482	3.6504	3.7539
3-1	3	3.73024	0.02482	3.6785	3.7820
3-2	3	3.77441	0.02482	3.7226	3.8262
4-1	3	3.75434	0.02482	3.7026	3.8061
4-2	3	3.80654	0.02482	3.7548	3.8583
5-1	3	3.77843	0.02482	3.7267	3.8302
5-2	3	3.72221	0.02482	3.6704	3.7740

Std Error uses a pooled estimate of error variance

Exhibit A3. PSAL Oxide Measurements by Analytical Block for Samples of the Standard Glasses Prepared Using the LM Method

Oneway Analysis of MgO (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 1.419 wt%



Oneway Anova
Summary of Fit

Rsquare	0.646132
Adj Rsquare	0.486891
Root Mean Square Error	0.01064
Mean of Response	1.309504
Observations (or Sum Wgts)	30

Analysis of Variance

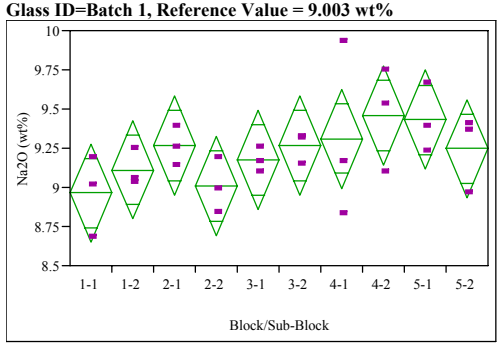
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00413410	0.000459	4.0576	0.0044
Error	20	0.00226413	0.000113		
C. Total	29	0.00639824			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	1.28684	0.00614	1.2740	1.2997
1-2	3	1.32940	0.00614	1.3166	1.3422
2-1	3	1.31116	0.00614	1.2983	1.3240
2-2	3	1.29900	0.00614	1.2862	1.3118
3-1	3	1.29845	0.00614	1.2856	1.3113
3-2	3	1.30674	0.00614	1.2939	1.3196
4-1	3	1.31116	0.00614	1.2983	1.3240
4-2	3	1.32167	0.00614	1.3089	1.3345
5-1	3	1.31337	0.00614	1.3006	1.3262
5-2	3	1.31724	0.00614	1.3044	1.3301

Std Error uses a pooled estimate of error variance

Oneway Analysis of Na2O (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 9.003 wt%



Oneway Anova
Summary of Fit

Rsquare	0.343291
Adj Rsquare	0.047772
Root Mean Square Error	0.261259
Mean of Response	9.223915
Observations (or Sum Wgts)	30

Analysis of Variance

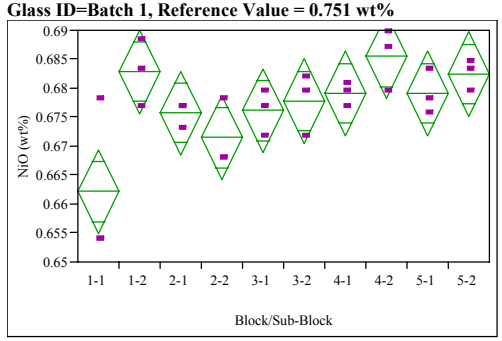
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.7136131	0.079290	1.1617	0.3692
Error	20	1.3651297	0.068256		
C. Total	29	2.0787427			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	8.96420	0.15084	8.6496	9.2788
1-2	3	9.11248	0.15084	8.7978	9.4271
2-1	3	9.26525	0.15084	8.9506	9.5799
2-2	3	9.00913	0.15084	8.6945	9.3238
3-1	3	9.17539	0.15084	8.8607	9.4900
3-2	3	9.26525	0.15084	8.9506	9.5799
4-1	3	9.31019	0.15084	8.9955	9.6248
4-2	3	9.45847	0.15084	9.1438	9.7731
5-1	3	9.43151	0.15084	9.1169	9.7461
5-2	3	9.24728	0.15084	8.9326	9.5619

Std Error uses a pooled estimate of error variance

Oneway Analysis of NiO (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 0.751 wt%



Oneway Anova
Summary of Fit

Rsquare	0.622103
Adj Rsquare	0.452049
Root Mean Square Error	0.006036
Mean of Response	0.677225
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00119955	0.000133	3.6583	0.0075
Error	20	0.00072867	0.000036		
C. Total	29	0.00192821			

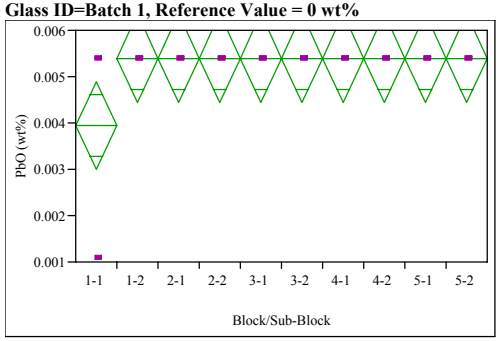
Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.662124	0.00348	0.65485	0.66939
1-2	3	0.682908	0.00348	0.67564	0.69018
2-1	3	0.675698	0.00348	0.66843	0.68297
2-2	3	0.671456	0.00348	0.66419	0.67873
3-1	3	0.676122	0.00348	0.66885	0.68339
3-2	3	0.677818	0.00348	0.67055	0.68509
4-1	3	0.679091	0.00348	0.67182	0.68636
4-2	3	0.685453	0.00348	0.67818	0.69272
5-1	3	0.679091	0.00348	0.67182	0.68636
5-2	3	0.682484	0.00348	0.67521	0.68975

Std Error uses a pooled estimate of error variance

Exhibit A3. PSAL Oxide Measurements by Analytical Block for Samples of the Standard Glasses Prepared Using the LM Method

Oneway Analysis of PbO (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 0 wt%



Oneway Anova
Summary of Fit

Rsquare	0.310345
Adj Rsquare	3.33e-16
Root Mean Square Error	0.000787
Mean of Response	0.005242
Observations (or Sum Wgts)	30

Analysis of Variance

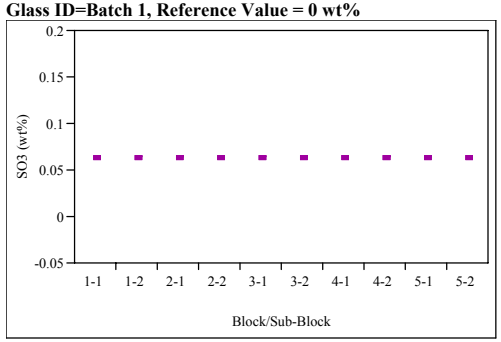
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00000557	6.1886e-7	1.0000	0.4711
Error	20	0.00001238	6.1886e-7		
C. Total	29	0.00001795			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.003950	0.00045	0.00300	0.00490
1-2	3	0.005386	0.00045	0.00444	0.00633
2-1	3	0.005386	0.00045	0.00444	0.00633
2-2	3	0.005386	0.00045	0.00444	0.00633
3-1	3	0.005386	0.00045	0.00444	0.00633
3-2	3	0.005386	0.00045	0.00444	0.00633
4-1	3	0.005386	0.00045	0.00444	0.00633
4-2	3	0.005386	0.00045	0.00444	0.00633
5-1	3	0.005386	0.00045	0.00444	0.00633
5-2	3	0.005386	0.00045	0.00444	0.00633

Std Error uses a pooled estimate of error variance

Oneway Analysis of SO3 (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 0 wt%



Oneway Anova
Summary of Fit

Rsquare	.
Adj Rsquare	.
Root Mean Square Error	.
Mean of Response	0.062423
Observations (or Sum Wgts)	30

Analysis of Variance

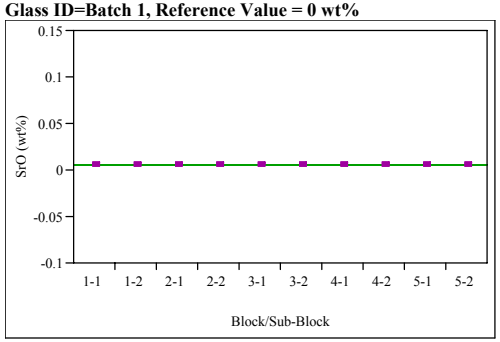
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	1.4444e-33	1.605e-34	-2.2222	0.0000
Error	20	-1.444e-33	-7.22e-35		
C. Total	29	0			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.062423	.	.	.
1-2	3	0.062423	.	.	.
2-1	3	0.062423	.	.	.
2-2	3	0.062423	.	.	.
3-1	3	0.062423	.	.	.
3-2	3	0.062423	.	.	.
4-1	3	0.062423	.	.	.
4-2	3	0.062423	.	.	.
5-1	3	0.062423	.	.	.
5-2	3	0.062423	.	.	.

Std Error uses a pooled estimate of error variance

Oneway Analysis of SrO (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 0 wt%



Oneway Anova
Summary of Fit

Rsquare	.
Adj Rsquare	.
Root Mean Square Error	0
Mean of Response	0.005913
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0	0	.	.
Error	20	0	0		
C. Total	29	0			

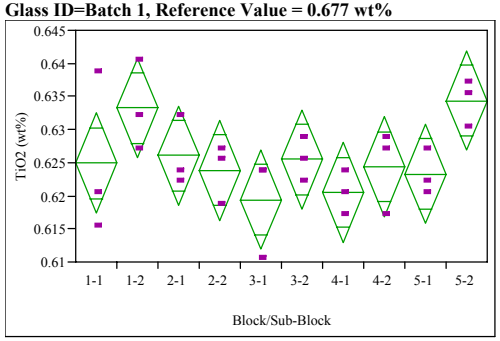
Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.005913	0	0.00591	0.00591
1-2	3	0.005913	0	0.00591	0.00591
2-1	3	0.005913	0	0.00591	0.00591
2-2	3	0.005913	0	0.00591	0.00591
3-1	3	0.005913	0	0.00591	0.00591
3-2	3	0.005913	0	0.00591	0.00591
4-1	3	0.005913	0	0.00591	0.00591
4-2	3	0.005913	0	0.00591	0.00591
5-1	3	0.005913	0	0.00591	0.00591
5-2	3	0.005913	0	0.00591	0.00591

Std Error uses a pooled estimate of error variance

Exhibit A3. PSAL Oxide Measurements by Analytical Block for Samples of the Standard Glasses Prepared Using the LM Method

Oneway Analysis of TiO2 (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 0.677 wt%



Oneway Anova
Summary of Fit

Rsquare	0.448556
Adj Rsquare	0.200406
Root Mean Square Error	0.006249
Mean of Response	0.625556
Observations (or Sum Wgts)	30

Analysis of Variance

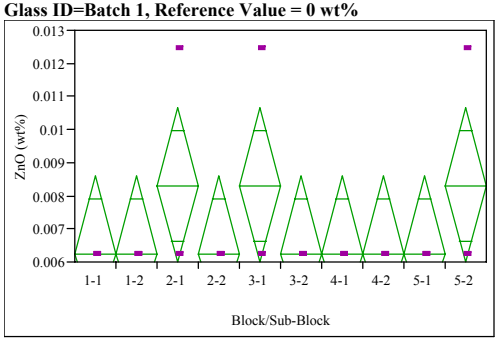
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00063518	0.000071	1.8076	0.1295
Error	20	0.00078088	0.000039		
C. Total	29	0.00141606			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.624944	0.00361	0.61742	0.63247
1-2	3	0.633284	0.00361	0.62576	0.64081
2-1	3	0.626056	0.00361	0.61853	0.63358
2-2	3	0.623832	0.00361	0.61631	0.63136
3-1	3	0.619384	0.00361	0.61186	0.62691
3-2	3	0.625500	0.00361	0.61797	0.63303
4-1	3	0.620496	0.00361	0.61297	0.62802
4-2	3	0.624388	0.00361	0.61686	0.63191
5-1	3	0.623276	0.00361	0.61575	0.63080
5-2	3	0.634396	0.00361	0.62687	0.64192

Std Error uses a pooled estimate of error variance

Oneway Analysis of ZnO (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 0 wt%



Oneway Anova
Summary of Fit

Rsquare	0.259259
Adj Rsquare	-0.07407
Root Mean Square Error	0.001968
Mean of Response	0.006846
Observations (or Sum Wgts)	30

Analysis of Variance

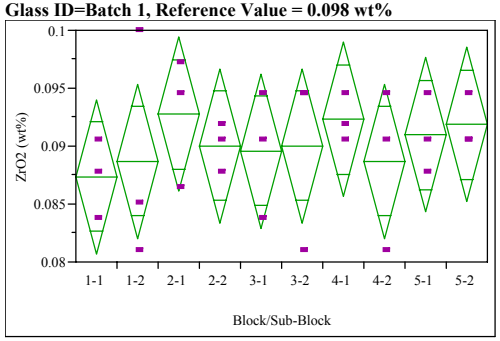
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00002712	3.013e-6	0.7778	0.6387
Error	20	0.00007748	3.8738e-6		
C. Total	29	0.00010459			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.006224	0.00114	0.00385	0.00859
1-2	3	0.006224	0.00114	0.00385	0.00859
2-1	3	0.008299	0.00114	0.00593	0.01067
2-2	3	0.006224	0.00114	0.00385	0.00859
3-1	3	0.008299	0.00114	0.00593	0.01067
3-2	3	0.006224	0.00114	0.00385	0.00859
4-1	3	0.006224	0.00114	0.00385	0.00859
4-2	3	0.006224	0.00114	0.00385	0.00859
5-1	3	0.006224	0.00114	0.00385	0.00859
5-2	3	0.008299	0.00114	0.00593	0.01067

Std Error uses a pooled estimate of error variance

Oneway Analysis of ZrO2 (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 0.098 wt%



Oneway Anova
Summary of Fit

Rsquare	0.117647
Adj Rsquare	-0.27941
Root Mean Square Error	0.005537
Mean of Response	0.090233
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00008174	9.083e-6	0.2963	0.9674
Error	20	0.00061309	0.000031		
C. Total	29	0.00069483			

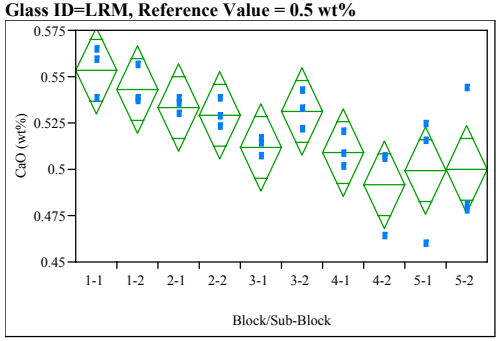
Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.087352	0.00320	0.08068	0.09402
1-2	3	0.088703	0.00320	0.08203	0.09537
2-1	3	0.092755	0.00320	0.08609	0.09942
2-2	3	0.090053	0.00320	0.08339	0.09672
3-1	3	0.089603	0.00320	0.08294	0.09627
3-2	3	0.090053	0.00320	0.08339	0.09672
4-1	3	0.092305	0.00320	0.08564	0.09897
4-2	3	0.088703	0.00320	0.08203	0.09537
5-1	3	0.090954	0.00320	0.08429	0.09762
5-2	3	0.091854	0.00320	0.08519	0.09852

Std Error uses a pooled estimate of error variance

Exhibit A3. PSAL Oxide Measurements by Analytical Block for Samples of the Standard Glasses Prepared Using the LM Method

Oneway Analysis of CaO (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 0.5 wt%



Oneway Anova
Summary of Fit

Rsquare	0.600383
Adj Rsquare	0.420555
Root Mean Square Error	0.019569
Mean of Response	0.520176
Observations (or Sum Wgts)	30

Analysis of Variance

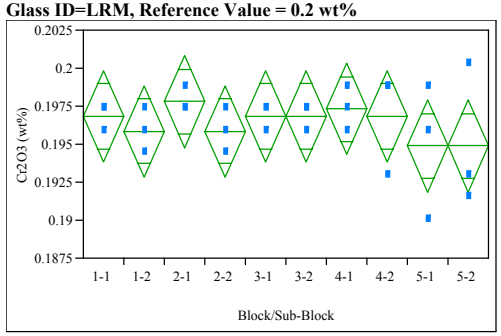
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.01150648	0.001278	3.3387	0.0118
Error	20	0.00765876	0.000383		
C. Total	29	0.01916524			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.553150	0.01130	0.52958	0.57672
1-2	3	0.542890	0.01130	0.51932	0.56646
2-1	3	0.533562	0.01130	0.50999	0.55713
2-2	3	0.528898	0.01130	0.50533	0.55246
3-1	3	0.512107	0.01130	0.48854	0.53567
3-2	3	0.531230	0.01130	0.50766	0.55480
4-1	3	0.509309	0.01130	0.48574	0.53288
4-2	3	0.491586	0.01130	0.46802	0.51515
5-1	3	0.499048	0.01130	0.47548	0.52262
5-2	3	0.499981	0.01130	0.47641	0.52355

Std Error uses a pooled estimate of error variance

Oneway Analysis of Cr2O3 (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 0.2 wt%



Oneway Anova
Summary of Fit

Rsquare	0.173321
Adj Rsquare	-0.19868
Root Mean Square Error	0.002503
Mean of Response	0.19639
Observations (or Sum Wgts)	30

Analysis of Variance

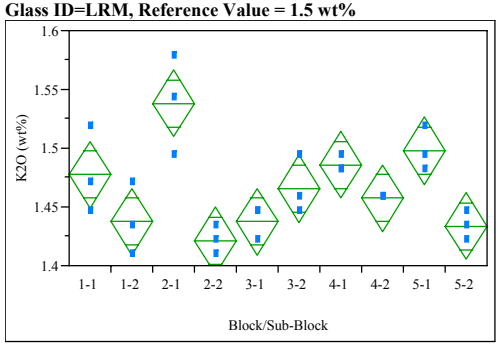
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00002628	2.9196e-6	0.4659	0.8804
Error	20	0.00012533	6.2664e-6		
C. Total	29	0.00015160			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.196829	0.00145	0.19381	0.19984
1-2	3	0.195854	0.00145	0.19284	0.19887
2-1	3	0.197803	0.00145	0.19479	0.20082
2-2	3	0.195854	0.00145	0.19284	0.19887
3-1	3	0.196829	0.00145	0.19381	0.19984
3-2	3	0.196829	0.00145	0.19381	0.19984
4-1	3	0.197316	0.00145	0.19430	0.20033
4-2	3	0.196829	0.00145	0.19381	0.19984
5-1	3	0.194880	0.00145	0.19187	0.19789
5-2	3	0.194880	0.00145	0.19187	0.19789

Std Error uses a pooled estimate of error variance

Oneway Analysis of K2O (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 1.5 wt%



Oneway Anova
Summary of Fit

Rsquare	0.755032
Adj Rsquare	0.644797
Root Mean Square Error	0.023585
Mean of Response	1.465195
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.03428858	0.003810	6.8493	0.0002
Error	20	0.01112480	0.000556		
C. Total	29	0.04541338			

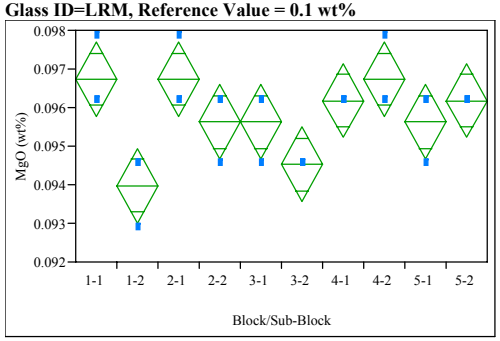
Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	1.47764	0.01362	1.4492	1.5060
1-2	3	1.43749	0.01362	1.4091	1.4659
2-1	3	1.53787	0.01362	1.5095	1.5663
2-2	3	1.42143	0.01362	1.3930	1.4498
3-1	3	1.43749	0.01362	1.4091	1.4659
3-2	3	1.46560	0.01362	1.4372	1.4940
4-1	3	1.48567	0.01362	1.4573	1.5141
4-2	3	1.45757	0.01362	1.4292	1.4860
5-1	3	1.49772	0.01362	1.4693	1.5261
5-2	3	1.43347	0.01362	1.4051	1.4619

Std Error uses a pooled estimate of error variance

Exhibit A3. PSAL Oxide Measurements by Analytical Block for Samples of the Standard Glasses Prepared Using the LM Method

Oneway Analysis of MgO (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 0.1 wt%



Oneway Anova
Summary of Fit

Rsquare	0.650873
Adj Rsquare	0.493766
Root Mean Square Error	0.000801
Mean of Response	0.095794
Observations (or Sum Wgts)	30

Analysis of Variance

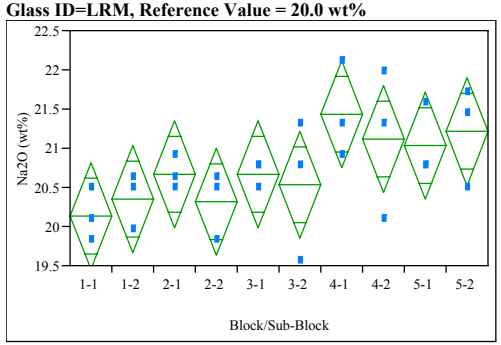
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00002392	2.6583e-6	4.1429	0.0039
Error	20	0.00001283	6.4166e-7		
C. Total	29	0.00003676			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.096734	0.00046	0.09577	0.09770
1-2	3	0.093970	0.00046	0.09301	0.09494
2-1	3	0.096734	0.00046	0.09577	0.09770
2-2	3	0.095629	0.00046	0.09466	0.09659
3-1	3	0.095629	0.00046	0.09466	0.09659
3-2	3	0.094523	0.00046	0.09356	0.09549
4-1	3	0.096181	0.00046	0.09522	0.09715
4-2	3	0.096734	0.00046	0.09577	0.09770
5-1	3	0.095629	0.00046	0.09466	0.09659
5-2	3	0.096181	0.00046	0.09522	0.09715

Std Error uses a pooled estimate of error variance

Oneway Analysis of Na2O (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 20.0 wt%



Oneway Anova
Summary of Fit

Rsquare	0.439439
Adj Rsquare	0.187187
Root Mean Square Error	0.567656
Mean of Response	20.74572
Observations (or Sum Wgts)	30

Analysis of Variance

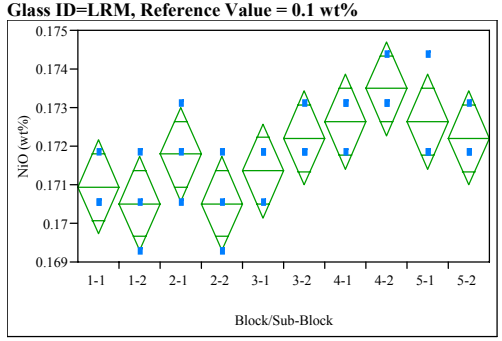
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	5.052155	0.561351	1.7421	0.1443
Error	20	6.444662	0.322233		
C. Total	29	11.496817			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	20.1301	0.32774	19.446	20.814
1-2	3	20.3548	0.32774	19.671	21.038
2-1	3	20.6693	0.32774	19.986	21.353
2-2	3	20.3099	0.32774	19.626	20.994
3-1	3	20.6693	0.32774	19.986	21.353
3-2	3	20.5345	0.32774	19.851	21.218
4-1	3	21.4332	0.32774	20.750	22.117
4-2	3	21.1187	0.32774	20.435	21.802
5-1	3	21.0288	0.32774	20.345	21.712
5-2	3	21.2085	0.32774	20.525	21.892

Std Error uses a pooled estimate of error variance

Oneway Analysis of NiO (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 0.1 wt%



Oneway Anova
Summary of Fit

Rsquare	0.562716
Adj Rsquare	0.365938
Root Mean Square Error	0.001013
Mean of Response	0.17183
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00002639	2.9327e-6	2.8596	0.0241
Error	20	0.00002051	1.0255e-6		
C. Total	29	0.00004690			

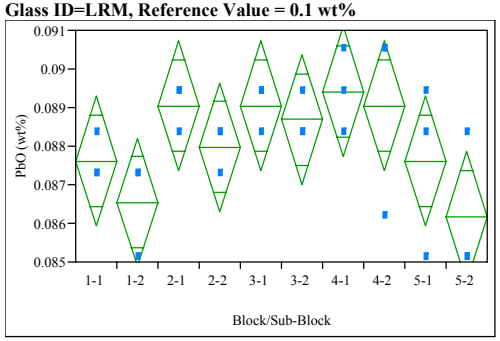
Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.170939	0.00058	0.16972	0.17216
1-2	3	0.170515	0.00058	0.16930	0.17173
2-1	3	0.171788	0.00058	0.17057	0.17301
2-2	3	0.170515	0.00058	0.16930	0.17173
3-1	3	0.171363	0.00058	0.17014	0.17258
3-2	3	0.172212	0.00058	0.17099	0.17343
4-1	3	0.172636	0.00058	0.17142	0.17386
4-2	3	0.173484	0.00058	0.17226	0.17470
5-1	3	0.172636	0.00058	0.17142	0.17386
5-2	3	0.172212	0.00058	0.17099	0.17343

Std Error uses a pooled estimate of error variance

Exhibit A3. PSAL Oxide Measurements by Analytical Block for Samples of the Standard Glasses Prepared Using the LM Method

Oneway Analysis of PbO (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 0.1 wt%



Oneway Anova
Summary of Fit

Rsquare	0.469214
Adj Rsquare	0.230361
Root Mean Square Error	0.001391
Mean of Response	0.088115
Observations (or Sum Wgts)	30

Analysis of Variance

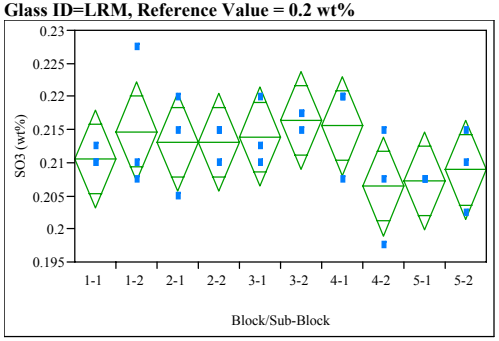
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00003419	0.0000038	1.9644	0.1001
Error	20	0.00003868	1.9339e-6		
C. Total	29	0.00007287			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.087612	0.00080	0.08594	0.08929
1-2	3	0.086535	0.00080	0.08486	0.08821
2-1	3	0.089049	0.00080	0.08737	0.09072
2-2	3	0.087971	0.00080	0.08630	0.08965
3-1	3	0.089049	0.00080	0.08737	0.09072
3-2	3	0.088689	0.00080	0.08701	0.09036
4-1	3	0.089408	0.00080	0.08773	0.09108
4-2	3	0.089049	0.00080	0.08737	0.09072
5-1	3	0.087612	0.00080	0.08594	0.08929
5-2	3	0.086176	0.00080	0.08450	0.08785

Std Error uses a pooled estimate of error variance

Oneway Analysis of SO3 (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 0.2 wt%



Oneway Anova
Summary of Fit

Rsquare	0.302018
Adj Rsquare	-0.01207
Root Mean Square Error	0.0062
Mean of Response	0.211987
Observations (or Sum Wgts)	30

Analysis of Variance

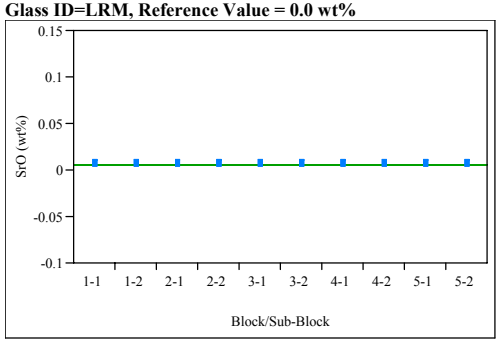
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00033271	0.000037	0.9616	0.4981
Error	20	0.00076892	0.000038		
C. Total	29	0.00110164			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.210572	0.00358	0.20310	0.21804
1-2	3	0.214733	0.00358	0.20727	0.22220
2-1	3	0.213069	0.00358	0.20560	0.22054
2-2	3	0.213069	0.00358	0.20560	0.22054
3-1	3	0.213901	0.00358	0.20643	0.22137
3-2	3	0.216398	0.00358	0.20893	0.22387
4-1	3	0.215566	0.00358	0.20810	0.22303
4-2	3	0.206410	0.00358	0.19894	0.21388
5-1	3	0.207243	0.00358	0.19978	0.21471
5-2	3	0.208907	0.00358	0.20144	0.21637

Std Error uses a pooled estimate of error variance

Oneway Analysis of SrO (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 0.0 wt%



Oneway Anova
Summary of Fit

Rsquare	.
Adj Rsquare	.
Root Mean Square Error	0
Mean of Response	0.005913
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0	0	.	.
Error	20	0	0		
C. Total	29	0			

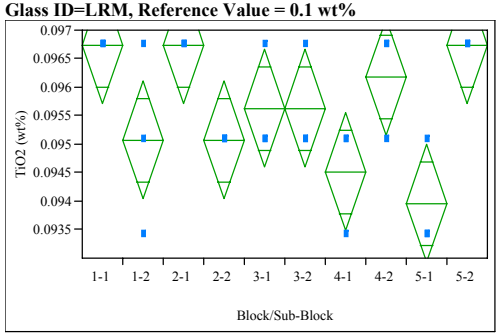
Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.005913	0	0.00591	0.00591
1-2	3	0.005913	0	0.00591	0.00591
2-1	3	0.005913	0	0.00591	0.00591
2-2	3	0.005913	0	0.00591	0.00591
3-1	3	0.005913	0	0.00591	0.00591
3-2	3	0.005913	0	0.00591	0.00591
4-1	3	0.005913	0	0.00591	0.00591
4-2	3	0.005913	0	0.00591	0.00591
5-1	3	0.005913	0	0.00591	0.00591
5-2	3	0.005913	0	0.00591	0.00591

Std Error uses a pooled estimate of error variance

Exhibit A3. PSAL Oxide Measurements by Analytical Block for Samples of the Standard Glasses Prepared Using the LM Method

Oneway Analysis of TiO2 (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 0.1 wt%



Oneway Anova
Summary of Fit

Rsquare	0.636364
Adj Rsquare	0.472727
Root Mean Square Error	0.000861
Mean of Response	0.095632
Observations (or Sum Wgts)	30

Analysis of Variance

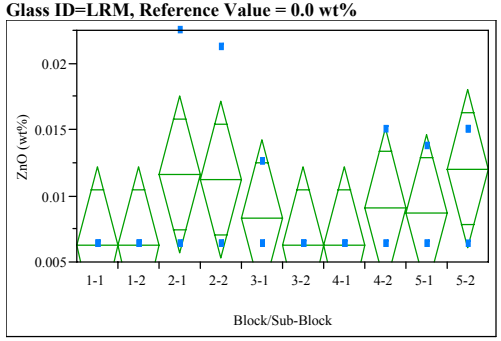
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00002597	2.8853e-6	3.8889	0.0055
Error	20	0.00001484	7.4193e-7		
C. Total	29	0.00004081			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.096744	0.00050	0.09571	0.09778
1-2	3	0.095076	0.00050	0.09404	0.09611
2-1	3	0.096744	0.00050	0.09571	0.09778
2-2	3	0.095076	0.00050	0.09404	0.09611
3-1	3	0.095632	0.00050	0.09459	0.09667
3-2	3	0.095632	0.00050	0.09459	0.09667
4-1	3	0.094520	0.00050	0.09348	0.09556
4-2	3	0.096188	0.00050	0.09515	0.09723
5-1	3	0.093964	0.00050	0.09293	0.09500
5-2	3	0.096744	0.00050	0.09571	0.09778

Std Error uses a pooled estimate of error variance

Oneway Analysis of ZnO (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 0.0 wt%



Oneway Anova
Summary of Fit

Rsquare	0.237541
Adj Rsquare	-0.10556
Root Mean Square Error	0.004938
Mean of Response	0.008589
Observations (or Sum Wgts)	30

Analysis of Variance

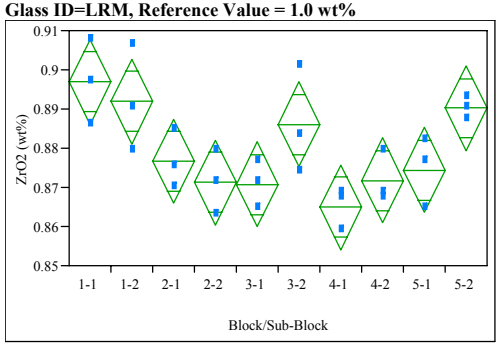
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00015191	0.000017	0.6923	0.7081
Error	20	0.00048758	0.000024		
C. Total	29	0.00063949			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.006224	0.00285	0.00028	0.01217
1-2	3	0.006224	0.00285	0.00028	0.01217
2-1	3	0.011618	0.00285	0.00567	0.01756
2-2	3	0.011203	0.00285	0.00526	0.01715
3-1	3	0.008299	0.00285	0.00235	0.01425
3-2	3	0.006224	0.00285	0.00028	0.01217
4-1	3	0.006224	0.00285	0.00028	0.01217
4-2	3	0.009129	0.00285	0.00318	0.01507
5-1	3	0.008714	0.00285	0.00277	0.01466
5-2	3	0.012033	0.00285	0.00609	0.01798

Std Error uses a pooled estimate of error variance

Oneway Analysis of ZrO2 (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 1.0 wt%



Oneway Anova
Summary of Fit

Rsquare	0.664481
Adj Rsquare	0.513498
Root Mean Square Error	0.008987
Mean of Response	0.879506
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.00319930	0.000355	4.4010	0.0028
Error	20	0.00161543	0.000081		
C. Total	29	0.00481473			

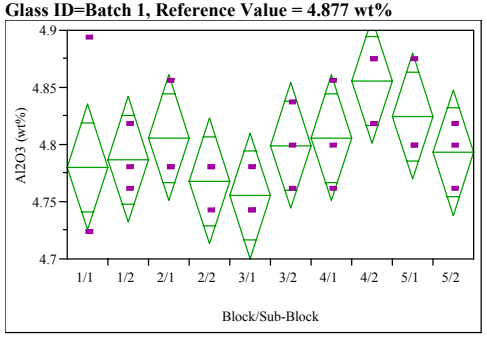
Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1-1	3	0.896931	0.00519	0.88611	0.90775
1-2	3	0.891978	0.00519	0.88115	0.90280
2-1	3	0.876669	0.00519	0.86585	0.88749
2-2	3	0.871266	0.00519	0.86044	0.88209
3-1	3	0.870816	0.00519	0.85999	0.88164
3-2	3	0.886125	0.00519	0.87530	0.89695
4-1	3	0.864962	0.00519	0.85414	0.87579
4-2	3	0.871716	0.00519	0.86089	0.88254
5-1	3	0.874418	0.00519	0.86359	0.88524
5-2	3	0.890177	0.00519	0.87935	0.90100

Std Error uses a pooled estimate of error variance

Exhibit A4: PSAL Oxide Measurements by Analytical Block for Samples of the Standard Glasses Prepared Using the PF Method

Oneway Analysis of Al2O3 (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 4.877 wt%



Oneway Anova
Summary of Fit

Rsquare	0.347137
Adj Rsquare	0.053348
Root Mean Square Error	0.045636
Mean of Response	4.797441
Observations (or Sum Wgts)	30

Analysis of Variance

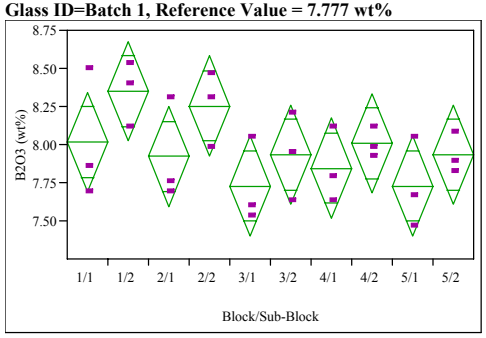
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.02214720	0.002461	1.1816	0.3579
Error	20	0.04165245	0.002083		
C. Total	29	0.06379966			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	4.78044	0.02635	4.7255	4.8354
1/2	3	4.78673	0.02635	4.7318	4.8417
2/1	3	4.80563	0.02635	4.7507	4.8606
2/2	3	4.76784	0.02635	4.7129	4.8228
3/1	3	4.75524	0.02635	4.7003	4.8102
3/2	3	4.79933	0.02635	4.7444	4.8543
4/1	3	4.80563	0.02635	4.7507	4.8606
4/2	3	4.85602	0.02635	4.8011	4.9110
5/1	3	4.82452	0.02635	4.7696	4.8795
5/2	3	4.79303	0.02635	4.7381	4.8480

Std Error uses a pooled estimate of error variance

Oneway Analysis of B2O3 (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 7.777 wt%



Oneway Anova
Summary of Fit

Rsquare	0.426703
Adj Rsquare	0.168719
Root Mean Square Error	0.271886
Mean of Response	7.971399
Observations (or Sum Wgts)	30

Analysis of Variance

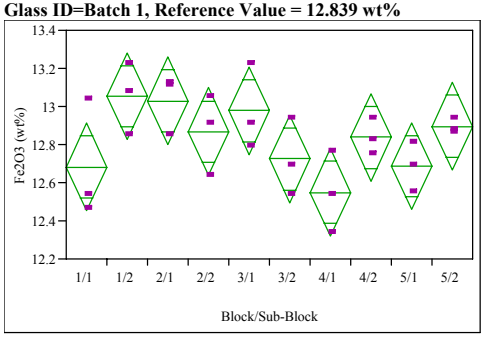
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	1.1003991	0.122267	1.6540	0.1668
Error	20	1.4784420	0.073922		
C. Total	29	2.5788411			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	8.01755	0.15697	7.6901	8.3450
1/2	3	8.35027	0.15697	8.0228	8.6777
2/1	3	7.92095	0.15697	7.5935	8.2484
2/2	3	8.25368	0.15697	7.9262	8.5811
3/1	3	7.72776	0.15697	7.4003	8.0552
3/2	3	7.93169	0.15697	7.6042	8.2591
4/1	3	7.84582	0.15697	7.5184	8.1733
4/2	3	8.00682	0.15697	7.6794	8.3343
5/1	3	7.72776	0.15697	7.4003	8.0552
5/2	3	7.93169	0.15697	7.6042	8.2591

Std Error uses a pooled estimate of error variance

Oneway Analysis of Fe2O3 (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 12.839 wt%



Oneway Anova
Summary of Fit

Rsquare	0.508572
Adj Rsquare	0.287429
Root Mean Square Error	0.190496
Mean of Response	12.83013
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.7510901	0.083454	2.2997	0.0580
Error	20	0.7257712	0.036289		
C. Total	29	1.4768613			

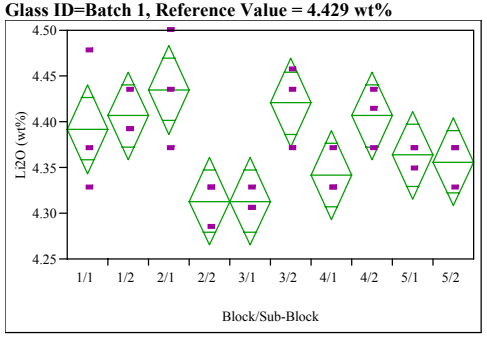
Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	12.6814	0.10998	12.452	12.911
1/2	3	13.0532	0.10998	12.824	13.283
2/1	3	13.0293	0.10998	12.800	13.259
2/2	3	12.8673	0.10998	12.638	13.097
3/1	3	12.9769	0.10998	12.747	13.206
3/2	3	12.7243	0.10998	12.495	12.954
4/1	3	12.5480	0.10998	12.319	12.777
4/2	3	12.8387	0.10998	12.609	13.068
5/1	3	12.6862	0.10998	12.457	12.916
5/2	3	12.8959	0.10998	12.666	13.125

Std Error uses a pooled estimate of error variance

Exhibit A4: PSAL Oxide Measurements by Analytical Block for Samples of the Standard Glasses Prepared Using the PF Method

Oneway Analysis of Li2O (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 4.429 wt%



Oneway Anova
Summary of Fit

Rsquare	0.616519
Adj Rsquare	0.443953
Root Mean Square Error	0.040085
Mean of Response	4.374693
Observations (or Sum Wgts)	30

Analysis of Variance

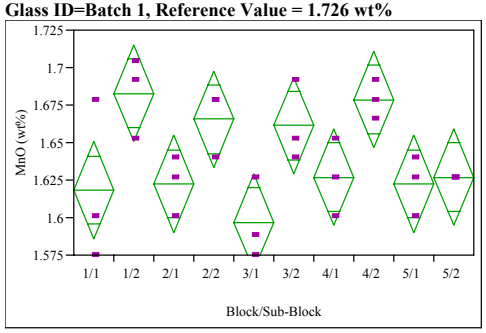
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.05166456	0.005741	3.5726	0.0085
Error	20	0.03213585	0.001607		
C. Total	29	0.08380041			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	4.39192	0.02314	4.3436	4.4402
1/2	3	4.40627	0.02314	4.3580	4.4545
2/1	3	4.43497	0.02314	4.3867	4.4832
2/2	3	4.31298	0.02314	4.2647	4.3613
3/1	3	4.31298	0.02314	4.2647	4.3613
3/2	3	4.42062	0.02314	4.3723	4.4689
4/1	3	4.34168	0.02314	4.2934	4.3900
4/2	3	4.40627	0.02314	4.3580	4.4545
5/1	3	4.36321	0.02314	4.3149	4.4115
5/2	3	4.35603	0.02314	4.3078	4.4043

Std Error uses a pooled estimate of error variance

Oneway Analysis of MnO (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 1.726 wt%



Oneway Anova
Summary of Fit

Rsquare	0.617721
Adj Rsquare	0.445696
Root Mean Square Error	0.026775
Mean of Response	1.640254
Observations (or Sum Wgts)	30

Analysis of Variance

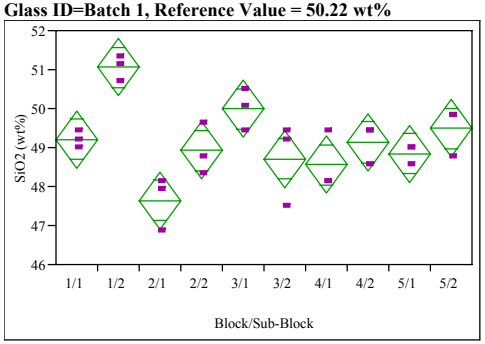
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.02316849	0.002574	3.5909	0.0083
Error	20	0.01433790	0.000717		
C. Total	29	0.03750639			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	1.61830	0.01546	1.5861	1.6505
1/2	3	1.68286	0.01546	1.6506	1.7151
2/1	3	1.62261	0.01546	1.5904	1.6549
2/2	3	1.66565	0.01546	1.6334	1.6979
3/1	3	1.59678	0.01546	1.5645	1.6290
3/2	3	1.66134	0.01546	1.6291	1.6936
4/1	3	1.62691	0.01546	1.5947	1.6592
4/2	3	1.67856	0.01546	1.6463	1.7108
5/1	3	1.62261	0.01546	1.5904	1.6549
5/2	3	1.62691	0.01546	1.5947	1.6592

Std Error uses a pooled estimate of error variance

Oneway Analysis of SiO2 (wt%) By Block/Sub-Block
Glass ID=Batch 1, Reference Value = 50.22 wt%



Oneway Anova
Summary of Fit

Rsquare	0.751553
Adj Rsquare	0.639752
Root Mean Square Error	0.607601
Mean of Response	49.15398
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	22.335355	2.48171	6.7222	0.0002
Error	20	7.383589	0.36918		
C. Total	29	29.718944			

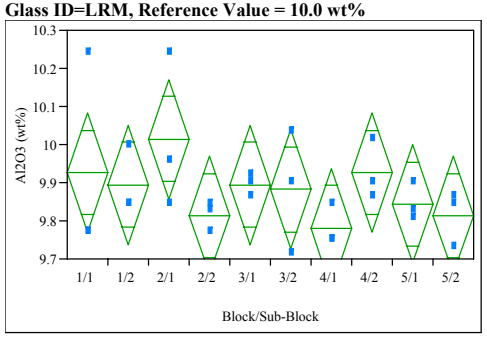
Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	49.2039	0.35080	48.472	49.936
1/2	3	51.0580	0.35080	50.326	51.790
2/1	3	47.6351	0.35080	46.903	48.367
2/2	3	48.9187	0.35080	48.187	49.650
3/1	3	49.9883	0.35080	49.257	50.720
3/2	3	48.7047	0.35080	47.973	49.436
4/1	3	48.5621	0.35080	47.830	49.294
4/2	3	49.1326	0.35080	48.401	49.864
5/1	3	48.8474	0.35080	48.116	49.579
5/2	3	49.4891	0.35080	48.757	50.221

Std Error uses a pooled estimate of error variance

Exhibit A4: PSAL Oxide Measurements by Analytical Block for Samples of the Standard Glasses Prepared Using the PF Method

Oneway Analysis of Al2O3 (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 10.0 wt%



Oneway Anova
Summary of Fit

Rsquare	0.275233
Adj Rsquare	-0.05091
Root Mean Square Error	0.129996
Mean of Response	9.878936
Observations (or Sum Wgts)	30

Analysis of Variance

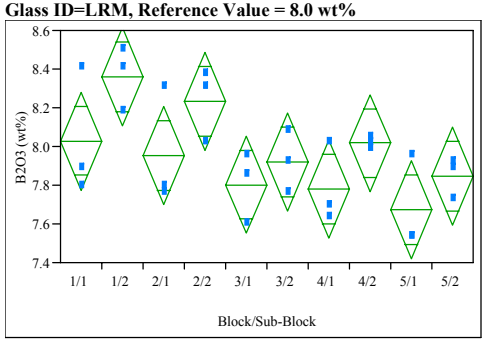
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.12834906	0.014261	0.8439	0.5862
Error	20	0.33797990	0.016899		
C. Total	29	0.46632896			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	9.9262	0.07505	9.7696	10.083
1/2	3	9.8947	0.07505	9.7381	10.051
2/1	3	10.0144	0.07505	9.8578	10.171
2/2	3	9.8128	0.07505	9.6562	9.969
3/1	3	9.8947	0.07505	9.7381	10.051
3/2	3	9.8821	0.07505	9.7255	10.039
4/1	3	9.7813	0.07505	9.6248	9.938
4/2	3	9.9262	0.07505	9.7696	10.083
5/1	3	9.8443	0.07505	9.6877	10.001
5/2	3	9.8128	0.07505	9.6562	9.969

Std Error uses a pooled estimate of error variance

Oneway Analysis of B2O3 (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 8.0 wt%



Oneway Anova
Summary of Fit

Rsquare	0.575516
Adj Rsquare	0.384498
Root Mean Square Error	0.209252
Mean of Response	7.961739
Observations (or Sum Wgts)	30

Analysis of Variance

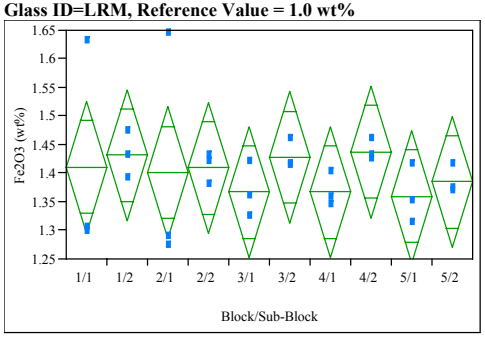
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	1.1873154	0.131924	3.0129	0.0191
Error	20	0.8757298	0.043786		
C. Total	29	2.0630452			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	8.02828	0.12081	7.7763	8.2803
1/2	3	8.36101	0.12081	8.1090	8.6130
2/1	3	7.95315	0.12081	7.7011	8.2052
2/2	3	8.23221	0.12081	7.9802	8.4842
3/1	3	7.80289	0.12081	7.5509	8.0549
3/2	3	7.92095	0.12081	7.6689	8.1730
4/1	3	7.78143	0.12081	7.5294	8.0334
4/2	3	8.01755	0.12081	7.7655	8.2696
5/1	3	7.67410	0.12081	7.4221	7.9261
5/2	3	7.84582	0.12081	7.5938	8.0978

Std Error uses a pooled estimate of error variance

Oneway Analysis of Fe2O3 (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 1.0 wt%



Oneway Anova
Summary of Fit

Rsquare	0.10846
Adj Rsquare	-0.29273
Root Mean Square Error	0.095227
Mean of Response	1.399438
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.02206373	0.002452	0.2703	0.9757
Error	20	0.18136377	0.009068		
C. Total	29	0.20342750			

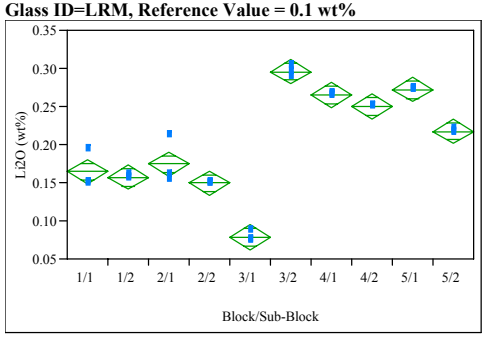
Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	1.41016	0.05498	1.2955	1.5248
1/2	3	1.43113	0.05498	1.3164	1.5458
2/1	3	1.40111	0.05498	1.2864	1.5158
2/2	3	1.40921	0.05498	1.2945	1.5239
3/1	3	1.36679	0.05498	1.2521	1.4815
3/2	3	1.42779	0.05498	1.3131	1.5425
4/1	3	1.36727	0.05498	1.2526	1.4820
4/2	3	1.43685	0.05498	1.3222	1.5515
5/1	3	1.35917	0.05498	1.2445	1.4739
5/2	3	1.38490	0.05498	1.2702	1.4996

Std Error uses a pooled estimate of error variance

Exhibit A4: PSAL Oxide Measurements by Analytical Block for Samples of the Standard Glasses Prepared Using the PF Method

Oneway Analysis of Li2O (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 0.1 wt%



Oneway Anova
Summary of Fit

Rsquare	0.972678
Adj Rsquare	0.960383
Root Mean Square Error	0.01337
Mean of Response	0.202301
Observations (or Sum Wgts)	30

Analysis of Variance

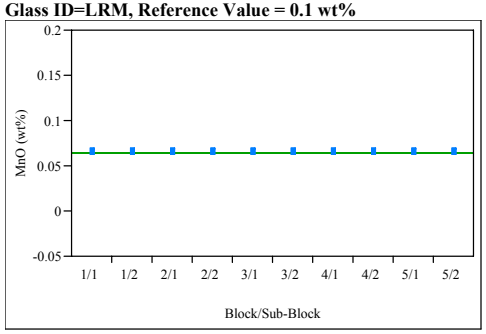
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0.12727481	0.014142	79.1116	<.0001
Error	20	0.00357511	0.000179		
C. Total	29	0.13084992			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	0.164338	0.00772	0.14824	0.18044
1/2	3	0.157162	0.00772	0.14106	0.17326
2/1	3	0.174385	0.00772	0.15828	0.19049
2/2	3	0.149268	0.00772	0.13317	0.16537
3/1	3	0.078222	0.00772	0.06212	0.09432
3/2	3	0.295665	0.00772	0.27956	0.31177
4/1	3	0.264807	0.00772	0.24870	0.28091
4/2	3	0.249736	0.00772	0.23363	0.26584
5/1	3	0.271983	0.00772	0.25588	0.28808
5/2	3	0.217443	0.00772	0.20134	0.23354

Std Error uses a pooled estimate of error variance

Oneway Analysis of MnO (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 0.1 wt%



Oneway Anova
Summary of Fit

Rsquare	.
Adj Rsquare	.
Root Mean Square Error	0
Mean of Response	0.06456
Observations (or Sum Wgts)	30

Analysis of Variance

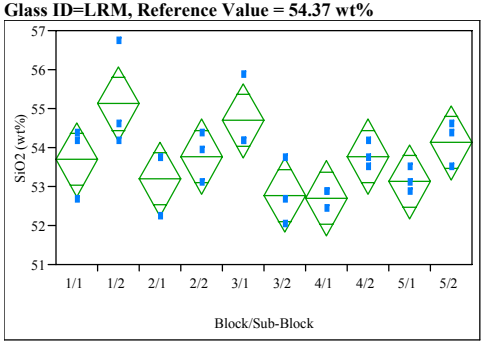
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	0	0	.	.
Error	20	0	0		
C. Total	29	0			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	0.064560	0	0.06456	0.06456
1/2	3	0.064560	0	0.06456	0.06456
2/1	3	0.064560	0	0.06456	0.06456
2/2	3	0.064560	0	0.06456	0.06456
3/1	3	0.064560	0	0.06456	0.06456
3/2	3	0.064560	0	0.06456	0.06456
4/1	3	0.064560	0	0.06456	0.06456
4/2	3	0.064560	0	0.06456	0.06456
5/1	3	0.064560	0	0.06456	0.06456
5/2	3	0.064560	0	0.06456	0.06456

Std Error uses a pooled estimate of error variance

Oneway Analysis of SiO2 (wt%) By Block/Sub-Block
Glass ID=LRM, Reference Value = 54.37 wt%



Oneway Anova
Summary of Fit

Rsquare	0.575569
Adj Rsquare	0.384576
Root Mean Square Error	0.790866
Mean of Response	53.69643
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Block/Sub-Block	9	16.963947	1.88488	3.0136	0.0191
Error	20	12.509386	0.62547		
C. Total	29	29.473333			

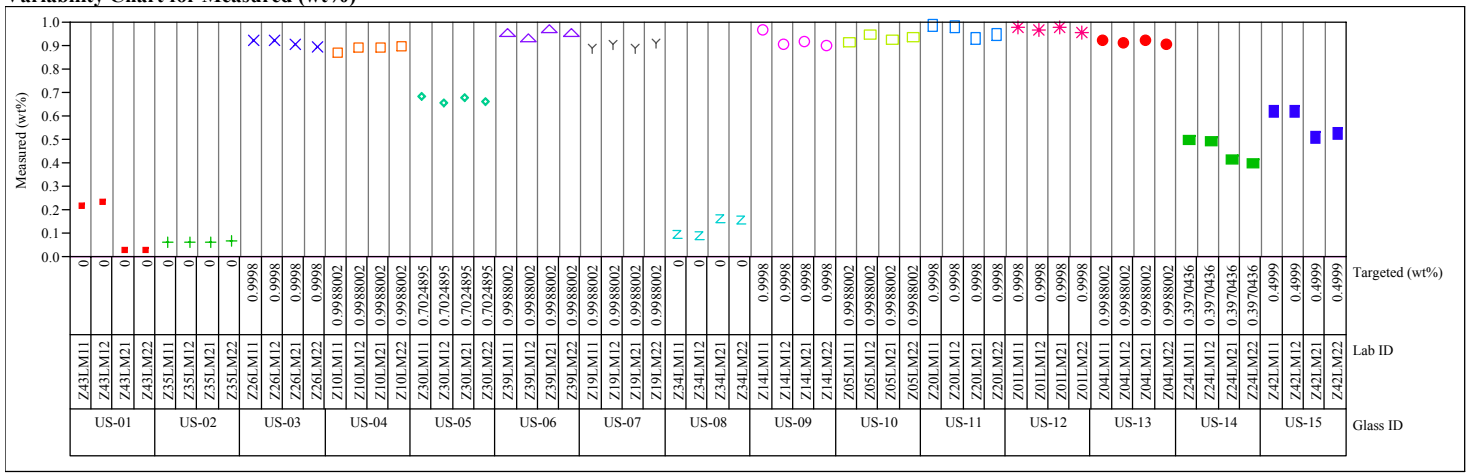
Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	53.6964	0.45661	52.744	54.649
1/2	3	55.1226	0.45661	54.170	56.075
2/1	3	53.1973	0.45661	52.245	54.150
2/2	3	53.7677	0.45661	52.815	54.720
3/1	3	54.6948	0.45661	53.742	55.647
3/2	3	52.7694	0.45661	51.817	53.722
4/1	3	52.6981	0.45661	51.746	53.651
4/2	3	53.7677	0.45661	52.815	54.720
5/1	3	53.1260	0.45661	52.173	54.078
5/2	3	54.1243	0.45661	53.172	55.077

Std Error uses a pooled estimate of error variance

Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=1, Oxide=CaO (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=CaO (wt%)
Variability Chart for Measured bias-corrected (wt%)

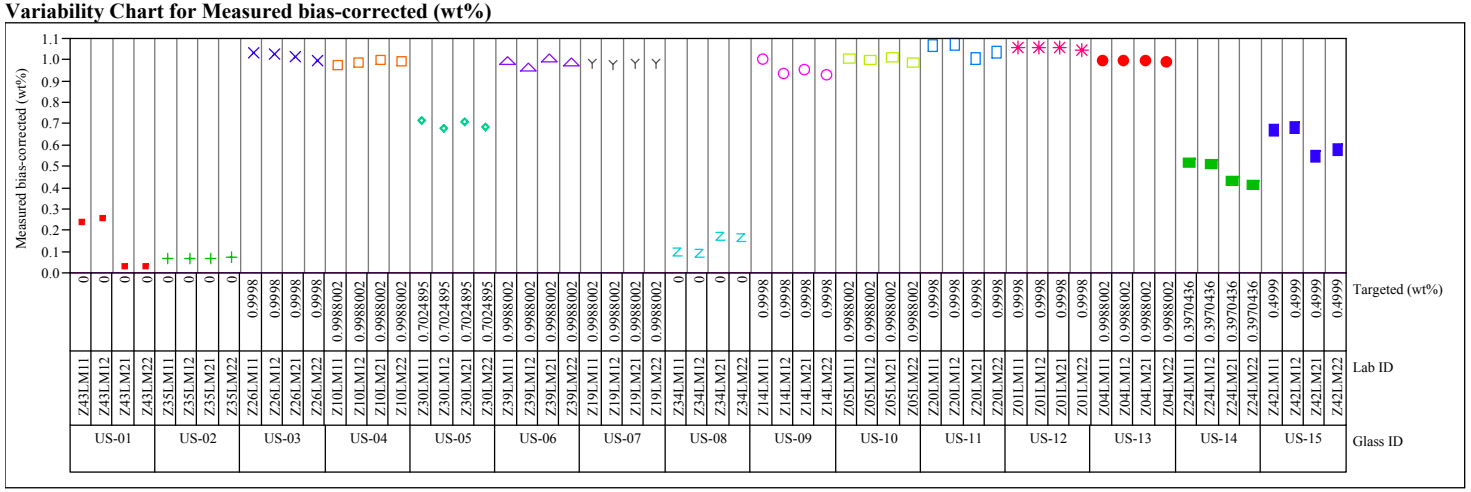
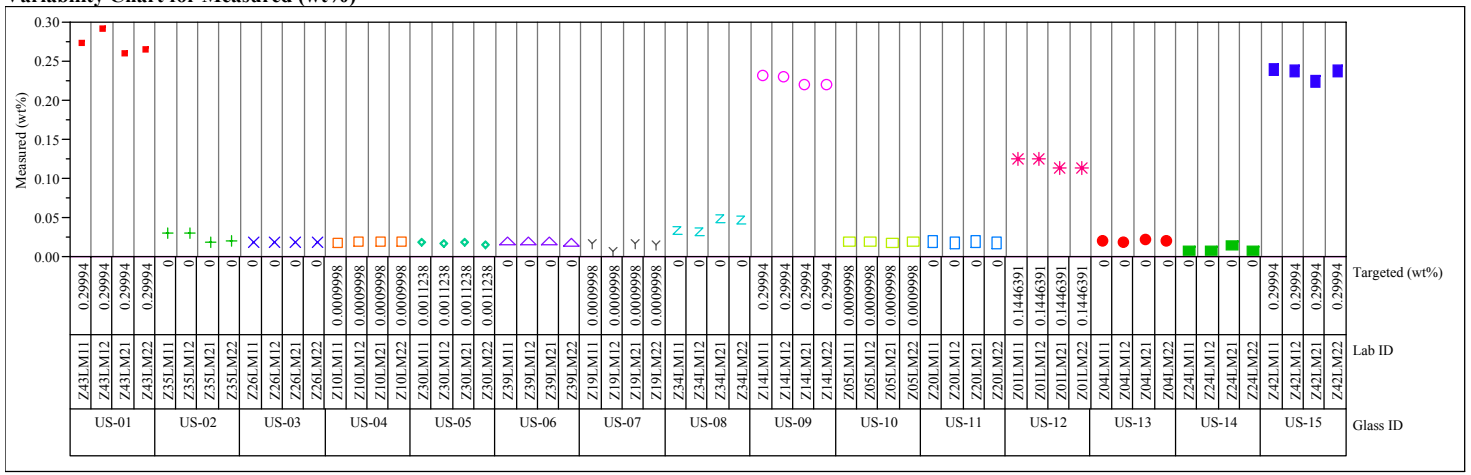


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=1, Oxide=Cr2O3 (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=Cr2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

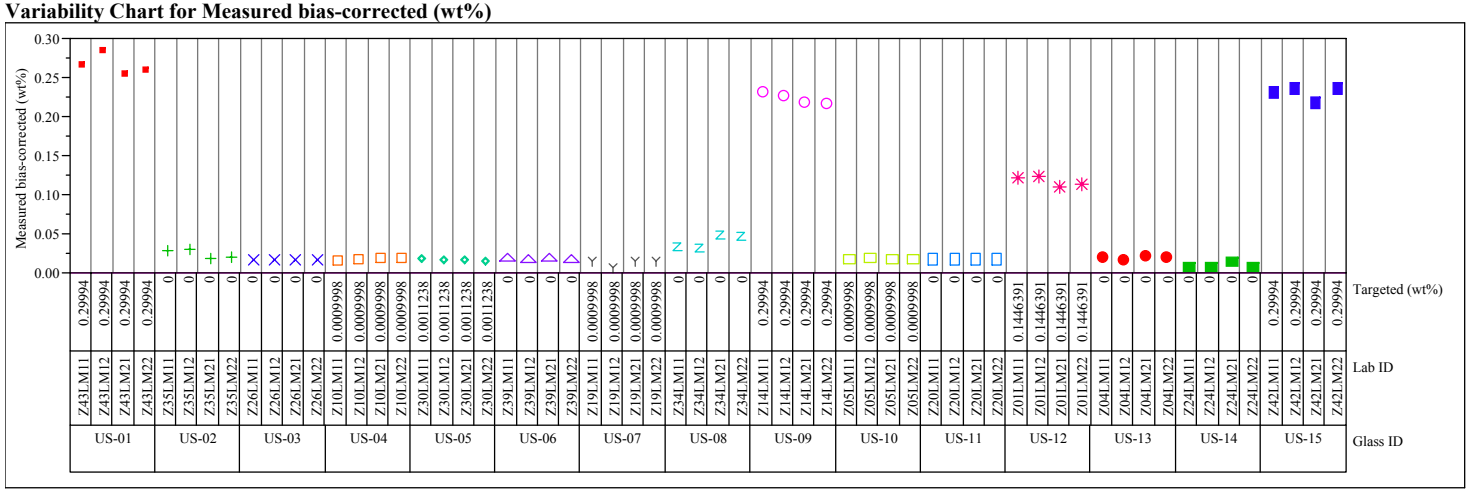
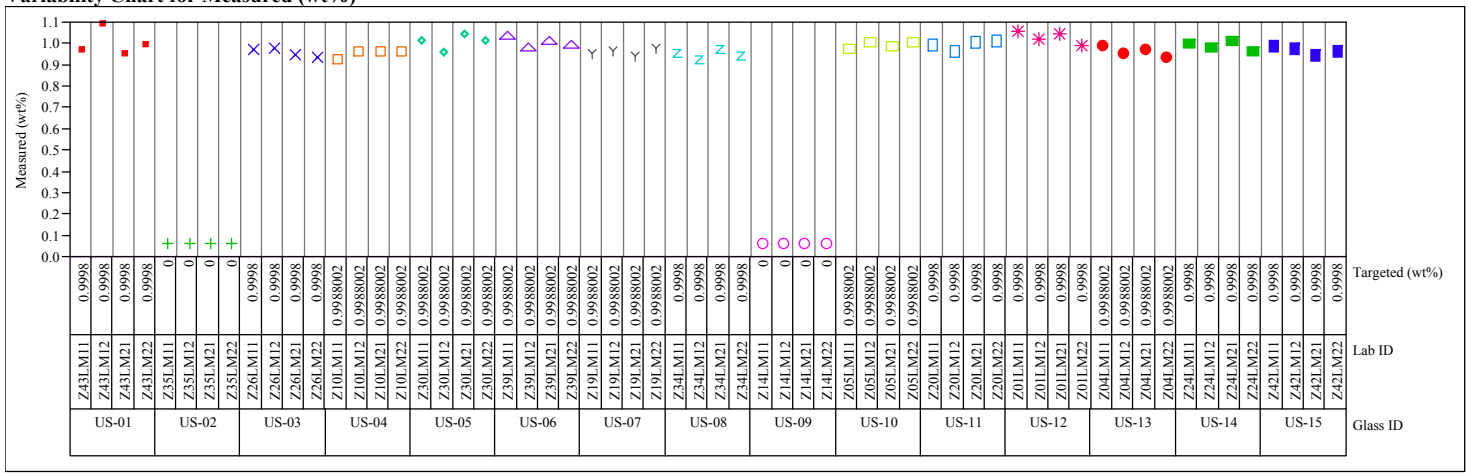


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=1, Oxide=K2O (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=K2O (wt%)
Variability Chart for Measured bias-corrected (wt%)

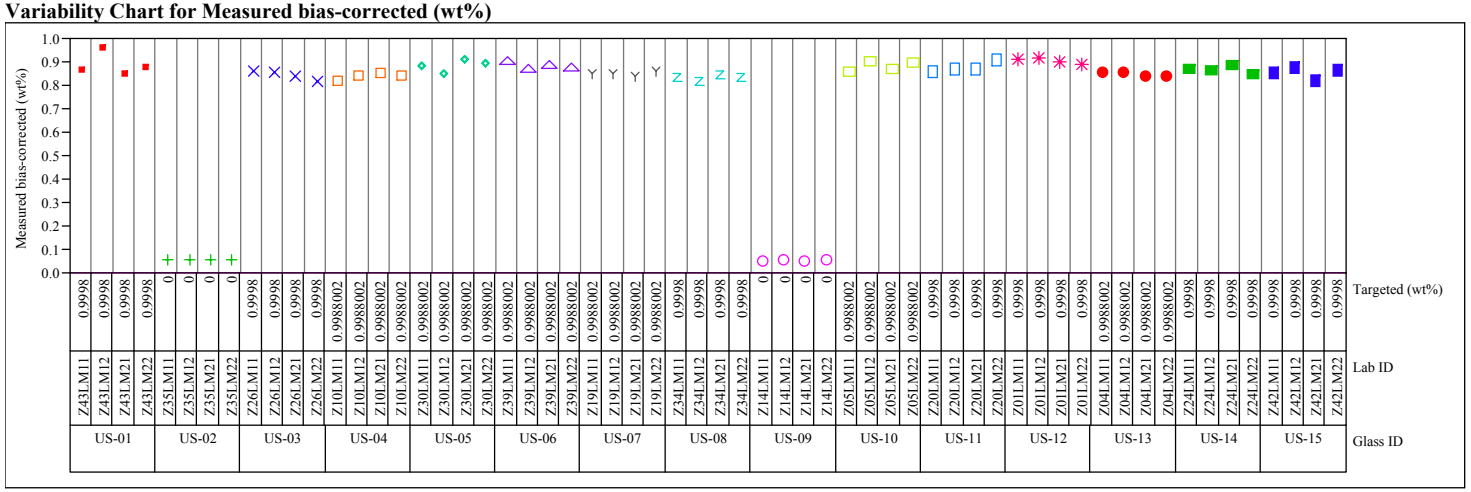
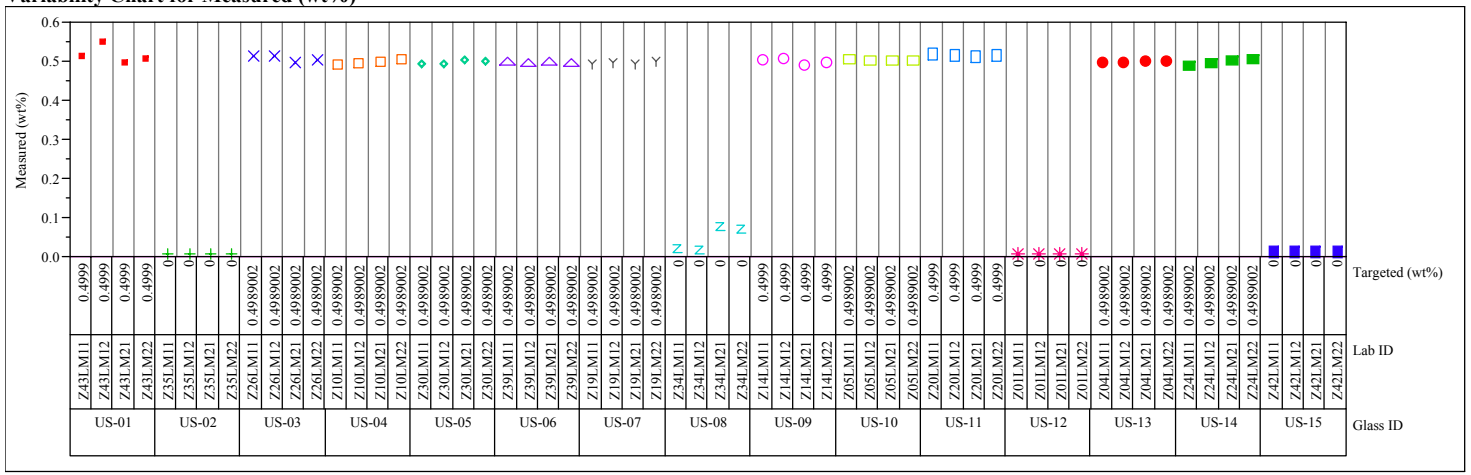


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=1, Oxide=MgO (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=MgO (wt%)
Variability Chart for Measured bias-corrected (wt%)

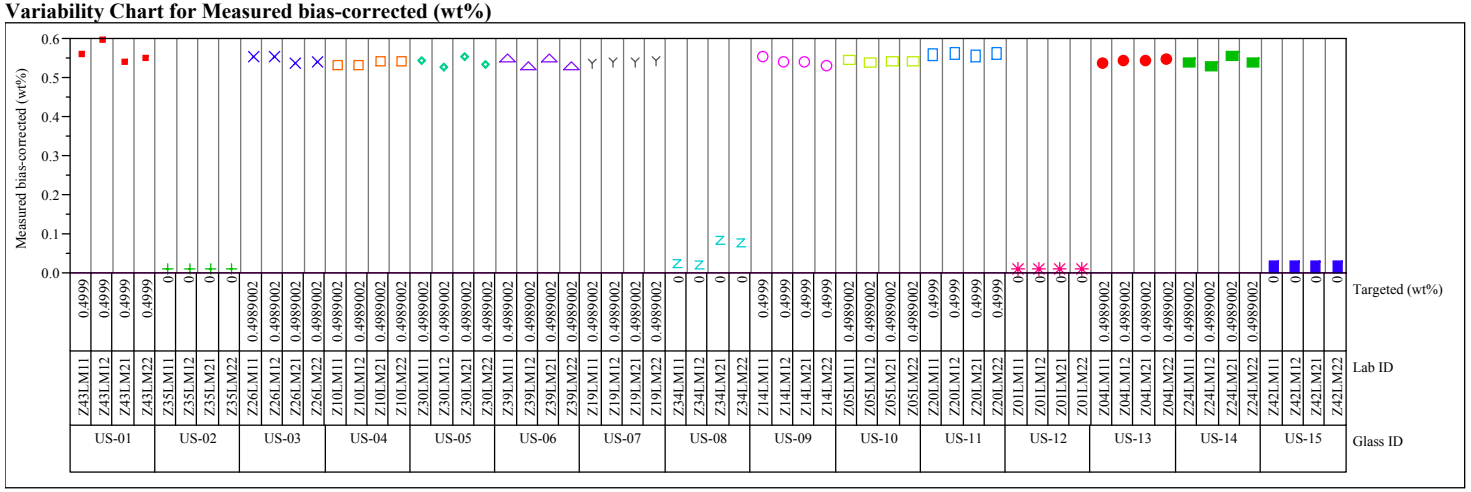
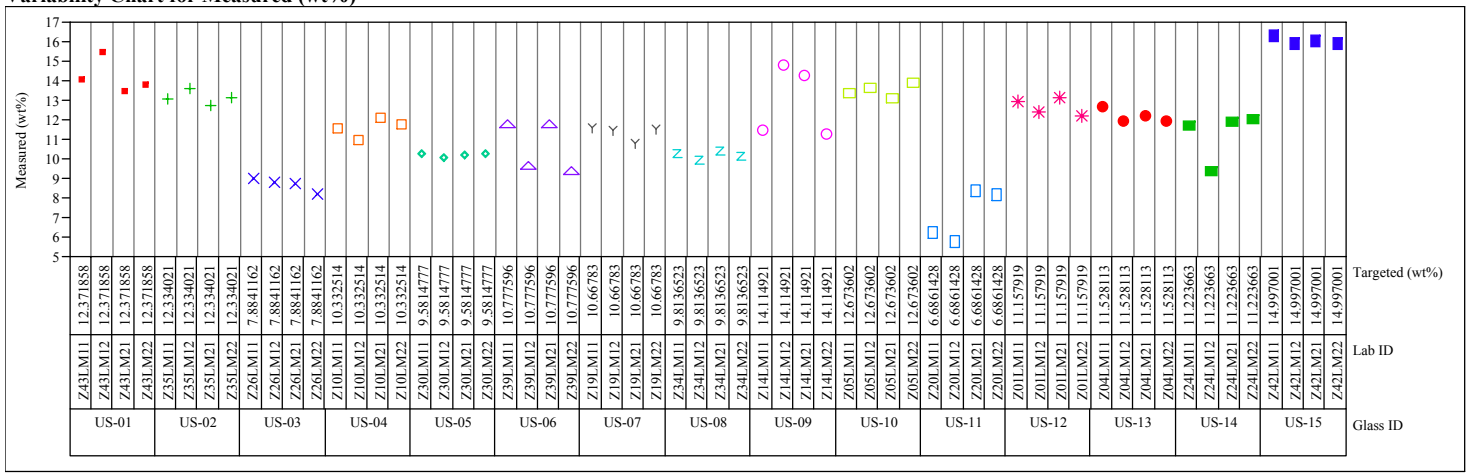


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=1, Oxide=Na2O (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=Na2O (wt%)
Variability Chart for Measured bias-corrected (wt%)

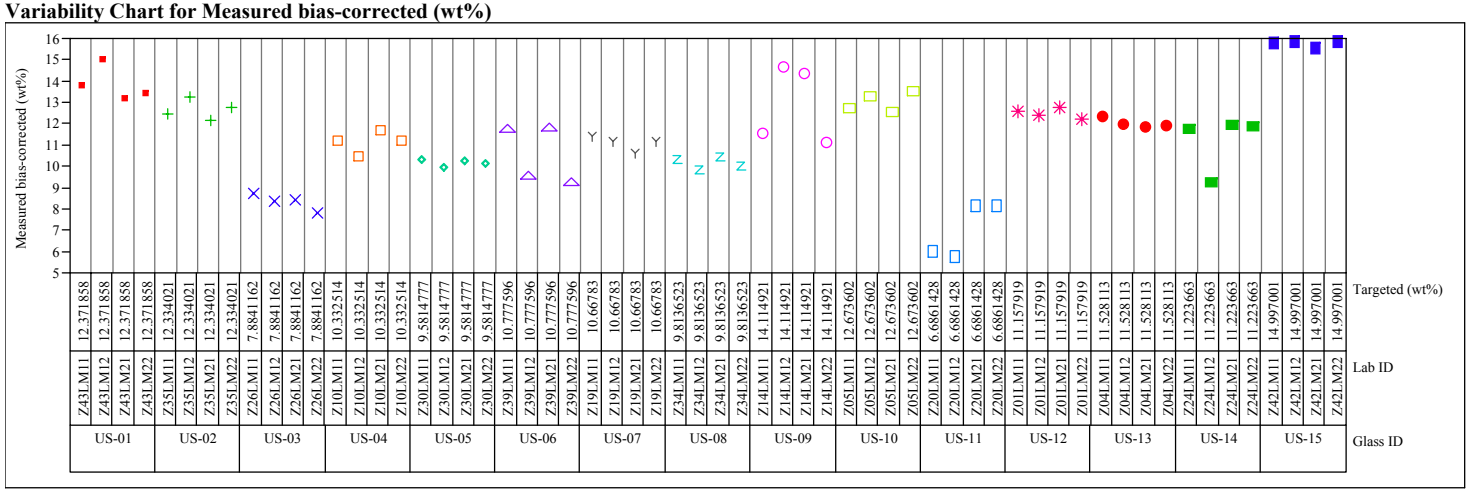
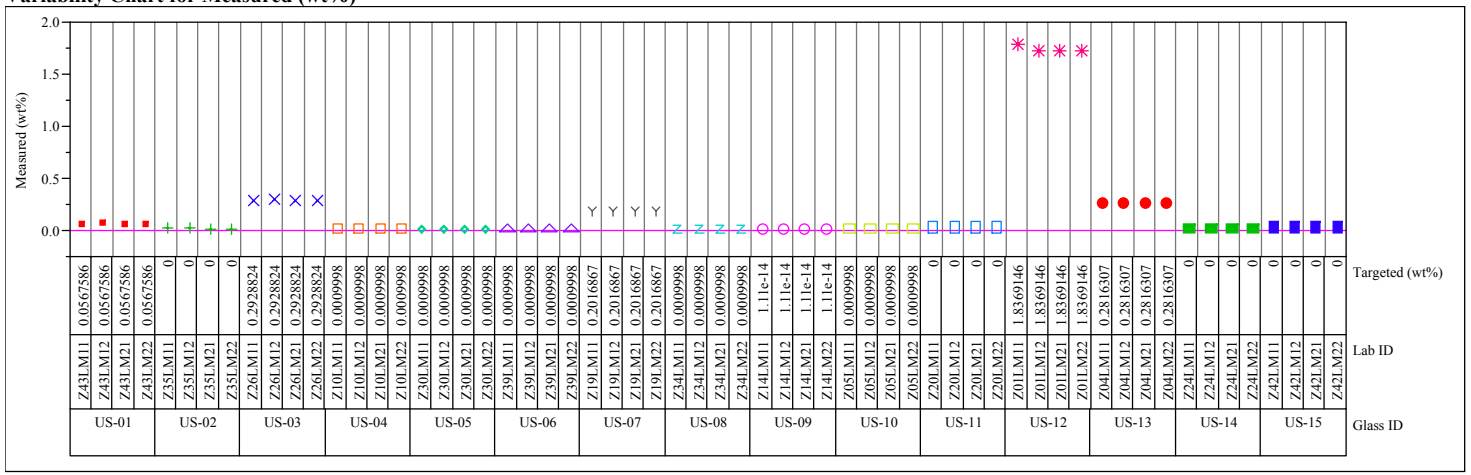


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=1, Oxide=NiO (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=NiO (wt%)
Variability Chart for Measured bias-corrected (wt%)

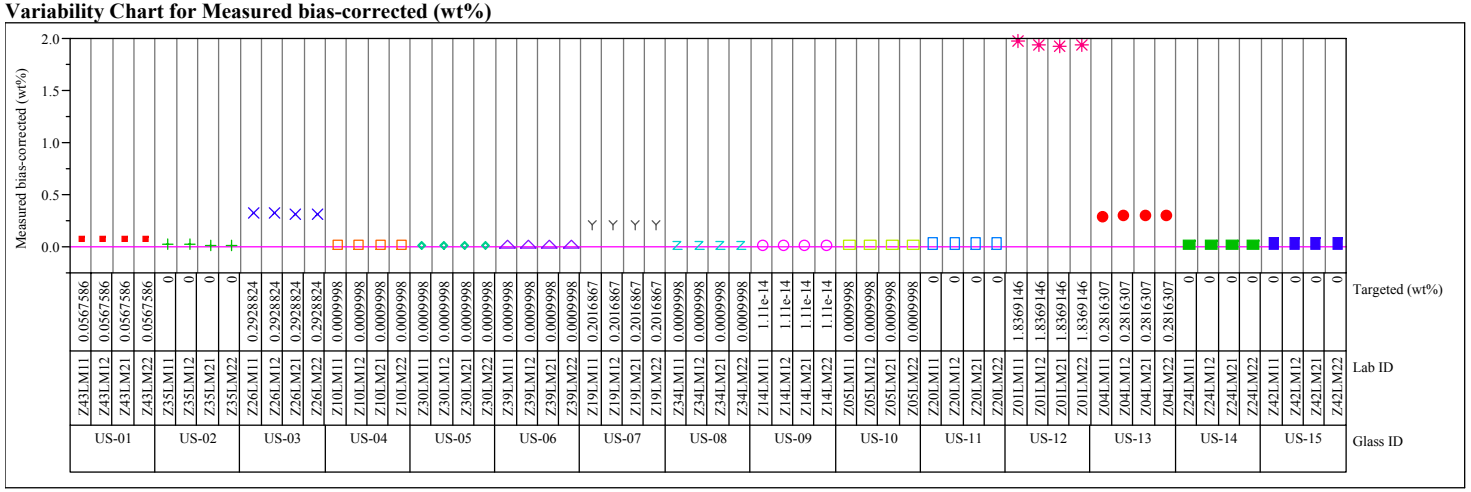
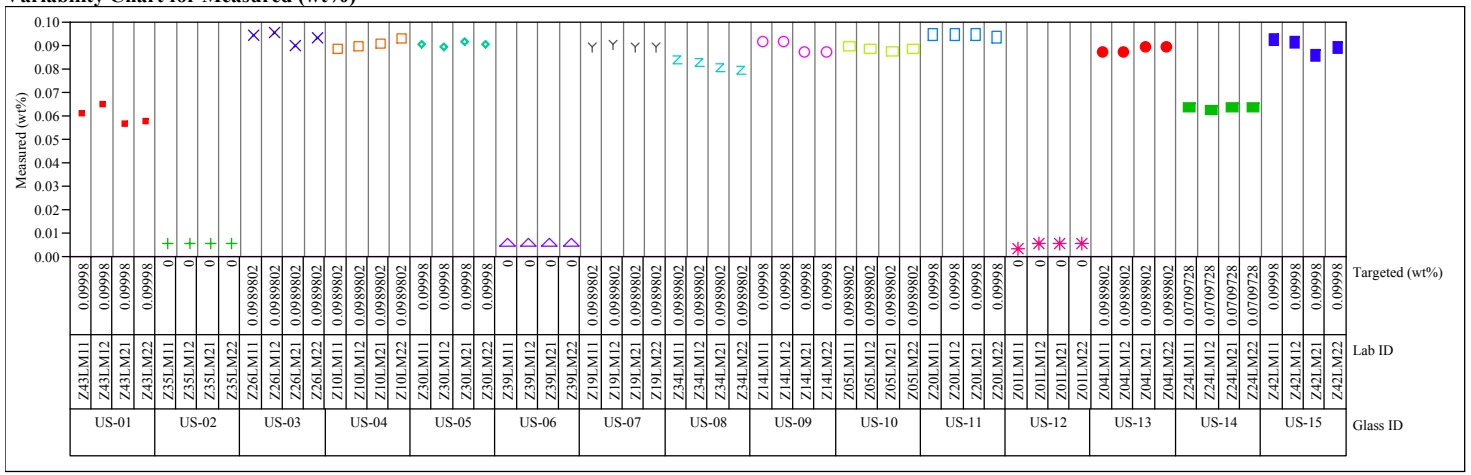


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=1, Oxide=PbO (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=PbO (wt%)
Variability Chart for Measured bias-corrected (wt%)

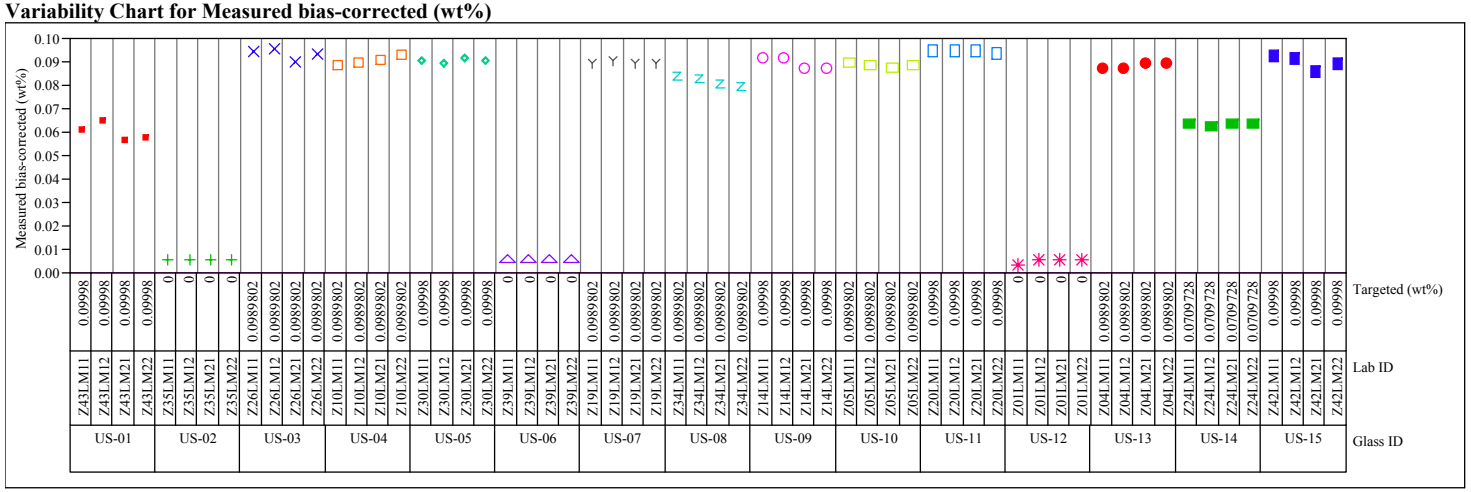
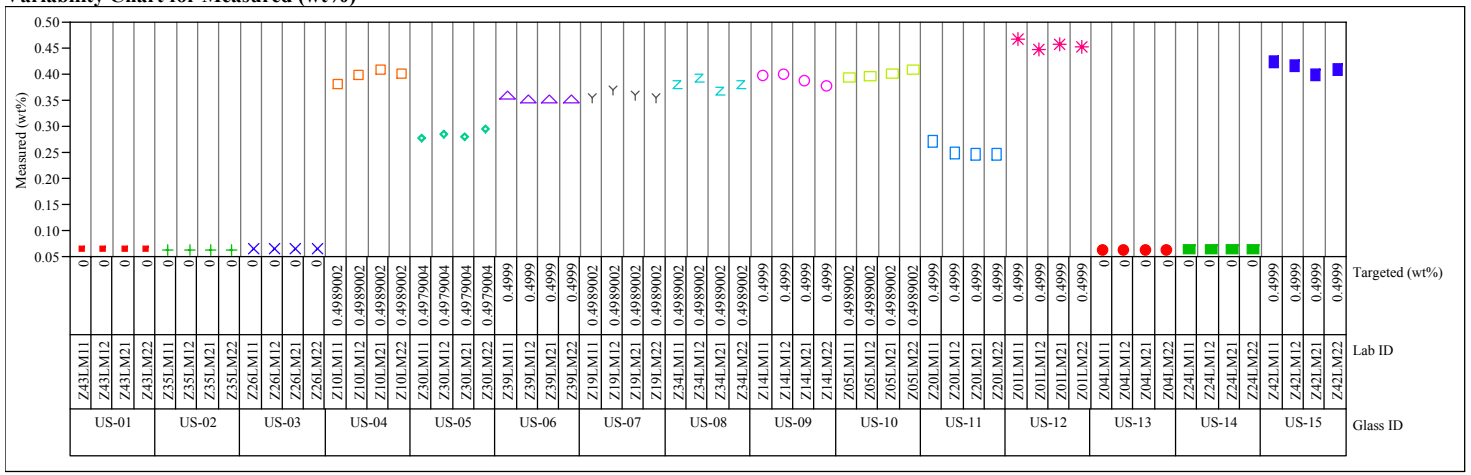


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=1, Oxide=SO3 (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=SO3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

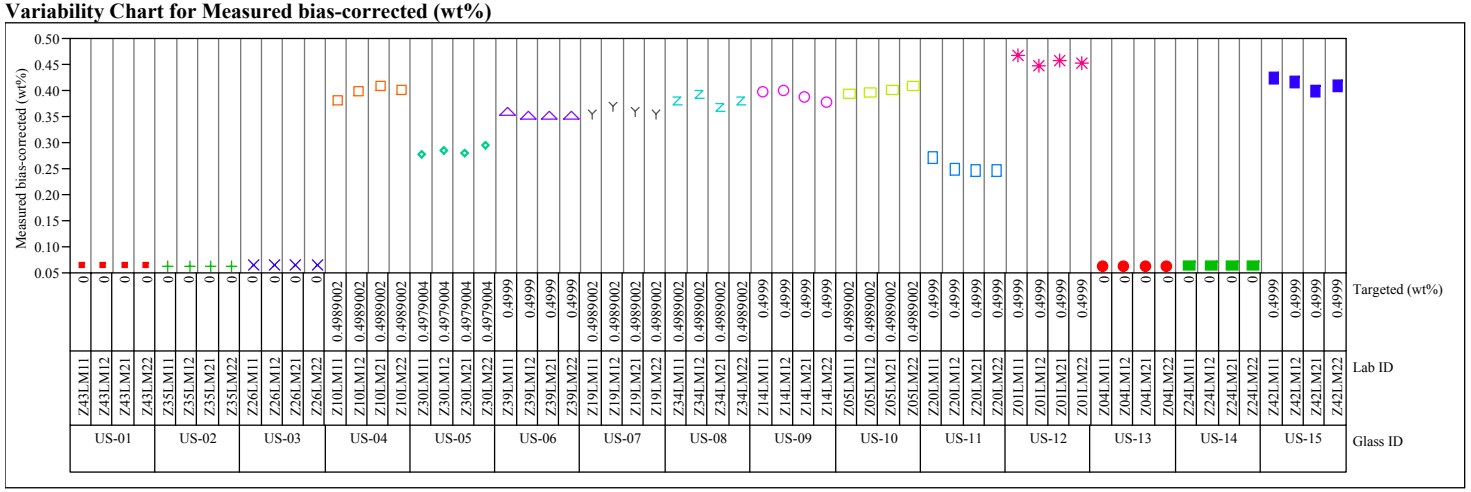
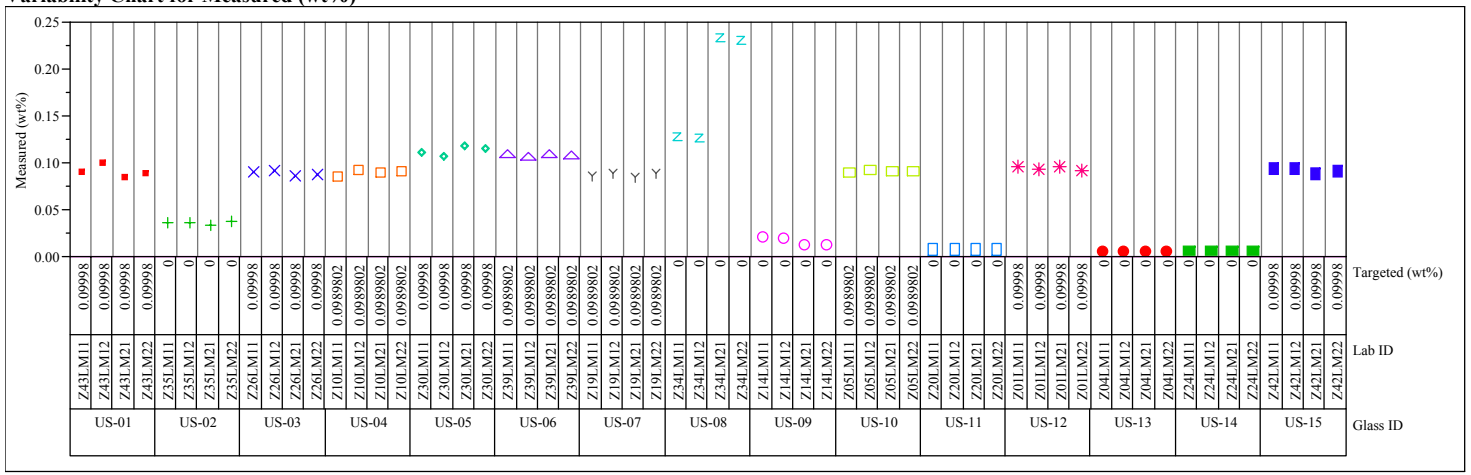


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=1, Oxide=SrO (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=SrO (wt%)
Variability Chart for Measured bias-corrected (wt%)

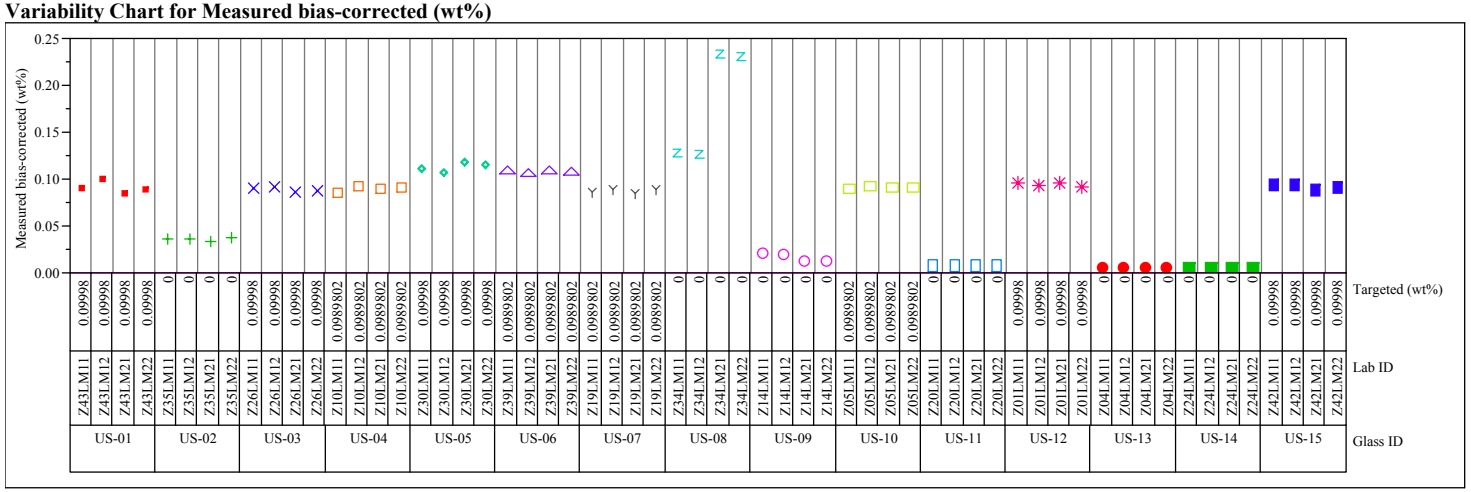
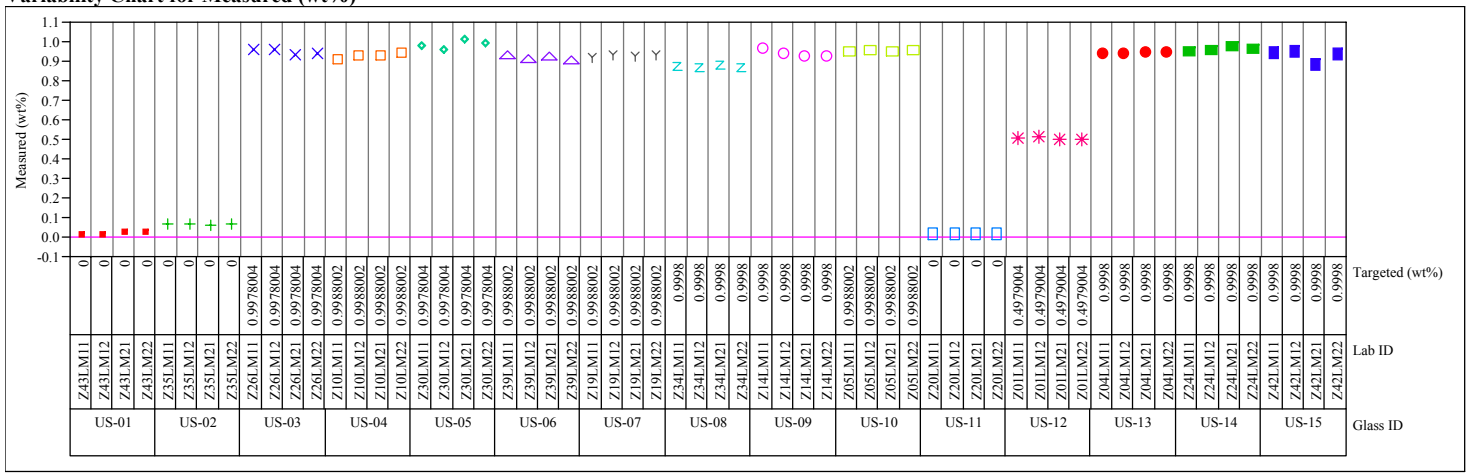


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=1, Oxide=TiO2 (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=TiO2 (wt%)
Variability Chart for Measured bias-corrected (wt%)

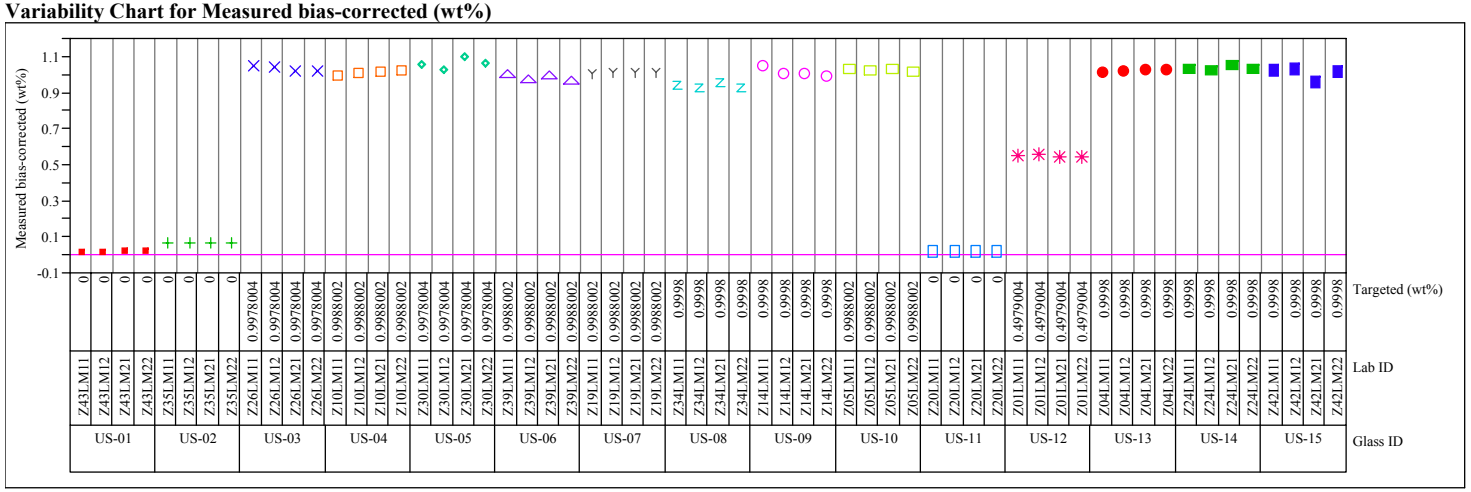
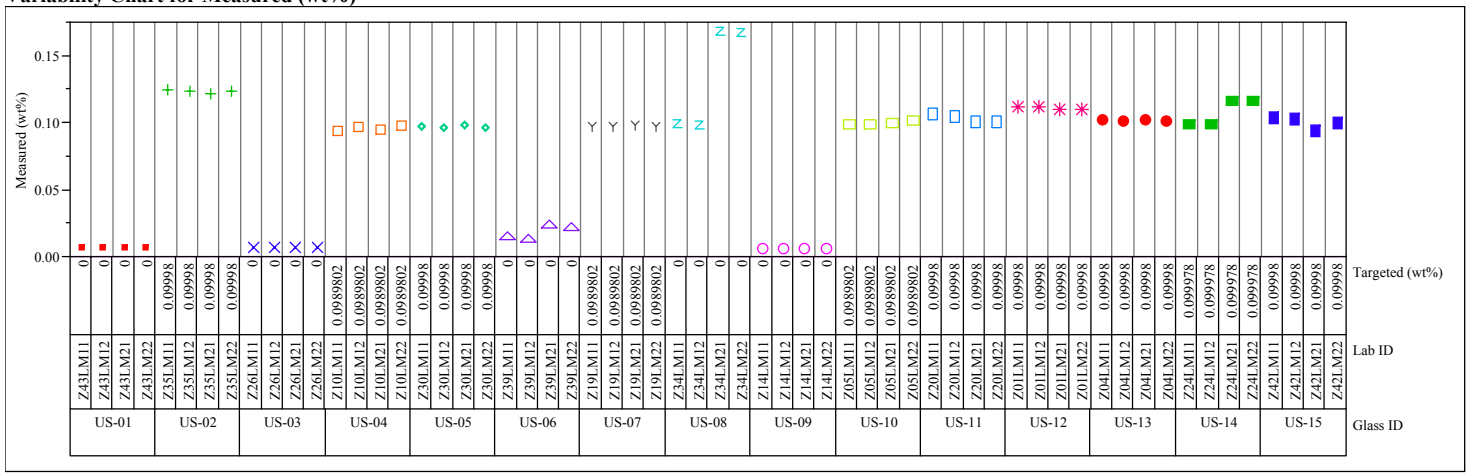


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=1, Oxide=ZnO (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=ZnO (wt%)
Variability Chart for Measured bias-corrected (wt%)

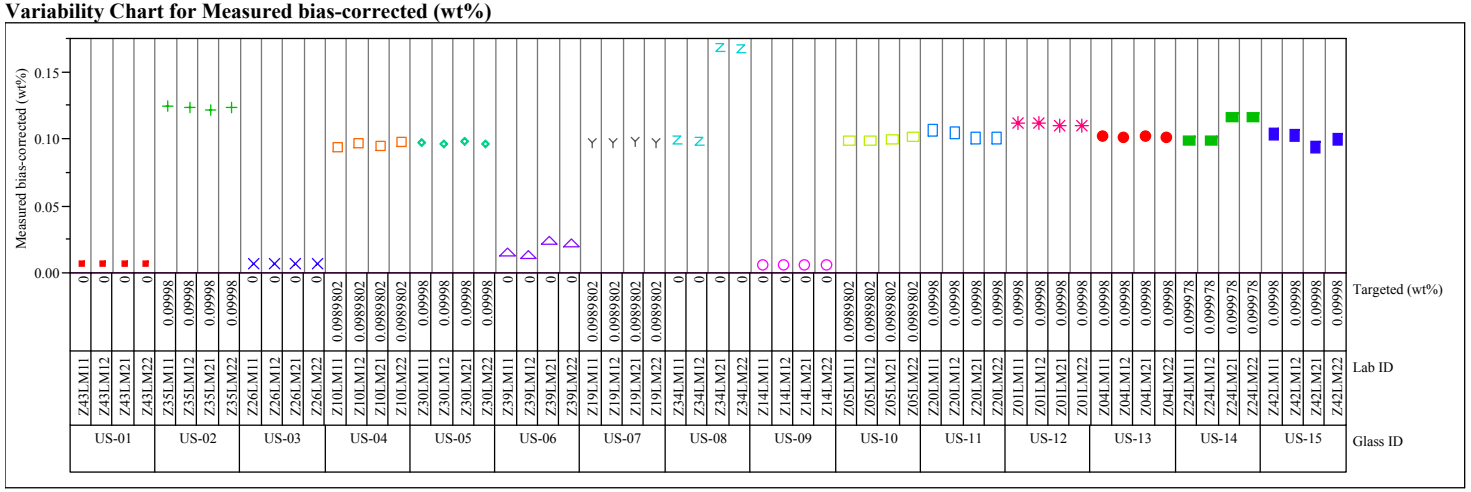
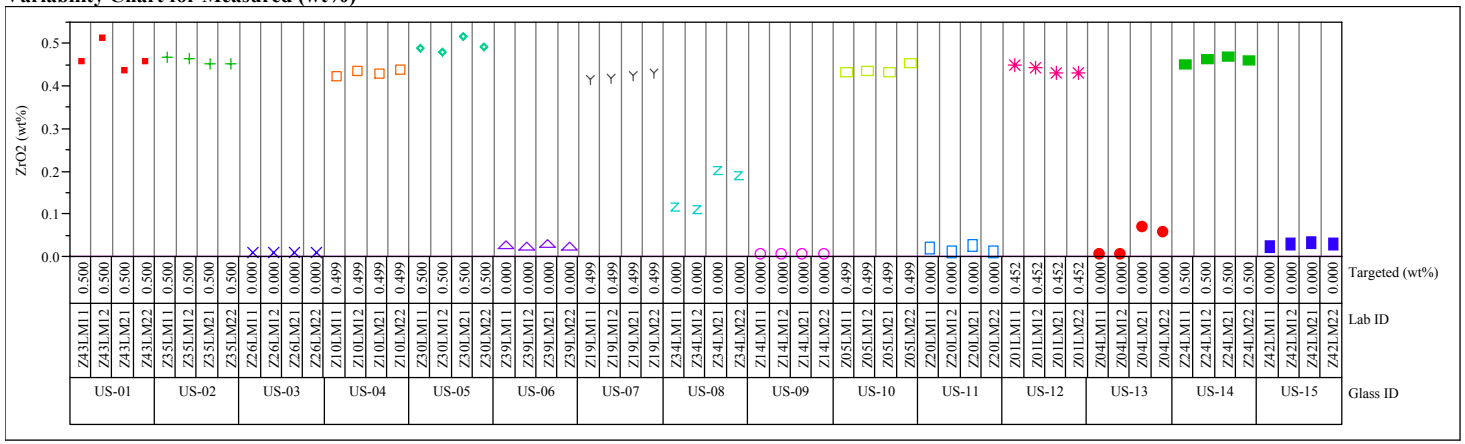


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=1, Oxide=ZrO2 (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=ZrO2 (wt%)
Variability Chart for Measured bias-corrected (wt%)

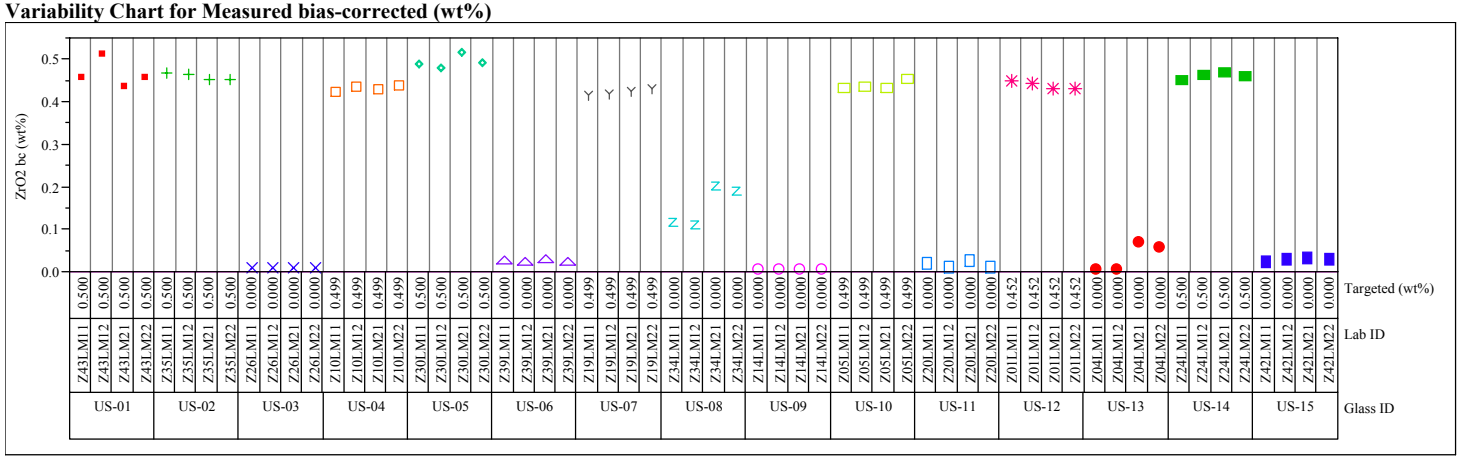
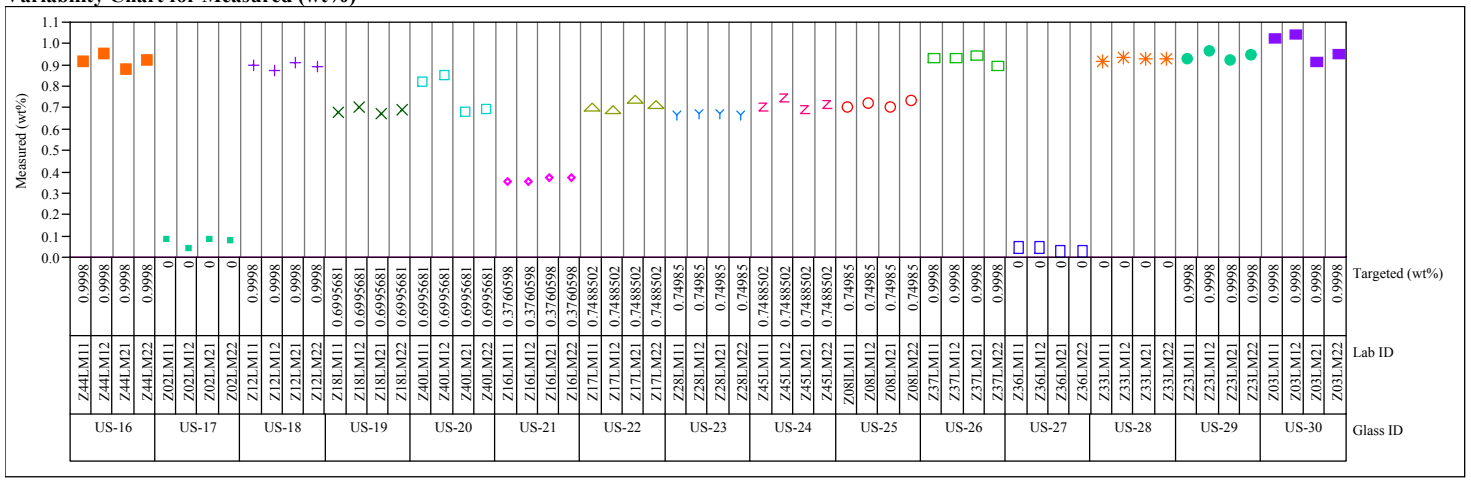


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=2, Oxide=CaO (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=CaO (wt%)
Variability Chart for Measured bias-corrected (wt%)

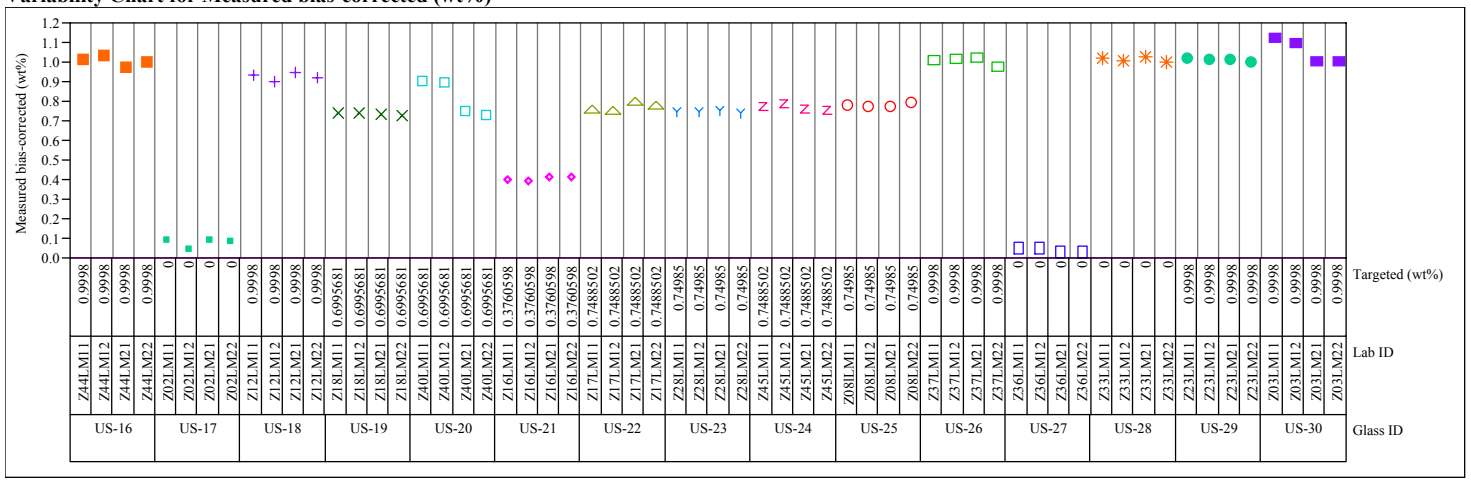
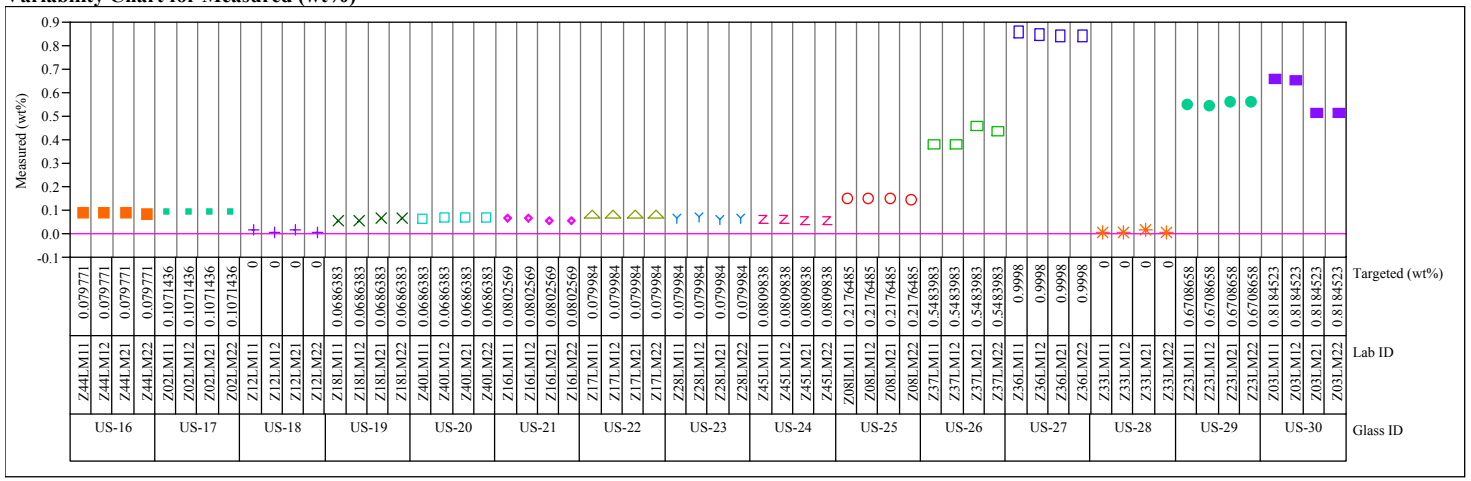


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=2, Oxide=Cr2O3 (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=Cr2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

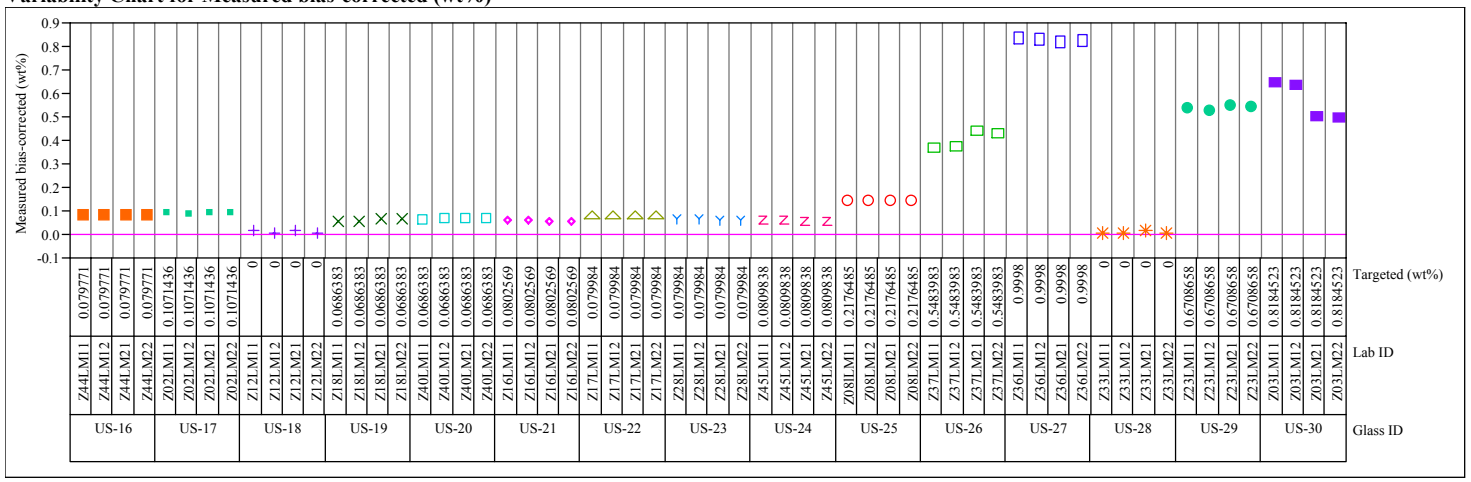
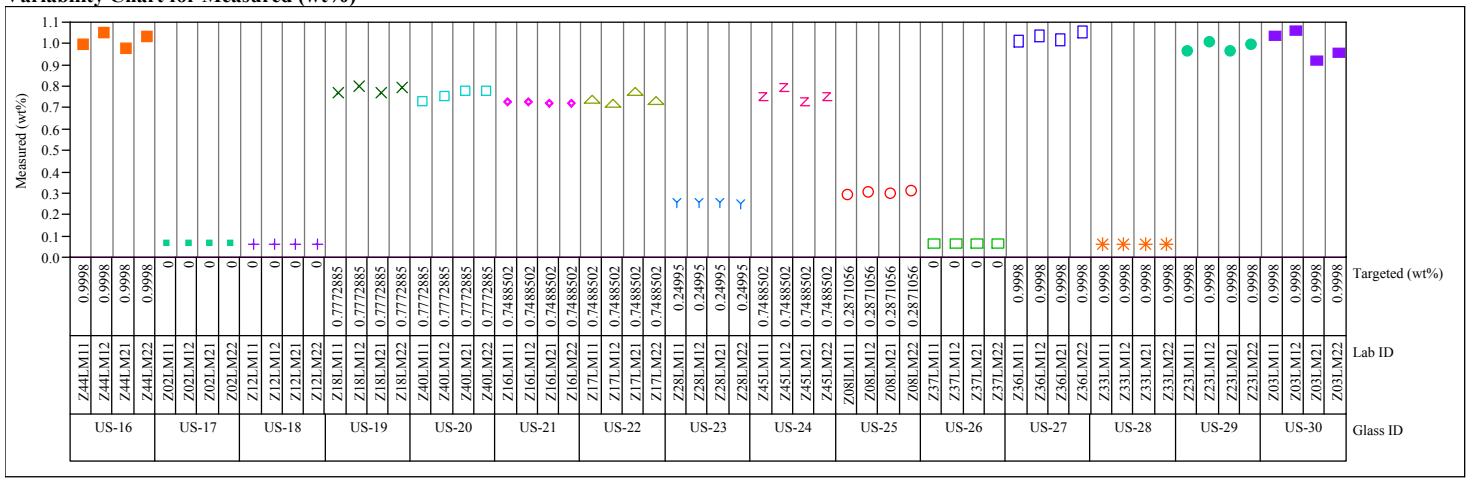


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=2, Oxide=K2O (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=K2O (wt%)
Variability Chart for Measured bias-corrected (wt%)

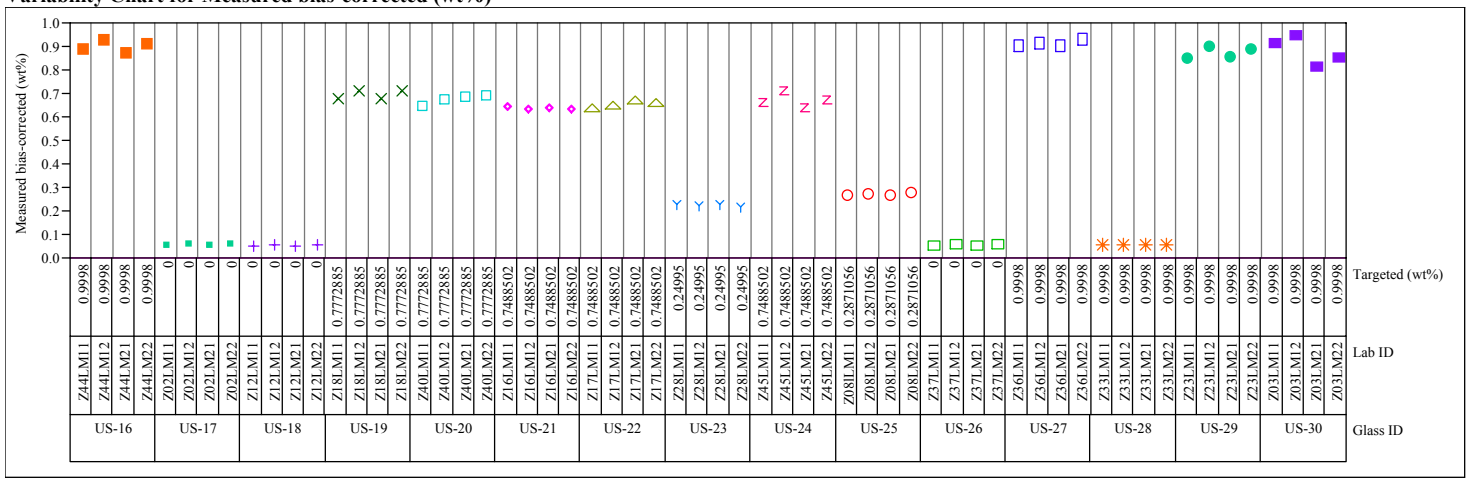
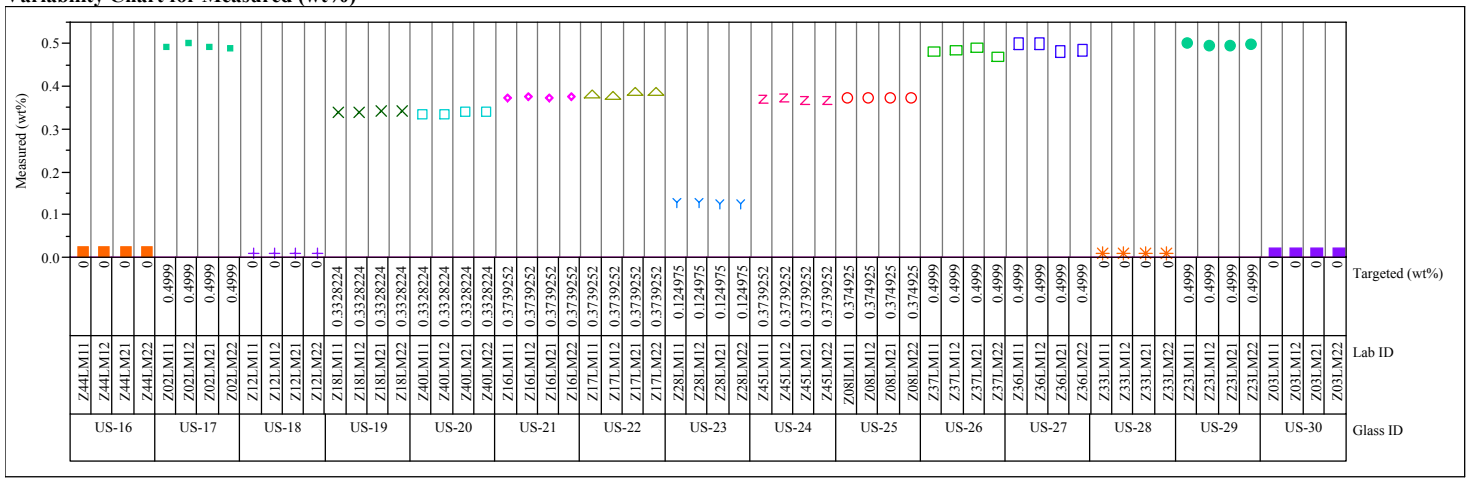


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=2, Oxide=MgO (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=MgO (wt%)
Variability Chart for Measured bias-corrected (wt%)

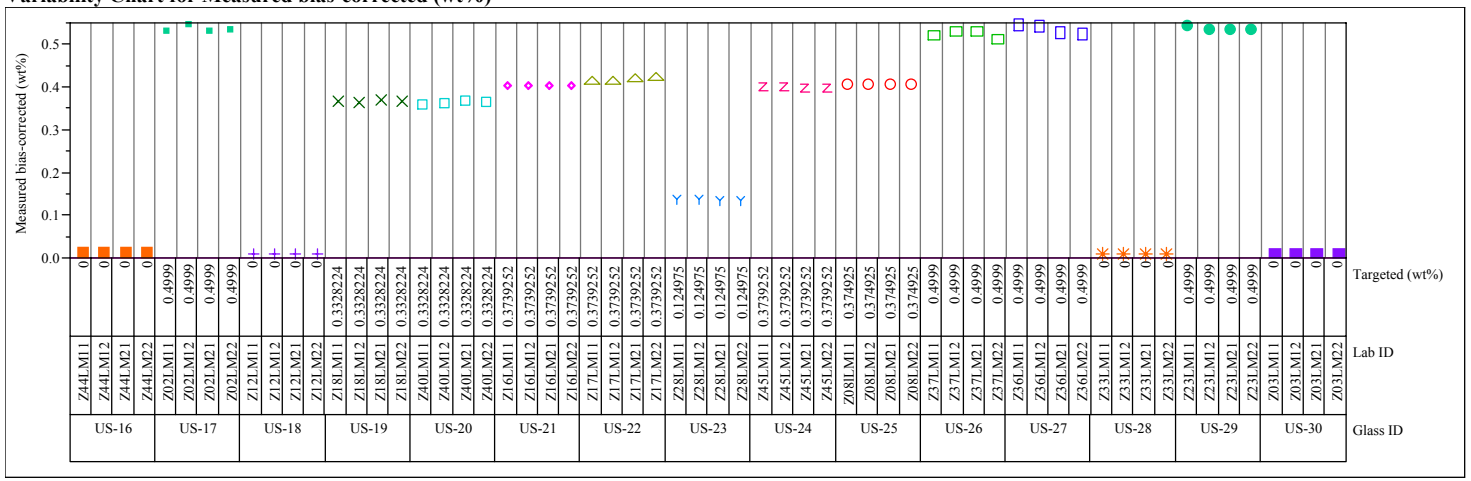
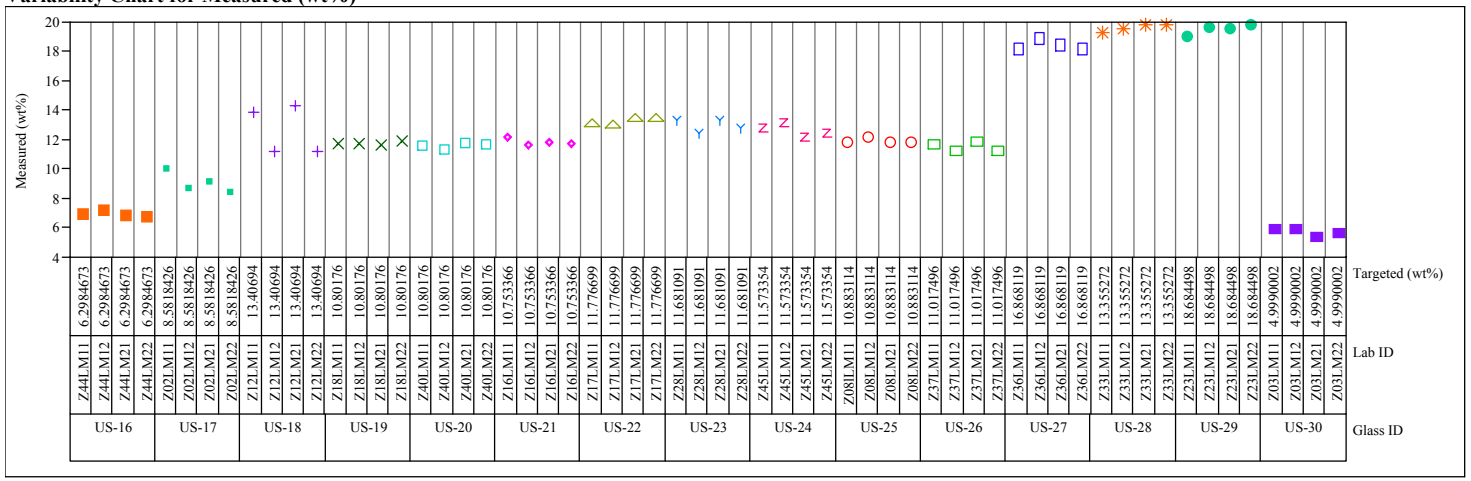


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=2, Oxide=Na2O (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=Na2O (wt%)
Variability Chart for Measured bias-corrected (wt%)

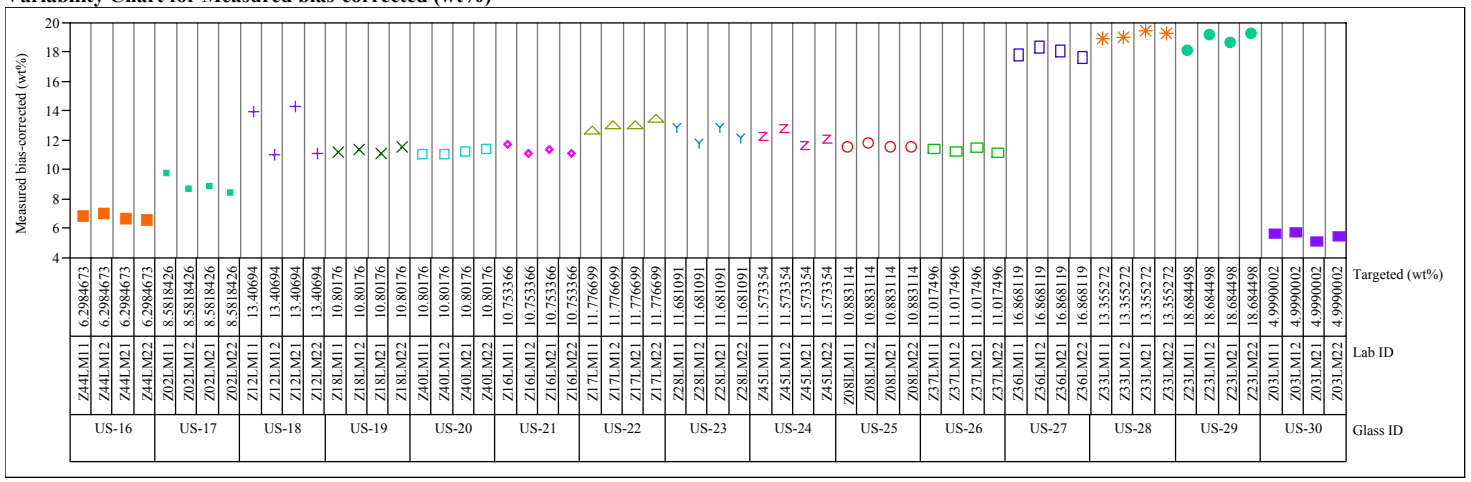
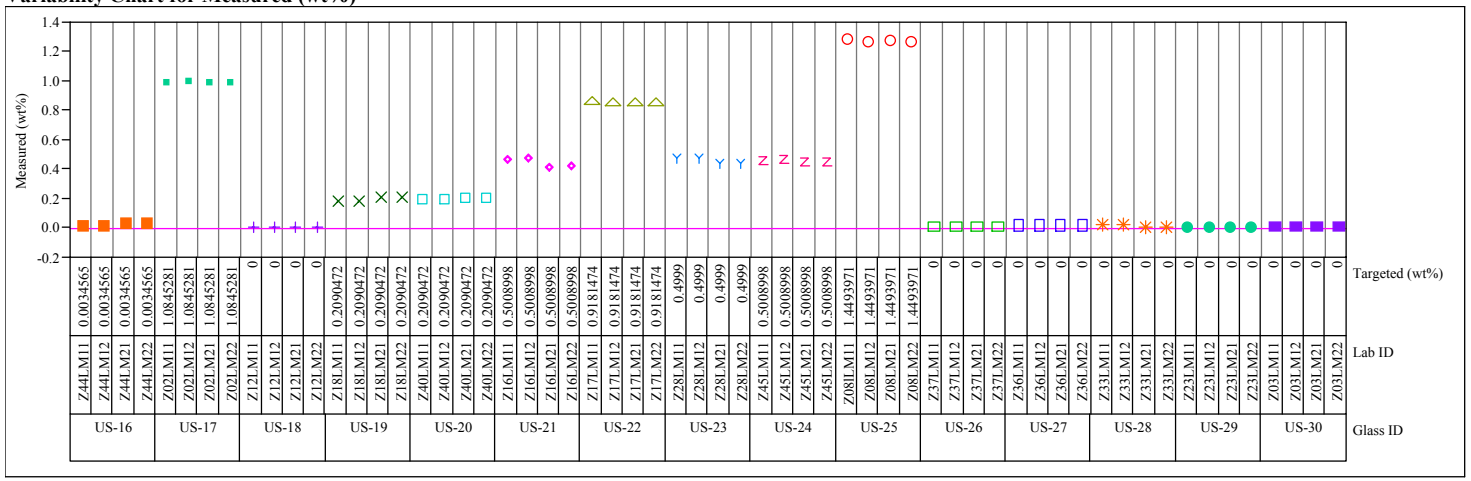


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=2, Oxide=NiO (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=NiO (wt%)
Variability Chart for Measured bias-corrected (wt%)

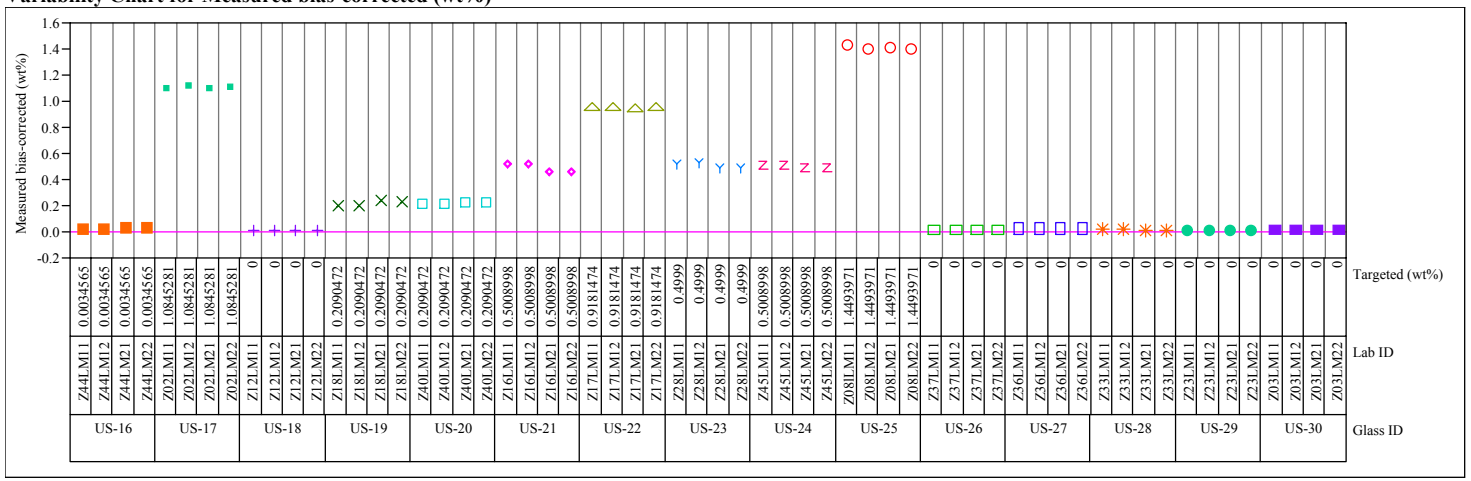
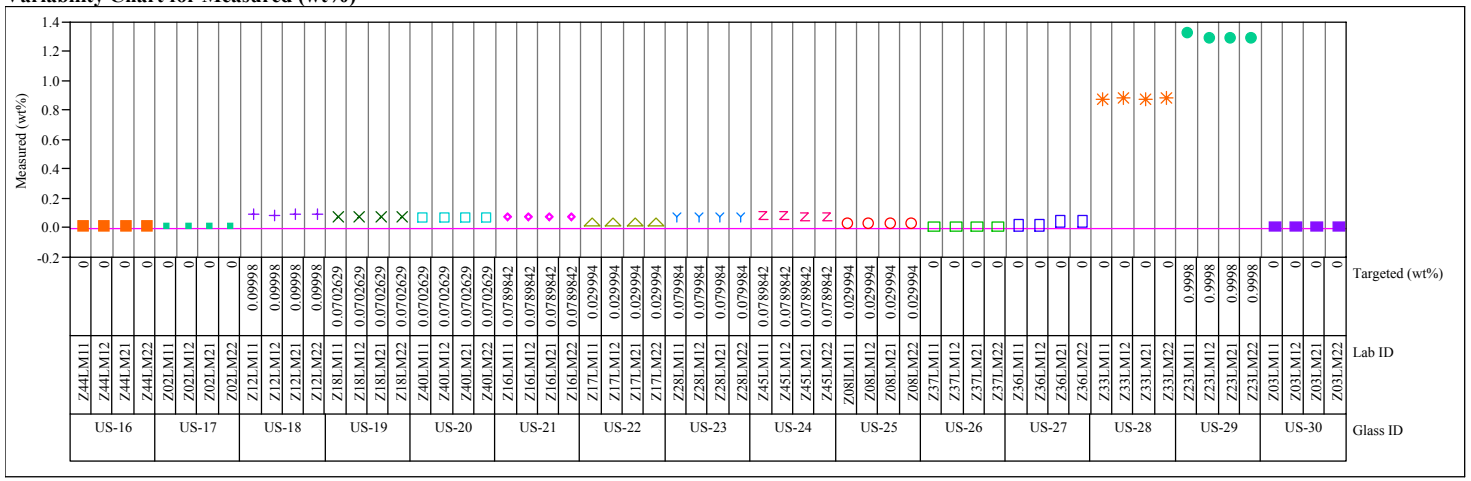


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=2, Oxide=PbO (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=PbO (wt%)
Variability Chart for Measured bias-corrected (wt%)

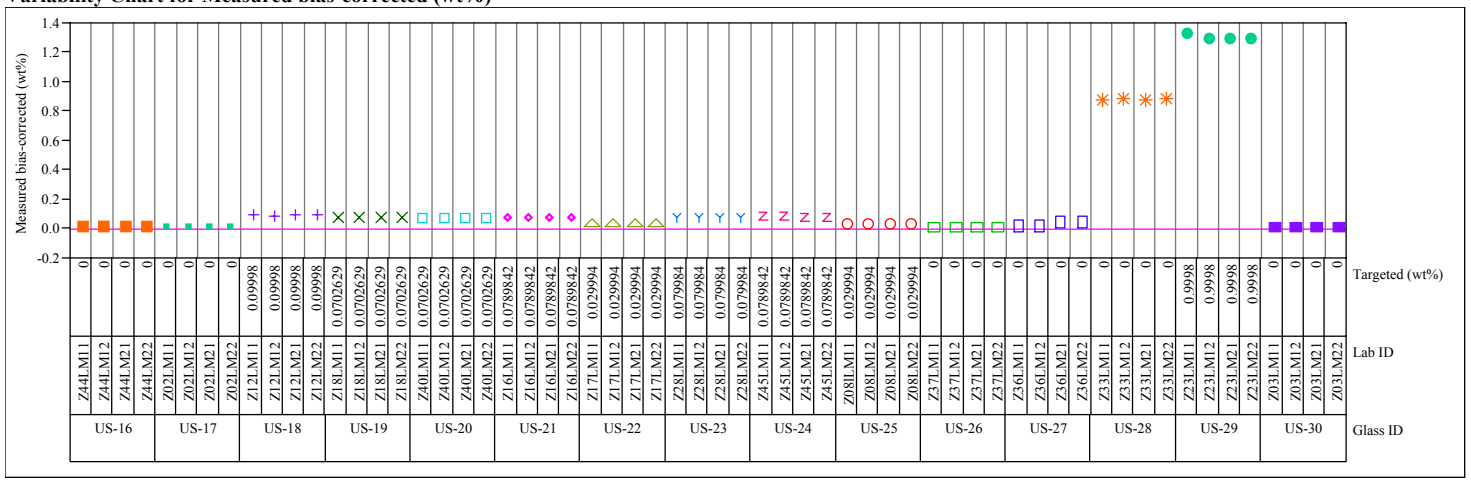
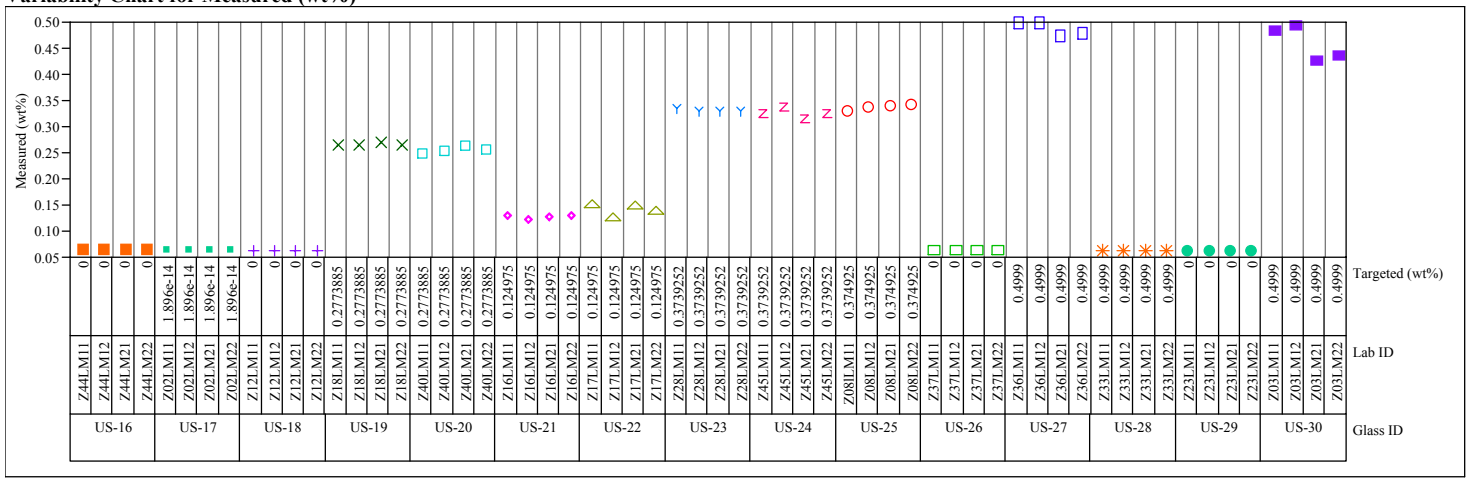


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=2, Oxide=SO3 (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=SO3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

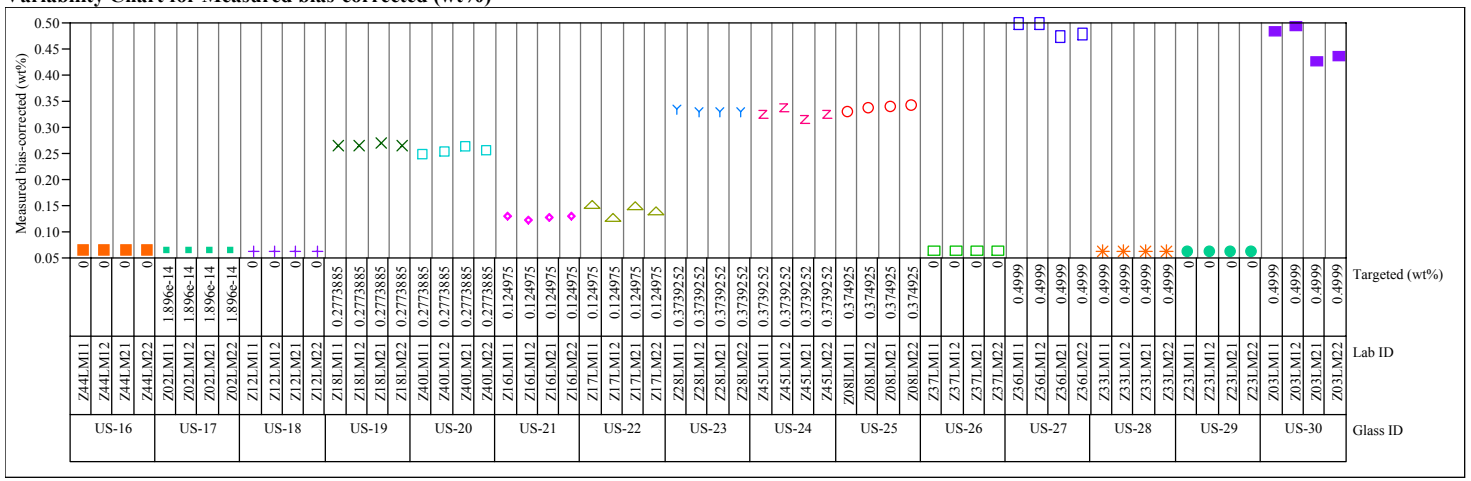
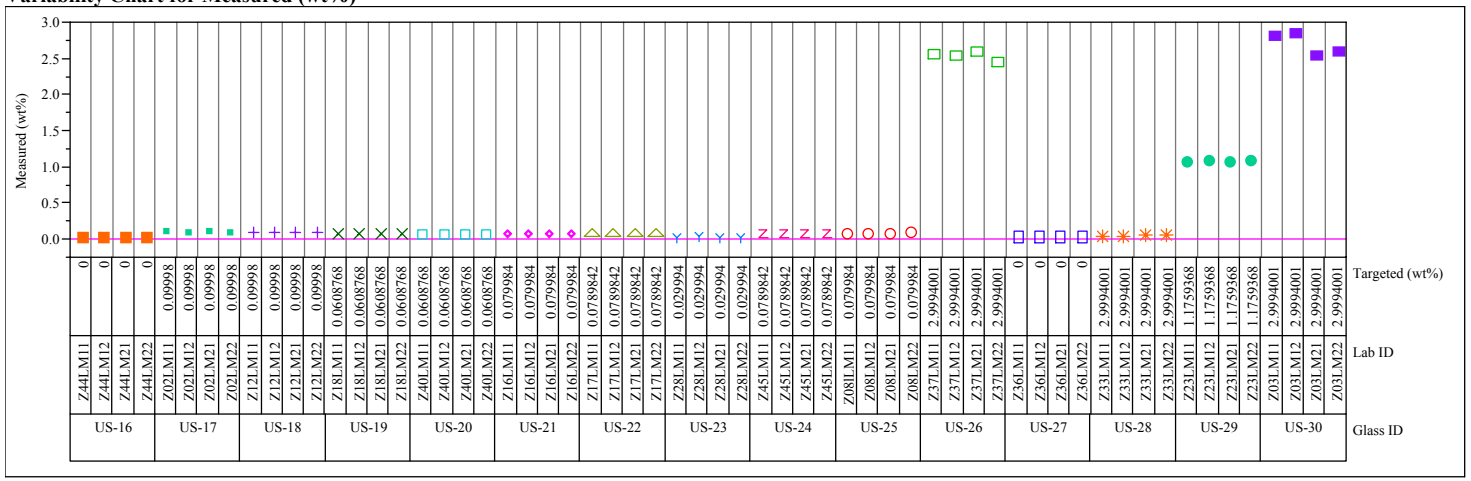


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=2, Oxide=SrO (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=SrO (wt%)
Variability Chart for Measured bias-corrected (wt%)

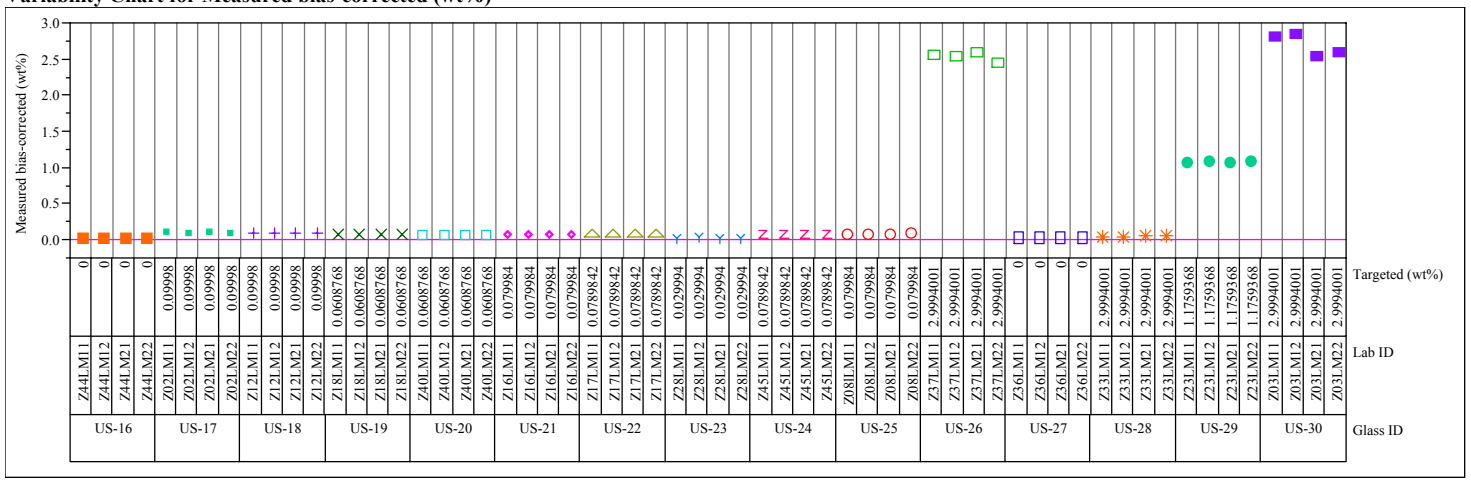
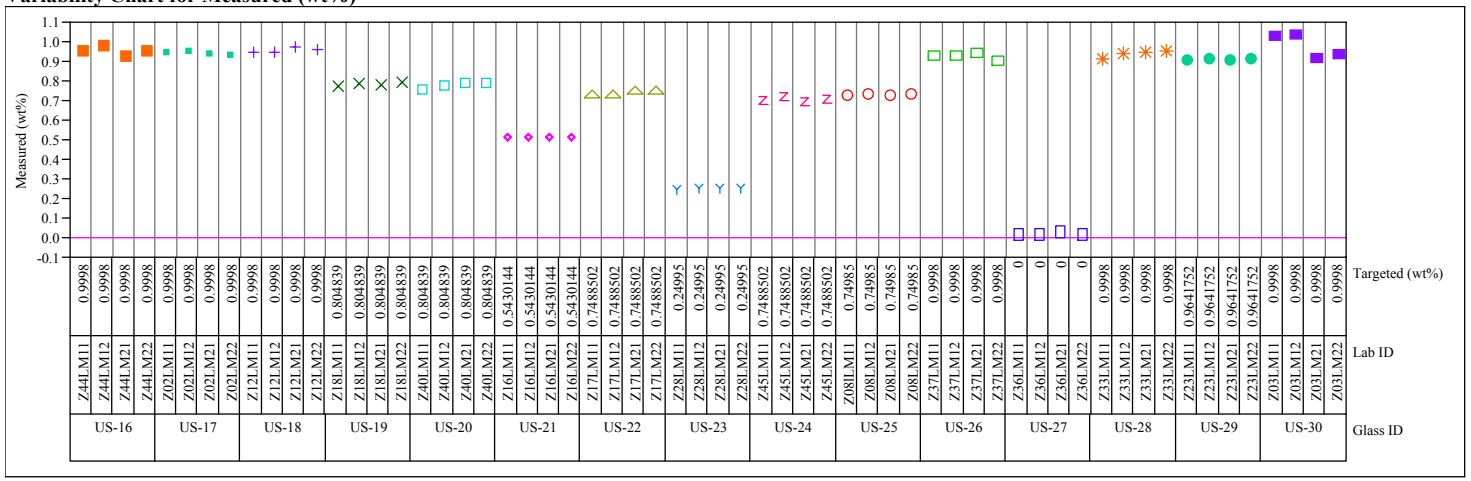


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=2, Oxide=TiO2 (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=TiO2 (wt%)
Variability Chart for Measured bias-corrected (wt%)

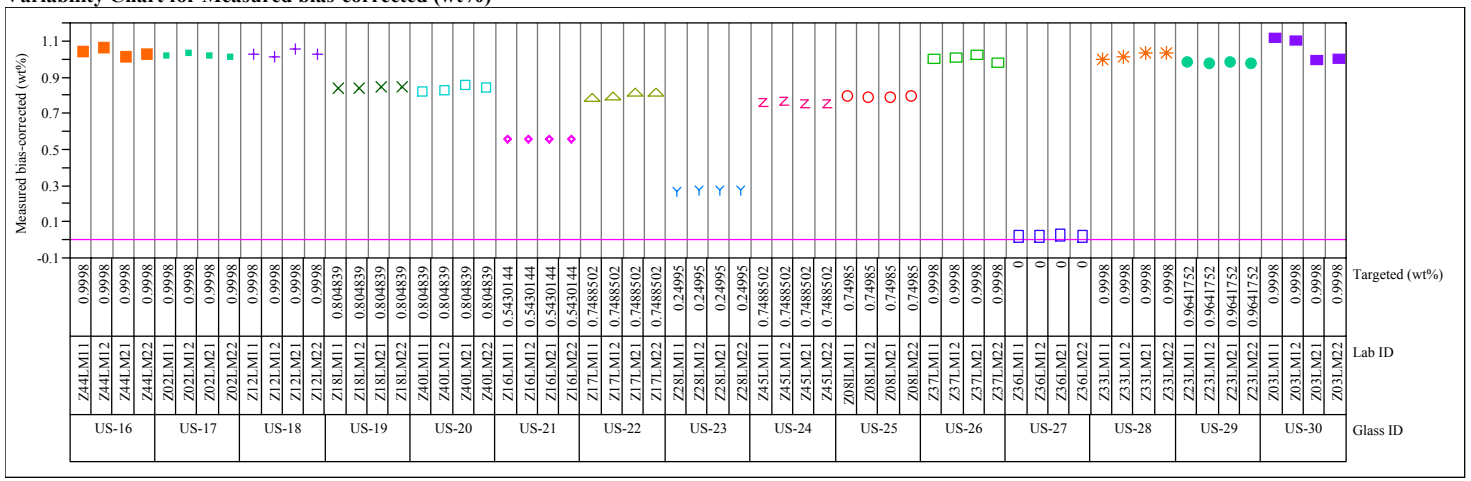
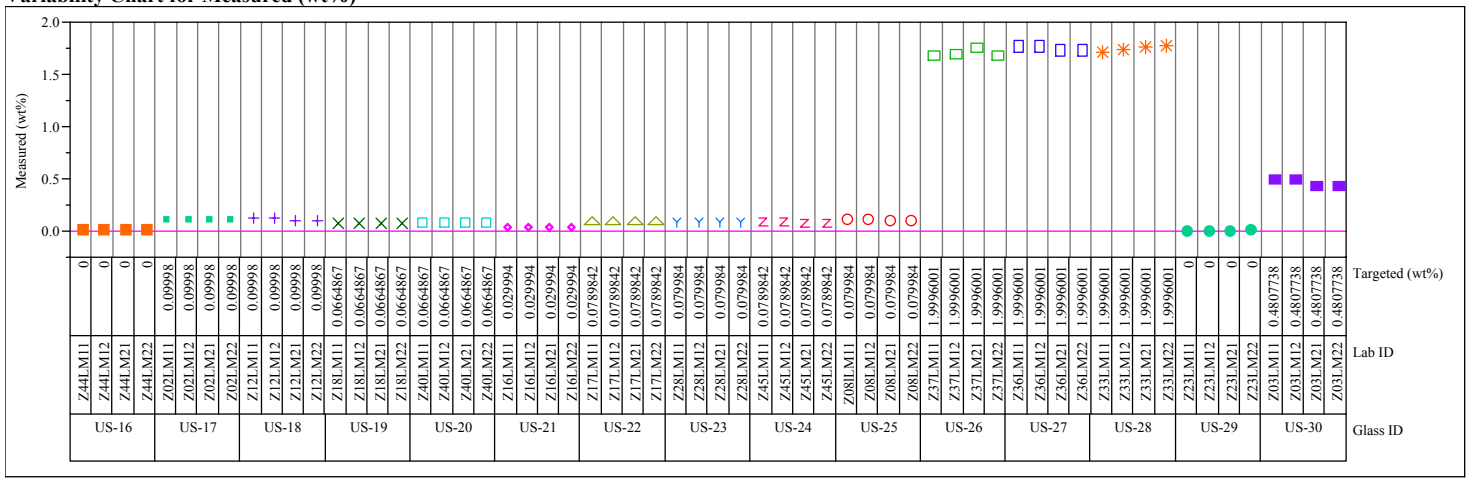


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=2, Oxide=ZnO (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=ZnO (wt%)
Variability Chart for Measured bias-corrected (wt%)

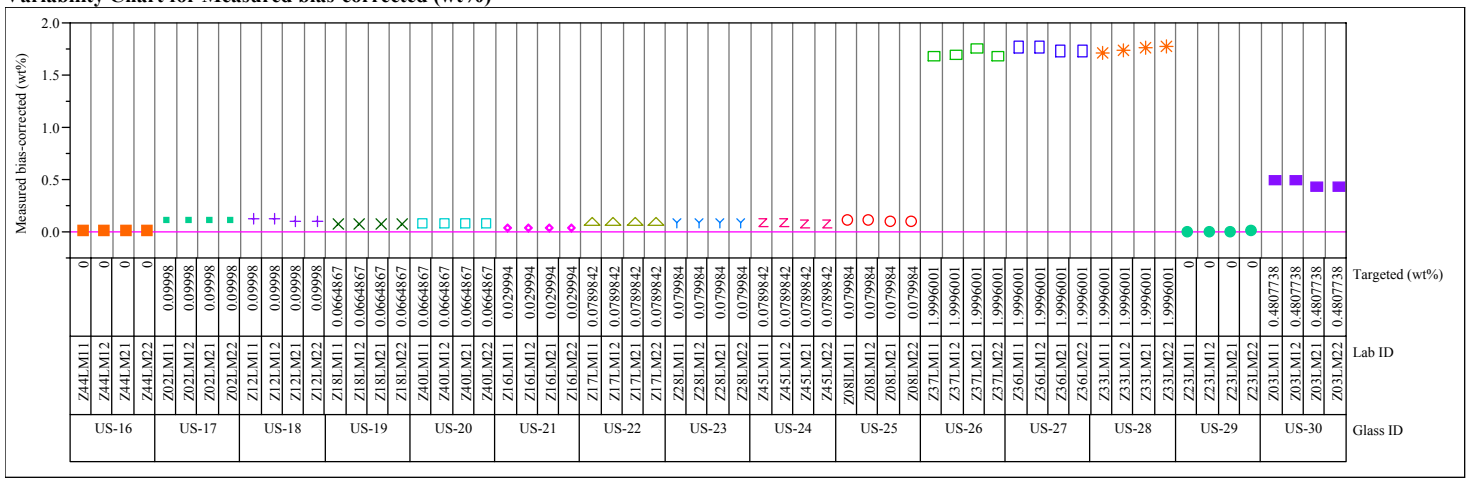
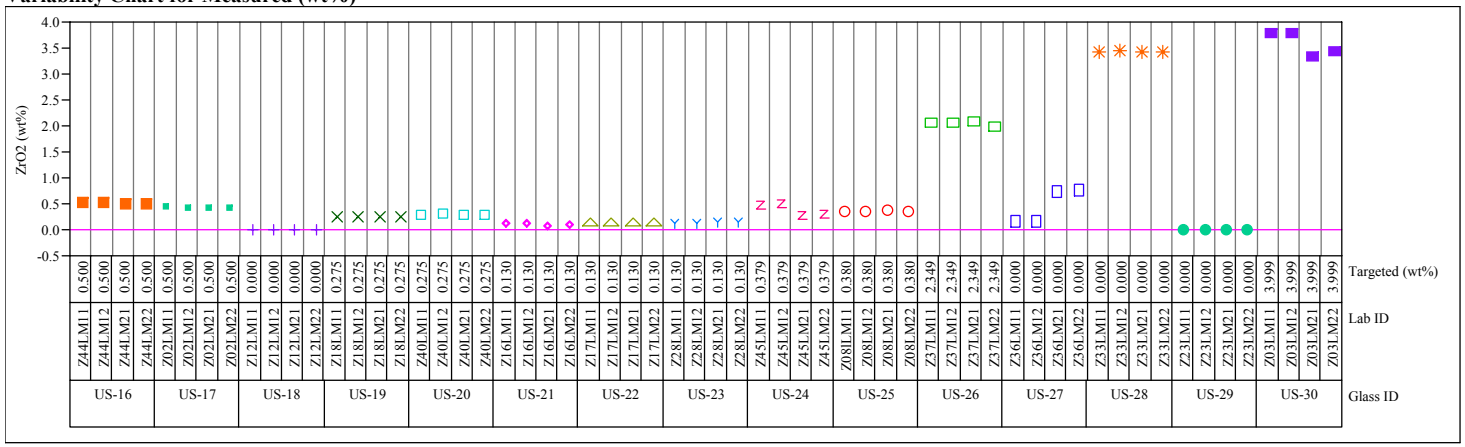


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=2, Oxide=ZrO2 (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=ZrO2 (wt%)
Variability Chart for Measured bias-corrected (wt%)

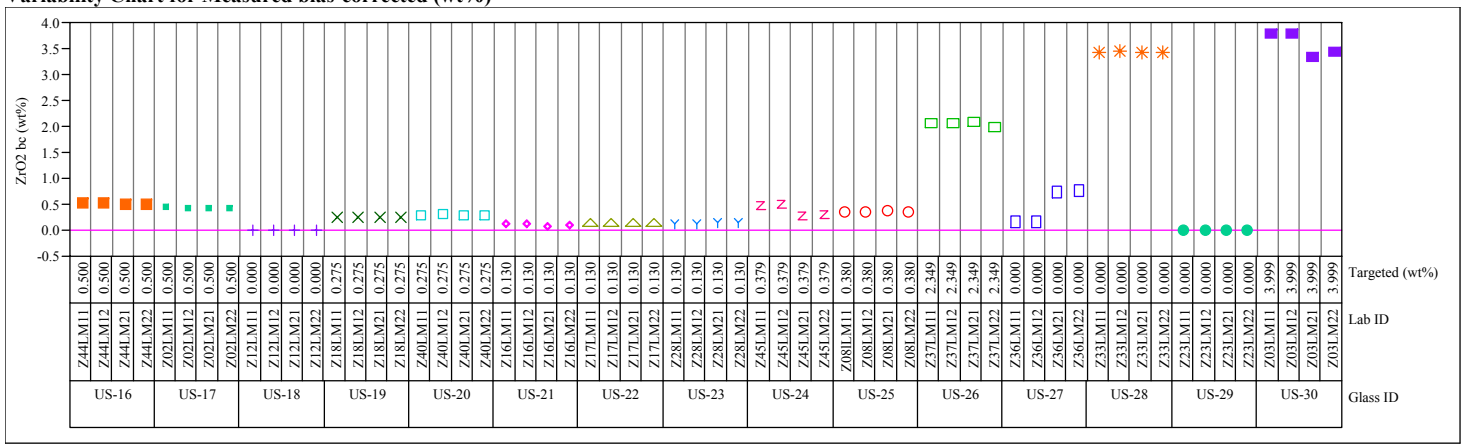
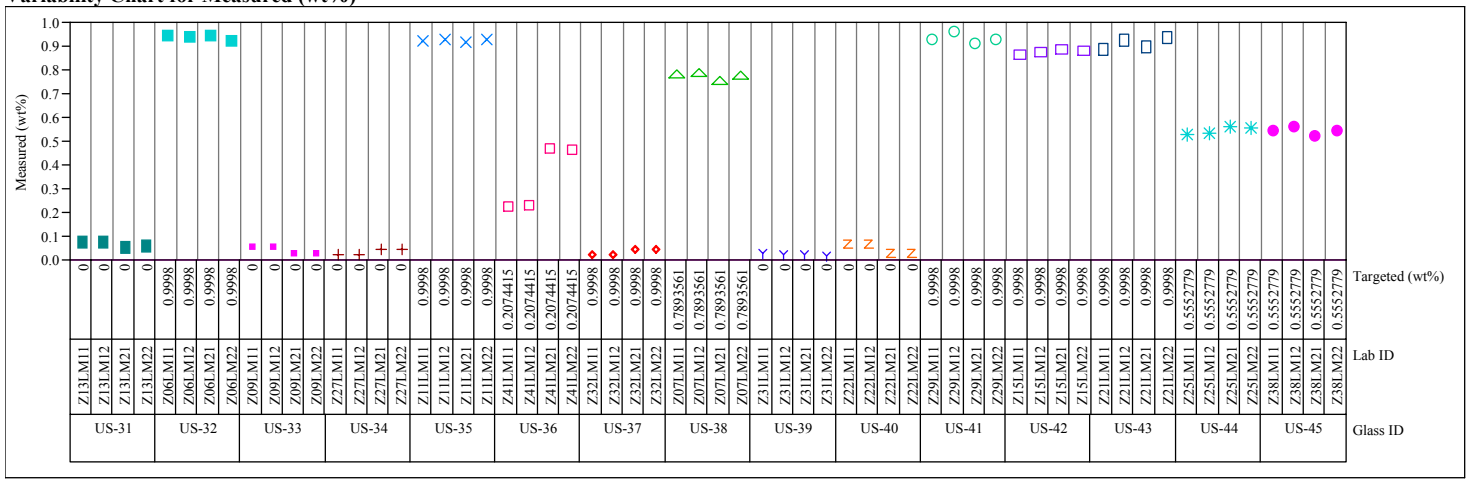


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=3, Oxide=CaO (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=CaO (wt%)
Variability Chart for Measured bias-corrected (wt%)

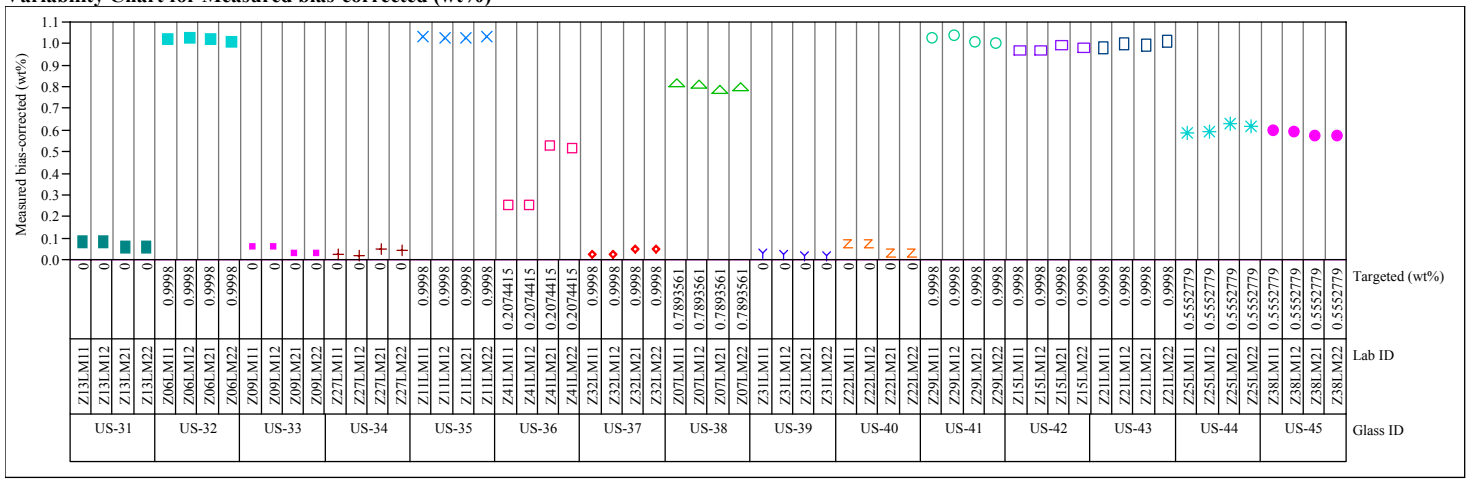
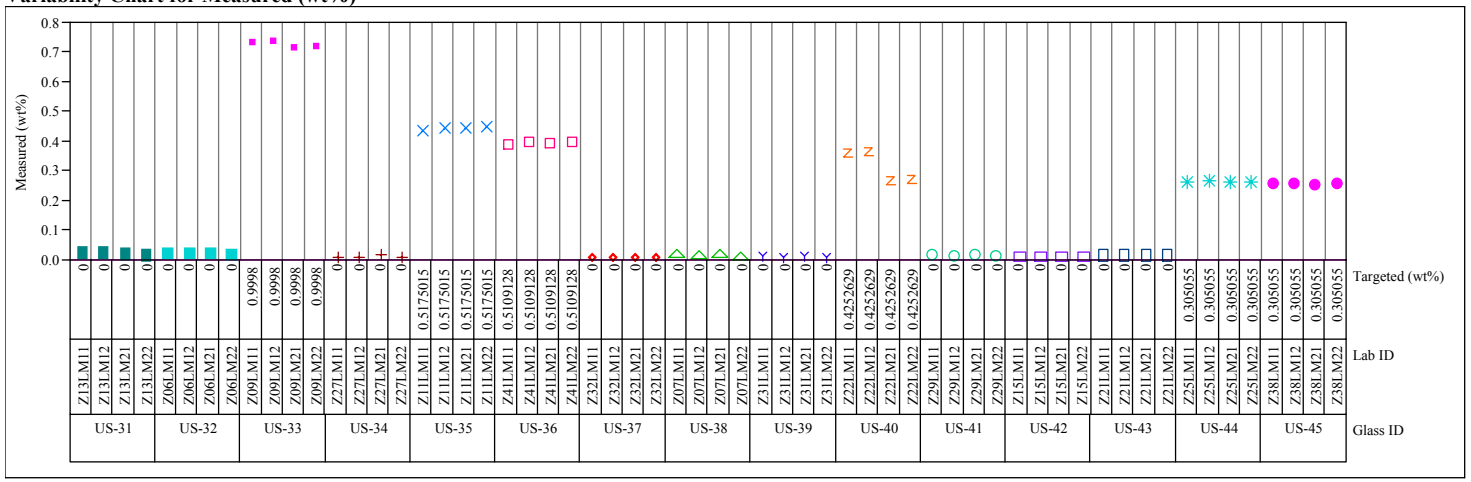


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=3, Oxide=Cr2O3 (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=Cr2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

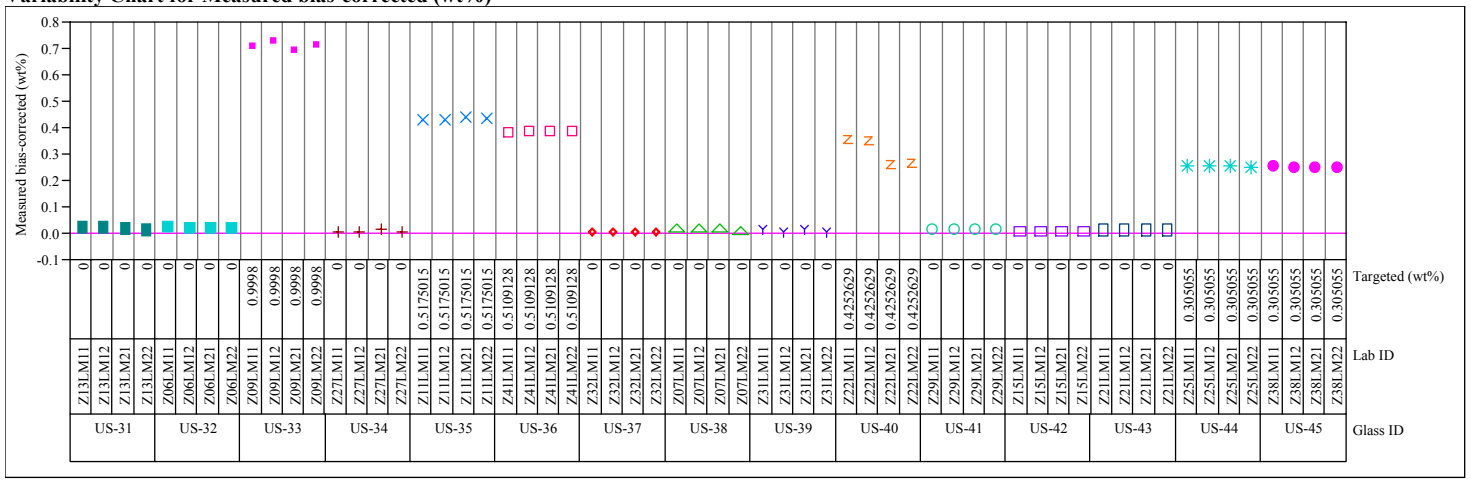
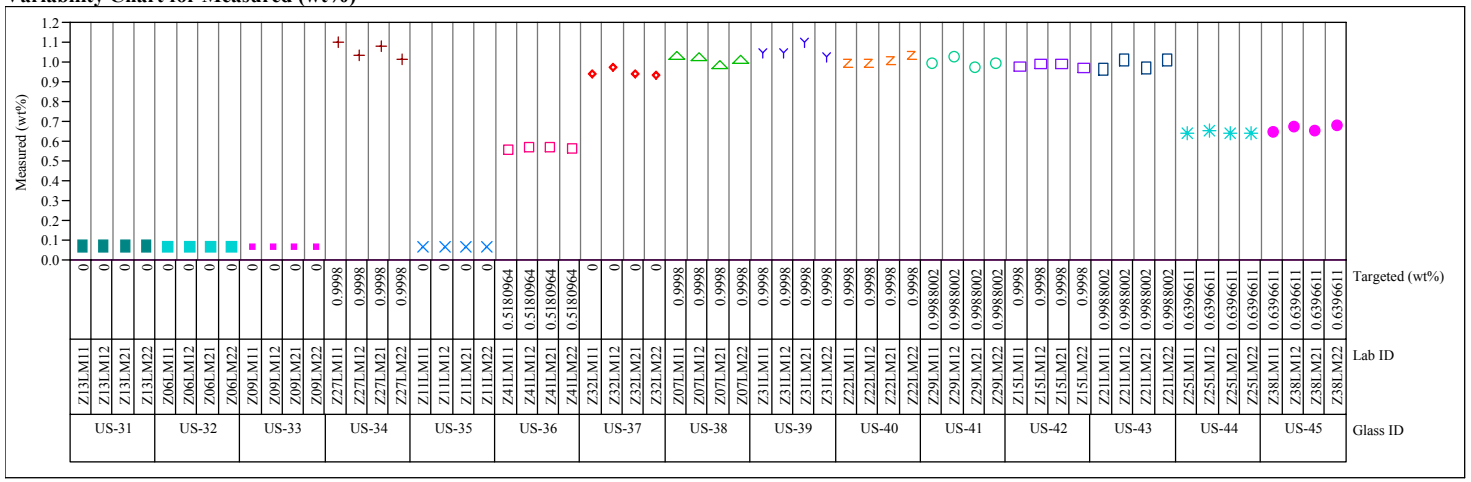


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=3, Oxide=K2O (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=K2O (wt%)
Variability Chart for Measured bias-corrected (wt%)

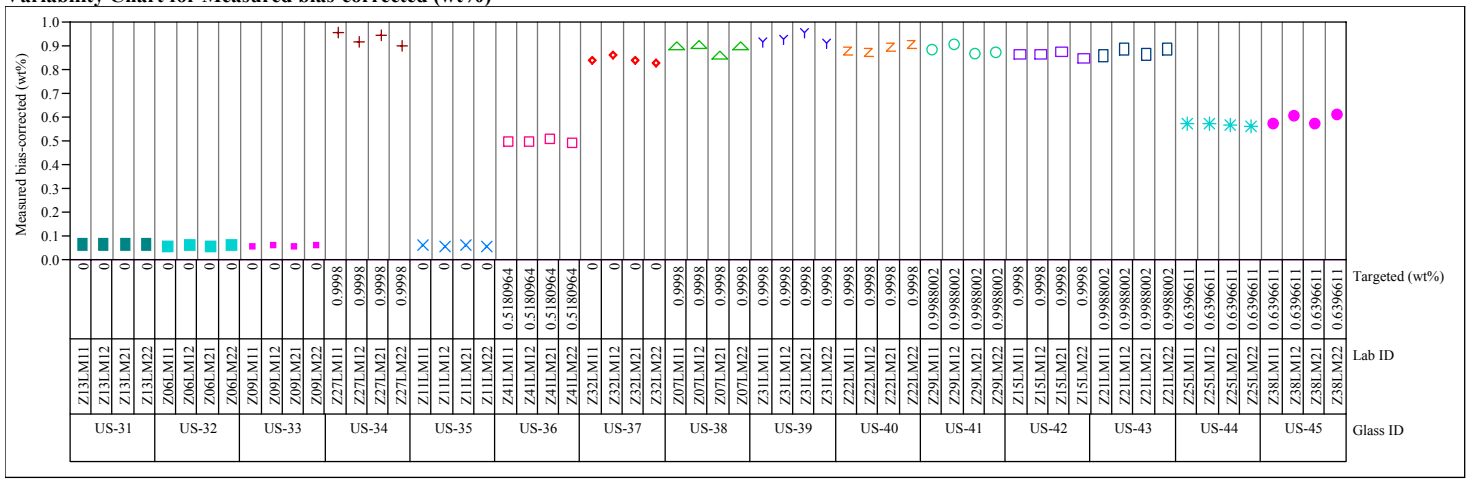
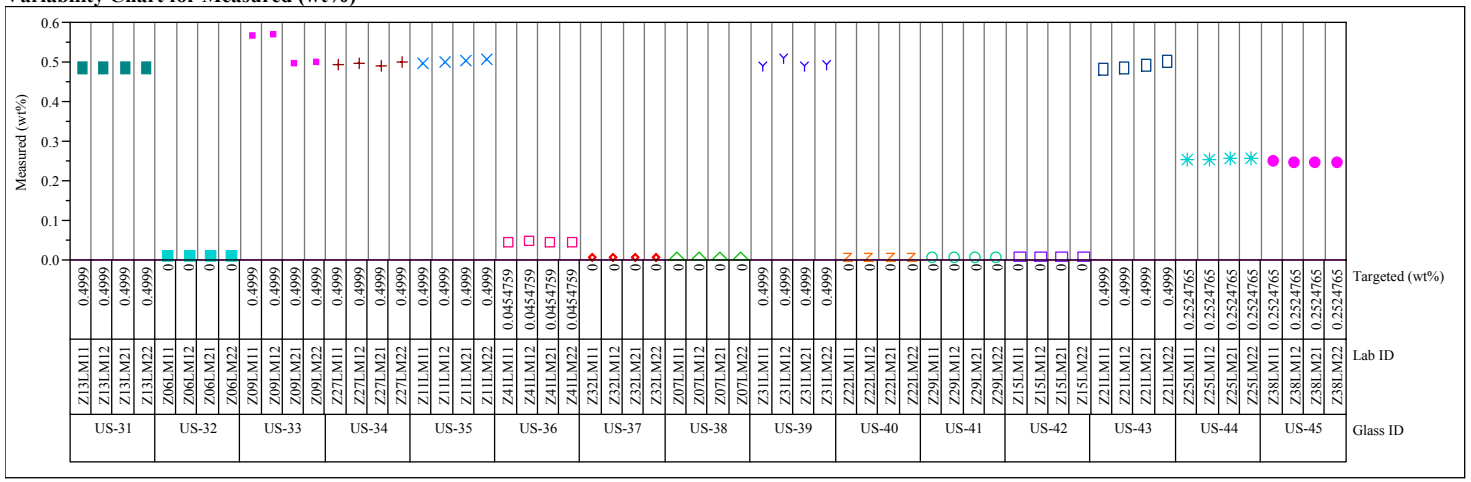


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=3, Oxide=MgO (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=MgO (wt%)
Variability Chart for Measured bias-corrected (wt%)

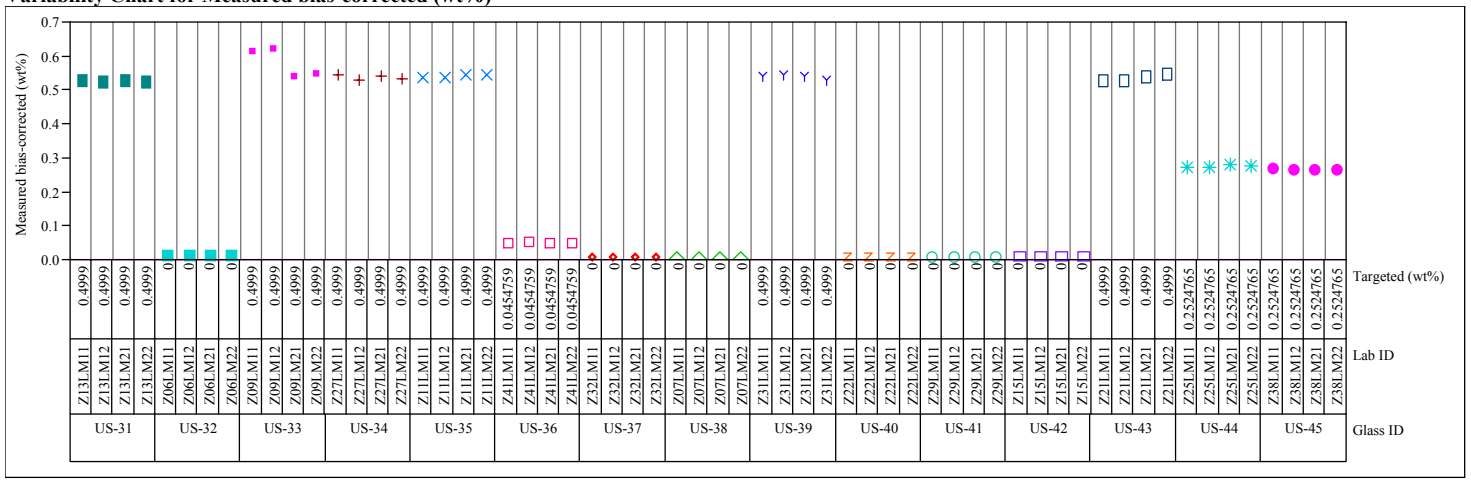
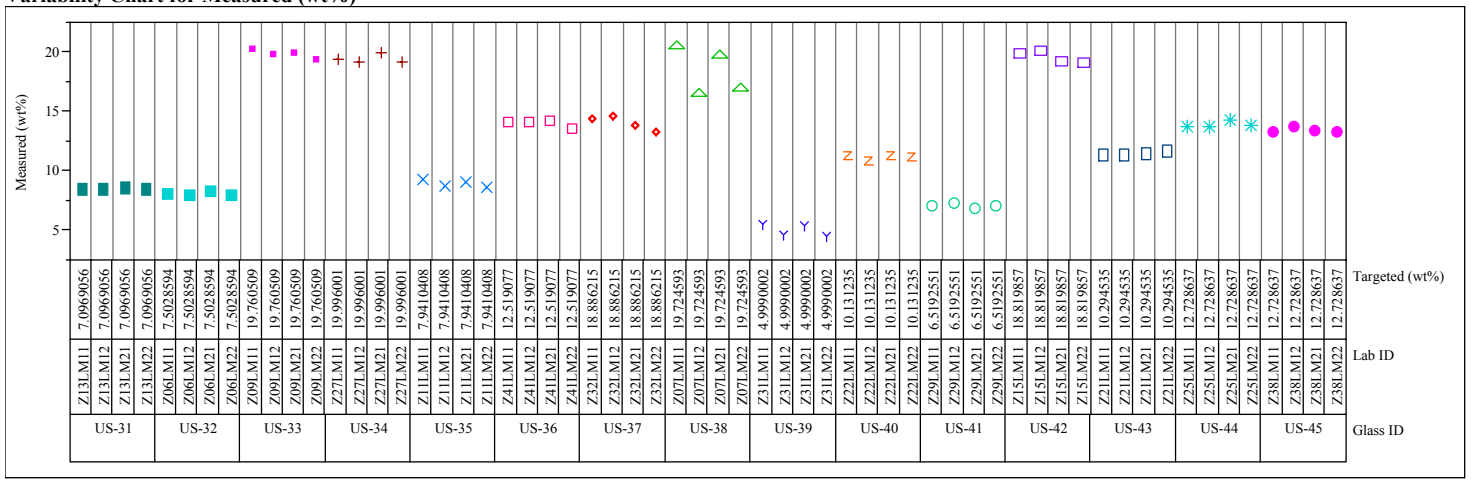


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=3, Oxide=Na2O (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=Na2O (wt%)
Variability Chart for Measured bias-corrected (wt%)

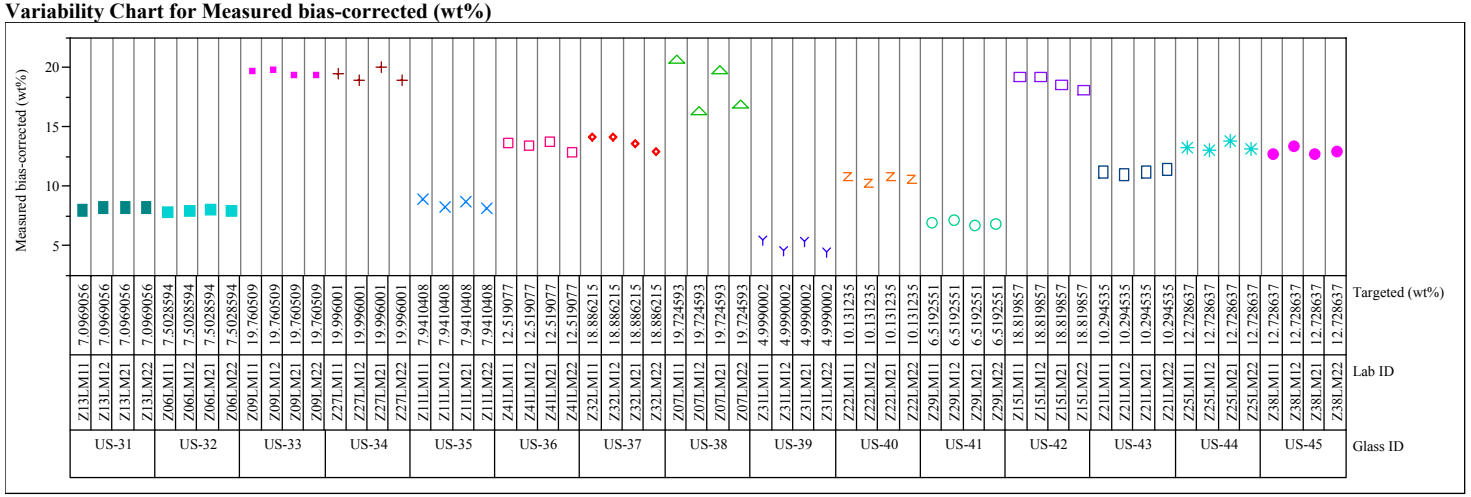
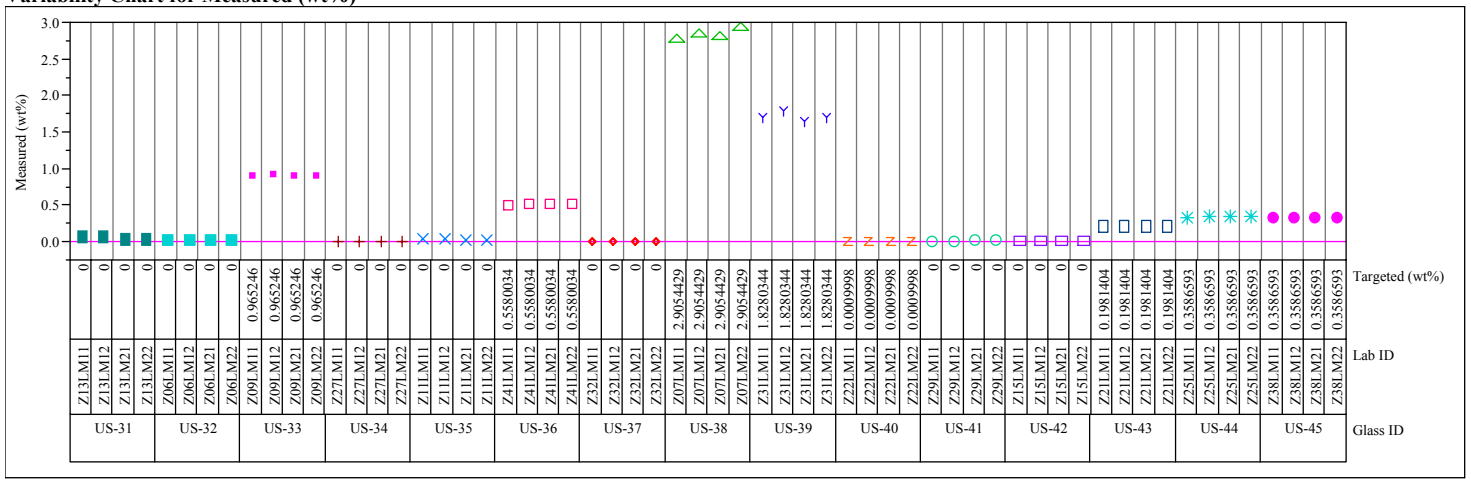


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=3, Oxide=NiO (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=NiO (wt%)
Variability Chart for Measured bias-corrected (wt%)

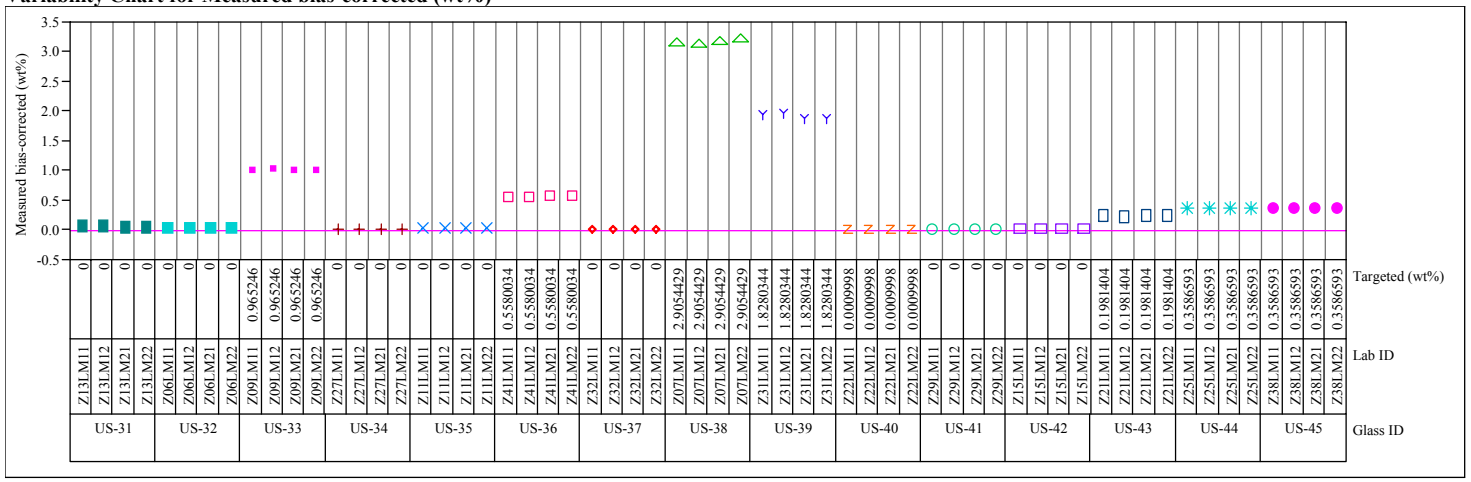
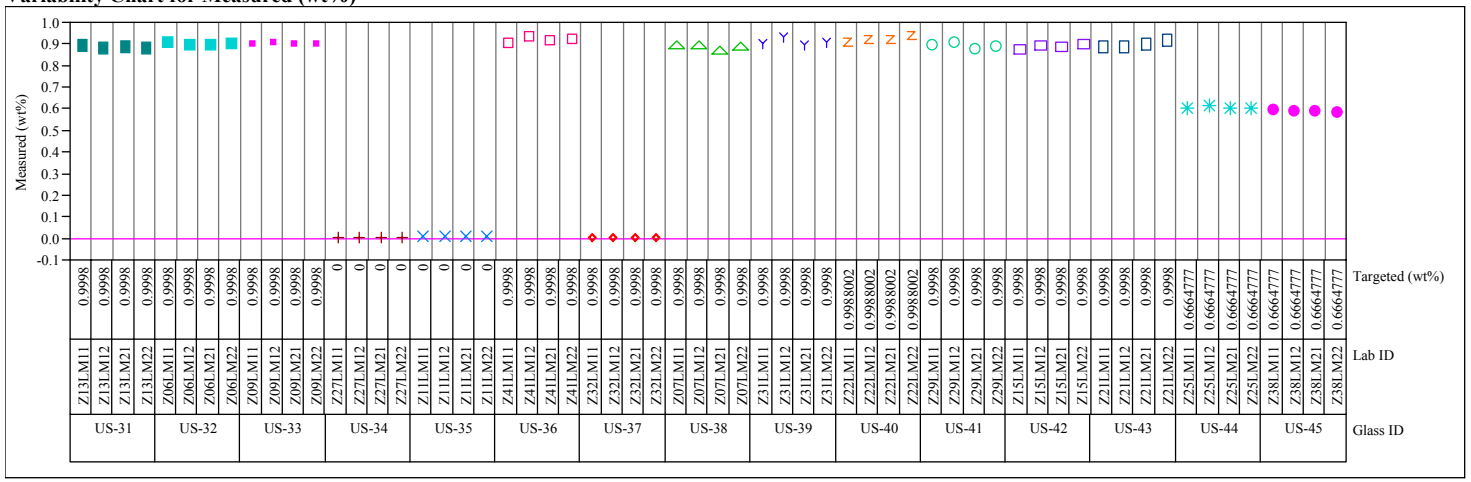


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=3, Oxide=PbO (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=PbO (wt%)
Variability Chart for Measured bias-corrected (wt%)

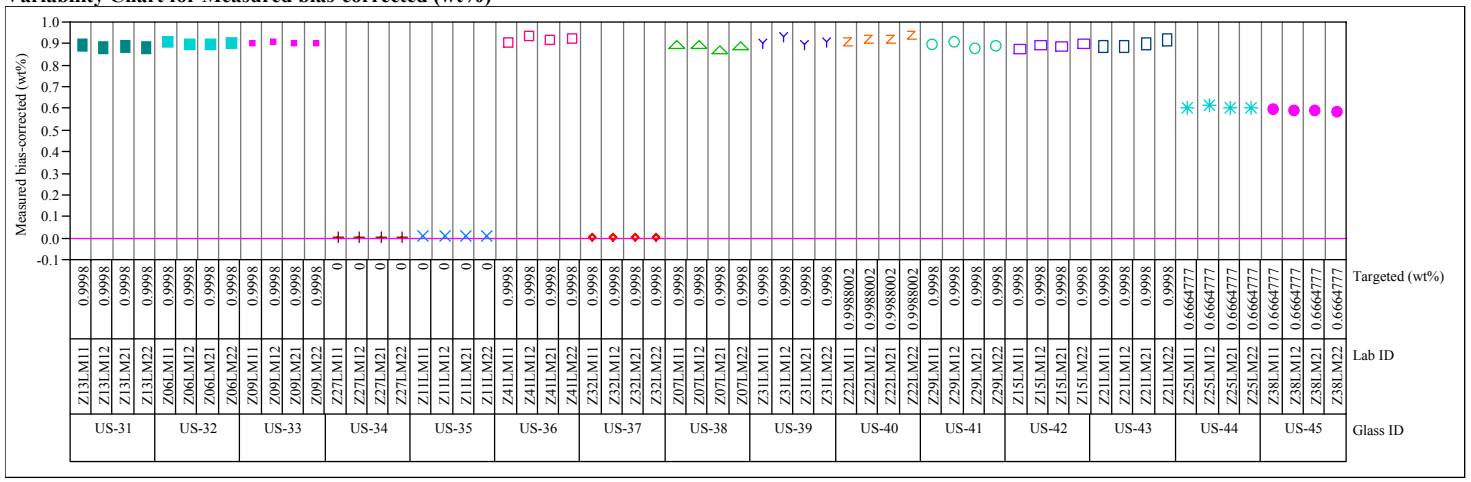
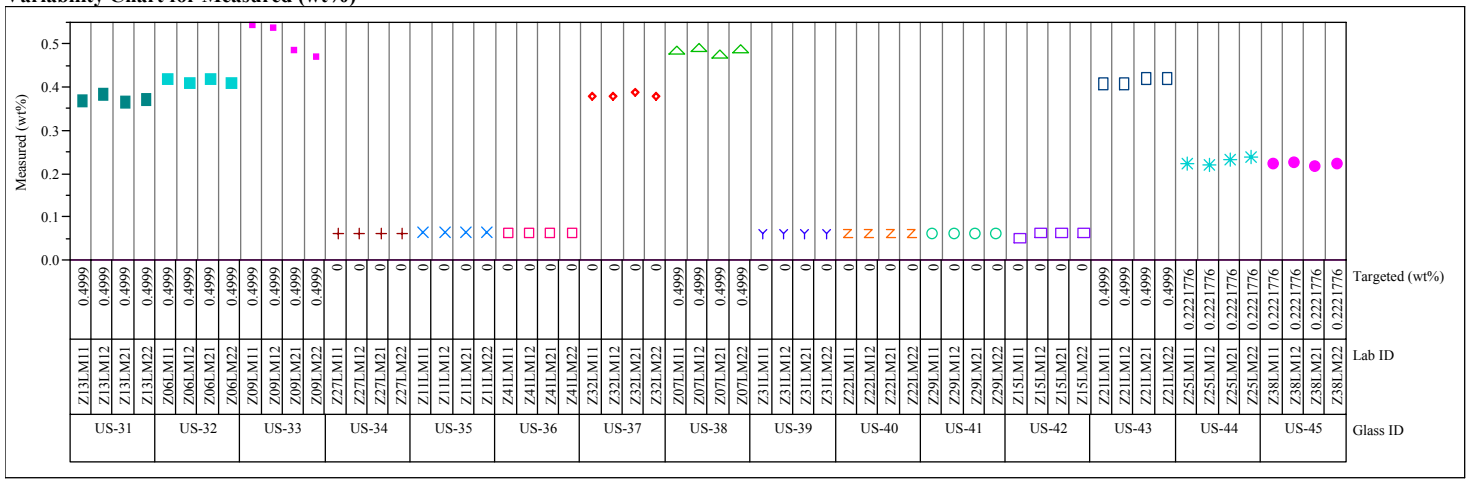


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=3, Oxide=SO3 (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=SO3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

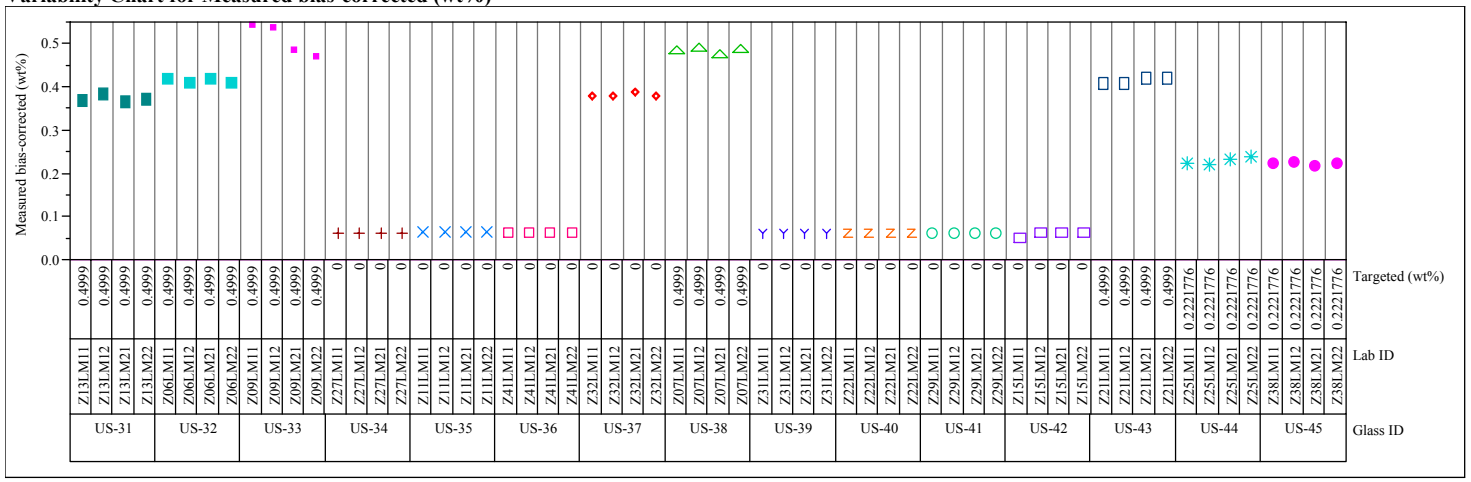
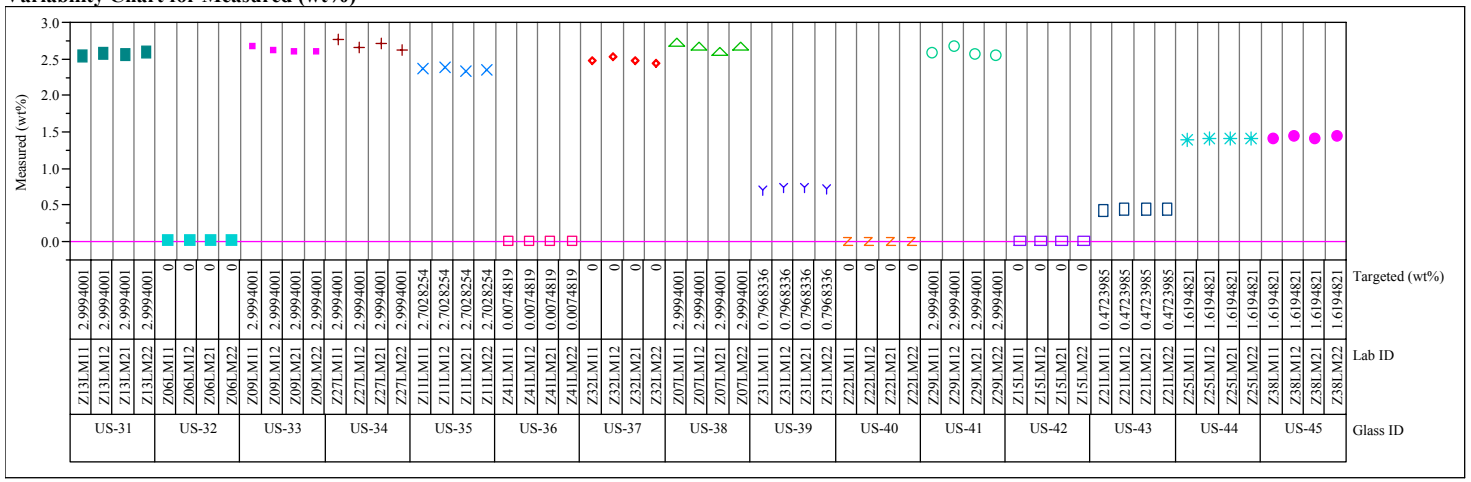


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=3, Oxide=SrO (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=SrO (wt%)
Variability Chart for Measured bias-corrected (wt%)

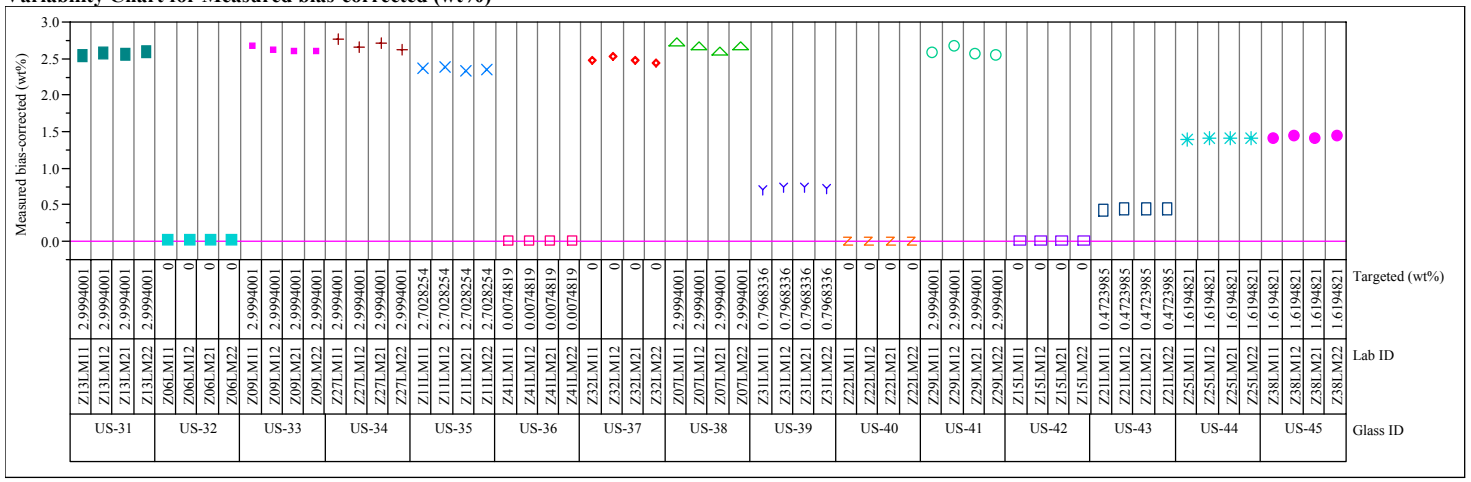
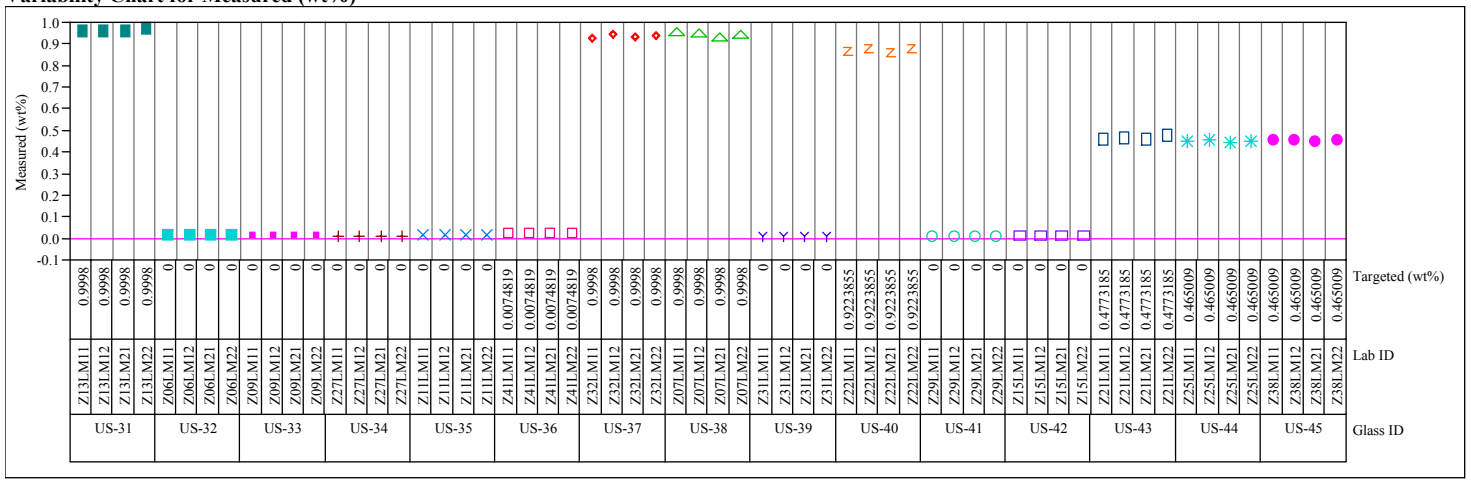


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=3, Oxide=TiO2 (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=TiO2 (wt%)
Variability Chart for Measured bias-corrected (wt%)

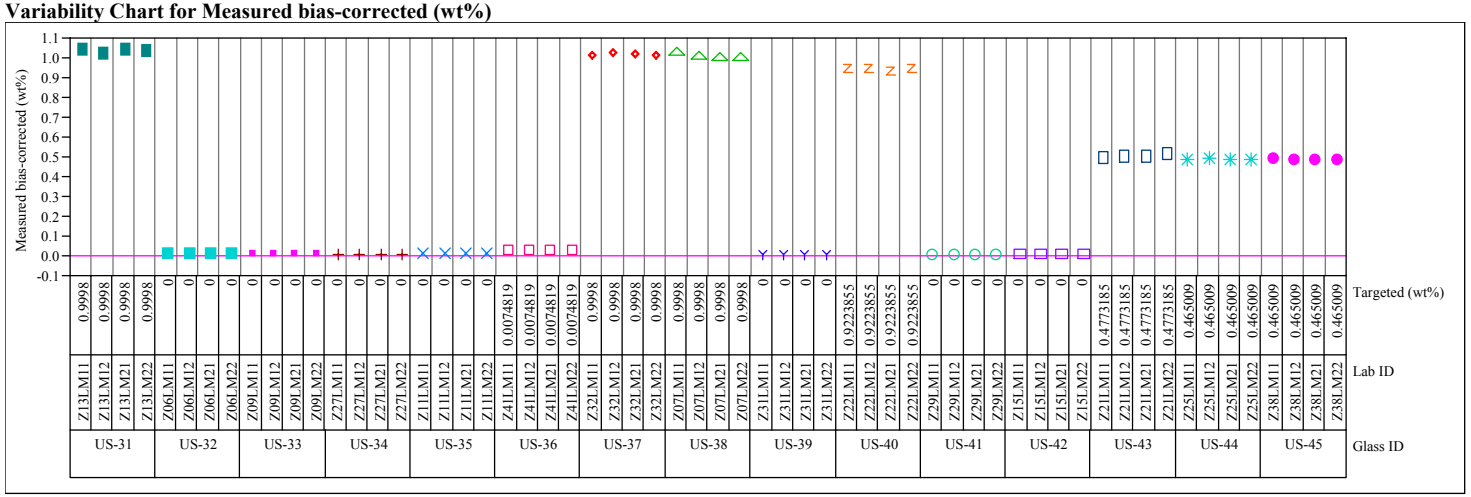
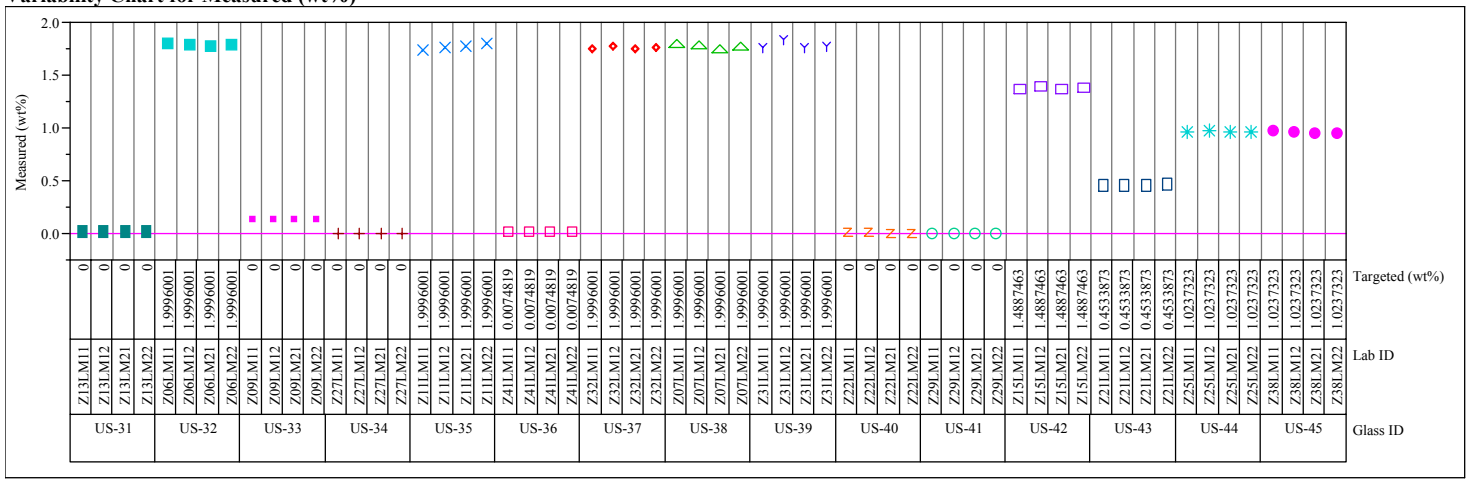


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=3, Oxide=ZnO (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=ZnO (wt%)
Variability Chart for Measured bias-corrected (wt%)

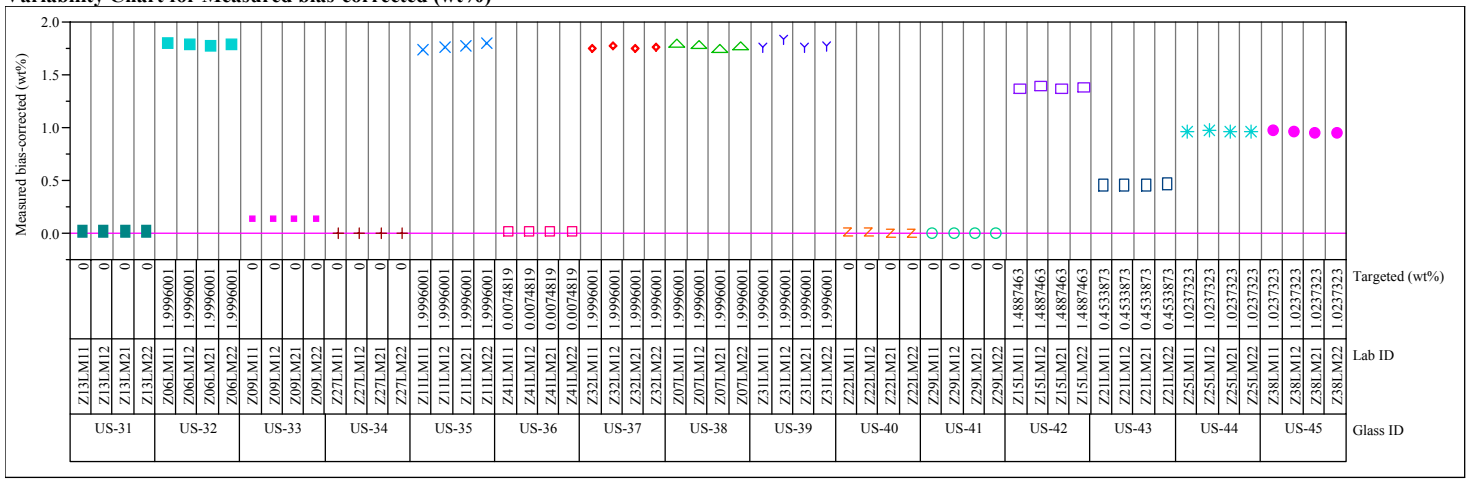
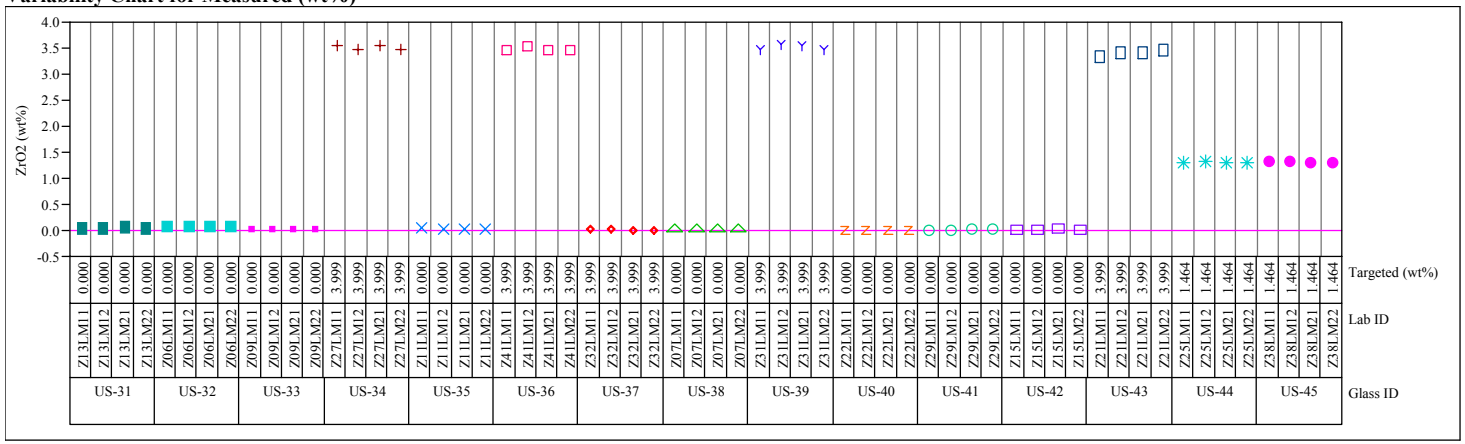


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=3, Oxide=ZrO2 (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=ZrO2 (wt%)
Variability Chart for Measured bias-corrected (wt%)

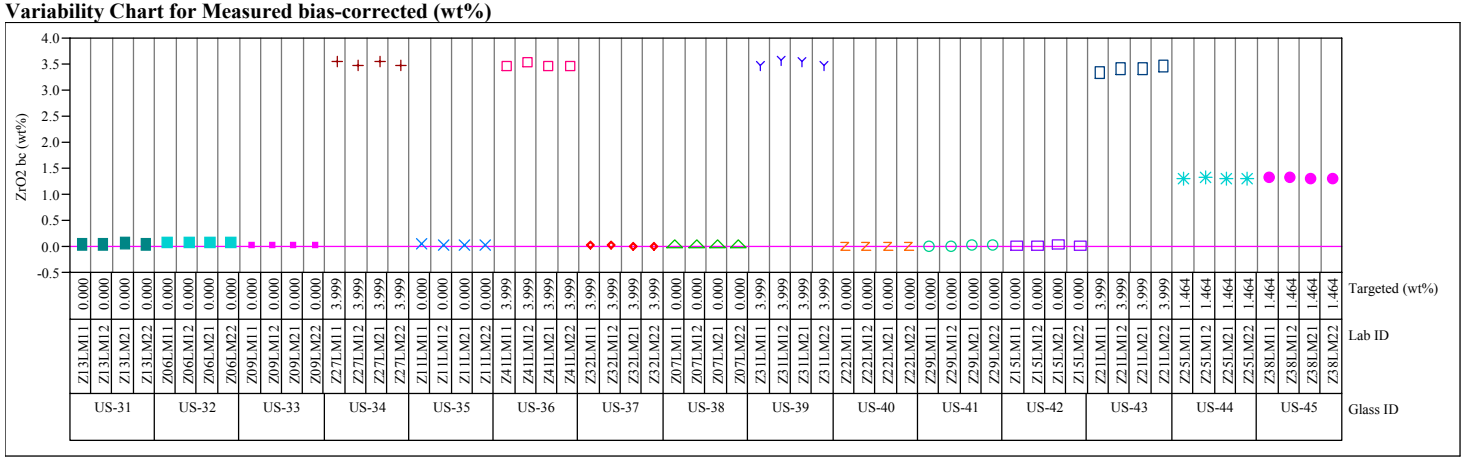
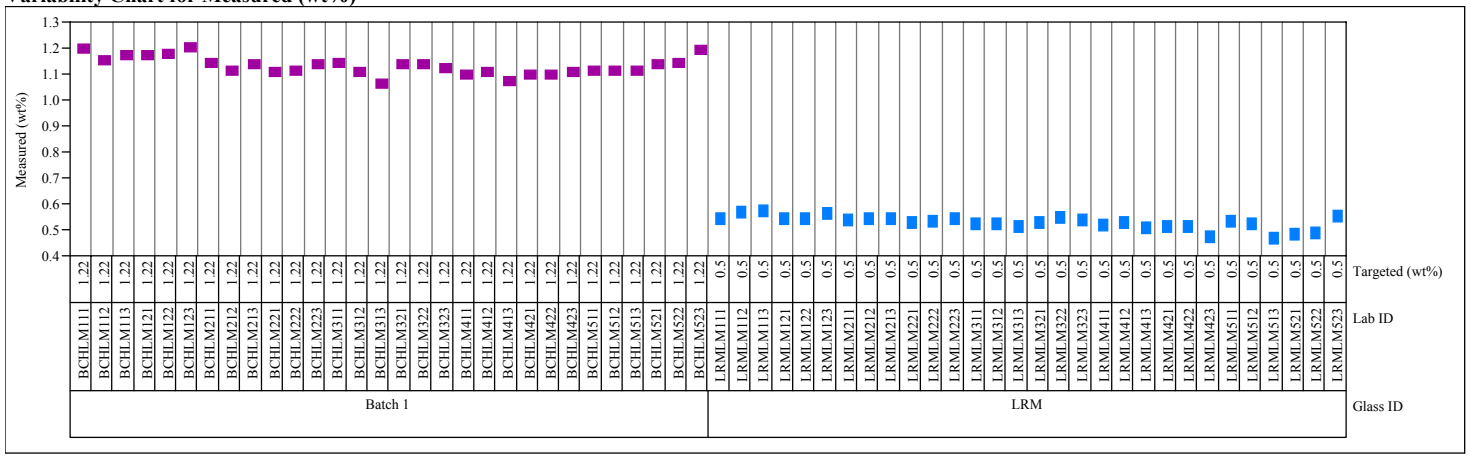


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=4, Oxide=CaO (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=CaO (wt%)
Variability Chart for Measured bias-corrected (wt%)

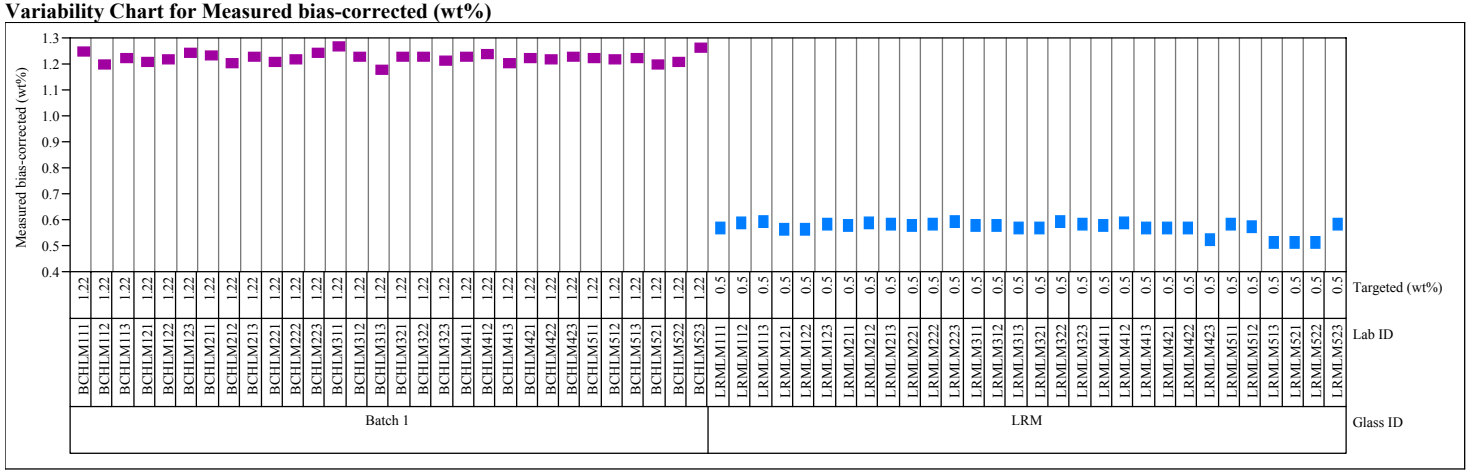
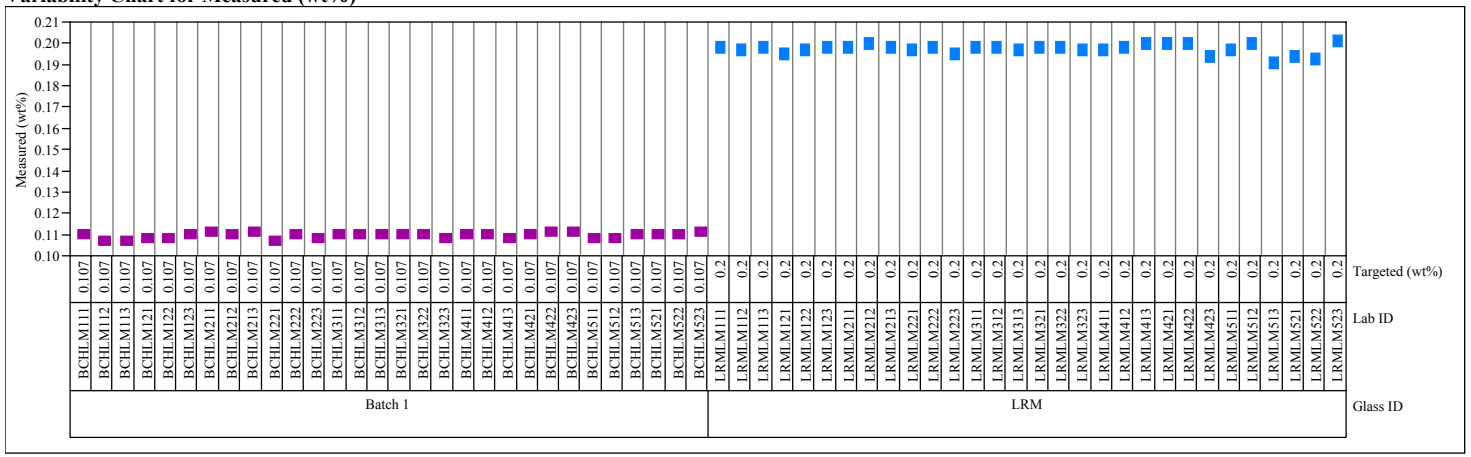


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=4, Oxide=Cr2O3 (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=Cr2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

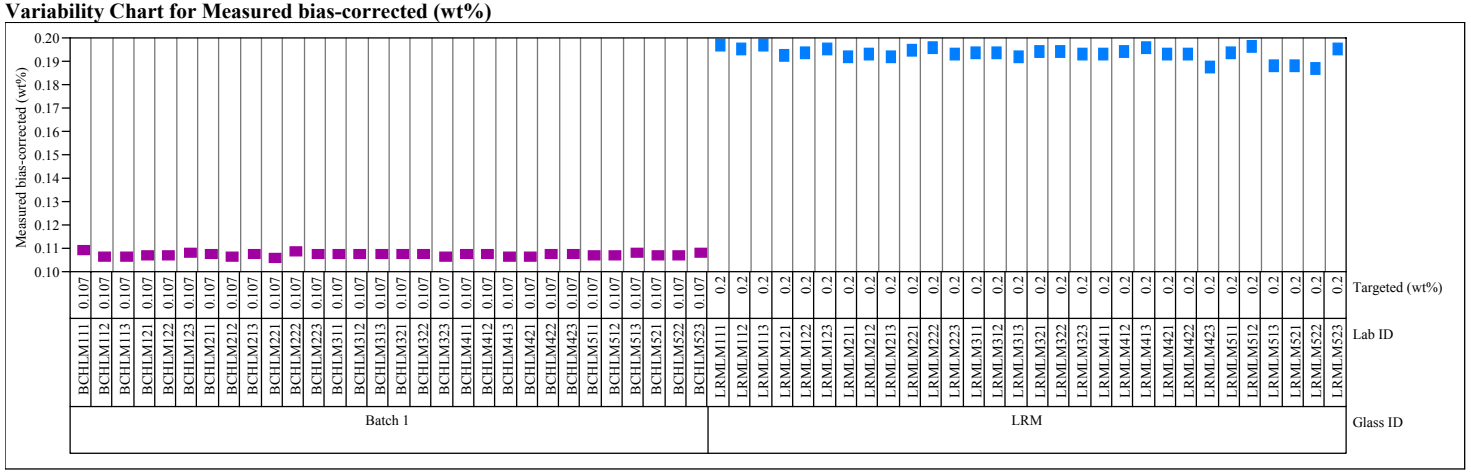
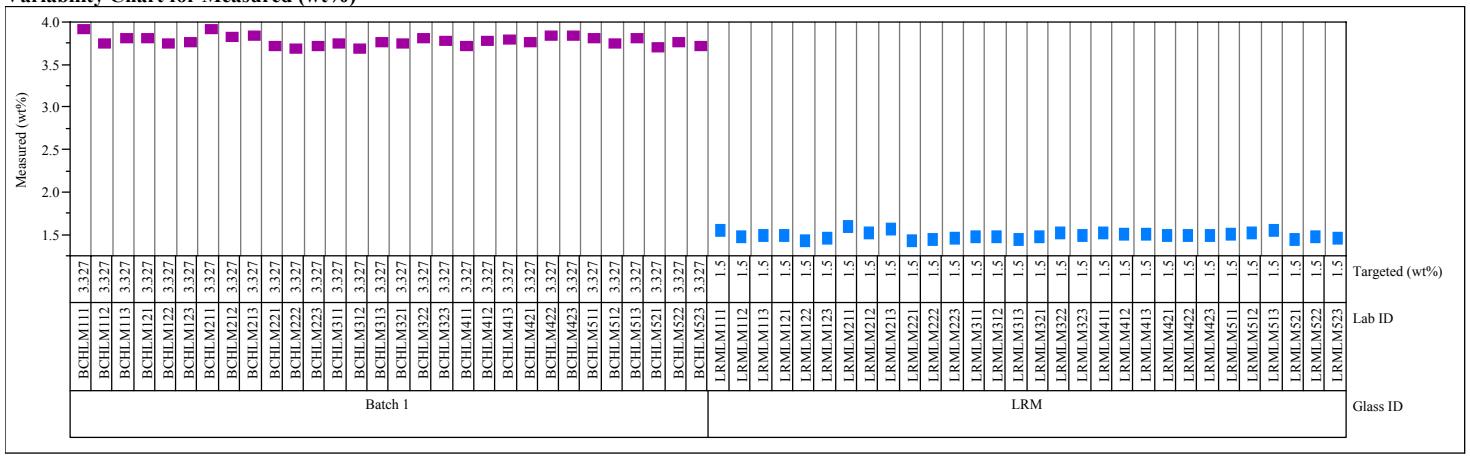


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=4, Oxide=K2O (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=K2O (wt%)
Variability Chart for Measured bias-corrected (wt%)

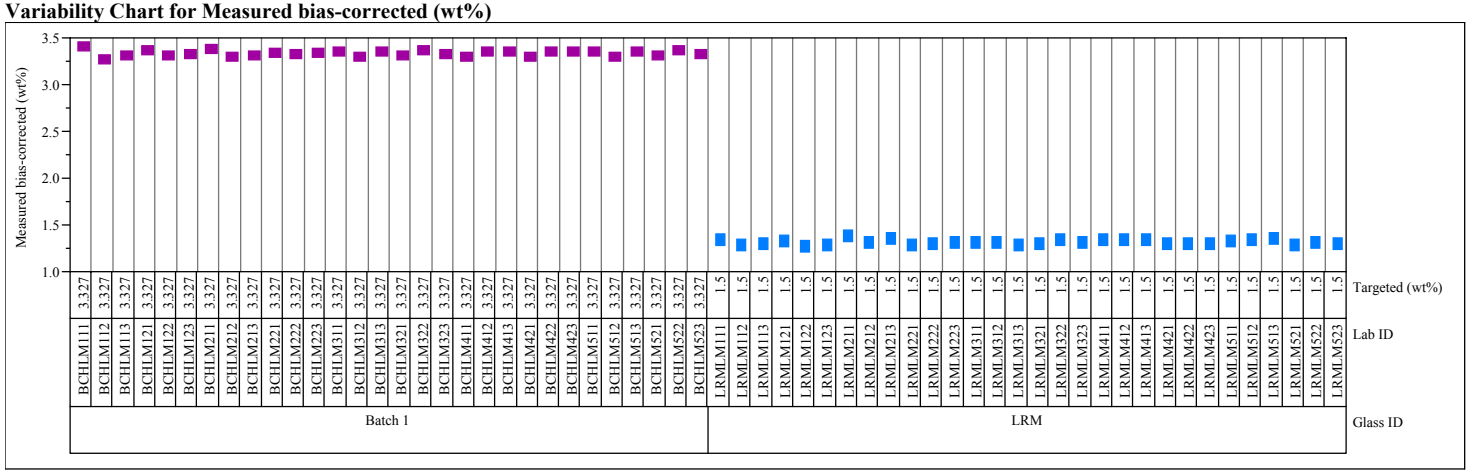
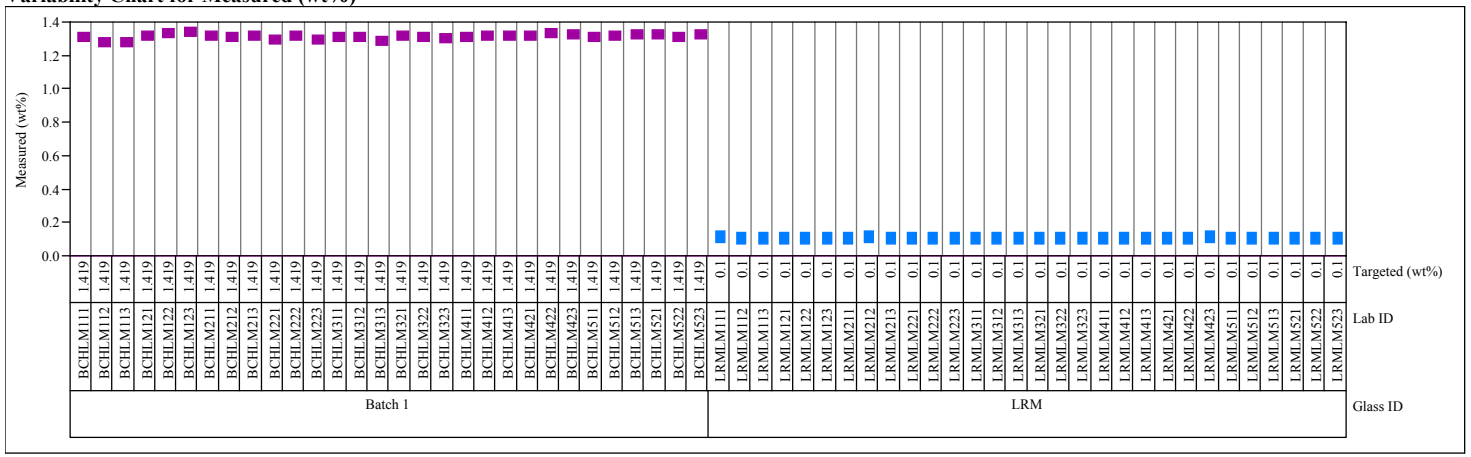


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=4, Oxide=MgO (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=MgO (wt%)
Variability Chart for Measured bias-corrected (wt%)

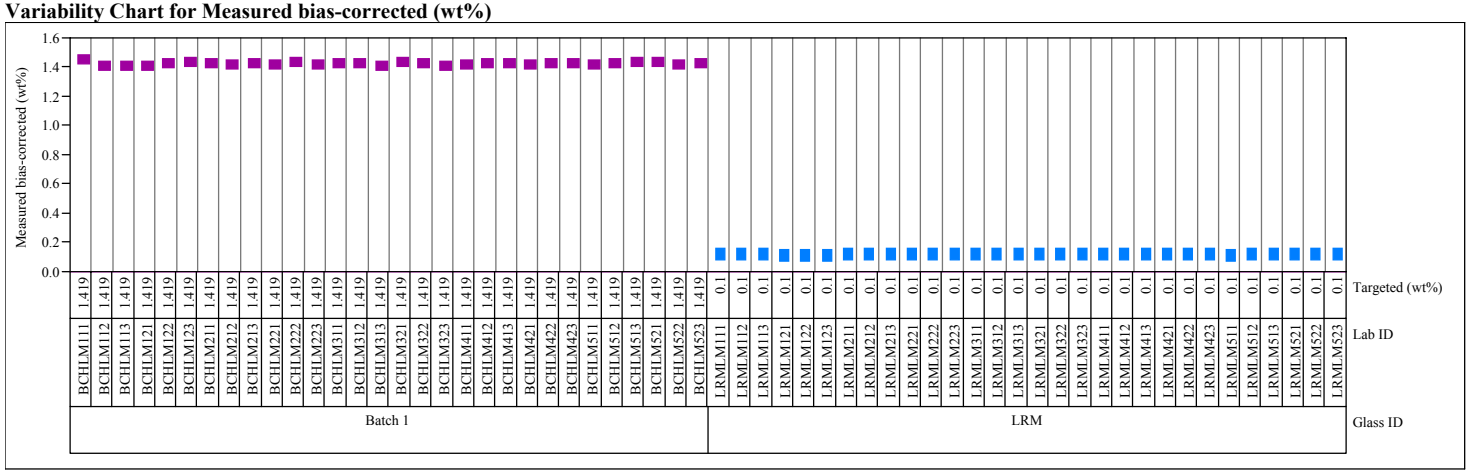
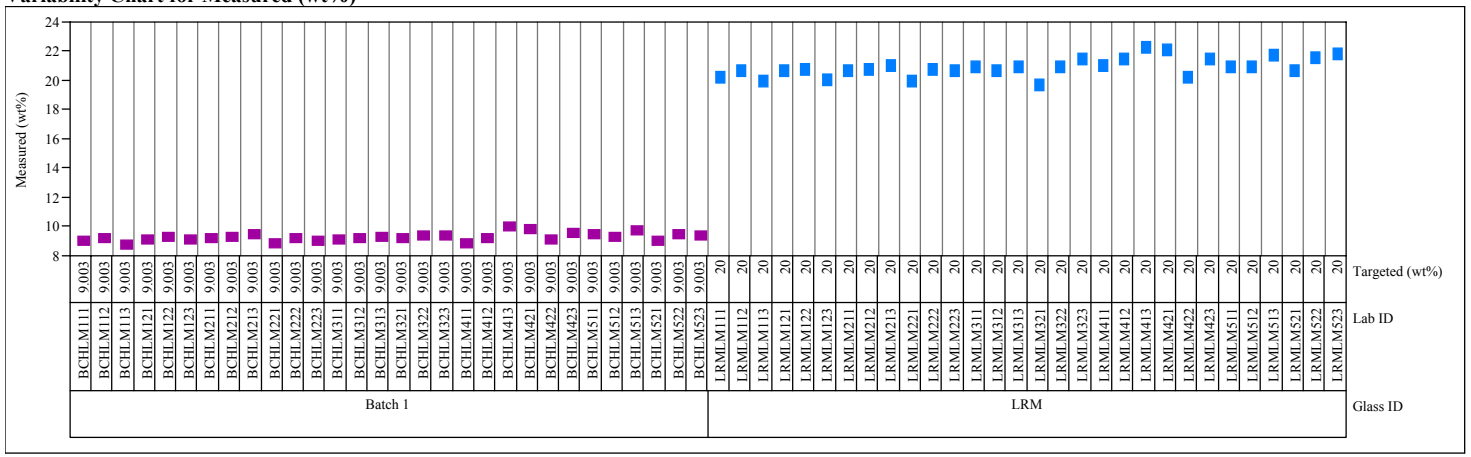


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=4, Oxide=Na2O (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=Na2O (wt%)
Variability Chart for Measured bias-corrected (wt%)

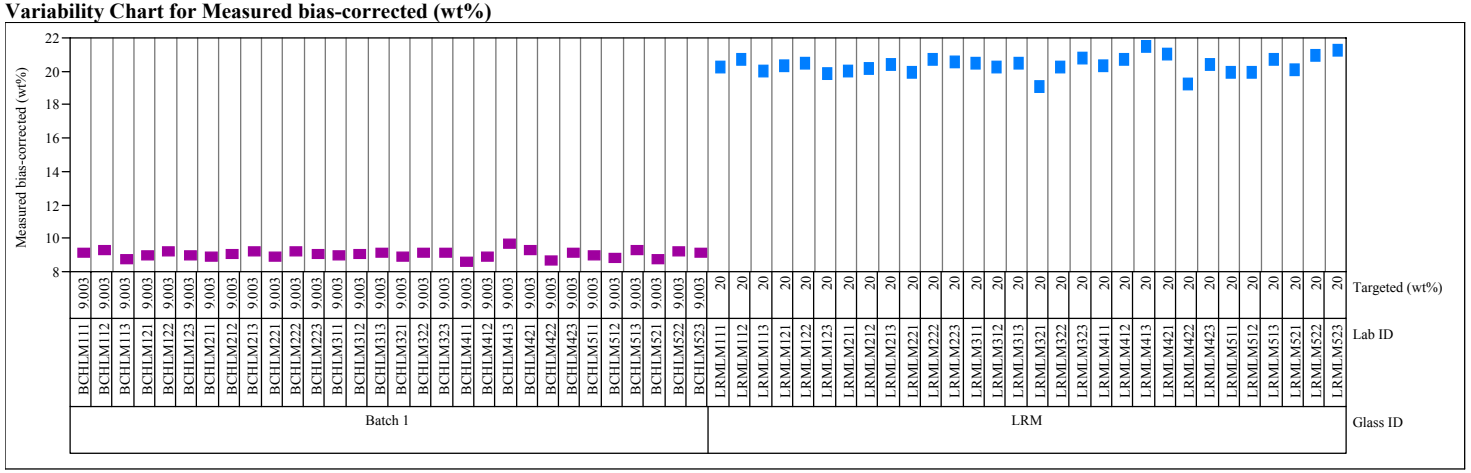
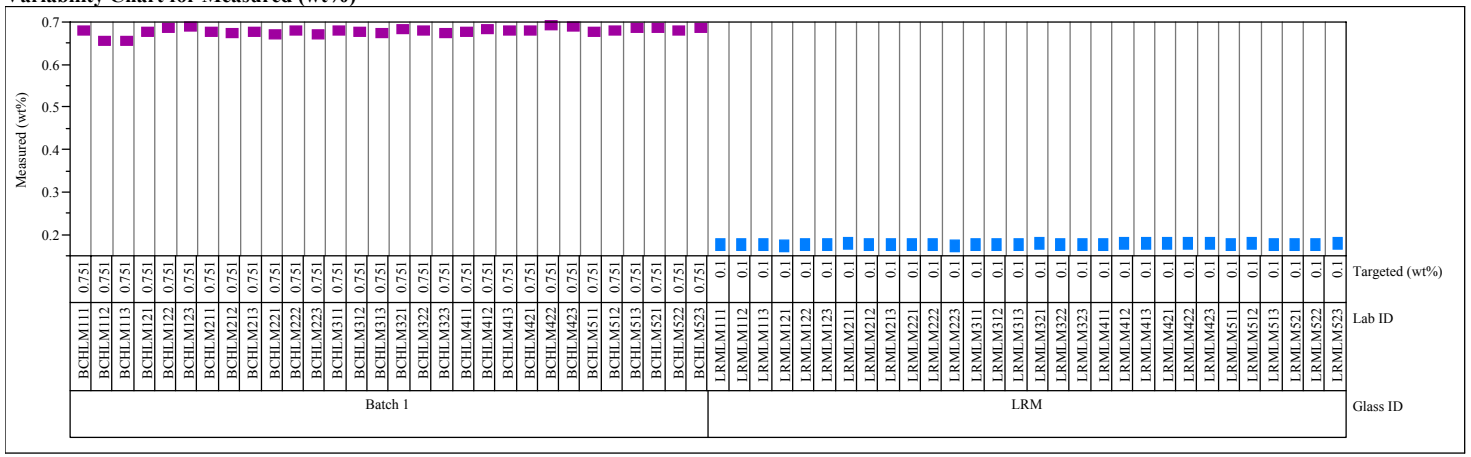


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=4, Oxide=NiO (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=NiO (wt%)
Variability Chart for Measured bias-corrected (wt%)

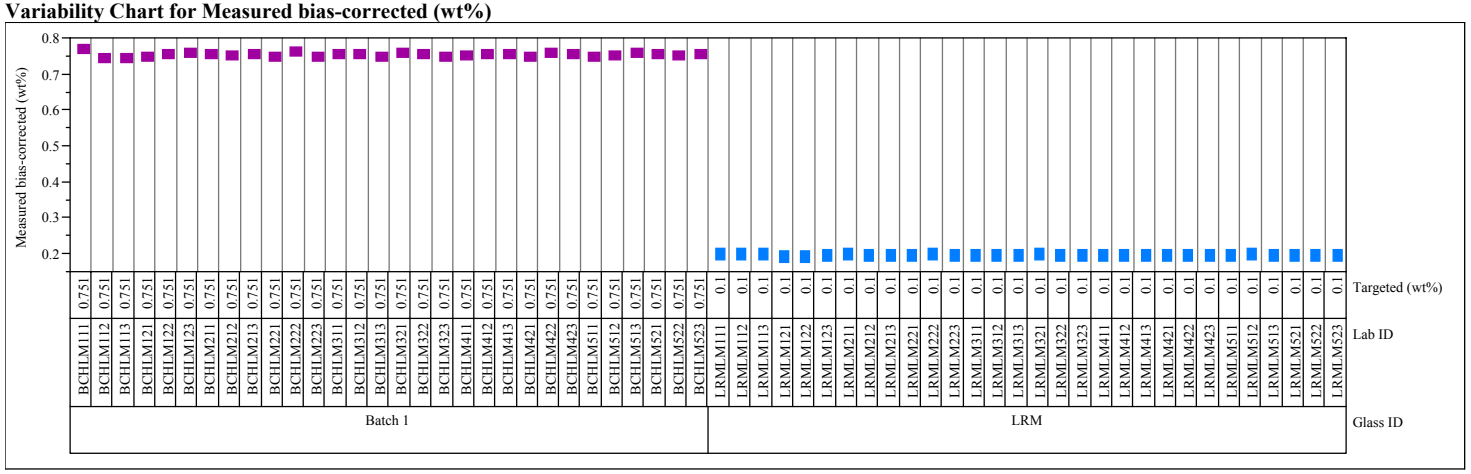
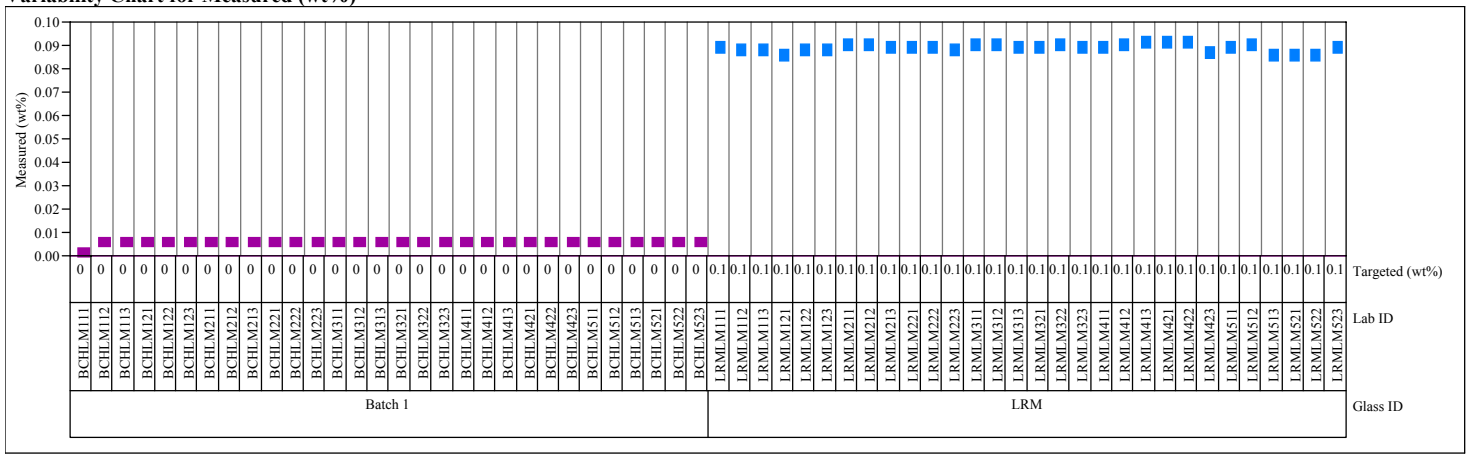


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=4, Oxide=PbO (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=PbO (wt%)
Variability Chart for Measured bias-corrected (wt%)

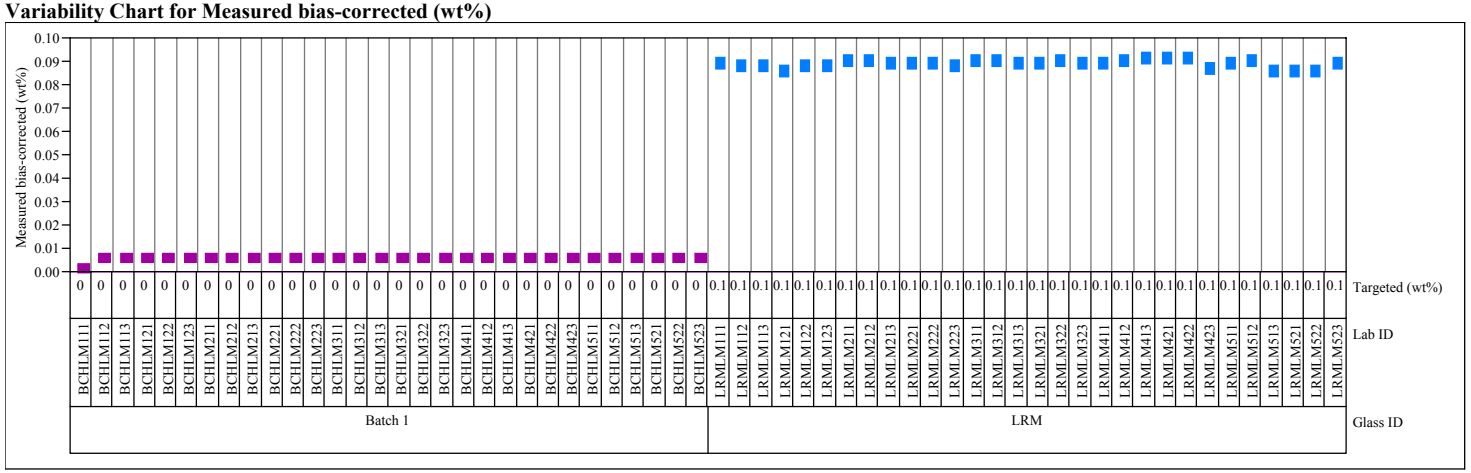
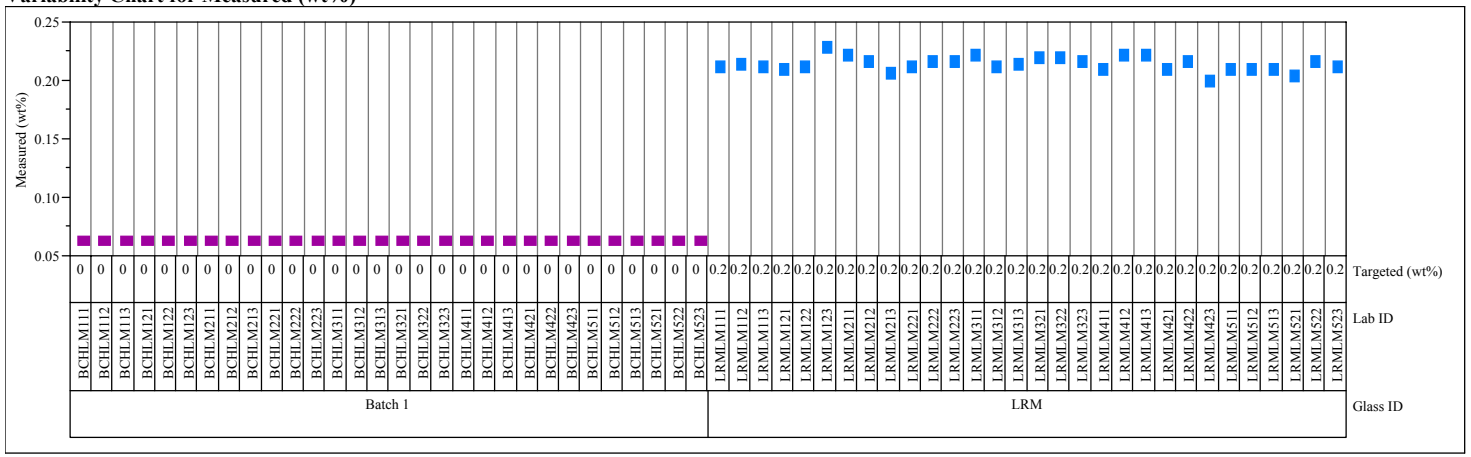


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=4, Oxide=SO3 (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=SO3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

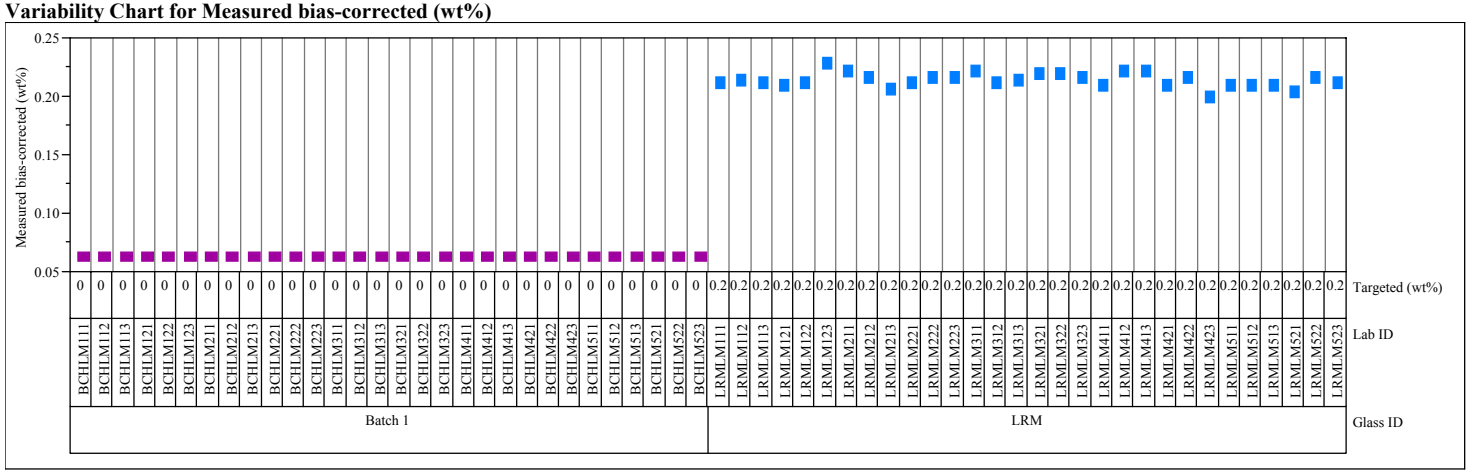
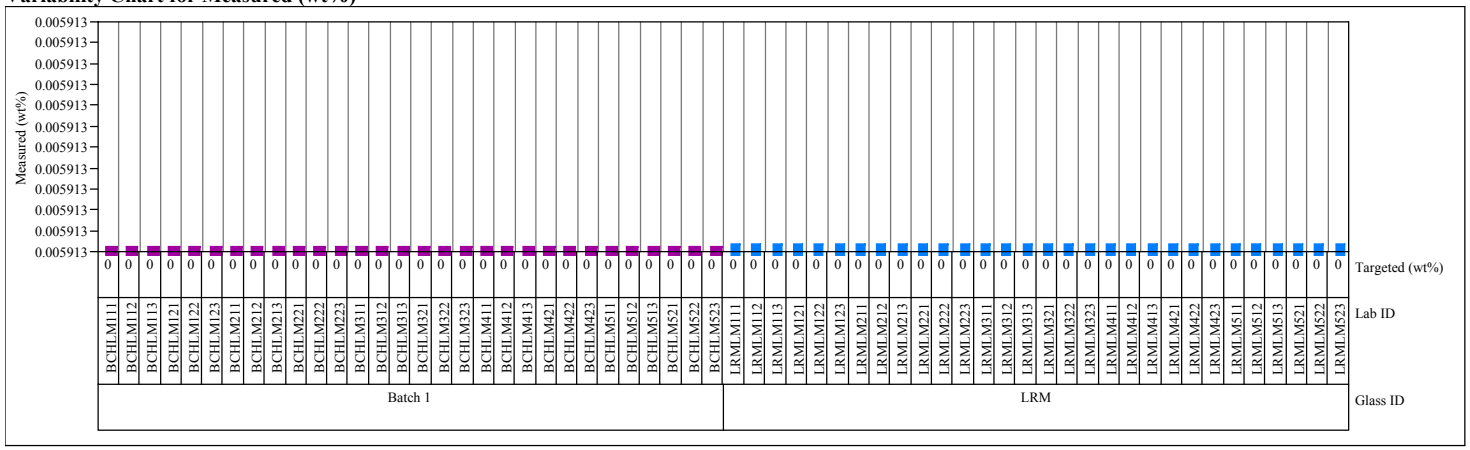


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=4, Oxide=SrO (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=SrO (wt%)
Variability Chart for Measured bias-corrected (wt%)

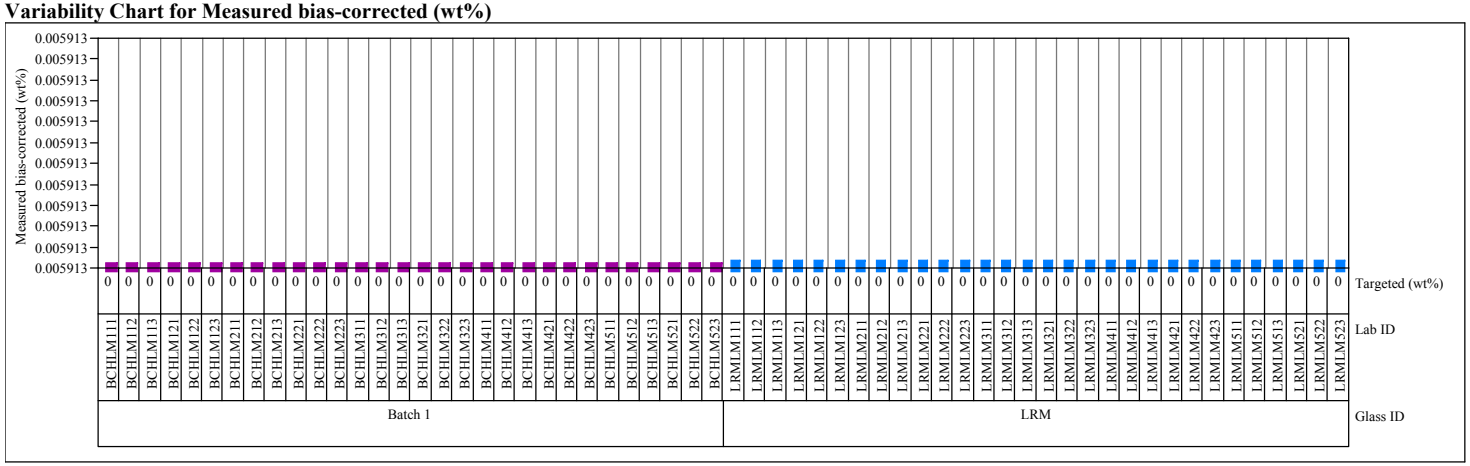
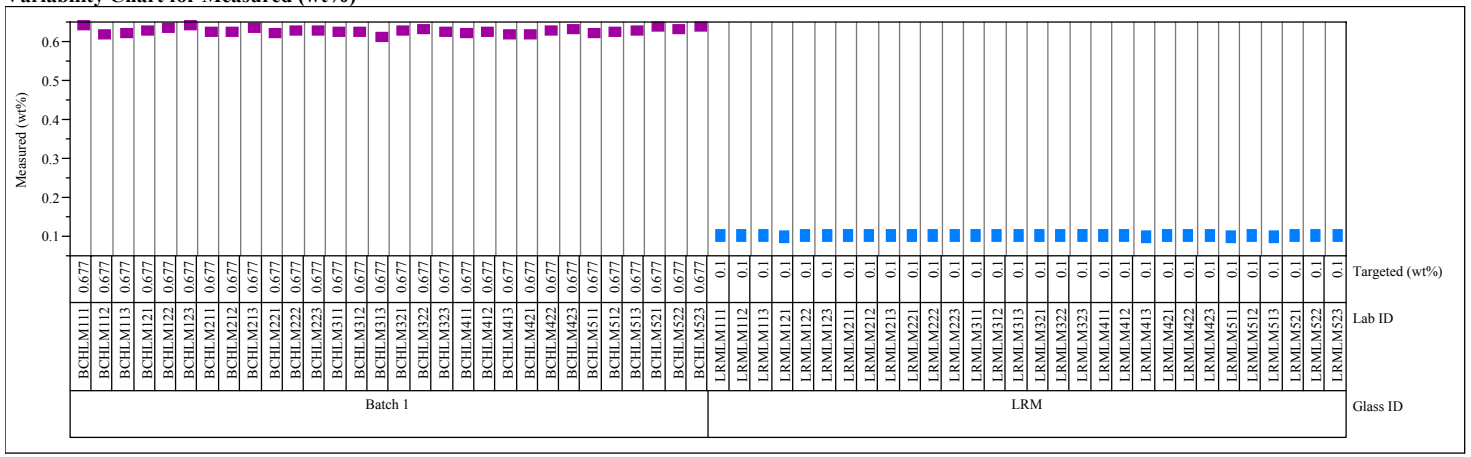


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=4, Oxide=TiO2 (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=TiO2 (wt%)
Variability Chart for Measured bias-corrected (wt%)

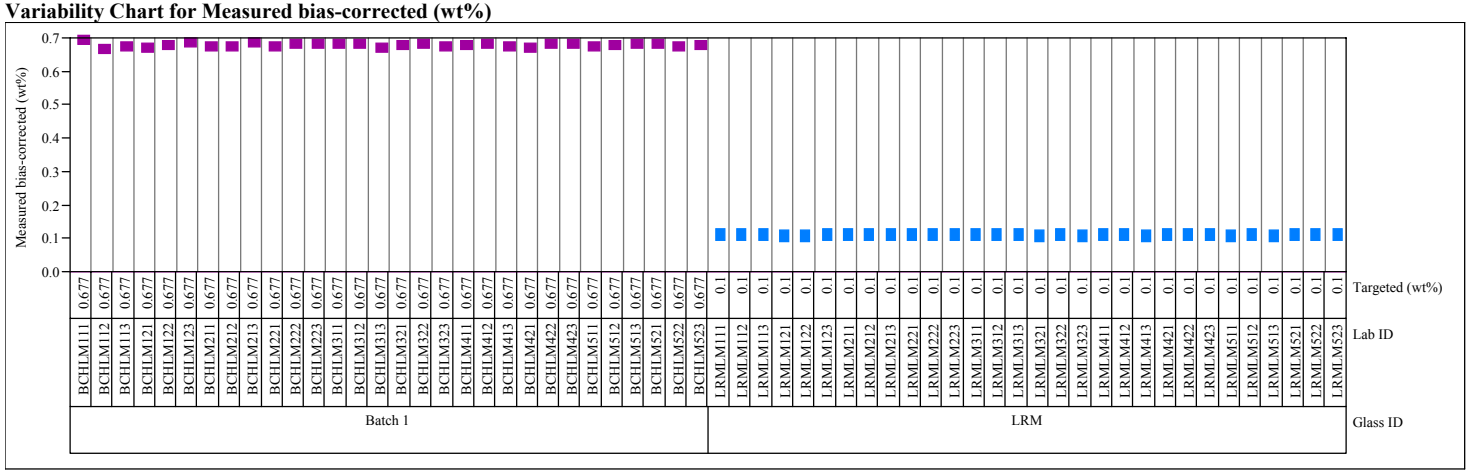
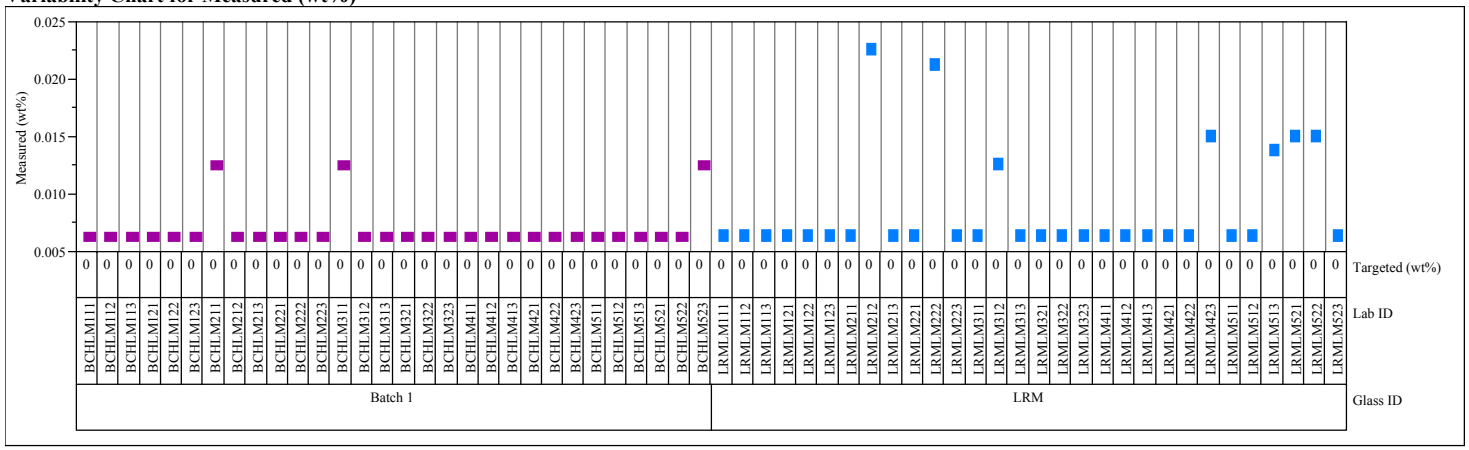


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=4, Oxide=ZnO (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=ZnO (wt%)
Variability Chart for Measured bias-corrected (wt%)

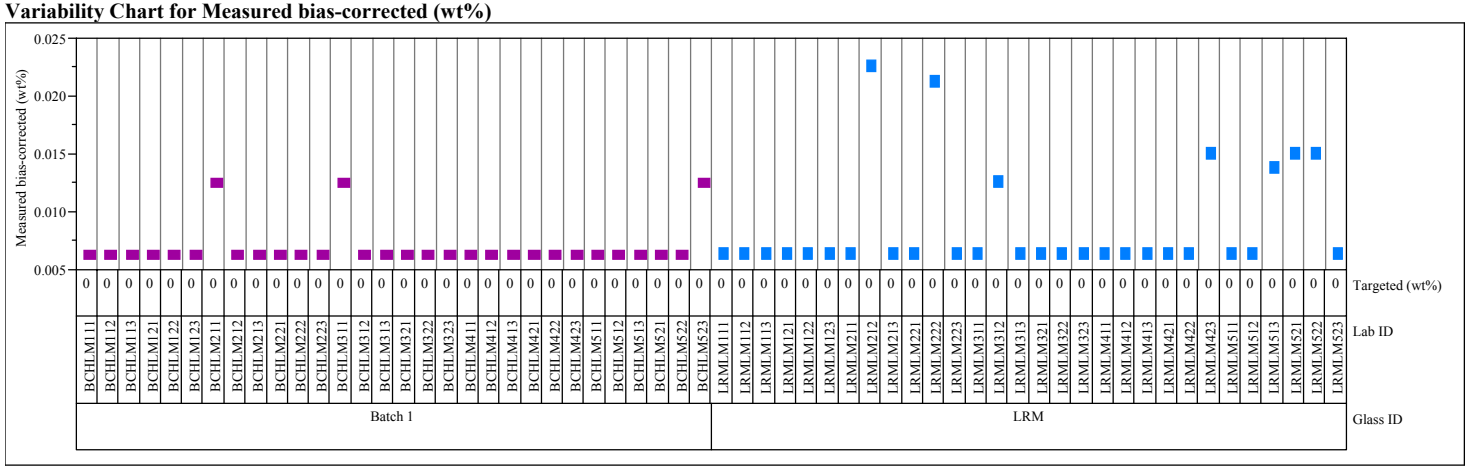
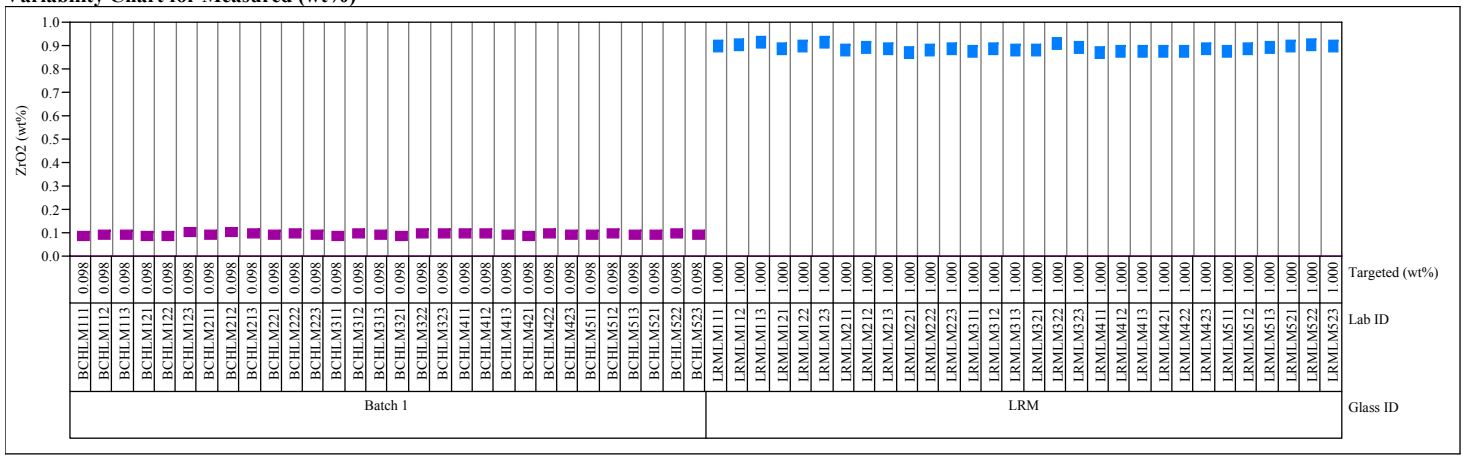


Exhibit A5. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the LM Method

Group=4, Oxide=ZrO2 (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=ZrO2 (wt%)
Variability Chart for Measured bias-corrected (wt%)

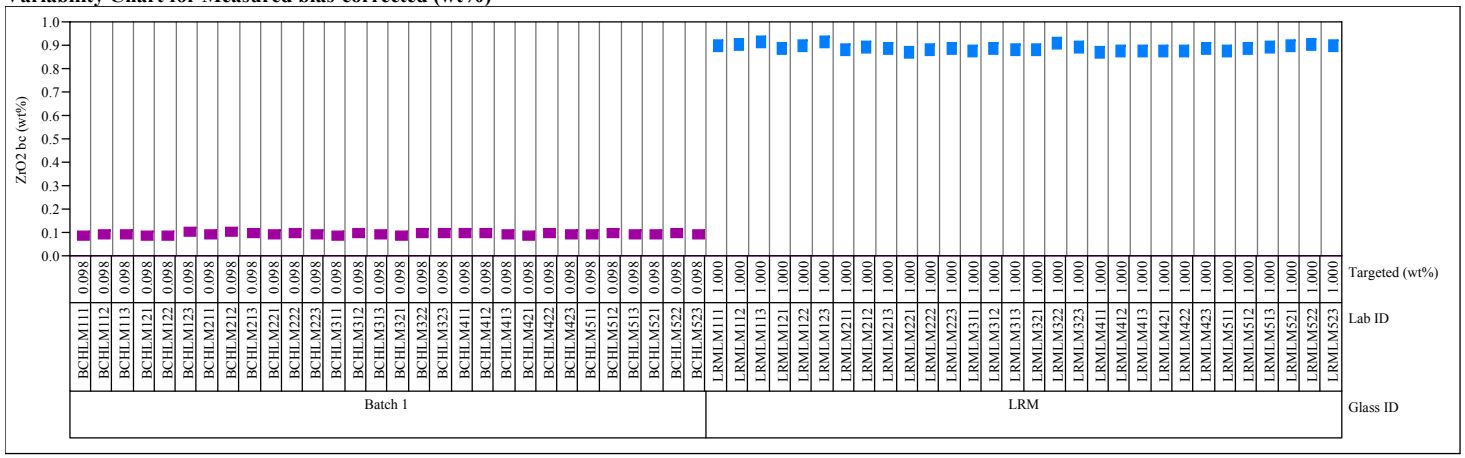
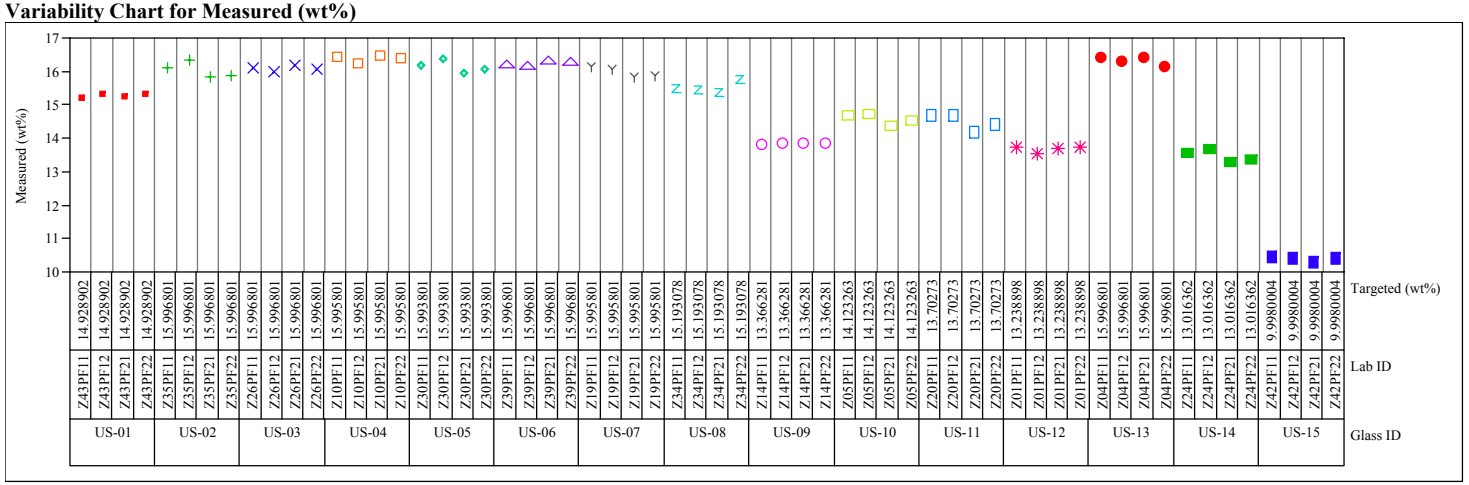


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=1, Oxide=Al2O3 (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=Al2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

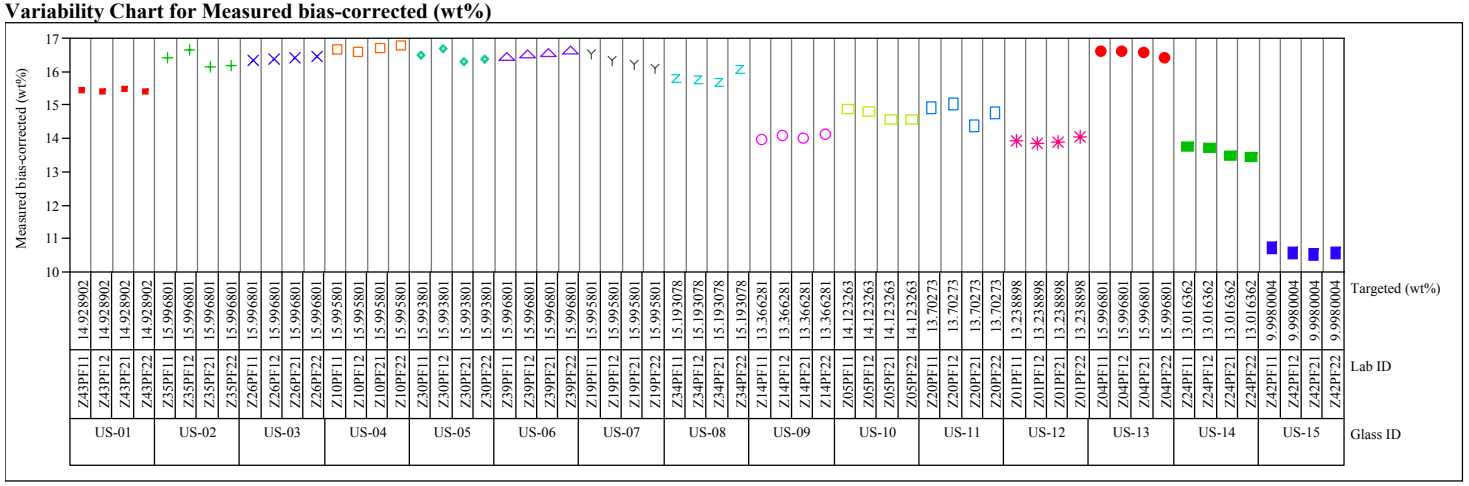
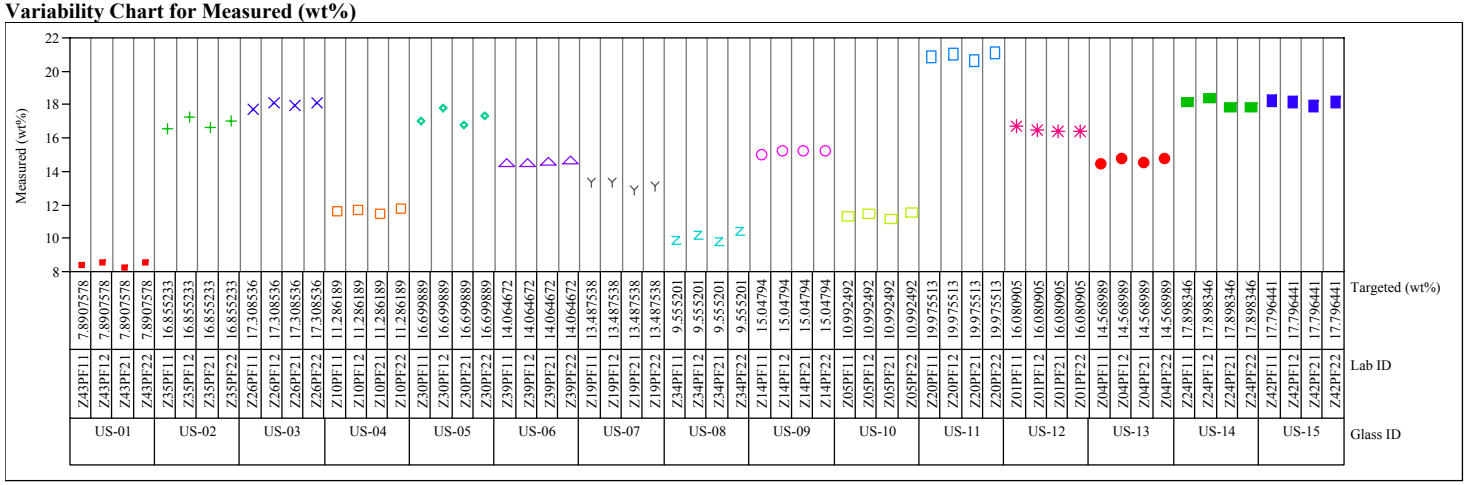


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=1, Oxide=B2O3 (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=B2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

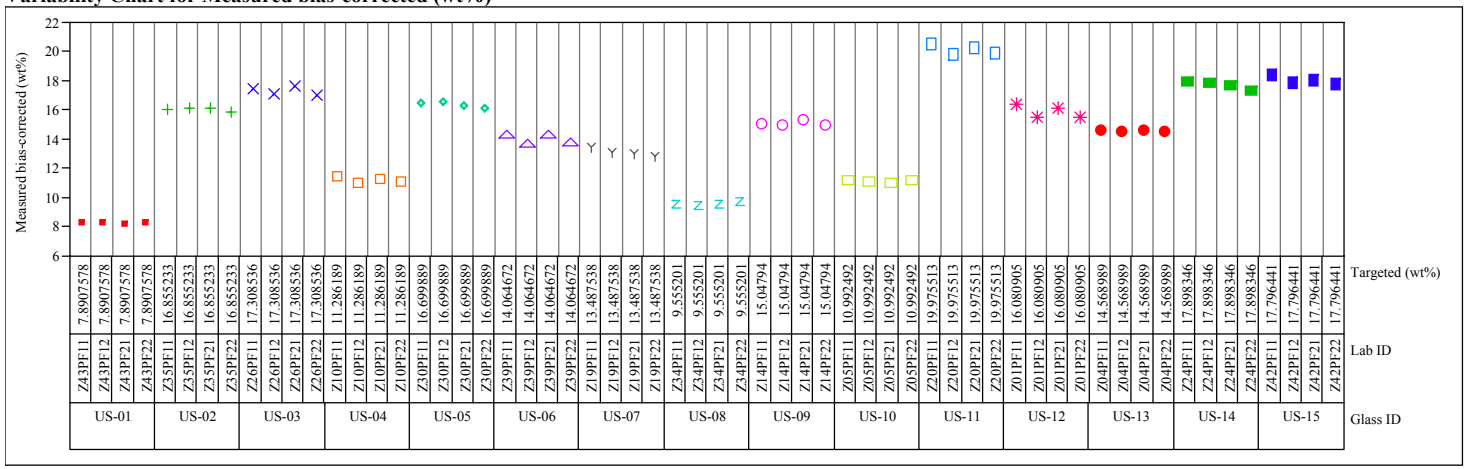
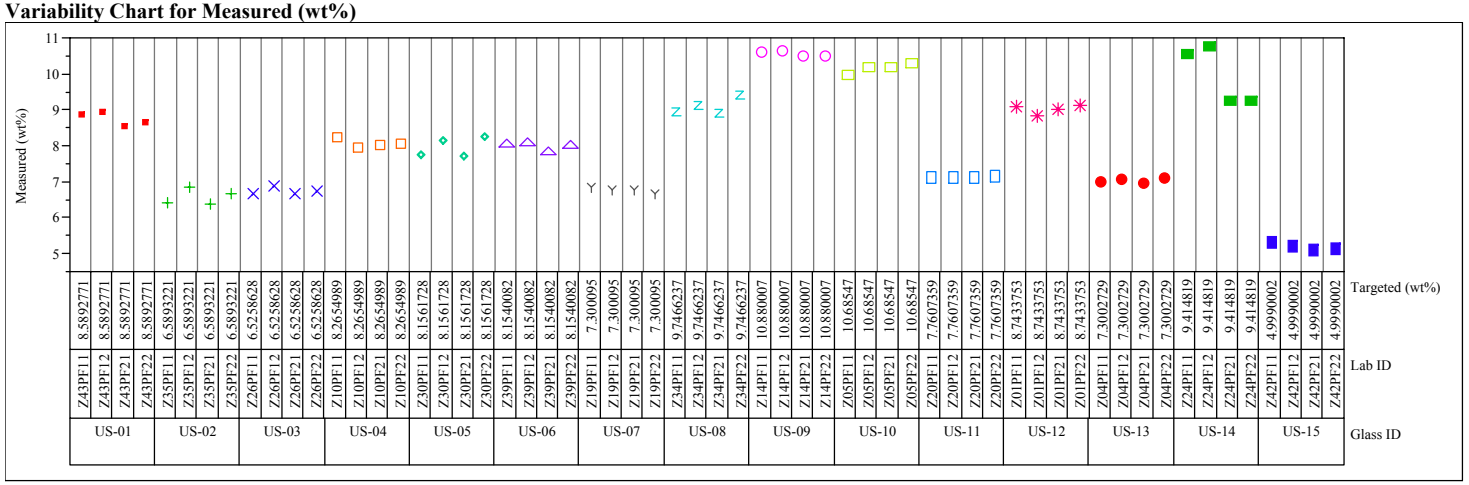


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=1, Oxide=Fe2O3 (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=Fe2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

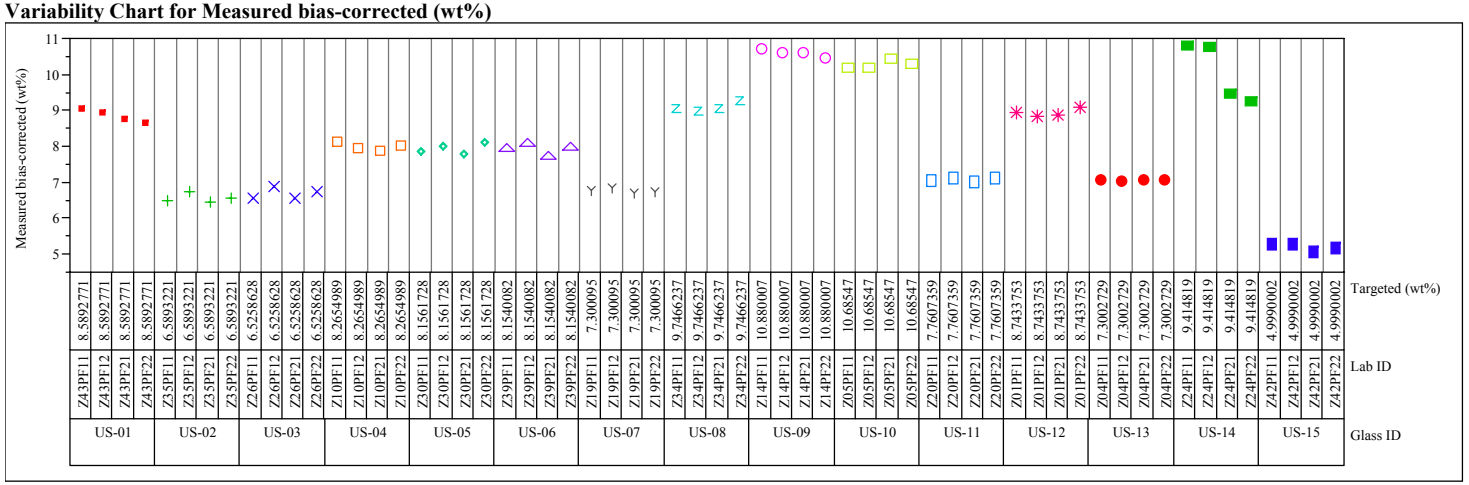
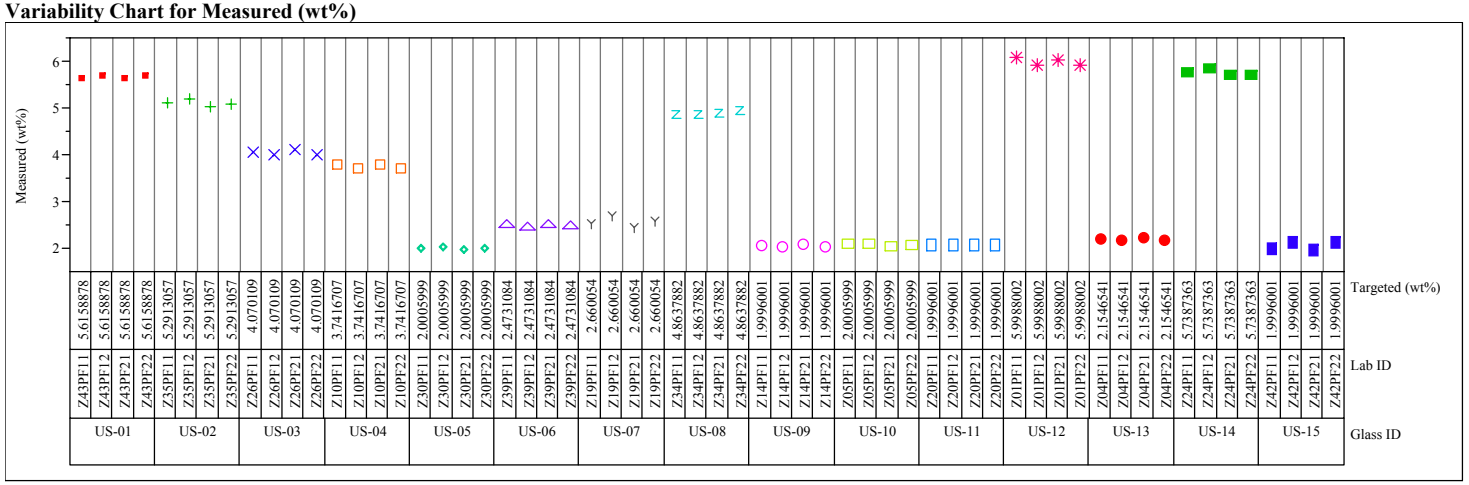


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=1, Oxide=Li2O (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=Li2O (wt%)
Variability Chart for Measured bias-corrected (wt%)

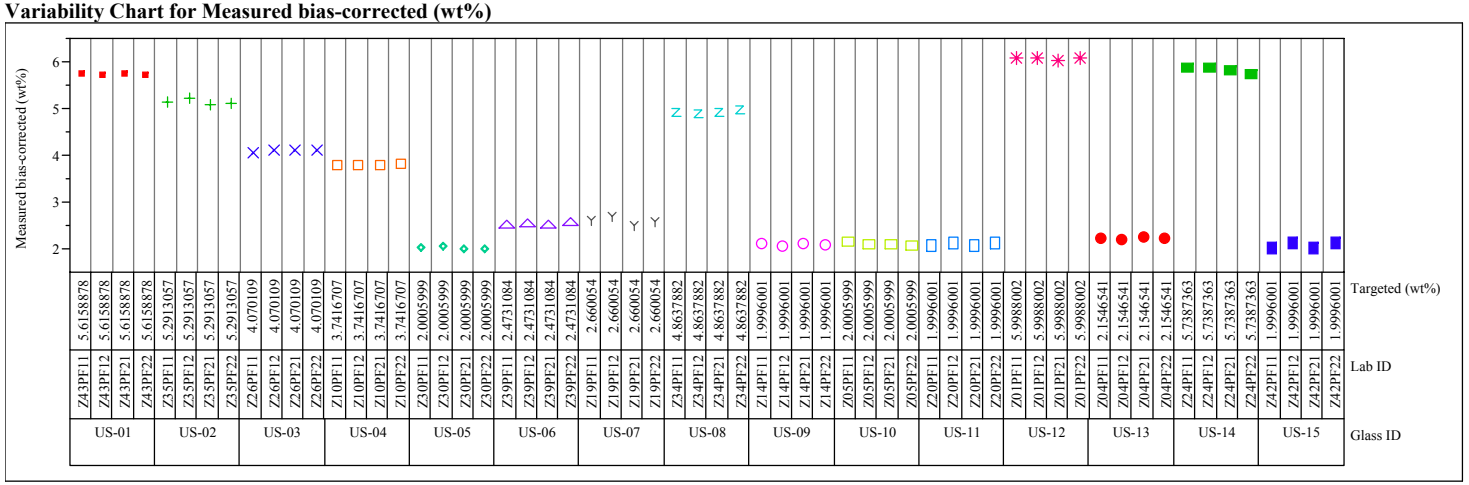
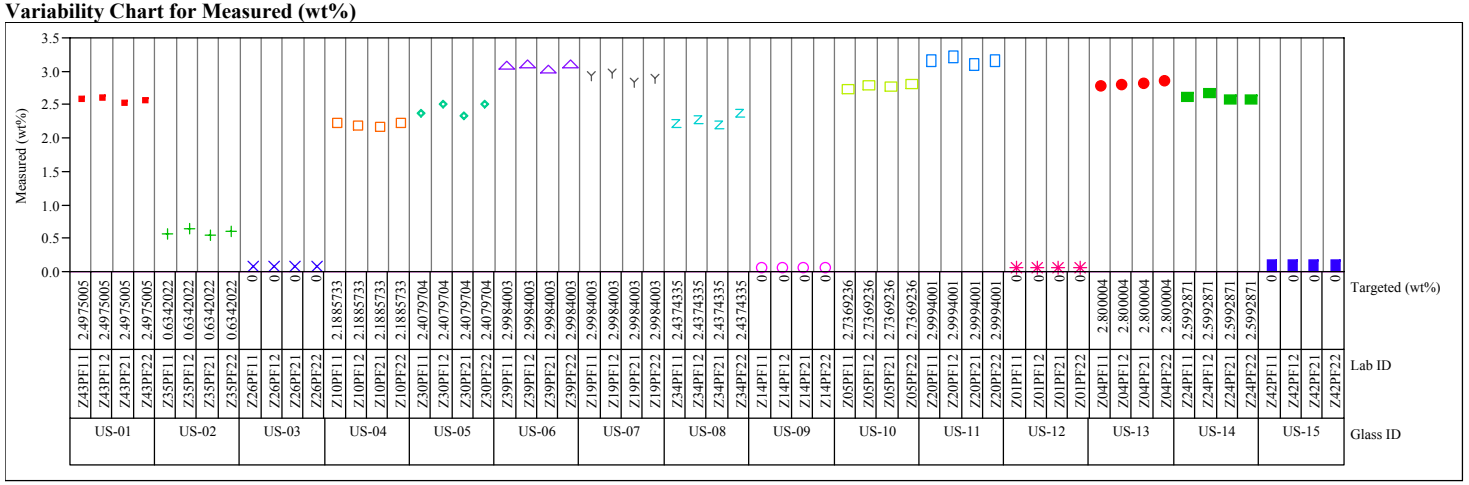


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=1, Oxide=MnO (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=MnO (wt%)
Variability Chart for Measured bias-corrected (wt%)

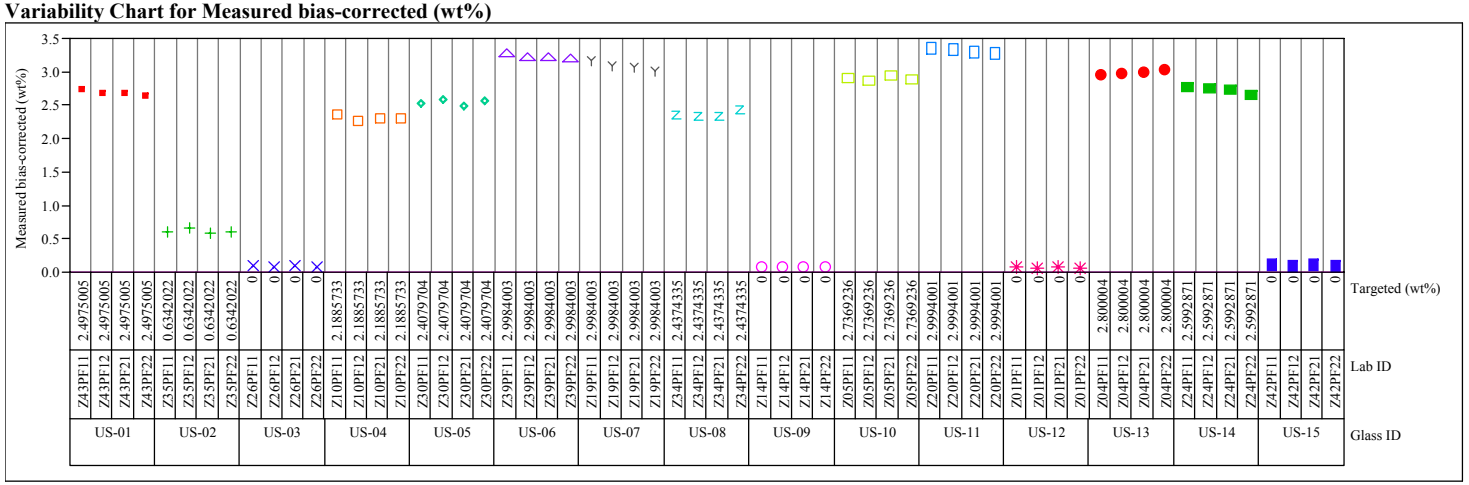
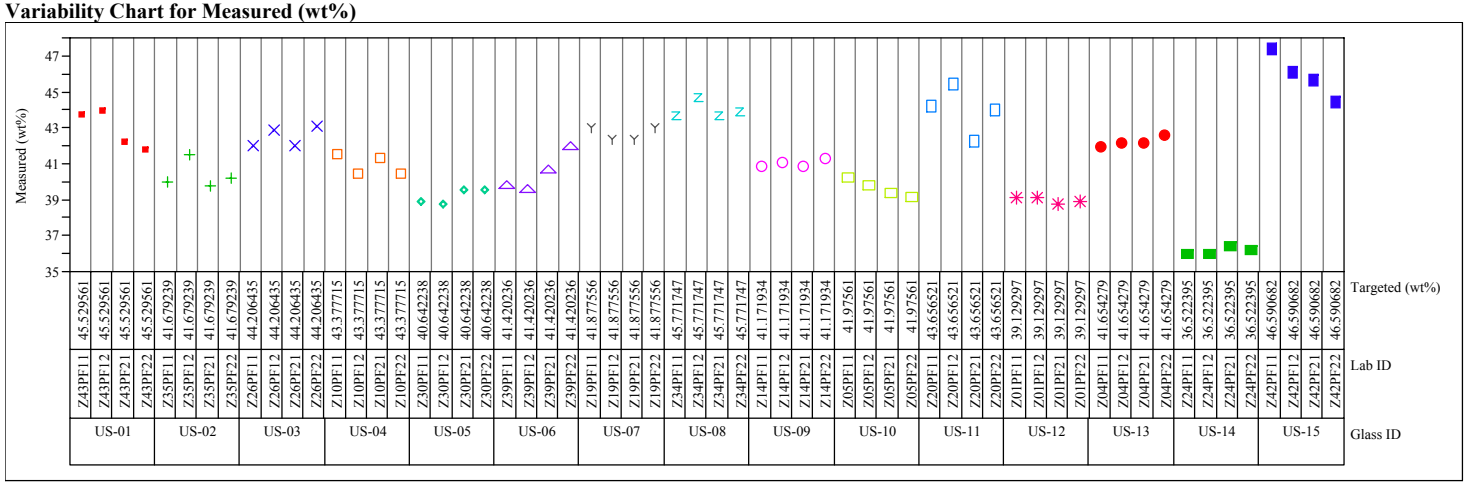


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=1, Oxide=SiO2 (wt%)
Variability Chart for Measured (wt%)



Group=1, Oxide=SiO2 (wt%)
Variability Chart for Measured bias-corrected (wt%)

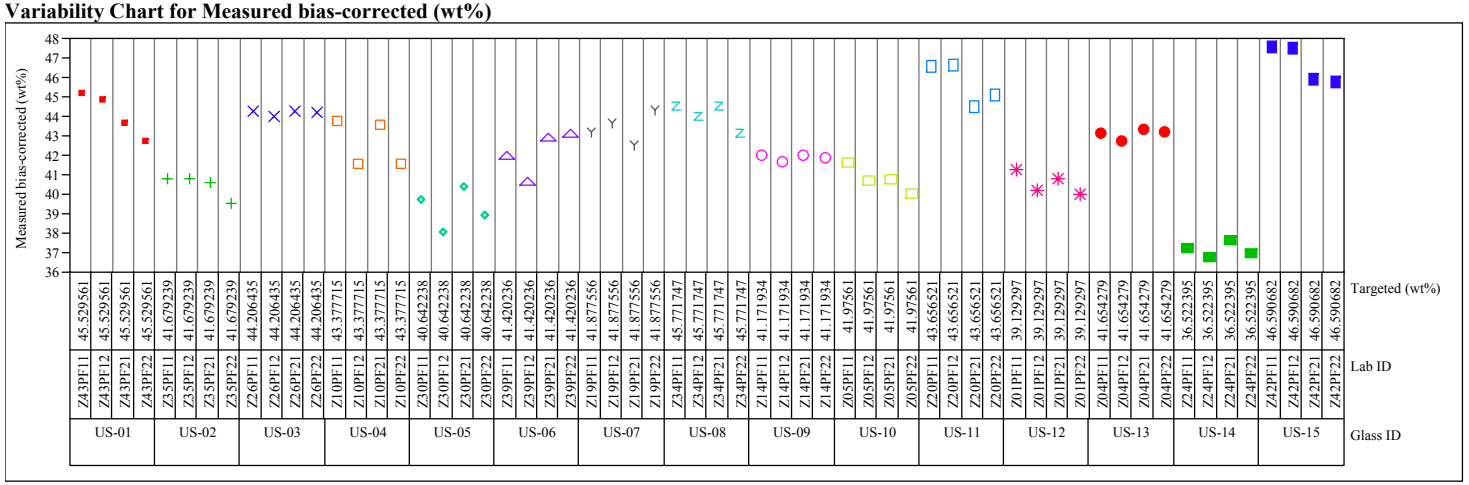
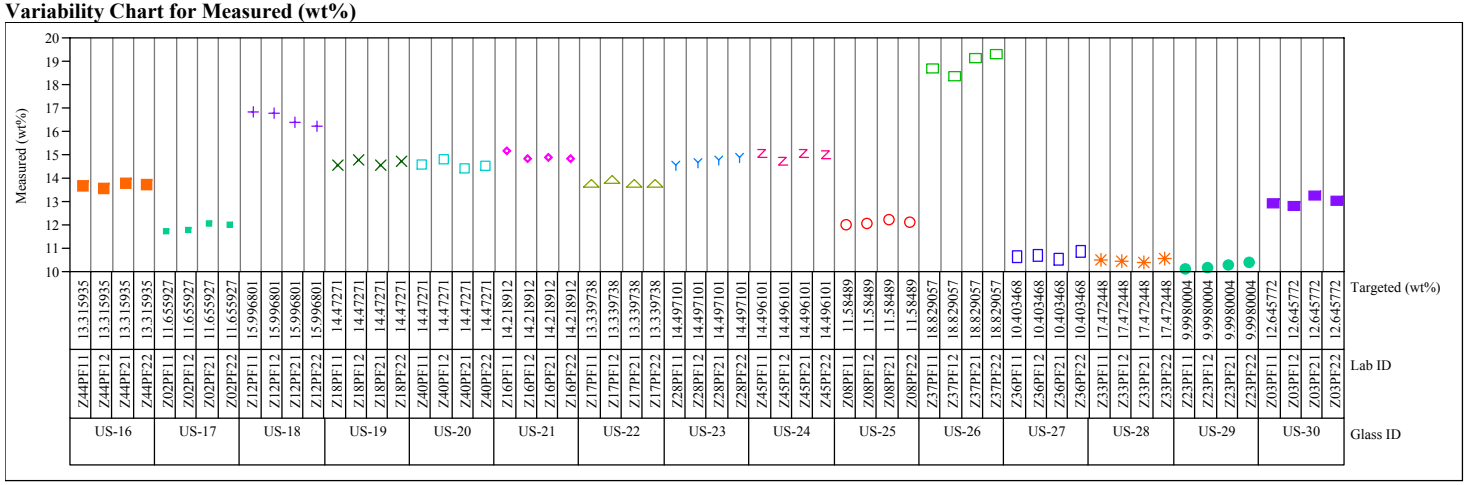


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=2, Oxide=Al2O3 (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=Al2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

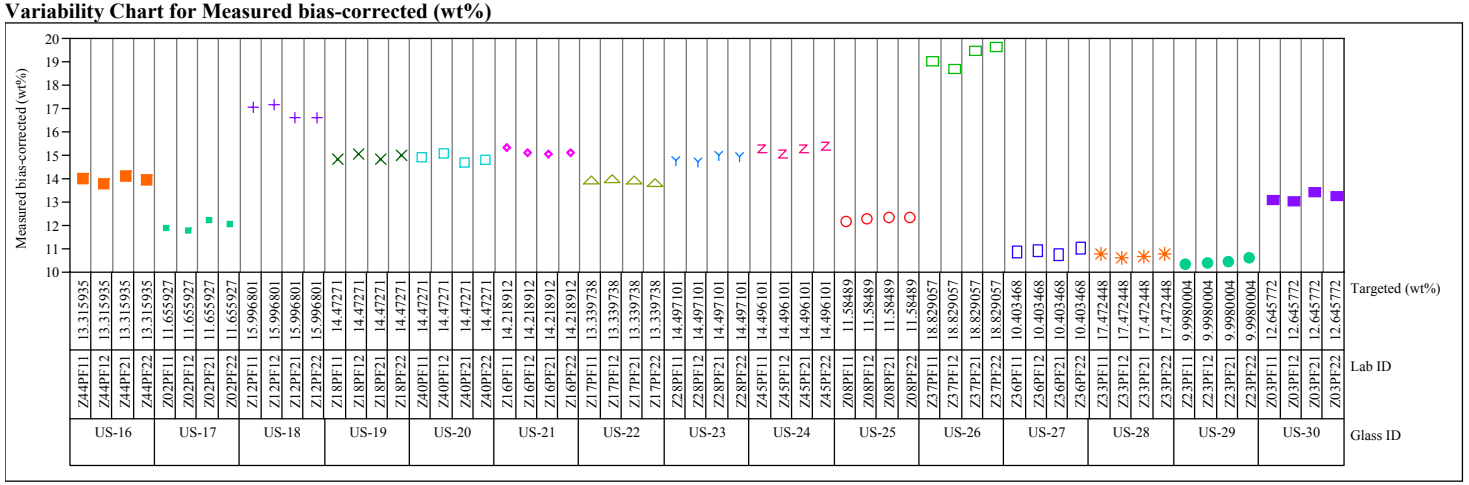
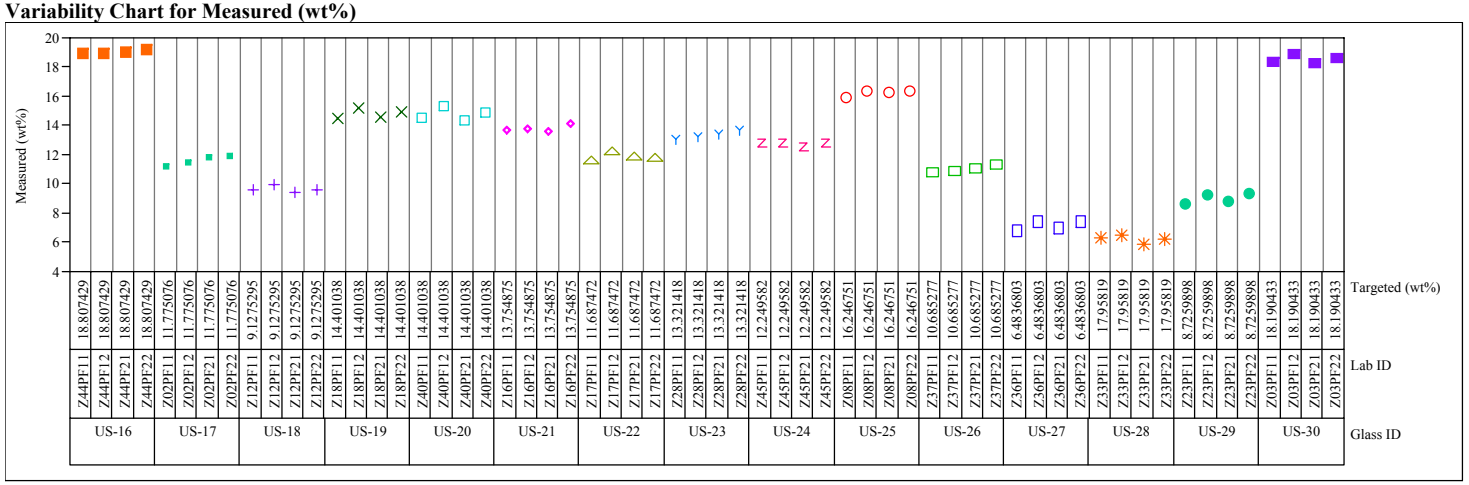


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=2, Oxide=B2O3 (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=B2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

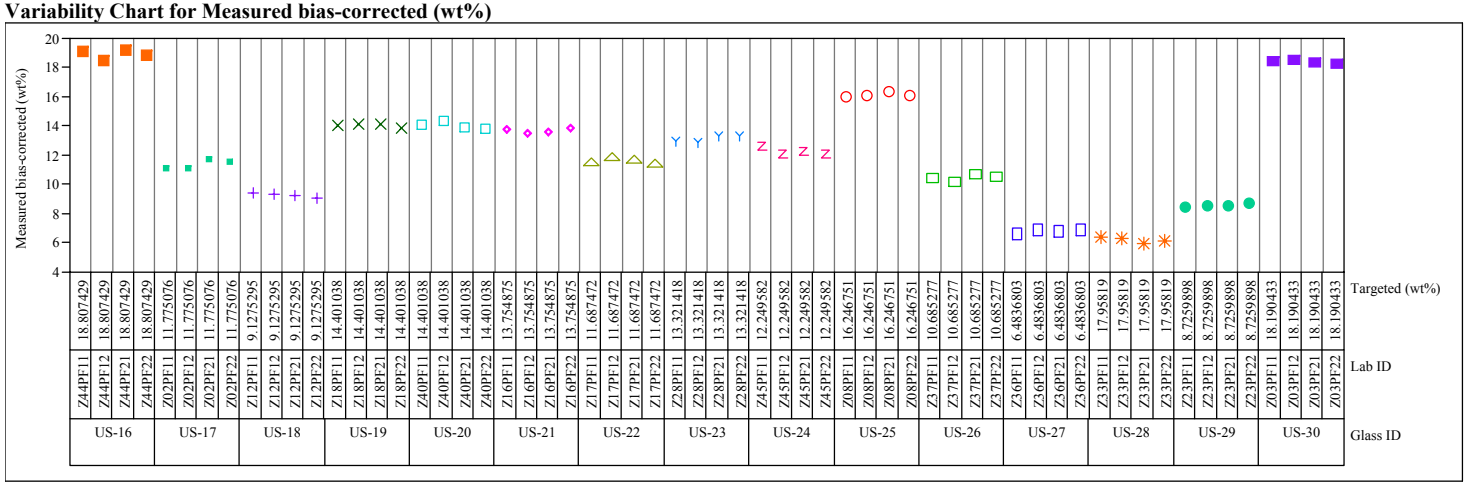
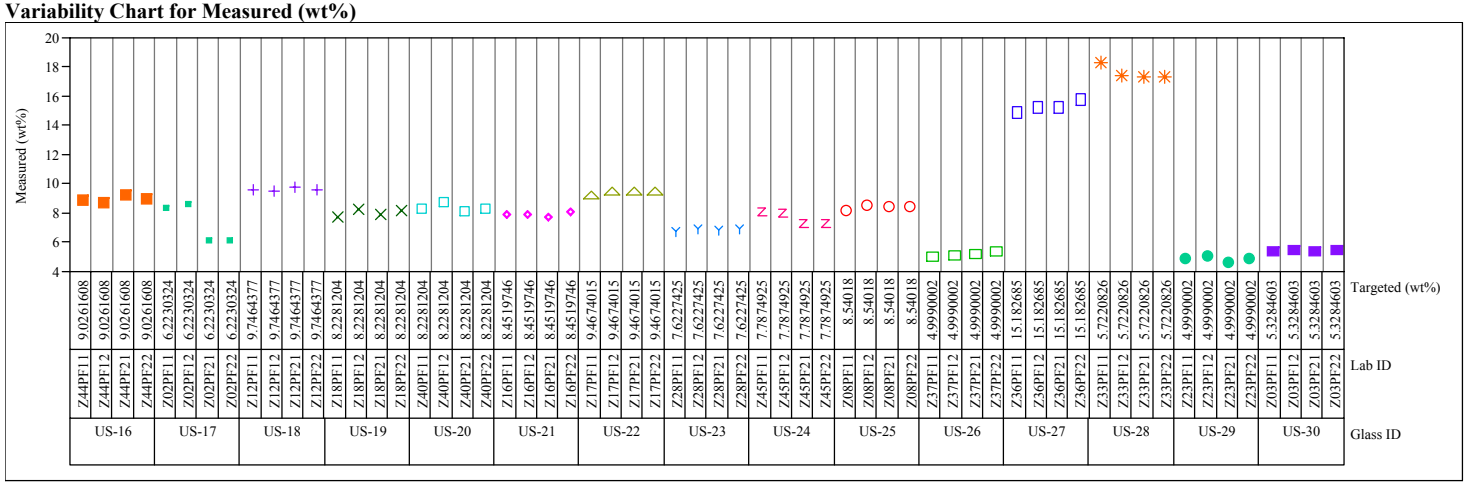


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=2, Oxide=Fe2O3 (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=Fe2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

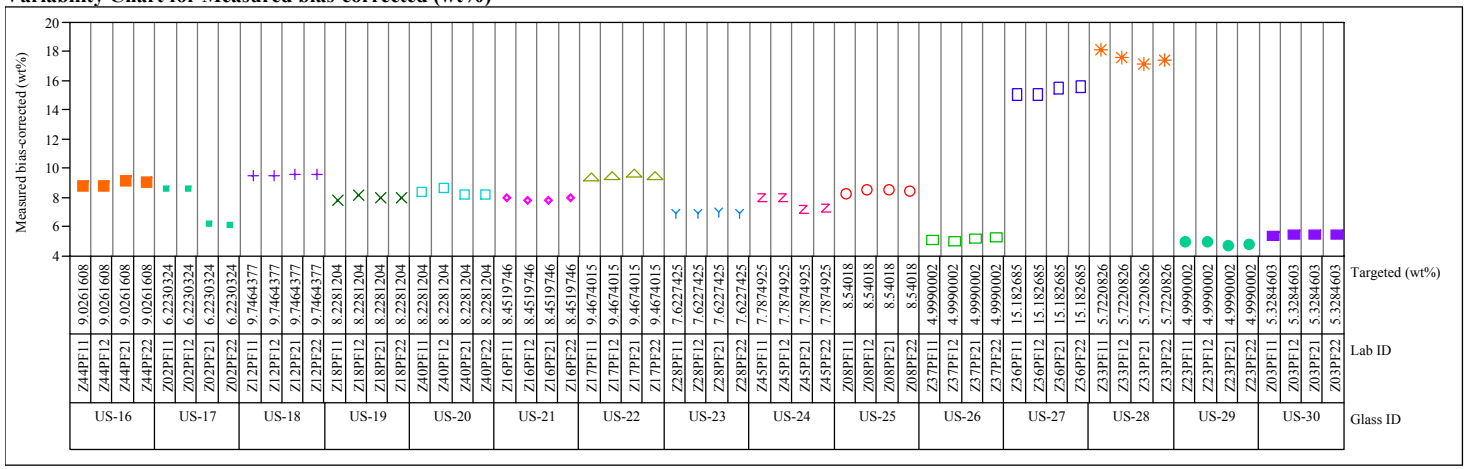
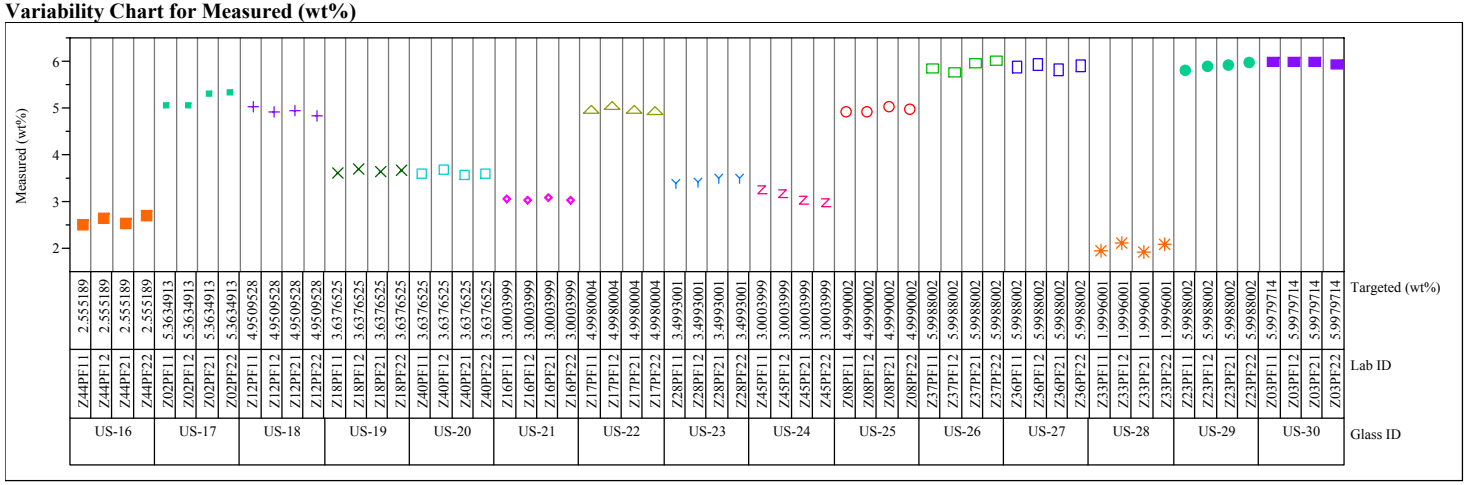


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=2, Oxide=Li2O (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=Li2O (wt%)
Variability Chart for Measured bias-corrected (wt%)

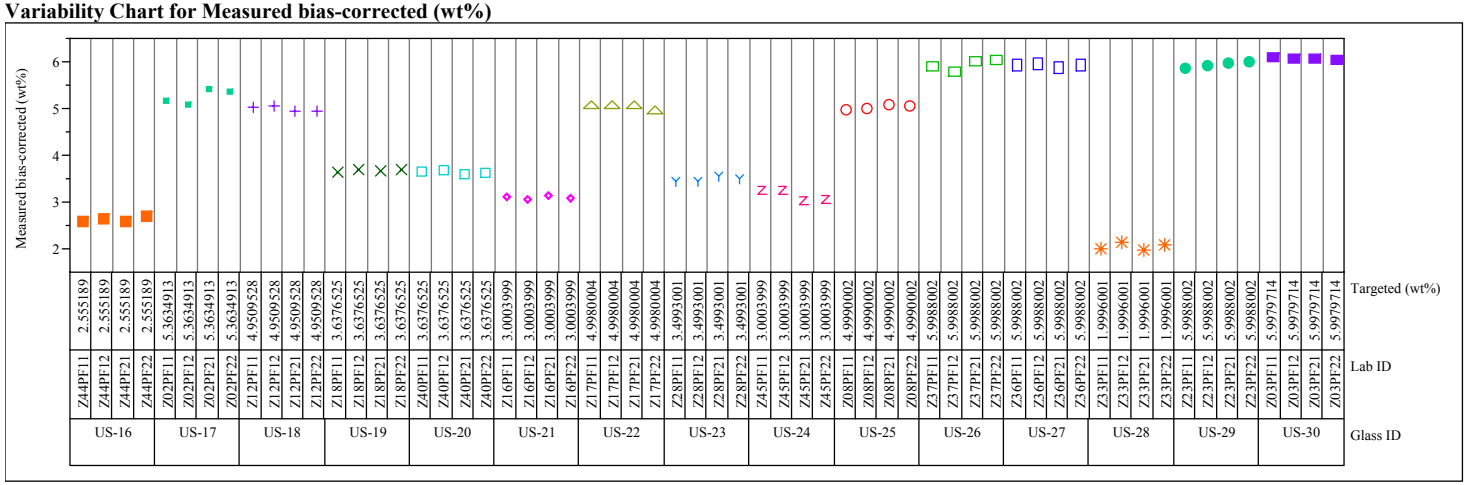
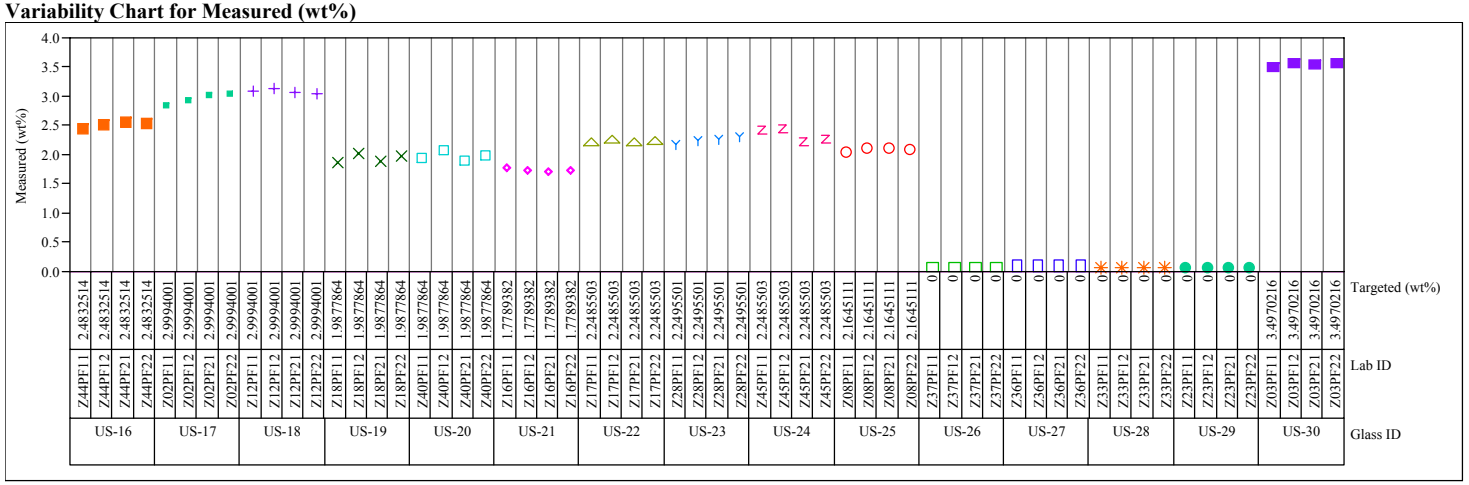


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=2, Oxide=MnO (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=MnO (wt%)
Variability Chart for Measured bias-corrected (wt%)

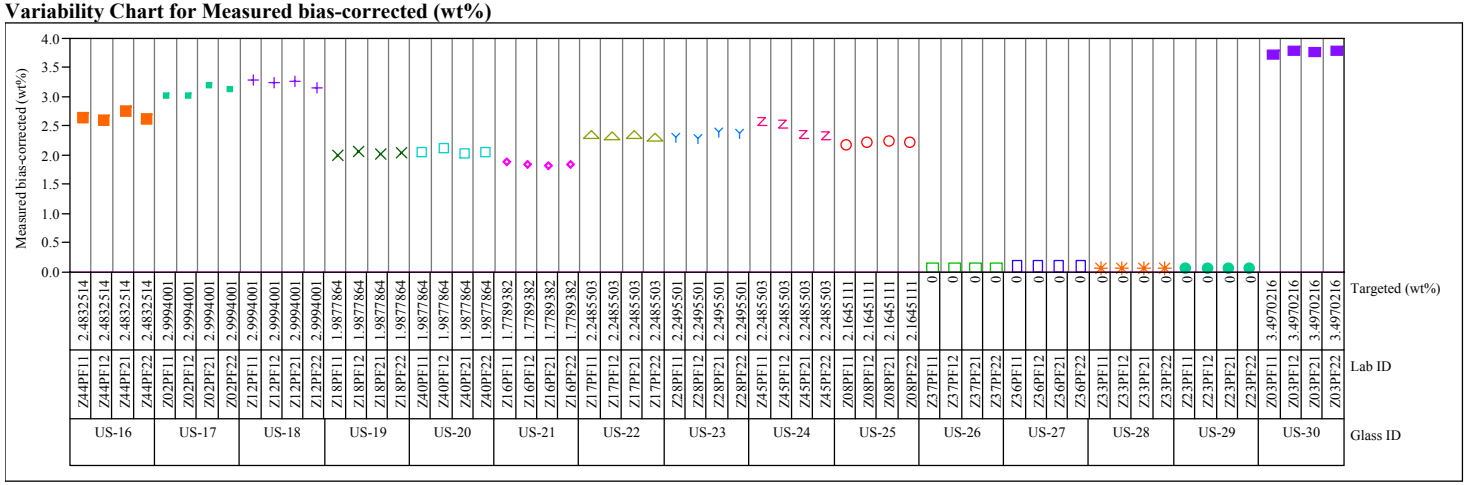
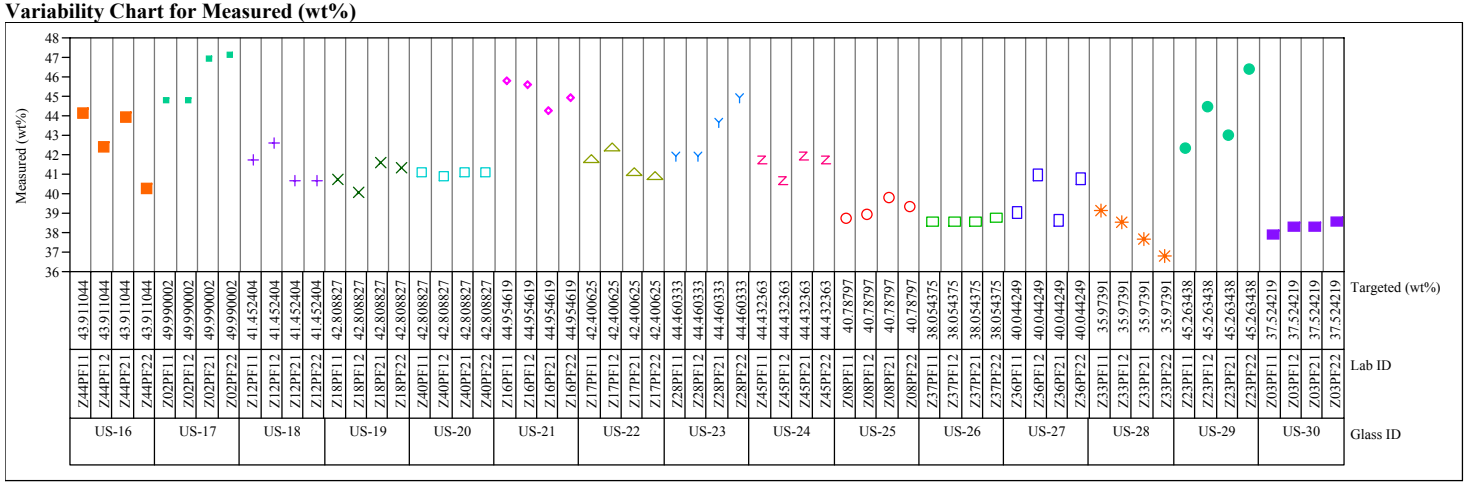


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=2, Oxide=SiO2 (wt%)
Variability Chart for Measured (wt%)



Group=2, Oxide=SiO2 (wt%)
Variability Chart for Measured bias-corrected (wt%)

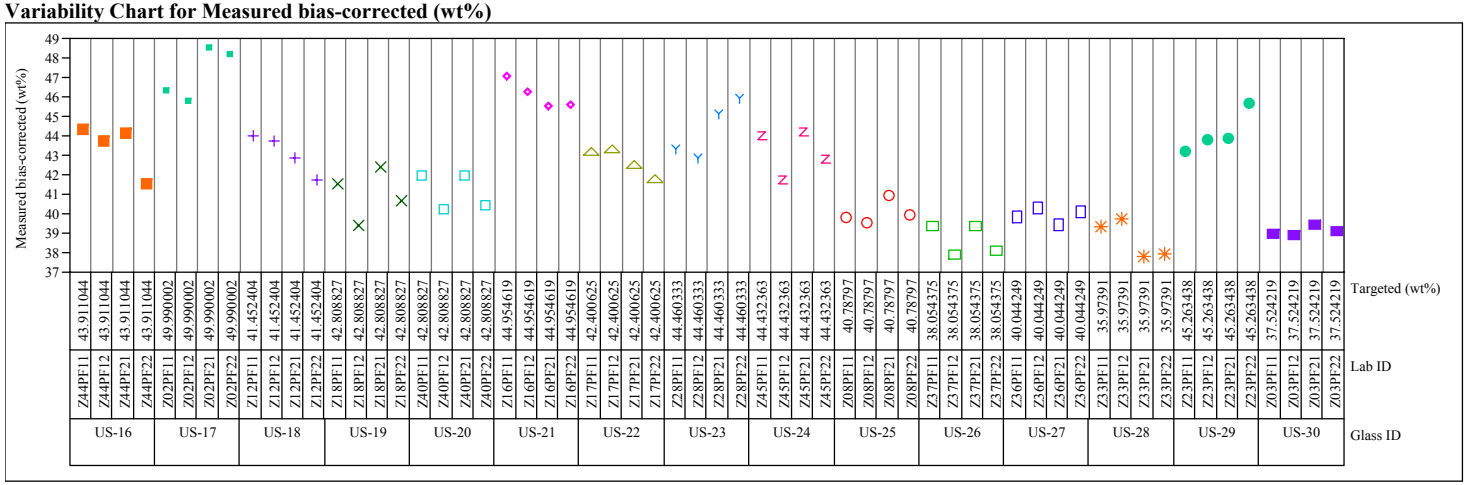
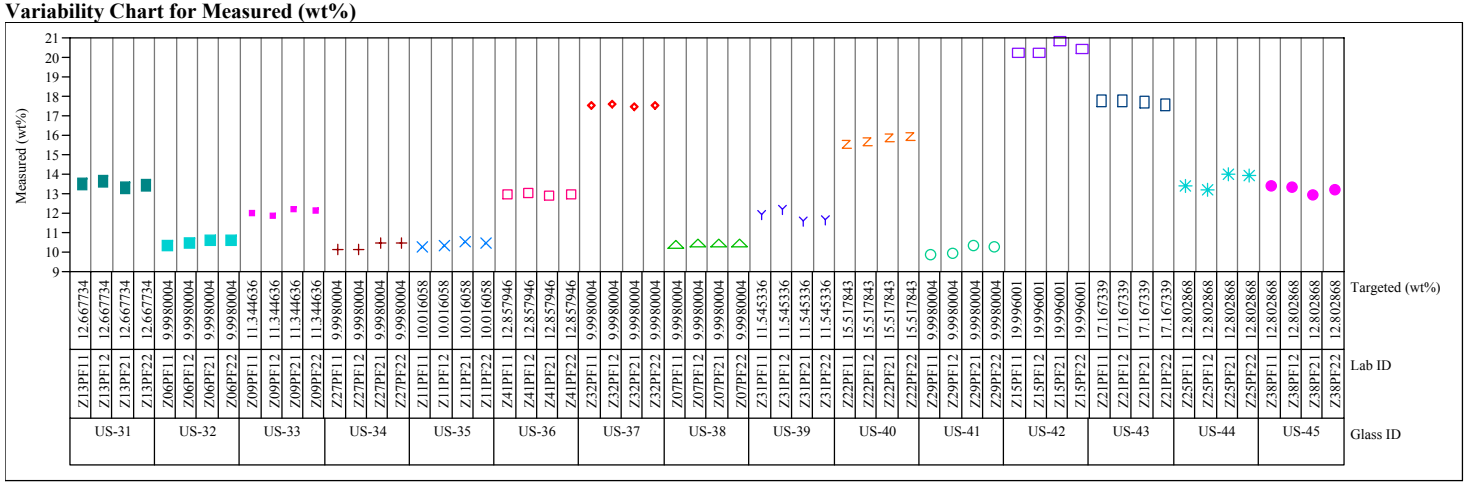


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=3, Oxide=Al2O3 (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=Al2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

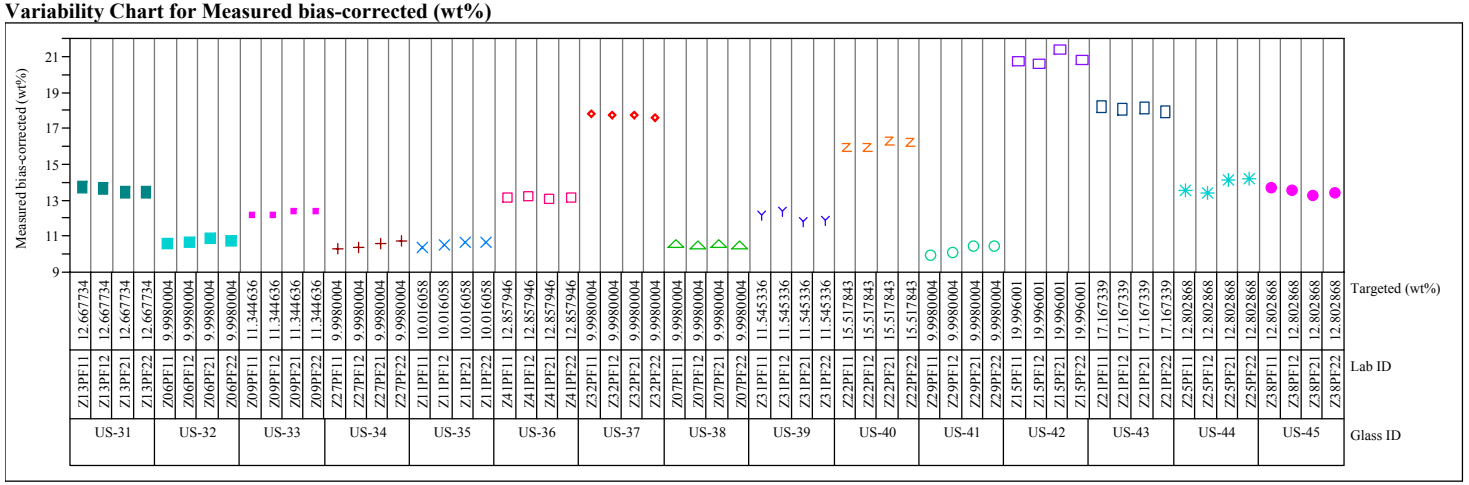
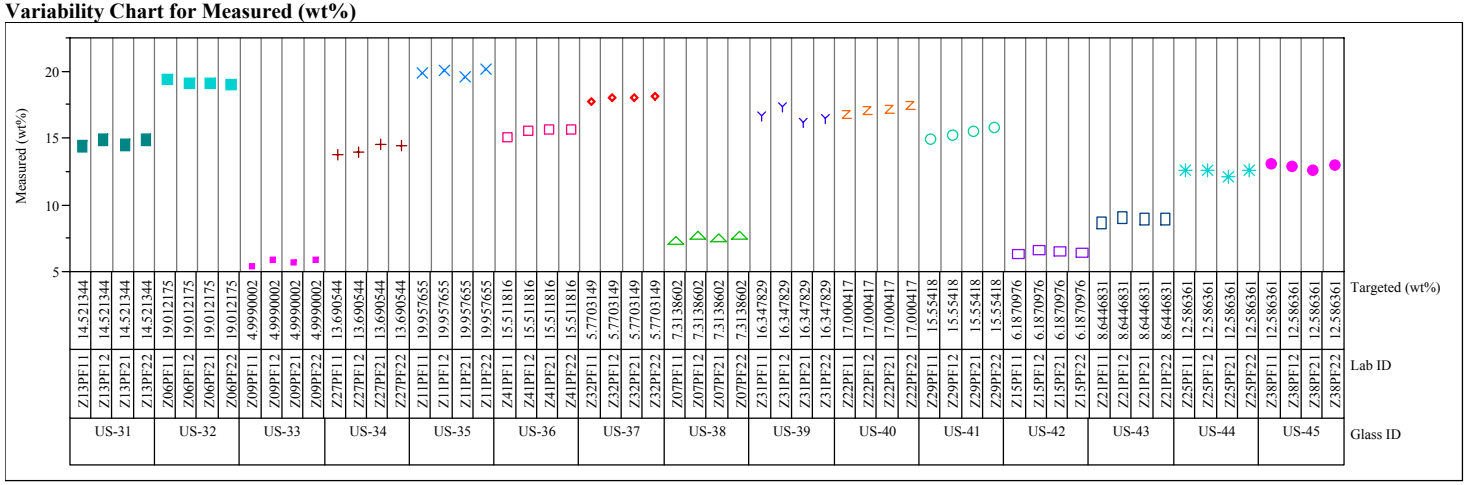


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=3, Oxide=B2O3 (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=B2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

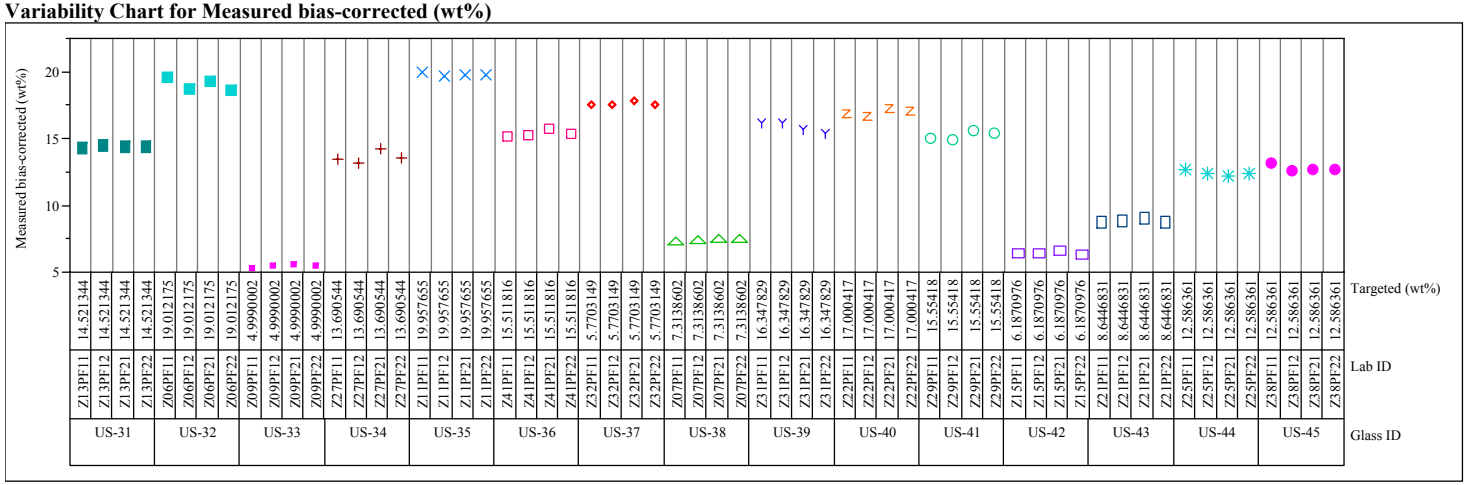
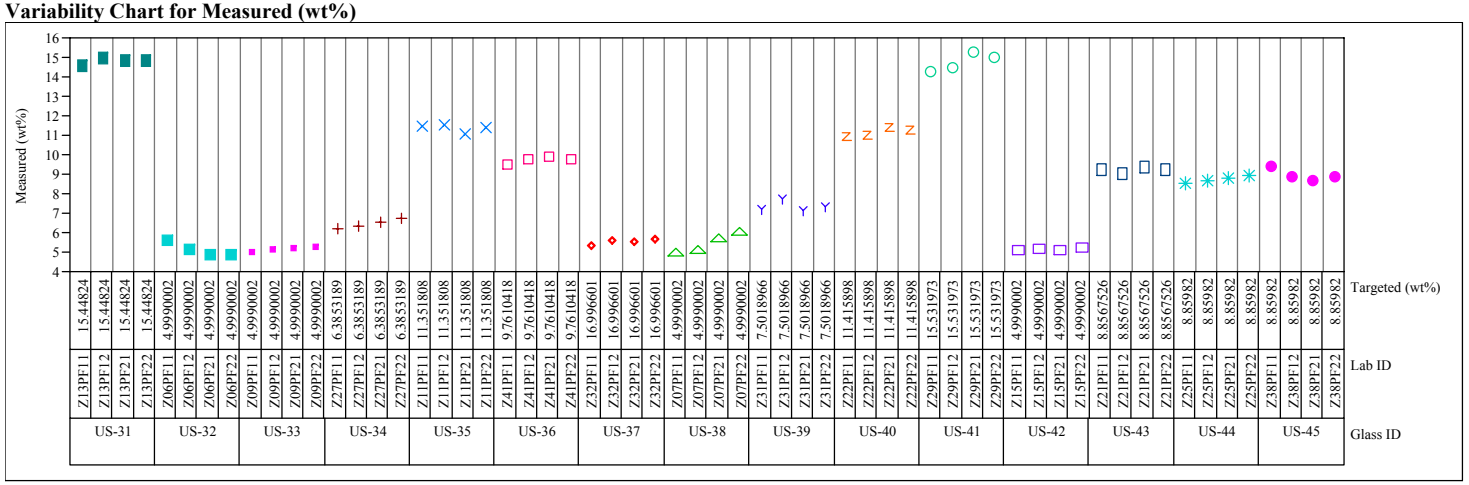


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=3, Oxide=Fe2O3 (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=Fe2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

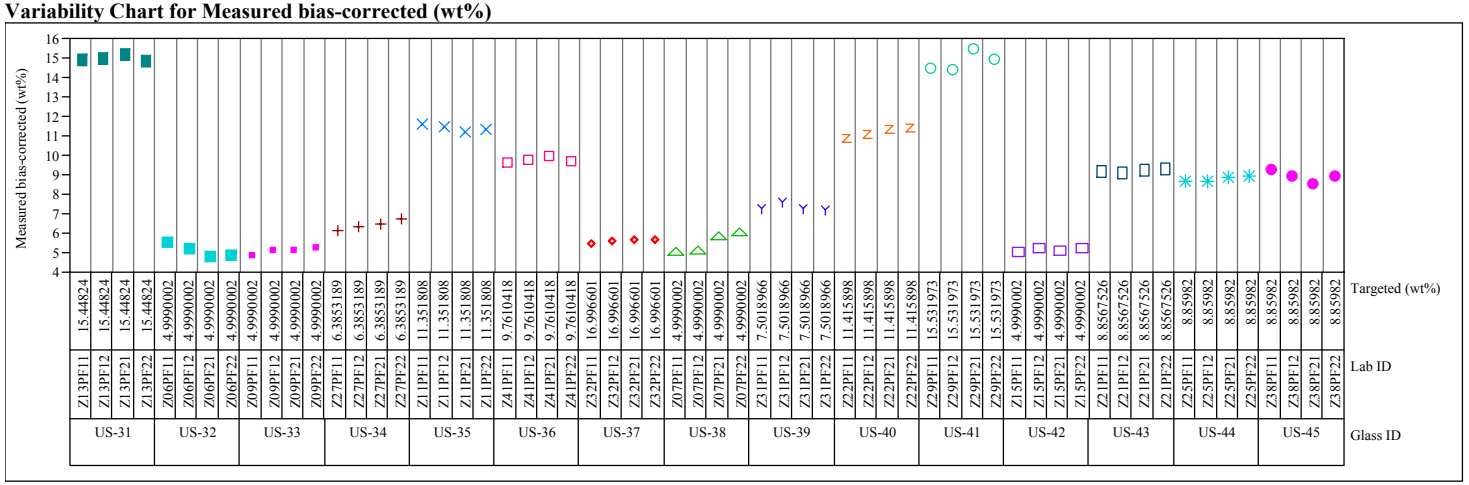
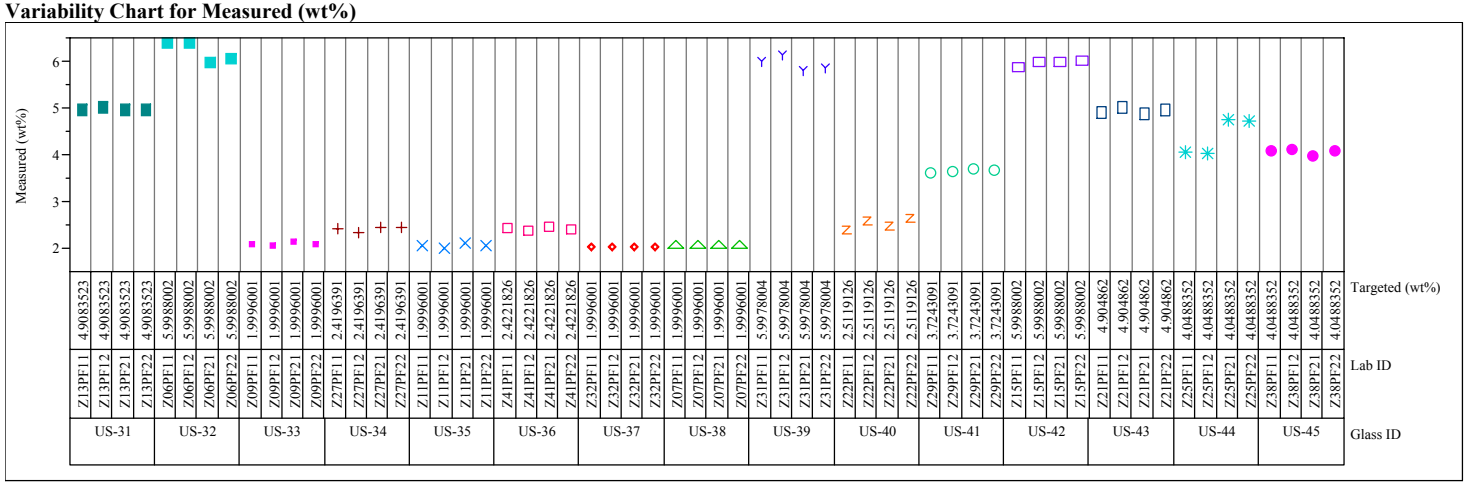


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=3, Oxide=Li2O (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=Li2O (wt%)
Variability Chart for Measured bias-corrected (wt%)

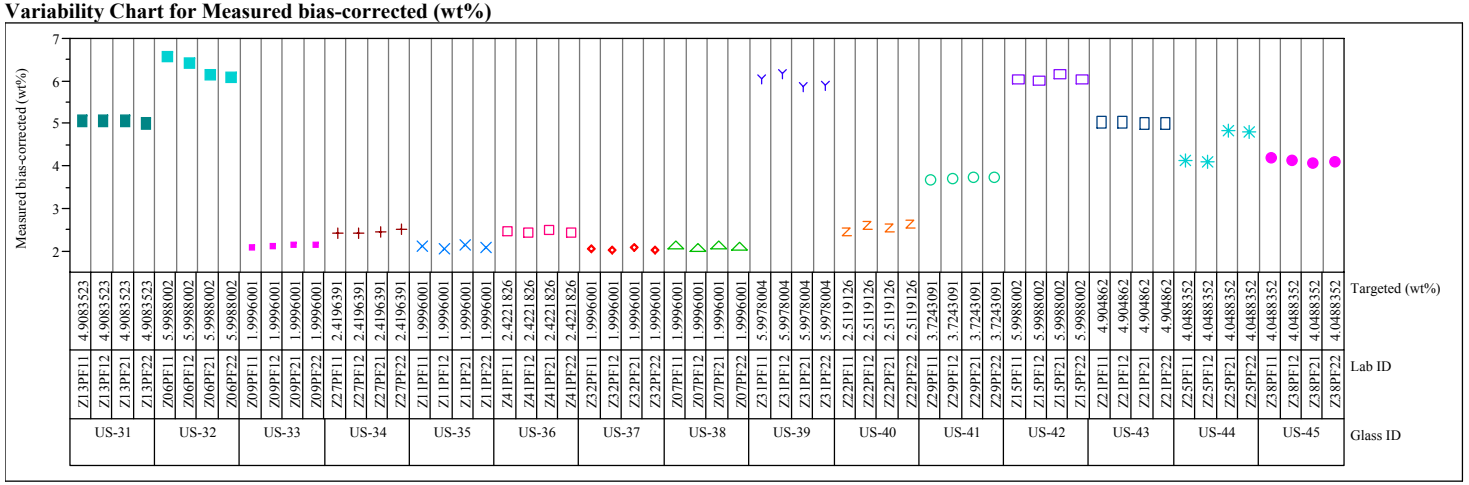
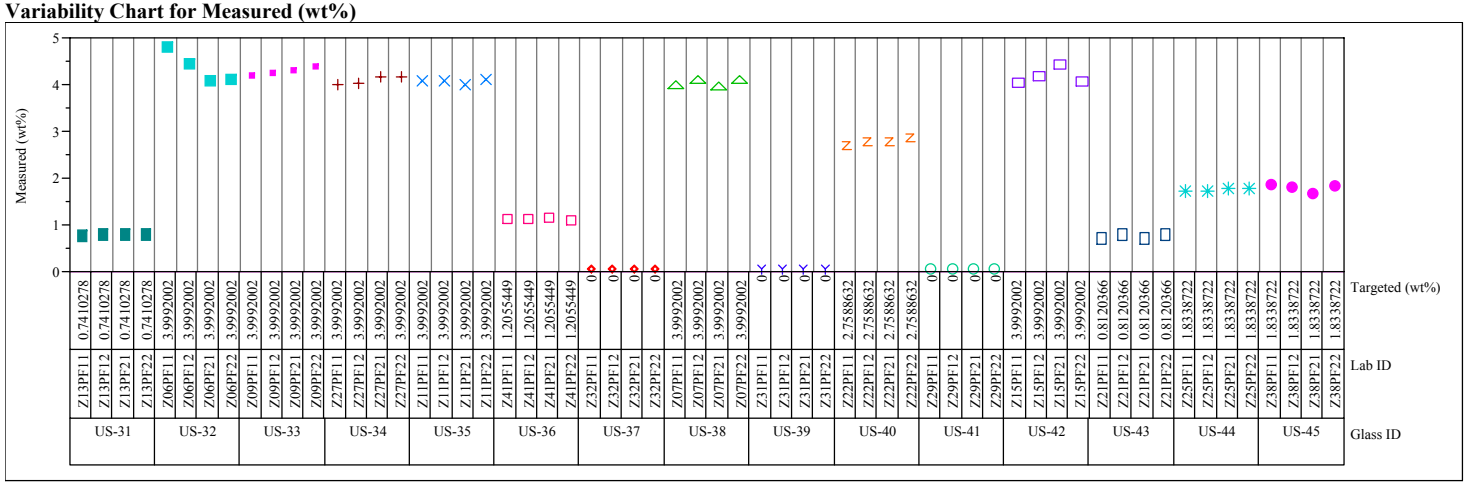


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=3, Oxide=MnO (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=MnO (wt%)
Variability Chart for Measured bias-corrected (wt%)

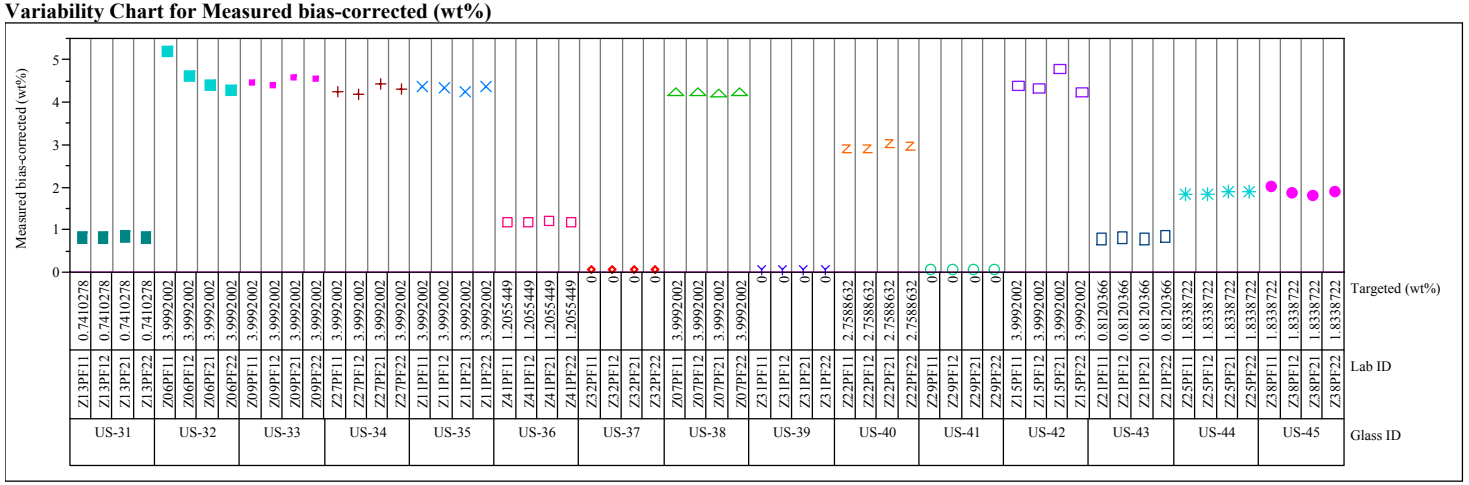
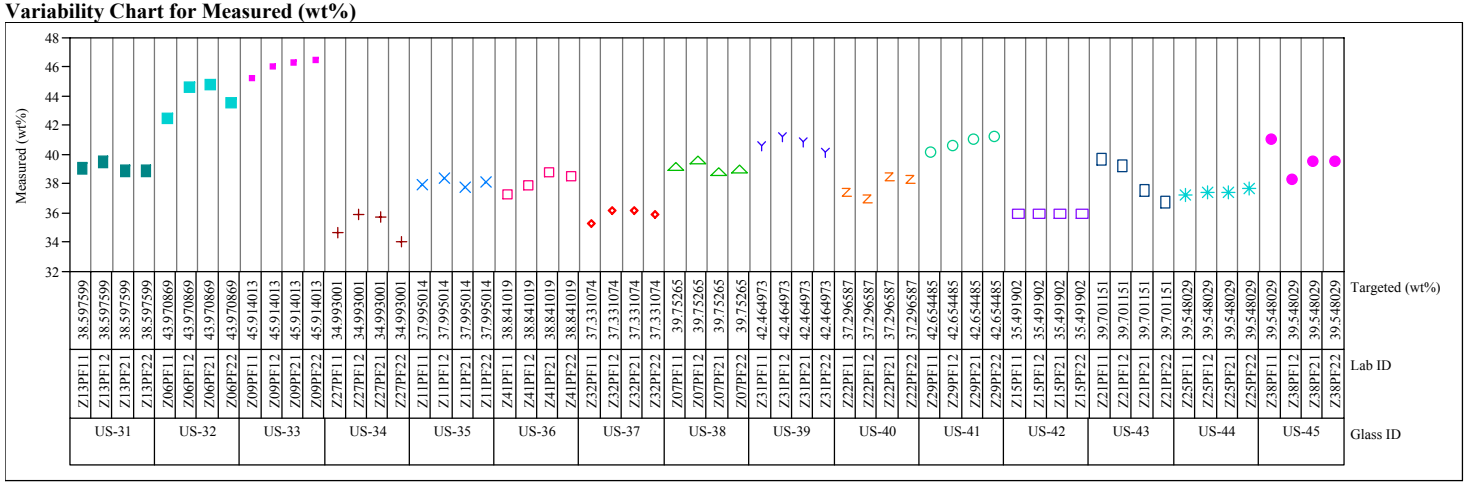


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=3, Oxide=SiO2 (wt%)
Variability Chart for Measured (wt%)



Group=3, Oxide=SiO2 (wt%)
Variability Chart for Measured bias-corrected (wt%)

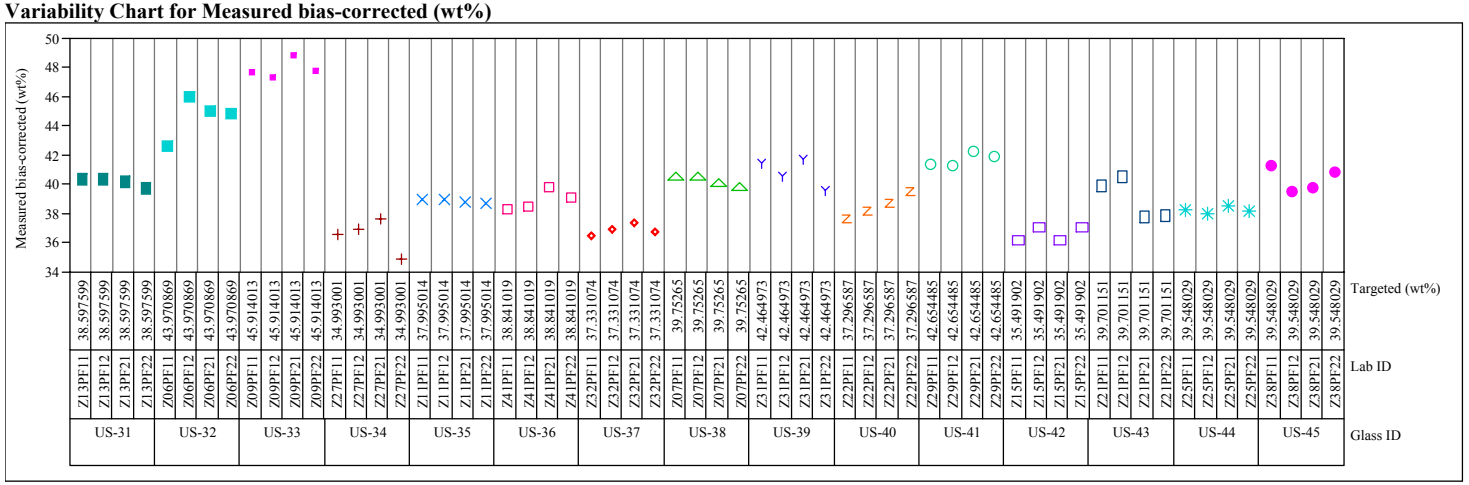
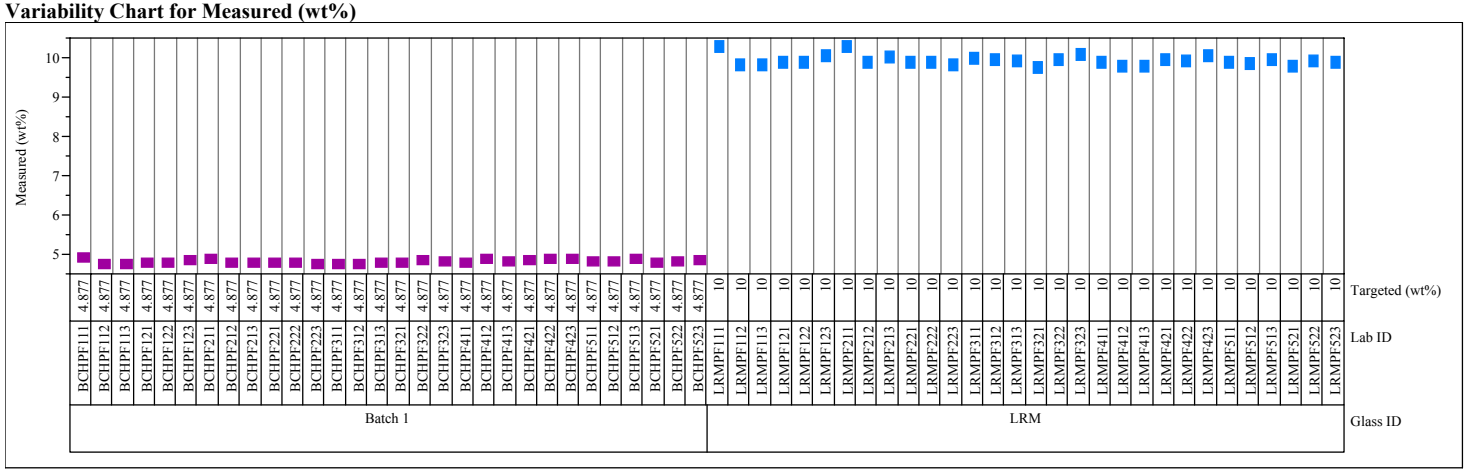


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=4, Oxide=Al2O3 (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=Al2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

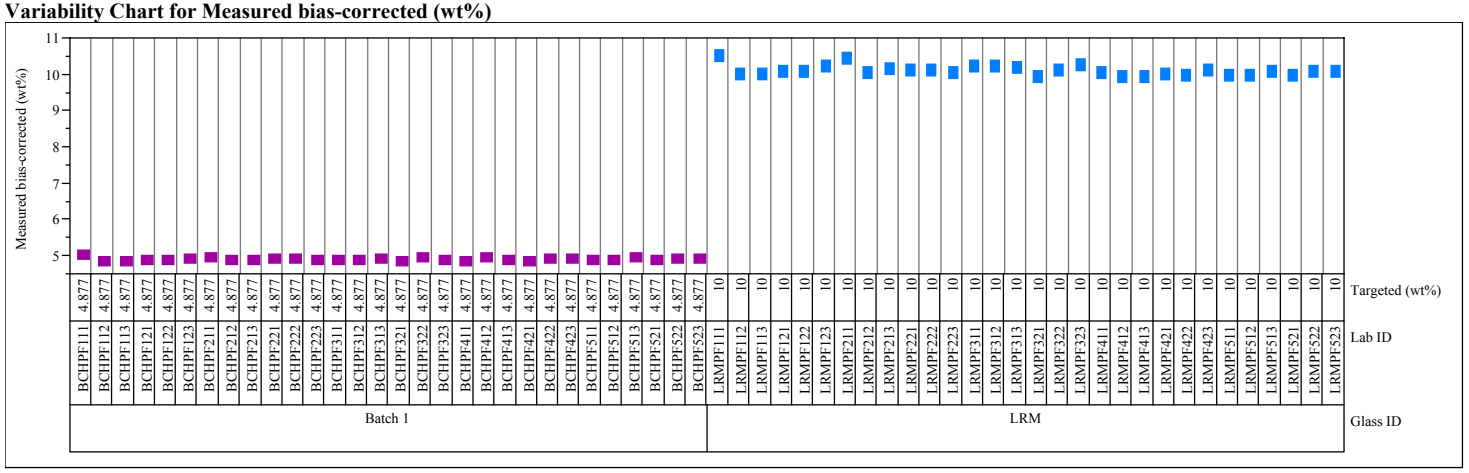
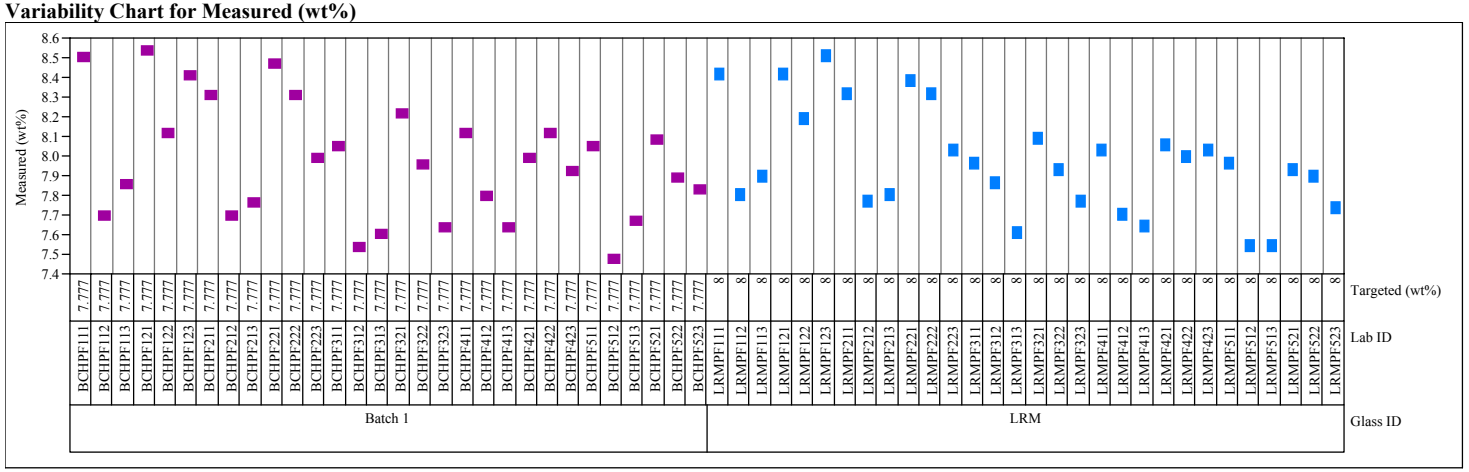


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=4, Oxide=B2O3 (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=B2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

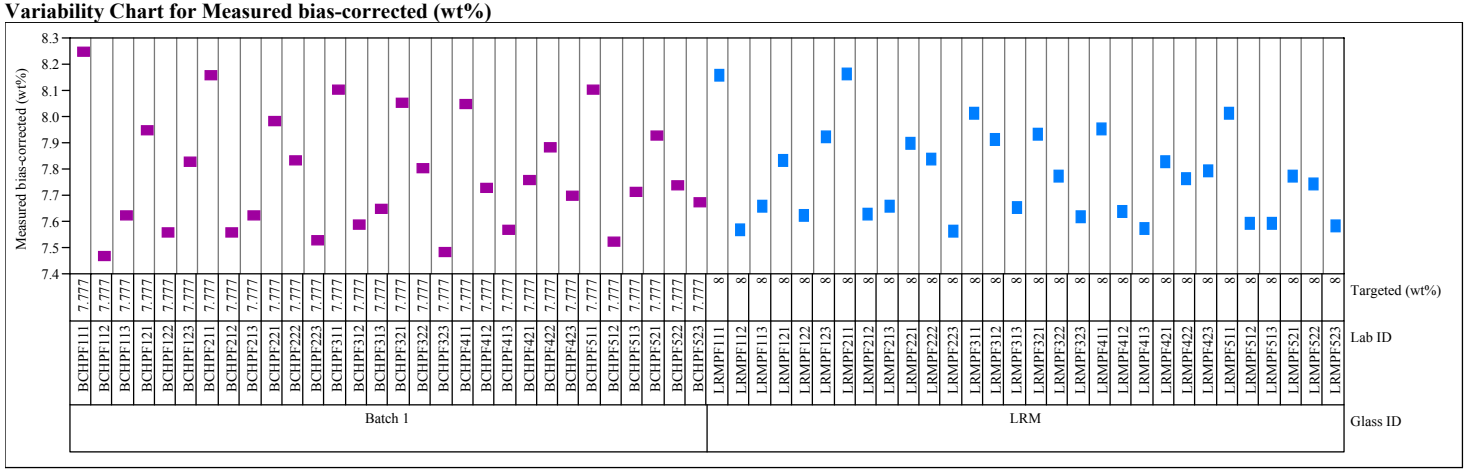
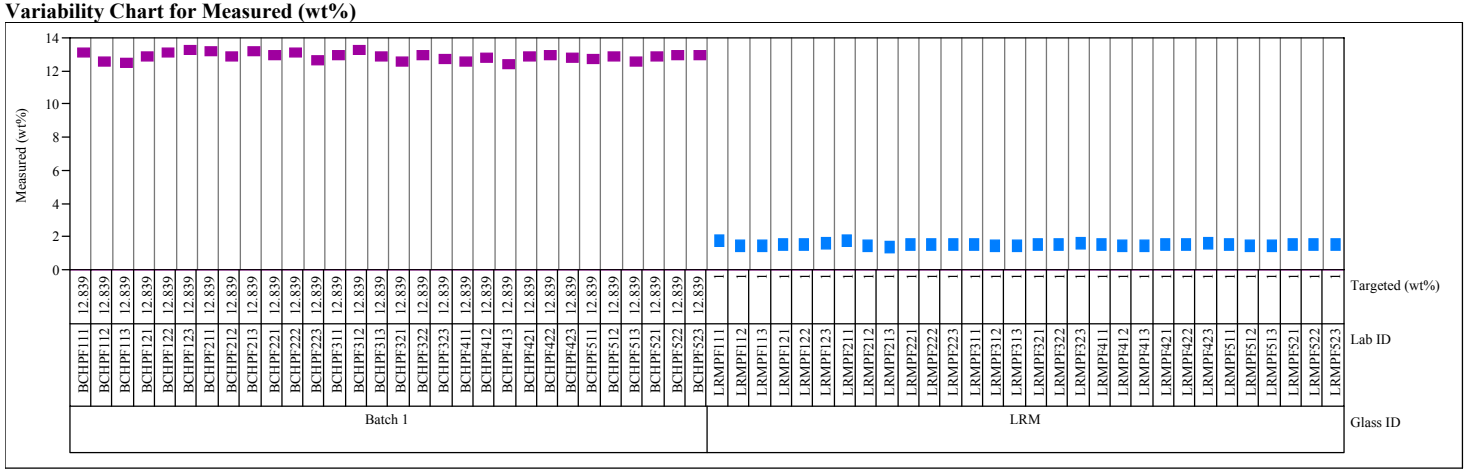


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=4, Oxide=Fe2O3 (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=Fe2O3 (wt%)
Variability Chart for Measured bias-corrected (wt%)

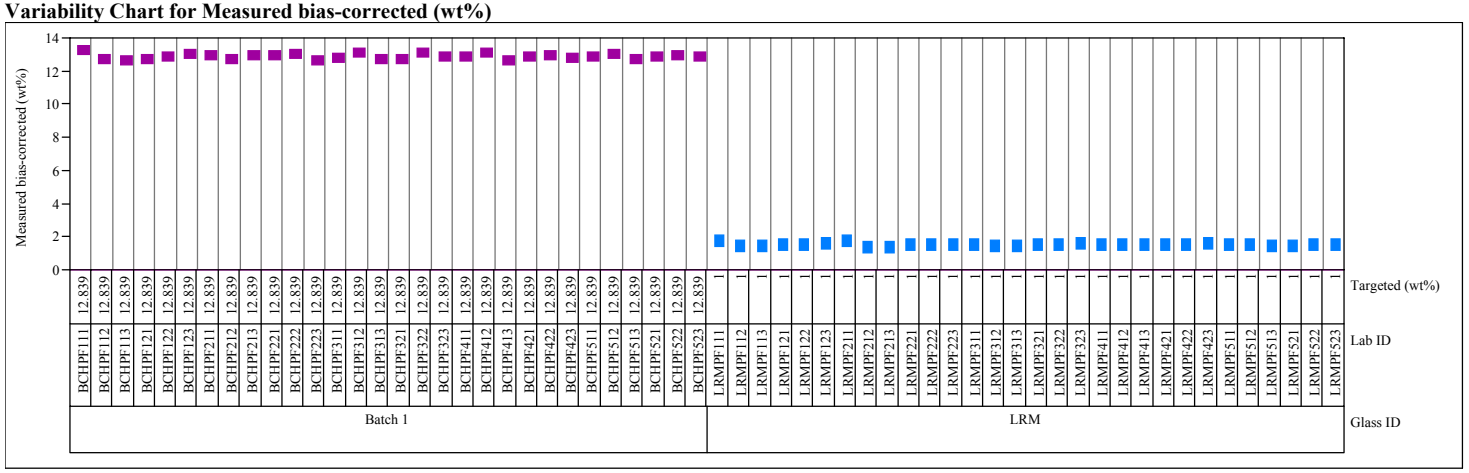
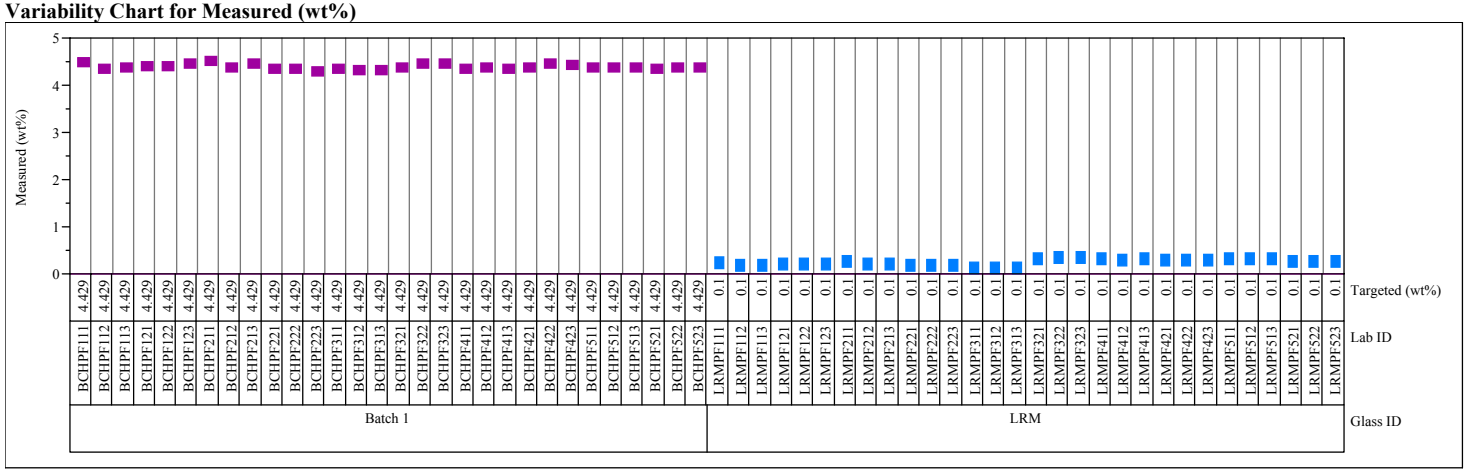


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=4, Oxide=Li2O (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=Li2O (wt%)
Variability Chart for Measured bias-corrected (wt%)

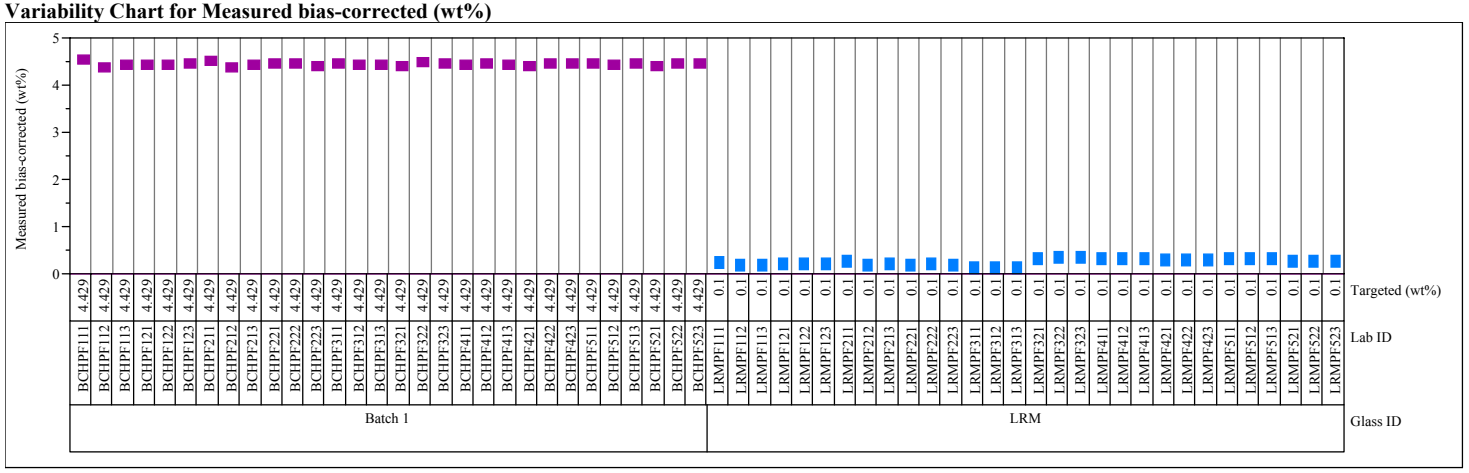
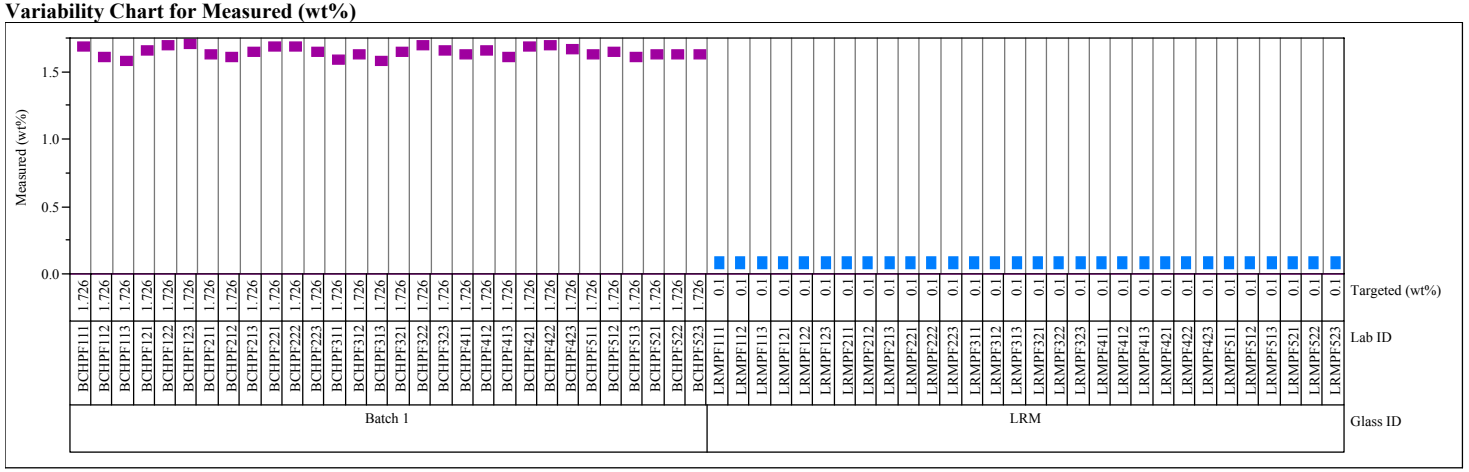


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=4, Oxide=MnO (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=MnO (wt%)
Variability Chart for Measured bias-corrected (wt%)

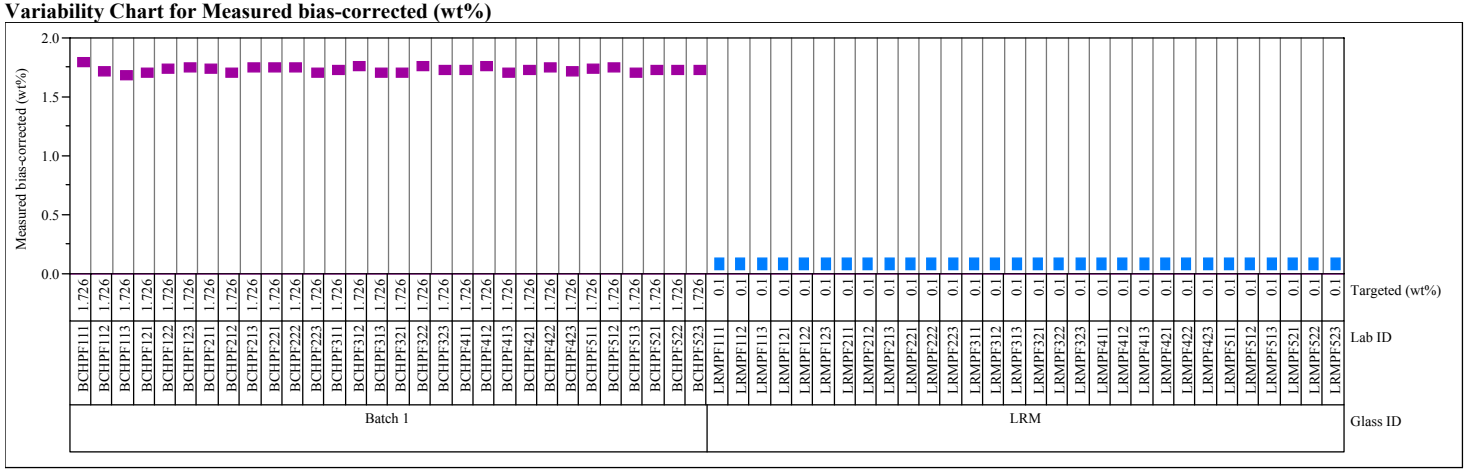
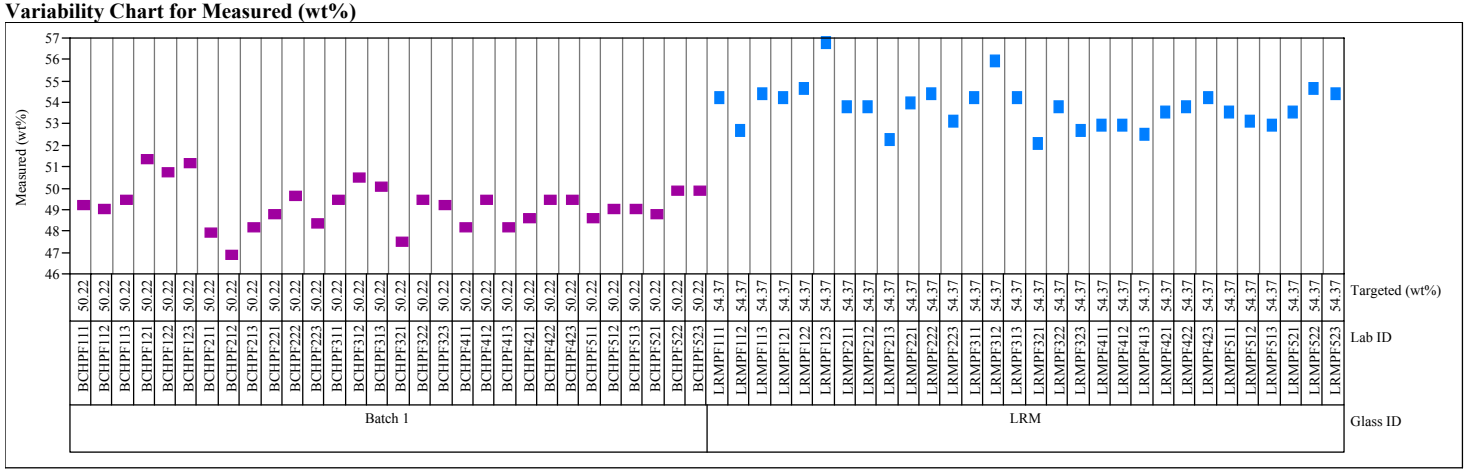


Exhibit A6. Measured and Measured Bias-Corrected Oxide Weight Percents by Lab ID for the Samples Prepared Using the PF Method

Group=4, Oxide=SiO2 (wt%)
Variability Chart for Measured (wt%)



Group=4, Oxide=SiO2 (wt%)
Variability Chart for Measured bias-corrected (wt%)

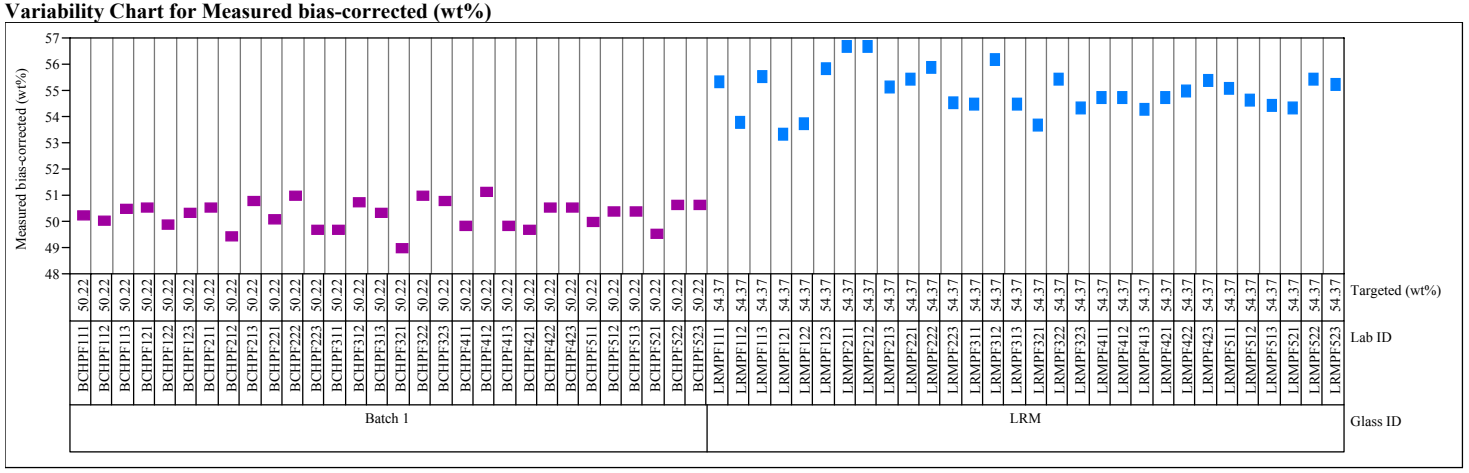
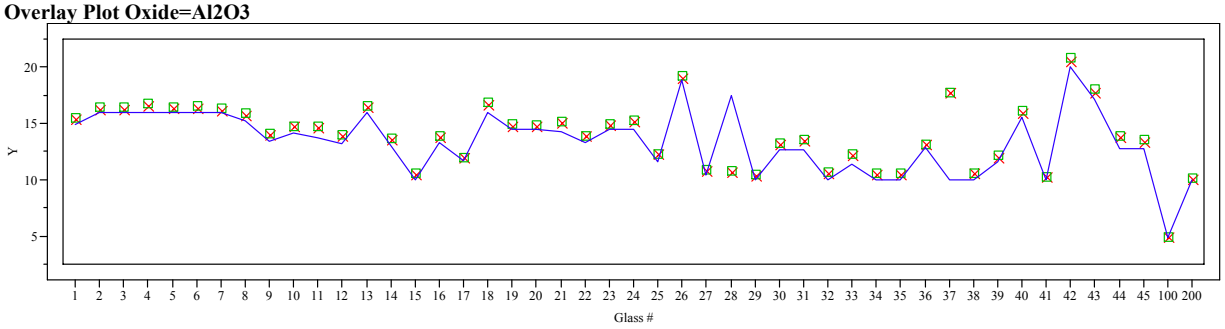
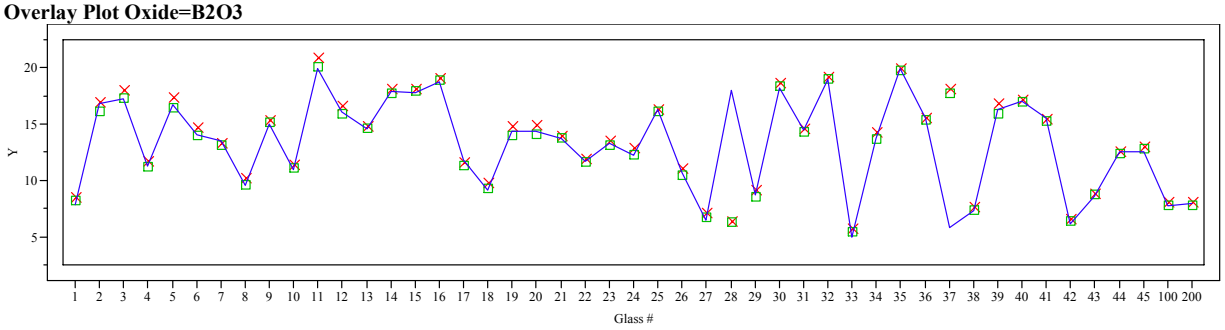


Exhibit A7. Plots of the Targeted, Measured, and Measured Bias-Corrected Values by Glass ID for Each Oxide

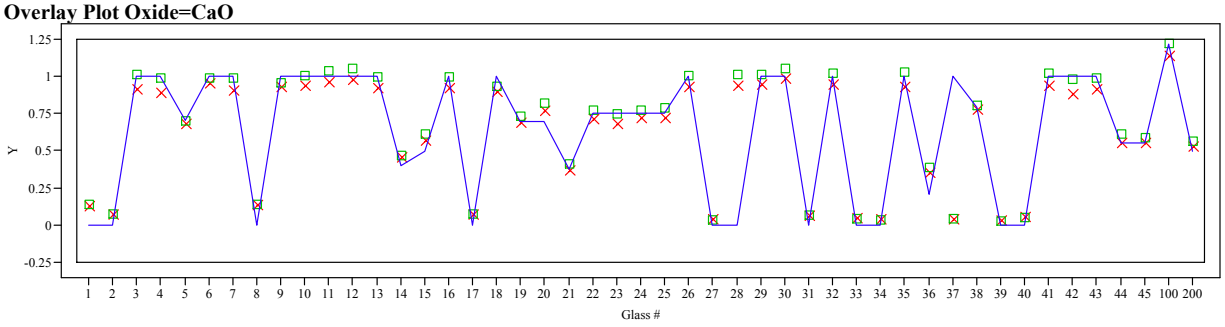
Overlay Plot Oxide=Al2O3



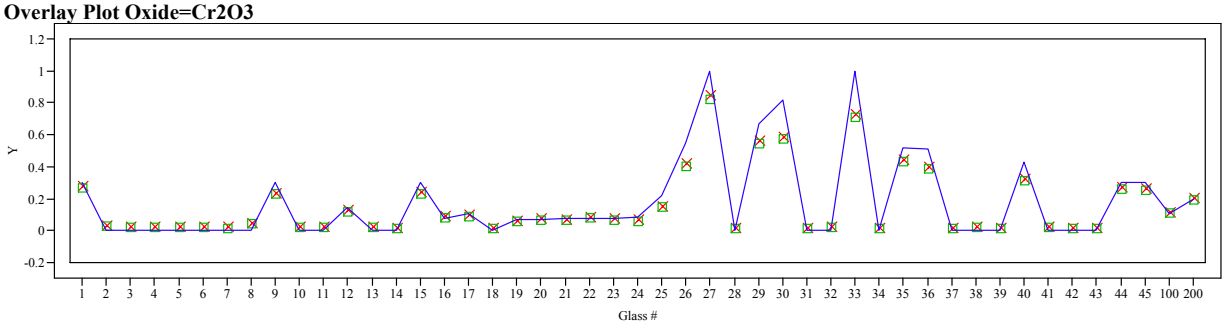
Overlay Plot Oxide=B2O3



Overlay Plot Oxide=CaO



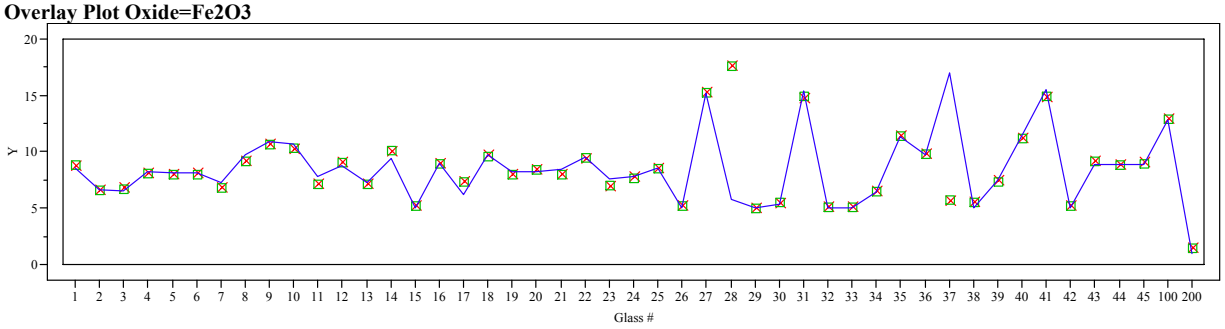
Overlay Plot Oxide=Cr2O3



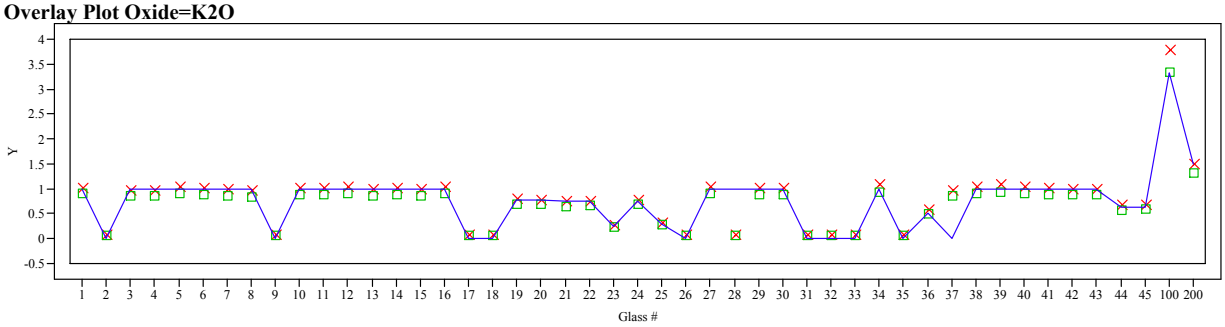
Y Measured Measured bc Targeted

Exhibit A7. Plots of the Targeted, Measured, and Measured Bias-Corrected Values by Glass ID for Each Oxide

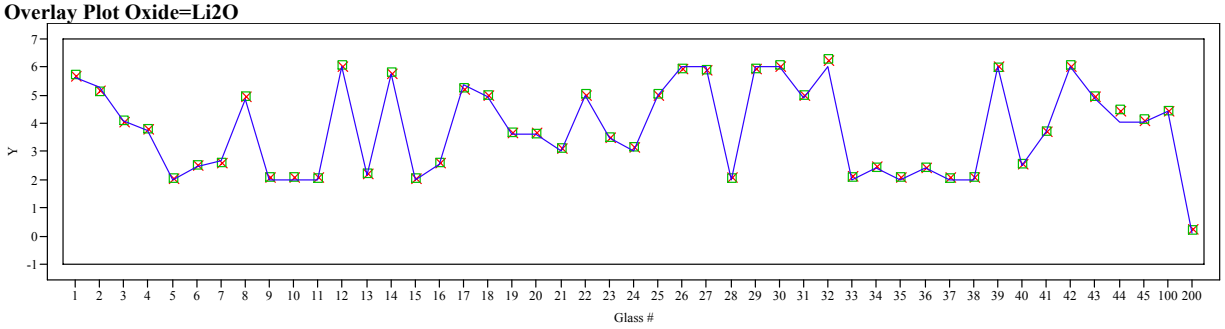
Overlay Plot Oxide=Fe2O3



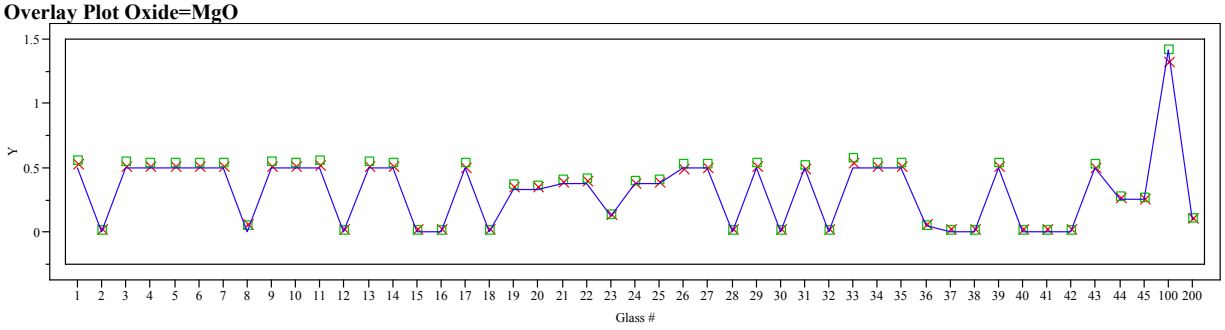
Overlay Plot Oxide=K2O



Overlay Plot Oxide=Li2O



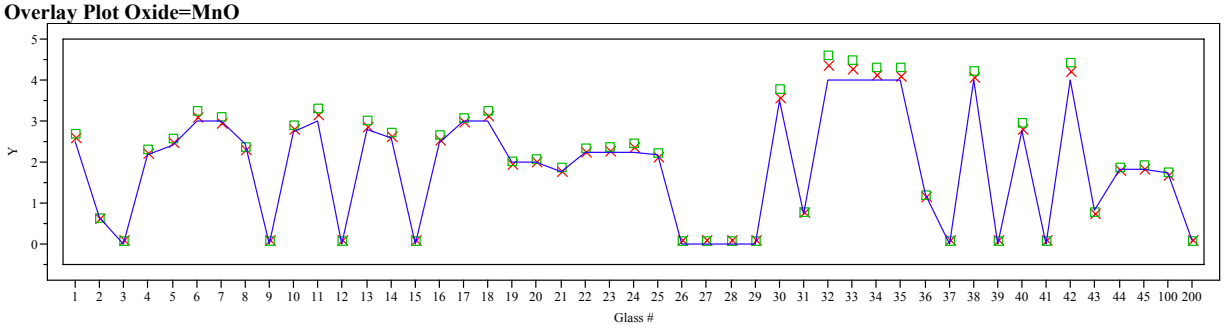
Overlay Plot Oxide=MgO



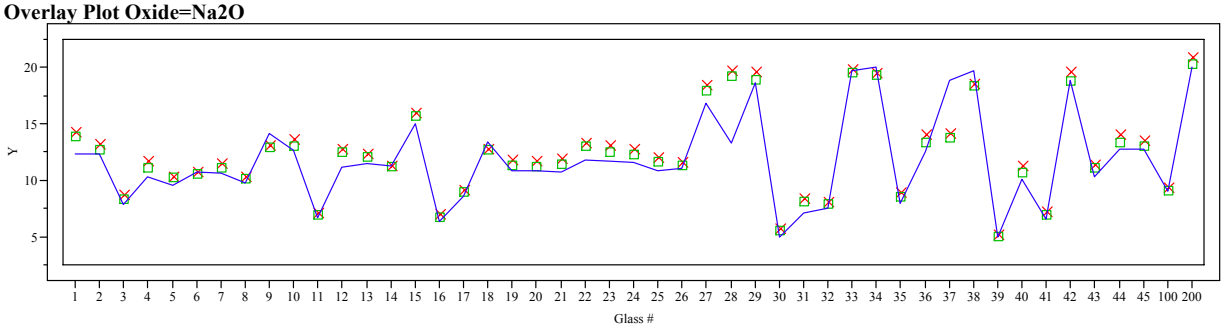
Y ✕ Measured ▫ Measured bc — Targeted

Exhibit A7. Plots of the Targeted, Measured, and Measured Bias-Corrected Values by Glass ID for Each Oxide

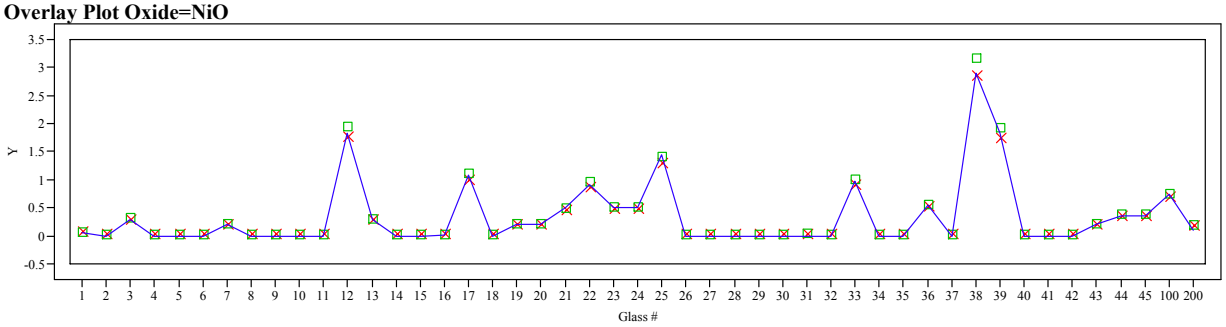
Overlay Plot Oxide=MnO



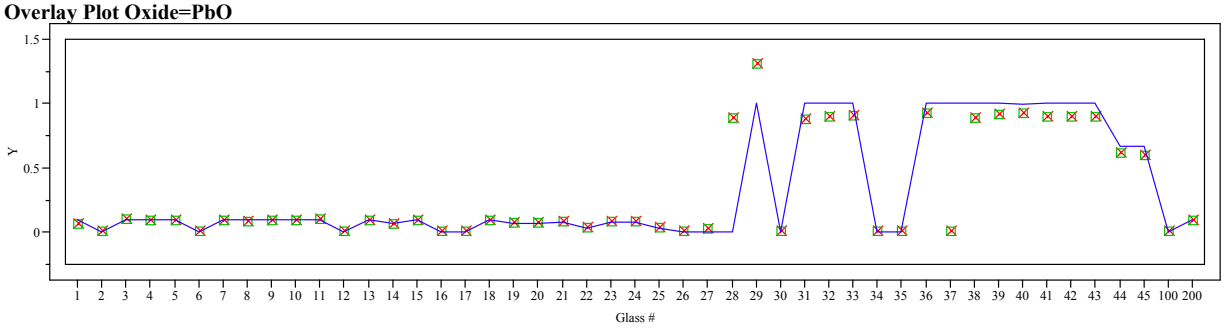
Overlay Plot Oxide=Na2O



Overlay Plot Oxide=NiO



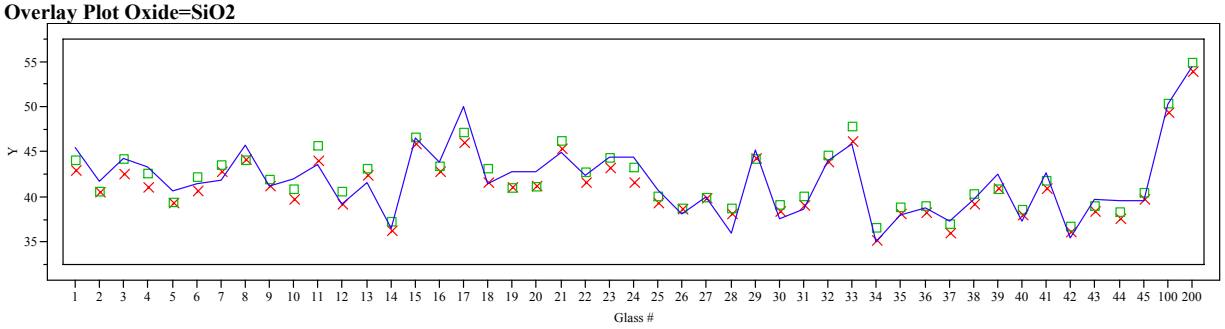
Overlay Plot Oxide=PbO



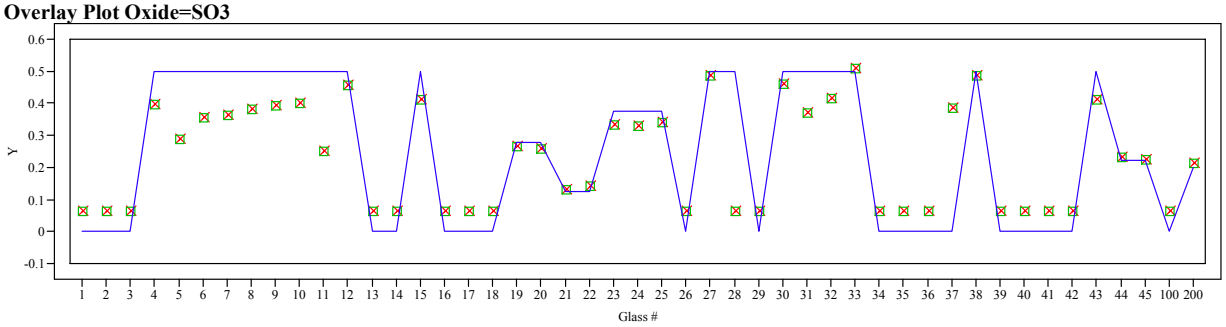
Y ✕ Measured ▫ Measured bc — Targeted

Exhibit A7. Plots of the Targeted, Measured, and Measured Bias-Corrected Values by Glass ID for Each Oxide

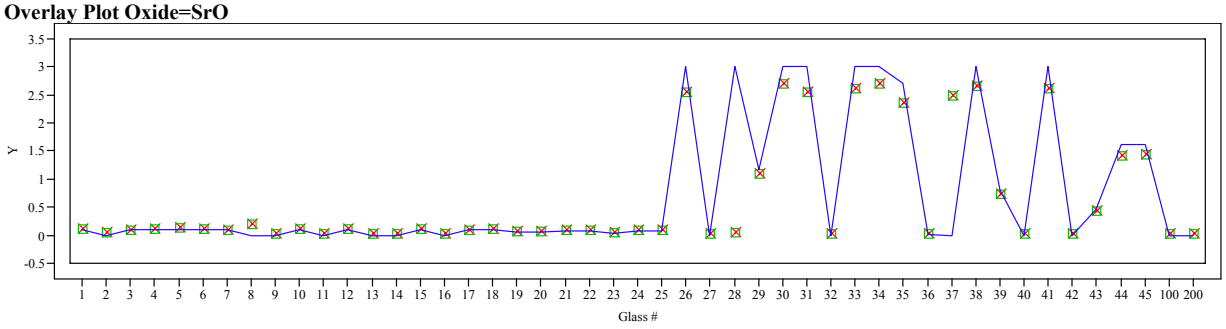
Overlay Plot Oxide=SiO2



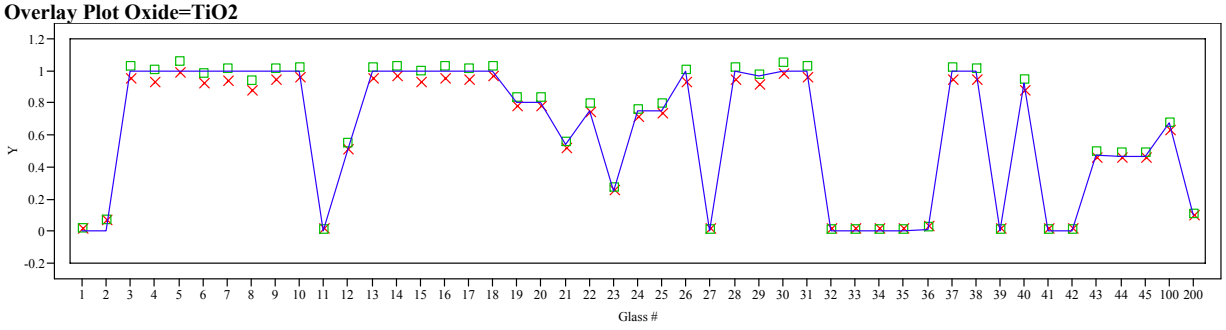
Overlay Plot Oxide=SO3



Overlay Plot Oxide=SrO



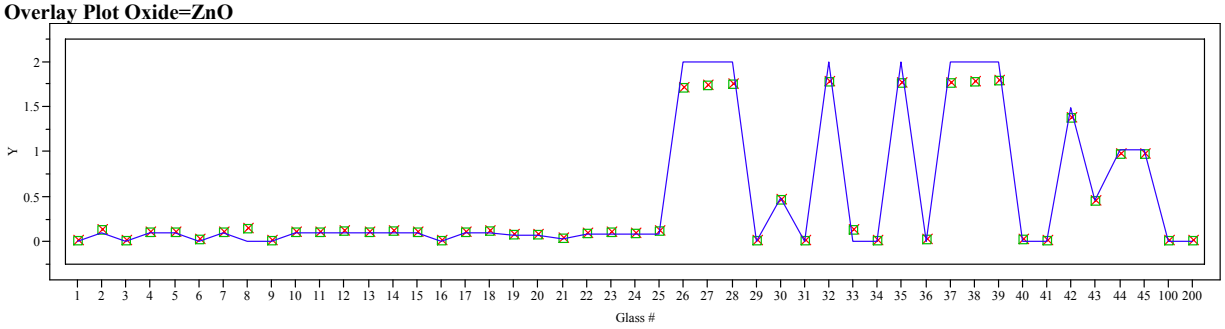
Overlay Plot Oxide=TiO2



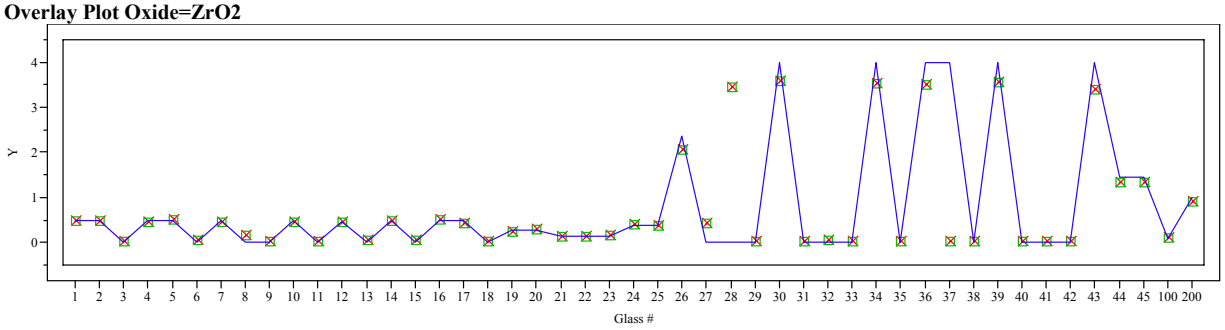
Y Measured Measured bc Targeted

Exhibit A7. Plots of the Targeted, Measured, and Measured Bias-Corrected Values by Glass ID for Each Oxide

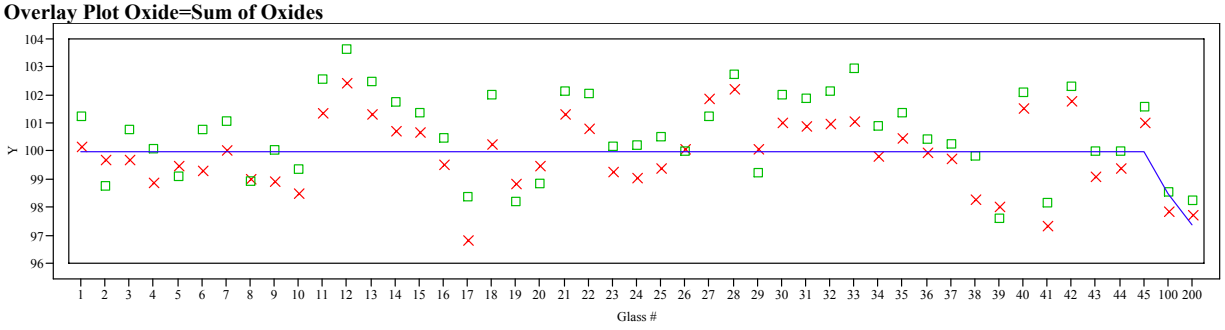
Overlay Plot Oxide=ZnO



Overlay Plot Oxide=ZrO2



Overlay Plot Oxide=Sum of Oxides



Y Measured Measured bc Targeted

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Appendix B:

Tables and Exhibits Supporting the Analysis of the PCT Results for the US Study Glasses

Table B1. Laboratory Measurements of the PCT Solutions for the US Study Glasses

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al ar	B ar	Fe ar	Li ar	Na ar	Si ar
1	Soln Std	Soln Std		1	1	1	STD-B1-1	3.75	20.6	4.07	9.88	82	50.2
1	ARM	ARM		1	2	2	W73	2.46	10.5	<0.100	8.08	21.3	37.2
1	US	US-01	quenched	1	3	3	W88	20.5	7.32	9.84	9.16	30.7	54.7
1	US	US-01ccc	ccc	1	4	4	W45	19	6.82	8.19	8.5	27.7	50.3
1	US	US-02	quenched	1	5	5	W76	17.3	53.7	8.06	22.2	48.1	39.4
1	US	US-02ccc	ccc	1	6	6	W68	17.6	45.2	8.33	18.7	42.5	41.6
1	US	US-11	quenched	1	7	7	W96	11.2	10.2	0.152	3.15	10.6	24.4
1	US	US-05ccc	ccc	1	8	8	W55	14.8	14.2	0.478	3.72	14.7	33
1	US	US-08	quenched	1	9	9	W85	18.2	7.53	10	8.06	13.6	47.5
1	Soln Std	Soln Std		1	10	10	STD-B1-2	3.95	19.6	3.91	9.81	82.9	49.1
1	US	US-08ccc	ccc	1	11	11	W90	18.8	7.81	10.9	7.7	14.8	49.5
1	US	US-10	quenched	1	12	12	W51	11.8	7.48	0.154	2.81	21.8	29
1	US	US-10ccc	ccc	1	13	13	W75	11.4	7.3	0.192	2.69	21.3	28.5
1	US	US-09ccc	ccc	1	14	14	W95	8.09	13.8	<0.100	3.35	6.84	22.9
1	US	US-11ccc	ccc	1	15	15	W08	10	30.9	0.64	5.32	15.9	28.8
1	US	US-13	quenched	1	16	16	W74	13.1	9.84	0.338	3.09	17.6	29.2
1	US	US-13ccc	ccc	1	17	17	W58	11.9	8.19	0.491	2.65	15.4	26.2
1	US	US-14	quenched	1	18	18	W80	14.9	98.9	1.98	41.1	91.4	33.7
1	US	US-14ccc	ccc	1	19	19	W91	15.2	88.2	1.35	36.8	82.2	34.2
1	Soln Std	Soln Std		1	20	20	STD-B1-3	3.83	20.2	4.17	9.8	83.5	48.8
1	Soln Std	Soln Std		2	1	21	STD-B2-1	3.87	20.3	5.25	9.77	82.8	49.5
1	ARM	ARM		2	2	22	W26	2.57	10.6	<0.100	7.89	21.9	35.4
1	US	US-01	quenched	2	3	23	W37	18.8	6.75	8.27	8.38	28.4	49.6
1	US	US-01ccc	ccc	2	4	24	W24	18.9	6.75	7.84	8.4	27.9	49.9
1	US	US-02	quenched	2	5	25	W05	17.1	53.1	7.69	21.9	49	38.7
1	US	US-02ccc	ccc	2	6	26	W79	17.3	43.7	7.88	18.1	42.9	39.8
1	US	US-05	quenched	2	7	27	W89	11.9	10.5	<0.100	3.17	11.4	25.1
1	US	US-05ccc	ccc	2	8	28	W09	13.8	15.6	0.344	3.78	15.6	29.9
1	US	US-08	quenched	2	9	29	W67	19.2	7.61	10.2	8.16	14.5	48.5
1	Soln Std	Soln Std		2	10	30	STD-B2-2	3.71	19.2	3.45	9.58	83.8	48
1	US	US-08ccc	ccc	2	11	31	W83	16.9	6.97	8.4	6.9	14	42.9
1	US	US-10	quenched	2	12	32	W07	11.9	7.14	<0.100	2.72	22.5	28.4
1	US	US-10ccc	ccc	2	13	33	W78	11.3	6.91	<0.100	2.61	21.7	26.8
1	US	US-11	quenched	2	14	34	W31	7.63	13.5	<0.100	3.2	5.87	23.5
1	US	US-11ccc	ccc	2	15	35	W21	9.74	29.1	0.564	4.93	14.3	27.9
1	US	US-13	quenched	2	16	36	W47	12.4	9.54	0.204	2.96	16.3	27.8
1	US	US-13ccc	ccc	2	17	37	W44	11.5	8.11	0.418	2.55	14.3	26.1
1	US	US-14	quenched	2	18	38	W63	14.5	104	2.07	42	89.5	34.6
1	US	US-14ccc	ccc	2	19	39	W01	14.6	85.6	1.87	34.7	75.6	34.3
1	Soln Std	Soln Std		2	20	40	STD-B2-3	3.57	20.3	3.65	9.64	80.3	48.5

Table B1. Laboratory Measurements of the PCT Solutions for the US Study Glasses

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al ar	B ar	Fe ar	Li ar	Na ar	Si ar
1	Soln Std	Soln Std		3	1	41	STD-B3-1	3.83	20.4	4.98	9.77	82.2	49.5
1	ARM	ARM		3	2	42	W82	2.65	11.1	<0.100	8.12	22.5	36.3
1	blank	blank		3	3	43	W17	<0.100	<0.100	<0.100	<0.500	<0.100	<0.100
1	US	US-01	quenched	3	4	44	W18	19.2	6.71	8.74	8.49	29.1	50.8
1	US	US-01ccc	ccc	3	5	45	W28	19.2	6.83	8.31	8.53	28	50.8
1	US	US-02	quenched	3	6	46	W52	18.3	56.6	8.65	23	50.2	42.4
1	US	US-02ccc	ccc	3	7	47	W56	16.7	42.8	7.85	17.5	40.1	39.3
1	US	US-05	quenched	3	8	48	W65	11.9	10.5	<0.100	3.2	10.9	25.8
1	US	US-05ccc	ccc	3	9	49	W13	13.8	16	0.279	3.85	15.6	30.6
1	Soln Std	Soln Std		3	10	50	STD-B3-2	3.85	19.7	3.67	9.72	82	49.1
1	US	US-08	quenched	3	11	51	W23	19.8	8.03	11	8.48	14.5	50.6
1	US	US-08ccc	ccc	3	12	52	W98	17.4	7.06	9.13	7.12	13.7	45
1	US	US-10	quenched	3	13	53	W71	12	7.22	0.112	2.77	21.8	28.8
1	US	US-10ccc	ccc	3	14	54	W29	11.6	7.22	0.163	2.71	21.1	28.9
1	US	US-11	quenched	3	15	55	W53	8.32	13.3	<0.100	3.29	6.96	23.4
1	US	US-11ccc	ccc	3	16	56	W86	9.89	29.1	0.543	5.03	15.5	27.9
1	US	US-13	quenched	3	17	57	W69	12.6	9.28	0.194	2.96	16.9	27.6
1	US	US-13ccc	ccc	3	18	58	W11	11.9	8.05	0.505	2.62	15.2	26.1
1	US	US-14	quenched	3	19	59	W60	15.6	110	1.93	44.1	94.3	36.1
1	US	US-14ccc	ccc	3	20	60	W36	15.3	88.2	2.04	35.4	77.3	35.4
1	Soln Std	Soln Std		3	21	61	STD-B3-3	4.28	20.9	3.92	9.95	82.6	50.8
1	Soln Std	Soln Std		4	1	62	STD-B4-1	3.84	20.8	5.47	9.72	81.9	50.3
1	EA	EA		4	2	63	W92	<0.100	37.2	<0.100	11	99.2	52.4
1	US	US-03	quenched	4	3	64	W14	13.4	11.2	4.7	5.74	4.69	32.4
1	US	US-03ccc	ccc	4	4	65	W39	13	10.5	4.12	5.21	5.66	31.4
1	US	US-04	quenched	4	5	66	W42	13.2	7.16	0.278	4.88	12.6	29.4
1	US	US-04ccc	ccc	4	6	67	W10	12.6	6.77	<0.100	4.41	12.8	27.7
1	US	US-06	quenched	4	7	68	W35	12.3	8.83	<0.100	3.31	13.5	26
1	US	US-06ccc	ccc	4	8	69	W06	11.4	7.9	<0.100	2.86	12.7	24.8
1	US	US-07	quenched	4	9	70	W19	12.2	8.66	<0.100	3.56	13.2	26.4
1	Soln Std	Soln Std		4	10	71	STD-B4-2	4.14	20.1	3.72	9.64	82.9	49.7
1	US	US-07ccc	ccc	4	11	72	W93	11.6	8.03	<0.100	3.12	12.3	25.5
1	US	US-09	quenched	4	12	73	W66	12.8	12.1	6.72	2.96	26.4	32.2
1	US	US-09ccc	ccc	4	13	74	W16	11.9	11.5	4.7	2.68	24.5	30.7
1	US	US-12	quenched	4	14	75	W46	15.1	36.6	2.61	17.9	43.9	37.3
1	US	US-12ccc	ccc	4	15	76	W48	16.4	51.1	6.43	24.4	53.6	40.6
1	US	US-15	quenched	4	16	77	W84	5.81	145	2.9	20.4	168	26.4
1	US	US-15ccc	ccc	4	17	78	W70	6.13	117	3.39	16.6	137	29
1	Soln Std	Soln Std		4	18	79	STD-B4-3	3.8	20.8	4.53	9.77	82.1	50.2
1	Soln Std	Soln Std		5	1	80	STD-B5-1	3.98	20.7	3.93	9.81	82.6	50

Table B1. Laboratory Measurements of the PCT Solutions for the US Study Glasses

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al ar	B ar	Fe ar	Li ar	Na ar	Si ar
1	EA	EA		5	2	81	W64	<0.100	37.4	<0.100	11.4	99.5	53.2
1	US	US-05	quenched	5	3	82	W97	13.1	10.8	4.85	5.72	4.83	31.8
1	US	US-03ccc	ccc	5	4	83	W38	13.2	10.4	4.32	5.34	5.86	31.8
1	US	US-04	quenched	5	5	84	W54	13.7	7.22	0.634	5.14	13.7	30.3
1	US	US-04ccc	ccc	5	6	85	W77	13.5	6.9	0.314	4.75	13.1	30.5
1	US	US-06	quenched	5	7	86	W22	12.6	8.8	0.207	3.47	14.4	26.7
1	US	US-06ccc	ccc	5	8	87	W57	12.3	8.24	0.439	3.12	13.6	27.1
1	US	US-07	quenched	5	9	88	W81	12.7	8.5	<0.100	3.72	13.7	27
1	Soln Std	Soln Std		5	10	89	STD-B5-2	4.01	19.9	4.81	9.78	83.4	49.7
1	US	US-07ccc	ccc	5	11	90	W33	12.1	8.13	<0.100	3.34	12.7	27
1	US	US-09	quenched	5	12	91	W61	11.8	11.8	6.7	3	24.4	32.1
1	US	US-09ccc	ccc	5	13	92	W72	12.3	12	5.02	2.9	26.5	32.1
1	US	US-12	quenched	5	14	93	W27	15.6	38.4	2.73	18.9	44.8	38.9
1	US	US-12ccc	ccc	5	15	94	W32	16.5	51.5	6.84	24.8	53.7	41.3
1	US	US-15	quenched	5	16	95	W03	6.43	155	3.4	22.3	178	28.5
1	US	US-15ccc	ccc	5	17	96	W50	6.27	120	3.72	17.3	141	30.2
1	Soln Std	Soln Std		5	18	97	STD-B5-3	3.99	21.3	4.05	9.76	82.6	49.6
1	Soln Std	Soln Std		6	1	98	STD-B6-1	4.07	20.5	3.69	9.88	81.3	50.1
1	blank	blank		6	2	99	W40	<0.100	0.403	<0.100	<0.500	<0.100	<0.100
1	EA	EA		6	3	100	W02	0.123	39.1	<0.100	12	102	55.9
1	US	US-03	quenched	6	4	101	W62	14	11.4	4.85	6.3	5.45	34.3
1	US	US-03ccc	ccc	6	5	102	W12	13.3	10.5	4.07	5.63	5.83	32
1	US	US-04	quenched	6	6	103	W43	14.6	7.66	0.398	5.64	13.2	32.4
1	US	US-04ccc	ccc	6	7	104	W30	13.6	7.23	<0.100	5.16	13.2	30.9
1	US	US-06	quenched	6	8	105	W15	12.6	8.83	<0.100	3.75	13.9	27
1	US	US-06ccc	ccc	6	9	106	W87	11.6	7.98	<0.100	3.3	13.1	26.1
1	Soln Std	Soln Std		6	10	107	STD-B6-2	4.15	20.3	3.77	10	81.7	50.5
1	US	US-07	quenched	6	11	108	W49	13.1	9.53	<0.100	4.2	15	29.4
1	US	US-07ccc	ccc	6	12	109	W25	12	8.11	<0.100	3.6	13.3	27
1	US	US-09	quenched	6	13	110	W41	11.9	12.5	6.23	3.38	25	32.5
1	US	US-03	quenched	6	14	111	W97	12.6	11.9	5.42	3.15	24.4	33.9
1	US	US-12	quenched	6	15	112	W04	16.6	39.2	3.18	19.3	44.6	40.7
1	US	US-12ccc	ccc	6	16	113	W34	18.2	54.2	7.07	25.8	55.9	44.6
1	US	US-15	quenched	6	17	114	W20	6.79	163	3.64	23	180	30.5
1	US	US-15ccc	ccc	6	18	115	W59	6.68	126	3.82	17.9	142	32
1	Soln Std	Soln Std		6	19	116	STD-B6-3	4.02	21.6	3.69	9.83	80.3	50.3
2	Soln Std	Soln Std		1	1	117	STD-B1-1	3.92	21.5	3.9	10.1	81.2	50.6
2	US	US-23	quenched	1	2	118	X005	16.2	11.5	4.72	6.06	18.9	42.6
2	US	US-24ccc	ccc	1	3	119	X065	14.3	9.46	2.28	4.73	18.6	37.1
2	US	US-25	quenched	1	4	120	X093	13	35.3	1.47	14.8	38.5	39.2

Table B1. Laboratory Measurements of the PCT Solutions for the US Study Glasses

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al ar	B ar	Fe ar	Li ar	Na ar	Si ar
2	US	US-21	quenched	1	5	121	X021	15.1	11.5	5.9	5.38	15.2	41.3
2	US	US-28	quenched	1	6	122	X012	15.9	59.2	4.13	8.74	64.7	28
2	US	US-25ccc	ccc	1	7	123	X088	13.3	43.4	3.04	17.5	44.8	40.4
2	US	US-30	quenched	1	8	124	X097	10.6	19.1	0.585	9.6	9.21	24
2	US	US-21ccc	ccc	1	9	125	X009	13.6	10.7	3.17	4.82	14.6	37.6
2	US	US-24	quenched	1	10	126	X029	14	9.6	2.18	4.8	17.5	36.6
2	Soln Std	Soln Std		1	11	127	STD-B1-2	3.86	20.5	3.69	9.94	81	49.6
2	US	US-23ccc	ccc	1	12	128	X092	15.3	11.5	3.78	5.64	18.9	40.2
2	US	US-27	quenched	1	13	129	X032	28.9	15.7	35.4	17.5	118	95.1
2	EA	EA		1	14	130	X069	0.48	38.2	0.202	11.8	103	54.9
2	US	US-20ccc	ccc	1	15	131	X030	14.5	12.1	2.19	5.74	17	36.1
2	US	US-27ccc	ccc	1	16	132	X049	8.12	205	<0.100	122	568	267
2	US	US-28ccc	ccc	1	17	133	X071	15.6	46.6	4.65	7.1	53.8	27.8
2	US	US-30ccc	ccc	1	18	134	X013	11.1	22.5	0.269	10.4	9.84	26
2	US	US-20	quenched	1	19	135	X048	15	12.8	3.59	6.1	16.8	36.9
2	blank	Blank 1 (ACTL-14)		1	20	136	X051	4.03	1.23	0.197	0.709	5.41	22.7
2	Soln Std	Soln Std		1	21	137	STD-B1-3	3.85	20.3	3.57	9.89	81	49.6
2	Soln Std	Soln Std		2	1	138	STD-B2-1	3.86	20.9	3.86	9.9	81.1	50.1
2	US	US-23ccc	ccc	2	2	139	X026	15.7	11.2	3.59	5.58	18.6	41.2
2	US	US-21ccc	ccc	2	3	140	X006	13.4	9.93	3.42	4.65	14	37.6
2	US	US-20	quenched	2	4	141	X010	15.3	11.5	3.87	6.11	18.8	38.5
2	US	US-23	quenched	2	5	142	X003	16.4	11.4	3.71	6.17	19.4	43.7
2	US	US-27ccc	ccc	2	6	143	X082	7.77	201	<0.100	121	571	260
2	US	US-30	quenched	2	7	144	X075	10.4	20.4	<0.100	9.76	8.69	24
2	US	US-28ccc	ccc	2	8	145	X035	15.9	46.5	5.19	7.07	54.7	28.5
2	US	US-24ccc	ccc	2	9	146	X062	14.7	9.77	1.81	4.61	17.9	37.2
2	US	US-24	quenched	2	10	147	X095	13.6	9.06	1.71	4.65	16.9	35.9
2	Soln Std	Soln Std		2	11	148	STD-B-2-2	3.76	20	3.72	9.83	81.3	49.4
2	US	US-27	quenched	2	12	149	X057	28.2	15.2	33.5	17.3	118	92.1
2	EA	EA		2	13	150	X053	0.292	37.5	<0.100	11.6	102	55.1
2	US	US-20ccc	ccc	2	14	151	X045	14.1	11.1	2.12	5.55	15.9	35.6
2	US	US-25	quenched	2	15	152	X096	12.3	34.2	1.48	14.5	37.4	38.7
2	US	US-21	quenched	2	16	153	X023	25.4	10.4	4.9	5.06	16.3	60
2	US	US-25ccc	ccc	2	17	154	X081	30	42.7	3.51	17.4	46.8	71.3
2	US	US-30ccc	ccc	2	18	155	X028	11.2	21.5	<0.100	10.6	9.68	26.7
2	US	US-28	quenched	2	19	156	X077	14.8	55.3	4.14	8.24	62.1	26.2
2	Soln Std	Soln Std		2	20	157	STD-B2-3	3.74	20	3.62	9.74	81.1	48.9
2	Soln Std	Soln Std		3	1	158	STD-B3-1	4.03	20.6	3.51	9.81	81.1	49.6
2	US	US-21	quenched	3	2	159	X060	13.8	10.2	4.23	4.77	14.2	37.4
2	US	US-23	quenched	3	3	160	X094	17.6	10.6	4.01	5.59	18	45.3

Table B1. Laboratory Measurements of the PCT Solutions for the US Study Glasses

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al ar	B ar	Fe ar	Li ar	Na ar	Si ar
2	US	US-23ccc	ccc	3	4	161	X085	14.9	10	2.96	5.29	18.2	39
2	US	US-20ccc	ccc	3	5	162	X061	14.9	10.5	2.94	5.44	16.8	36.1
2	US	US-27ccc	ccc	3	6	163	X055	8.06	190	<0.100	115	541	249
2	US	US-25	quenched	3	7	164	X084	14	34.6	1.14	13.9	37.5	39.4
2	blank	Blank 2 (ACTL -14)		3	8	165	X054	<0.100	0.79	<0.100	<0.500	<0.100	<0.100
2	US	US-28	quenched	3	9	166	X047	15.1	56.9	4.28	8.18	60.5	26.5
2	US	US-30	quenched	3	10	167	X090	10.7	19	<0.100	9.32	8.17	23.9
2	Soln Std	Soln Std		3	11	168	STD-B3-2	4	21.4	3.93	10.1	80.8	52.5
2	US	US-25ccc	ccc	3	12	169	X011	14.9	42.2	2.79	16.8	42.7	39.7
2	US	US-21ccc	ccc	3	13	170	X004	14.3	9.86	4.23	4.59	15.7	38.5
2	US	US-30ccc	ccc	3	14	171	X001	11.7	21.1	<0.100	10.2	10	27.4
2	US	US-28ccc	ccc	3	15	172	X076	15.9	45.1	5.41	6.85	53.4	28
2	US	US-20	quenched	3	16	173	X039	14.6	11.6	3.13	5.83	15.7	37.1
2	EA	EA		3	17	174	X031	0.132	37.4	<0.100	11.3	101	53.6
2	US	US-24ccc	ccc	3	18	175	X014	14.1	8.72	1.78	4.38	18.1	36.6
2	US	US-24	quenched	3	19	176	X034	13.9	8.46	1.66	4.53	17.8	36.1
2	US	US-27	quenched	3	20	177	X037	28.4	14.4	36	16.8	116	92.5
2	Soln Std	Soln Std		3	21	178	STD-B3-3	3.92	20.2	3.7	9.86	80.7	51.1
2	Soln Std	Soln Std		4	1	179	STD-B4-1	3.82	21.3	4.02	10	81.4	50.9
2	US	US-19	quenched	4	2	180	X089	15	12.4	3.69	6.03	16.4	38.1
2	US	US-26	quenched	4	3	181	X033	18.1	8.7	0.29	8.87	20.6	28.7
2	US	US-17	quenched	4	4	182	X083	14.8	11.4	3.71	9.61	11.2	56.8
2	ARM	ARM		4	5	183	X066	2.96	11	<0.100	8.25	22.1	37.6
2	US	US-18	quenched	4	6	184	X043	22.7	9.07	5.44	8.38	35.1	48
2	US	US-18ccc	ccc	4	7	185	X036	29.7	187	10.9	116	203	100
2	US	US-17ccc	ccc	4	8	186	X041	15.3	11.7	4.52	8.46	13.2	54.1
2	US	US-26ccc	ccc	4	9	187	X024	15.6	71.5	0.194	41.7	57.5	34.5
2	US	US-29ccc	ccc	4	10	188	X018	23.3	25.4	9.73	23	146	94.8
2	Soln Std	Soln Std		4	11	189	STD-B4-2	3.89	21.7	4.09	10.1	82.4	51.4
2	US	US-16	quenched	4	12	190	X019	10.7	22	2.7	5.61	8.19	30.9
2	US	US-22	quenched	4	13	191	X017	16.2	12.3	3.52	8.07	27.1	43.8
2	US	US-29	quenched	4	14	192	X016	24.9	29.5	10.1	24.5	174	96.9
2	blank	Blank 1 (ACTL -15)		4	15	193	X067	<0.100	0.24	<0.100	0.533	<0.100	0.564
2	US	US-16ccc	ccc	4	16	194	X059	11.7	30.8	2.3	6.82	12.9	33.7
2	US	US-19ccc	ccc	4	17	195	X022	14.2	11.2	2.68	5.47	16	35.8
2	US	US-22ccc	ccc	4	18	196	X070	27.4	11.3	4.57	7.71	39.5	67.7
2	Soln Std	Soln Std		4	19	197	STD-B4-3	3.86	20.7	4.08	10	82.4	51.1
2	Soln Std	Soln Std		5	1	198	STD-B5-1	3.98	20.9	4.02	10	81.4	50.5
2	US	US-16	quenched	5	2	199	X078	11.1	21.9	2.58	5.8	9.12	30.7
2	US	US-19ccc	ccc	5	3	200	X050	13.9	11	2.39	5.45	16.2	34.1

Table B1. Laboratory Measurements of the PCT Solutions for the US Study Glasses

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al ar	B ar	Fe ar	Li ar	Na ar	Si ar
2	US	US-18	quenched	5	4	201	X068	22.1	9.01	4.88	8.21	34.8	45.5
2	US	US-18ccc	ccc	5	5	202	X080	29.4	178	10.7	112	197	99.7
2	US	US-22ccc	ccc	5	6	203	X074	15.8	12.5	3.23	7.76	25.7	42.6
2	US	US-22	quenched	5	7	204	X072	16.1	12.7	2.93	8.13	27.1	42.7
2	US	US-26ccc	ccc	5	8	205	X046	16.6	71.9	0.757	42.9	60.7	35.7
2	US	US-16ccc	ccc	5	9	206	X027	11.3	30	1.82	6.74	12.3	32.1
2	ARM	ARM		5	10	207	X058	2.94	10.8	<0.100	7.9	21.7	34.8
2	Soln Std	Soln Std		5	11	208	STD-B5-2	4.16	20.7	4	10	81.9	50.4
2	US	US-29	quenched	5	12	209	X098	24.8	30.3	9.78	24.7	173	98.2
2	US	US-29ccc	ccc	5	13	210	X091	22.9	25	9.7	22.8	145	93.6
2	US	US-26	quenched	5	14	211	X073	17.9	8.57	0.305	8.81	20.2	28.2
2	US	US-17ccc	ccc	5	15	212	X044	14	10.6	2.93	8.62	11.2	52.8
2	US	US-17	quenched	5	16	213	X063	15	11	3.2	9.52	11.1	54.4
2	US	US-19	quenched	5	17	214	X056	17.3	11.5	3.73	6.03	16.9	42.2
2	Soln Std	Soln Std		5	18	215	STD-B5-3	4.05	20.5	4.13	10.1	82.6	51.2
2	Soln Std	Soln Std		6	1	216	STD-B6-1	3.63	20.4	3.25	9.81	80.5	51.4
2	US	US-29	quenched	6	2	217	X064	25.8	29.4	9.44	24.5	174	98.6
2	US	US-19ccc	ccc	6	3	218	X008	15.2	11.1	1.82	5.32	17.1	37.7
2	US	US-16ccc	ccc	6	4	219	X040	11.1	30.1	0.904	6.54	12.9	32.5
2	US	US-16	quenched	6	5	220	X007	10.9	23.4	1.66	5.71	8.82	31.2
2	ARM	ARM		6	6	221	X052	2.88	10.2	<0.100	7.74	21.2	36.5
2	blank	Blank 2 (ACTL -15)		6	7	222	X002	0.159	<0.100	<0.100	<0.500	<0.100	<0.100
2	US	US-29ccc	ccc	6	8	223	X079	22.7	24.5	9.16	23.1	145	94
2	US	US-17	quenched	6	9	224	X099	14	10.1	2.87	8.91	10.7	53.5
2	US	US-17ccc	ccc	6	10	225	X025	13.5	9.55	1.74	8.21	11.5	51.5
2	Soln Std	Soln Std		6	11	226	STD-B6-2	3.67	19.9	3.15	9.73	81.1	50.9
2	US	US-26	quenched	6	12	227	X086	17.8	7.8	<0.100	8.42	20.8	28.1
2	US	US-18	quenched	6	13	228	X020	21.9	8.66	4.16	8.08	34.4	47.4
2	US	US-26ccc	ccc	6	14	229	X015	16.4	71.8	<0.100	43.1	60.2	35.5
2	US	US-22ccc	ccc	6	15	230	X087	15.5	11	2.13	7.42	26.4	42.1
2	US	US-18ccc	ccc	6	16	231	X100	29.9	179	10.6	112	196	101
2	US	US-19	quenched	6	17	232	X038	14.8	11.9	2.35	5.6	16.2	35.4
2	US	US-22	quenched	6	18	233	X042	15.5	12	1.88	7.7	26.8	41.8
2	Soln Std	Soln Std		6	19	234	STD-B6-3	3.71	20.4	3.09	9.69	80.7	50.5
3	Soln Std	Soln Std		1	1	235	STD-B1-1	3.9	18.5	3.49	10.1	79.5	50.6
3	EA	EA		1	2	236	Y85	<0.100	37.3	<0.010	12	99.7	56.1
3	US	US-31	quenched	1	3	237	Y15	12	12.3	<0.010	8.74	9.42	31
3	US	US-31ccc	ccc	1	4	238	Y89	9.98	7.12	0.698	6.81	6.2	27.5
3	US	US-33	quenched	1	5	239	Y81	12.1	2.15	0.162	2.98	78.8	47.3
3	US	US-33ccc	ccc	1	6	240	Y66	12.4	1.81	1.32	3.11	70.5	46.7

Table B1. Laboratory Measurements of the PCT Solutions for the US Study Glasses

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al ar	B ar	Fe ar	Li ar	Na ar	Si ar
3	US	US-35	quenched	1	7	241	Y46	6.36	29.4	<0.010	5.27	22.7	22.3
3	US	US-35ccc	ccc	1	8	242	Y45	5.75	149	0.34	20	88.2	23.7
3	US	US-37	quenched	1	9	243	Y73	14.9	6.22	<0.010	3.65	75.9	41.1
3	US	US-37ccc	ccc	1	10	244	Y38	9.62	20.9	0.801	9.17	114	54.5
3	Soln Std	Soln Std		1	11	245	STD-B1-2	3.76	17.3	3.5	9.69	76.7	48.5
3	US	US-39	quenched	1	12	246	Y75	10.1	13.8	<0.010	9.36	5.02	33.1
3	US	US-39ccc	ccc	1	13	247	Y80	10.8	11.8	0.206	8.76	4.28	33.1
3	US	US-41	quenched	1	14	248	Y51	6.53	7.78	0.159	5.08	6	25.1
3	US	US-41ccc	ccc	1	15	249	Y84	6.29	6.62	0.959	5.11	5.18	24.5
3	US	US-43	quenched	1	16	250	Y88	18.1	4.56	<0.010	8.12	16.1	31.1
3	US	US-43ccc	ccc	1	17	251	Y92	18.4	26.2	0.503	24	23.1	37.8
3	US	US-45	quenched	1	18	252	Y97	12.5	9.52	<0.010	6.44	26.8	31.9
3	US	US-45ccc	ccc	1	19	253	Y70	12.1	8.89	<0.010	6.17	25.2	31
3	Soln Std	Soln Std		1	20	254	STD-B1-3	3.79	17	3.56	9.75	75.6	48.8
3	Soln Std	Soln Std		2	1	255	STD-B2-1	3.84	20.7	3.61	9.99	82	50.1
3	EA	EA		2	2	256	Y27	<0.100	40.1	0.248	12	104	55.8
3	US	US-31	quenched	2	3	257	Y06	12.3	14.2	<0.010	8.73	9.6	31.1
3	US	US-31ccc	ccc	2	4	258	Y41	9.69	8.74	0.776	6.54	5.75	26.3
3	US	US-33	quenched	2	5	259	Y79	12	4.1	0.325	2.83	79.7	45.6
3	US	US-33ccc	ccc	2	6	260	Y30	12.8	4.12	1.38	3.19	78.4	48.8
3	US	US-35	quenched	2	7	261	Y53	6.03	31.3	<0.010	5.11	23.2	22.5
3	US	US-35ccc	ccc	2	8	262	Y33	5.46	153	0.616	20.3	92	23.9
3	US	US-37	quenched	2	9	263	Y20	15.1	8.7	<0.010	3.64	79.8	42.3
3	US	US-37ccc	ccc	2	10	264	Y82	10.6	24.5	1.44	9.52	124	55.9
3	Soln Std	Soln Std		2	11	265	STD-B2-2	3.76	20.2	3.52	9.79	80.7	49.3
3	US	US-39	quenched	2	12	266	Y34	10.1	15.8	<0.010	9.2	5.11	32.8
3	US	US-39ccc	ccc	2	13	267	Y86	10.4	14	0.347	8.51	4.08	32.7
3	US	US-41	quenched	2	14	268	Y72	6.57	10.5	0.303	5.13	6.22	26.2
3	US	US-41ccc	ccc	2	15	269	Y96	6.08	8.92	1.05	5.08	5.22	25.1
3	US	US-43	quenched	2	16	270	Y18	18.5	8.55	<0.010	8.22	17.1	31.9
3	US	US-43ccc	ccc	2	17	271	Y24	19	30	0.634	24.8	24.9	39.5
3	US	US-45	quenched	2	18	272	Y61	12.9	12.1	0.035	6.52	29.4	32.5
3	US	US-45ccc	ccc	2	19	273	Y83	12.7	11.7	0.228	6.26	27.6	32
3	Soln Std	Soln Std		2	20	274	STD-B2-3	3.77	19.5	3.35	9.75	81.8	48.9
3	Soln Std	Soln Std		3	1	275	STD-B3-1	3.81	20.2	3.48	9.88	80.3	48.8
3	blank	blank		3	2	276	Y12	<0.100	<0.500	<0.010	<1.00	<0.100	<0.100
3	EA	EA		3	3	277	Y04	0.255	38	<0.010	11.7	102.1	54.4
3	US	US-31	quenched	3	4	278	Y94	12.2	14	<0.010	8.62	9.05	30.5
3	US	US-31ccc	ccc	3	5	279	Y71	10.1	9.23	1.24	6.93	7.22	27.4
3	US	US-33	quenched	3	6	280	Y36	11.6	4.35	0.294	2.89	78.3	44.5

Table B1. Laboratory Measurements of the PCT Solutions for the US Study Glasses

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al ar	B ar	Fe ar	Li ar	Na ar	Si ar
3	US	US-33ccc	ccc	3	7	281	Y76	13.2	4.42	4.33	3.21	75.8	47.6
3	US	US-35	quenched	3	8	282	Y57	5.71	28.8	<0.010	4.85	21.4	21.4
3	US	US-35ccc	ccc	3	9	283	Y56	5.49	140	0.563	19	86.9	22.5
3	US	US-37	quenched	3	10	284	Y13	15.1	8.78	0.295	3.76	79.3	41.7
3	Soln Std	Soln Std		3	11	285	STD-B3-2	3.87	20.5	3.45	9.93	81	49.3
3	US	US-37ccc	ccc	3	12	286	Y63	9.45	23.4	0.946	9.08	119	53.3
3	US	US-39	quenched	3	13	287	Y29	9.74	15.8	<0.010	9.09	4.58	32
3	US	US-39ccc	ccc	3	14	288	Y37	10.5	14.3	0.337	8.71	3.84	32.9
3	US	US-41	quenched	3	15	289	Y08	6.35	10.3	0.171	5.08	5.96	24.7
3	US	US-41ccc	ccc	3	16	290	Y77	6.07	9.14	1.01	5.09	5.19	24.3
3	US	US-43	quenched	3	17	291	Y62	17.9	7.11	<0.010	8.04	16.2	30.7
3	US	US-43ccc	ccc	3	18	292	Y26	18.5	28.7	0.62	24.1	24.3	37.7
3	US	US-45	quenched	3	19	293	Y22	12.3	11.9	0.028	6.3	27.7	30.8
3	US	US-45ccc	ccc	3	20	294	Y10	12.1	11.5	0.222	6.1	25.5	31.2
3	Soln Std	Soln Std		3	21	295	STD-B3-3	3.84	20	3.5	9.9	80.6	49.3
3	Soln Std	Soln Std		4	1	296	STD-B4-1	3.7	20.3	3.68	9.8	81.7	49.5
3	ARM	ARM-1		4	2	297	Y11	2.48	12.2	<0.010	8.21	20.9	36.5
3	US	US-32	quenched	4	3	298	Y40	8.23	124	1.7	49.9	63	42.3
3	US	US-32ccc	ccc	4	4	299	Y07	8.46	94.6	1.49	37.7	49.1	41.4
3	US	US-34	quenched	4	5	300	Y95	15.8	105	0.191	22.6	263	45.9
3	US	US-34ccc	ccc	4	6	301	Y47	15.4	96.4	0.133	21.2	244	44
3	US	US-36	quenched	4	7	302	Y58	9.99	18.1	0.214	4.51	22.6	24
3	US	US-36ccc	ccc	4	8	303	Y74	10.3	22.8	0.682	5.21	27.3	25.5
3	US	US-38	quenched	4	9	304	Y78	12.4	10.5	0.616	3.93	95.9	47.5
3	US	US-38ccc	ccc	4	10	305	Y98	14	11.1	1.55	4.54	101	55.3
3	Soln Std	Soln Std		4	11	306	STD-B4-2	3.69	20.4	3.9	9.79	81	49.7
3	US	US-40	quenched	4	12	307	Y87	15.3	36.1	3.37	7.73	29.3	32
3	US	US-40ccc	ccc	4	13	308	Y09	15.2	49.3	3.03	9.81	38.1	32.5
3	US	US-42	quenched	4	14	309	Y50	49.6	15	5.27	18.2	140	70.9
3	US	US-42ccc	ccc	4	15	310	Y42	1.74	10.8	<0.010	33.7	309	19.6
3	US	US-44	quenched	4	16	311	Y01	11.9	12	0.437	6.21	27.8	30.4
3	US	US-44ccc	ccc	4	17	312	Y16	12.5	11.9	0.693	6.25	27.1	31.8
3	Soln Std	Soln Std		4	18	313	STD-B4-3	3.75	19.9	3.84	9.87	83.1	49.5
3	Soln Std	Soln Std		5	1	314	STD-B5-1	3.8	20.3	3.63	9.8	80.2	49.2
3	ARM	ARM-1		5	2	315	Y02	2.54	11.1	<0.010	8.36	21.5	37
3	US	US-32	quenched	5	3	316	Y14	7.83	124	1.16	48.4	60.4	41.5
3	US	US-32ccc	ccc	5	4	317	Y39	8.02	103	1.92	40.3	51.2	42
3	US	US-34	quenched	5	5	318	Y67	16.1	107	<0.010	23.1	262	46.2
3	US	US-34ccc	ccc	5	6	319	Y64	15.1	98.8	<0.010	21.6	240	44
3	US	US-36	quenched	5	7	320	Y25	10.3	19.4	<0.010	4.78	23.8	24.8

Table B1. Laboratory Measurements of the PCT Solutions for the US Study Glasses

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al ar	B ar	Fe ar	Li ar	Na ar	Si ar
3	US	US-36ccc	ccc	5	8	321	Y05	10.3	23	0.311	5.26	26.8	25.8
3	US	US-38	quenched	5	9	322	Y91	11.1	11.1	0.137	4.02	94.4	49.3
3	US	US-38ccc	ccc	5	10	323	Y19	14.2	11.3	1.62	4.62	98.8	56.3
3	Soln Std	Soln Std		5	11	324	STD-B5-2	3.82	20.8	3.79	9.89	80.3	50.1
3	US	US-40	quenched	5	12	325	Y43	15.1	34.4	3.03	7.42	28.4	31.4
3	US	US-40ccc	ccc	5	13	326	Y23	13.6	48.4	2.38	9.42	35.7	29.7
3	US	US-42	quenched	5	14	327	Y44	48.6	15.3	5.05	18.1	135	71
3	US	US-42ccc	ccc	5	15	328	Y90	3.3	10.7	<0.010	33.1	303	19.3
3	US	US-44	quenched	5	16	329	Y49	12.3	12.4	0.137	6.41	28.4	31.6
3	US	US-44ccc	ccc	5	17	330	Y48	12.7	12.3	0.216	6.46	27.9	32.9
3	Soln Std	Soln Std		5	18	331	STD-B5-3	3.77	20.3	3.7	9.84	80	49.7
3	Soln Std	Soln Std		6	1	332	STD-B6-1	3.88	20.1	3.53	9.86	80.5	49.3
3	ARM	ARM-1		6	2	333	Y21	2.59	10.4	<0.010	8.16	20.9	36
3	blank	blank		6	3	334	Y17	<0.100	<0.500	<0.010	<1.00	<0.100	<0.100
3	US	US-32	quenched	6	4	335	Y35	8.1	131	1.1	51	63.5	42.6
3	US	US-32ccc	ccc	6	5	336	Y68	8.14	102	0.726	40.4	50.7	41.6
3	US	US-34	quenched	6	6	337	Y28	16.2	106	<0.010	23.5	267	46.2
3	US	US-34ccc	ccc	6	7	338	Y69	15.1	99.1	<0.010	21.9	242	44.1
3	US	US-36	quenched	6	8	339	Y59	10.4	18.9	<0.010	4.75	24.1	25.1
3	US	US-36ccc	ccc	6	9	340	Y65	10.8	23.8	0.232	5.5	28.4	26.7
3	US	US-38	quenched	6	10	341	Y54	11.1	10.7	<0.010	4.04	94.8	48.3
3	Soln Std	Soln Std		6	11	342	STD-B6-2	3.87	20.5	3.58	9.98	80.5	49.4
3	US	US-38ccc	ccc	6	12	343	Y93	13.7	10.3	1.5	4.45	95.8	53.3
3	US	US-40	quenched	6	13	344	Y03	15.1	33.5	2.45	7.43	28.8	30.6
3	US	US-40ccc	ccc	6	14	345	Y32	14.3	48.7	2.09	9.94	39.3	29.5
3	US	US-42	quenched	6	15	346	Y55	50.1	14.6	4.91	18.7	141	70.6
3	US	US-42ccc	ccc	6	16	347	Y31	1.76	10.5	<0.010	33.6	304	19.6
3	US	US-44	quenched	6	17	348	Y52	12.4	12.4	0.028	6.54	28.8	31.9
3	US	US-44ccc	ccc	6	18	349	Y60	12.9	11.8	0.112	6.54	29.1	32.2
3	Soln Std	Soln Std		6	19	350	STD-B6-3	3.9	19.7	3.46	9.93	81.6	49.1

Table B2. PSAL Measurements of the PCT Solutions for the US Study Glasses After Appropriate Adjustments

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al (ppm)	B (ppm)	Fe (ppm)	Li (ppm)	Na (ppm)	Si (ppm)
1	Soln Std	Soln Std		1	1	1	STD-B1-1	3.750	20.600	4.070	9.880	82.000	50.200
1	ARM	ARM		1	2	2	W73	4.100	17.500	0.083	13.467	35.501	62.001
1	US	US-01	quenched	1	3	3	W88	34.167	12.200	16.400	15.267	51.168	91.168
1	US	US-01ccc	ccc	1	4	4	W45	31.667	11.367	13.650	14.167	46.168	83.835
1	US	US-02	quenched	1	5	5	W76	28.834	89.502	13.434	37.001	80.168	65.668
1	US	US-02ccc	ccc	1	6	6	W68	29.334	75.335	13.884	31.167	70.835	69.335
1	US	US-11	quenched	1	7	7	W96	18.667	17.000	0.253	5.250	17.667	40.667
1	US	US-05ccc	ccc	1	8	8	W55	24.667	23.667	0.797	6.200	24.500	55.001
1	US	US-08	quenched	1	9	9	W85	30.334	12.550	16.667	13.434	22.667	79.168
1	Soln Std	Soln Std		1	10	10	STD-B1-2	3.950	19.600	3.910	9.810	82.900	49.100
1	US	US-08ccc	ccc	1	11	11	W90	31.334	13.017	18.167	12.834	24.667	82.502
1	US	US-10	quenched	1	12	12	W51	19.667	12.467	0.257	4.683	36.334	48.334
1	US	US-10ccc	ccc	1	13	13	W75	19.000	12.167	0.320	4.483	35.501	47.501
1	US	US-09ccc	ccc	1	14	14	W95	13.484	23.000	0.083	5.583	11.400	38.167
1	US	US-11ccc	ccc	1	15	15	W08	16.667	51.501	1.067	8.867	26.501	48.001
1	US	US-13	quenched	1	16	16	W74	21.834	16.400	0.563	5.150	29.334	48.668
1	US	US-13ccc	ccc	1	17	17	W58	19.834	13.650	0.818	4.417	25.667	43.668
1	US	US-14	quenched	1	18	18	W80	24.834	164.837	3.300	68.501	152.336	56.168
1	US	US-14ccc	ccc	1	19	19	W91	25.334	147.003	2.250	61.335	137.003	57.001
1	Soln Std	Soln Std		1	20	20	STD-B1-3	3.830	20.200	4.170	9.800	83.500	48.800
1	Soln Std	Soln Std		2	1	21	STD-B2-1	3.870	20.300	5.250	9.770	82.800	49.500
1	ARM	ARM		2	2	22	W26	4.283	17.667	0.083	13.150	36.501	59.001
1	US	US-01	quenched	2	3	23	W37	31.334	11.250	13.784	13.967	47.334	82.668
1	US	US-01ccc	ccc	2	4	24	W24	31.501	11.250	13.067	14.000	46.501	83.168
1	US	US-02	quenched	2	5	25	W05	28.501	88.502	12.817	36.501	81.668	64.501
1	US	US-02ccc	ccc	2	6	26	W79	28.834	72.835	13.134	30.167	71.501	66.335
1	US	US-05	quenched	2	7	27	W89	19.834	17.500	0.083	5.283	19.000	41.834
1	US	US-05ccc	ccc	2	8	28	W09	23.000	26.001	0.573	6.300	26.001	49.834
1	US	US-08	quenched	2	9	29	W67	32.001	12.684	17.000	13.600	24.167	80.835
1	Soln Std	Soln Std		2	10	30	STD-B2-2	3.710	19.200	3.450	9.580	83.800	48.000
1	US	US-08ccc	ccc	2	11	31	W83	28.167	11.617	14.000	11.500	23.334	71.501
1	US	US-10	quenched	2	12	32	W07	19.834	11.900	0.083	4.533	37.501	47.334
1	US	US-10ccc	ccc	2	13	33	W78	18.834	11.517	0.083	4.350	36.167	44.668
1	US	US-11	quenched	2	14	34	W31	12.717	22.500	0.083	5.333	9.784	39.167
1	US	US-11ccc	ccc	2	15	35	W21	16.234	48.501	0.940	8.217	23.834	46.501
1	US	US-13	quenched	2	16	36	W47	20.667	15.900	0.340	4.933	27.167	46.334
1	US	US-13ccc	ccc	2	17	37	W44	19.167	13.517	0.697	4.250	23.834	43.501
1	US	US-14	quenched	2	18	38	W63	24.167	173.337	3.450	70.001	149.170	57.668
1	US	US-14ccc	ccc	2	19	39	W01	24.334	142.670	3.117	57.834	126.003	57.168
1	Soln Std	Soln Std		2	20	40	STD-B2-3	3.570	20.300	3.650	9.640	80.300	48.500

Table B2. PSAL Measurements of the PCT Solutions for the US Study Glasses After Appropriate Adjustments

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al (ppm)	B (ppm)	Fe (ppm)	Li (ppm)	Na (ppm)	Si (ppm)
1	Soln Std	Soln Std		3	1	41	STD-B3-1	3.830	20.400	4.980	9.770	82.200	49.500
1	ARM	ARM		3	2	42	W82	4.417	18.500	0.083	13.534	37.501	60.501
1	blank	blank		3	3	43	W17	0.083	0.083	0.083	0.417	0.083	0.083
1	US	US-01	quenched	3	4	44	W18	32.001	11.184	14.567	14.150	48.501	84.668
1	US	US-01ccc	ccc	3	5	45	W28	32.001	11.384	13.850	14.217	46.668	84.668
1	US	US-02	quenched	3	6	46	W52	30.501	94.335	14.417	38.334	83.668	70.668
1	US	US-02ccc	ccc	3	7	47	W56	27.834	71.335	13.084	29.167	66.835	65.501
1	US	US-05	quenched	3	8	48	W65	19.834	17.500	0.083	5.333	18.167	43.001
1	US	US-05ccc	ccc	3	9	49	W13	23.000	26.667	0.465	6.417	26.001	51.001
1	Soln Std	Soln Std		3	10	50	STD-B3-2	3.850	19.700	3.670	9.720	82.000	49.100
1	US	US-08	quenched	3	11	51	W23	33.001	13.384	18.334	14.134	24.167	84.335
1	US	US-08ccc	ccc	3	12	52	W98	29.001	11.767	15.217	11.867	22.834	75.002
1	US	US-10	quenched	3	13	53	W71	20.000	12.034	0.187	4.617	36.334	48.001
1	US	US-10ccc	ccc	3	14	54	W29	19.334	12.034	0.272	4.517	35.167	48.168
1	US	US-11	quenched	3	15	55	W53	13.867	22.167	0.083	5.483	11.600	39.001
1	US	US-11ccc	ccc	3	16	56	W86	16.484	48.501	0.905	8.384	25.834	46.501
1	US	US-13	quenched	3	17	57	W69	21.000	15.467	0.323	4.933	28.167	46.001
1	US	US-13ccc	ccc	3	18	58	W11	19.834	13.417	0.842	4.367	25.334	43.501
1	US	US-14	quenched	3	19	59	W60	26.001	183.337	3.217	73.501	157.170	60.168
1	US	US-14ccc	ccc	3	20	60	W36	25.501	147.003	3.400	59.001	128.836	59.001
1	Soln Std	Soln Std		3	21	61	STD-B3-3	4.280	20.900	3.920	9.950	82.600	50.800
1	Soln Std	Soln Std		4	1	62	STD-B4-1	3.840	20.800	5.470	9.720	81.900	50.300
1	EA	EA		4	2	63	W92	0.833	620.001	0.833	183.334	1653.337	873.335
1	US	US-03	quenched	4	3	64	W14	22.334	18.667	7.833	9.567	7.817	54.001
1	US	US-03ccc	ccc	4	4	65	W39	21.667	17.500	6.867	8.684	9.434	52.334
1	US	US-04	quenched	4	5	66	W42	22.000	11.934	0.463	8.133	21.000	49.001
1	US	US-04ccc	ccc	4	6	67	W10	21.000	11.284	0.083	7.350	21.334	46.168
1	US	US-06	quenched	4	7	68	W35	20.500	14.717	0.083	5.517	22.500	43.334
1	US	US-06ccc	ccc	4	8	69	W06	19.000	13.167	0.083	4.767	21.167	41.334
1	US	US-07	quenched	4	9	70	W19	20.334	14.434	0.083	5.933	22.000	44.001
1	Soln Std	Soln Std		4	10	71	STD-B4-2	4.140	20.100	3.720	9.640	82.900	49.700
1	US	US-07ccc	ccc	4	11	72	W93	19.334	13.384	0.083	5.200	20.500	42.501
1	US	US-09	quenched	4	12	73	W66	21.334	20.167	11.200	4.933	44.001	53.668
1	US	US-09ccc	ccc	4	13	74	W16	19.834	19.167	7.833	4.467	40.834	51.168
1	US	US-12	quenched	4	14	75	W46	25.167	61.001	4.350	29.834	73.168	62.168
1	US	US-12ccc	ccc	4	15	76	W48	27.334	85.168	10.717	40.667	89.335	67.668
1	US	US-15	quenched	4	16	77	W84	9.684	241.672	4.833	34.001	280.006	44.001
1	US	US-15ccc	ccc	4	17	78	W70	10.217	195.004	5.650	27.667	228.338	48.334
1	Soln Std	Soln Std		4	18	79	STD-B4-3	3.800	20.800	4.530	9.770	82.100	50.200
1	Soln Std	Soln Std		5	1	80	STD-B5-1	3.980	20.700	3.930	9.810	82.600	50.000

Table B2. PSAL Measurements of the PCT Solutions for the US Study Glasses After Appropriate Adjustments

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al (ppm)	B (ppm)	Fe (ppm)	Li (ppm)	Na (ppm)	Si (ppm)
1	EA	EA		5	2	81	W64	0.833	623.335	0.833	190.000	1658.337	886.668
1	US	US-05	quenched	5	3	82	W97	21.834	18.000	8.083	9.534	8.050	53.001
1	US	US-03ccc	ccc	5	4	83	W38	22.000	17.334	7.200	8.900	9.767	53.001
1	US	US-04	quenched	5	5	84	W54	22.834	12.034	1.057	8.567	22.834	50.501
1	US	US-04ccc	ccc	5	6	85	W77	22.500	11.500	0.523	7.917	21.834	50.834
1	US	US-06	quenched	5	7	86	W22	21.000	14.667	0.345	5.783	24.000	44.501
1	US	US-06ccc	ccc	5	8	87	W57	20.500	13.734	0.732	5.200	22.667	45.168
1	US	US-07	quenched	5	9	88	W81	21.167	14.167	0.083	6.200	22.834	45.001
1	Soln Std	Soln Std		5	10	89	STD-B5-2	4.010	19.900	4.810	9.780	83.400	49.700
1	US	US-07ccc	ccc	5	11	90	W33	20.167	13.550	0.083	5.567	21.167	45.001
1	US	US-09	quenched	5	12	91	W61	19.667	19.667	11.167	5.000	40.667	53.501
1	US	US-09ccc	ccc	5	13	92	W72	20.500	20.000	8.367	4.833	44.168	53.501
1	US	US-12	quenched	5	14	93	W27	26.001	64.001	4.550	31.501	74.668	64.835
1	US	US-12ccc	ccc	5	15	94	W32	27.501	85.835	11.400	41.334	89.502	68.835
1	US	US-15	quenched	5	16	95	W03	10.717	258.339	5.667	37.167	296.673	47.501
1	US	US-15ccc	ccc	5	17	96	W50	10.450	200.004	6.200	28.834	235.005	50.334
1	Soln Std	Soln Std		5	18	97	STD-B5-3	3.990	21.300	4.050	9.760	82.600	49.600
1	Soln Std	Soln Std		6	1	98	STD-B6-1	4.070	20.500	3.690	9.880	81.300	50.100
1	blank	blank		6	2	99	W40	0.083	0.672	0.083	0.417	0.083	0.083
1	EA	EA		6	3	100	W02	2.050	651.668	0.833	200.000	1700.003	931.669
1	US	US-03	quenched	6	4	101	W62	23.334	19.000	8.083	10.500	9.084	57.168
1	US	US-03ccc	ccc	6	5	102	W12	22.167	17.500	6.783	9.384	9.717	53.334
1	US	US-04	quenched	6	6	103	W43	24.334	12.767	0.663	9.400	22.000	54.001
1	US	US-04ccc	ccc	6	7	104	W30	22.667	12.050	0.083	8.600	22.000	51.501
1	US	US-06	quenched	6	8	105	W15	21.000	14.717	0.083	6.250	23.167	45.001
1	US	US-06ccc	ccc	6	9	106	W87	19.334	13.300	0.083	5.500	21.834	43.501
1	Soln Std	Soln Std		6	10	107	STD-B6-2	4.150	20.300	3.770	10.000	81.700	50.500
1	US	US-07	quenched	6	11	108	W49	21.834	15.884	0.083	7.000	25.001	49.001
1	US	US-07ccc	ccc	6	12	109	W25	20.000	13.517	0.083	6.000	22.167	45.001
1	US	US-09	quenched	6	13	110	W41	19.834	20.834	10.384	5.633	41.668	54.168
1	US	US-03	quenched	6	14	111	W97	21.000	19.834	9.034	5.250	40.667	56.501
1	US	US-12	quenched	6	15	112	W04	27.667	65.335	5.300	32.167	74.335	67.835
1	US	US-12ccc	ccc	6	16	113	W34	30.334	90.335	11.784	43.001	93.169	74.335
1	US	US-15	quenched	6	17	114	W20	11.317	271.672	6.067	38.334	300.006	50.834
1	US	US-15ccc	ccc	6	18	115	W59	11.134	210.004	6.367	29.834	236.671	53.334
1	Soln Std	Soln Std		6	19	116	STD-B6-3	4.020	21.600	3.690	9.830	80.300	50.300
2	Soln Std	Soln Std		1	1	117	STD-B1-1	3.920	21.500	3.900	10.100	81.200	50.600
2	US	US-23	quenched	1	2	118	X005	27.001	19.167	7.867	10.100	31.501	71.001
2	US	US-24ccc	ccc	1	3	119	X065	23.834	15.767	3.800	7.883	31.001	61.835
2	US	US-25	quenched	1	4	120	X093	21.667	58.835	2.450	24.667	64.168	65.335

Table B2. PSAL Measurements of the PCT Solutions for the US Study Glasses After Appropriate Adjustments

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al (ppm)	B (ppm)	Fe (ppm)	Li (ppm)	Na (ppm)	Si (ppm)
2	US	US-21	quenched	1	5	121	X021	25.167	19.167	9.834	8.967	25.334	68.835
2	US	US-28	quenched	1	6	122	X012	26.501	98.669	6.883	14.567	107.835	46.668
2	US	US-25ccc	ccc	1	7	123	X088	22.167	72.335	5.067	29.167	74.668	67.335
2	US	US-30	quenched	1	8	124	X097	17.667	31.834	0.975	16.000	15.350	40.001
2	US	US-21ccc	ccc	1	9	125	X009	22.667	17.834	5.283	8.033	24.334	62.668
2	US	US-24	quenched	1	10	126	X029	23.334	16.000	3.633	8.000	29.167	61.001
2	Soln Std	Soln Std		1	11	127	STD-B1-2	3.860	20.500	3.690	9.940	81.000	49.600
2	US	US-23ccc	ccc	1	12	128	X092	25.501	19.167	6.300	9.400	31.501	67.001
2	US	US-27	quenched	1	13	129	X032	48.168	26.167	59.001	29.167	196.671	158.503
2	EA	EA		1	14	130	X069	8.000	636.668	3.367	196.667	1716.670	915.002
2	US	US-20ccc	ccc	1	15	131	X030	24.167	20.167	3.650	9.567	28.334	60.168
2	US	US-27ccc	ccc	1	16	132	X049	13.534	341.674	0.083	203.337	946.686	445.009
2	US	US-28ccc	ccc	1	17	133	X071	26.001	77.668	7.750	11.834	89.668	46.334
2	US	US-30ccc	ccc	1	18	134	X013	18.500	37.501	0.448	17.334	16.400	43.334
2	US	US-20	quenched	1	19	135	X048	25.001	21.334	5.983	10.167	28.001	61.501
2	blank	Blank 1 (ACTL-14)		1	20	136	X051	6.717	2.050	0.328	1.182	9.017	37.834
2	Soln Std	Soln Std		1	21	137	STD-B1-3	3.850	20.300	3.570	9.890	81.000	49.600
2	Soln Std	Soln Std		2	1	138	STD-B2-1	3.860	20.900	3.860	9.900	81.100	50.100
2	US	US-23ccc	ccc	2	2	139	X026	26.167	18.667	5.983	9.300	31.001	68.668
2	US	US-21ccc	ccc	2	3	140	X006	22.334	16.550	5.700	7.750	23.334	62.668
2	US	US-20	quenched	2	4	141	X010	25.501	19.167	6.450	10.184	31.334	64.168
2	US	US-23	quenched	2	5	142	X003	27.334	19.000	6.183	10.284	32.334	72.835
2	US	US-27ccc	ccc	2	6	143	X082	12.950	335.007	0.083	201.671	951.686	433.342
2	US	US-30	quenched	2	7	144	X075	17.334	34.001	0.083	16.267	14.484	40.001
2	US	US-28ccc	ccc	2	8	145	X035	26.501	77.502	8.650	11.784	91.168	47.501
2	US	US-24ccc	ccc	2	9	146	X062	24.500	16.284	3.017	7.683	29.834	62.001
2	US	US-24	quenched	2	10	147	X095	22.667	15.100	2.850	7.750	28.167	59.835
2	Soln Std	Soln Std		2	11	148	STD-B-2-2	3.760	20.000	3.720	9.830	81.300	49.400
2	US	US-27	quenched	2	12	149	X057	47.001	25.334	55.834	28.834	196.671	153.503
2	EA	EA		2	13	150	X053	4.867	625.001	0.833	193.334	1700.003	918.335
2	US	US-20ccc	ccc	2	14	151	X045	23.500	18.500	3.533	9.250	26.501	59.335
2	US	US-25	quenched	2	15	152	X096	20.500	57.001	2.467	24.167	62.335	64.501
2	US	US-21	quenched	2	16	153	X023	42.334	17.334	8.167	8.434	27.167	100.002
2	US	US-25ccc	ccc	2	17	154	X081	50.001	71.168	5.850	29.001	78.002	118.836
2	US	US-30ccc	ccc	2	18	155	X028	18.667	35.834	0.083	17.667	16.134	44.501
2	US	US-28	quenched	2	19	156	X077	24.667	92.169	6.900	13.734	103.502	43.668
2	Soln Std	Soln Std		2	20	157	STD-B2-3	3.740	20.000	3.620	9.740	81.100	48.900
2	Soln Std	Soln Std		3	1	158	STD-B3-1	4.030	20.600	3.510	9.810	81.100	49.600
2	US	US-21	quenched	3	2	159	X060	23.000	17.000	7.050	7.950	23.667	62.335
2	US	US-23	quenched	3	3	160	X094	29.334	17.667	6.683	9.317	30.001	75.502

Table B2. PSAL Measurements of the PCT Solutions for the US Study Glasses After Appropriate Adjustments

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al (ppm)	B (ppm)	Fe (ppm)	Li (ppm)	Na (ppm)	Si (ppm)
2	US	US-23ccc	ccc	3	4	161	X085	24.834	16.667	4.933	8.817	30.334	65.001
2	US	US-20ccc	ccc	3	5	162	X061	24.834	17.500	4.900	9.067	28.001	60.168
2	US	US-27ccc	ccc	3	6	163	X055	13.434	316.673	0.083	191.671	901.685	415.008
2	US	US-25	quenched	3	7	164	X084	23.334	57.668	1.900	23.167	62.501	65.668
2	blank	Blank 2 (ACTL -14)		3	8	165	X054	0.083	1.317	0.083	0.417	0.083	0.083
2	US	US-28	quenched	3	9	166	X047	25.167	94.835	7.133	13.634	100.835	44.168
2	US	US-30	quenched	3	10	167	X090	17.834	31.667	0.083	15.534	13.617	39.834
2	Soln Std	Soln Std		3	11	168	STD-B3-2	4.000	21.400	3.930	10.100	80.800	52.500
2	US	US-25ccc	ccc	3	12	169	X011	24.834	70.335	4.650	28.001	71.168	66.168
2	US	US-21ccc	ccc	3	13	170	X004	23.834	16.434	7.050	7.650	26.167	64.168
2	US	US-30ccc	ccc	3	14	171	X001	19.500	35.167	0.083	17.000	16.667	45.668
2	US	US-28ccc	ccc	3	15	172	X076	26.501	75.168	9.017	11.417	89.002	46.668
2	US	US-20	quenched	3	16	173	X039	24.334	19.334	5.217	9.717	26.167	61.835
2	EA	EA		3	17	174	X031	2.200	623.335	0.833	188.334	1683.337	893.335
2	US	US-24ccc	ccc	3	18	175	X014	23.500	14.534	2.967	7.300	30.167	61.001
2	US	US-24	quenched	3	19	176	X034	23.167	14.100	2.767	7.550	29.667	60.168
2	US	US-27	quenched	3	20	177	X037	47.334	24.000	60.001	28.001	193.337	154.170
2	Soln Std	Soln Std		3	21	178	STD-B3-3	3.920	20.200	3.700	9.860	80.700	51.100
2	Soln Std	Soln Std		4	1	179	STD-B4-1	3.820	21.300	4.020	10.000	81.400	50.900
2	US	US-19	quenched	4	2	180	X089	25.001	20.667	6.150	10.050	27.334	63.501
2	US	US-26	quenched	4	3	181	X033	30.167	14.500	0.483	14.784	34.334	47.834
2	US	US-17	quenched	4	4	182	X083	24.667	19.000	6.183	16.017	18.667	94.669
2	ARM	ARM		4	5	183	X066	4.933	18.334	0.083	13.750	36.834	62.668
2	US	US-18	quenched	4	6	184	X043	37.834	15.117	9.067	13.967	58.501	80.002
2	US	US-18ccc	ccc	4	7	185	X036	49.501	311.673	18.167	193.337	338.340	166.670
2	US	US-17ccc	ccc	4	8	186	X041	25.501	19.500	7.533	14.100	22.000	90.168
2	US	US-26ccc	ccc	4	9	187	X024	26.001	119.169	0.323	69.501	95.835	57.501
2	US	US-29ccc	ccc	4	10	188	X018	38.834	42.334	16.217	38.334	243.338	158.003
2	Soln Std	Soln Std		4	11	189	STD-B4-2	3.890	21.700	4.090	10.100	82.400	51.400
2	US	US-16	quenched	4	12	190	X019	17.834	36.667	4.500	9.350	13.650	51.501
2	US	US-22	quenched	4	13	191	X017	27.001	20.500	5.867	13.450	45.168	73.001
2	US	US-29	quenched	4	14	192	X016	41.501	49.168	16.834	40.834	290.006	161.503
2	blank	Blank 1 (ACTL -15)		4	15	193	X067	0.083	0.400	0.083	0.888	0.083	0.940
2	US	US-16ccc	ccc	4	16	194	X059	19.500	51.334	3.833	11.367	21.500	56.168
2	US	US-19ccc	ccc	4	17	195	X022	23.667	18.667	4.467	9.117	26.667	59.668
2	US	US-22ccc	ccc	4	18	196	X070	45.668	18.834	7.617	12.850	65.835	112.836
2	Soln Std	Soln Std		4	19	197	STD-B4-3	3.860	20.700	4.080	10.000	82.400	51.100
2	Soln Std	Soln Std		5	1	198	STD-B5-1	3.980	20.900	4.020	10.000	81.400	50.500
2	US	US-16	quenched	5	2	199	X078	18.500	36.501	4.300	9.667	15.200	51.168
2	US	US-19ccc	ccc	5	3	200	X050	23.167	18.334	3.983	9.084	27.001	56.834

Table B2. PSAL Measurements of the PCT Solutions for the US Study Glasses After Appropriate Adjustments

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al (ppm)	B (ppm)	Fe (ppm)	Li (ppm)	Na (ppm)	Si (ppm)
2	US	US-18	quenched	5	4	201	X068	36.834	15.017	8.133	13.684	58.001	75.835
2	US	US-18ccc	ccc	5	5	202	X080	49.001	296.673	17.834	186.670	328.340	166.170
2	US	US-22ccc	ccc	5	6	203	X074	26.334	20.834	5.383	12.934	42.834	71.001
2	US	US-22	quenched	5	7	204	X072	26.834	21.167	4.883	13.550	45.168	71.168
2	US	US-26ccc	ccc	5	8	205	X046	27.667	119.836	1.262	71.501	101.169	59.501
2	US	US-16ccc	ccc	5	9	206	X027	18.834	50.001	3.033	11.234	20.500	53.501
2	ARM	ARM		5	10	207	X058	4.900	18.000	0.083	13.167	36.167	58.001
2	Soln Std	Soln Std		5	11	208	STD-B5-2	4.160	20.700	4.000	10.000	81.900	50.400
2	US	US-29	quenched	5	12	209	X098	41.334	50.501	16.300	41.167	288.339	163.670
2	US	US-29ccc	ccc	5	13	210	X091	38.167	41.668	16.167	38.001	241.672	156.003
2	US	US-26	quenched	5	14	211	X073	29.834	14.284	0.508	14.684	33.667	47.001
2	US	US-17ccc	ccc	5	15	212	X044	23.334	17.667	4.883	14.367	18.667	88.002
2	US	US-17	quenched	5	16	213	X063	25.001	18.334	5.333	15.867	18.500	90.668
2	US	US-19	quenched	5	17	214	X056	28.834	19.167	6.217	10.050	28.167	70.335
2	Soln Std	Soln Std		5	18	215	STD-B5-3	4.050	20.500	4.130	10.100	82.600	51.200
2	Soln Std	Soln Std		6	1	216	STD-B6-1	3.630	20.400	3.250	9.810	80.500	51.400
2	US	US-29	quenched	6	2	217	X064	43.001	49.001	15.734	40.834	290.006	164.337
2	US	US-19ccc	ccc	6	3	218	X008	25.334	18.500	3.033	8.867	28.501	62.835
2	US	US-16ccc	ccc	6	4	219	X040	18.500	50.168	1.507	10.900	21.500	54.168
2	US	US-16	quenched	6	5	220	X007	18.167	39.001	2.767	9.517	14.700	52.001
2	ARM	ARM		6	6	221	X052	4.800	17.000	0.083	12.900	35.334	60.835
2	blank	Blank 2 (ACTL -15)		6	7	222	X002	0.265	0.083	0.083	0.417	0.083	0.083
2	US	US-29ccc	ccc	6	8	223	X079	37.834	40.834	15.267	38.501	241.672	156.670
2	US	US-17	quenched	6	9	224	X099	23.334	16.834	4.783	14.850	17.834	89.168
2	US	US-17ccc	ccc	6	10	225	X025	22.500	15.917	2.900	13.684	19.167	85.835
2	Soln Std	Soln Std		6	11	226	STD-B6-2	3.670	19.900	3.150	9.730	81.100	50.900
2	US	US-26	quenched	6	12	227	X086	29.667	13.000	0.083	14.034	34.667	46.834
2	US	US-18	quenched	6	13	228	X020	36.501	14.434	6.933	13.467	57.334	79.002
2	US	US-26ccc	ccc	6	14	229	X015	27.334	119.669	0.083	71.835	100.335	59.168
2	US	US-22ccc	ccc	6	15	230	X087	25.834	18.334	3.550	12.367	44.001	70.168
2	US	US-18ccc	ccc	6	16	231	X100	49.834	298.339	17.667	186.670	326.673	168.337
2	US	US-19	quenched	6	17	232	X038	24.667	19.834	3.917	9.334	27.001	59.001
2	US	US-22	quenched	6	18	233	X042	25.834	20.000	3.133	12.834	44.668	69.668
2	Soln Std	Soln Std		6	19	234	STD-B6-3	3.710	20.400	3.090	9.690	80.700	50.500
3	Soln Std	Soln Std		1	1	235	STD-B1-1	3.900	18.500	3.490	10.100	79.500	50.600
3	EA	EA		1	2	236	Y85	0.833	621.668	0.083	200.000	1661.670	935.002
3	US	US-31	quenched	1	3	237	Y15	20.000	20.500	0.008	14.567	15.700	51.668
3	US	US-31ccc	ccc	1	4	238	Y89	16.634	11.867	1.163	11.350	10.334	45.834
3	US	US-33	quenched	1	5	239	Y81	20.167	3.583	0.270	4.967	131.336	78.835
3	US	US-33ccc	ccc	1	6	240	Y66	20.667	3.017	2.200	5.183	117.502	77.835

Table B2. PSAL Measurements of the PCT Solutions for the US Study Glasses After Appropriate Adjustments

Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al (ppm)	B (ppm)	Fe (ppm)	Li (ppm)	Na (ppm)	Si (ppm)
3	US	US-35	quenched	1	7	241	Y46	10.600	49.001	0.008	8.784	37.834	37.167
3	US	US-35ccc	ccc	1	8	242	Y45	9.584	248.338	0.567	33.334	147.003	39.501
3	US	US-37	quenched	1	9	243	Y73	24.834	10.367	0.008	6.083	126.503	68.501
3	US	US-37ccc	ccc	1	10	244	Y38	16.034	34.834	1.335	15.284	190.004	90.835
3	Soln Std	Soln Std		1	11	245	STD-B1-2	3.760	17.300	3.500	9.690	76.700	48.500
3	US	US-39	quenched	1	12	246	Y75	16.834	23.000	0.008	15.600	8.367	55.168
3	US	US-39ccc	ccc	1	13	247	Y80	18.000	19.667	0.343	14.600	7.133	55.168
3	US	US-41	quenched	1	14	248	Y51	10.884	12.967	0.265	8.467	10.000	41.834
3	US	US-41ccc	ccc	1	15	249	Y84	10.484	11.034	1.598	8.517	8.634	40.834
3	US	US-43	quenched	1	16	250	Y88	30.167	7.600	0.008	13.534	26.834	51.834
3	US	US-43ccc	ccc	1	17	251	Y92	30.667	43.668	0.838	40.001	38.501	63.001
3	US	US-45	quenched	1	18	252	Y97	20.834	15.867	0.008	10.734	44.668	53.168
3	US	US-45ccc	ccc	1	19	253	Y70	20.167	14.817	0.008	10.284	42.001	51.668
3	Soln Std	Soln Std		1	20	254	STD-B1-3	3.790	17.000	3.560	9.750	75.600	48.800
3	Soln Std	Soln Std		2	1	255	STD-B2-1	3.840	20.700	3.610	9.990	82.000	50.100
3	EA	EA		2	2	256	Y27	0.833	668.335	4.133	200.000	1733.337	930.002
3	US	US-31	quenched	2	3	257	Y06	20.500	23.667	0.008	14.550	16.000	51.834
3	US	US-31ccc	ccc	2	4	258	Y41	16.150	14.567	1.293	10.900	9.584	43.834
3	US	US-33	quenched	2	5	259	Y79	20.000	6.833	0.542	4.717	132.836	76.002
3	US	US-33ccc	ccc	2	6	260	Y30	21.334	6.867	2.300	5.317	130.669	81.335
3	US	US-35	quenched	2	7	261	Y53	10.050	52.168	0.008	8.517	38.667	37.501
3	US	US-35ccc	ccc	2	8	262	Y33	9.100	255.005	1.027	33.834	153.336	39.834
3	US	US-37	quenched	2	9	263	Y20	25.167	14.500	0.008	6.067	133.003	70.501
3	US	US-37ccc	ccc	2	10	264	Y82	17.667	40.834	2.400	15.867	206.671	93.169
3	Soln Std	Soln Std		2	11	265	STD-B2-2	3.760	20.200	3.520	9.790	80.700	49.300
3	US	US-39	quenched	2	12	266	Y34	16.834	26.334	0.008	15.334	8.517	54.668
3	US	US-39ccc	ccc	2	13	267	Y86	17.334	23.334	0.578	14.184	6.800	54.501
3	US	US-41	quenched	2	14	268	Y72	10.950	17.500	0.505	8.550	10.367	43.668
3	US	US-41ccc	ccc	2	15	269	Y96	10.134	14.867	1.750	8.467	8.700	41.834
3	US	US-43	quenched	2	16	270	Y18	30.834	14.250	0.008	13.700	28.501	53.168
3	US	US-43ccc	ccc	2	17	271	Y24	31.667	50.001	1.057	41.334	41.501	65.835
3	US	US-45	quenched	2	18	272	Y61	21.500	20.167	0.058	10.867	49.001	54.168
3	US	US-45ccc	ccc	2	19	273	Y83	21.167	19.500	0.380	10.434	46.001	53.334
3	Soln Std	Soln Std		2	20	274	STD-B2-3	3.770	19.500	3.350	9.750	81.800	48.900
3	Soln Std	Soln Std		3	1	275	STD-B3-1	3.810	20.200	3.480	9.880	80.300	48.800
3	blank	blank		3	2	276	Y12	0.083	0.417	0.008	0.833	0.083	0.083
3	EA	EA		3	3	277	Y04	4.250	633.335	0.083	195.000	1701.670	906.668
3	US	US-31	quenched	3	4	278	Y94	20.334	23.334	0.008	14.367	15.084	50.834
3	US	US-31ccc	ccc	3	5	279	Y71	16.834	15.384	2.067	11.550	12.034	45.668
3	US	US-33	quenched	3	6	280	Y36	19.334	7.250	0.490	4.817	130.503	74.168

Table B2. PSAL Measurements of the PCT Solutions for the US Study Glasses After Appropriate Adjustments

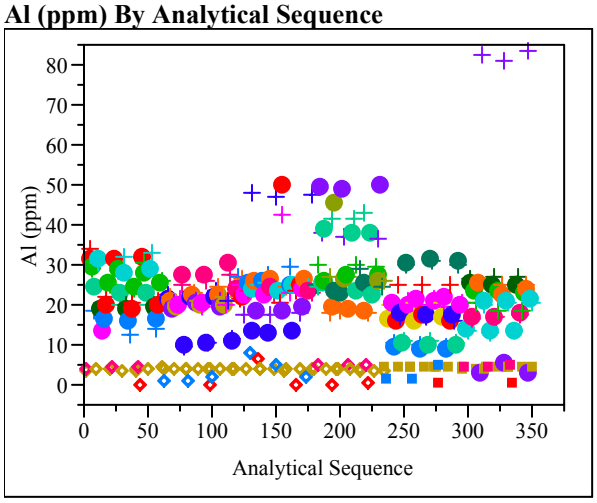
Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al (ppm)	B (ppm)	Fe (ppm)	Li (ppm)	Na (ppm)	Si (ppm)
3	US	US-33ccc	ccc	3	7	281	Y76	22.000	7.367	7.217	5.350	126.336	79.335
3	US	US-35	quenched	3	8	282	Y57	9.517	48.001	0.008	8.083	35.667	35.667
3	US	US-35ccc	ccc	3	9	283	Y56	9.150	233.338	0.938	31.667	144.836	37.501
3	US	US-37	quenched	3	10	284	Y13	25.167	14.634	0.492	6.267	132.169	69.501
3	Soln Std	Soln Std		3	11	285	STD-B3-2	3.870	20.500	3.450	9.930	81.000	49.300
3	US	US-37ccc	ccc	3	12	286	Y63	15.750	39.001	1.577	15.134	198.337	88.835
3	US	US-39	quenched	3	13	287	Y29	16.234	26.334	0.008	15.150	7.633	53.334
3	US	US-39ccc	ccc	3	14	288	Y37	17.500	23.834	0.562	14.517	6.400	54.834
3	US	US-41	quenched	3	15	289	Y08	10.584	17.167	0.285	8.467	9.934	41.167
3	US	US-41ccc	ccc	3	16	290	Y77	10.117	15.234	1.683	8.484	8.650	40.501
3	US	US-43	quenched	3	17	291	Y62	29.834	11.850	0.008	13.400	27.001	51.168
3	US	US-43ccc	ccc	3	18	292	Y26	30.834	47.834	1.033	40.167	40.501	62.835
3	US	US-45	quenched	3	19	293	Y22	20.500	19.834	0.047	10.500	46.168	51.334
3	US	US-45ccc	ccc	3	20	294	Y10	20.167	19.167	0.370	10.167	42.501	52.001
3	Soln Std	Soln Std		3	21	295	STD-B3-3	3.840	20.000	3.500	9.900	80.600	49.300
3	Soln Std	Soln Std		4	1	296	STD-B4-1	3.700	20.300	3.680	9.800	81.700	49.500
3	ARM	ARM-1		4	2	297	Y11	4.133	20.334	0.008	13.684	34.834	60.835
3	US	US-32	quenched	4	3	298	Y40	13.717	206.671	2.833	83.168	105.002	70.501
3	US	US-32ccc	ccc	4	4	299	Y07	14.100	157.670	2.483	62.835	81.835	69.001
3	US	US-34	quenched	4	5	300	Y95	26.334	175.004	0.318	37.667	438.342	76.502
3	US	US-34ccc	ccc	4	6	301	Y47	25.667	160.670	0.222	35.334	406.675	73.335
3	US	US-36	quenched	4	7	302	Y58	16.650	30.167	0.357	7.517	37.667	40.001
3	US	US-36ccc	ccc	4	8	303	Y74	17.167	38.001	1.137	8.684	45.501	42.501
3	US	US-38	quenched	4	9	304	Y78	20.667	17.500	1.027	6.550	159.837	79.168
3	US	US-38ccc	ccc	4	10	305	Y98	23.334	18.500	2.583	7.567	168.337	92.169
3	Soln Std	Soln Std		4	11	306	STD-B4-2	3.690	20.400	3.900	9.790	81.000	49.700
3	US	US-40	quenched	4	12	307	Y87	25.501	60.168	5.617	12.884	48.834	53.334
3	US	US-40ccc	ccc	4	13	308	Y09	25.334	82.168	5.050	16.350	63.501	54.168
3	US	US-42	quenched	4	14	309	Y50	82.668	25.001	8.784	30.334	233.338	118.169
3	US	US-42ccc	ccc	4	15	310	Y42	2.900	18.000	0.008	56.168	515.010	32.667
3	US	US-44	quenched	4	16	311	Y01	19.834	20.000	0.728	10.350	46.334	50.668
3	US	US-44ccc	ccc	4	17	312	Y16	20.834	19.834	1.155	10.417	45.168	53.001
3	Soln Std	Soln Std		4	18	313	STD-B4-3	3.750	19.900	3.840	9.870	83.100	49.500
3	Soln Std	Soln Std		5	1	314	STD-B5-1	3.800	20.300	3.630	9.800	80.200	49.200
3	ARM	ARM-1		5	2	315	Y02	4.233	18.500	0.008	13.934	35.834	61.668
3	US	US-32	quenched	5	3	316	Y14	13.050	206.671	1.933	80.668	100.669	69.168
3	US	US-32ccc	ccc	5	4	317	Y39	13.367	171.670	3.200	67.168	85.335	70.001
3	US	US-34	quenched	5	5	318	Y67	26.834	178.337	0.008	38.501	436.675	77.002
3	US	US-34ccc	ccc	5	6	319	Y64	25.167	164.670	0.008	36.001	400.008	73.335
3	US	US-36	quenched	5	7	320	Y25	17.167	32.334	0.008	7.967	39.667	41.334

Table B2. PSAL Measurements of the PCT Solutions for the US Study Glasses After Appropriate Adjustments

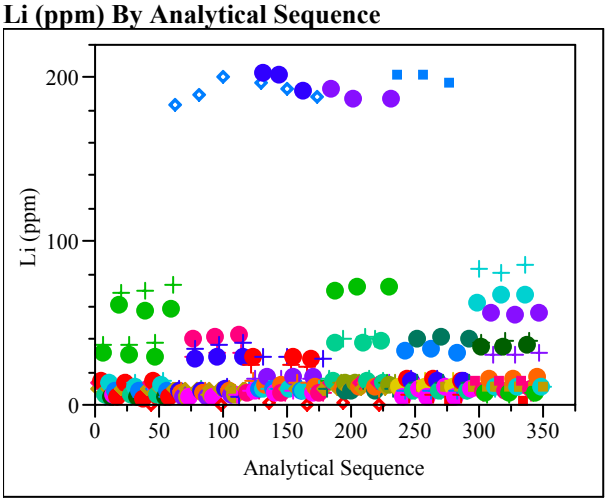
Set	Type	Glass ID	Heat Treatment	Block	Seq	Analytical Sequence	Lab ID	Al (ppm)	B (ppm)	Fe (ppm)	Li (ppm)	Na (ppm)	Si (ppm)
3	US	US-36ccc	ccc	5	8	321	Y05	17.167	38.334	0.518	8.767	44.668	43.001
3	US	US-38	quenched	5	9	322	Y91	18.500	18.500	0.228	6.700	157.336	82.168
3	US	US-38ccc	ccc	5	10	323	Y19	23.667	18.834	2.700	7.700	164.670	93.835
3	Soln Std	Soln Std		5	11	324	STD-B5-2	3.820	20.800	3.790	9.890	80.300	50.100
3	US	US-40	quenched	5	12	325	Y43	25.167	57.334	5.050	12.367	47.334	52.334
3	US	US-40ccc	ccc	5	13	326	Y23	22.667	80.668	3.967	15.700	59.501	49.501
3	US	US-42	quenched	5	14	327	Y44	81.002	25.501	8.417	30.167	225.005	118.336
3	US	US-42ccc	ccc	5	15	328	Y90	5.500	17.834	0.008	55.168	505.010	32.167
3	US	US-44	quenched	5	16	329	Y49	20.500	20.667	0.228	10.684	47.334	52.668
3	US	US-44ccc	ccc	5	17	330	Y48	21.167	20.500	0.360	10.767	46.501	54.834
3	Soln Std	Soln Std		5	18	331	STD-B5-3	3.770	20.300	3.700	9.840	80.000	49.700
3	Soln Std	Soln Std		6	1	332	STD-B6-1	3.880	20.100	3.530	9.860	80.500	49.300
3	ARM	ARM-1		6	2	333	Y21	4.317	17.334	0.008	13.600	34.834	60.001
3	blank	blank		6	3	334	Y17	0.083	0.417	0.008	0.833	0.083	0.083
3	US	US-32	quenched	6	4	335	Y35	13.500	218.338	1.833	85.002	105.835	71.001
3	US	US-32ccc	ccc	6	5	336	Y68	13.567	170.003	1.210	67.335	84.502	69.335
3	US	US-34	quenched	6	6	337	Y28	27.001	176.670	0.008	39.167	445.009	77.002
3	US	US-34ccc	ccc	6	7	338	Y69	25.167	165.170	0.008	36.501	403.341	73.501
3	US	US-36	quenched	6	8	339	Y59	17.334	31.501	0.008	7.917	40.167	41.834
3	US	US-36ccc	ccc	6	9	340	Y65	18.000	39.667	0.387	9.167	47.334	44.501
3	US	US-38	quenched	6	10	341	Y54	18.500	17.834	0.008	6.733	158.003	80.502
3	Soln Std	Soln Std		6	11	342	STD-B6-2	3.870	20.500	3.580	9.980	80.500	49.400
3	US	US-38ccc	ccc	6	12	343	Y93	22.834	17.167	2.500	7.417	159.670	88.835
3	US	US-40	quenched	6	13	344	Y03	25.167	55.834	4.083	12.384	48.001	51.001
3	US	US-40ccc	ccc	6	14	345	Y32	23.834	81.168	3.483	16.567	65.501	49.168
3	US	US-42	quenched	6	15	346	Y55	83.502	24.334	8.183	31.167	235.005	117.669
3	US	US-42ccc	ccc	6	16	347	Y31	2.933	17.500	0.008	56.001	506.677	32.667
3	US	US-44	quenched	6	17	348	Y52	20.667	20.667	0.047	10.900	48.001	53.168
3	US	US-44ccc	ccc	6	18	349	Y60	21.500	19.667	0.187	10.900	48.501	53.668
3	Soln Std	Soln Std		6	19	350	STD-B6-3	3.900	19.700	3.460	9.930	81.600	49.100

Exhibit B1. Laboratory PCT Measurements in Analytical Sequence for Study Glasses, EA, ARM, Blanks, and Solution Standards

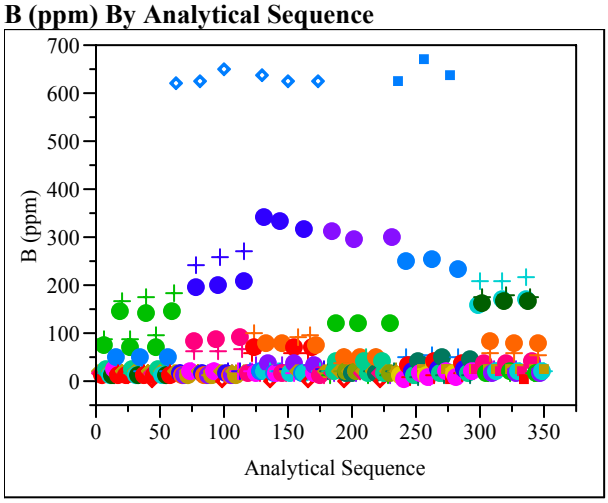
Al (ppm) By Analytical Sequence



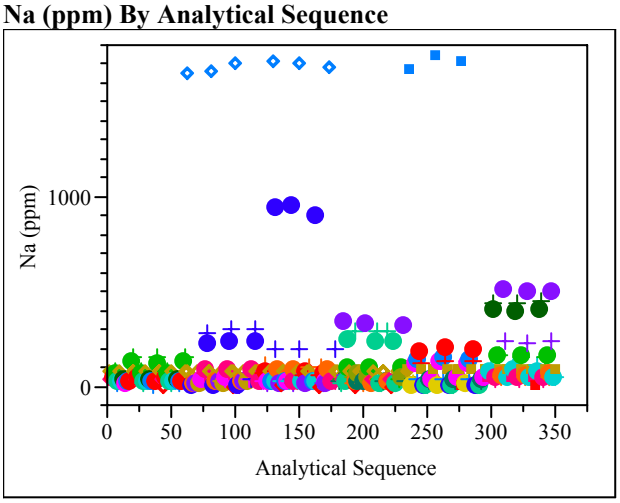
Li (ppm) By Analytical Sequence



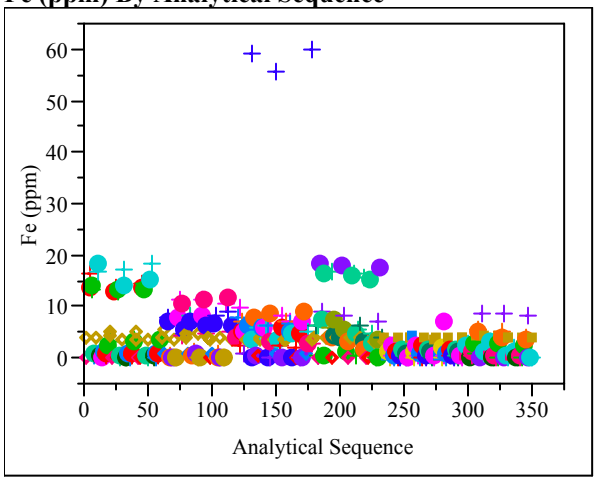
B (ppm) By Analytical Sequence



Na (ppm) By Analytical Sequence



Fe (ppm) By Analytical Sequence



Si (ppm) By Analytical Sequence

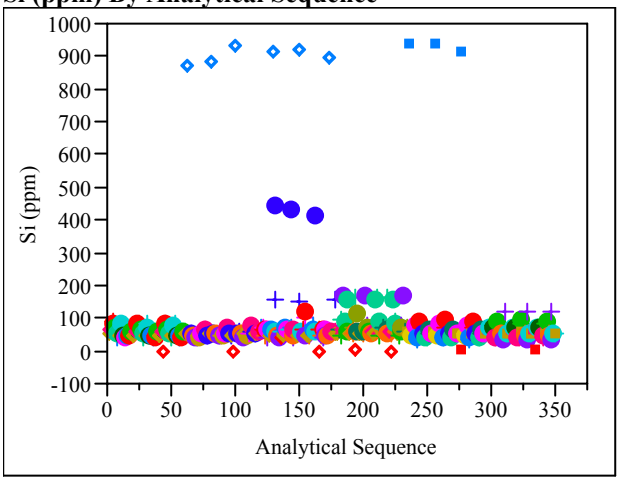
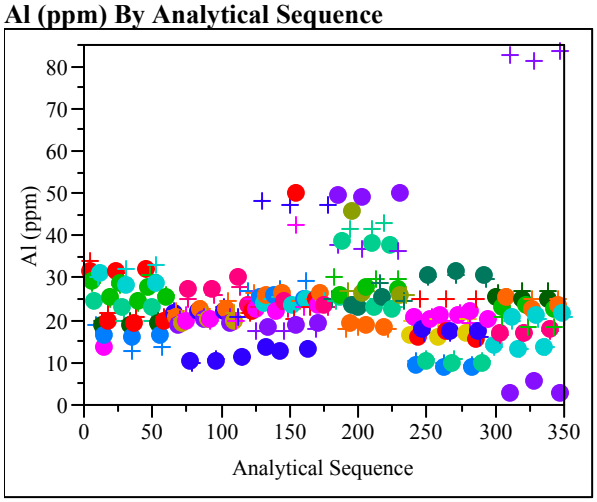
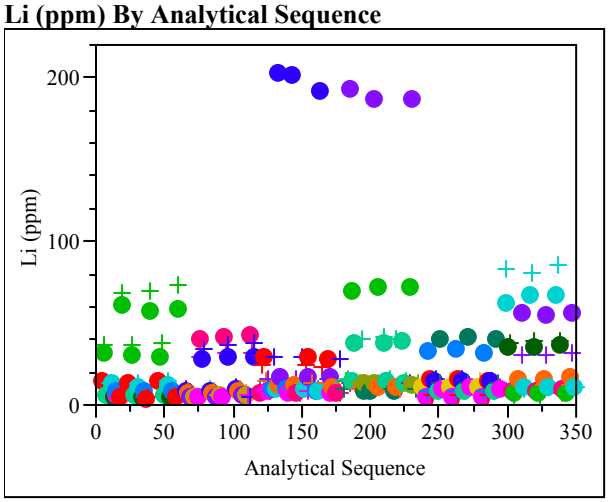


Exhibit B2. Laboratory PCT Measurements in Analytical Sequence for Study Glasses

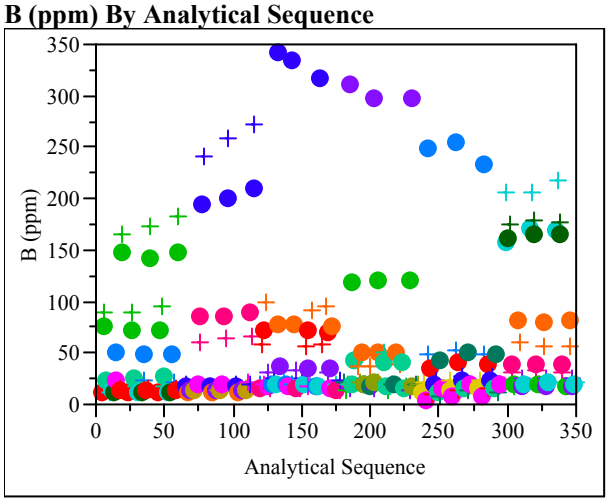
Al (ppm) By Analytical Sequence



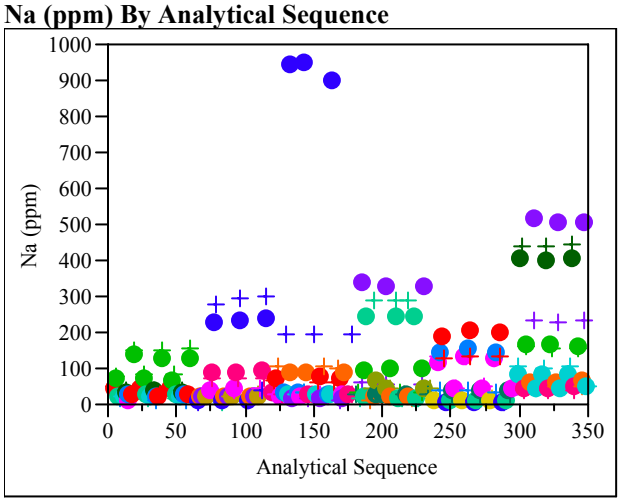
Li (ppm) By Analytical Sequence



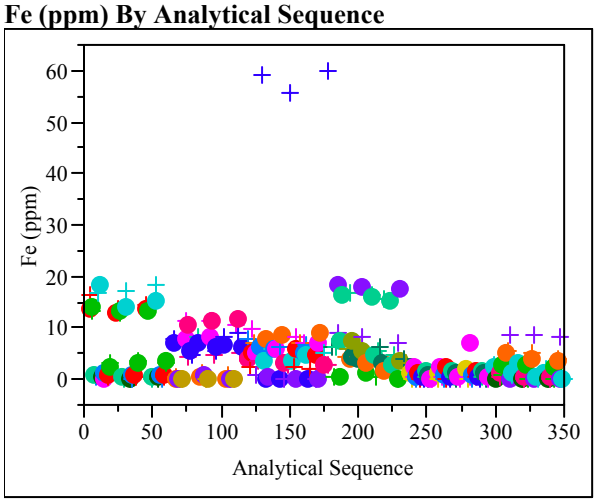
B (ppm) By Analytical Sequence



Na (ppm) By Analytical Sequence



Fe (ppm) By Analytical Sequence



Si (ppm) By Analytical Sequence

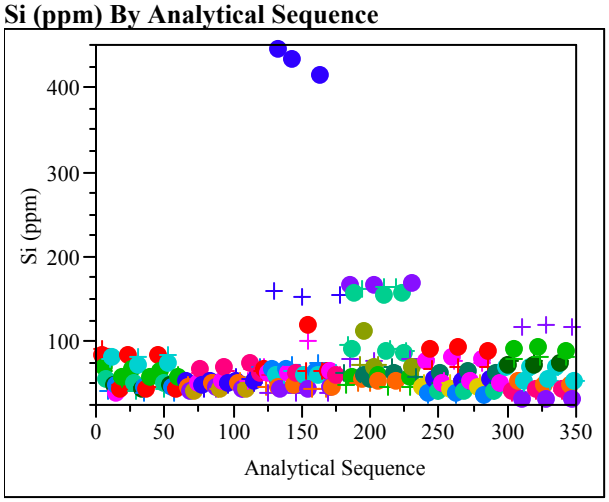
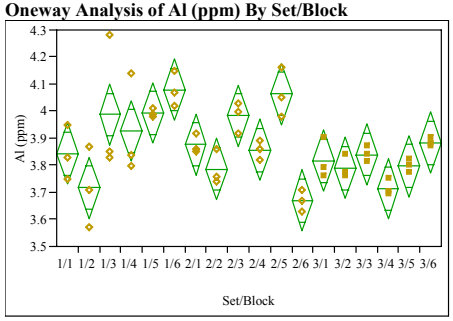


Exhibit B3. Measurements of the Multi-Element Solution Standard by Set and ICP Block

Oneway Analysis of Al (ppm) By Set/Block



Oneway Anova/Summary of Fit

Rsquare	0.682044
Adj Rsquare	0.531898
Root Mean Square Error	0.096138
Mean of Response	3.867963
Observations (or Sum Wgts)	54

Analysis of Variance

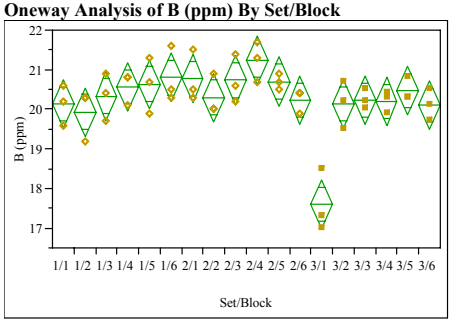
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Set/Block	17	0.7137426	0.041985	4.5425	<.0001
Error	36	0.3327333	0.009243		
C. Total	53	1.0464759			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	3.84333	0.05551	3.7308	3.9559
1/2	3	3.71667	0.05551	3.6041	3.8292
1/3	3	3.98667	0.05551	3.8741	4.0992
1/4	3	3.92667	0.05551	3.8141	4.0392
1/5	3	3.99333	0.05551	3.8808	4.1059
1/6	3	4.08000	0.05551	3.9674	4.1926
2/1	3	3.87667	0.05551	3.7641	3.9892
2/2	3	3.78667	0.05551	3.6741	3.8992
2/3	3	3.98333	0.05551	3.8708	4.0959
2/4	3	3.85667	0.05551	3.7441	3.9692
2/5	3	4.06333	0.05551	3.9508	4.1759
2/6	3	3.67000	0.05551	3.5574	3.7826
3/1	3	3.81667	0.05551	3.7041	3.9292
3/2	3	3.79000	0.05551	3.6774	3.9026
3/3	3	3.84000	0.05551	3.7274	3.9526
3/4	3	3.71333	0.05551	3.6008	3.8259
3/5	3	3.79667	0.05551	3.6841	3.9092
3/6	3	3.88333	0.05551	3.7708	3.9959

Std Error uses a pooled estimate of error variance

Oneway Analysis of B (ppm) By Set/Block



Oneway Anova/Summary of Fit

Rsquare	0.740029
Adj Rsquare	0.617265
Root Mean Square Error	0.525463
Mean of Response	20.28333
Observations (or Sum Wgts)	54

Analysis of Variance

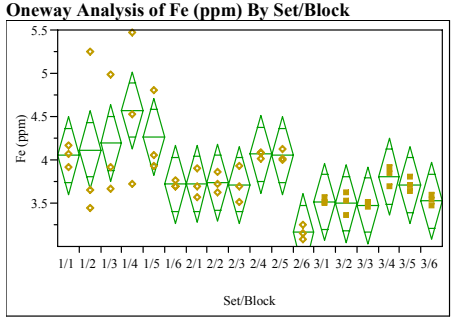
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Set/Block	17	28.295000	1.66441	6.0281	<.0001
Error	36	9.940000	0.27611		
C. Total	53	38.235000			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	20.1333	0.30338	19.518	20.749
1/2	3	19.9333	0.30338	19.318	20.549
1/3	3	20.3333	0.30338	19.718	20.949
1/4	3	20.5667	0.30338	19.951	21.182
1/5	3	20.6333	0.30338	20.018	21.249
1/6	3	20.8000	0.30338	20.185	21.415
2/1	3	20.7667	0.30338	20.151	21.382
2/2	3	20.3000	0.30338	19.685	20.915
2/3	3	20.7333	0.30338	20.118	21.349
2/4	3	21.2333	0.30338	20.618	21.849
2/5	3	20.7000	0.30338	20.085	21.315
2/6	3	20.2333	0.30338	19.618	20.849
3/1	3	17.6000	0.30338	16.985	18.215
3/2	3	20.1333	0.30338	19.518	20.749
3/3	3	20.2333	0.30338	19.618	20.849
3/4	3	20.2000	0.30338	19.585	20.815
3/5	3	20.4667	0.30338	19.851	21.082
3/6	3	20.1000	0.30338	19.485	20.715

Std Error uses a pooled estimate of error variance

Oneway Analysis of Fe (ppm) By Set/Block



Oneway Anova/Summary of Fit

Rsquare	0.53958
Adj Rsquare	0.32216
Root Mean Square Error	0.38102
Mean of Response	3.826481
Observations (or Sum Wgts)	54

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Set/Block	17	6.124898	0.360288	2.4817	0.0108
Error	36	5.226333	0.145176		
C. Total	53	11.351231			

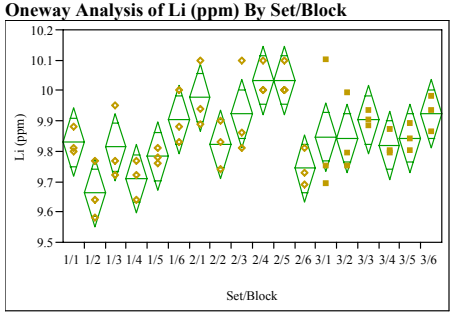
Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	4.05000	0.21998	3.6039	4.4961
1/2	3	4.11667	0.21998	3.6705	4.5628
1/3	3	4.19000	0.21998	3.7439	4.6361
1/4	3	4.57333	0.21998	4.1272	5.0195
1/5	3	4.26333	0.21998	3.8172	4.7095
1/6	3	3.71667	0.21998	3.2705	4.1628
2/1	3	3.72000	0.21998	3.2739	4.1661
2/2	3	3.73333	0.21998	3.2872	4.1795
2/3	3	3.71333	0.21998	3.2672	4.1595
2/4	3	4.06333	0.21998	3.6172	4.5095
2/5	3	4.05000	0.21998	3.6039	4.4961
2/6	3	3.16333	0.21998	2.7172	3.6095
3/1	3	3.51667	0.21998	3.0705	3.9628
3/2	3	3.49333	0.21998	3.0472	3.9395
3/3	3	3.47667	0.21998	3.0305	3.9228
3/4	3	3.80667	0.21998	3.3605	4.2528
3/5	3	3.70667	0.21998	3.2605	4.1528
3/6	3	3.52333	0.21998	3.0772	3.9695

Std Error uses a pooled estimate of error variance

Exhibit B3. Measurements of the Multi-Element Solution Standard by Set and ICP Block

Oneway Analysis of Li (ppm) By Set/Block



Oneway Anova/Summary of Fit

Rsquare	0.610576
Adj Rsquare	0.426681
Root Mean Square Error	0.095801
Mean of Response	9.856481
Observations (or Sum Wgts)	54

Analysis of Variance

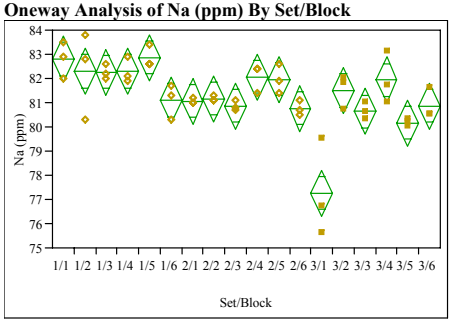
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Set/Block	17	0.51803148	0.030472	3.3202	0.0012
Error	36	0.33040000	0.009178		
C. Total	53	0.84843148			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	9.8300	0.05531	9.7178	9.942
1/2	3	9.6633	0.05531	9.5512	9.776
1/3	3	9.8133	0.05531	9.7012	9.926
1/4	3	9.7100	0.05531	9.5978	9.822
1/5	3	9.7833	0.05531	9.6712	9.896
1/6	3	9.9033	0.05531	9.7912	10.016
2/1	3	9.9767	0.05531	9.8645	10.089
2/2	3	9.8233	0.05531	9.7112	9.936
2/3	3	9.9233	0.05531	9.8112	10.036
2/4	3	10.0333	0.05531	9.9212	10.146
2/5	3	10.0333	0.05531	9.9212	10.146
2/6	3	9.7433	0.05531	9.6312	9.856
3/1	3	9.8467	0.05531	9.7345	9.959
3/2	3	9.8433	0.05531	9.7312	9.956
3/3	3	9.9033	0.05531	9.7912	10.016
3/4	3	9.8200	0.05531	9.7078	9.932
3/5	3	9.8433	0.05531	9.7312	9.956
3/6	3	9.9233	0.05531	9.8112	10.036

Std Error uses a pooled estimate of error variance

Oneway Analysis of Na (ppm) By Set/Block



Oneway Anova/Summary of Fit

Rsquare	0.776763
Adj Rsquare	0.671345
Root Mean Square Error	0.81695
Mean of Response	81.32778
Observations (or Sum Wgts)	54

Analysis of Variance

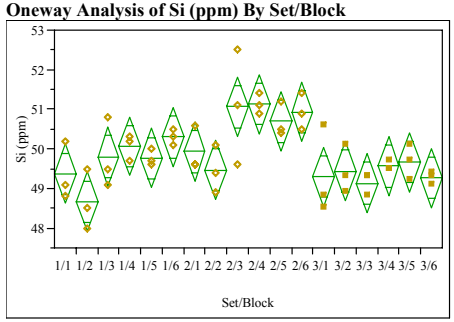
Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Set/Block	17	83.60167	4.91775	7.3684	<.0001
Error	36	24.02667	0.66741		
C. Total	53	107.62833			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	82.8000	0.47167	81.843	83.757
1/2	3	82.3000	0.47167	81.343	83.257
1/3	3	82.2667	0.47167	81.310	83.223
1/4	3	82.3000	0.47167	81.343	83.257
1/5	3	82.8667	0.47167	81.910	83.823
1/6	3	81.1000	0.47167	80.143	82.057
2/1	3	81.0667	0.47167	80.110	82.023
2/2	3	81.1667	0.47167	80.210	82.123
2/3	3	80.8667	0.47167	79.910	81.823
2/4	3	82.0667	0.47167	81.110	83.023
2/5	3	81.9667	0.47167	81.010	82.923
2/6	3	80.7667	0.47167	79.810	81.723
3/1	3	77.2667	0.47167	76.310	78.223
3/2	3	81.5000	0.47167	80.543	82.457
3/3	3	80.6333	0.47167	79.677	81.590
3/4	3	81.9333	0.47167	80.977	82.890
3/5	3	80.1667	0.47167	79.210	81.123
3/6	3	80.8667	0.47167	79.910	81.823

Std Error uses a pooled estimate of error variance

Oneway Analysis of Si (ppm) By Set/Block



Oneway Anova/Summary of Fit

Rsquare	0.634705
Adj Rsquare	0.462204
Root Mean Square Error	0.638865
Mean of Response	49.86481
Observations (or Sum Wgts)	54

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Set/Block	17	25.529815	1.50175	3.6794	0.0005
Error	36	14.693333	0.40815		
C. Total	53	40.223148			

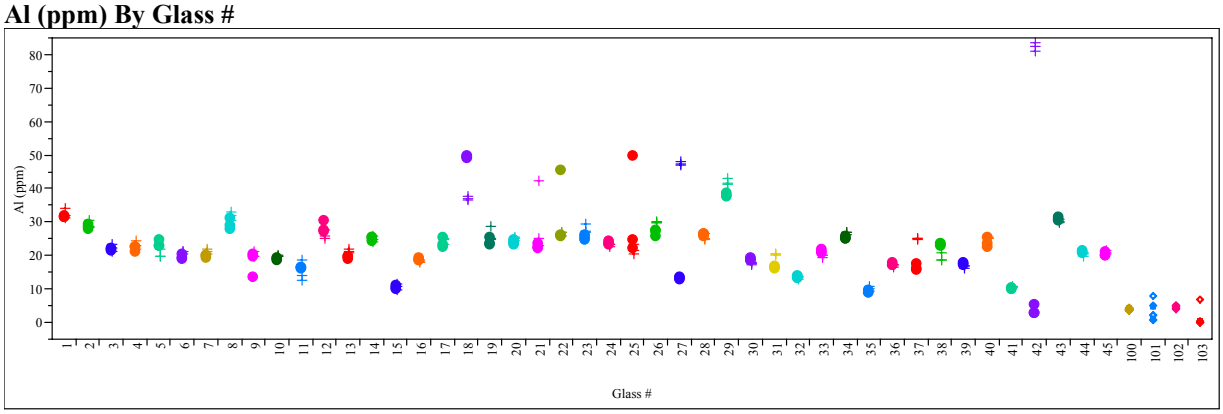
Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
1/1	3	49.3667	0.36885	48.619	50.115
1/2	3	48.6667	0.36885	47.919	49.415
1/3	3	49.8000	0.36885	49.052	50.548
1/4	3	50.0667	0.36885	49.319	50.815
1/5	3	49.7667	0.36885	49.019	50.515
1/6	3	50.3000	0.36885	49.552	51.048
2/1	3	49.9333	0.36885	49.185	50.681
2/2	3	49.4667	0.36885	48.719	50.215
2/3	3	51.0667	0.36885	50.319	51.815
2/4	3	51.1333	0.36885	50.385	51.881
2/5	3	50.7000	0.36885	49.952	51.448
2/6	3	50.9333	0.36885	50.185	51.681
3/1	3	49.3000	0.36885	48.552	50.048
3/2	3	49.4333	0.36885	48.685	50.181
3/3	3	49.1333	0.36885	48.385	49.881
3/4	3	49.5667	0.36885	48.819	50.315
3/5	3	49.6667	0.36885	48.919	50.415
3/6	3	49.2667	0.36885	48.519	50.015

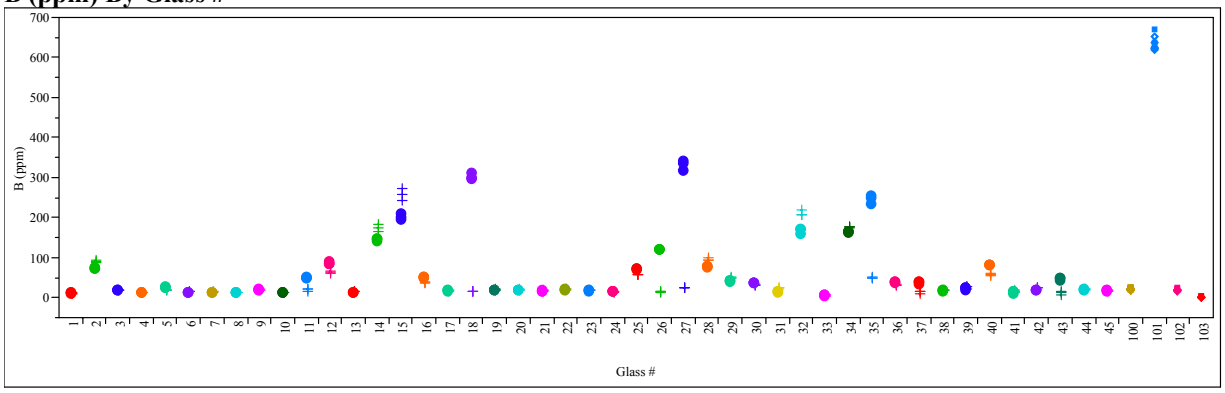
Std Error uses a pooled estimate of error variance

Exhibit B4. Laboratory PCT Measurements by Glass Number for Study Glasses and Standards
(100 – Solution Standard; 101 – EA; 102 – ARM; 103 – Blanks)

Al (ppm) By Glass #



B (ppm) By Glass #



Fe (ppm) By Glass #

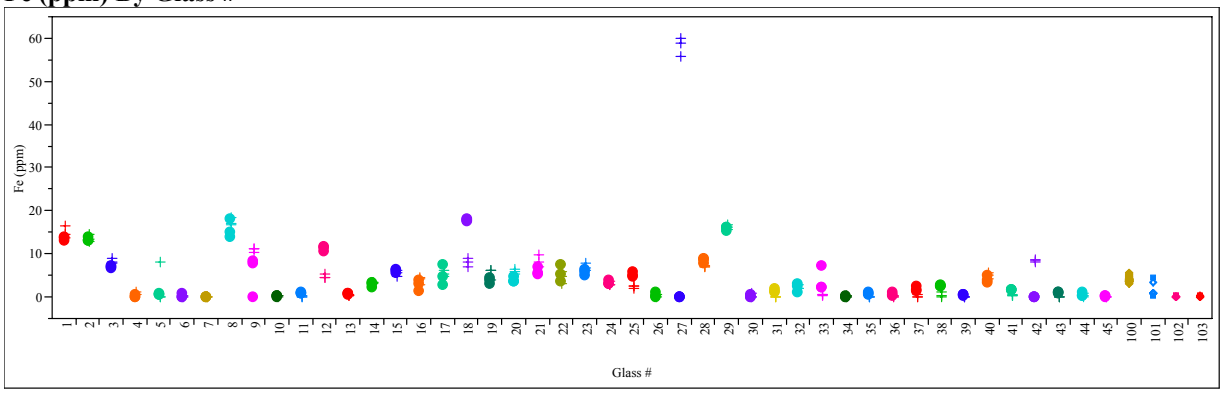
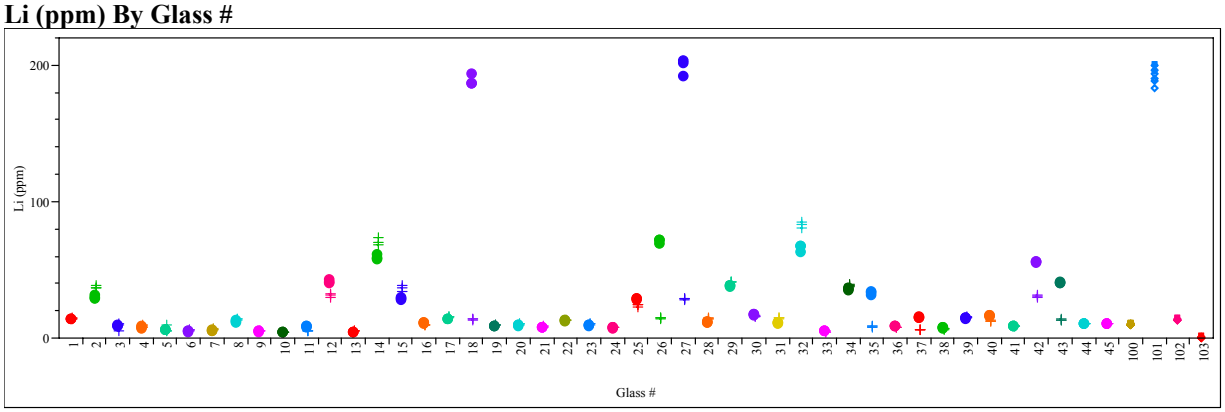
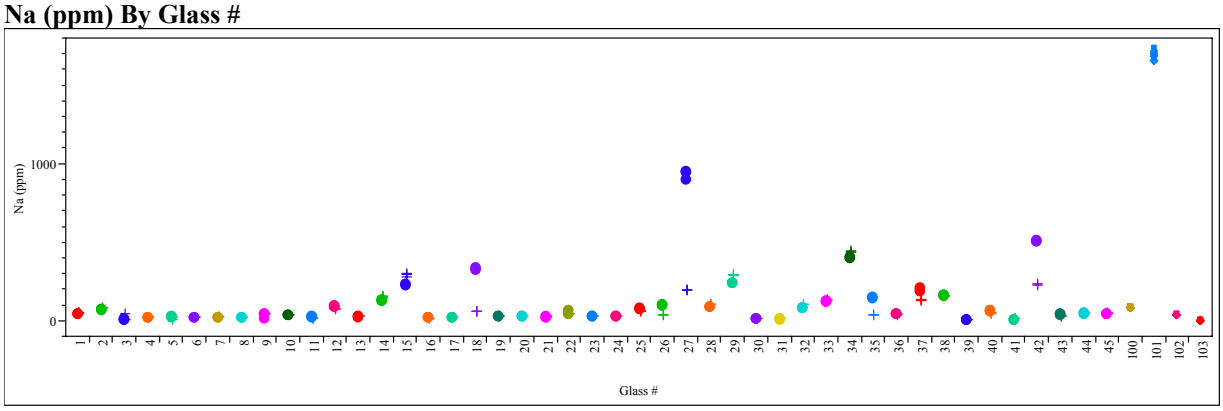


Exhibit B4. Laboratory PCT Measurements by Glass Number for Study Glasses and Standards
(100 – Solution Standard; 101 – EA; 102 – ARM; 103 – Blanks)

Li (ppm) By Glass #



Na (ppm) By Glass #



Si (ppm) By Glass #

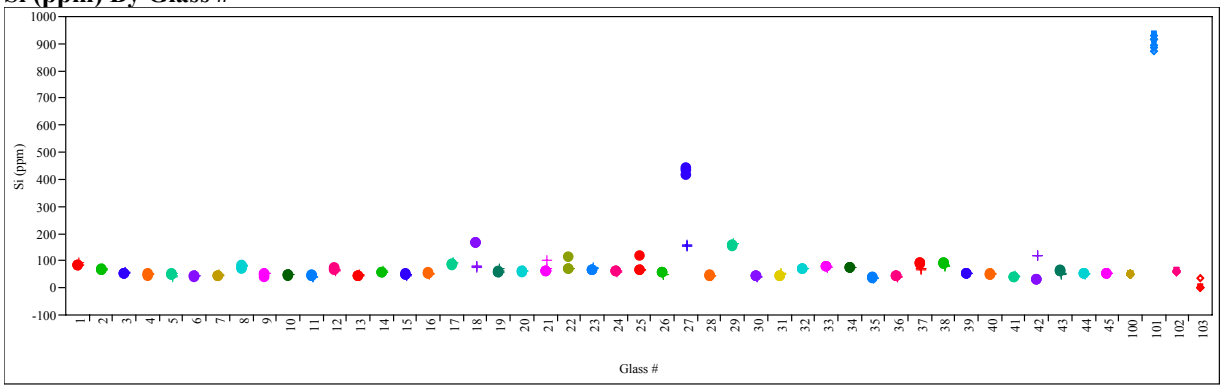
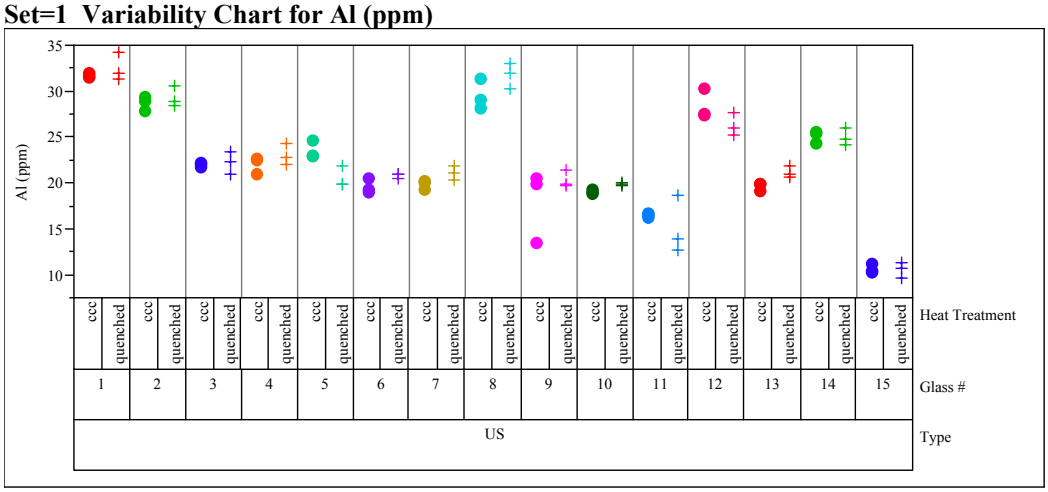
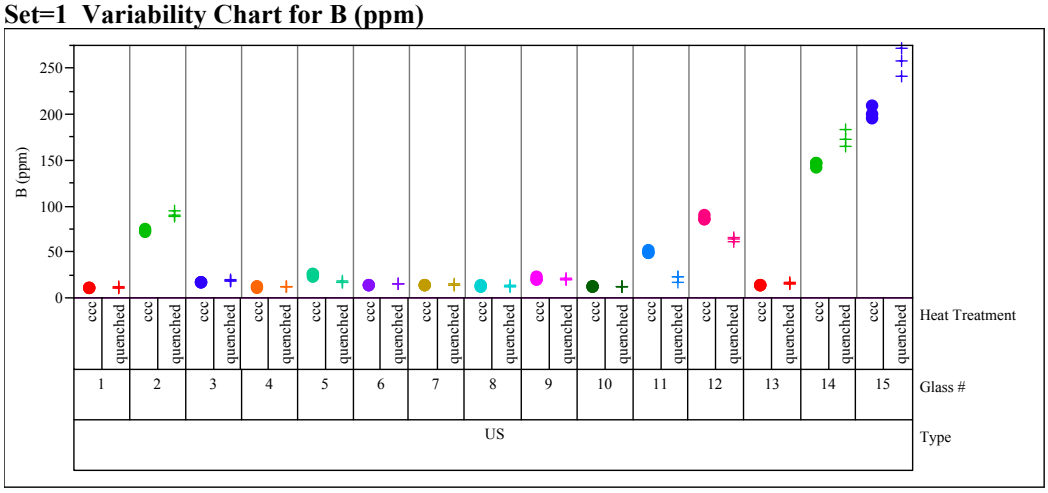


Exhibit B5. Laboratory PCT Measurements by Glass Number for Study Glasses

Set=1 Variability Chart for Al (ppm)



Set=1 Variability Chart for B (ppm)



Set=1 Variability Chart for Fe (ppm)

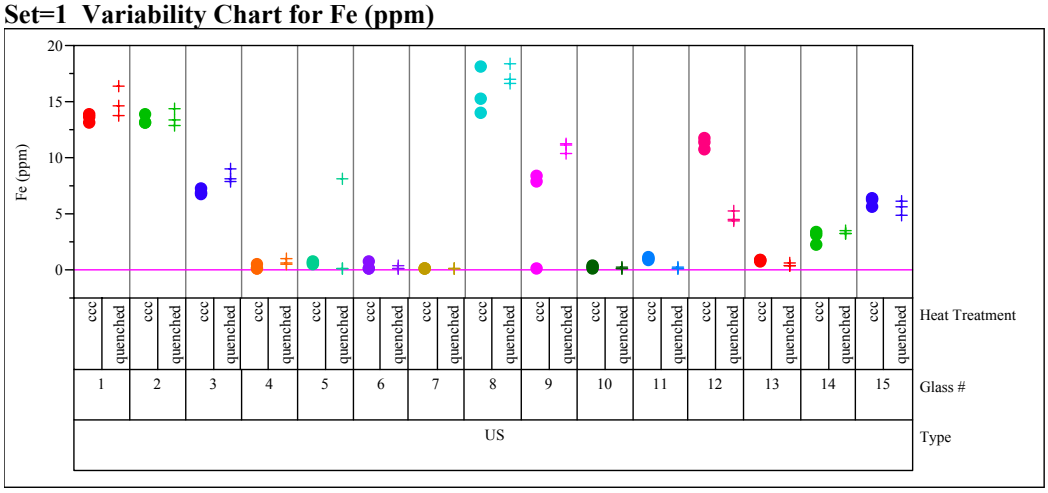
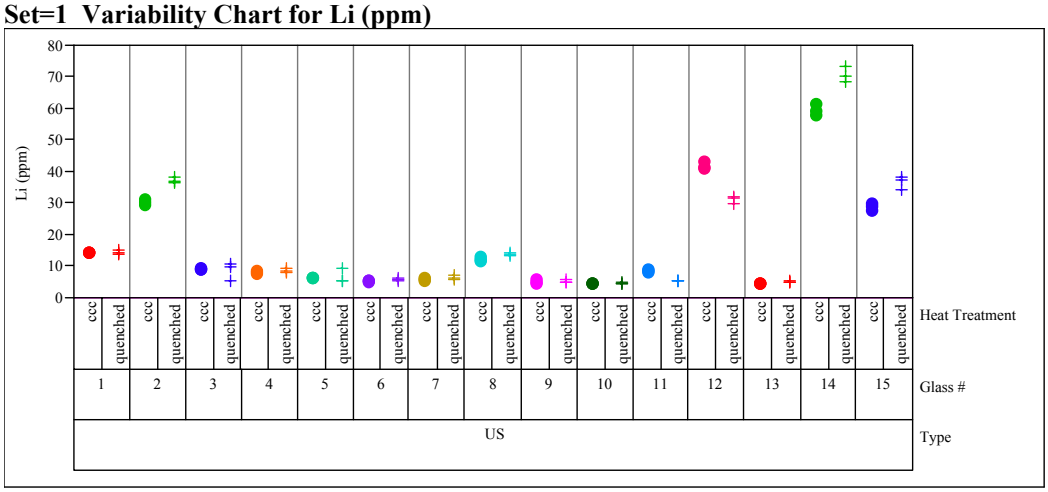
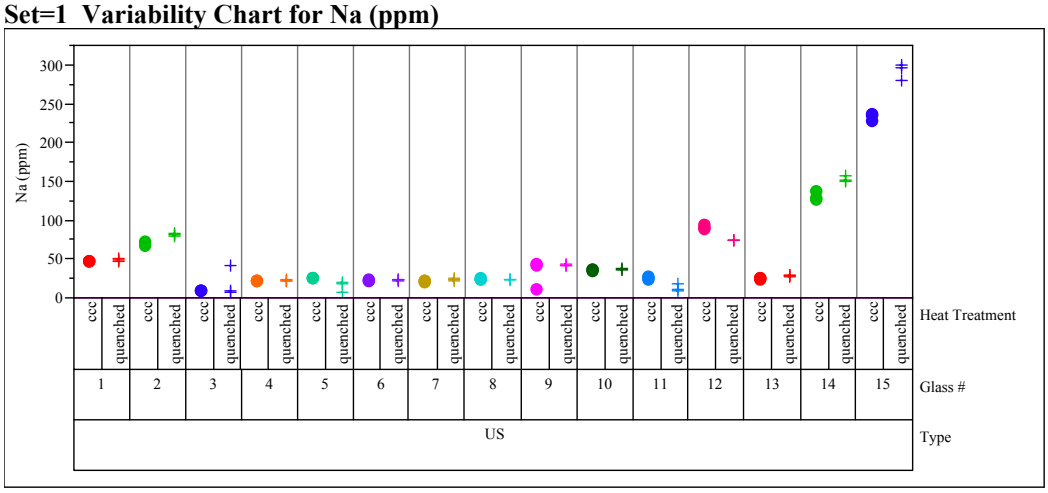


Exhibit B5. Laboratory PCT Measurements by Glass Number for Study Glasses

Set=1 Variability Chart for Li (ppm)



Set=1 Variability Chart for Na (ppm)



Set=1 Variability Chart for Si (ppm)

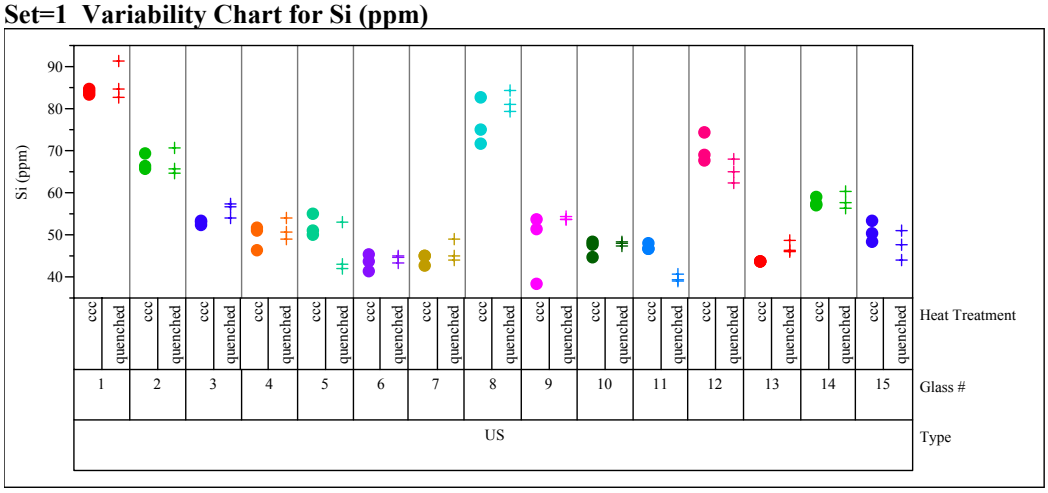
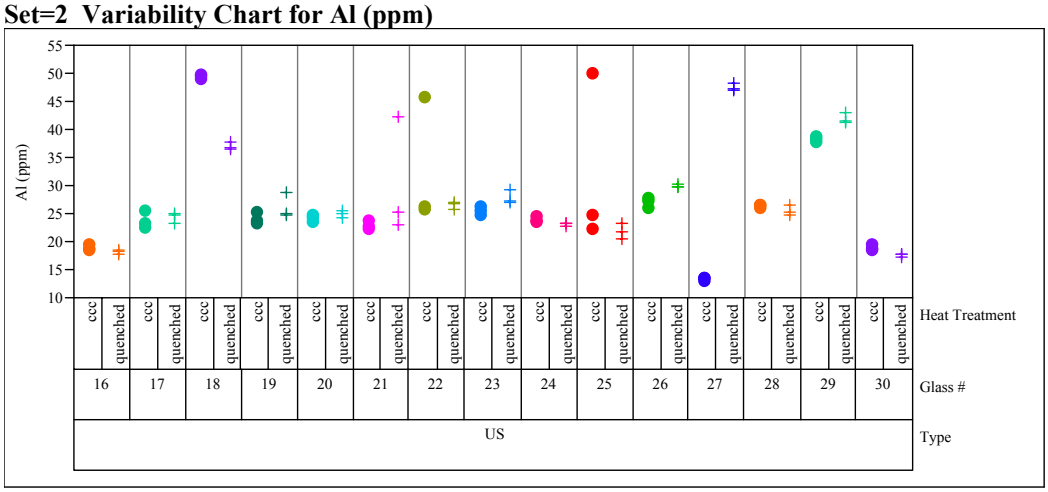
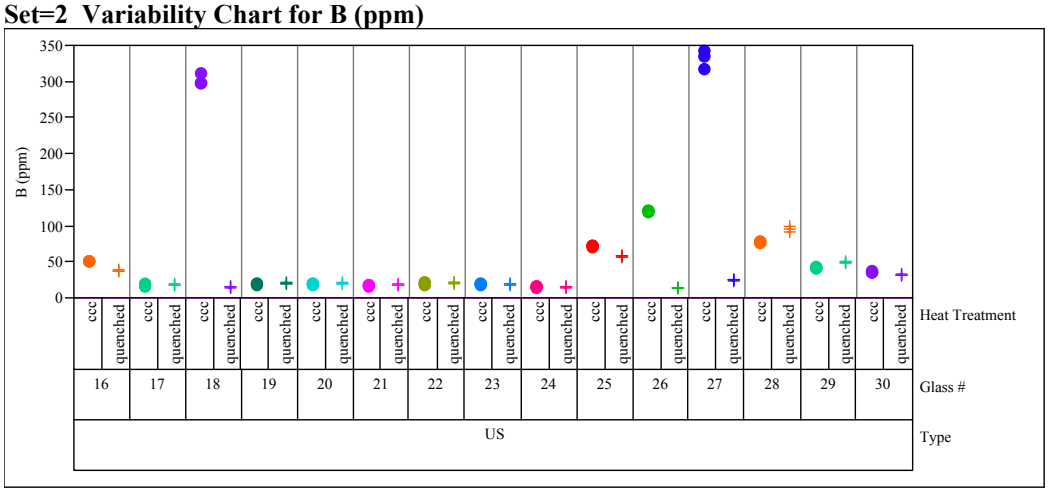


Exhibit B5. Laboratory PCT Measurements by Glass Number for Study Glasses

Set=2 Variability Chart for Al (ppm)



Set=2 Variability Chart for B (ppm)



Set=2 Variability Chart for Fe (ppm)

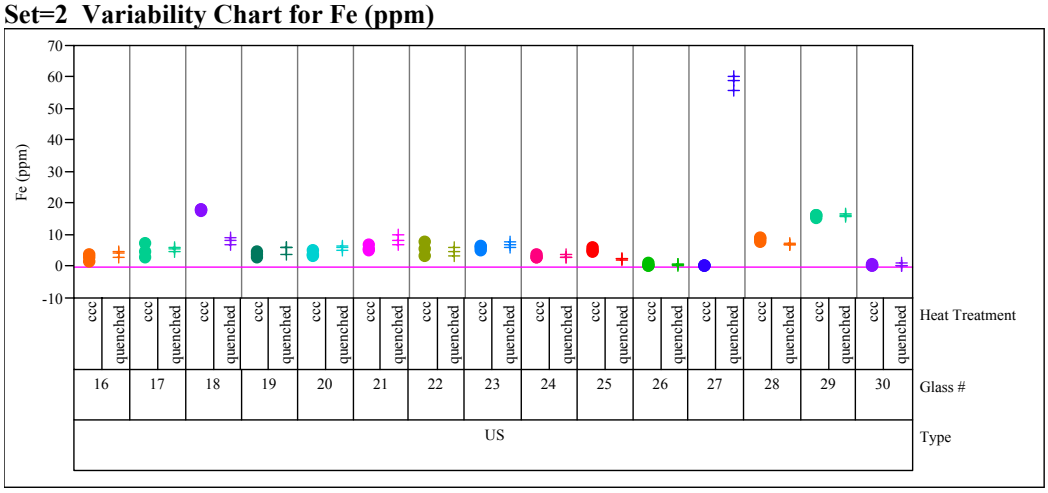
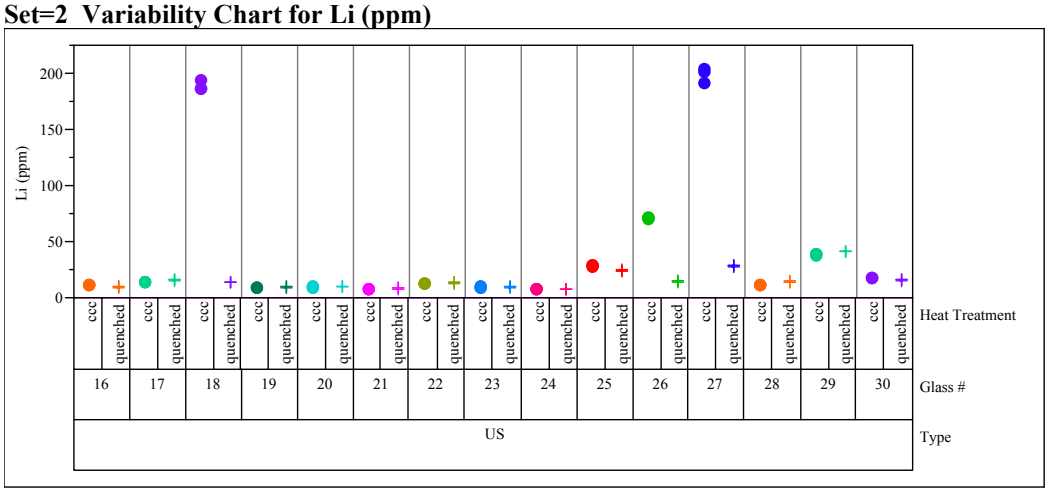
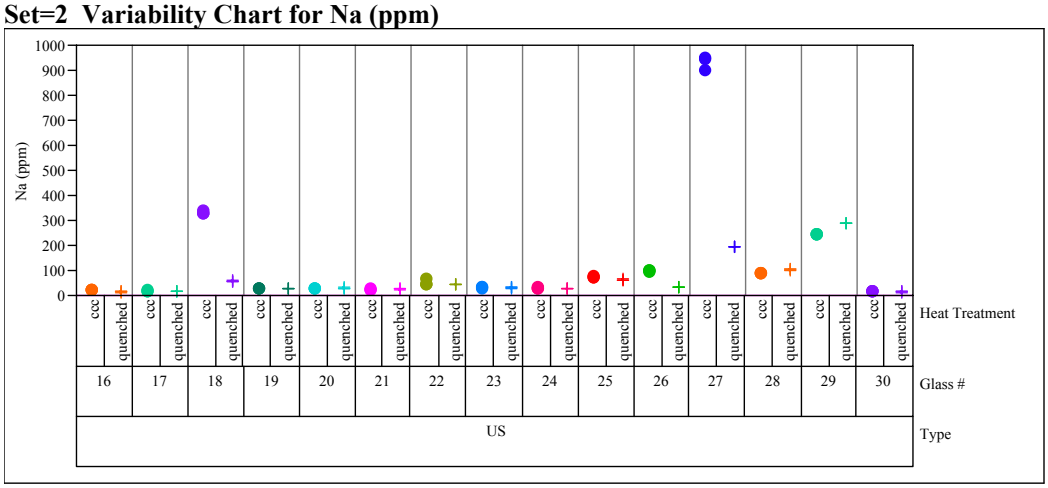


Exhibit B5. Laboratory PCT Measurements by Glass Number for Study Glasses

Set=2 Variability Chart for Li (ppm)



Set=2 Variability Chart for Na (ppm)



Set=2 Variability Chart for Si (ppm)

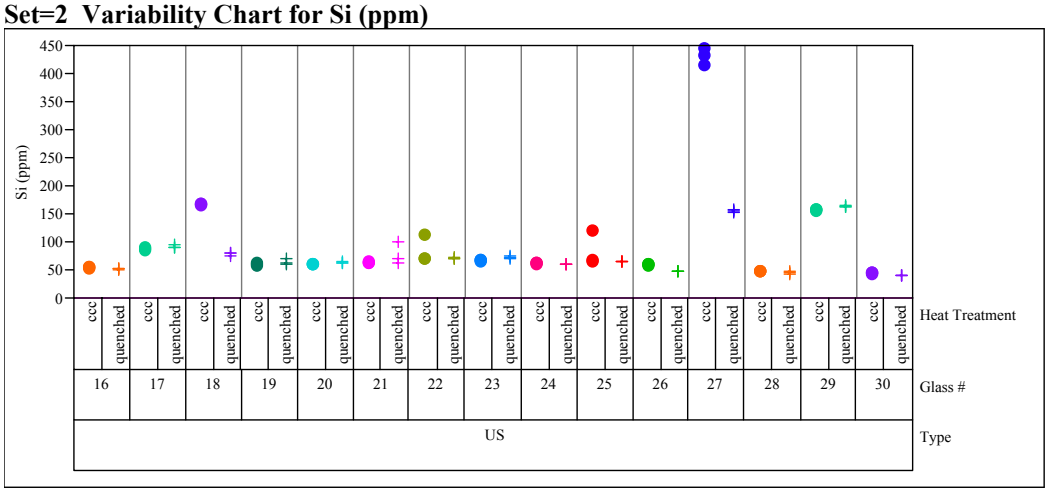
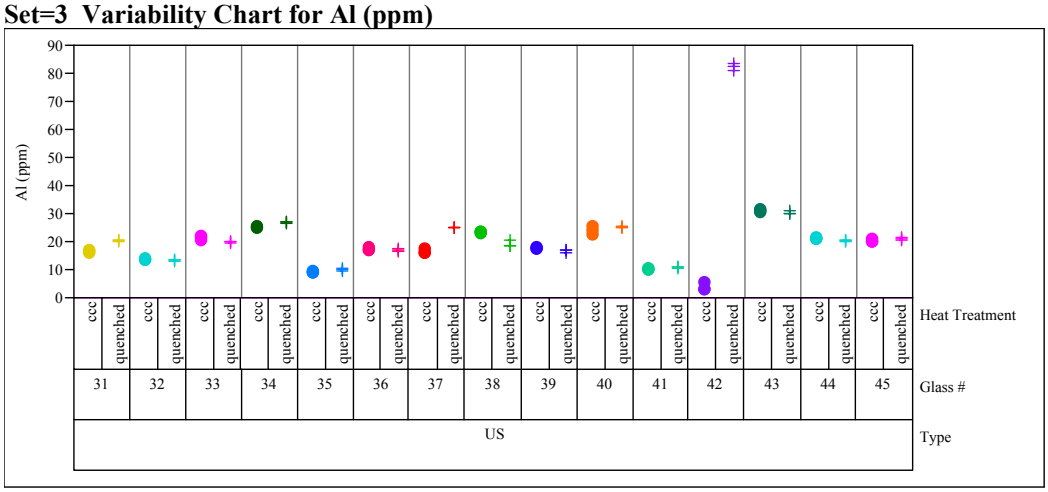
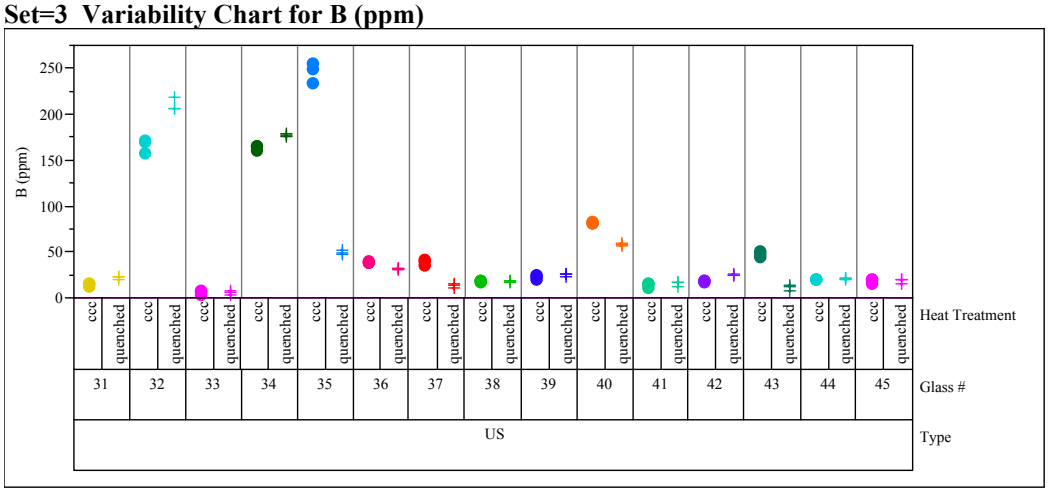


Exhibit B5. Laboratory PCT Measurements by Glass Number for Study Glasses

Set=3 Variability Chart for Al (ppm)



Set=3 Variability Chart for B (ppm)



Set=3 Variability Chart for Fe (ppm)

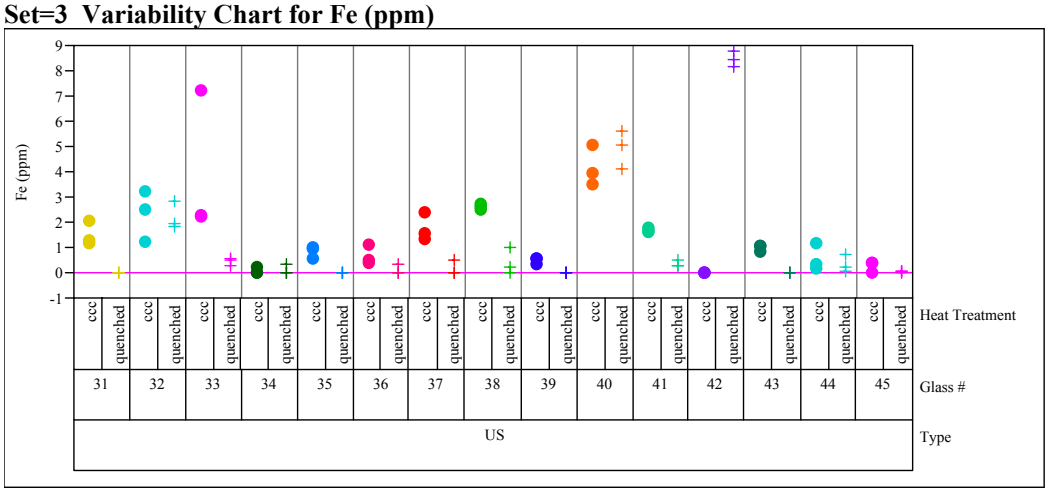
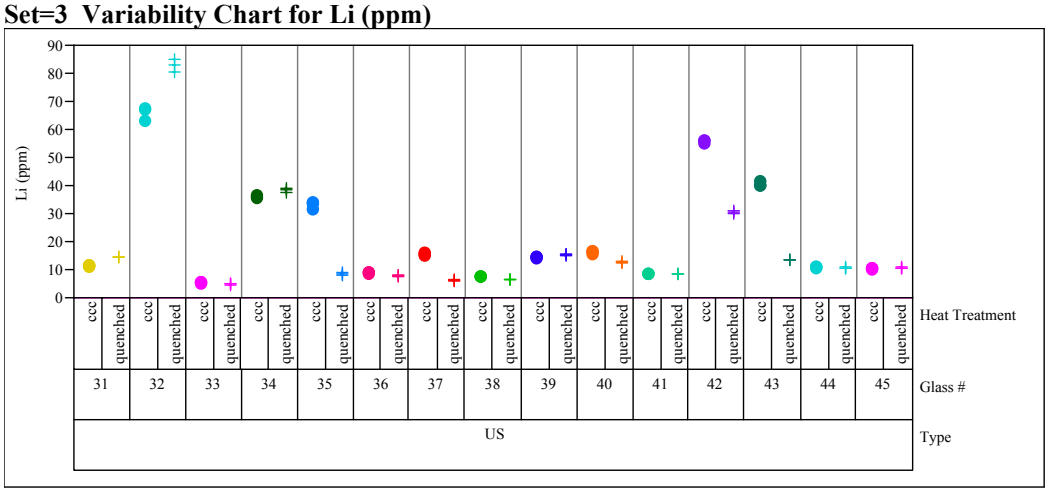
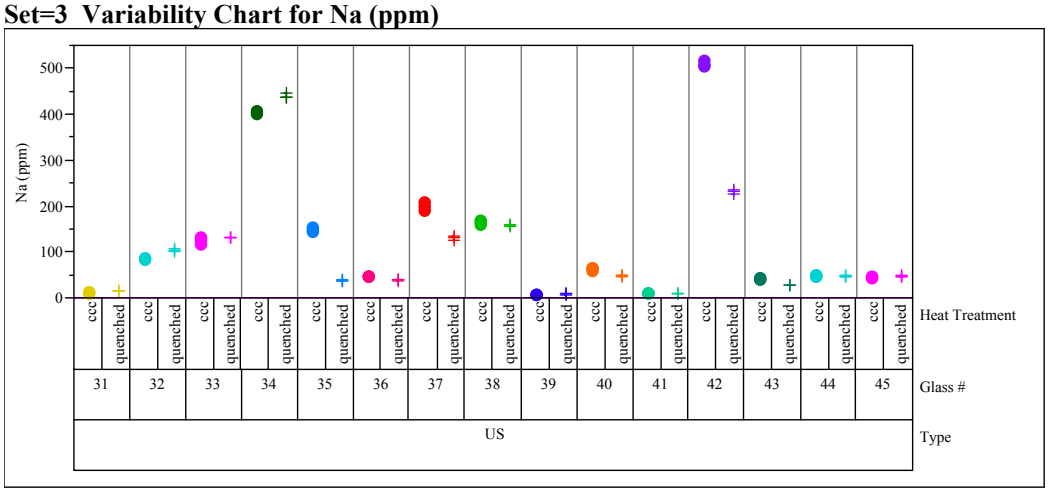


Exhibit B5. Laboratory PCT Measurements by Glass Number for Study Glasses

Set=3 Variability Chart for Li (ppm)



Set=3 Variability Chart for Na (ppm)



Set=3 Variability Chart for Si (ppm)

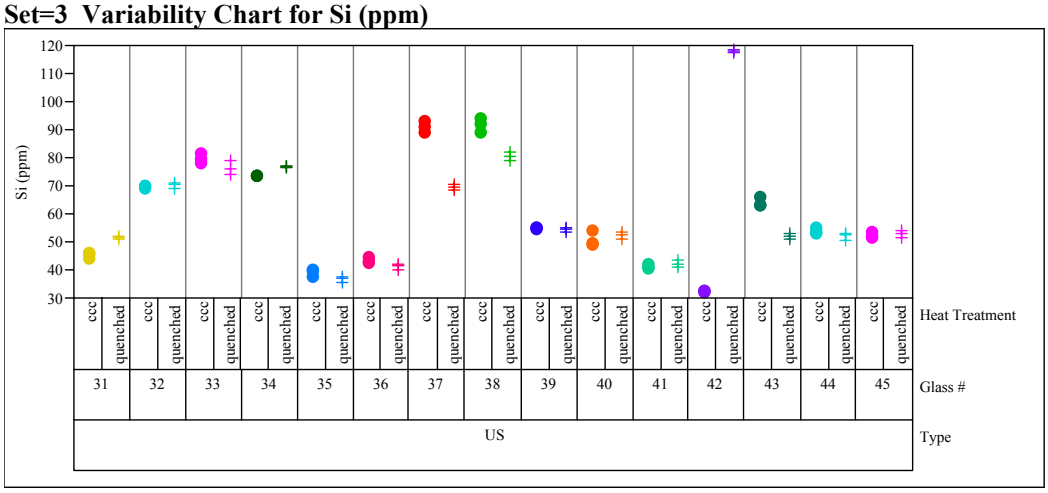


Exhibit B6. Correlations and Scatter Plots of Normalized PCTs by Set Over All Compositional Views and Heat Treatments

Multivariate Set=1
Correlations

	log NL[B (g/L)]	log NL[Li(g/L)]	log NL[Na (g/L)]	log NL[Si (g/L)]
log NL[B (g/L)]	1.0000	0.9027	0.9171	0.4460
log NL[Li(g/L)]	0.9027	1.0000	0.7939	0.3794
log NL[Na (g/L)]	0.9171	0.7939	1.0000	0.5105
log NL[Si (g/L)]	0.4460	0.3794	0.5105	1.0000

Scatterplot Matrix

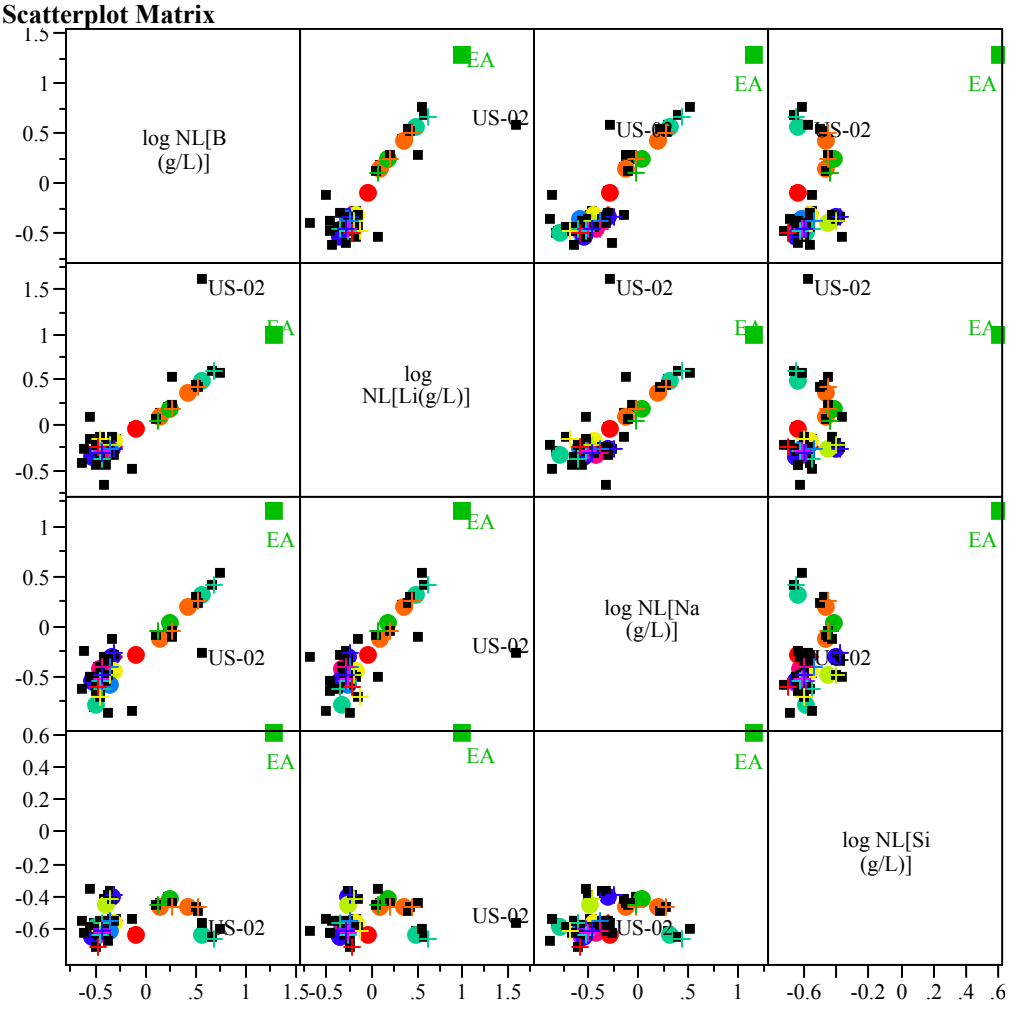


Exhibit B6. Correlations and Scatter Plots of Normalized PCTs by Set Over All Compositional Views and Heat Treatments

Multivariate Set=2
Correlations

	log NL[B (g/L)]	log NL[Li(g/L)]	log NL[Na (g/L)]	log NL[Si (g/L)]
log NL[B (g/L)]	1.0000	0.9328	0.8440	0.7530
log NL[Li(g/L)]	0.9328	1.0000	0.8049	0.7382
log NL[Na (g/L)]	0.8440	0.8049	1.0000	0.8616
log NL[Si (g/L)]	0.7530	0.7382	0.8616	1.0000

4 rows not used due to missing or excluded values or frequency or weight variables missing, negative or less than one.

Scatterplot Matrix

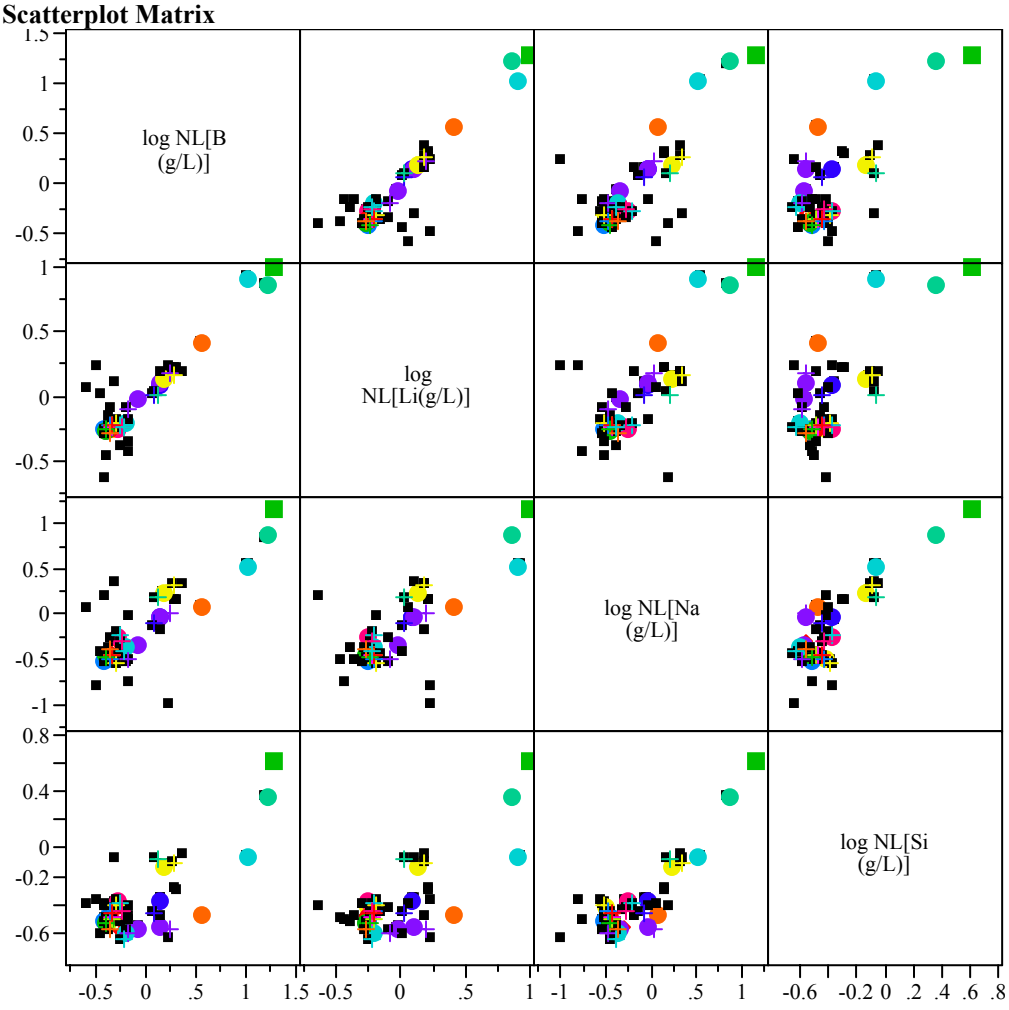


Exhibit B6. Correlations and Scatter Plots of Normalized PCTs by Set Over All Compositional Views and Heat Treatments

Multivariate Set=3
Correlations

	log NL[B (g/L)]	log NL[Li(g/L)]	log NL[Na (g/L)]	log NL[Si (g/L)]
log NL[B (g/L)]	1.0000	0.8918	0.6438	0.3747
log NL[Li(g/L)]	0.8918	1.0000	0.7083	0.3800
log NL[Na (g/L)]	0.6438	0.7083	1.0000	0.5243
log NL[Si (g/L)]	0.3747	0.3800	0.5243	1.0000

4 rows not used due to missing or excluded values or frequency or weight variables missing, negative or less than one.

Scatterplot Matrix

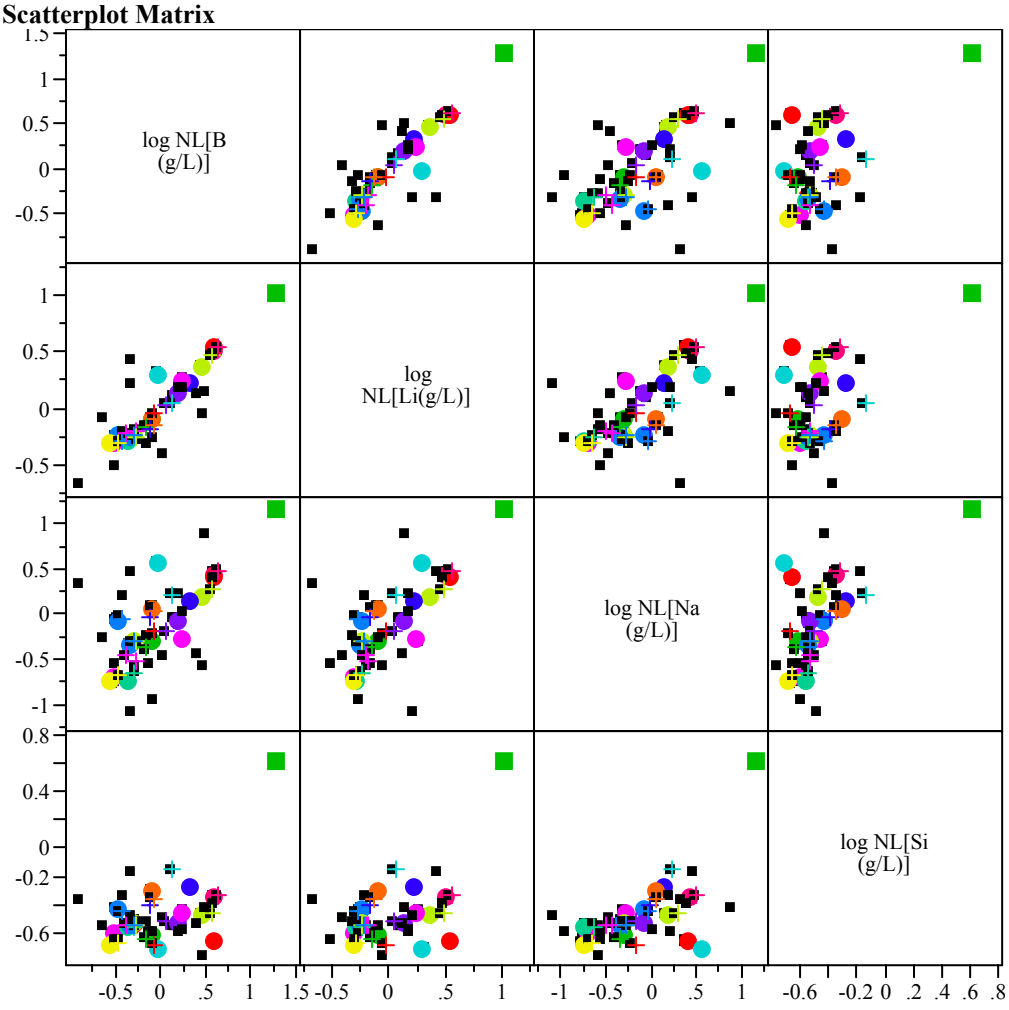
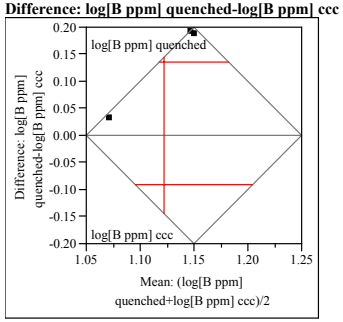


Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

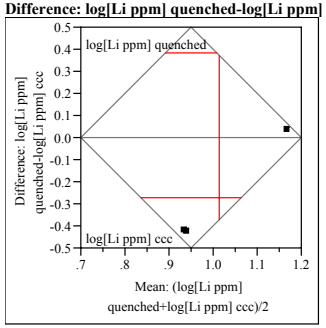
Matched Pairs Glass #=1

Difference: log[B ppm] quenched-log[B ppm] ccc



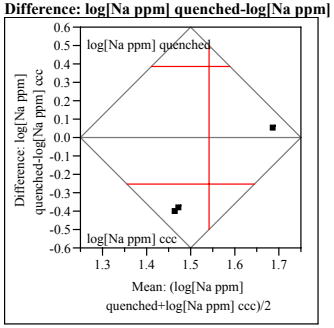
log[B ppm] quenched	1.19082	t-Ratio	2.580203
log[B ppm] ccc	1.05436	DF	2
Mean Difference	0.13646	Prob > |t|	0.1231
Std Error	0.05289	Prob > t	0.0615
Upper95%	0.36402	Prob < t	0.9385
Lower95%	-0.0911		
N	3		
Correlation	-0.3979		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



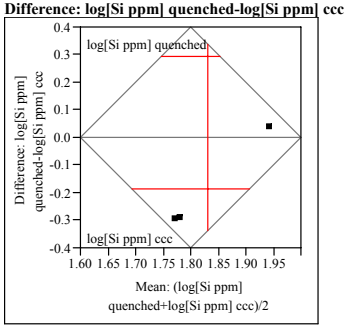
log[Li ppm] quenched	0.87789	t-Ratio	-1.78678
log[Li ppm] ccc	1.15007	DF	2
Mean Difference	-0.2722	Prob > |t|	0.2159
Std Error	0.15233	Prob > t	0.8921
Upper95%	0.38324	Prob < t	0.1079
Lower95%	-0.9276		
N	3		
Correlation	0.30559		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.41568	t-Ratio	-1.69674
log[Na ppm] ccc	1.66694	DF	2
Mean Difference	-0.2513	Prob > |t|	0.2318
Std Error	0.14808	Prob > t	0.8841
Upper95%	0.38589	Prob < t	0.1159
Lower95%	-0.8884		
N	3		
Correlation	-0.9571		

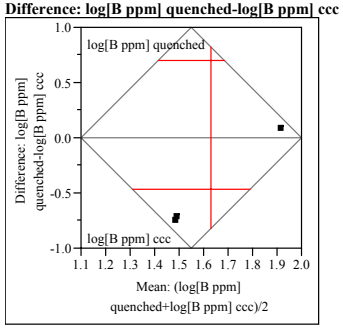
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.73828	t-Ratio	-1.67156
log[Si ppm] ccc	1.9237	DF	2
Mean Difference	-0.1854	Prob > |t|	0.2366
Std Error	0.11092	Prob > t	0.8817
Upper95%	0.29185	Prob < t	0.1183
Lower95%	-0.6627		
N	3		
Correlation	-0.0304		

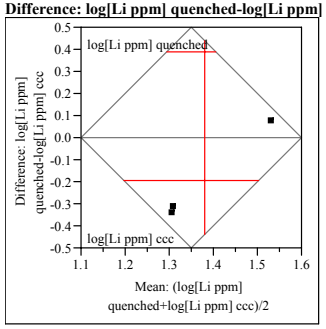
Matched Pairs Glass #=2

Difference: log[B ppm] quenched-log[B ppm] ccc



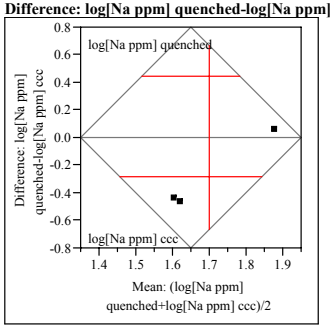
log[B ppm] quenched	1.39388	t-Ratio	-1.72444
log[B ppm] ccc	1.86421	DF	2
Mean Difference	-0.4703	Prob > |t|	0.2268
Std Error	0.27274	Prob > t	0.8866
Upper95%	0.70319	Prob < t	0.1134
Lower95%	-1.6438		
N	3		
Correlation	0.91646		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



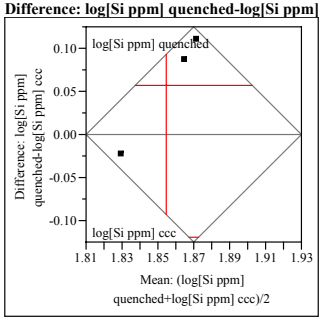
log[Li ppm] quenched	1.284	t-Ratio	-1.44458
log[Li ppm] ccc	1.47938	DF	2
Mean Difference	-0.1954	Prob > |t|	0.2854
Std Error	0.13525	Prob > t	0.8573
Upper95%	0.38654	Prob < t	0.1427
Lower95%	-0.7773		
N	3		
Correlation	0.84347		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.55682	t-Ratio	-1.68182
log[Na ppm] ccc	1.84319	DF	2
Mean Difference	-0.2864	Prob > |t|	0.2346
Std Error	0.17027	Prob > t	0.8827
Upper95%	0.44626	Prob < t	0.1173
Lower95%	-1.019		
N	3		
Correlation	0.38495		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

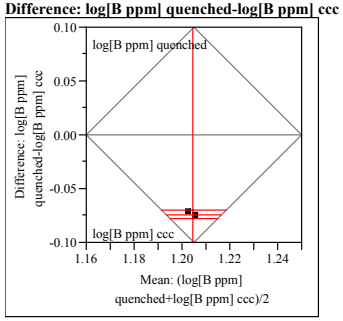


log[Si ppm] quenched	1.88365	t-Ratio	1.396749
log[Si ppm] ccc	1.82631	DF	2
Mean Difference	0.05734	Prob > |t|	0.2973
Std Error	0.04105	Prob > t	0.1486
Upper95%	0.23397	Prob < t	0.8514
Lower95%	-0.1193		
N	3		
Correlation	-0.9985		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

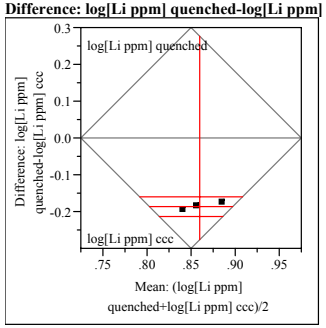
Matched Pairs Glass #=3

Difference: log[B ppm] quenched-log[B ppm] ccc



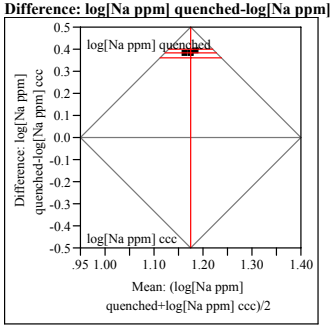
log[B ppm] quenched	1.16733	t-Ratio	-83.2763
log[B ppm] ccc	1.24166	DF	2
Mean Difference	-0.0743	Prob > |t|	0.0001
Std Error	0.00089	Prob > t	0.9999
Upper95%	-0.0705	Prob < t	<.0001
Lower95%	-0.0782		
N	3		
Correlation	1		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



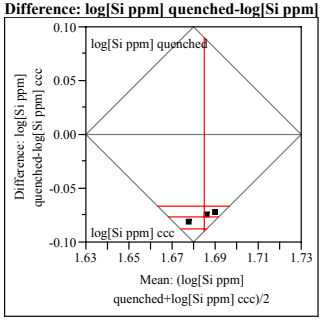
log[Li ppm] quenched	0.76659	t-Ratio	-31.5213
log[Li ppm] ccc	0.95349	DF	2
Mean Difference	-0.1869	Prob > |t|	0.0010
Std Error	0.00593	Prob > t	0.9995
Upper95%	-0.1614	Prob < t	0.0005
Lower95%	-0.2124		
N	3		
Correlation	0.99772		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.36576	t-Ratio	87.87286
log[Na ppm] ccc	0.98398	DF	2
Mean Difference	0.38178	Prob > |t|	0.0001
Std Error	0.00434	Prob > t	<.0001
Upper95%	0.40047	Prob < t	0.9999
Lower95%	0.36308		
N	3		
Correlation	0.90427		

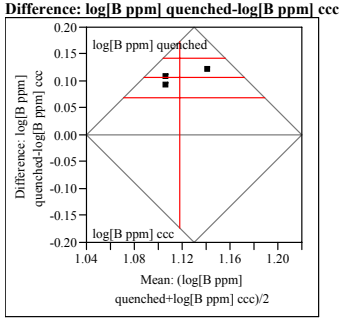
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.64614	t-Ratio	-31.5579
log[Si ppm] ccc	1.72336	DF	2
Mean Difference	-0.0772	Prob > |t|	0.0010
Std Error	0.00245	Prob > t	0.9995
Upper95%	-0.0667	Prob < t	0.0005
Lower95%	-0.0877		
N	3		
Correlation	0.99925		

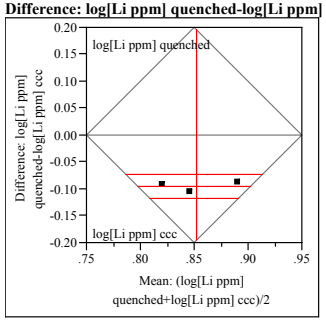
Matched Pairs Glass #=4

Difference: log[B ppm] quenched-log[B ppm] ccc



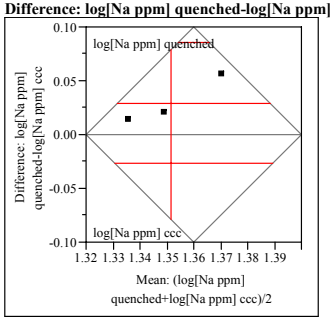
log[B ppm] quenched	1.17053	t-Ratio	12.44794
log[B ppm] ccc	1.06472	DF	2
Mean Difference	0.10582	Prob > |t|	0.0064
Std Error	0.0085	Prob > t	0.0032
Upper95%	0.14239	Prob < t	0.9968
Lower95%	0.06924		
N	3		
Correlation	0.90581		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



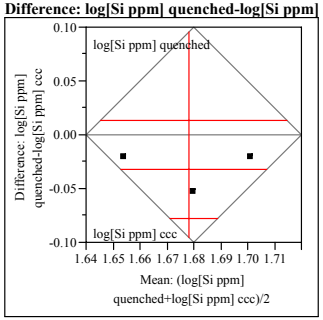
log[Li ppm] quenched	0.8036	t-Ratio	-18.889
log[Li ppm] ccc	0.89978	DF	2
Mean Difference	-0.0962	Prob > |t|	0.0028
Std Error	0.00509	Prob > t	0.9986
Upper95%	-0.0743	Prob < t	0.0014
Lower95%	-0.1181		
N	3		
Correlation	0.97305		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.36632	t-Ratio	2.238247
log[Na ppm] ccc	1.33688	DF	2
Mean Difference	0.02944	Prob > |t|	0.1546
Std Error	0.01315	Prob > t	0.0773
Upper95%	0.08604	Prob < t	0.9227
Lower95%	-0.0272		
N	3		
Correlation	0.86729		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

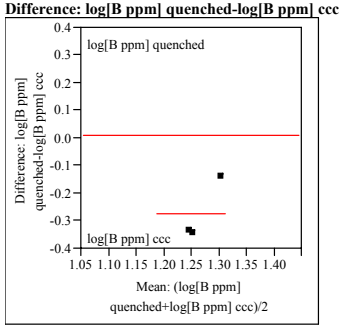


log[Si ppm] quenched	1.6623	t-Ratio	-3.01029
log[Si ppm] ccc	1.6941	DF	2
Mean Difference	-0.0318	Prob > |t|	0.0949
Std Error	0.01057	Prob > t	0.9525
Upper95%	0.01366	Prob < t	0.0475
Lower95%	-0.0773		
N	3		
Correlation	0.73937		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

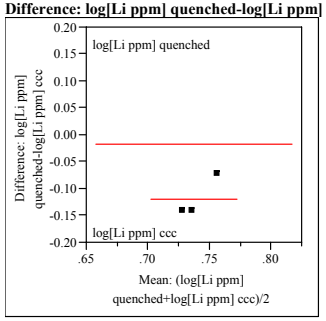
Matched Pairs Glass #=5

Difference: log[B ppm] quenched-log[B ppm] ccc



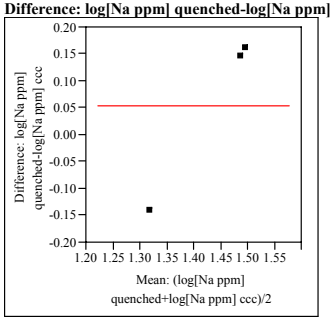
log[B ppm] quenched	1.1288	t-Ratio	-4.16666
log[B ppm] ccc	1.40504	DF	2
Mean Difference	-0.2762	Prob > |t|	0.0531
Std Error	0.0663	Prob > t	0.9735
Upper95%	0.00902	Prob < t	0.0265
Lower95%	-0.5615		
N	3		
Correlation	-0.9736		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



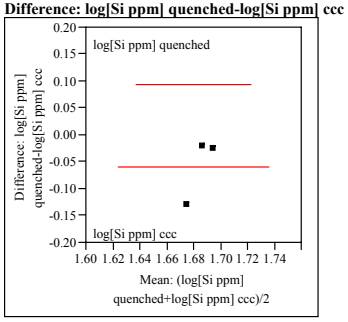
log[Li ppm] quenched	0.68031	t-Ratio	-5.06418
log[Li ppm] ccc	0.79969	DF	2
Mean Difference	-0.1194	Prob > |t|	0.0369
Std Error	0.02357	Prob > t	0.9816
Upper95%	-0.018	Prob < t	0.0184
Lower95%	-0.2208		
N	3		
Correlation	-0.7794		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.46051	t-Ratio	0.55147
log[Na ppm] ccc	1.40638	DF	2
Mean Difference	0.05413	Prob > |t|	0.6367
Std Error	0.09815	Prob > t	0.3183
Upper95%	0.47643	Prob < t	0.6817
Lower95%	-0.3682		
N	3		
Correlation	0.99931		

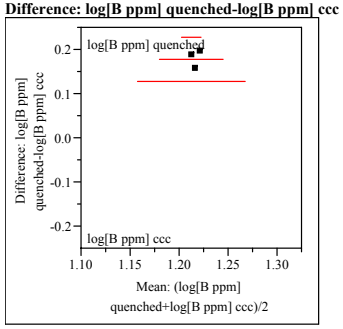
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.65522	t-Ratio	-1.68297
log[Si ppm] ccc	1.71516	DF	2
Mean Difference	-0.0599	Prob > |t|	0.2344
Std Error	0.03561	Prob > t	0.8828
Upper95%	0.09329	Prob < t	0.1172
Lower95%	-0.2132		
N	3		
Correlation	-0.9546		

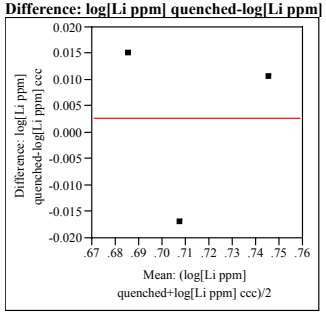
Matched Pairs Glass #=6

Difference: log[B ppm] quenched-log[B ppm] ccc



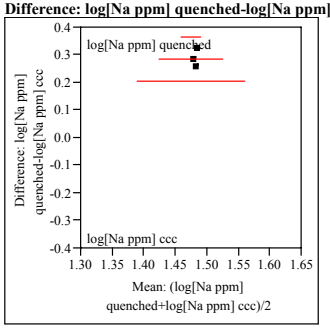
log[B ppm] quenched	1.30572	t-Ratio	15.26768
log[B ppm] ccc	1.12704	DF	2
Mean Difference	0.17867	Prob > |t|	0.0043
Std Error	0.0117	Prob > t	0.0021
Upper95%	0.22903	Prob < t	0.9979
Lower95%	0.12832		
N	3		
Correlation	-0.6758		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



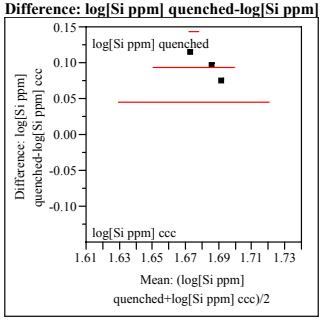
log[Li ppm] quenched	0.7143	t-Ratio	0.276921
log[Li ppm] ccc	0.71154	DF	2
Mean Difference	0.00277	Prob > |t|	0.8078
Std Error	0.00998	Prob > t	0.4039
Upper95%	0.04573	Prob < t	0.5961
Lower95%	-0.0402		
N	3		
Correlation	0.84953		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.62417	t-Ratio	15.32363
log[Na ppm] ccc	1.34006	DF	2
Mean Difference	0.28411	Prob > |t|	0.0042
Std Error	0.01854	Prob > t	0.0021
Upper95%	0.36388	Prob < t	0.9979
Lower95%	0.20433		
N	3		
Correlation	-0.9632		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

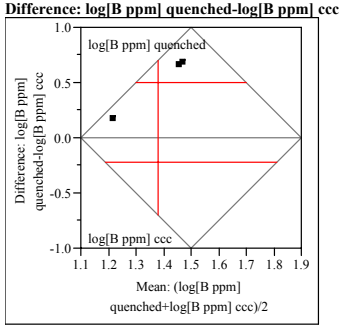


log[Si ppm] quenched	1.73061	t-Ratio	8.162041
log[Si ppm] ccc	1.63654	DF	2
Mean Difference	0.09406	Prob > |t|	0.0147
Std Error	0.01152	Prob > t	0.0073
Upper95%	0.14365	Prob < t	0.9927
Lower95%	0.04448		
N	3		
Correlation	-0.1556		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

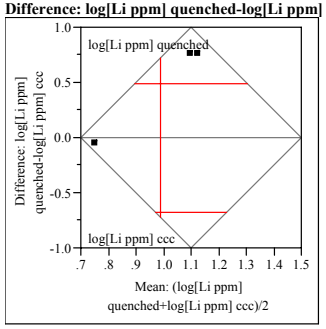
Matched Pairs Glass #=7

Difference: log[B ppm] quenched-log[B ppm] ccc



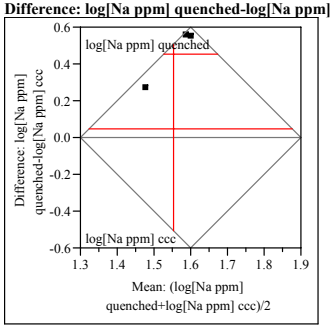
log[B ppm] quenched	1.62964	t-Ratio	2.998126
log[B ppm] ccc	1.1298	DF	2
Mean Difference	0.49984	Prob > |t|	0.0956
Std Error	0.16672	Prob > t	0.0478
Upper95%	1.21718	Prob < t	0.9522
Lower95%	-0.2175		
N	3		
Correlation	-0.2939		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



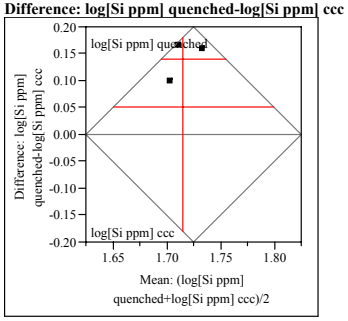
log[Li ppm] quenched	1.23107	t-Ratio	1.786155
log[Li ppm] ccc	0.74659	DF	2
Mean Difference	0.48447	Prob > |t|	0.2160
Std Error	0.27124	Prob > t	0.1080
Upper95%	1.65152	Prob < t	0.8920
Lower95%	-0.6826		
N	3		
Correlation	-0.8665		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.78223	t-Ratio	4.759205
log[Na ppm] ccc	1.32771	DF	2
Mean Difference	0.45452	Prob > |t|	0.0414
Std Error	0.0955	Prob > t	0.0207
Upper95%	0.86545	Prob < t	0.9793
Lower95%	0.0436		
N	3		
Correlation	-0.901		

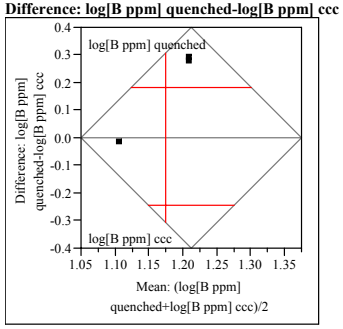
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.78581	t-Ratio	6.676147
log[Si ppm] ccc	1.64495	DF	2
Mean Difference	0.14086	Prob > |t|	0.0217
Std Error	0.0211	Prob > t	0.0109
Upper95%	0.23165	Prob < t	0.9891
Lower95%	0.05008		
N	3		
Correlation	-0.2194		

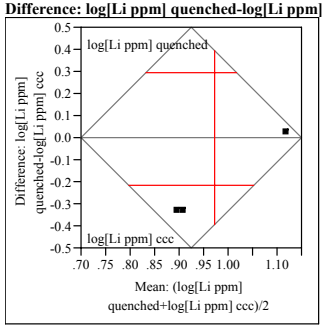
Matched Pairs Glass #=8

Difference: log[B ppm] quenched-log[B ppm] ccc



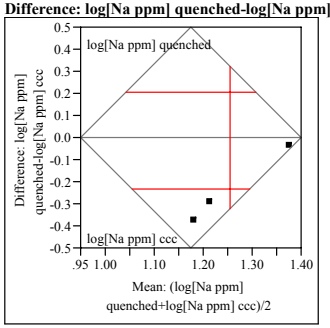
log[B ppm] quenched	1.26552	t-Ratio	1.838664
log[B ppm] ccc	1.08342	DF	2
Mean Difference	0.1821	Prob > |t|	0.2073
Std Error	0.09904	Prob > t	0.1037
Upper95%	0.60822	Prob < t	0.8963
Lower95%	-0.244		
N	3		
Correlation	-0.9967		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



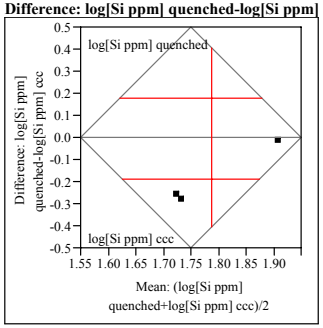
log[Li ppm] quenched	0.86475	t-Ratio	-1.83197
log[Li ppm] ccc	1.08113	DF	2
Mean Difference	-0.2164	Prob > |t|	0.2084
Std Error	0.11811	Prob > t	0.8958
Upper95%	0.29182	Prob < t	0.1042
Lower95%	-0.7246		
N	3		
Correlation	0.96764		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.13679	t-Ratio	-2.30221
log[Na ppm] ccc	1.37289	DF	2
Mean Difference	-0.2361	Prob > |t|	0.1479
Std Error	0.10256	Prob > t	0.9260
Upper95%	0.20516	Prob < t	0.0740
Lower95%	-0.6774		
N	3		
Correlation	0.89235		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

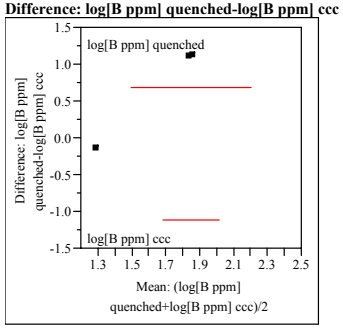


log[Si ppm] quenched	1.69418	t-Ratio	-2.20441
log[Si ppm] ccc	1.88195	DF	2
Mean Difference	-0.1878	Prob > |t|	0.1583
Std Error	0.08518	Prob > t	0.9208
Upper95%	0.17872	Prob < t	0.0792
Lower95%	-0.5543		
N	3		
Correlation	0.94295		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

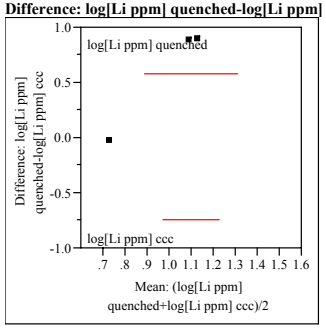
Matched Pairs Glass #=9

Difference: log[B ppm] quenched-log[B ppm] ccc



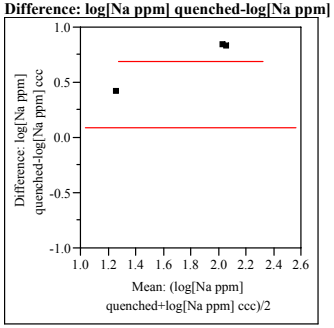
log[B ppm] quenched	2.00342	t-Ratio	1.648221
log[B ppm] ccc	1.31511	DF	2
Mean Difference	0.68831	Prob > |t|	0.2411
Std Error	0.41761	Prob > t	0.1205
Upper95%	2.48514	Prob < t	0.8795
Lower95%	-1.1085		
N	3		
Correlation	-0.9698		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



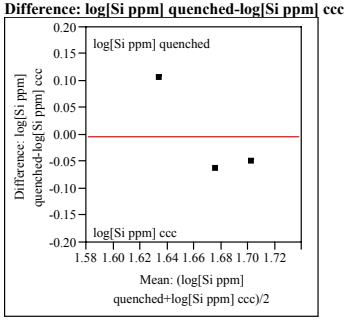
log[Li ppm] quenched	1.27116	t-Ratio	1.885421
log[Li ppm] ccc	0.69372	DF	2
Mean Difference	0.57744	Prob > |t|	0.2000
Std Error	0.30627	Prob > t	0.1000
Upper95%	1.89519	Prob < t	0.9000
Lower95%	-0.7403		
N	3		
Correlation	-0.9226		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	2.12894	t-Ratio	4.922628
log[Na ppm] ccc	1.43768	DF	2
Mean Difference	0.69126	Prob > |t|	0.0389
Std Error	0.14042	Prob > t	0.0194
Upper95%	1.29546	Prob < t	0.9806
Lower95%	0.08706		
N	3		
Correlation	0.99956		

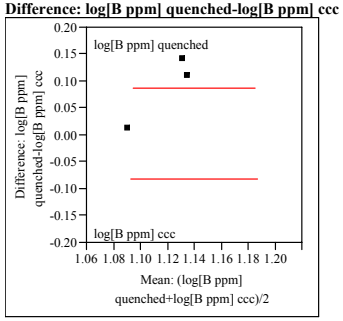
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.66913	t-Ratio	-0.07077
log[Si ppm] ccc	1.67302	DF	2
Mean Difference	-0.0039	Prob > |t|	0.9500
Std Error	0.05486	Prob > t	0.5250
Upper95%	0.23217	Prob < t	0.4750
Lower95%	-0.2399		
N	3		
Correlation	-0.5927		

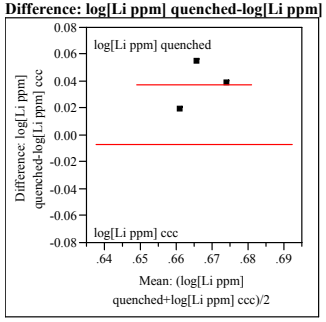
Matched Pairs Glass #=10

Difference: log[B ppm] quenched-log[B ppm] ccc



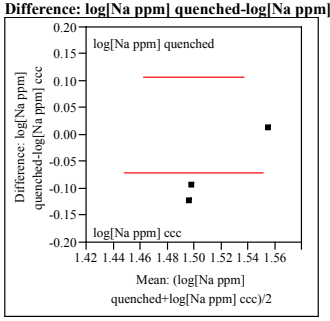
log[B ppm] quenched	1.16219	t-Ratio	2.217548
log[B ppm] ccc	1.07564	DF	2
Mean Difference	0.08655	Prob > |t|	0.1569
Std Error	0.03903	Prob > t	0.0784
Upper95%	0.25449	Prob < t	0.9216
Lower95%	-0.0814		
N	3		
Correlation	-0.73		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



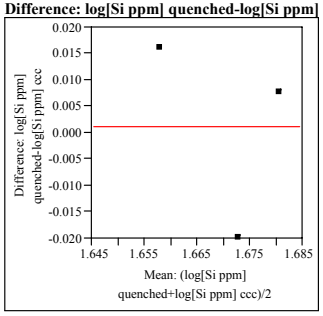
log[Li ppm] quenched	0.68562	t-Ratio	3.616171
log[Li ppm] ccc	0.64831	DF	2
Mean Difference	0.03731	Prob > |t|	0.0687
Std Error	0.01032	Prob > t	0.0343
Upper95%	0.0817	Prob < t	0.9657
Lower95%	-0.0071		
N	3		
Correlation	-0.3302		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.48137	t-Ratio	-1.71481
log[Na ppm] ccc	1.55156	DF	2
Mean Difference	-0.0702	Prob > |t|	0.2285
Std Error	0.04094	Prob > t	0.8857
Upper95%	0.10594	Prob < t	0.1143
Lower95%	-0.2463		
N	3		
Correlation	-0.2964		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

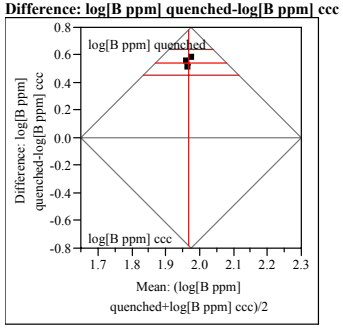


log[Si ppm] quenched	1.67097	t-Ratio	0.106787
log[Si ppm] ccc	1.66982	DF	2
Mean Difference	0.00116	Prob > |t|	0.9247
Std Error	0.01085	Prob > t	0.4624
Upper95%	0.04782	Prob < t	0.5376
Lower95%	-0.0455		
N	3		
Correlation	0.212		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

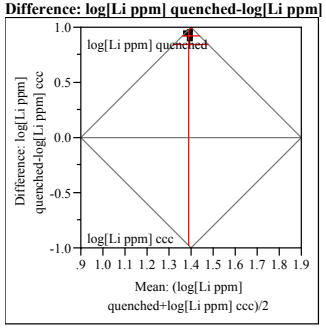
Matched Pairs Glass #=11

Difference: log[B ppm] quenched-log[B ppm] ccc



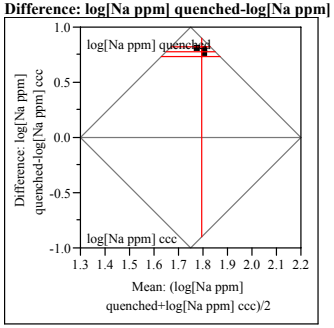
log[B ppm] quenched	2.23973	t-Ratio	25.68979
log[B ppm] ccc	1.69444	DF	2
Mean Difference	0.54529	Prob > |t|	0.0015
Std Error	0.02123	Prob > t	0.0008
Upper95%	0.63662	Prob < t	0.9992
Lower95%	0.45396		
N	3		
Correlation	-0.8498		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



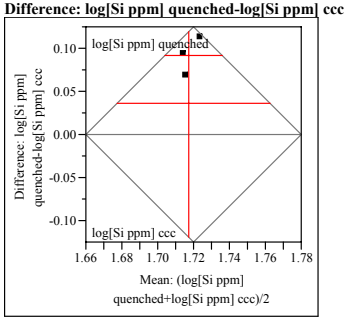
log[Li ppm] quenched	1.84903	t-Ratio	55.34711
log[Li ppm] ccc	0.92863	DF	2
Mean Difference	0.9204	Prob > |t|	0.0003
Std Error	0.01663	Prob > t	0.0002
Upper95%	0.99195	Prob < t	0.9998
Lower95%	0.84885		
N	3		
Correlation	-0.5406		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	2.18428	t-Ratio	71.83589
log[Na ppm] ccc	1.40421	DF	2
Mean Difference	0.78007	Prob > |t|	0.0002
Std Error	0.01086	Prob > t	<.0001
Upper95%	0.82679	Prob < t	0.9999
Lower95%	0.73335		
N	3		
Correlation	0.64609		

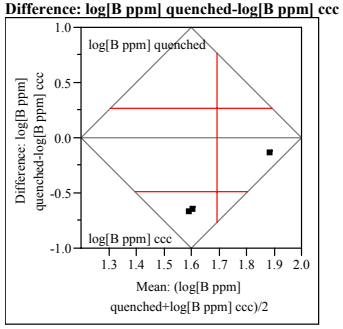
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.76326	t-Ratio	7.206355
log[Si ppm] ccc	1.67206	DF	2
Mean Difference	0.0912	Prob > |t|	0.0187
Std Error	0.01266	Prob > t	0.0094
Upper95%	0.14566	Prob < t	0.9906
Lower95%	0.03675		
N	3		
Correlation	-0.7914		

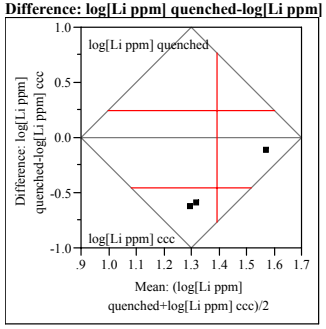
Matched Pairs Glass #=12

Difference: log[B ppm] quenched-log[B ppm] ccc



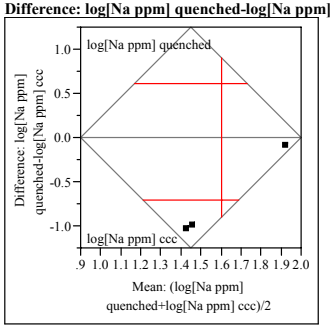
log[B ppm] quenched	1.44973	t-Ratio	-2.8037
log[B ppm] ccc	1.93993	DF	2
Mean Difference	-0.4902	Prob > |t|	0.1072
Std Error	0.17484	Prob > t	0.9464
Upper95%	0.26208	Prob < t	0.0536
Lower95%	-1.2425		
N	3		
Correlation	0.99638		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



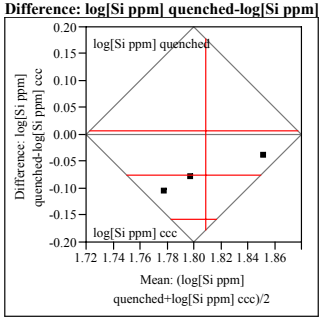
log[Li ppm] quenched	1.16929	t-Ratio	-2.77204
log[Li ppm] ccc	1.61968	DF	2
Mean Difference	-0.4504	Prob > |t|	0.1092
Std Error	0.16248	Prob > t	0.9454
Upper95%	0.24869	Prob < t	0.0546
Lower95%	-1.1495		
N	3		
Correlation	0.97681		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.24508	t-Ratio	-2.31663
log[Na ppm] ccc	1.95737	DF	2
Mean Difference	-0.7123	Prob > |t|	0.1465
Std Error	0.30747	Prob > t	0.9268
Upper95%	0.61064	Prob < t	0.0732
Lower95%	-2.0352		
N	3		
Correlation	0.99996		

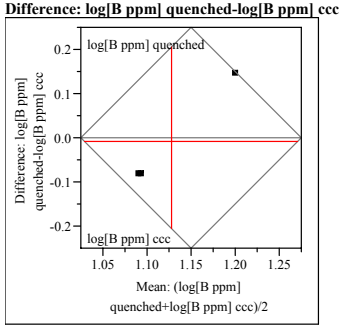
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.77096	t-Ratio	-3.906
log[Si ppm] ccc	1.84646	DF	2
Mean Difference	-0.0755	Prob > |t|	0.0597
Std Error	0.01933	Prob > t	0.9701
Upper95%	0.00767	Prob < t	0.0299
Lower95%	-0.1587		
N	3		
Correlation	0.99125		

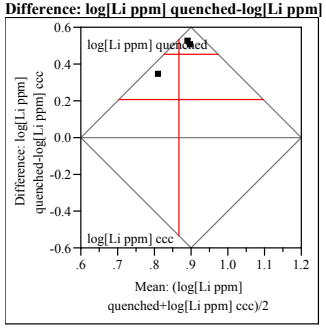
Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

Matched Pairs Glass #=13
Difference: log[B ppm] quenched-log[B ppm] ccc



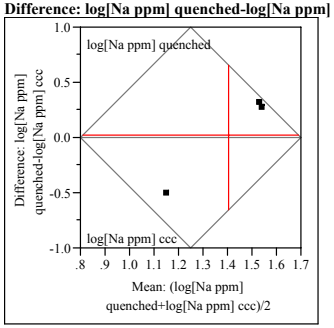
log[B ppm] quenched	1.12361	t-Ratio	-0.10088
log[B ppm] ccc	1.13122	DF	2
Mean Difference	-0.0076	Prob > |t|	0.9288
Std Error	0.07552	Prob > t	0.5356
Upper95%	0.31733	Prob < t	0.4644
Lower95%	-0.3326		
N	3		
Correlation	-0.8176		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



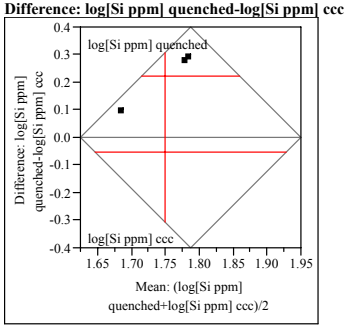
log[Li ppm] quenched	1.09221	t-Ratio	7.939569
log[Li ppm] ccc	0.63789	DF	2
Mean Difference	0.45433	Prob > |t|	0.0155
Std Error	0.05722	Prob > t	0.0077
Upper95%	0.70054	Prob < t	0.9923
Lower95%	0.20812		
N	3		
Correlation	-0.2578		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



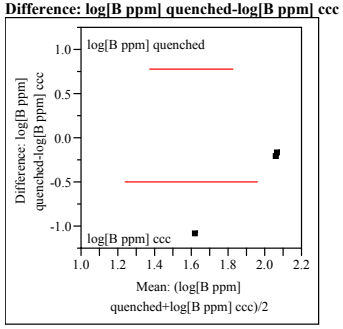
log[Na ppm] quenched	1.41799	t-Ratio	0.079734
log[Na ppm] ccc	1.39676	DF	2
Mean Difference	0.02123	Prob > |t|	0.9437
Std Error	0.26624	Prob > t	0.4719
Upper95%	1.16675	Prob < t	0.5281
Lower95%	-1.1243		
N	3		
Correlation	-0.3609		

Difference: log[Si ppm] quenched-log[Si ppm] ccc



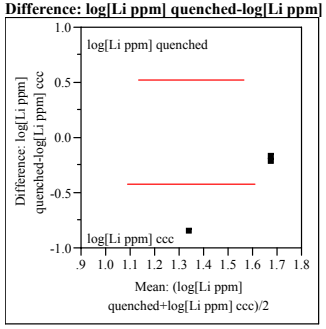
log[Si ppm] quenched	1.85915	t-Ratio	3.482925
log[Si ppm] ccc	1.63905	DF	2
Mean Difference	0.2201	Prob > |t|	0.0735
Std Error	0.06319	Prob > t	0.0367
Upper95%	0.49201	Prob < t	0.9633
Lower95%	-0.0518		
N	3		
Correlation	0.45853		

Matched Pairs Glass #=14
Difference: log[B ppm] quenched-log[B ppm] ccc



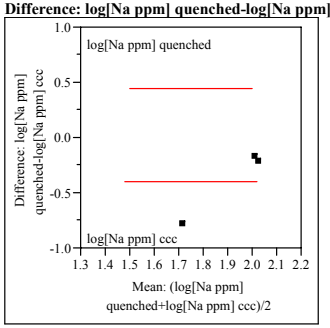
log[B ppm] quenched	1.66613	t-Ratio	-1.67249
log[B ppm] ccc	2.16299	DF	2
Mean Difference	-0.4969	Prob > |t|	0.2364
Std Error	0.29708	Prob > t	0.8818
Upper95%	0.78137	Prob < t	0.1182
Lower95%	-1.7751		
N	3		
Correlation	-0.5233		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



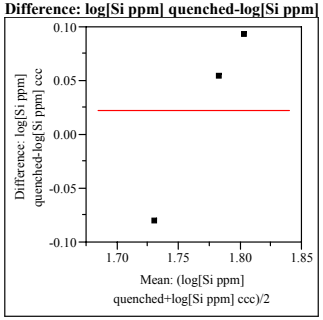
log[Li ppm] quenched	1.35205	t-Ratio	-1.91655
log[Li ppm] ccc	1.77358	DF	2
Mean Difference	-0.4215	Prob > |t|	0.1953
Std Error	0.21994	Prob > t	0.9023
Upper95%	0.52481	Prob < t	0.0977
Lower95%	-1.3679		
N	3		
Correlation	0.15437		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.71895	t-Ratio	-2.02445
log[Na ppm] ccc	2.11572	DF	2
Mean Difference	-0.3968	Prob > |t|	0.1802
Std Error	0.19599	Prob > t	0.9099
Upper95%	0.4465	Prob < t	0.0901
Lower95%	-1.24		
N	3		
Correlation	0.24638		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

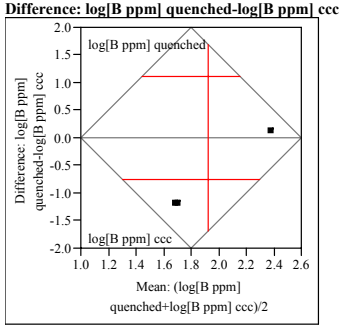


log[Si ppm] quenched	1.783	t-Ratio	0.414411
log[Si ppm] ccc	1.7613	DF	2
Mean Difference	0.0217	Prob > |t|	0.7188
Std Error	0.05236	Prob > t	0.3594
Upper95%	0.247	Prob < t	0.6406
Lower95%	-0.2036		
N	3		
Correlation	-0.9498		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

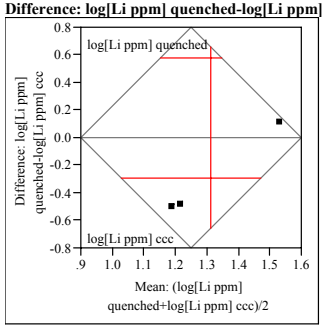
Matched Pairs Glass #=15

Difference: log[B ppm] quenched-log[B ppm] ccc



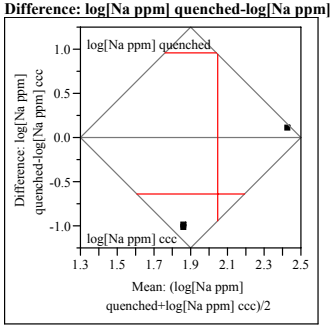
log[B ppm] quenched	1.54018	t-Ratio	-1.74465
log[B ppm] ccc	2.30444	DF	2
Mean Difference	-0.7643	Prob > |t|	0.2232
Std Error	0.43806	Prob > t	0.8884
Upper95%	1.12056	Prob < t	0.1116
Lower95%	-2.6491		
N	3		
Correlation	0.94729		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



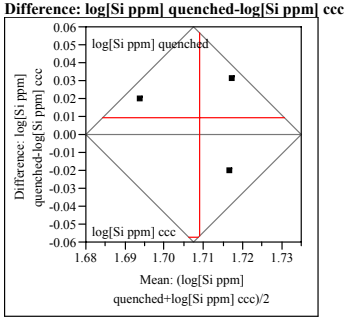
log[Li ppm] quenched	1.16318	t-Ratio	-1.46101
log[Li ppm] ccc	1.45886	DF	2
Mean Difference	-0.2957	Prob > |t|	0.2815
Std Error	0.20238	Prob > t	0.8593
Upper95%	0.57509	Prob < t	0.1407
Lower95%	-1.1665		
N	3		
Correlation	0.86611		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.72605	t-Ratio	-1.72306
log[Na ppm] ccc	2.36793	DF	2
Mean Difference	-0.6419	Prob > |t|	0.2270
Std Error	0.37253	Prob > t	0.8865
Upper95%	0.96097	Prob < t	0.1135
Lower95%	-2.2447		
N	3		
Correlation	0.64298		

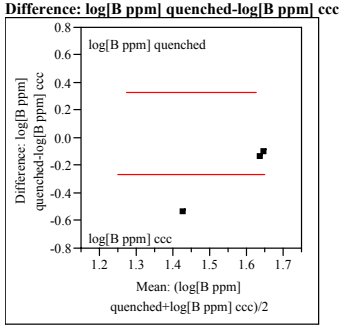
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.71395	t-Ratio	0.615071
log[Si ppm] ccc	1.70438	DF	2
Mean Difference	0.00958	Prob > |t|	0.6012
Std Error	0.01557	Prob > t	0.3006
Upper95%	0.07658	Prob < t	0.6994
Lower95%	-0.0574		
N	3		
Correlation	-0.0122		

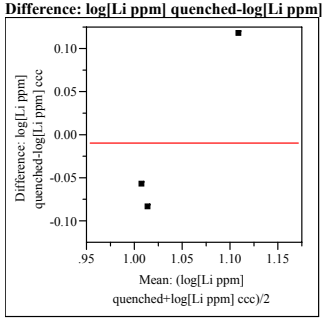
Matched Pairs Glass #=16

Difference: log[B ppm] quenched-log[B ppm] ccc



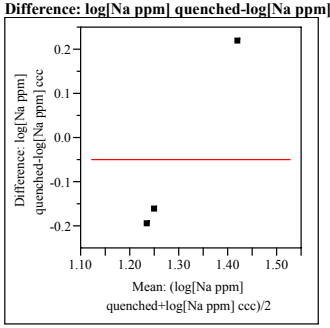
log[B ppm] quenched	1.43673	t-Ratio	-1.91472
log[B ppm] ccc	1.70327	DF	2
Mean Difference	-0.2665	Prob > |t|	0.1956
Std Error	0.13921	Prob > t	0.9022
Upper95%	0.33241	Prob < t	0.0978
Lower95%	-0.8655		
N	3		
Correlation	0.55232		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



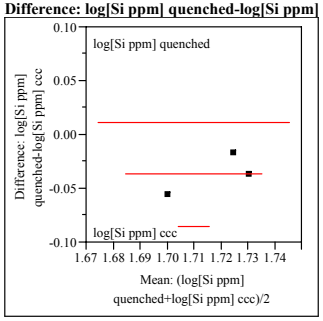
log[Li ppm] quenched	1.03872	t-Ratio	-0.14482
log[Li ppm] ccc	1.04786	DF	2
Mean Difference	-0.0091	Prob > |t|	0.8981
Std Error	0.06318	Prob > t	0.5509
Upper95%	0.26267	Prob < t	0.4491
Lower95%	-0.281		
N	3		
Correlation	0.21102		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.27656	t-Ratio	-0.36963
log[Na ppm] ccc	1.32555	DF	2
Mean Difference	-0.049	Prob > |t|	0.7471
Std Error	0.13255	Prob > t	0.6264
Upper95%	0.52131	Prob < t	0.3736
Lower95%	-0.6193		
N	3		
Correlation	-0.9973		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

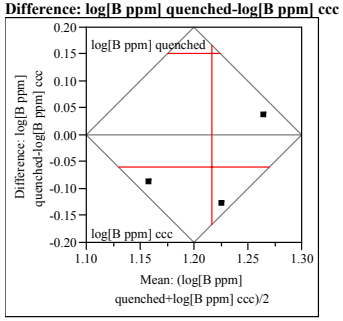


log[Si ppm] quenched	1.69998	t-Ratio	-3.34576
log[Si ppm] ccc	1.7372	DF	2
Mean Difference	-0.0372	Prob > |t|	0.0789
Std Error	0.01112	Prob > t	0.9605
Upper95%	0.01064	Prob < t	0.0395
Lower95%	-0.0851		
N	3		
Correlation	0.63218		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

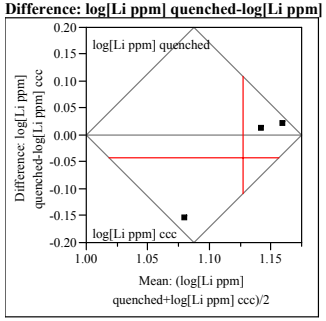
Matched Pairs Glass #=17

Difference: log[B ppm] quenched-log[B ppm] ccc



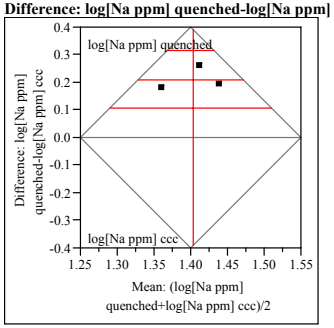
log[B ppm] quenched	1.18596	t-Ratio	-1.22461
log[B ppm] ccc	1.24636	DF	2
Mean Difference	-0.0604	Prob > |t|	0.3454
Std Error	0.04932	Prob > t	0.8273
Upper95%	0.1518	Prob < t	0.1727
Lower95%	-0.2726		
N	3		
Correlation	0.28794		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



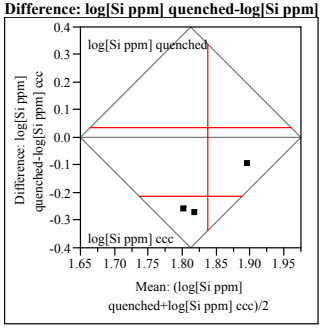
log[Li ppm] quenched	1.10638	t-Ratio	-0.72256
log[Li ppm] ccc	1.1476	DF	2
Mean Difference	-0.0412	Prob > |t|	0.5450
Std Error	0.05705	Prob > t	0.7275
Upper95%	0.20425	Prob < t	0.2725
Lower95%	-0.2867		
N	3		
Correlation	-0.7103		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.50846	t-Ratio	8.680455
log[Na ppm] ccc	1.29869	DF	2
Mean Difference	0.20978	Prob > |t|	0.0130
Std Error	0.02417	Prob > t	0.0065
Upper95%	0.31376	Prob < t	0.9935
Lower95%	0.1058		
N	3		
Correlation	0.59135		

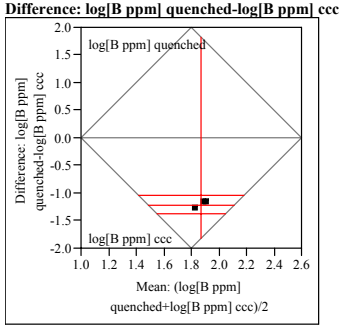
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.73249	t-Ratio	-3.6916
log[Si ppm] ccc	1.9444	DF	2
Mean Difference	-0.2119	Prob > |t|	0.0662
Std Error	0.0574	Prob > t	0.9669
Upper95%	0.03508	Prob < t	0.0331
Lower95%	-0.4589		
N	3		
Correlation	0.05324		

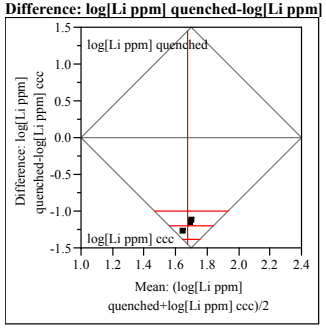
Matched Pairs Glass #=18

Difference: log[B ppm] quenched-log[B ppm] ccc



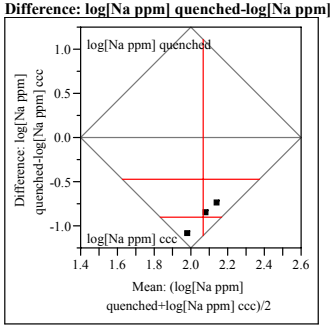
log[B ppm] quenched	1.2643	t-Ratio	-30.4693
log[B ppm] ccc	2.48023	DF	2
Mean Difference	-1.2159	Prob > |t|	0.0011
Std Error	0.03991	Prob > t	0.9995
Upper95%	-1.0442	Prob < t	0.0005
Lower95%	-1.3876		
N	3		
Correlation	0.66011		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



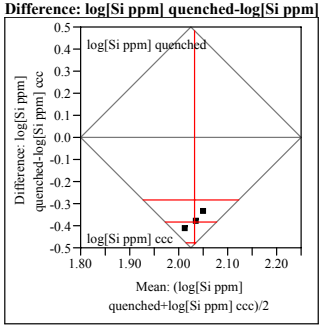
log[Li ppm] quenched	1.08224	t-Ratio	-26.0543
log[Li ppm] ccc	2.27616	DF	2
Mean Difference	-1.1939	Prob > |t|	0.0015
Std Error	0.04582	Prob > t	0.9993
Upper95%	-0.9967	Prob < t	0.0007
Lower95%	-1.3911		
N	3		
Correlation	-0.9804		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.61671	t-Ratio	-9.0312
log[Na ppm] ccc	2.51993	DF	2
Mean Difference	-0.9032	Prob > |t|	0.0120
Std Error	0.10001	Prob > t	0.9940
Upper95%	-0.4729	Prob < t	0.0060
Lower95%	-1.3335		
N	3		
Correlation	-0.8853		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

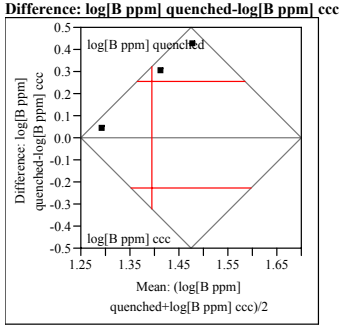


log[Si ppm] quenched	1.84189	t-Ratio	-16.8155
log[Si ppm] ccc	2.22286	DF	2
Mean Difference	-0.381	Prob > |t|	0.0035
Std Error	0.02266	Prob > t	0.9982
Upper95%	-0.2835	Prob < t	0.0018
Lower95%	-0.4784		
N	3		
Correlation	-0.1965		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

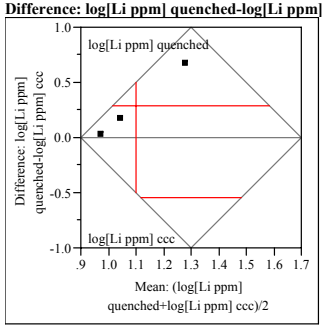
Matched Pairs Glass #=19

Difference: log[B ppm] quenched-log[B ppm] ccc



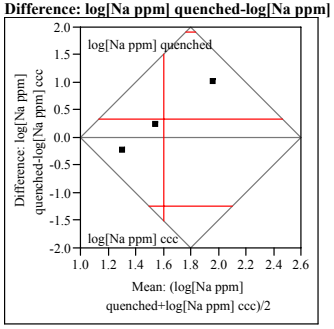
log[B ppm] quenched	1.52142	t-Ratio	2.257608
log[B ppm] ccc	1.26717	DF	2
Mean Difference	0.25425	Prob > |t|	0.1525
Std Error	0.11262	Prob > t	0.0763
Upper95%	0.73882	Prob < t	0.9237
Lower95%	-0.2303		
N	3		
Correlation	-0.6488		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



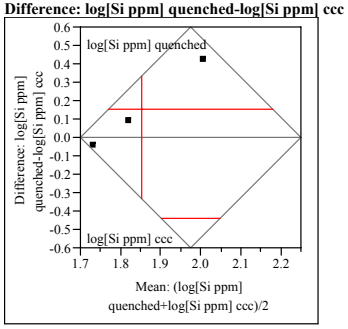
log[Li ppm] quenched	1.24168	t-Ratio	1.485197
log[Li ppm] ccc	0.95529	DF	2
Mean Difference	0.28639	Prob > |t|	0.2758
Std Error	0.19283	Prob > t	0.1379
Upper95%	1.11607	Prob < t	0.8621
Lower95%	-0.5433		
N	3		
Correlation	-0.942		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.76636	t-Ratio	0.89801
log[Na ppm] ccc	1.4374	DF	2
Mean Difference	0.32896	Prob > |t|	0.4640
Std Error	0.36632	Prob > t	0.2320
Upper95%	1.90512	Prob < t	0.7680
Lower95%	-1.2472		
N	3		
Correlation	0.85227		

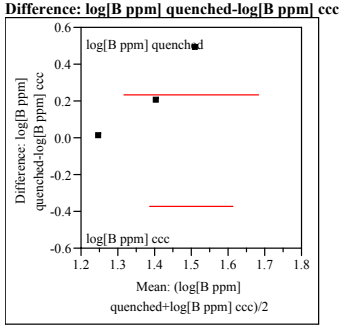
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.92935	t-Ratio	1.112651
log[Si ppm] ccc	1.77618	DF	2
Mean Difference	0.15317	Prob > |t|	0.3817
Std Error	0.13766	Prob > t	0.1908
Upper95%	0.74548	Prob < t	0.8092
Lower95%	-0.4391		
N	3		
Correlation	0.9792		

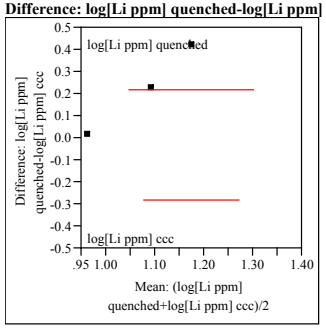
Matched Pairs Glass #=20

Difference: log[B ppm] quenched-log[B ppm] ccc



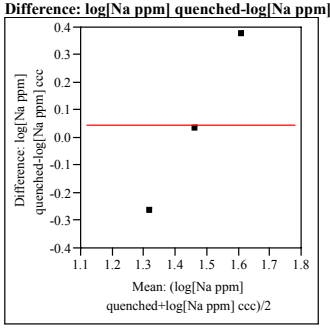
log[B ppm] quenched	1.50198	t-Ratio	1.635977
log[B ppm] ccc	1.27162	DF	2
Mean Difference	0.23036	Prob > |t|	0.2435
Std Error	0.14081	Prob > t	0.1217
Upper95%	0.8362	Prob < t	0.8783
Lower95%	-0.3755		
N	3		
Correlation	0.39164		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



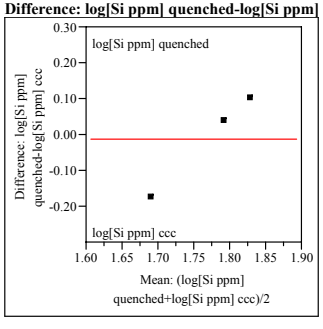
log[Li ppm] quenched	1.18554	t-Ratio	1.857828
log[Li ppm] ccc	0.96813	DF	2
Mean Difference	0.21742	Prob > |t|	0.2043
Std Error	0.11703	Prob > t	0.1022
Upper95%	0.72094	Prob < t	0.8978
Lower95%	-0.2861		
N	3		
Correlation	0.43993		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.48599	t-Ratio	0.244706
log[Na ppm] ccc	1.44091	DF	2
Mean Difference	0.04508	Prob > |t|	0.8295
Std Error	0.18423	Prob > t	0.4148
Upper95%	0.83777	Prob < t	0.5852
Lower95%	-0.7476		
N	3		
Correlation	-0.9454		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

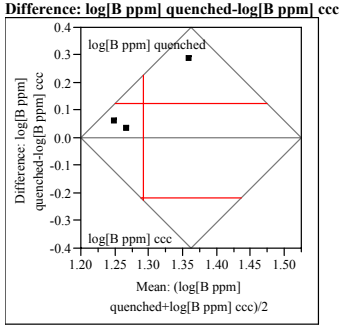


log[Si ppm] quenched	1.7632	t-Ratio	-0.16937
log[Si ppm] ccc	1.77735	DF	2
Mean Difference	-0.0141	Prob > |t|	0.8811
Std Error	0.08353	Prob > t	0.5595
Upper95%	0.34527	Prob < t	0.4405
Lower95%	-0.3736		
N	3		
Correlation	-0.2795		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

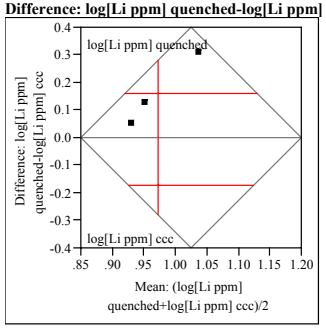
Matched Pairs Glass #=21

Difference: log[B ppm] quenched-log[B ppm] ccc



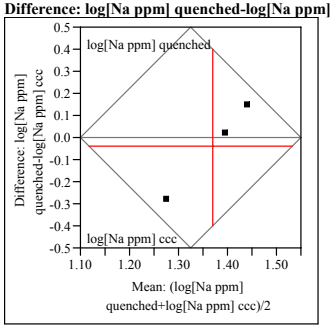
log[B ppm] quenched	1.35398	t-Ratio	1.56386
log[B ppm] ccc	1.22859	DF	2
Mean Difference	0.12538	Prob > |t|	0.2583
Std Error	0.08017	Prob > t	0.1291
Upper95%	0.47035	Prob < t	0.8709
Lower95%	-0.2196		
N	3		
Correlation	-0.5537		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



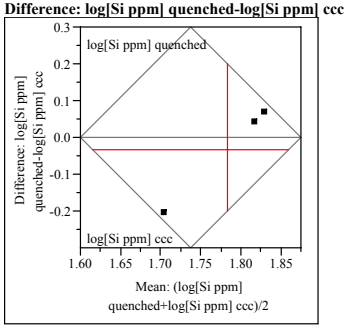
log[Li ppm] quenched	1.05202	t-Ratio	2.064312
log[Li ppm] ccc	0.89263	DF	2
Mean Difference	0.15939	Prob > |t|	0.1750
Std Error	0.07721	Prob > t	0.0875
Upper95%	0.49161	Prob < t	0.9125
Lower95%	-0.1728		
N	3		
Correlation	-0.8546		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.34915	t-Ratio	-0.32866
log[Na ppm] ccc	1.39065	DF	2
Mean Difference	-0.0415	Prob > |t|	0.7736
Std Error	0.12628	Prob > t	0.6132
Upper95%	0.50184	Prob < t	0.3868
Lower95%	-0.5849		
N	3		
Correlation	-0.9957		

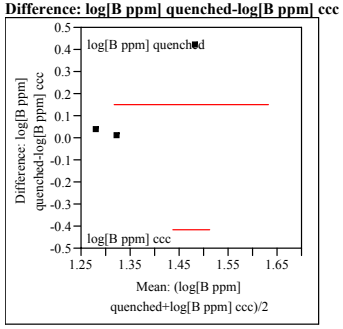
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.7668	t-Ratio	-0.38706
log[Si ppm] ccc	1.80047	DF	2
Mean Difference	-0.0337	Prob > |t|	0.7360
Std Error	0.08699	Prob > t	0.6320
Upper95%	0.3406	Prob < t	0.3680
Lower95%	-0.4079		
N	3		
Correlation	-0.9964		

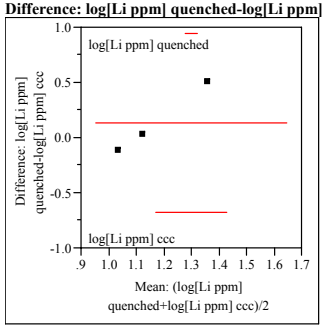
Matched Pairs Glass #=22

Difference: log[B ppm] quenched-log[B ppm] ccc



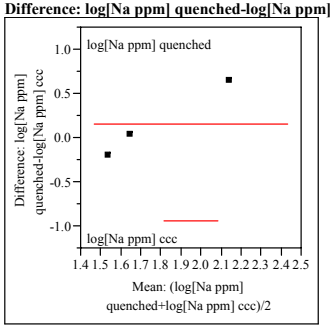
log[B ppm] quenched	1.43825	t-Ratio	1.153353
log[B ppm] ccc	1.28565	DF	2
Mean Difference	0.1526	Prob > |t|	0.3680
Std Error	0.13231	Prob > t	0.1840
Upper95%	0.72187	Prob < t	0.8160
Lower95%	-0.4167		
N	3		
Correlation	-0.2555		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



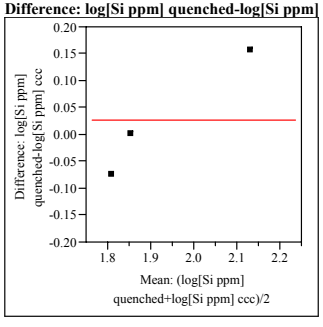
log[Li ppm] quenched	1.23767	t-Ratio	0.706067
log[Li ppm] ccc	1.1043	DF	2
Mean Difference	0.13337	Prob > |t|	0.5533
Std Error	0.1889	Prob > t	0.2767
Upper95%	0.94614	Prob < t	0.7233
Lower95%	-0.6794		
N	3		
Correlation	0.59323		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.84954	t-Ratio	0.593834
log[Na ppm] ccc	1.6979	DF	2
Mean Difference	0.15163	Prob > |t|	0.6128
Std Error	0.25535	Prob > t	0.3064
Upper95%	1.2503	Prob < t	0.6936
Lower95%	-0.947		
N	3		
Correlation	0.96553		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

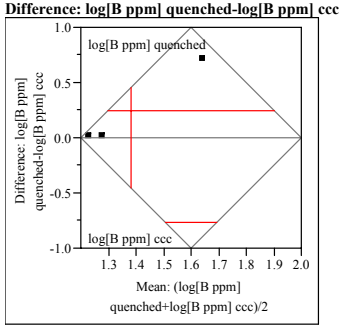


log[Si ppm] quenched	1.94378	t-Ratio	0.39964
log[Si ppm] ccc	1.91662	DF	2
Mean Difference	0.02716	Prob > |t|	0.7281
Std Error	0.06796	Prob > t	0.3640
Upper95%	0.31955	Prob < t	0.6360
Lower95%	-0.2652		
N	3		
Correlation	0.98814		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

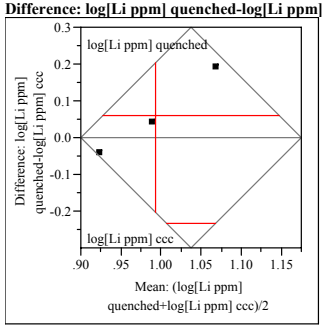
Matched Pairs Glass #=23

Difference: log[B ppm] quenched-log[B ppm] ccc



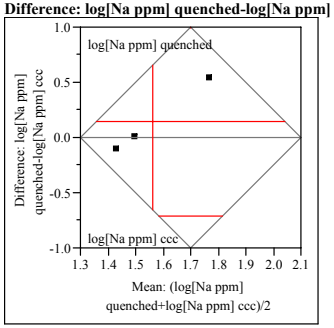
log[B ppm] quenched	1.5024	t-Ratio	1.042925
log[B ppm] ccc	1.2585	DF	2
Mean Difference	0.2439	Prob > |t|	0.4065
Std Error	0.23386	Prob > t	0.2032
Upper95%	1.25013	Prob < t	0.7968
Lower95%	-0.7623		
N	3		
Correlation	0.69156		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



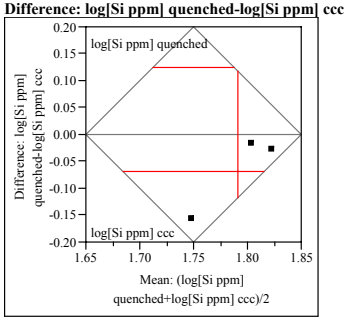
log[Li ppm] quenched	1.02388	t-Ratio	0.895058
log[Li ppm] ccc	0.96231	DF	2
Mean Difference	0.06157	Prob > |t|	0.4652
Std Error	0.06879	Prob > t	0.2326
Upper95%	0.35753	Prob < t	0.7674
Lower95%	-0.2344		
N	3		
Correlation	0.89065		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.63431	t-Ratio	0.726046
log[Na ppm] ccc	1.49054	DF	2
Mean Difference	0.14377	Prob > |t|	0.5433
Std Error	0.19802	Prob > t	0.2716
Upper95%	0.99576	Prob < t	0.7284
Lower95%	-0.7082		
N	3		
Correlation	0.90628		

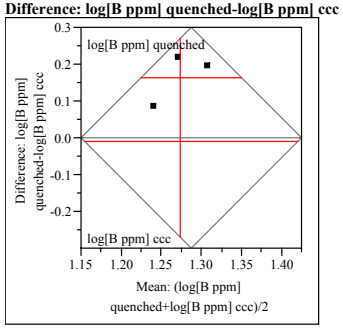
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.75702	t-Ratio	-1.53207
log[Si ppm] ccc	1.82525	DF	2
Mean Difference	-0.0682	Prob > |t|	0.2652
Std Error	0.04454	Prob > t	0.8674
Upper95%	0.12339	Prob < t	0.1326
Lower95%	-0.2599		
N	3		
Correlation	0.02215		

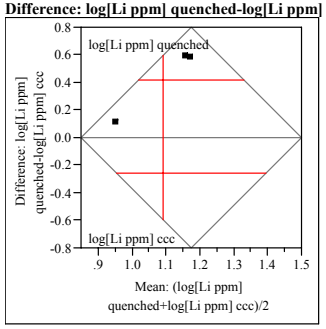
Matched Pairs Glass #=24

Difference: log[B ppm] quenched-log[B ppm] ccc



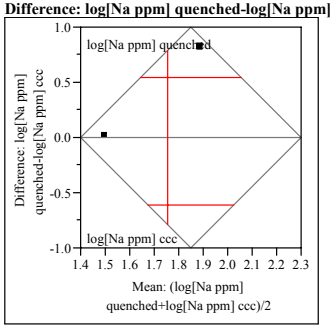
log[B ppm] quenched	1.35549	t-Ratio	4.048568
log[B ppm] ccc	1.19062	DF	2
Mean Difference	0.16487	Prob > |t|	0.0559
Std Error	0.04072	Prob > t	0.0280
Upper95%	0.34008	Prob < t	0.9720
Lower95%	-0.0103		
N	3		
Correlation	-0.0611		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



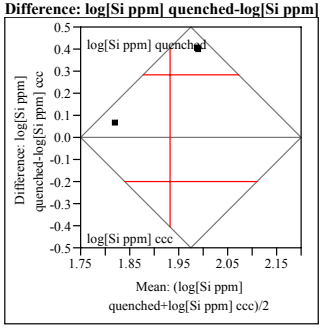
log[Li ppm] quenched	1.3038	t-Ratio	2.68432
log[Li ppm] ccc	0.88187	DF	2
Mean Difference	0.42193	Prob > |t|	0.1153
Std Error	0.15718	Prob > t	0.0576
Upper95%	1.09824	Prob < t	0.9424
Lower95%	-0.2544		
N	3		
Correlation	-0.7403		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	2.02612	t-Ratio	2.02569
log[Na ppm] ccc	1.48187	DF	2
Mean Difference	0.54425	Prob > |t|	0.1801
Std Error	0.26868	Prob > t	0.0900
Upper95%	1.70027	Prob < t	0.9100
Lower95%	-0.6118		
N	3		
Correlation	-0.9618		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

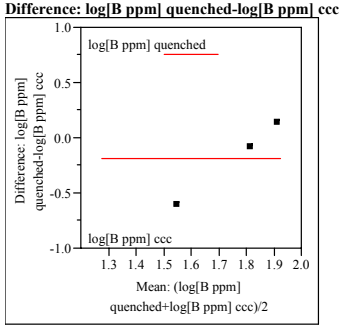


log[Si ppm] quenched	2.07513	t-Ratio	2.531956
log[Si ppm] ccc	1.78966	DF	2
Mean Difference	0.28547	Prob > |t|	0.1270
Std Error	0.11275	Prob > t	0.0635
Upper95%	0.77058	Prob < t	0.9365
Lower95%	-0.1996		
N	3		
Correlation	-0.3648		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

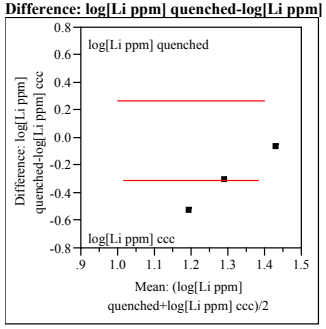
Matched Pairs Glass #=25

Difference: log[B ppm] quenched-log[B ppm] ccc



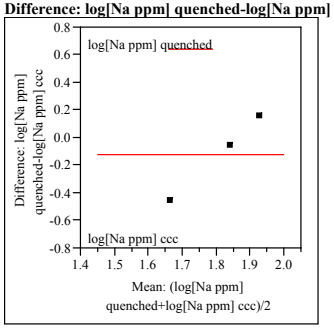
log[B ppm] quenched	1.66183	t-Ratio	-0.86688
log[B ppm] ccc	1.85293	DF	2
Mean Difference	-0.1911	Prob > |t|	0.4774
Std Error	0.22045	Prob > t	0.7613
Upper95%	0.75742	Prob < t	0.2387
Lower95%	-1.1396		
N	3		
Correlation	-0.1828		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



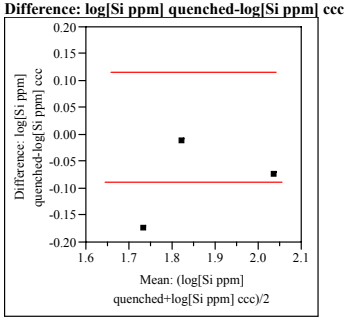
log[Li ppm] quenched	1.15091	t-Ratio	-2.29522
log[Li ppm] ccc	1.45816	DF	2
Mean Difference	-0.3072	Prob > |t|	0.1486
Std Error	0.13386	Prob > t	0.9257
Upper95%	0.26872	Prob < t	0.0743
Lower95%	-0.8832		
N	3		
Correlation	0.18937		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.74833	t-Ratio	-0.69641
log[Na ppm] ccc	1.87251	DF	2
Mean Difference	-0.1242	Prob > |t|	0.5582
Std Error	0.17832	Prob > t	0.7209
Upper95%	0.64306	Prob < t	0.2791
Lower95%	-0.8914		
N	3		
Correlation	-0.9791		

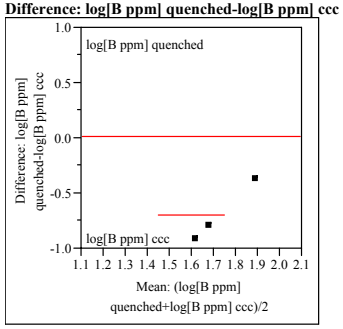
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.82009	t-Ratio	-1.856
log[Si ppm] ccc	1.90794	DF	2
Mean Difference	-0.0879	Prob > |t|	0.2046
Std Error	0.04734	Prob > t	0.8977
Upper95%	0.11582	Prob < t	0.1023
Lower95%	-0.2915		
N	3		
Correlation	0.89009		

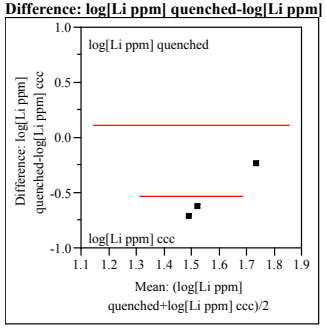
Matched Pairs Glass #=26

Difference: log[B ppm] quenched-log[B ppm] ccc



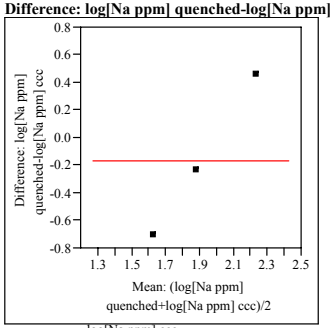
log[B ppm] quenched	1.38048	t-Ratio	-4.2334
log[B ppm] ccc	2.07758	DF	2
Mean Difference	-0.6971	Prob > |t|	0.0515
Std Error	0.16467	Prob > t	0.9742
Upper95%	0.0114	Prob < t	0.0258
Lower95%	-1.4056		
N	3		
Correlation	0.52715		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



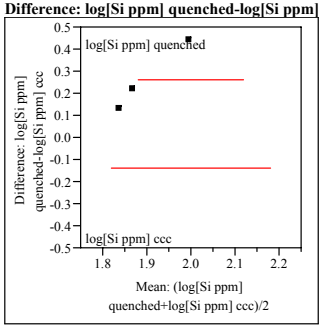
log[Li ppm] quenched	1.31613	t-Ratio	-3.57101
log[Li ppm] ccc	1.85088	DF	2
Mean Difference	-0.5347	Prob > |t|	0.0703
Std Error	0.14975	Prob > t	0.9649
Upper95%	0.10956	Prob < t	0.0351
Lower95%	-1.1791		
N	3		
Correlation	0.24589		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.8298	t-Ratio	-0.4909
log[Na ppm] ccc	1.99601	DF	2
Mean Difference	-0.1662	Prob > |t|	0.6721
Std Error	0.33858	Prob > t	0.6640
Upper95%	1.29059	Prob < t	0.3360
Lower95%	-1.623		
N	3		
Correlation	0.88468		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

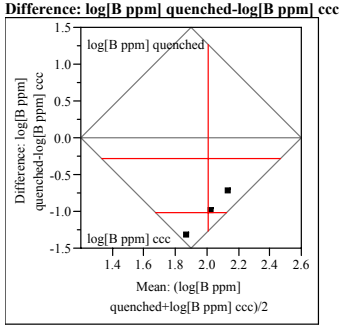


log[Si ppm] quenched	2.02927	t-Ratio	2.793854
log[Si ppm] ccc	1.76876	DF	2
Mean Difference	0.26051	Prob > |t|	0.1078
Std Error	0.09324	Prob > t	0.0539
Upper95%	0.6617	Prob < t	0.9461
Lower95%	-0.1407		
N	3		
Correlation	0.42284		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

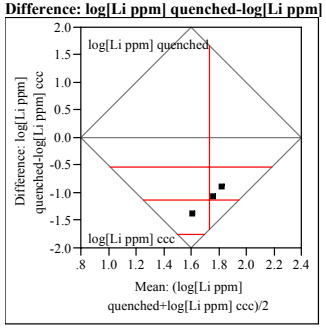
Matched Pairs Glass #=27

Difference: log[B ppm] quenched-log[B ppm] ccc



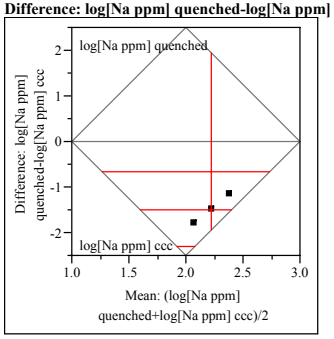
log[B ppm] quenched	1.49885	t-Ratio	-5.97686
log[B ppm] ccc	2.51976	DF	2
Mean Difference	-1.0209	Prob > |t|	0.0269
Std Error	0.17081	Prob > t	0.9866
Upper95%	-0.286	Prob < t	0.0134
Lower95%	-1.7558		
N	3		
Correlation	-0.9315		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



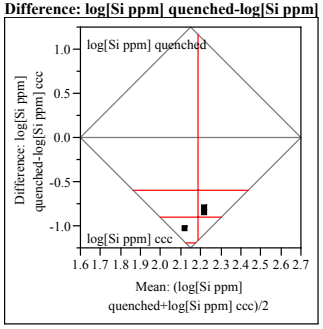
log[Li ppm] quenched	1.15976	t-Ratio	-7.9894
log[Li ppm] ccc	2.29847	DF	2
Mean Difference	-1.1387	Prob > |t|	0.0153
Std Error	0.14253	Prob > t	0.9923
Upper95%	-0.5255	Prob < t	0.0077
Lower95%	-1.752		
N	3		
Correlation	-0.8334		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.47389	t-Ratio	-7.86426
log[Na ppm] ccc	2.96992	DF	2
Mean Difference	-1.496	Prob > |t|	0.0158
Std Error	0.19023	Prob > t	0.9921
Upper95%	-0.6775	Prob < t	0.0079
Lower95%	-2.3145		
N	3		
Correlation	-0.9169		

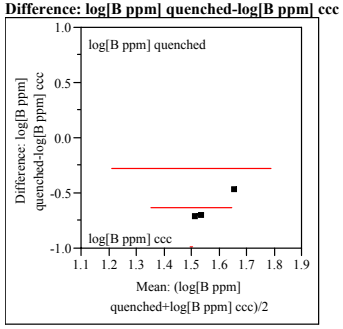
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.73492	t-Ratio	-12.8529
log[Si ppm] ccc	2.63442	DF	2
Mean Difference	-0.8995	Prob > |t|	0.0060
Std Error	0.06998	Prob > t	0.9970
Upper95%	-0.5984	Prob < t	0.0030
Lower95%	-1.2006		
N	3		
Correlation	-0.2717		

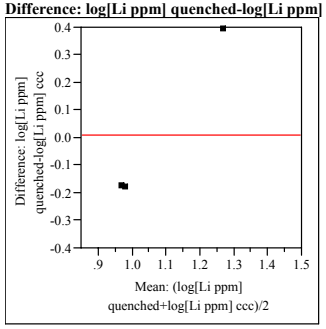
Matched Pairs Glass #=28

Difference: log[B ppm] quenched-log[B ppm] ccc



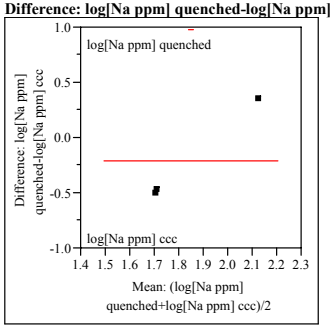
log[B ppm] quenched	1.24866	t-Ratio	-7.74715
log[B ppm] ccc	1.8852	DF	2
Mean Difference	-0.6365	Prob > |t|	0.0163
Std Error	0.08216	Prob > t	0.9919
Upper95%	-0.283	Prob < t	0.0081
Lower95%	-0.9901		
N	3		
Correlation	0.63157		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



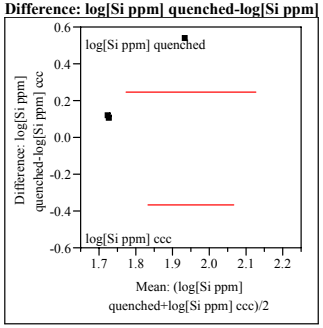
log[Li ppm] quenched	1.07739	t-Ratio	0.052782
log[Li ppm] ccc	1.06731	DF	2
Mean Difference	0.01007	Prob > |t|	0.9627
Std Error	0.19085	Prob > t	0.4814
Upper95%	0.83125	Prob < t	0.5186
Lower95%	-0.8111		
N	3		
Correlation	0.60424		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.73859	t-Ratio	-0.77361
log[Na ppm] ccc	1.95396	DF	2
Mean Difference	-0.2154	Prob > |t|	0.5201
Std Error	0.2784	Prob > t	0.7400
Upper95%	0.98248	Prob < t	0.2600
Lower95%	-1.4132		
N	3		
Correlation	-0.2368		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

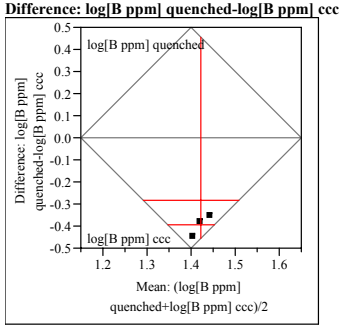


log[Si ppm] quenched	1.91878	t-Ratio	1.736279
log[Si ppm] ccc	1.67054	DF	2
Mean Difference	0.24824	Prob > |t|	0.2246
Std Error	0.14298	Prob > t	0.1123
Upper95%	0.86342	Prob < t	0.8877
Lower95%	-0.3669		
N	3		
Correlation	-0.7259		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

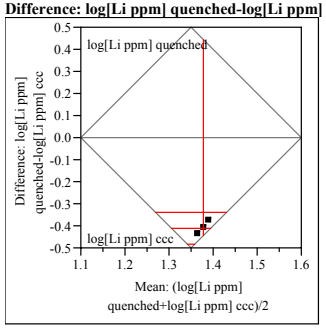
Matched Pairs Glass #=29

Difference: log[B ppm] quenched-log[B ppm] ccc



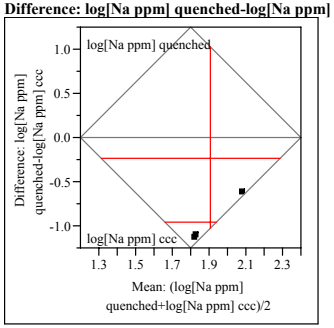
log[B ppm] quenched	1.22296	t-Ratio	-14.7915
log[B ppm] ccc	1.61917	DF	2
Mean Difference	-0.3962	Prob > |t|	0.0045
Std Error	0.02679	Prob > t	0.9977
Upper95%	-0.281	Prob < t	0.0023
Lower95%	-0.5115		
N	3		
Correlation	-0.4976		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



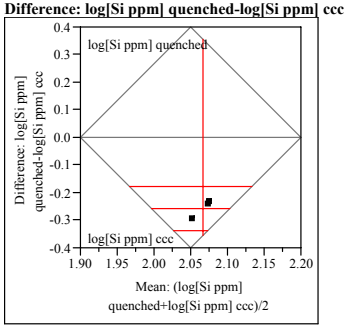
log[Li ppm] quenched	1.17244	t-Ratio	-23.92
log[Li ppm] ccc	1.58295	DF	2
Mean Difference	-0.4105	Prob > |t|	0.0017
Std Error	0.01716	Prob > t	0.9991
Upper95%	-0.3367	Prob < t	0.0009
Lower95%	-0.4843		
N	3		
Correlation	-0.6724		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.42853	t-Ratio	-5.67561
log[Na ppm] ccc	2.38422	DF	2
Mean Difference	-0.9557	Prob > |t|	0.0297
Std Error	0.16839	Prob > t	0.9852
Upper95%	-0.2312	Prob < t	0.0148
Lower95%	-1.6802		
N	3		
Correlation	0.99963		

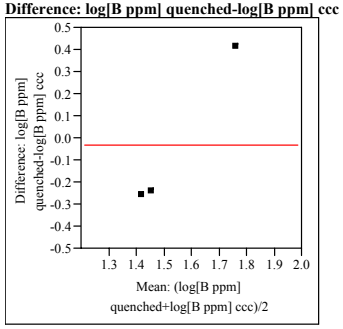
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.93692	t-Ratio	-13.8824
log[Si ppm] ccc	2.19559	DF	2
Mean Difference	-0.2587	Prob > |t|	0.0051
Std Error	0.01863	Prob > t	0.9974
Upper95%	-0.1785	Prob < t	0.0026
Lower95%	-0.3388		
N	3		
Correlation	-0.9776		

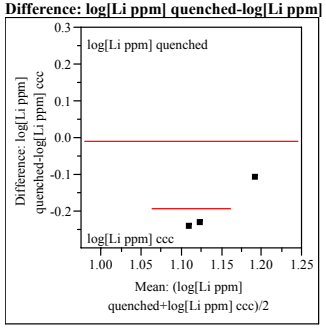
Matched Pairs Glass #=30

Difference: log[B ppm] quenched-log[B ppm] ccc



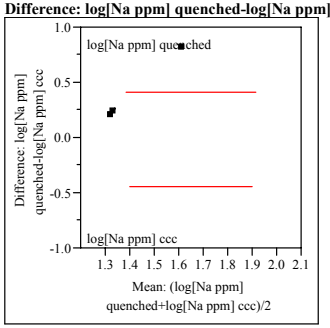
log[B ppm] quenched	1.52666	t-Ratio	-0.14259
log[B ppm] ccc	1.55816	DF	2
Mean Difference	-0.0315	Prob > |t|	0.8997
Std Error	0.22094	Prob > t	0.5502
Upper95%	0.91911	Prob < t	0.4498
Lower95%	-0.9821		
N	3		
Correlation	-0.1781		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



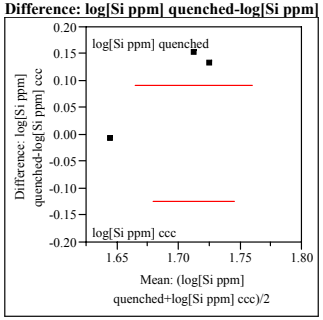
log[Li ppm] quenched	1.04417	t-Ratio	-4.55166
log[Li ppm] ccc	1.23884	DF	2
Mean Difference	-0.1947	Prob > |t|	0.0450
Std Error	0.04277	Prob > t	0.9775
Upper95%	-0.0106	Prob < t	0.0225
Lower95%	-0.3787		
N	3		
Correlation	0.91772		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.62662	t-Ratio	2.080034
log[Na ppm] ccc	1.21481	DF	2
Mean Difference	0.41181	Prob > |t|	0.1730
Std Error	0.19798	Prob > t	0.0865
Upper95%	1.26366	Prob < t	0.9135
Lower95%	-0.44		
N	3		
Correlation	-0.8892		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

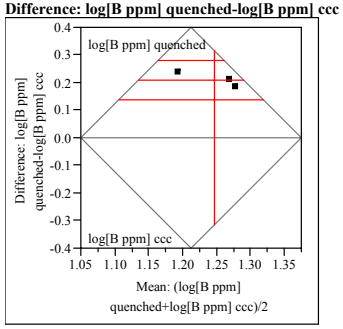


log[Si ppm] quenched	1.74009	t-Ratio	1.823222
log[Si ppm] ccc	1.64827	DF	2
Mean Difference	0.09182	Prob > |t|	0.2098
Std Error	0.05036	Prob > t	0.1049
Upper95%	0.30851	Prob < t	0.8951
Lower95%	-0.1249		
N	3		
Correlation	0.00599		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

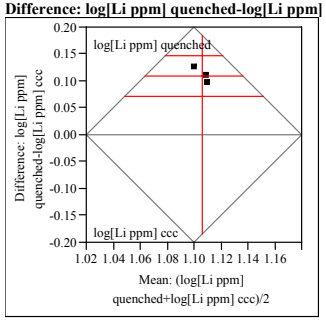
Matched Pairs Glass #=31

Difference: log[B ppm] quenched-log[B ppm] ccc



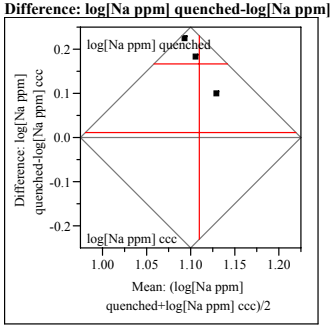
log[B ppm] quenched	1.3513	t-Ratio	12.85101
log[B ppm] ccc	1.14159	DF	2
Mean Difference	0.20971	Prob > |t|	0.0060
Std Error	0.01632	Prob > t	0.0030
Upper95%	0.27992	Prob < t	0.9970
Lower95%	0.1395		
N	3		
Correlation	0.95814		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



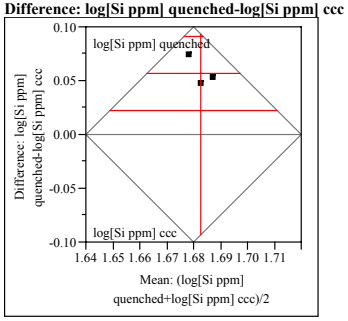
log[Li ppm] quenched	1.1612	t-Ratio	12.34711
log[Li ppm] ccc	1.05168	DF	2
Mean Difference	0.10952	Prob > |t|	0.0065
Std Error	0.00887	Prob > t	0.0032
Upper95%	0.14769	Prob < t	0.9968
Lower95%	0.07136		
N	3		
Correlation	-0.6797		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.19285	t-Ratio	4.571295
log[Na ppm] ccc	1.02539	DF	2
Mean Difference	0.16746	Prob > |t|	0.0447
Std Error	0.03663	Prob > t	0.0223
Upper95%	0.32507	Prob < t	0.9777
Lower95%	0.00984		
N	3		
Correlation	-0.9999		

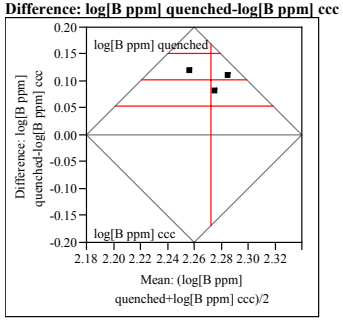
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.71133	t-Ratio	7.14406
log[Si ppm] ccc	1.6542	DF	2
Mean Difference	0.05713	Prob > |t|	0.0190
Std Error	0.008	Prob > t	0.0095
Upper95%	0.09153	Prob < t	0.9905
Lower95%	0.02272		
N	3		
Correlation	-0.5686		

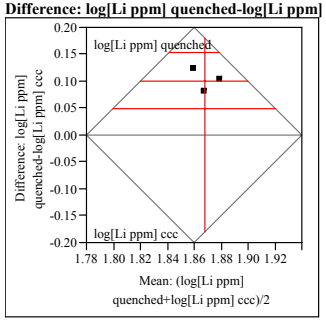
Matched Pairs Glass #=32

Difference: log[B ppm] quenched-log[B ppm] ccc



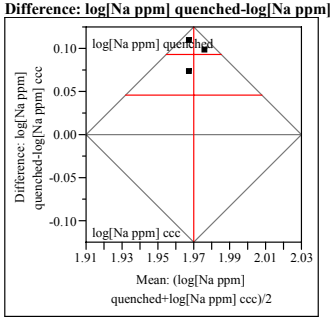
log[B ppm] quenched	2.32323	t-Ratio	9.182655
log[B ppm] ccc	2.22097	DF	2
Mean Difference	0.10226	Prob > |t|	0.0117
Std Error	0.01114	Prob > t	0.0058
Upper95%	0.15018	Prob < t	0.9942
Lower95%	0.05435		
N	3		
Correlation	0.40651		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



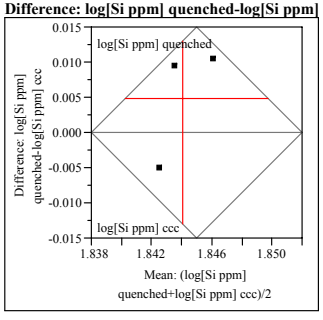
log[Li ppm] quenched	1.9187	t-Ratio	8.272258
log[Li ppm] ccc	1.81787	DF	2
Mean Difference	0.10083	Prob > |t|	0.0143
Std Error	0.01219	Prob > t	0.0072
Upper95%	0.15327	Prob < t	0.9928
Lower95%	0.04838		
N	3		
Correlation	-0.0643		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	2.01624	t-Ratio	8.536903
log[Na ppm] ccc	1.92364	DF	2
Mean Difference	0.0926	Prob > |t|	0.0134
Std Error	0.01085	Prob > t	0.0067
Upper95%	0.13927	Prob < t	0.9933
Lower95%	0.04593		
N	3		
Correlation	-0.5664		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

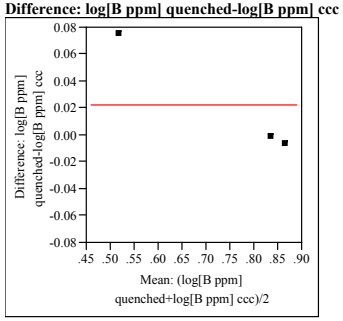


log[Si ppm] quenched	1.84646	t-Ratio	0.960274
log[Si ppm] ccc	1.84164	DF	2
Mean Difference	0.00482	Prob > |t|	0.4382
Std Error	0.00502	Prob > t	0.2191
Upper95%	0.02641	Prob < t	0.7809
Lower95%	-0.0168		
N	3		
Correlation	-0.8257		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

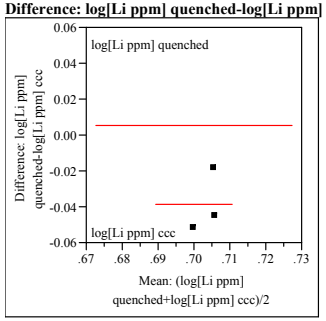
Matched Pairs Glass #=33

Difference: log[B ppm] quenched-log[B ppm] ccc



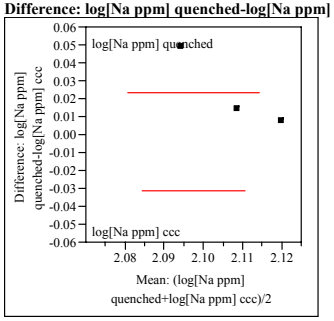
log[B ppm] quenched	0.74976	t-Ratio	0.8277
log[B ppm] ccc	0.72786	DF	2
Mean Difference	0.0219	Prob > |t|	0.4949
Std Error	0.02646	Prob > t	0.2474
Upper95%	0.13577	Prob < t	0.7526
Lower95%	-0.092		
N	3		
Correlation	0.99999		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



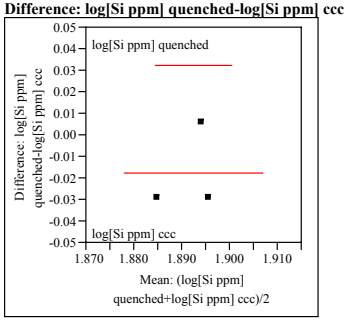
log[Li ppm] quenched	0.68416	t-Ratio	-3.77563
log[Li ppm] ccc	0.72288	DF	2
Mean Difference	-0.0387	Prob > |t|	0.0635
Std Error	0.01025	Prob > t	0.9682
Upper95%	0.0054	Prob < t	0.0318
Lower95%	-0.0828		
N	3		
Correlation	-0.8235		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	2.11911	t-Ratio	1.821401
log[Na ppm] ccc	2.09592	DF	2
Mean Difference	0.02319	Prob > |t|	0.2101
Std Error	0.01273	Prob > t	0.1051
Upper95%	0.07797	Prob < t	0.8949
Lower95%	-0.0316		
N	3		
Correlation	0.45924		

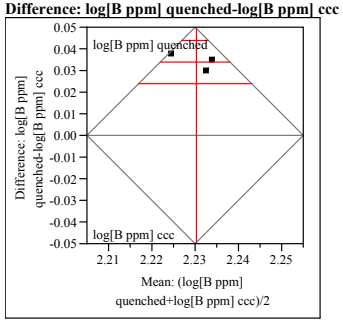
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.88259	t-Ratio	-1.52333
log[Si ppm] ccc	1.90031	DF	2
Mean Difference	-0.0177	Prob > |t|	0.2671
Std Error	0.01163	Prob > t	0.8664
Upper95%	0.03233	Prob < t	0.1336
Lower95%	-0.0678		
N	3		
Correlation	-0.5331		

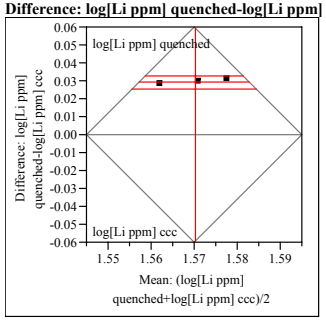
Matched Pairs Glass #=34

Difference: log[B ppm] quenched-log[B ppm] ccc



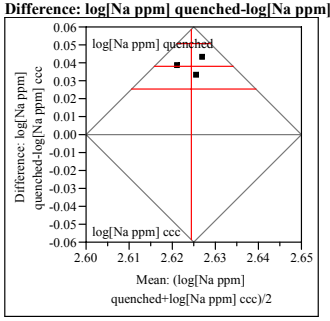
log[B ppm] quenched	2.24715	t-Ratio	14.47072
log[B ppm] ccc	2.21349	DF	2
Mean Difference	0.03366	Prob > |t|	0.0047
Std Error	0.00233	Prob > t	0.0024
Upper95%	0.04366	Prob < t	0.9976
Lower95%	0.02365		
N	3		
Correlation	0.81323		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



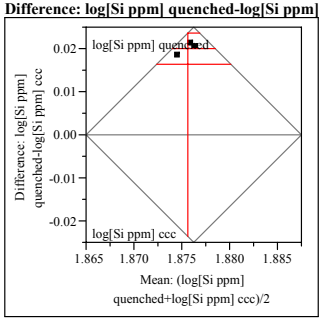
log[Li ppm] quenched	1.58479	t-Ratio	35.45425
log[Li ppm] ccc	1.5556	DF	2
Mean Difference	0.02918	Prob > |t|	0.0008
Std Error	0.00082	Prob > t	0.0004
Upper95%	0.03273	Prob < t	0.9996
Lower95%	0.02564		
N	3		
Correlation	0.99985		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	2.64345	t-Ratio	12.90315
log[Na ppm] ccc	2.60566	DF	2
Mean Difference	0.03778	Prob > |t|	0.0060
Std Error	0.00293	Prob > t	0.0030
Upper95%	0.05038	Prob < t	0.9970
Lower95%	0.02518		
N	3		
Correlation	0.19286		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

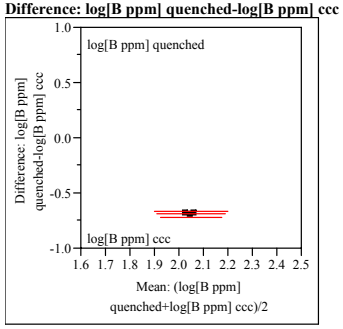


log[Si ppm] quenched	1.88556	t-Ratio	24.02154
log[Si ppm] ccc	1.86564	DF	2
Mean Difference	0.01992	Prob > |t|	0.0017
Std Error	0.00083	Prob > t	0.0009
Upper95%	0.02349	Prob < t	0.9991
Lower95%	0.01635		
N	3		
Correlation	0.5		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

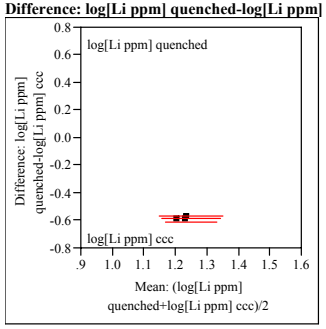
Matched Pairs Glass #=35

Difference: log[B ppm] quenched-log[B ppm] ccc



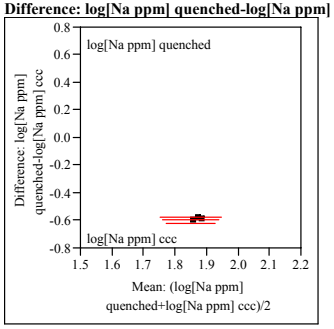
log[B ppm] quenched	1.69629	t-Ratio	-122.207
log[B ppm] ccc	2.38986	DF	2
Mean Difference	-0.6936	Prob > |t|	<.0001
Std Error	0.00568	Prob > t	1.0000
Upper95%	-0.6692	Prob < t	<.0001
Lower95%	-0.718		
N	3		
Correlation	0.87164		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



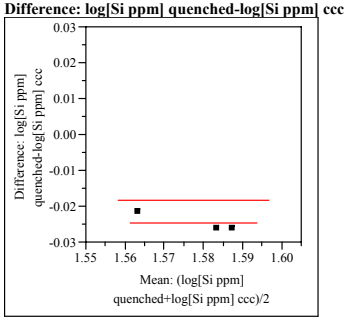
log[Li ppm] quenched	0.92718	t-Ratio	-100.502
log[Li ppm] ccc	1.51762	DF	2
Mean Difference	-0.5904	Prob > |t|	<.0001
Std Error	0.00587	Prob > t	1.0000
Upper95%	-0.5652	Prob < t	<.0001
Lower95%	-0.6157		
N	3		
Correlation	0.82978		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.5725	t-Ratio	-108.138
log[Na ppm] ccc	2.17128	DF	2
Mean Difference	-0.5988	Prob > |t|	<.0001
Std Error	0.00554	Prob > t	1.0000
Upper95%	-0.575	Prob < t	<.0001
Lower95%	-0.6226		
N	3		
Correlation	0.86292		

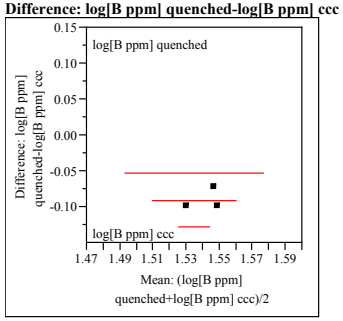
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.56549	t-Ratio	-16.3041
log[Si ppm] ccc	1.5903	DF	2
Mean Difference	-0.0248	Prob > |t|	0.0037
Std Error	0.00152	Prob > t	0.9981
Upper95%	-0.0183	Prob < t	0.0019
Lower95%	-0.0314		
N	3		
Correlation	0.99924		

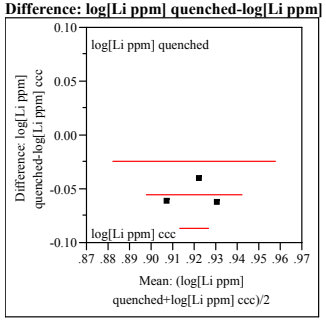
Matched Pairs Glass #=36

Difference: log[B ppm] quenched-log[B ppm] ccc



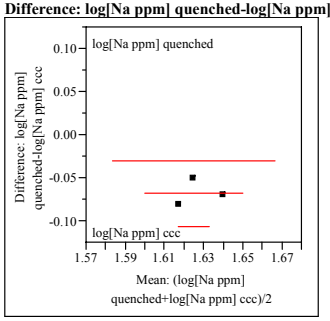
log[B ppm] quenched	1.49584	t-Ratio	-10.4455
log[B ppm] ccc	1.58727	DF	2
Mean Difference	-0.0914	Prob > |t|	0.0090
Std Error	0.00875	Prob > t	0.9955
Upper95%	-0.0538	Prob < t	0.0045
Lower95%	-0.1291		
N	3		
Correlation	0.32915		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



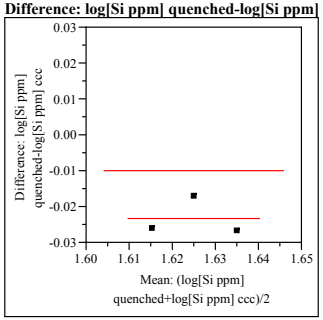
log[Li ppm] quenched	0.89196	t-Ratio	-7.76365
log[Li ppm] ccc	0.94792	DF	2
Mean Difference	-0.056	Prob > |t|	0.0162
Std Error	0.00721	Prob > t	0.9919
Upper95%	-0.0249	Prob < t	0.0081
Lower95%	-0.087		
N	3		
Correlation	0.55695		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.59276	t-Ratio	-7.64874
log[Na ppm] ccc	1.66106	DF	2
Mean Difference	-0.0683	Prob > |t|	0.0167
Std Error	0.00893	Prob > t	0.9917
Upper95%	-0.0299	Prob < t	0.0083
Lower95%	-0.1067		
N	3		
Correlation	0.38129		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

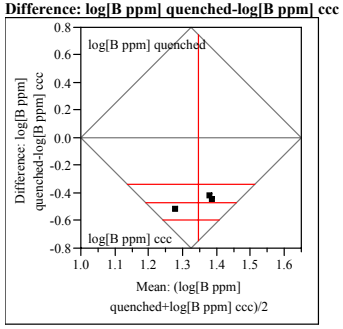


log[Si ppm] quenched	1.6133	t-Ratio	-7.46214
log[Si ppm] ccc	1.63675	DF	2
Mean Difference	-0.0234	Prob > |t|	0.0175
Std Error	0.00314	Prob > t	0.9913
Upper95%	-0.0099	Prob < t	0.0087
Lower95%	-0.037		
N	3		
Correlation	0.85883		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

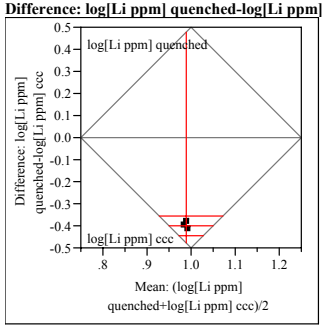
Matched Pairs Glass #=37

Difference: log[B ppm] quenched-log[B ppm] ccc



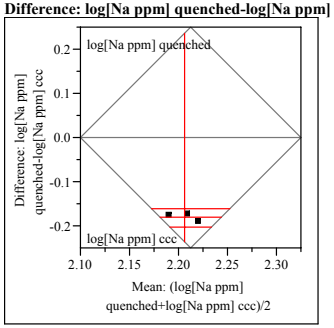
log[B ppm] quenched	1.11413	t-Ratio	-15.3933
log[B ppm] ccc	1.58137	DF	2
Mean Difference	-0.4672	Prob > |t|	0.0042
Std Error	0.03035	Prob > t	0.9979
Upper95%	-0.3366	Prob < t	0.0021
Lower95%	-0.5978		
N	3		
Correlation	0.95295		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



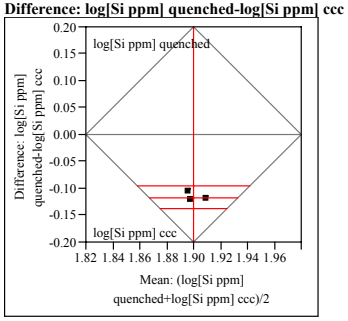
log[Li ppm] quenched	0.78805	t-Ratio	-40.0206
log[Li ppm] ccc	1.18822	DF	2
Mean Difference	-0.4002	Prob > |t|	0.0006
Std Error	0.01	Prob > t	0.9997
Upper95%	-0.3571	Prob < t	0.0003
Lower95%	-0.4432		
N	3		
Correlation	-0.7165		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	2.1157	t-Ratio	-36.4016
log[Na ppm] ccc	2.29715	DF	2
Mean Difference	-0.1815	Prob > |t|	0.0008
Std Error	0.00498	Prob > t	0.9996
Upper95%	-0.16	Prob < t	0.0004
Lower95%	-0.2029		
N	3		
Correlation	0.92258		

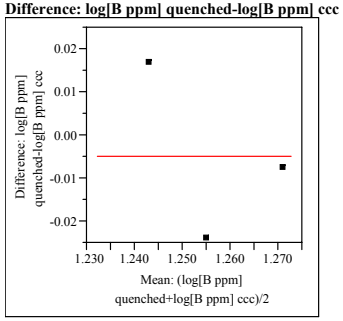
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.84196	t-Ratio	-22.926
log[Si ppm] ccc	1.9587	DF	2
Mean Difference	-0.1167	Prob > |t|	0.0019
Std Error	0.00509	Prob > t	0.9991
Upper95%	-0.0948	Prob < t	0.0009
Lower95%	-0.1386		
N	3		
Correlation	0.52864		

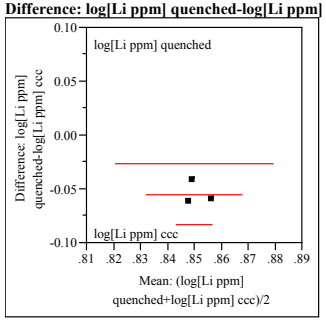
Matched Pairs Glass #=38

Difference: log[B ppm] quenched-log[B ppm] ccc



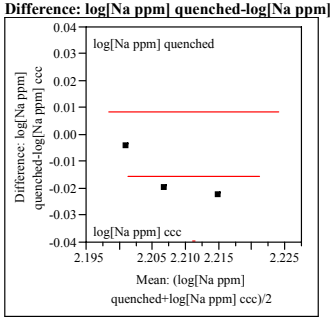
log[B ppm] quenched	1.25382	t-Ratio	-0.43277
log[B ppm] ccc	1.25894	DF	2
Mean Difference	-0.0051	Prob > |t|	0.7074
Std Error	0.01182	Prob > t	0.6463
Upper95%	0.04573	Prob < t	0.3537
Lower95%	-0.056		
N	3		
Correlation	0.35774		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



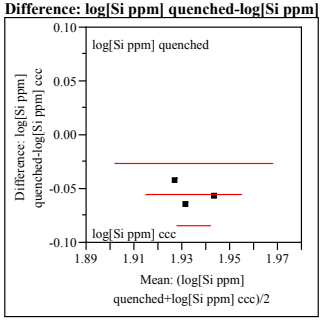
log[Li ppm] quenched	0.82352	t-Ratio	-8.39666
log[Li ppm] ccc	0.87854	DF	2
Mean Difference	-0.055	Prob > |t|	0.0139
Std Error	0.00655	Prob > t	0.9931
Upper95%	-0.0268	Prob < t	0.0069
Lower95%	-0.0832		
N	3		
Correlation	-0.2072		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	2.19972	t-Ratio	-2.79623
log[Na ppm] ccc	2.21534	DF	2
Mean Difference	-0.0156	Prob > |t|	0.1076
Std Error	0.00558	Prob > t	0.9462
Upper95%	0.00841	Prob < t	0.0538
Lower95%	-0.0396		
N	3		
Correlation	0.63589		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

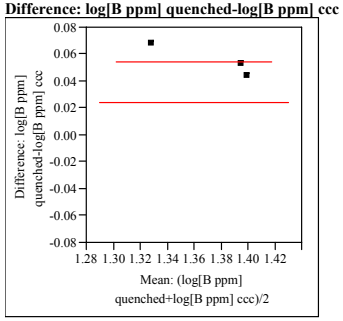


log[Si ppm] quenched	1.90635	t-Ratio	-8.16131
log[Si ppm] ccc	1.96184	DF	2
Mean Difference	-0.0555	Prob > |t|	0.0147
Std Error	0.0068	Prob > t	0.9927
Upper95%	-0.0262	Prob < t	0.0073
Lower95%	-0.0847		
N	3		
Correlation	0.37604		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

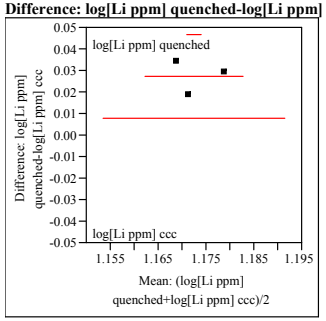
Matched Pairs Glass #=39

Difference: log[B ppm] quenched-log[B ppm] ccc



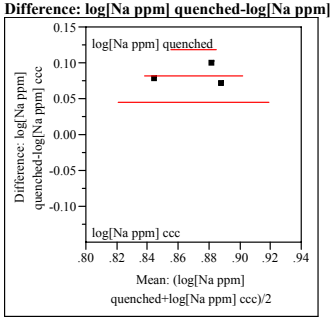
log[B ppm] quenched	1.40092	t-Ratio	7.586194
log[B ppm] ccc	1.34631	DF	2
Mean Difference	0.05462	Prob > |t|	0.0169
Std Error	0.0072	Prob > t	0.0085
Upper95%	0.08559	Prob < t	0.9915
Lower95%	0.02364		
N	3		
Correlation	0.99492		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



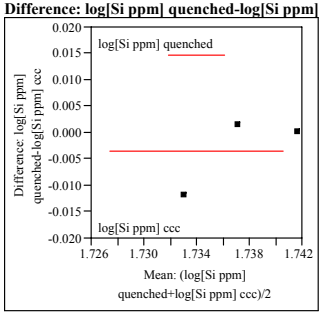
log[Li ppm] quenched	1.1864	t-Ratio	6.009573
log[Li ppm] ccc	1.15934	DF	2
Mean Difference	0.02706	Prob > |t|	0.0266
Std Error	0.0045	Prob > t	0.0133
Upper95%	0.04643	Prob < t	0.9867
Lower95%	0.00769		
N	3		
Correlation	0.28617		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	0.91185	t-Ratio	9.495575
log[Na ppm] ccc	0.83067	DF	2
Mean Difference	0.08118	Prob > |t|	0.0109
Std Error	0.00855	Prob > t	0.0055
Upper95%	0.11797	Prob < t	0.9945
Lower95%	0.0444		
N	3		
Correlation	0.82107		

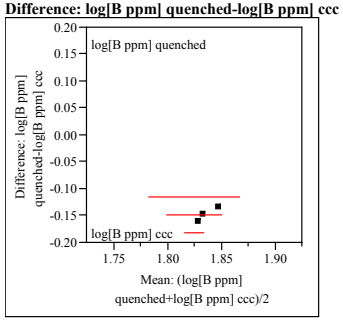
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.73547	t-Ratio	-0.84006
log[Si ppm] ccc	1.73905	DF	2
Mean Difference	-0.0036	Prob > |t|	0.4893
Std Error	0.00425	Prob > t	0.7554
Upper95%	0.01473	Prob < t	0.2446
Lower95%	-0.0219		
N	3		
Correlation	0.25863		

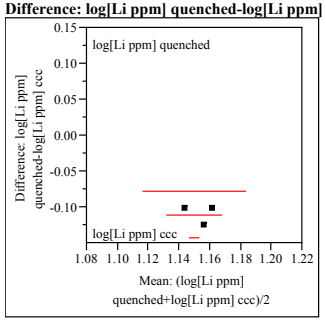
Matched Pairs Glass #=40

Difference: log[B ppm] quenched-log[B ppm] ccc



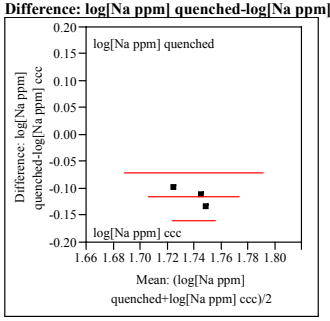
log[B ppm] quenched	1.76156	t-Ratio	-18.9705
log[B ppm] ccc	1.91026	DF	2
Mean Difference	-0.1487	Prob > |t|	0.0028
Std Error	0.00784	Prob > t	0.9986
Upper95%	-0.115	Prob < t	0.0014
Lower95%	-0.1824		
N	3		
Correlation	0.76927		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



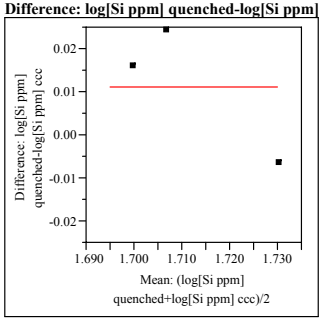
log[Li ppm] quenched	1.09838	t-Ratio	-14.6096
log[Li ppm] ccc	1.20956	DF	2
Mean Difference	-0.1112	Prob > |t|	0.0047
Std Error	0.00761	Prob > t	0.9977
Upper95%	-0.0784	Prob < t	0.0023
Lower95%	-0.1439		
N	3		
Correlation	0.31011		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.68172	t-Ratio	-11.2277
log[Na ppm] ccc	1.79785	DF	2
Mean Difference	-0.1161	Prob > |t|	0.0078
Std Error	0.01034	Prob > t	0.9961
Upper95%	-0.0716	Prob < t	0.0039
Lower95%	-0.1606		
N	3		
Correlation	0.61771		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

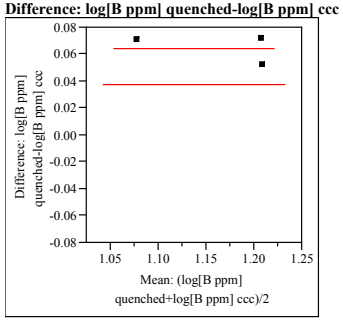


log[Si ppm] quenched	1.71779	t-Ratio	1.203059
log[Si ppm] ccc	1.70668	DF	2
Mean Difference	0.01111	Prob > |t|	0.3520
Std Error	0.00924	Prob > t	0.1760
Upper95%	0.05086	Prob < t	0.8240
Lower95%	-0.0286		
N	3		
Correlation	0.85271		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

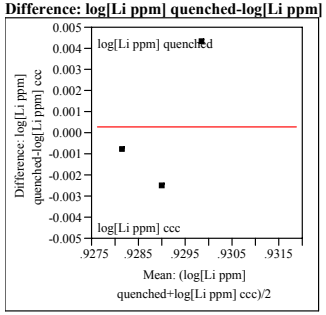
Matched Pairs Glass #=41

Difference: log[B ppm] quenched-log[B ppm] ccc



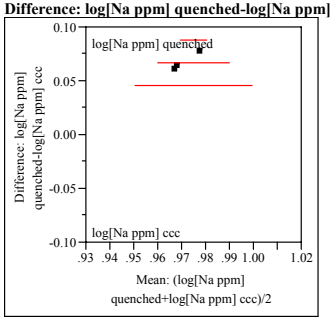
log[B ppm] quenched	1.19686	t-Ratio	10.37207
log[B ppm] ccc	1.13258	DF	2
Mean Difference	0.06428	Prob > |t|	0.0092
Std Error	0.0062	Prob > t	0.0046
Upper95%	0.09094	Prob < t	0.9954
Lower95%	0.03761		
N	3		
Correlation	0.99217		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



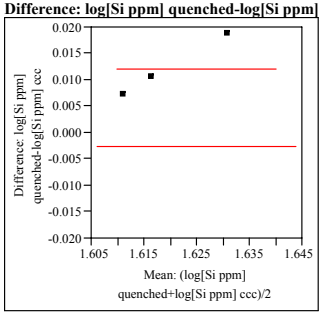
log[Li ppm] quenched	0.92914	t-Ratio	0.137218
log[Li ppm] ccc	0.92886	DF	2
Mean Difference	0.00028	Prob > |t|	0.9034
Std Error	0.00205	Prob > t	0.4517
Upper95%	0.00909	Prob < t	0.5483
Lower95%	-0.0085		
N	3		
Correlation	-0.7564		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.00425	t-Ratio	13.76067
log[Na ppm] ccc	0.93758	DF	2
Mean Difference	0.06667	Prob > |t|	0.0052
Std Error	0.00485	Prob > t	0.0026
Upper95%	0.08752	Prob < t	0.9974
Lower95%	0.04583		
N	3		
Correlation	0.92511		

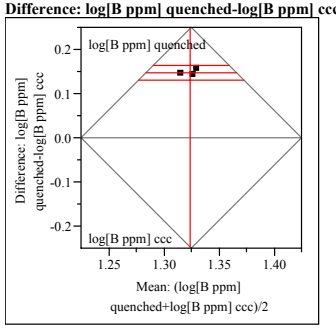
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.62541	t-Ratio	3.529334
log[Si ppm] ccc	1.61334	DF	2
Mean Difference	0.01208	Prob > |t|	0.0717
Std Error	0.00342	Prob > t	0.0359
Upper95%	0.0268	Prob < t	0.9641
Lower95%	-0.0026		
N	3		
Correlation	0.99978		

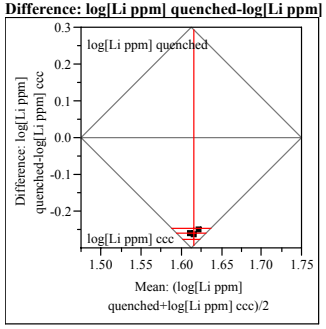
Matched Pairs Glass #=42

Difference: log[B ppm] quenched-log[B ppm] ccc



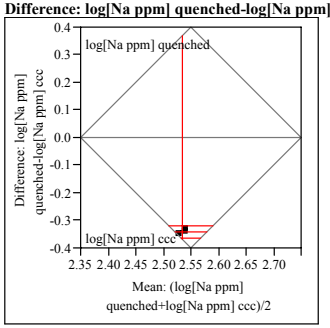
log[B ppm] quenched	1.3969	t-Ratio	35.57694
log[B ppm] ccc	1.24986	DF	2
Mean Difference	0.14705	Prob > |t|	0.0008
Std Error	0.00413	Prob > t	0.0004
Upper95%	0.16483	Prob < t	0.9996
Lower95%	0.12926		
N	3		
Correlation	0.72156		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



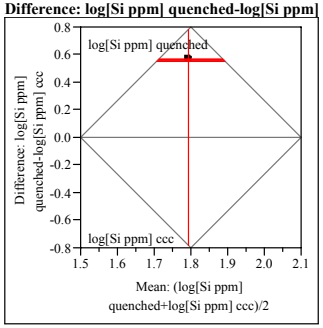
log[Li ppm] quenched	1.48505	t-Ratio	-68.9929
log[Li ppm] ccc	1.74646	DF	2
Mean Difference	-0.2614	Prob > |t|	0.0002
Std Error	0.00379	Prob > t	0.9999
Upper95%	-0.2451	Prob < t	0.0001
Lower95%	-0.2777		
N	3		
Correlation	0.50307		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	2.36375	t-Ratio	-67.7365
log[Na ppm] ccc	2.70662	DF	2
Mean Difference	-0.3429	Prob > |t|	0.0002
Std Error	0.00506	Prob > t	0.9999
Upper95%	-0.3211	Prob < t	0.0001
Lower95%	-0.3646		
N	3		
Correlation	0.50379		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

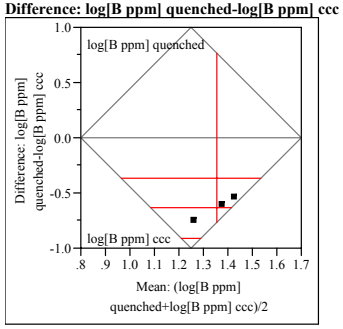


log[Si ppm] quenched	2.07209	t-Ratio	200.441
log[Si ppm] ccc	1.51188	DF	2
Mean Difference	0.56021	Prob > |t|	<.0001
Std Error	0.00279	Prob > t	<.0001
Upper95%	0.57224	Prob < t	1.0000
Lower95%	0.54819		
N	3		
Correlation	-0.693		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

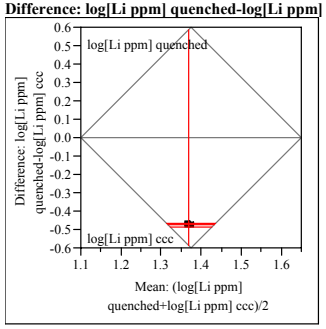
Matched Pairs Glass #=43

Difference: log[B ppm] quenched-log[B ppm] ccc



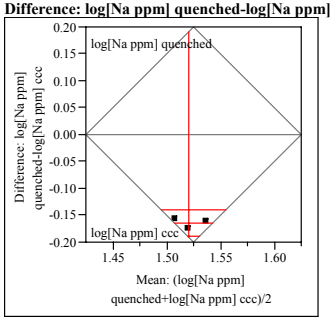
log[B ppm] quenched	1.03612	t-Ratio	-9.99418
log[B ppm] ccc	1.67296	DF	2
Mean Difference	-0.6368	Prob > |t|	0.0099
Std Error	0.06372	Prob > t	0.9951
Upper95%	-0.3627	Prob < t	0.0049
Lower95%	-0.911		
N	3		
Correlation	0.99931		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



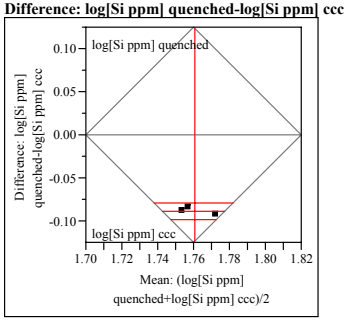
log[Li ppm] quenched	1.13175	t-Ratio	-180.592
log[Li ppm] ccc	1.60742	DF	2
Mean Difference	-0.4757	Prob > |t|	<.0001
Std Error	0.00263	Prob > t	1.0000
Upper95%	-0.4643	Prob < t	<.0001
Lower95%	-0.487		
N	3		
Correlation	0.83679		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.4383	t-Ratio	-29.1316
log[Na ppm] ccc	1.60366	DF	2
Mean Difference	-0.1654	Prob > |t|	0.0012
Std Error	0.00568	Prob > t	0.9994
Upper95%	-0.1409	Prob < t	0.0006
Lower95%	-0.1898		
N	3		
Correlation	0.80839		

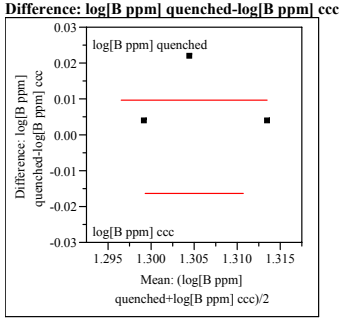
Difference: log[Si ppm] quenched-log[Si ppm] ccc



log[Si ppm] quenched	1.71642	t-Ratio	-38.0699
log[Si ppm] ccc	1.80533	DF	2
Mean Difference	-0.0889	Prob > |t|	0.0007
Std Error	0.00234	Prob > t	0.9997
Upper95%	-0.0789	Prob < t	0.0003
Lower95%	-0.099		
N	3		
Correlation	0.95891		

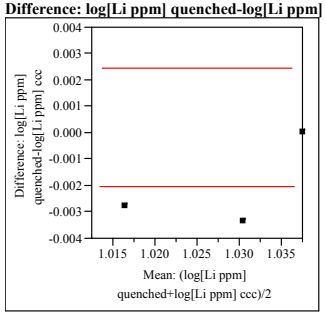
Matched Pairs Glass #=44

Difference: log[B ppm] quenched-log[B ppm] ccc



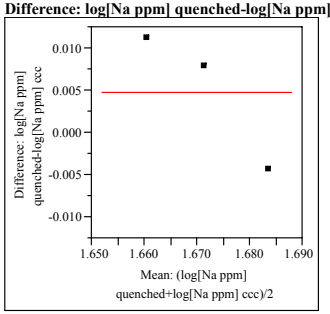
log[B ppm] quenched	1.31053	t-Ratio	1.597065
log[B ppm] ccc	1.30097	DF	2
Mean Difference	0.00956	Prob > |t|	0.2513
Std Error	0.00599	Prob > t	0.1257
Upper95%	0.03533	Prob < t	0.8743
Lower95%	-0.0162		
N	3		
Correlation	0.32406		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



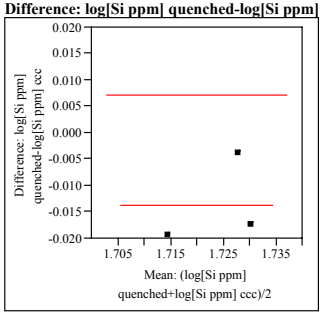
log[Li ppm] quenched	1.02703	t-Ratio	-1.97341
log[Li ppm] ccc	1.02909	DF	2
Mean Difference	-0.0021	Prob > |t|	0.1872
Std Error	0.00104	Prob > t	0.9064
Upper95%	0.00242	Prob < t	0.0936
Lower95%	-0.0065		
N	3		
Correlation	0.99166		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.67411	t-Ratio	1.006492
log[Na ppm] ccc	1.66935	DF	2
Mean Difference	0.00476	Prob > |t|	0.4202
Std Error	0.00473	Prob > t	0.2101
Upper95%	0.02512	Prob < t	0.7899
Lower95%	-0.0156		
N	3		
Correlation	0.97481		

Difference: log[Si ppm] quenched-log[Si ppm] ccc

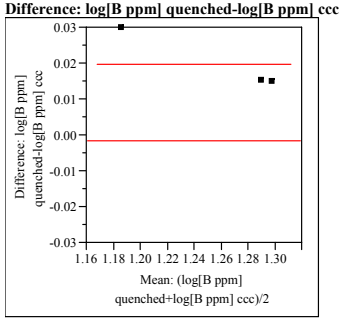


log[Si ppm] quenched	1.71731	t-Ratio	-2.82199
log[Si ppm] ccc	1.73102	DF	2
Mean Difference	-0.0137	Prob > |t|	0.1060
Std Error	0.00486	Prob > t	0.9470
Upper95%	0.00719	Prob < t	0.0530
Lower95%	-0.0346		
N	3		
Correlation	0.65128		

Exhibit B7. Effects of Heat Treatment on PCT log(ppm)-Response of Study Glasses

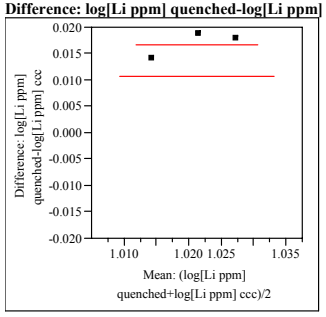
Matched Pairs Glass #=45

Difference: log[B ppm] quenched-log[B ppm] ccc



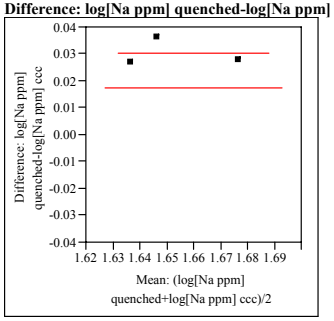
log[B ppm] quenched	1.26751	t-Ratio	3.942321
log[B ppm] ccc	1.24779	DF	2
Mean Difference	0.01973	Prob > |t|	0.0587
Std Error	0.005	Prob > t	0.0294
Upper95%	0.04126	Prob < t	0.9706
Lower95%	-0.0018		
N	3		
Correlation	0.99998		

Difference: log[Li ppm] quenched-log[Li ppm] ccc



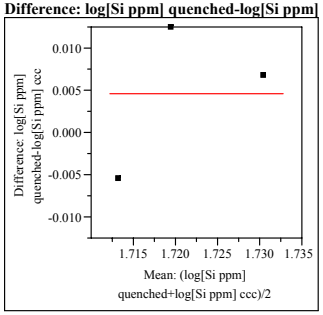
log[Li ppm] quenched	1.02935	t-Ratio	11.96197
log[Li ppm] ccc	1.01259	DF	2
Mean Difference	0.01676	Prob > |t|	0.0069
Std Error	0.0014	Prob > t	0.0035
Upper95%	0.02279	Prob < t	0.9965
Lower95%	0.01073		
N	3		
Correlation	0.97389		

Difference: log[Na ppm] quenched-log[Na ppm] ccc



log[Na ppm] quenched	1.66818	t-Ratio	10.15427
log[Na ppm] ccc	1.63814	DF	2
Mean Difference	0.03004	Prob > |t|	0.0096
Std Error	0.00296	Prob > t	0.0048
Upper95%	0.04277	Prob < t	0.9952
Lower95%	0.01731		
N	3		
Correlation	0.9714		

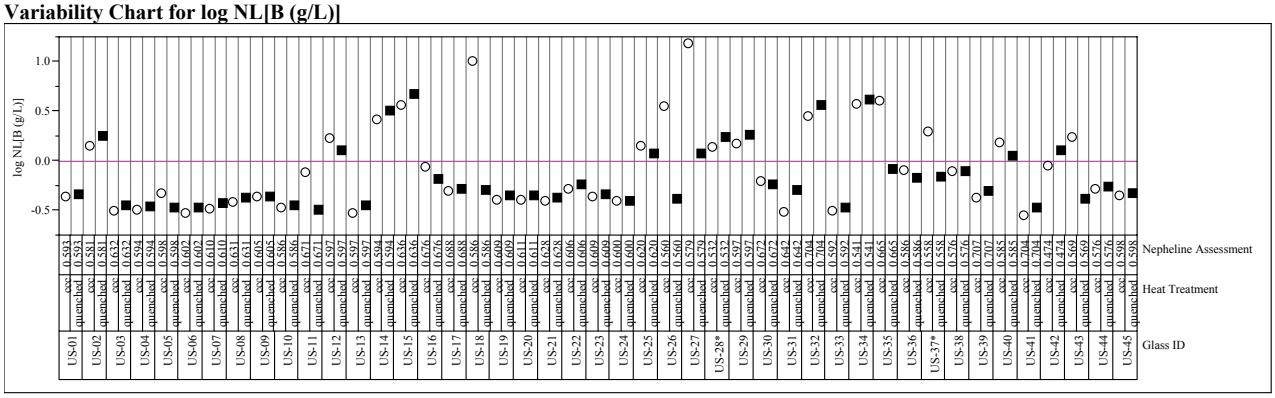
Difference: log[Si ppm] quenched-log[Si ppm] ccc



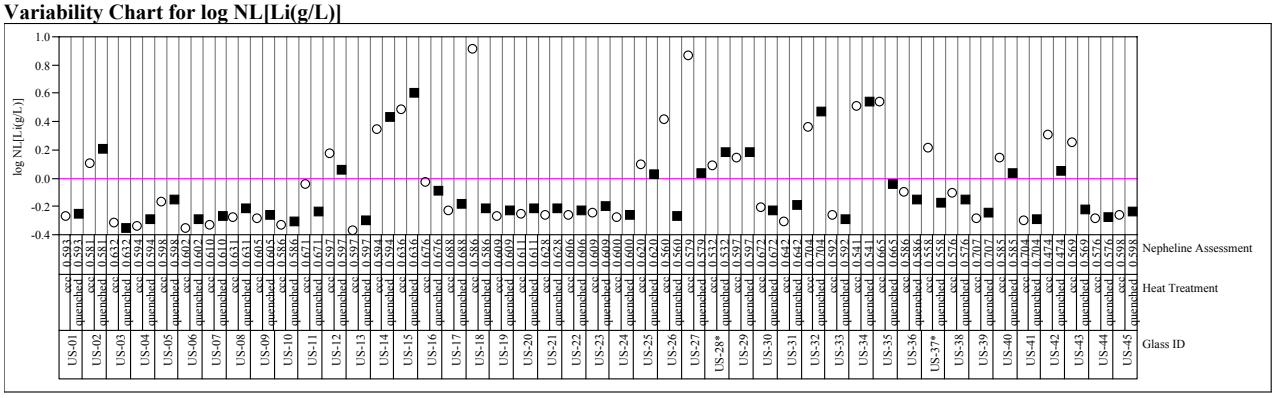
log[Si ppm] quenched	1.72327	t-Ratio	0.849206
log[Si ppm] ccc	1.71875	DF	2
Mean Difference	0.00452	Prob > |t|	0.4852
Std Error	0.00532	Prob > t	0.2426
Upper95%	0.02742	Prob < t	0.7574
Lower95%	-0.0184		
N	3		
Correlation	0.62832		

Exhibit B8. Normalized PCT Responses for Both Heat Treatments of the Study Glasses by Compositional View

Variability Gage Comp View=measured
Variability Chart for log NL[B (g/L)]



Variability Gage Comp View=measured
Variability Chart for log NL[Li(g/L)]



Variability Gage Comp View=measured
Variability Chart for log NL[Na (g/L)]

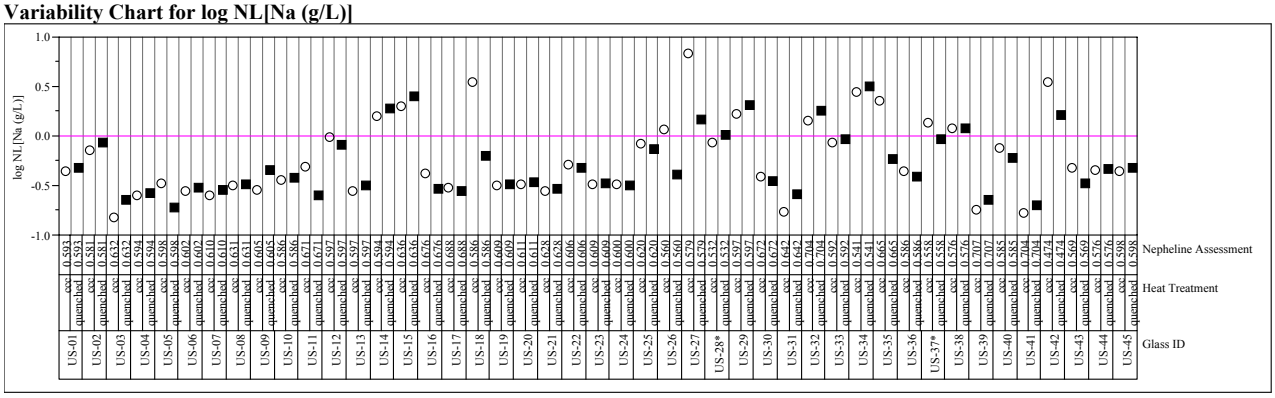
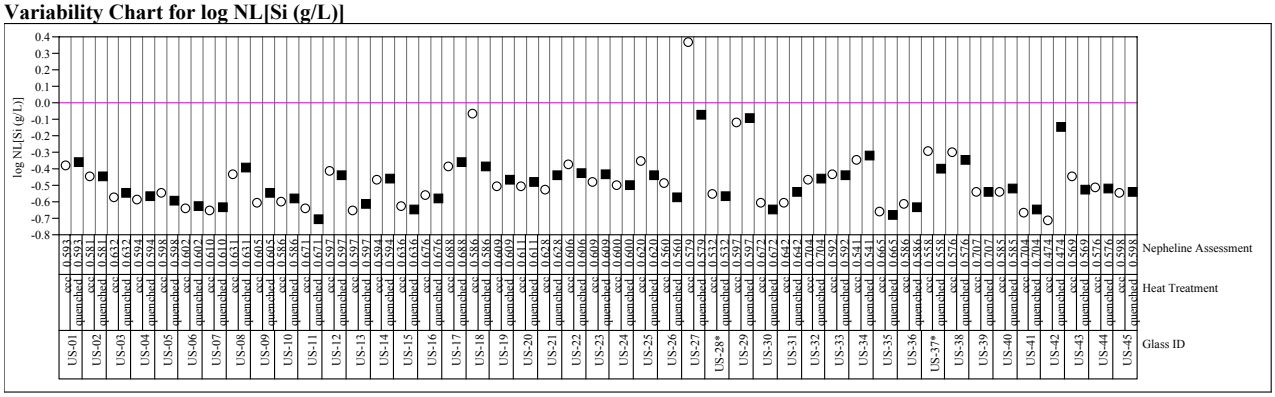
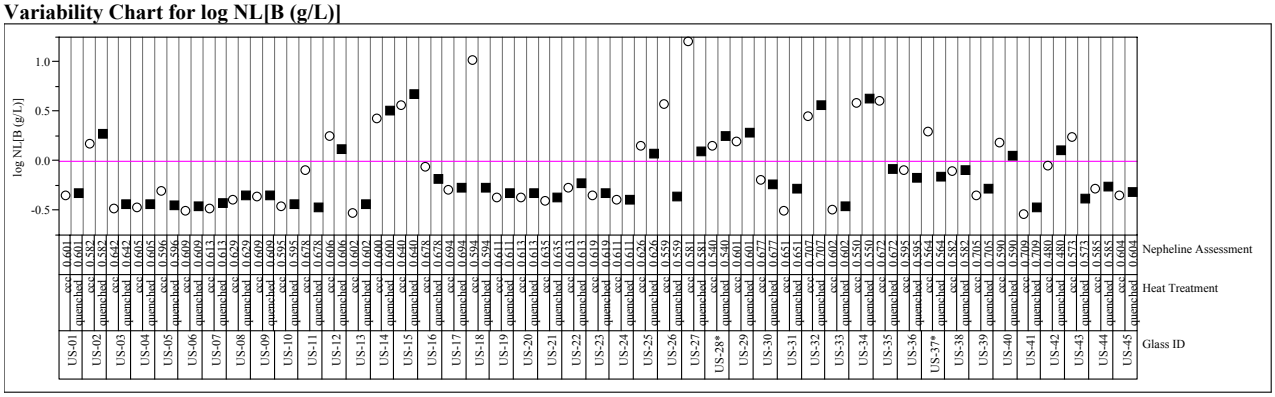


Exhibit B8. Normalized PCT Responses for Both Heat Treatments of the Study Glasses by Compositional View

Variability Gage Comp View=measured
Variability Chart for log NL[Si (g/L)]



Variability Gage Comp View=measured bc
Variability Chart for log NL[B (g/L)]



Variability Gage Comp View=measured bc
Variability Chart for log NL[Li(g/L)]

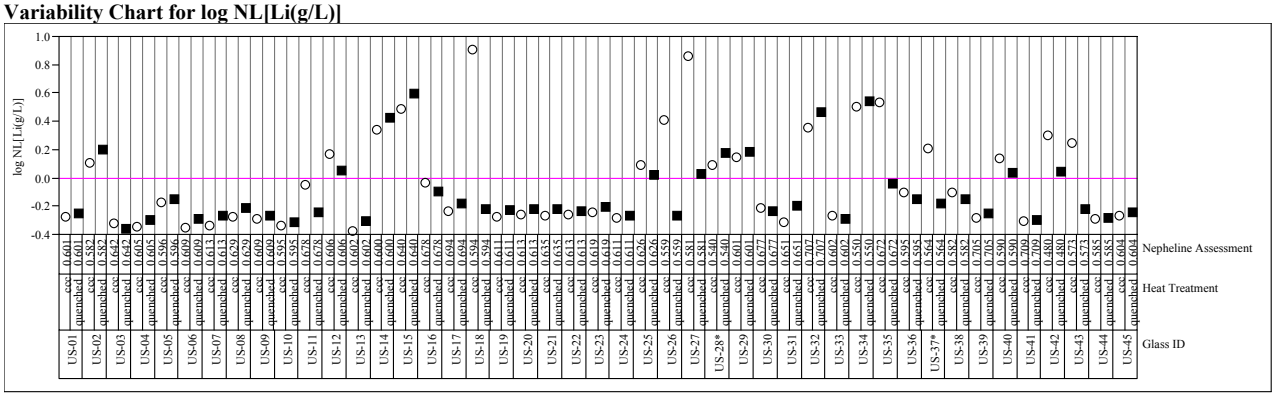
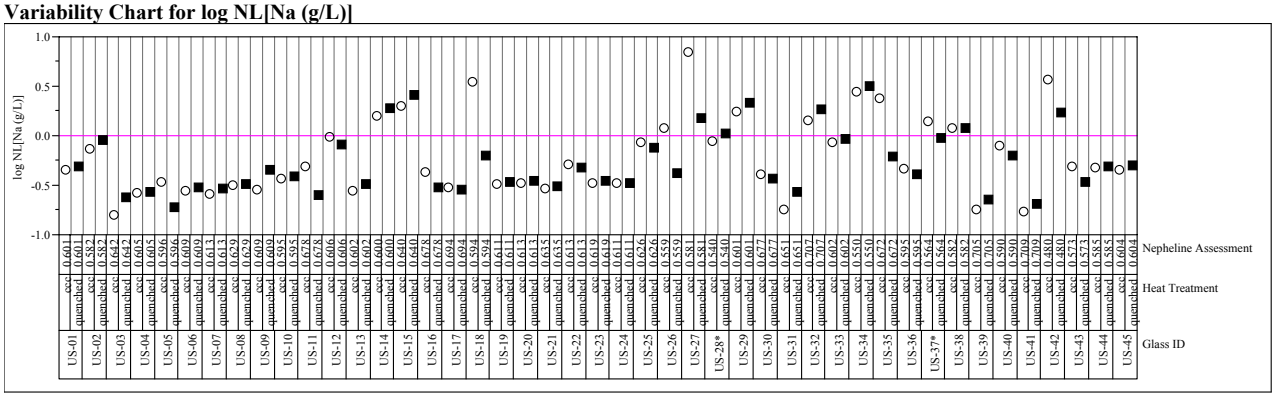
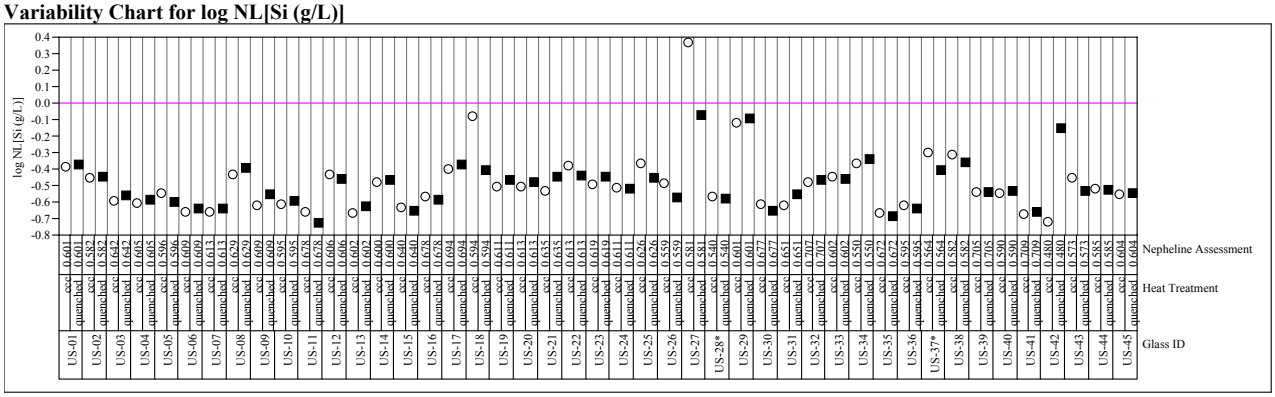


Exhibit B8. Normalized PCT Responses for Both Heat Treatments of the Study Glasses by Compositional View

Variability Gage Comp View=measured bc
Variability Chart for log NL[Na (g/L)]



Variability Gage Comp View=measured bc
Variability Chart for log NL[Si (g/L)]



Variability Gage Comp View=target
Variability Chart for log NL[B (g/L)]

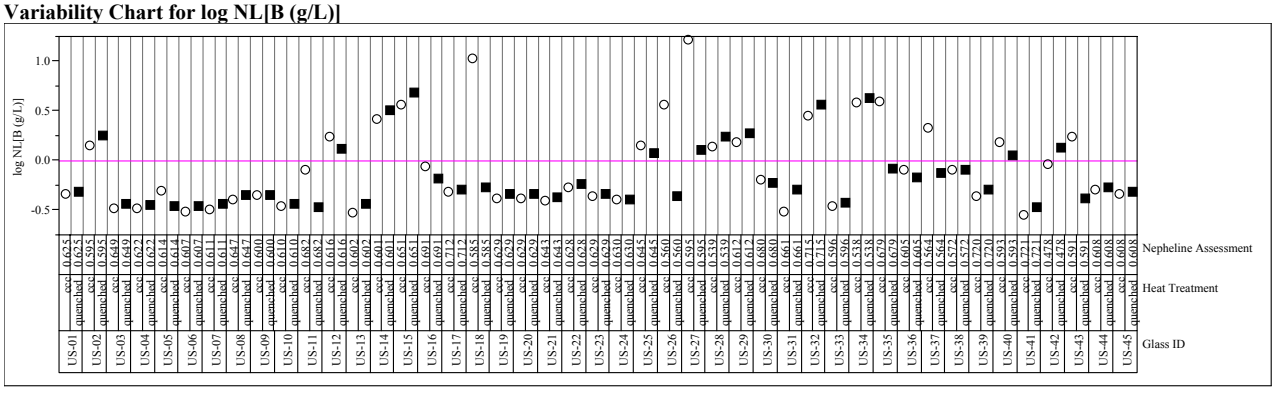
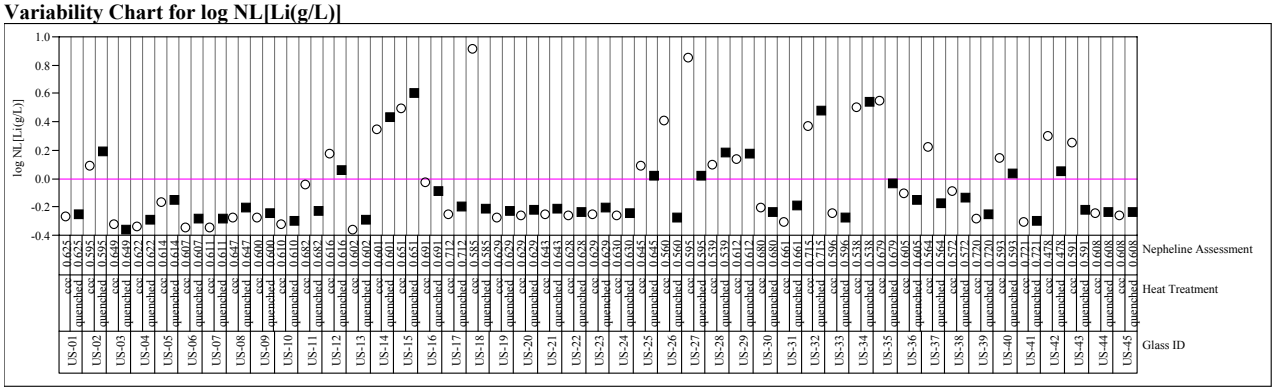
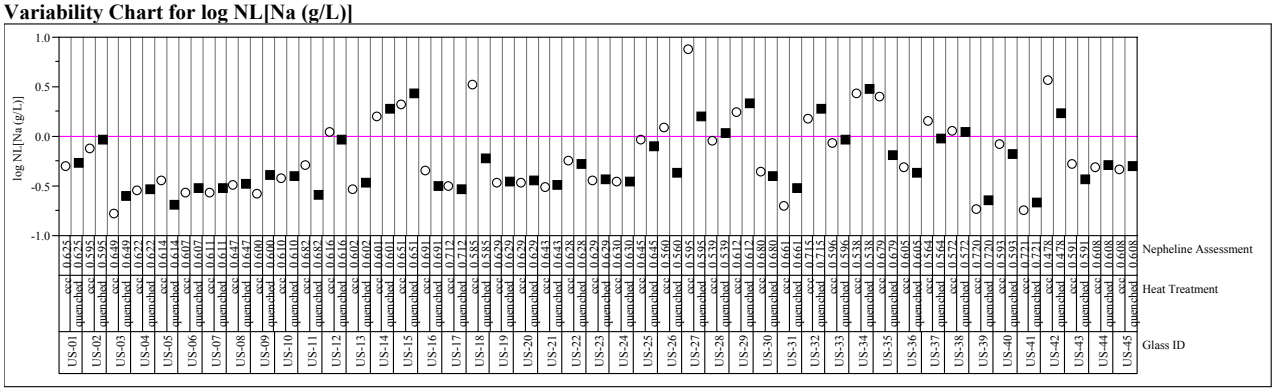


Exhibit B8. Normalized PCT Responses for Both Heat Treatments of the Study Glasses by Compositional View

Variability Gage Comp View=target
Variability Chart for log NL[Li(g/L)]



Variability Gage Comp View=target
Variability Chart for log NL[Na (g/L)]



Variability Gage Comp View=target
Variability Chart for log NL[Si (g/L)]