

SDG COVER PAGE

Lab Name: Alliance Technical Group, LLC Contract: 68HERH20D0011
Lab Code: ACE Case No.: 51988 MA No.: _____ SDG No.: MBHHA0
SOW No. : SFAM01.1

EPA Sample No.	Lab Sample Id	ICP-AES	Analysis Method		
			ICP-MS	Mercury	Cyanide
<u>MBHHA0</u>	<u>Q1272-01</u>	<u>X</u>	_____	_____	_____
<u>MBHHA1</u>	<u>Q1272-02</u>	<u>X</u>	_____	_____	_____
<u>MBHHA2</u>	<u>Q1272-03</u>	<u>X</u>	_____	_____	_____
<u>MBHHA2D</u>	<u>Q1272-04</u>	<u>X</u>	_____	_____	_____
<u>MBHHA2S</u>	<u>Q1272-05</u>	<u>X</u>	_____	_____	_____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the SDG Narrative. All edits and manual integrations have been peer-reviewed. Release of the data contained in this hardcopy Complete SDG File and in the electronic data submitted has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: _____
Date: _____ Title: _____

CHAIN OF CUSTODY RECORD

No: 3-013125-091046 0006

Case #: 51988

Cooler #: 1

Lab: Alliance Technical Group L.L.S

Lab Contact: Mohammad Ahmied

Lab Phone: 908-789-8900

[illegible]

Shipment for Case Completely
Samples Transferred From Chain of Custody #

Analysis Key: ICP-AES=CLP ICP AES 11+ Metals, TCLP ICP-AES=CLP TCLP ICP-AES Metals

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	<i>[Signature]</i> (Sevenson)	1/31/25 1000	<i>[Signature]</i>	2/11/25	1.2" IDent
				9:25	Temp blend
					Cell count

FORM DC-1
SAMPLE LOG-IN SHEET

Lab Name : Alliance Technical Group, LLC		Page <u>1</u> of <u>1</u>
Received By (Print Name) <u>Cassanova Rex</u>		Log-in Date 2/1/2025
Received By (Signature) <u>[Signature]</u>		
Case Number 51988	SDG No. MBHHA0	MA No. N/A

Remarks:	
1. Custody Seal (s)	Present, Intact
2. Custody Seal Nos.	<u>n/a</u>
3. Traffic Reports/Chain Of Custody Records	Present
4. Airbill	Present
5. Airbill No. and Shipping Container ID No.	<u>771794230518</u> <u>1</u>
6. Shipping Container Temperature Indicator Bottle	Present
7. Shipping Container Temperature	<u>1.2</u> Degree C
8. Sample Condition	Intact
9. Sample Tags Sample Tag Numbers	Absent Listed on Traffic Report
10. Does information on Traffic Reports/Chain of Custody Records and Sample Tags agree ?	Yes
11. Date Received at Lab	<u>02/01/2025</u>
12. Time Received	<u>09:25</u>

	EPA Sample #	Aqueous/ Water Sample pH	Corresponding		Remarks: Condition of Sample Shipment, etc.
			Sample Tag #	Assigned Lab #	
1	MBHHA0	N/A	1113	Q1272-01	Intact
2	MBHHA1	N/A	1099	Q1272-02	Intact
3	MBHHA2	N/A	1106	Q1272-03	Intact
4	MBHHA2D	N/A	1106	Q1272-04	Intact
5	MBHHA2S	N/A	1106	Q1272-05	Intact
6	N/A	N/A	N/A	N/A	N/A
7	N/A	N/A	N/A	N/A	N/A
8	N/A	N/A	N/A	N/A	N/A
9	N/A	N/A	N/A	N/A	N/A
10	N/A	N/A	N/A	N/A	N/A
11	N/A	N/A	N/A	N/A	N/A
12	N/A	N/A	N/A	N/A	N/A
13	N/A	N/A	N/A	N/A	N/A
14	N/A	N/A	N/A	N/A	N/A
15	N/A	N/A	N/A	N/A	N/A
16	N/A	N/A	N/A	N/A	N/A
17	N/A	N/A	N/A	N/A	N/A
18	N/A	N/A	N/A	N/A	N/A
19	N/A	N/A	N/A	N/A	N/A
20	N/A	N/A	N/A	N/A	N/A
21	N/A	N/A	N/A	N/A	N/A
22	N/A	N/A	N/A	N/A	N/A
23	N/A	N/A	N/A	N/A	N/A

* Contact SMO and attach record of resolution

Reviewed By <u>[Signature]</u>	Logbook No. N/A
Date <u>2/1/25</u>	Logbook Page No. N/A

FORM DC-2
COMPLETE SDG FILE (CSF) INVENTORY SHEET

LAB NAME	Alliance Technical Group, LLC		
LAB CODE	ACE		
CONTRACT NO.	68HERH20D0011		
CASE NO.	51988	SDG NO.	MBHHA0
MA NO.		SOW NO.	SFAM01.1

All documents delivered in the Complete SDG File must be original documents where possible.
(Reference - Exhibit B Section 2.4)

	PAGE NOS:		CHECK	
	FROM	TO	LAB	REGION
1. SDG Cover Page	1	1	✓	
2. Traffic Report/Chain of Custody Record(s)	2	2	✓	
3. Sample Log-In Sheet (DC-1)	3	3	✓	
4. CSF Inventory Sheet (DC-2)	4	6	✓	
5. SDG Narrative	7	9	✓	
6. Communication Logs	10	11	✓	
7. Percent Solids Log	12	13	✓	
Analysis Forms and Data (ICP-AES)				
8. Sample Analysis Data Forms (1A-OR, 1B-OR, and 1-IN) for each sample or sample analysis, laboratory QC as applicable	14	16	✓	
9. Instrument raw data by instrument in analysis order	17	184	✓	
Other Data				
10. Standard and Reagent Preparation Logs	185	338	✓	
11. Original Preparation and Cleanup forms or copies of Preparation and Cleanup Logbooks	339	340	✓	
12. Original Analysis or Instrument Run forms or copies of Analysis or Instrument Logbooks	341	343	✓	
13. Performance Evaluation (PE)/Proficiency Testing (PT) Sample Instructions	NA	NA	✓	
14. Extraction Logs for TCLP and SPLP	NA	NA	✓	
15. Raw GPC Data	NA	NA	✓	
16. Raw Florisil Data	NA	NA	✓	
Analysis Forms and Data (ICP-MS)				
17. Sample Analysis Data Forms (1A-OR, 1B-OR, and 1-IN) for each sample or sample analysis, laboratory QC as applicable	NA	NA	✓	
18. Instrument raw data by instrument in analysis order	NA	NA	✓	
Other Data				
19. Standard and Reagent Preparation Logs	NA	NA	✓	
20. Original Preparation and Cleanup forms or copies of Preparation and Cleanup Logbooks	NA	NA	✓	
21. Original Analysis or Instrument Run forms or copies of Analysis or Instrument Logbooks	NA	NA	✓	
22. Performance Evaluation (PE)/Proficiency Testing (PT) Sample Instructions	NA	NA	✓	

- 23 . Extraction Logs for TCLP and SPLP
- 24 . Raw GPC Data
- 25 . Raw Florisil Data

PAGE NOS:		CHECK	
FROM	TO	LAB	REGION
NA	NA	✓	
NA	NA	✓	
NA	NA	✓	

Analysis Forms and Data (Mercury)

- 26 . Sample Analysis Data Forms (1A-OR, 1B-OR, and 1-IN) for each sample or sample analysis, laboratory QC as applicable
- 27 . Instrument raw data by instrument in analysis order

NA	NA	✓	
NA	NA	✓	

Other Data

- 28 . Standard and Reagent Preparation Logs
- 29 . Original Preparation and Cleanup forms or copies of Preparation and Cleanup Logbooks
- 30 . Original Analysis or Instrument Run forms or copies of Analysis or Instrument Logbooks
- 31 . Performance Evaluation (PE)/Proficiency Testing (PT) Sample Instructions
- 32 . Extraction Logs for TCLP and SPLP
- 33 . Raw GPC Data
- 34 . Raw Florisil Data

NA	NA	✓	
NA	NA	✓	
NA	NA	✓	
NA	NA	✓	
NA	NA	✓	
NA	NA	✓	
NA	NA	✓	

Analysis Forms and Data (Cyanide)

- 35 . Sample Analysis Data Forms (1A-OR, 1B-OR, and 1-IN) for each sample or sample analysis, laboratory QC as applicable
- 36 . Instrument raw data by instrument in analysis order

NA	NA	✓	
NA	NA	✓	

Other Data

- 37 . Standard and Reagent Preparation Logs
- 38 . Original Preparation and Cleanup forms or copies of Preparation and Cleanup Logbooks
- 39 . Original Analysis or Instrument Run forms or copies of Analysis or Instrument Logbooks
- 40 . Performance Evaluation (PE)/Proficiency Testing (PT) Sample Instructions
- 41 . Extraction Logs for TCLP and SPLP
- 42 . Raw GPC Data
- 43 . Raw Florisil Data

NA	NA	✓	
NA	NA	✓	
NA	NA	✓	
NA	NA	✓	
NA	NA	✓	
NA	NA	✓	
NA	NA	✓	

Additional

44. EPA Shipping/Receiving Documents

Airbill (No. of Shipments 1)

Sample Tags

Sample Log-In Sheet (Lab)

45. Misc. Shipping/Receiving Records (list all individual records)

46. Internal Lab Sample Transfer Records and Tracking Sheets
(describe or list)47. Other Records and related Communication Logs
(describe or list)

48. Comments:

Completed by:
(CLP Lab)Audited by:
(EPA)

Nimisha Pandya, Document Control Officer

(Signature)

(Print Name & Title)

(Date)

(Signature)

(Print Name & Title)

(Date)

PAGE NOs:		CHECK	
FROM	TO	LAB	REGION
344	344	✓	
NA	NA	✓	
345	345	✓	
NA	NA	✓	
346	346	✓	
NA	NA	✓	



**284 Sheffield Street
Mountainside, NJ 07092**

SDG NARRATIVE

USEPA

SDG # MBHHA0

CASE # 51988

CONTRACT # 68HERH20D0011

SOW# SFAM01.1

LAB NAME: Alliance Technical Group, LLC

LAB CODE: ACE

LAB ORDER ID # Q1272

A. Number of Samples and Date of Receipt

03 Soil samples were delivered to the laboratory intact on 02/01/2025

B. Parameters

Test requested for Metals CLP FULL = Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, Zinc.

C. Cooler Temp

Indicator Bottle: Presence/Absence

Cooler: 1.2°C

D. Detail Documentation (related to Sample Handling Shipping, Analytical Problem, Temp of Cooler etc):

Issue 1: A "P" or "M" prefix was listed at the beginning of a CLP sample ID.

Issue 2: Laboratory QC is scheduled for ICP-AES and TCLP ICP-AES analysis, but no sample was designated for laboratory QC on the COC. The laboratory would like to use sample MBHHA2 for laboratory QC. The laboratory confirms that these samples are not blanks, rinsates, or PT.

E. Corrective Action taken for above:

Resolution 1: To maintain COC integrity, ASB requests no changes to the Sample IDs. The laboratory will note the issue in the SDG Narrative and proceed with the analysis of the samples.

Resolution 2: Per SOW SFAM01.1 Exhibit A, Section 5.5.4.1., please note the issue in the SDG Narrative and proceed with the analysis of the samples.



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Mountainside, NJ 07092**

F. Analytical Techniques:

All analyses were based on CLP Methodology by method SFAM01.1.

Inter Element correction factors (IECs) are determined annually and correction factor are applied during ICP-AES analysis.

G. Calculation:

Calculation for ICP-AES Soil Sample:

Conversion of Results from mg/L or ppm to mg/kg (Dry Weight Basis):

$$\text{Concentration (mg/kg)} = C \times \frac{V_f}{W \times S} \times DF$$

Where,

C = Instrument value in ppm (The average of all replicate exposures)

V_f = Final digestion volume (mL)

W = Initial aliquot amount (g) (Sample amount taken in prep)

S = % Solids / 100 (Fraction of Percent Solids)

DF = Dilution Factor

Example Calculation For Sample MBHHA0 For Arsenic:

If C = 0.1138834 ppm

V_f = 100 ml

W = 1.21g

S = 0.854 (85.4/100)

DF = 1

$$\text{Concentration (mg/kg)} = 0.1138834 \times \frac{100}{1.21 \times 0.854} \times 1$$

$$= 11.0209 \text{ mg/kg}$$

$$= 11 \text{ mg/kg (Reported Result with Signification)}$$

H. QA/ QC

Calibrations met requirements. Interference check met requirements. Blank analyses did not indicate any presence of contamination. Laboratory Control sample was within control limits. MS Spike sample did meet requirements except for Antimony, Silver, Thallium, Zinc. Duplicate sample did meet requirements.



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Mountainside, NJ 07092**

Serial Dilution did meet requirements except for Beryllium, Calcium, Iron, Magnesium, Manganese, Vanadium.

Chemical or physical interference effect was suspected and the data for all affected analytes in the sample received and associated with this serial dilution were flagged.

I certify that the data package is in compliance with the terms and conditions of the contract both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature.

Signature _____

Name: Nimisha Pandya

Date _____

Title: Document Control Officer

From: DeBerry, Eric <Eric.Deberry@gdit.com>
Sent: Monday, February 03, 2025 9:30 AM
To: Deepak Parmar; Sohil Jodhani; Mohammad Ahmed
Cc: Bauer, Heather E; Johnson, Matthew; Burman, Jarmael; 'Moody, Brett'; Gambrah, Derrick; Patel, Bhavita; Vargas.Magda@epa.gov; Britz, Helen
Subject: Task Area SST | Region 03 | Case 51988 | Lab ACE | Issue Insufficient/inappropriate designation of laboratory QC | FINAL
Attachments: SKM_95825020111380.pdf

EXTERNAL EMAIL - This email was sent by a person from outside your organization. Exercise caution when clicking links, opening attachments or taking further action, before validating its authenticity.

Secured by Check Point

Good morning Deepak,

Issue: Laboratory QC is scheduled for ICP-AES and TCLP ICP-AES analysis, but no sample was designated for laboratory QC on the COC. The laboratory would like to use sample MBHHA2 for laboratory QC. The laboratory confirms that these samples are not blanks, rinsates, or PT.

Resolution: Per SOW SFAM01.1 Exhibit A, Section 5.5.4.1., please note the issue in the SDG Narrative and proceed with the analysis of the samples.

Please note that the laboratory may contact the appropriate CLP PM should any defects need to be waived for this issue.

Thanks,

Eric DeBerry

Associate Environmental Analyst
CLP QSS Coordinator – EPA Regions 1 & 3

Under contract to the EPA

T: (571) 833-5166
Eric.DeBerry@GDIT.com
15036 Conference Center Drive
Chantilly, VA 20151
www.gdit.com

GENERAL DYNAMICS
Information Technology

From: Deepak Parmar <Deepak.Parmar@alliancetg.com>
Sent: Monday, February 3, 2025 8:21 AM
To: DeBerry, Eric <Eric.Deberry@gdit.com>

Cc: Sohil Jodhani <Sohil.Jodhani@AllianceTG.com>

Subject: Region 3 | Case 51988 | Lab ACE | Issue Discrepancies with tags, jars, and/or COC/QC

This Message Is From an External Sender

Please use caution with links, attachments, and any requests for credentials.

Good morning,

Issue 1: QC Scheduled for ICP-AES and TCLP ICP-AES analysis However, a sample was not designated for Laboratory QC. Lab like to use sample MBHHA2 for Lab QC. these samples is not blanks, rinsates or PT.

Please see attachment for your reference.

Thanks & Regards,



Deepak Parmar

QA/QC

An Alliance Technical Group Company

Main: 908-789-8900

Direct: 908-728-3154

Address: 284 Sheffield St, Ste 1, Mountainside, NJ 07092

www.alliancetg.com



PERCENT SOLID

Supervisor: Iwona
Analyst: jignesh
Date: 2/4/2025

OVENTEMP IN Celsius(°C): 107
Time IN: 13:25
In Date: 02/03/2025
Weight Check 1.0g: 1.00
Weight Check 10g: 10.00
OvenID: M OVEN#1

OVENTEMP OUT Celsius(°C): 103
Time OUT: 07:50
Out Date: 02/04/2025
Weight Check 1.0g: 1.00
Weight Check 10g: 10.00
BalanceID: M SC-4
Thermometer ID: % SOLID- OVEN

QC:LB134526

Lab ID	Client SampleID	Dish #	Dish Wt(g) (A)	Sample Wt(g)	Dish + Sample Wt(g) (B)	Dish+Dry Sample Wt(g) (C)	% Solid	Comments
Q1251-01	E1491	1	1.15	8.40	9.55	7.73	78.3	
Q1251-02	E1492	2	1.15	8.82	9.97	7.94	77.0	
Q1251-03	E1493	3	1.19	8.40	9.59	8.05	81.7	
Q1251-04	E1494	4	1.16	8.50	9.66	7.93	79.6	
Q1251-05	E1495	5	1.15	8.68	9.83	8.27	82.0	
Q1251-06	E1496	6	1.18	8.67	9.85	8.17	80.6	
Q1251-07	E1496D	7	1.18	8.67	9.85	8.17	80.6	
Q1251-08	E1496S	8	1.18	8.67	9.85	8.17	80.6	
Q1251-09	E1497	9	1.14	8.84	9.98	8.5	83.3	
Q1272-01	MBHHA0	10	1.12	8.64	9.76	8.5	85.4	
Q1272-02	MBHHA1	11	1.12	8.60	9.72	9.26	94.7	
Q1272-03	MBHHA2	12	1.15	8.82	9.97	8.72	85.8	
Q1272-04	MBHHA2D	13	1.15	8.82	9.97	8.72	85.8	
Q1272-05	MBHHA2S	14	1.15	8.82	9.97	8.72	85.8	

$$\% \text{ Solid} = \frac{(C-A) * 100}{(B-A)}$$

WORKLIST(Hardcopy Internal Chain)

134326

WorkList Name : %1-Q1251

WorkList ID : 187412

Department : Wet-Chemistry

Date : 02-03-2025 12:15:50

Sample	Customer Sample	Matrix	Test	Preservative	Customer	Raw Sample Storage Location	Collect Date	Method
Q1251-01	E1491	Solid	Percent Solids	Cool 4 deg C	USEP01	C11	01/29/2025	Chemtech -SO
Q1251-02	E1492	Solid	Percent Solids	Cool 4 deg C	USEP01	C11	01/29/2025	Chemtech -SO
Q1251-03	E1493	Solid	Percent Solids	Cool 4 deg C	USEP01	C11	01/29/2025	Chemtech -SO
Q1251-04	E1494	Solid	Percent Solids	Cool 4 deg C	USEP01	C11	01/29/2025	Chemtech -SO
Q1251-05	E1495	Solid	Percent Solids	Cool 4 deg C	USEP01	C11	01/29/2025	Chemtech -SO
Q1251-06	E1496	Solid	Percent Solids	Cool 4 deg C	USEP01	C11	01/29/2025	Chemtech -SO
Q1251-07	E1496D	Solid	Percent Solids	Cool 4 deg C	USEP01	C11	01/29/2025	Chemtech -SO
Q1251-08	E1496S	Solid	Percent Solids	Cool 4 deg C	USEP01	C11	01/29/2025	Chemtech -SO
Q1251-09	E1497	Solid	Percent Solids	Cool 4 deg C	USEP01	C11	01/29/2025	Chemtech -SO
Q1272-01	MBHHA0	Solid	Percent Solids	Cool 4 deg C	USEP01	C21	01/30/2025	Chemtech -SO
Q1272-02	MBHHA1	Solid	Percent Solids	Cool 4 deg C	USEP01	C21	01/30/2025	Chemtech -SO
Q1272-03	MBHHA2	Solid	Percent Solids	Cool 4 deg C	USEP01	C21	01/30/2025	Chemtech -SO
Q1272-04	MBHHA2D	Solid	Percent Solids	Cool 4 deg C	USEP01	C21	01/30/2025	Chemtech -SO
Q1272-05	MBHHA2S	Solid	Percent Solids	Cool 4 deg C	USEP01	C21	01/30/2025	Chemtech -SO

13

Date/Time 02/03/23 12:30

Raw Sample Received by: 18 wsc

Raw Sample Relinquished by: OP

Date/Time 02/03/25 13:30

Raw Sample Received by: OP

Raw Sample Relinquished by: 18 wsc

FORM 1 - IN
INORGANIC ANALYSIS DATA SHEET

MBHHA0

Lab Name: Alliance Technical Group, LLC Contract: 68HERH20D0011

Lab Code: ACE Case No.: 51988 MA No. : SDG No.: MBHHA0

Matrix: SOIL Lab Sample ID: Q1272-01

% Solids: 85.4 Date Received: 02/01/2025

Analytical Method: ICP_AES

Concentration Units ($\mu\text{g/L}$, mg/L , mg/kg dry weight, μg , or $\mu\text{g/cm}^2$): mg/kg

CAS No.	Analyte	Concentration	Q	Date Analyzed	Time Analyzed
7429-90-5	Aluminum	9600		02/05/2025	1916
7440-36-0	Antimony	4.5	J*	02/05/2025	1916
7440-38-2	Arsenic	11		02/05/2025	1916
7440-39-3	Barium	91		02/05/2025	1916
7440-41-7	Beryllium	1.6	*	02/05/2025	1916
7440-43-9	Cadmium	0.24	J	02/05/2025	1916
7440-70-2	Calcium	3000	*	02/05/2025	1916
7440-47-3	Chromium	22		02/05/2025	1916
7440-48-4	Cobalt	18		02/05/2025	1916
7440-50-8	Copper	19		02/05/2025	1916
7439-89-6	Iron	26000	*	02/05/2025	1916
7439-92-1	Lead	31		02/05/2025	1916
7439-95-4	Magnesium	4800	*	02/05/2025	1916
7439-96-5	Manganese	790	*	02/05/2025	1916
7440-02-0	Nickel	31		02/05/2025	1916
7440-09-7	Potassium	480	U	02/05/2025	1916
7782-49-2	Selenium	16		02/05/2025	1916
7440-22-4	Silver	2.3	*	02/05/2025	1916
7440-23-5	Sodium	160	J	02/05/2025	1916
7440-28-0	Thallium	2.4	U*	02/05/2025	1916
7440-62-2	Vanadium	26	*	02/05/2025	1916
7440-66-6	Zinc	99	*	02/05/2025	1916

NOTE: Hardness (total) is reported in mg/L

Comments:

FORM 1 - IN
INORGANIC ANALYSIS DATA SHEET

MBHHA1

Lab Name: Alliance Technical Group, LLC Contract: 68HERH20D0011

Lab Code: ACE Case No.: 51988 MA No. : SDG No.: MBHHA0

Matrix: SOIL Lab Sample ID: Q1272-02

% Solids: 94.7 Date Received: 02/01/2025

Analytical Method: ICP_AES

Concentration Units ($\mu\text{g/L}$, mg/L , mg/kg dry weight, μg , or $\mu\text{g/cm}^2$): mg/kg

CAS No.	Analyte	Concentration	Q	Date Analyzed	Time Analyzed
7429-90-5	Aluminum	15000		02/05/2025	1919
7440-36-0	Antimony	5.7	*	02/05/2025	1919
7440-38-2	Arsenic	22		02/05/2025	1919
7440-39-3	Barium	150		02/05/2025	1919
7440-41-7	Beryllium	1.8	*	02/05/2025	1919
7440-43-9	Cadmium	0.047	J	02/05/2025	1919
7440-70-2	Calcium	4000	*	02/05/2025	1919
7440-47-3	Chromium	41		02/05/2025	1919
7440-48-4	Cobalt	22		02/05/2025	1919
7440-50-8	Copper	31		02/05/2025	1919
7439-89-6	Iron	36000	*	02/05/2025	1919
7439-92-1	Lead	26		02/05/2025	1919
7439-95-4	Magnesium	10000	*	02/05/2025	1919
7439-96-5	Manganese	790	*	02/05/2025	1919
7440-02-0	Nickel	44		02/05/2025	1919
7440-09-7	Potassium	420	U	02/05/2025	1919
7782-49-2	Selenium	22		02/05/2025	1919
7440-22-4	Silver	3.3	*	02/05/2025	1919
7440-23-5	Sodium	240	J	02/05/2025	1919
7440-28-0	Thallium	2.1	U*	02/05/2025	1919
7440-62-2	Vanadium	48	*	02/05/2025	1919
7440-66-6	Zinc	61	*	02/05/2025	1919

NOTE: Hardness (total) is reported in mg/L

Comments:

FORM 1 - IN
INORGANIC ANALYSIS DATA SHEET

MBHHA2

Lab Name: Alliance Technical Group, LLC Contract: 68HERH20D0011

Lab Code: ACE Case No.: 51988 MA No. : SDG No.: MBHHA0

Matrix: SOIL Lab Sample ID: Q1272-03

% Solids: 85.8 Date Received: 02/01/2025

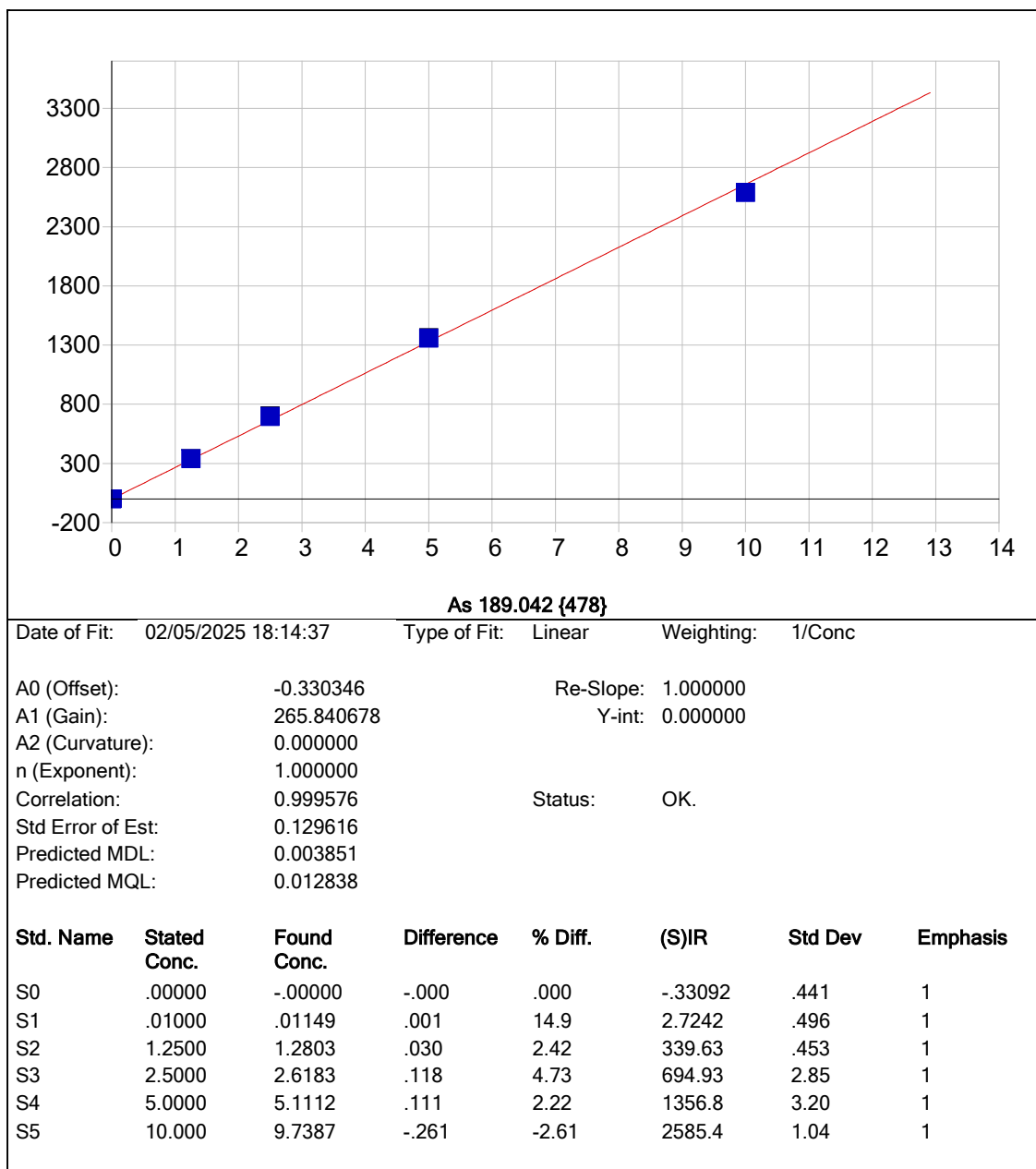
Analytical Method: ICP_AES

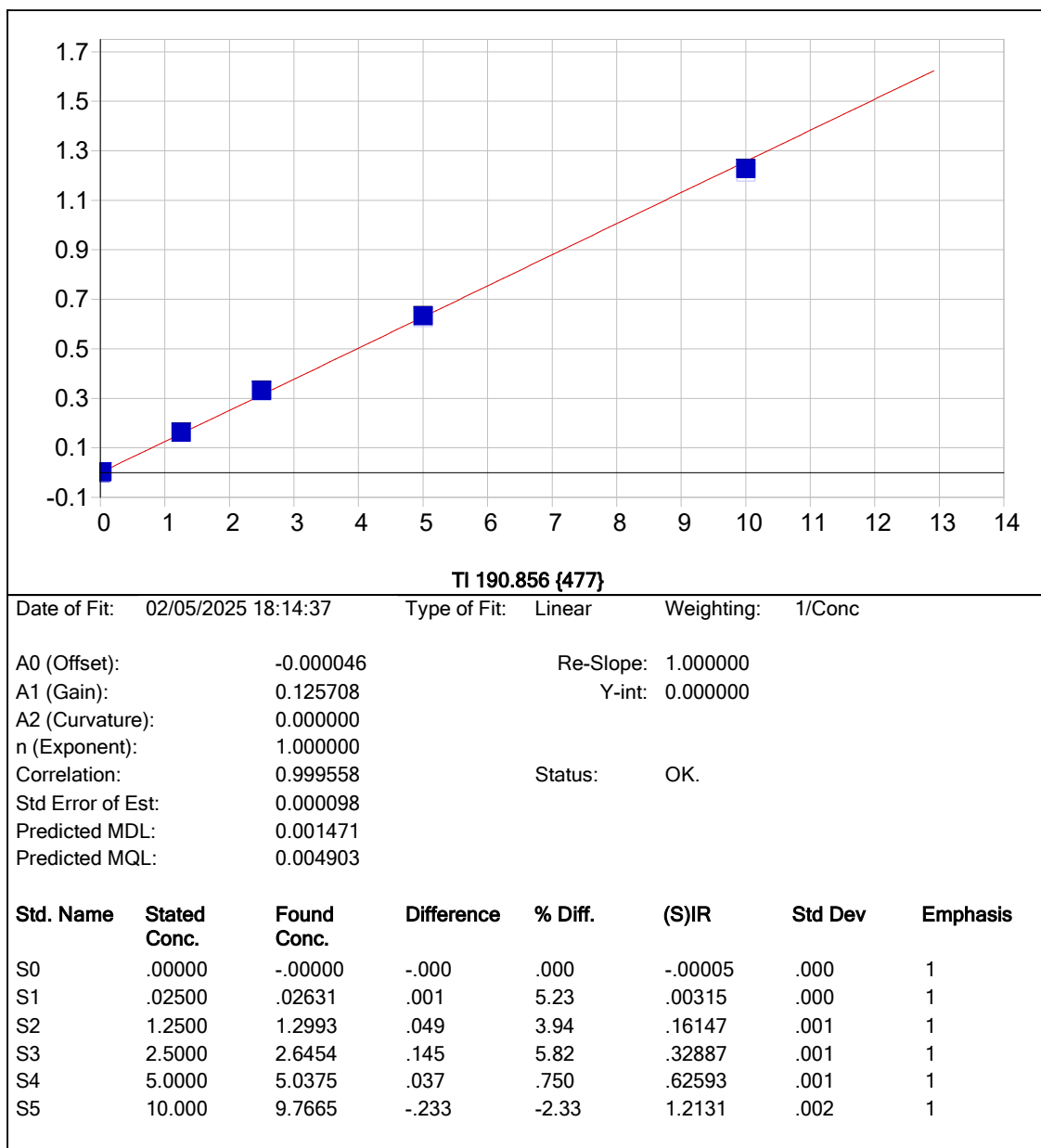
Concentration Units ($\mu\text{g/L}$, mg/L , mg/kg dry weight, μg , or $\mu\text{g/cm}^2$): mg/kg

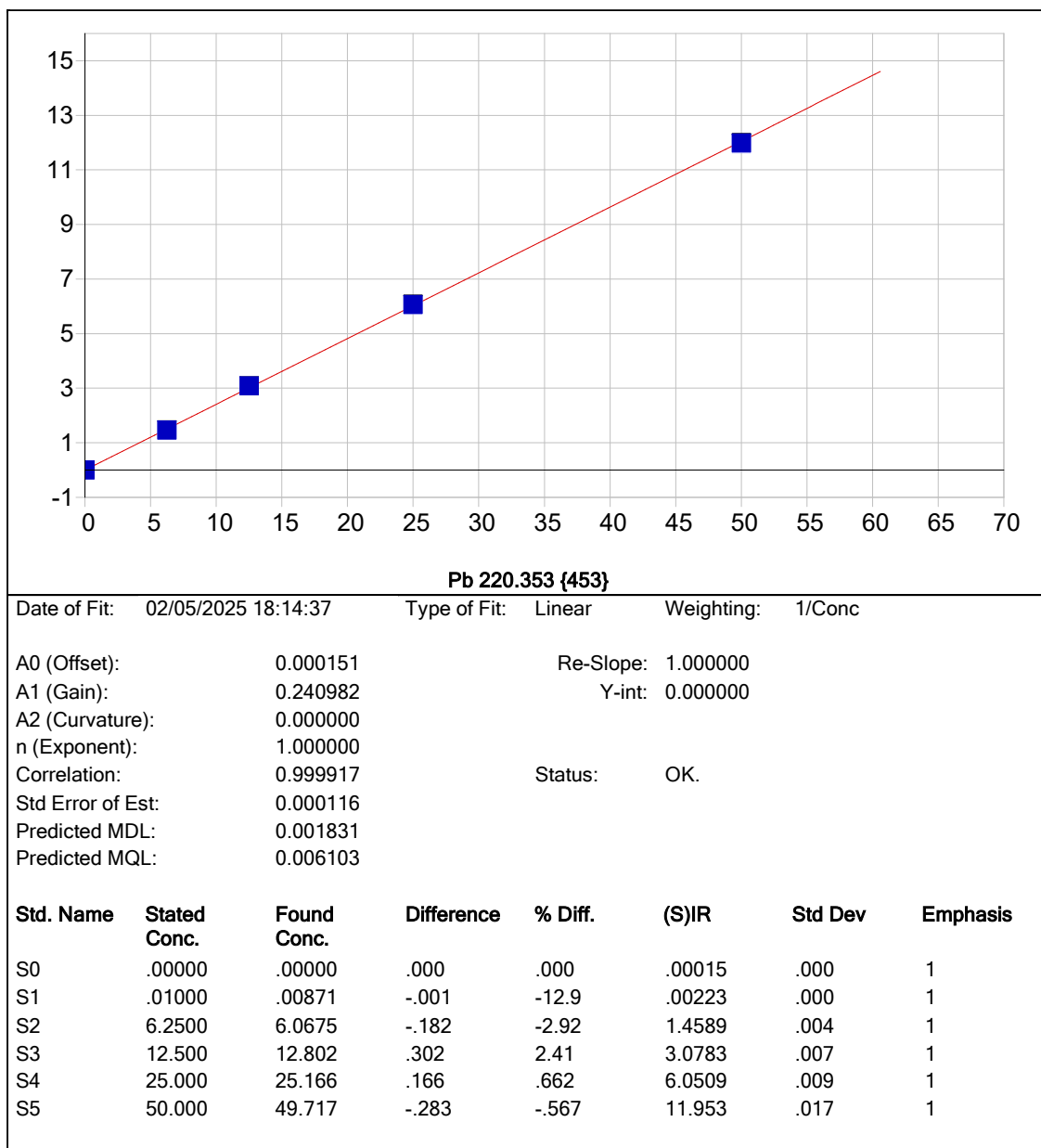
CAS No.	Analyte	Concentration	Q	Date Analyzed	Time Analyzed
7429-90-5	Aluminum	11000		02/05/2025	1923
7440-36-0	Antimony	4.5	J*	02/05/2025	1923
7440-38-2	Arsenic	14		02/05/2025	1923
7440-39-3	Barium	94		02/05/2025	1923
7440-41-7	Beryllium	1.7	*	02/05/2025	1923
7440-43-9	Cadmium	0.20	J	02/05/2025	1923
7440-70-2	Calcium	7300	*	02/05/2025	1923
7440-47-3	Chromium	28		02/05/2025	1923
7440-48-4	Cobalt	19		02/05/2025	1923
7440-50-8	Copper	20		02/05/2025	1923
7439-89-6	Iron	29000	*	02/05/2025	1923
7439-92-1	Lead	34		02/05/2025	1923
7439-95-4	Magnesium	7800	*	02/05/2025	1923
7439-96-5	Manganese	750	*	02/05/2025	1923
7440-02-0	Nickel	34		02/05/2025	1923
7440-09-7	Potassium	540		02/05/2025	1923
7782-49-2	Selenium	17		02/05/2025	1923
7440-22-4	Silver	2.5	*	02/05/2025	1923
7440-23-5	Sodium	250	J	02/05/2025	1923
7440-28-0	Thallium	2.4	U*	02/05/2025	1923
7440-62-2	Vanadium	34	*	02/05/2025	1923
7440-66-6	Zinc	84	*	02/05/2025	1923

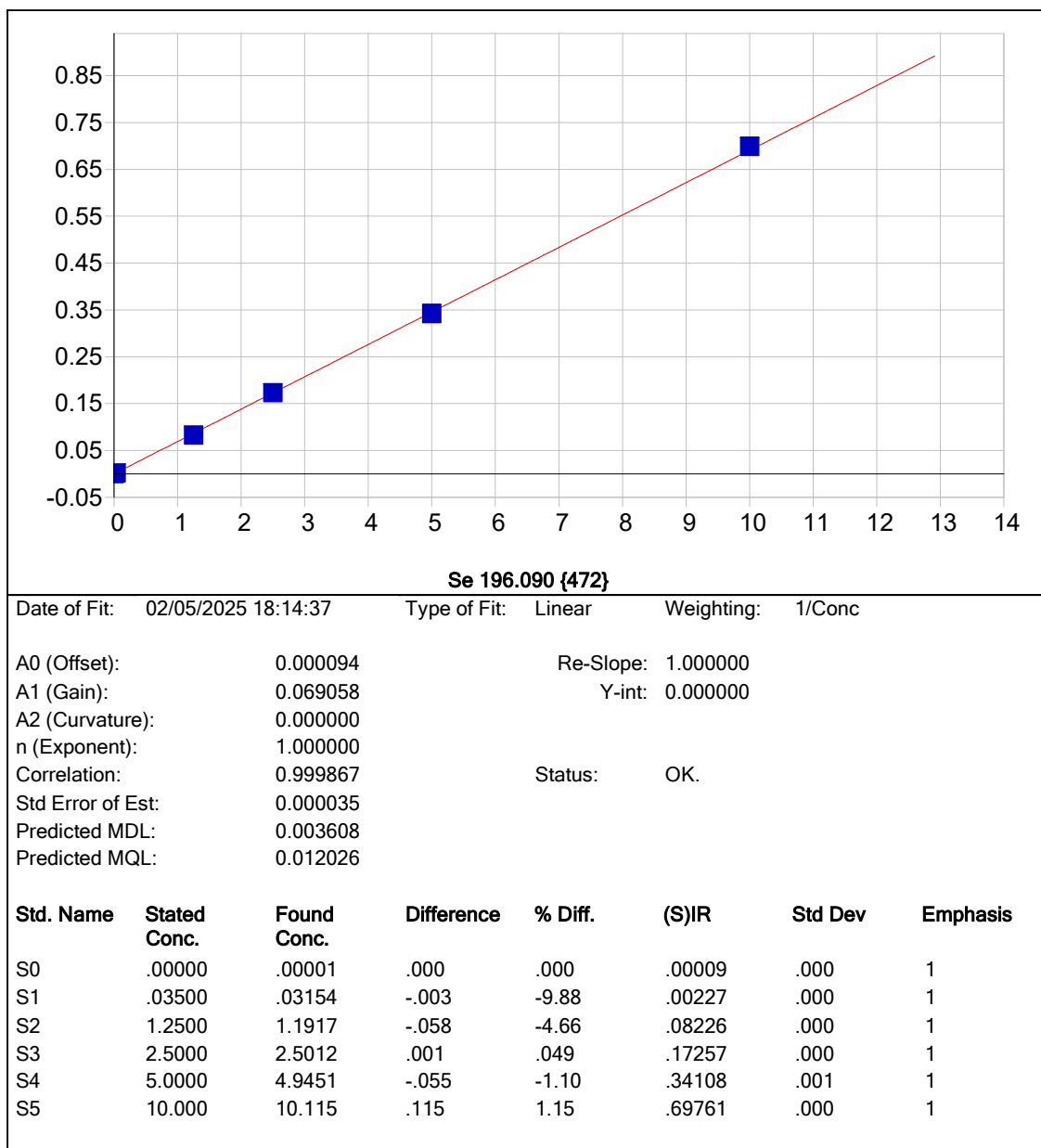
NOTE: Hardness (total) is reported in mg/L

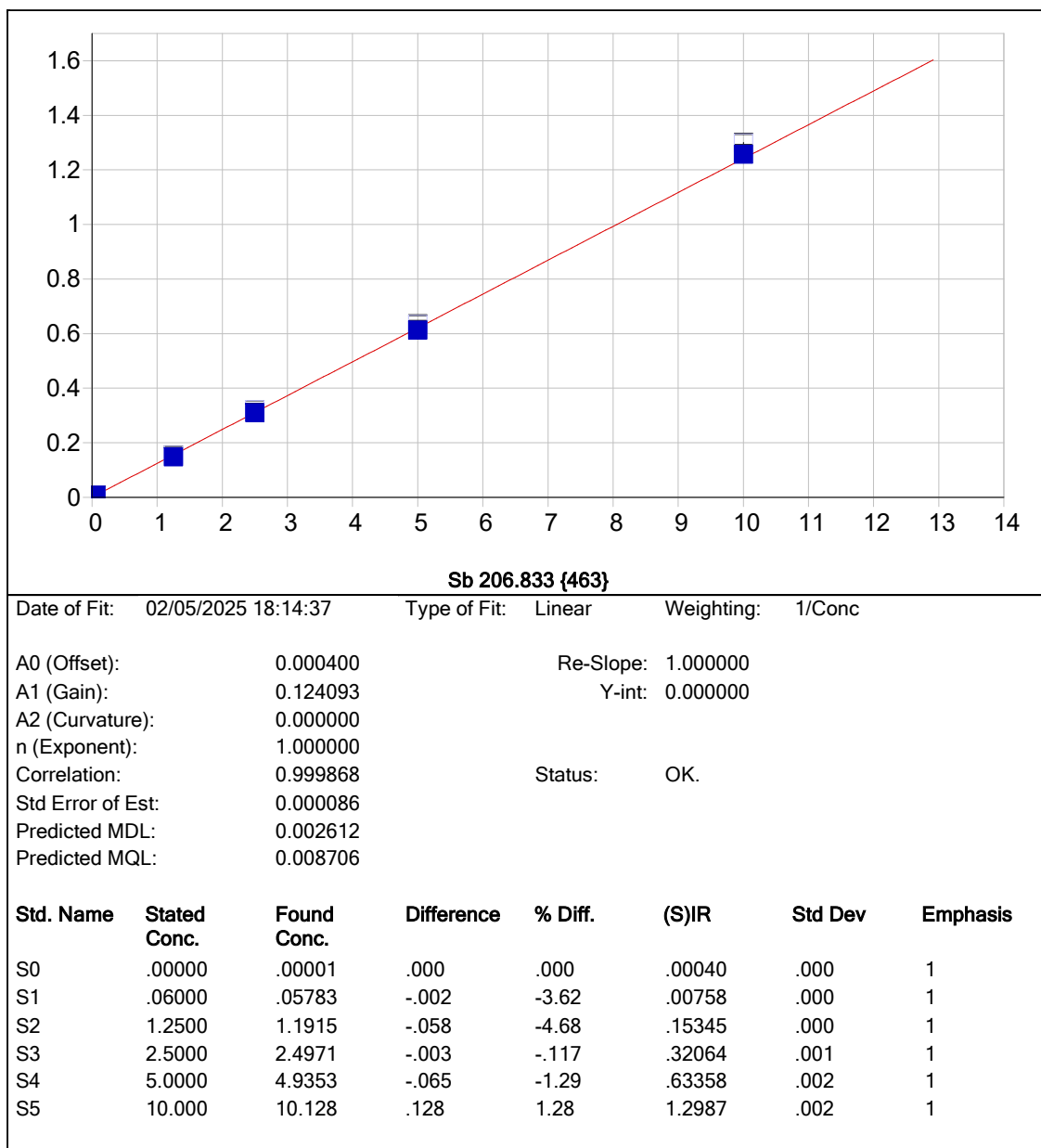
Comments:

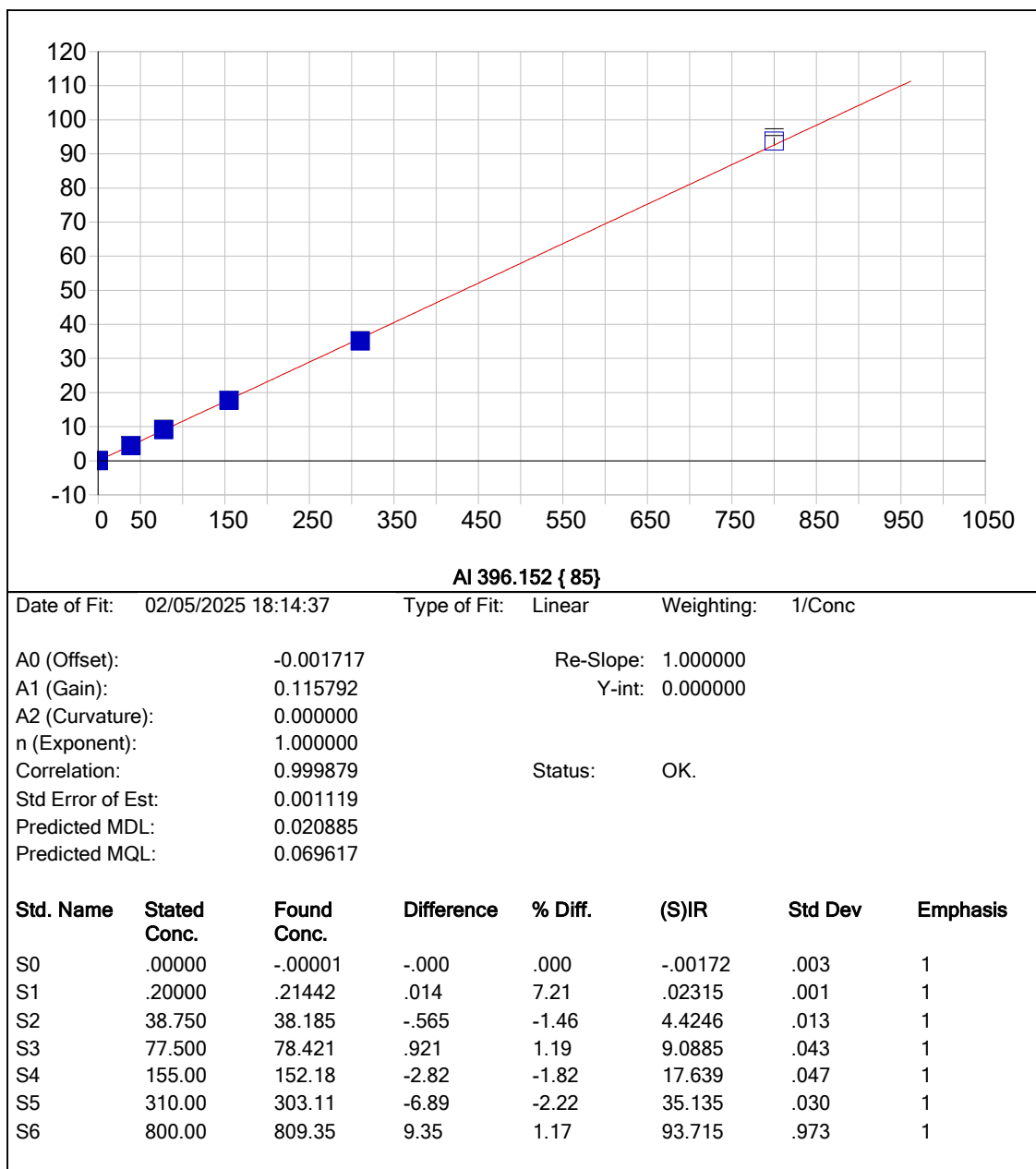


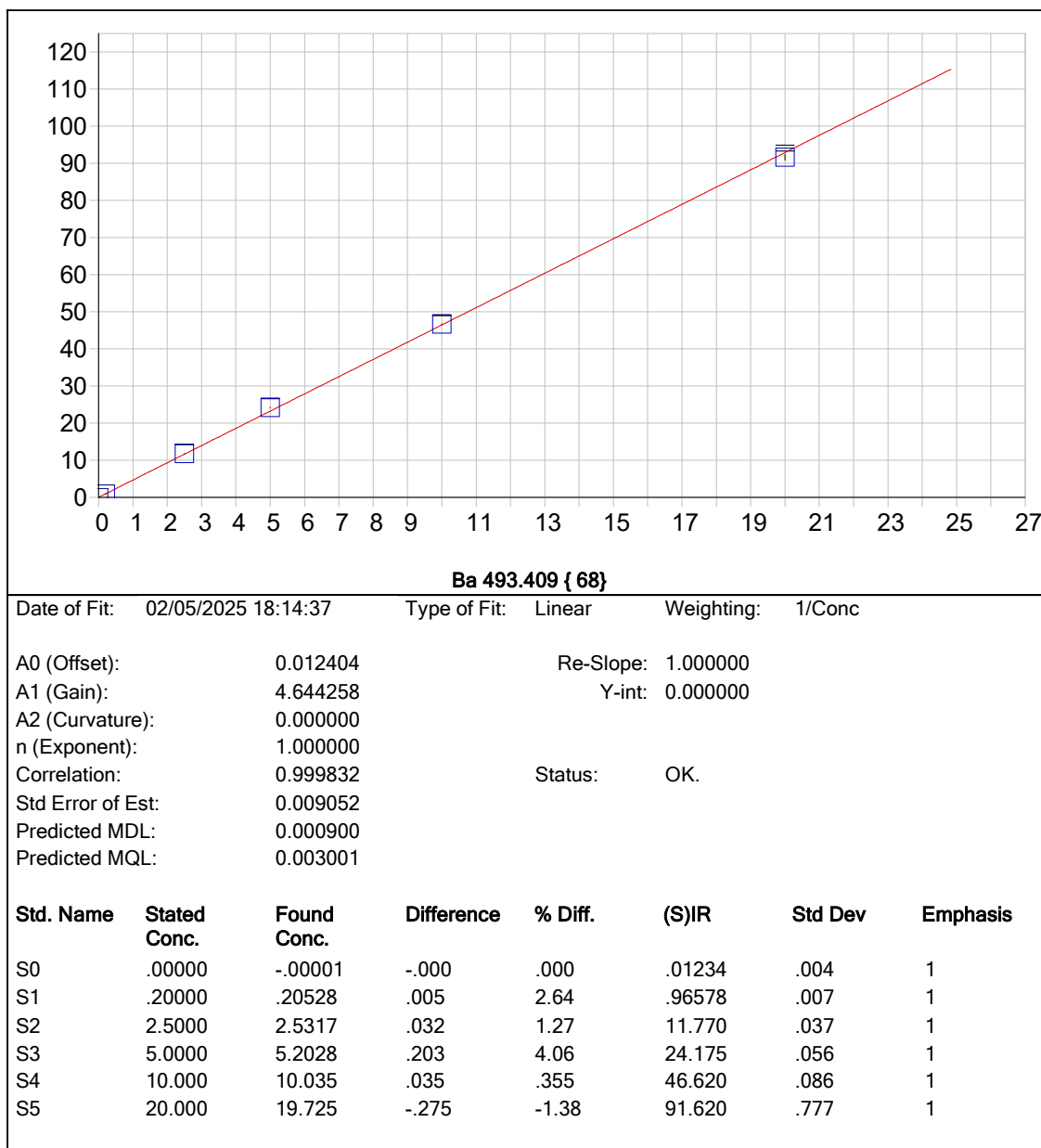


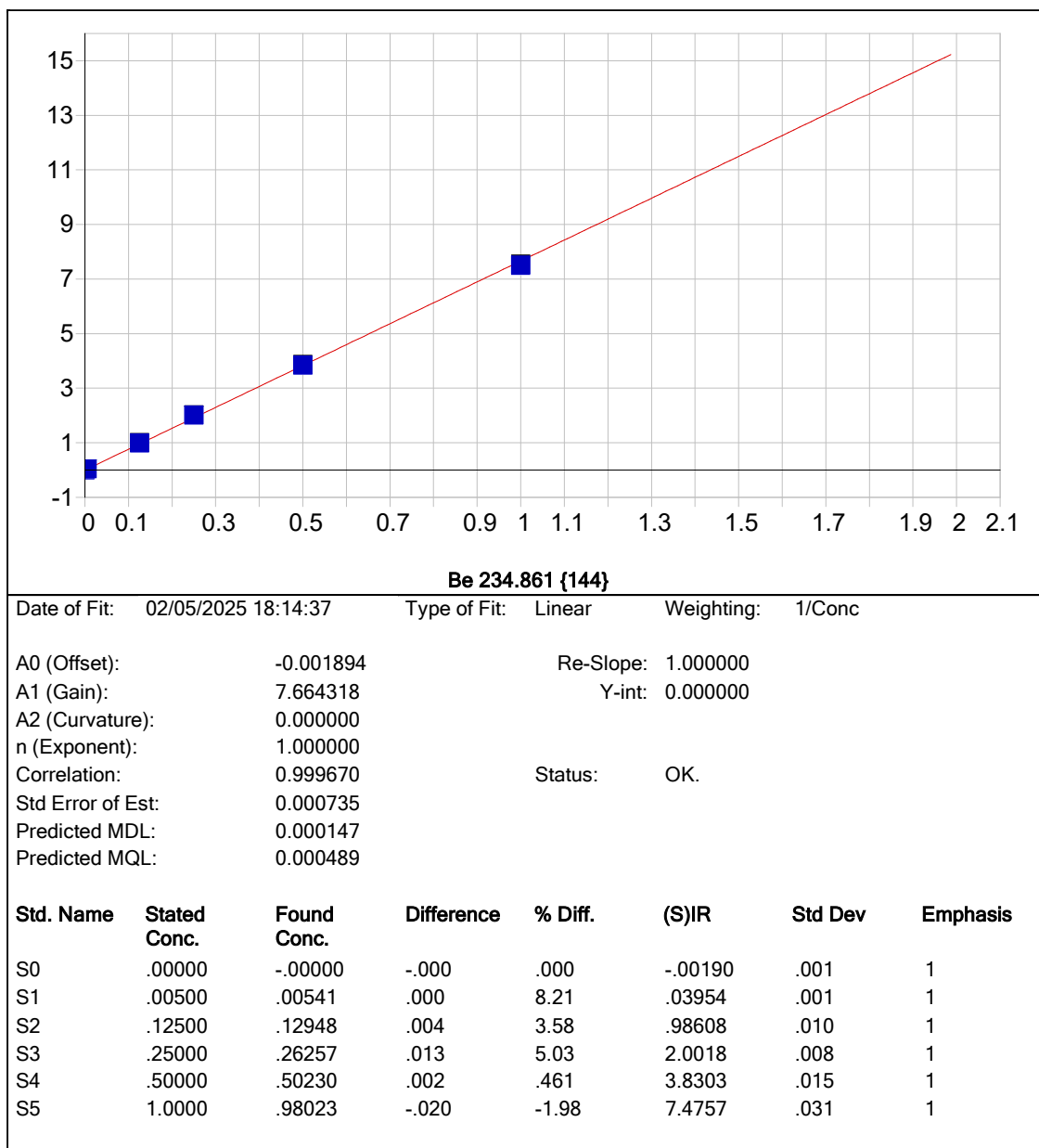


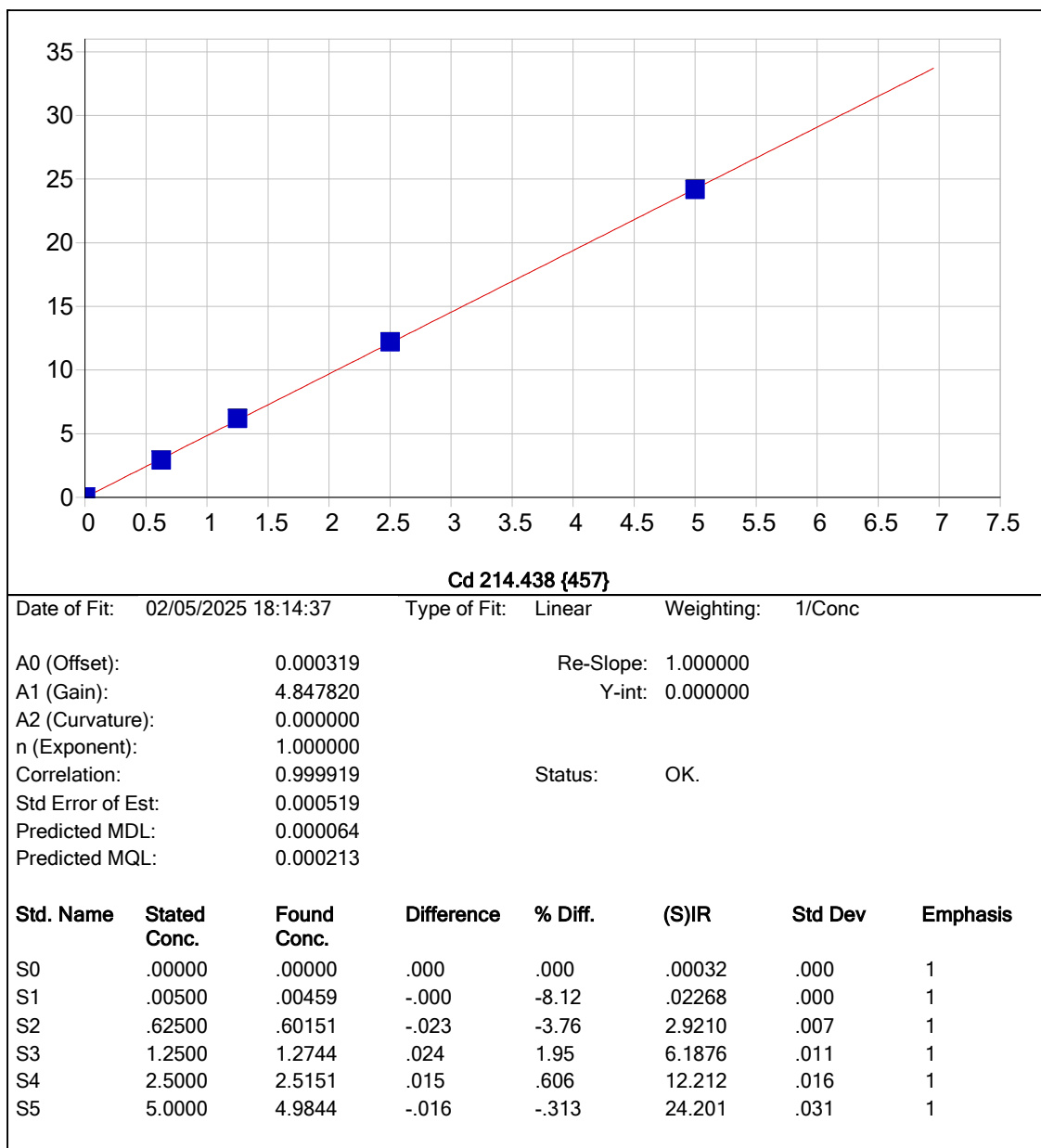


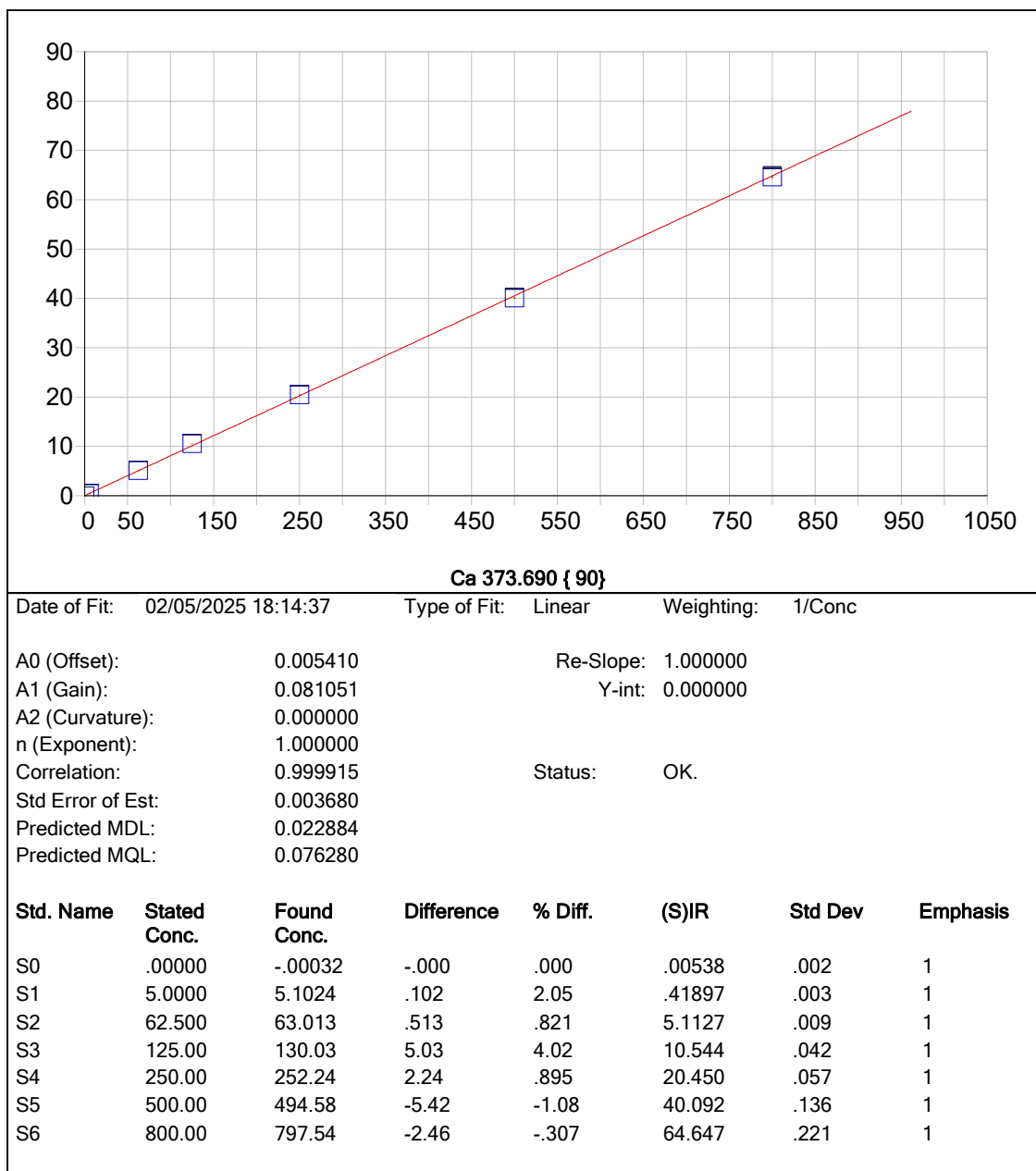


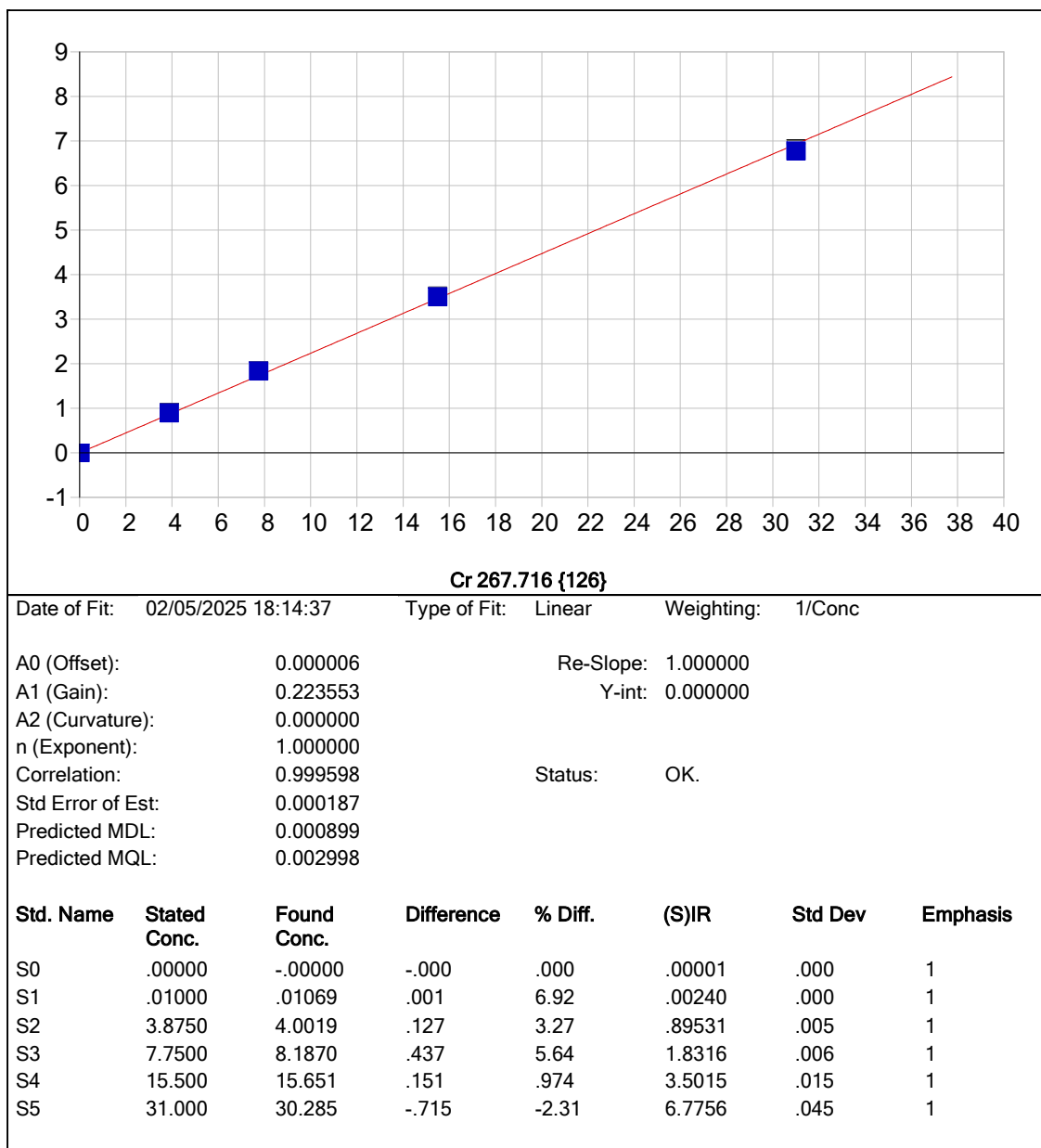


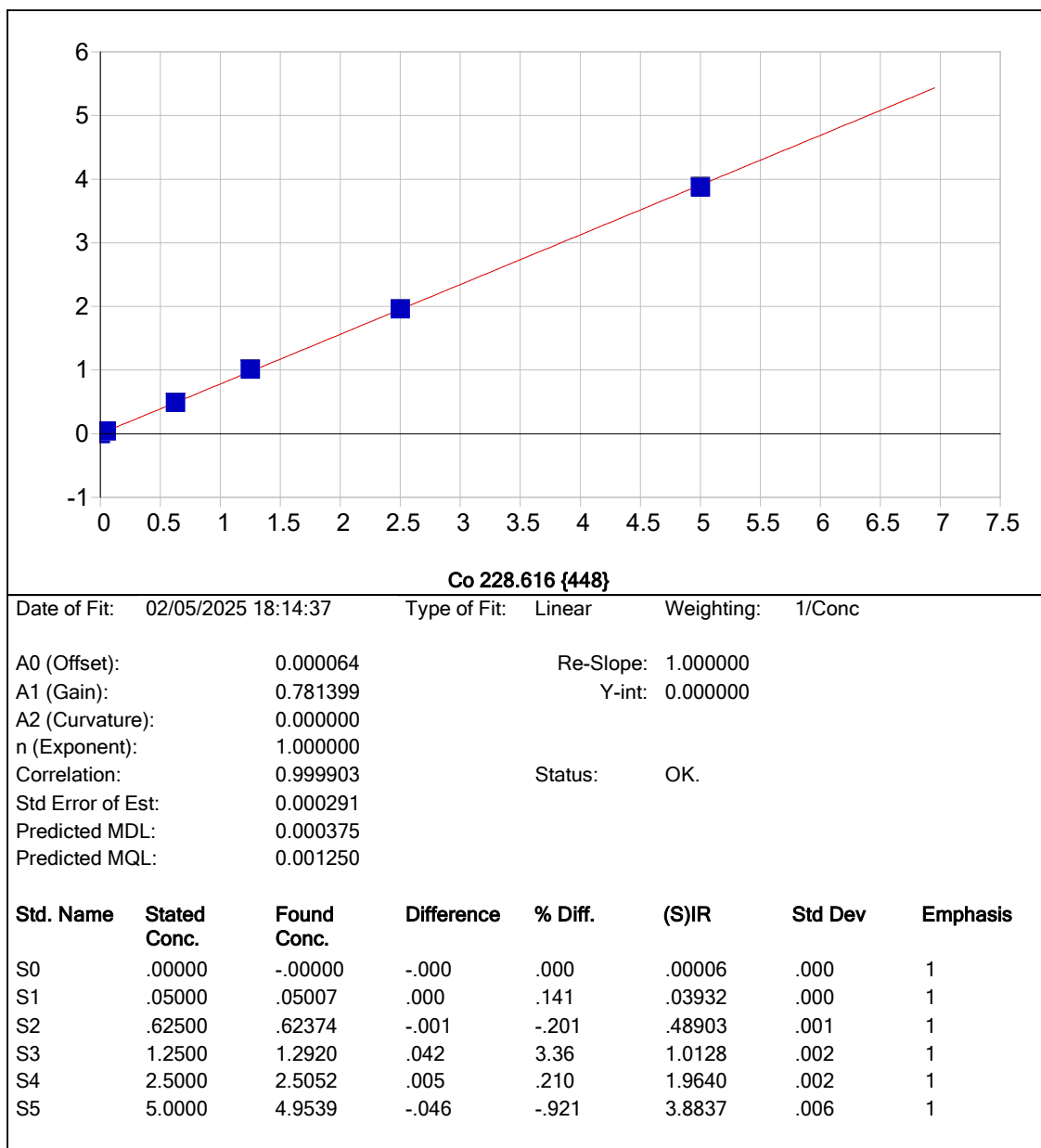


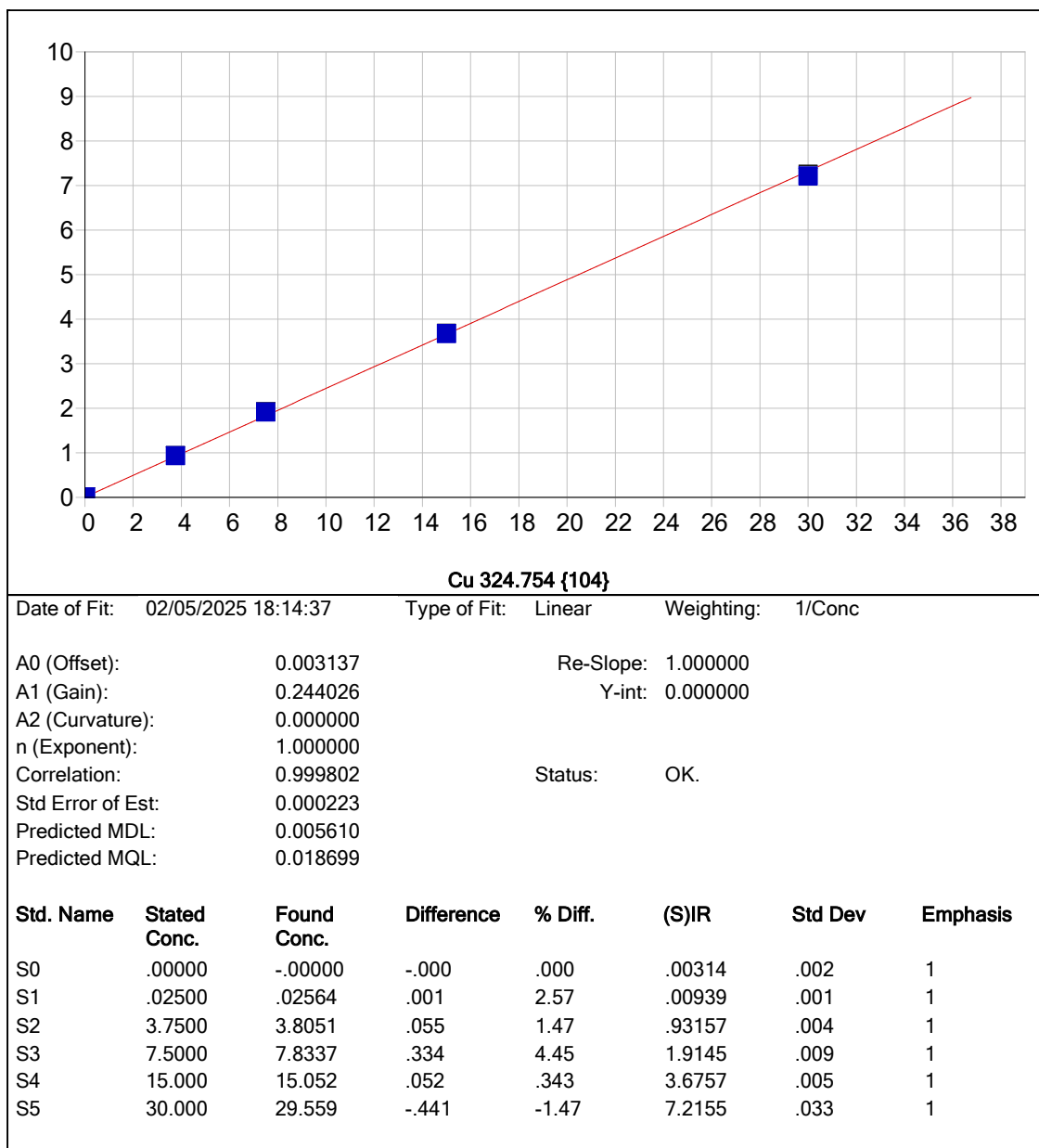


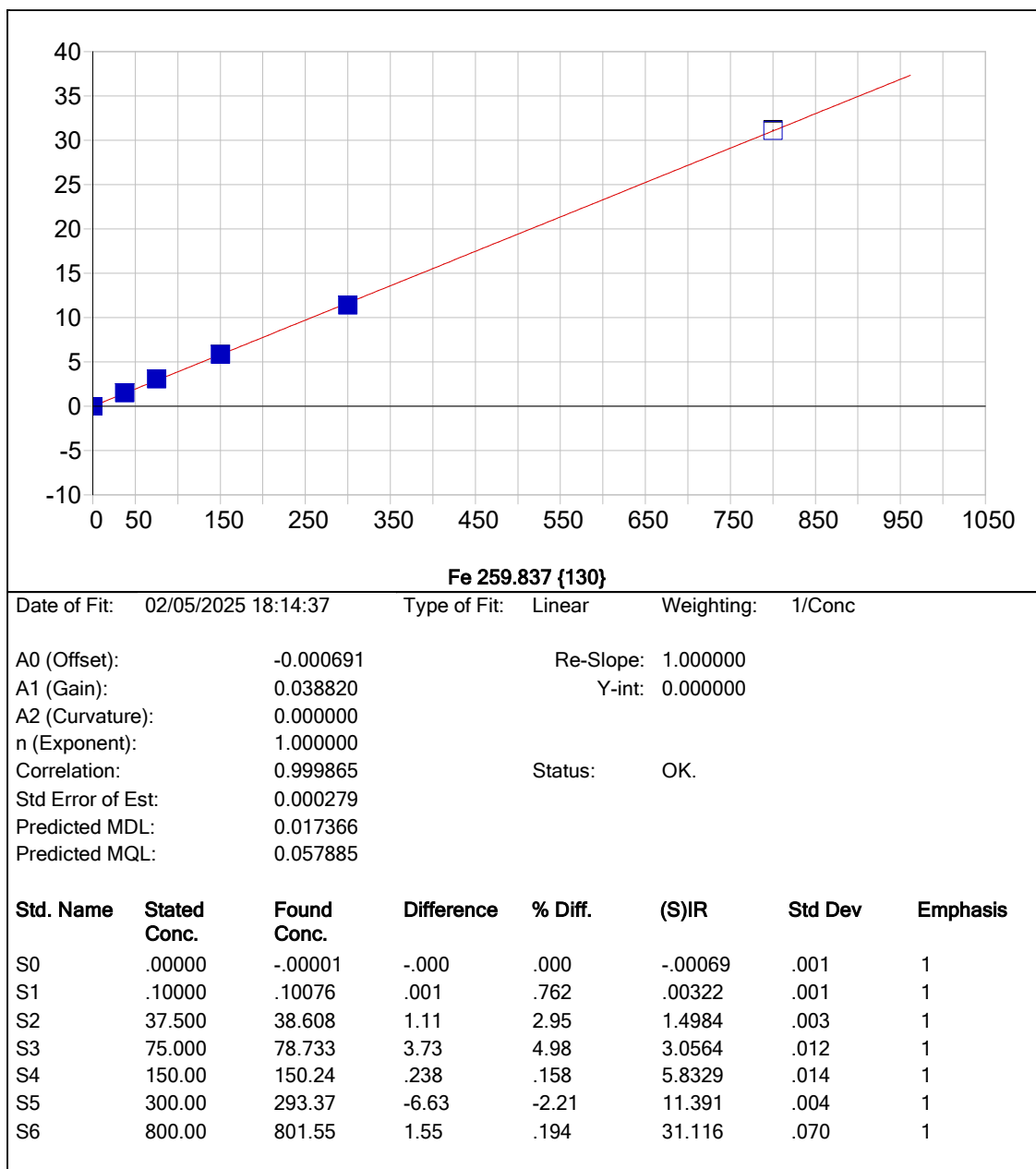


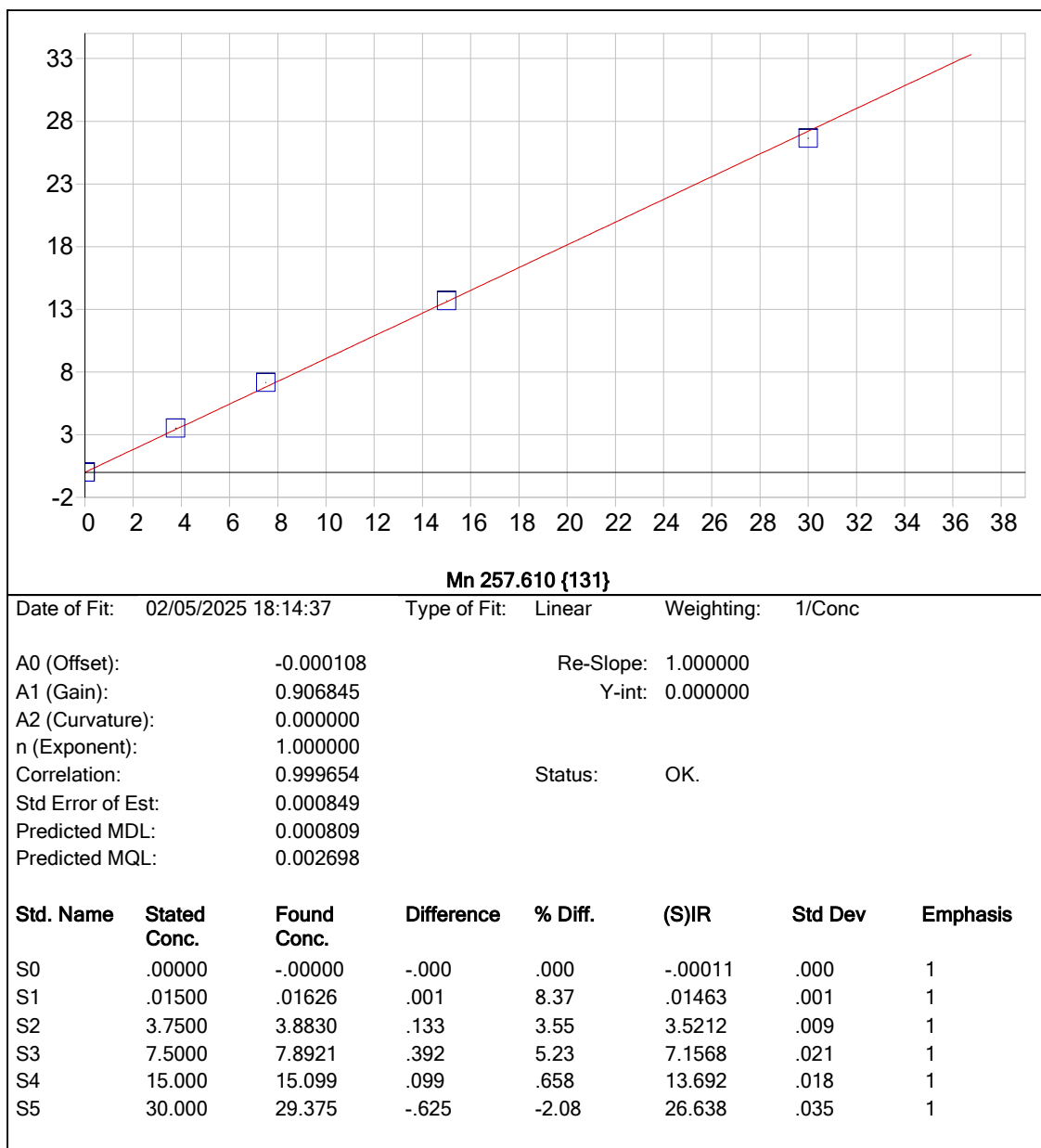


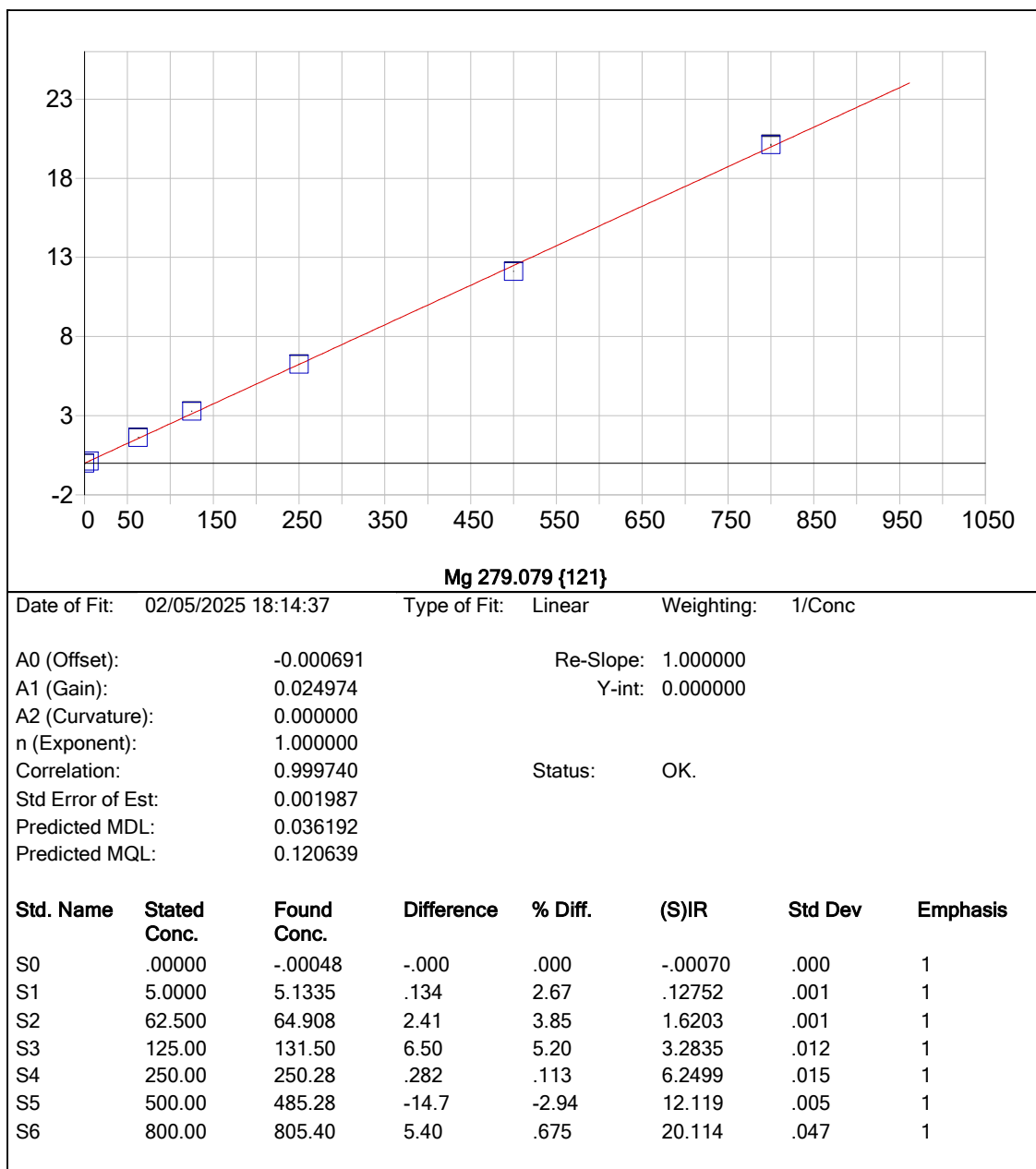


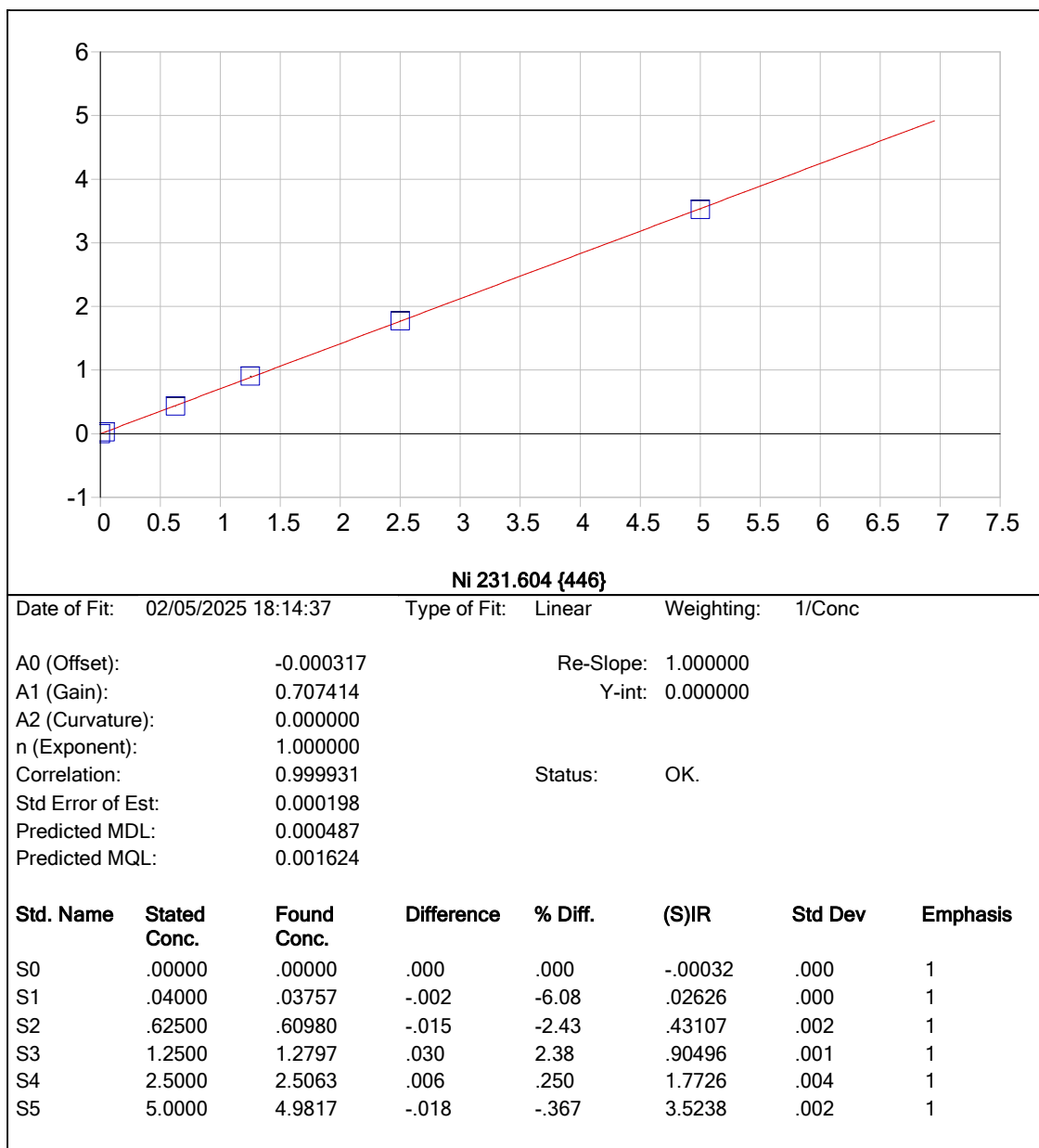


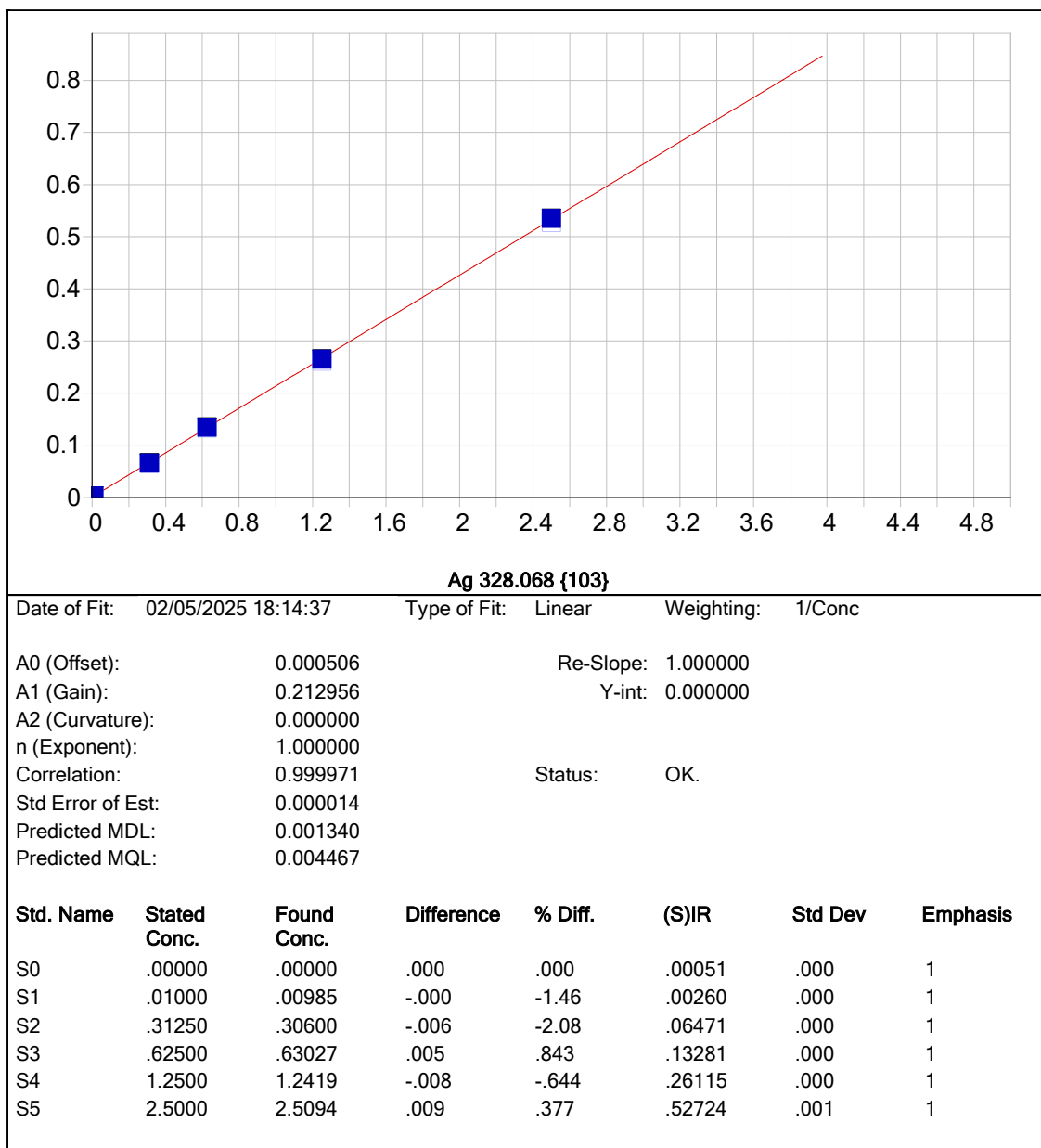


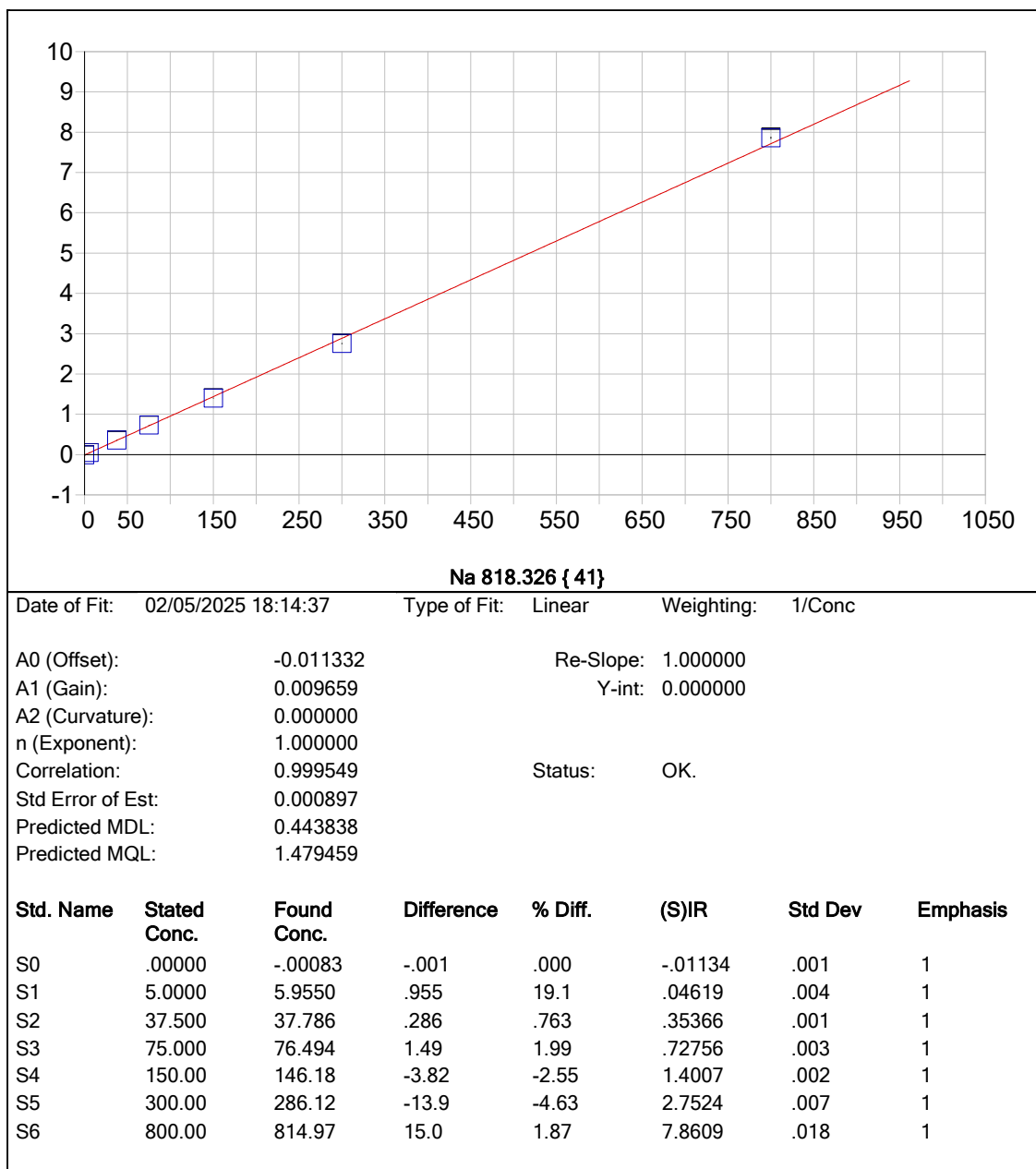


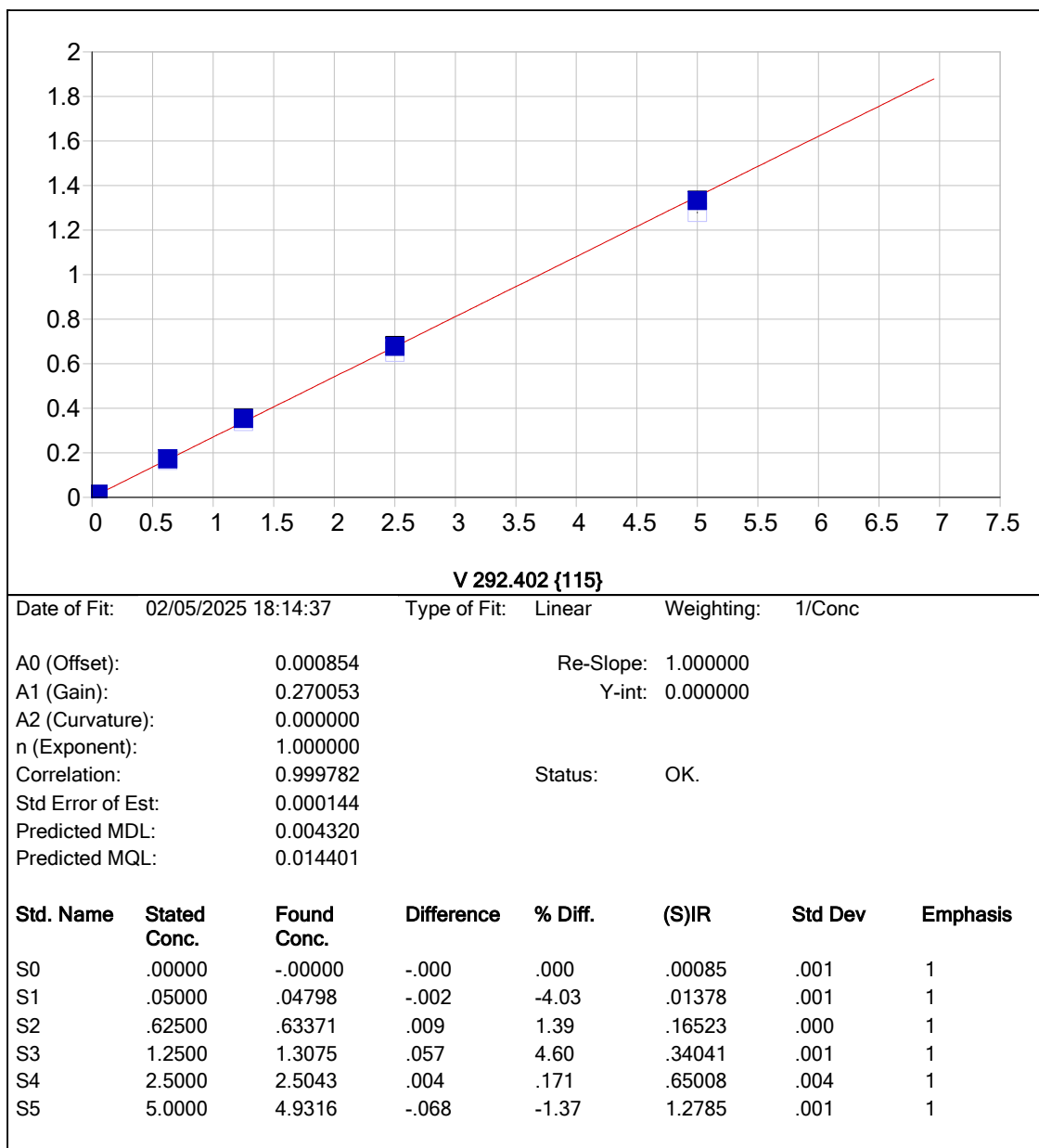


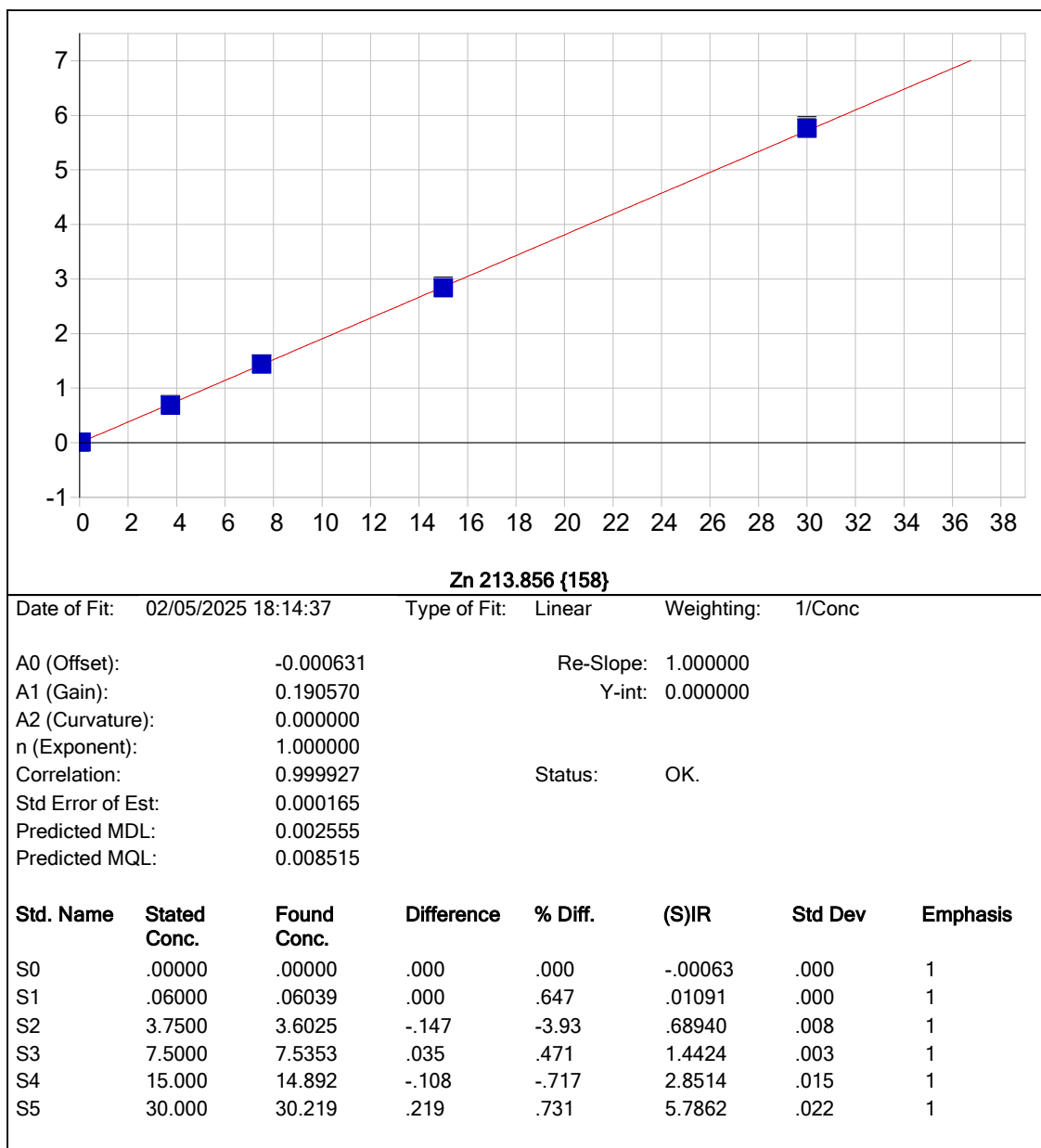


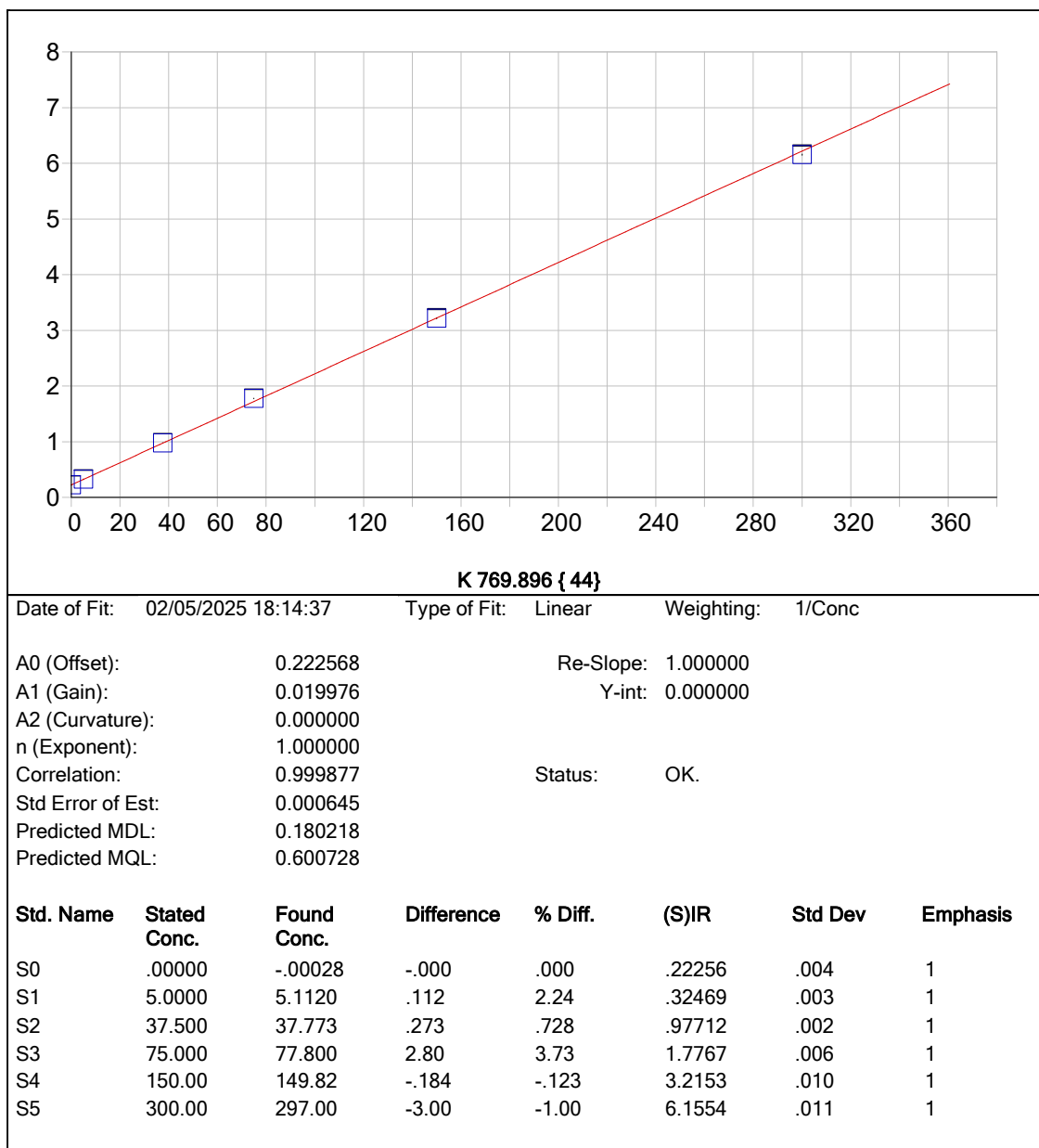


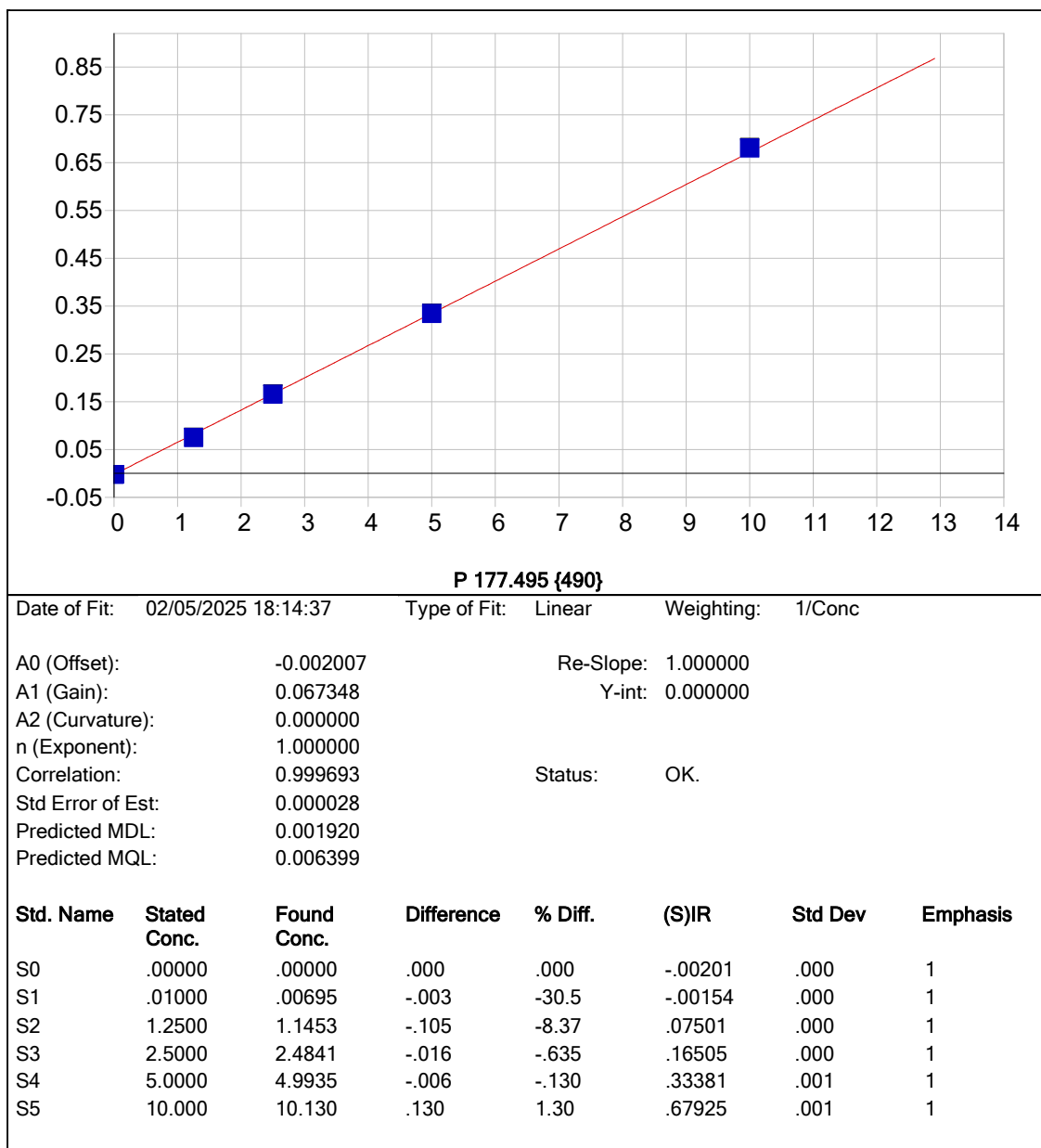


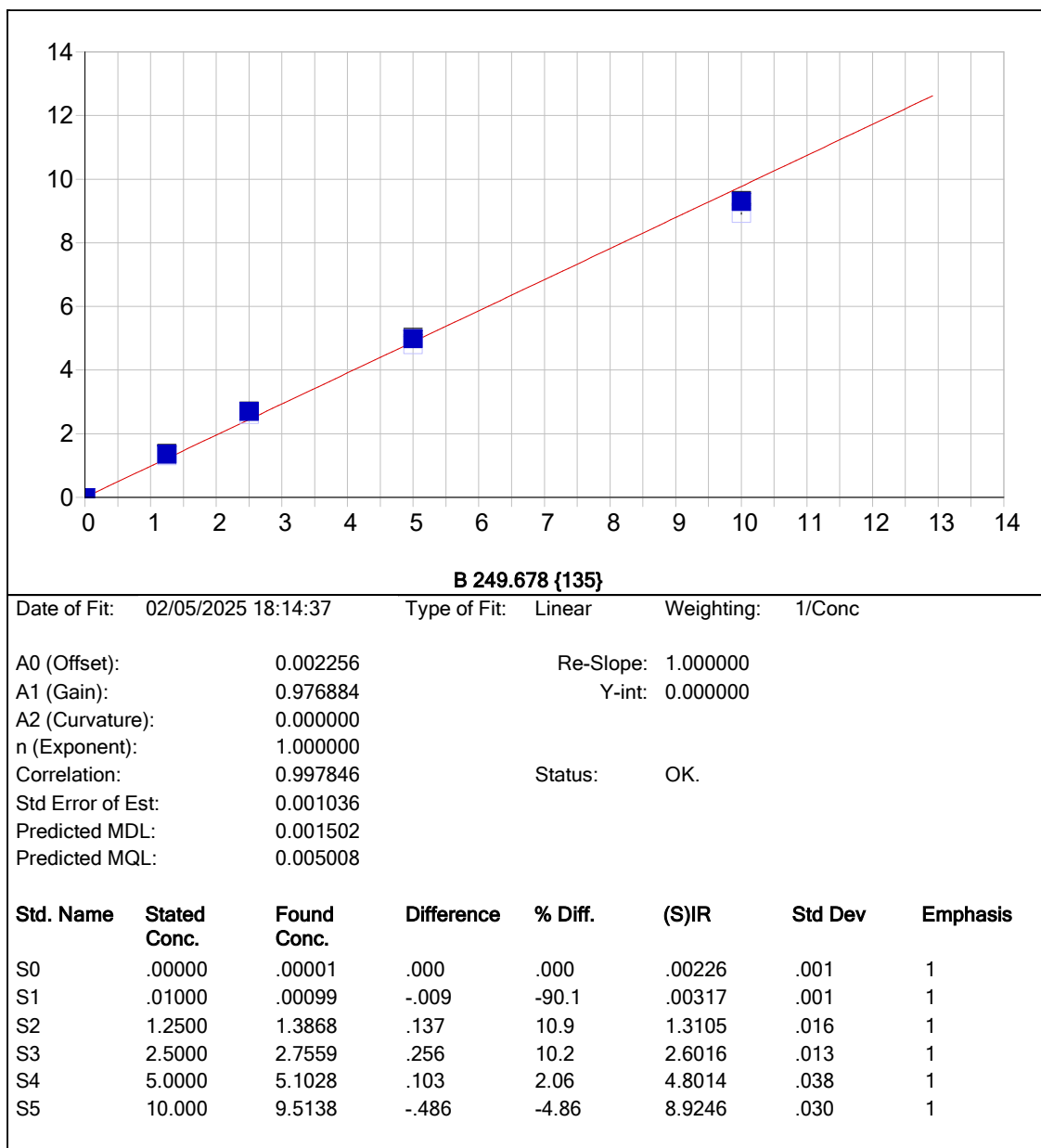


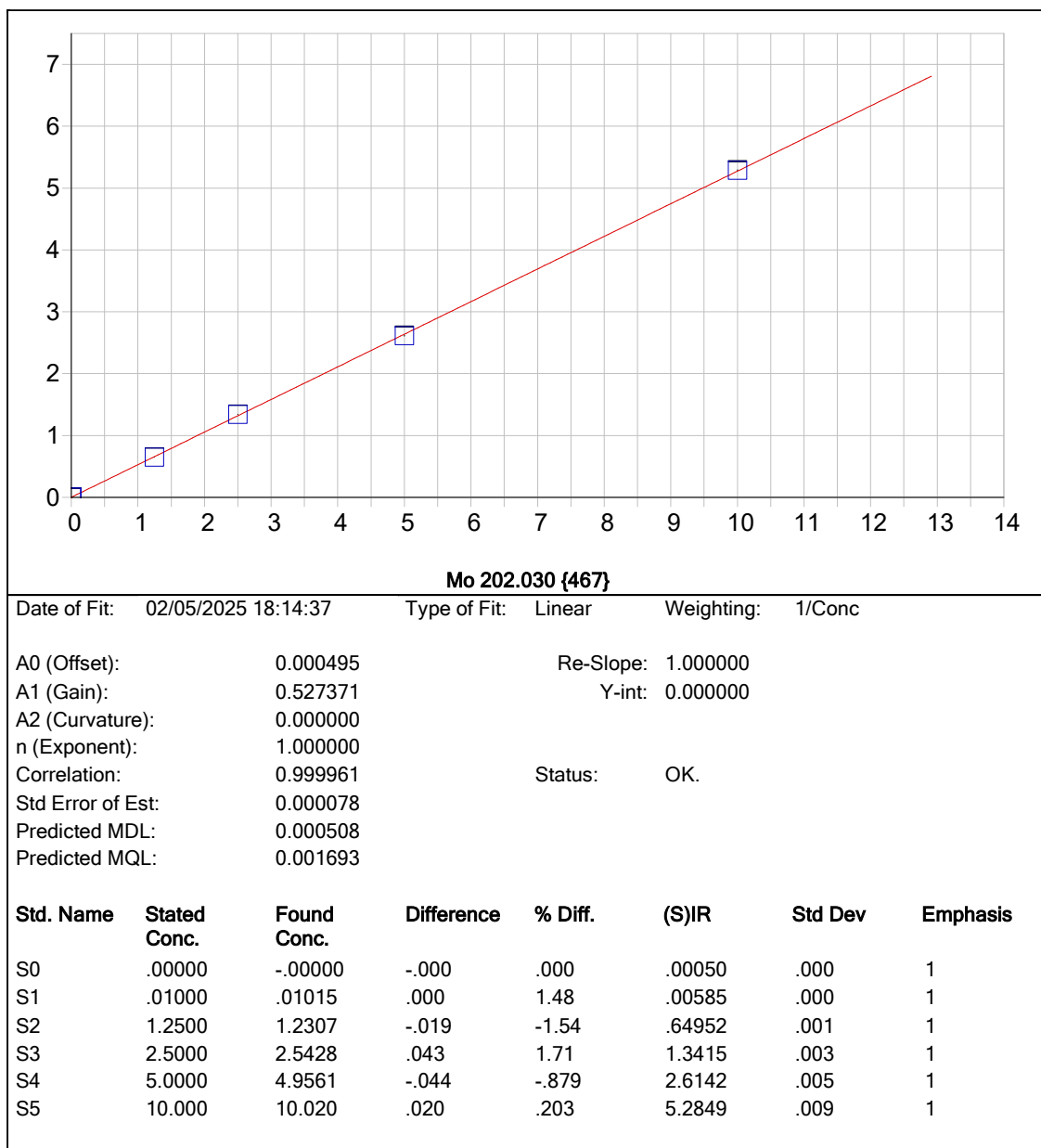


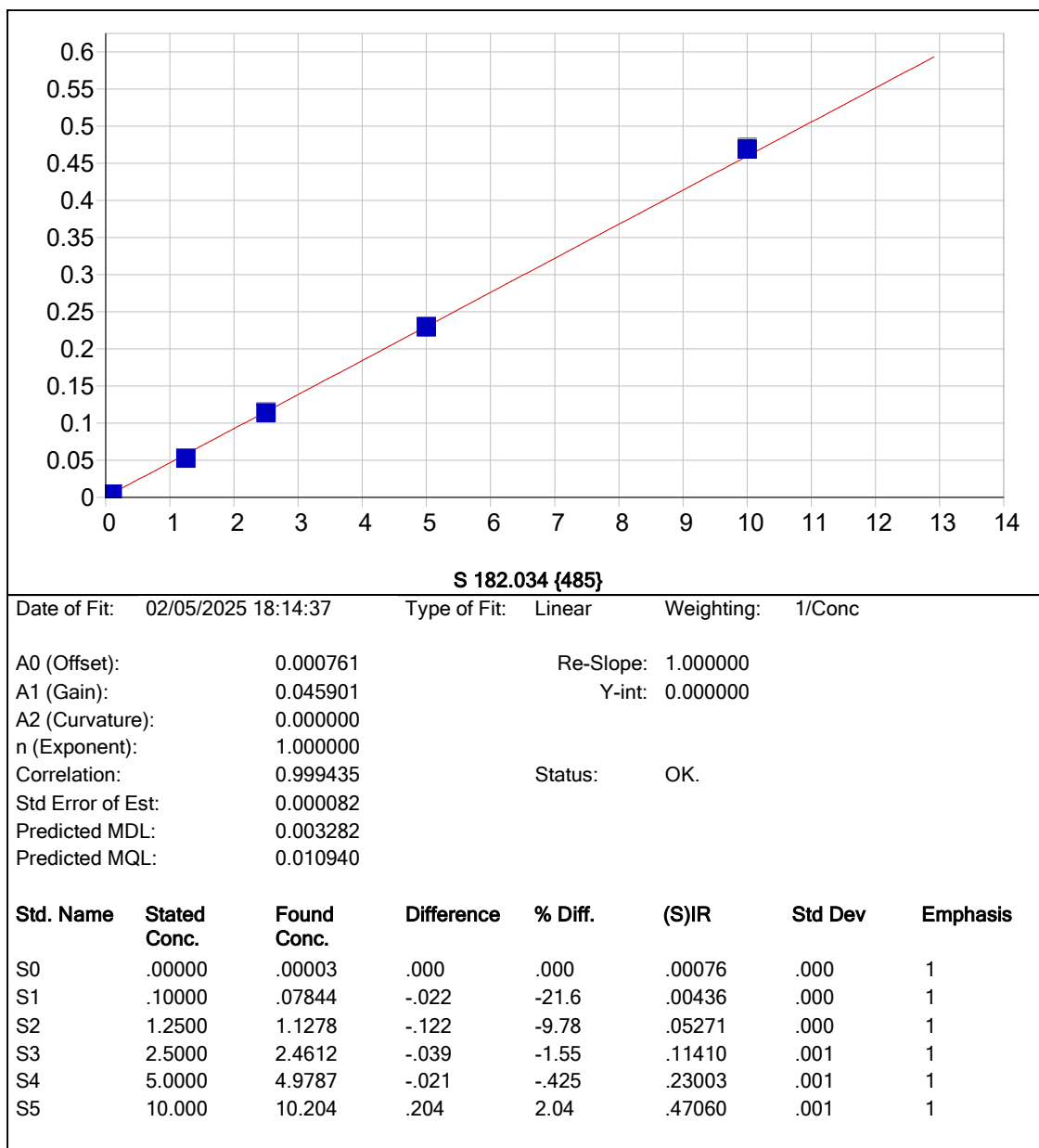


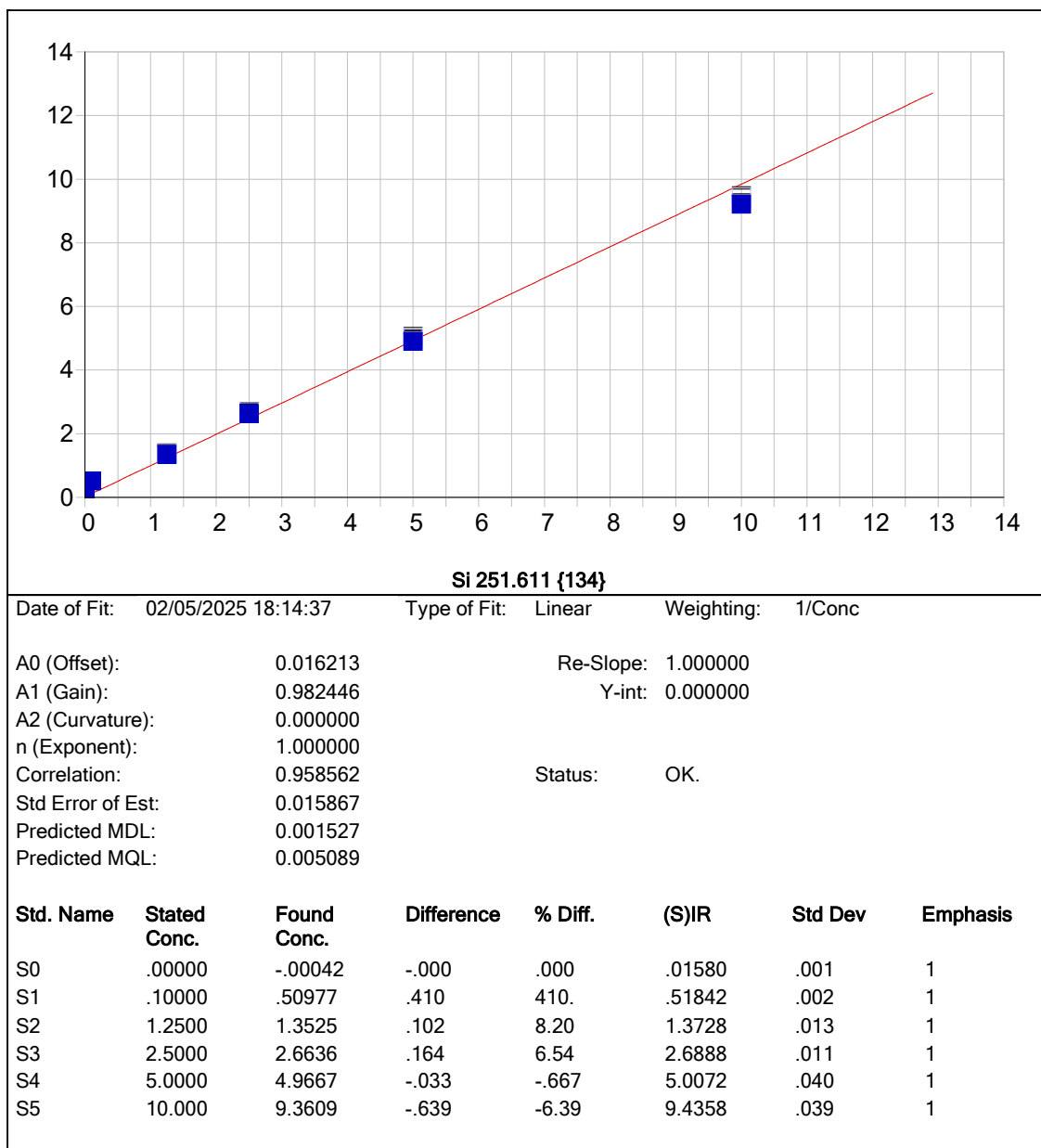


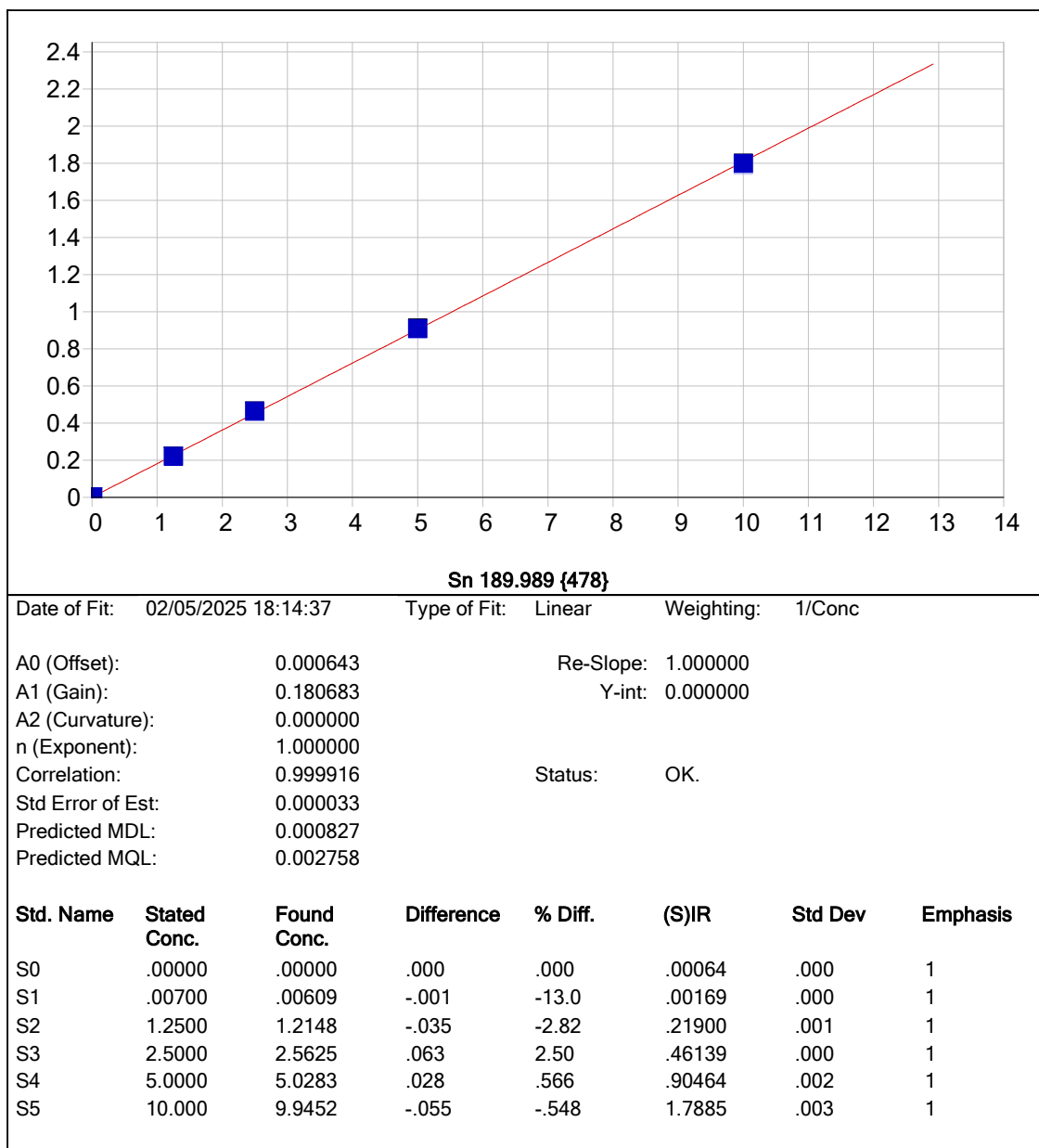


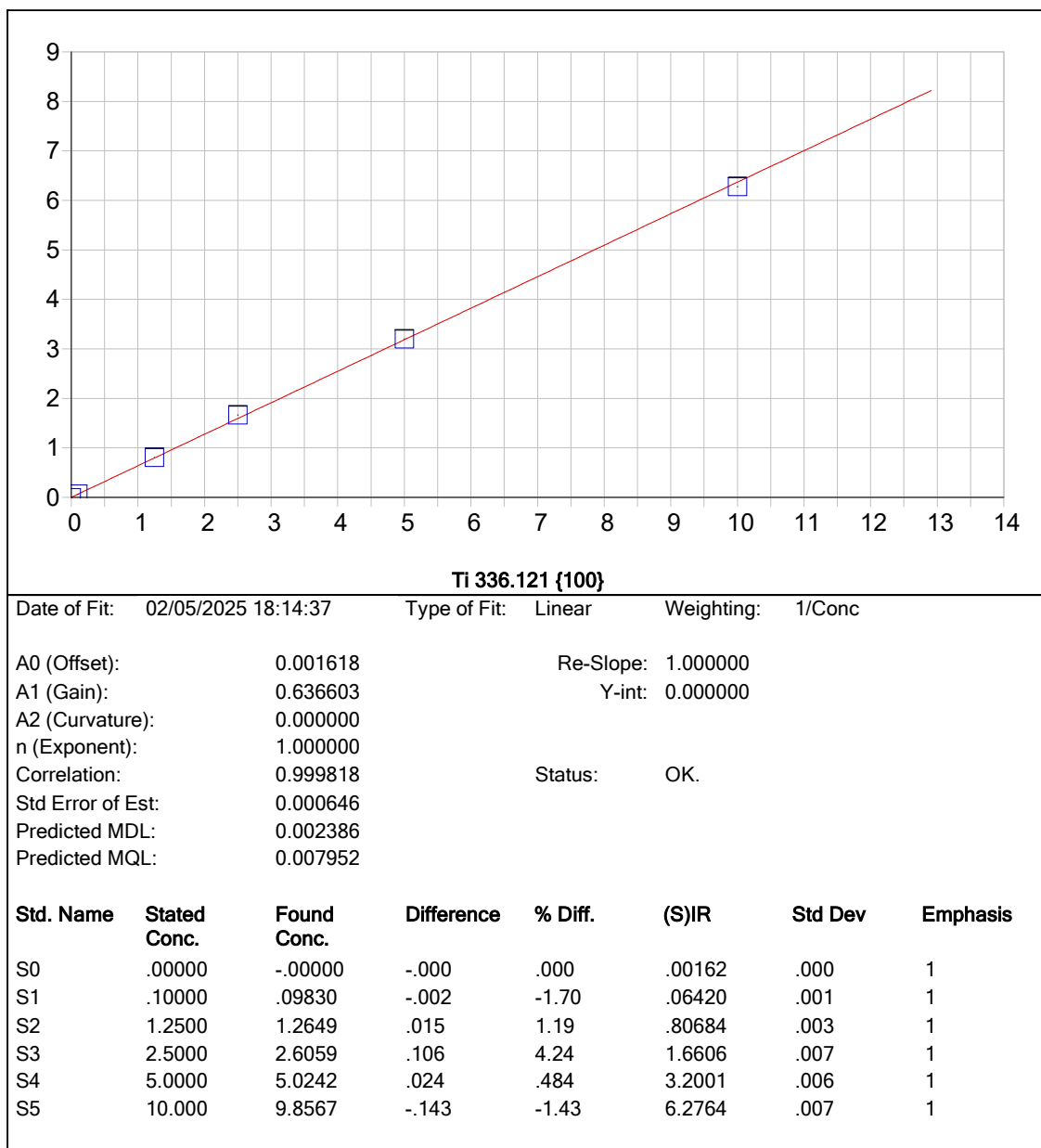


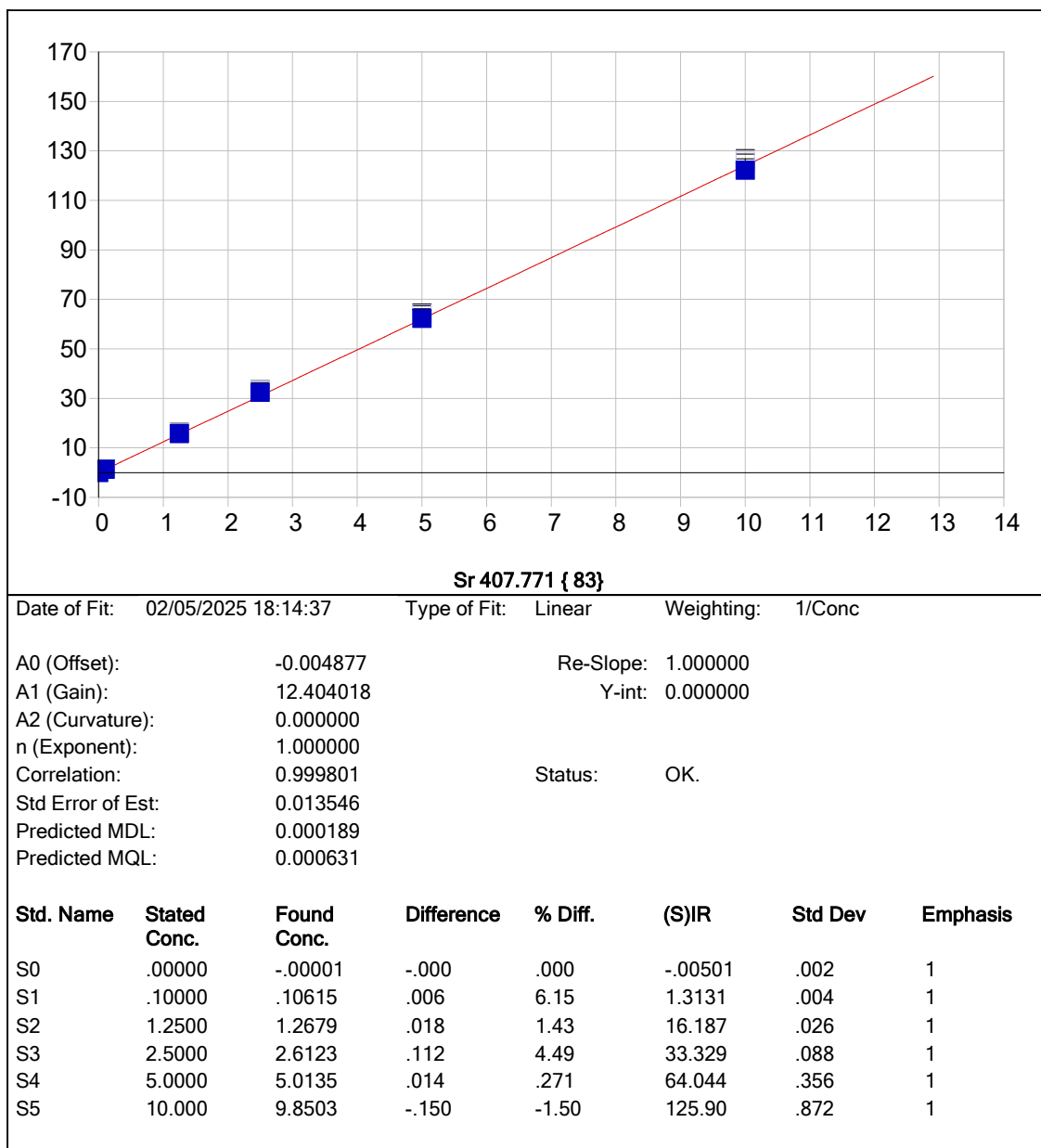


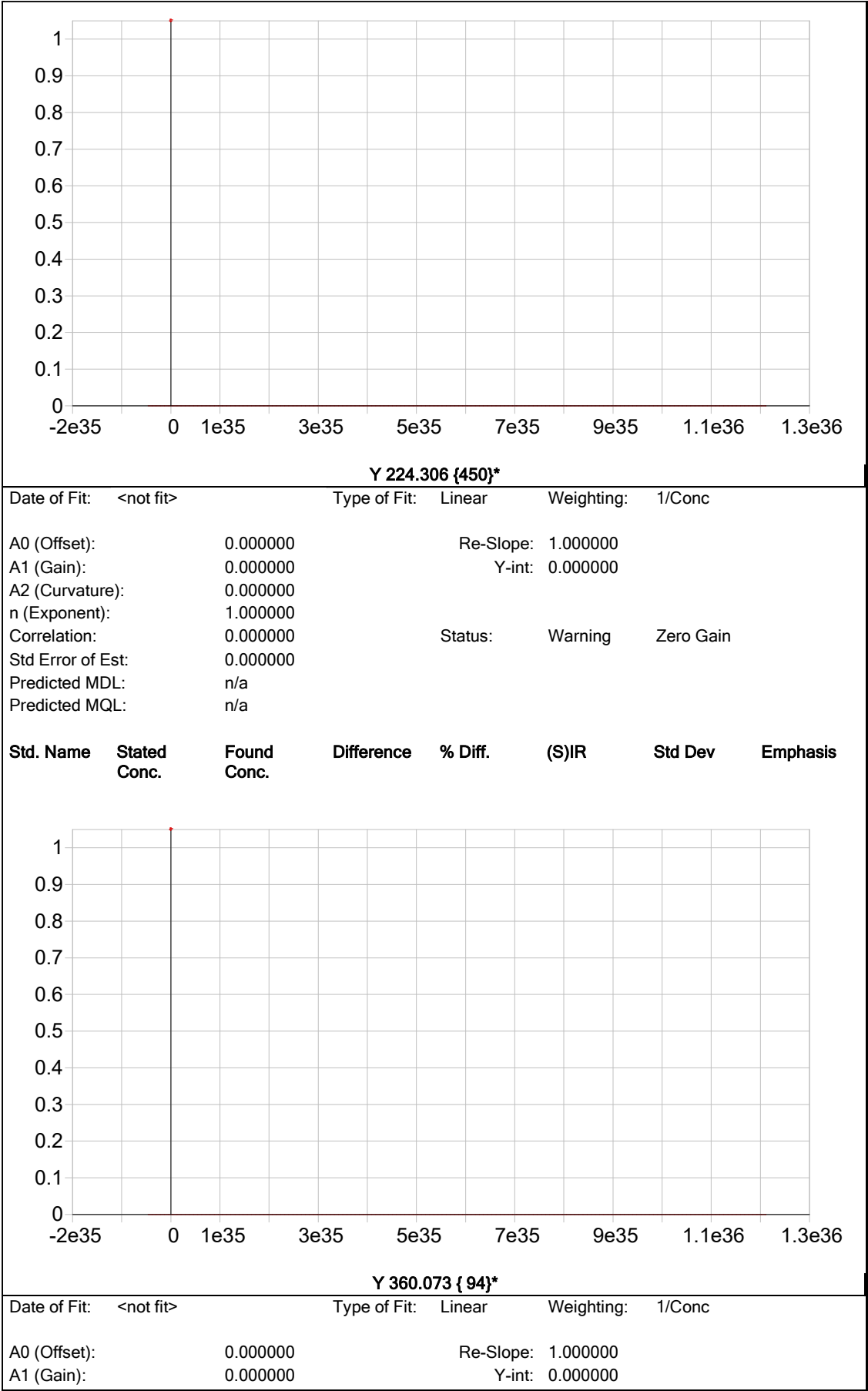


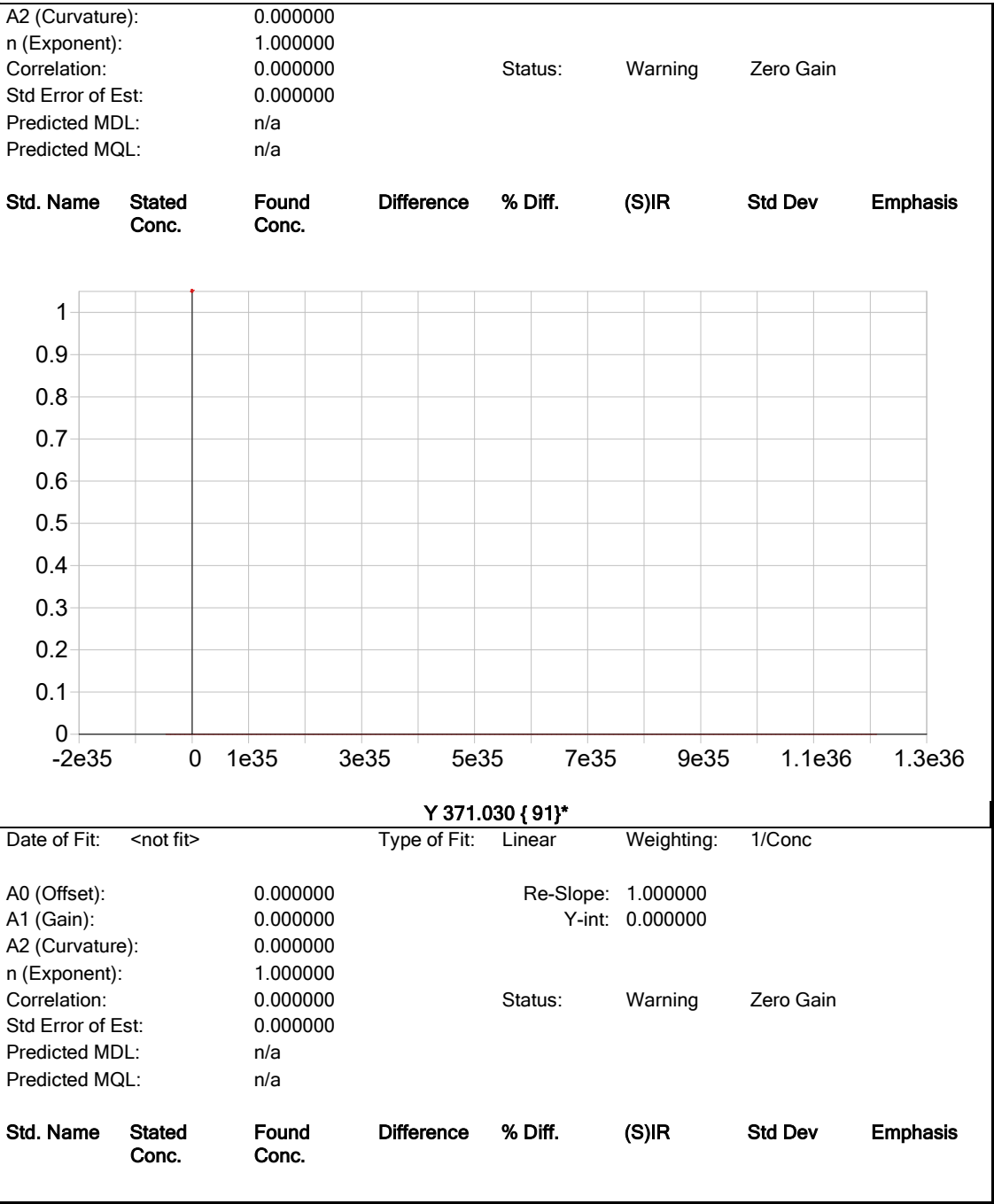


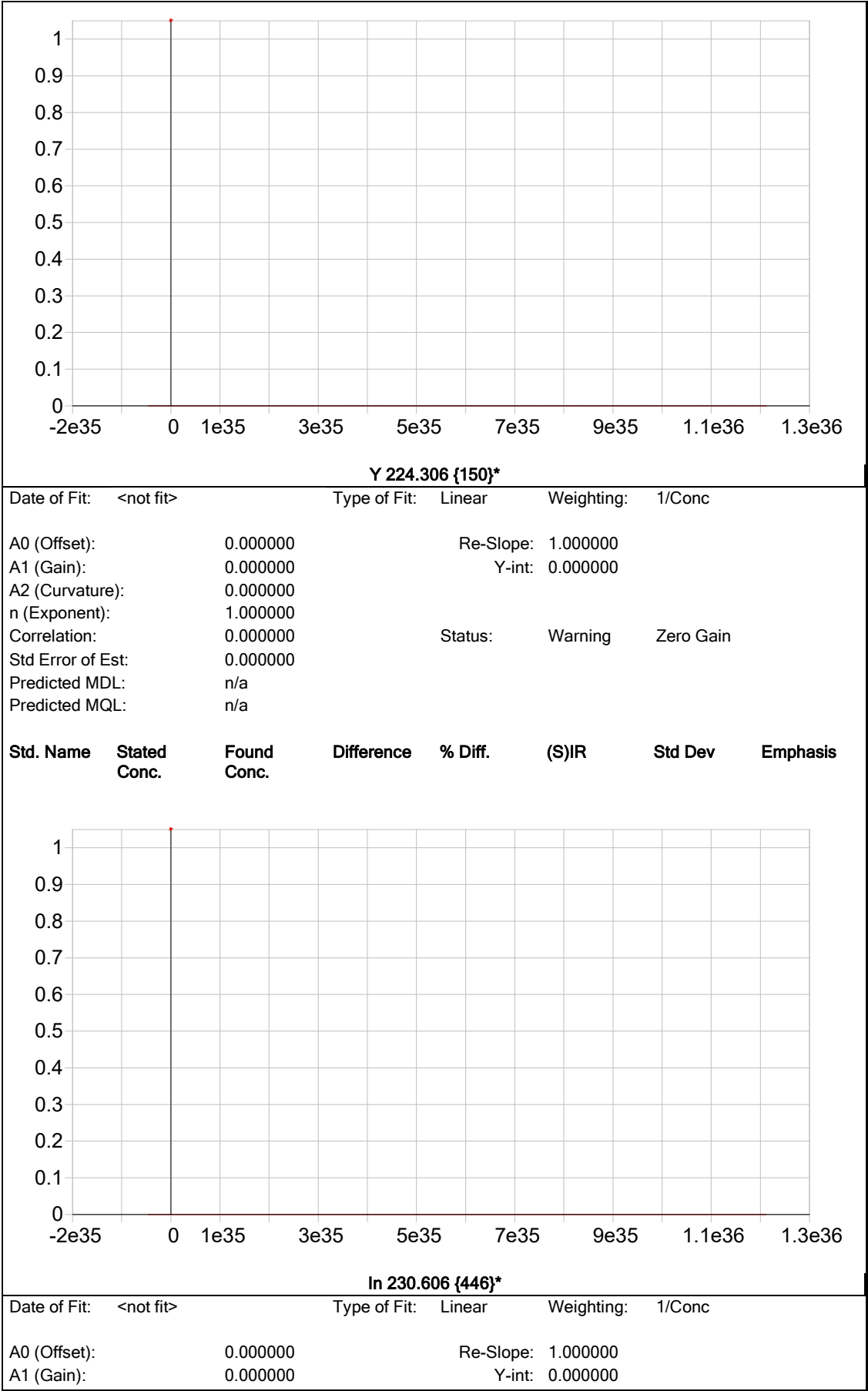


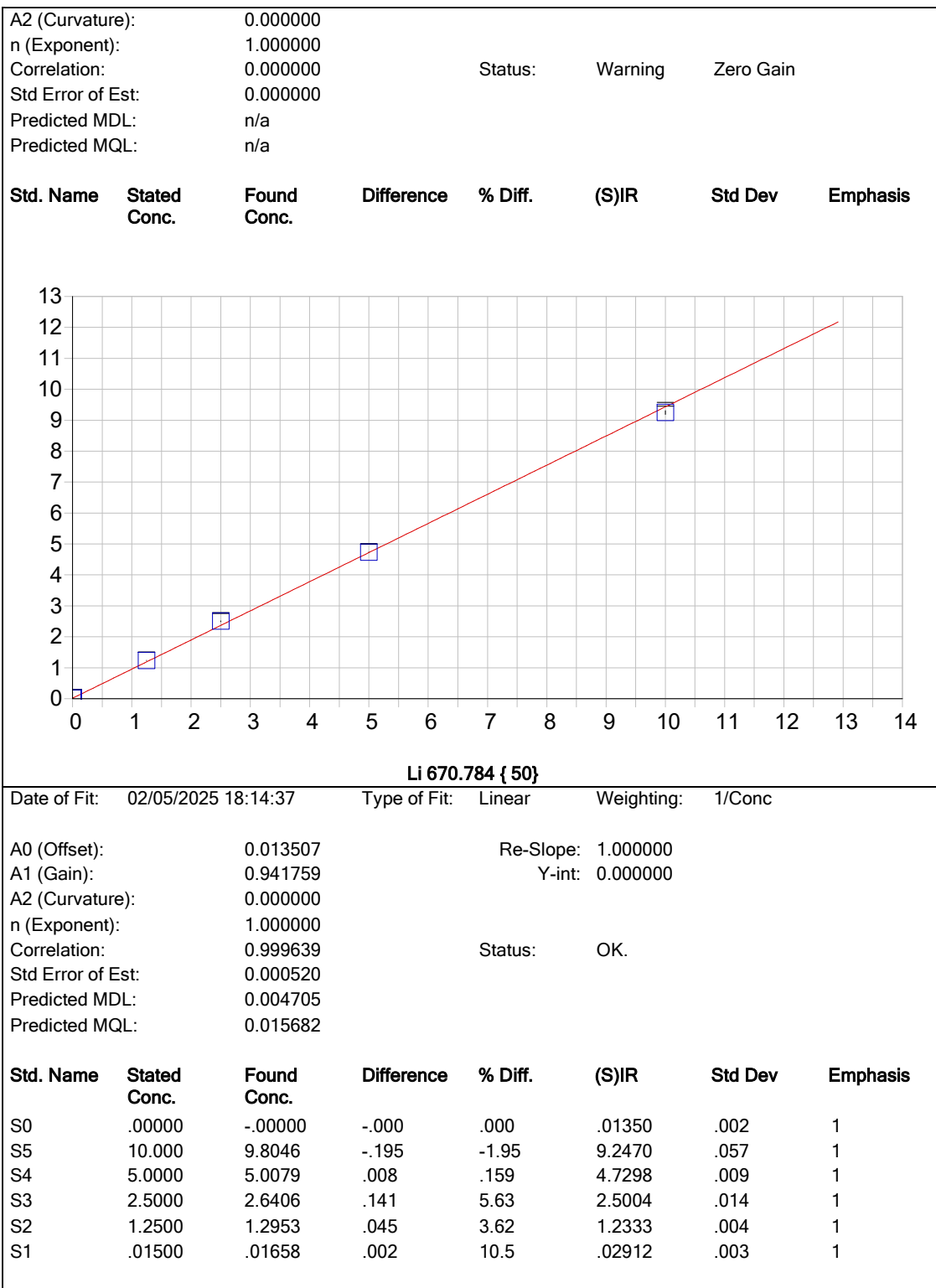












Sample Name: S0 Acquired: 02/05/2025 15:17:42 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S0 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	-.33092	-.00005	.00015	.00009	.00040	-.00172	.01234	-.00190
Stddev	.44051	.00014	.00041	.00022	.00027	.00268	.00374	.00053
%RSD	133.12	312.95	268.39	231.80	66.259	156.13	30.277	27.739
#1	-.77443	-.00015	-.00030	.00032	.00069	-.00115	.00811	-.00162
#2	.10653	-.00010	.00026	.00007	.00016	.00063	.01521	-.00157
#3	-.32487	.00012	.00050	-.00011	.00036	-.00464	.01370	-.00251
Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.00032	.00538	.00001	.00006	.00314	-.00069	-.00011	-.00070
Stddev	.00019	.00155	.00020	.00007	.00244	.00094	.00037	.00039
%RSD	60.622	28.723	3649.6	117.47	77.853	135.90	336.76	55.279
#1	.00014	.00705	.00019	.00008	.00089	.00021	-.00039	-.00030
#2	.00053	.00400	.00004	-.00002	.00574	-.00062	-.00025	-.00108
#3	.00029	.00510	-.00021	.00013	.00278	-.00167	.00031	-.00073
Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	-.00032	.00051	-.01134	.00085	-.00063	.22256	-.00201	.00226
Stddev	.00025	.00012	.00121	.00056	.00046	.00389	.00009	.00130
%RSD	80.882	23.418	10.684	65.931	73.528	1.7458	4.4822	57.427
#1	-.00059	.00063	-.01035	.00039	-.00065	.22222	-.00193	.00236
#2	-.00028	.00049	-.01269	.00148	-.00109	.22661	-.00199	.00092
#3	-.00008	.00040	-.01098	.00070	-.00016	.21886	-.00210	.00351
Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077	Li6707	
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	
Avg	.00050	.00076	.01580	.00064	.00162	-.00501	.01350	
Stddev	.00043	.00008	.00059	.00003	.00045	.00210	.00159	
%RSD	87.401	10.303	3.7548	4.6583	27.833	41.894	11.803	
#1	.00098	.00085	.01587	.00065	.00199	-.00436	.01262	
#2	.00016	.00075	.01518	.00061	.00112	-.00736	.01254	
#3	.00035	.00069	.01636	.00067	.00175	-.00332	.01534	

Sample Name: S0 Acquired: 02/05/2025 15:17:42 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S0 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4460.7	37569.	3621.0	3222.5	5394.3
Stddev	6.8	53.	23.9	4.6	5.9
%RSD	.15285	.14109	.65927	.14306	.10909
#1	4468.4	37511.	3602.2	3227.4	5391.1
#2	4458.2	37582.	3613.1	3221.8	5401.1
#3	4455.5	37614.	3647.9	3218.2	5390.7

Sample Name: S1 Acquired: 02/05/2025 15:21:46 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S01 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2.7242	.00315	.00223	.00227	.00758	.02315	.96578	.03954
Stddev	.4965	.00019	.00018	.00019	.00024	.00119	.00661	.00088
%RSD	18.225	6.0716	7.9456	8.3481	3.1389	5.1468	.68476	2.2264

#1	2.5532	.00293	.00230	.00220	.00752	.02451	.96978	.03890
#2	3.2836	.00325	.00203	.00249	.00737	.02231	.95814	.04054
#3	2.3358	.00326	.00236	.00213	.00784	.02263	.96941	.03918

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.02268	.41897	.00240	.03932	.00939	.00322	.01463	.12752
Stddev	.00017	.00307	.00011	.00027	.00107	.00072	.00074	.00069
%RSD	.74002	.73233	4.4114	.67453	11.365	22.256	5.0475	.54069

#1	.02261	.42057	.00247	.03937	.01010	.00376	.01378	.12821
#2	.02287	.41543	.00245	.03955	.00816	.00349	.01507	.12750
#3	.02256	.42091	.00228	.03903	.00990	.00241	.01505	.12684

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.02626	.00260	.04619	.01378	.01091	.32469	-.00154	.00317
Stddev	.00007	.00027	.00397	.00060	.00015	.00343	.00009	.00058
%RSD	.25465	10.219	8.6015	4.3645	1.3909	1.0572	5.6631	18.424

#1	.02630	.00279	.04519	.01438	.01108	.32177	-.00163	.00276
#2	.02618	.00271	.04282	.01317	.01086	.32382	-.00152	.00291
#3	.02629	.00230	.05057	.01377	.01079	.32847	-.00146	.00384

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077	Li6707
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.00585	.00436	.51842	.00169	.06420	1.3131	.02912
Stddev	.00010	.00016	.00237	.00005	.00085	.0036	.00266
%RSD	1.6988	3.5571	.45809	2.9550	1.3256	.27445	9.1301

#1	.00575	.00445	.52111	.00167	.06485	1.3172	.02606
#2	.00595	.00445	.51658	.00175	.06323	1.3104	.03087
#3	.00584	.00418	.51758	.00165	.06451	1.3117	.03044

Sample Name: S1 Acquired: 02/05/2025 15:21:46 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S01 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4438.6	37346.	3673.9	3204.5	5157.3
Stddev	13.4	178.	23.9	24.9	12.2
%RSD	.30195	.47666	.64942	.77589	.23724
#1	4452.0	37269.	3652.9	3193.6	5156.5
#2	4425.2	37549.	3699.8	3233.0	5145.4
#3	4438.6	37219.	3668.9	3187.0	5169.9

Sample Name: S2 Acquired: 02/05/2025 15:25:49 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S02 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	339.63	.16147	1.4589	.08226	.15345	4.4246	11.770	.98608
Stddev	.45	.00068	.0045	.00030	.00032	.0131	.037	.00984
%RSD	.13336	.42181	.30828	.36525	.20922	.29663	.31626	.99813

#1	339.18	.16174	1.4614	.08236	.15380	4.4281	11.791	.99574
#2	339.61	.16069	1.4537	.08192	.15317	4.4356	11.792	.98642
#3	340.09	.16197	1.4615	.08250	.15337	4.4101	11.727	.97607

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2.9210	5.1127	.89531	.48903	.93157	1.4984	3.5212	1.6203
Stddev	.0071	.0087	.00482	.00112	.00447	.0026	.0085	.0014
%RSD	.24279	.17098	.53859	.22955	.47968	.17357	.24234	.08549

#1	2.9247	5.1142	.89138	.48976	.93240	1.4975	3.5228	1.6219
#2	2.9128	5.1206	.90069	.48774	.93556	1.5014	3.5288	1.6196
#3	2.9254	5.1033	.89385	.48960	.92674	1.4964	3.5120	1.6195

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.43107	.06471	.35366	.16523	.68940	.97712	.07501	1.3105
Stddev	.00235	.00027	.00099	.00031	.00755	.00196	.00017	.0156
%RSD	.54501	.41204	.28122	.18597	1.0949	.20019	.22594	1.1937

#1	.43298	.06501	.35425	.16533	.68206	.97908	.07502	1.3213
#2	.42844	.06465	.35423	.16546	.68900	.97516	.07483	1.3177
#3	.43178	.06449	.35252	.16488	.69714	.97713	.07517	1.2926

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077	Li6707
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.64952	.05271	1.3728	.21900	.80684	16.187	1.2333
Stddev	.00135	.00008	.0134	.00058	.00271	.026	.0043
%RSD	.20724	.14870	.97467	.26599	.33603	.15822	.34769

#1	.64991	.05266	1.3787	.21946	.80586	16.205	1.2349
#2	.64803	.05268	1.3823	.21835	.80990	16.199	1.2366
#3	.65064	.05280	1.3575	.21920	.80475	16.158	1.2285

Sample Name: S2 Acquired: 02/05/2025 15:25:49 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S02 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4136.0	34504.	3527.6	2975.0	4397.7
Stddev	4.1	23.	32.4	15.8	5.1
%RSD	.09943	.06801	.91947	.53014	.11551
#1	4136.5	34530.	3495.8	2989.5	4394.8
#2	4139.8	34486.	3526.3	2977.3	4403.5
#3	4131.6	34495.	3560.6	2958.2	4394.7

Sample Name: S3 Acquired: 02/05/2025 15:29:34 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S03 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	694.93	.32887	3.0783	.17257	.32064	9.0885	24.175	2.0018
Stddev	2.85	.00077	.0066	.00021	.00085	.0431	.056	.0078
%RSD	.41026	.23502	.21521	.12067	.26544	.47445	.23018	.39215

#1	691.66	.32841	3.0711	.17233	.32009	9.0934	24.220	1.9989
#2	696.89	.32843	3.0795	.17271	.32021	9.0432	24.113	1.9958
#3	696.25	.32976	3.0842	.17266	.32162	9.1290	24.194	2.0106

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	6.1876	10.544	1.8316	1.0128	1.9145	3.0564	7.1568	3.2835
Stddev	.0113	.042	.0062	.0020	.0088	.0122	.0214	.0116
%RSD	.18269	.40225	.33915	.19552	.45785	.39934	.29922	.35367

#1	6.1772	10.543	1.8381	1.0108	1.9230	3.0665	7.1687	3.2918
#2	6.1862	10.502	1.8308	1.0128	1.9055	3.0428	7.1321	3.2702
#3	6.1996	10.587	1.8258	1.0148	1.9152	3.0598	7.1696	3.2885

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.90496	.13281	.72756	.34041	1.4424	1.7767	.16505	2.6016
Stddev	.00091	.00038	.00337	.00073	.0028	.0059	.00044	.0134
%RSD	.10109	.28560	.46339	.21566	.19500	.32901	.26412	.51379

#1	.90450	.13266	.72396	.34088	1.4451	1.7763	.16479	2.6131
#2	.90436	.13253	.73064	.34078	1.4395	1.7711	.16480	2.5869
#3	.90601	.13324	.72808	.33956	1.4425	1.7828	.16555	2.6049

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077	Li6707
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	1.3415	.11410	2.6888	.46139	1.6606	33.329	2.5004
Stddev	.0030	.00070	.0112	.00039	.0071	.088	.0143
%RSD	.22644	.61688	.41559	.08372	.42842	.26526	.57306

#1	1.3399	.11341	2.6941	.46126	1.6666	33.352	2.5135
#2	1.3397	.11408	2.6760	.46108	1.6527	33.231	2.5026
#3	1.3450	.11481	2.6964	.46182	1.6623	33.403	2.4851

Sample Name: S3 Acquired: 02/05/2025 15:29:34 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S03 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3998.9	33346.	3515.1	2875.8	4140.2
Stddev	11.2	183.	20.8	10.4	9.4
%RSD	.27908	.54925	.59283	.36282	.22765
#1	3992.2	33157.	3492.2	2864.4	4134.3
#2	4011.8	33358.	3532.9	2878.2	4151.0
#3	3992.7	33522.	3520.3	2884.8	4135.2

Sample Name: S4 Acquired: 02/05/2025 15:33:20 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S04 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	1356.8	.62593	6.0509	.34108	.63358	17.639	46.620	3.8303
Stddev	3.2	.00080	.0094	.00068	.00176	.047	.086	.0146
%RSD	.23605	.12839	.15561	.19868	.27740	.26859	.18444	.38032

#1	1353.7	.62501	6.0418	.34041	.63266	17.636	46.652	3.8185
#2	1356.8	.62647	6.0501	.34106	.63248	17.593	46.522	3.8258
#3	1360.1	.62632	6.0606	.34176	.63561	17.688	46.685	3.8466

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	12.212	20.450	3.5015	1.9640	3.6757	5.8329	13.692	6.2499
Stddev	.016	.057	.0148	.0021	.0053	.0136	.018	.0150
%RSD	.12967	.27742	.42160	.10884	.14459	.23307	.12786	.23939

#1	12.196	20.460	3.4948	1.9621	3.6816	5.8379	13.708	6.2598
#2	12.212	20.388	3.4913	1.9635	3.6743	5.8175	13.673	6.2327
#3	12.228	20.501	3.5184	1.9663	3.6712	5.8433	13.696	6.2573

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	1.7726	.26115	1.4007	.65008	2.8514	3.2153	.33381	4.8014
Stddev	.0038	.00042	.0022	.00359	.0153	.0103	.00082	.0379
%RSD	.21287	.16099	.15507	.55157	.53479	.31947	.24451	.78903

#1	1.7696	.26114	1.3993	.65041	2.8657	3.2113	.33348	4.7759
#2	1.7715	.26158	1.3995	.64635	2.8532	3.2076	.33320	4.7834
#3	1.7769	.26074	1.4032	.65350	2.8353	3.2270	.33473	4.8449

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077	Li6707	
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	
Avg	2.6142	.23003	5.0072	.90464	3.2001	64.044	4.7298	
Stddev	.0053	.00058	.0395	.00247	.0060	.356	.0094	
%RSD	.20214	.25317	.78949	.27350	.18796	.55552	.19948	

#1	2.6090	.22973	4.9880	.90193	3.1997	63.770	4.7406	
#2	2.6140	.22965	4.9810	.90524	3.1942	63.915	4.7255	
#3	2.6195	.23070	5.0527	.90677	3.2062	64.446	4.7233	

Sample Name: S4 Acquired: 02/05/2025 15:33:20 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S04 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3923.7	33394.	3621.1	2848.8	3999.9
Stddev	1.6	118.	25.3	11.9	3.5
%RSD	.04010	.35423	.69804	.41864	.08823
#1	3924.6	33355.	3623.9	2836.8	3998.8
#2	3921.9	33527.	3644.8	2860.7	3997.1
#3	3924.6	33300.	3594.5	2848.8	4003.9

Sample Name: S5 Acquired: 02/05/2025 15:37:12 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S05 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2585.4	1.2131	11.953	.69761	1.2987	35.135	91.620	7.4757
Stddev	1.0	.0015	.017	.00035	.0022	.030	.777	.0306
%RSD	.04035	.12772	.13828	.04979	.16848	.08489	.84822	.40960

#1	2586.6	1.2124	11.952	.69753	1.2986	35.101	92.499	7.5087
#2	2584.6	1.2120	11.937	.69731	1.2966	35.146	91.334	7.4482
#3	2585.1	1.2149	11.970	.69799	1.3010	35.158	91.026	7.4702

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	24.201	40.092	6.7756	3.8837	7.2155	11.391	26.638	12.119
Stddev	.031	.136	.0447	.0060	.0331	.004	.035	.005
%RSD	.12986	.33934	.65973	.15557	.45870	.03762	.13021	.03743

#1	24.198	39.954	6.7254	3.8833	7.2355	11.395	26.651	12.122
#2	24.171	40.095	6.8112	3.8778	7.2338	11.390	26.665	12.120
#3	24.233	40.226	6.7901	3.8899	7.1773	11.387	26.599	12.114

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3.5238	.52724	2.7524	1.2785	5.7862	6.1554	.67925	8.9246
Stddev	.0018	.00063	.0066	.0010	.0222	.0115	.00114	.0298
%RSD	.05133	.11919	.23859	.07645	.38286	.18634	.16835	.33406

#1	3.5238	.52776	2.7571	1.2790	5.7722	6.1686	.67898	8.9590
#2	3.5220	.52654	2.7553	1.2774	5.8118	6.1474	.67826	8.9062
#3	3.5256	.52742	2.7449	1.2793	5.7748	6.1503	.68050	8.9086

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077	Li6707
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	5.2849	.47060	9.4358	1.7885	6.2764	125.90	9.2470
Stddev	.0094	.00073	.0385	.0027	.0074	.87	.0572
%RSD	.17753	.15585	.40809	.14990	.11750	.69284	.61818

#1	5.2808	.47058	9.4802	1.7857	6.2846	125.65	9.2887
#2	5.2783	.46987	9.4162	1.7887	6.2742	126.87	9.2706
#3	5.2956	.47134	9.4111	1.7911	6.2704	125.18	9.1819

Sample Name: S5 Acquired: 02/05/2025 15:37:12 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S05 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3614.6	31811.	3576.3	2635.2	3706.1
Stddev	7.1	53.	13.5	4.1	6.0
%RSD	.19619	.16524	.37679	.15614	.16137
#1	3615.1	31828.	3560.8	2635.8	3706.3
#2	3621.3	31752.	3583.0	2630.8	3712.0
#3	3607.2	31853.	3585.1	2638.9	3700.0

Sample Name: S6 Acquired: 02/05/2025 15:41:22 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S06 Custom ID2: Custom ID3:
Comment:

Elem	Al3961	Ca3736	Fe2598	Mg2790	Na8183
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	93.715	64.647	31.116	20.114	7.8609
Stddev	.973	.221	.070	.047	.0176
%RSD	1.0379	.34251	.22494	.23158	.22457
#1	93.665	64.669	31.041	20.063	7.8550
#2	92.768	64.857	31.127	20.123	7.8469
#3	94.711	64.416	31.180	20.154	7.8807
Int. Std.	Y_3710				
Units	Cts/S				
Avg	3427.6				
Stddev	23.0				
%RSD	.67081				
#1	3420.4				
#2	3453.3				
#3	3409.0				

Sample Name: ICV001 Acquired: 02/05/2025 17:08:38 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICV001 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.043756	1.060797	.9490350	.9828518	.9388854	2.402528
Stddev	.004097	.002740	.0009694	.0075205	.0017270	.021467
%RSD	.3925628	.2583380	.1021409	.7651699	.1839423	.8935138

#1	1.039639	1.058632	.9486619	.9889579	.9398658	2.385510
#2	1.043796	1.059882	.9483075	.9744514	.9398990	2.395429
#3	1.047833	1.063878	.9501354	.9851461	.9368913	2.426646

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5190527	.5294603	.4656956	10.08649	.5344819	.4855609
Stddev	.0017994	.0024583	.0007988	.01339	.0026650	.0011204
%RSD	.3466739	.4643100	.1715258	.1327172	.4986123	.2307463

#1	.5196083	.5316889	.4650433	10.09163	.5319392	.4843926
#2	.5170409	.5268233	.4654568	10.07129	.5342522	.4856638
#3	.5205087	.5298686	.4665865	10.09653	.5372543	.4866263

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5188320	10.27699	.5270236	5.924227	.4831233	.2426304
Stddev	.0044999	.03832	.0022541	.019213	.0021553	.0018063
%RSD	.8673113	.3729181	.4277066	.3243150	.4461239	.7444547

#1	.5159690	10.24828	.5247836	5.945289	.4832737	.2438499
#2	.5165083	10.26218	.5269957	5.907658	.4808967	.2434860
#3	.5240187	10.32051	.5292915	5.919735	.4851994	.2405553

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	10.14098	.5066325	1.035838	10.06347	F -.000676	F .0000739
Stddev	.43542	.0052079	.006300	.11727	.002031	.0020799
%RSD	4.293683	1.027934	.6082297	1.165266	300.6349	2813.277

#1	10.64358	.5082930	1.034517	9.96416	.001629	-.000272
#2	9.87816	.5108076	1.042695	10.19284	-.001451	-.001811
#3	9.90118	.5007969	1.030304	10.03342	-.002206	.002305

Sample Name: ICV001 Acquired: 02/05/2025 17:08:38 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICV001 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F .0003064	F -.002232	F -.000510	F .0043917	F -.000275	F -.008957
Stddev	.0002943	.001842	.001704	.0005337	.001275	.000138
%RSD	96.04172	82.54021	334.2713	12.15290	463.5684	1.544551
#1	.0003206	-.000281	-.001379	.0044718	.000871	-.008997
#2	.0005933	-.002474	.001453	.0038224	-.000048	-.008804
#3	.0000053	-.003941	-.001604	.0048808	-.001649	-.009072

Elem	Li6707
Units	ppm
Avg	F -.007719
Stddev	.002346
%RSD	30.39836
#1	-.005642
#2	-.007250
#3	-.010264

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4305.787	36946.59	3635.039	3182.651	4905.368
Stddev	10.551	3.71	15.357	1.829	12.373
%RSD	.2450405	.0100438	.4224620	.0574674	.2522257
#1	4302.964	36943.10	3627.190	3182.782	4906.271
#2	4317.463	36946.17	3652.734	3180.760	4917.265
#3	4296.935	36950.49	3625.193	3184.411	4892.569

Sample Name: ICB001 Acquired: 02/05/2025 17:15:44 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICB001 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0023608	.0009157	-.000143	.0020874	.0035238	.0092419	-.000013
Stddev	.0024873	.0004969	.000856	.0024511	.0012500	.0053925	.000868
%RSD	105.3566	54.26874	598.5894	117.4200	35.47430	58.34887	6514.469

#1	.0037662	.0012549	.000660	.0012461	.0046510	.0038556	-.000337
#2	.0038272	.0003453	-.001043	.0001678	.0037411	.0092294	.000971
#3	-.000511	.0011468	-.000045	.0048483	.0021794	.0146406	-.000673

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000820	.0000303	-.041072	-.000041	.0000525	-.003765	.0099395
Stddev	.0000735	.0000735	.022403	.000662	.0003344	.006985	.0049026
%RSD	89.58550	242.6617	54.54565	1633.541	637.1139	185.5308	49.32401

#1	.0000238	.0000798	-.015208	.000723	-.000168	-.001660	.0097550
#2	.0000576	.0000654	-.053593	-.000402	-.000112	.001925	.0051318
#3	.0001646	-.000054	-.054416	-.000443	.000437	-.011560	.0149317

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000035	-.013840	.0000303	.0008881	.1285077	-.000866	.0003454
Stddev	.001096	.039032	.0002111	.0012211	.1772391	.002101	.0016330
%RSD	3168.624	282.0287	696.1383	137.4867	137.9210	242.4617	472.7741

#1	-.000218	.015488	-.000165	.0003356	.2431644	.001336	.0010776
#2	.001141	.001134	.000002	.0022878	-.075634	-.002849	.0014841
#3	-.001027	-.058141	.000254	.0000410	.217992	-.001086	-.001526

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.4463192	-.004259	-.000678	-.000283	-.009750	-.000412	.0043438
Stddev	.1092290	.001750	.001284	.000560	.001672	.002561	.0002079
%RSD	24.47329	41.08700	189.3782	197.6492	17.14759	621.0469	4.785081

#1	.3897324	-.002486	.000732	-.000813	-.010103	-.000801	.0045295
#2	.5722313	-.005985	-.001780	.000302	-.007930	.002321	.0041193
#3	.3769939	-.004307	-.000986	-.000339	-.011218	-.002756	.0043825

Sample Name: ICB001 Acquired: 02/05/2025 17:15:44 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICB001 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	-.001440	.0002684	-.004593
Stddev	.001557	.0001819	.005399
%RSD	108.0620	67.77059	117.5514
#1	.000190	.0002598	-.009843
#2	-.002911	.0004544	-.004877
#3	-.001601	.0000910	.000942

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4376.841	37569.79	3605.287	3213.900	5311.718
Stddev	4.360	65.49	6.764	13.387	6.056
%RSD	.0996076	.1743111	.1876105	.4165440	.1140045
#1	4379.849	37618.98	3605.218	3229.349	5305.814
#2	4378.833	37495.45	3612.085	3205.715	5317.915
#3	4371.841	37594.93	3598.558	3206.635	5311.425

Sample Name: ICSA001 Acquired: 02/05/2025 17:41:14 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICSA001 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0011338	-.001678	-.005223	-.029901	.0044339	240.2877
Stddev	.0035724	.003022	.003170	.004560	.0013699	1.1696
%RSD	315.0690	180.0648	60.69967	15.25112	30.89493	.4867348

#1	.0011233	-.005115	-.008811	-.026557	.0041103	238.9705
#2	-.002433	-.000478	-.004052	-.028049	.0032549	241.2045
#3	.004711	.000559	-.002804	-.035095	.0059367	240.6881

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0064470	.0025318	.0003040	253.7866	.0521536	.0297651
Stddev	.0001463	.0001008	.0000822	1.0486	.0014077	.0005473
%RSD	2.268755	3.980003	27.02908	.4131880	2.699083	1.838732

#1	.0063305	.0026057	.0003235	252.7428	.0535465	.0303663
#2	.0066111	.0024170	.0002138	254.8400	.0507316	.0296330
#3	.0063994	.0025725	.0003746	253.7770	.0521826	.0292959

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.022037	102.2920	.0071673	245.1682	.0070644	.0015000
Stddev	.009825	.6158	.0003124	1.1790	.0005207	.0017925
%RSD	44.58297	.6020104	4.359213	.4808949	7.370458	119.5035

#1	-.011527	101.6812	.0071463	243.8439	.0064792	-.000473
#2	-.023595	102.9127	.0068659	246.1038	.0074765	.001944
#3	-.030990	102.2823	.0074897	245.5567	.0072375	.003029

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.8707986	.0004861	-.032215	-1.16216	F .0142918	F .0190209
Stddev	.2456254	.0039287	.004788	.07632	.0017649	.0036647
%RSD	28.20692	808.1571	14.86266	6.567123	12.34905	19.26688

#1	.6934866	-.002613	-.027576	-1.08363	.0148861	.0153598
#2	1.151163	-.000833	-.037140	-1.23606	.0123065	.0226892
#3	.767746	.004905	-.031928	-1.16677	.0156829	.0190136

Sample Name: ICSA001 Acquired: 02/05/2025 17:41:14 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICSA001 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0008576	.0130383	-.006325	F .0138633	-.000881	.0033399
Stddev	.0003464	.0023853	.001899	.0017349	.001868	.0000335
%RSD	40.39136	18.29483	30.02859	12.51453	211.9091	1.001906
#1	.0007463	.0104064	-.008292	.0134544	.000537	.0033059
#2	.0005806	.0136509	-.006184	.0157661	-.002998	.0033728
#3	.0012460	.0150575	-.004501	.0123693	-.000184	.0033410

Elem	Li6707
Units	ppm
Avg	-.002363
Stddev	.003306
%RSD	139.8957
#1	-.003543
#2	.001371
#3	-.004918

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3995.325	33084.19	3509.566	2948.605	4105.424
Stddev	7.122	155.15	14.402	14.161	8.652
%RSD	.1782485	.4689619	.4103690	.4802777	.2107485
#1	3988.715	33005.84	3524.882	2939.651	4095.893
#2	3994.396	32983.85	3507.521	2941.233	4107.597
#3	4002.866	33262.90	3496.296	2964.932	4112.782

Sample Name: ICSAB001 Acquired: 02/05/2025 17:46:13 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICSAB001 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0972338	.1001504	.0467089	.0205501	.5568783	239.3115
Stddev	.0025578	.0018560	.0019178	.0017633	.0032825	.6704
%RSD	2.630586	1.853188	4.105883	8.580706	.5894518	.2801408

#1	.0968776	.1018954	.0473809	.0224120	.5603363	239.1484
#2	.0948727	.0982004	.0445455	.0189055	.5564932	238.7376
#3	.0999510	.1003553	.0482003	.0203329	.5538052	240.0484

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5275931	.5240390	.9888379	251.8241	.5813606	.5200174
Stddev	.0010480	.0016743	.0026645	.5496	.0020141	.0013158
%RSD	.1986294	.3194906	.2694569	.2182474	.3464502	.2530269

#1	.5266108	.5242244	.9914871	252.0843	.5790708	.5214690
#2	.5274724	.5222798	.9861583	251.1927	.5828581	.5196798
#3	.5286962	.5256129	.9888684	252.1952	.5821528	.5189033

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5007022	101.5136	.5242449	243.9584	.9899896	.2069226
Stddev	.0068660	.1502	.0025555	.5240	.0032823	.0014673
%RSD	1.371268	.1479538	.4874659	.2147773	.3315505	.7091046

#1	.4966887	101.4506	.5231786	244.4888	.9934770	.2054748
#2	.4967878	101.4052	.5223952	243.4411	.9869606	.2084087
#3	.5086302	101.6850	.5271609	243.9454	.9895312	.2068843

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.7040850	.5057839	.9155593	-2.31492	F .0164782	F .0202532
Stddev	.5153824	.0047661	.0040820	.04557	.0030349	.0009239
%RSD	73.19889	.9423102	.4458431	1.968687	18.41743	4.561827

#1	.1488633	.5083256	.9109515	-2.26830	.0130141	.0192291
#2	1.167211	.5002858	.9170038	-2.31709	.0186691	.0210242
#3	.796181	.5087404	.9187227	-2.35937	.0177514	.0205063

Sample Name: ICSAB001 Acquired: 02/05/2025 17:46:13 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v132) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICSAB001 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0020391	.0132848	-.003694	F .0123650	.0000908	.0033012
Stddev	.0008087	.0051312	.004279	.0009957	.0017812	.0001040
%RSD	39.65906	38.62451	115.8476	8.052243	1960.757	3.149393
#1	.0015506	.0156313	-.006115	.0135017	-.001956	.0032644
#2	.0015941	.0073999	-.006213	.0119461	.000943	.0032206
#3	.0029725	.0168232	.001247	.0116473	.001286	.0034185

Elem	Li6707
Units	ppm
Avg	-.000461
Stddev	.000750
%RSD	162.6800
#1	-.000865
#2	-.000923
#3	.000405

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3975.356	33145.64	3503.851	2945.078	4113.705
Stddev	2.459	111.25	7.794	17.176	7.508
%RSD	.0618474	.3356416	.2224461	.5832120	.1825217
#1	3974.989	33250.95	3496.286	2964.873	4105.160
#2	3973.101	33029.28	3511.856	2934.125	4116.708
#3	3977.977	33156.69	3503.411	2936.235	4119.247

Sample Name: CCV001 Acquired: 02/05/2025 18:10:50 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCV001 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	4.689138	4.710184	24.18898	4.934175	4.805949	396.1477	9.987133
Stddev	.020546	.006357	.04796	.012821	.013756	.9611	.015077
%RSD	.4381688	.1349583	.1982685	.2598342	.2862341	.2426003	.1509655

#1	4.712364	4.714655	24.23872	4.926443	4.806170	395.1997	9.976838
#2	4.681716	4.712989	24.18522	4.948974	4.819593	396.1222	9.980122
#3	4.673333	4.702907	24.14302	4.927108	4.792083	397.1213	10.00444

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.4952062	2.471078	402.4474	15.33395	2.456817	14.95733	398.6452
Stddev	.0015351	.003947	.3051	.04177	.003877	.03941	.7241
%RSD	.3099818	.1597458	.0758054	.2723898	.1578002	.2634901	.1816481

#1	.4967276	2.475563	402.2506	15.28789	2.461290	14.93270	397.9803
#2	.4936579	2.469540	402.2928	15.36935	2.454728	14.93651	398.5387
#3	.4952331	2.468131	402.7988	15.34462	2.454432	15.00279	399.4167

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	14.72308	388.1638	2.452784	1.273041	388.2429	2.454306	14.52699
Stddev	.02809	1.0077	.006652	.002944	.8385	.019148	.03114
%RSD	.1908045	.2596180	.2711973	.2312316	.2159712	.7801772	.2143544

#1	14.69810	387.2554	2.459993	1.274666	387.5745	2.439838	14.49105
#2	14.71764	387.9882	2.451477	1.274813	387.9706	2.447061	14.54388
#3	14.75349	389.2478	2.446883	1.269643	389.1838	2.476020	14.54603

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	149.0331	4.910925	4.837910	4.853514	4.846245	4.624743	4.971324
Stddev	.3253	.007693	.006591	.007210	.011538	.002729	.009655
%RSD	.2182751	.1566579	.1362431	.1485513	.2380769	.0590149	.1942083

#1	149.1636	4.914654	4.840034	4.850911	4.858334	4.622456	4.982371
#2	148.6628	4.916043	4.843177	4.861664	4.845049	4.627765	4.964499
#3	149.2729	4.902077	4.830518	4.847967	4.835352	4.624009	4.967103

Sample Name: CCV001 Acquired: 02/05/2025 18:10:50 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCV001 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	4.982885	4.667509	4.966865
Stddev	.009324	.045801	.014365
%RSD	.1871273	.9812780	.2892231
#1	4.976424	4.713645	4.950282
#2	4.993574	4.622050	4.975477
#3	4.978657	4.666832	4.974837

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3634.191	30862.54	3435.081	2671.309	3637.061
Stddev	6.378	56.09	11.637	2.108	5.731
%RSD	.1755097	.1817302	.3387835	.0789106	.1575844
#1	3641.374	30817.02	3425.166	2669.109	3637.919
#2	3632.011	30925.20	3447.894	2671.507	3642.315
#3	3629.188	30845.41	3432.183	2673.311	3630.948

Sample Name: CCB001 Acquired: 02/05/2025 18:14:35 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCB001 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0008833	.0018085	.0009372	-.000728	-.001467	.0153657	.0001331
Stddev	.0024086	.0012020	.0009677	.004741	.000895	.0221808	.0005348
%RSD	272.6754	66.46184	103.2576	651.0404	61.01075	144.3523	401.7992

#1	.0027736	.0005686	.0018918	.003467	-.000434	.0255254	-.000115
#2	.0017050	.0018885	.0009629	.000220	-.001988	-.010075	-.000232
#3	-.001829	.0029685	-.000043	-.005871	-.001980	.030647	.000747

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001558	.0000501	-.004493	.0009779	.0000925	-.000763	.0270203
Stddev	.0000315	.0000392	.007053	.0003115	.0003124	.001261	.0124502
%RSD	20.23571	78.20556	156.9935	31.85831	337.7781	165.2370	46.07700

#1	.0001412	.0000303	-.001866	.0006199	.0004528	-.002117	.0143281
#2	.0001920	.0000247	.000870	.0011260	-.000072	.000376	.0275195
#3	.0001342	.0000952	-.012483	.0011878	-.000103	-.000548	.0392135

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0009607	.0225782	-.000609	-.000647	.8234540	-.000881	.0029174
Stddev	.0009305	.0093635	.000246	.000035	.0663990	.002107	.0020241
%RSD	96.85850	41.47142	40.44937	5.333408	8.063477	239.0575	69.38234

#1	.0008035	.0333033	-.000437	-.000618	.9000967	.001408	.0011789
#2	.0001188	.0160306	-.000498	-.000638	.7833286	-.001312	.0024336
#3	.0019597	.0184007	-.000891	-.000685	.7869367	-.002740	.0051395

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.7713401	-.004368	.0139445	.0005697	-.010164	-.001713	.0037840
Stddev	.1756717	.000499	.0010427	.0004352	.002003	.001527	.0005492
%RSD	22.77487	11.41375	7.477287	76.40452	19.70288	89.18375	14.51319

#1	.9617654	-.004811	.0127416	.0005136	-.011778	.000051	.0033490
#2	.7366604	-.004465	.0145908	.0010302	-.007923	-.002580	.0036019
#3	.6155946	-.003828	.0145010	.0001652	-.010790	-.002609	.0044011

Sample Name: CCB001 Acquired: 02/05/2025 18:14:35 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCB001 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	-.000514	.0001616	.0044238
Stddev	.000496	.0000321	.0059473
%RSD	96.42638	19.85130	134.4388
#1	-.000712	.0001376	-.001481
#2	-.000881	.0001980	.010413
#3	.000050	.0001491	.004339

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4311.355	36881.54	3551.813	3150.324	5257.228
Stddev	1.656	226.09	21.282	32.827	2.857
%RSD	.0384036	.6130277	.5991908	1.042029	.0543393
#1	4309.570	37129.75	3533.473	3182.896	5254.720
#2	4312.840	36827.54	3575.148	3150.829	5256.627
#3	4311.656	36687.34	3546.818	3117.247	5260.338

Sample Name: PB166534BL Acquired: 02/05/2025 18:18:36 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: PBS534 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0021508	.0000406	-.001090	-.000763	.0018234	-.002115	-.000401
Stddev	.0022045	.0009702	.000313	.003134	.0015025	.009370	.000306
%RSD	102.4968	2387.223	28.71374	410.5442	82.39736	443.0017	76.18073

#1	.0045063	.0008246	-.001451	-.001757	.0001411	.004008	-.000485
#2	.0018091	.0003417	-.000920	.002747	.0022978	.002549	-.000062
#3	.0001371	-.001044	-.000898	-.003280	.0030315	-.012902	-.000656

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000005	-.000004	-.026452	.0002547	-.000066	-.000864	.0033944
Stddev	.000149	.000011	.020436	.0002019	.000067	.010331	.0074293
%RSD	3147.045	300.8150	77.25896	79.28187	102.1888	1195.218	218.8698

#1	.000030	.000003	-.049976	.0003648	-.000131	-.012574	.0007016
#2	.000124	.000002	-.013075	.0003776	.000003	.003013	-.002313
#3	-.000168	-.000017	-.016304	.0000217	-.000068	.006967	.011795

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001681	-.044135	.0000220	-.000059	.6667372	-.001676	.0008882
Stddev	.0002259	.032678	.0004086	.000779	.7190936	.000426	.0020959
%RSD	134.4180	74.03984	1853.835	1316.327	107.8526	25.44227	235.9780

#1	.0002697	-.016554	.0004918	-.000255	-.121597	-.001361	-.000977
#2	-.000091	-.035626	-.000252	-.000722	1.286719	-.002161	.003156
#3	.000325	-.080225	-.000174	.000799	.835090	-.001507	.000486

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.7435879	-.003780	.0067288	.0003191	-.010386	-.000008	.0040155
Stddev	.0901972	.002440	.0016487	.0005758	.003105	.000510	.0005780
%RSD	12.13000	64.54752	24.50221	180.4408	29.89855	6766.247	14.39408

#1	.6668910	-.006053	.0048252	.0008987	-.011079	.000174	.0033926
#2	.8429586	-.004084	.0076996	-.000253	-.006993	.000387	.0045345
#3	.7209140	-.001202	.0076616	.000311	-.013087	-.000583	.0041193

Sample Name: PB166534BL Acquired: 02/05/2025 18:18:36 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: PBS534 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	.0000517	-.000008	-.004188
Stddev	.0014307	.000005	.005813
%RSD	2764.657	62.63690	138.8061
#1	-.000468	-.000012	-.010722
#2	.001670	-.000002	-.002250
#3	-.001046	-.000010	.000408

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4287.730	36720.12	3536.264	3137.881	5208.895
Stddev	11.252	122.14	11.265	9.823	10.107
%RSD	.2624334	.3326248	.3185439	.3130312	.1940303
#1	4283.909	36812.06	3542.009	3149.167	5202.670
#2	4278.886	36581.53	3523.285	3131.263	5203.458
#3	4300.395	36766.78	3543.497	3133.214	5220.556

Sample Name: PB166534BS Acquired: 02/05/2025 18:22:36 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: LCS534 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0239846	.0551026	.0181144	.0628113	.1096267	.4047456
Stddev	.0055958	.0014160	.0013787	.0019682	.0009691	.0197550
%RSD	23.33100	2.569720	7.611171	3.133563	.8839987	4.880831

#1	.0227264	.0547138	.0174780	.0646904	.1107444	.3930667
#2	.0191249	.0539216	.0171688	.0629790	.1090206	.4275545
#3	.0301024	.0566723	.0196964	.0607646	.1091151	.3936157

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.4129413	.0109143	.0094716	10.34353	.0206921	.1013488
Stddev	.0010246	.0001280	.0000826	.00885	.0002905	.0005383
%RSD	.2481238	1.173049	.8718637	.0855530	1.403909	.5311570

#1	.4135882	.0109573	.0095323	10.34888	.0204420	.1018805
#2	.4134757	.0107703	.0095049	10.34839	.0210107	.1013618
#3	.4117600	.0110152	.0093775	10.33331	.0206237	.1008041

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0527960	.2127602	.0320042	10.11986	.0766369	.0199761
Stddev	.0029590	.0053623	.0006819	.07532	.0007081	.0015484
%RSD	5.604514	2.520370	2.130644	.7442699	.9240148	7.751273

#1	.0562038	.2143003	.0327335	10.19039	.0767153	.0191612
#2	.0508778	.2067963	.0313825	10.12866	.0758929	.0190053
#3	.0513065	.2171839	.0318966	10.04053	.0773026	.0217618

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	10.59960	.1032542	.1152070	10.77030	F .0130983	F .0053581
Stddev	.59552	.0008423	.0032252	.10620	.0012099	.0015319
%RSD	5.618365	.8157790	2.799478	.9860812	9.237208	28.58986

#1	10.79845	.1040975	.1150776	10.88469	.0144469	.0055915
#2	11.07025	.1032523	.1184949	10.67483	.0127400	.0067599
#3	9.93009	.1024128	.1120484	10.75136	.0121080	.0037229

Sample Name: PB166534BS Acquired: 02/05/2025 18:22:36 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: LCS534 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0211021	.1573185	F 1.008330	F .0194220	.2023673	.2115154
Stddev	.0003623	.0029135	.002101	.0007804	.0022968	.0010504
%RSD	1.717091	1.851997	.2084061	4.018037	1.134973	.4965868
#1	.0209353	.1566606	1.006391	.0199193	.1999656	.2126536
#2	.0215178	.1547901	1.008035	.0198242	.2025939	.2113094
#3	.0208533	.1605047	1.010563	.0185226	.2045424	.2105834

Elem	Li6707
Units	ppm
Avg	.0299890
Stddev	.0052942
%RSD	17.65387
#1	.0285639
#2	.0358499
#3	.0255532

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4266.214	36291.97	3565.103	3136.139	4859.011
Stddev	7.839	157.14	16.447	12.314	13.454
%RSD	.1837414	.4329861	.4613335	.3926439	.2768804
#1	4268.943	36110.75	3548.743	3124.170	4865.773
#2	4257.375	36390.42	3564.929	3135.476	4843.517
#3	4272.323	36374.74	3581.636	3148.771	4867.742

Sample Name: PB166531BL Acquired: 02/05/2025 18:26:31 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: PBS531 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0019067	-.000608	-.000620	-.000412	-.000622	.0026673	.0000943
Stddev	.0010551	.001876	.001364	.002944	.001965	.0184281	.0006563
%RSD	55.33914	308.5190	219.9712	714.8448	316.0731	690.8838	695.6604

#1	.0007378	.001348	-.002101	.000831	.000939	-.018197	-.000356
#2	.0021933	-.002392	.000586	.001707	-.002829	.016719	-.000208
#3	.0027889	-.000779	-.000346	-.003773	.000025	.009480	.000847

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000537	-.000019	-.028431	-.000053	.0001875	-.006150	.0290084
Stddev	.0000406	.000018	.020815	.000918	.0001230	.004427	.0225247
%RSD	75.51467	92.62214	73.21188	1737.110	65.58330	71.98156	77.64895

#1	.0000813	-.000009	-.050639	.000951	.0003108	-.008280	.0054503
#2	.0000071	-.000039	-.009367	-.000261	.0001868	-.001061	.0503334
#3	.0000727	-.000008	-.025288	-.000848	.0000649	-.009110	.0312415

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000754	.0145324	.0001573	-.000031	.4530823	-.006136	.0013100
Stddev	.000120	.0287498	.0005639	.000889	.5553586	.004662	.0008461
%RSD	15.86918	197.8317	358.5478	2877.233	122.5734	75.98587	64.58977

#1	-.000745	.0300986	-.000101	.000928	.0925459	-.000845	.0004668
#2	-.000878	.0321427	-.000231	-.000827	1.092625	-.007919	.0021590
#3	-.000639	-.018644	.000804	-.000194	.174076	-.009643	.0013041

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.6936493	-.005086	.0024465	-.000016	-.012889	.0004141	.0045826
Stddev	.2724580	.000702	.0006017	.000815	.002343	.0014849	.0011589
%RSD	39.27892	13.79241	24.59563	5211.039	18.17787	358.5919	25.28856

#1	.4146328	-.004385	.0017873	-.000805	-.014008	-.001248	.0032923
#2	.9590372	-.005087	.0025860	.000822	-.014463	.000881	.0055349
#3	.7072778	-.005788	.0029663	-.000064	-.010196	.001609	.0049205

Sample Name: PB166531BL Acquired: 02/05/2025 18:26:31 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: PBS531 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	-.001566	.0001112	-.010429
Stddev	.001786	.0002477	.004631
%RSD	114.0579	222.7356	44.40662
#1	-.002670	.0002202	-.012307
#2	.000495	.0002858	-.005153
#3	-.002523	-.000172	-.013825

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4332.060	37251.17	3591.235	3204.050	5252.665
Stddev	16.663	103.04	8.744	5.457	22.968
%RSD	.3846435	.2766220	.2434703	.1703116	.4372663
#1	4331.803	37193.54	3599.724	3199.318	5252.924
#2	4315.527	37189.84	3582.258	3202.813	5229.568
#3	4348.850	37370.14	3591.724	3210.019	5275.502

Sample Name: Q1251-01 Acquired: 02/05/2025 18:34:25 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1491 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1039964	-.068997	.5650585	.0961622	.0240279	58.14042
Stddev	.0044399	.000368	.0032283	.0022970	.0003574	.10511
%RSD	4.269313	.5336378	.5713236	2.388701	1.487423	.1807941

#1	.1066775	-.069380	.5636628	.0945527	.0236293	58.01951
#2	.0988715	-.068646	.5627628	.0951412	.0243198	58.21001
#3	.1064402	-.068964	.5687498	.0987927	.0241345	58.19176

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.6476056	.0091779	.0027110	27.18666	.1436076	.0635424
Stddev	.0020987	.0001785	.0001361	.02011	.0007541	.0003018
%RSD	.3240787	1.944934	5.021450	.0739842	.5251405	.4749458

#1	.6458515	.0090295	.0027675	27.20864	.1427372	.0632657
#2	.6499308	.0093759	.0025557	27.16918	.1440209	.0634973
#3	.6470345	.0091282	.0028098	27.18218	.1440648	.0638642

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0997230	159.8971	2.215426	11.12122	.1148342	.0142674
Stddev	.0032314	.4046	.004410	.02431	.0005562	.0009385
%RSD	3.240401	.2530408	.1990448	.2186046	.4843212	6.578029

#1	.0969757	159.5635	2.212226	11.10736	.1154704	.0151021
#2	.1032833	159.7806	2.213596	11.14929	.1145924	.0132515
#3	.0989099	160.3472	2.220456	11.10701	.1144399	.0144485

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.194376	.1692579	.5112867	F -4.87001	4.093560	.0390477
Stddev	.166061	.0086768	.0025873	.10163	.014160	.0001882
%RSD	13.90361	5.126389	.5060407	2.086888	.3459164	.4820689

#1	1.172099	.1607531	.5142534	-4.75453	4.082442	.0392649
#2	1.370452	.1689235	.5094979	-4.90970	4.088736	.0389443
#3	1.040578	.1780971	.5101089	-4.94581	4.109502	.0389337

Sample Name: Q1251-01 Acquired: 02/05/2025 18:34:25 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1491 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0087727	2.371148	5.304675	.0305422	.4299505	-.078452
Stddev	.0006066	.004937	.018578	.0004049	.0024659	.000254
%RSD	6.914605	.2082216	.3502242	1.325546	.5735211	.3241526
#1	.0084008	2.372809	5.325536	.0307366	.4286008	-.078359
#2	.0094727	2.365595	5.289913	.0308131	.4284541	-.078258
#3	.0084446	2.375041	5.298574	.0300768	.4327966	-.078740

Elem	Li6707
Units	ppm
Avg	.0550325
Stddev	.0016356
%RSD	2.971985
#1	.0537197
#2	.0568647
#3	.0545132

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4714.408	39838.32	3991.906	3472.547	4821.728
Stddev	4.843	274.62	31.613	26.187	1.299
%RSD	.1027198	.6893256	.7919354	.7541259	.0269454
#1	4716.595	39985.46	4004.204	3487.811	4822.395
#2	4708.858	40008.02	4015.523	3487.521	4820.231
#3	4717.771	39521.49	3955.992	3442.309	4822.558

Sample Name: Q1251-02 Acquired: 02/05/2025 18:38:11 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1492 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0886212	-.054775	.5411170	.0762470	.0166195	56.20642
Stddev	.0024442	.001587	.0023178	.0027113	.0011746	.23141
%RSD	2.757995	2.896764	.4283434	3.555994	7.067724	.4117185
#1	.0858676	-.055829	.5385341	.0751218	.0160679	56.19515
#2	.0905339	-.052950	.5430157	.0793398	.0158222	56.44325
#3	.0894621	-.055546	.5418013	.0742795	.0179684	55.98084
Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5828831	.0077656	.0015991	47.55002	.0977874	.0674108
Stddev	.0019308	.0000583	.0000347	.20742	.0004717	.0007012
%RSD	.3312496	.7503589	2.168099	.4362191	.4824128	1.040156
#1	.5842913	.0078206	.0015631	47.57318	.0983229	.0666050
#2	.5836759	.0077717	.0016323	47.74489	.0974331	.0678817
#3	.5806821	.0077045	.0016019	47.33199	.0976062	.0677458
Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0987624	136.7905	1.560419	12.90619	.1022175	.0107314
Stddev	.0027425	.5372	.005618	.07236	.0008801	.0012148
%RSD	2.776884	.3926873	.3600283	.5606332	.8609836	11.31993
#1	.0961167	136.8486	1.557177	12.88096	.1014041	.0114809
#2	.0985780	137.2962	1.566906	12.98779	.1031518	.0113836
#3	.1015924	136.2266	1.557174	12.84984	.1020966	.0093298
Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.197251	.1523215	.4346380	F -5.13327	2.633960	.0402761
Stddev	.232735	.0016404	.0064982	.32928	.025072	.0006978
%RSD	19.43914	1.076958	1.495074	6.414708	.9518615	1.732455
#1	1.308419	.1518801	.4414291	-4.89898	2.605020	.0410803
#2	.929778	.1541374	.4284790	-4.99106	2.649123	.0399173
#3	1.353556	.1509469	.4340058	-5.50976	2.647735	.0398307

Sample Name: Q1251-02 Acquired: 02/05/2025 18:38:11 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1492 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0079111	1.600630	5.522906	.0291129	.3711333	-.022541
Stddev	.0006549	.009376	.048634	.0009432	.0018143	.000189
%RSD	8.278848	.5857454	.8805945	3.239737	.4888554	.8386072
#1	.0076332	1.589872	5.490151	.0286226	.3697651	-.022373
#2	.0086592	1.607054	5.578788	.0302003	.3704435	-.022745
#3	.0074410	1.604965	5.499778	.0285159	.3731914	-.022505

Elem	Li6707
Units	ppm
Avg	.0597785
Stddev	.0027710
%RSD	4.635391
#1	.0607256
#2	.0619518
#3	.0566582

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4631.317	38536.63	3865.260	3369.121	4744.149
Stddev	30.581	219.13	13.630	18.388	31.475
%RSD	.6603131	.5686339	.3526217	.5457665	.6634559
#1	4646.079	38305.45	3868.832	3356.410	4758.274
#2	4596.155	38741.31	3850.201	3390.204	4708.085
#3	4651.716	38563.13	3876.749	3360.747	4766.087

Sample Name: Q1251-03 Acquired: 02/05/2025 18:41:58 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1493 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1121379	-.079361	.3130945	.1117501	.0268515	80.58903
Stddev	.0023197	.001281	.0003656	.0016493	.0036118	.26353
%RSD	2.068576	1.614616	.1167706	1.475835	13.45092	.3270039

#1	.1126973	-.080499	.3132906	.1103306	.0304064	80.29260
#2	.1095896	-.079611	.3126727	.1113602	.0231855	80.67769
#3	.1141266	-.077973	.3133202	.1135593	.0269627	80.79679

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.7622981	.0100679	.0006766	21.95714	.1170240	.0594085
Stddev	.0020190	.0000348	.0000407	.02955	.0006469	.0007669
%RSD	.2648599	.3459139	6.010812	.1345791	.5527987	1.290977

#1	.7610129	.0100578	.0007221	21.97825	.1169841	.0601410
#2	.7612561	.0101066	.0006640	21.92337	.1163980	.0586112
#3	.7646252	.0100392	.0006438	21.96979	.1176900	.0594732

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0865934	183.1262	1.124534	12.56929	.1130379	.0146253
Stddev	.0065508	.2525	.001983	.04128	.0002246	.0010214
%RSD	7.565015	.1378656	.1763664	.3284190	.1986557	6.983623

#1	.0904104	182.8435	1.122533	12.58773	.1132589	.0137947
#2	.0790293	183.3293	1.126499	12.52201	.1128100	.0143154
#3	.0903406	183.2059	1.124570	12.59814	.1130449	.0157657

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.308913	.2047528	.3171203	F -4.88940	2.263458	.0392436
Stddev	.588185	.0048401	.0032610	.20973	.007938	.0027384
%RSD	44.93685	2.363893	1.028317	4.289453	.3507178	6.977887

#1	.759438	.2033241	.3196312	-4.86650	2.264484	.0361776
#2	1.237936	.2007878	.3182951	-5.10964	2.255057	.0401068
#3	1.929366	.2101464	.3134347	-4.69206	2.270834	.0414464

Sample Name: Q1251-03 Acquired: 02/05/2025 18:41:58 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1493 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0084223	.9180682	7.079369	.0255497	.3462569	-.117632
Stddev	.0001270	.0017883	.049536	.0009545	.0039352	.000145
%RSD	1.508253	.1947931	.6997303	3.735663	1.136500	.1232648
#1	.0085446	.9160327	7.134171	.0265984	.3490647	-.117496
#2	.0084314	.9187849	7.066160	.0253190	.3479470	-.117785
#3	.0082910	.9193871	7.037775	.0247318	.3417589	-.117614

Elem	Li6707
Units	ppm
Avg	.0872778
Stddev	.0024691
%RSD	2.828975
#1	.0871611
#2	.0848691
#3	.0898031

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4606.918	38452.37	3878.836	3362.589	4716.002
Stddev	12.838	135.98	14.275	9.844	15.996
%RSD	.2786605	.3536385	.3680151	.2927568	.3391840
#1	4593.510	38371.98	3864.453	3351.351	4698.737
#2	4619.098	38609.38	3893.000	3369.687	4730.319
#3	4608.145	38375.76	3879.054	3366.730	4718.949

Sample Name: PB166531BS Acquired: 02/05/2025 18:45:44 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: LCS531 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0251214	.0546267	.0176479	.0638578	.1146111	.4185628
Stddev	.0006811	.0010151	.0008231	.0008932	.0030741	.0047369
%RSD	2.711323	1.858323	4.663816	1.398738	2.682178	1.131709
#1	.0244367	.0557977	.0171869	.0646412	.1173865	.4209773
#2	.0251286	.0540868	.0185981	.0640469	.1113069	.4131051
#3	.0257989	.0539956	.0171586	.0628851	.1151398	.4216059
Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.4169157	.0107370	.0095286	10.47943	.0211489	.1024201
Stddev	.0022824	.0000837	.0000391	.05435	.0006056	.0003413
%RSD	.5474537	.7792091	.4098393	.5185932	2.863346	.3332285
#1	.4166924	.0107480	.0094860	10.45734	.0214068	.1023678
#2	.4147532	.0108146	.0095628	10.43960	.0215828	.1027846
#3	.4193016	.0106484	.0095368	10.54134	.0204571	.1021080
Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0545757	.2386076	.0329360	10.08335	.0770638	.0201431
Stddev	.0005835	.0150192	.0014934	.04225	.0005884	.0009630
%RSD	1.069139	6.294528	4.534087	.4190015	.7635736	4.780917
#1	.0548968	.2559354	.0343952	10.08253	.0771069	.0196055
#2	.0539022	.2293217	.0314107	10.04151	.0776296	.0212549
#3	.0549282	.2305656	.0330022	10.12600	.0764550	.0195689
Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	11.01682	.1043422	.1184173	10.17204	F .0124453	F .0014044
Stddev	.40446	.0025674	.0024377	.24022	.0016187	.0000832
%RSD	3.671268	2.460544	2.058529	2.361540	13.00644	5.926659
#1	11.47382	.1044763	.1165602	10.16305	.0115553	.0013101
#2	10.70494	.1017104	.1175140	9.93644	.0143137	.0014674
#3	10.87171	.1068399	.1211777	10.41662	.0114669	.0014358

Sample Name: PB166531BS Acquired: 02/05/2025 18:45:44 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: LCS531 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0211639	.1593649	F 1.019623	.0156750	.2061843	.2130462
Stddev	.0003769	.0050172	.000713	.0002889	.0016387	.0011467
%RSD	1.780941	3.148244	.0699420	1.842737	.7947692	.5382398
#1	.0212098	.1638715	1.020238	.0159417	.2048784	.2126505
#2	.0207662	.1539588	1.018841	.0153682	.2056515	.2121498
#3	.0215158	.1602645	1.019789	.0157152	.2080231	.2143384

Elem	Li6707
Units	ppm
Avg	.0266430
Stddev	.0020084
%RSD	7.538120
#1	.0243670
#2	.0281663
#3	.0273957

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4286.526	36412.58	3594.275	3143.589	4871.628
Stddev	5.480	185.42	11.350	17.856	5.083
%RSD	.1278397	.5092214	.3157778	.5680102	.1043380
#1	4287.275	36290.37	3587.182	3129.665	4877.451
#2	4280.710	36625.93	3607.366	3163.720	4868.083
#3	4291.592	36321.43	3588.279	3137.382	4869.349

Sample Name: Q1251-04 Acquired: 02/05/2025 18:49:37 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1494 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0899132	-.062442	.1272752	.0827756	.0220022	54.99114
Stddev	.0042030	.000643	.0031878	.0040393	.0020496	.15315
%RSD	4.674491	1.029399	2.504633	4.879864	9.315590	.2785048

#1	.0928488	-.062792	.1297780	.0791573	.0242352	54.84814
#2	.0917923	-.062833	.1236863	.0871337	.0215651	55.15275
#3	.0850985	-.061700	.1283613	.0820357	.0202064	54.97254

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.4095742	.0072404	-.000422	11.11491	.0742889	.0344989
Stddev	.0003777	.0001756	.000052	.04784	.0007925	.0002201
%RSD	.0922077	2.424793	12.38261	.4304084	1.066800	.6381041

#1	.4092262	.0071656	-.000419	11.06236	.0735100	.0346031
#2	.4099758	.0071146	-.000372	11.15594	.0742624	.0342460
#3	.4095207	.0074410	-.000476	11.12643	.0750943	.0346475

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0350080	140.2875	.6270123	8.791488	.0742175	.0109837
Stddev	.0038811	.9837	.0054938	.031785	.0005799	.0010876
%RSD	11.08617	.7011768	.8761847	.3615396	.7813341	9.901742

#1	.0320033	139.1667	.6206703	8.804579	.0742642	.0109961
#2	.0336310	141.0075	.6300591	8.755248	.0747726	.0098900
#3	.0393898	140.6882	.6303077	8.814636	.0736157	.0120650

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.533363	.1510041	.1576274	F -5.53575	1.453294	.0269203
Stddev	.019601	.0011799	.0045279	.12736	.002927	.0024989
%RSD	1.278332	.7813828	2.872539	2.300604	.2014208	9.282732

#1	1.555654	.1504375	.1574391	-5.44429	1.453503	.0240793
#2	1.525617	.1502144	.1531966	-5.48175	1.450268	.0287781
#3	1.518819	.1523604	.1622465	-5.68121	1.456111	.0279035

Sample Name: Q1251-04 Acquired: 02/05/2025 18:49:37 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1494 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0059502	.4268357	5.927302	.0156455	.2859630	-.077700
Stddev	.0001697	.0023101	.061480	.0009202	.0034198	.000702
%RSD	2.851627	.5412187	1.037236	5.881370	1.195871	.9036422
#1	.0059233	.4294241	5.903787	.0146626	.2878194	-.076896
#2	.0057955	.4260999	5.997068	.0157875	.2820165	-.078008
#3	.0061317	.4249831	5.881049	.0164864	.2880530	-.078194

Elem	Li6707
Units	ppm
Avg	.0609171
Stddev	.0048786
%RSD	8.008664
#1	.0663081
#2	.0568059
#3	.0596373

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4692.246	39592.50	3947.671	3461.174	4899.431
Stddev	9.269	98.15	29.036	11.956	12.791
%RSD	.1975492	.2478928	.7355288	.3454205	.2610646
#1	4686.329	39661.85	3945.003	3471.090	4893.457
#2	4702.929	39635.45	3920.061	3464.533	4914.116
#3	4687.480	39480.20	3977.949	3447.898	4890.721

Sample Name: Q1251-05 Acquired: 02/05/2025 18:53:26 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1495 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1523198	-.065571	3.985335	.0972308	.0201875	61.15609	.9164114
Stddev	.0050989	.001101	.011390	.0027192	.0027997	.17893	.0028382
%RSD	3.347504	1.678577	.2857973	2.796623	13.86845	.2925746	.3097074

#1	.1465386	-.064671	3.984772	.0947636	.0189614	61.27599	.9194511
#2	.1561759	-.066798	3.974236	.1001463	.0182100	61.24185	.9159525
#3	.1542449	-.065242	3.996996	.0967826	.0233910	60.95042	.9138306

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0097777	.0101255	135.2624	.1023444	.0912293	.2190871	169.5543
Stddev	.0001921	.0000429	.2558	.0003306	.0001885	.0055665	.5096
%RSD	1.964345	.4234340	.1891341	.3230324	.2065932	2.540777	.3005800

#1	.0099768	.0101015	135.4515	.1021934	.0914371	.2249404	170.1000
#2	.0097626	.0101000	135.3643	.1021163	.0910693	.2138604	169.4723
#3	.0095936	.0101750	134.9713	.1027236	.0911815	.2184603	169.0907

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	3.521322	11.89316	.1459827	.0151972	1.738938	.2129784	2.903163
Stddev	.007722	.10364	.0006799	.0011924	.160933	.0054193	.008730
%RSD	.2192808	.8713941	.4657547	7.846403	9.254662	2.544547	.3007119

#1	3.526730	11.97708	.1466947	.0152644	1.634756	.2187893	2.911382
#2	3.524758	11.92509	.1453402	.0139725	1.657765	.2080619	2.904108
#3	3.512479	11.77732	.1459134	.0163545	1.924291	.2120841	2.893999

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-2.28370	5.139232	.0873553	.0160146	7.263412	5.721392	.0533789
Stddev	.08560	.014150	.0016190	.0000925	.014912	.041163	.0006715
%RSD	3.748462	.2753389	1.853409	.5773924	.2053080	.7194630	1.258064

#1	-2.34429	5.138210	.0891932	.0161106	7.265059	5.767845	.0540917
#2	-2.32105	5.125621	.0867330	.0159261	7.247744	5.706884	.0527581
#3	-2.18577	5.153866	.0861398	.0160073	7.277432	5.689447	.0532868

Sample Name: Q1251-05 Acquired: 02/05/2025 18:53:26 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1495 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	.8341051	-.021306	.0577684
Stddev	.0005625	.000459	.0045108
%RSD	.0674401	2.152354	7.808443
#1	.8347437	-.021418	.0535110
#2	.8338887	-.020802	.0624958
#3	.8336829	-.021699	.0572983

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4695.795	39572.85	4022.686	3471.368	4648.940
Stddev	6.620	167.03	19.304	18.218	5.985
%RSD	.1409737	.4220834	.4798667	.5248086	.1287463
#1	4702.335	39390.57	4000.472	3450.342	4643.650
#2	4695.950	39718.59	4032.208	3482.451	4655.437
#3	4689.098	39609.38	4035.379	3481.311	4647.734

Sample Name: Q1251-06 Acquired: 02/05/2025 18:57:11 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1496 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1385688	-.101426	.3343459	.1416957	.0358605	85.55378
Stddev	.0020304	.001313	.0029844	.0042648	.0019263	.33807
%RSD	1.465257	1.294965	.8926150	3.009837	5.371641	.3951601

#1	.1385078	-.101361	.3366319	.1465640	.0353711	85.64494
#2	.1406290	-.100146	.3354361	.1399048	.0379843	85.83692
#3	.1365696	-.102770	.3309696	.1386184	.0342261	85.17947

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.6867399	.0113117	.0004204	17.29820	.1084297	.0818985
Stddev	.0018852	.0003545	.0000208	.07392	.0008061	.0006062
%RSD	.2745166	3.133924	4.938667	.4273542	.7434630	.7402349

#1	.6861035	.0113879	.0004207	17.35868	.1079132	.0825983
#2	.6888609	.0116219	.0004410	17.32013	.1080172	.0815650
#3	.6852552	.0109253	.0003994	17.21579	.1093586	.0815322

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0928190	227.6533	1.757371	11.98747	.1225128	.0198746
Stddev	.0018479	.6875	.007933	.03914	.0003535	.0006988
%RSD	1.990872	.3019814	.4514134	.3264878	.2885218	3.516256

#1	.0907180	228.1779	1.764229	12.03264	.1221675	.0191783
#2	.0941923	227.9068	1.759200	11.96608	.1224971	.0205760
#3	.0935466	226.8750	1.748683	11.96369	.1228739	.0198693

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.479006	.2224719	.4023275	F -4.15049	2.616955	.0423314
Stddev	.305829	.0035652	.0054747	.09985	.007454	.0011431
%RSD	20.67803	1.602547	1.360761	2.405721	.2848330	2.700447

#1	1.532267	.2261444	.4003632	-4.22145	2.625295	.0411296
#2	1.150044	.2222466	.3981059	-4.03631	2.610944	.0424593
#3	1.754706	.2190247	.4085133	-4.19371	2.614625	.0434052

Sample Name: Q1251-06 Acquired: 02/05/2025 18:57:11 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1496 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0119696	.7962333	7.371271	.0248508	.4307380	-.168337
Stddev	.0003815	.0066152	.081315	.0011093	.0049308	.000516
%RSD	3.187659	.8308078	1.103135	4.463978	1.144727	.3066290
#1	.0121802	.8035201	7.420426	.0242269	.4344705	-.168920
#2	.0115291	.7906056	7.415976	.0241939	.4325952	-.168151
#3	.0121993	.7945743	7.277412	.0261316	.4251484	-.167939

Elem	Li6707
Units	ppm
Avg	.0873788
Stddev	.0077484
%RSD	8.867563
#1	.0940794
#2	.0891632
#3	.0788939

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4731.784	39963.92	3991.723	3513.108	4772.454
Stddev	5.809	143.27	25.876	7.148	1.938
%RSD	.1227735	.3584924	.6482320	.2034732	.0406100
#1	4738.412	39815.43	3969.803	3504.911	4774.657
#2	4727.573	40101.32	3985.099	3518.045	4771.011
#3	4729.368	39974.99	4020.266	3516.367	4771.695

Sample Name: Q1251-07 Acquired: 02/05/2025 19:00:58 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1496D Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1358826	-.099753	.3304760	.1379827	.0354785	85.92434	.6844545
Stddev	.0022649	.002271	.0010354	.0051543	.0008480	.39262	.0023589
%RSD	1.666789	2.276599	.3133079	3.735438	2.390216	.4569384	.3446469

#1	.1382120	-.101770	.3310860	.1439209	.0346080	85.89113	.6856946
#2	.1336883	-.097293	.3310616	.1346676	.0355254	85.54938	.6817342
#3	.1357474	-.100195	.3292805	.1353596	.0363021	86.33252	.6859348

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0112409	.0003413	17.19663	.1082313	.0808303	.0966725	227.0346
Stddev	.0002956	.0000218	.09966	.0014296	.0008339	.0051102	1.1074
%RSD	2.630040	6.372659	.5795037	1.320906	1.031680	5.286140	.4877624

#1	.0115572	.0003424	17.22737	.1069490	.0804168	.1006513	226.9133
#2	.0109715	.0003190	17.08523	.1097728	.0817901	.0909093	225.9928
#3	.0111941	.0003625	17.27729	.1079723	.0802839	.0984567	228.1976

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.757419	12.02127	.1217780	.0185451	1.015693	.2221195	.4095977
Stddev	.008627	.04250	.0003585	.0011117	.151112	.0024884	.0026200
%RSD	.4908975	.3535119	.2944136	5.994652	14.87769	1.120280	.6396606

#1	1.754432	12.04519	.1219467	.0174082	1.185976	.2202945	.4068784
#2	1.750682	11.97221	.1213662	.0185973	.963532	.2249540	.4121057
#3	1.767142	12.04642	.1220210	.0196297	.897572	.2211100	.4098090

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-3.88589	2.578190	.0483379	.0122610	.7780709	7.133369	.0249777
Stddev	.18131	.003190	.0048674	.0002242	.0010144	.013979	.0005688
%RSD	4.665849	.1237176	10.06952	1.828529	.1303709	.1959667	2.277356

#1	-4.02493	2.580354	.0466198	.0122932	.7770059	7.126700	.0252704
#2	-3.95193	2.579689	.0445625	.0120224	.7790257	7.149434	.0243221
#3	-3.68082	2.574527	.0538313	.0124673	.7781811	7.123974	.0253406

Sample Name: Q1251-07 Acquired: 02/05/2025 19:00:58 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1496D Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	.4323281	-.167693	.0870520
Stddev	.0018499	.000730	.0062424
%RSD	.4278854	.4350845	7.170893
#1	.4308524	-.167549	.0825331
#2	.4344034	-.167047	.0844482
#3	.4317286	-.168484	.0941749

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4670.187	39164.14	3911.099	3413.186	4735.350
Stddev	9.956	242.35	22.435	21.341	15.123
%RSD	.2131828	.6188111	.5736315	.6252654	.3193687
#1	4679.003	39110.54	3912.657	3413.953	4748.280
#2	4659.389	39428.81	3932.715	3434.134	4718.720
#3	4672.169	38953.08	3887.926	3391.472	4739.049

Sample Name: Q1251-06LX5 Acquired: 02/05/2025 19:04:45 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1496L Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0311079	-.020856	.0682873	.0290707	.0069005	18.78562	.1484073
Stddev	.0033742	.001964	.0008220	.0021100	.0002147	.05589	.0005732
%RSD	10.84670	9.418321	1.203715	7.258001	3.112005	.2975152	.3862167
#1	.0293755	-.019117	.0685216	.0277114	.0067177	18.78950	.1489376
#2	.0289518	-.022987	.0673736	.0315013	.0071370	18.72789	.1477992
#3	.0349964	-.020465	.0689666	.0279992	.0068467	18.83947	.1484850
Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0026881	.0000429	3.744690	.0237346	.0170253	.0228571	49.94819
Stddev	.0000360	.0000299	.025648	.0001148	.0002129	.0068196	.15484
%RSD	1.337905	69.68449	.6849240	.4836232	1.250714	29.83598	.3100015
#1	.0027271	.0000748	3.773845	.0236041	.0167797	.0169089	49.99674
#2	.0026563	.0000157	3.725604	.0237793	.0171589	.0213622	49.77489
#3	.0026809	.0000381	3.734621	.0238202	.0171372	.0303001	50.07293
Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3877532	2.671426	.0240132	.0043895	.7101127	.0437496	.0900322
Stddev	.0030030	.033187	.0005864	.0002452	.3560990	.0068721	.0024160
%RSD	.7744628	1.242291	2.442153	5.587035	50.14682	15.70784	2.683477
#1	.3887611	2.697105	.0233446	.0041364	.3717089	.0474030	.0891193
#2	.3843760	2.633953	.0242543	.0044059	1.081598	.0358225	.0882056
#3	.3901227	2.683221	.0244406	.0046261	.677031	.0480234	.0927716
Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.493191	.5062366	.0093643	.0023323	.1453161	1.629160	.0092005
Stddev	.057512	.0017846	.0028239	.0005447	.0013523	.016776	.0003467
%RSD	11.66114	.3525144	30.15596	23.35336	.9305829	1.029758	3.768724
#1	-.426787	.5041788	.0081750	.0029170	.1468636	1.636530	.0091027
#2	-.527062	.5073599	.0125883	.0022406	.1443616	1.609960	.0089132
#3	-.525725	.5071710	.0073295	.0018393	.1447230	1.640990	.0095857

Sample Name: Q1251-06LX5 Acquired: 02/05/2025 19:04:45 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1496L Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	.0923846	-.036846	.0135314
Stddev	.0039469	.000330	.0035085
%RSD	4.272254	.8964796	25.92835
#1	.0908725	-.037214	.0108544
#2	.0968640	-.036751	.0122367
#3	.0894173	-.036574	.0175033

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4384.857	36865.86	3584.557	3190.453	4975.710
Stddev	16.748	144.44	23.918	21.387	18.758
%RSD	.3819575	.3917924	.6672605	.6703420	.3769984
#1	4386.124	36914.09	3595.003	3181.727	4976.827
#2	4367.511	36703.48	3601.476	3174.809	4956.418
#3	4400.936	36980.01	3557.193	3214.823	4993.885

Sample Name: Q1251-08 Acquired: 02/05/2025 19:08:38 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1496S Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2199286	-.006068	.3629554	.2956752	.1938671	87.17148	4.309128
Stddev	.0052691	.001569	.0044274	.0011859	.0042676	.09043	.001881
%RSD	2.395834	25.86314	1.219807	.4010959	2.201294	.1037396	.0436567

#1	.2239659	-.004698	.3619385	.2956190	.1894678	87.14910	4.308844
#2	.2218518	-.007780	.3591249	.2945184	.1941441	87.09433	4.307404
#3	.2139680	-.005726	.3678027	.2968883	.1979895	87.27099	4.311134

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1010556	.0905937	16.86731	.4871008	.9933716	.5515578	223.4157
Stddev	.0006415	.0003884	.07683	.0012408	.0041952	.0033509	.2633
%RSD	.6348363	.4287131	.4554807	.2547228	.4223209	.6075334	.1178606

#1	.1015611	.0904908	16.81601	.4867608	.9905008	.5514049	223.2588
#2	.1003339	.0902671	16.83027	.4860655	.9914278	.5549825	223.2686
#3	.1012719	.0910231	16.95564	.4884761	.9981861	.5482859	223.7197

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	2.624466	11.70258	1.037649	.0807587	1.503029	1.117196	1.183145
Stddev	.004729	.05056	.003672	.0006855	.546580	.005805	.011269
%RSD	.1801949	.4320185	.3538827	.8487895	36.36526	.5195867	.9524450

#1	2.619206	11.69663	1.037352	.0808136	1.961709	1.112227	1.174528
#2	2.625826	11.65526	1.034135	.0814151	1.649134	1.123577	1.195897
#3	2.628366	11.75585	1.041461	.0800475	.898243	1.115786	1.179009

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-3.90148	2.563619	.0445078	.0116720	.7811244	7.099239	.0249709
Stddev	.06825	.009024	.0013989	.0002565	.0036442	.065472	.0004352
%RSD	1.749352	.3519832	3.143080	2.197309	.4665389	.9222364	1.742948

#1	-3.82438	2.562258	.0429234	.0114129	.7823204	7.141394	.0244736
#2	-3.92590	2.555354	.0455725	.0116774	.7770324	7.023813	.0251568
#3	-3.95416	2.573246	.0450276	.0119257	.7840204	7.132511	.0252824

Sample Name: Q1251-08 Acquired: 02/05/2025 19:08:38 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1496S Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	.4151909	-.165337	.0827356
Stddev	.0030319	.000363	.0077715
%RSD	.7302361	.2197282	9.393126
#1	.4177662	-.164936	.0776209
#2	.4159571	-.165431	.0916785
#3	.4118494	-.165644	.0789075

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4778.399	40091.36	3999.332	3507.124	4837.599
Stddev	10.117	137.38	12.544	12.975	14.482
%RSD	.2117193	.3426684	.3136587	.3699721	.2993569
#1	4782.459	40248.06	3988.445	3516.653	4843.030
#2	4785.855	39991.66	4013.050	3492.347	4848.580
#3	4766.883	40034.34	3996.500	3512.374	4821.186

Sample Name: Q1251-09 Acquired: 02/05/2025 19:12:25 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1497 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0965893	-.068519	.3184939	.0927153	.0238087	65.53207
Stddev	.0063846	.006737	.0016239	.0087633	.0021046	5.59148
%RSD	6.610055	9.832613	.5098746	9.451881	8.839735	8.532434
#1	.1039522	-.076298	.3174890	.1028325	.0257907	71.97408
#2	.0925858	-.064576	.3176253	.0874871	.0240356	62.68526
#3	.0932299	-.064682	.3203674	.0878264	.0215998	61.93686
Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5259497	.0086698	-.000163	11.59138	.0815620	.0407987
Stddev	.0464165	.0006921	.000308	1.04567	.0005545	.0002434
%RSD	8.825272	7.983272	189.1579	9.021063	.6798359	.5965404
#1	.5794092	.0094563	-.000511	12.79708	.0815943	.0409743
#2	.5025443	.0083995	-.000050	11.04459	.0809921	.0409010
#3	.4958956	.0081536	.000073	10.93248	.0820997	.0405209
Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0739289	152.5756	.7605948	9.473507	.0893498	.0139581
Stddev	.0071094	12.9374	.0662354	.820570	.0004132	.0027487
%RSD	9.616550	8.479324	8.708366	8.661737	.4624888	19.69255
#1	.0821319	167.4414	.8368555	10.42069	.0892955	.0171262
#2	.0701045	146.4197	.7274998	9.02159	.0889664	.0125418
#3	.0695504	143.8656	.7174291	8.97824	.0897875	.0122065
Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.266549	.1710197	.2593673	F -4.84581	2.447974	.0262207
Stddev	.610910	.0168492	.0052756	.50081	.012950	.0020626
%RSD	48.23421	9.852217	2.034046	10.33485	.5290053	7.866304
#1	.860915	.1903699	.2533147	-4.27096	2.433332	.0285560
#2	1.969172	.1595913	.2629910	-5.18774	2.452664	.0254579
#3	.969559	.1630979	.2617963	-5.07873	2.457925	.0246481

Sample Name: Q1251-09 Acquired: 02/05/2025 19:12:25 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: E1497 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0095775	.7922981	5.561902	.0261144	.3077444	-.111547
Stddev	.0001742	.0008623	.502824	.0015087	.0288726	.009709
%RSD	1.818979	.1088316	9.040502	5.777266	9.382008	8.703633

#1	.0097659	.7915201	6.140957	.0276355	.3410707	-.122724
#2	.0094222	.7932252	5.309165	.0260892	.2902780	-.106704
#3	.0095444	.7921491	5.235585	.0246184	.2918845	-.105212

Elem	Li6707
Units	ppm
Avg	.0695723
Stddev	.0090712
%RSD	13.03859

#1	.0800469
#2	.0643668
#3	.0643034

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4821.071	40827.76	3812.013	3575.970	4856.731
Stddev	11.886	294.64	319.570	27.615	13.202
%RSD	.2465418	.7216701	8.383224	.7722395	.2718276

#1	4830.221	41036.19	3444.521	3576.248	4869.882
#2	4807.637	40956.42	3966.825	3603.444	4843.479
#3	4825.356	40490.67	4024.692	3548.217	4856.831

Sample Name: Q1272-01 Acquired: 02/05/2025 19:16:12 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: MBHHA0 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1138834	-.116499	.3242057	.1617717	.0465356	99.66339	.9401358
Stddev	.0017790	.000817	.0013902	.0053328	.0003169	.25921	.0024603
%RSD	1.562079	.7016638	.4287960	3.296496	.6810751	.2600874	.2616939

#1	.1131487	-.117271	.3237007	.1677643	.0465968	99.87408	.9409793
#2	.1159120	-.115643	.3231385	.1600024	.0461925	99.37393	.9373647
#3	.1125894	-.116582	.3257777	.1575484	.0468175	99.74217	.9420634

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0163190	.0025264	30.61627	.2295939	.1860417	.1927760	268.3514
Stddev	.0000422	.0000348	.04434	.0011178	.0002203	.0029509	.9332
%RSD	.2585474	1.378542	.1448189	.4868564	.1184065	1.530725	.3477608

#1	.0162769	.0024934	30.66742	.2289470	.1858782	.1896396	269.2124
#2	.0163186	.0025628	30.58877	.2308846	.1859547	.1954974	267.3597
#3	.0163613	.0025231	30.59262	.2289501	.1862922	.1931910	268.4822

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	8.122454	49.10602	.3241419	.0232407	1.607910	.2700529	1.017717
Stddev	.041178	.24214	.0005614	.0004239	.064597	.0007708	.011211
%RSD	.5069694	.4930887	.1731972	1.823963	4.017455	.2854402	1.101604

#1	8.160347	49.32063	.3241753	.0233969	1.669515	.2696044	1.004773
#2	8.078633	48.84352	.3235645	.0227609	1.540688	.2709430	1.024341
#3	8.128383	49.15392	.3246859	.0235644	1.613528	.2696113	1.024037

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-1.19083	4.073879	.0762003	.0110922	1.724042	4.086274	.0420249
Stddev	.05634	.013542	.0004637	.0010171	.007026	.045301	.0002719
%RSD	4.731372	.3324056	.6084995	9.169139	.4075502	1.108606	.6469394

#1	-1.25576	4.058897	.0765658	.0119068	1.718901	4.113054	.0417879
#2	-1.15489	4.077492	.0756787	.0099523	1.721176	4.033970	.0419650
#3	-1.16183	4.085248	.0763563	.0114176	1.732048	4.111798	.0423217

Sample Name: Q1272-01 Acquired: 02/05/2025 19:16:12 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: MBHHA0 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	3.472260	-.028017	.1944189
Stddev	.010380	.000183	.0027986
%RSD	.2989360	.6548531	1.439448
#1	3.482631	-.028229	.1966982
#2	3.461871	-.027909	.1912954
#3	3.472278	-.027914	.1952629

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	5398.413	45167.35	4598.674	3987.214	4547.781
Stddev	13.208	76.02	42.294	15.114	12.579
%RSD	.2446623	.1683155	.9197101	.3790501	.2765905
#1	5413.605	45094.36	4564.493	4004.566	4561.230
#2	5389.655	45161.61	4645.973	3976.927	4545.806
#3	5391.979	45246.08	4585.556	3980.150	4536.307

Sample Name: Q1272-02 Acquired: 02/05/2025 19:19:57 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: MBHHA1 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2629623	-.193406	.3071820	.2624683	.0674416	173.2765	1.719518
Stddev	.0019277	.000461	.0017657	.0020008	.0024033	1.8378	.019093
%RSD	.7330838	.2384502	.5748178	.7623030	3.563519	1.060626	1.110369

#1	.2641878	-.193538	.3078277	.2634380	.0674847	173.8978	1.724963
#2	.2607403	-.192894	.3051843	.2601674	.0650170	171.2085	1.698293
#3	.2639589	-.193788	.3085340	.2637995	.0698230	174.7231	1.735296

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0213434	.0005595	47.28992	.4806865	.2573993	.3716389	431.0897
Stddev	.0004606	.0001208	.44656	.0057329	.0049361	.0043582	3.6610
%RSD	2.157791	21.59563	.9442981	1.192657	1.917675	1.172706	.8492466

#1	.0215302	.0005817	47.50262	.4740810	.2616290	.3766676	432.5648
#2	.0208188	.0004291	46.77678	.4843661	.2519758	.3689558	426.9212
#3	.0216812	.0006677	47.59037	.4836125	.2585932	.3692934	433.7830

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	9.309428	121.4005	.5210724	.0391050	2.779459	.5625064	.7179722
Stddev	.082650	1.0285	.0107193	.0001011	.336599	.0070231	.0143681
%RSD	.8878120	.8471906	2.057156	.2585603	12.11024	1.248546	2.001207

#1	9.338298	121.9496	.5296738	.0389902	3.071307	.5685697	.7025780
#2	9.216216	120.2140	.5090636	.0391444	2.411234	.5548109	.7310272
#3	9.373772	122.0380	.5244797	.0391805	2.855834	.5641386	.7203114

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-2.70112	5.783269	.0805718	.0147279	.1833298	5.027406	.0385687
Stddev	.07130	.110287	.0052805	.0004371	.0082386	.073185	.0012043
%RSD	2.639552	1.907003	6.553752	2.968023	4.493842	1.455713	3.122455

#1	-2.73867	5.867476	.0744771	.0148539	.1870940	5.094756	.0385632
#2	-2.74578	5.658430	.0834626	.0142416	.1738815	4.949527	.0373672
#3	-2.61889	5.823900	.0837756	.0150882	.1890139	5.037935	.0397757

Sample Name: Q1272-02 Acquired: 02/05/2025 19:19:57 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: MBHHA1 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	.5288046	-.140563	.5738951
Stddev	.0037659	.001039	.0078477
%RSD	.7121570	.7393415	1.367447
#1	.5304658	-.141317	.5760550
#2	.5244937	-.139377	.5651936
#3	.5314543	-.140993	.5804367

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	5043.514	41872.14	4354.041	3707.805	4393.602
Stddev	49.060	382.75	48.545	26.506	57.720
%RSD	.9727427	.9141013	1.114945	.7148704	1.313723
#1	5006.529	42305.98	4319.956	3736.691	4345.288
#2	5099.168	41582.16	4409.623	3684.602	4457.520
#3	5024.844	41728.28	4332.544	3702.121	4378.000

Sample Name: Q1272-03 Acquired: 02/05/2025 19:23:42 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: MBHHA2 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1484761	-.128847	.3564627	.1758872	.0477399	111.2261	1.004273
Stddev	.0025571	.000527	.0052127	.0079581	.0015712	2.0505	.018619
%RSD	1.722235	.4090973	1.462331	4.524567	3.291106	1.843577	1.853944

#1	.1481790	-.129356	.3601991	.1813204	.0480895	113.5559	1.025739
#2	.1511688	-.128304	.3505078	.1667525	.0491067	109.6956	.992506
#3	.1460806	-.128881	.3586813	.1795887	.0460233	110.4268	.994574

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0181484	.0021148	77.96260	.2973619	.2003049	.2091762	303.4126
Stddev	.0004393	.0000799	1.39783	.0007793	.0002164	.0054745	5.4854
%RSD	2.420506	3.776256	1.792950	.2620703	.1080557	2.617192	1.807908

#1	.0185836	.0020708	79.55647	.2981688	.2001399	.2154107	309.7120
#2	.0177052	.0022070	76.94520	.2973034	.2002249	.2051541	299.6898
#3	.0181563	.0020666	77.38612	.2966135	.2005500	.2069638	300.8360

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	7.933526	83.34848	.3579224	.0265505	2.605512	.3565224	.8982347
Stddev	.145728	1.58296	.0014990	.0007271	.359925	.0068925	.0058468
%RSD	1.836865	1.899211	.4188062	2.738640	13.81400	1.933273	.6509201

#1	8.098985	85.15263	.3596224	.0269924	2.206286	.3638263	.9040755
#2	7.824261	82.19232	.3573546	.0257112	2.905177	.3501323	.8982467
#3	7.877331	82.70049	.3567903	.0269477	2.705072	.3556088	.8923819

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	5.728264	5.129392	.1038106	.0169806	2.239636	2.633462	.0607795
Stddev	.335761	.013370	.0050307	.0003719	.005268	.035564	.0012733
%RSD	5.861475	.2606560	4.846029	2.190312	.2351995	1.350456	2.095021

#1	6.066141	5.144674	.1092634	.0174038	2.245717	2.664481	.0606062
#2	5.394660	5.123647	.1028186	.0167059	2.236687	2.594647	.0596017
#3	5.723990	5.119854	.0993498	.0168320	2.236503	2.641258	.0621306

Sample Name: Q1272-03 Acquired: 02/05/2025 19:23:42 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: MBHHA2 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	3.424603	.3373965	.2932760
Stddev	.066977	.0068042	.0083243
%RSD	1.955753	2.016676	2.838388
#1	3.501173	.3450563	.3012256
#2	3.376903	.3320524	.2846218
#3	3.395732	.3350808	.2939806

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	5070.699	42314.31	4440.860	3715.525	4412.259
Stddev	6.685	108.58	51.599	9.968	5.360
%RSD	.1318445	.2566132	1.161914	.2682839	.1214908
#1	5065.246	42189.28	4390.648	3726.932	4406.350
#2	5078.158	42368.74	4493.742	3711.158	4416.810
#3	5068.693	42384.92	4438.191	3708.486	4413.617

Sample Name: Q1272-04 Acquired: 02/05/2025 19:27:27 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: MBHHA2D Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1472978	-.131273	.3590832	.1837078	.0491587	114.7276	1.032524
Stddev	.0055178	.003520	.0012561	.0046034	.0014560	.2569	.003802
%RSD	3.745992	2.681536	.3498080	2.505809	2.961920	.2239334	.3681927

#1	.1427055	-.132280	.3578783	.1854134	.0488749	114.9889	1.036339
#2	.1457692	-.127359	.3589862	.1872149	.0478654	114.7187	1.032498
#3	.1534187	-.134181	.3603849	.1784950	.0507357	114.4753	1.028736

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0188229	.0020456	80.15530	.3006573	.2009959	.2122639	310.5924
Stddev	.0005038	.0001746	.30470	.0016531	.0005319	.0042545	.5472
%RSD	2.676570	8.534414	.3801311	.5498267	.2646478	2.004326	.1761855

#1	.0190894	.0018442	80.50672	.3012582	.2007149	.2136385	311.1922
#2	.0191375	.0021374	79.96471	.3019259	.2006634	.2156610	310.1203
#3	.0182418	.0021551	79.99449	.2987878	.2016094	.2074920	310.4647

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	8.135976	85.79093	.3606337	.0273263	2.724975	.3678492	.9054643
Stddev	.015311	.35506	.0013023	.0012144	.175655	.0053487	.0102151
%RSD	.1881931	.4138706	.3611020	4.443871	6.446130	1.454035	1.128164

#1	8.151126	86.13344	.3611124	.0287251	2.764813	.3676890	.8941545
#2	8.136294	85.42452	.3591598	.0267124	2.877290	.3625824	.9082183
#3	8.120509	85.81482	.3616288	.0265415	2.532822	.3732761	.9140202

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	5.971829	5.168407	.1116312	.0166766	2.245157	3.103474	.0565225
Stddev	.117825	.007093	.0025565	.0001218	.011966	.044480	.0006681
%RSD	1.973010	.1372357	2.290146	.7305596	.5329525	1.433238	1.182022

#1	6.053355	5.167587	.1122514	.0167465	2.237680	3.119458	.0571903
#2	5.836737	5.161760	.1088217	.0165359	2.238833	3.137754	.0558541
#3	6.025393	5.175874	.1138206	.0167474	2.258957	3.053211	.0565232

Sample Name: Q1272-04 Acquired: 02/05/2025 19:27:27 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: MBHHA2D Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	3.551838	.3503591	.3025223
Stddev	.009358	.0015047	.0029440
%RSD	.2634557	.4294708	.9731581

#1	3.555561	.3511529	.2992007
#2	3.558761	.3513007	.3048095
#3	3.541192	.3486238	.3035568

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	5020.781	41745.57	4284.909	3655.645	4367.329
Stddev	10.198	140.79	44.571	9.441	3.128
%RSD	.2031122	.3372504	1.040190	.2582509	.0716123

#1	5012.021	41583.10	4257.500	3646.102	4363.751
#2	5018.347	41831.72	4260.889	3655.851	4368.689
#3	5031.976	41821.89	4336.338	3664.981	4369.546

Sample Name: Q1272-03LX5 Acquired: 02/05/2025 19:31:12 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: MBHHA2L Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0334931	-.028982	.0716552	.0417622	.0092126	26.74323	.2405385
Stddev	.0041464	.001193	.0008398	.0044920	.0010505	.18111	.0014914
%RSD	12.37977	4.115276	1.172025	10.75620	11.40242	.6772025	.6200166

#1	.0381906	-.027916	.0718835	.0412046	.0103947	26.55743	.2409381
#2	.0319464	-.028760	.0723573	.0375751	.0083860	26.91925	.2417893
#3	.0303425	-.030270	.0707249	.0465070	.0088571	26.75300	.2388880

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0049060	.0001583	19.02000	.0704464	.0450779	.0482891	73.56998
Stddev	.0002192	.0000837	.08565	.0003357	.0017764	.0047361	.49681
%RSD	4.468661	52.89143	.4503370	.4765676	3.940770	9.807887	.6752880

#1	.0046726	.0001518	18.94322	.0705373	.0458687	.0520175	73.09905
#2	.0049377	.0002451	19.11238	.0707273	.0463216	.0429600	74.08915
#3	.0051076	.0000780	19.00439	.0700746	.0430434	.0498898	73.52175

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.957567	20.72919	.0692496	.0051052	1.340654	.0896903	.2074278
Stddev	.008635	.06087	.0024184	.0008659	.349275	.0035521	.0030783
%RSD	.4411282	.2936680	3.492371	16.96055	26.05260	3.960400	1.484024

#1	1.949988	20.65920	.0708442	.0045820	1.736980	.0855898	.2068912
#2	1.966968	20.76985	.0704377	.0061047	1.207200	.0918220	.2046531
#3	1.955745	20.75851	.0664669	.0046289	1.077782	.0916592	.2107391

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.894794	.9688876	.0232930	.0041813	.4159151	.9598916	.0155889
Stddev	.315386	.0396065	.0015931	.0005705	.0167114	.0127286	.0006143
%RSD	16.64486	4.087837	6.839416	13.64318	4.017989	1.326043	3.940790

#1	1.865203	.9934523	.0214535	.0048370	.4254944	.9477362	.0155590
#2	2.223933	.9900135	.0242110	.0037990	.4256323	.9731248	.0162177
#3	1.595247	.9231970	.0242146	.0039079	.3966186	.9588137	.0149901

Sample Name: Q1272-03LX5 Acquired: 02/05/2025 19:31:12 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: MBHHA2L Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	.8381693	.0837108	.0684988
Stddev	.0060062	.0006565	.0014124
%RSD	.7165812	.7842330	2.061910
#1	.8358943	.0830830	.0673672
#2	.8449806	.0843926	.0700817
#3	.8336329	.0836567	.0680474

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4544.451	37410.53	3656.515	3244.430	4881.598
Stddev	142.125	48.69	32.014	9.042	155.454
%RSD	3.127450	.1301436	.8755259	.2786833	3.184497
#1	4455.379	37430.83	3683.436	3242.201	4780.641
#2	4469.618	37354.98	3621.115	3236.712	4803.540
#3	4708.358	37445.78	3664.993	3254.378	5060.614

Sample Name: Q1272-05 Acquired: 02/05/2025 19:35:02 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: MBHHA2S Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2310772	-.041321	.3960942	.3345018	.1960345	116.3074	4.381520
Stddev	.0033889	.001097	.0006777	.0019955	.0017032	.7759	.023860
%RSD	1.466563	2.654896	.1710856	.5965486	.8688136	.6670966	.5445624

#1	.2280396	-.041489	.3953122	.3347060	.1941967	115.6695	4.362602
#2	.2347325	-.042325	.3965104	.3324120	.1963471	116.0814	4.373634
#3	.2304596	-.040150	.3964599	.3363873	.1975598	117.1711	4.408325

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1016301	.0979673	79.76487	.6468459	1.156645	.6219115	309.8932
Stddev	.0006969	.0003642	.44103	.0024834	.002396	.0095479	2.4399
%RSD	.6857041	.3718017	.5529102	.3839275	.2071379	1.535254	.7873232

#1	.1018045	.0979648	79.30695	.6443688	1.156389	.6117365	307.2886
#2	.1008626	.0976043	79.80086	.6468333	1.154387	.6233227	310.2656
#3	.1022232	.0983327	80.18680	.6493356	1.159158	.6306753	312.1255

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	8.883089	84.86735	1.318687	.0850573	1.974088	1.188071	1.631834
Stddev	.059302	.60938	.002773	.0008488	.380594	.002552	.017098
%RSD	.6675837	.7180396	.2103066	.9979706	19.27950	.2147962	1.047784

#1	8.820644	84.41539	1.318313	.0841086	2.390051	1.187850	1.615411
#2	8.889978	84.62628	1.316120	.0857451	1.888921	1.185636	1.649535
#3	8.938646	85.56039	1.321629	.0853181	1.643293	1.190726	1.630557

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	6.029049	5.183234	.1032016	.0165036	2.263628	3.144303	.0617451
Stddev	.088805	.013487	.0049574	.0002521	.009224	.021406	.0003446
%RSD	1.472953	.2602078	4.803652	1.527629	.4074977	.6807811	.5580827

#1	5.949626	5.176077	.0980876	.0165145	2.258684	3.138254	.0614283
#2	6.012588	5.174833	.1079861	.0162463	2.257930	3.126572	.0616949
#3	6.124933	5.198791	.1035309	.0167501	2.274270	3.168082	.0621120

Sample Name: Q1272-05 Acquired: 02/05/2025 19:35:02 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: MBHHA2S Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	3.529510	.3447947	.2942947
Stddev	.023548	.0013614	.0054522
%RSD	.6671618	.3948448	1.852630

#1	3.507107	.3434093	.2922270
#2	3.527368	.3448443	.2901788
#3	3.554056	.3461307	.3004783

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	5078.650	42540.32	4375.208	3740.070	4410.572
Stddev	9.021	130.87	14.748	26.196	8.268
%RSD	.1776288	.3076358	.3370741	.7004220	.1874663

#1	5068.455	42673.18	4377.997	3753.105	4401.548
#2	5081.898	42411.54	4388.363	3709.914	4417.785
#3	5085.598	42536.26	4359.265	3757.192	4412.384

Sample Name: CCV002 Acquired: 02/05/2025 19:54:26 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCV002 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	4.795078	4.870239	24.98451	5.109668	4.968370	405.1476	10.32316
Stddev	.003917	.003565	.03724	.008388	.010311	1.6617	.04369
%RSD	.0816965	.0732000	.1490556	.1641686	.2075266	.4101440	.4232144

#1	4.792288	4.872811	24.97777	5.117514	4.978067	407.0619	10.37320
#2	4.793389	4.866170	24.95109	5.100826	4.957539	404.0773	10.29256
#3	4.799556	4.871737	25.02465	5.110665	4.969505	404.3036	10.30373

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5133410	2.556445	410.3386	15.87674	2.538926	15.37691	403.9484
Stddev	.0033155	.002568	2.3843	.14228	.003788	.03434	.9771
%RSD	.6458570	.1004697	.5810544	.8961408	.1491819	.2232942	.2418807

#1	.5165991	2.556279	413.0912	15.71495	2.542618	15.40852	405.0213
#2	.5099710	2.553963	408.9144	15.98236	2.535049	15.34038	403.1098
#3	.5134528	2.559092	409.0103	15.93289	2.539112	15.38184	403.7139

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	14.98055	395.4294	2.532227	1.315012	400.0553	2.512762	14.62040
Stddev	.03833	1.3453	.003293	.003807	.8361	.008607	.10193
%RSD	.2558508	.3402093	.1300385	.2895223	.2090055	.3425422	.6971528

#1	15.02278	396.9819	2.535909	1.310769	400.2030	2.522659	14.52946
#2	14.94796	394.6091	2.529565	1.316133	399.1551	2.508604	14.73057
#3	14.97092	394.6971	2.531208	1.318132	400.8077	2.507024	14.60115

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	153.1862	5.096528	5.014620	5.021542	5.025802	4.817431	5.155004
Stddev	.4302	.014316	.017471	.002251	.018830	.022663	.000595
%RSD	.2808185	.2808934	.3483928	.0448300	.3746619	.4704433	.0115511

#1	153.5581	5.092085	5.031490	5.023835	5.026759	4.839384	5.155549
#2	152.7150	5.084961	4.996605	5.019335	5.006511	4.794118	5.154368
#3	153.2854	5.112539	5.015764	5.021458	5.044134	4.818792	5.155095

Sample Name: CCV002 Acquired: 02/05/2025 19:54:26 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCV002 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	5.100581	4.848588	5.125556
Stddev	.026251	.008815	.023478
%RSD	.5146738	.1817959	.4580594
#1	5.130879	4.838920	5.119662
#2	5.084644	4.856178	5.105587
#3	5.086218	4.850667	5.151420

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3581.858	30282.01	3354.973	2620.440	3579.808
Stddev	4.301	251.92	10.298	19.317	3.142
%RSD	.1200775	.8319182	.3069451	.7371495	.0877742
#1	3578.033	30566.72	3346.672	2640.322	3577.740
#2	3581.027	30087.97	3366.497	2601.744	3578.260
#3	3586.514	30191.36	3351.751	2619.253	3583.424

Sample Name: CCB002 Acquired: 02/05/2025 19:58:10 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCB002 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0055992	.0009221	.0027427	.0039327	.0002163	.0182563	-.000043
Stddev	.0018425	.0009424	.0025884	.0017531	.0005764	.0138551	.000606
%RSD	32.90610	102.2090	94.37359	44.57675	266.5330	75.89210	1397.776

#1	.0047872	.0000154	.0041971	.0026362	.0001103	.0184153	.000522
#2	.0043022	.0018966	-.000246	.0059272	-.000300	.0043224	-.000683
#3	.0077082	.0008543	.004277	.0032346	.000838	.0320313	.000031

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001345	.0001837	.0112557	.0014246	.0005220	-.004375	.0321710
Stddev	.0001551	.0000423	.0160937	.0002447	.0002168	.004044	.0122739
%RSD	115.2461	23.00626	142.9832	17.17897	41.53892	92.44438	38.15220

#1	.0002974	.0002278	.0277988	.0015823	.0002744	-.001808	.0436529
#2	-.000011	.0001435	.0103154	.0015489	.0006779	-.002279	.0336254
#3	.000118	.0001799	-.004347	.0011427	.0006137	-.009036	.0192346

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0008473	.0357836	-.000232	-.000266	1.069067	.0009563	.0022207
Stddev	.0001690	.0590196	.000160	.000816	.638321	.0039172	.0018498
%RSD	19.94134	164.9348	68.93348	306.9190	59.70827	409.6148	83.29456

#1	.0006936	.0255636	-.000393	-.000767	.361099	-.002644	.0033998
#2	.0010283	-.017459	-.000074	.000676	1.600645	.000386	.0000888
#3	.0008201	.099246	-.000228	-.000707	1.245456	.005127	.0031736

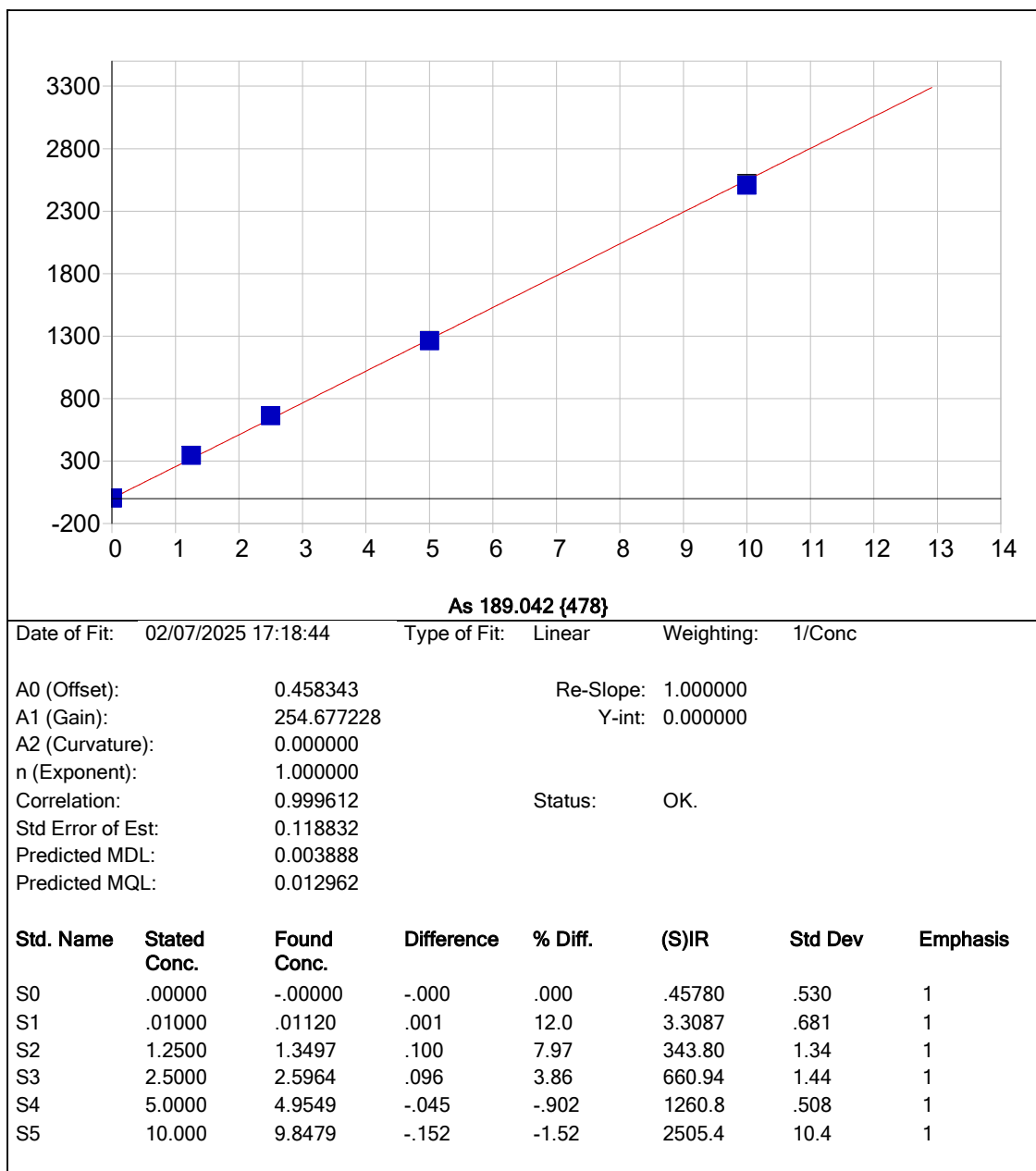
Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5437237	-.004966	.0099849	.0007550	-.011209	-.002839	.0013397
Stddev	.1757206	.000422	.0013420	.0004983	.001334	.002142	.0009264
%RSD	32.31800	8.503637	13.43998	65.99966	11.90450	75.46531	69.14866

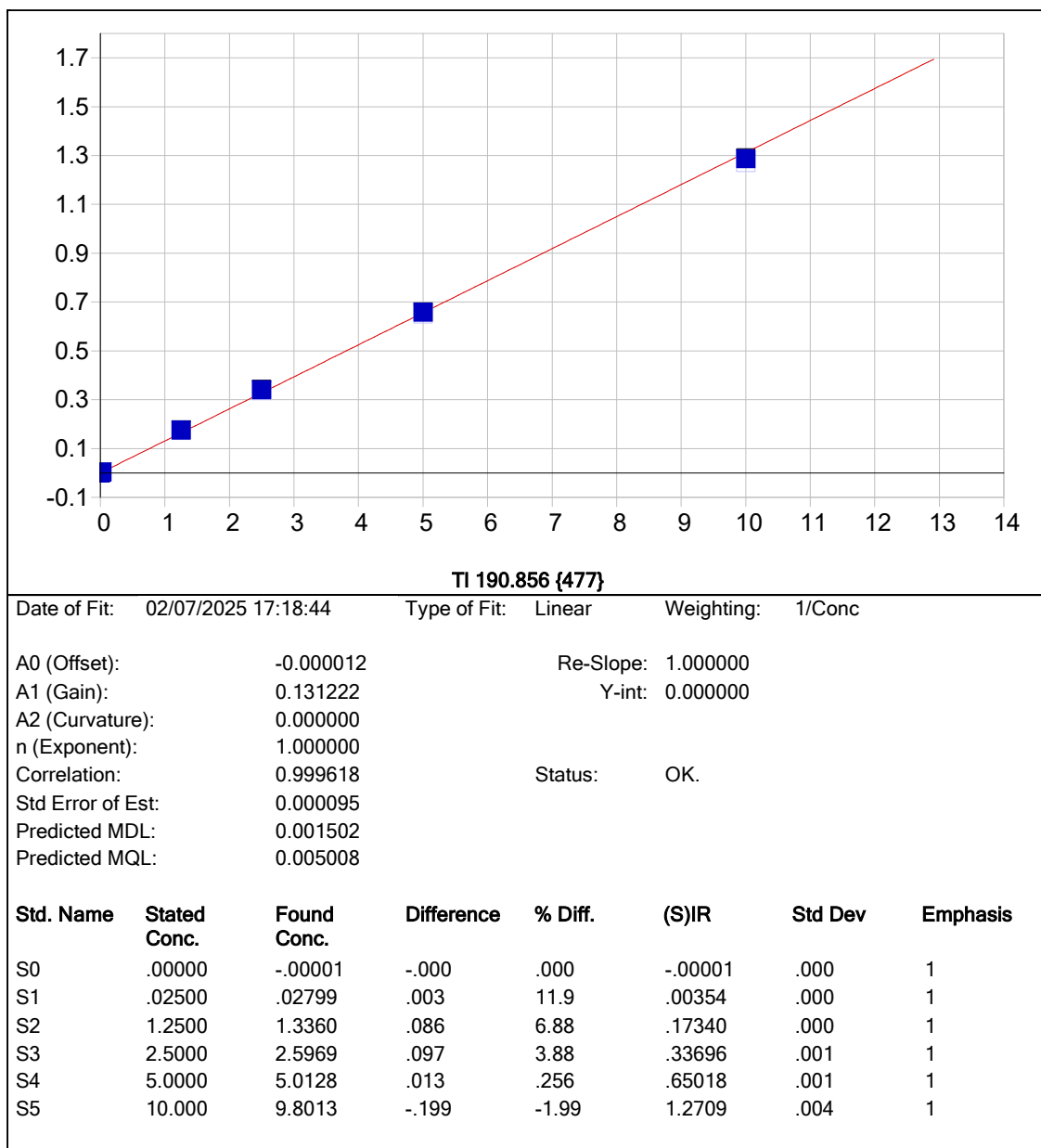
#1	.5884086	-.004550	.0114452	.0005315	-.011080	-.003526	.0022568
#2	.3499748	-.004955	.0088059	.0013258	-.012603	-.000437	.0013581
#3	.6927878	-.005394	.0097036	.0004076	-.009943	-.004553	.0004043

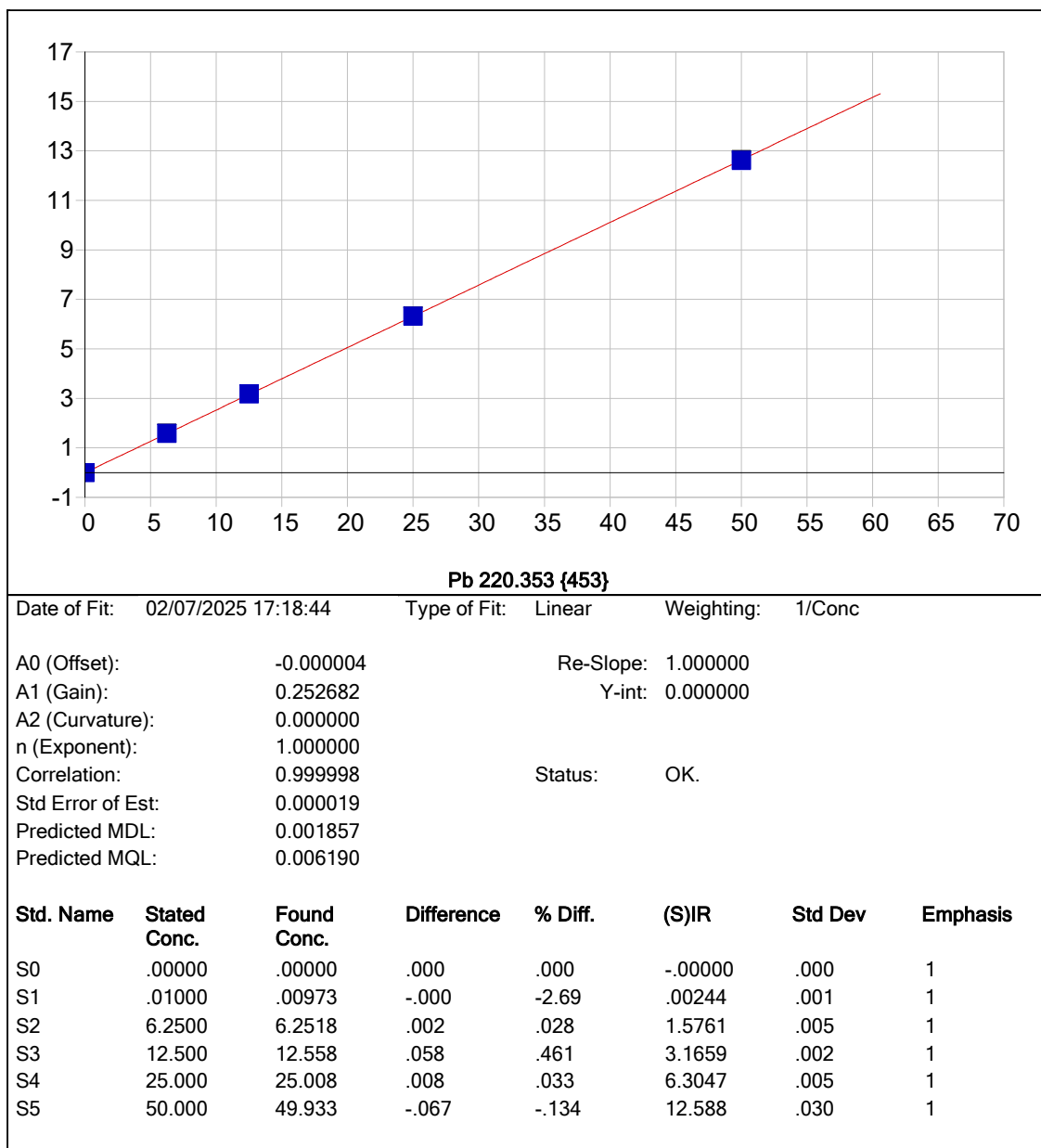
Sample Name: CCB002 Acquired: 02/05/2025 19:58:10 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v131) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCB002 Custom ID2: Custom ID3:
Comment:

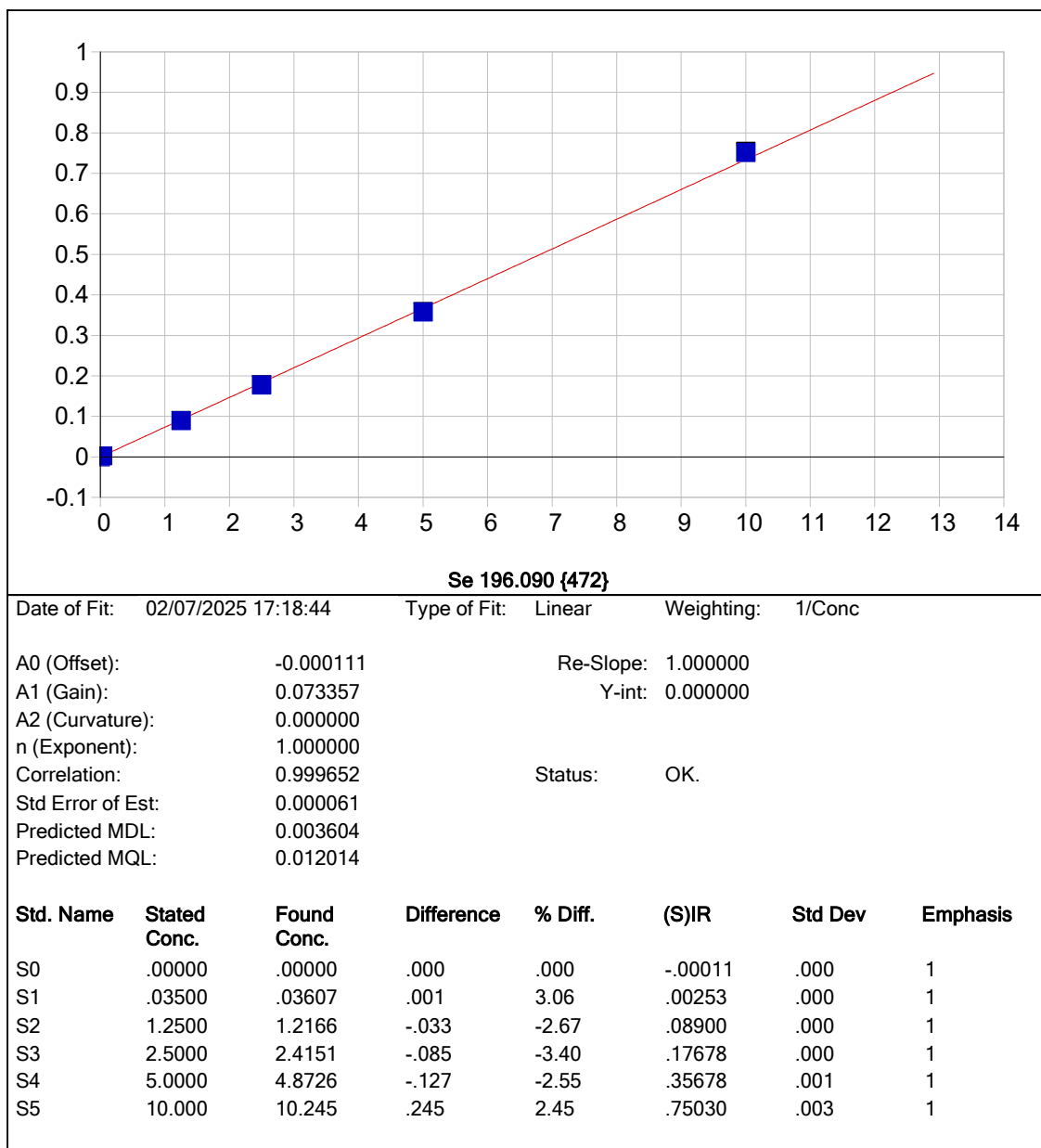
Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	-.002602	.0003974	.0039811
Stddev	.001941	.0000982	.0031060
%RSD	74.58594	24.71362	78.01757
#1	-.004818	.0004394	.0020793
#2	-.001200	.0004676	.0022987
#3	-.001789	.0002852	.0075653

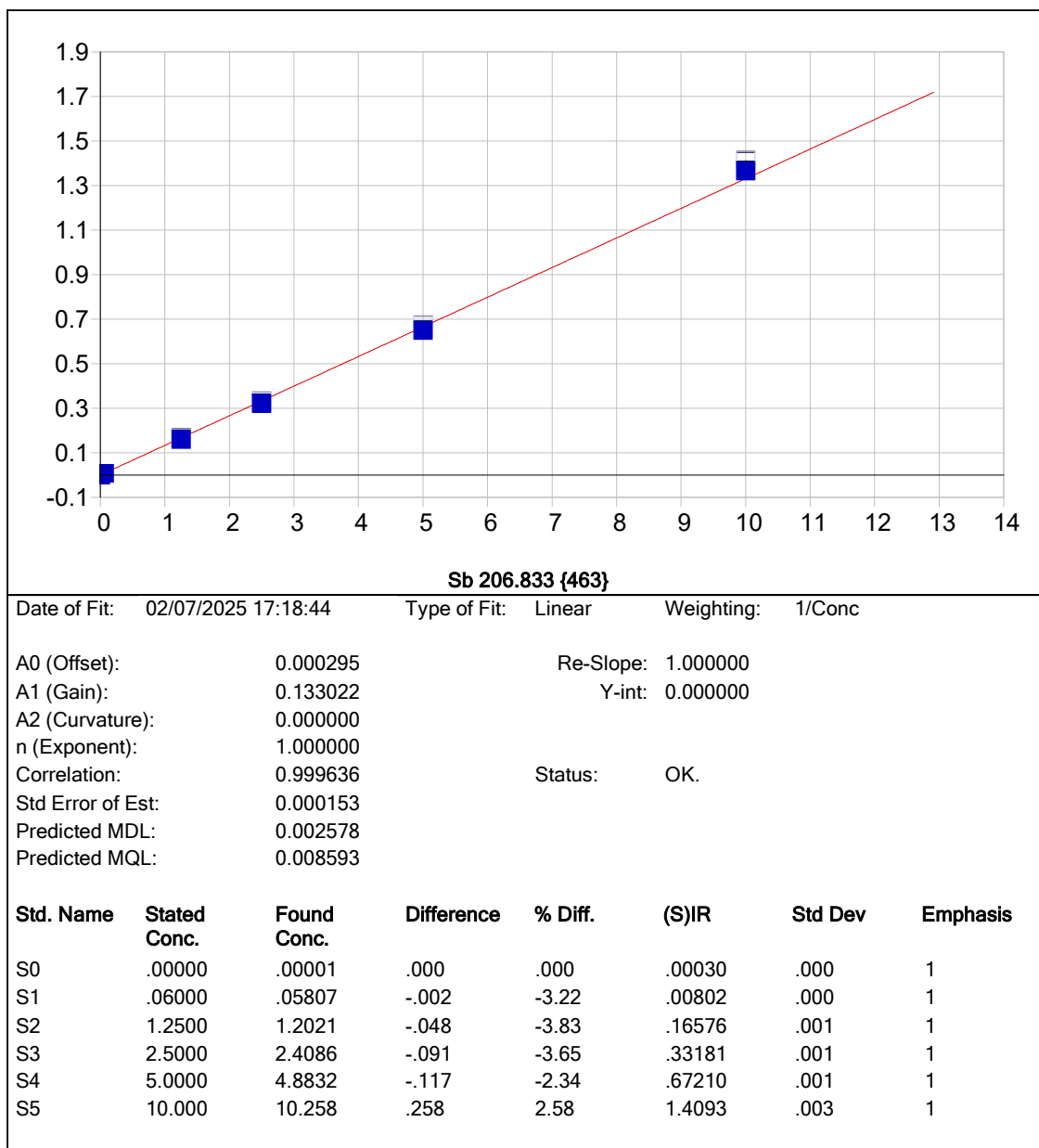
Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4293.018	36742.30	3539.265	3163.890	5201.853
Stddev	30.070	95.12	28.735	2.685	37.207
%RSD	.7004286	.2588943	.8118847	.0848777	.7152704
#1	4284.880	36814.15	3511.082	3166.885	5194.317
#2	4326.319	36634.43	3538.191	3161.696	5242.251
#3	4267.855	36778.33	3568.521	3163.089	5168.990

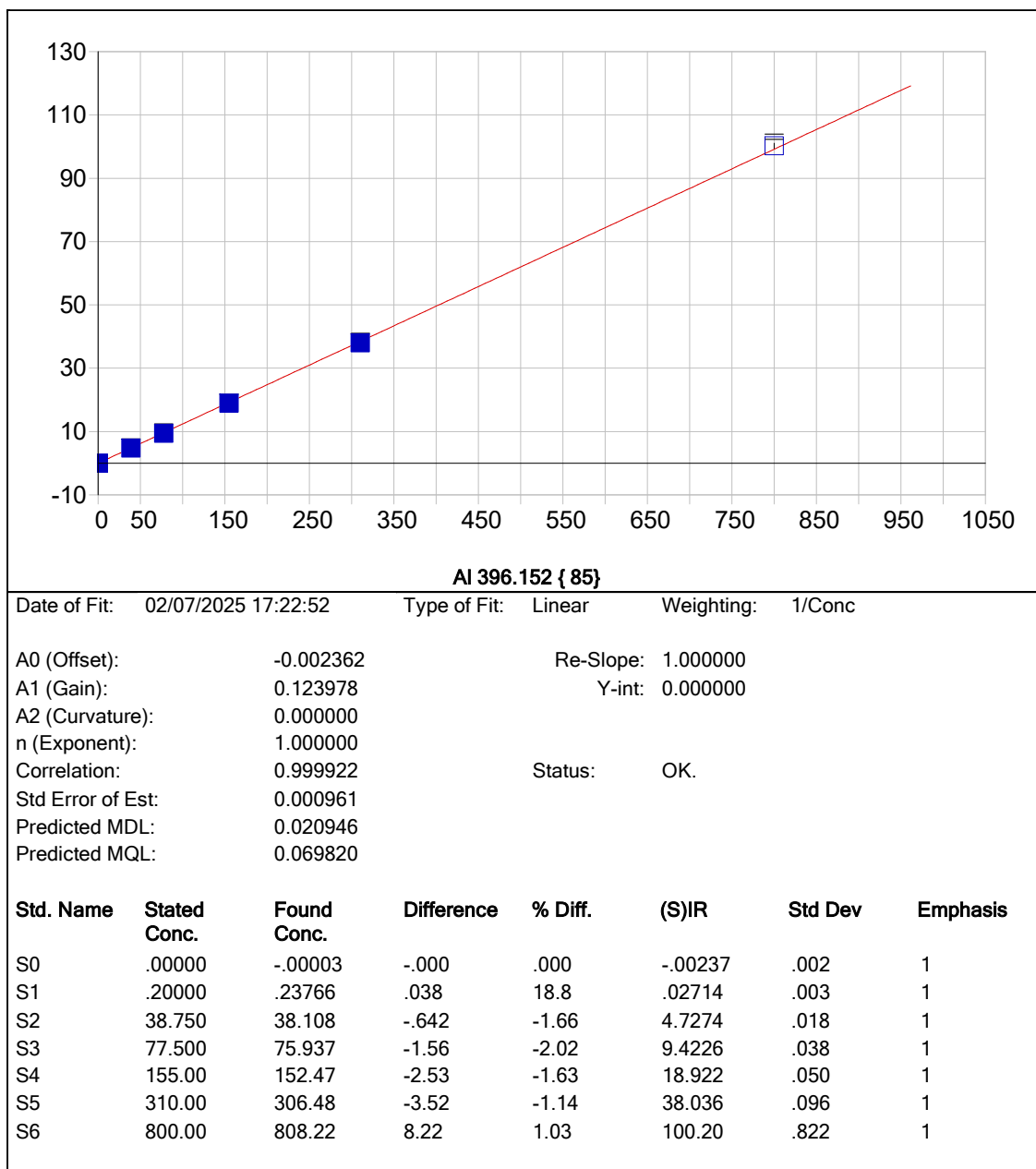


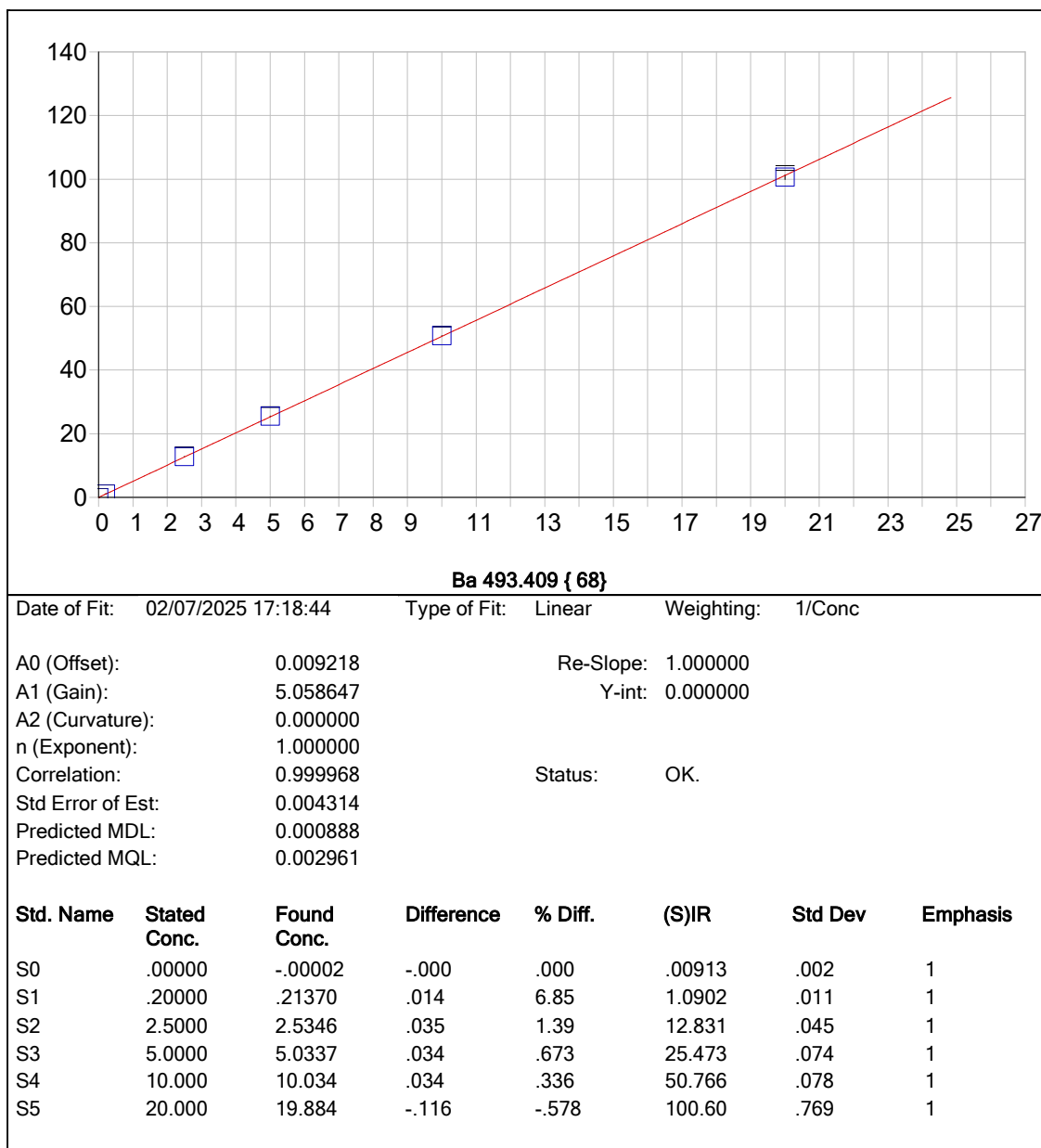


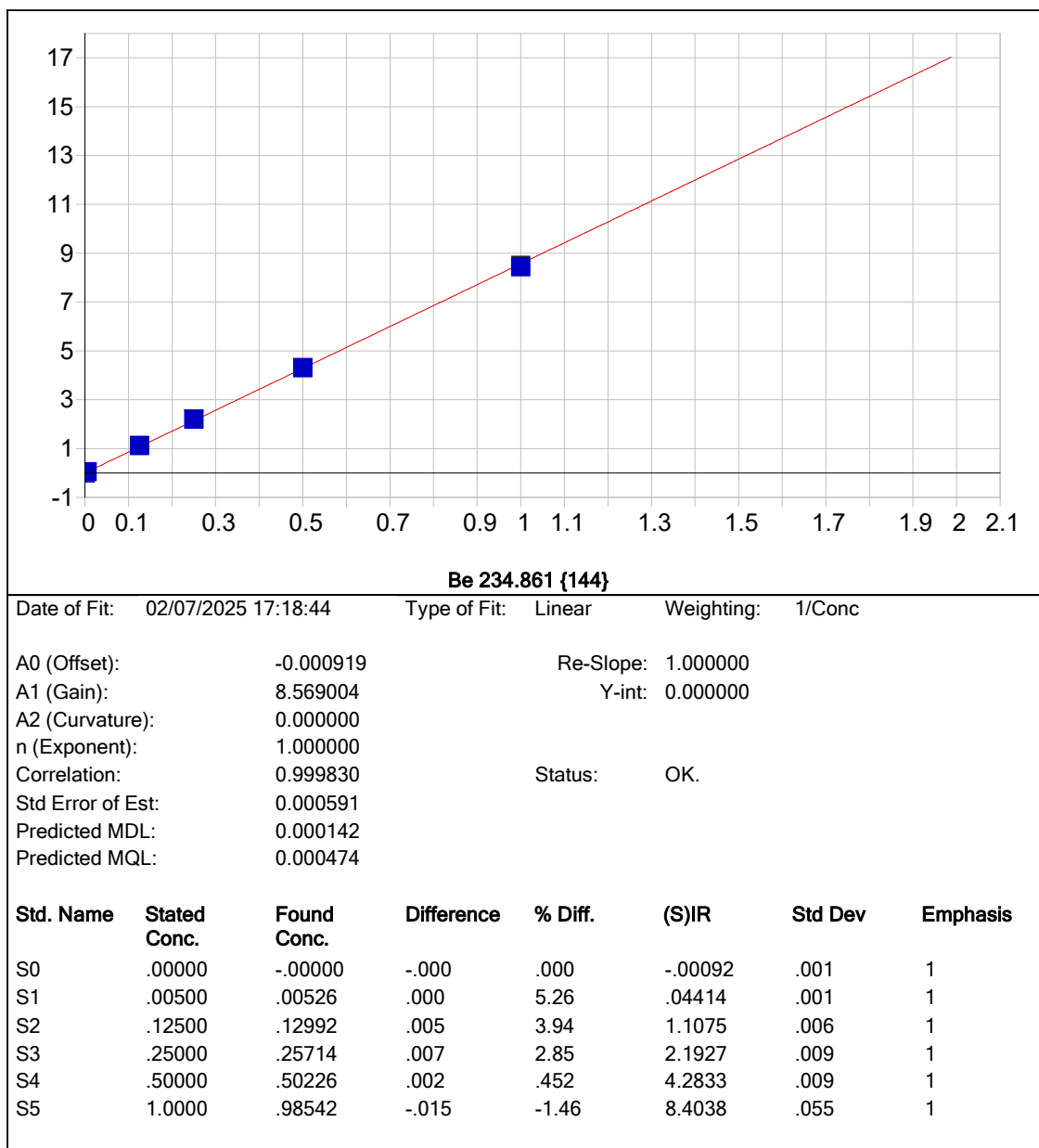


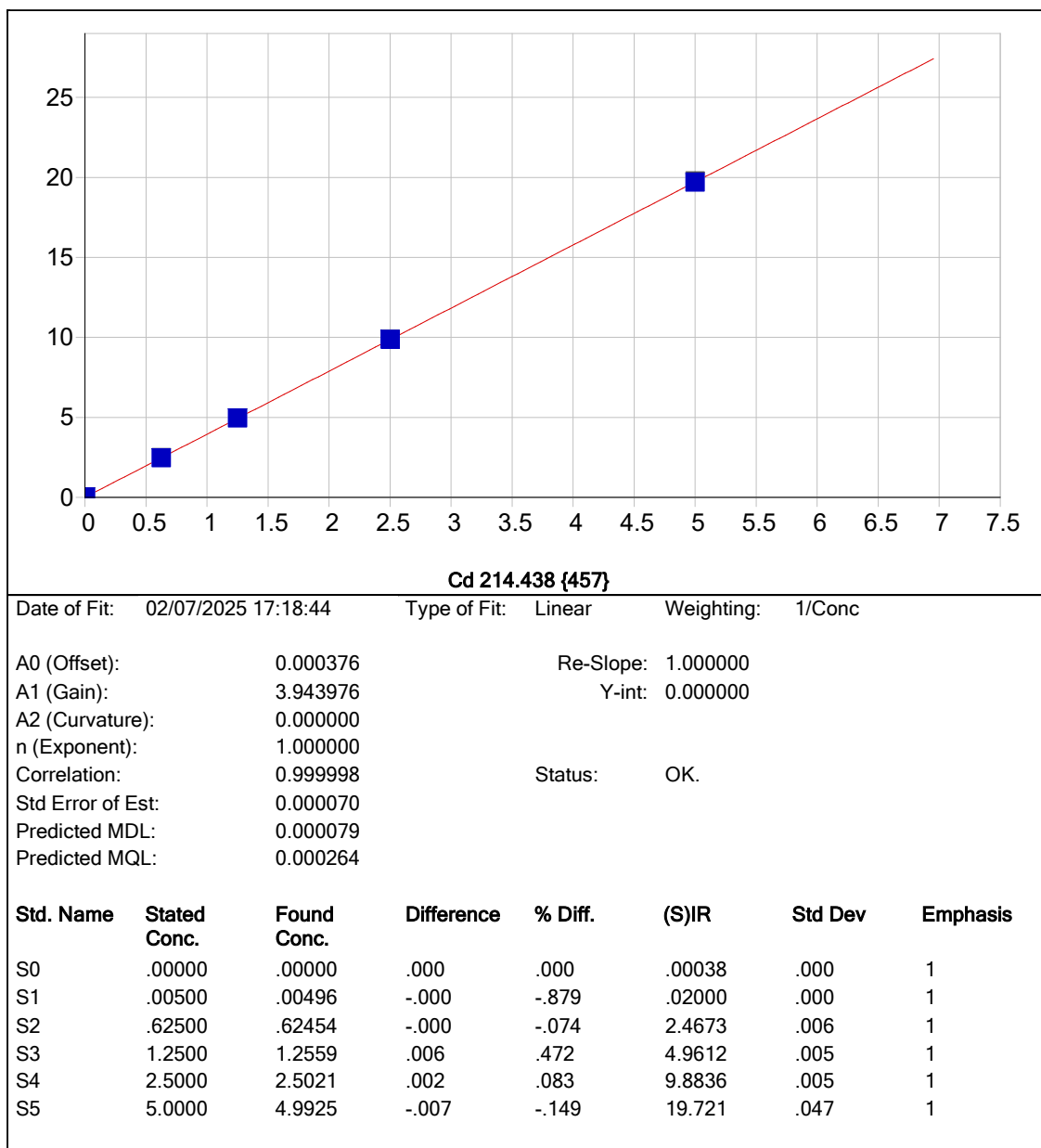


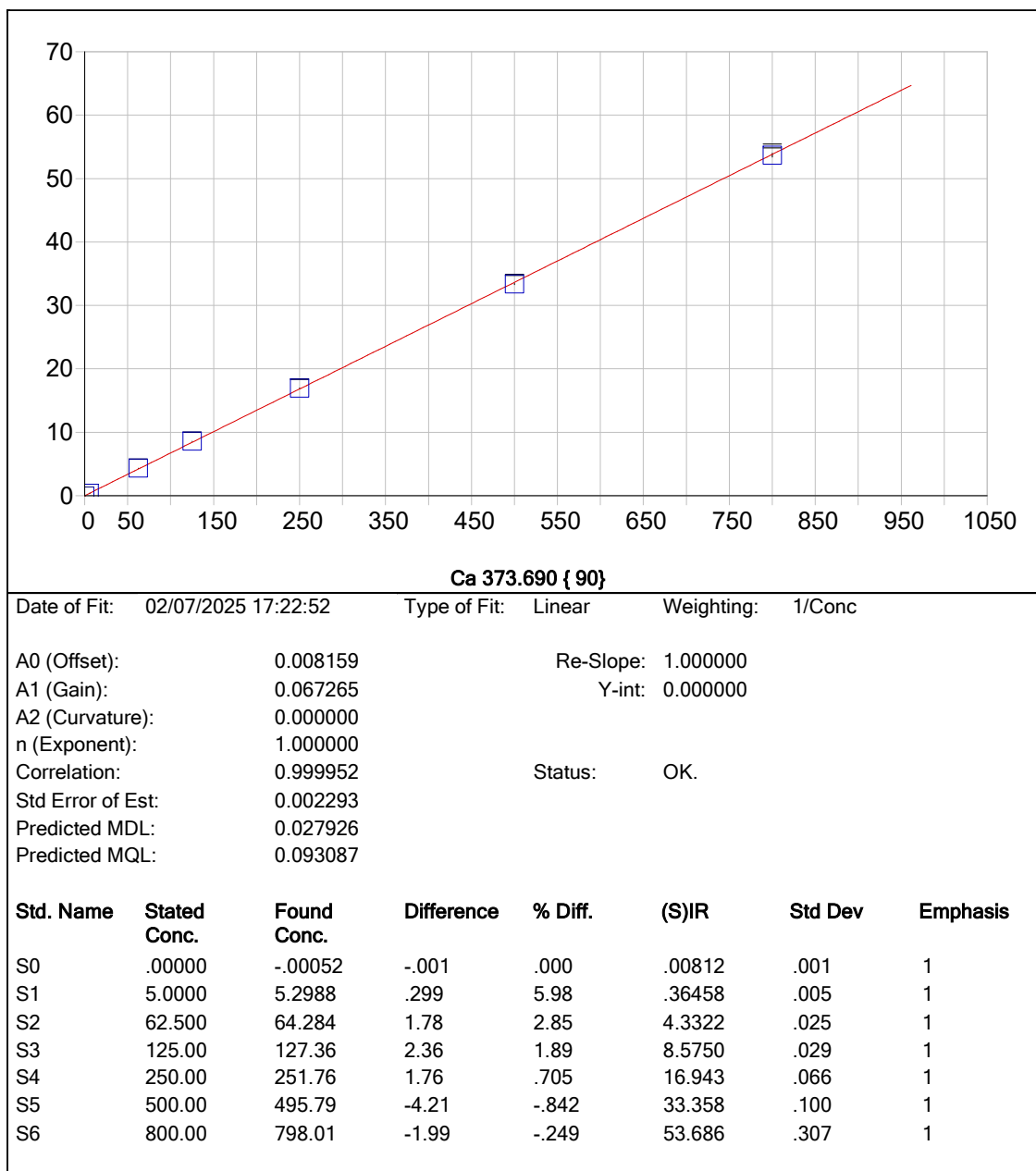


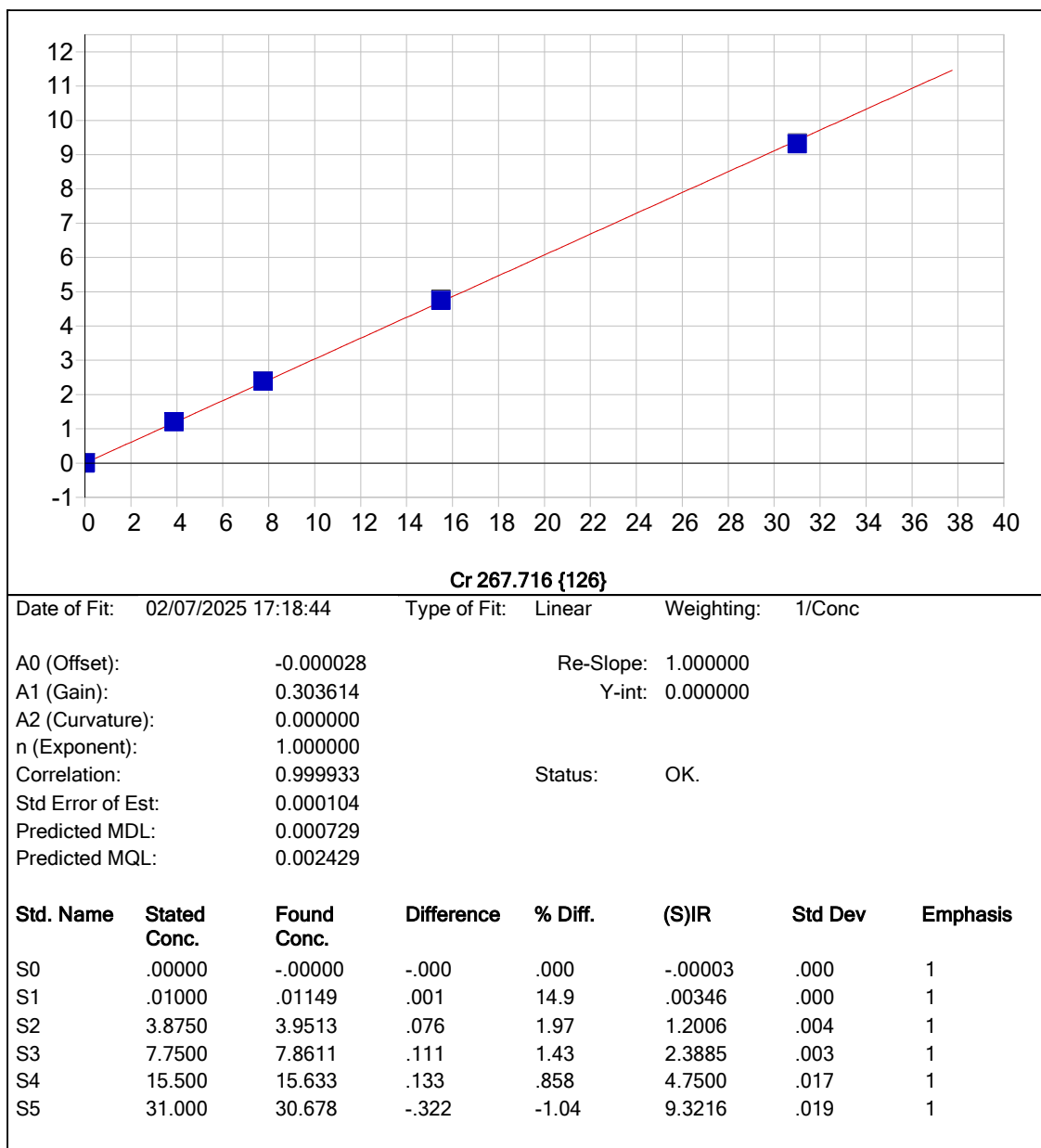


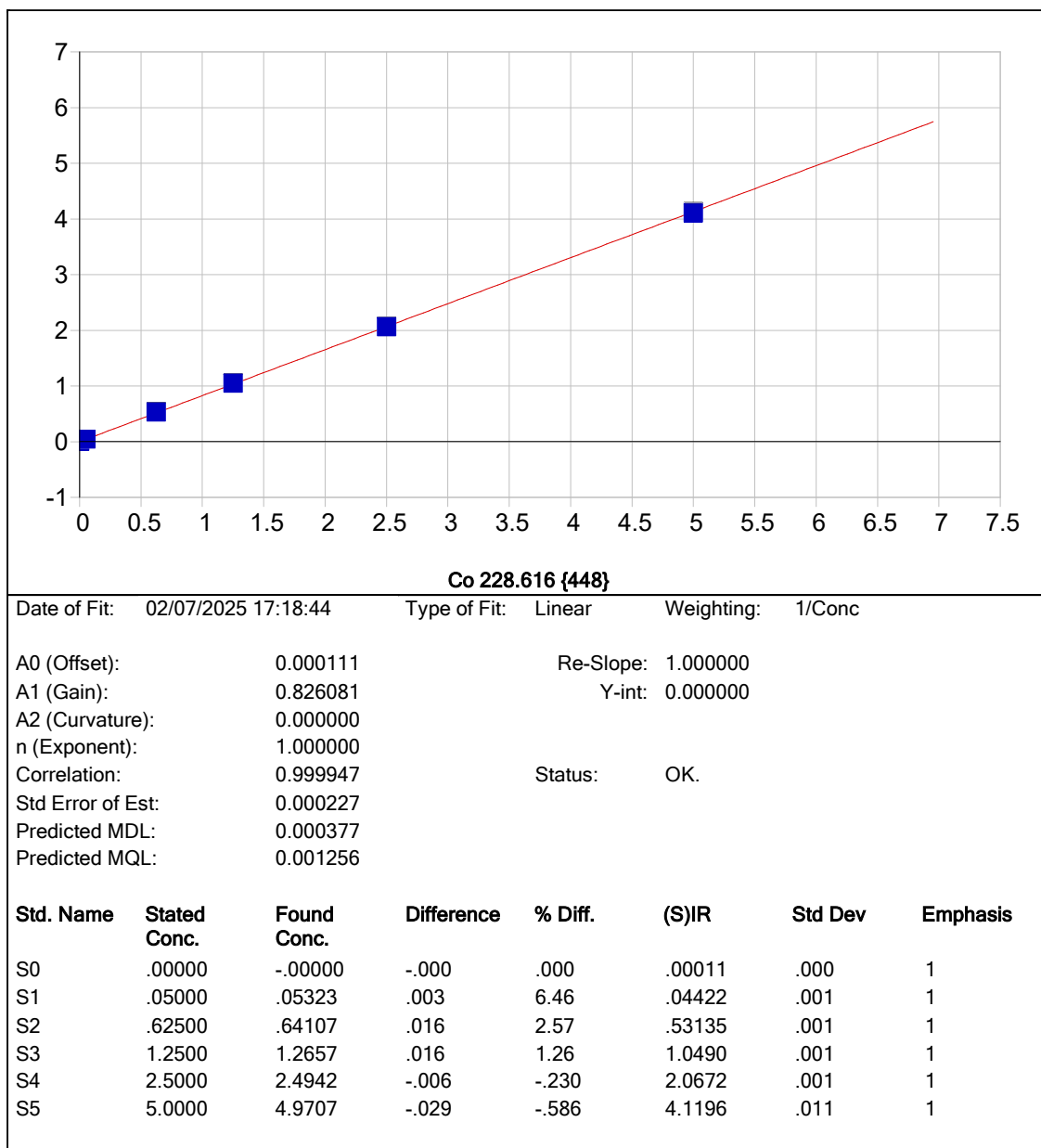


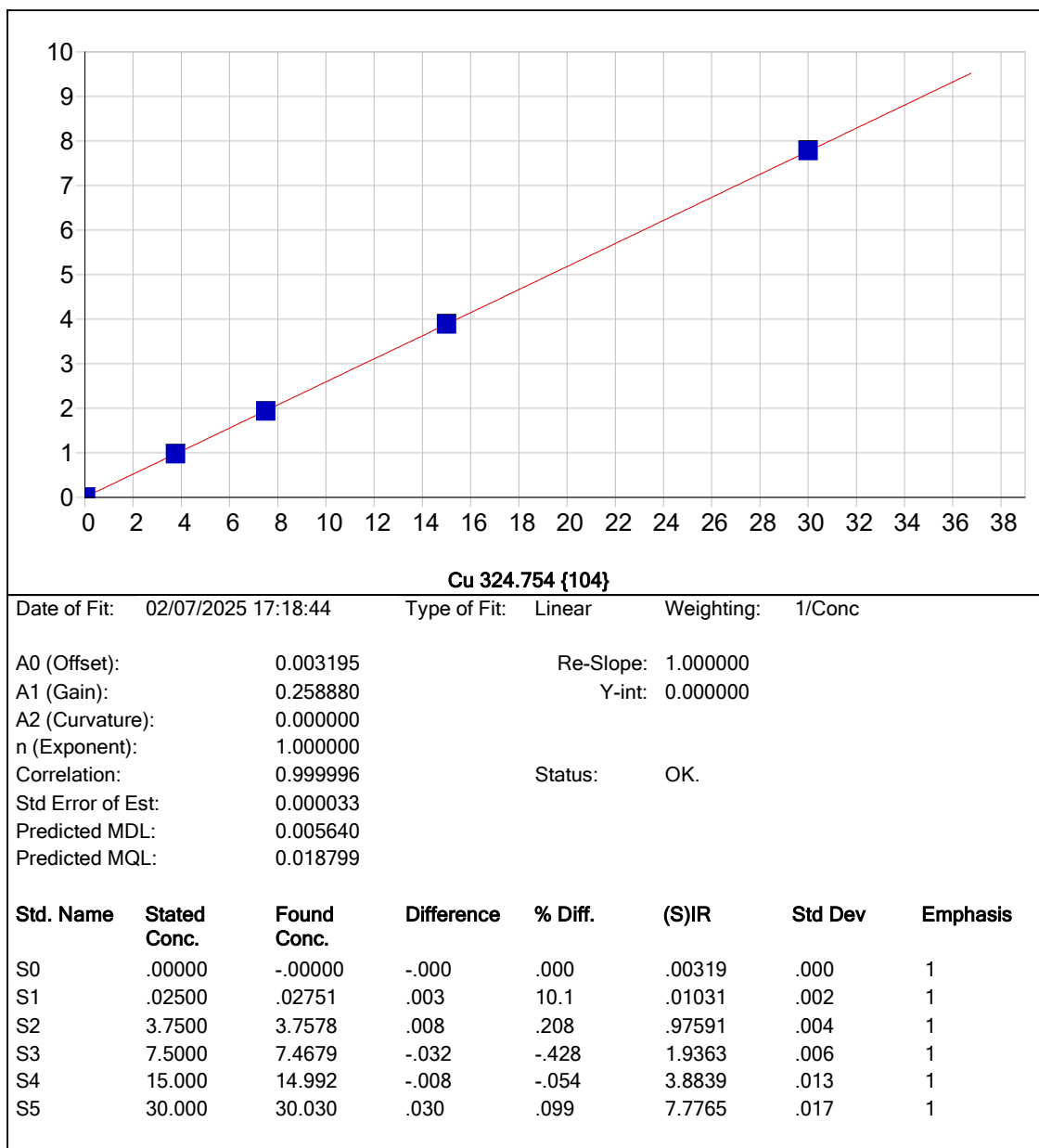


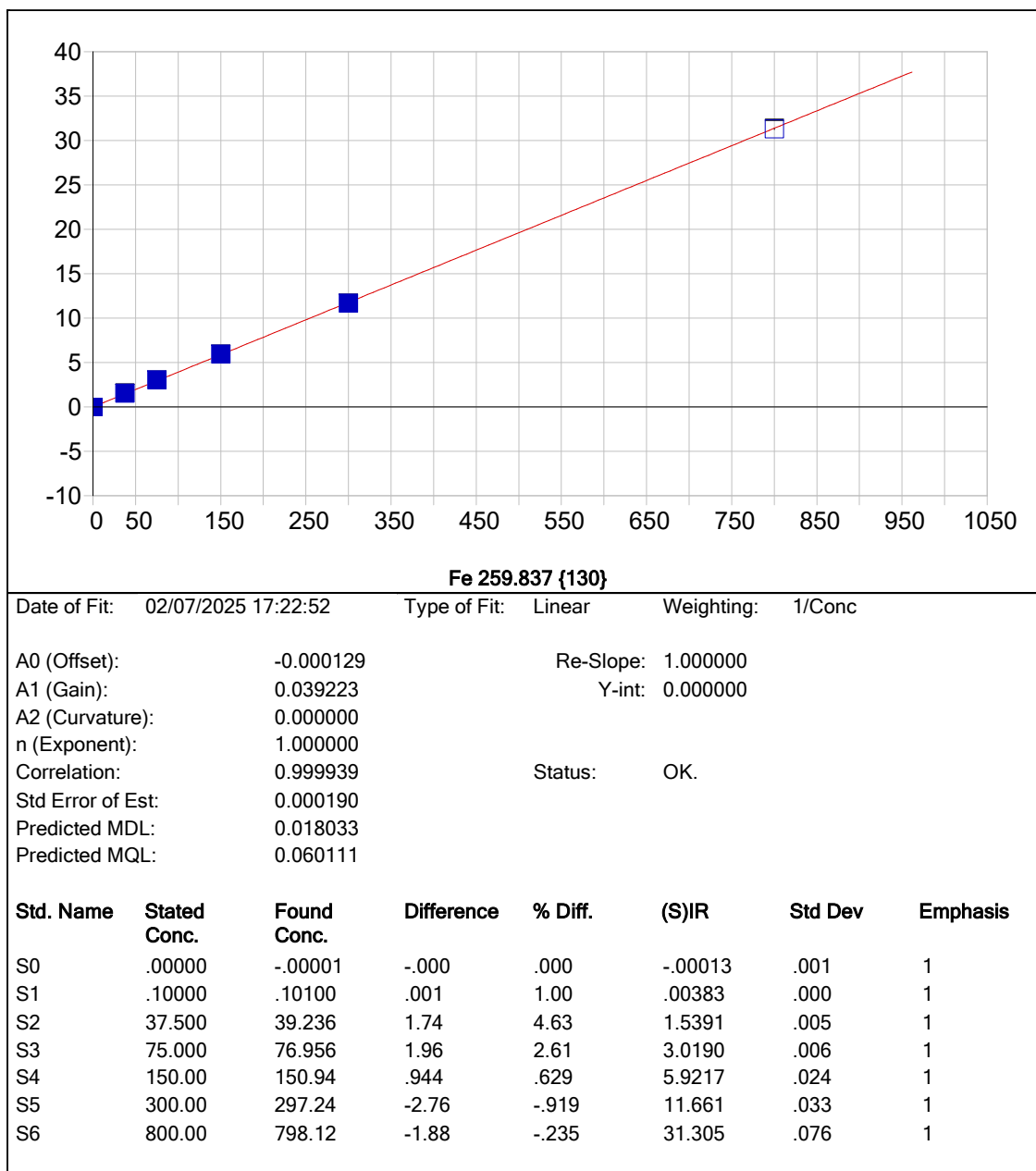


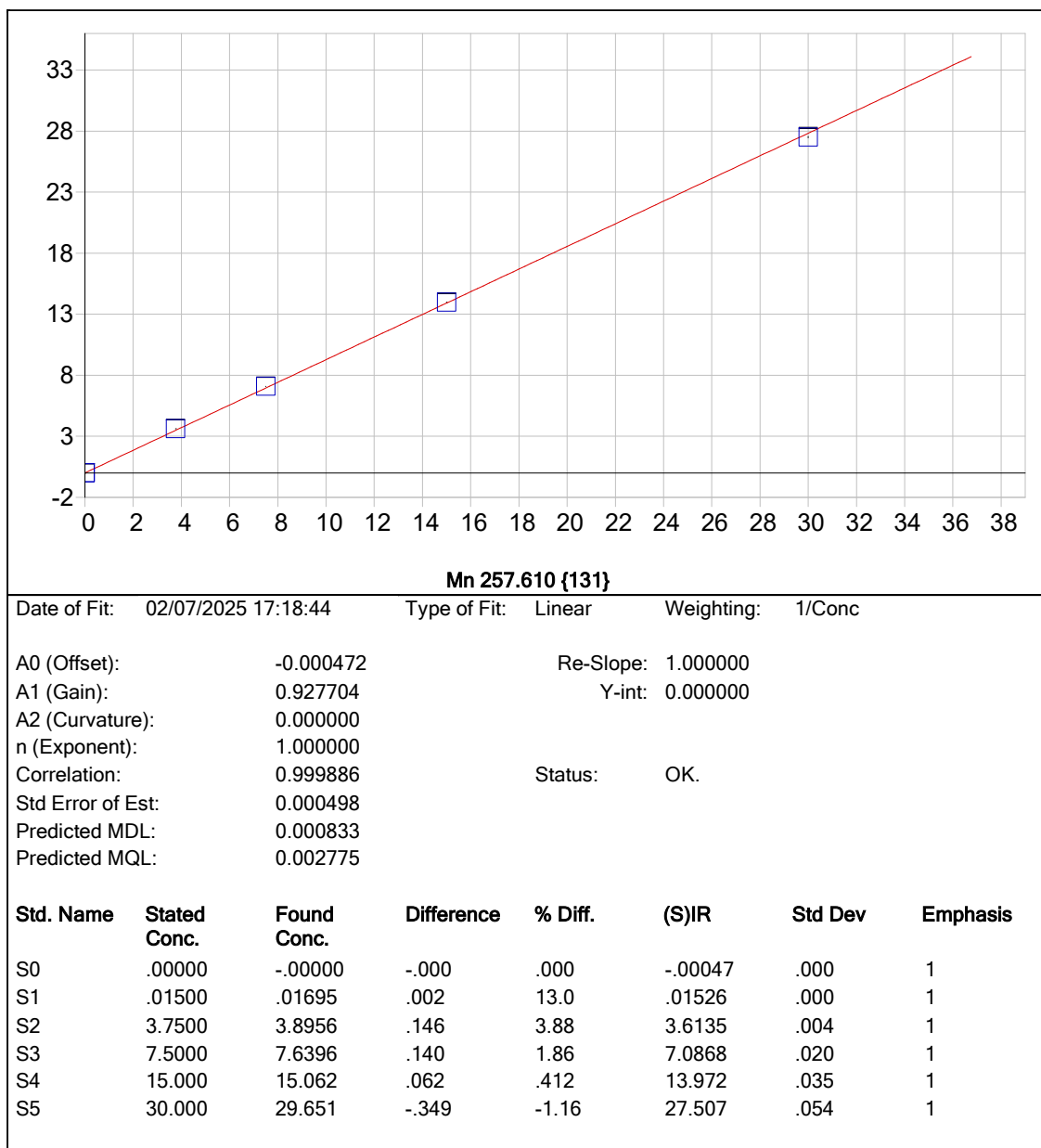


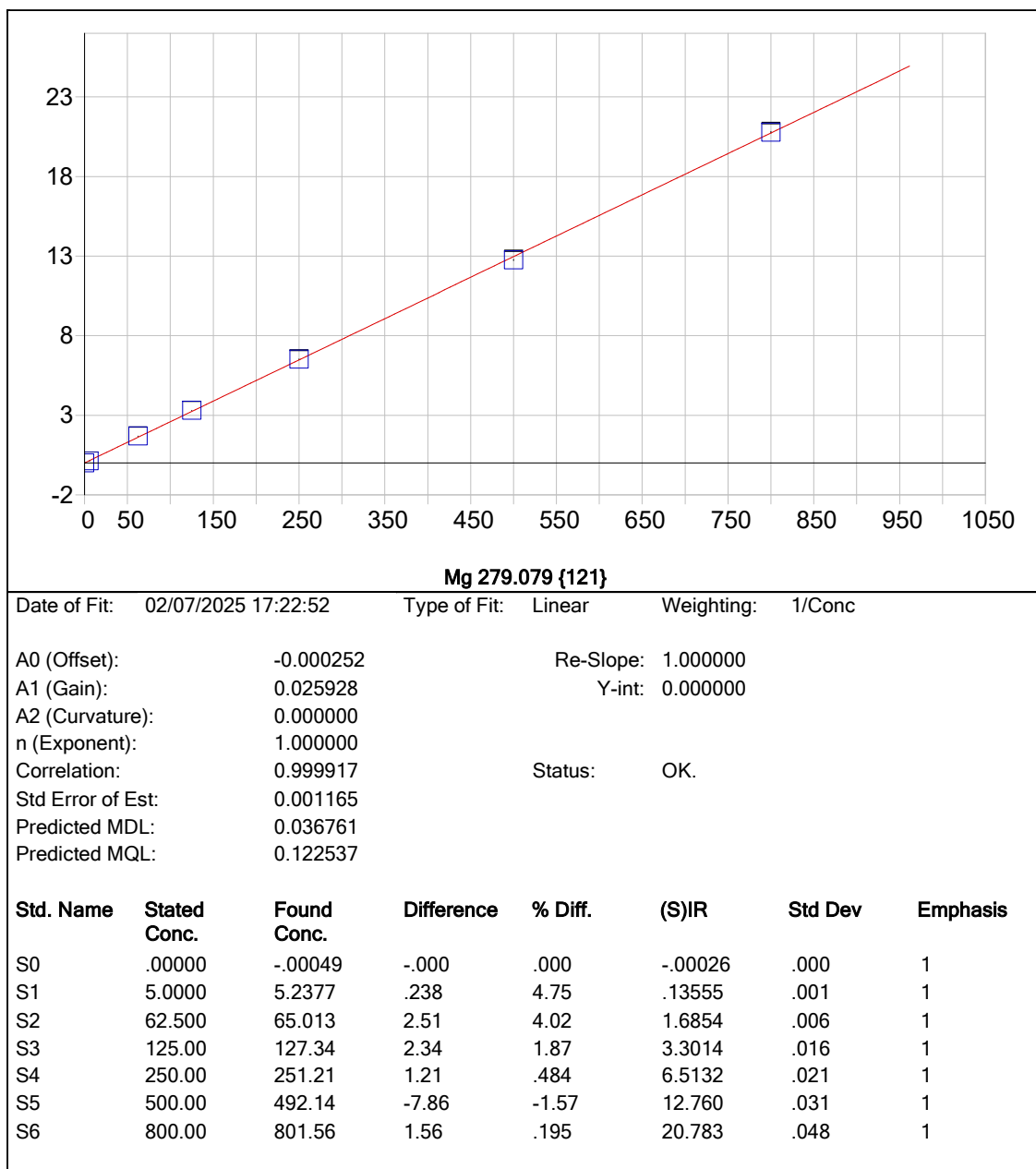


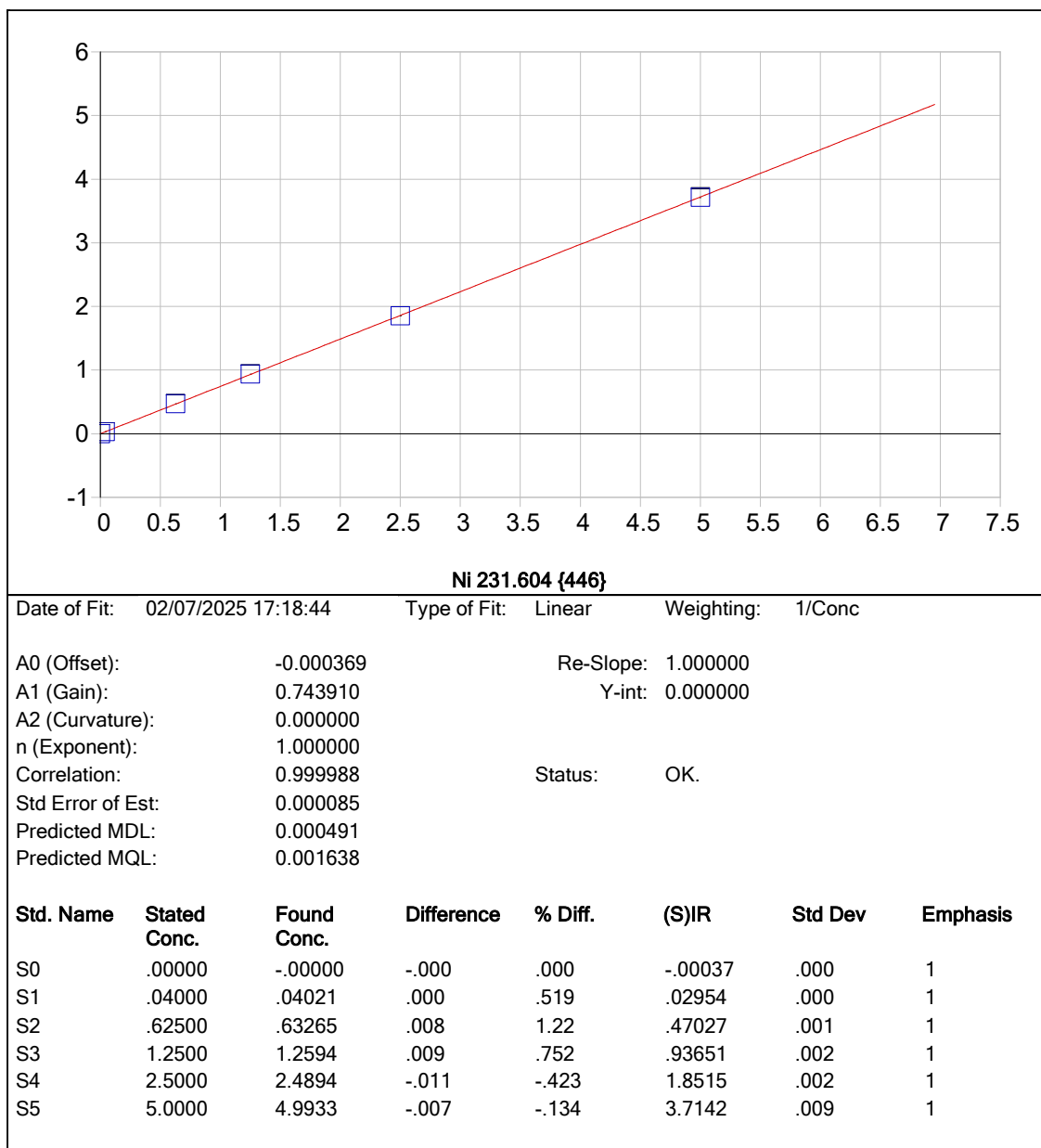


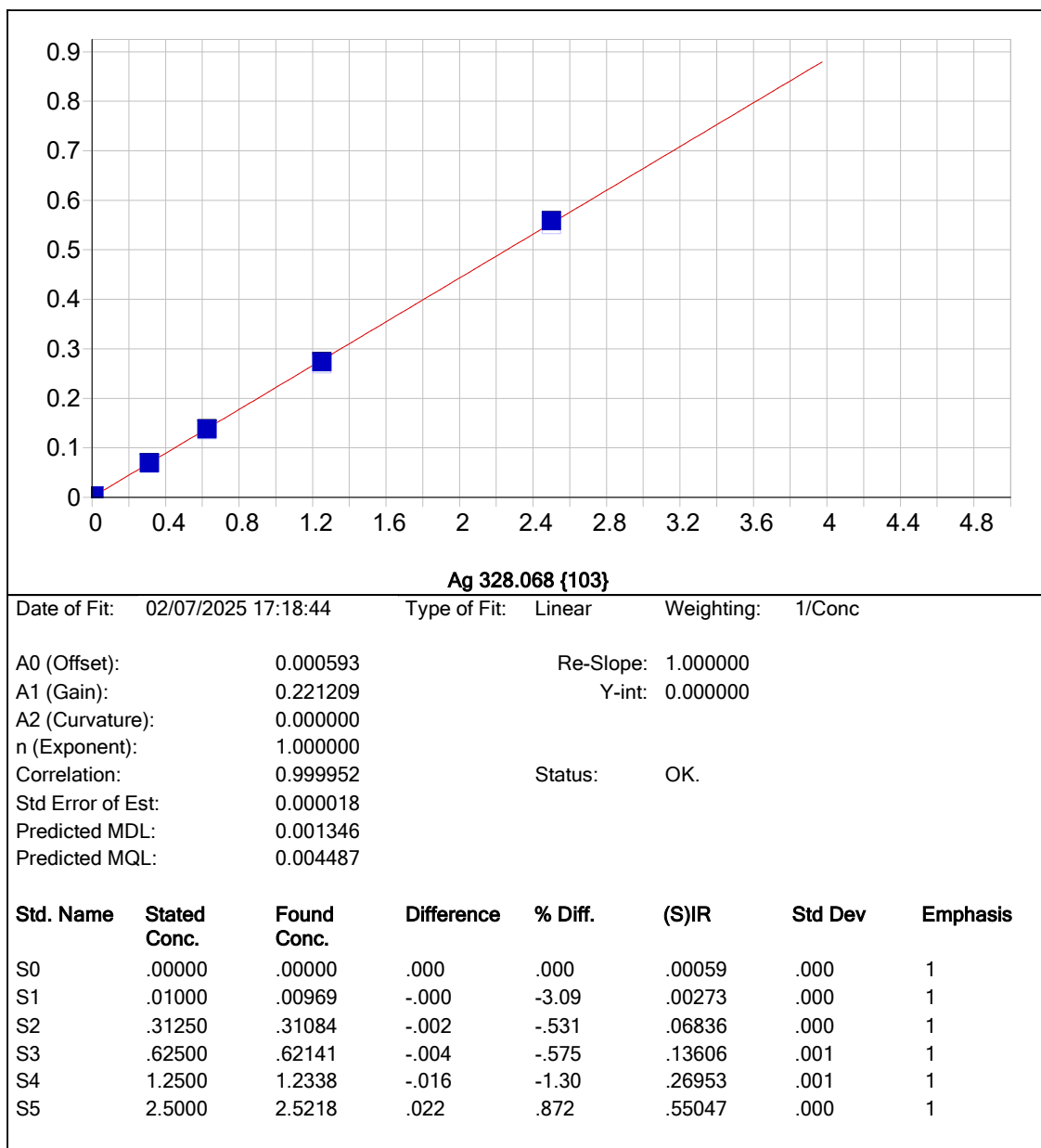


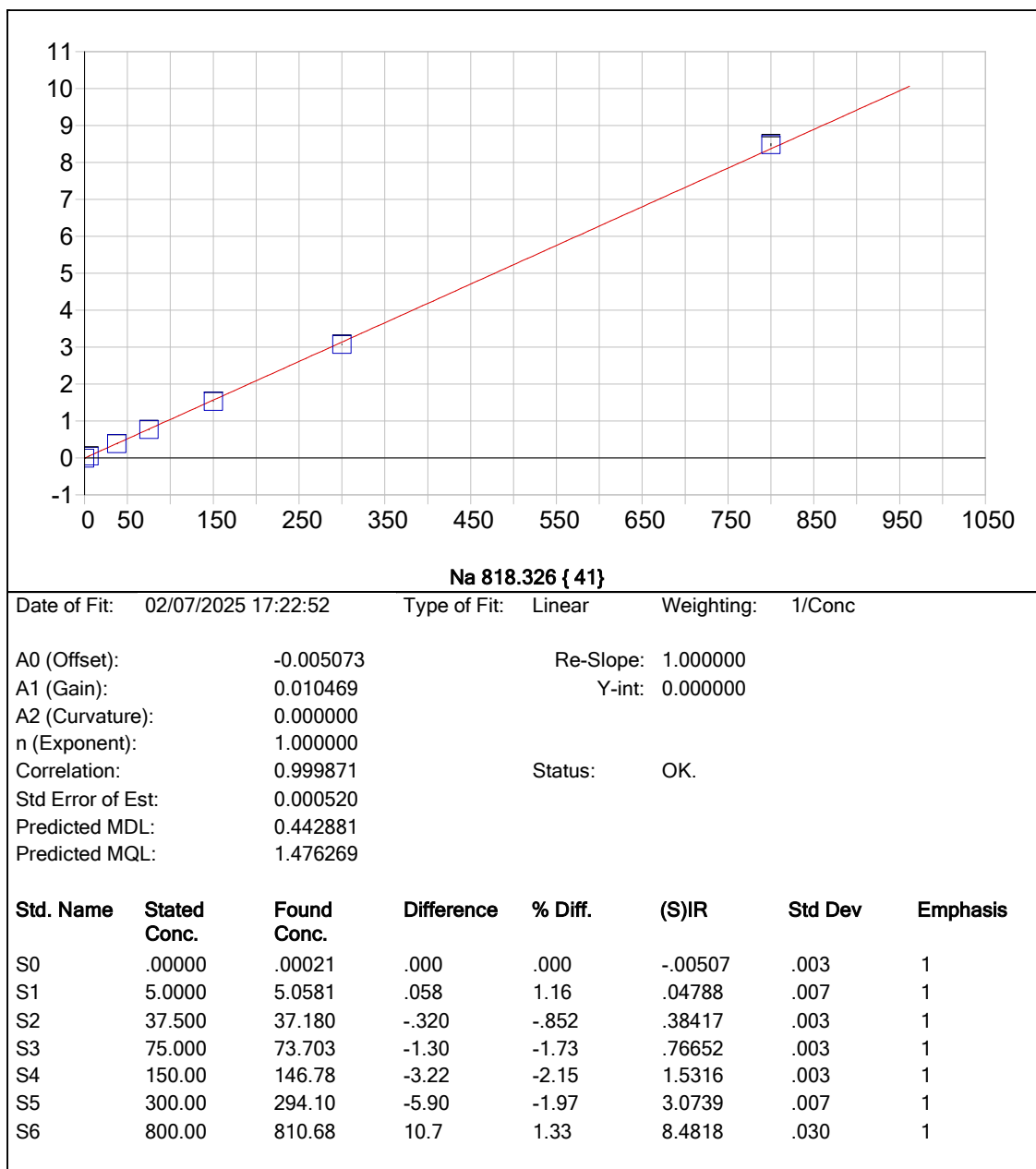


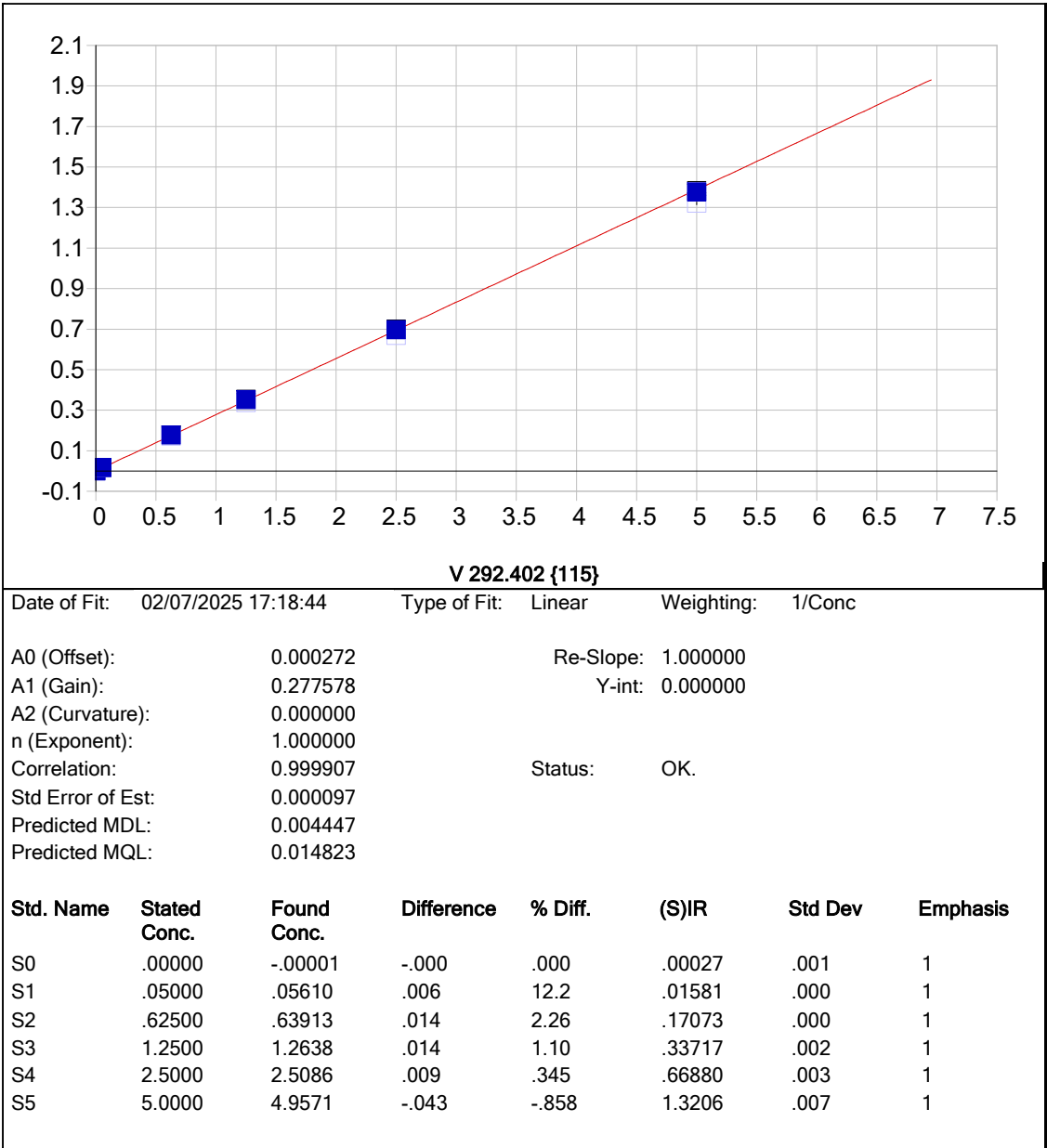


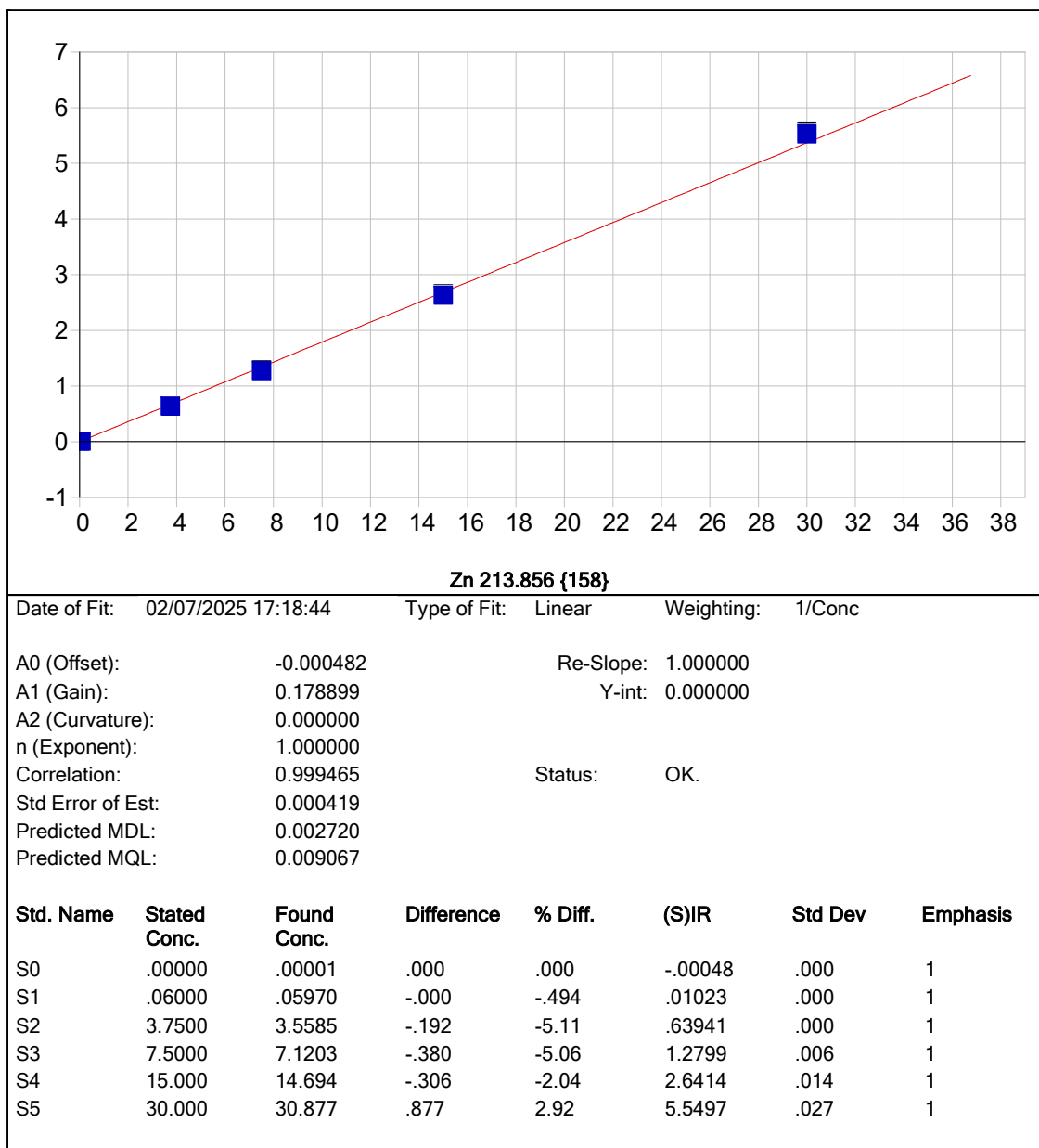


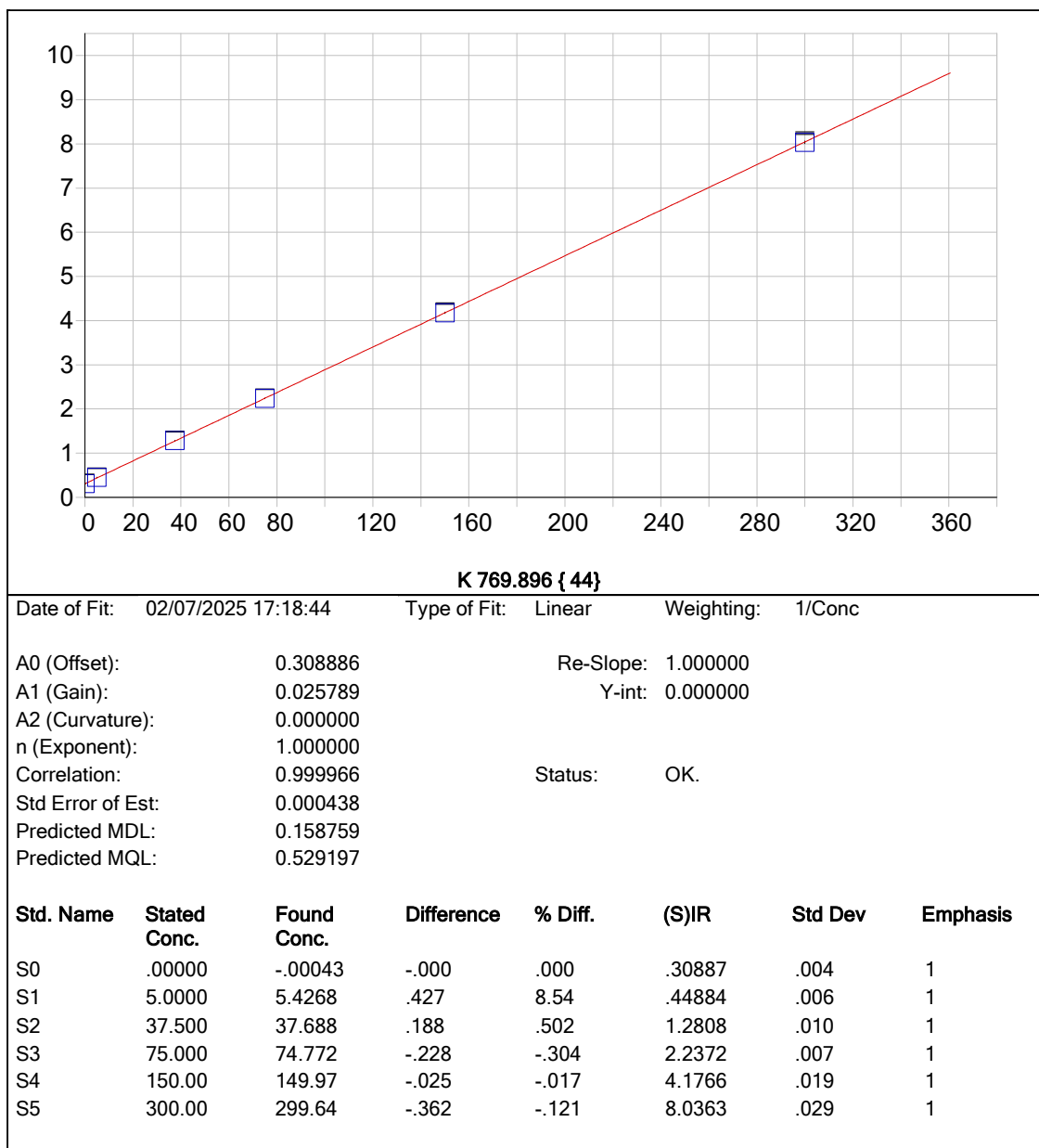


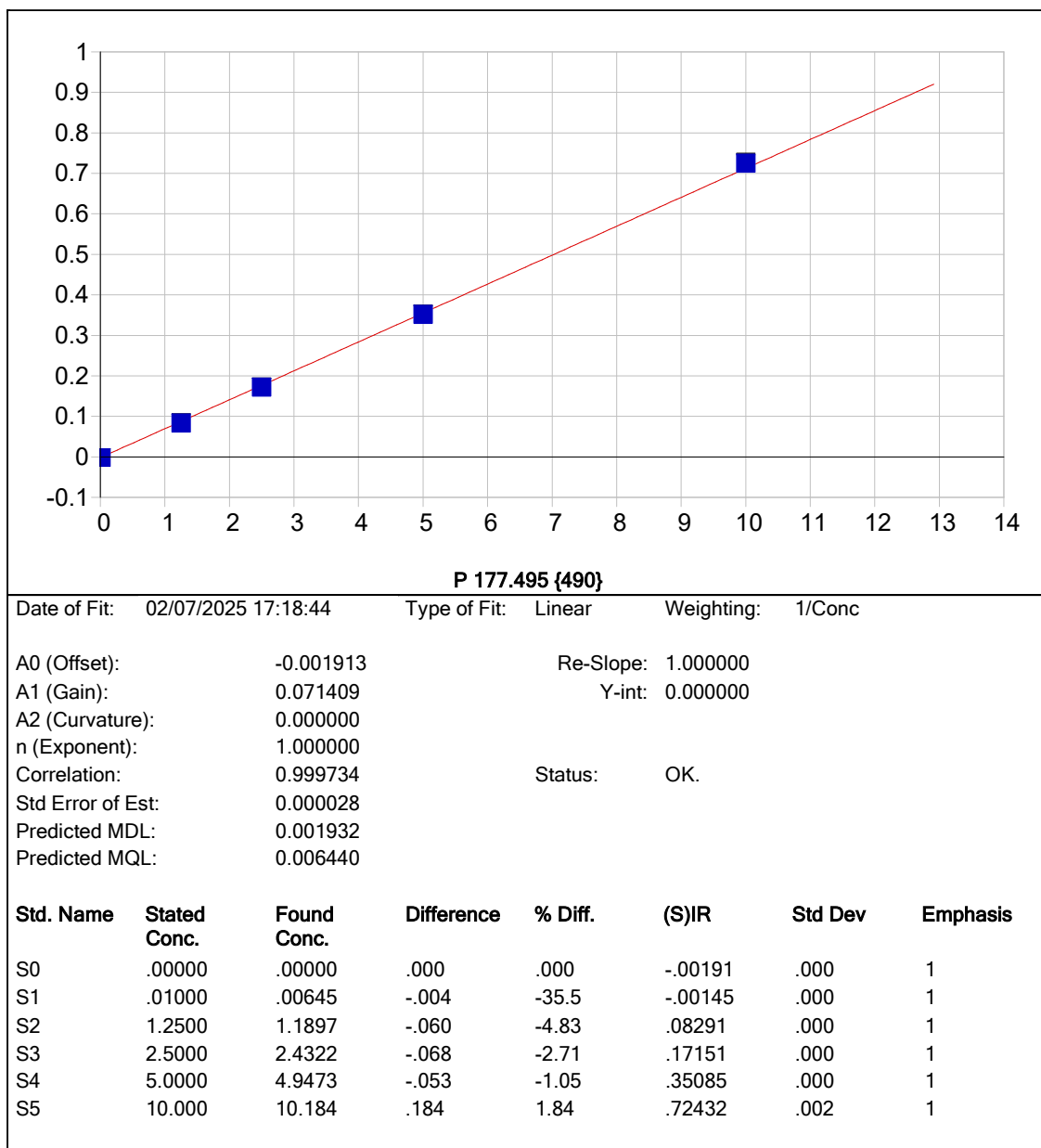


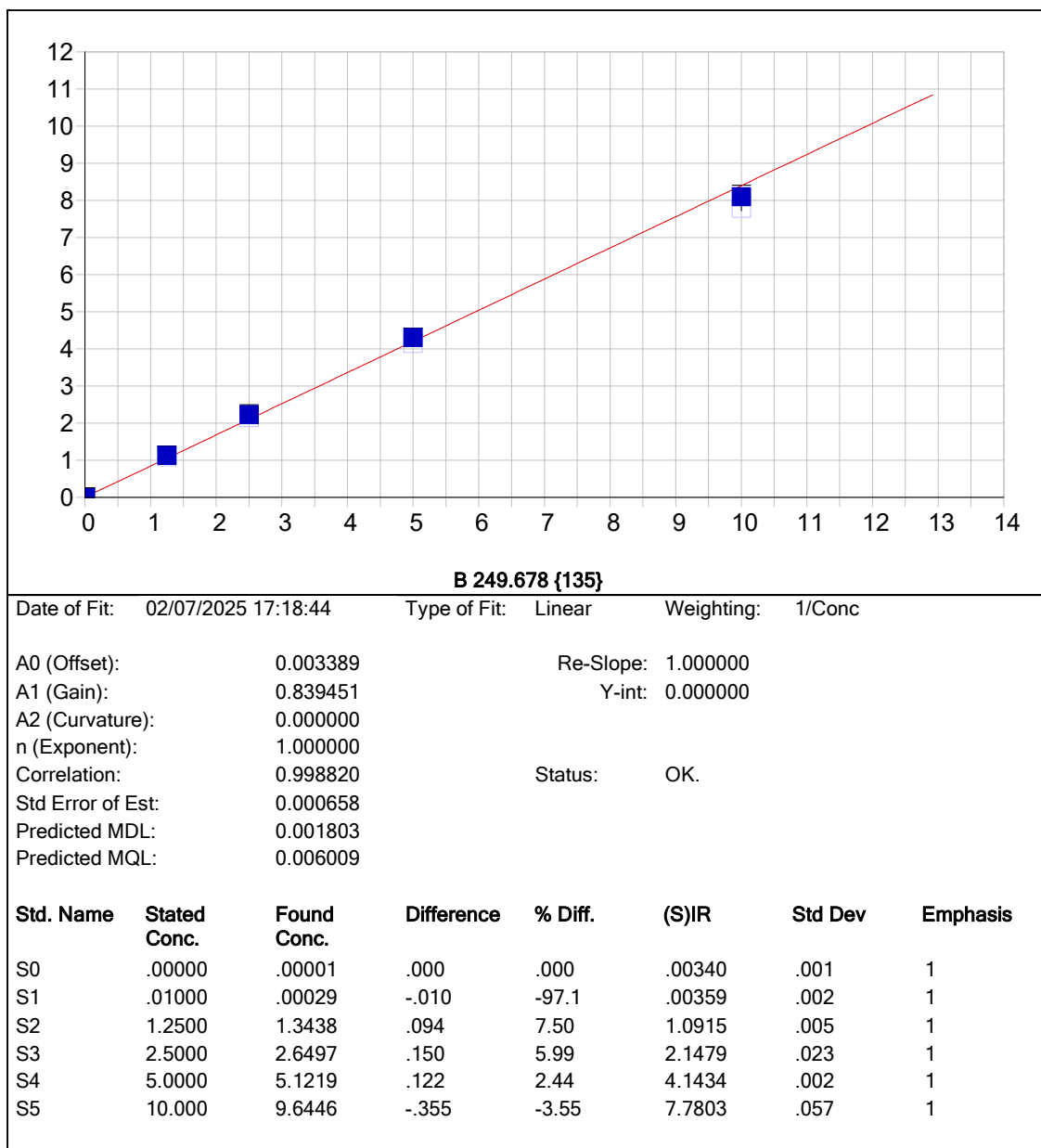


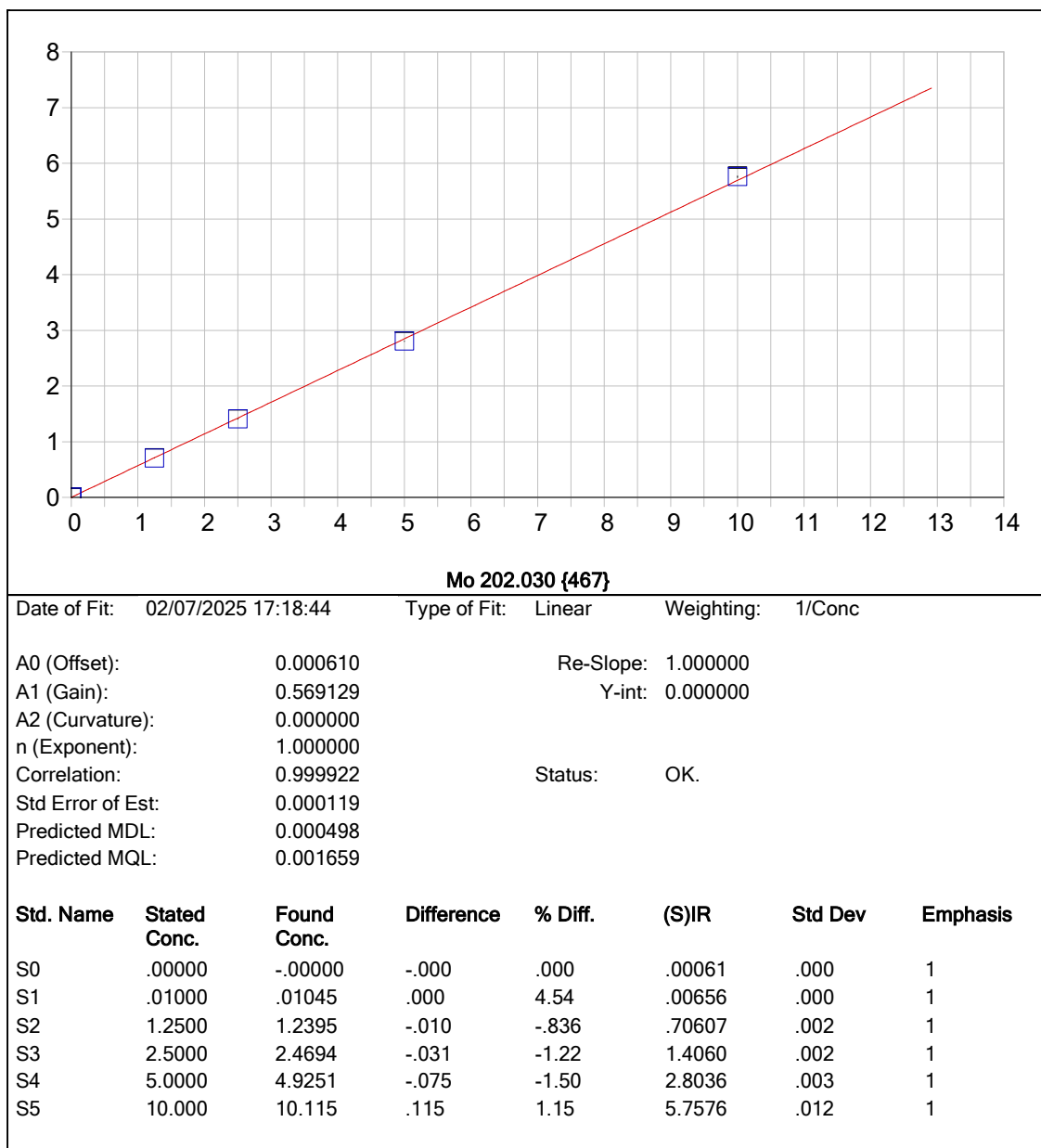


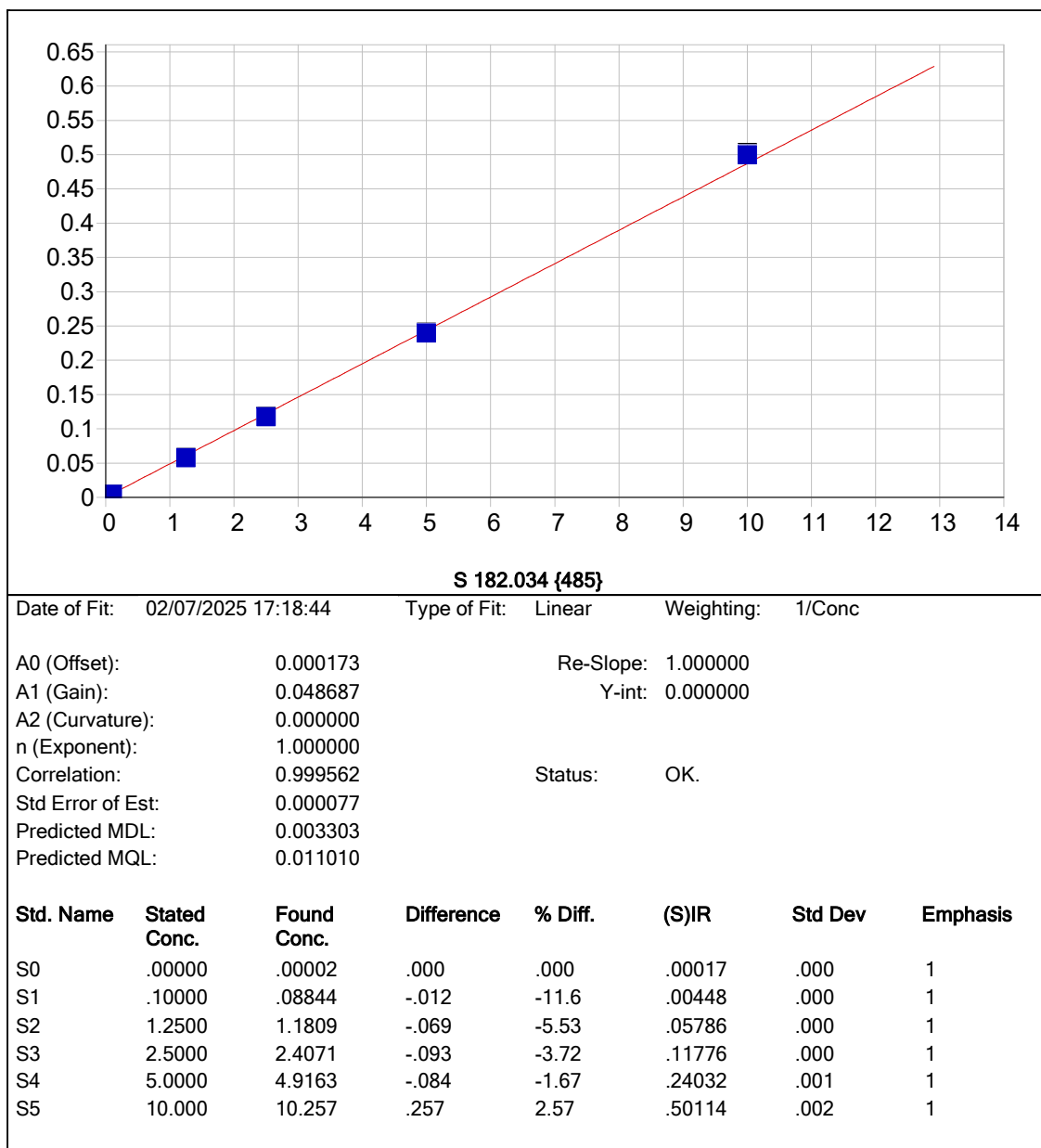


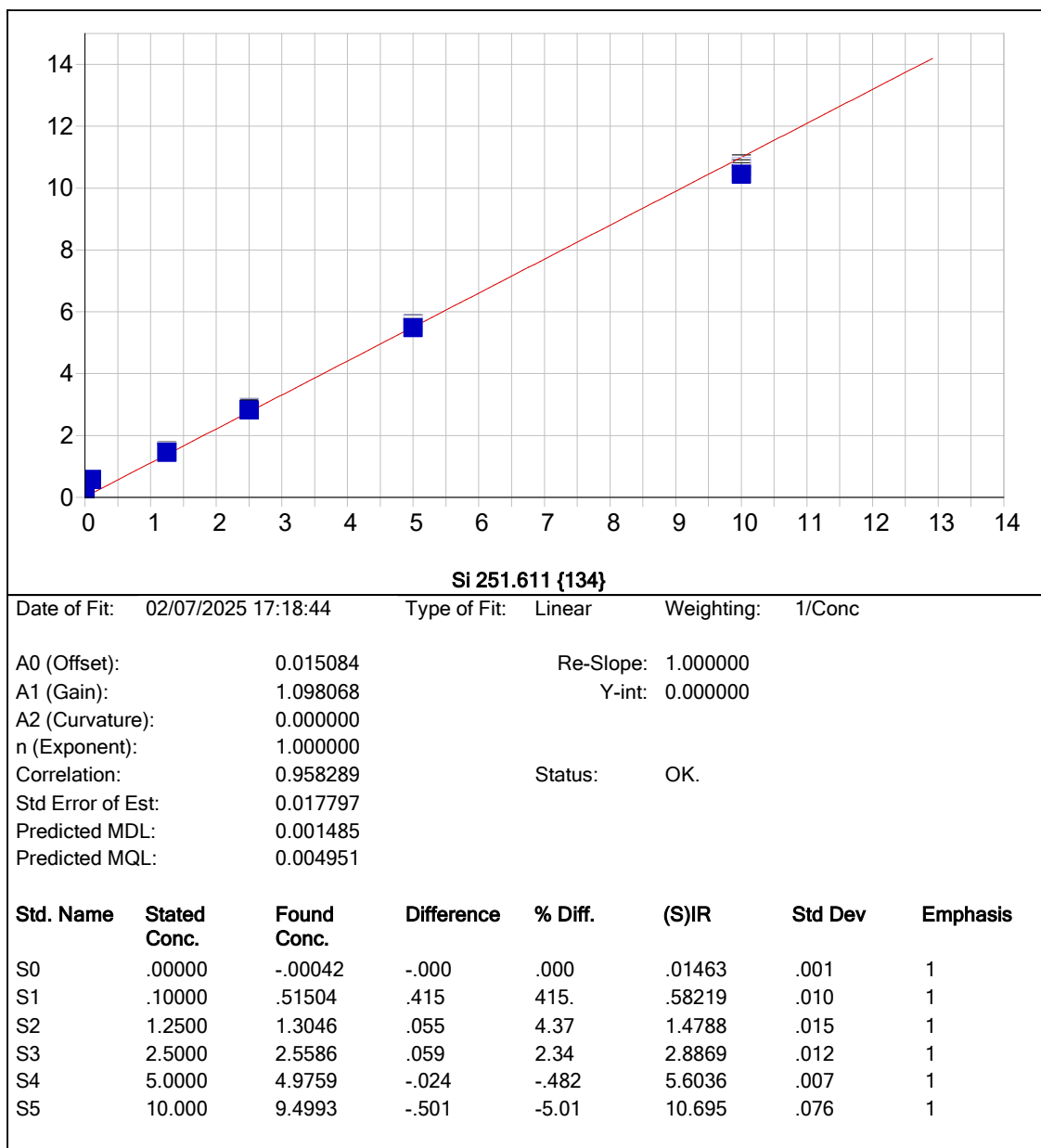


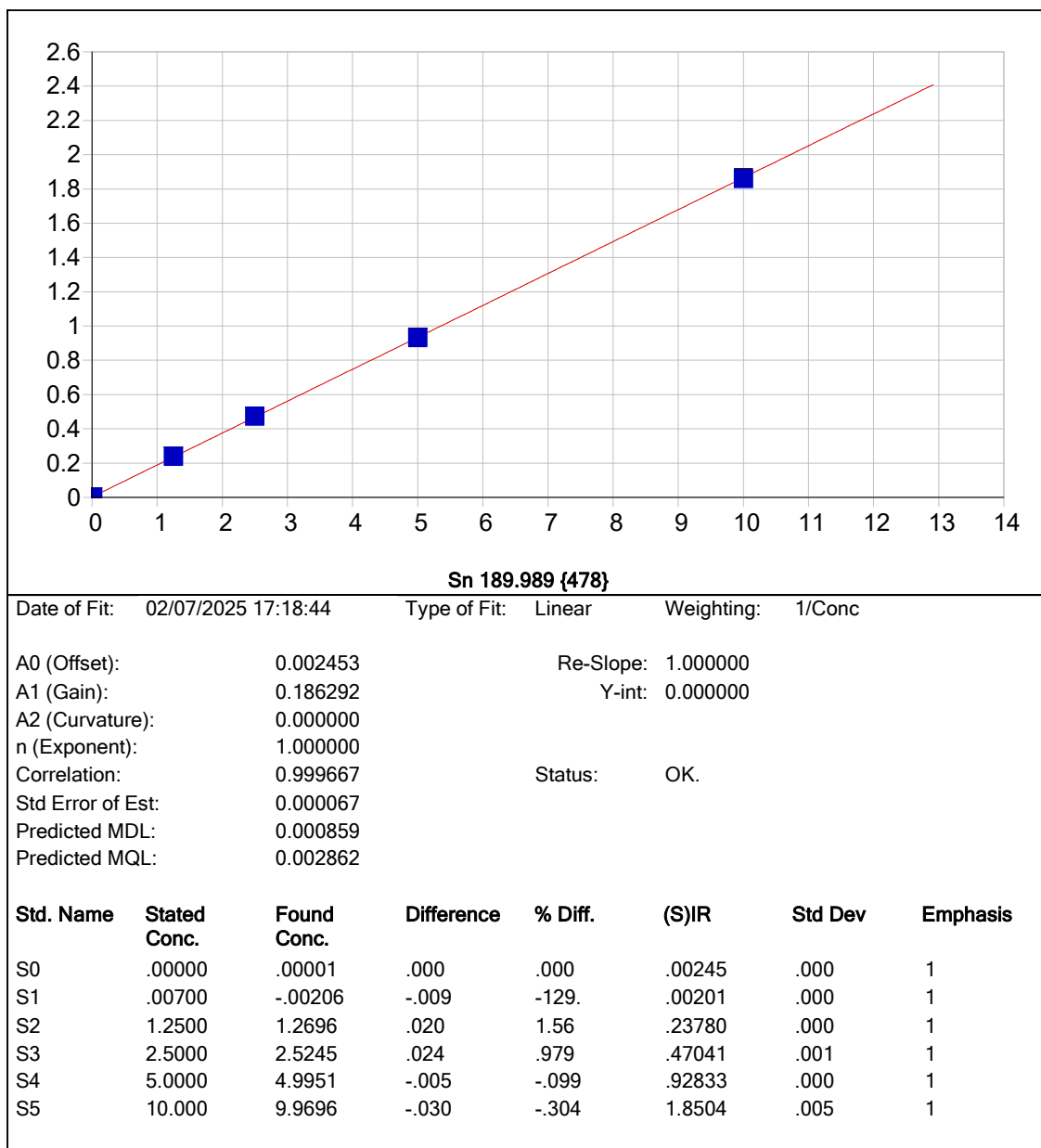


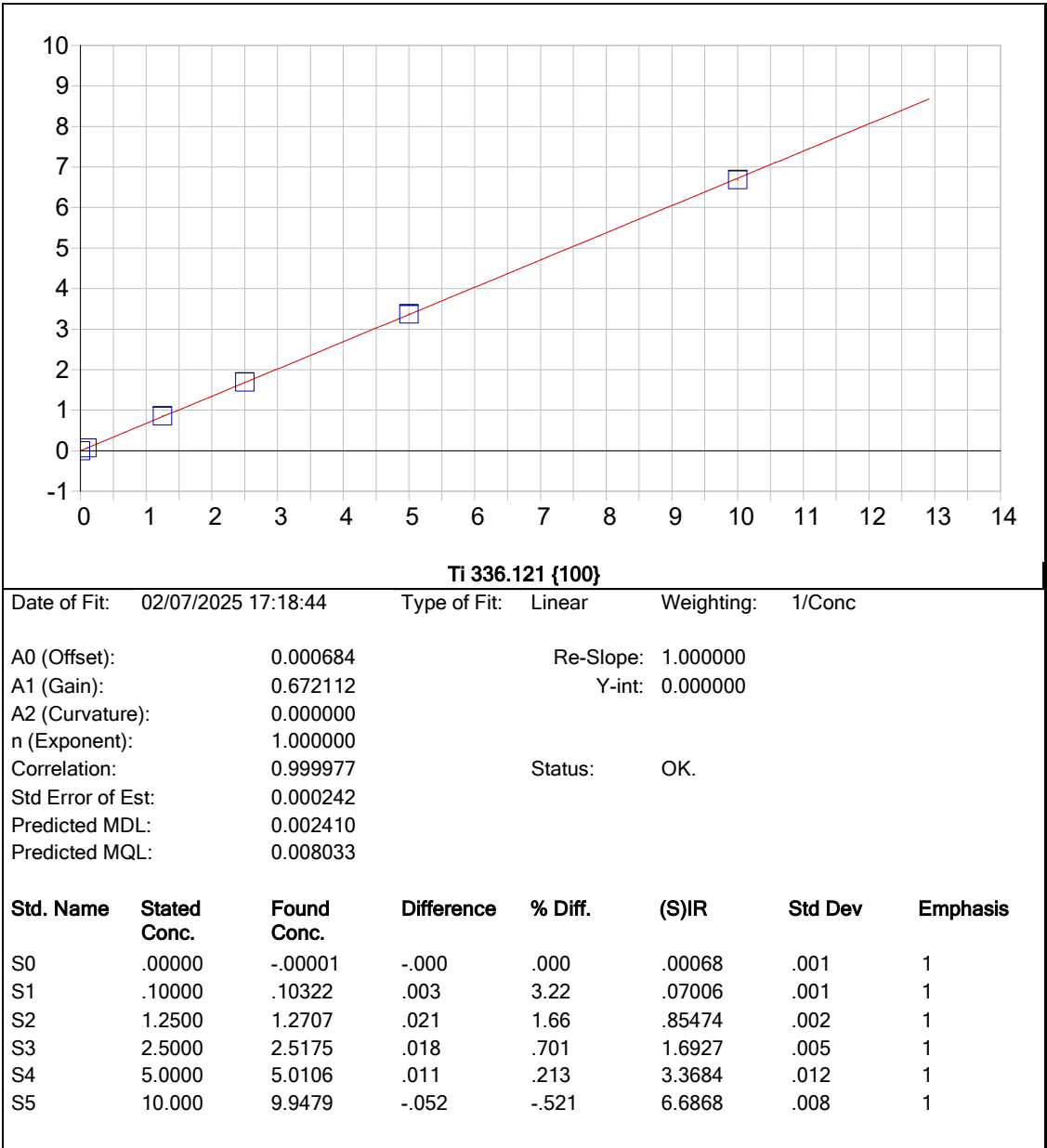


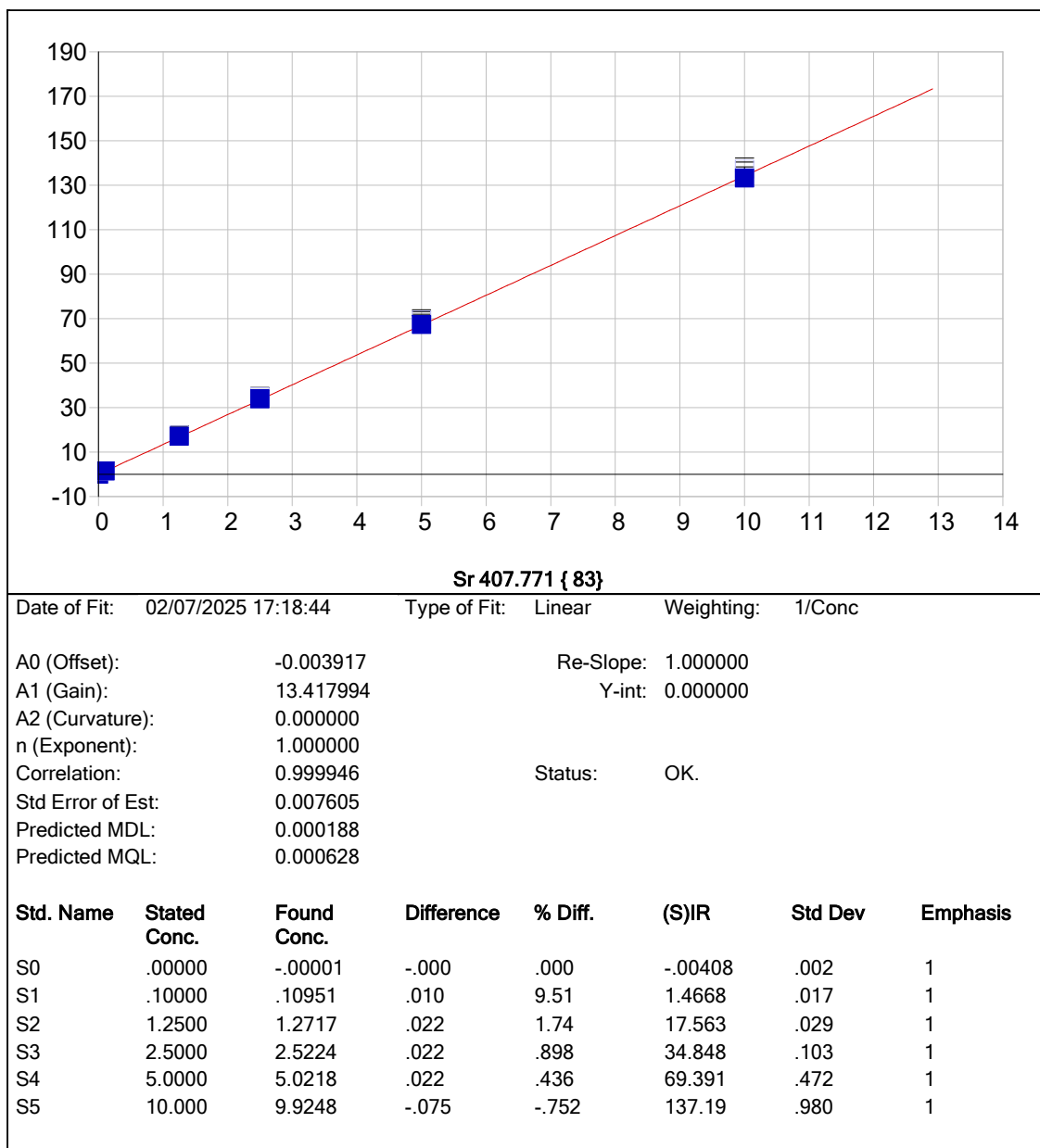


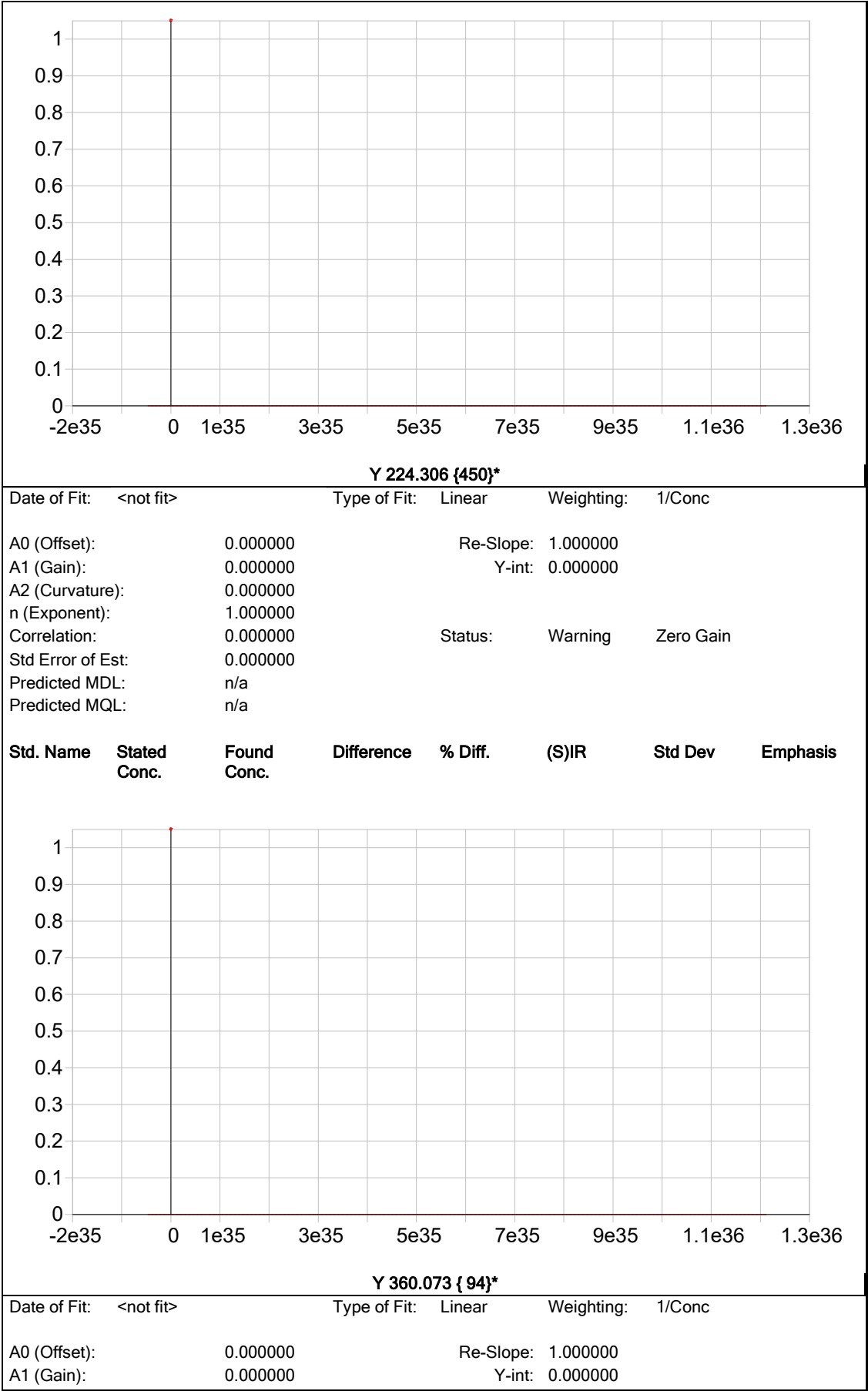


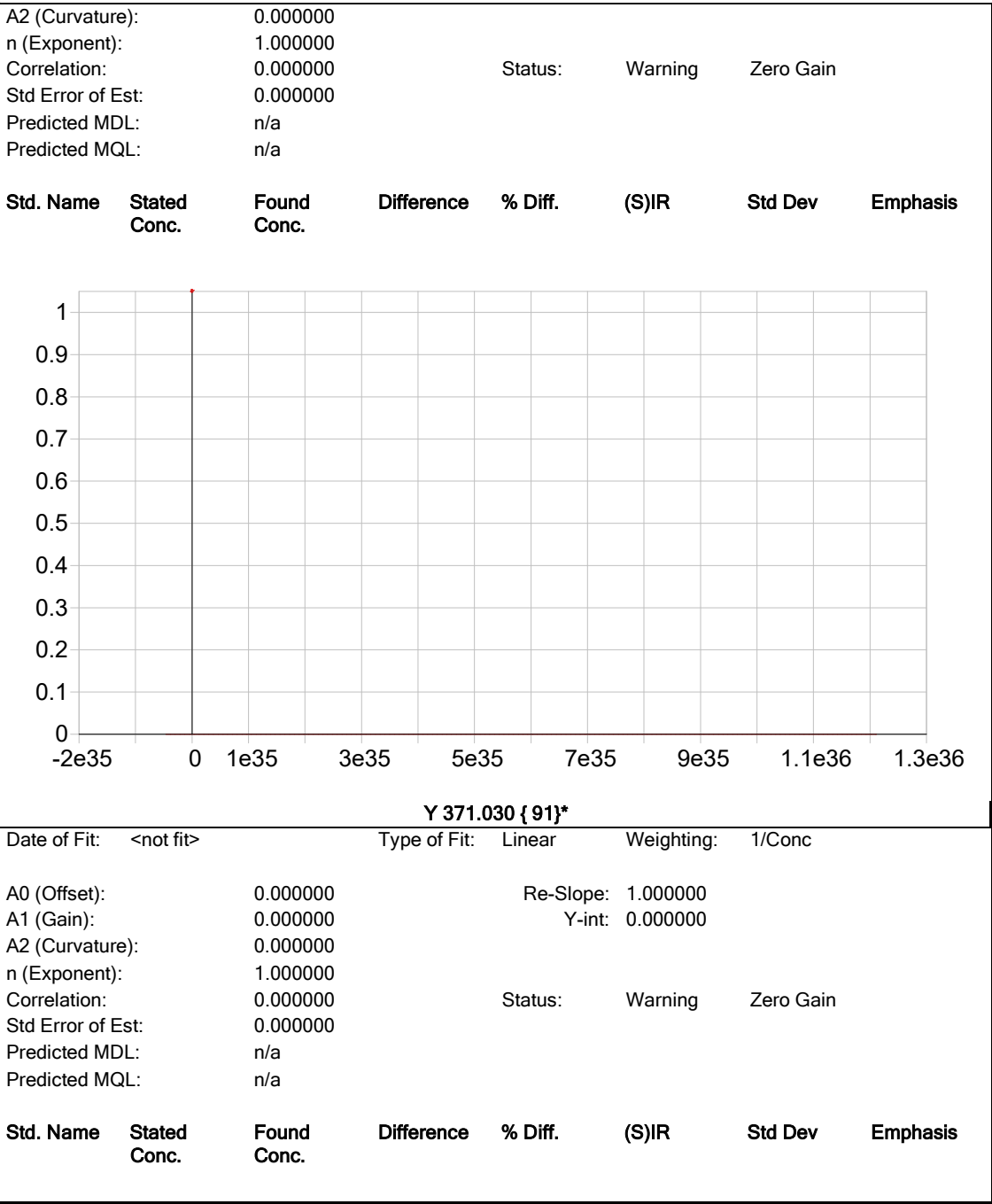


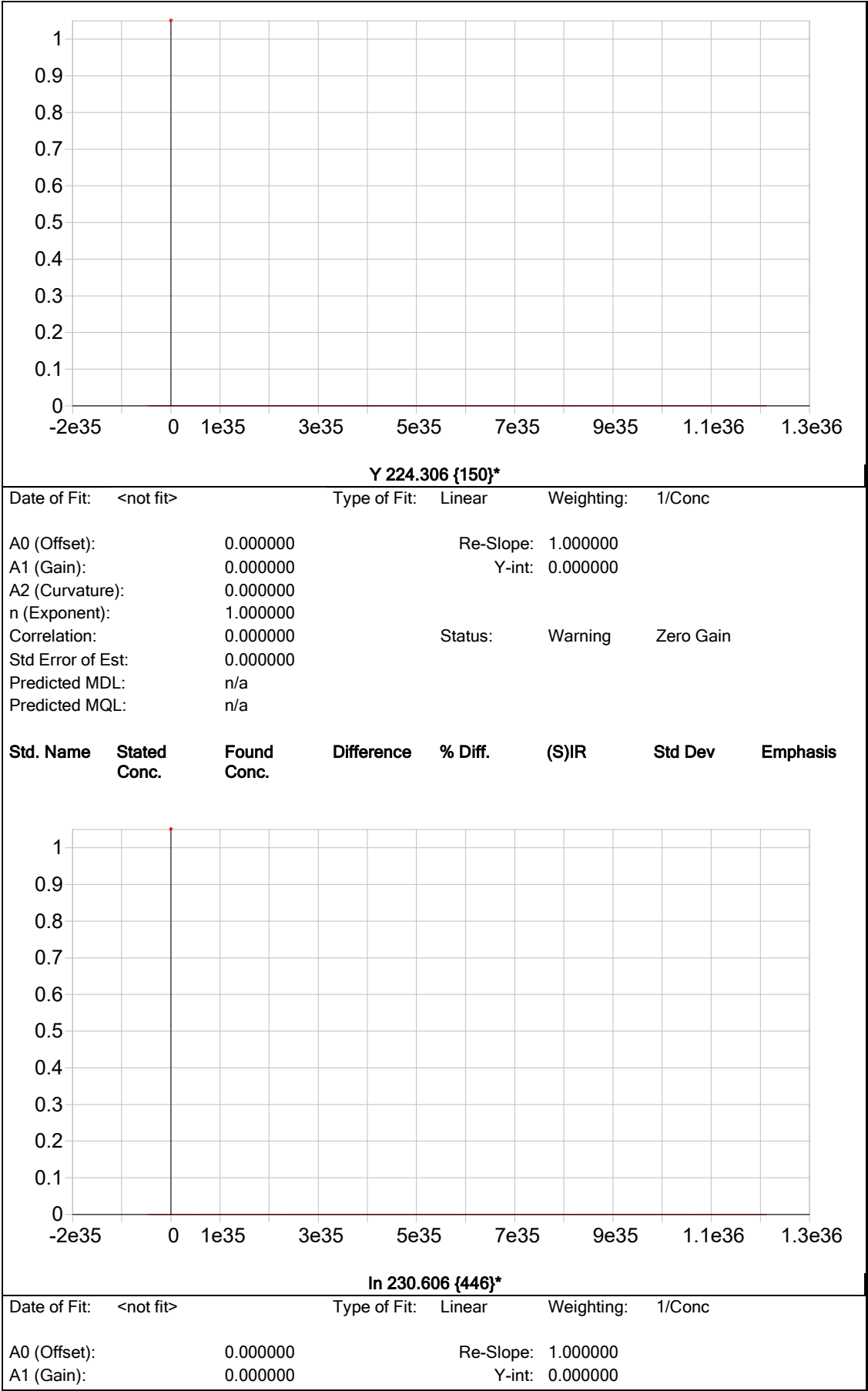


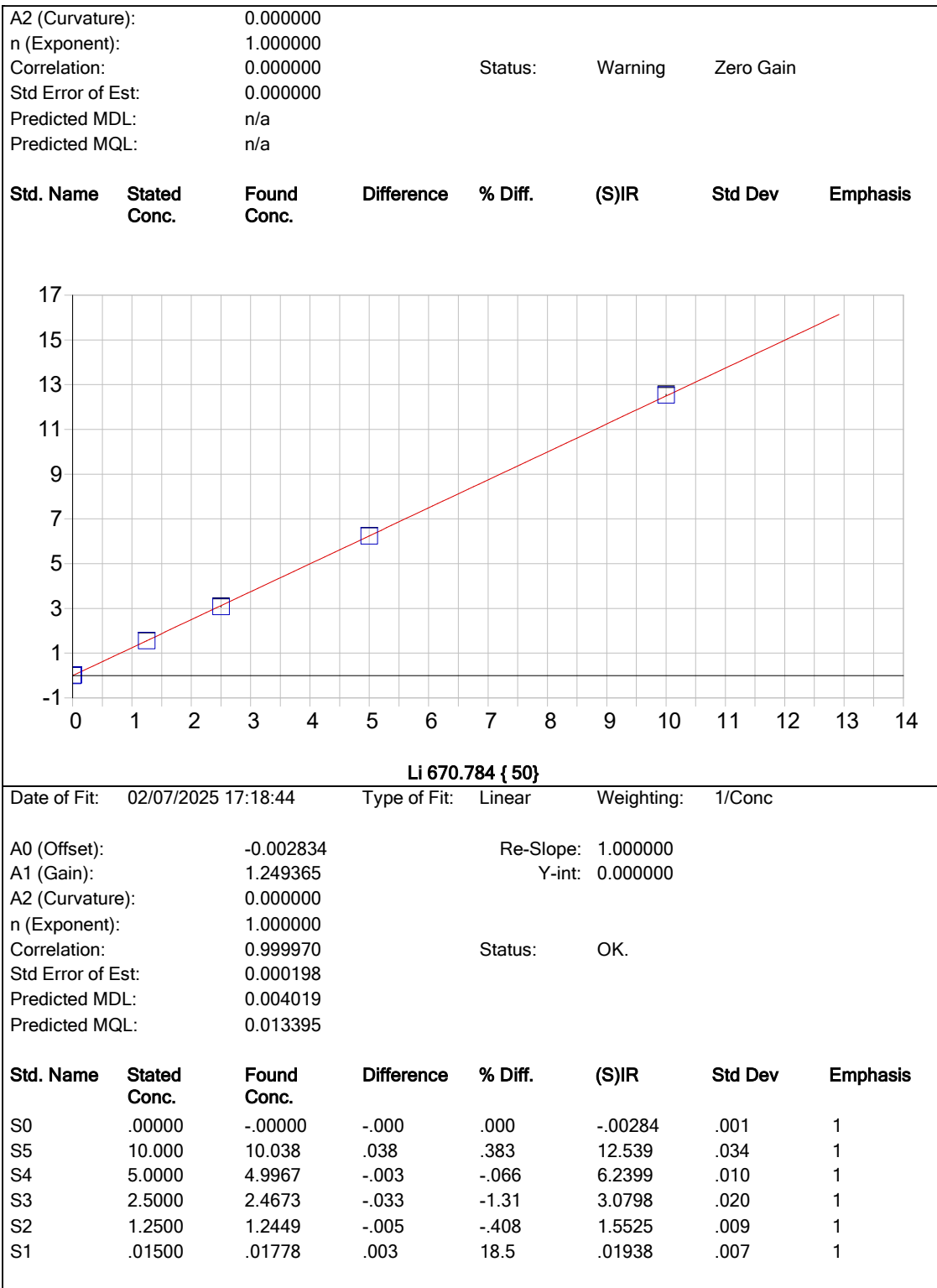












Sample Name: S0 Acquired: 02/07/2025 16:55:28 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S0 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.45780	-.00001	-.00000	-.00011	.00030	-.00237	.00913	-.00092
Stddev	.52968	.00009	.00029	.00011	.00033	.00158	.00226	.00149
%RSD	115.70	673.41	7254.3	100.98	110.16	66.658	24.719	161.04

#1	.73094	-.00005	-.00013	-.00003	.00018	-.00109	.00968	-.00219
#2	.79516	-.00008	-.00021	-.00006	.00004	-.00187	.01106	-.00130
#3	-.15270	.00009	.00033	-.00024	.00066	-.00413	.00665	.00072

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.00038	.00812	-.00003	.00011	.00319	-.00013	-.00047	-.00026
Stddev	.00019	.00104	.00010	.00038	.00038	.00052	.00040	.00044
%RSD	51.072	12.794	332.12	353.81	11.900	402.59	84.283	167.29

#1	.00027	.00724	.00001	-.00016	.00288	.00027	-.00058	-.00020
#2	.00026	.00927	.00005	-.00006	.00308	.00006	-.00081	-.00073
#3	.00060	.00787	-.00014	.00054	.00362	-.00072	-.00003	.00014

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	-.00037	.00059	-.00507	.00027	-.00048	.30887	-.00191	.00340
Stddev	.00012	.00010	.00339	.00122	.00034	.00375	.00009	.00056
%RSD	32.807	16.199	66.851	452.88	70.268	1.2136	4.9249	16.623

#1	-.00023	.00070	-.00749	.00166	-.00009	.31318	-.00191	.00334
#2	-.00046	.00051	-.00120	-.00064	-.00072	.30712	-.00201	.00399
#3	-.00042	.00058	-.00653	-.00020	-.00063	.30633	-.00182	.00286

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077	Li6707	
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	
Avg	.00061	.00017	.01463	.00245	.00068	-.00408	-.00284	
Stddev	.00026	.00011	.00081	.00007	.00088	.00161	.00145	
%RSD	42.553	62.059	5.5115	2.7580	129.55	39.550	51.029	

#1	.00039	.00011	.01501	.00242	.00131	-.00593	-.00378	
#2	.00054	.00030	.01370	.00241	.00106	-.00301	-.00117	
#3	.00090	.00011	.01517	.00253	-.00033	-.00328	-.00357	

Sample Name: S0 Acquired: 02/07/2025 16:55:28 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S0 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4062.6	34692.	3184.7	2942.9	4874.6
Stddev	5.8	110.	14.0	1.0	5.7
%RSD	.14227	.31596	.43913	.03272	.11599
#1	4058.7	34565.	3171.2	2941.9	4874.7
#2	4069.2	34751.	3183.7	2943.7	4880.2
#3	4059.8	34758.	3199.2	2943.3	4868.9

Sample Name: S1 Acquired: 02/07/2025 16:59:33 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S01 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3.3087	.00354	.00244	.00253	.00802	.02714	1.0902	.04414
Stddev	.6812	.00008	.00080	.00005	.00030	.00261	.0108	.00080
%RSD	20.588	2.3000	32.898	1.9763	3.6796	9.6301	.99472	1.8165

#1	4.0790	.00359	.00178	.00252	.00799	.03004	1.0956	.04493
#2	2.7857	.00345	.00220	.00259	.00775	.02644	1.0974	.04416
#3	3.0613	.00358	.00333	.00250	.00833	.02495	1.0778	.04333

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.02000	.36458	.00346	.04422	.01031	.00383	.01526	.13555
Stddev	.00037	.00477	.00008	.00052	.00162	.00037	.00041	.00127
%RSD	1.8416	1.3092	2.2713	1.1849	15.757	9.6996	2.7106	.93929

#1	.01962	.36504	.00353	.04414	.00955	.00426	.01500	.13698
#2	.02036	.36911	.00348	.04374	.01217	.00357	.01573	.13455
#3	.02001	.35960	.00337	.04478	.00920	.00367	.01503	.13512

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.02954	.00273	.04788	.01581	.01023	.44884	-.00145	.00359
Stddev	.00024	.00021	.00710	.00014	.00019	.00616	.00005	.00172
%RSD	.82758	7.7970	14.827	.91233	1.8798	1.3714	3.3886	47.832

#1	.02965	.00285	.04830	.01597	.01006	.45533	-.00145	.00519
#2	.02926	.00249	.05476	.01573	.01020	.44809	-.00140	.00178
#3	.02971	.00286	.04058	.01572	.01044	.44309	-.00150	.00380

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077	Li6707
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.00656	.00448	.58219	.00201	.07006	1.4668	.01938
Stddev	.00008	.00011	.00968	.00011	.00146	.0175	.00742
%RSD	1.2947	2.5550	1.6622	5.3547	2.0804	1.1928	38.267

#1	.00653	.00447	.59182	.00189	.06962	1.4785	.01112
#2	.00649	.00459	.58228	.00209	.06887	1.4752	.02547
#3	.00666	.00437	.57247	.00206	.07168	1.4467	.02155

Sample Name: S1 Acquired: 02/07/2025 16:59:33 Type: Cal
 Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: IR Corr. Factor: 1.000000
 User: Kareem Custom ID1: S01 Custom ID2: Custom ID3:
 Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4018.5	34291.	3275.4	2932.8	4606.5
Stddev	5.7	113.	47.1	9.8	5.9
%RSD	.14266	.33052	1.4367	.33342	.12734
#1	4015.3	34247.	3238.5	2926.4	4604.9
#2	4025.1	34207.	3259.2	2928.0	4613.0
#3	4015.1	34420.	3328.4	2944.1	4601.6

Sample Name: S2 Acquired: 02/07/2025 17:03:33 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S02 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	343.80	.17340	1.5761	.08900	.16576	4.7274	12.831	1.1075
Stddev	1.34	.00024	.0046	.00022	.00059	.0179	.045	.0057
%RSD	.38966	.13836	.28927	.24776	.35864	.37755	.34945	.51423

#1	344.85	.17325	1.5730	.08885	.16527	4.7386	12.868	1.1128
#2	342.29	.17329	1.5740	.08889	.16558	4.7068	12.781	1.1081
#3	344.27	.17368	1.5813	.08925	.16642	4.7367	12.844	1.1015

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2.4673	4.3322	1.2006	.53135	.97591	1.5391	3.6135	1.6854
Stddev	.0056	.0254	.0036	.00128	.00406	.0047	.0039	.0057
%RSD	.22570	.58574	.29874	.24143	.41578	.30475	.10706	.33635

#1	2.4638	4.3559	1.1995	.53055	.98024	1.5446	3.6177	1.6919
#2	2.4645	4.3055	1.2045	.53067	.97219	1.5365	3.6126	1.6816
#3	2.4737	4.3353	1.1976	.53283	.97531	1.5363	3.6101	1.6827

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.47027	.06836	.38417	.17073	.63941	1.2808	.08291	1.0915
Stddev	.00080	.00029	.00317	.00019	.00028	.0096	.00010	.0045
%RSD	.17072	.42545	.82461	.11102	.04352	.74691	.11795	.41462

#1	.47099	.06869	.38056	.17077	.63911	1.2912	.08293	1.0947
#2	.46941	.06826	.38650	.17052	.63944	1.2724	.08280	1.0935
#3	.47041	.06813	.38544	.17089	.63967	1.2789	.08300	1.0864

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077	Li6707	
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	
Avg	.70607	.05786	1.4788	.23780	.85474	17.563	1.5525	
Stddev	.00208	.00014	.0147	.00014	.00171	.029	.0094	
%RSD	.29477	.23498	.99074	.06022	.19957	.16679	.60789	

#1	.70524	.05784	1.4849	.23765	.85643	17.595	1.5632	
#2	.70453	.05774	1.4894	.23793	.85302	17.538	1.5454	
#3	.70844	.05801	1.4621	.23780	.85478	17.556	1.5489	

Sample Name: S2 Acquired: 02/07/2025 17:03:33 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S02 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3844.1	33016.	3238.3	2839.0	4055.8
Stddev	4.6	69.	15.0	3.0	6.6
%RSD	.11914	.20916	.46327	.10729	.16172
#1	3848.4	32978.	3221.0	2836.3	4062.7
#2	3844.6	33095.	3247.8	2842.3	4055.0
#3	3839.3	32973.	3246.2	2838.4	4049.7

Sample Name: S3 Acquired: 02/07/2025 17:07:17 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S03 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	660.94	.33696	3.1659	.17678	.33181	9.4226	25.473	2.1927
Stddev	1.44	.00100	.0019	.00014	.00063	.0377	.074	.0090
%RSD	.21716	.29818	.05996	.08187	.19033	.40059	.29184	.41039

#1	659.94	.33801	3.1674	.17694	.33243	9.3818	25.387	2.1861
#2	660.29	.33688	3.1637	.17667	.33117	9.4299	25.508	2.1889
#3	662.58	.33600	3.1664	.17671	.33183	9.4562	25.523	2.2029

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4.9612	8.5750	2.3885	1.0490	1.9363	3.0190	7.0868	3.3014
Stddev	.0046	.0288	.0033	.0015	.0059	.0055	.0205	.0163
%RSD	.09304	.33525	.13633	.13953	.30582	.18309	.28902	.49302

#1	4.9646	8.5425	2.3853	1.0480	1.9316	3.0130	7.0659	3.2826
#2	4.9560	8.5971	2.3885	1.0484	1.9343	3.0200	7.0878	3.3094
#3	4.9630	8.5853	2.3918	1.0507	1.9429	3.0239	7.1068	3.3121

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.93651	.13606	.76652	.33717	1.2799	2.2372	.17151	2.1479
Stddev	.00217	.00063	.00272	.00199	.0056	.0067	.00007	.0230
%RSD	.23217	.46324	.35454	.59095	.43511	.29971	.04149	1.0708

#1	.93901	.13678	.76678	.33658	1.2752	2.2306	.17159	2.1245
#2	.93510	.13581	.76369	.33553	1.2861	2.2369	.17145	2.1486
#3	.93542	.13560	.76910	.33939	1.2784	2.2440	.17148	2.1705

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077	Li6707	
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	
Avg	1.4060	.11776	2.8869	.47041	1.6927	34.848	3.0798	
Stddev	.0019	.00009	.0120	.00110	.0050	.103	.0199	
%RSD	.13880	.07593	.41431	.23299	.29782	.29634	.64755	

#1	1.4064	.11786	2.8763	.47164	1.6869	34.734	3.0570	
#2	1.4039	.11771	2.8845	.46954	1.6954	34.878	3.0941	
#3	1.4077	.11770	2.8999	.47005	1.6959	34.934	3.0882	

Sample Name: S3 Acquired: 02/07/2025 17:07:17 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S03 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3687.0	31776.	3145.9	2710.9	3832.4
Stddev	7.0	113.	19.8	16.4	6.2
%RSD	.19105	.35691	.62812	.60440	.16106
#1	3683.3	31875.	3168.6	2726.6	3825.9
#2	3695.2	31652.	3136.9	2693.9	3838.2
#3	3682.7	31800.	3132.3	2712.3	3833.0

Sample Name: S4 Acquired: 02/07/2025 17:10:55 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S04 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	1260.8	.65018	6.3047	.35678	.67210	18.922	50.766	4.2833
Stddev	.5	.00070	.0052	.00070	.00062	.050	.078	.0095
%RSD	.04030	.10837	.08301	.19760	.09282	.26339	.15364	.22057

#1	1260.2	.65057	6.3020	.35596	.67156	18.883	50.769	4.2841
#2	1261.2	.65060	6.3107	.35714	.67196	18.978	50.842	4.2734
#3	1261.0	.64937	6.3013	.35722	.67278	18.905	50.686	4.2923

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	9.8836	16.943	4.7500	2.0672	3.8839	5.9217	13.972	6.5132
Stddev	.0050	.066	.0169	.0010	.0125	.0237	.035	.0206
%RSD	.05010	.38877	.35658	.04992	.32203	.40080	.25115	.31565

#1	9.8781	16.915	4.7448	2.0661	3.8696	5.9142	13.957	6.5030
#2	9.8851	17.018	4.7689	2.0680	3.8889	5.9482	14.013	6.5368
#3	9.8876	16.896	4.7363	2.0675	3.8931	5.9026	13.948	6.4997

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	1.8515	.26953	1.5316	.66880	2.6414	4.1766	.35085	4.1434
Stddev	.0018	.00090	.0032	.00258	.0141	.0186	.00006	.0024
%RSD	.09839	.33222	.20959	.38517	.53346	.44493	.01690	.05708

#1	1.8510	.26850	1.5289	.66854	2.6420	4.1733	.35078	4.1412
#2	1.8536	.27001	1.5351	.67149	2.6552	4.1966	.35088	4.1431
#3	1.8500	.27009	1.5307	.66636	2.6271	4.1599	.35088	4.1459

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077	Li6707
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2.8036	.24032	5.6036	.92833	3.3684	69.391	6.2399
Stddev	.0027	.00059	.0073	.00015	.0125	.472	.0098
%RSD	.09765	.24628	.13082	.01612	.37082	.67954	.15707

#1	2.8005	.23969	5.6044	.92849	3.3606	69.884	6.2287
#2	2.8047	.24040	5.5959	.92821	3.3828	69.347	6.2440
#3	2.8057	.24086	5.6105	.92828	3.3618	68.944	6.2470

Sample Name: S4 Acquired: 02/07/2025 17:10:55 Type: Cal
 Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: IR Corr. Factor: 1.000000
 User: Kareem Custom ID1: S04 Custom ID2: Custom ID3:
 Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3462.7	30162.	3045.1	2510.4	3576.5
Stddev	1.6	177.	7.7	11.3	2.3
%RSD	.04563	.58600	.25255	.44821	.06473
#1	3461.6	30282.	3052.7	2514.7	3574.9
#2	3462.0	29959.	3037.3	2497.7	3575.4
#3	3464.5	30245.	3045.3	2519.0	3579.1

Sample Name: S5 Acquired: 02/07/2025 17:14:42 Type: Cal
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S05 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2505.4	1.2709	12.588	.75030	1.4093	38.036	100.60	8.4038
Stddev	10.4	.0044	.030	.00299	.0028	.096	.77	.0548
%RSD	.41361	.34660	.23996	.39908	.19701	.25139	.76485	.65249

#1	2502.5	1.2666	12.559	.74801	1.4082	38.105	99.814	8.4666
#2	2496.8	1.2709	12.586	.74921	1.4073	37.927	101.35	8.3653
#3	2516.9	1.2754	12.619	.75369	1.4125	38.076	100.63	8.3796

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	19.721	33.358	9.3216	4.1196	7.7765	11.661	27.507	12.760
Stddev	.047	.100	.0186	.0113	.0166	.033	.054	.031
%RSD	.23766	.29943	.19909	.27421	.21357	.27960	.19560	.24176

#1	19.678	33.432	9.3387	4.1103	7.7723	11.674	27.536	12.783
#2	19.714	33.244	9.3019	4.1164	7.7623	11.624	27.445	12.725
#3	19.771	33.396	9.3241	4.1322	7.7947	11.686	27.540	12.772

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3.7142	.55047	3.0739	1.3206	5.5497	8.0363	.72432	7.7803
Stddev	.0095	.00014	.0074	.0068	.0273	.0285	.00174	.0570
%RSD	.25494	.02577	.24098	.51184	.49177	.35527	.23985	.73306

#1	3.7050	.55063	3.0758	1.3240	5.5202	8.0679	.72264	7.8460
#2	3.7138	.55035	3.0657	1.3129	5.5741	8.0123	.72420	7.7428
#3	3.7239	.55044	3.0801	1.3250	5.5547	8.0286	.72611	7.7522

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077	Li6707	
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	
Avg	5.7576	.50114	10.695	1.8504	6.6868	137.19	12.539	
Stddev	.0116	.00200	.076	.0050	.0082	.98	.034	
%RSD	.20056	.39987	.71085	.27072	.12289	.71449	.26967	

#1	5.7473	.50024	10.782	1.8453	6.6911	136.50	12.525	
#2	5.7555	.49975	10.641	1.8505	6.6773	138.31	12.514	
#3	5.7701	.50344	10.662	1.8553	6.6920	136.77	12.577	

Sample Name: S5 Acquired: 02/07/2025 17:14:42 Type: Cal
 Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: IR Corr. Factor: 1.000000
 User: Kareem Custom ID1: S05 Custom ID2: Custom ID3:
 Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3248.3	29116.	3073.4	2330.7	3407.0
Stddev	9.0	175.	6.6	7.0	9.4
%RSD	.27784	.60229	.21556	.30043	.27635
#1	3257.0	29308.	3067.1	2337.1	3415.9
#2	3239.0	29076.	3080.3	2323.2	3397.2
#3	3249.0	28965.	3072.9	2331.7	3408.1

Sample Name: S6 Acquired: 02/07/2025 17:18:45 Type: Cal
 Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: IR Corr. Factor: 1.000000
 User: Kareem Custom ID1: S06 Custom ID2: Custom ID3:
 Comment:

Elem	Al3961	Ca3736	Fe2598	Mg2790	Na8183
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	100.20	53.686	31.305	20.783	8.4818
Stddev	.82	.307	.076	.048	.0301
%RSD	.82067	.57173	.24330	.23109	.35427
#1	100.70	53.384	31.247	20.777	8.4562
#2	99.251	53.998	31.276	20.738	8.4745
#3	100.65	53.677	31.391	20.833	8.5149
Int. Std.	Y_3710				
Units	Cts/S				
Avg	3033.6				
Stddev	14.0				
%RSD	.46240				
#1	3044.0				
#2	3039.1				
#3	3017.7				

Sample Name: ICV004 Acquired: 02/07/2025 17:22:53 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICV004 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F 1.101135	1.097695	.9934540	1.007728	.9503270	2.498039
Stddev	.004084	.001714	.0020863	.004735	.0039114	.010654
%RSD	.3709029	.1561849	.2100027	.4698746	.4115801	.4264785

#1	1.100277	1.096028	.9952084	1.012789	.9490265	2.507377
#2	1.105581	1.097604	.9911471	1.003406	.9472316	2.486434
#3	1.097549	1.099453	.9940065	1.006988	.9547229	2.500305

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5354182	.5492018	.4886500	10.40416	.5491053	.5067082
Stddev	.0018692	.0024165	.0005392	.05258	.0006370	.0009781
%RSD	.3491034	.4400017	.1103506	.5054139	.1160081	.1930214

#1	.5369550	.5464586	.4888309	10.43882	.5486826	.5067132
#2	.5333374	.5510157	.4880435	10.43000	.5498380	.5057277
#3	.5359621	.5501312	.4890755	10.34365	.5487954	.5076838

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5284629	10.65608	.5478392	6.152537	.5082119	.2464577
Stddev	.0053762	.02159	.0011249	.029447	.0002274	.0026963
%RSD	1.017330	.2025964	.2053413	.4786200	.0447408	1.094028

#1	.5245216	10.66626	.5490846	6.152534	.5079583	.2434583
#2	.5345873	10.63128	.5468967	6.123091	.5082800	.2486804
#3	.5262799	10.67070	.5475364	6.181985	.5083975	.2472345

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	10.41053	.5285455	.9014251	9.590357	F .0007198	F .0123448
Stddev	.20710	.0103823	.0025907	.144994	.0012016	.0006828
%RSD	1.989352	1.964322	.2874040	1.511869	166.9390	5.531170

#1	10.43568	.5389934	.9030108	9.670087	.0001120	.0116384
#2	10.60392	.5182300	.8984354	9.422995	.0021039	.0123946
#3	10.19201	.5284131	.9028291	9.677989	-.000057	.0130013

Sample Name: ICV004 Acquired: 02/07/2025 17:22:53 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICV004 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F -.000022	F .0065125	F .0035896	F .0015433	F -.001287	F -.009234
Stddev	.000406	.0010247	.0023736	.0010986	.000975	.000074
%RSD	1878.340	15.73488	66.12430	71.18550	75.76949	.7985465
#1	-.000010	.0062372	.0019066	.0028118	-.001830	-.009215
#2	.000379	.0056535	.0025577	.0009199	-.001869	-.009172
#3	-.000433	.0076467	.0063045	.0008982	-.000161	-.009316

Elem	Li6707
Units	ppm
Avg	F .0130627
Stddev	.0023222
%RSD	17.77703
#1	.0103846
#2	.0142873
#3	.0145163

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3994.531	34249.18	3170.804	2949.375	4484.310
Stddev	15.825	92.99	19.587	4.747	16.048
%RSD	.3961559	.2714985	.6177375	.1609436	.3578798
#1	3991.342	34335.60	3193.248	2947.168	4477.183
#2	4011.708	34261.15	3162.002	2954.824	4502.688
#3	3980.544	34150.78	3157.162	2946.134	4473.060

Sample Name: ICB004 Acquired: 02/07/2025 17:26:40 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICB004 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.001026	-.000370	.0009336	.0005048	.0007903	-.003467	.0000581
Stddev	.002886	.000267	.0018041	.0007793	.0034132	.024492	.0011606
%RSD	281.3465	72.08732	193.2453	154.3866	431.8711	706.4341	1996.392

#1	.002302	-.000399	.0011521	.0001066	.0007926	-.013718	-.001189
#2	-.002539	-.000090	.0026184	.0014028	.0042024	-.021168	.001106
#3	-.002839	-.000622	-.000970	.0000050	-.002624	.024485	.000258

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000097	-.000026	-.039252	.0002459	.0000568	-.004139	-.010100
Stddev	.000116	.000051	.005598	.0004100	.0004097	.004137	.016879
%RSD	118.8339	194.6777	14.26216	166.7645	720.7395	99.95951	167.1237

#1	.000033	.000021	-.044946	-.000047	.0000593	.000475	.005937
#2	-.000187	-.000019	-.033755	.000715	-.000354	-.007520	-.027711
#3	-.000139	-.000081	-.039054	.000070	.000465	-.005373	-.008525

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0004303	-.017619	-.000001	-.000403	-.047209	-.002326	.0013664
Stddev	.0002428	.019199	.000122	.000036	.279504	.002578	.0012811
%RSD	56.42372	108.9689	8845.816	8.882555	592.0575	110.8558	93.75192

#1	.0003754	-.037113	-.000122	-.000433	.181821	-.005302	.0010618
#2	.0002197	-.017016	.000122	-.000364	.035206	-.000865	.0002651
#3	.0006959	.001272	-.000004	-.000413	-.358654	-.000810	.0027724

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.7601204	-.001066	.0087340	-.000509	-.000560	.0002204	.0011908
Stddev	.3027271	.002077	.0014844	.000166	.003391	.0005814	.0003073
%RSD	39.82621	194.8467	16.99549	32.65308	606.0487	263.7618	25.80663

#1	.4124922	-.003343	.0075874	-.000702	-.004367	-.000200	.0014940
#2	.9657100	.000724	.0104107	-.000415	.002137	.000884	.0008796
#3	.9021590	-.000578	.0082040	-.000412	.000551	-.000022	.0011988

Sample Name: ICB004 Acquired: 02/07/2025 17:26:40 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICB004 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	.0000425	.0000953	.0048080
Stddev	.0013781	.0001451	.0035290
%RSD	3241.149	152.2355	73.39778
#1	.0009110	.0002607	.0018987
#2	-.001546	-.000010	.0037918
#3	.000763	.000035	.0087336

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3998.158	34585.84	3121.193	2935.193	4794.349
Stddev	20.626	106.68	14.424	15.205	15.718
%RSD	.5158805	.3084366	.4621470	.5180093	.3278483
#1	4021.074	34574.02	3129.888	2952.334	4811.990
#2	3992.316	34697.94	3104.542	2929.909	4789.223
#3	3981.083	34485.57	3129.149	2923.335	4781.833

Sample Name: ICSA004 Acquired: 02/07/2025 17:30:41 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICSA004 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.003115	-.001097	-.001011	-.024573	.0180399	238.5064
Stddev	.003946	.003556	.001765	.004493	.0041820	.3682
%RSD	126.6851	324.0811	174.6566	18.28445	23.18214	.1543779

#1	-.002146	-.004531	.000518	-.023473	.0152440	238.1233
#2	-.007456	-.001330	-.002943	-.029513	.0160280	238.8576
#3	.000256	.002569	-.000607	-.020731	.0228476	238.5383

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0074362	.0033527	.0021619	246.5145	.0535009	.0302201
Stddev	.0009354	.0000520	.0001561	.4726	.0006956	.0003498
%RSD	12.57851	1.550883	7.221576	.1917035	1.300235	1.157614

#1	.0069108	.0033046	.0019817	246.3519	.0542048	.0299481
#2	.0068817	.0033456	.0022500	247.0469	.0534840	.0306147
#3	.0085161	.0034079	.0022541	246.1447	.0528139	.0300974

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.020964	101.0896	.0075471	246.5365	.0078558	-.004960
Stddev	.004325	.2620	.0003798	.7474	.0005776	.000866
%RSD	20.63192	.2591915	5.032887	.3031709	7.353144	17.45213

#1	-.016480	100.8170	.0075462	245.9071	.0085152	-.005655
#2	-.021300	101.3395	.0071677	247.3626	.0076133	-.003991
#3	-.025111	101.1123	.0079274	246.3397	.0074389	-.005235

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.012968	-.000469	-.035429	-1.05253	.0045864	F .0213639
Stddev	.683975	.003189	.000541	.12483	.0019294	.0014550
%RSD	5274.473	680.1816	1.527148	11.86002	42.06871	6.810308

#1	.604137	-.004031	-.035373	-1.16917	.0023686	.0228958
#2	-.748379	.000505	-.034918	-1.06754	.0055118	.0211955
#3	.105339	.002119	-.035996	-.92087	.0058788	.0200005

Sample Name: ICSA004 Acquired: 02/07/2025 17:30:41 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICSA004 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0033286	.0269738	-.006714	F .0091483	.0019685	.0036677
Stddev	.0003624	.0014192	.001320	.0012113	.0029813	.0006010
%RSD	10.88641	5.261534	19.66555	13.24095	151.4501	16.38637
#1	.0034580	.0259260	-.005891	.0101244	.0043686	.0037988
#2	.0036086	.0285889	-.006014	.0077927	.0029057	.0030119
#3	.0029193	.0264065	-.008237	.0095279	-.001369	.0041922

Elem	Li6707
Units	ppm
Avg	.0130905
Stddev	.0033728
%RSD	25.76533
#1	.0102350
#2	.0122247
#3	.0168119

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3699.616	30602.77	3088.468	2679.508	3821.832
Stddev	11.306	55.52	9.956	3.643	8.412
%RSD	.3056125	.1814221	.3223469	.1359725	.2201032
#1	3695.517	30666.56	3097.090	2682.356	3815.669
#2	3690.930	30576.45	3077.572	2680.765	3818.412
#3	3712.400	30565.32	3090.743	2675.402	3831.415

Sample Name: ICSAB004 Acquired: 02/07/2025 17:34:33 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICSAB004 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0992639	.1010228	.0500210	.0239608	.5788219	240.5051
Stddev	.0017323	.0010247	.0028574	.0014991	.0025825	1.1838
%RSD	1.745107	1.014365	5.712482	6.256488	.4461714	.4922297

#1	.0977483	.1019940	.0515182	.0239136	.5818037	239.3611
#2	.1011522	.1011226	.0467261	.0224859	.5773603	240.4291
#3	.0988912	.0999518	.0518188	.0254830	.5773016	241.7251

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5322556	.5303174	1.005101	249.4397	.5912604	.5290535
Stddev	.0030303	.0018800	.001449	.9169	.0008392	.0007824
%RSD	.5693237	.3544998	.1441204	.3675818	.1419354	.1478855

#1	.5293830	.5318167	1.004439	248.9149	.5922290	.5294662
#2	.5319616	.5309273	1.004102	248.9058	.5907500	.5281512
#3	.5354221	.5282082	1.006762	250.4985	.5908023	.5295431

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5057779	102.3463	.5275990	248.3606	1.011740	.2054431
Stddev	.0059758	.5699	.0022187	1.1205	.002161	.0005566
%RSD	1.181501	.5567890	.4205347	.4511515	.2136265	.2709204

#1	.4995320	101.7327	.5257937	247.2397	1.009586	.2059253
#2	.5063610	102.4473	.5269274	248.3614	1.011727	.2048340
#3	.5114408	102.8589	.5300760	249.4807	1.013909	.2055701

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.4540295	.5190998	.9185870	-2.19889	.0070810	F .0193562
Stddev	.4322005	.0077086	.0158113	.32047	.0013446	.0015315
%RSD	95.19217	1.484995	1.721262	14.57422	18.98908	7.912359

#1	.9129135	.5138291	.9018702	-2.56793	.0086273	.0186735
#2	.3944887	.5279470	.9205884	-1.99070	.0061864	.0182847
#3	.0546863	.5155232	.9333022	-2.03804	.0064292	.0211103

Sample Name: ICSAB004 Acquired: 02/07/2025 17:34:33 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: ICSAB004 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0029400	.0268149	-.005092	F .0088915	.0003023	.0041141
Stddev	.0003573	.0052849	.002030	.0011592	.0028185	.0006346
%RSD	12.15280	19.70898	39.86801	13.03768	932.4900	15.42576
#1	.0033015	.0292333	-.003051	.0099293	.0017716	.0035881
#2	.0025871	.0207535	-.007111	.0076404	.0020824	.0039354
#3	.0029313	.0304579	-.005113	.0091047	-.002947	.0048190

Elem	Li6707
Units	ppm
Avg	.0140430
Stddev	.0046576
%RSD	33.16686
#1	.0113039
#2	.0194208
#3	.0114042

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3753.225	31078.11	3108.534	2727.211	3869.075
Stddev	5.066	183.08	10.476	28.194	5.033
%RSD	.1349686	.5890809	.3370044	1.033810	.1300835
#1	3759.070	31277.28	3120.530	2759.330	3874.876
#2	3750.506	31039.90	3101.185	2706.548	3865.869
#3	3750.099	30917.16	3103.888	2715.756	3866.481

Sample Name: CCV007 Acquired: 02/07/2025 17:38:20 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCV007 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	5.091425	5.019996	25.63127	5.064474	5.128721	406.0626	10.36640
Stddev	.018014	.009194	.03083	.012628	.006724	2.7884	.07325
%RSD	.3538163	.1831436	.1202908	.2493487	.1311091	.6866996	.7066359

#1	5.091140	5.014161	25.59567	5.063695	5.123312	406.6071	10.38251
#2	5.073556	5.015233	25.64912	5.052254	5.126600	403.0421	10.28643
#3	5.109581	5.030594	25.64903	5.077474	5.136249	408.5387	10.43025

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5187931	2.589674	412.7341	15.82693	2.576668	15.34481	411.8533
Stddev	.0029462	.001741	3.1473	.01394	.002119	.08060	2.7815
%RSD	.5678964	.0672394	.7625525	.0880945	.0822487	.5252451	.6753595

#1	.5200389	2.587665	413.6696	15.83655	2.576317	15.39805	413.2801
#2	.5154287	2.590600	409.2251	15.81094	2.574747	15.25208	408.6479
#3	.5209118	2.590757	415.3076	15.83331	2.578941	15.38429	413.6319

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	15.23236	404.6710	2.593584	1.300722	403.3236	2.572860	15.15409
Stddev	.08620	2.6084	.003783	.002527	2.4480	.009102	.05470
%RSD	.5659232	.6445692	.1458459	.1942682	.6069676	.3537541	.3609384

#1	15.26633	405.3293	2.590645	1.301800	404.0424	2.567572	15.16746
#2	15.13435	401.7965	2.597852	1.302531	400.5966	2.567638	15.09395
#3	15.29640	406.8872	2.592254	1.297835	405.3318	2.583369	15.20086

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	155.3260	5.210296	5.006845	5.031377	5.255011	4.841620	5.202495
Stddev	.7291	.011009	.027903	.005306	.011710	.021736	.006160
%RSD	.4694198	.2112842	.5573034	.1054565	.2228296	.4489478	.1184109

#1	155.4419	5.216349	5.013416	5.025260	5.241508	4.846501	5.198534
#2	154.5459	5.197589	4.976242	5.034141	5.261154	4.817858	5.209593
#3	155.9903	5.216950	5.030876	5.034731	5.262370	4.860501	5.199359

Sample Name: CCV007 Acquired: 02/07/2025 17:38:20 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCV007 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	5.123775	4.875045	5.128965
Stddev	.030957	.005385	.024715
%RSD	.6041761	.1104615	.4818783
#1	5.131994	4.869647	5.147613
#2	5.089538	4.875071	5.100932
#3	5.149793	4.880417	5.138350

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3383.159	29193.26	3074.711	2465.258	3432.962
Stddev	9.356	41.76	18.390	9.302	11.036
%RSD	.2765315	.1430433	.5981040	.3773202	.3214862
#1	3386.930	29148.98	3066.188	2463.046	3436.479
#2	3372.507	29231.93	3095.816	2475.467	3420.595
#3	3390.041	29198.86	3062.129	2457.263	3441.810

Sample Name: CCB007 Acquired: 02/07/2025 17:42:04 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCB007 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000988	.0011404	.0004283	.0022116	.0002184	.0158241	-.000614
Stddev	.000095	.0005269	.0018700	.0032092	.0018837	.0133563	.000209
%RSD	9.565765	46.20117	436.5892	145.1047	862.3921	84.40467	33.99616

#1	-.001084	.0013570	.0021614	.0032287	-.000259	.0304664	-.000845
#2	-.000985	.0005398	.0006772	-.001383	.002295	.0043087	-.000557
#3	-.000895	.0015246	-.001554	.004789	-.001381	.0126972	-.000439

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000101	.0000925	-.053059	.0004810	.0002238	-.000510	.0218678
Stddev	.000117	.0000886	.012078	.0005787	.0005519	.001453	.0203875
%RSD	115.5199	95.74505	22.76342	120.2944	246.5565	284.9342	93.23049

#1	-.000203	.0000756	-.041124	.0004629	.0008521	.000161	.0267082
#2	.000027	.0001884	-.065275	.0010685	-.000182	-.002177	.0393995
#3	-.000127	.0000137	-.052778	-.000088	.000002	.000486	-.000504

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0008330	-.004513	-.000368	-.000892	-.095682	-.000712	-.001856
Stddev	.0001808	.029327	.000358	.000359	.583751	.003865	.001540
%RSD	21.70747	649.8138	97.14756	40.28499	610.0950	542.8661	82.97269

#1	.0007378	-.010217	-.000733	-.000593	-.309974	-.003639	-.000089
#2	.0010416	-.030569	-.000017	-.001290	-.542002	.003669	-.002912
#3	.0007198	.027247	-.000355	-.000793	.564930	-.002166	-.002566

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.6162161	-.001498	.0086543	-.000336	-.000487	.0026870	.0010402
Stddev	.0567013	.000533	.0019359	.000089	.003076	.0006458	.0011343
%RSD	9.201526	35.58425	22.36965	26.49725	631.0465	24.03539	109.0522

#1	.5773824	-.002058	.0107697	-.000299	-.004037	.0033034	.0000107
#2	.5899821	-.001439	.0082225	-.000437	.001392	.0020153	.0008536
#3	.6812837	-.000997	.0069708	-.000271	.001183	.0027422	.0022563

Sample Name: CCB007 Acquired: 02/07/2025 17:42:04 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCB007 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	.0012769	.0002266	.0049792
Stddev	.0033647	.0002459	.0011990
%RSD	263.5100	108.5322	24.08126
#1	-.000712	.0005085	.0038428
#2	-.000619	.0001153	.0048624
#3	.005162	.0000560	.0062323

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4075.474	35270.09	3184.686	3003.242	4870.465
Stddev	14.996	103.53	7.855	10.585	12.340
%RSD	.3679635	.2935408	.2466403	.3524680	.2533703
#1	4092.196	35303.30	3184.245	2992.527	4884.351
#2	4071.007	35154.03	3177.061	3003.506	4866.294
#3	4063.218	35352.94	3192.751	3013.693	4860.751

Sample Name: Q1272-03A Acquired: 02/07/2025 17:46:03 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: MBHHA2A Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000400	.0675044	.0251927	-.006542	.0847275	.1014401
Stddev	.002618	.0006060	.0005984	.002935	.0013081	.0108948
%RSD	653.9209	.8977274	2.375453	44.85864	1.543883	10.74011
#1	-.003320	.0681151	.0246244	-.009260	.0857624	.0897103
#2	.000379	.0669032	.0251364	-.003430	.0851629	.1033674
#3	.001739	.0674951	.0258173	-.006936	.0832572	.1112427
Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.996814	.0002031	.0028127	201.2825	.0041131	.0353202
Stddev	.013523	.0000295	.0000892	.3465	.0003344	.0002011
%RSD	.6772480	14.51049	3.171775	.1721661	8.131087	.5693019
#1	2.009977	.0001744	.0027272	201.4671	.0044735	.0354079
#2	1.982957	.0002017	.0029052	201.4978	.0038128	.0350902
#3	1.997507	.0002333	.0028057	200.8828	.0040531	.0354625
Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0816193	.0419027	4.071527	32.55784	.0110344	.0226704
Stddev	.0027102	.0258242	.020959	.09293	.0002281	.0006406
%RSD	3.320587	61.62896	.5147764	.2854406	2.067646	2.825861
#1	.0813895	.0716780	4.090303	32.66271	.0111658	.0222079
#2	.0844371	.0284171	4.048915	32.52514	.0107710	.0224017
#3	.0790313	.0256131	4.075364	32.48568	.0111666	.0234017
Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F 1360.523	.0018780	2.203881	3.524003	.0916208	.2665645
Stddev	9.729	.0030128	.031844	.191907	.0031621	.0025117
%RSD	.7150614	160.4302	1.444924	5.445714	3.451264	.9422320
#1	1368.943	.0053568	2.236268	3.318519	.0900149	.2651840
#2	1349.873	.0001590	2.172608	3.554908	.0895839	.2650460
#3	1362.755	.0001181	2.202766	3.698582	.0952635	.2694637

Sample Name: Q1272-03A Acquired: 02/07/2025 17:46:03 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: MBHHA2A Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0025045	1.817174	3.380741	-.007744	-.002145	1.432393
Stddev	.0006310	.001976	.030205	.000603	.002164	.008142
%RSD	25.19263	.1087254	.8934536	7.790272	100.8763	.5684120
#1	.0017787	1.819445	3.355700	-.008127	-.004607	1.440459
#2	.0028122	1.816229	3.372236	-.008056	-.001285	1.424177
#3	.0029226	1.815849	3.414287	-.007048	-.000544	1.432544

Elem	Li6707
Units	ppm
Avg	.0126125
Stddev	.0037730
%RSD	29.91488
#1	.0136701
#2	.0157440
#3	.0084236

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3741.373	30673.85	3260.312	2746.147	3672.161
Stddev	9.001	218.56	17.952	20.355	7.254
%RSD	.2405823	.7125201	.5506344	.7412101	.1975334
#1	3747.683	30439.80	3254.887	2724.534	3675.919
#2	3745.369	30872.62	3280.351	2764.952	3676.765
#3	3731.065	30709.14	3245.698	2748.954	3663.800

Sample Name: CCV008 Acquired: 02/07/2025 17:50:20 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCV008 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	4.933814	4.942242	25.16975	4.959492	5.059508	406.5578	10.35915
Stddev	.007343	.012293	.00461	.011598	.015477	2.1637	.05941
%RSD	.1488375	.2487341	.0183201	.2338623	.3059041	.5321884	.5734723

#1	4.936657	4.952122	25.17041	4.967933	5.065650	405.0394	10.33220
#2	4.925474	4.928475	25.16484	4.946267	5.041902	409.0352	10.42725
#3	4.939311	4.946127	25.17399	4.964275	5.070971	405.5989	10.31799

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5147304	2.542276	411.6976	15.74785	2.538679	15.38440	410.7677
Stddev	.0018889	.001114	2.0681	.03596	.002018	.08438	1.7209
%RSD	.3669696	.0438020	.5023282	.2283693	.0795090	.5484993	.4189421

#1	.5128407	2.543445	410.2876	15.77309	2.539460	15.34938	409.7710
#2	.5166185	2.541228	414.0717	15.76380	2.536387	15.48066	412.7548
#3	.5147322	2.542154	410.7336	15.70667	2.540190	15.32317	409.7772

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	15.18426	405.1349	2.546364	1.286188	404.2907	2.552800	15.06400
Stddev	.07471	1.3860	.003314	.002792	2.2398	.011006	.06373
%RSD	.4920038	.3421126	.1301276	.2170959	.5540148	.4311447	.4230542

#1	15.12184	404.0407	2.550185	1.289303	402.4642	2.543223	15.09441
#2	15.26703	406.6934	2.544270	1.285351	406.7898	2.564824	15.10682
#3	15.16390	404.6705	2.544638	1.283909	403.6182	2.550354	14.99076

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	154.1359	5.091336	5.012351	4.982372	5.119499	4.830296	5.095979
Stddev	.8653	.009426	.026818	.010036	.011474	.017080	.008514
%RSD	.5613897	.1851418	.5350467	.2014257	.2241300	.3535934	.1670650

#1	153.1739	5.101963	4.988862	4.983984	5.129297	4.811779	5.086207
#2	154.8508	5.088058	5.041572	4.971628	5.106876	4.845432	5.101790
#3	154.3829	5.083985	5.006619	4.991505	5.122324	4.833678	5.099941

Sample Name: CCV008 Acquired: 02/07/2025 17:50:20 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCV008 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Sr4077	Li6707
Units	ppm	ppm	ppm
Avg	5.131098	4.856075	5.186967
Stddev	.034996	.025132	.034509
%RSD	.6820321	.5175378	.6653017
#1	5.110836	4.831865	5.159972
#2	5.171507	4.882037	5.225848
#3	5.110950	4.854324	5.175082

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3335.512	28717.97	3007.627	2406.423	3398.387
Stddev	3.824	122.03	11.022	9.689	1.605
%RSD	.1146375	.4249236	.3664739	.4026282	.0472409
#1	3336.663	28616.98	3016.259	2400.220	3398.615
#2	3338.627	28683.36	2995.211	2401.461	3396.680
#3	3331.244	28853.56	3011.409	2417.588	3399.867

Sample Name: CCB008 Acquired: 02/07/2025 17:54:04 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCB008 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.001944	.0019105	.0005711	.0043518	-.000528	.0078156
Stddev	.004787	.0012592	.0005223	.0003770	.002188	.0315031
%RSD	246.1709	65.90810	91.44864	8.662579	414.6858	403.0791

#1	-.002270	.0018019	.0000666	.0043740	-.002105	-.026023
#2	.002997	.0032204	.0011094	.0039642	.001970	.036295
#3	-.006560	.0007091	.0005373	.0047171	-.001448	.013175

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000090	-.000072	-.000010	-.003402	.0010960	.0002944
Stddev	.000362	.000077	.000022	.018150	.0003348	.0004250
%RSD	402.4372	107.5339	214.2347	533.5575	30.54384	144.3682

#1	.000296	.000000	-.000036	.017555	.0007133	.0000018
#2	-.000143	-.000154	-.000001	-.013725	.0013347	.0000995
#3	-.000423	-.000063	.000006	-.014035	.0012400	.0007819

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.002341	-.002591	.0009323	-.052248	-.000052	-.000256
Stddev	.003146	.017567	.0005960	.009087	.000405	.000824
%RSD	134.4049	677.9947	63.92513	17.39169	771.8787	322.1410

#1	-.004577	.017646	.0007380	-.042530	.000004	.000006
#2	-.003703	-.011502	.0016012	-.060534	.000322	-.001179
#3	.001257	-.013916	.0004577	-.053680	-.000483	.000406

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0302343	.0005362	-.000631	.7938617	-.000116	.0112860
Stddev	.0920278	.0041953	.001100	.1427607	.001100	.0015758
%RSD	304.3817	782.3594	174.3503	17.98307	948.5062	13.96226

#1	.0612700	-.004289	.000398	.6317685	-.001163	.0130430
#2	-.073299	.002576	-.001791	.9008882	-.000216	.0099978
#3	.102732	.003322	-.000500	.8489284	.001031	.0108172

Sample Name: CCB008 Acquired: 02/07/2025 17:54:04 Type: Unk
Method: SFAM01.1 INSTRUMENT P5 WITH 6 POINT ICAL-2(v135) Mode: CONC Corr. Factor: 1.00000
User: Kareem Custom ID1: CCB008 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Sr4077
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000476	.0009103	-.000287	-.000003	-.001737	.0003500
Stddev	.0001115	.0024279	.001414	.000263	.000947	.0000840
%RSD	234.2192	266.7020	492.0557	9695.307	54.53702	23.99265

#1	.0001601	-.001879	-.001360	-.000297	-.000963	.0002623
#2	.0000457	.002546	-.000817	.000210	-.002793	.0003580
#3	-.000063	.002064	.001315	.000079	-.001454	.0004297

Elem	Li6707
Units	ppm
Avg	F .0166780
Stddev	.0032156
%RSD	19.28041

#1	.0203865
#2	.0149832
#3	.0146643

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4061.150	34889.69	3161.368	2952.270	4862.059
Stddev	11.735	121.14	21.394	13.650	9.878
%RSD	.2889556	.3472137	.6767303	.4623612	.2031573

#1	4047.737	34886.33	3152.097	2961.559	4851.016
#2	4069.520	35012.48	3146.173	2958.654	4865.110
#3	4066.193	34770.26	3185.833	2936.598	4870.052

Prep Standard - Chemical Standard Summary

Order ID : Q1272

Test : Metals CLP Full

Prepbatch ID : PB166531,

Sequence ID/Qc Batch ID: LB134591, LB134645,

Standard ID :

MP83500, MP84041, MP84063, MP84070, MP84204, MP84218, MP84219, MP84381, MP84382, MP84383, MP84384, MP84385, MP84386, MP84387, MP84388, MP84389, MP84390, MP84391, MP84392, MP84410,

Chemical ID :

M4884, M5218, M5289, M5298, M5393, M5429, M5467, M5472, M5476, M5496, M5497, M5498, M5513, M5519, M5565, M5658, M5697, M5798, M5799, M5800, M5801, M5802, M5806, M5811, M5815, M5817, M5819, M5875, M5942, M5959, M5961, M5962, M5976, M5977, M5978, M5985, M5990, M6021, M6023, M6025, M6028, M6030, M6032, M6077, M6121, M6125, M6126, M6127, M6128, M6144, M6145, M6146, M6147, M6148, M6149, W3112,

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
902	ICP AES CAL BLK (SO/ICB/CCB)	MP83500	12/06/2024	01/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								12/09/2024

FROM 125.00000ml of M6121 + 2350.00000ml of W3112 + 25.00000ml of M6126 = Final Quantity: 2500.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
169	1:1HNO3	MP84041	01/14/2025	07/14/2025	Eman Mughal	None	None	Sarabjit Jaswal
								01/16/2025

FROM 1250.00000ml of M6126 + 1250.00000ml of W3112 = Final Quantity: 2500.000 ml

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
994	ICPAES ISM01.2 S1 (CONC.)	MP84063	01/14/2025	02/14/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/16/2025

FROM 0.02000ml of M5815 + 0.03000ml of M5429 + 0.10000ml of M5798 + 0.10000ml of M6028 + 0.14000ml of M5799 + 0.20000ml of M5298 + 0.20000ml of M5476 + 0.20000ml of M5658 + 0.20000ml of M5801 + 0.20000ml of M5817 + 0.20000ml of M5976 + 0.20000ml of M6025 + 0.20000ml of M6030 + 0.30000ml of M6128 + 0.40000ml of M5496 + 0.50000ml of M5697 + 0.50000ml of M6023 + 0.70000ml of M5962 + 0.80000ml of M5961 + 1.00000ml of M5800 + 1.00000ml of M6021 + 1.20000ml of M5802 + 1.20000ml of M5819 + 10.00000ml of M5497 + 10.00000ml of M5519 + 10.00000ml of M5806 + 10.00000ml of M6127 + 2.00000ml of M5942 + 4.00000ml of M6032 + 34.24000ml of MP83500 = Final Quantity: 100.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
921	ICPAES SPIKE SOL#6	MP84070	01/14/2025	02/14/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/16/2025

FROM 2.50000ml of M5962 + 50.00000ml of M5565 + 50.00000ml of M5990 + 147.50000ml of MP83500 = Final Quantity: 250.000 ml

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
902	ICP AES CAL BLK (SO/ICB/CCB)	MP84204	01/24/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/27/2025

FROM 125.00000ml of M6121 + 2350.00000ml of W3112 + 25.00000ml of M6126 = Final Quantity: 2500.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
919	ICP AES INTERNAL STD	MP84218	01/24/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/27/2025

FROM 1.00000ml of M5959 + 10.00000ml of M5985 + 1969.00000ml of W3112 + 20.00000ml of M6126 = Final Quantity: 2000.000 ml

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
903	ICP AES RINSE SOLN	MP84219	01/24/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/27/2025

FROM 200.00000ml of M6126 + 9800.00000ml of W3112 = Final Quantity: 10000.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
2480	ICP AES STD 6 ISM01.3	MP84381	01/27/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								02/10/2025

FROM 4.00000ml of M5289 + 4.00000ml of M5497 + 4.00000ml of M5811 + 4.00000ml of M6127 + 4.00000ml of M6144 + 30.00000ml of MP84204 = Final Quantity: 50.000 ml

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1004	ICPAES ISM01.2 (S5)	MP84382	01/27/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								02/10/2025
FROM 0.25000ml of M5798 + 0.50000ml of M5429 + 0.50000ml of M5476 + 0.50000ml of M5815 + 0.50000ml of M5817 + 12.50000ml of M5519 + 12.50000ml of M6128 + 12.50000ml of M6144 + 13.75000ml of M5697 + 14.50000ml of M5496 + 14.50000ml of M5658 + 14.50000ml of M5811 + 2.00000ml of M5513 + 22.50000ml of M5497 + 22.50000ml of M6127 + 5.00000ml of M4884 + 5.00000ml of M5393 + 5.00000ml of M5875 + 5.00000ml of M6077 + 5.00000ml of M6146 + 303.50000ml of MP84204 = Final Quantity: 500.000 ml								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1004	ICPAES ISM01.2 (S5)	MP84383	01/27/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								02/10/2025
FROM 0.25000ml of M5798 + 0.50000ml of M5429 + 0.50000ml of M5476 + 0.50000ml of M5815 + 0.50000ml of M5817 + 12.50000ml of M5519 + 12.50000ml of M6128 + 12.50000ml of M6144 + 12.50000ml of M6145 + 13.75000ml of M5697 + 14.50000ml of M5496 + 14.50000ml of M5658 + 14.50000ml of M5811 + 2.00000ml of M5513 + 22.50000ml of M5497 + 22.50000ml of M6127 + 5.00000ml of M4884 + 5.00000ml of M5393 + 5.00000ml of M5875 + 5.00000ml of M6077 + 5.00000ml of M6146 + 303.50000ml of MP84204 = Final Quantity: 500.000 ml								

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1005	ICPAES ISM01.2(S4)	MP84384	01/27/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								02/10/2025

FROM 250.00000ml of MP84204 + 250.00000ml of MP84382 = Final Quantity: 500.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1007	ICPAES ISM01.2(S3)	MP84385	01/27/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								02/10/2025

FROM 25.00000ml of MP84382 + 75.00000ml of MP84204 = Final Quantity: 100.000 ml

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1008	ICPAES ISM01.2(S2)	MP84386	01/27/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								02/10/2025

FROM 12.50000ml of MP84382 + 87.50000ml of MP84204 = Final Quantity: 100.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
994	ICPAES ISM01.2 S1 (CONC.)	MP84387	01/27/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								02/10/2025

FROM 0.02000ml of M5815 + 0.03000ml of M5429 + 0.10000ml of M5798 + 0.10000ml of M6028 + 0.14000ml of M5799 + 0.20000ml of M5476 + 0.20000ml of M5658 + 0.20000ml of M5801 + 0.20000ml of M5811 + 0.20000ml of M5817 + 0.20000ml of M5977 + 0.20000ml of M6025 + 0.20000ml of M6030 + 0.30000ml of M6128 + 0.40000ml of M5496 + 0.50000ml of M5697 + 0.50000ml of M6023 + 0.70000ml of M5962 + 0.80000ml of M5961 + 1.00000ml of M5800 + 1.00000ml of M6021 + 1.20000ml of M6145 + 1.20000ml of M6146 + 10.00000ml of M4884 + 10.00000ml of M5498 + 10.00000ml of M5519 + 10.00000ml of M6127 + 10.00000ml of M6144 + 2.00000ml of M5978 + 4.00000ml of M6032 + 34.24000ml of MP84204 = Final Quantity: 100.000 ml

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1003	ICPAES ISM01.2 S1	MP84388	01/27/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								02/10/2025

FROM 0.50000ml of MP84387 + 99.50000ml of MP84204 = Final Quantity: 100.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
912	ICP AES ICV SOLN	MP84389	01/27/2025	02/08/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								02/10/2025

FROM 0.02500ml of M5429 + 0.02500ml of M5815 + 0.02500ml of M5817 + 0.10000ml of M5467 + 0.25000ml of M5218 + 0.25000ml of M5472 + 10.00000ml of M6147 + 89.77500ml of MP84204 = Final Quantity: 100.000 ml

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
904	ICP AES ICSA SOLN	MP84390	01/27/2025	02/08/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								02/10/2025

FROM 25.00000ml of M6148 + 225.00000ml of MP84204 = Final Quantity: 250.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
905	ICP AES ICSAB SOLN	MP84391	01/27/2025	02/08/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								02/10/2025

FROM 25.00000ml of M6148 + 25.00000ml of M6149 + 200.00000ml of MP84204 = Final Quantity: 250.000 ml

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1119	ICPAES ISM01.2(CCV)	MP84392	01/27/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								02/10/2025

FROM 0.75000ml of M5498 + 0.75000ml of M6127 + 1.22500ml of M5496 + 1.25000ml of M5811 + 1.25000ml of M6144 + 19.77500ml of MP84204 + 25.00000ml of MP84382 = Final Quantity: 50.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
2632	TL 100.00PPM	MP84410	01/20/2025	02/20/2025	Kareem Khairalla	None	None	Sohil Jodhani
								02/10/2025

FROM 1.00000ml of M6023 + 9.00000ml of MP84204 = Final Quantity: 10.000 ml

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57014 / Si, 1000 PPM, 125 ml	030921	03/09/2025	08/06/2021 / jaswal	08/05/2021 / jaswal	M4884

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CHEM-QC-4 / CHEM-QC-4, Second Source, 1000 ug/ml, B, Mo, Si, Sn, Ti	S2-MEB711674	11/02/2026	07/01/2022 / bin	09/10/2021 / bin	M5218

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58113 / Aluminum (Al) 10,000PPM	070622	07/06/2025	09/02/2022 / jaswal	07/12/2022 / jaswal	M5289

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58126 / Fe, 10000 PPM, 500 ml	020422	02/04/2025	05/02/2023 / jaswal	06/15/2022 / jaswal	M5298

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CLPP-CAL-3 / CLP CAL SOLUTION #3, 125mL	T2-MEB714159	01/13/2027	10/12/2022 / bin	09/19/2022 / bin	M5393

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57103 / Li, 10000 PPM, 125 ml	070622	07/06/2025	01/30/2023 / bin	01/26/2023 / bin	M5429

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57058 / Cerium, 1000PPM, 100ML	020623	02/06/2026	03/06/2023 / bin	03/01/2023 / bin	M5467

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57038 / Sr, 1000 PPM, 125 ml	082922	08/29/2025	01/14/2025 / Jaswal	03/16/2023 / jaswal	M5472

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57138 / Sr, 10000 PPM, 125 ml	082922	08/29/2025	07/29/2024 / jaswal	03/16/2023 / jaswal	M5476

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58113 / Al, 10000 PPM, 500 ml	011623	01/16/2026	08/15/2023 / jaswal	03/17/2023 / bin	M5496

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58120 / Ca, 10000 PPM, 500 ml	031523	03/15/2026	03/18/2023 / bin	03/17/2023 / bin	M5497

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58120 / Ca, 10000 PPM, 500 ml	031523	03/15/2026	08/15/2023 / jaswal	03/17/2023 / bin	M5498

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57182 / Pb, 10000 PPM, 125 ml	061522	06/15/2025	03/19/2023 / bin	03/17/2023 / bin	M5513

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57119 / Potassium (K) 10,000PPM	120822	12/08/2025	01/08/2024 / bin	03/17/2023 / bin	M5519

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CLPP-SPK-1 / SOIL/WATER SPIKE SOLN 1, 125mL	T2-MEB721963	07/27/2027	05/30/2023 / jaswal	05/26/2023 / jaswal	M5565

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58024 / Chromium, Cr, 500 ml, 1000 PPM	060523	06/05/2026	08/28/2023 / jaswal	08/25/2023 / jaswal	M5658

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58029 / Cu, 1000 PPM, 500 ml	102523	10/25/2026	04/03/2024 / jaswal	10/27/2023 / jaswal	M5697

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57004 / Be, 1000 PPM, 125 ml	102523	10/25/2026	02/09/2024 / bin	02/09/2024 / bin	M5798

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57050 / Sn, 1000 PPM, 125 ml	071123	07/11/2026	02/09/2024 / bin	02/09/2024 / bin	M5799

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57027 / CO, 1000 PPM, 125 ml	091923	09/19/2026	05/31/2024 / bin	02/09/2024 / bin	M5800

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57033 / As, 1000 PPM, 125 ml	111323	11/13/2026	02/09/2024 / bin	02/09/2024 / bin	M5801

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57051 / Sb, 1000 PPM, 125 ml	120523	12/05/2026	08/07/2024 / jaswal	01/03/2024 / jaswal	M5802

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58111 / Na, 10000 PPM, 500 ml	122223	12/22/2026	08/01/2024 / Jaswal	01/03/2024 / jaswal	M5806

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58126 / Fe, 10000 PPM, 500 ml	051523	05/15/2026	02/06/2025 / kareem	01/03/2024 / jaswal	M5811

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57115 / P, 10000 PPM, 125 ml	041723	04/17/2026	05/21/2024 / Jaswal	02/09/2024 / jaswal	M5815

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57116 / S, 10000 PPM, 125 ml	071123	07/11/2026	03/01/2024 / jaswal	02/09/2024 / jaswal	M5817

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58030 / Zinc, Zn, 500 ml, 1000 PPM	111623	11/16/2026	03/20/2024 / jaswal	02/09/2024 / jaswal	M5819

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CLPP-CAL-1 / CLP CAL SOLUTION #1, 125mL	T2-MEB714417	01/27/2027	04/19/2024 / jaswal	02/22/2024 / jaswal	M5875

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGT11-1 / TITANIUM 125mL 1000ug/mL	T2-TI719972	06/17/2027	06/18/2024 / Jaswal	02/22/2024 / Jaswal	M5942

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGY10-1 / YTTRIUM 125mL 10,000ug/mL	V2-Y740548	02/20/2029	07/01/2024 / Jaswal	06/14/2024 / Jaswal	M5959

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57028 / Ni, 1000 PPM, 125 ml	041124	04/11/2027	07/02/2024 / Jaswal	06/11/2024 / Jaswal	M5961

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57034 / Se, 1000 PPM, 125 ml	060624	06/06/2027	07/02/2024 / Jaswal	06/14/2024 / Jaswal	M5962

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGMO1-1 / MOLYBDENUM 125mL 1000ug/mL	T2-MO720876	07/17/2027	08/07/2024 / jaswal	02/22/2024 / Jaswal	M5976

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGMO1-1 / MOLYBDENUM 125mL 1000ug/mL	T2-MO720876	07/17/2027	01/16/2025 / JANVI	02/22/2024 / Jaswal	M5977

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGT11-1 / TITANIUM 125mL 1000ug/mL	T2-TI719972	06/17/2027	08/07/2024 / jaswal	02/22/2024 / Jaswal	M5978

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGIN10-5 / INDIUM 1 x 500 ml	U2-IN729349	02/21/2028	10/08/2024 / Jaswal	06/14/2024 / Jaswal	M5985

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CLPP-SPK-5 / CLP Spike Standard 5	V2-MEB742037	03/12/2029	10/04/2024 / Jaswal	02/22/2024 / Jaswal	M5990

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57023 / V, 1000 PPM, 125 ml	062424	06/24/2027	09/28/2024 / jaswal	08/05/2024 / Jaswal	M6021

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57081 / TI, 1000 PPM, 125 ml	0624724	06/27/2027	08/05/2024 / kareem	08/05/2024 / Jaswal	M6023

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57082 / Pb, 1000 PPM, 125 ml	061224	11/09/2026	08/05/2024 / Jaswal	08/05/2024 / Jaswal	M6025

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57048 / Cd, 1000 PPM, 125 ml	070124	07/01/2027	08/05/2024 / kareem	08/05/2024 / Jaswal	M6028

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57047 / Ag, 1000 PPM, 125 ml	122823	12/28/2026	08/05/2024 / kareem	08/05/2024 / Jaswal	M6030

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57056 / Ba, 1000 PPM, 125 ml	010924	01/09/2027	01/14/2025 / Jaswal	08/05/2024 / Jaswal	M6032

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	Z9651Q / CHEM-CLP-4/.25L	V2-MEB746762	09/06/2029	01/23/2025 / kareem	09/19/2024 / kareem	M6077

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9530-33 / Hydrochloric Acid, Instra-Analyzed (cs/6x2.5L)	0000275677	05/13/2025	11/13/2024 / Eman	10/13/2024 / Eman	M6121

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	1403 / Hydrogen Peroxide, 30% 1 gal	820803	05/25/2025	11/26/2024 / Eman	11/22/2024 / Eman	M6125

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9598-34 / Nitric Acid, Instra-Analyzed (cs/4x2.5L)	24D1062002	06/03/2025	12/03/2024 / Janvi	11/12/2024 / Janvi	M6126

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58112 / Mg, 10000 PPM, 500 ml	112124	11/21/2027	01/13/2025 / kareem	01/13/2025 / kareem	M6127

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58025 / Mn, 1000 PPM, 500 ml	101124	10/11/2027	01/13/2025 / kareem	01/13/2025 / kareem	M6128

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58111 / Na, 10000 PPM, 500 ml	072424	07/24/2027	01/23/2025 / kareem	01/13/2025 / Jaswal	M6144

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58030 / Zinc, Zn, 500 ml, 1000 PPM	121724	12/17/2027	02/04/2025 / jaswal	01/13/2025 / Jaswal	M6145

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57051 / Sb, 1000 PPM, 125 ml	071724	07/17/2027	01/31/2025 / kareem	10/18/2024 / kareem	M6146

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
EPA	ICV-1 / ICV (ICP/ICPMS) STOCK SOLN	ICV1-1014	02/08/2025	02/06/2025 / kareem	02/20/2020 / kareem	M6147

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
EPA	PART A / ICSA (ICP) STOCK SOLN	ICSA-1211	02/08/2025	02/06/2025 / kareem	04/20/2021 / kareem	M6148

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
EPA	PART B / ICSAB (ICP) STOCK SOLN	ICSB-0710	02/08/2025	02/06/2025 / kareem	04/20/2021 / kareem	M6149

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	DIW / DI Water	Daily Lab-Certified	07/03/2029	07/03/2024 / lwona	07/03/2024 / lwona	W3112

Certificate of Analysis

R: 02/22/24 M5986, M5987, M5988, M5989, M5990

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info@inorganicventures.com

1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution
 Catalog Number: CLPP-SPK-5
 Lot Number: V2-MEB742037
 Matrix: 5% (v/v) HNO₃
 Value / Analyte(s):
 100 µg/mL ea:
 Antimony,
 50 µg/mL ea:
 Selenium, Thallium,
 Cadmium,
 40 µg/mL ea:
 Arsenic,
 20 µg/mL ea:
 Lead

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Antimony, Sb	100.0 ± 0.7 µg/mL	Arsenic, As	40.00 ± 0.26 µg/mL
Cadmium, Cd	49.99 ± 0.22 µg/mL	Lead, Pb	19.99 ± 0.09 µg/mL
Selenium, Se	50.00 ± 0.23 µg/mL	Thallium, Tl	50.00 ± 0.22 µg/mL

Density: 1.025 g/mL (measured at 20 ± 4 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
As	ICP Assay	3103a	100818
Cd	ICP Assay	3108	130116
Cd	EDTA	928	928
Cd	Calculated		See Sec. 4.2
Pb	ICP Assay	3128	101026
Pb	EDTA	928	928
Pb	Calculated		See Sec. 4.2
Sb	ICP Assay	3102a	140911
Se	ICP Assay	3149	100901
Se	Calculated		See Sec. 4.2
Tl	ICP Assay	3158	151215
Tl	Calculated		See Sec. 4.2

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

Characterization of CRM/RM by Two or More Methods

Certified Value, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

$$X_{CRM/RM} = \sum(w_i)(X_i)$$

X_i = mean of Assay Method i with standard uncertainty $u_{char i}$

w_i = the weighting factors for each method calculated using the inverse square of the variance:

$$w_i = (1/u_{char i}^2) / (\sum(1/(u_{char i}^2)))$$

$$CRM/RM \text{ Expanded Uncertainty } (k) = U_{CRM/RM} = k(u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char} = (\sum((w_i)^2(u_{char i}^2)))^{1/2}$ where $u_{char i}$ are the errors from each characterization method

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, $X_{CRM/RM}$, where one method of characterization is used is the mean of individual results:

$$X_{CRM/RM} = (X_a)(u_{char a})$$

X_a = mean of Assay Method A with

$u_{char a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (k) = U_{CRM/RM} = k(u_{char a}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

N/A

6.0 INTENDED USE

6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.

6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ In the Inorganic Ventures Terms and Conditions of Sale, <https://www.inorganicventures.com/terms-and-conditions-sale>. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

- Store between approximately 4° - 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° - 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

- For more information, visit www.inorganicventures.com/TCT

8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; inorganicventures.com; info@inorganicventures.com

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

March 12, 2024

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

11.2 Lot Expiration Date

- **March 12, 2029**

- The date after which this CRM/RM should not be used.

- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Joseph Burns
Custom VS Manager



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57056
010924
Barium (Ba)

Lot #
Solvent: 24002546 Nitric Acid

Expiration Date:

010927

Recommended Storage:

Ambient (20 °C)

Nominal Concentration (µg/mL):

1000

NIST Test Number:

6UTB

Weight shown below was diluted to (mL):

2000.02

0.058 Flask Uncertainty

2% 40.0 (mL) Nitric Acid

Giovanni Caporale	
Formulated By:	Giovanni Esposito
	010924
Reviewed By:	Pedro L. Renteria
	010924

Compound

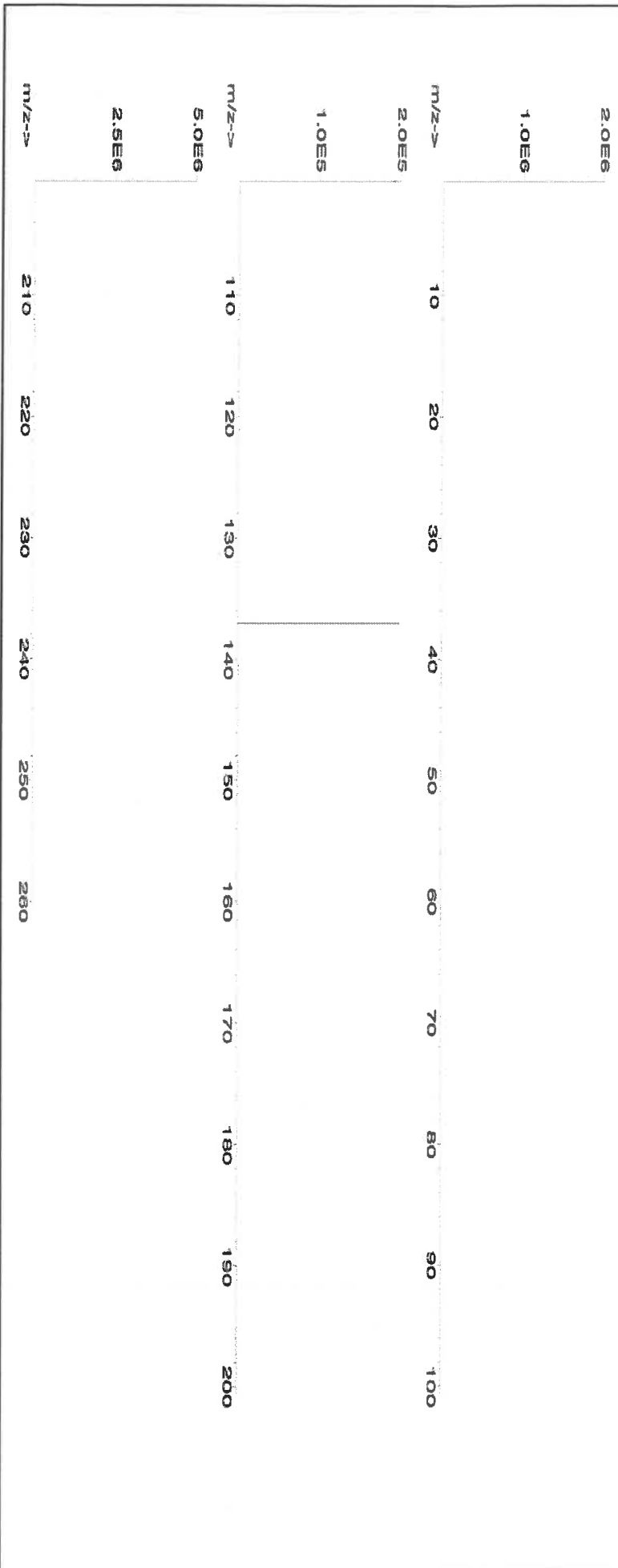
Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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SDS Information

(Solvent Safety Info. On Attached pg.)

1. Barium nitrate (Ba) IN023 BA0022019A1 1000 99.999 0.10 52.3 3.82417 3.82441 1000.1 2.0 10022-31-8 0.5 mg/m3 or-hat 355 mg/kg 3104a

[1] Spectrum No.1 [12.514 sec]:58156.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

211

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	T	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Certified by:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57048
070124
Cadmium (Cd)

Solvent: 24002546 Nitric Acid

Lot #

Aleah O'Brady
Formulated By: Aleah O'Brady
Reviewed By: Pedro L. Rentas

212

Expiration Date:
Recommended Storage:
Nominal Concentration (µg/mL):

070127
Ambient (20 °C)
1000

2% 40.0 Nitric Acid (mL)

NIST Test Number:

6UTB

SE-05 Balance Uncertainty

Pedro L. Rentas

070124

Weight shown below was diluted to (mL):

2000.07

0.100 Flask Uncertainty

Compound

Lot
Number

Nominal
Conc. (µg/mL)

Purity
Uncertainty
Assay
(%)

Target
Weight (g)

Actual
Weight (g)

Actual
Conc. (µg/mL)

Expanded
Uncertainty
+/- (µg/mL)

CAS#

OSHA PEL (TWA)

LD50

NIST
SRM

SDS Information

1. Cadmium nitrate tetrahydrate (Cd)

IN024 CDM09221A1

1000

99.999

0.10

36.5

5.4797

5.4804

1000.1

2.0

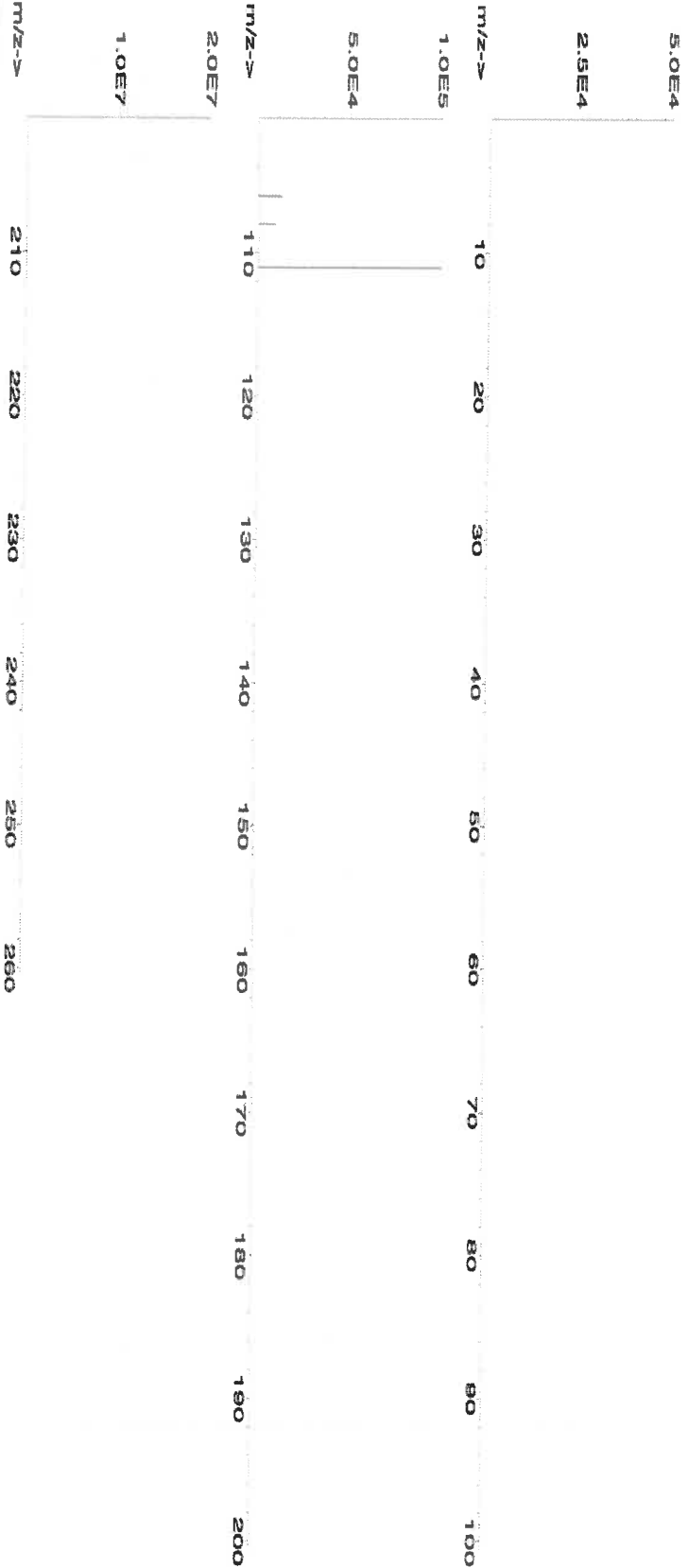
10022-68-1

0.01 mg/m3

or-rat 60.2mg/kg

3108

[1] Spectrum No.1 [12.514 sec]:\$8148.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

213

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.2	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Ba	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Cd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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1.0 ACCREDITATION / REGISTRATION

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2.0 PRODUCT DESCRIPTION

Product Code:	Multi Analyte Custom Grade Solution	
Catalog Number:	CLPP-CAL-1	
Lot Number:	T2-MEB714417	
Matrix:	5% (v/v) HNO ₃	
Value / Analyte(s):	5 000 µg/mL ea:	Potassium, Sodium,
	Calcium, Magnesium,	
	2 000 µg/mL ea:	Barium,
	Aluminum,	
	1 000 µg/mL ea:	
	Iron,	
	500 µg/mL ea:	Vanadium, Cobalt,
	Nickel,	
	Zinc,	
	Manganese,	
	250 µg/mL ea:	Copper,
	Silver,	
	200 µg/mL ea:	
	Chromium,	
	50 µg/mL ea:	
	Beryllium	

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Aluminum, Al	2 000 ± 7 µg/mL	Barium, Ba	2 000 ± 9 µg/mL
Beryllium, Be	50.00 ± 0.26 µg/mL	Calcium, Ca	5 000 ± 22 µg/mL
Chromium, Cr	200.0 ± 1.0 µg/mL	Cobalt, Co	500.0 ± 2.4 µg/mL
Copper, Cu	250.0 ± 1.0 µg/mL	Iron, Fe	1 000 ± 4 µg/mL
Magnesium, Mg	5 000 ± 20 µg/mL	Manganese, Mn	500.0 ± 2.0 µg/mL
Nickel, Ni	500.0 ± 2.2 µg/mL	Potassium, K	5 000 ± 19 µg/mL
Silver, Ag	250.0 ± 1.1 µg/mL	Sodium, Na	5 000 ± 18 µg/mL
Vanadium, V	499.7 ± 2.2 µg/mL	Zinc, Zn	500.0 ± 2.2 µg/mL

Density: 1.118 g/mL (measured at 20 ± 4 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
Ag	ICP Assay	3151	160729
Ag	Volhard	999c	999c
Al	ICP Assay	3101a	140903
Al	EDTA	928	928
Ba	ICP Assay	3104a	140909
Ba	Gravimetric		See Sec. 4.2
Be	ICP Assay	3105a	090514
Be	Calculated		See Sec. 4.2
Ca	ICP Assay	3109a	130213
Ca	EDTA	928	928
Co	ICP Assay	3113	190630
Co	EDTA	928	928
Cr	ICP Assay	3112a	170630
Cr	Calculated		See Sec. 4.2
Cu	ICP Assay	3114	121207
Cu	EDTA	928	928
Fe	ICP Assay	3126a	140812
Fe	EDTA	928	928
K	ICP Assay	3141a	140813
K	Gravimetric		See Sec. 4.2
Mg	ICP Assay	3131a	140110
Mg	EDTA	928	928
Mn	ICP Assay	3132	050429
Mn	EDTA	928	928
Na	ICP Assay	3152a	120715
Na	Gravimetric		See Sec. 4.2
Ni	ICP Assay	3136	120619
Ni	EDTA	928	928
V	IC Assay	3165	160906
V	EDTA	928	928
Zn	ICP Assay	3168a	120629
Zn	EDTA	928	928

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Characterization of CRM/RM by Two or More Methods

Certified Value, $X_{\text{CRM/RM}}$, where two or more methods of characterization are used is the weighted mean of the results:

$$X_{\text{CRM/RM}} = \sum(w_i)(X_i)$$

X_i = mean of Assay Method i with standard uncertainty $u_{\text{char } i}$

w_i = the weighting factors for each method calculated using the inverse square of the variance:

$$w_i = (1/u_{\text{char } i}^2) / (\sum(1/u_{\text{char } i}^2))$$

$$\text{CRM/RM Expanded Uncertainty } (\pm) = U_{\text{CRM/RM}} = k (u_{\text{char}}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

$u_{\text{char}} = [\sum(w_i)^2 (u_{\text{char } i}^2)]^{1/2}$ where $u_{\text{char } i}$ are the errors from each characterization method

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, $X_{\text{CRM/RM}}$, where one method of characterization is used is the mean of individual results:

$$X_{\text{CRM/RM}} = (X_a)(u_{\text{char } a})$$

X_a = mean of Assay Method A with

$u_{\text{char } a}$ = the standard uncertainty of characterization Method A

$$\text{CRM/RM Expanded Uncertainty } (\pm) = U_{\text{CRM/RM}} = k (u_{\text{char } a}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

$u_{\text{char } a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

N/A

6.0 INTENDED USE

- For the calibration of analytical instruments and validation of analytical methods as appropriate.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

- Store between approximately 4° - 30° C while in sealed TCT bag.

- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° - 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

- For more information, visit www.inorganicventures.com/TCT

Note: This solution contains Silver (Ag), please refer to our Sample Preparation Guide for more information.

<https://www.inorganicventures.com/sample-preparation-guide/samples-containing-silver>

8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; inorganicventures.com; info@inorganicventures.com

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

January 27, 2022

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

11.2 Lot Expiration Date

- January 27, 2027

- The date after which this CRM/RM should not be used.

- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski
Manager, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





Refine your results. Redefine your industry.

Certificate of Analysis

300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.com

P: 800-669-6799/540-585-3030
F: 540-585-3012
info@inorganicventures.com

1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution
Catalog Number: CLPP-CAL-3
Lot Number: T2-MEB714159
Matrix: 7% (v/v) HNO₃
Value / Analyte(s):
1 000 µg/mL ea:
Arsenic, Lead,
Selenium, Thallium,
500 µg/mL ea:
Cadmium

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Arsenic, As	1 000 ± 8 µg/mL	Cadmium, Cd	500.0 ± 2.1 µg/mL
Lead, Pb	1 000 ± 5 µg/mL	Selenium, Se	1 000 ± 8 µg/mL
Thallium, Tl	1 000 ± 7 µg/mL		

Density: 1.043 g/mL (measured at 20 ± 4 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
As	ICP Assay	3103a	100818
Cd	ICP Assay	3108	130116
Cd	EDTA	928	928
Pb	ICP Assay	3128	101026
Pb	EDTA	928	928
Se	ICP Assay	3149	100901
Tl	ICP Assay	3158	151215

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Characterization of CRM/RM by Two or More Methods

Certified Value, $X_{\text{CRM/RM}}$, where two or more methods of characterization are used is the weighted mean of the results:

$$X_{\text{CRM/RM}} = \sum(w_i)(X_i)$$

X_i = mean of Assay Method i with standard uncertainty $u_{\text{char } i}$

w_i = the weighting factors for each method calculated using the inverse square of the variance:

$$w_i = (1/u_{\text{char } i}^2) / (\sum(1/u_{\text{char } i}^2))$$

$$\text{CRM/RM Expanded Uncertainty } (\pm) = U_{\text{CRM/RM}} = k(u_{\text{char}}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

$u_{\text{char}} = [\sum(w_i)^2(u_{\text{char } i}^2)]^{1/2}$ where $u_{\text{char } i}$ are the errors from each characterization method

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, $X_{\text{CRM/RM}}$, where one method of characterization is used is the mean of individual results:

$$X_{\text{CRM/RM}} = (X_a)(u_{\text{char } a})$$

X_a = mean of Assay Method A with

$u_{\text{char } a}$ = the standard uncertainty of characterization Method A

$$\text{CRM/RM Expanded Uncertainty } (\pm) = U_{\text{CRM/RM}} = k(u_{\text{char } a}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

$u_{\text{char } a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

N/A

6.0 INTENDED USE

- For the calibration of analytical instruments and validation of analytical methods as appropriate.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

- Store between approximately 4° - 30° C while in sealed TCT bag.

- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° - 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

- For more information, visit www.inorganicventures.com/TCT

8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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- Chemical Testing - Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

January 13, 2022

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

11.2 Lot Expiration Date

- **January 13, 2027**

- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski
Manager, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





CERTIFIED WEIGHT REPORT:

Part Number: 58126
Lot Number: 051523
Description: Iron (Fe)

Solvent: 21110221 Nitric Acid

Lot #

Expiration Date: 051526

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 10000

NIST Test Number: 6UTB

Weight shown below was diluted to (mL): 5000.1

5E-05 Balance Uncertainty

0.12 Flask Uncertainty

5.0% 250.0 (mL) Nitric Acid

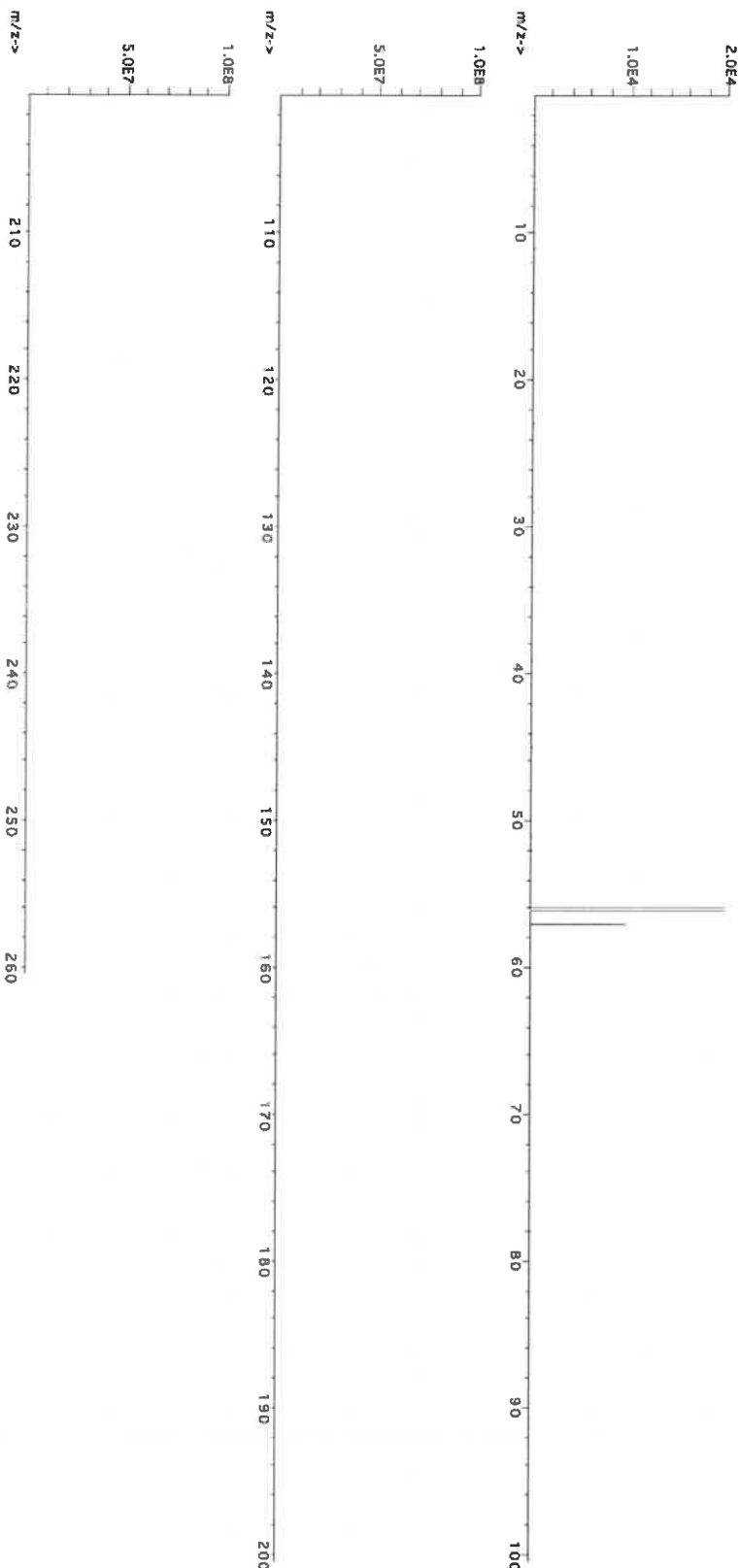
<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito
	051523
<i>Pedro L. Renias</i>	
Reviewed By:	Pedro L. Renias
	051523

Compound

RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Iron (Fe)	IN346	2302010-500	10000	99.995	0.10	100.0	50.0034	50.0111	10001.5	20.0	7439-89-6	5 mg/m3	or-tral 7500mg/kg 3126a
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[1] Spectrum No. 1 [30.763 sec]:58126.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.10	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rb	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.10	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.05	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.10	Ge	<0.10	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.10
B	<0.02	Cu	<0.10	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Tl	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



CERTIFIED WEIGHT REPORT:

Part Number: **57182**
Lot Number: **110923**
Description: **Lead (Pb)**

Solvent: **24002546 Nitric Acid**
Lot #: **M6025**

Expiration Date: **110926**
Recommended Storage: **Ambient (20 °C)**
Nominal Concentration (µg/mL): **10000**
NIST Test Number: **6UTB**

2% **40.0** **Nitric Acid**
(mL)

Weight shown below was diluted to (mL):

2000.02 **5E-05** **Balance Uncertainty**
0.058 **Flask Uncertainty**

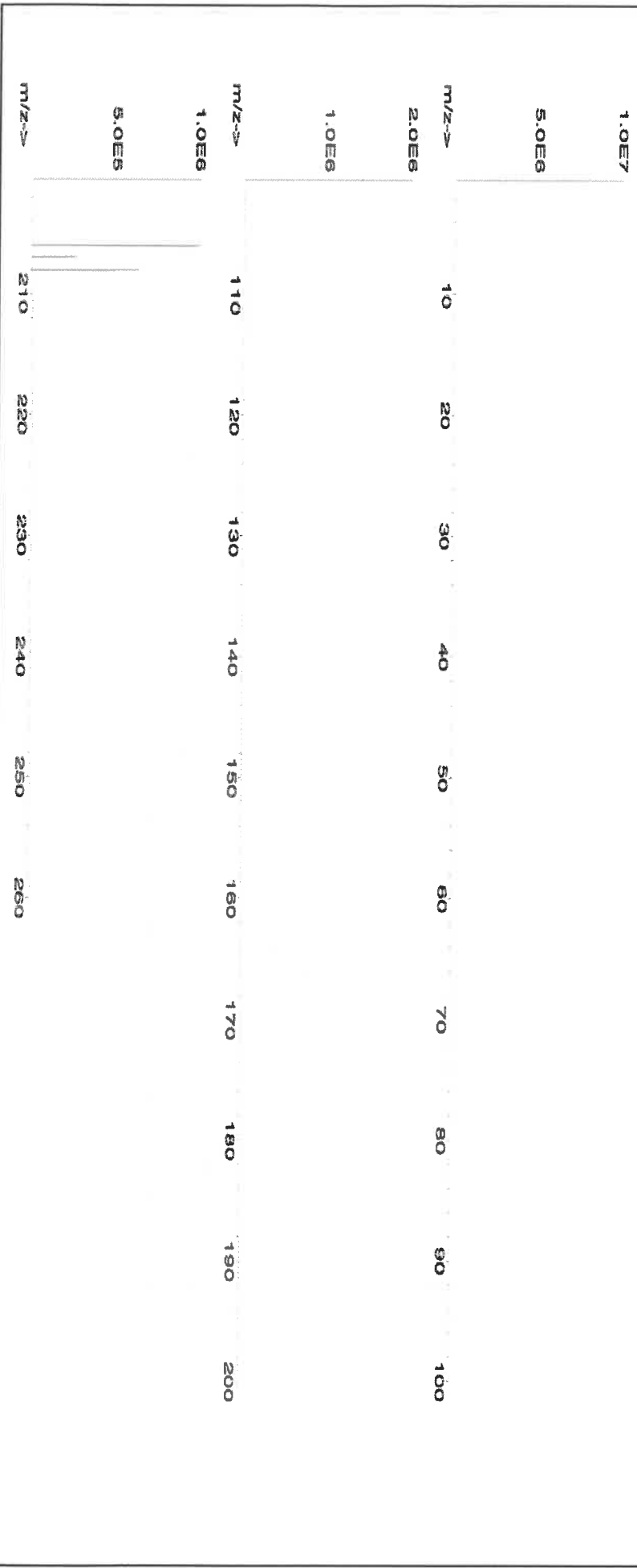
Formulated By:	Lawrence Barry
	110923
Reviewed By:	Pedro L. Rentas
	110923

Compound

RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. **Lead(II) nitrate (Pb)** **IN029** **PED12016A1** **10000** **99.999** **0.10** **62.5** **32.0006** **32.0040** **10001.1** **20.0** **10099-74-8** **0.05 mg/m3** **inhalant rat 83 mg/kg** **3128**

[1] Spectrum No.1 [17.284 sec]:58182.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

224

Trace Metals Verification by ICP-MS ($\mu\text{g/mL}$)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	T	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

Physical Characterization:

(T)= Target analyte

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



Certified Reference Material CRM



CERTIFIED WEIGHT REPORT:

Part Number: 57014
Lot Number: 030921
Description: Silicon (Si)

Lot # 19410105
Solvent: Nitric Acid

Expiration Date: 030924

2.0% 60.0 (mL) Nitric Acid

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 1000

NIST Test Number: 6UTB

5E-05 Balance Uncertainty

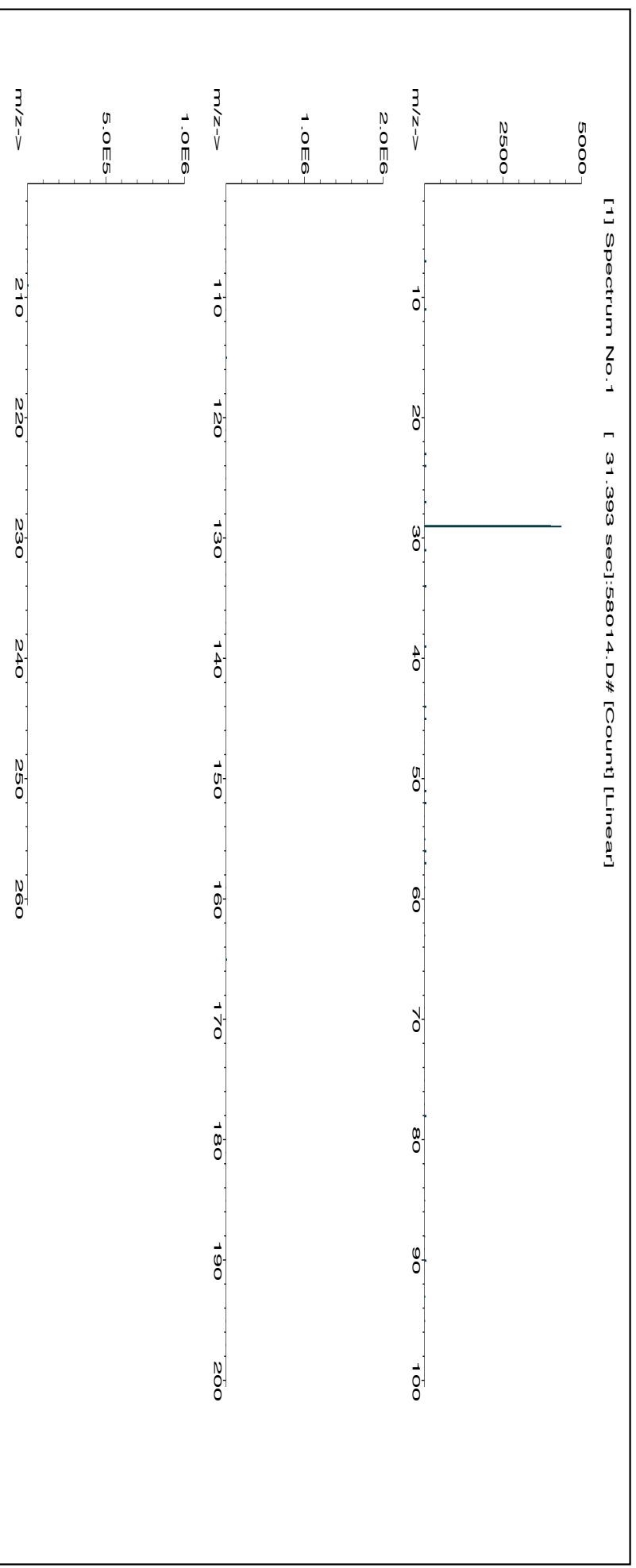
Volume shown below was diluted to (mL): 3000.41 0.058 Flask Uncertainty

Formulated By:	Lawrence Barry
	030921
Reviewed By:	Pedro L. Rentas
	030921

SDS Information

Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
----------	-------------	------------	-----------------	-------------------	--------------------------	-----------------------	-----------------------	---------------------	----------------------------------	------	----------------	------	----------

1. Ammonium hexafluorosilicate (Si) 58114 070120 0.1000 300.0 0.084 1000 10000.0 1000.0 2.1 16919-19-0 2.50 mg/m3 orl-rat 70 mg/kg NA





Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS):

226

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	T	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T)= Target analyte

Physical Characterization:

Certified by:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
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Certificate of Analysis

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 inorganicventures.com

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 F: 540-585-3012
 info@inorganicventures.com

1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution
 Catalog Number: CHEM-QC-4
 Lot Number: S2-MEB711674
 Matrix: 3% (v/v) HNO₃
 3% (v/v) HF
 Value / Analyte(s): 1 000 µg/mL ea:
 Boron, Molybdenum,
 Silicon, Tin,
 Titanium

Second Source: Whenever possible, this solution was manufactured from a second set of concentrates in our manufacturing facility.

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Boron, B	1 000 ± 7 µg/mL	Molybdenum, Mo	1 000 ± 5 µg/mL
Silicon, Si	1 000 ± 7 µg/mL	Tin, Sn	1 000 ± 5 µg/mL
Titanium, Ti	1 001 ± 6 µg/mL		

Density: 1.032 g/mL (measured at 20 ± 4 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
B	ICP Assay	3107	110830
Mo	ICP Assay	3134	130418
Si	ICP Assay	3150	130912
Sn	ICP Assay	3161a	140917
Ti	ICP Assay	3162a	130925

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Characterization of CRM/RM by Two or More Methods

Certified Value, $X_{\text{CRM/RM}}$, where two or more methods of characterization are used is the weighted mean of the results:

$$X_{\text{CRM/RM}} = \sum(w_i)(X_i)$$

X_i = mean of Assay Method i with standard uncertainty $u_{\text{char } i}$

w_i = the weighting factors for each method calculated using the inverse square of the variance:

$$w_i = (1/u_{\text{char } i}^2) / (\sum(1/u_{\text{char } i}^2))$$

$$\text{CRM/RM Expanded Uncertainty } (\pm) = U_{\text{CRM/RM}} = k(u_{\text{char}}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

$u_{\text{char}} = [\sum(w_i)^2(u_{\text{char } i}^2)]^{1/2}$ where $u_{\text{char } i}$ are the errors from each characterization method

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, $X_{\text{CRM/RM}}$, where one method of characterization is used is the mean of individual results:

$$X_{\text{CRM/RM}} = (X_a)(u_{\text{char } a})$$

X_a = mean of Assay Method A with

$u_{\text{char } a}$ = the standard uncertainty of characterization Method A

$$\text{CRM/RM Expanded Uncertainty } (\pm) = U_{\text{CRM/RM}} = k(u_{\text{char } a}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

$u_{\text{char } a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

N/A

6.0 INTENDED USE

- For the calibration of analytical instruments and validation of analytical methods as appropriate.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

- Store between approximately 4° - 30° C while in sealed TCT bag.

- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° - 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

- For more information, visit www.inorganicventures.com/TCT

HF Note: This standard should not be prepared or stored in glass.

8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; inorganicventures.com; info@inorganicventures.com

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

November 02, 2021

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

11.2 Lot Expiration Date

- **November 02, 2026**

- The date after which this CRM/RM should not be used.

- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Michael Booth
Director, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





M5289 R: 07/12/22
Certified Reference Material CRM

34



CERTIFIED WEIGHT REPORT:

Part Number: 58113
Lot Number: 070622
Description: Aluminum (Al)

Lot #
Solvent: 20370011 Nitric Acid

Expiration Date: 070625
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB
Weight shown below was diluted to (mL): 2000.02
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

2%
40.0 (mL)
Nitric Acid

Formulated By:	Lawrence Barry
	070622
Reviewed By:	Pedro L. Rientas
	070622

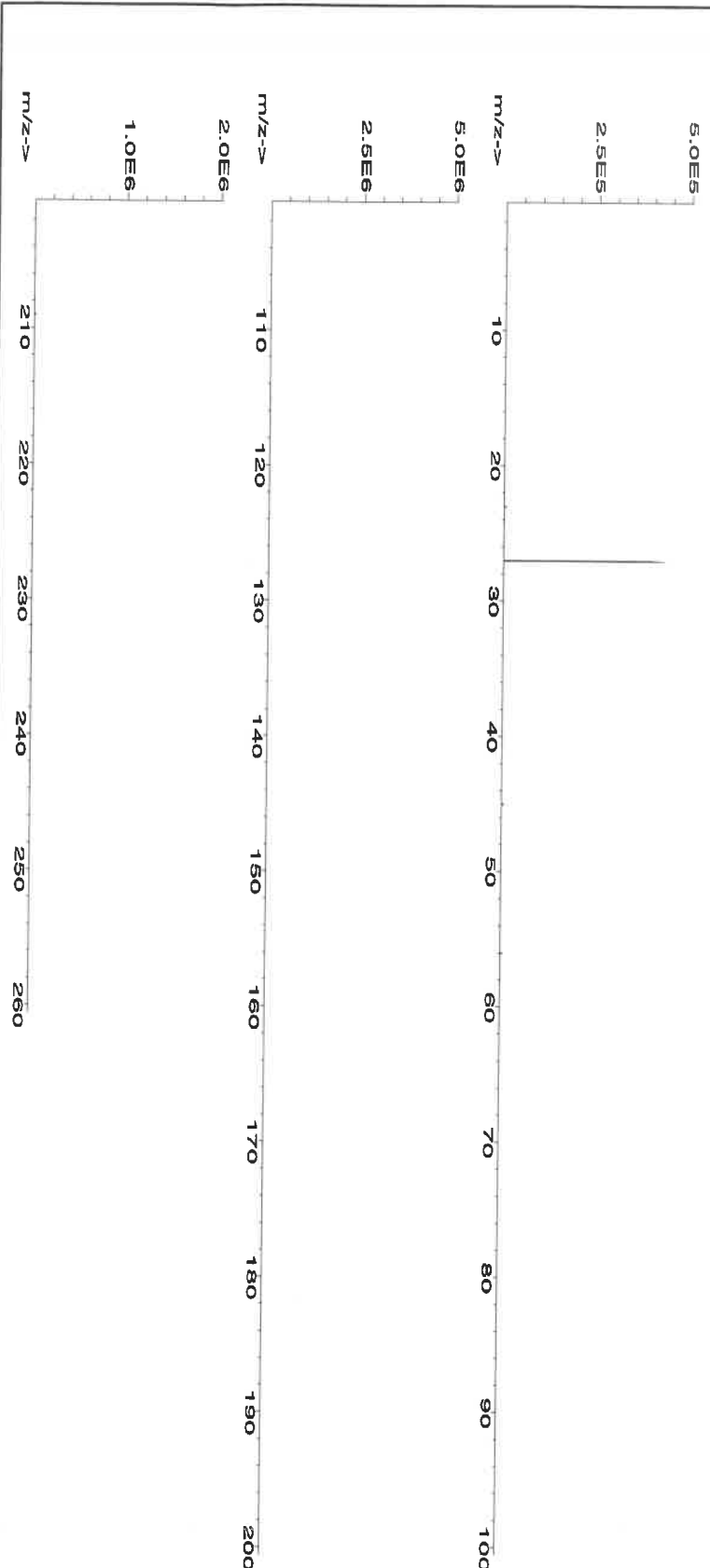
Compound

RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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SDS Information

1. Aluminum nitrate nonahydrate (Al) IN022 ALD012021A1 10000 99.999 0.10 7.10 281.6956 281.6977 10000.1 20.0 7784-27-2 2 mg/m3 or-tal 3671 mg/kg 3101a

[1] Spectrum No. 1 [15.014 sec]:58113.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	T	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Ru	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Sr	<0.02	S	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	Ta	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ti	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



Certified Reference Material CRM

CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

58126
020422
Iron (Fe)

Lot #
Solvent: 20370011 Nitric Acid

M15298

Expiration Date:
Recommended Storage:
Nominal Concentration (µg/mL):
NIST Test Number:

020425
Ambient (20 °C)
10000
6UTB
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

Weight shown below was diluted to (mL):

3000.41

Giovanni Esposito	
Formulated By:	Giovanni Esposito
Pedro L. Rentas	
Reviewed By:	Pedro L. Rentas
020422	

SDS Information

(Solvent Safety Info. On Attached pg.)
LD50

Expanded
Uncertainty
+/- (µg/mL)

Actual
Conc. (µg/mL)

Actual
Weight (g)

Target
Weight (g)

Assay
(%)

Purity
(%)

Nominal
Conc. (µg/mL)

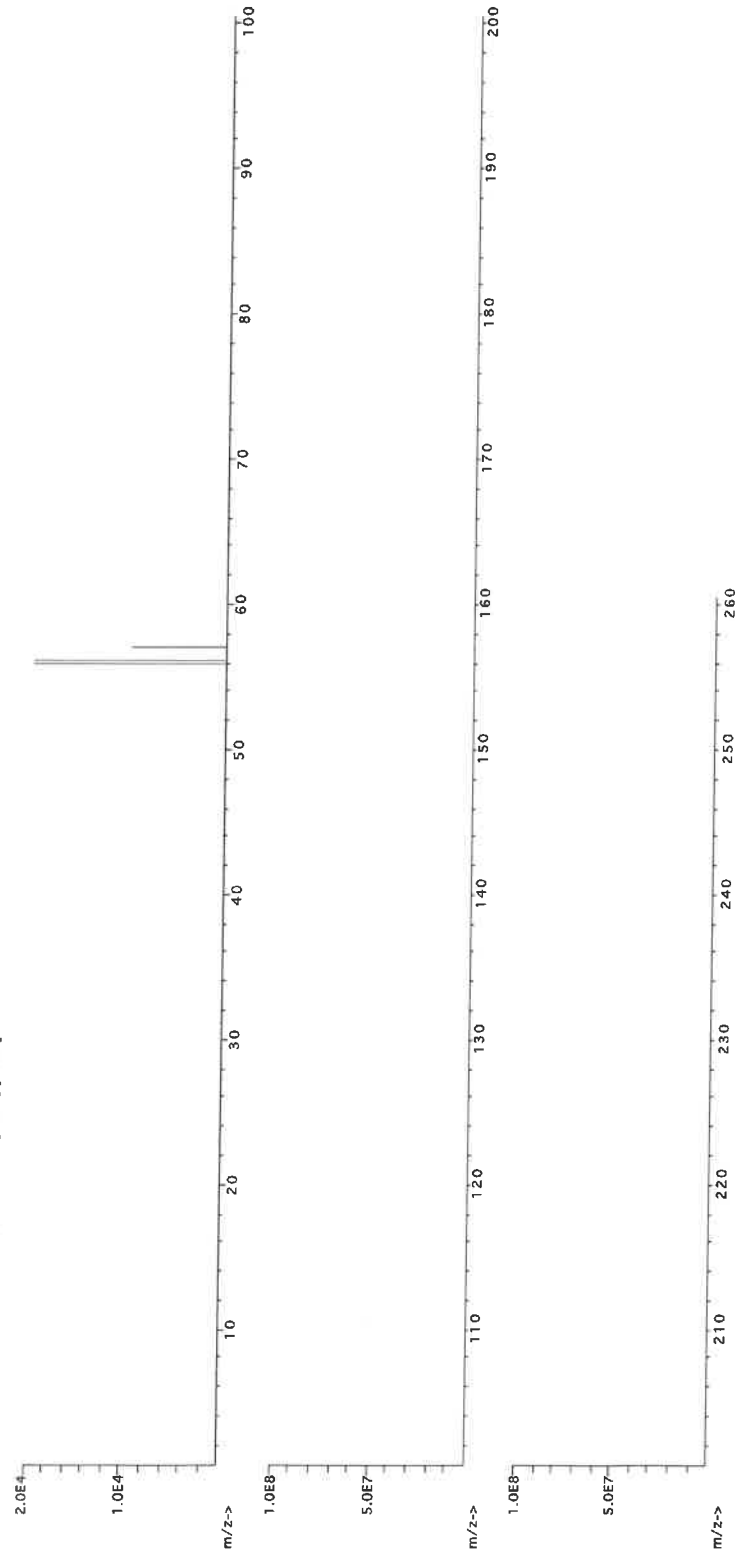
Lot
Number

RM#

Compound
1. Iron(III) nitrate nonahydrate (Fe)

IN346 221035107 10000 99.999 0.10 100.0 30.0044 30.0090 10001.5 20.0 7782-61-8 5 mg/mL or-hat 7500mg/kg 3126a

[1] Spectrum No.1 [30.763 sec]:58126.D# [Count] [Linear]



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Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS ($\mu\text{g/mL}$)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.10	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.01	Mg	<0.02	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.10	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.5	Ga	<0.2	Fe	<0.2	Hg	<0.02	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.10	Ge	<0.02	La	<0.10	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.10	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T)= Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



Certified Reference Material CRM

M5429 R1 0126/23 (B)

CERTIFIED WEIGHT REPORT:

Part Number: 57103
Lot Number: 070622
Description: Lithium (Li)

Expiration Date: 070625
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB

Weight shown below was diluted to (mL): 1000.12

Solvent: 20510011 Nitric Acid

2% 20.0 Nitric Acid (mL)

5E-05 Balance Uncertainty
0.058 Flask Uncertainty

<i>Lawrence Barry</i>	
Formulated By:	Lawrence Barry
<i>Pedro L. Rentas</i>	
Reviewed By:	Pedro L. Rentas

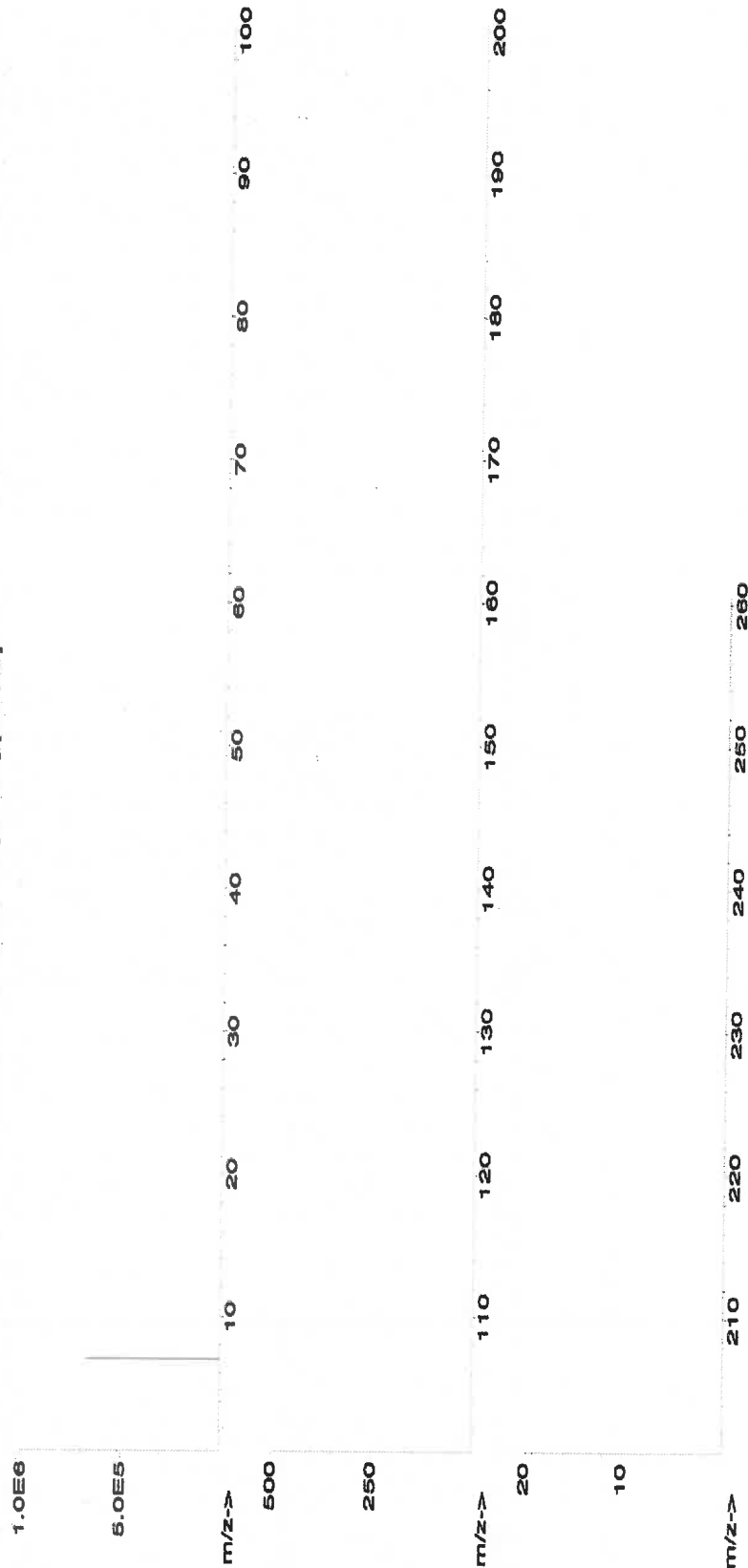
Compound	RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty		NIST SRM
										Conc. (µg/mL)	+/- (µg/mL)	
SDS Information												
(Solvent Safety Info. On Attached pg.)												
											CAS#	LD50
											OSHA PEL (TWA)	

1. Lithium nitrate (Li)	IN019	L2042019A1	10000	99.999	0.10	10.0	100.0134	100.0173	10000.4	20.0	7790-69-4	5 mg/m3	of-rat 1426 mg/kg	NA
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SDS Information

(Solvent Safety Info. On Attached pg.)
CAS# OSHA PEL (TWA) LD50

[1] Spectrum No.1 [9.619 sec]:58103.D# [Count] [Linear]



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Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.2	Ho	<0.02	La	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.2	Na	<0.02	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



Certified Reference Material CRM



M5467 R: 03/01/23 (14)

CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57058
020623
Cerium (Ce)

Expiration Date:
Recommended Storage:
Nominal Concentration (µg/mL):
NIST Test Number:

020626
Ambient (20 °C)
1000
6UTB

Weight shown below was diluted to (mL):

1000.12 **0.058** **Balance Uncertainty**
Flask Uncertainty

Lot #

Solvent: **21110221** **Nitric Acid**

2% **20.0** **Nitric Acid**
(mL)

Formulated By:	Lawrence Barry
020623	
Reviewed By:	Pedro L. Rentas
020623	

Expanded
Uncertainty
+/- (µg/mL)

SDS Information

(Solvent Safety Info. On Attached pg.)
LD50:
CAS#
OSHA PEL (TWA)

2.0

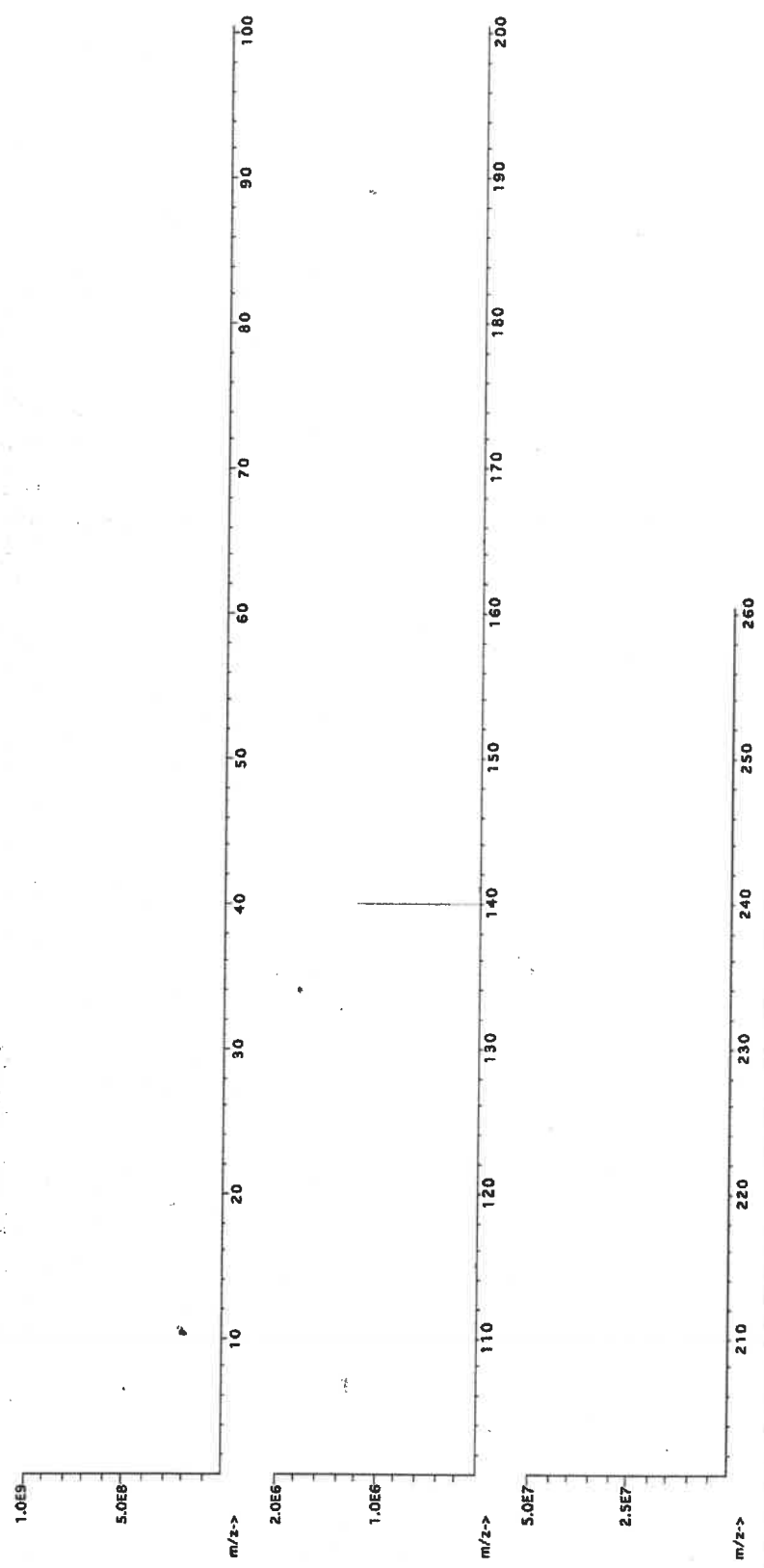
NA

NA

NA

Compound	RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	SRM
1. Cerium nitrate hexahydrate (Ce)	IN146	Z512CEB1	1000	99.999	0.10	32.8	3.04919	3.04921	1000.0	2.0	10294-41-4	NA	NA

[1] Spectrum No.1 [43.472 sec]58158.D# [Count] [Linear]



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Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.02	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	La	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Tc	<0.02	U	<0.02
As	<0.2	Ce	T	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.02	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.02	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T)= Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



Certified Reference Material CRM



CERTIFIED WEIGHT REPORT:

Part Number: **58113**
Lot Number: **011623**
Description: **Aluminum (Al)**

Solvent: **20510011 Nitric Acid**

Lot #

R 17/20/23

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Expiration Date: **011626**
Recommended Storage: **Ambient (20 °C)**
Nominal Concentration (µg/mL): **10000**
NIST Test Number: **6UTB**

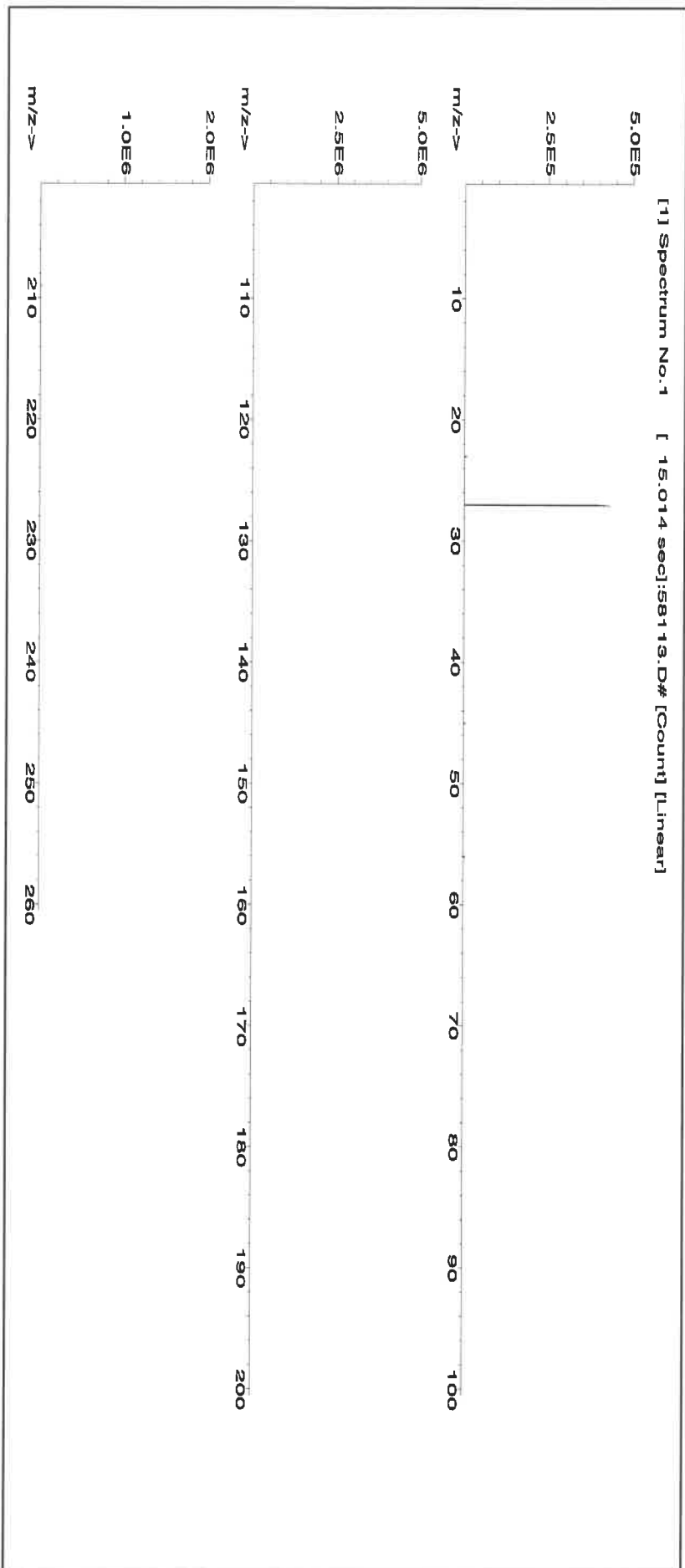
2% 40.0 Nitric Acid (mL)

Weight shown below was diluted to (mL): **2000.02** 5E-05 Balance Uncertainty 0.058 Flask Uncertainty

<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito
	011623
<i>Pedro L. Rentas</i>	
Reviewed By:	Pedro L. Rentas
	011623

SDS Information									
Compound	Lot	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)
1. Aluminum nitrate nonahydrate (Al)	NO22 ALM112021A1	10000	99.999	0.10	7.30	273.9779	274.0078	10001.1	20.0
									7784-27-2
									2 mg/mL
									or-lab 3671 mg/kg
									3101a

[1] Spectrum No. 1 [15.014 sec]:58113.D# [Count] [Linear]



CERTIFIED WEIGHT REPORT:

Part Number: 58120
Lot Number: 031523
Description: Calcium (Ca)

Expiration Date: 031526
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB

Weight shown below was diluted to (mL): 3000.41

Solvent: 21110221 Nitric Acid

2% 60.0 Nitric Acid (mL)

5E-05 Balance Uncertainty
0.058 Flask Uncertainty

<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito 031523
<i>Pedro L. Rentas</i>	
Reviewed By:	Pedro L. Rentas 031523

SDS Information

Expanded Uncertainty
(Solvent Safety Info. On Attached pg.)
NIST SRM

Actual Conc. (µg/mL) +/- (µg/mL)

Actual Weight (g)

Target Weight (g)

Assay Purity (%)

Uncertainty Purity (%)

Nominal Conc. (µg/mL)

Lot Number

RM#

Compound

IN014 CAD072022A1

10000

99.999

0.10

39.9

75.2093

75.1990

10001.4

20.0

471-34-1

5 mg/m3

or-rat >2000mg/kg

3109a

[1] Spectrum No.1 [12.514 sec]:58120.D# [Count] [Linear]



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Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.02	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Tc	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Ti	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.2	Fe	<0.02	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Tl	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	T	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Tc	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Ti	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.2	Fe	<0.02	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Tl	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

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- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
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- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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CERTIFIED WEIGHT REPORT:

Part Number:	Lot Number:	Description:

281.25

061522

Lead (Pb)

Expiration Date:
Recommended Storage:
Nominal Concentration (µg/mL):
NIST Test Number:

061525

Recommended Storage: Ambient (20 °C)

10000

6UTB

Weight shown below was diluted to (mL): 2000.02

ОСОБЫЕ ПРЕЖДЕВСТРЕЖЕНИЯ

0.058 Flask Uncertainty

Lot #

Solvent: 20510011 Nitric Acid

Solvent: 20510011

2% Nitric Acid

(mL)

5E-05 Balance Uncertainty

0.058 Flask Uncertainty

<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito 061522
<i>Pedro L. Rentas</i>	
Reviewed By:	Pedro L. Rentas 061522

Expanded

SDS Information

(Solvent Safety Info. On Attached pg.)

NIST SRM

1. Lead(II) nitrate (Pb)

IN029 P8D12201541

10000 00000 0 10

2000

000011

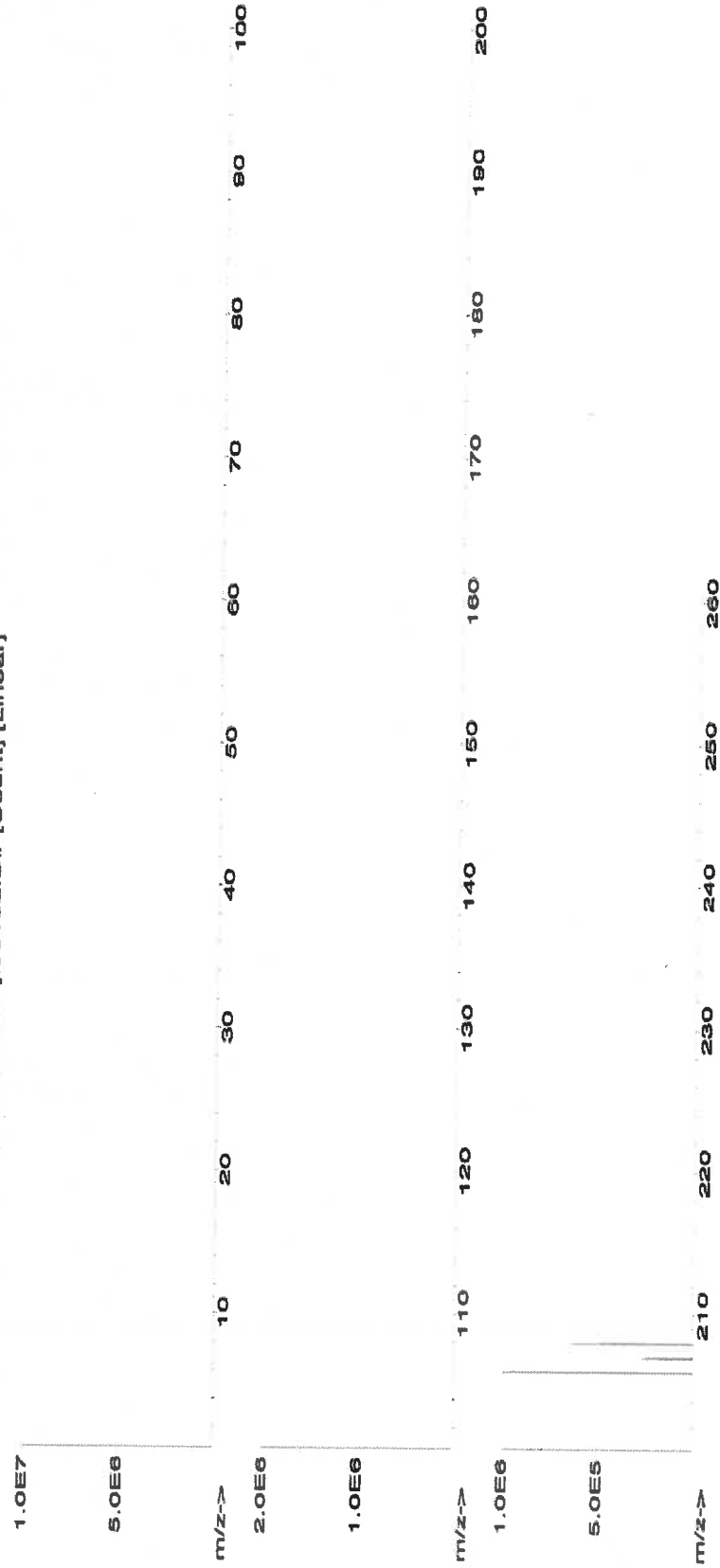
1991

1

10

1

[1] Spectrum No.1 [17.284 sec]:58182.D# [Count] [Linear]



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Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.2	Fe	<0.02	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pr	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T)= Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

Ben P. Sha

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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Certified Reference Material CRM

CERTIFIED WEIGHT REPORT:

Part Number: **58119**
Lot Number: **120822**
Description: **Potassium (K)**

Solvent: 20510011 Nitric Acid

Lot #

Giovanni Esposito

Formulated By: Giovanni Esposito 120822

Expiration Date: 120825
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB

2% 60.0 (mL) Nitric Acid

Pedro L. Renteria

Reviewed By: Pedro L. Renteria 120822

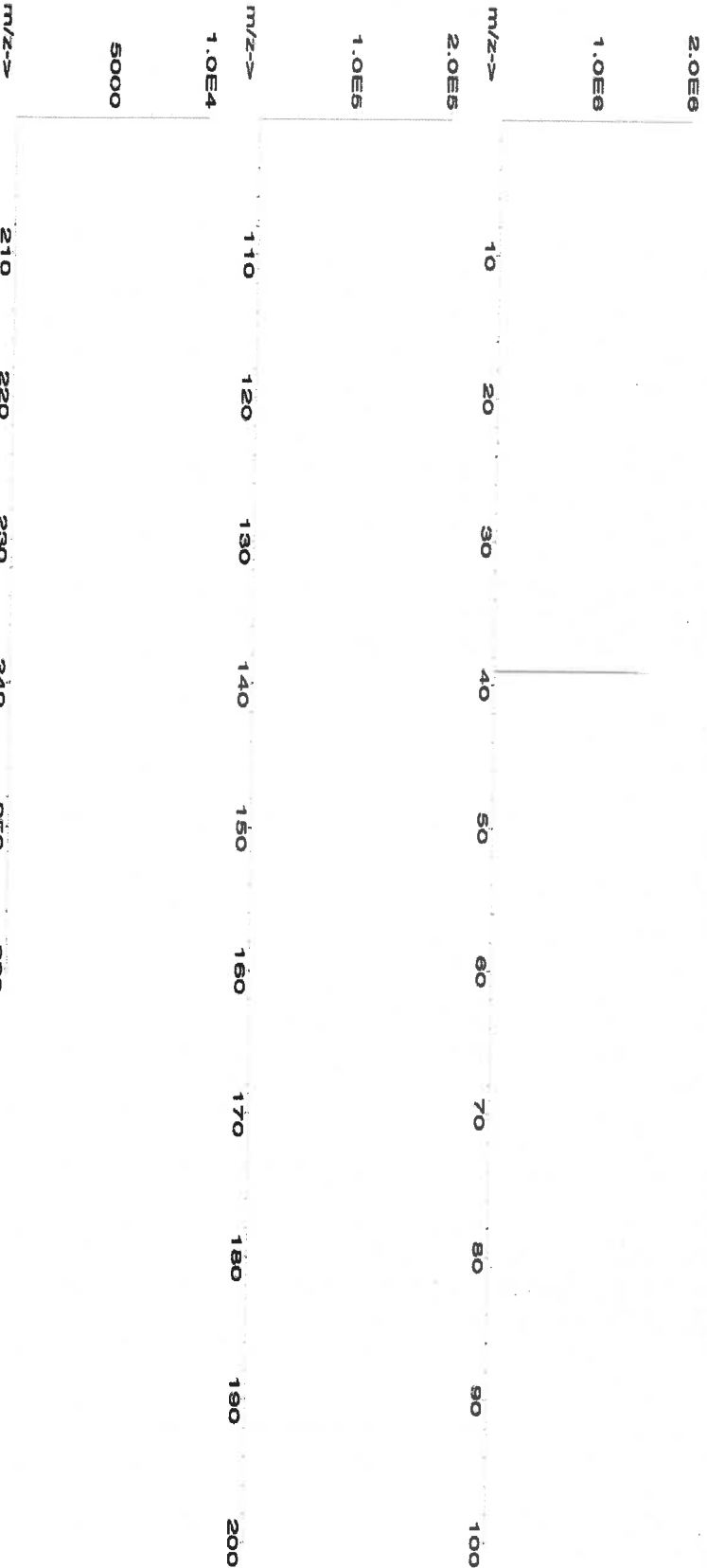
Weight shown below was diluted to (mL): 3000.4 0.06 Flask Uncertainty

Compound

Lot	Nominal	Purity	Uncertainty	Assay	Target	Actual	Actual	Expanded	SDS Information	NIST
RM#	Number	Conc. (µg/mL)	(%)	Purity (%)	Weight (g)	Weight (g)	Conc. (µg/mL)	+/- (µg/mL)	(Solvent Safety Info. On Attached pg.)	SRM

1. Potassium nitrate (K) IN034 KD022021A1 10000 99.989 0.10 37.6 79.7990 79.8075 10001.1 20.0 7757-79-1 5 mg/m3 or/air 3015 mg/kg 3141a

[1] Spectrum No.1 [35.763 sec]:58119.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.02	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Certified by:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
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- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

Certificate of Analysis

300 Technology Drive
 Christiansburg, VA 24073 USA
 inorganicventures.com

P: 800-669-6799/540-585-3030

F: 540-585-3012

info@inorganicventures.com

1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution
 Catalog Number: CLPP-SPK-1
 Lot Number: T2-MEB721963
 Matrix: 7% (v/v) HNO₃
 Value / Analyte(s):
 2 000 µg/mL ea:
 Aluminum, Barium,
 1 000 µg/mL ea:
 Iron,
 500 µg/mL ea:
 Manganese, Nickel,
 Vanadium, Zinc,
 Cobalt,
 250 µg/mL ea:
 Copper,
 200 µg/mL ea:
 Chromium,
 50 µg/mL ea:
 Beryllium, Silver

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Aluminum, Al	2 000 ± 7 µg/mL	Barium, Ba	2 000 ± 9 µg/mL
Beryllium, Be	50.00 ± 0.26 µg/mL	Chromium, Cr	200.0 ± 1.1 µg/mL
Cobalt, Co	500.0 ± 2.4 µg/mL	Copper, Cu	250.0 ± 1.0 µg/mL
Iron, Fe	1 000 ± 4 µg/mL	Manganese, Mn	500.0 ± 2.0 µg/mL
Nickel, Ni	500.0 ± 2.2 µg/mL	Silver, Ag	50.00 ± 0.22 µg/mL
Vanadium, V	500.0 ± 2.2 µg/mL	Zinc, Zn	500.0 ± 2.2 µg/mL

Density: 1.070 g/mL (measured at 20 ± 4 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
Ag	ICP Assay	3151	160729
Ag	Volhard	999c	999c
Ag	Calculated		See Sec. 4.2
Al	ICP Assay	3101a	140903
Al	EDTA	928	928
Ba	ICP Assay	3104a	140909
Ba	Gravimetric		See Sec. 4.2
Be	ICP Assay	3105a	090514
Be	Calculated		See Sec. 4.2
Co	ICP Assay	3113	190630
Co	EDTA	928	928
Cr	ICP Assay	3112a	170630
Cu	ICP Assay	3114	121207
Cu	EDTA	928	928
Fe	ICP Assay	3126a	140812
Fe	EDTA	928	928
Mn	ICP Assay	3132	050429
Mn	EDTA	928	928
Ni	ICP Assay	3136	120619
Ni	EDTA	928	928
V	IC Assay	3165	160906
V	EDTA	928	928
Zn	ICP Assay	3168a	120629
Zn	EDTA	928	928

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

Characterization of CRM/RM by Two or More Methods

Certified Value, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

$$X_{CRM/RM} = \sum (w_i) (X_i)$$

X_i = mean of Assay Method i with standard uncertainty $u_{char\ i}$

w_i = the weighting factors for each method calculated using the inverse square of the variance:

$$w_i = (1/u_{char\ i}^2) / (\sum (1/u_{char\ i}^2))$$

$$CRM/RM \text{ Expanded Uncertainty } (k) = U_{CRM/RM} = k (u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char} = [\sum (w_i)^2 (u_{char\ i})^2]^{1/2}$ where $u_{char\ i}$ are the errors from each characterization method

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, $X_{CRM/RM}$, where one method of characterization is used is the mean of individual results:

$$X_{CRM/RM} = (\bar{X}_a) (u_{char\ a})$$

$\bar{X}_a$ = mean of Assay Method A with

$u_{char\ a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (k) = U_{CRM/RM} = k (u_{char\ a}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char\ a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

N/A

6.0 INTENDED USE

- For the calibration of analytical instruments and validation of analytical methods as appropriate.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

- Store between approximately 4° - 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° - 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

- For more information, visit www.inorganicventures.com/TCT

Note: This solution contains Silver (Ag), please refer to our Sample Preparation Guide for more information.

<https://www.inorganicventures.com/sample-preparation-guide/samples-containing-silver>

8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va, 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; inorganicventures.com; info@inorganicventures.com

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

July 27, 2022

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

11.2 Lot Expiration Date

- July 27, 2027

- The date after which this CRM/RM should not be used.

- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski
Manager, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





CERTIFIED WEIGHT REPORT:

Part Number: 58024
Lot Number: 060523
Description: Chromium (Cr)

Lot #
21110221
Solvent: Nitric Acid

2.0%

40.0 (mL)
Nitric Acid

Formulated By: *Lawrence Barry*
Reviewed By: *Pedro L. Renteria*

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Expiration Date: 060526
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 1000

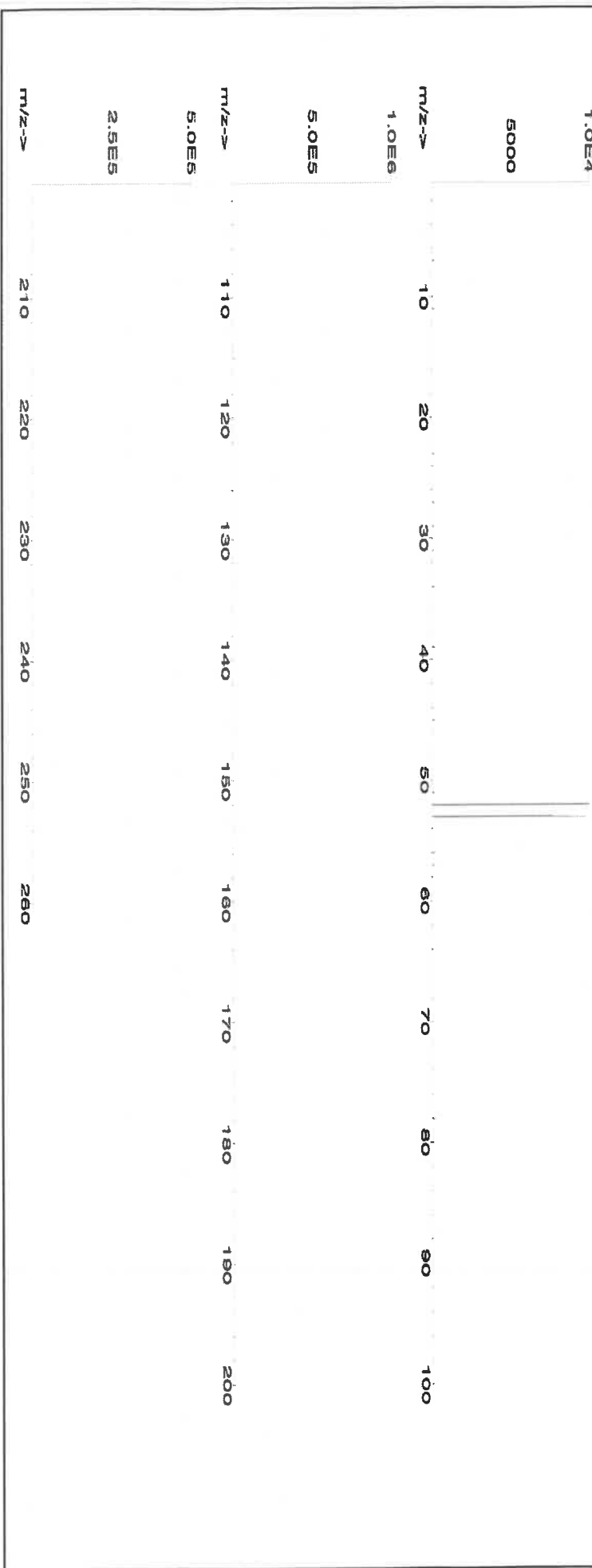
Formulated By: *Lawrence Barry*
Reviewed By: *Pedro L. Renteria*

NIST Test Number: 6UTB
Volume shown below was diluted to (mL): 2000.02
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
----------	-------------	------------	-----------------	-------------------	------------------	-----------------------	-----------------------	---------------------	----------------------------------	------	----------------	------	----------

1. Chromium(III) nitrate nonahydrate (Cr) 58124 071122 0.1000 200.0 0.084 1000 10000.1 1000.0 2.2 7789-02-8 0.5 mg(Cr)/m3 or rat 3250 mg/kg 3112a

[1] Spectrum No.1 [31.393 sec]:57024.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	T	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Certified by:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
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CERTIFIED WEIGHT REPORT:

Part Number: 58029
Lot Number: 102523
Description: Copper (Cu)

Lot # 24002546
Solvent: Nitric Acid

Expiration Date: 102526

2.0%

40.0 (mL)

Nitric Acid

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 1000

Formulated By:	Benson Chan	102523
Reviewed By:	Pedro L. Rentas	102523

NIST Test Number: 6UTB

5E-05 Balance Uncertainty

Volume shown below was diluted to (mL): 2000.02

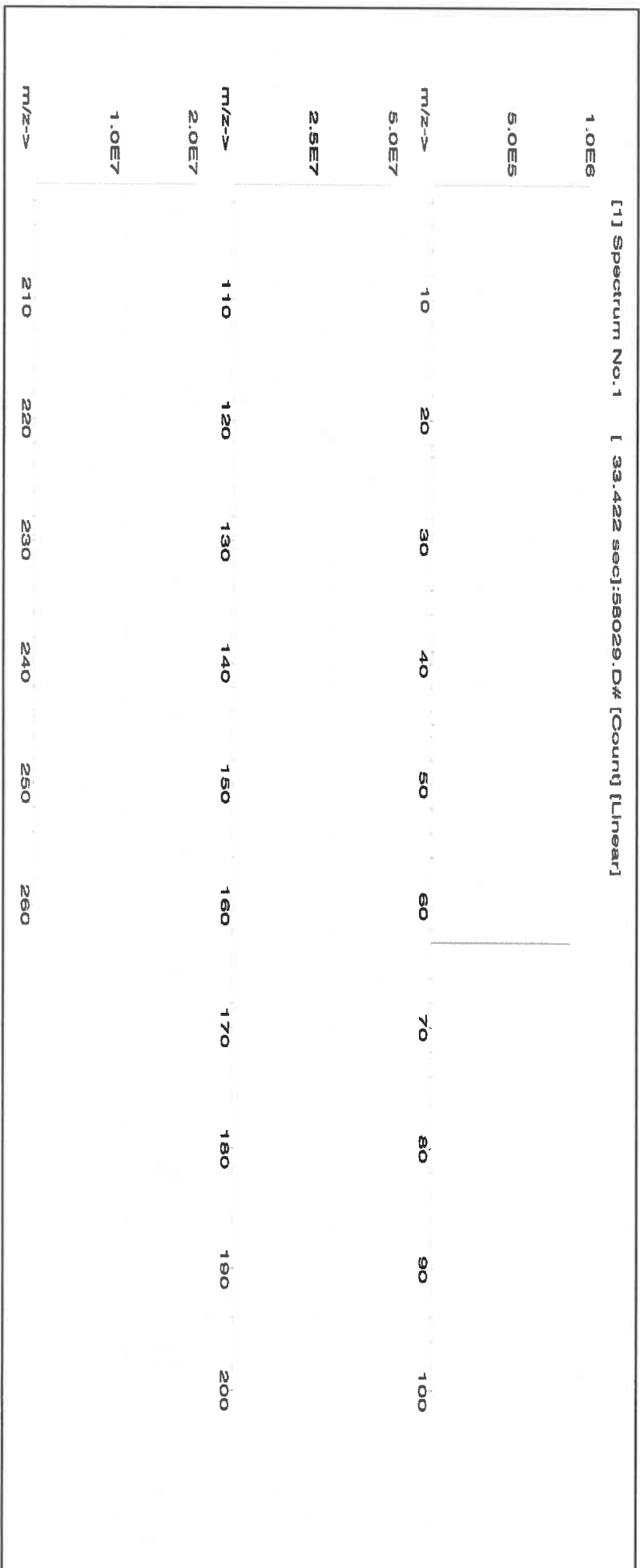
0.058 Flask Uncertainty

SDS Information

Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
----------	-------------	------------	-----------------	-------------------	--------------------------	-----------------------	-----------------------	---------------------	----------------------------------	------	----------------	------	----------

1. Copper(II) nitrate trihydrate (Cu) 58129 100223 0.1000 200.0 0.084 1000 10000.1 1000.0 2.2 10031-43-3 1 mg/m3 or-rat 794 mg/kg 3114

[1] Spectrum No.1 [33.422 sec]:58029.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Bu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	T	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



CERTIFIED WEIGHT REPORT:

Part Number: 57004
Lot Number: 102523
Description: Beryllium (Be)

Lot # 24002546
Solvent: Nitric Acid

Expiration Date:

102526

2.0%

40.0 (mL)

Nitric Acid

Recommended Storage:

Ambient (20 °C)

Nominal Concentration (µg/mL):

1000

NIST Test Number:

6UTB

Volume shown below was diluted to (mL): 2000.02

5E-05 Balance Uncertainty

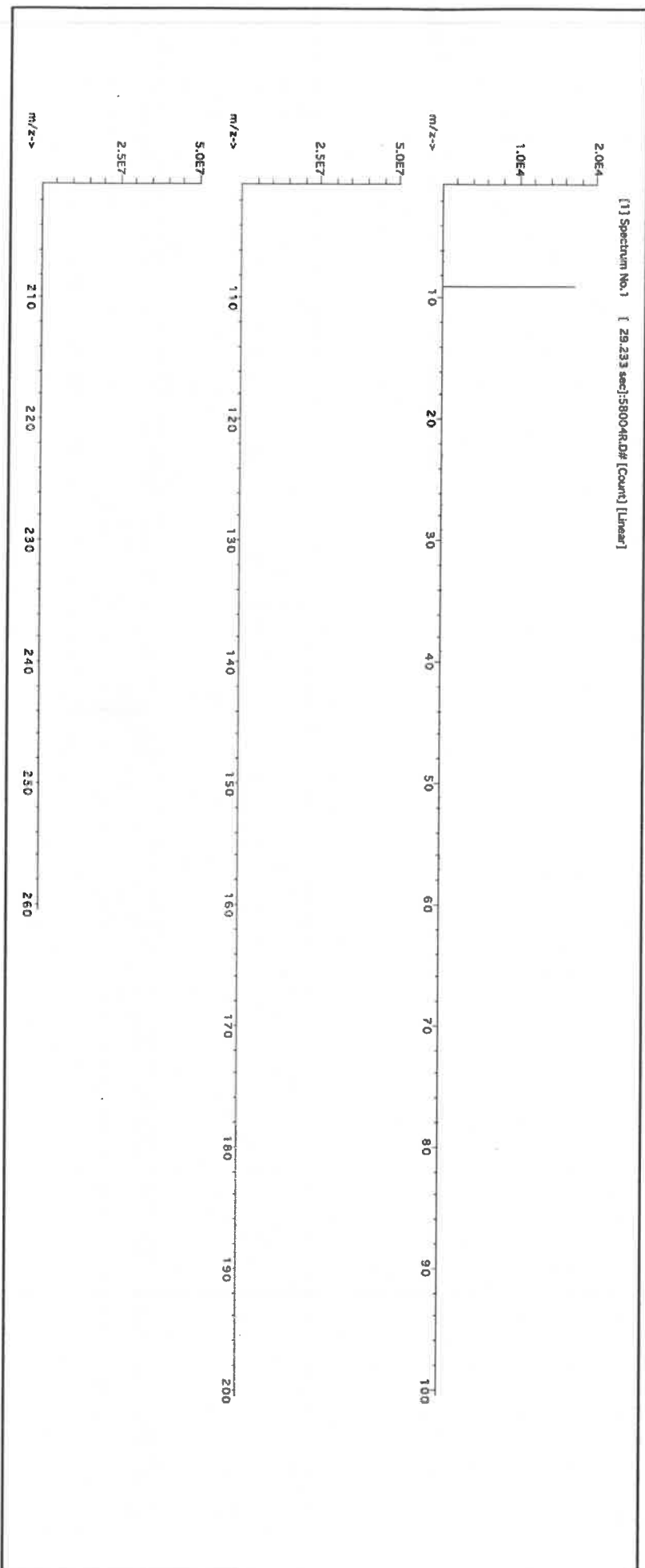
0.058 Flask Uncertainty

Formulated By:	Benson Chan	102523
Reviewed By:	Pedro L. Rentas	102523

SDS Information

Compound	Part Number	Lot	Dilution Factor	Initial Vol. (mL)	Uncertainty Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
----------	-------------	-----	-----------------	-------------------	--------------------------	-----------------------	-----------------------	---------------------	----------------------------------	------	----------------	------	----------

1. Beryllium nitrate (Be)	58104	091423	0.1000	200.0	0.084	1000	10001.5	1000.0	2.2	13597-99-4	0.2µg/m3	intrinsc-rat 3.16mg/kg	NA
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Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS ($\mu\text{g/mL}$)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Tc	<0.02	U	<0.02
As	<0.02	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Ti	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	T	Cr	<0.02	Ga	<0.02	Fe	<0.02	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Ta	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.02	Sc	<0.02	Ta	<0.02	Tl	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
 * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.

* All standard containers are meticulously cleaned prior to use.

* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).

* Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.

* All Standards should be stored with caps tight and under appropriate laboratory conditions.

* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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Certified Reference Material CRM

CERTIFIED WEIGHT REPORT:

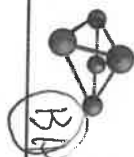
Part Number: 57050
Lot Number: 071123
Description: Tin (Sn)

Solvents: 21110221 Nitric Acid
22D0562008 Hydrochloric acid

Lot #

R-02509124

M599



Expiration Date: 071126
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 1000

2% 10.0 Nitric Acid
6% 30.0 Hydrochloric acid
(mL)

NIST Test Number: 6UTB

Weight shown below was diluted to (mL):

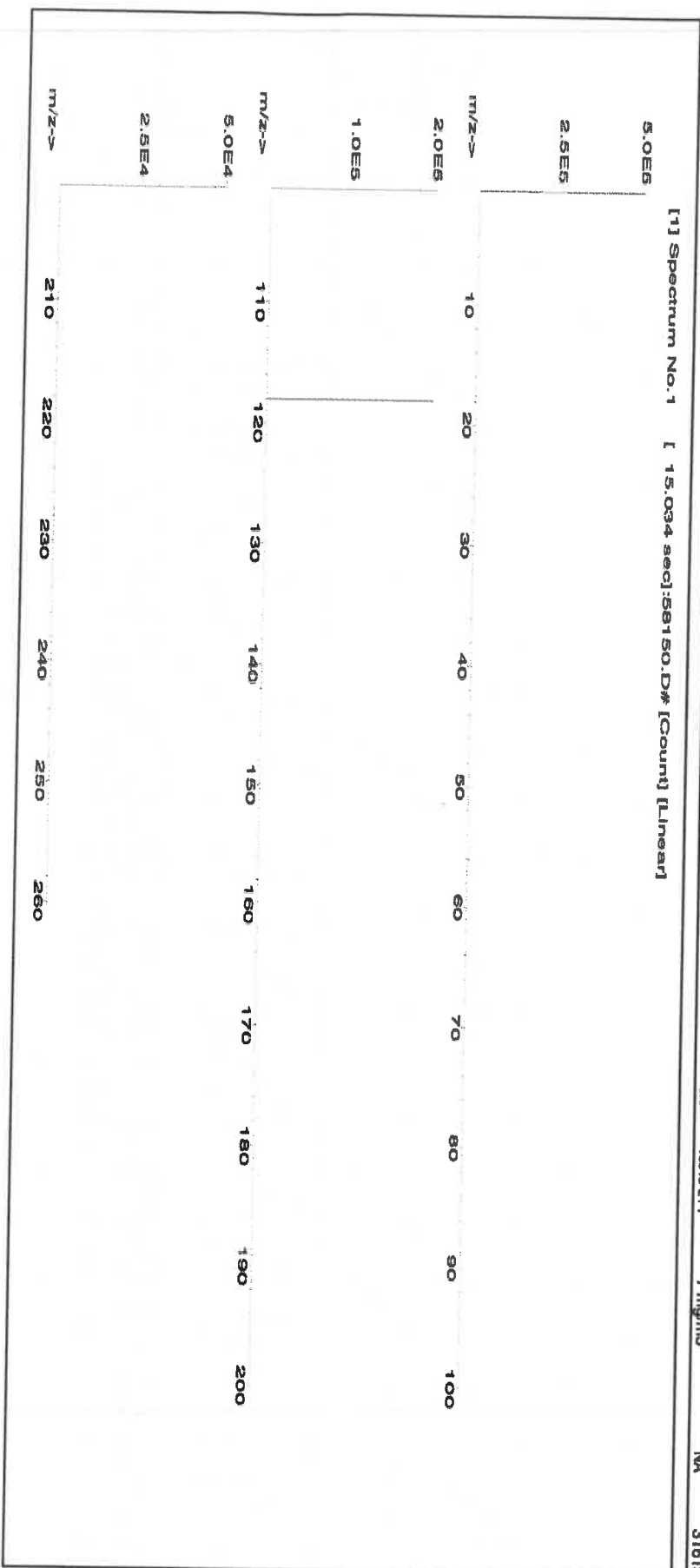
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

Formulated By: Benson Chan	
071123	
Reviewed By: Pedro L. Rientas	
071123	

Compound		Lot		Nominal		Purity		Uncertainty		Assay		Target		Actual		Actual		Expanded		SDS Information		NIST	
RM#	Number	Conc. (µg/mL)	(%)	Purity (%)	(%)	Weight (g)	Weight (g)	Conc. (µg/mL)	+/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	SRM										

1. Ammonium hexafluoroantimonate(V) (Sn) IN010 SMD042023A1 1000 99.999 0.10 44.2 1.13107 1.13286 1001.6 2.0 16919-24-7 7 mg/m3 NA 3161a

[1] Spectrum No. 1 [15.034 sec]:56150.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Ti	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<500	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sa	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Tl	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Certified by:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



R: 02/09/24 115800 (54)

CERTIFIED WEIGHT REPORT:

Part Number: 57027
Lot Number: 091923
Description: Cobalt (Co)

Expiration Date: 091926
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 1000
NIST Test Number: 6UTB

Volume shown below was diluted to (mL): 2000.02

5E-05 Balance Uncertainty
0.058 Flask Uncertainty

Lot # 24002546
Solvent: Nitric Acid

2.0% Nitric Acid
40.0 (mL)

Formulated By:	Lawrence Barry
Reviewed By:	Pedro L. Rentas

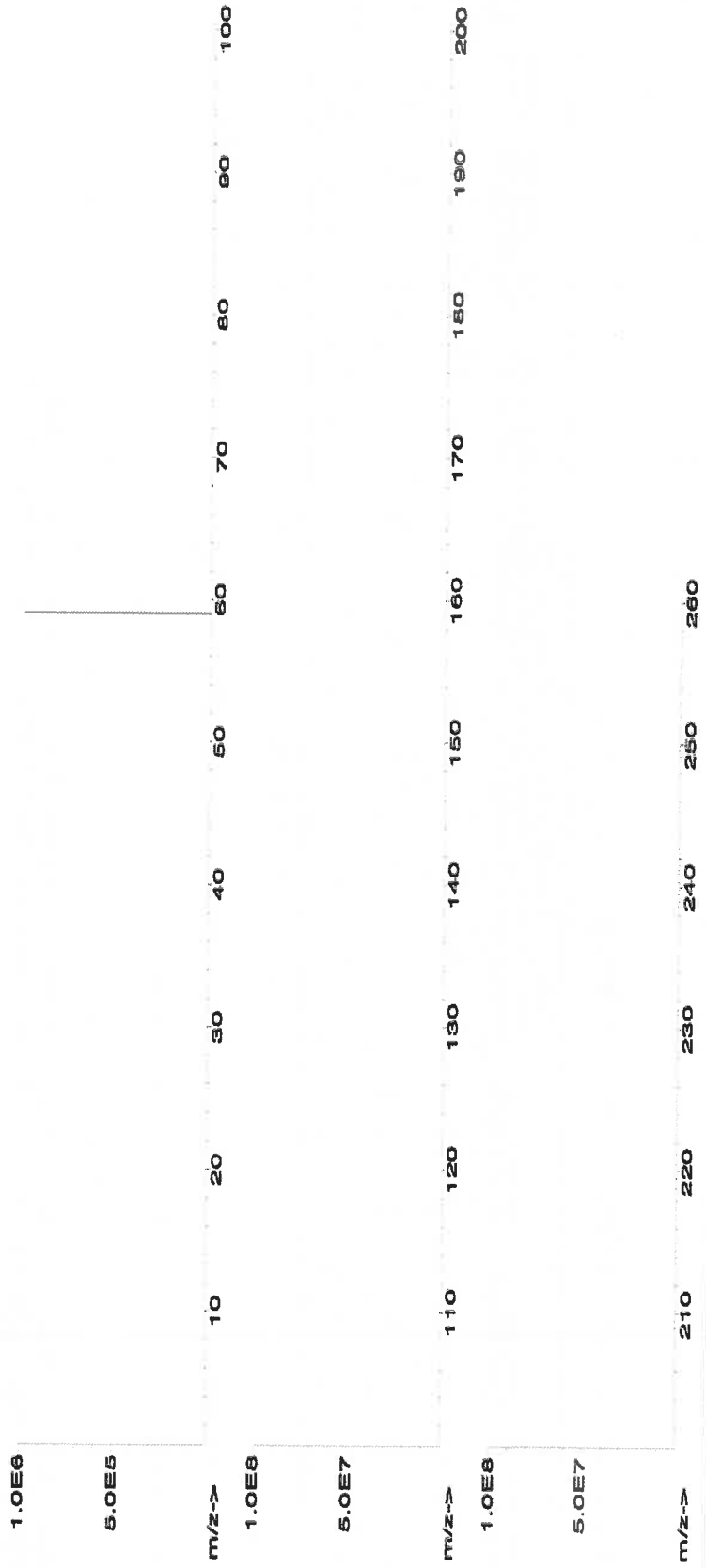
SDS Information

Expanded Uncertainty +/- (µg/mL)
(Solvent Safety Info. On Attached pg.)
NIST SRM
CAS# OSHA PEL (TWA) LD50

Compound

1. Cobalt(II) nitrate hexahydrate (Co)	58127	050923	0.1000	200.0	0.084	1000	10000.0	1000.0	2.2	10026-22-9	0.02 mg/m3	or-rat 691 mg/kg	3113
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[1] Spectrum No.1 [34.243 sec]:58027.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.02	Os	<0.01	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.2	Na	<0.02	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	T	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T)= Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



AR: 02/09/24

M5801

BA



CERTIFIED WEIGHT REPORT:

Part Number: 57033
Lot Number: 111323
Description: Arsenic (As)

Lot # 24002546
Solvent: Nitric Acid

Expiration Date: 111326

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 1000

NIST Test Number: 6LUTB

Volume shown below was diluted to (mL): 4000.0

Balance Uncertainty: 5E-05
Flask Uncertainty: 0.06

2.0%

80.0 (mL)

Nitric Acid

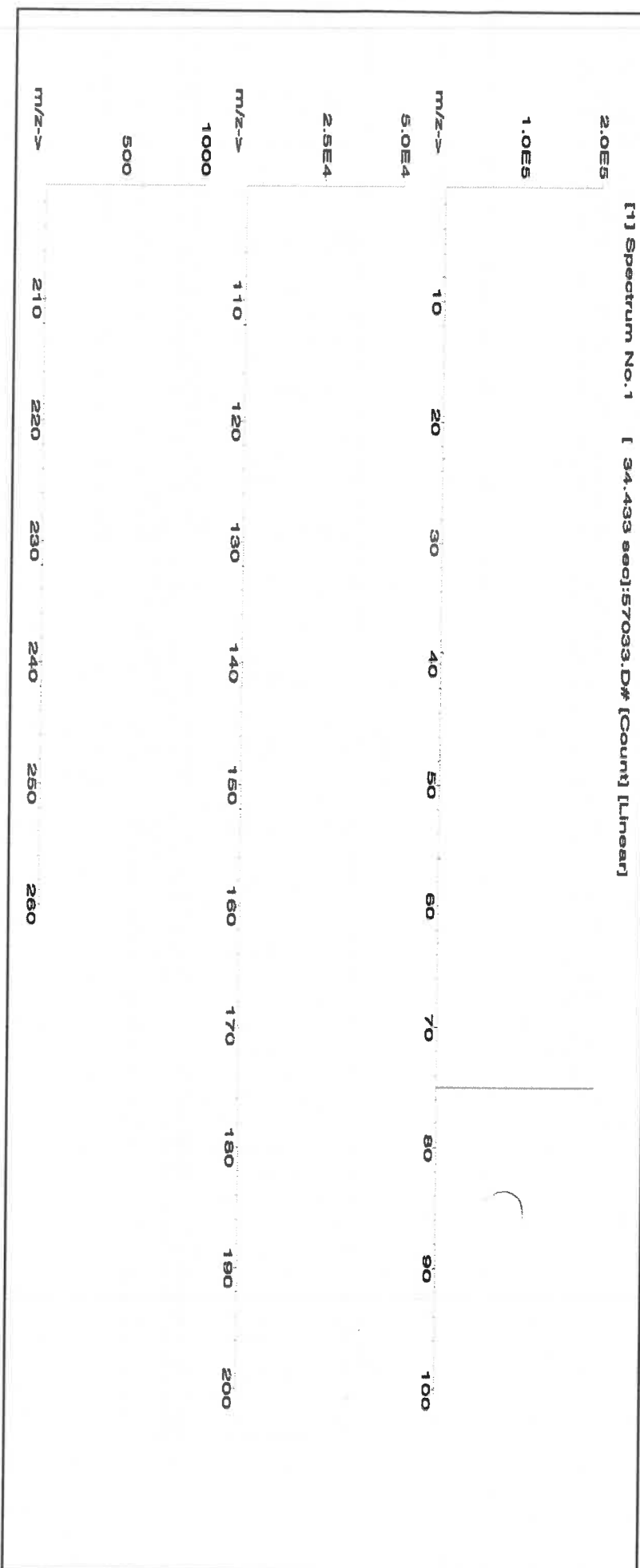
Formulated By:	Lawrence Barry	111323
Reviewed By:	Pedro L. Rendas	111323

SDS Information

Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	(Solvent Safety Info. On Attached pg.)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Arsenic (As)	58133	020522	0.1000	400.0	0.084	1000	10001.0	1000.0	2.0	7440-38-2	0.5 mg/m3	or-lat 500 mg/kg	3103a	
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[1] Spectrum No.1 [34.433 sec]:57033.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	T	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Tl	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge*	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Su	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
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- * All standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



CERTIFIED WEIGHT REPORT:

Part Number: 57115
Lot Number: 041723
Description: Phosphorous (P)

Solvent: 21110221 Nitric Acid

Lot #

Expiration Date: 041726

2% 40.0 (mL) Nitric Acid

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 10000

NIST Test Number: 6UTB

5E-05 Balance Uncertainty

Weight shown below was diluted to (mL): 2000.02 0.058 Flask Uncertainty

Formulated By:	Lawrence Barry	041723
Reviewed By:	Pedro L. Rentas	041723

SDS Information

Compound

Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Ammonium dihydrogen phosphate (P) IN008 P082019A1 10000 99.999 0.10 27.5 72.7287 72.7289 10000.0 20.0 7722-76-1 5 mg/m3 or-hal->2000mg/kg 3186

[1] Spectrum No.1 [12.074 sec]:58115.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	T	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



CERTIFIED WEIGHT REPORT:

Part Number: **57116**
Lot Number: **071123**
Description: **Sulfur (S)**

Solvent: **071123** Lot # **071123**
ASTM Type 1 Water

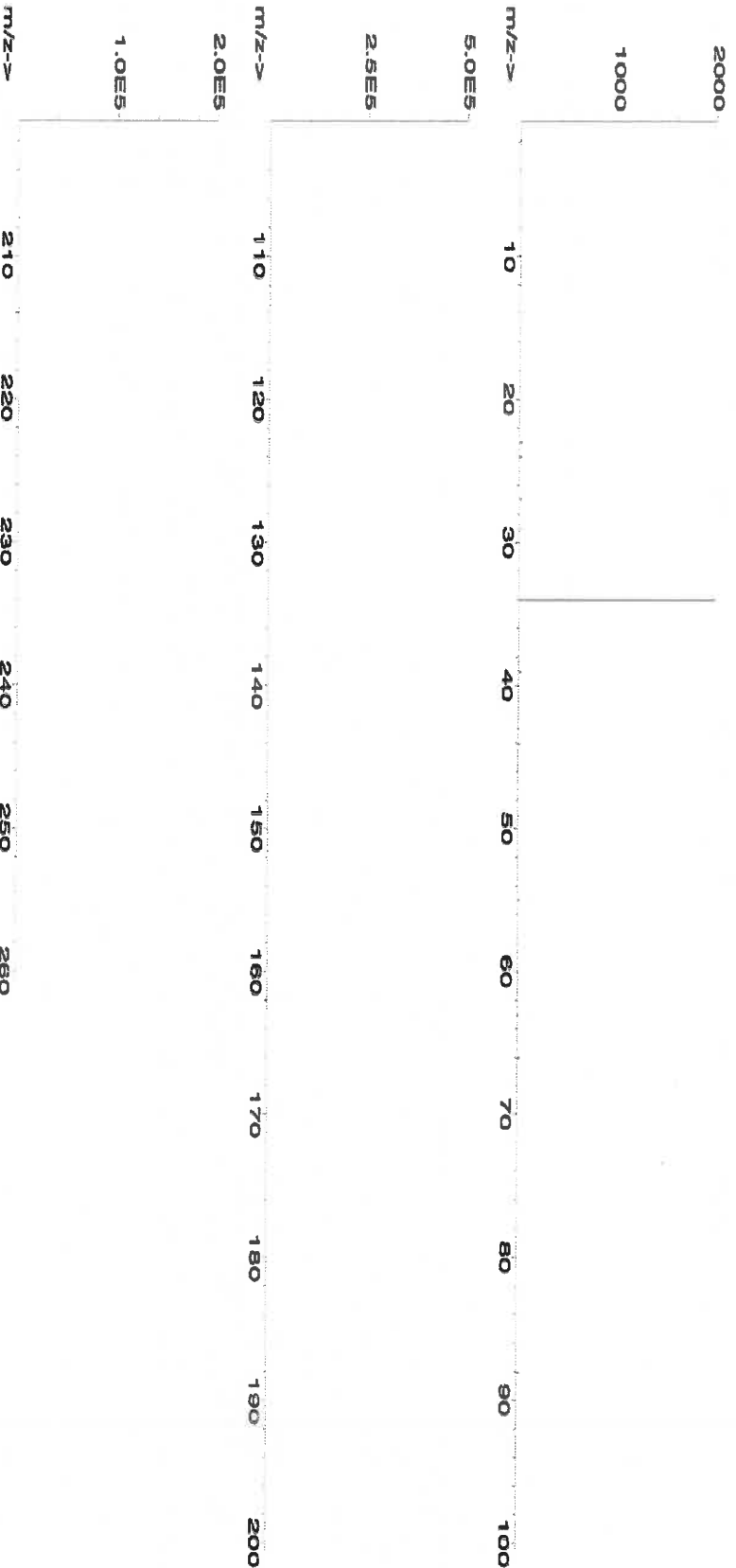
Formulated By:	Lawrence Barry
Reviewed By:	Pedro L. Rentas
071123	

265

Expiration Date: **071126**
Recommended Storage: **Ambient (20 °C)**
Nominal Concentration (µg/mL): **10000**
NIST Test Number: **6UTB**
Weight shown below was diluted to (mL): **1999.48** **5E-05** Balance Uncertainty
0.058 Flask Uncertainty

SDS Information									
Compound	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)
Ammonium sulfate (S)	IN117	SLBR725V	10000	99.9	0.10	24.3	82.4675	82.4692	10000.1
							20.0	7763-20-2	NA
								oral 4250mg/kg	3181

[1] Spectrum No. 1 [24.004 sec]:58116.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	T	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

Physical Characterization:

(T)= Target analyte

Certified by:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



CERTIFIED WEIGHT REPORT:

Part Number: 58030
Lot Number: 111623
Description: Zinc (Zn)

Solvent: 24002546 Nitric Acid

Lot # R: 02109124 MS819

Expiration Date: 111626

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 1000

NIST Test Number: 6UTB

Weight shown below was diluted to (mL): 3000.4

5E-05 Balance Uncertainty

0.06 Flask Uncertainty

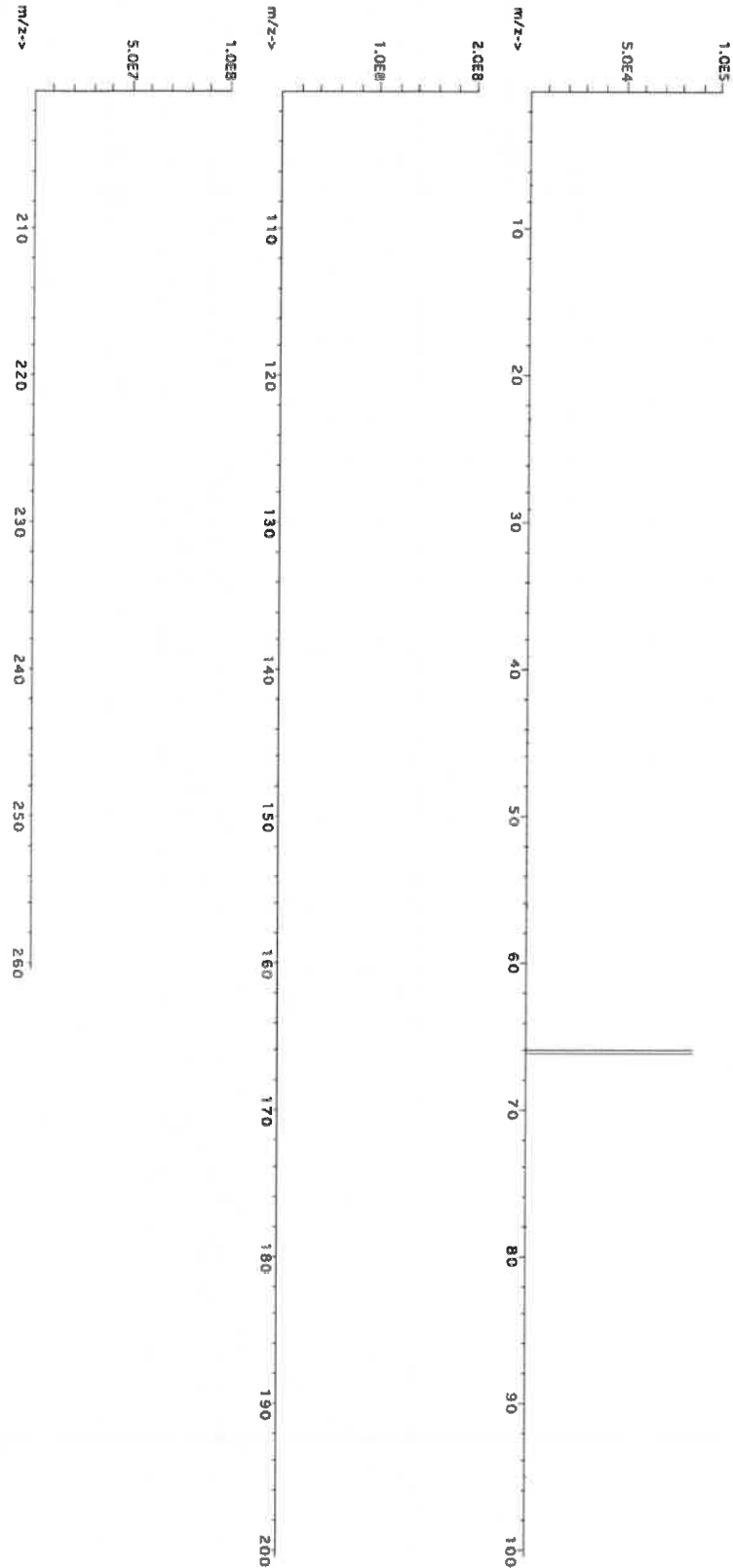
2% 60.0 (mL) Nitric Acid

Formulated By:	Benson Chan
Reviewed By:	Pedro L. Reitas
111623	

Compound	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LDSO	NIST SRM
----------	------------	-----------------------	------------	-----------------	-----------	-------------------	-------------------	----------------------	----------------------------------	------	----------------	------	----------

1. Zinc nitrate hexahydrate (Zn)	IN016 ZNE03021A1	1000	99.999	0.10	24.3	12.3475	12.3502	1000.2	2.0	10196-18-6	1 mg/m ³	on-rat 1190mg/kg	3168
----------------------------------	------------------	------	--------	------	------	---------	---------	--------	-----	------------	---------------------	------------------	------

[1] Spectrum No.1 [31.103 sec]58130.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Bu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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R: 02/22/24 M.5942

1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



2.0 PRODUCT DESCRIPTION

Product Code: Single Analyte Custom Grade Solution
Catalog Number: CGT11
Lot Number: T2-TI719972
Matrix: 2% (v/v) HNO₃
tr. HF
Value / Analyte(s): 1 000 µg/mL ea:
Titanium
Starting Material: Ti Metal
Starting Material Lot#: 2094
Starting Material Purity: 99.9975%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 1002 ± 5 µg/mL
Density: 1.012 g/mL (measured at 20 ± 4 °C)

Assay Information:

Assay Method #1 1002 ± 4 µg/mL
ICP Assay NIST SRM 3162a Lot Number: 130925

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a National Institute of Standards and Technology (NIST) SRM/RM. See Sec 4.2 for balance traceability.

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Characterization of CRM/RM by Two or More Methods

Certified Value, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

$$X_{CRM/RM} = \sum (w_i) (X_i)$$

X_i = mean of Assay Method i with standard uncertainty $u_{char i}$

w_i = the weighting factors for each method calculated using the inverse square of the variance:

$$w_i = (1/u_{char i}^2) / (\sum (1/u_{char i}^2))$$

$$CRM/RM \text{ Expanded Uncertainty } (z) = U_{CRM/RM} = k (u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char} = [\sum (w_i)^2 (u_{char i}^2)]^{1/2}$ where $u_{char i}$ are the errors from each characterization method

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, $X_{CRM/RM}$, where one method of characterization is used is the mean of individual results:

$$X_{CRM/RM} = (X_a) (u_{char a})$$

X_a = mean of Assay Method A with

$u_{char a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (z) = U_{CRM/RM} = k (u_{char a}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

CRM/RMs are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

M	Ag	<	0.000536	M	Eu	<	0.000268	O	Na	<	0.032670	M	Se		0.001204	O	Zn	<	0.003267
O	Al		0.000872	O	Fe		0.003225	O	Nb	<	0.043560	O	Si		0.004735	O	Zr	<	0.043560
M	As	<	0.008586	M	Ga	<	0.000268	M	Nd	<	0.000268	M	Sm	<	0.000268				
M	Au	<	0.004577	M	Gd	<	0.000268	O	Ni	<	0.010890	M	Sn		0.000096				
O	B	<	0.008929	M	Ge	<	0.002146	M	Os	<	0.000269	O	Sr		0.000096				
M	Ba	<	0.002683	M	Hf		0.002161	O	P	<	0.054450	M	Ta		0.010560				
M	Be	<	0.005366	M	Hg	<	0.003231	M	Pb	<	0.001073	M	Tb	<	0.000268				
M	Bi	<	0.001609	M	Ho	<	0.000268	M	Pd	<	0.000268	M	Te	<	0.001341				
O	Ca		0.000676	M	In	<	0.002683	M	Pr	<	0.000268	M	Th	<	0.053663				
M	Cd	<	0.000268	M	Ir	<	0.000269	M	Pt	<	0.000536	s	Ti	<					
M	Ce	<	0.000268	M	K		0.001172	M	Rb	<	0.000268	M	Tl	<	0.000268				
M	Co	<	0.004293	M	La	<	0.000268	M	Re	<	0.000268	M	Tm	<	0.000268				
M	Cr		0.000752	O	Li	<	0.027225	M	Rh	<	0.000268	M	U	<	0.000268				
M	Cs	<	0.000268	M	Lu	<	0.000268	M	Ru	<	0.000269	M	V	<	0.019855				
O	Cu	<	0.010890	O	Mg	<	0.005445	i	S	<		M	W		0.000473				
M	Dy	<	0.000268	O	Mn	<	0.003267	M	Sb	<	0.006976	M	Y	<	0.002146				
M	Er	<	0.000268	M	Mo		0.000774	O	Sc	<	0.004900	M	Yb	<	0.000536				

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference
n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

- For the calibration of analytical instruments and validation of analytical methods as appropriate.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

- Store between approximately 4° - 30° C while in sealed TCT bag.

- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° - 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

- For more information, visit www.inorganicventures.com/TCT

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 47.87 +4 6 Ti(F)6-2

Chemical Compatibility - Soluble in concentrated HCl, HF, H3PO4 H2SO4 and HNO3. Avoid neutral to basic media. Unstable at ppm levels with metals that would pull F- away (i.e. Do not mix with Alkaline or Rare Earths or high levels of transition elements unless they are fluorinated). Stable with most inorganic anions with a tendency to hydrolyze forming the hydrated oxide in all dilute acids except HF.

Stability - 2-100 ppb levels stable (Alone or mixed with all other metals) as the Ti(F)6-2 for months in 1% HNO3 / LDPE container. 1-10,000 ppm single element solutions as the Ti(F)6-2 chemically stable for years in 2-5% HNO3 / trace HF in an LDPE container.

Ti Containing Samples (Preparation and Solution) - Metal (Soluble in H2O / HF caution -powder reacts violently); Oxide - low temperature history anatase or rutile (Dissolved by heating in 1:1:1 H2O / HF / H2SO4); Oxide - high temperature history (~800EC) brookite (fuse in Pt0 with K2S2O7); Ores (fuse in Pt0 with KF + K2S2O7 - no KF if silica not present); Organic Matrices (Dry ash at 450EC in Pt0 and dissolve by heating with 1:1:1 H2O / HF / H2SO4 or fuse ash with pyrosulfate if oxide is as plastic pigment and likely in brookite crystalline form).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 48 amu	14 ppt	N/A	32S16O, 32S14N, 14N16O18O, 14N17N2, 36Ar12C, 48Ca, [96X=2 (where X = Zr, Mo, Ru)]
ICP-OES 323.452 nm	0.0054 / 0.00092 µg/mL	1	Ce, Ar, Ni
ICP-OES 334.941 nm	0.0038 / 0.000028 µg/mL	1	Nb, Ta, Cr, U
ICP-OES 336.121 nm	0.0053 / 0.000034 µg/mL	1	W, Mo, Co

HF Note: This standard should not be prepared or stored in glass.

8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

June 17, 2022

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

11.2 Lot Expiration Date

- June 17, 2027

- The date after which this CRM/RM should not be used.

- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski
Manager, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



M5959 R: 6/14/24

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1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



2.0 PRODUCT DESCRIPTION

Product Code: Single Analyte Custom Grade Solution
Catalog Number: CGY10
Lot Number: V2-Y740548
Matrix: 2% (v/v) HNO₃
Value / Analyte(s): 10 000 µg/mL ea:
Yttrium
Starting Material: Yttrium Oxide
Starting Material Lot#: 2661 and 06230520YL
Starting Material Purity: 99.9984%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 10000 ± 30 µg/mL
Density: 1.032 g/mL (measured at 20 ± 4 °C)

Assay Information:

Assay Method #1	10011 ± 25 µg/mL EDTA NIST SRM 928 Lot Number: 928
Assay Method #2	9997 ± 50 µg/mL ICP Assay NIST SRM 3167a Lot Number: 190730
Assay Method #3	9984 ± 31 µg/mL Calculated NIST SRM Lot Number: See Sec. 4.2

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a National Institute of Standards and Technology (NIST) SRM/RM. See Sec 4.2 for balance traceability.

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Characterization of CRM/RM by Two or More Methods

Certified Value, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

$$X_{CRM/RM} = \sum(w_i)(X_i)$$

X_i = mean of Assay Method i with standard uncertainty $u_{char i}$

w_i = the weighting factors for each method calculated using the inverse square of the variance:

$$w_i = (1/u_{char i}^2) / (\sum(1/u_{char i}^2))$$

$$CRM/RM \text{ Expanded Uncertainty } (z) = U_{CRM/RM} = k(u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char} = [\sum(w_i)^2(u_{char i}^2)]^{1/2}$ where $u_{char i}$ are the errors from each characterization method

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, $X_{CRM/RM}$, where one method of characterization is used is the mean of individual results:

$$X_{CRM/RM} = (X_a)(u_{char a})$$

X_a = mean of Assay Method A with

$u_{char a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (z) = U_{CRM/RM} = k(u_{char a}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

CRM/RMs are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

M Ag <	0.004600	M Eu	0.009037	M Na	0.086360	M Se <	0.005200	M Zn	0.030125
M Al	0.014862	O Fe	0.002410	M Nb <	0.000570	O Si	0.024100	O Zr <	0.002600
M As <	0.003500	M Ga <	0.000570	M Nd	0.000923	M Sm	0.000461		
M Au <	0.001700	M Gd <	0.003500	M Ni <	0.005700	M Sn <	0.002300		
O B	0.002209	M Ge <	0.005200	M Os <	0.001200	M Sr <	0.004600		
O Ba <	0.002500	M Hf <	0.000570	n P <		M Ta <	0.000570		
O Be <	0.001400	M Hg <	0.000570	M Pb	0.005020	M Tb	0.001044		
M Bi <	0.003500	M Ho	0.009037	M Pd <	0.005100	M Te <	0.002300		
O Ca	0.009841	M In <	0.002300	M Pr <	0.002300	M Th <	0.000570		
M Cd <	0.000570	M Ir <	0.000570	M Pt <	0.000570	M Ti <	0.003500		
M Ce <	0.002300	O K	0.018677	M Rb <	0.000570	M Tl <	0.000570		
M Co <	0.000570	M La	0.000461	M Re <	0.000570	M Tm <	0.003500		
M Cr <	0.004000	O Li <	0.009300	M Rh <	0.008000	M U <	0.000570		
M Cs <	0.000570	M Lu	0.000582	M Ru <	0.000570	M V	0.001265		
M Cu	0.002610	O Mg	0.001486	n S <		M W <	0.002300		
M Dy	0.003815	M Mn	0.000582	M Sb	0.005422	s Y <			
M Er	0.003615	M Mo <	0.005700	M Sc <	0.001200	M Yb	0.001827		

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference
n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.

6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures Terms and Conditions of Sale, <https://www.inorganicventures.com/terms-and-conditions-sale>. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

- Store between approximately 4° - 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° - 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

- For more information, visit www.inorganicventures.com/TCT

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 88.91 +3 6 Y(OH)(H₂O)_{x+2}

Chemical Compatibility -Soluble in HCl, H₂SO₄ and HNO₃. Avoid HF, H₃PO₄ and neutral to basic media. Stable with most metals and inorganic anions forming an insoluble carbonate, oxide, oxalate, and fluoride.

Avoid mixing with elements / solutions containing moderate amounts of fluoride.

Stability - 2-100 ppb levels stable for months in 1% HNO₃ / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO₃ / LDPE container.

Y Containing Samples (Preparation and Solution) - Metal (Soluble in acids); Oxide (Dissolve by heating in H₂O / HNO₃); Ores (Carbonate fusion in PtO followed by HCl dissolution); Organic Matrices (Dry ash and dissolve in 1:1 H₂O / HCl or HNO₃).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 89 amu	0.8 ppt	N/A	73Ge16O, 178Hf+2
ICP-OES 360.073 nm	0.005 / 0.000036 µg/mL	1	Ce, Th
ICP-OES 371.030 nm	0.004 / 0.00007 µg/mL	1	Ce
ICP-OES 377.433 nm	0.005 / 0.0009 µg/mL	1	Ta, Th

8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; inorganicventures.com; info@inorganicventures.com

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

February 20, 2024

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

11.2 Lot Expiration Date

- February 20, 2029

- The date after which this CRM/RM should not be used.

- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:

Uyen Truong
Custom Processing Supervisor



Certificate Approved By:

Muzzammil Khan
Stock Laboratory Supervisor



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





CERTIFIED WEIGHT REPORT:

MS961 R-1 6/11/24

Part Number:

57028

Solvent: 24002546 Nitric Acid

Lot #

Lot Number:
Description:

041124
Nickel (NI)

Expiration Date:

041127

2% 5.0 (mL) Nitric Acid

Recommended Storage:
Nominal Concentration (µg/mL):

Ambient (20 °C)
1000

NIST Test Number:
Weight shown below was diluted to (mL):

6UTB

5E-05 Balance Uncertainty
0.002 Flask Uncertainty

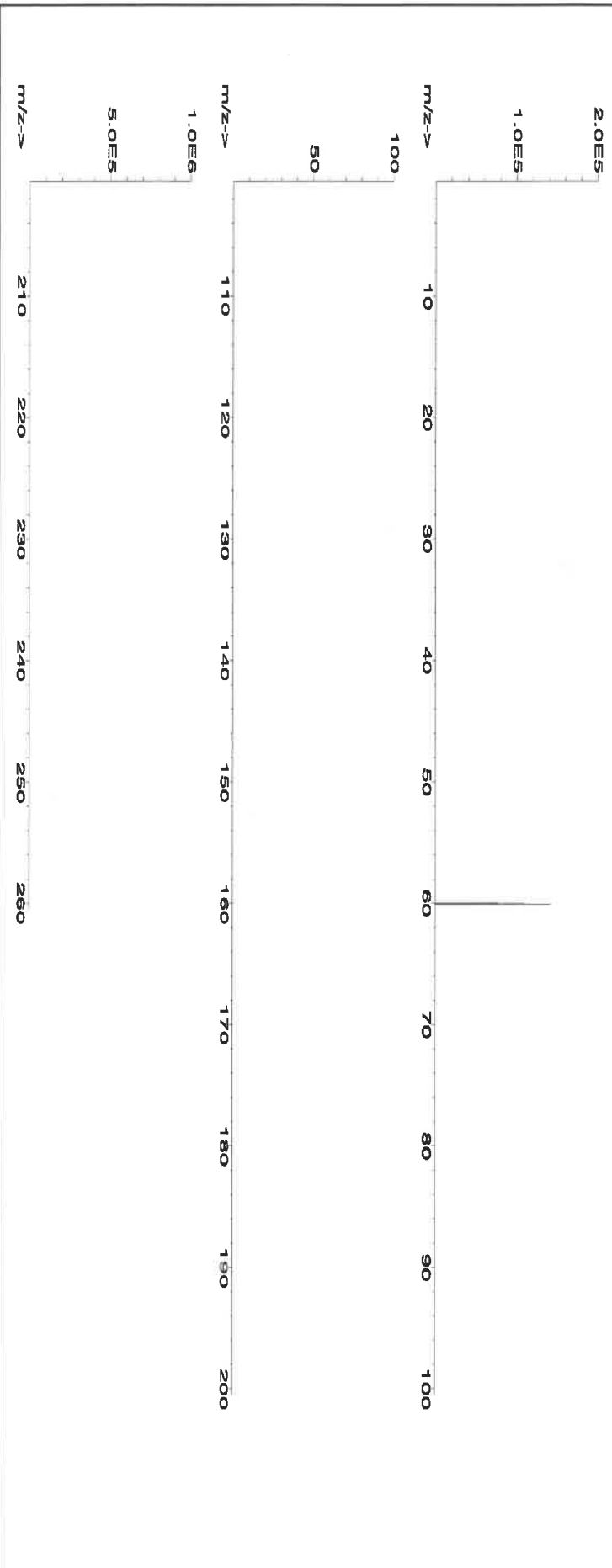
Formulated By:	Brian Geddes	041124
Reviewed By:	Pedro L. Rentas	041124

Compound

RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay Purity (%)	Target Weight (g)	(Solvent Safety Info. On Attached pg.)				NIST SRM		
							Actual Weight (g)	Actual Conc. (µg/mL)	Uncertainty +/- (µg/mL)	CAS#			

1. Nickel(II) nitrate hexahydrate (NI) IN033 NIM052023A1 1000 99.999 0.10 20.2 1.2369 1.2369 1000.0 2.0 13478-00-7 1 mg/m3 or-rat 1620 mg/kg 3136

[1] Spectrum No.1 [12.374 sec]:58128.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	T	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Ba	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Bc	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



M5962 **R10614124**



CERTIFIED WEIGHT REPORT:

Part Number: 57034
Lot Number: 060624
Description: Selenium (Se)

Lot # 24002546
Solvent: Nitric Acid

2.0% 40.0 (mL) Nitric Acid

Expiration Date: 060627

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 1000

NIST Test Number: 6UTB

Volume shown below was diluted to (mL): 2000.07

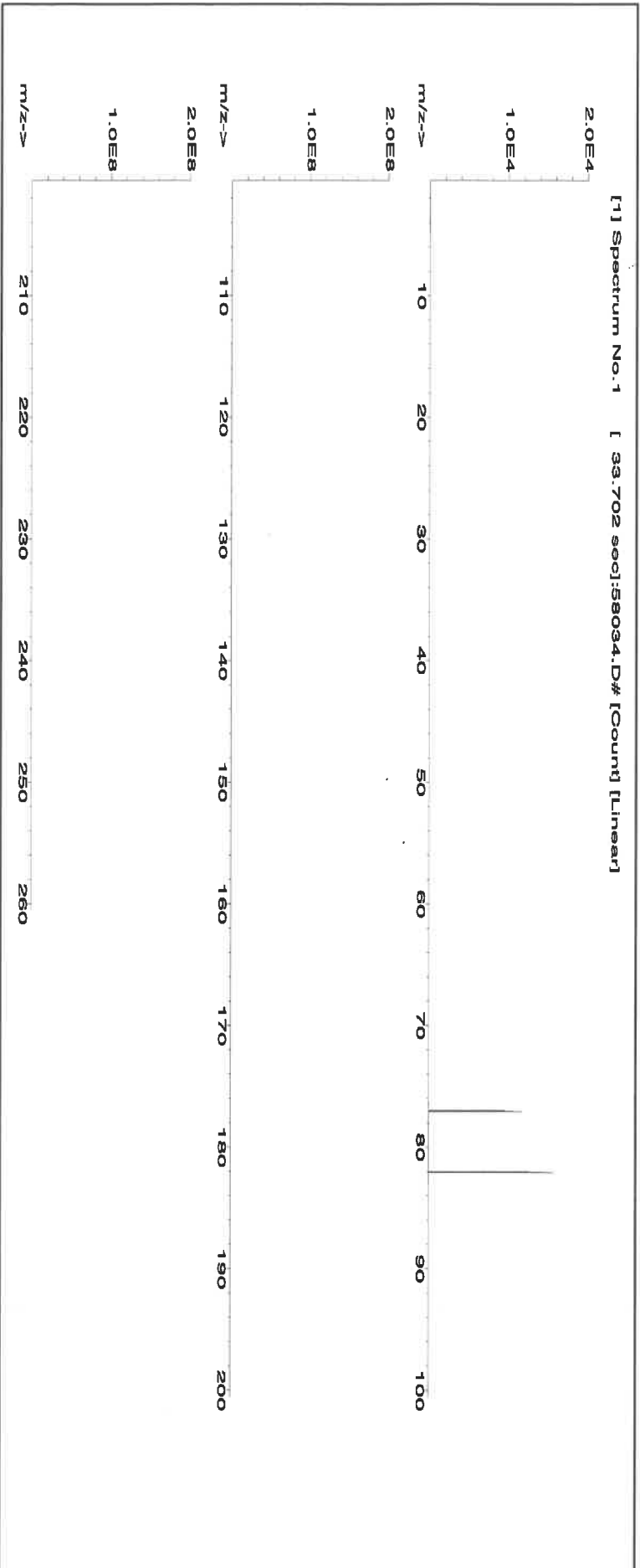
SE-05 Balance Uncertainty
0.100 Flask Uncertainty

Formulated By:	Benson Chan
	060624
Reviewed By:	Pedro L. Rantas
	060624

SDS Information

Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	(Solvent Safety Info. On Attached pg.)	CAS#	OSHA PEL (TWA)	LDSO	NIST SRM
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1. Selenium (Se)	58134	071223	0.1000	200.0	0.084	1000	10002.5	1000.0	2.2	7782-49-2	0.2 mg/m3	or-tral 6700 mg/kg	3149
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Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

280

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	T	Tb	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	U	<0.02
As	<0.2	Ce	<0.02	Bu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Ru	<0.02	Na	<0.2	Th	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Sr	<0.02	S	<0.02	Tm	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	Ta	<0.02	Sn	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02		<0.02	Ti	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



2.0 PRODUCT DESCRIPTION

Product Code: Single Analyte Custom Grade Solution
Catalog Number: CGMO1
Lot Number: T2-MO720876
Matrix: H2O
tr. NH4OH
Value / Analyte(s): 1 000 µg/mL ea:
Molybdenum
Starting Material: Ammonium Molybdate
Starting Material Lot#: 2361
Starting Material Purity: 99.9893%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 998 ± 7 µg/mL
Density: 1.000 g/mL (measured at 20 ± 4 °C)
Assay Information:

Assay Method #1 **998 ± 4 µg/mL**
ICP Assay NIST SRM 3134 Lot Number: 130418

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a National Institute of Standards and Technology (NIST) SRM/RM. See Sec 4.2 for balance traceability.

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

Characterization of CRM/RM by Two or More Methods

Certified Value, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

$$X_{CRM/RM} = \sum (w_i) (X_i)$$

X_i = mean of Assay Method i with standard uncertainty $u_{char i}$

w_i = the weighting factors for each method calculated using the inverse square of the variance.

$$w_i = (1/u_{char i}^2) / (\sum (1/u_{char i}^2))$$

$$CRM/RM \text{ Expanded Uncertainty } (\pm) = U_{CRM/RM} = k (u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char} = [\sum (w_i)^2 (u_{char i}^2)]^{1/2}$ where $u_{char i}$ are the errors from each characterization method

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, $X_{CRM/RM}$, where one method of characterization is used is the mean of individual results:

$$X_{CRM/RM} = (X_a) (u_{char a})$$

X_a = mean of Assay Method A with

$u_{char a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (\pm) = U_{CRM/RM} = k (u_{char a}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

CRM/RMs are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

M	Ag	<	0.000590	M	Eu	<	0.000300	M	Na		0.000879	M	Se	<	0.008000	M	Zn		0.000598
M	Al		0.000563	M	Fe	<	0.006500	M	Nb	<	0.029000	i	Si	<		M	Zr	<	0.001800
M	As	<	0.002100	M	Ga	<	0.000300	i	Nd	<		M	Sm	<	0.000300				
M	Au	<	0.000300	M	Gd	<	0.000300	M	Ni	<	0.008000	M	Sn	<	0.008900				
M	B	<	0.003300	M	Ge	<	0.000300	M	Os	<	0.000590	M	Sr		0.000175				
M	Ba		0.001689	M	Hf	<	0.001800	i	P	<		M	Ta	<	0.004200				
M	Be	<	0.000890	M	Hg	<	0.003300	M	Pb	<	0.000300	M	Tb	<	0.000300				
M	Bi	<	0.000890	M	Ho	<	0.000300	M	Pd	<	0.001800	M	Te	<	0.021000				
O	Ca		0.006334	M	In	<	0.032000	M	Pr	<	0.013000	M	Th	<	0.000300				
O	Cd	<	0.026000	M	Ir	<	0.000300	M	Pt	<	0.000300	O	Tl	<	0.032000				
M	Ce	<	0.008300	M	K		0.130213	M	Rb		0.004575	M	Tl		0.001266				
M	Co		0.000598	M	La	<	0.000300	M	Re	<	0.000300	M	Tm	<	0.000300				
M	Cr		0.000527	O	Li		0.000059	M	Rh	<	0.000300	M	U	<	0.005300				
M	Cs		0.000527	M	Lu	<	0.000300	M	Ru	<	0.079000	M	V	<	0.000890				
M	Cu		0.002252	M	Mg		0.000563	i	S	<		M	W		0.087982				
M	Dy	<	0.000300	M	Mn	<	0.005900	M	Sb		0.001513	M	Y	<	0.000300				
M	Er	<	0.000300	s	Mo	<		M	Sc	<	0.001200	M	Yb	<	0.000300				

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference
n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

- For the calibration of analytical instruments and validation of analytical methods as appropriate.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

- Store between approximately 4° - 30° C while in sealed TCT bag.

- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° - 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

- For more information, visit www.inorganicventures.com/TCT

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 95.94 +6 6,7,8,9

[MoO4]-2(chemical form as received)

Chemical Compatibility -Mo is received in a NH4OH matrix giving the operator the option of using HCl or HF to stabilize acidic solutions. The [MoO4]-2 is soluble in concentrated HCl [MoOCl5]-2, dilute HF / HNO3 [MoOF5]-2 and basic media [MoO4]-2. Stable at ppm levels with some metals provided it is fluorinated. Do not mix with Alkaline or Rare Earths when HF is present. Stable with most inorganic anions provided it is in the [MoO4]-2 chemical form.

Stability - 2-100 ppb levels stable (alone or mixed with all other metals that are at comparable levels) as the [MoOF5]-2 for months in 1% HNO3 / LDPE container. 1-10,000 ppm single element solutions as the [MoO4]-2 chemically stable for years in 1% NH4OH in a LDPE container.

Mo Containing Samples (Preparation and Solution) -Metal (Soluble in HF / HNO3 or hot dilute HCl); Oxide (soluble in HF or NH4OH) ; Organic Matrices (Dry ash at 450EC in Pt0 and dissolve oxide with HF or HCl).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 95 amu	3 ppt	n/a	40Ar39K16O,79Br16O,190Os2+,190Pt2+
ICP-OES 202.030 nm	0.008 / 0.0002 µg/mL	1	Os, Hf
ICP-OES 203.844 nm	0.012 / 0.002 µg/mL	1	
ICP-OES 204.598 nm	0.012 / 0.001 µg/mL	1	Ir, Ta

8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.569.6799; 540.585.3030, Fax: 540.585.3012; info@inorganicventures.com

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

July 17, 2022

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

11.2 Lot Expiration Date

- July 17, 2027

- The date after which this CRM/RM should not be used.

- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:

Uyen Truong
Supervisor, Product Documentation



Certificate Approved By:

Michael Booth
Director, Technical



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



M5976, M5977

R: 02/22/24

1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



2.0 PRODUCT DESCRIPTION

Product Code: Single Analyte Custom Grade Solution
Catalog Number: CGMO1
Lot Number: T2-MO720876
Matrix: H2O
tr. NH4OH
Value / Analyte(s): 1 000 µg/mL ea:
Molybdenum
Starting Material: Ammonium Molybdate
Starting Material Lot#: 2361
Starting Material Purity: 99.9893%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 998 ± 7 µg/mL
Density: 1.000 g/mL (measured at 20 ± 4 °C)
Assay Information:

Assay Method #1 **998 ± 4 µg/mL**
ICP Assay NIST SRM 3134 Lot Number: 130418

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a National Institute of Standards and Technology (NIST) SRM/RM. See Sec 4.2 for balance traceability.

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

Characterization of CRM/RM by Two or More Methods

Certified Value, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

$$X_{CRM/RM} = \sum(w_i)(X_i)$$

X_i = mean of Assay Method i with standard uncertainty $u_{char i}$

w_i = the weighting factors for each method calculated using the inverse square of the variance.

$$w_i = (1/u_{char i}^2) / (\sum(1/u_{char i}^2))$$

$$CRM/RM \text{ Expanded Uncertainty } (\pm) = U_{CRM/RM} = k(u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char} = [\sum(w_i)^2(u_{char i}^2)]^{1/2}$ where $u_{char i}$ are the errors from each characterization method

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, $X_{CRM/RM}$, where one method of characterization is used is the mean of individual results:

$$X_{CRM/RM} = (X_a)(u_{char a})$$

X_a = mean of Assay Method A with

$u_{char a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (\pm) = U_{CRM/RM} = k(u_{char a}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

CRM/RMs are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

M	Ag	<	0.000590	M	Eu	<	0.000300	M	Na		0.000879	M	Se	<	0.008000	M	Zn		0.000598
M	Al		0.000563	M	Fe	<	0.006500	M	Nb	<	0.029000	i	Si	<		M	Zr	<	0.001800
M	As	<	0.002100	M	Ga	<	0.000300	i	Nd	<		M	Sm	<	0.000300				
M	Au	<	0.000300	M	Gd	<	0.000300	M	Ni	<	0.008000	M	Sn	<	0.008900				
M	B	<	0.003300	M	Ge	<	0.000300	M	Os	<	0.000590	M	Sr		0.000175				
M	Ba		0.001689	M	Hf	<	0.001800	i	P	<		M	Ta	<	0.004200				
M	Be	<	0.000890	M	Hg	<	0.003300	M	Pb	<	0.000300	M	Tb	<	0.000300				
M	Bi	<	0.000890	M	Ho	<	0.000300	M	Pd	<	0.001800	M	Te	<	0.021000				
O	Ca		0.006334	M	In	<	0.032000	M	Pr	<	0.013000	M	Th	<	0.000300				
O	Cd	<	0.026000	M	Ir	<	0.000300	M	Pt	<	0.000300	O	Tl	<	0.032000				
M	Ce	<	0.008300	M	K		0.130213	M	Rb		0.004575	M	Tl		0.001266				
M	Co		0.000598	M	La	<	0.000300	M	Re	<	0.000300	M	Tm	<	0.000300				
M	Cr		0.000527	O	Li		0.000059	M	Rh	<	0.000300	M	U	<	0.005300				
M	Cs		0.000527	M	Lu	<	0.000300	M	Ru	<	0.079000	M	V	<	0.000890				
M	Cu		0.002252	M	Mg		0.000563	i	S	<		M	W		0.087982				
M	Dy	<	0.000300	M	Mn	<	0.005900	M	Sb		0.001513	M	Y	<	0.000300				
M	Er	<	0.000300	s	Mo	<		M	Sc	<	0.001200	M	Yb	<	0.000300				

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference
n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

- For the calibration of analytical instruments and validation of analytical methods as appropriate.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

- Store between approximately 4° - 30° C while in sealed TCT bag.

- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° - 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

- For more information, visit www.inorganicventures.com/TCT

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 95.94 +6 6,7,8,9

[MoO₄]-2(chemical form as received)

Chemical Compatibility -Mo is received in a NH₄OH matrix giving the operator the option of using HCl or HF to stabilize acidic solutions. The [MoO₄]-2 is soluble in concentrated HCl [MoOCl₅]-2, dilute HF / HNO₃ [MoOF₅]-2 and basic media [MoO₄]-2. Stable at ppm levels with some metals provided it is fluorinated. Do not mix with Alkaline or Rare Earths when HF is present. Stable with most inorganic anions provided it is in the [MoO₄]-2 chemical form.

Stability - 2-100 ppb levels stable (alone or mixed with all other metals that are at comparable levels) as the [MoOF₅]-2 for months in 1% HNO₃ / LDPE container. 1-10,000 ppm single element solutions as the [MoO₄]-2 chemically stable for years in 1% NH₄OH in a LDPE container.

Mo Containing Samples (Preparation and Solution) -Metal (Soluble in HF / HNO₃ or hot dilute HCl); Oxide (soluble in HF or NH₄OH) ; Organic Matrices (Dry ash at 450EC in Pt0 and dissolve oxide with HF or HCl).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 95 amu	3 ppt	n/a	40Ar39K16O,79Br16O,190Os2+,190Pt2+
ICP-OES 202.030 nm	0.008 / 0.0002 µg/mL	1	Os, Hf
ICP-OES 203.844 nm	0.012 / 0.002 µg/mL	1	
ICP-OES 204.598 nm	0.012 / 0.001 µg/mL	1	Ir, Ta

8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

July 17, 2022

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

11.2 Lot Expiration Date

- July 17, 2027

- The date after which this CRM/RM should not be used.

- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:

Uyen Truong
Supervisor, Product Documentation



Certificate Approved By:

Michael Booth
Director, Technical



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



Certificate of Analysis

M5978, M5979



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INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories".
Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).

1.0 ACCREDITATION / REGISTRATION

2.0 PRODUCT DESCRIPTION

Product Code: Single Analyte Custom Grade Solution

Catalog Number: CGT1

Lot Number: T2-T1719972

Matrix: 2% (v/v) HNO₃

Value / Analyte(s): tr. HF

Starting Material: 1 000 µg/mL ea.

Starting Material: Titanium

Starting Material: Ti Metal

Starting Material Lot#: 2094

Starting Material Purity: 99.9975%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 1002 ± 5 µg/mL

Density: 1.012 g/mL (measured at 20 ± 4 °C)

Assay Method #1

1002 ± 4 µg/mL

ICP Assay NIST SRM 3162a Lot Number: 130925

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a National Institute of Standards and Technology (NIST) SRM/RM. See Sec 4.2 for balance traceability.

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Characterization of CRM/RM by Two or More Methods
Certified Value, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

$$X_{CRM/RM} = 2(w) / (w_1 + w_2)$$

w_1 = the weighting factors for each method calculated using the inverse square of the variance

$$w_1 = (1/u_{CRM}^2) / (1/u_{CRM}^2 + 1/u_{CRM}^2)$$

$$X_{CRM/RM} = (u_{CRM}^2 + u_{CRM}^2 + u_{CRM}^2 + u_{CRM}^2) / (u_{CRM}^2 + u_{CRM}^2 + u_{CRM}^2 + u_{CRM}^2)$$

k = coverage factor = 2

$$u_{CRM} = (2/(w_1 + w_2)) / (u_{CRM}^2 + u_{CRM}^2 + u_{CRM}^2 + u_{CRM}^2)$$

u_{CRM} = bottle to bottle homogeneity standard uncertainty

u_{CRM} = long term stability standard uncertainty (storage)

u_{CRM} = transport stability standard uncertainty

CRM/RM Expanded Uncertainty (2) = $U_{CRM} = k(u_{CRM}^2 + u_{CRM}^2 + u_{CRM}^2 + u_{CRM}^2)^{1/2}$
 k = coverage factor = 2
 u_{CRM} = bottle to bottle homogeneity standard uncertainty
 u_{CRM} = long term stability standard uncertainty (storage)
 u_{CRM} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0

TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

CRM/RMs are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an UHPA-filtered Clean Room. An UHPA-filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

M Ag	<	0.000536	M Eu	<	0.000268	O Na	<	0.032670	M Se	0.001204	O Zn	<	0.003267
M Al	<	0.000872	O Fe	<	0.003225	O Nb	<	0.043560	O Si	0.004735	O Zr	<	0.043560
M As	<	0.008586	M Ga	<	0.000268	M Nd	<	0.000268	M Sm	<	0.000268		
M Au	<	0.004577	M Gd	<	0.000268	O Ni	<	0.010890	M Sn	<	0.00096		
O B	<	0.008929	M Ge	<	0.002146	M Os	<	0.000269	O Sr	<	0.00096		
M Ba	<	0.002683	M Hf	<	0.002161	O P	<	0.054450	M Ta	<	0.010560		
M Be	<	0.005366	M Hg	<	0.003231	M Pb	<	0.001073	M Tb	<	0.000268		
M Bi	<	0.001609	M Ho	<	0.000268	M Pd	<	0.000268	M Th	<	0.001341		
O Ca	<	0.000676	M In	<	0.002683	M Pr	<	0.000268	M Tl	<	0.053663		
M Cd	<	0.000268	M Ir	<	0.000269	M Pt	<	0.000536	S Ti	<			
M Co	<	0.000268	M K	<	0.001172	M Rb	<	0.000268	M Tl	<	0.000268		
M Cr	<	0.000752	O Li	<	0.000268	M Re	<	0.000268	M Tm	<	0.000268		
M Cs	<	0.000268	M Lu	<	0.000268	M Rh	<	0.000268	M U	<	0.000268		
O Cu	<	0.010890	O Mg	<	0.005445	I S	<	0.006976	M Y	<	0.002146		
M Dy	<	0.000268	O Mn	<	0.003267	M Sb	<	0.004900	M Yb	<	0.000536		
M Er	<	0.000268	M Mo	<	0.000774	O Sc	<	0.004900	M Yb	<	0.000536		

6.0 INTENDED USE

- For the calibration of analytical instruments and validation of analytical methods as appropriate.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

- Store between approximately 4° - 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° - 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

- For more information, visit www.inorganicventures.com/TCT

Atomic Weight; Valence: Soluble in concentrated HCl, HF, H₃PO₄, H₂SO₄ and HNO₃. Avoid neutral to basic media. Unstable at ppm levels with metals that would pull F⁻ away (i.e. Do not mix with Alkaline or Rare Earths or high levels of transition elements unless they are fluorinated). Stable with most inorganic anions with a tendency to hydrolyze forming the hydrated oxide in all dilute acids except HF.

Stability: - 2-100 ppb levels stable (Alone or mixed with all other metals) as the Ti(F)₆-2 for months in 1% HNO₃ / LDPE container. - 1-10,000 ppm single element solutions as the Ti(F)₆-2 chemically stable for years in 2-5% HNO₃ / trace HF in an LDPE container.

Ti Containing Samples (Preparation and Solution) - Metal (Soluble in H₂O / HF caution - powder reacts violently): Oxide - low temperature history anatase or rutile (Dissolved by heating in 1:1:1 H₂O / HF / H₂SO₄); K₂SiO₃ - no KF if silica not present); Organic Matrices (Dry ash at 450°C in P10 and dissolve by heating with 1:1:1 H₂O / HF / H₂SO₄ or fuse ash with pyrosulfate if oxide is as plastic pigment and likely in brookite crystaline form).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 48 amu	14 ppt	N/A	32S16O, 32S14N, 14N16O18O, 14N17N2, 36Ar12C, 48Ca, [96X=2 (where X = Zr, Mo, W, Mo, Co Nb, Ta, Cr, U Ce, Ar, Ni Ru)]
ICP-OES 323.452 nm	0.0054 / 0.00092 µg/mL	1	
ICP-OES 334.941 nm	0.0038 / 0.00028 µg/mL	1	
ICP-OES 336.121 nm	0.0053 / 0.00034 µg/mL	1	

HAZARDOUS INFORMATION

HF Note: This standard should not be prepared or stored in glass.

8.0

HOMOGENEITY

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.
- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.
- Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0

QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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11.0

CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

June 17, 2022

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

11.2 Lot Expiration Date

- June 17, 2027

- The date after which this CRM/RM should not be used.

- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date:

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

12.0

NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozlikowski
Manager, Quality Control

TD9784

Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director

Paul R. Gaines

Certificate of Analysis

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M5985
R: 6/14/24

1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



2.0 PRODUCT DESCRIPTION

Product Code: Single Analyte Custom Grade Solution
Catalog Number: CGIN10
Lot Number: U2-IN729349
Matrix: 5% (v/v) HNO₃
Value / Analyte(s): 10 000 µg/mL ea:
Indium
Starting Material: Indium Metal
Starting Material Lot#: 2511
Starting Material Purity: 99.9995%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 10022 ± 30 µg/mL
Density: 1.044 g/mL (measured at 20 ± 4 °C)

Assay Information:

Assay Method #1	10021 ± 56 µg/mL ICP Assay NIST SRM 3124a Lot Number: 110516
Assay Method #2	10035 ± 25 µg/mL EDTA NIST SRM 928 Lot Number: 928
Assay Method #3	10001 ± 33 µg/mL Calculated NIST SRM Lot Number: See Sec. 4.2

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a National Institute of Standards and Technology (NIST) SRM/RM. See Sec 4.2 for balance traceability.

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Characterization of CRM/RM by Two or More Methods

Certified Value, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

$$X_{CRM/RM} = \sum (w_i) (X_i)$$

X_i = mean of Assay Method i with standard uncertainty $u_{char i}$

w_i = the weighting factors for each method calculated using the inverse square of the variance:

$$w_i = (1/u_{char i}^2) / (\sum (1/u_{char i}^2))$$

$$CRM/RM \text{ Expanded Uncertainty } (k) = U_{CRM/RM} = k (u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char} = [\sum (w_i)^2 (u_{char i}^2)]^{1/2}$ where $u_{char i}$ are the errors from each characterization method

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, $X_{CRM/RM}$, where one method of characterization is used is the mean of individual results:

$$X_{CRM/RM} = (X_a) (u_{char a})$$

X_a = mean of Assay Method A with

$u_{char a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (k) = U_{CRM/RM} = k (u_{char a}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

CRM/RMs are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

M	Ag	<	0.000760	M	Eu	<	0.000760	O	Na	0.012771	M	Se	<	0.023000	M	Zn	<	0.006100
M	Al	0.003385	O	Fe	0.004462	M	Nb	<	0.000760	O	Si	0.024619	M	Zr	<	0.000760		
M	As	<	0.004600	M	Ga	<	0.000760	M	Nd	<	0.000760	M	Sm	<	0.000760			
M	Au	<	0.002300	M	Gd	<	0.000760	O	Ni	<	0.005100	M	Sn	<	0.000760			
O	B	0.003692	M	Ge	<	0.001600	M	Os	<	0.000760	O	Sr	<	0.000610				
M	Ba	<	0.001600	M	Hf	<	0.000760	n	P	<		M	Ta	<	0.000760			
O	Be	<	0.000130	M	Hg	<	0.003100	M	Pb	0.001400	M	Tb	<	0.000760				
M	Bi	<	0.000760	M	Ho	<	0.000760	M	Pd	<	0.001600	M	Te	<	0.000760			
O	Ca	0.004616	s	In	<			M	Pr	<	0.000760	M	Th	<	0.000760			
M	Cd	<	0.000760	M	Ir	<	0.000760	M	Pt	<	0.000760	O	Ti	<	0.001100			
M	Ce	<	0.000760	O	K	0.007078	M	Rb	<	0.000760	M	Tl	<	0.000760				
M	Co	<	0.000760	M	La	<	0.000760	M	Re	<	0.000760	M	Tm	<	0.000760			
O	Cr	<	0.001300	O	Li	<	0.000130	M	Rh	<	0.000760	M	U	<	0.000760			
M	Cs	<	0.000760	M	Lu	<	0.000760	M	Ru	<	0.000760	M	V	<	0.001600			
M	Cu	<	0.003800	O	Mg	0.000707	n	S	<		M	W	<	0.001600				
M	Dy	<	0.000760	O	Mn	0.000149	M	Sb	<	0.000760	M	Y	<	0.000760				
M	Er	<	0.000760	M	Mo	<	0.002300	M	Sc	<	0.000760	M	Yb	<	0.000760			

M - Checked by ICP-MS

O - Checked by ICP-OES

i - Spectral Interference

n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.

6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures Terms and Conditions of Sale. <https://www.inorganicventures.com/terms-and-conditions-sale>. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

- Store between approximately 4° - 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° - 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

- For more information, visit www.inorganicventures.com/TCT

Atomic Weight; Valence; Coordination Number; Chemical Form In Solution - 114.82 +3 6 In(H₂O)₆+3

Chemical Compatibility -Soluble in HCl, HNO₃, and H₂SO₄. Avoid neutral and basic media. Stable with most metals and inorganic anions. The oxalate, sulfide, carbonate, hydroxide and phosphate are insoluble in water.

Stability - 2-100 ppb levels stable for months in 1% HNO₃ / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO₃ / LDPE container.

In Containing Samples (Preparation and Solution) -Metal (Best dissolved in HCl / HNO₃); Oxide (Soluble in mineral acids); Ores (Carbonate fusion in PtO followed by HCl dissolution); Organic Matrices (Sulfuric/peroxide digestion or dry ash and dissolution in dilute HCl).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 115 amu	1 ppt	n/a	115Sn, 99Ru16O
ICP-OES 158.583 nm	0.05 / 0.002 µg/mL	1	
ICP-OES 230.606 nm	0.1 / 0.03 µg/mL	1	Ni, Os
ICP-OES 325.609 nm	0.2 / 0.05 µg/mL	1	Mn, Mo, Th

8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; inorganicventures.com; Info@inorganicventures.com

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

February 21, 2023

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

11.2 Lot Expiration Date

- February 21, 2028

- The date after which this CRM/RM should not be used.

- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski
Manager, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.com

Certificate of Analysis

M6074
M6075
M6076
M6077

P: 800-669-6799/540-585-3030

F: 540-585-3012

info@inorganicventures.com

EXP: 9/6/2029

1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution
Catalog Number: CHEM-CLP-4
Lot Number: V2-MEB746762
Matrix: 3% (v/v) HNO₃
3% (v/v) HF
Value / Analyte(s): 1 000 µg/mL ea:
Boron, Molybdenum,
Silicon, Tin,
Titanium

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Boron, B	1 000 ± 5 µg/mL	Molybdenum, Mo	1 000 ± 5 µg/mL
Silicon, Si	1 000 ± 7 µg/mL	Tin, Sn	1 000 ± 5 µg/mL
Titanium, Ti	1 000 ± 6 µg/mL		

Density: 1.033 g/mL (measured at 20 ± 4 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
B	ICP Assay	3107	190605
B	Calculated		See Sec. 4.2
Mo	ICP Assay	traceable to 3134	U2-MO739068
Si	ICP Assay	Traceable to 3150	S2-SI702546
Sn	ICP Assay	3161a	140917
Ti	ICP Assay	traceable to 3162a	T2-TI725816

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Characterization of CRM/RM by Two or More Methods

Certified Value, $X_{\text{CRM/RM}}$, where two or more methods of characterization are used is the weighted mean of the results:

$$X_{\text{CRM/RM}} = \sum(w_i)(X_i)$$

X_i = mean of Assay Method i with standard uncertainty $u_{\text{char } i}$

w_i = the weighting factors for each method calculated using the inverse square of the variance:

$$w_i = (1/u_{\text{char } i}^2) / (\sum(1/u_{\text{char } i}^2))$$

$$\text{CRM/RM Expanded Uncertainty } (\pm) = U_{\text{CRM/RM}} = k(u_{\text{char}}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

$u_{\text{char}} = [\sum(w_i)^2(u_{\text{char } i}^2)]^{1/2}$ where $u_{\text{char } i}$ are the errors from each characterization method

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, $X_{\text{CRM/RM}}$, where one method of characterization is used is the mean of individual results:

$$X_{\text{CRM/RM}} = (X_a)(u_{\text{char } a})$$

X_a = mean of Assay Method A with

$u_{\text{char } a}$ = the standard uncertainty of characterization Method A

$$\text{CRM/RM Expanded Uncertainty } (\pm) = U_{\text{CRM/RM}} = k(u_{\text{char } a}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

$u_{\text{char } a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

N/A

6.0 INTENDED USE

6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.

6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures Terms and Conditions of Sale. <https://www.inorganicventures.com/terms-and-conditions-sale>. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

- Store between approximately 4° - 30° C while in sealed TCT bag.

- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° - 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

- For more information, visit www.inorganicventures.com/TCT

HF Note: This standard should not be prepared or stored in glass.

8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

September 06, 2024

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

11.2 Lot Expiration Date

- **September 06, 2029**

- The date after which this CRM/RM should not be used.

- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Joseph Burns
Custom VS Manager



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



Hydrochloric Acid, 36.5-38.0%
BAKER INSTRA-ANALYZED® Reagent
For Trace Metal Analysis

avantor™



R → 16/13/24
Met dig

M 6121

Material No.: 9530-33
Batch No.: 0000275677
Manufactured Date: 2020/12/16
Retest Date: 2025/12/15
Revision No: 1

Certificate of Analysis

Test	Specification	Result
ACS - Assay (as HCl) (by acid-base titrn)	36.5 - 38.0 %	37.6
ACS - Color (APHA)	<= 10	5
ACS - Residue after Ignition	<= 3 ppm	1
ACS - Specific Gravity at 60°/60°F	1.185 - 1.192	1.190
ACS - Bromide (Br)	<= 0.005 %	< 0.005
ACS - Extractable Organic Substances	<= 5 ppm	1
ACS - Free Chlorine (as Cl ₂)	<= 0.5 ppm	< 0.5
Phosphate (PO ₄)	<= 0.05 ppm	< 0.03
Sulfate (SO ₄)	<= 0.5 ppm	< 0.3
Sulfite (SO ₃)	<= 0.8 ppm	0.3
Ammonium (NH ₄)	<= 3 ppm	< 1
Trace Impurities - Arsenic (As)	<= 0.010 ppm	< 0.003
Trace Impurities - Aluminum (Al)	<= 10.0 ppb	< 0.2
Arsenic and Antimony (as As)	<= 5 ppb	< 3
Trace Impurities - Barium (Ba)	<= 1.0 ppb	< 0.2
Trace Impurities - Beryllium (Be)	<= 1.0 ppb	< 0.2
Trace Impurities - Bismuth (Bi)	<= 10.0 ppb	< 1.0
Trace Impurities - Boron (B)	<= 20.0 ppb	< 5.0
Trace Impurities - Cadmium (Cd)	<= 1.0 ppb	< 0.3
Trace Impurities - Calcium (Ca)	<= 50.0 ppb	29.7
Trace Impurities - Chromium (Cr)	<= 1.0 ppb	< 0.4
Trace Impurities - Cobalt (Co)	<= 1.0 ppb	< 0.3
Trace Impurities - Copper (Cu)	<= 1.0 ppb	< 0.1
Trace Impurities - Gallium (Ga)	<= 1.0 ppb	< 0.2

For questions on this Certificate of Analysis please contact Technical Services at 855.282.6867 or +1.610.386.1700

Avantor Performance Materials, LLC

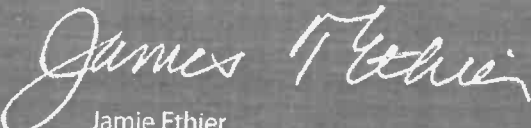
100 Matsonford Rd, Suite 200, Radnor, PA 19087. U.S.A. Phone: 610.386.1700

301

Test	Specification	Result
Trace Impurities – Germanium (Ge)	<= 3.0 ppb	< 2.0
Trace Impurities – Gold (Au)	<= 4.0 ppb	< 0.2
Heavy Metals (as Pb)	<= 100 ppb	< 50
Trace Impurities – Iron (Fe)	<= 15.0 ppb	< 1
Trace Impurities – Lead (Pb)	<= 1.0 ppb	< 0.5
Trace Impurities – Lithium (Li)	<= 1.0 ppb	0.2
Trace Impurities – Magnesium (Mg)	<= 10.0 ppb	0.4
Trace Impurities – Manganese (Mn)	<= 1.0 ppb	< 0.4
Trace Impurities – Mercury (Hg)	<= 0.5 ppb	0.1
Trace Impurities – Molybdenum (Mo)	<= 10.0 ppb	< 5.0
Trace Impurities – Nickel (Ni)	<= 4.0 ppb	< 0.3
Trace Impurities – Niobium (Nb)	<= 1.0 ppb	< 0.2
Trace Impurities – Potassium (K)	<= 9.0 ppb	< 2.0
Trace Impurities – Selenium (Se), For Information Only	ppb	1.0
Trace Impurities – Silicon (Si)	<= 100.0 ppb	< 10.0
Trace Impurities – Silver (Ag)	<= 1.0 ppb	< 0.3
Trace Impurities – Sodium (Na)	<= 100.0 ppb	< 5.0
Trace Impurities – Strontium (Sr)	<= 1.0 ppb	< 0.2
Trace Impurities – Tantalum (Ta)	<= 1.0 ppb	< 0.9
Trace Impurities – Thallium (Tl)	<= 5.0 ppb	< 2.0
Trace Impurities – Tin (Sn)	<= 5.0 ppb	< 0.8
Trace Impurities – Titanium (Ti)	<= 1.0 ppb	0.2
Trace Impurities – Vanadium (V)	<= 1.0 ppb	< 0.2
Trace Impurities – Zinc (Zn)	<= 5.0 ppb	0.3
Trace Impurities – Zirconium (Zr)	<= 1.0 ppb	< 0.1

For Laboratory, Research or Manufacturing Use
Product Information (not specifications):
Appearance (clear, fuming liquid)
Meets ACS Specifications

Country of Origin: US
Packaging Site: Phillipsburg Mfg Ctr & DC


Jamie Ethier
Vice President Global Quality

For questions on this Certificate of Analysis please contact Technical Services at 855.282.6867 or +1.610.386.1700

Avantor Performance Materials, LLC
100 Matsonford Rd, Suite 200, Radnor, PA 19087. U.S.A. Phone: 610.386.1700

302

M612 S

Receive → 11/22/24

CORCO CHEMICAL CORPORATION

Manufacturers of ACS Reagents and Semiconductor Grade Chemicals

Office and Plant
299 Cedar Lane
Fairless Hills, PA 19030

Phone: 215-295-5006
Fax: 215-295-0781

Hydrogen Peroxide 30%, ACS Reagent Grade

SPECIFICATION

MAXIMUM LIMITS

Appearance	Colorless and free from suspended matter or sediment
Assay	29-32%
Color (APHA)	10
Residue after Evaporation	0.002%
Titrateable Acid	0.0006 meq/g
Chloride (Cl)	3 ppm
Nitrate (NO ₃)	2 ppm
Phosphate	2 ppm
Sulfate (SO ₄)	5 ppm
Ammonium (NH ₄)	5 ppm
Heavy Metals (as Pb)	1 ppm
Iron (Fe)	0.5 ppm

Nitric Acid 69%
CMOS



R → 11/12/24

M6126

Material No.: 9606-03
Batch No.: 24D1062002
Manufactured Date: 2024-03-26
Retest Date: 2029-03-25
Revision No.: 0

Certificate of Analysis

Test	Specification	Result
Assay (HNO ₃)	69.0 – 70.0 %	69.7 %
Appearance	Passes Test	Passes Test
Color (APHA)	≤ 10	5
Residue after Ignition	≤ 2 ppm	1 ppm
Chloride (Cl)	≤ 0.08 ppm	< 0.03 ppm
Phosphate (PO ₄)	≤ 0.10 ppm	< 0.03 ppm
Sulfate (SO ₄)	≤ 0.2 ppm	< 0.2 ppm
Trace Impurities – Aluminum (Al)	≤ 40.0 ppb	< 1.0 ppb
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 2.0 ppb
Trace Impurities – Barium (Ba)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Beryllium (Be)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Bismuth (Bi)	≤ 20.0 ppb	< 10.0 ppb
Trace Impurities – Boron (B)	≤ 10.0 ppb	< 5.0 ppb
Trace Impurities – Cadmium (Cd)	≤ 50 ppb	< 1 ppb
Trace Impurities – Calcium (Ca)	≤ 50.0 ppb	2.3 ppb
Trace Impurities – Chromium (Cr)	≤ 30.0 ppb	< 1.0 ppb
Trace Impurities – Cobalt (Co)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Copper (Cu)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Gallium (Ga)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Germanium (Ge)	≤ 20 ppb	< 10 ppb
Trace Impurities – Gold (Au)	≤ 20 ppb	< 5 ppb
Heavy Metals (as Pb)	≤ 100 ppb	100 ppb
Trace Impurities – Iron (Fe)	≤ 40.0 ppb	< 1.0 ppb
Trace Impurities – Lead (Pb)	≤ 20.0 ppb	< 10.0 ppb
Trace Impurities – Lithium (Li)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Magnesium (Mg)	≤ 20 ppb	< 1 ppb
Trace Impurities – Manganese (Mn)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Nickel (Ni)	≤ 20.0 ppb	< 5.0 ppb

>>> Continued on page 2 >>>

Nitric Acid 69%
CMOS

 **avantor**TM



Material No.: 9606-03
Batch No.: 24D1062002

Test	Specification	Result
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For Microelectronic Use

Country of Origin: USA
Packaging Site: Phillipsburg Mfg Ctr & DC



Jamie Croak
Director Quality Operations, Bioscience Production

306



CERTIFIED WEIGHT REPORT:

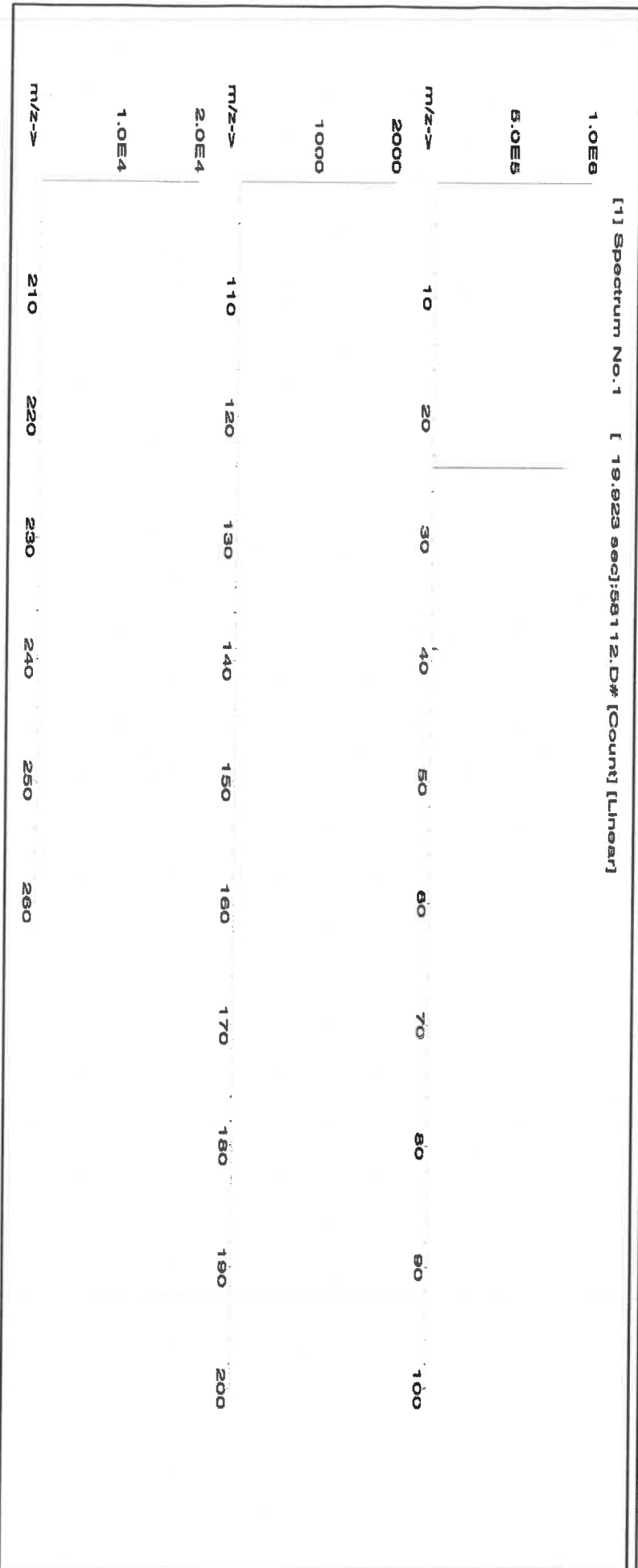
Part Number: 58112
Lot # 24012496
Description: Magnesium (Mg)
Solvent: Nitric Acid

Expiration Date: 11/21/27
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6LUB
Weight shown below was diluted to (mL): 2000.07
5E-05 Balance Uncertainty
0.100 Flask Uncertainty

<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito
Reviewed By:	Pedro L. Rentas
	112124

Compound	Lot	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Magnesium nitrate hexahydrate (Mg) IN030 MG000023A1 10000 99.999 0.10 8.51 234.9183 234.9459 10001.2 20.0 13446-18-9 NA off-rat 5440 mg/kg 3131a





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Rc	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	T	Os	<0.02	Rb	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Ru	<0.02	Na	<0.2	Tm	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Sm	<0.02	Sr	<0.02	Sn	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sc	<0.02	S	<0.02	Ti	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2			Ta	<0.02			Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

58025
101124
Manganese (Mn)

R-71113128

Lot #
Solvent: 24002546 Nitric Acid

Expiration Date:

101127

2% 80.0 (mL) Nitric Acid

Recommended Storage:
Nominal Concentration (µg/mL):

Ambient (20 °C)
1000

NIST Test Number:

6UTB

5E-05 Balance Uncertainty

Weight shown below was diluted to (mL):

4000.2 0.10 Flask Uncertainty

<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito
Reviewed By:	<i>Pedro L. Renteria</i>
	101124

Compound

RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Manganese(II) nitrate hydrate (Mn) IN031 MMN032020A1 1000 99.999 0.10 20.8 19.2322 19.2344 **1000.1** **2.0** 15710-66-4 5 mg/m3 or-rel >300mg/kg 3132

[1] Spectrum No.1 [34.243 sec]:57025.D# [Count] [Linear]

5.0E6	m/z->	110	120	130	140	150	160	170	180	190	200
2.5E6	m/z->	10	20	30	40	50	60	70	80	90	100
1.0E6	m/z->	10	20	30	40	50	60	70	80	90	100
5.0E7	m/z->	110	120	130	140	150	160	170	180	190	200
5.0E7	m/z->	210	220	230	240	250	260				



Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

310

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	T	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Certified by:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



CERTIFIED WEIGHT REPORT:

Part Number: 58111
Lot Number: 072424
Description: Sodium (Na)

Lot # R-1113/25
Solvent: 24002546 Nitric Acid

Expiration Date: 072427
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB

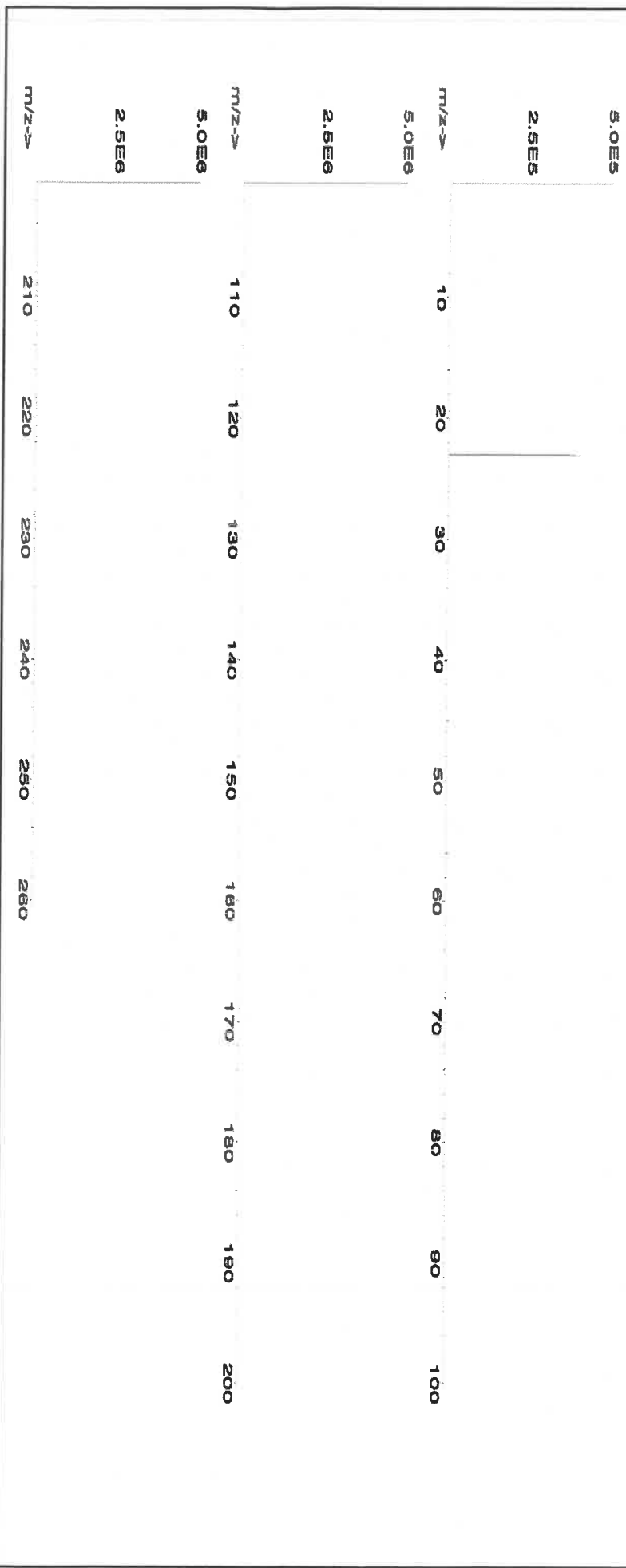
Weight shown below was diluted to (mL): 4000.2
5E-05 Balance Uncertainty
0.10 Flask Uncertainty

Formulated By:	Benson Chan	072424
Reviewed By:	Pedro L. Renteria	072424

Compound	RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM

1. Sodium nitrate (Na) IN036 NAV01201511 10000 99.999 0.10 26.9 148.7096 ##### 10000.0 20.0 7631-99-4 5 mg/m3 orl-rat 3430 mg/kg 3152a

[1] Spectrum No. 1 [8.935 sec]:58111.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

312

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rb	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	T	Tb	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Certified by:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



CERTIFIED WEIGHT REPORT:

Part Number: **58030** Lot # **121724**
Description: **Zinc (Zn)**

Expiration Date: **121727** Solvent: **24012496 Nitric Acid**

Recommended Storage: **Ambient (20 °C)** 2% 40.0 Nitric Acid
Nominal Concentration (µg/mL): **1000**

NIST Test Number: **6UTB** 5E-05 Balance Uncertainty
Weight shown below was diluted to (mL): **2000.1** 0.10 Flask Uncertainty

<i>Aleah O'Brady</i>	
Formulated By:	Aleah O'Brady
Reviewed By:	<i>Pedro L. Rentias</i>
	Pedro L. Rentias
	121724

313

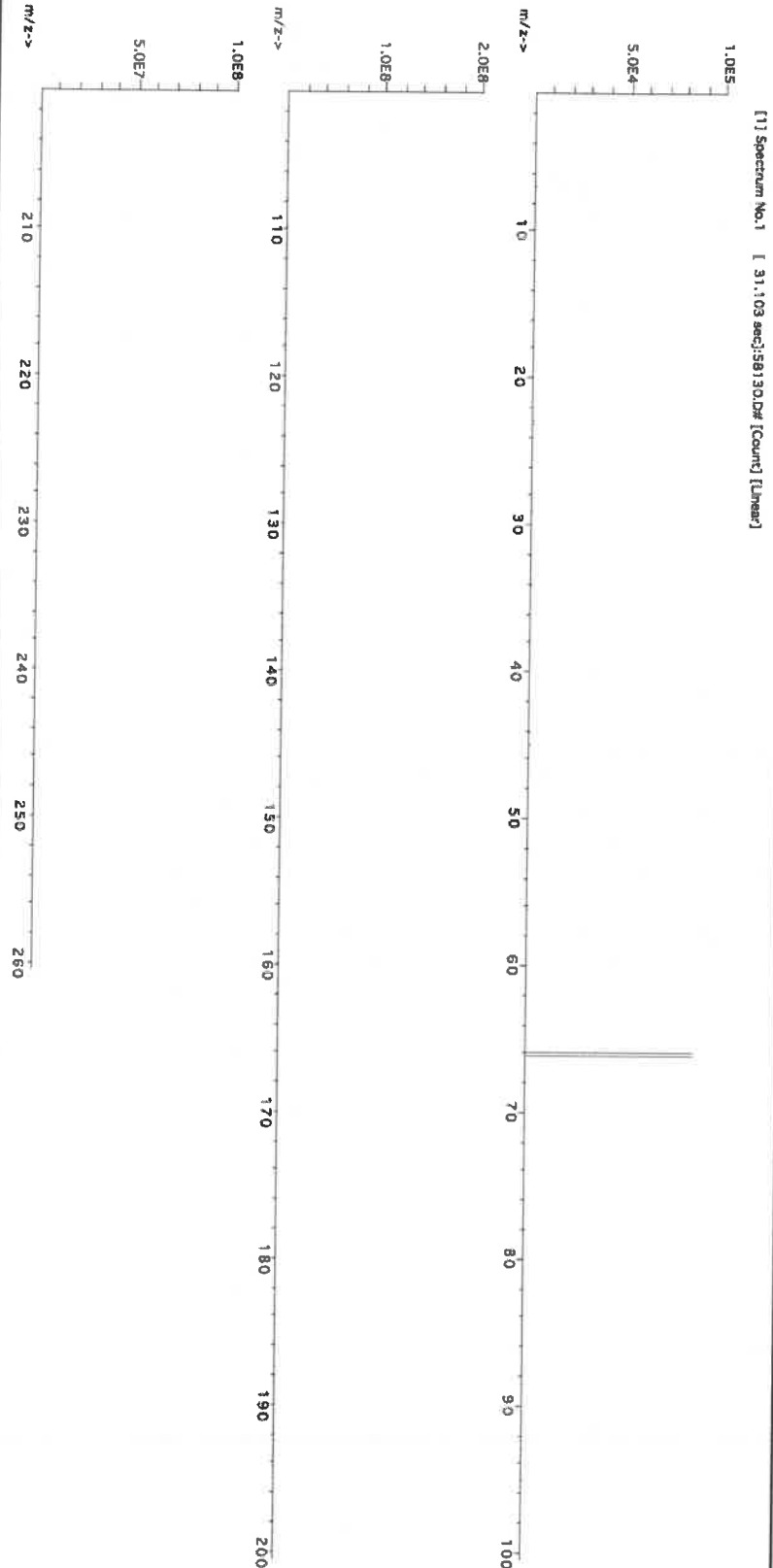
1. Zinc nitrate hexahydrate (Zn) IN016 ZNE032021A1 1000 99.999 0.10 24.3 8.2308 8.2311 1000.0 2.0 10196-18-6 1 mg/m3 or-rat 1190mg/kg 3168

Compound

RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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SDS Information

(Solvent Safety Info. On Attached pg.)





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Bu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



CERTIFIED WEIGHT REPORT:

Part Number: 58111
Lot Number: 122223
Description: Sodium (Na)

Solvent: 24002546 Nitric Acid

Lot #

Aleah O Brady
Formulated By: Aleah O Brady

122223

Expiration Date: 122226

2% 60.0 Nitric Acid
(mL)

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 10000

NIST Test Number: 6UTB 5E-05 Balance Uncertainty

Weight shown below was diluted to (mL): 3000.4 0.06 Flask Uncertainty

Pedro L Rentas
Reviewed By: Pedro L Rentas

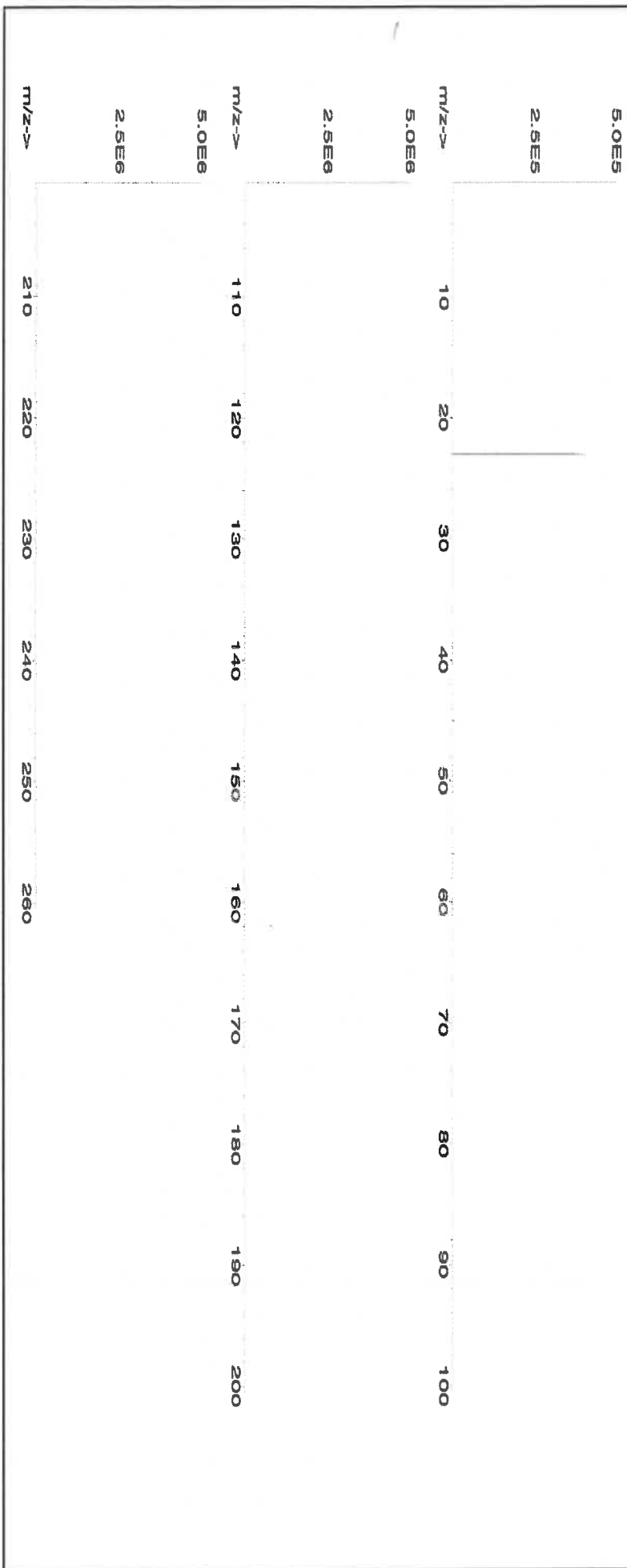
122223

SDS Information

Compound	Lot	Nominal	Purity	Uncertainty	Assay	Target	Actual	Actual	Expanded	(Solvent Safety Info. On Attached pg.)	NIST
	RM#	Number	Conc. (µg/mL)	(%)	Purity (%)	Weight (g)	Weight (g)	Conc. (µg/mL)	+/- (µg/mL)	CAS#	SRM

1. Sodium nitrate (Na) IN036 NAV01201511 10000 99.999 0.10 26.9 111.5406 111.5479 10000.7 20.0 7631-99-4 5 mg/m3 or-trat 3430 mg/kg 3152a

[1] Spectrum No.1 [8.935 sec]:58111.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.02	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



Certified Reference Material CRM



CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57051
120523
Antimony (Sb)

Lot #
Solvent:

24002546 Nitric Acid

2.0% 60.0 Nitric Acid (mL)

Expiration Date:

120526

Recommended Storage:
Ambient (20 °C)

Nominal Concentration (µg/mL):
1000

NIST Test Number:
6U7B

Volume shown below was diluted to (mL):
3000.41

5E-05 Balance Uncertainty
0.058 Flask Uncertainty

Formulated By:	Lawrence Barry	120523
Reviewed By:	Pedro L. Renteria	120523

SDS Information

Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Antimony (Sb) 58151 100923 0.1000 300.0 0.084 1000 10001.4 1000.0 2.1 7440-36-0 0.5 mg/m3 or-rel 7000 mg/kg 3102a

[1] Spectrum No.1 [17.964 sec]:58051.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	T	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
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- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



CERTIFIED WEIGHT REPORT:

Part Number: **57047**
Lot Number: **122823**
Description: **Silver (Ag)**

Lot #
Solvent: 24002546 Nitric Acid

Expiration Date: 122826
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 1000
NIST Test Number: 6UTB

2% 80.0 (mL) Nitric Acid

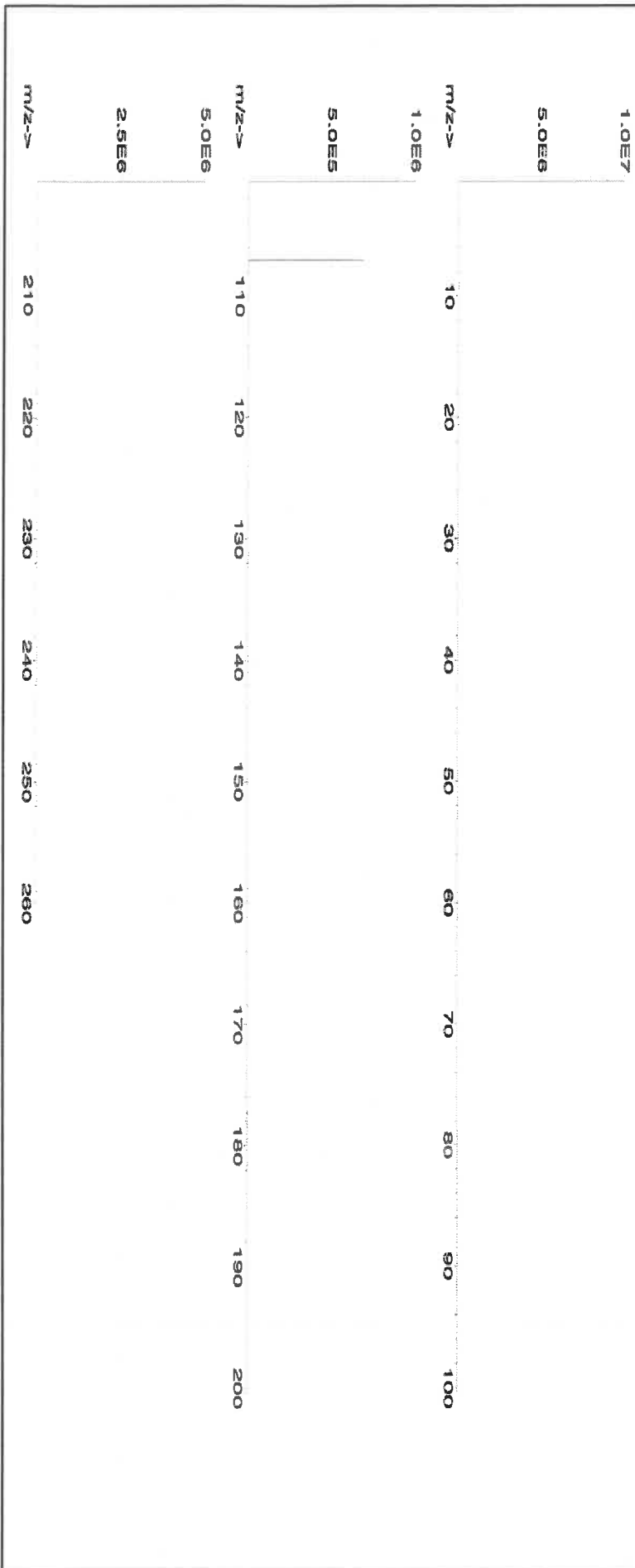
Weight shown below was diluted to (mL): 4000.30 0.058 Balance Uncertainty
Flask Uncertainty

Formulated By:	Benson Chan
Reviewed By:	Pedro L. Rentas
	122823

Compound		Lot		Nominal	Purity	Uncertainty	Assay	Target	Actual	Actual	Expanded	SDS Information		NIST
RM#	Number	Conc. (µg/mL)	(%)	Purity (%)	Assay (%)	Weight (g)	Weight (g)	Conc. (µg/mL)	Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	(Solvent Safety Info. On Attached pg.)	LD50	SRM

1. Silver nitrate (Ag) IN035 J0612AGA1 1000.0 99.999 0.10 63.7 6.27992 6.27998 1000.0 2.0 7761-88-8 10 µg/m³ NA 3151

[1] Spectrum No. 1 [14.044 sec]:58147.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	T	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

Physical Characterization:

(T)= Target analyte

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 meghom deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



R: 10/18/24
Certified Reference Material CRM



CERTIFIED WEIGHT REPORT:

Part Number:

Lot Number:

Description:

57051

071724

Antimony (Sb)

Lot #
24002546

Solvent:
Nitric Acid

Expiration Date: 071727

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 1000

NIST Test Number: 6LJB

Volume shown below was diluted to (mL): 2000.26

Balance Uncertainty: 5E-05

Flask Uncertainty: 0.058

2.0%

40.0 (mL)

Nitric Acid

Formulated By:

Giovanni Esposito

071724

Reviewed By:

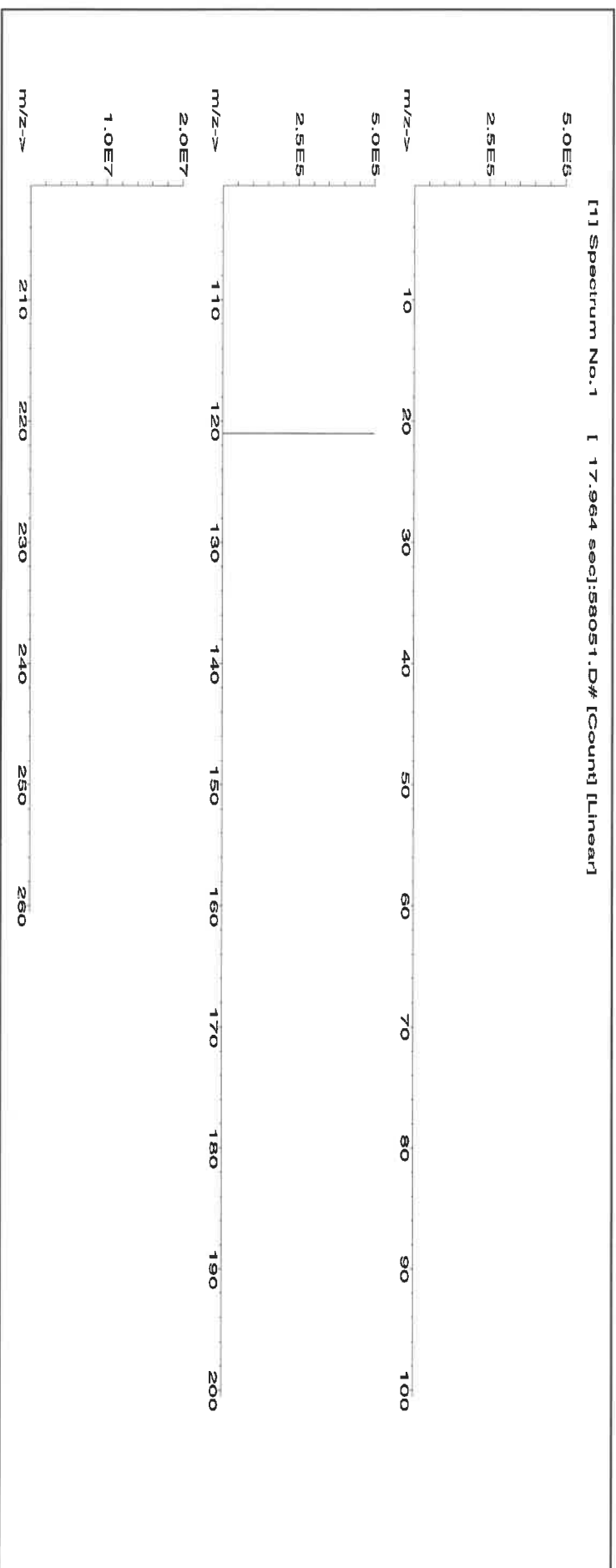
Pedro L. Rentas

071724

SDS Information

Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Antimony (Sb)	58151	060324	0.1000	200.0	0.084	1000	10001.4	1000.0	2.2	7440-36-0	0.5 mg/m3	or-rat 7000 mg/kg	3102a
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Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	T	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Bu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY
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R: 02/20/20

Instructions for QATS Reference Material: *Inorganic ICV Solutions*

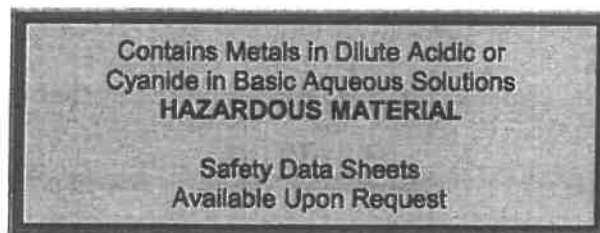
QATS LABORATORY INORGANIC REFERENCE MATERIAL
INITIAL CALIBRATION VERIFICATION SOLUTIONS
(ICV1, ICV5, AND ICV6)

M6147

NOTE: These instructions are for advisory purposes only. If any apparent conflict exists between these instructions and the analytical protocol or your contract, disregard these instructions.

APPLICATION: For use with the CLP SFAM01.0 SOW and revisions.

CAUTION: Read instructions carefully before opening bottle(s) and proceeding with the analyses.



(A) SAMPLE DESCRIPTION

Enclosed is a set of one (1) or more Aqueous Inorganic Reference Materials containing various analyte concentrations. ICV1 and ICV5 are in a matrix of dilute nitric acid. ICV6 is in a matrix of dilute basic solution. For the reference material source in reporting ICVs use "USEPA". For the reference material lot number for the ICV1, ICV5, and ICV6 solutions use "ICV1-1014", "ICV5-0415", and "ICV6-0400", respectively.

(B) BREAKAGE OR MISSING ITEMS

Check the contents of the shipment carefully for any broken, leaking, or missing items. Check that the seal is intact on each bottle. Refer to the enclosed chain of custody record. Report any problems to Mr. Keith Strout, APTIM Federal Services, LLC, at (702) 895-8722. If requested, return the chain-of-custody record with appropriate annotations and signatures to the address provided below.

QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY
APTIM Federal Services, LLC
2700 Chandler Avenue - Building C
Las Vegas, NV 89120

(C) ANALYSIS OF SAMPLES

The Initial Calibration Verification Solutions (ICVs) are to be used to evaluate the accuracy of the initial calibrations of ICP, AA, and Cyanide colorimetric instruments, and are to be used with the CLP SOWs and revisions. The values for each element in the ICVs are listed below in µg/L (ppb) for the resulting solution(s) after the dilution of the concentrate(s) according to the following instructions. Use Class 'A' glassware to prepare the solution(s).

ICV1-1014 For ICP-AES analysis, use a 10-fold dilution by pipetting 10 mL of the ICV1 concentrate into a 100 mL volumetric flask and dilute to volume with 2% (v/v) nitric acid.





QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY
"An ISO 9001:2015 Certified Program"

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Instructions for QATS Reference Material: *Inorganic ICV Solutions*

ICV1-1014 For ICP-MS analysis, use a 50-fold dilution by pipetting 2 mL of the ICV1 concentrate into a 100 mL volumetric flask and dilute to volume with 1% (v/v) nitric acid.

ICV5-0415 For the cold vapor analysis of mercury by AA, use a 100-fold dilution by pipetting 1 mL of the ICV5 concentrate into a 100 mL volumetric flask and dilute to volume with 2% (v/v) nitric acid. The ICV5 concentrate is prepared in 0.05% (w/v) $K_2Cr_2O_7$ and 5% (v/v) nitric acid.

ICV6-0400 For the analysis of cyanide, use a 100-fold dilution by pipetting 1 mL of the ICV6 concentrate into a 100 mL volumetric flask and dilute to volume with Type II water. Distill this solution along with the samples before analysis. The cyanide concentrate is prepared from $K_3Fe(CN)_6$, Type II water, and 0.1 % sodium hydroxide, and will decompose rapidly if exposed to light.

NOTE: USE TYPE II WATER AND HIGH-PURITY ACIDS FOR ALL DILUTIONS.

(D) CERTIFIED CONCENTRATIONS OF QATS ICV1, ICV5, AND ICV6 SOLUTIONS

ICV1-1014		
Element	Concentration (µg/L) (after 10-fold dilution)	Concentration (µg/L) (after 50-fold dilution)
Al	2500	500
Sb	1000	200
As	1000	200
Ba	520	100
Be	510	100
Cd	510	100
Ca	10000	2000
Cr	520	100
Co	520	100
Cu	510	100
Fe	10000	2000
Pb	1000	200
Mg	6000	1200
Mn	520	100
Ni	530	110
K	9900	2000
Se	1000	200
Ag	250	50
Na	10000	2000
Tl	1000	210
V	500	100
Zn	1000	200

ICV5-0415		ICV6-0400	
Element	Concentration (µg/L) (after 100-fold dilution)	Analyte	Concentration (µg/L) (after 100-fold dilution)
Hg	4.0	CN ⁻	99

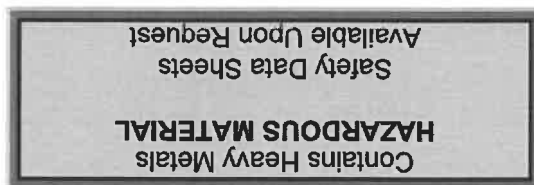


**QATS LABORATORY INORGANIC REFERENCE MATERIAL
INTERFERENCE CHECK SAMPLE SET FOR ICP-AES (ICSA WITH ICSB)**

NOTE: These instructions are for advisory purposes only. If any apparent conflict exists between these instructions and the analytical protocol or your contract, disregard these instructions.

APPLICATION: For use with the CLP SFAM01.0 SOW and revisions.

CAUTION: Read instructions carefully before opening bottle(s) and proceeding with the analyses.



(A) SAMPLE DESCRIPTION

Enclosed is a set of one (1) or more bottles of Aqueous Reference Material, each composed of metals at various concentrations and prepared with nitrate salts and oxy-acids of the respective elements in a 5% nitric acid matrix. For the reference material source in reporting ICSA and ICSAB mixture use "USEPA". For the reference material lot number for the ICSA use "ICSA-1211" and for the ICSAB mixture use "ICSA-1211+ICSB-0710".

CAUTION: The bottle(s) should be protected from light during storage to ensure the stability of silver which is contained in the ICSB solution. The bottle(s) should be stored at room temperature. Do not allow the solution(s) to freeze.

(B) BREAKAGE OR MISSING ITEMS

Check the contents of the shipment carefully for any broken, leaking, or missing items. Check that the seal is intact on each bottle. Refer to the enclosed chain of custody record. Report any problems to Mr. Keith Strout, APTIM Federal Services, LLC, at (702) 895-8722. If requested, return the chain-of-custody record with appropriate annotations and signatures to the address provided below.

**QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY
APTIM Federal Services, LLC
2700 Chandler Avenue - Building C
Las Vegas, NV 89120**

(C) ANALYSIS OF SAMPLES

The interference check sample set is to be used to verify inter-element and background correction factors of inductively-coupled plasma (ICP) spectrometers. This reference material set consists of two (2) concentrated solutions. The ICSA solution contains the four (4) interelement elements: Al, Ca, Fe, and Mg. The ICSB solution contains the analytes: Ag, As, Sb, Ba, Be,



Instructions for QATS Reference Material: ICP-AES ICS
Cd, Co, Cr, Cu, Mn, Ni, Pb, Ti, Se, V, and Zn. This instruction sheet provides the nominal values for ICP-AES Part A and Part B target analytes when diluted as directed.

Using Class "A" glassware, preparation and analysis must be performed according to the following instructions:

ICSA-1211, Interferents: Pipet 10 mL of the ICSA solution into a 100 mL volumetric flask and dilute to volume with 2% v/v HNO₃. Analyze this ICSA solution by ICP-AES.

ICSB-0710, Analytes, mixed with ICSA-1211, Interferents: Pipet 10 mL of the ICSA solution and 10 mL of the ICSB solution into a 100 mL volumetric flask and dilute to volume with 2% v/v HNO₃. Analyze this ICSAB solution by ICP-AES.

(D) "CERTIFIED VALUE" CONCENTRATIONS OF QATS ICP-AES ICS SOLUTION(S)

The "Certified Value" concentrations of the elements, listed in Table 1 below, were derived from statistically pooled analysis results from the following sources, if available: QATS Laboratory, CLP laboratories, Quarterly Blind (QB)/Proficiency Testing (PT) events, CLP pre-award events, and external referee laboratories.

Table 1. "CERTIFIED VALUES" FOR INTERFERENCE CHECK SAMPLE ICP-AES ICSA-1211, AND ICSA-1211 MIXED WITH ICSB-0710

Element	CRQL	Part A (µg/L)	Low Limit (µg/L)	High Limit (µg/L)	Part A (µg/L)	Part B (µg/L)	Low Limit (µg/L)	High Limit (µg/L)
Al	200	255000	216000	294000	247000	209000	285000	711
Sb	60	(0.0)	-60.0	60.0	618	525	711	120
As	10	(0.0)	-10.0	10.0	104	88.4	120	737
Ba	200	(6.0)	-194	206	(537)	420	570	1120
Be	5.0	(0.0)	-5.0	5.0	495	420	570	624
Cd	5.0	(1.0)	-4.0	6.0	972	826	1120	271000
Ca	5000	245000	208000	282000	235000	199000	271000	588
Cr	10	(52.0)	42.0	62.0	542	460	624	548
Co	50	(0.0)	-50.0	50.0	476	404	548	588
Cu	25	(2.0)	-23.0	27.0	511	434	588	114500
Fe	100	101000	85600	116500	99300	84400	114500	59.0
Pb	10	(0.0)	-10.0	10.0	(49.0)	39.0	59.0	286000
Mg	5000	255000	216000	294000	248000	210000	286000	584
Mn	15	(7.0)	-8.0	22.0	507	430	584	1100
Ni	40	(2.0)	-38.0	42.0	954	810	1100	81.0
Se	35	(0.0)	-35.0	35.0	(46.0)	11.0	81.0	232
Ag	10	(0.0)	-10.0	10.0	201	170	232	133
Ti	25	(0.0)	-25.0	25.0	(108)	83.0	133	565
V	50	(0.0)	-50.0	50.0	491	417	565	1095
Zn	60	(0.0)	-60.0	60.0	952	809	1095	

The acceptance ranges for all analytes in parentheses in the above table were determined using the listed certified value ± 1 times the associated CLP SOW CRQL. The acceptance ranges for all other analytes were determined using the certified value ± 15 percent of the listed certified value.



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Instructions for QATS Reference Material: ICP-AES ICS

QATS LABORATORY INORGANIC REFERENCE MATERIAL
INTERFERENCE CHECK SAMPLE SET FOR ICP-AES (ICSA WITH ICSB)

NOTE: These instructions are for advisory purposes only. If any apparent conflict exists between these instructions and the analytical protocol or your contract, disregard these instructions.

APPLICATION: For use with the CLP SFAM01.0 SOW and revisions.

CAUTION: Read instructions carefully before opening bottle(s) and proceeding with the analyses.

Contains Heavy Metals
HAZARDOUS MATERIAL

Safety Data Sheets
Available Upon Request

(A) SAMPLE DESCRIPTION

Enclosed is a set of one (1) or more bottles of Aqueous Reference Material, each composed of metals at various concentrations and prepared with nitrate salts and oxy-acids of the respective elements in a 5% nitric acid matrix. **For the reference material source in reporting ICSA and ICSAB mixture use "USEPA". For the reference material lot number for the ICSA use "ICSA-1211" and for the ICSAB mixture use "ICSA-1211+ICSB-0710".**

CAUTION: The bottle(s) should be protected from light during storage to ensure the stability of silver which is contained in the ICSB solution. The bottle(s) should be stored at room temperature. **Do not allow the solution(s) to freeze.**

(B) BREAKAGE OR MISSING ITEMS

Check the contents of the shipment carefully for any broken, leaking, or missing items. Check that the seal is intact on each bottle. Refer to the enclosed chain of custody record. Report any problems to Mr. Keith Strout, APTIM Federal Services, LLC, at (702) 895-8722. If requested, return the chain-of-custody record with appropriate annotations and signatures to the address provided below.

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APTIM Federal Services, LLC
2700 Chandler Avenue - Building C
Las Vegas, NV 89120

(C) ANALYSIS OF SAMPLES

The interference check sample set is to be used to verify inter-element and background correction factors of inductively-coupled plasma (ICP) spectrometers. This reference material set consists of two (2) concentrated solutions. The ICSA solution contains the four (4) interferent elements: Al, Ca, Fe, and Mg. The ICSB solution contains the analytes: Ag, As, Sb, Ba, Be,





Instructions for QATS Reference Material: ICP-AES ICS

Cd, Co, Cr, Cu, Mn, Ni, Pb, Ti, Se, V, and Zn. This instruction sheet provides the nominal values for ICP-AES Part A and Part B target analytes when diluted as directed.

Using Class "A" glassware, preparation and analysis must be performed according to the following instructions:

ICSA-1211, Interferents: Pipet 10 mL of the ICSA solution into a 100 mL volumetric flask and dilute to volume with 2% v/v HNO₃. Analyze this ICSA solution by ICP-AES.

ICSB-0710, Analytes, mixed with ICSA-1211, Interferents: Pipet 10 mL of the ICSA solution and 10 mL of the ICSB solution into a 100 mL volumetric flask and dilute to volume with 2% v/v HNO₃. Analyze this ICSAB solution by ICP-AES.

(D) "CERTIFIED VALUE" CONCENTRATIONS OF QATS ICP-AES ICS SOLUTION(S)

The "Certified Value" concentrations of the elements, listed in Table 1 below, were derived from statistically pooled analysis results from the following sources, if available: QATS Laboratory, CLP laboratories, Quarterly Blind (QB)/Proficiency Testing (PT) events, CLP pre-award events, and external referee laboratories.

Table 1. "CERTIFIED VALUES" FOR INTERFERENCE CHECK SAMPLE ICP-AES ICSA-1211, AND ICSA-1211 MIXED WITH ICSB-0710

Element	CRQL	Part A (µg/L)	Low Limit (µg/L)	High Limit (µg/L)	Part A +Part B (µg/L)	Low Limit (µg/L)	High Limit (µg/L)
Al	200	255000	216000	294000	247000	209000	285000
Sb	60	(0.0)	-60.0	60.0	618	525	711
As	10	(0.0)	-10.0	10.0	104	88.4	120
Ba	200	(6.0)	-194	206	(537)	337	737
Be	5.0	(0.0)	-5.0	5.0	495	420	570
Cd	5.0	(1.0)	-4.0	6.0	972	826	1120
Ca	5000	245000	208000	282000	235000	199000	271000
Cr	10	(52.0)	42.0	62.0	542	460	624
Co	50	(0.0)	-50.0	50.0	476	404	548
Cu	25	(2.0)	-23.0	27.0	511	434	588
Fe	100	101000	85600	116500	99300	84400	114500
Pb	10	(0.0)	-10.0	10.0	(49.0)	39.0	59.0
Mg	5000	255000	216000	294000	248000	210000	286000
Mn	15	(7.0)	-8.0	22.0	507	430	584
Ni	40	(2.0)	-38.0	42.0	954	810	1100
Se	35	(0.0)	-35.0	35.0	(46.0)	11.0	81.0
Ag	10	(0.0)	-10.0	10.0	201	170	232
Ti	25	(0.0)	-25.0	25.0	(108)	83.0	133
V	50	(0.0)	-50.0	50.0	491	417	565
Zn	60	(0.0)	-60.0	60.0	952	809	1095

The acceptance ranges for all analytes in parentheses in the above table were determined using the listed certified value ± 1 times the associated CLP SOW CRQL. The acceptance ranges for all other analytes were determined using the certified value ± 15 percent of the listed certified value.

R: 8/5/24

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300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.comP: 800-669-6799/540-585-3030
F: 540-585-3012
info@inorganicventures.com**1.0 ACCREDITATION / REGISTRATION**

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).

**2.0 PRODUCT DESCRIPTION**

Product Code: Single Analyte Custom Grade Solution
Catalog Number: CGSR1
Lot Number: U2-SR730227
Matrix: 0.1% (v/v) HNO₃
Value / Analyte(s): 1 000 µg/mL ea:
Strontium
Starting Material: SrCO₃
Starting Material Lot#: M2-2192
Starting Material Purity: 99.9993%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 1001 ± 3 µg/mL
Density: 1.000 g/mL (measured at 20 ± 4 °C)

Assay Information:

Assay Method #1	998 ± 4 µg/mL ICP Assay NIST SRM Traceable to 3153a Lot Number: K2-SR650985
Assay Method #2	1001 ± 3 µg/mL EDTA NIST SRM 928 Lot Number: 928
Assay Method #3	1001 ± 2 µg/mL Calculated NIST SRM Lot Number: See Sec. 4.2

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a National Institute of Standards and Technology (NIST) SRM/RM. See Sec 4.2 for balance traceability.

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Characterization of CRM/RM by Two or More Methods

Certified Value, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

$$X_{CRM/RM} = \sum(w_i)(X_i)$$

X_i = mean of Assay Method i with standard uncertainty $u_{char\ i}$

w_i = the weighting factors for each method calculated using the inverse square of the variance:

$$w_i = (1/u_{char\ i})^2 / (\sum(1/u_{char\ i})^2)$$

$$CRM/RM \text{ Expanded Uncertainty } (k) = U_{CRM/RM} = k(u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char} = [\sum(w_i)^2(u_{char\ i})^2]^{1/2}$ where $u_{char\ i}$ are the errors from each characterization method

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, $X_{CRM/RM}$, where one method of characterization is used is the mean of individual results:

$$X_{CRM/RM} = (X_a)(u_{char\ a})$$

X_a = mean of Assay Method A with

$u_{char\ a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (k) = U_{CRM/RM} = k(u_{char\ a}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char\ a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

CRM/RMs are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

M	Ag	<	0.001980	M	Eu	<	0.000495	O	Na	0.000200	M	Se	<	0.013862	O	Zn	0.000143	
O	Al	0.000370	O	Fe	0.000410	M	Nb	<	0.000495	i	Si	<			M	Zr	<	0.000495
M	As	<	0.000495	M	Ga	<	0.000495	M	Nd	<	0.000495	M	Sm	<	0.000495			
M	Au	<	0.000989	M	Gd	<	0.000495	O	Ni	<	0.007631	M	Sn	<	0.000990			
M	B	<	0.039606	M	Ge	<	0.000495	M	Os	<	0.000494	s	Sr	<				
M	Ba	0.006486	M	Hf	<	0.000495	i	P	<			M	Ta	<	0.000495			
M	Be	<	0.000990	M	Hg	<	0.000989	M	Pb	<	0.002970	M	Tb	<	0.000495			
M	Bi	<	0.000495	M	Ho	<	0.000495	M	Pd	<	0.003957	M	Te	<	0.027724			
O	Ca	0.004255	M	In	<	0.000495	M	Pr	<	0.000495	M	Th	<	0.000990				
M	Cd	0.001339	M	Ir	<	0.000494	M	Pt	<	0.002970	M	Ti	<	0.005940				
M	Ce	<	0.004950	O	K	<	0.008184	M	Rb	<	0.002970	M	Tl	<	0.000495			
M	Co	<	0.000495	M	La	<	0.000495	M	Re	<	0.000495	M	Tm	<	0.000495			
O	Cr	<	0.003207	O	Li	<	0.000884	O	Rh	<	0.012829	M	U	<	0.001485			
M	Cs	<	0.000990	M	Lu	<	0.002970	M	Ru	<	0.000989	M	V	<	0.001980			
M	Cu	0.000099	O	Mg	0.000064	i	S	<				M	W	<	0.003960			
M	Dy	<	0.000495	O	Mn	0.000066	M	Sb	<	0.014852	O	Y	<	0.000995				
M	Er	<	0.000495	M	Mo	<	0.001980	M	Sc	<	0.001980	M	Yb	<	0.000495			

M - Checked by ICP-MS

O - Checked by ICP-OES

i - Spectral Interference

n - Not Checked For

s - Solution Standard Element

6.0 INTENDED USE

6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.

6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures Terms and Conditions of Sale, <https://www.inorganicventures.com/terms-and-conditions-sale>. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

- Store between approximately 4° - 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° - 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

- For more information, visit www.inorganicventures.com/TCT

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 87.62 +2 6 Sr(H₂O)₆+2

Chemical Compatibility - Soluble in HCl, and HNO₃. Avoid H₂SO₄, HF and neutral to basic media. Stable with most metals and inorganic anions forming insoluble silicate, carbonate, hydroxide, oxide, fluoride, sulfate, oxalate, chromate, arsenate and tungstate in neutral aqueous media.

Stability - 2-100 ppb levels stable for months in 1% HNO₃ / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1 - 3.5% HNO₃ / LDPE container.

Sr Containing Samples (Preparation and Solution) -Metal (Best dissolved in diluted HNO₃); Ores (Carbonate fusion in PtO followed by HCl dissolution); Organic Matrices (Dry ash and dissolution in dilute HCl).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 88 amu	1200 ppt	N/A	72Ge16O, 176Yb+2, 176Lu+2 , 176Hf+2
ICP-OES 407.771 nm	0.0004 / 0.00006 µg/mL	1	U, Ce
ICP-OES 421.552 nm	0.0008 / 0.00004 µg/mL	1	Rb
ICP-OES 460.733 nm	0.07 / 0.003 µg/mL	1	Ce

8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; inorganicventures.com; info@inorganicventures.com

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

March 03, 2023

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

11.2 Lot Expiration Date

- March 03, 2028

- The date after which this CRM/RM should not be used.

- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski
Manager, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





Certified Reference Material CRM



CERTIFIED WEIGHT REPORT:

R: 03/16/23 MS473 MS474 MS475 MS476

Part Number: 56138
Lot Number: 082922
Description: Strontium (Sr)

Solvent: 20510011 Nitric Acid

Lot #

Expiration Date: 082925
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB

2% Nitric Acid (mL)

Weight shown below was diluted to (mL): 1000.12 0.058 Balance Uncertainty
Flask Uncertainty

Formulated By:	Lawrence Barry
	082922
Reviewed By:	Pedro L. Renteria
	082922

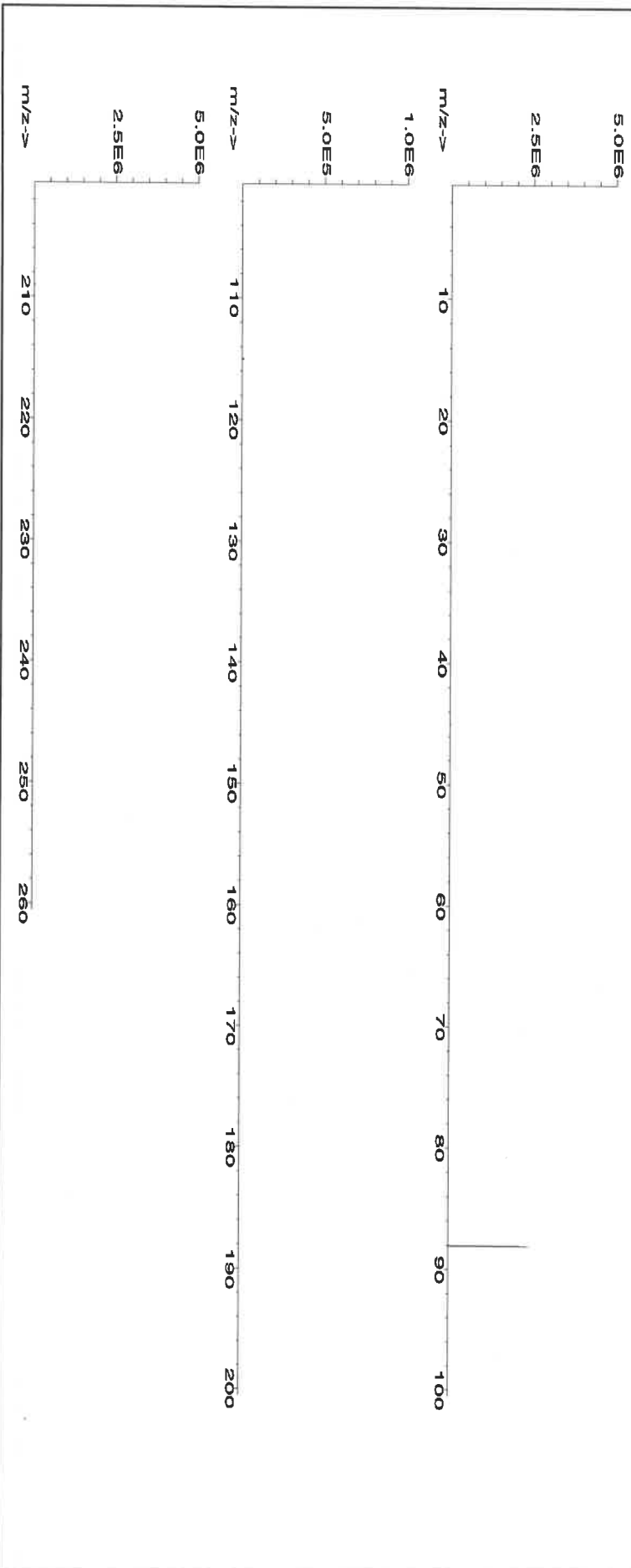
Compound

RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
-----	------------	-----------------------	------------	-----------------	-----------	-------------------	-------------------	----------------------	----------------------------------	------	----------------	------	----------

SDS Information

1. Strontium nitrate (Sr) IN017 SR2022018A1 10000 99.997 0.10 41.2 24.2756 24.2758 10000.1 20.0 10042-76-9 NA or-rat >2000mg/kg 3153a

[1] Spectrum No. 1 [14.495 sec]: 56138.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	T	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



CERTIFIED WEIGHT REPORT:

Part Number: 57081
Lot Number: 062724
Description: Thallium (TI)

Solvent: 24002546 Nitric Acid

Lot #

Aleah O'Brady
Formulated By: Aleah O'Brady 062724

Pedro L. Renteria
Reviewed By: Pedro L. Renterias 062724

2% 40.0 (mL) Nitric Acid

Expiration Date: 062727
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 1000

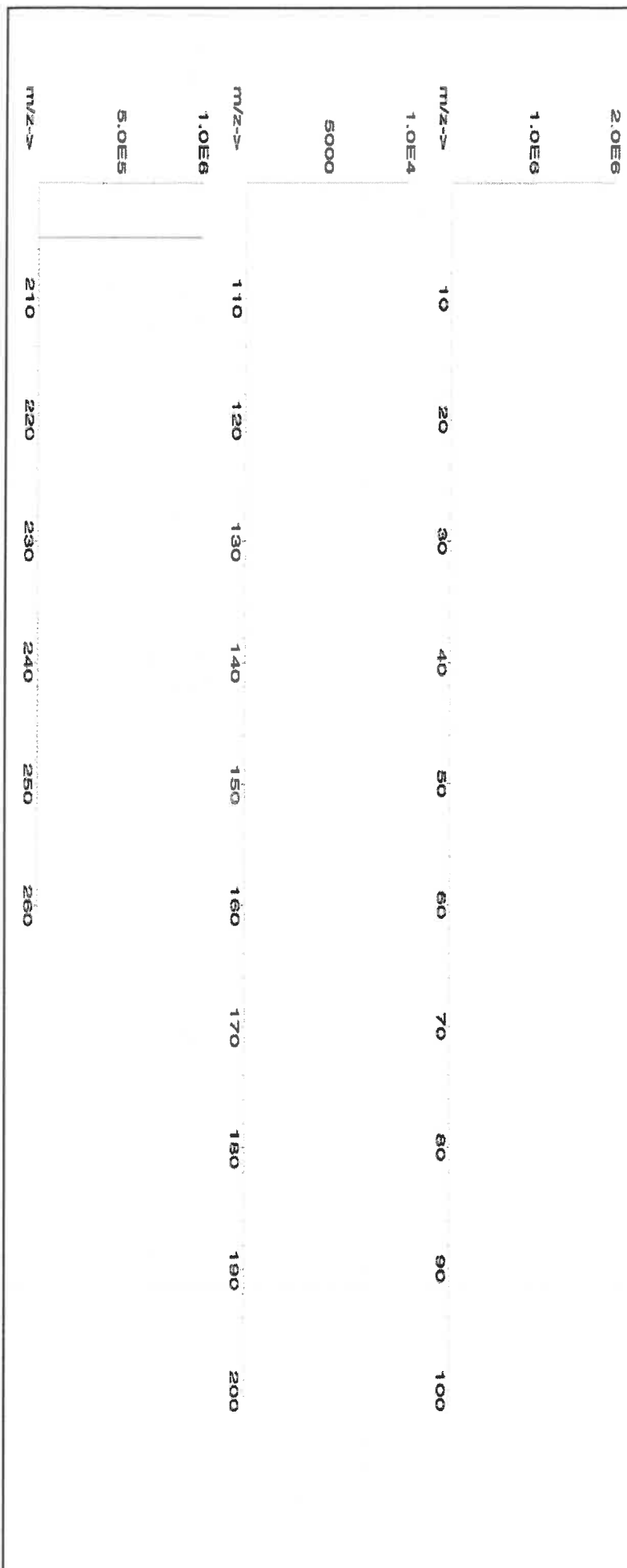
NIST Test Number: 6UTB
Weight shown below was diluted to (mL): 2000.1
5E-05 Balance Uncertainty
0.10 Flask Uncertainty

SDS Information

Compound	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
----------	------------	-----------------------	------------	-----------------	-----------	-------------------	-------------------	----------------------	----------------------------------	------	----------------	------	----------

1. Thallium nitrate (TI) IN037 BCCF4399 1000 99.999 0.10 77.0 2.5975 2.5977 1000.1 2.0 10102-45-1 0.1 mg/m3 orl-mus 15mg/kg 3158

[1] Spectrum No.1 [14.044 sec]:57081.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

336

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Sc	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	T	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Tm	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Sn	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Ti	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Se	<0.02	Ta	<0.02			Zr	<0.02

(T) = Target analyte

Physical Characterization:

Certified by:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



Certified Reference Material CRM

M6021



CERTIFIED WEIGHT REPORT:

Part Number: 57023
Lot Number: 062424
Description: Vanadium (V)

Lot # 24002546
Solvent: Nitric Acid

2.0%

40.0 (mL)

Nitric Acid

Formulated By: *Aleah O'Brady*

Aleah O'Brady

062424

Expiration Date: 062427
Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 1000

NIST Test Number: 6UTB

5E-05 Balance Uncertainty

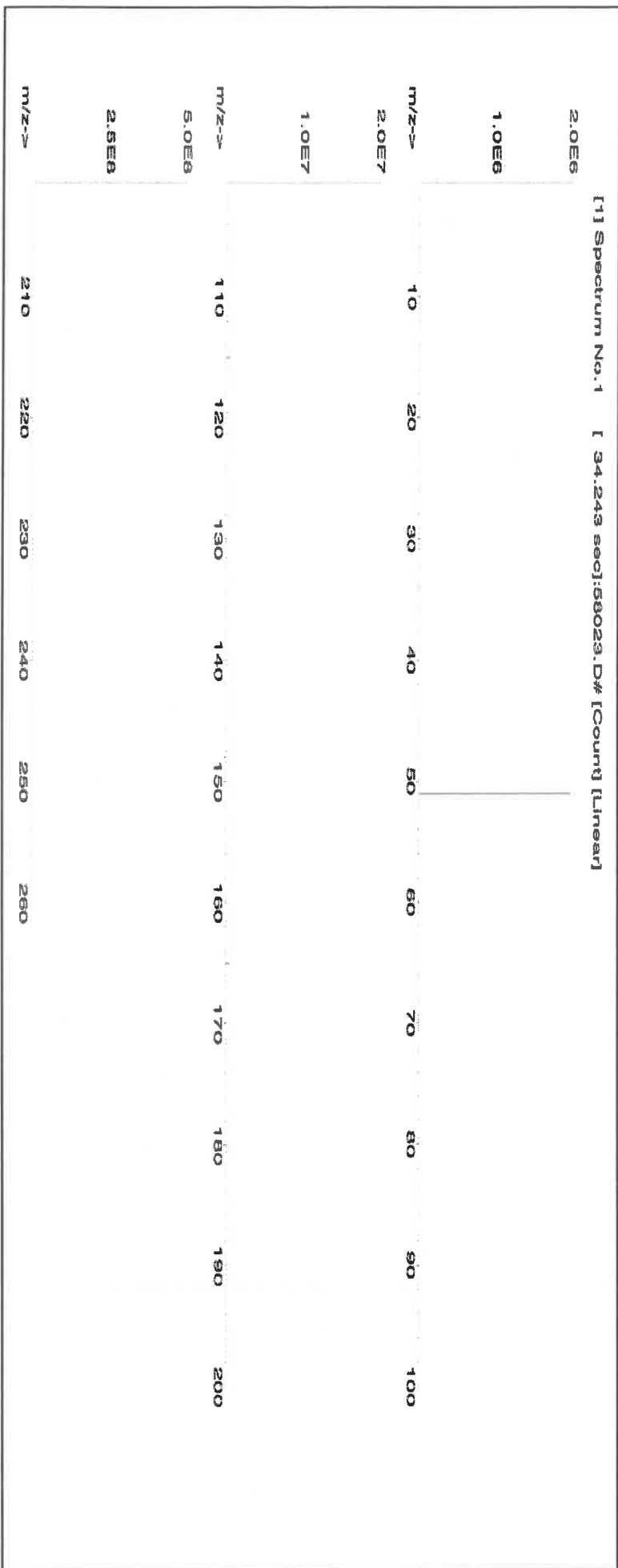
Volume shown below was diluted to (mL): 2000.3

0.06 Flask Uncertainty

Reviewed By:	<i>Pedro L. Rantas</i>	062424
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Compound	SDS information											
	Expanded									NIST		
	Part	Lot	Dilution	Initial	Uncertainty	Nominal	Initial	Final	Uncertainty			
Number	Number	Factor	Vol. (mL)	Pipette (mL)	Conc. (µg/mL)	Conc. (µg/mL)	Conc. (µg/mL)	+/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	SRM

[1] Spectrum No.1 [34.243 sec]:58023.D# [Count] [Linear]





Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

338

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	T
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pr	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Certified by:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- * Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- * Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

SOP ID : M3050B-Digestion-20, MSFAM01.1-Trace Metals-2

SDG No : MBHHA0

Matrix : SOIL

Pipette ID: ICP A

Balance ID : M SC-2

Filter paper ID : N/A

pH Strip ID : N/A

Hood ID : #3

Block ID: 1. HOT BLOCK #2 2. N/A

Start Digest Date: 02/04/2025 Time : 10:40 Temp : 96 °C

End Digest Date: 02/04/2025 Time : 12:45 Temp : 96 °C

Digestion tube ID: M6054

Block thermometer ID: MET-DIG. #2

Dig Technician Signature: *SLD*

Supervisor Signature: *[Signature]*

Temp : 1. 96°C 2. N/A

Standardized Name	MLS USED	STD REF. # FROM LOG
LCSS	1.00	MP84063
Spike Sol 6	1.00	MP84070
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Chemical Used	ML/SAMPLE USED	Lot Number
1:1 HNO3	10.00	MP84041
Conc. HNO3	5.00	M6126
30% H2O2	3.00	M6125
Conc. HCL	10.00	M6121
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Extraction Conformance/Non-Conformance Comments:

HOT BLOCK #2 CELL #35 : 96 C

Date / Time	Prepped Sample Relinquished By/Location	Received By/Location
02/04/25 13:45	<i>SLD. met. dig.</i>	<i>SA Conditio 2nd</i>
	Preparation Group	Analysis Group

Lab Sample ID	Client Sample ID	pH	Initial Weight (g)	Final Vol (ml)	Color Before	Color After	Texture	Artifact	Comment	Prep Pos
PB166531BL	PBS531	N/A	1.00	100	Colorless	Colorless	Fine	N/A	N/A	1
PB166531BS	LCS531	N/A	1.00	100	Colorless	Colorless	Fine	N/A	MP84063	2
Q1272-01	MBHHA0	N/A	1.21	100	Brown	Yellow	Medium	N/A	N/A	3
Q1272-02	MBHHA1	N/A	1.25	100	Brown	Yellow	Medium	N/A	N/A	4
Q1272-03	MBHHA2	N/A	1.24	100	Brown	Yellow	Medium	N/A	N/A	5
Q1272-04	MBHHA2D	N/A	1.11	100	Brown	Yellow	Medium	N/A	N/A	6
Q1272-05	MBHHA2S	N/A	1.29	100	Brown	Yellow	Medium	N/A	MP84070	7

Instrument ID: P5

Daily Analysis Runlog For Sequence/QC Batch ID # LB134591

Review By	Kareem Khairalla	Review On	2/7/2025 3:44:51 PM
Supervise By	Janvi Patel	Supervise On	2/10/2025 1:30:43 PM

STD. NAME	STD REF.#
ICAL Standard	MP84204,MP84388,MP84386,MP84385,MP84384,MP84383,MP84381
ICV Standard	MP84389
CCV Standard	MP84392
ICSA Standard	MP84390,MP84391
CRI Standard	
LCS Standard	MP84063
Chk Standard	MP84218,MP84219

Sr#	SampleId	ClientID	QcType	Date	Comment	Operator	Status
1	S0	S0	CAL1	02/05/25 15:17		Kareem	OK
2	S1	S01	CAL2	02/05/25 15:21		Kareem	OK
3	S2	S02	CAL3	02/05/25 15:25		Kareem	OK
4	S3	S03	CAL4	02/05/25 15:29		Kareem	OK
5	S4	S04	CAL5	02/05/25 15:33		Kareem	OK
6	S5	S05	CAL6	02/05/25 15:37		Kareem	OK
7	S6	S06	CAL7	02/05/25 15:41		Kareem	OK
8	ICV001	ICV001	ICV	02/05/25 17:08	Inst. paused for calibration review	Kareem	OK
9	ICB001	ICB001	ICB	02/05/25 17:15	Inst. paused for review	Kareem	OK
10	ICSA001	ICSA001	ICSA	02/05/25 17:41	Inst. paused for review	Kareem	OK
11	ICSAB001	ICSAB001	ICSAB	02/05/25 17:46		Kareem	OK
12	CCV001	CCV001	CCV	02/05/25 18:10	Inst. paused for review	Kareem	OK
13	CCB001	CCB001	CCB	02/05/25 18:14		Kareem	OK
14	PB166534BL	PBS534	MB	02/05/25 18:18		Kareem	OK
15	PB166534BS	LCS534	LCS	02/05/25 18:22		Kareem	OK
16	PB166531BL	PBS531	MB	02/05/25 18:26		Kareem	OK
17	Q1251-01	E1491	SAM	02/05/25 18:34		Kareem	OK
18	Q1251-02	E1492	SAM	02/05/25 18:38		Kareem	OK

Instrument ID: P5

Daily Analysis Runlog For Sequence/QC Batch ID # LB134591

Review By	Kareem Khairalla	Review On	2/7/2025 3:44:51 PM
Supervise By	Janvi Patel	Supervise On	2/10/2025 1:30:43 PM
STD. NAME	STD REF.#		
ICAL Standard	MP84204,MP84388,MP84386,MP84385,MP84384,MP84383,MP84381		
ICV Standard	MP84389		
CCV Standard	MP84392		
ICSA Standard	MP84390,MP84391		
CRI Standard			
LCS Standard	MP84063		
Chk Standard	MP84218,MP84219		

19	Q1251-03	E1493	SAM	02/05/25 18:41		Kareem	OK
20	PB166531BS	LCS531	LCS	02/05/25 18:45		Kareem	OK
21	Q1251-04	E1494	SAM	02/05/25 18:49		Kareem	OK
22	Q1251-05	E1495	SAM	02/05/25 18:53		Kareem	OK
23	Q1251-06	E1496	SAM	02/05/25 18:57		Kareem	OK
24	Q1251-07	E1496D	DUP	02/05/25 19:00		Kareem	OK
25	Q1251-06L	E1496L	SD	02/05/25 19:04		Kareem	OK
26	Q1251-08	E1496S	MS	02/05/25 19:08		Kareem	OK
27	Q1251-09	E1497	SAM	02/05/25 19:12		Kareem	OK
28	Q1272-01	MBHHA0	SAM	02/05/25 19:16		Kareem	OK
29	Q1272-02	MBHHA1	SAM	02/05/25 19:19		Kareem	OK
30	Q1272-03	MBHHA2	SAM	02/05/25 19:23		Kareem	OK
31	Q1272-04	MBHHA2D	DUP	02/05/25 19:27		Kareem	OK
32	Q1272-03L	MBHHA2L	SD	02/05/25 19:31		Kareem	OK
33	Q1272-05	MBHHA2S	MS	02/05/25 19:35	MS fail for Zn (898.23 ppb), Ag & Sb,Tl(Below RL)	Kareem	OK
34	CCV002	CCV002	CCV	02/05/25 19:54		Kareem	OK
35	CCB002	CCB002	CCB	02/05/25 19:58		Kareem	OK

Instrument ID: P5

Daily Analysis Runlog For Sequence/QC Batch ID # LB134645

Review By	Kareem Khairalla	Review On	2/10/2025 3:36:17 PM
Supervise By	Mohan Bera	Supervise On	2/10/2025 5:27:43 PM
STD. NAME	STD REF.#		
ICAL Standard	MP84204,MP84388,MP84386,MP84385,MP84384,MP84383,MP84381		
ICV Standard	MP84389		
CCV Standard	MP84392		
ICSA Standard	MP84390,MP84391		
CRI Standard			
LCS Standard			
Chk Standard	MP84218,MP84219		

Sr#	SampleId	ClientID	QcType	Date	Comment	Operator	Status
1	S0	S0	CAL1	02/07/25 16:55		Kareem	OK
2	S1	S01	CAL2	02/07/25 16:59		Kareem	OK
3	S2	S02	CAL3	02/07/25 17:03		Kareem	OK
4	S3	S03	CAL4	02/07/25 17:07		Kareem	OK
5	S4	S04	CAL5	02/07/25 17:10		Kareem	OK
6	S5	S05	CAL6	02/07/25 17:14		Kareem	OK
7	S6	S06	CAL7	02/07/25 17:18		Kareem	OK
8	ICV004	ICV004	ICV	02/07/25 17:22		Kareem	OK
9	ICB004	ICB004	ICB	02/07/25 17:26		Kareem	OK
10	ICSA004	ICSA004	ICSA	02/07/25 17:30		Kareem	OK
11	ICSAB004	ICSAB004	ICSAB	02/07/25 17:34		Kareem	OK
12	CCV007	CCV007	CCV	02/07/25 17:38		Kareem	OK
13	CCB007	CCB007	CCB	02/07/25 17:42		Kareem	OK
14	Q1272-03A	MBHHA2A	PS	02/07/25 17:46	PS for Ti,Zn(0.005 ML MP84410, 0.0179 ML M6145)	Kareem	OK
15	CCV008	CCV008	CCV	02/07/25 17:50		Kareem	OK
16	CCB008	CCB008	CCB	02/07/25 17:54		Kareem	OK

ORIGIN DATA
SANDRA HERNANDEZ (800) 258-2200
111 N. GOLD DR.
ROBINSVILLE, NJ 08891

SHIP DATE: 31 JAN 05
ACTWGT: 30.00 LBS
CART: 10.237232961533

BILL SENDER

TO: MOHAMMAD AHMED
ALLIANCE TECHNICAL GROUP LLC
284 SHEFFIELD STREET

MOUZAIDSIDE NJ 07092
(908) 795-9423
REF: 00003 100108

DEPT: 100108



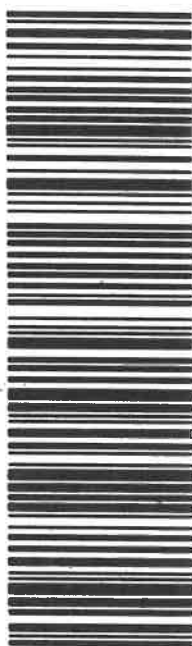
FedEx

TRK# 7717 9423 0518
0201

SATURDAY 12:00
PRIORITY OVERNIGHT

X0 KBCA

07092
NJ-US EWR



464071 01/31 BGCJ3/EC17/25C4

2/11/05
Q.25

After printing this label:
CONSIGNEE COPY - PLEASE PLACE IN FRONT OF POUCH.
1. Fold the printed page along the horizontal line
2. Place label in shipping pouch and affix it to your shipment.

Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com. FedEx will not be responsible for any claim in excess of \$100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of \$100 or the authorized declared value. Recovery cannot exceed actual documented loss. Maximum for items of extraordinary value is \$1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our Service Guide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Login Summary Report

Order ID :	Q1272	Order Date :	2/1/2025 9:25:00 AM	Project Mgr :	Deepak
Client :	USEPA CLP SMO	Project :	51988	Report Type :	USEPA CLP
Contact :	Anita Kapadia	Receive Date :	2/1/2025 9:25:00 AM	EDD Type :	EPA CLP
Date Sign Off :	2/3/2025 11:59:23 AM				

Sample ID	Client ID	Matrix	Sampling Date	Test	Test Group	Method	TAT Days	Fax Due Date	HC Due Date
Q1272-01	MBHHA0	Solid	01/30/2025						
				Metals CLP Full		SFAM_AES	10	02/17/2025	02/17/2025
				Percent Solids		Chemtech -SOP	10	02/17/2025	02/17/2025
Q1272-02	MBHHA1	Solid	01/30/2025						
				Metals CLP Full		SFAM_AES	10	02/17/2025	02/17/2025
				Percent Solids		Chemtech -SOP	10	02/17/2025	02/17/2025
Q1272-03	MBHHA2	Solid	01/30/2025						
				Metals CLP Full		SFAM_AES	10	02/17/2025	02/17/2025
				Percent Solids		Chemtech -SOP	10	02/17/2025	02/17/2025
Q1272-04	MBHHA2D	Solid	01/30/2025						
				Metals CLP Full		SFAM_AES	10	02/17/2025	02/17/2025
				Percent Solids		Chemtech -SOP	10	02/17/2025	02/17/2025
Q1272-05	MBHHA2S	Solid	01/30/2025						
				Metals CLP Full		SFAM_AES	10	02/17/2025	02/17/2025
				Percent Solids		Chemtech -SOP	10	02/17/2025	02/17/2025

WORKLIST(Hardcopy Internal Chain)

Worklist Name : PB166531

Worklist ID : 187448

Department : Digestion

Date : 02-04-2025 09:54:59

Sample	Customer Sample	Matrix	Test	Preservative	Customer	Raw Sample Storage Location	Collect Date	Method
Q1272-01	MBHHA0	Solid	Metals CLP Full	Cool 4 deg C	USEP01	C21	01/30/2025	SFAM_AES
Q1272-02	MBHHA1	Solid	Metals CLP Full	Cool 4 deg C	USEP01	C21	01/30/2025	SFAM_AES
Q1272-03	MBHHA2	Solid	Metals CLP Full	Cool 4 deg C	USEP01	C21	01/30/2025	SFAM_AES
Q1272-04	MBHHA2D	Solid	Metals CLP Full	Cool 4 deg C	USEP01	C21	01/30/2025	SFAM_AES
Q1272-05	MBHHA2S	Solid	Metals CLP Full	Cool 4 deg C	USEP01	C21	01/30/2025	SFAM_AES

Date/Time 02/04/25 10:15

Raw Sample Received by: 5120.mgt.d's.

Raw Sample Relinquished by: [Signature]

Date/Time 02/04/25 11:15

Raw Sample Received by: [Signature]

Raw Sample Relinquished by: 5125.mgt.d's.