

DATA REPORTING QUALIFIERS- INORGANIC

For reporting results, the following “ Results Qualifiers” are used:

J	Indicates the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL), but greater than or equal to the Instrument Detection Limit (IDL).
U	Indicates the analyte was analyzed for, but not detected.
ND	Indicates the analyte was analyzed for, but not detected
E	Indicates the reported value is estimated because of the presence of interference
M	Indicates Duplicate injection precision not met.
N	Indicates the spiked sample recovery is not within control limits.
S	Indicates the reported value was determined by the Method of Standard Addition (MSA).
*	Indicates that the duplicate analysis is not within control limits.
+	Indicates the correlation coefficient for the MSA is less than 0.995.
D	Indicates the reported value is from a secondary analysis with a dilution factor. The original analysis exceeded the calibration range.
M	Method qualifiers “P” for ICP instrument “PM” for ICP when Microwave Digestion is used “CV” for Manual Cold Vapor AA “AV” for automated Cold Vapor AA “CA” for MIDI-Distillation Spectrophotometric “AS” for Semi -Automated Spectrophotometric “C” for Manual Spectrophotometric “T” for Titrimetric “NR” for analyte not required to be analyzed
OR	Indicates the analyte’s concentration exceeds the calibrated range of the instrument for that specific analysis.
Q	Indicates the LCS did not meet the control limits requirements
H	Sample Analysis Out Of Hold Time



LAB CHRONICLE

OrderID:	P5327	OrderDate:	12/18/2024 11:54:00 AM
Client:	LEO Ingwer, Inc.	Project:	Waste Water 2024
Contact:	Matt Selig	Location:	L41

LabID	ClientID	Matrix	Test	Method	Sample Date	Prep Date	Anal Date	Received
P5327-01	12175-12176-12177-12178	Water	Metals Group3	200.7	12/18/24	12/19/24	12/20/24	12/18/24



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Hit Summary Sheet
SW-846

SDG No.: P5327

Order ID: P5327

Client: LEO Ingwer, Inc.

Project ID: Waste Water 2024

Sample ID	Client ID	Matrix	Parameter	Concentration	C	MDL	RDL	Units
Client ID :	12175-12176-12177-12178							
P5327-01	12175-12176-12177-12178	Water	Copper	370		1.52	10.0	ug/L



SAMPLE DATA

Report of Analysis

Client:	LEO Ingwer, Inc.	Date Collected:	12/18/24
Project:	Waste Water 2024	Date Received:	12/18/24
Client Sample ID:	12175-12176-12177-12178	SDG No.:	P5327
Lab Sample ID:	P5327-01	Matrix:	Water
Level (low/med):	low	% Solid:	0

Cas	Parameter	Conc.	Qua.	DF	MDL	LOQ / CRQL	Units	Prep Date	Date Ana.	Ana Met.	Prep Met.
7440-50-8	Copper	370		1	1.52	10.0	ug/L	12/19/24 09:30	12/20/24 17:25	EPA 200.7	

Color Before:	Colorless	Clarity Before:	Clear	Texture:
Color After:	Colorless	Clarity After:	Clear	Artifacts:
Comments:	Metals Group3			

U = Not Detected
 LOQ = Limit of Quantitation
 MDL = Method Detection Limit
 LOD = Limit of Detection
 D = Dilution
 Q = indicates LCS control criteria did not meet requirements

J = Estimated Value
 B = Analyte Found in Associated Method Blank
 * = indicates the duplicate analysis is not within control limits.
 E = Indicates the reported value is estimated because of the presence of interference.
 OR = Over Range
 N =Spiked sample recovery not within control limits



METAL CALIBRATION DATA

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: LEO Ingwer, Inc. **SDG No.:** P5327
Contract: LEOI01 **Lab Code:** CHEM **Case No.:** P5327 **SAS No.:** P5327
Initial Calibration Source: EPA
Continuing Calibration Source: Inorganic Ventures

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
ICV01	Copper	522	510	102	95 - 105	P	12/20/2024	16:07	LB134054



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Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: LEO Ingwer, Inc. **SDG No.:** P5327
Contract: LEOI01 **Lab Code:** CHEM **Case No.:** P5327 **SAS No.:** P5327
Initial Calibration Source: EPA
Continuing Calibration Source: Inorganic Ventures

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
LLICV01	Copper	21.8	20.0	109	80 - 120	P	12/20/2024	16:11	LB134054

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: LEO Ingwer, Inc. **SDG No.:** P5327

Contract: LEOI01 **Lab Code:** CHEM **Case No.:** P5327 **SAS No.:** P5327

Initial Calibration Source: EPA

Continuing Calibration Source: Inorganic Ventures

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
CCV01	Copper	1220	1250	97	90 - 110	P	12/20/2024	16:47	LB134054
CCV02	Copper	1260	1250	101	90 - 110	P	12/20/2024	17:29	LB134054
CCV03	Copper	1250	1250	100	90 - 110	P	12/20/2024	18:12	LB134054
CCV04	Copper	1240	1250	99	90 - 110	P	12/20/2024	19:02	LB134054
CCV05	Copper	1270	1250	102	90 - 110	P	12/20/2024	19:57	LB134054
CCV06	Copper	1220	1250	98	90 - 110	P	12/20/2024	20:47	LB134054
CCV07	Copper	1230	1250	99	90 - 110	P	12/20/2024	21:37	LB134054
CCV08	Copper	1260	1250	101	90 - 110	P	12/20/2024	23:01	LB134054
CCV09	Copper	1250	1250	100	90 - 110	P	12/20/2024	23:55	LB134054



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Metals

- 2b -

CRDL STANDARD FOR AA & ICP

Client: LEO Ingwer, Inc. **SDG No.:** P5327
Contract: LEOI01 **Lab Code:** CHEM **Case No.:** P5327 **SAS No.:** P5327
Initial Calibration Source: _____
Continuing Calibration Source: _____

Sample ID	Analyte	Result ug/L	True Value ug/L	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
CRI01	Copper	21.8	20.0	109	40 - 160	P	12/20/2024	16:26	LB134054



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Metals

- 3a -

INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client:	LEO Ingwer, Inc.				SDG No.:	P5327			
Contract:	LEOI01	Lab Code:	CHEM		Case No.:	P5327	SAS No.:	P5327	
Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
ICB01	Copper	20.0	+/-20.0	U	20.0	P	12/20/2024	16:21	LB134054

Metals

- 3a -

INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client: LEO Ingwer, Inc.

SDG No.: P5327

Contract: LEOI01

Lab Code: CHEM

Case No.: P5327

SAS No.: P5327

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
CCB01	Copper	20.0	+/-20.0	U	20.0	P	12/20/2024	16:51	LB134054
CCB02	Copper	20.0	+/-20.0	U	20.0	P	12/20/2024	17:34	LB134054
CCB03	Copper	20.0	+/-20.0	U	20.0	P	12/20/2024	18:16	LB134054
CCB04	Copper	20.0	+/-20.0	U	20.0	P	12/20/2024	19:11	LB134054
CCB05	Copper	20.0	+/-20.0	U	20.0	P	12/20/2024	20:01	LB134054
CCB06	Copper	20.0	+/-20.0	U	20.0	P	12/20/2024	20:51	LB134054
CCB07	Copper	20.0	+/-20.0	U	20.0	P	12/20/2024	22:04	LB134054
CCB08	Copper	20.0	+/-20.0	U	20.0	P	12/20/2024	23:12	LB134054
CCB09	Copper	20.0	+/-20.0	U	20.0	P	12/21/2024	00:05	LB134054

Metals
- 3b -
PREPARATION BLANK SUMMARY

Client: LEO Ingwer, Inc.

SDG No.: P5327

Instrument: P4

Sample ID	Analyte	Result (ug/L)	Acceptance Limit	Conc Qual	CRQL ug/L	M	Analysis Date	Analysis Time	Run
PB165738BL		WATER		Batch Number:	PB165738		Prep Date:	12/19/2024	
	Copper	10.0	<10.0	U	10.0	P	12/20/2024	17:38	LB134054

Metals

- 4 -

INTERFERENCE CHECK SAMPLE

Client: LEO Ingwer, Inc. **SDG No.:** P5327
Contract: LEOI01 **Lab Code:** CHEM **Case No.:** P5327 **SAS No.:** P5327
ICS Source: EPA **Instrument ID:** P4

Sample ID	Analyte	Result ug/L	True Value ug/L	% Recovery	Low Limit (ug/L)	High Limit (ug/L)	Analysis Date	Analysis Time	Run Number
ICSA01	Copper	16.4	2.0	820	-18	22	12/20/2024	16:30	LB134054
ICSAB01	Copper	520	511	102	434	588	12/20/2024	16:34	LB134054
ICSA	Copper	18.5	2.0	925	-18	22	12/20/2024	16:38	LB134054
ICSAB	Copper	561	511	110	434	588	12/20/2024	16:43	LB134054



METAL QC DATA

metals
- 5a -
MATRIX SPIKE SUMMARY

client: LEO Ingwer, Inc. **level:** low **sdg no.:** P5327
contract: LEOI01 **lab code:** CHEM **case no.:** P5327 **sas no.:** P5327
matrix: Water **sample id:** P5327-01 **client id:** 12175-12176-12177-12178MS
Percent Solids for Sample: NA **Spiked ID:** P5327-01MS **Percent Solids for Spike Sample:** NA

Analyte	Units	Acceptance Limit %R	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M
Copper	ug/L	75 - 125	544		370		150	116		P

metals
- 5a -
MATRIX SPIKE DUPLICATE SUMMARY

client: LEO Ingwer, Inc. **level:** low **sdg no.:** P5327
contract: LEOI01 **lab code:** CHEM **case no.:** P5327 **sas no.:** P5327
matrix: Water **sample id:** P5327-01 **client id:** 12175-12176-12177-12178MSD
Percent Solids for Sample: NA **Spiked ID:** P5327-01MSD **Percent Solids for Spike Sample:** NA

Analyte	Units	Acceptance Limit %R	MSD Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M
Copper	ug/L	75 - 125	542		370		150	115		P

Metals

- 5b -

Client: LEO Ingwer, Inc. **SDG No.:** P5327
Contract: LEOI01 **Lab Code:** CHEM **Case No.:** P5327 **SAS No.:** P5327
Matrix: **Level:** LOW **Client ID:**
Sample ID: **Spiked ID:**

Analyte	Units	Acceptance Limit %R	C	Sample Result	C	Spike Added	% Recovery	Qual	M
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Metals

- 6 -

DUPLICATE SAMPLE SUMMARY

Client: LEO Ingwer, Inc. **Level:** LOW **SDG No.:** P5327
Contract: LEOI01 **Lab Code:** CHEM **Case No.:** P5327 **SAS No.:** P5327
Matrix: Water **Sample ID:** P5327-01 **Client ID:** 12175-12176-12177-12178DUP
Percent Solids for Sample: NA **Duplicate ID** P5327-01DUP **Percent Solids for Spike Sample:** NA

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M
Copper	ug/L	20	370		374		1		P

Metals

- 6 -

DUPLICATE SAMPLE SUMMARY

Client: LEO Ingwer, Inc. **Level:** LOW **SDG No.:** P5327
Contract: LEOI01 **Lab Code:** CHEM **Case No.:** P5327 **SAS No.:** P5327
Matrix: Water **Sample ID:** P5327-01MS **Client ID:** 12175-12176-12177-12178MSD
Percent Solids for Sample: NA **Duplicate ID** P5327-01MSD **Percent Solids for Spike Sample:** NA

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M
Copper	ug/L	20	544		542		0		P

Metals

- 7 -

LABORATORY CONTROL SAMPLE SUMMARY

Client: LEO Ingwer, Inc.

SDG No.: P5327

Contract: LEOI01

Lab Code: CHEM

Case No.: P5327

SAS No.: P5327

Analyte	Units	True Value	Result	C	% Recovery	Acceptance Limits	M
PB165738BS Copper	ug/L	150	154		103	85 - 115	P

Metals

-9 -

ICP SERIAL DILUTIONS

SAMPLE NO.

12175-12176-12177-12178L

Lab Name: Chemtech Consulting Group

Contract: LEOI01

Lab Code: CHEM

Lb No.: lb134054

Lab Sample ID : P5327-01L

SDG No.: P5327

Matrix (soil/water): Water

Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I) C	Serial Dilution Result (S) C	% Differ- ence	Q	M
Copper	370	385	4		P



METAL PREPARATION & INSTRUMENT DATA



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Metals

- 11 -

ICP INTERELEMENT CORRECTION FACTORS

Client: LEO Ingwer, Inc.

SDG No.: P5327

Contract: LEOI01

Lab Code: CHEM

Case No.: P5327

SAS No.: P5327

Instrument ID: _____

Date: _____

Interelement Correction Factors (apparent ppb analyte/ppm interferent)

Analyte	Wave- Length (nm)	ICP Interelement Correction Factors For:				
		Al	Ca	Fe	Mg	Ag
Copper	224.700	0.0000000	0.0000000	0.0007850	0.0000000	0.0000000



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Metals

- 11 -

ICP INTERELEMENT CORRECTION FACTORS

Client: LEO Ingwer, Inc.

SDG No.: P5327

Contract: LEOI01

Lab Code: CHEM

Case No.: P5327

SAS No.: P5327

Instrument ID: _____

Date: _____

Interelement Correction Factors (apparent ppb analyte/ppm interferent)

Analyte	Wave- Length (nm)	ICP Interelement Correction Factors For:				
		As	Ba	Be	Cd	Co
Copper	224.700	0.0000000	0.0000000	0.0000000	0.0000000	0.0009530



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Metals

- 11 -

ICP INTERELEMENT CORRECTION FACTORS

Client: LEO Ingwer, Inc.

SDG No.: P5327

Contract: LEOI01

Lab Code: CHEM

Case No.: P5327

SAS No.: P5327

Instrument ID:

Date:

Interelement Correction Factors (apparent ppb analyte/ppm interferent)

Analyte	Wave- Length (nm)	ICP Interelement Correction Factors For:				
		Cr	Cu	K	Mn	Mo
Copper	224.700	0.0000000	0.0000000	0.0000000	0.0006510	0.0020500



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Metals

- 11 -

ICP INTERELEMENT CORRECTION FACTORS

Client: LEO Ingwer, Inc.

SDG No.: P5327

Contract: LEOI01

Lab Code: CHEM

Case No.: P5327

SAS No.: P5327

Instrument ID: _____

Date: _____

Interelement Correction Factors (apparent ppb analyte/ppm interferent)

Analyte	Wave- Length (nm)	ICP Interelement Correction Factors For:				
		Na	Ni	Pb	Sb	Se
Copper	224.700	0.0000000	-0.0047000	0.0036100	0.0000000	0.0000000



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Metals

- 11 -

ICP INTERELEMENT CORRECTION FACTORS

Client: LEO Ingwer, Inc.

SDG No.: P5327

Contract: LEOI01

Lab Code: CHEM

Case No.: P5327

SAS No.: P5327

Instrument ID: _____

Date: _____

Interelement Correction Factors (apparent ppb analyte/ppm interferent)

Analyte	Wave- Length (nm)	ICP Interelement Correction Factors For:				
		Sn	Ti	Tl	V	Zn
Copper	224.700	0.0000000	0.0003840	0.0000000	0.0000000	0.0000000



METAL PREPARATION & ANALYICAL SUMMARY

Metals

- 13 -

SAMPLE PREPARATION SUMMARY

Client: LEO Ingwer, Inc. **SDG No.:** P5327
Contract: LEOI01 **Lab Code:** CHEM **Method:**
Case No.: P5327 **SAS No.:** P5327

Sample ID	Client ID	Sample Type	Matrix	Prep Date	Initial Sample Size(mL)	Final Sample Volume (mL)	Percent Solids
Batch Number: PB165738							
P5327-01	12175-12176-12177-12178	SAM	WATER	12/19/2024	50.0	25.0	
P5327-01DUP	12175-12176-12177-12178DUP	DUP	WATER	12/19/2024	50.0	25.0	
P5327-01MS	12175-12176-12177-12178MS	MS	WATER	12/19/2024	50.0	25.0	
P5327-01MSD	12175-12176-12177-12178MSD	MSD	WATER	12/19/2024	50.0	25.0	
PB165738BL	PB165738BL	MB	WATER	12/19/2024	50.0	25.0	
PB165738BS	PB165738BS	LCS	WATER	12/19/2024	50.0	25.0	

metals
- 14 -
ANALYSIS RUN LOG

Client: LEO Ingwer, Inc. **Contract:** LEOI01

Lab code: CHEM **Case no.:** P5327 **Sas no.:** P5327 **Sdg no.:** P5327

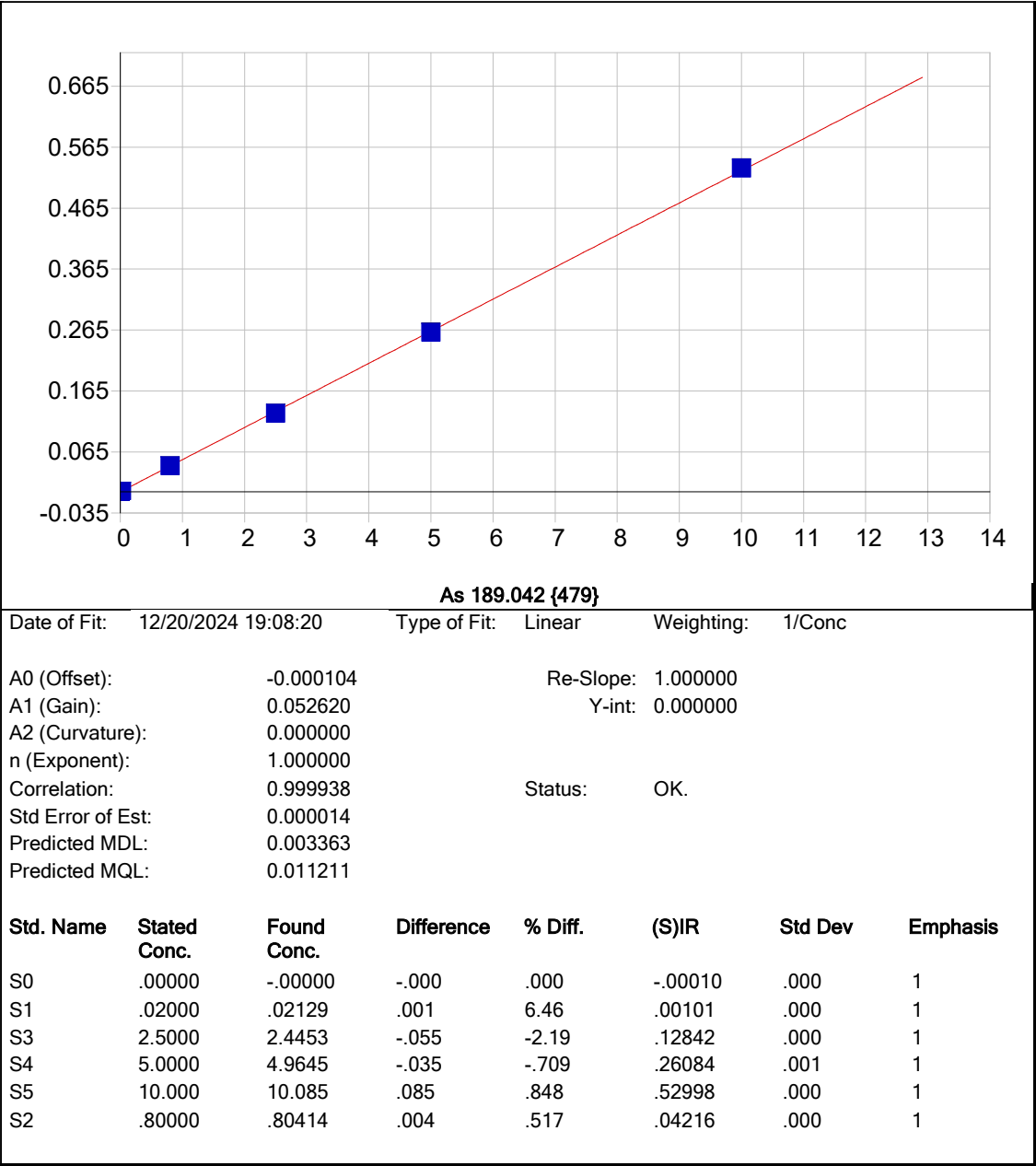
Instrument id number: **Method:** **Run number:** LB134054

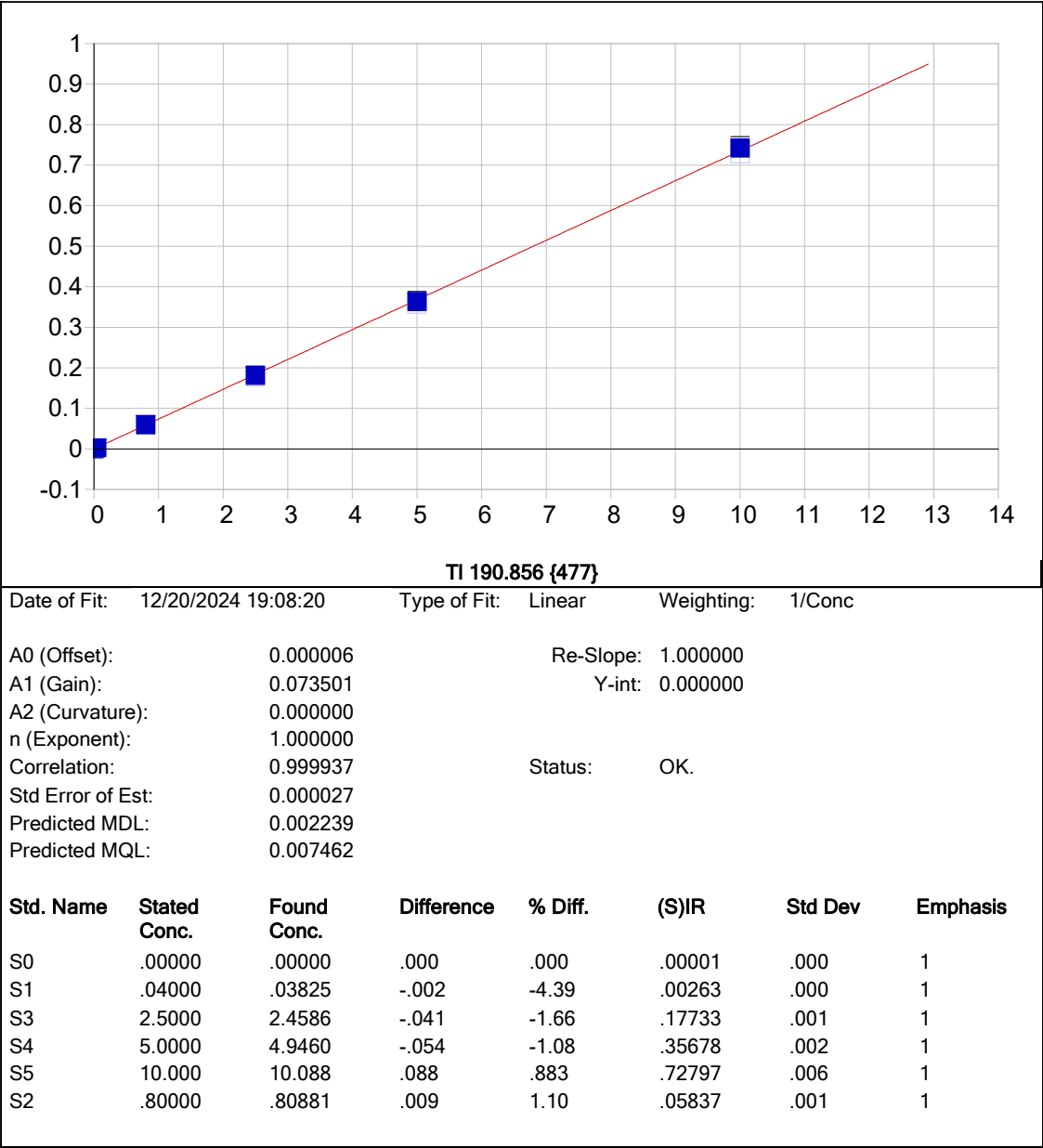
Start date: 12/20/2024 **End date:** 12/21/2024

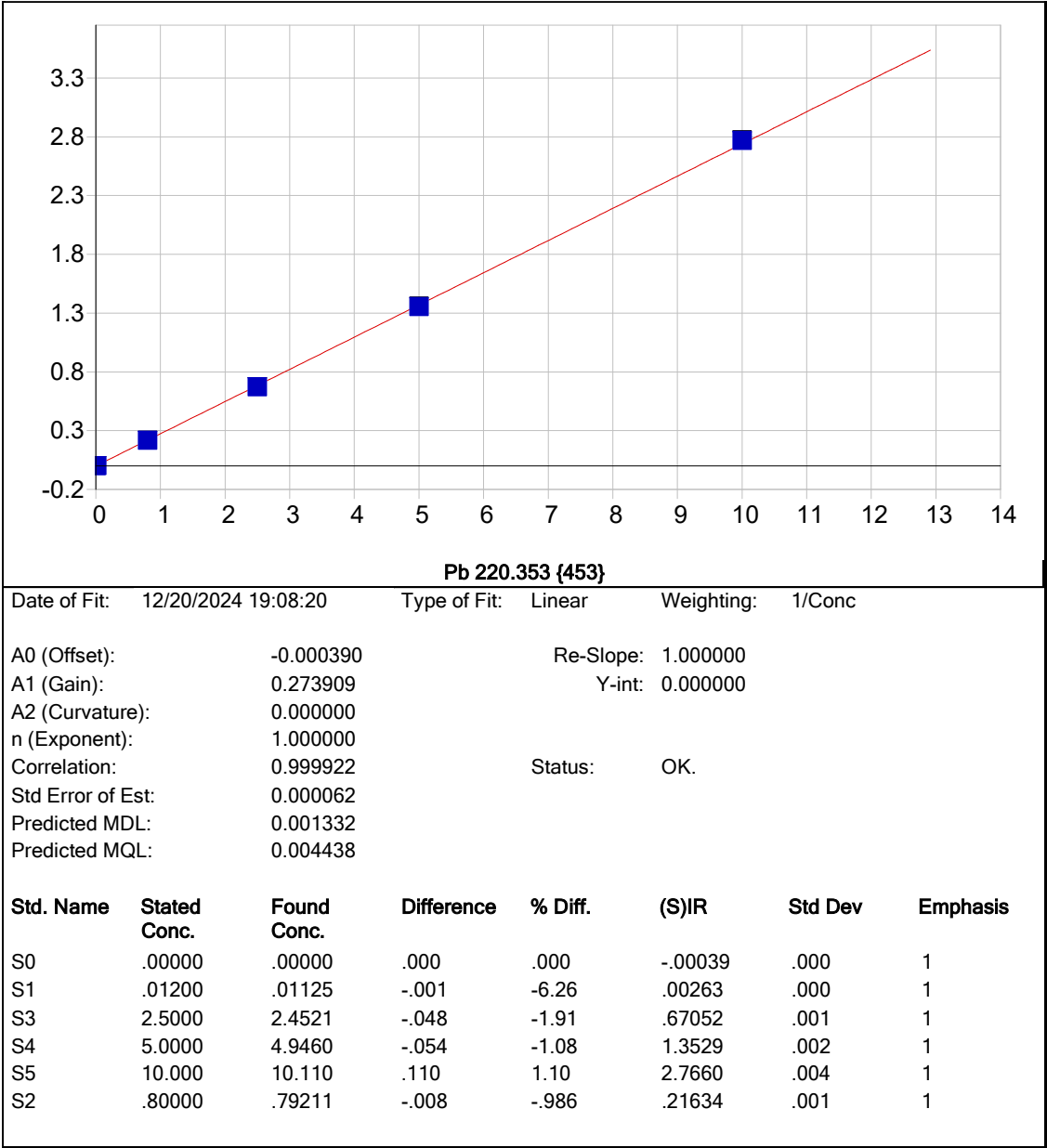
Lab sample id.	Client Sample Id	d/f	Time	Parameter list
S0	S0	1	1541	Cu
S1	S1	1	1546	Cu
S2	S2	1	1550	Cu
S3	S3	1	1554	Cu
S4	S4	1	1558	Cu
S5	S5	1	1603	Cu
ICV01	ICV01	1	1607	Cu
LLICV01	LLICV01	1	1611	Cu
ICB01	ICB01	1	1621	Cu
CRI01	CRI01	1	1626	Cu
ICSA01	ICSA01	1	1630	Cu
ICSAB01	ICSAB01	1	1634	Cu
ICSA	ICSA	20	1638	Cu
ICSAB	ICSAB	20	1643	Cu
CCV01	CCV01	1	1647	Cu
CCB01	CCB01	1	1651	Cu
P5327-01	12175-12176-12177-12178	1	1725	Cu
CCV02	CCV02	1	1729	Cu
CCB02	CCB02	1	1734	Cu
PB165738BL	PB165738BL	1	1738	Cu
PB165738BS	PB165738BS	1	1742	Cu
CCV03	CCV03	1	1812	Cu
CCB03	CCB03	1	1816	Cu
P5327-01DUP	12175-12176-12177-12178DUP	1	1842	Cu
P5327-01L	12175-12176-12177-12178L	5	1846	Cu
P5327-01MS	12175-12176-12177-12178MS	1	1850	Cu
P5327-01MSD	12175-12176-12177-12178MSD	1	1854	Cu
CCV04	CCV04	1	1902	Cu
CCB04	CCB04	1	1911	Cu
CCV05	CCV05	1	1957	Cu
CCB05	CCB05	1	2001	Cu
CCV06	CCV06	1	2047	Cu
CCB06	CCB06	1	2051	Cu
CCV07	CCV07	1	2137	Cu
CCB07	CCB07	1	2204	Cu
CCV08	CCV08	1	2301	Cu
CCB08	CCB08	1	2312	Cu
CCV09	CCV09	1	2355	Cu
CCB09	CCB09	1	0005	Cu

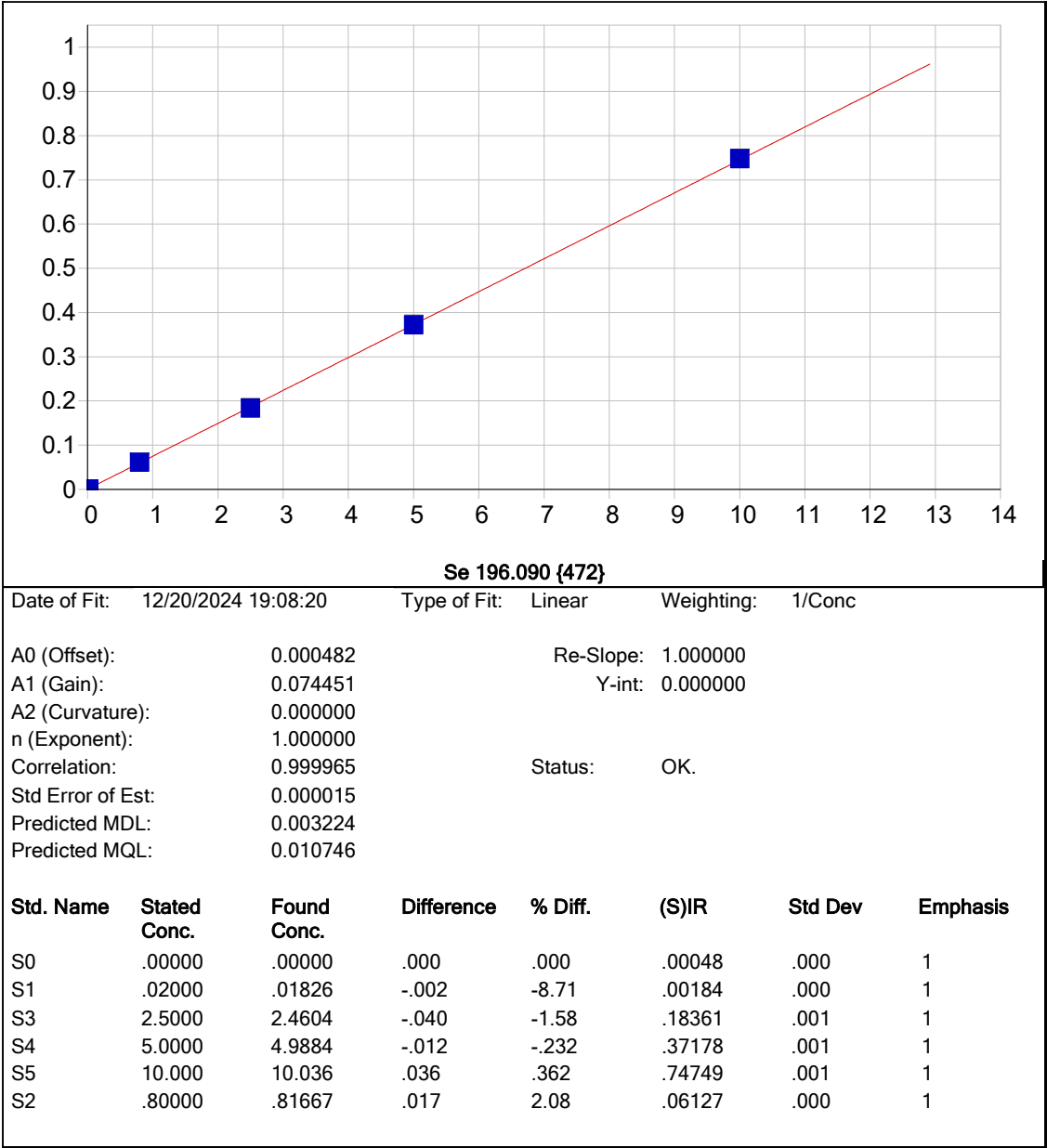


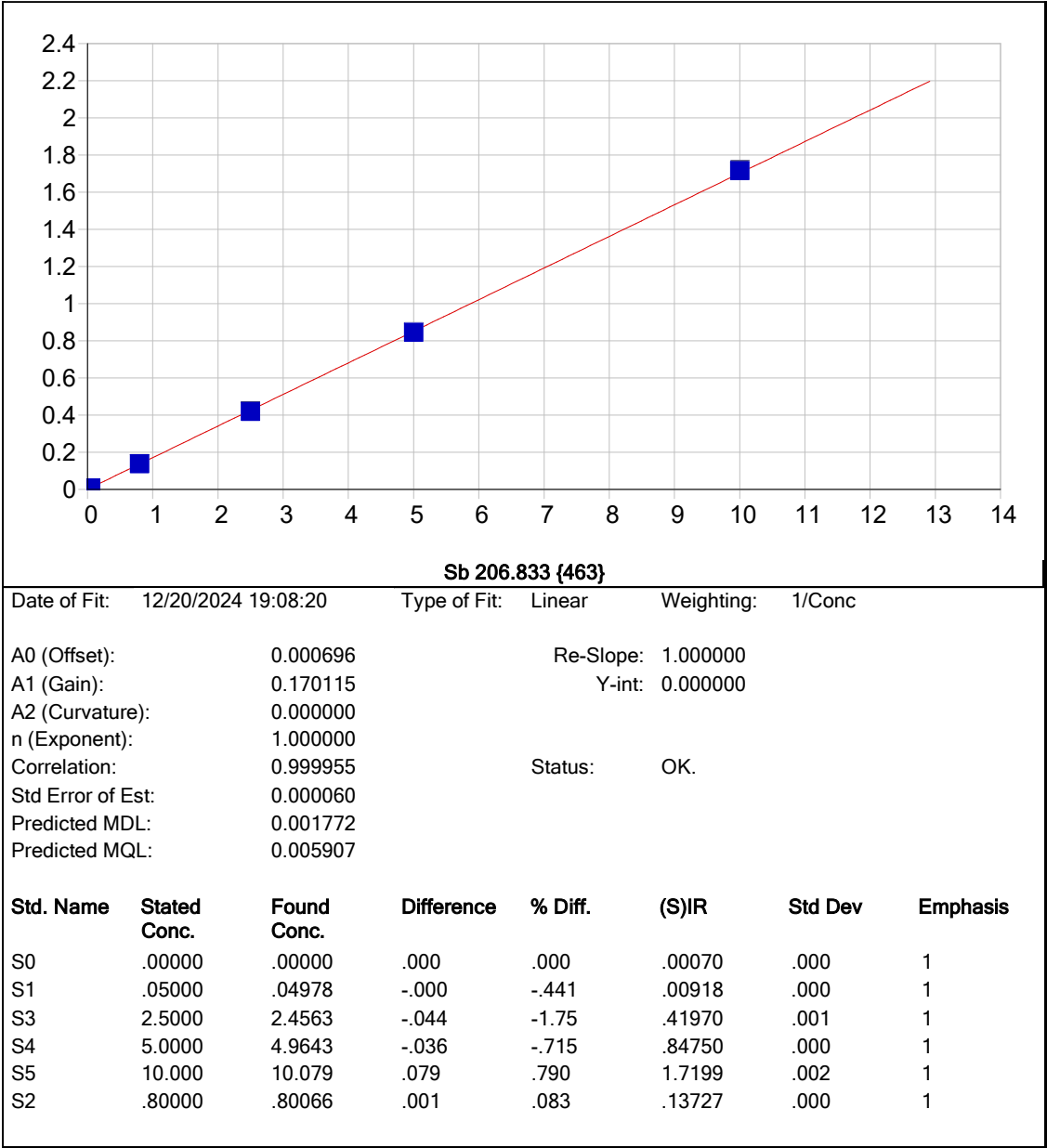
METAL RAW DATA

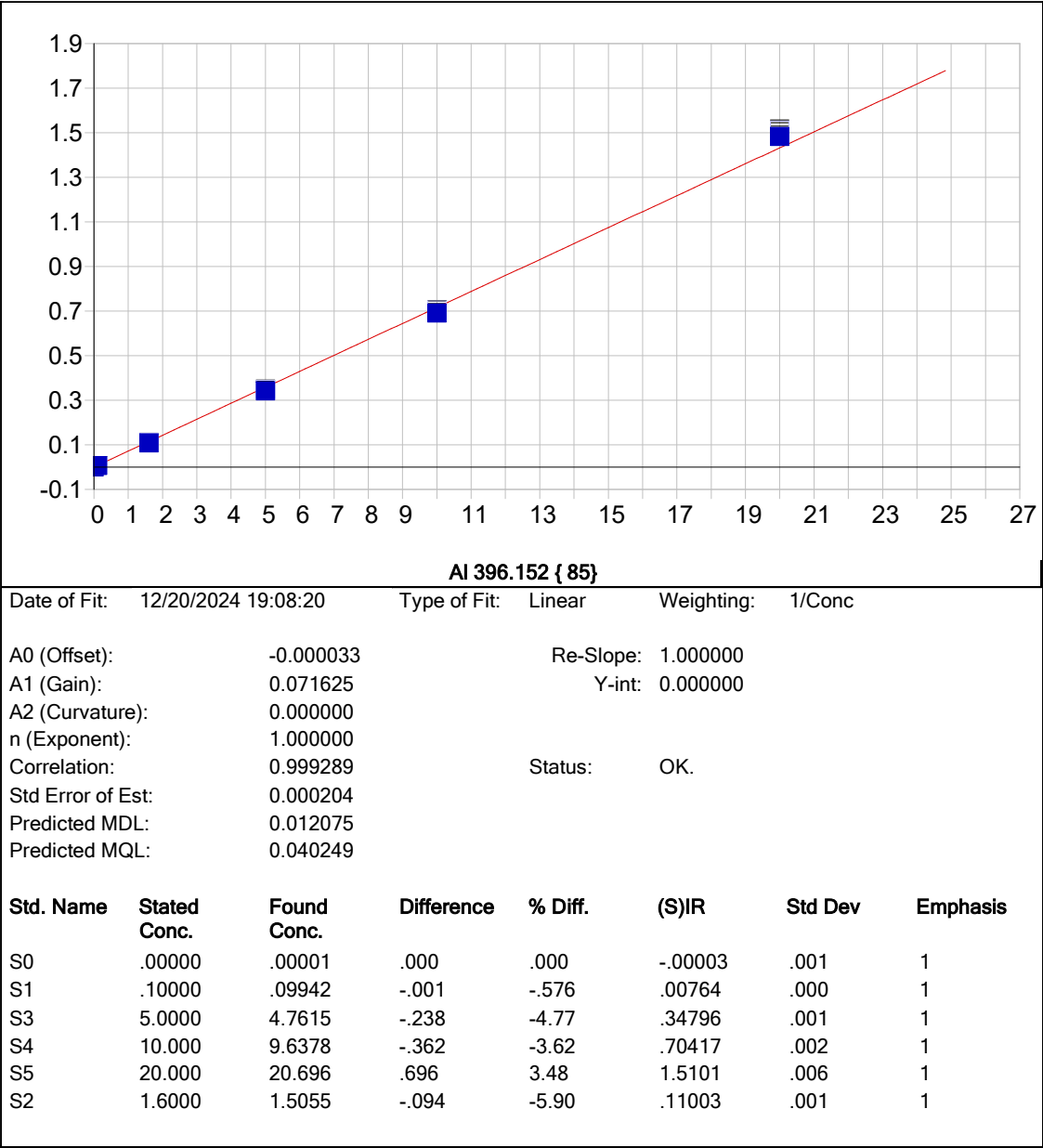


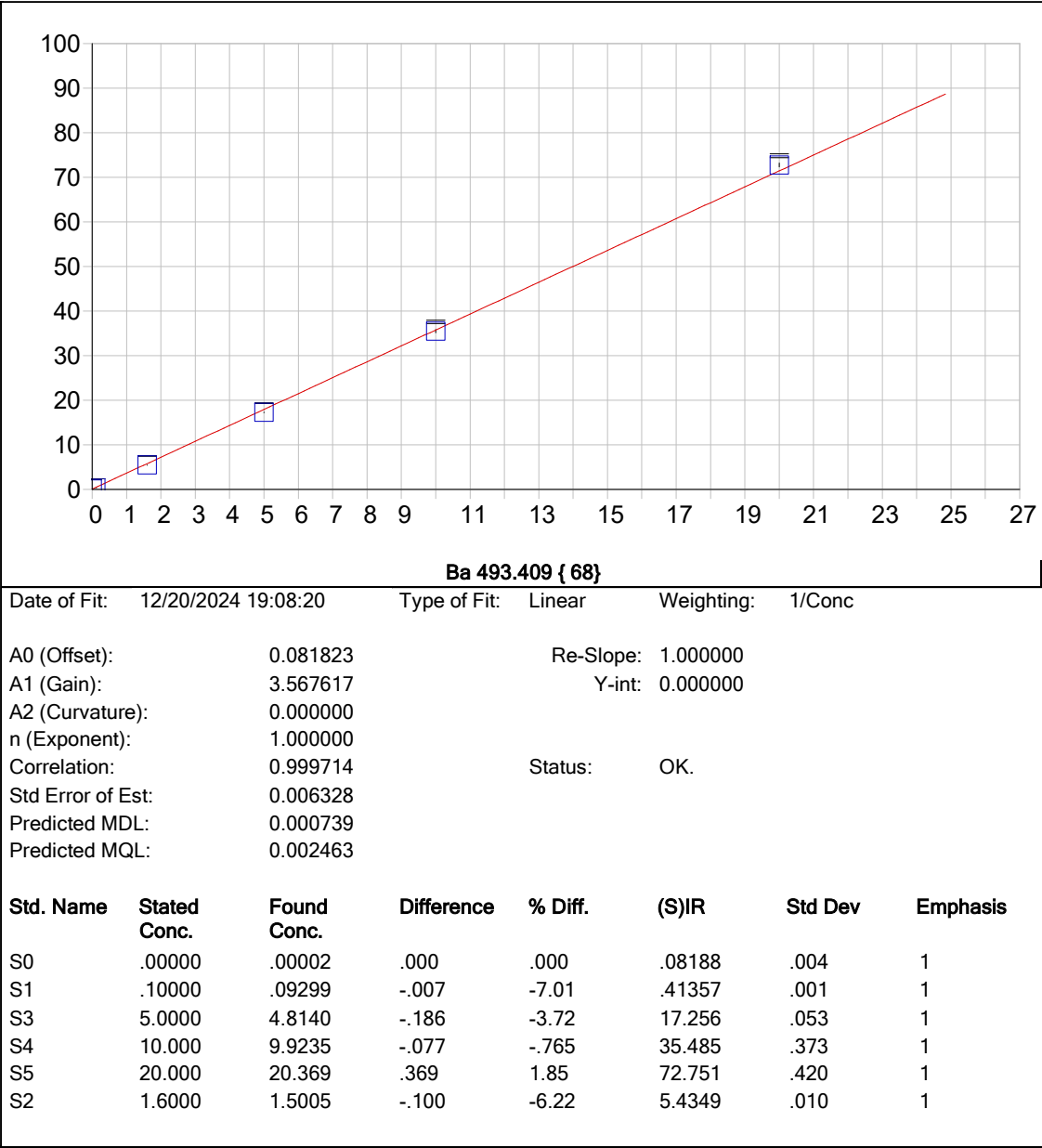


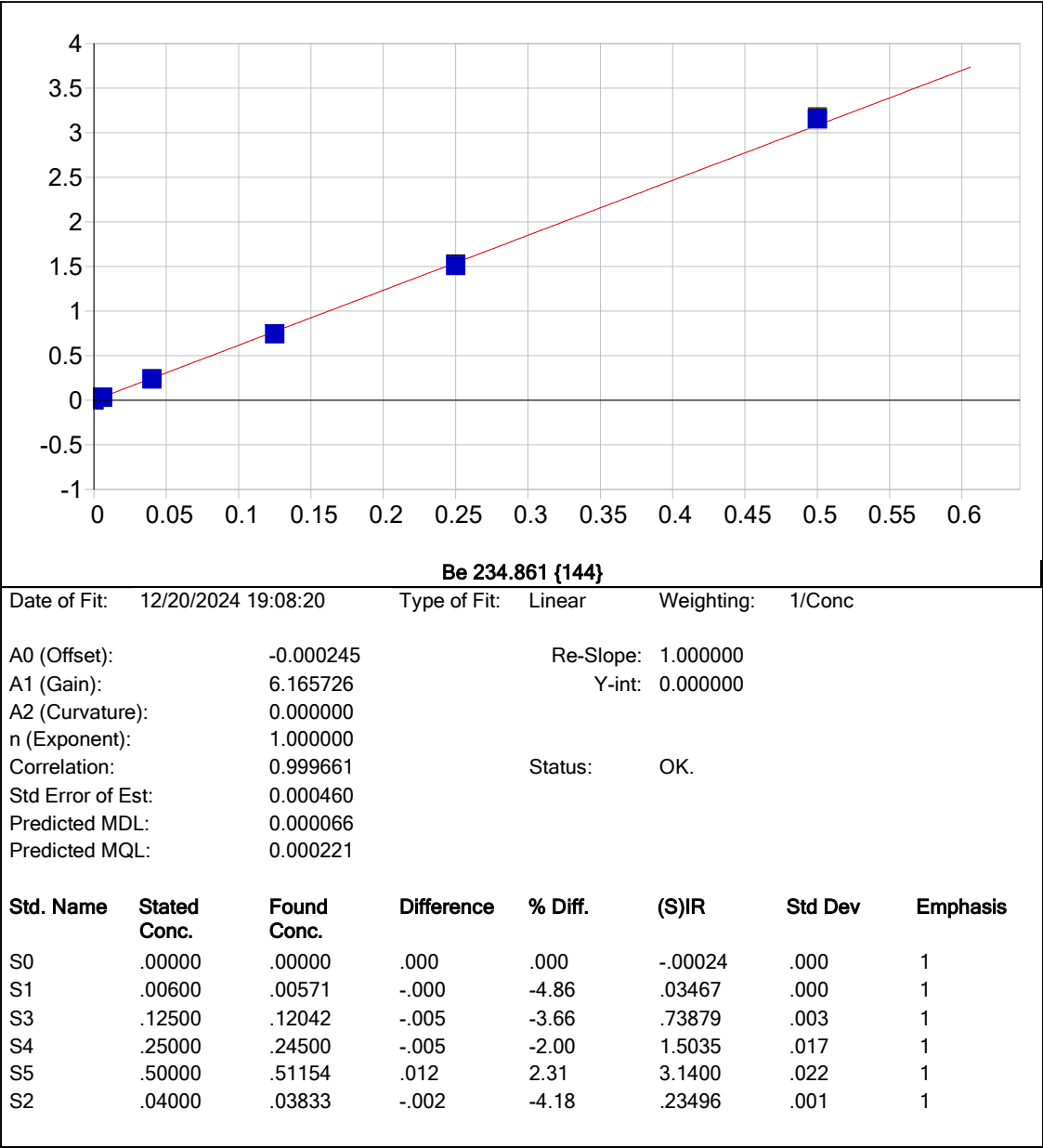


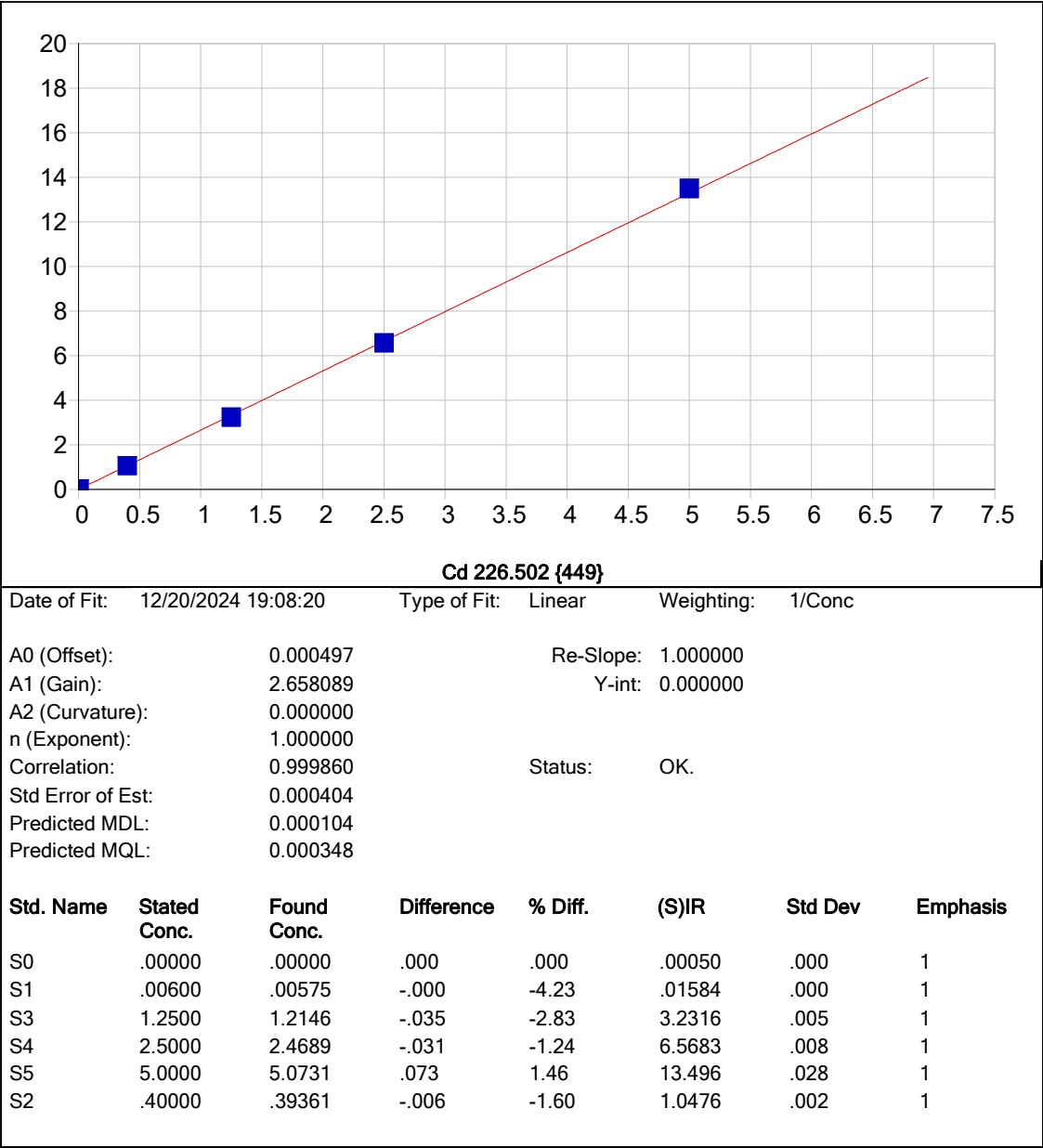


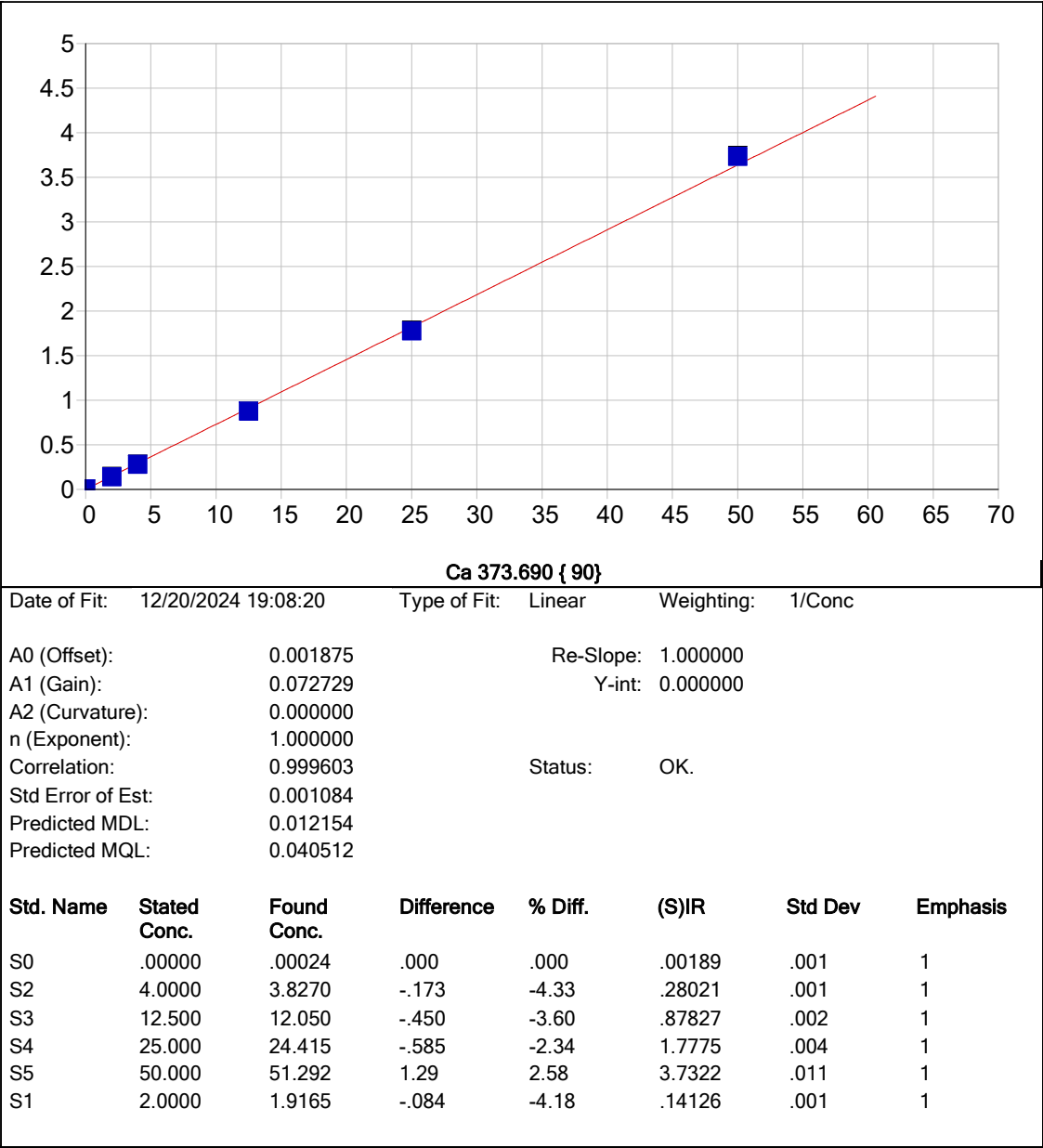


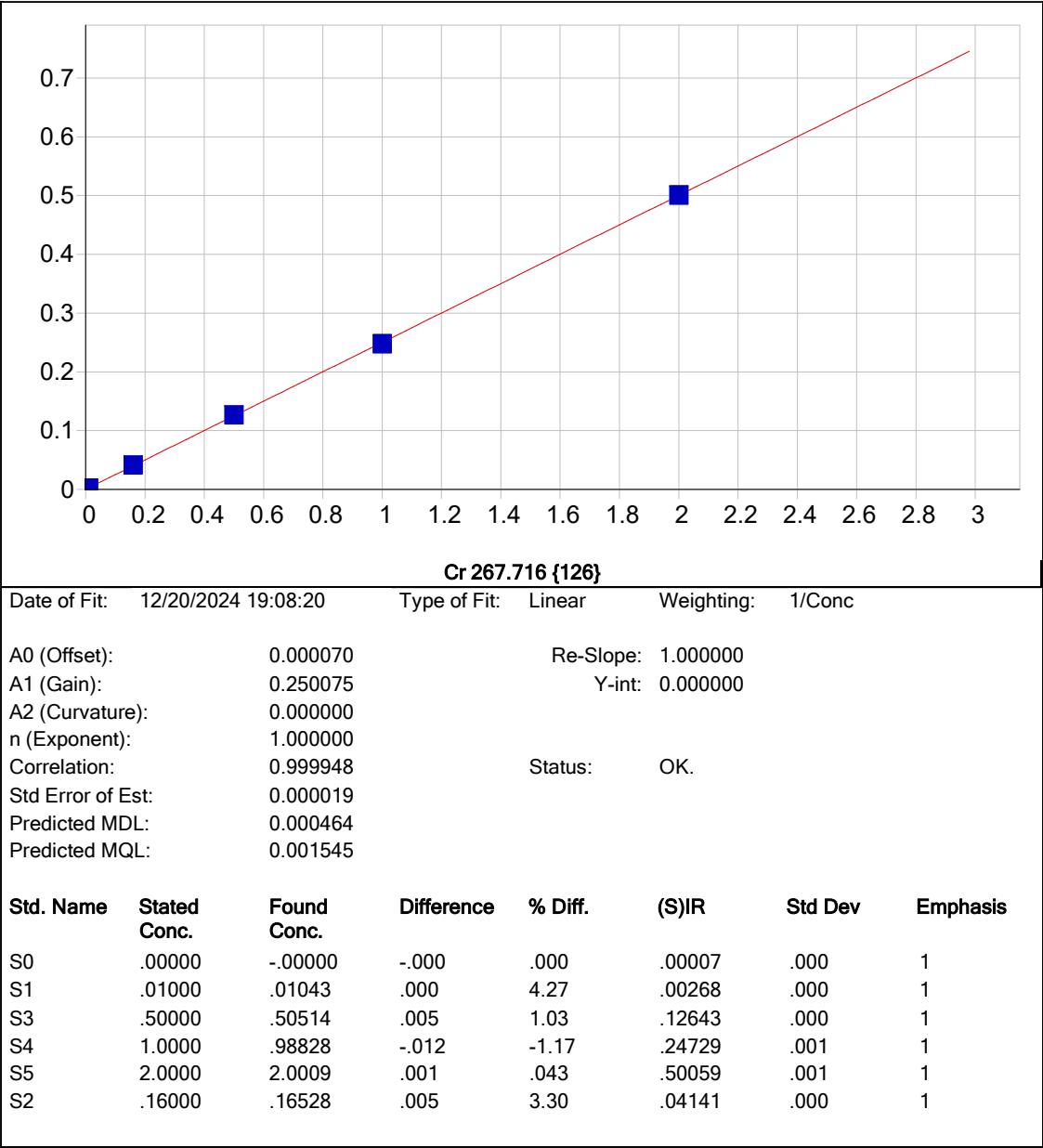


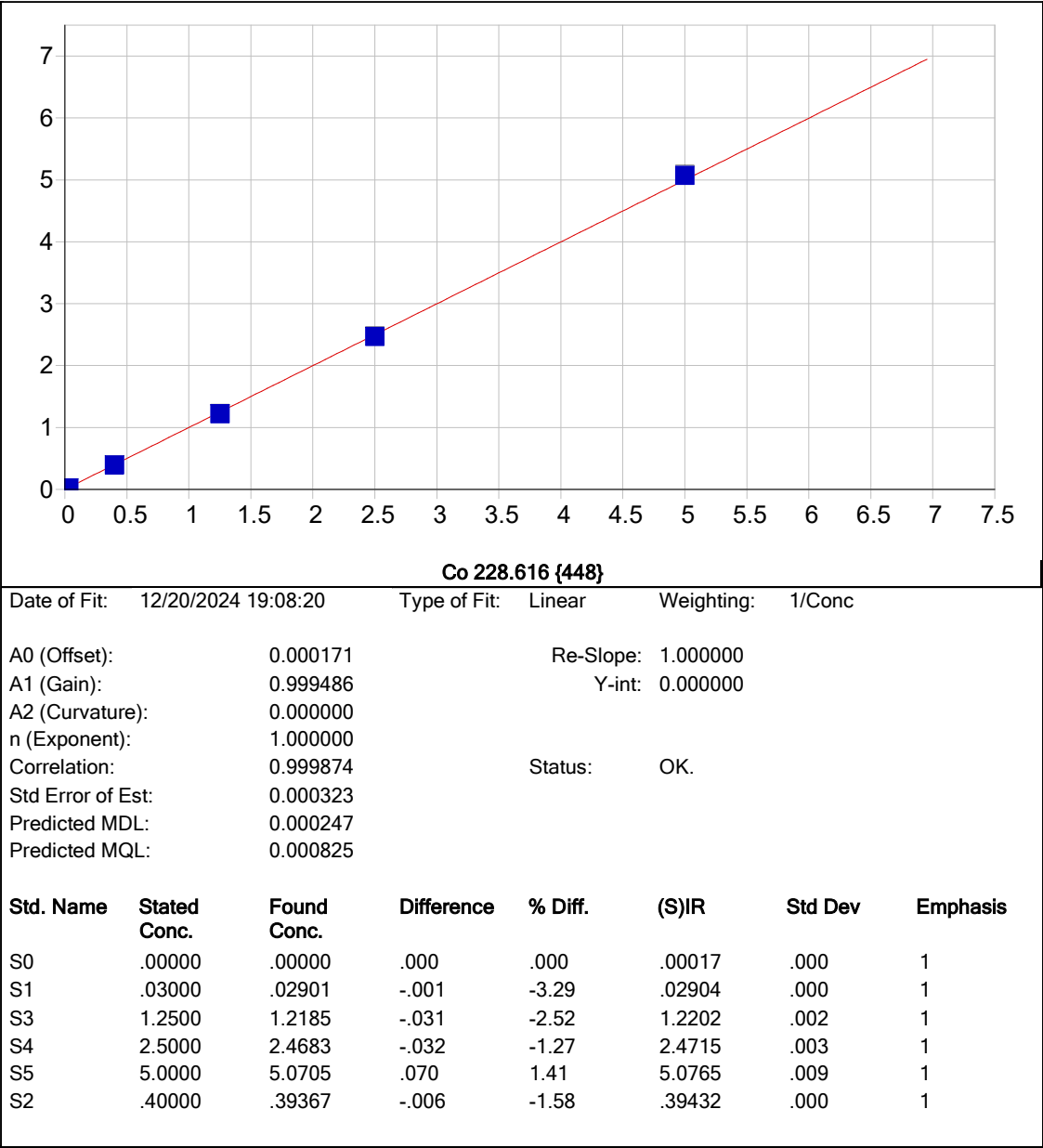


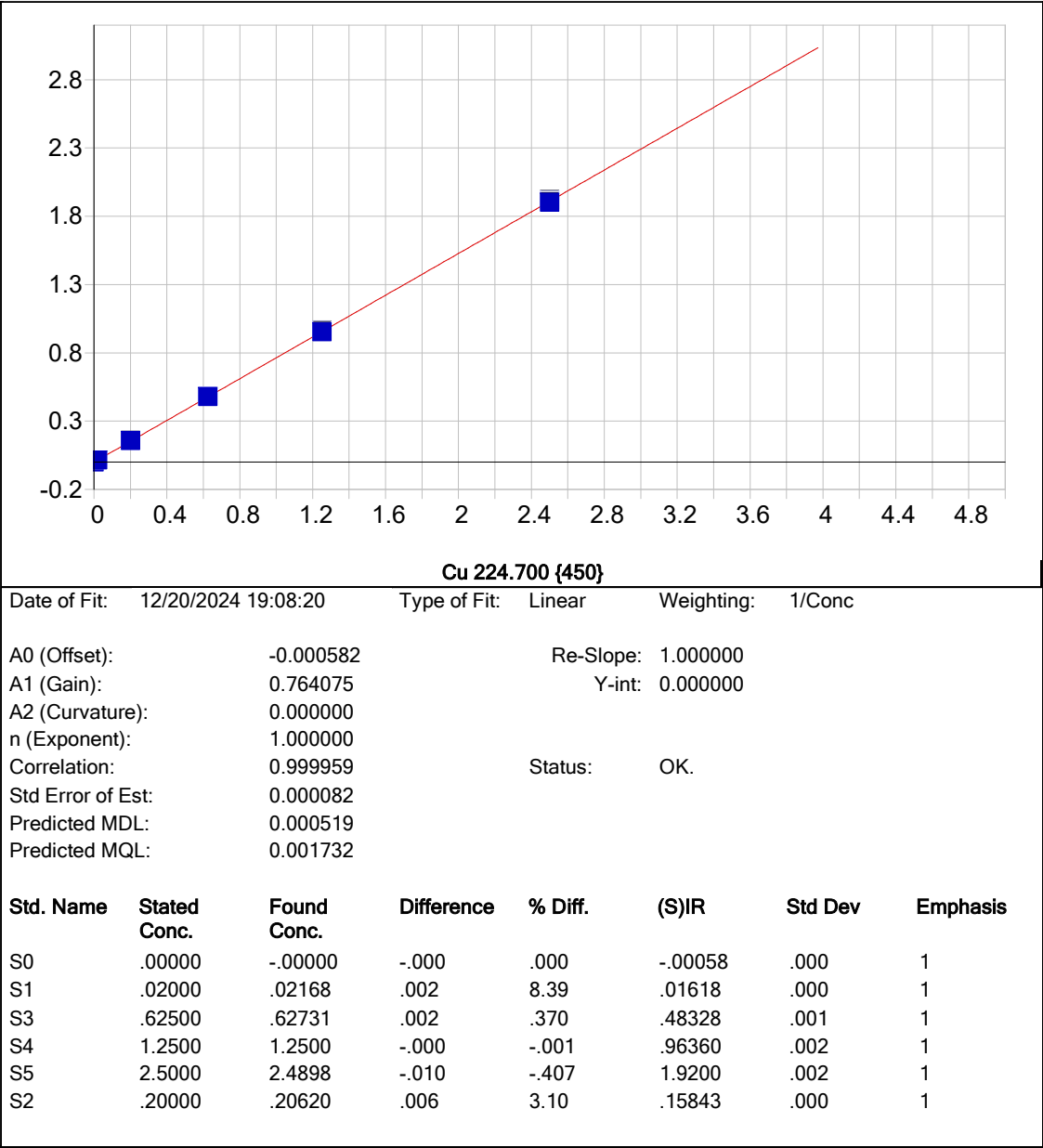


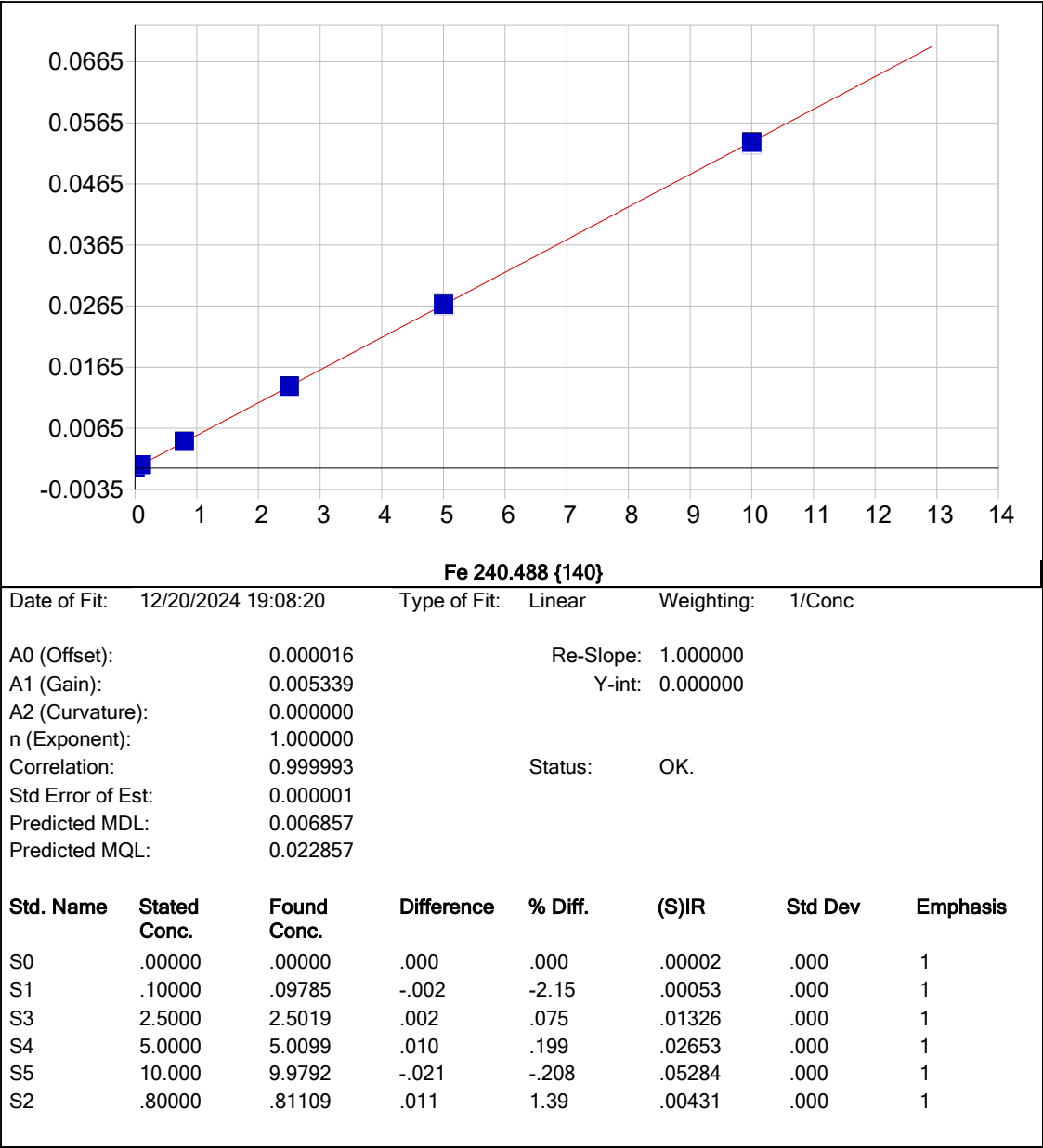


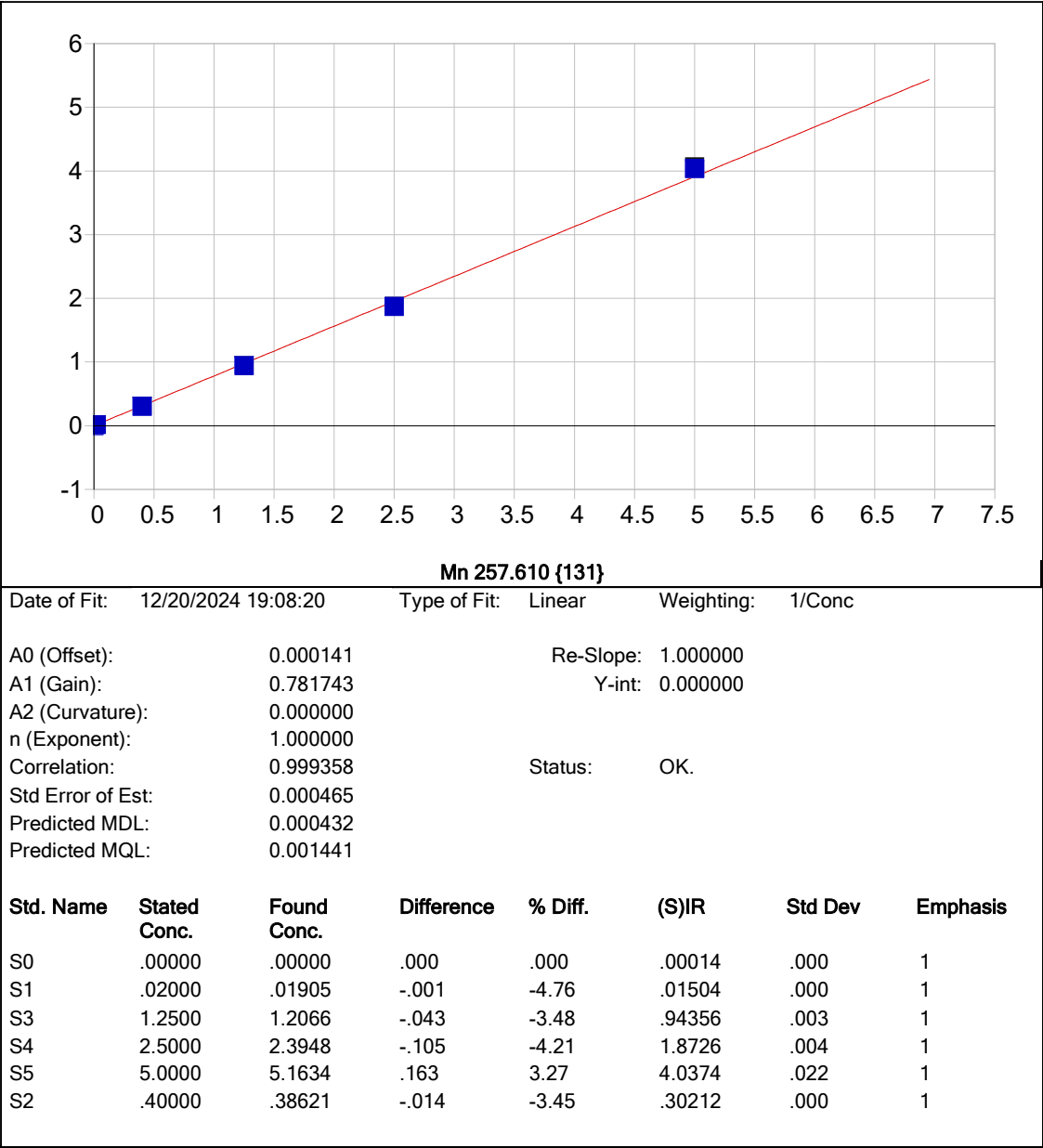


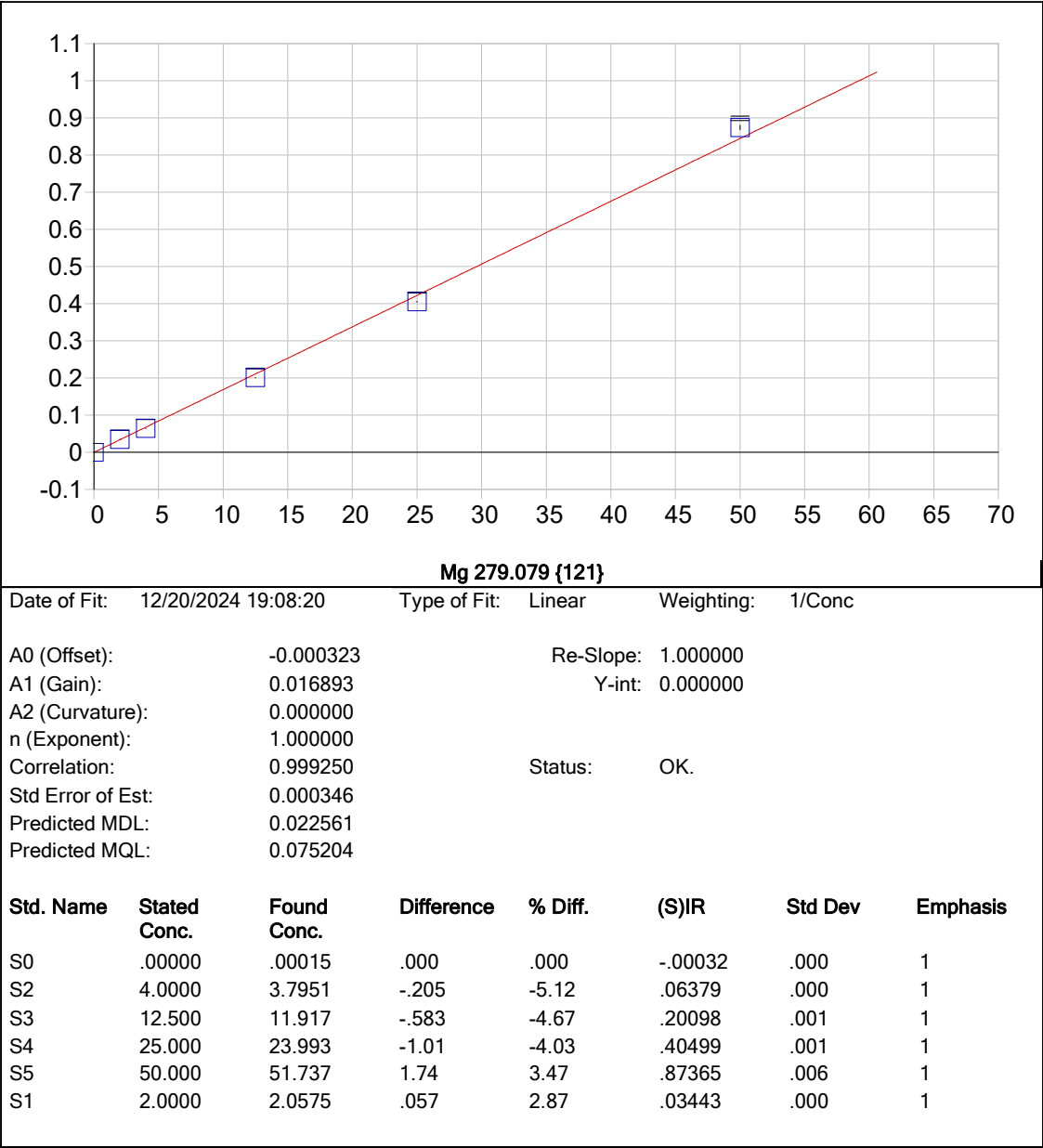


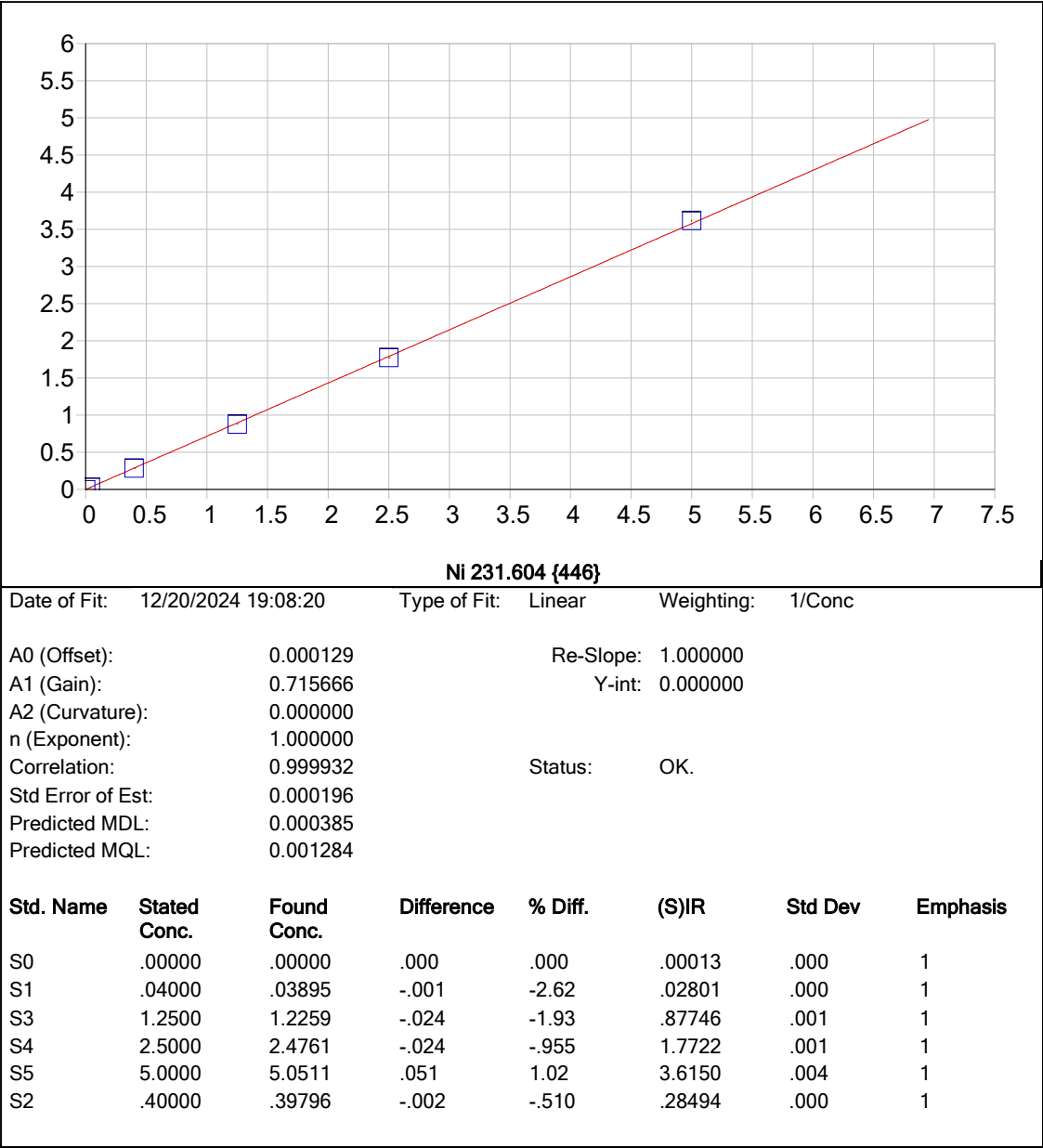


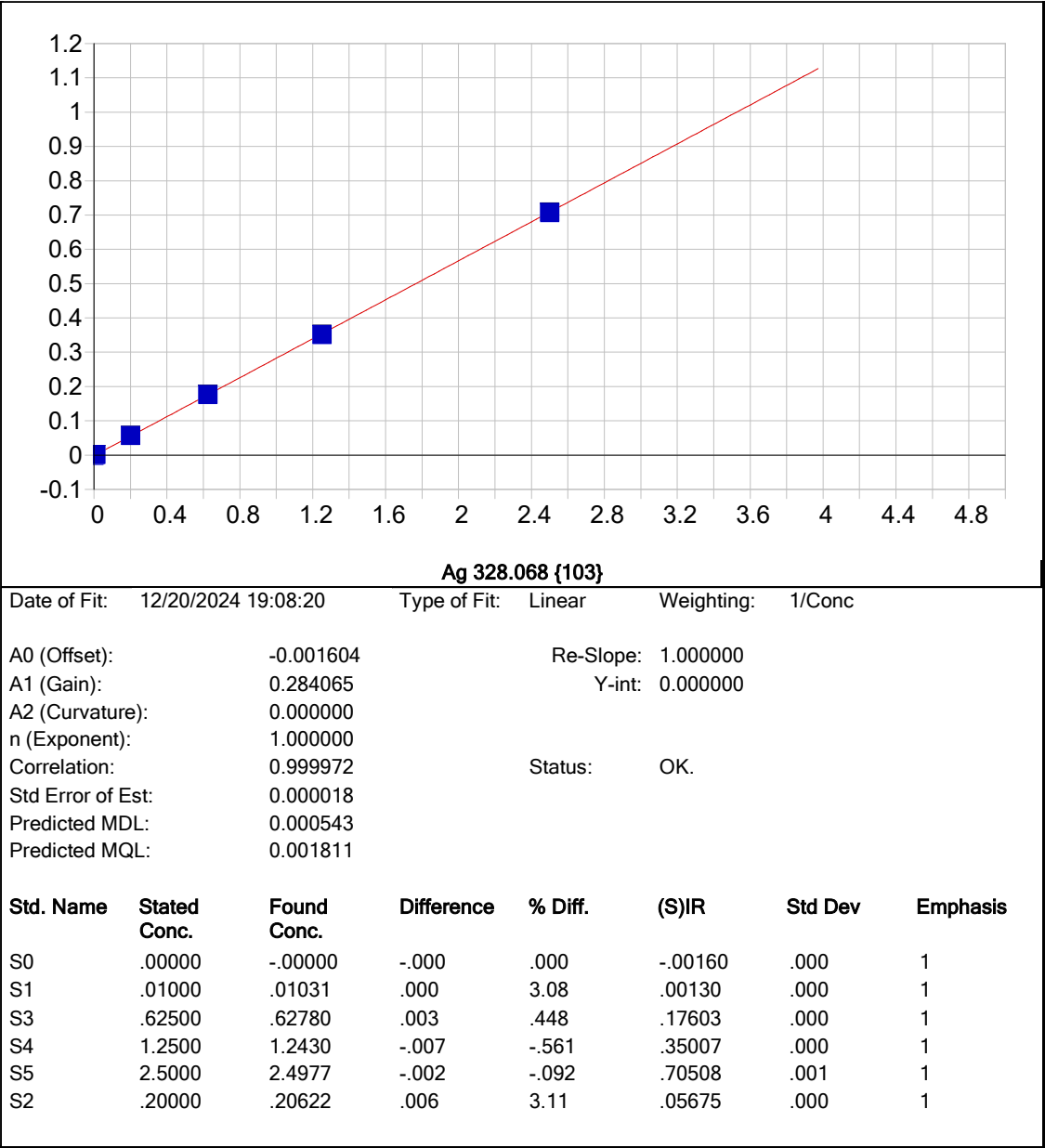


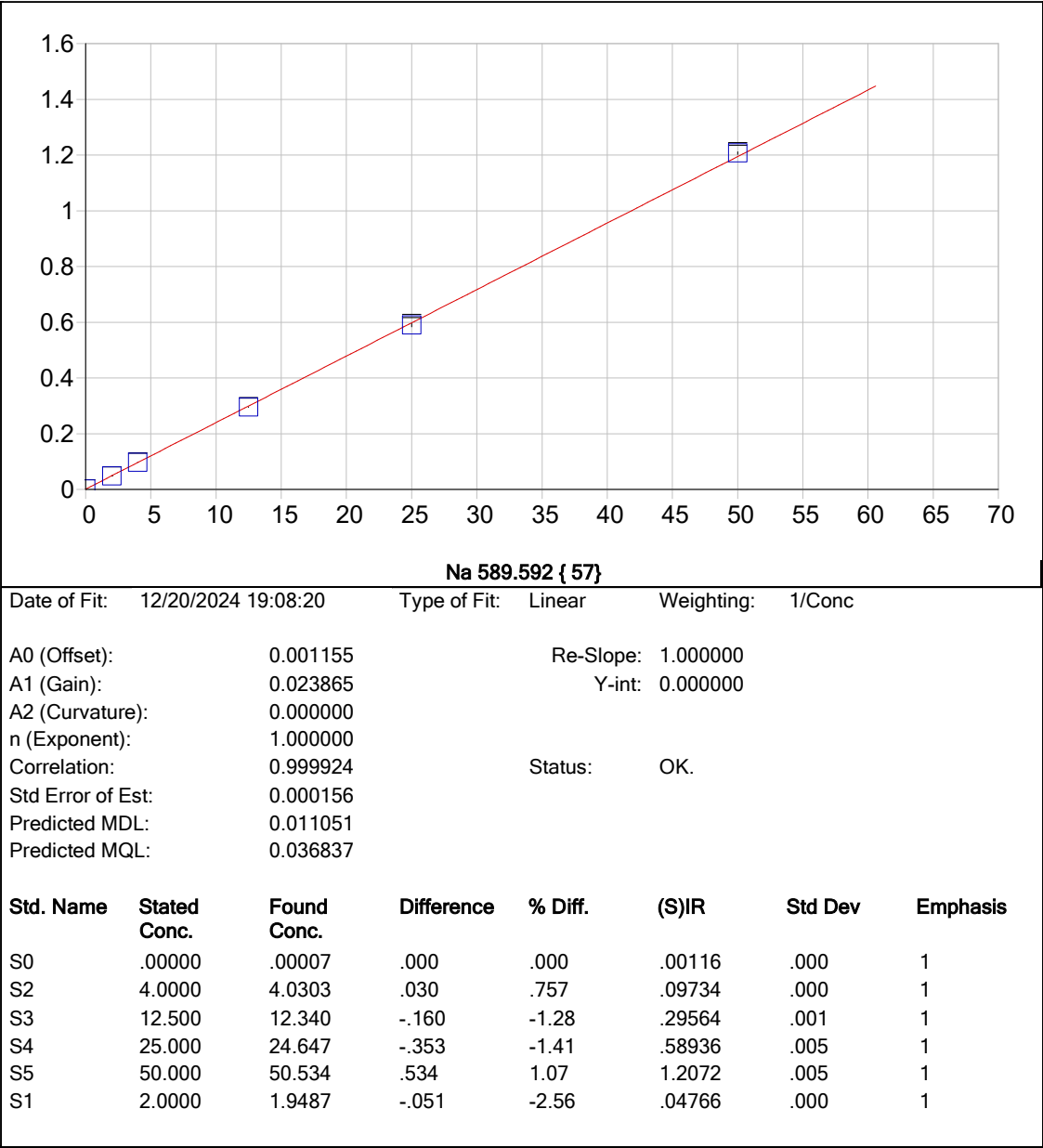


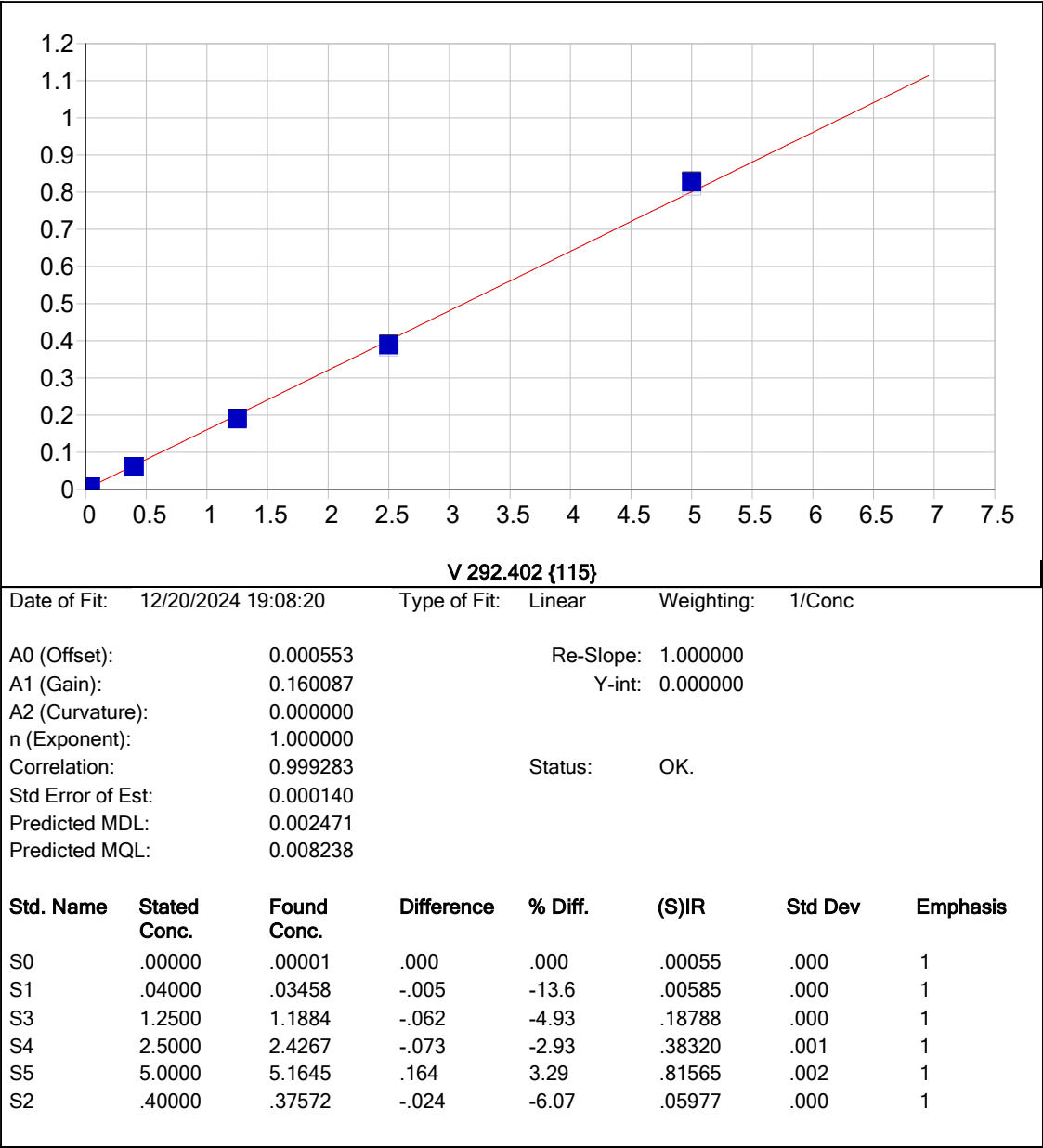


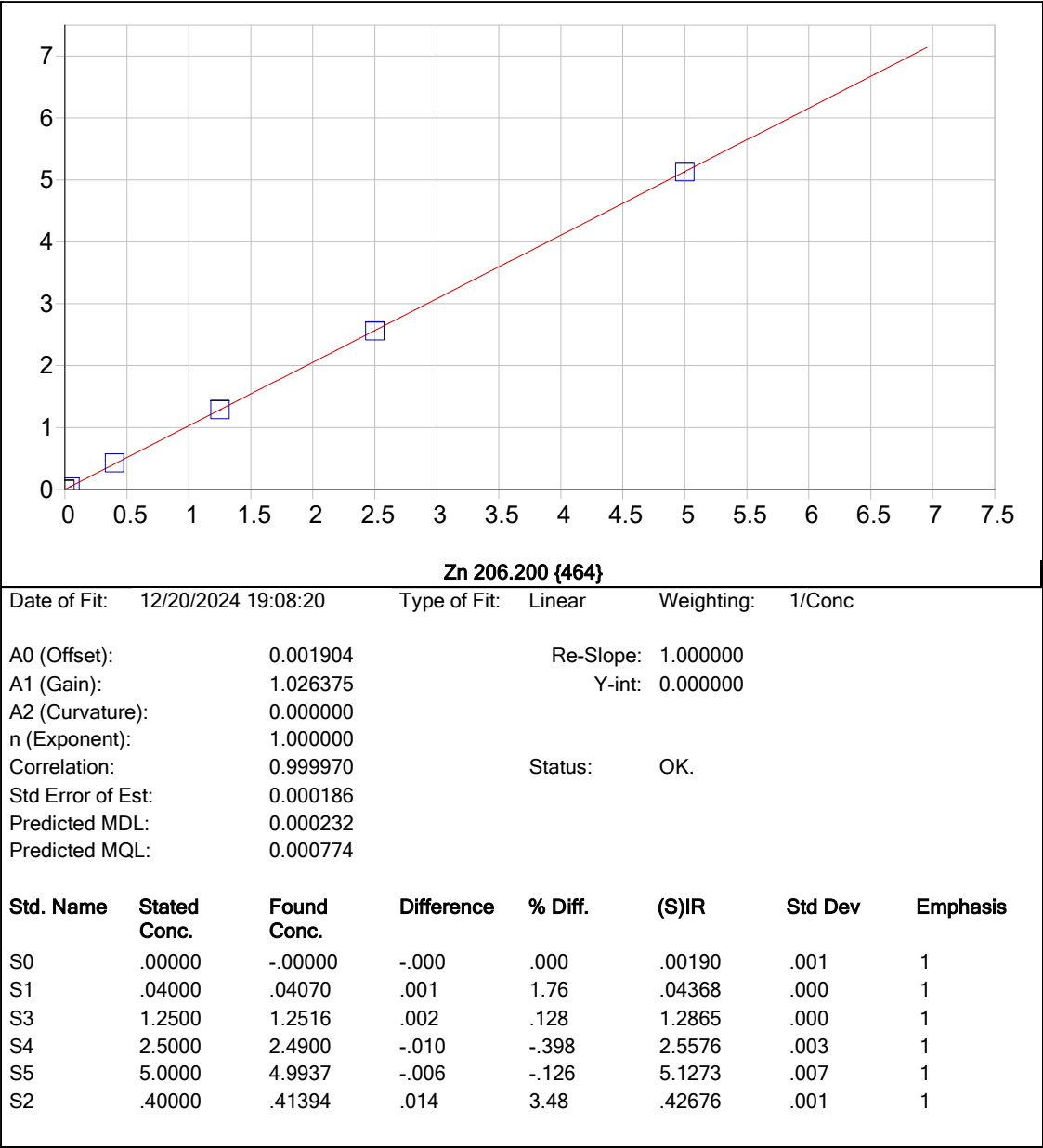


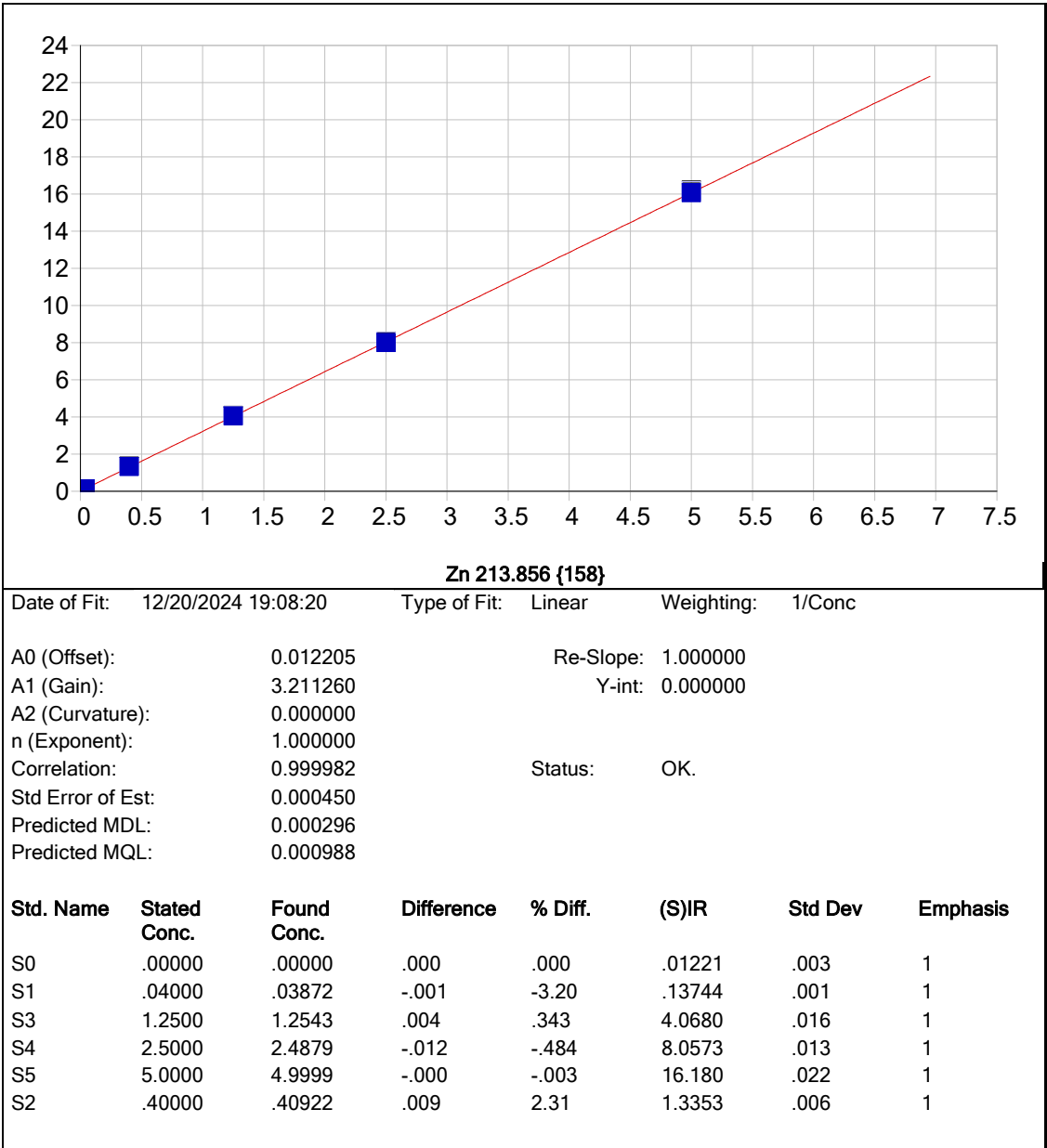


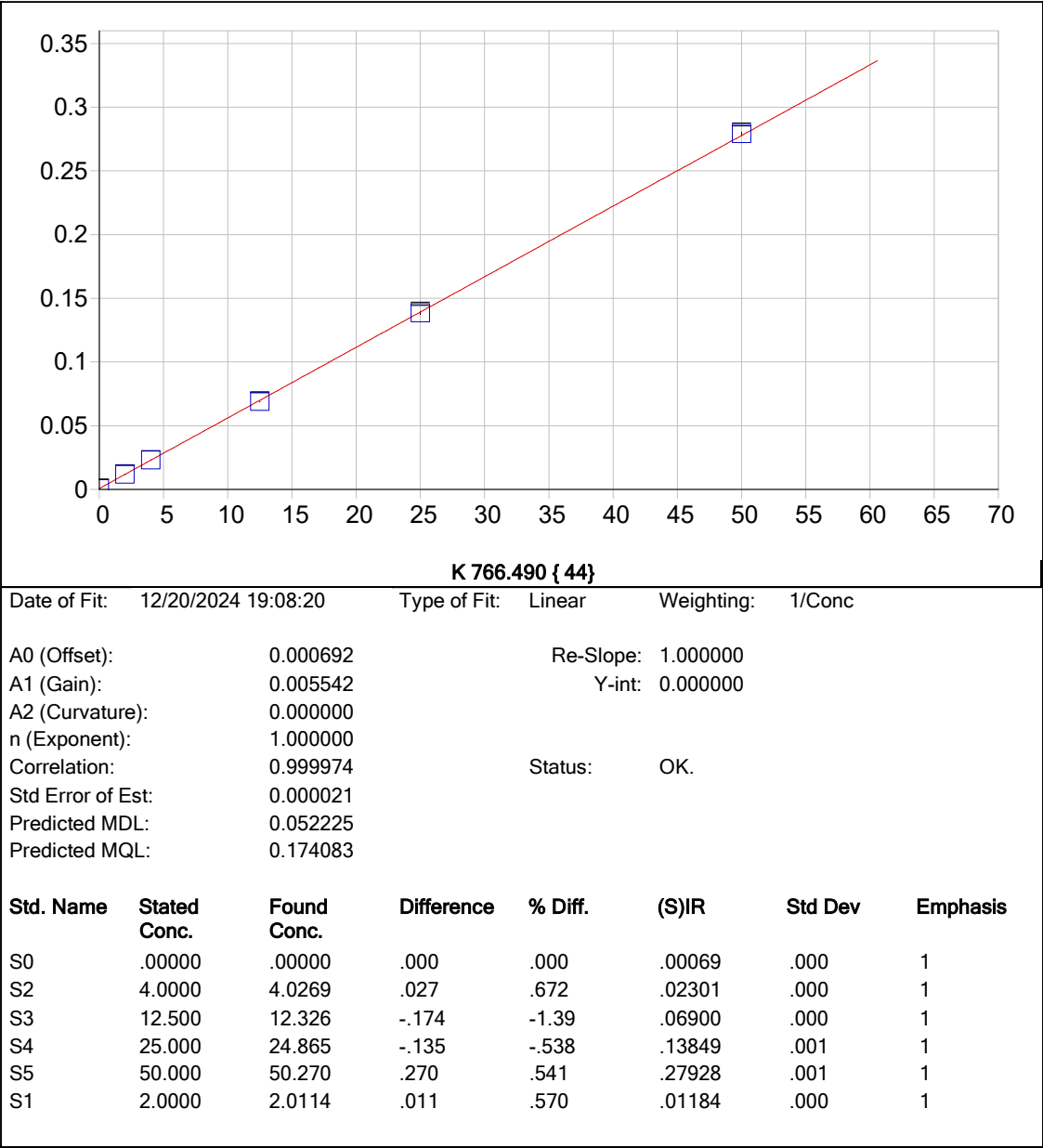


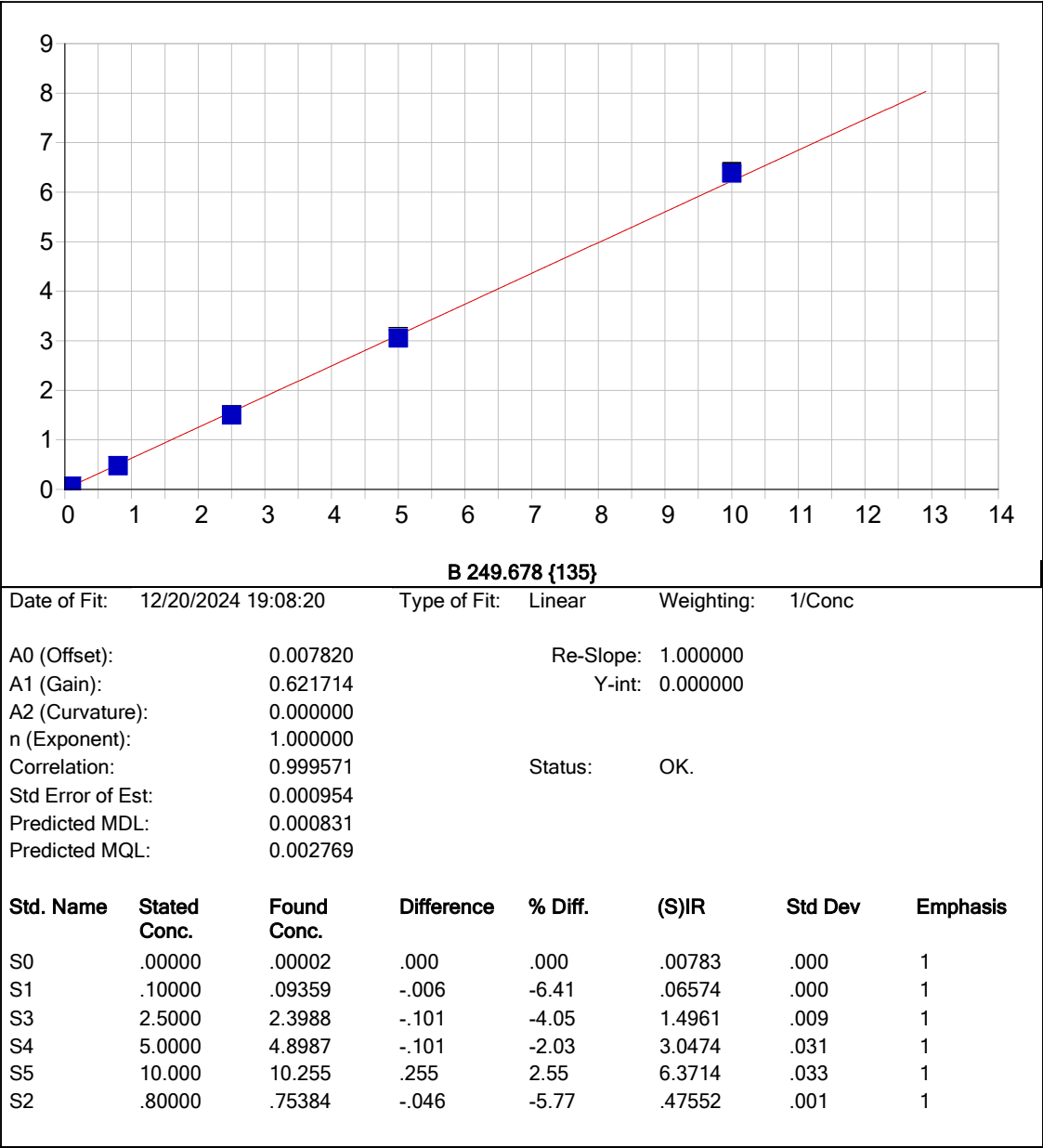


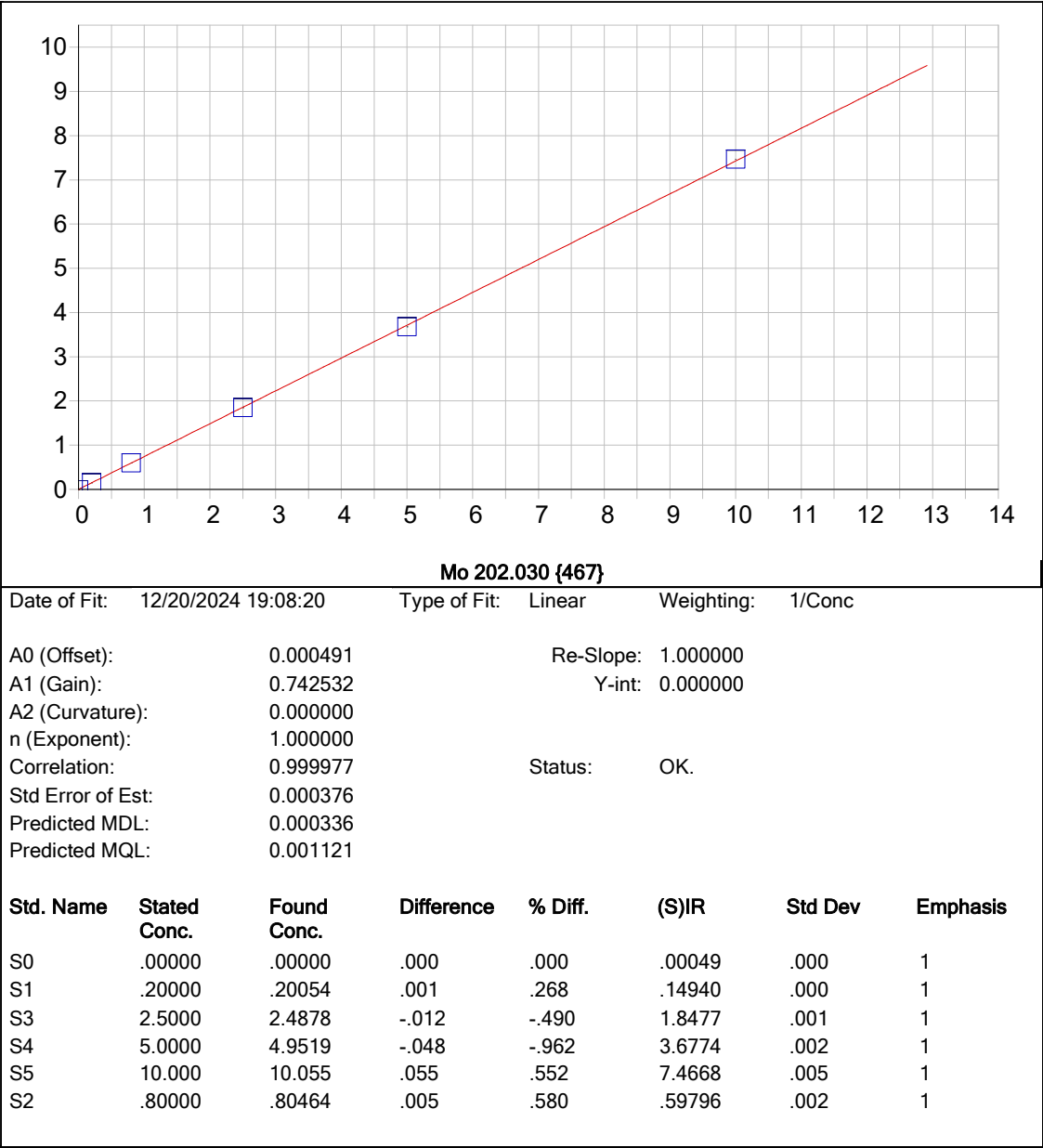


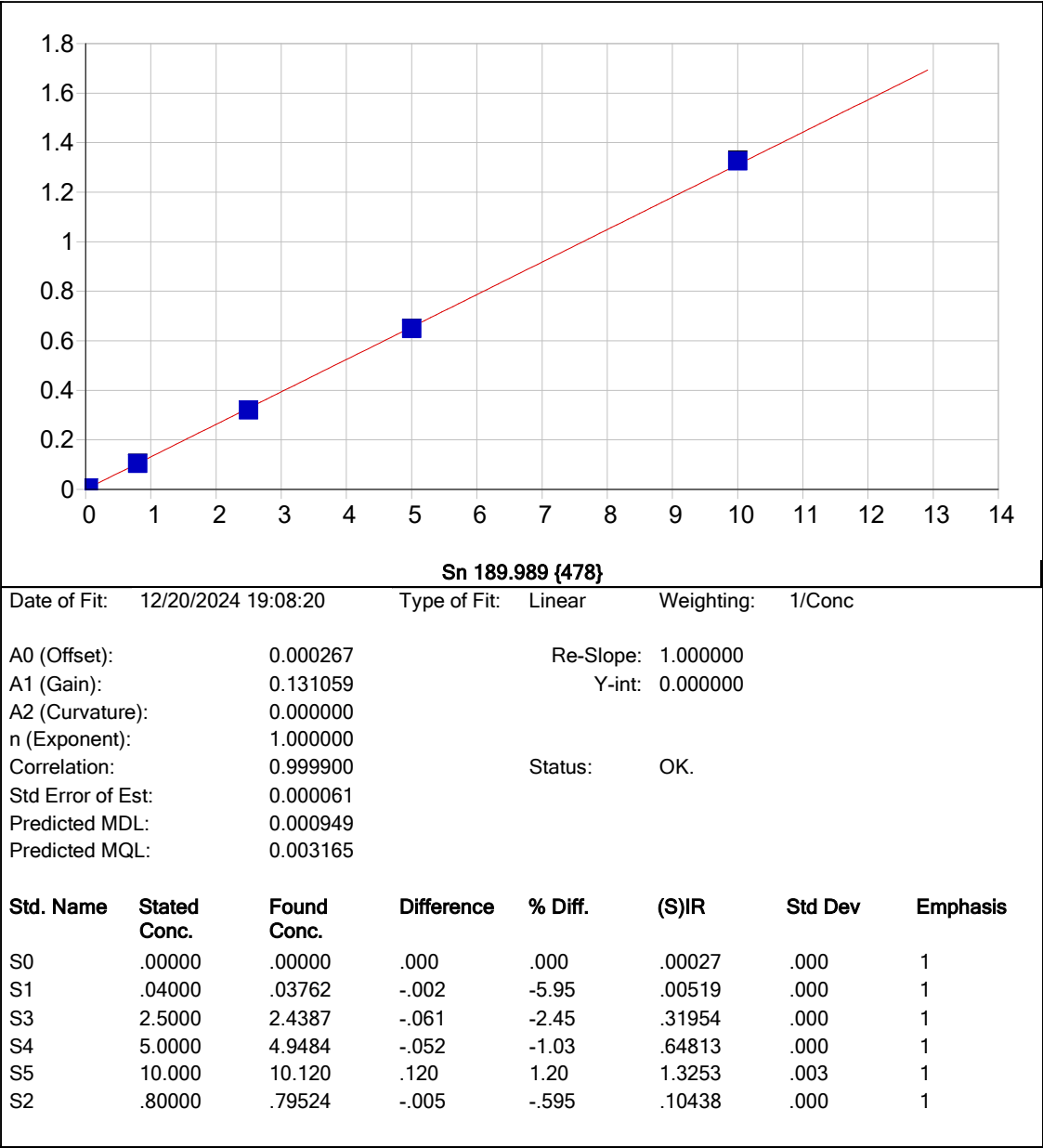


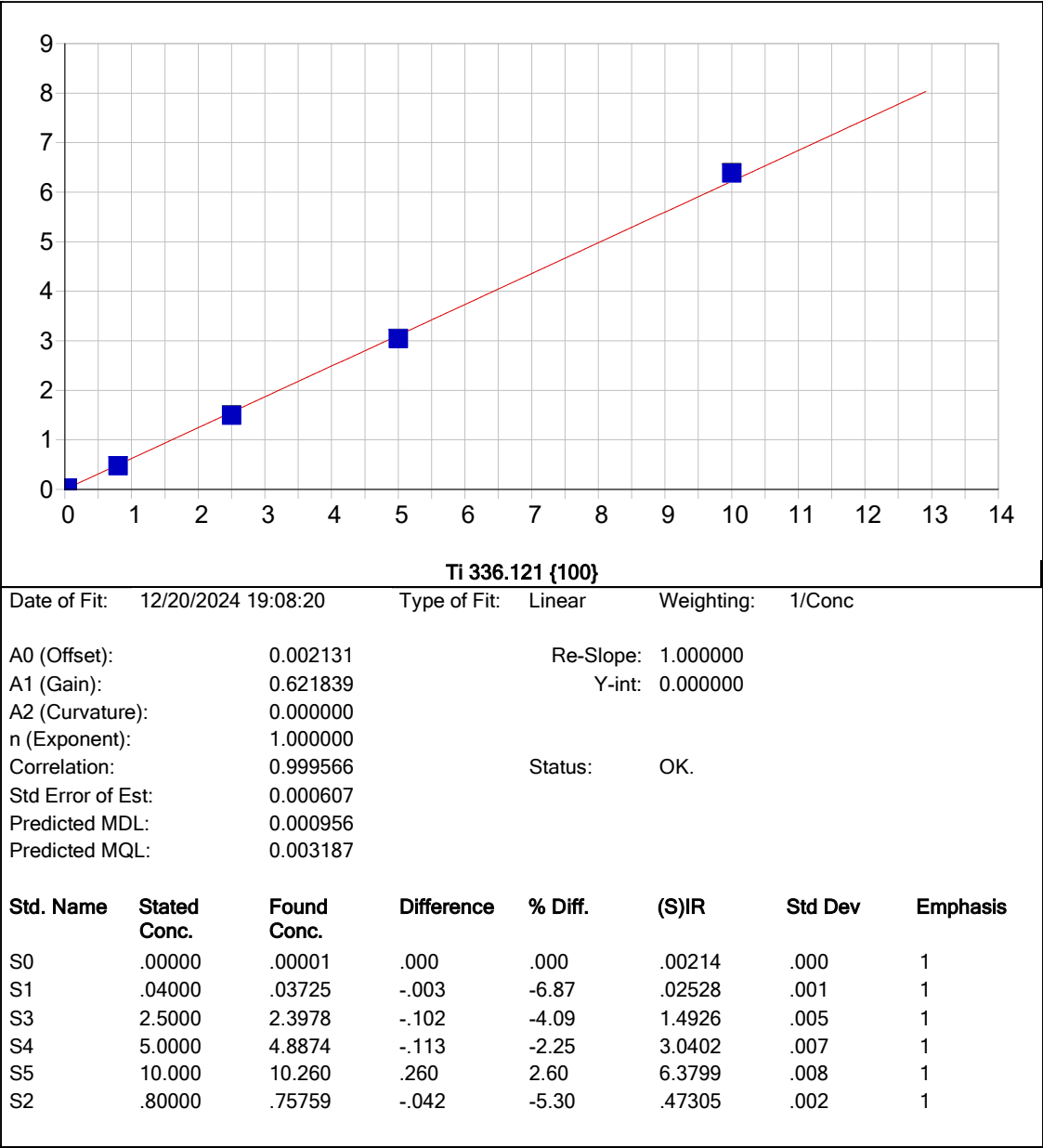


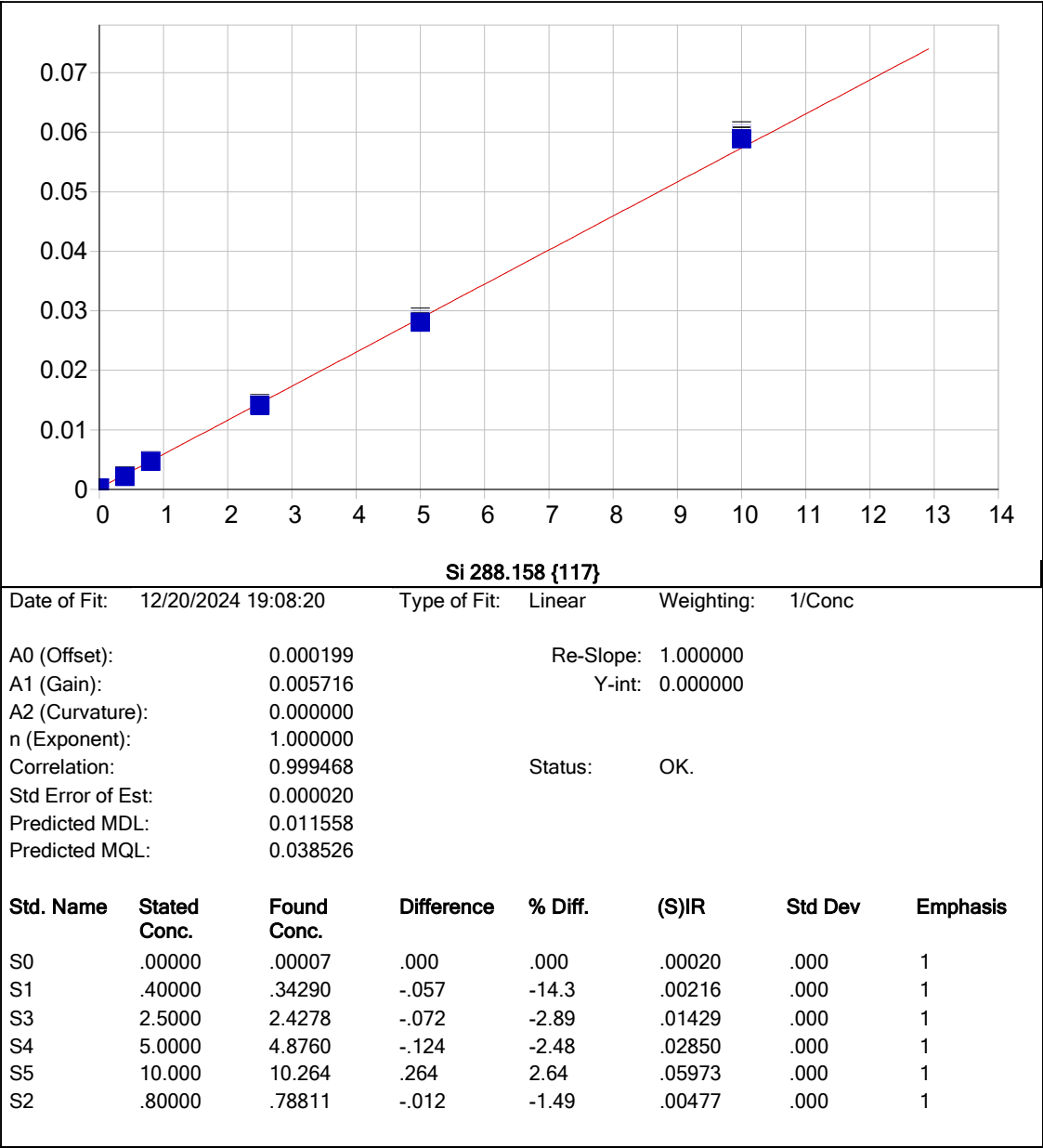


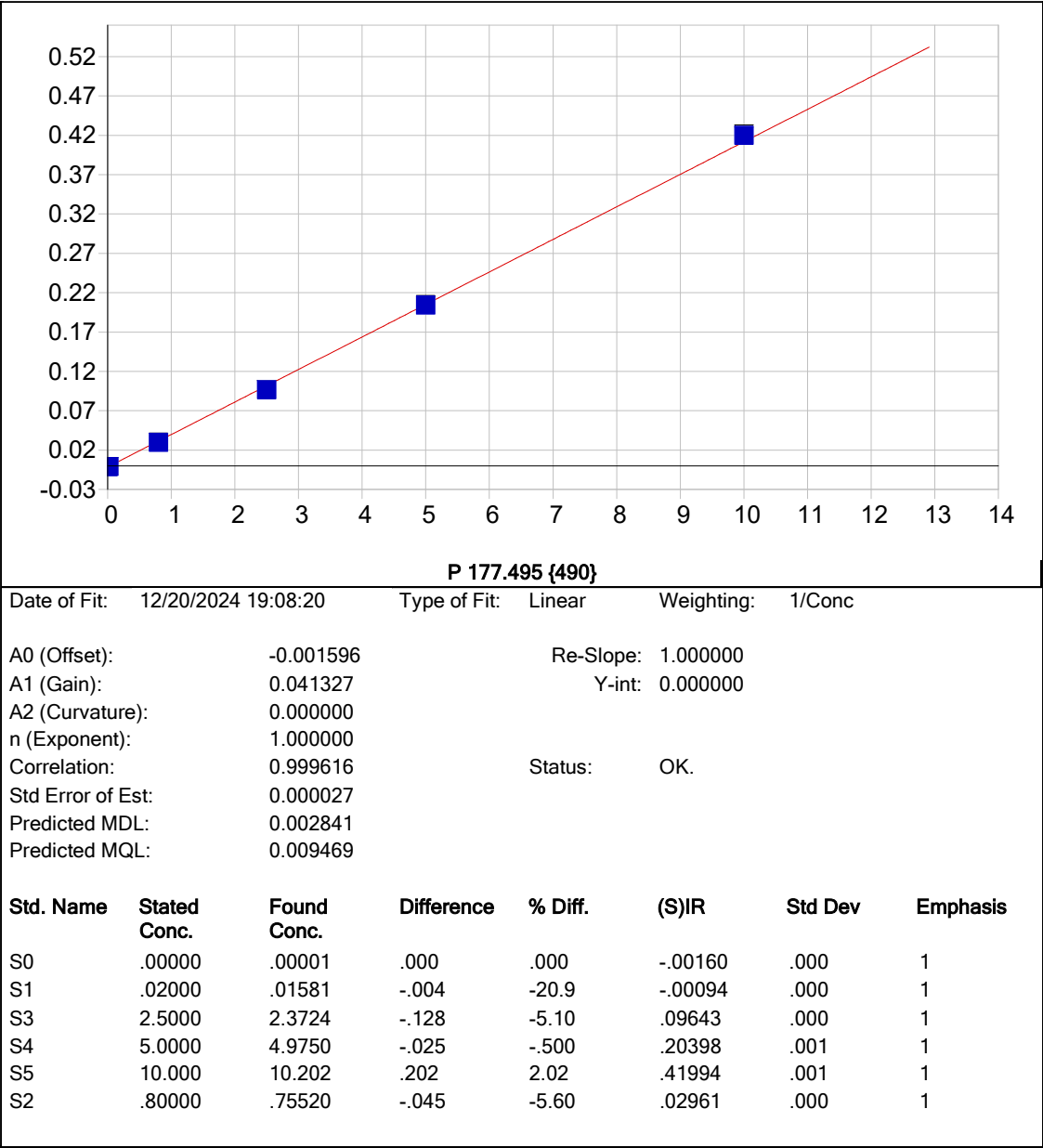


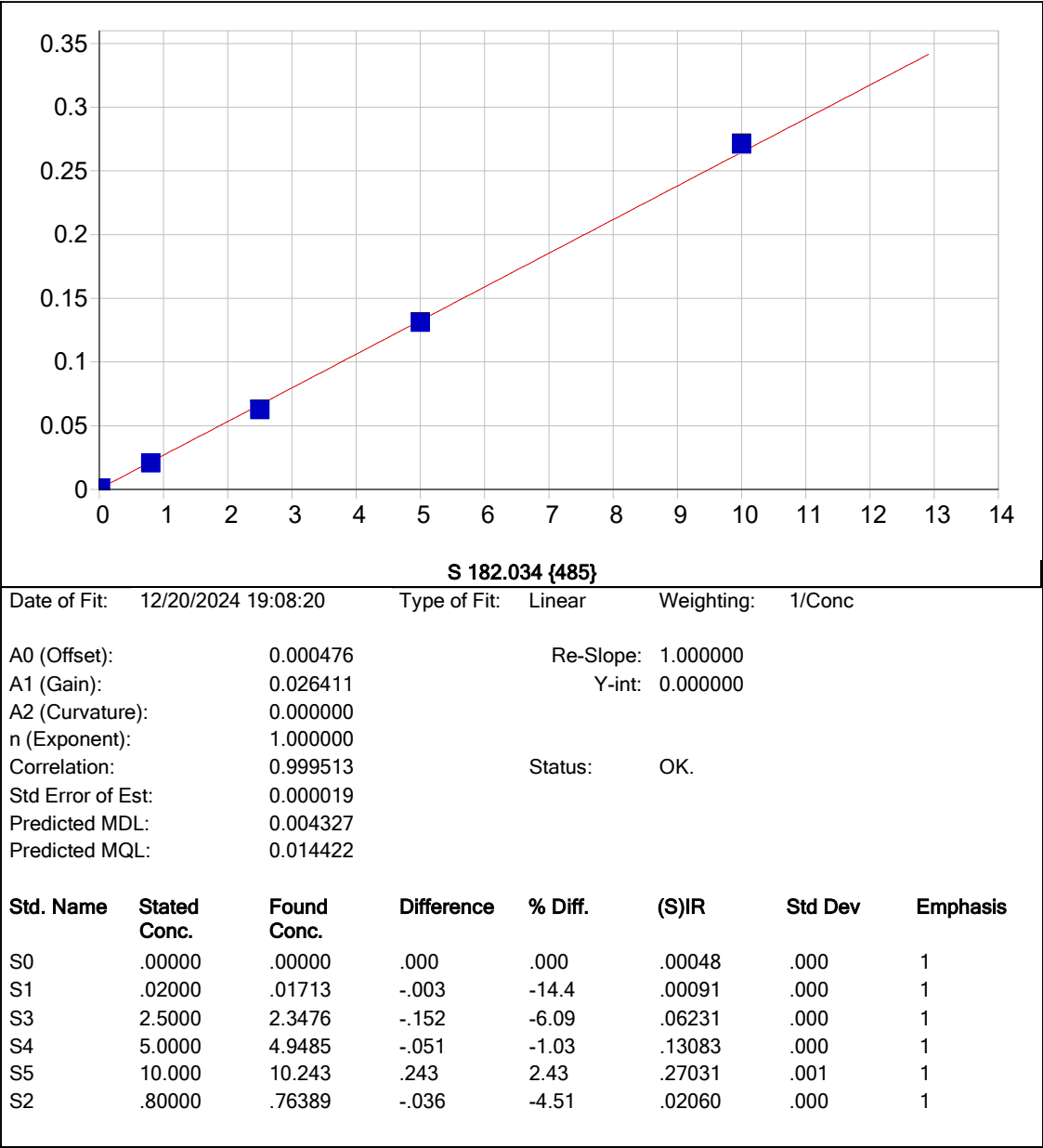


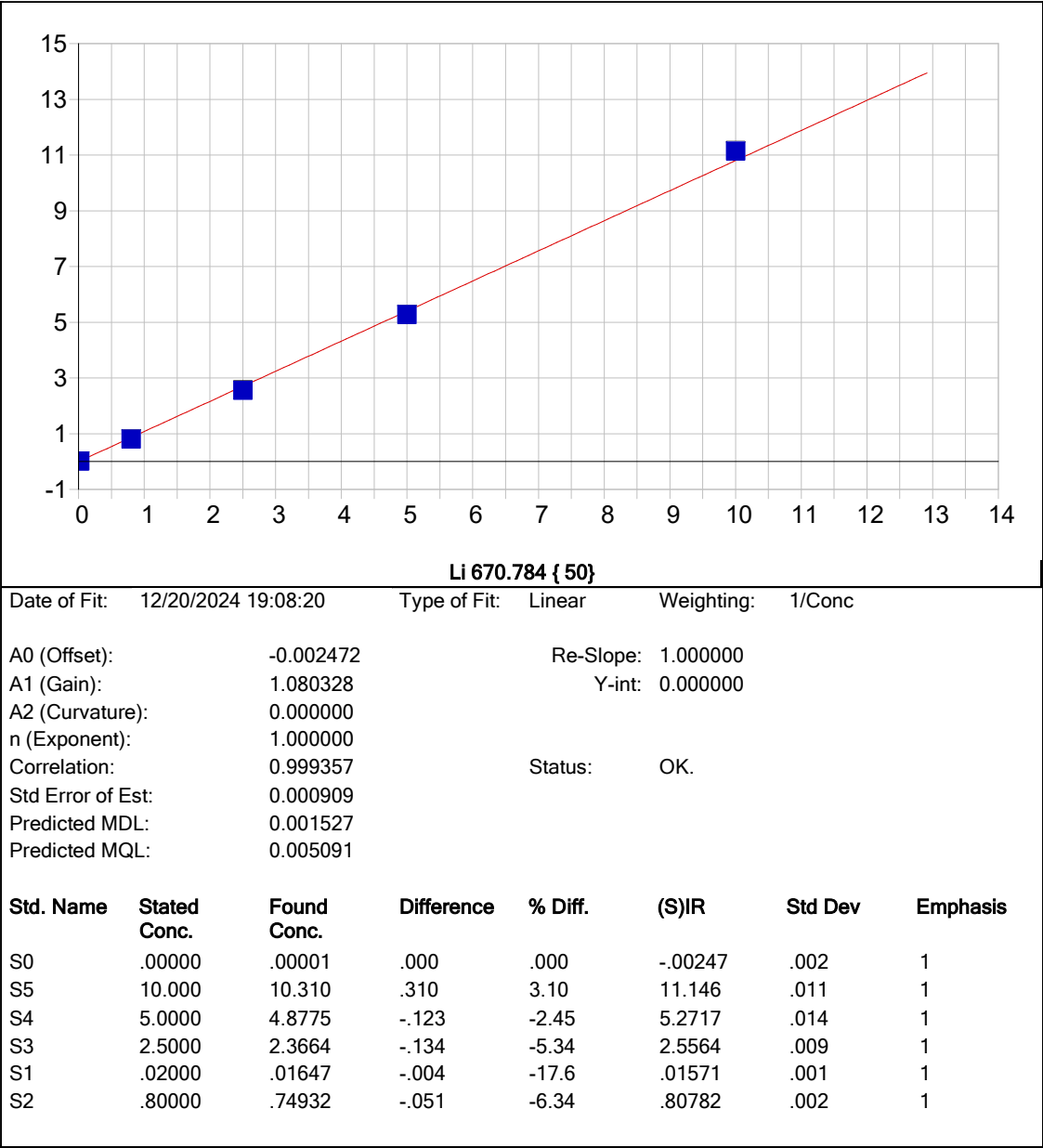


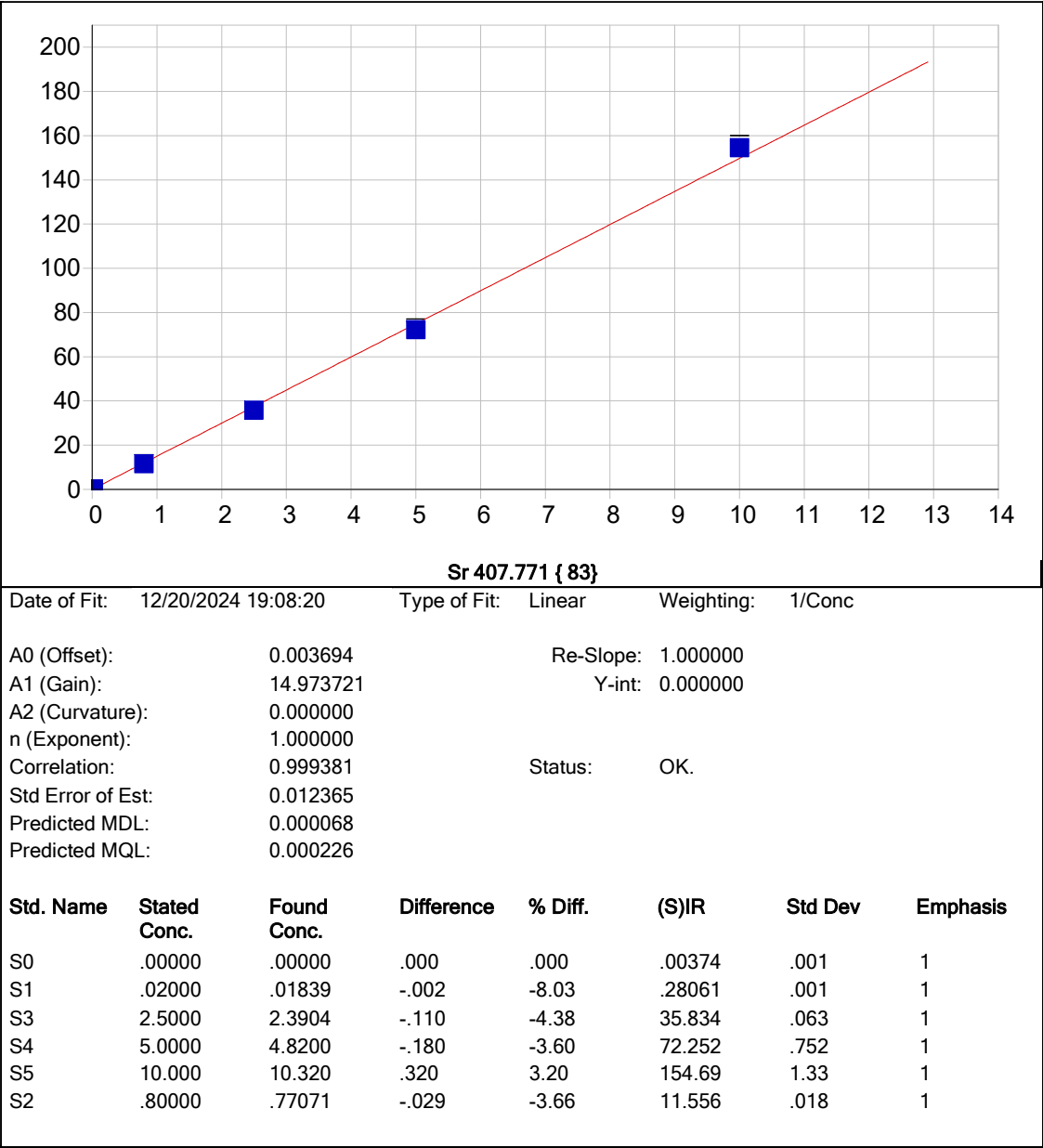


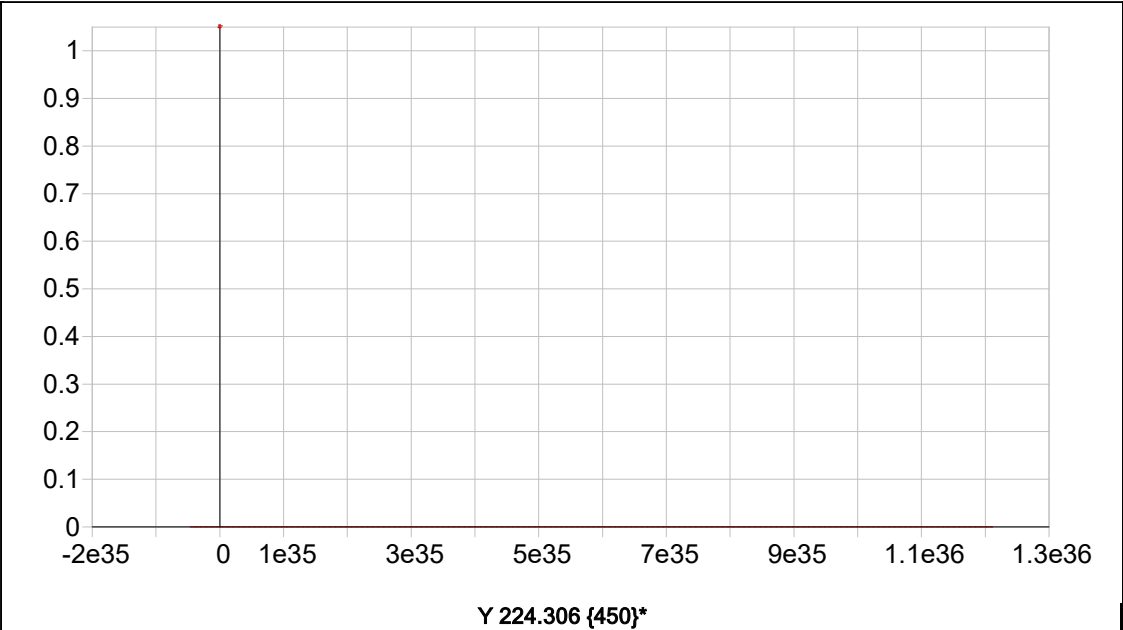








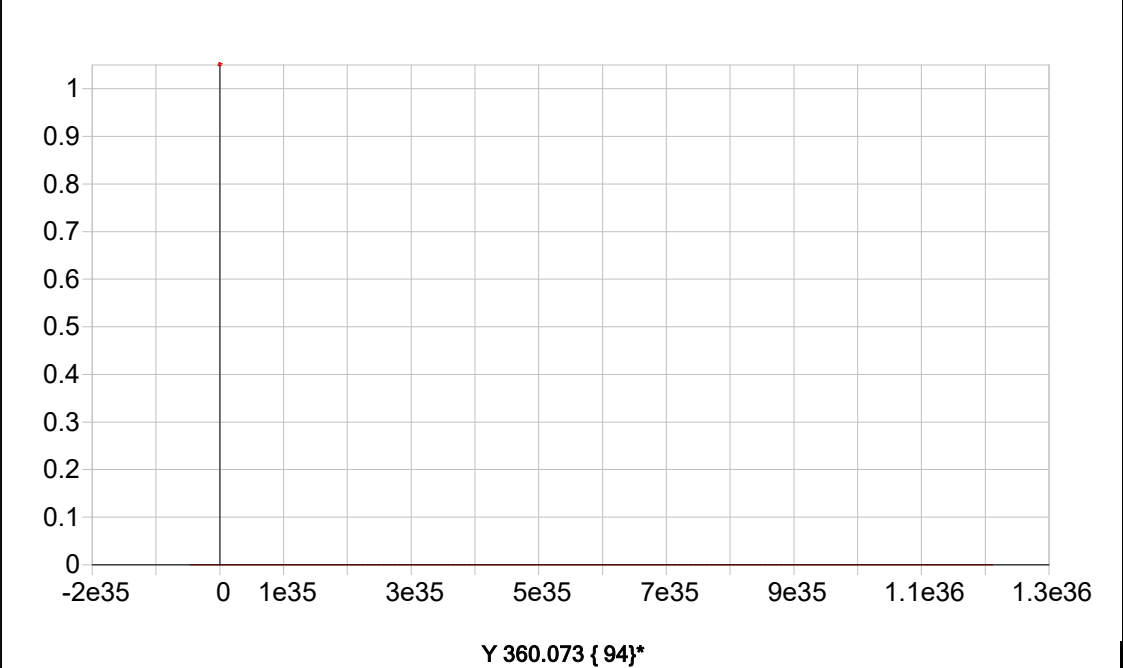




Date of Fit: 12/20/2024 19:08:20 Type of Fit: Linear Weighting: 1/Conc

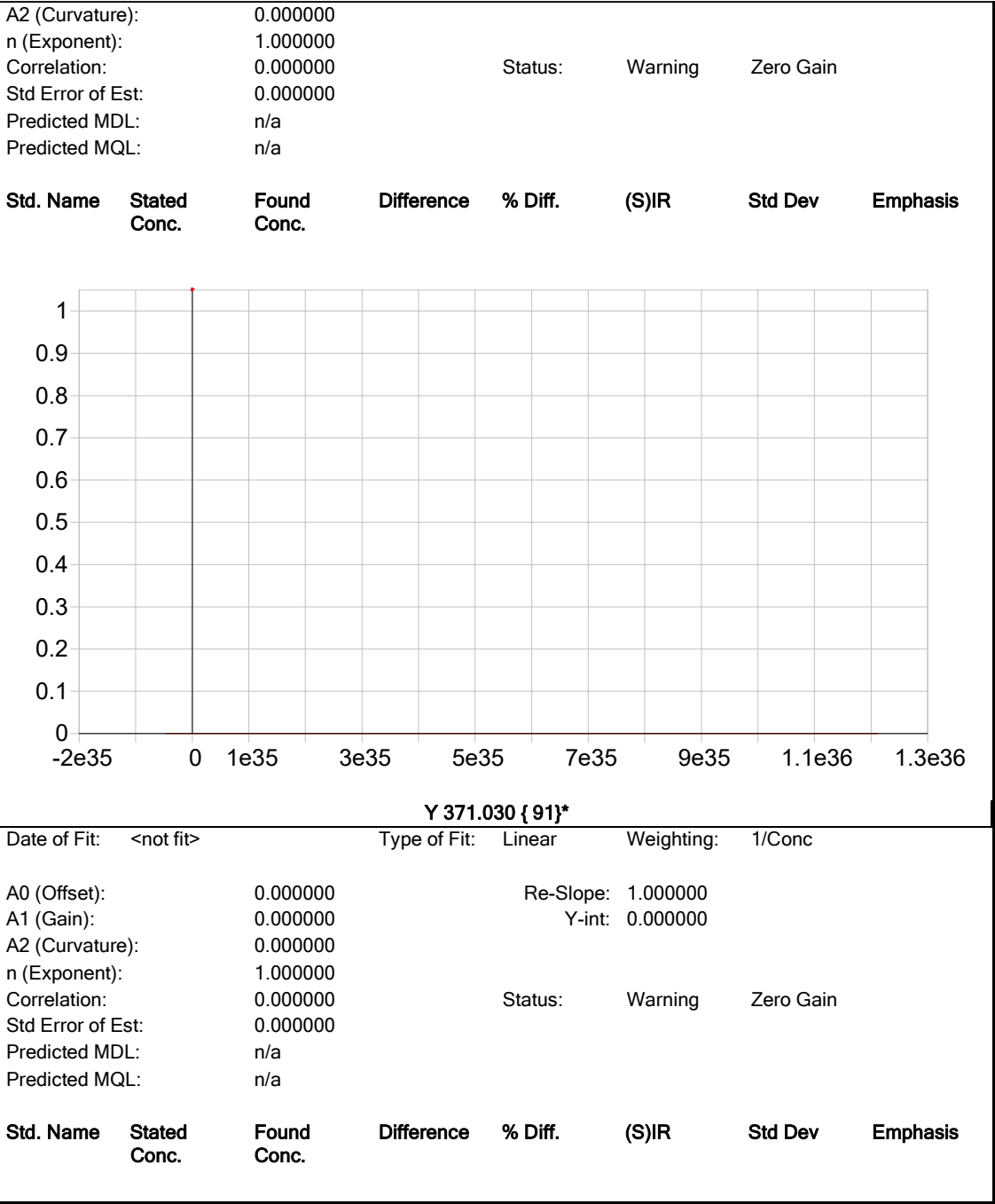
A0 (Offset): 0.000000 Re-Slope: 1.000000
A1 (Gain): 0.000000 Y-int: 0.000000
A2 (Curvature): 0.000000
n (Exponent): 1.000000
Correlation: 0.000000 Status: Warning Zero Gain
Std Error of Est: 0.000000
Predicted MDL: n/a
Predicted MQL: n/a

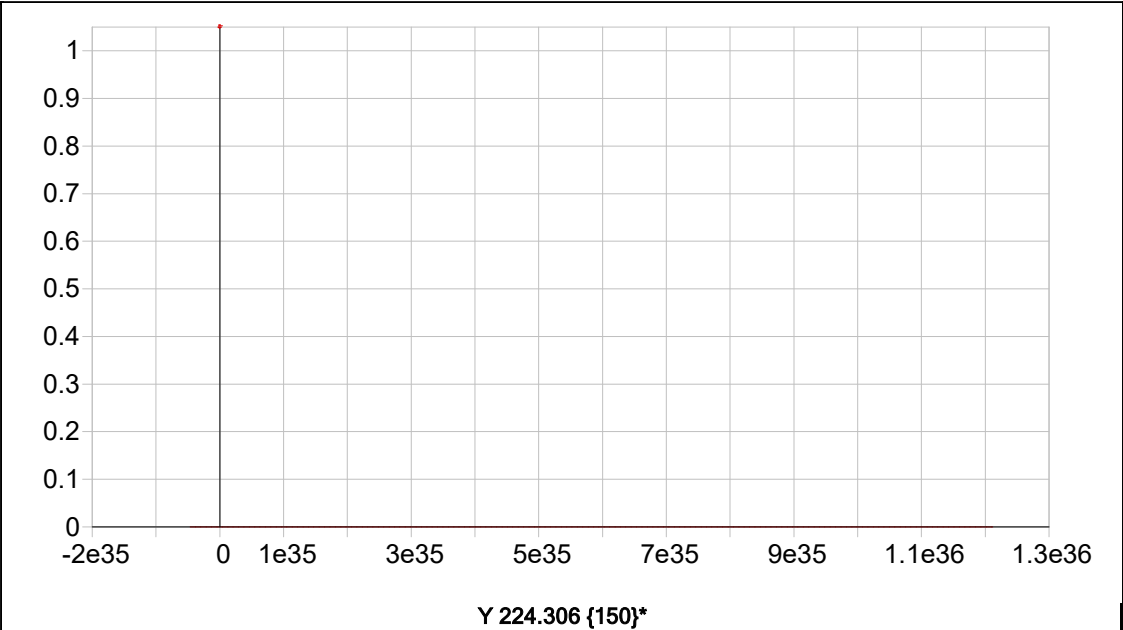
Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
-----------	--------------	-------------	------------	---------	-------	---------	----------



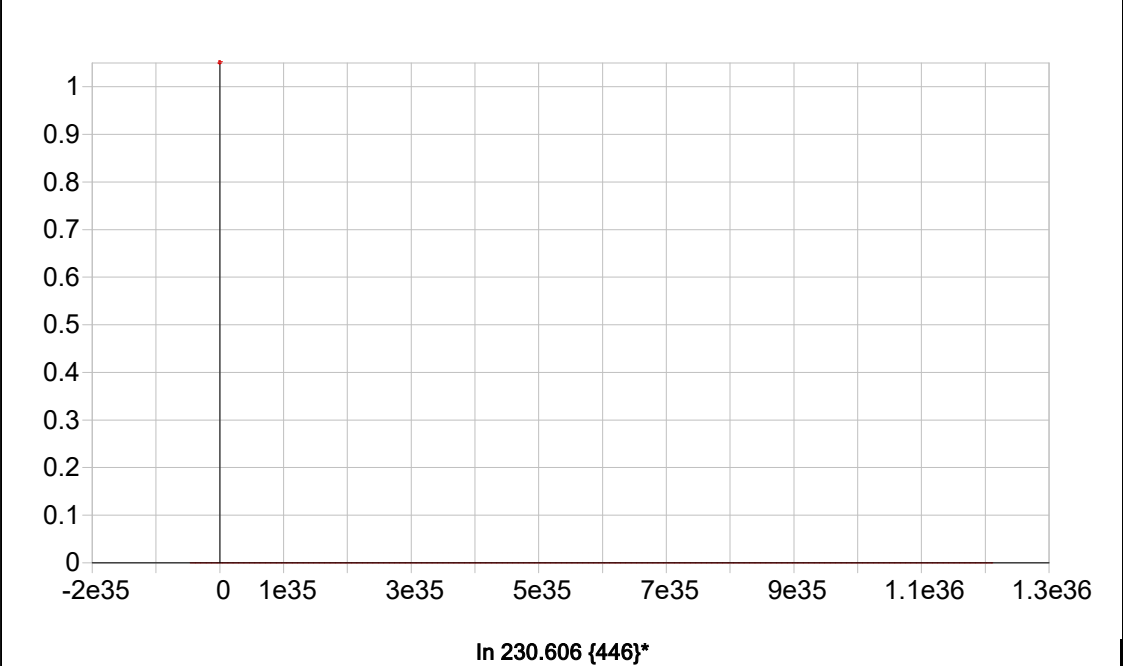
Date of Fit: <not fit> Type of Fit: Linear Weighting: 1/Conc

A0 (Offset): 0.000000 Re-Slope: 1.000000
A1 (Gain): 0.000000 Y-int: 0.000000





Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
-----------	--------------	-------------	------------	---------	-------	---------	----------



A2 (Curvature):		0.000000		Status:	Warning	Zero Gain	
n (Exponent):		1.000000					
Correlation:		0.000000					
Std Error of Est:		0.000000					
Predicted MDL:		n/a					
Predicted MQL:		n/a					
Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis

SOP ID : M200.7-Trace Elements-22

SDG No : N/A

Matrix : WATER

Pipette ID: ICP A

Balance ID : N/A

Filter paper ID : N/A

pH Strip ID : M6069

Hood ID : #3

Block ID: 1. HOT BLOCK #1 2. N/A

Start Digest Date: 12/19/2024 Time : 09:30 Temp : 95 °C

End Digest Date: 12/19/2024 Time : 12:40 Temp : 95 °C

Digestion tube ID: M5595

Block thermometer ID: MET-DIG. #1

Dig Technician Signature: *SKS*

Supervisor Signature: *AB*

Temp : 1. 95°C 2. N/A

Standardized Name	MLS USED	STD REF. # FROM LOG
LFS-1	0.25	M6000
LFS-2	0.25	M6009
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
Conc. HNO3	1.00	M6126
1:1 HCL	0.50	MP83105
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
N/A	N/A	N/A
N/A	N/A	N/A

Extraction Conformance/Non-Conformance Comments:

Hot Block # 1 Cell # 50 Temp: 95 C

Date / Time	Prepped Sample Relinquished By/Location	Received By/Location
12/19/24 13:40	SKS. met digestion	AB - metal lab
	Preparation Group	Analysis Group

Lab Sample ID	Client Sample ID	pH	Initial Vol (ml)	Final Vol (ml)	Color Before	Color After	Clarity Before	Clarity After	Comment	Prep Pos
P5192-02	EFF-WASTE WATER	<2	50	25	Colorless	Colorless	Clear	Clear	N/A	11
P5327-01	12175-12176-12177-12178	<2	50	25	Colorless	Colorless	Clear	Clear	N/A	12
P5327-01MS	12175-12176-12177-12178 MS	<2	50	25	Colorless	Colorless	Clear	Clear	M6000,M6009	14
P5327-01MSD	12175-12176-12177-12178 MSD	<2	50	25	Colorless	Colorless	Clear	Clear	M6000,M6009	15
P5327-01DUP	12175-12176-12177-12178 DUP	<2	50	25	Colorless	Colorless	Clear	Clear	N/A	13
PB165738BL	PBW738	<2	50	25	Colorless	Colorless	Clear	Clear	N/A	16
PB165738BS	LCS738	<2	50	25	Colorless	Colorless	Clear	Clear	M6000,M6009	17

WORKLIST(Hardcopy Internal Chain)

Worklist Name : PB165738

Worklist ID : 186462

Department : Digestion

Date : 12-19-2024 08:25:34

Sample	Customer Sample	Matrix	Test	Preservative	Customer	Raw Sample Storage Location	Collect Date	Method
P5192-02	EFF-WASTE WATER	Water	Metals ICP-Group	1:1 HNO3 to pH < 2	ARDM01	M11	12/06/2024	200.7
P5327-01	12175-12176-12177-12178	Water	Metals Group3	1:1 HNO3 to pH < 2	LEOI01	L41	12/18/2024	200.7

Date/Time

Raw Sample Received by:

Raw Sample Relinquished by:

JD CSM

Date/Time

Raw Sample Received by:

Raw Sample Relinquished by:

JD CSM

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB134054

Review By	Review On
Supervise By	Supervise On

STD. NAME	STD REF.#
ICAL Standard ICV Standard CCV Standard ICSA Standard CRI Standard LCS Standard Chk Standard	

Sr#	SampleId	ClientID	QcType	Date	Comment	Operator	Status
1	S0	S0	CAL1	12/20/24 15:41		Kareem	OK
2	S1	S1	CAL2	12/20/24 15:46		Kareem	OK
3	S2	S2	CAL3	12/20/24 15:50		Kareem	OK
4	S3	S3	CAL4	12/20/24 15:54		Kareem	OK
5	S4	S4	CAL5	12/20/24 15:58		Kareem	OK
6	S5	S5	CAL6	12/20/24 16:03		Kareem	OK
7	ICV01	ICV01	ICV	12/20/24 16:07	ICV fail for Ba,Mg,V (200.7)	Kareem	OK
8	LLICV01	LLICV01	LLICV	12/20/24 16:11		Kareem	OK
9	ICB01	ICB01	ICB	12/20/24 16:21		Kareem	OK
10	CRI01	CRI01	CRDL	12/20/24 16:26		Kareem	OK
11	ICSA01	ICSA01	ICSA	12/20/24 16:30		Kareem	OK
12	ICSAB01	ICSAB01	ICSAB	12/20/24 16:34		Kareem	OK
13	ICSADL	ICSADL	ICSA	12/20/24 16:38		Kareem	OK
14	ICSABDL	ICSABDL	ICSAB	12/20/24 16:43		Kareem	OK
15	CCV01	CCV01	CCV	12/20/24 16:47		Kareem	OK
16	CCB01	CCB01	CCB	12/20/24 16:51		Kareem	OK
17	P5312-01	SOIL-VNJ-222	SAM	12/20/24 16:55		Kareem	OK
18	P5343-01	VNJ210	SAM	12/20/24 17:00		Kareem	OK

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB134054

Review By	Review On
Supervise By	Supervise On

STD. NAME	STD REF.#
ICAL Standard ICV Standard CCV Standard ICSA Standard CRI Standard LCS Standard Chk Standard	

19	P5316-01	TT-304-IDWSO-2024	SAM	12/20/24 17:04		Kareem	OK
20	P5343-03	VNJ281	SAM	12/20/24 17:08		Kareem	OK
21	P5312-03	CONCRETE-VNJ-222	SAM	12/20/24 17:12		Kareem	OK
22	P5279-02	ROCKAWAY-PARK	SAM	12/20/24 17:16		Kareem	OK
23	P5192-02	EFF-WASTE WATER	SAM	12/20/24 17:21		Kareem	OK
24	P5327-01	12175-12176-12177-1	SAM	12/20/24 17:25		Kareem	OK
25	CCV02	CCV02	CCV	12/20/24 17:29		Kareem	OK
26	CCB02	CCB02	CCB	12/20/24 17:34		Kareem	OK
27	PB165738BL	PB165738BL	MB	12/20/24 17:38		Kareem	OK
28	PB165738BS	PB165738BS	LCS	12/20/24 17:42		Kareem	OK
29	PB165754BL	PB165754BL	MB	12/20/24 17:46		Kareem	OK
30	PB165754BS	PB165754BS	LCS	12/20/24 17:51		Kareem	OK
31	PB165720BL	PB165720BL	MB	12/20/24 17:55		Kareem	OK
32	PB165720BS	PB165720BS	LCS	12/20/24 17:59		Kareem	OK
33	PB165679TB	PB165679TB	MB	12/20/24 18:03		Kareem	OK
34	PB165680TB	PB165680TB	MB	12/20/24 18:08		Kareem	OK
35	CCV03	CCV03	CCV	12/20/24 18:12		Kareem	OK
36	CCB03	CCB03	CCB	12/20/24 18:16		Kareem	OK
37	P5341-01	STORMWATER-AQ-C	SAM	12/20/24 18:21		Kareem	OK
38	P5341-03RE	TOTE-425RE	SAM	12/20/24 18:25	NOT USE	Kareem	Not Ok

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB134054

Review By Supervise By	Review On Supervise On
STD. NAME	STD REF.#
ICAL Standard ICV Standard CCV Standard ICSA Standard CRI Standard LCS Standard Chk Standard	

39	P5343-06	PUMP-WATER-271	SAM	12/20/24 18:29		Kareem	OK
40	P5291-13RE	WC-20241213RE	SAM	12/20/24 18:33	NOT USE	Kareem	Not Ok
41	P5299-01	SB-01	SAM	12/20/24 18:38		Kareem	OK
42	P5327-01DUP	12175-12176-12177-1	DUP	12/20/24 18:42		Kareem	OK
43	P5327-01L	12175-12176-12177-1	SD	12/20/24 18:46		Kareem	OK
44	P5327-01MS	12175-12176-12177-1	MS	12/20/24 18:50		Kareem	OK
45	P5327-01MSD	12175-12176-12177-1	MSD	12/20/24 18:54		Kareem	OK
46	P5327-01A	12175-12176-12177-1	PS	12/20/24 18:58		Kareem	OK
47	CCV04	CCV04	CCV	12/20/24 19:02		Kareem	OK
48	CCB04	CCB04	CCB	12/20/24 19:11		Kareem	OK
49	P5343-06L	PUMP-WATER-271L	SD	12/20/24 19:16		Kareem	OK
50	P5343-06DUP	PUMP-WATER-271DUP	DUP	12/20/24 19:20		Kareem	OK
51	P5343-06MS	PUMP-WATER-271MS	MS	12/20/24 19:24		Kareem	OK
52	P5343-06MSD	PUMP-WATER-271MSD	MSD	12/20/24 19:28		Kareem	OK
53	P5343-06A	PUMP-WATER-271A	PS	12/20/24 19:32		Kareem	OK
54	P5291-13DUP	WC-20241213DUP	DUP	12/20/24 19:37		Kareem	OK
55	P5291-13L	WC-20241213L	SD	12/20/24 19:41		Kareem	OK
56	P5291-13MS	WC-20241213MS	MS	12/20/24 19:45		Kareem	OK
57	P5291-13MSD	WC-20241213MSD	MSD	12/20/24 19:49		Kareem	OK
58	P5291-13A	WC-20241213A	PS	12/20/24 19:53		Kareem	OK

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB134054

Review By Supervise By	Review On Supervise On
STD. NAME	STD REF.#
ICAL Standard ICV Standard CCV Standard ICSA Standard CRI Standard LCS Standard Chk Standard	

59	CCV05	CCV05	CCV	12/20/24 19:57		Kareem	OK
60	CCB05	CCB05	CCB	12/20/24 20:01		Kareem	OK
61	P5299-02	SB-02	SAM	12/20/24 20:06		Kareem	OK
62	P5299-03	SB-01	SAM	12/20/24 20:10		Kareem	OK
63	P5299-04	SB-02	SAM	12/20/24 20:14		Kareem	OK
64	P5299-04DUP	SB-02DUP	DUP	12/20/24 20:18		Kareem	OK
65	P5299-04L	SB-02L	SD	12/20/24 20:22		Kareem	OK
66	P5299-04MS	SB-02MS	MS	12/20/24 20:26		Kareem	OK
67	P5299-04MSD	SB-02MSD	MSD	12/20/24 20:30		Kareem	OK
68	P5299-04A	SB-02A	PS	12/20/24 20:34		Kareem	OK
69	PB165722BL	PB165722BL	MB	12/20/24 20:38		Kareem	OK
70	PB165722BS	PB165722BS	LCS	12/20/24 20:43		Kareem	OK
71	CCV06	CCV06	CCV	12/20/24 20:47		Kareem	OK
72	CCB06	CCB06	CCB	12/20/24 20:51		Kareem	OK
73	P5330-01	TP-5	SAM	12/20/24 20:55		Kareem	OK
74	P5342-01	CHRT26634	SAM	12/20/24 20:59		Kareem	OK
75	P5342-03	HT2651	SAM	12/20/24 21:04		Kareem	OK
76	P5342-05	RB21198	SAM	12/20/24 21:08		Kareem	OK
77	P5343-03DUP	VNJ281DUP	DUP	12/20/24 21:12		Kareem	OK
78	P5343-03L	VNJ281L	SD	12/20/24 21:16		Kareem	OK

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB134054

Review By	Review On
Supervise By	Supervise On

STD. NAME	STD REF.#
ICAL Standard ICV Standard CCV Standard ICSA Standard CRI Standard LCS Standard Chk Standard	

79	P5343-03MSD	VNJ281MSD	MSD	12/20/24 21:24		Kareem	OK
80	P5343-03A	VNJ281A	PS	12/20/24 21:28		Kareem	OK
81	PB165753BL	PB165753BL	MB	12/20/24 21:32		Kareem	OK
82	CCV07	CCV07	CCV	12/20/24 21:37		Kareem	OK
83	CCB07	CCB07	CCB	12/20/24 22:04		Kareem	OK
84	PB165753BS	PB165753BS	LCS	12/20/24 22:08		Kareem	OK
85	P5337-01	ETGI-357	SAM	12/20/24 22:12		Kareem	OK
86	P5339-01	TR-06-12182024	SAM	12/20/24 22:17		Kareem	OK
87	P5355-01	RBR251688	SAM	12/20/24 22:21	MS/MSD fail for more than parameters	Kareem	Not Ok
88	P5355-01DUP	RBR251688DUP	DUP	12/20/24 22:25	MS/MSD fail for more than parameters	Kareem	Not Ok
89	P5355-01L	RBR251688L	SD	12/20/24 22:29	MS/MSD fail for more than parameters	Kareem	Not Ok
90	P5355-01MS	RBR251688MS	MS	12/20/24 22:33	MS/MSD fail for more than parameters	Kareem	Not Ok
91	P5355-01MSD	RBR251688MSD	MSD	12/20/24 22:38	MS/MSD fail for more than parameters	Kareem	Not Ok
92	P5355-01A	RBR251688A	PS	12/20/24 22:42	MS/MSD fail for more than parameters	Kareem	Not Ok
93	PB165786BL	PB165786BL	MB	12/20/24 22:46		Kareem	OK
94	CCV08	CCV08	CCV	12/20/24 23:01		Kareem	OK
95	CCB08	CCB08	CCB	12/20/24 23:12		Kareem	OK
96	PB165786BS	PB165786BS	LCS	12/20/24 23:17		Kareem	OK

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB134054

Review By	Review On
Supervise By	Supervise On
STD. NAME	STD REF.#
ICAL Standard ICV Standard CCV Standard ICSA Standard CRI Standard LCS Standard Chk Standard	

97	P5341-03	TOTE-425	SAM	12/20/24 23:21		Kareem	OK
98	P5291-13	WC-20241213	SAM	12/20/24 23:25		Kareem	OK
99	LR1	LR1	HIGH STD	12/20/24 23:29		Kareem	OK
100	LR2	LR2	HIGH STD	12/20/24 23:41		Kareem	OK
101	P5343-03MS	VNJ281MS	MS	12/20/24 23:46		Kareem	OK
102	CCV09	CCV09	CCV	12/20/24 23:55		Kareem	OK
103	CCB09	CCB09	CCB	12/21/24 00:05		Kareem	OK

Prep Standard - Chemical Standard Summary

Order ID : P5327

Test : Metals Group3

Prepbatch ID : PB165738,

Sequence ID/Qc Batch ID: LB134054, LB134054,

Standard ID :
MP83105,

Chemical ID :
M6000, M6009, M6111, M6126, 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>
170	1:1HCL	MP83105	11/07/2024	12/27/2024	Janvi Patel	None	None	Sarabjit Jaswal 11/07/2024
FROM 1000.00000ml of M6111 + 1000.00000ml of W3112 = Final Quantity: 2000.000 ml								

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	WW-LFS-1 / Laboratory Fortified Stock Solution 1, 125 ml	T2-MEB723367	08/30/2026	08/13/2024 / Jaswal	05/14/2024 / Jaswal	M6000

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	WW-LFS-2 / Laboratory Fortified Stock Solution 2, 125 ml	U2-MEB731108	03/17/2028	08/13/2024 / Jaswal	05/14/2024 / Jaswal	M6009

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)	22F0762009	05/09/2027	11/04/2024 / Eman	09/29/2024 / Janvi	M6111

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 #
Seidler Chemical	DIW / DI Water	Daily Lab-Certified	07/03/2029	07/03/2024 / Iwona	07/03/2024 / Iwona	W3112



Refine your results. Redefine your industry.

RD:05/14/2024

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:	WW-LFS-1
Lot Number:	T2-MEB723367
Matrix:	5% (v/v) HNO ₃

Value / Analyte(s):	1 000 µg/mL ea:	
	Potassium,	
	600 µg/mL ea:	
	Phosphorus,	
	300 µg/mL ea:	
	Sodium,	Iron,
	200 µg/mL ea:	
	Magnesium,	Aluminum,
	Cerium,	Selenium,
	Thallium,	
	100 µg/mL ea:	
	Lead,	Calcium,
	80 µg/mL ea:	
	Arsenic,	
	70 µg/mL ea:	
	Mercury,	
	50 µg/mL ea:	
	Nickel,	
	40 µg/mL ea:	
	Chromium,	
	30 µg/mL ea:	
	Copper,	Boron,
	Vanadium,	
	20 µg/mL ea:	
	Zinc,	Strontium,
	Barium,	Beryllium,
	Cadmium,	Cobalt,
	Manganese,	Lithium,
	7.5 µg/mL ea:	
	Silver	

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Aluminum, Al	200.0 ± 0.7 µg/mL	Arsenic, As	80.0 ± 0.7 µg/mL
Barium, Ba	20.00 ± 0.09 µg/mL	Beryllium, Be	20.00 ± 0.13 µg/mL
Boron, B	30.00 ± 0.18 µg/mL	Cadmium, Cd	20.00 ± 0.09 µg/mL
Calcium, Ca	100.0 ± 0.4 µg/mL	Cerium, Ce	200.0 ± 0.8 µg/mL
Chromium, Cr	40.00 ± 0.30 µg/mL	Cobalt, Co	20.00 ± 0.10 µg/mL
Copper, Cu	30.00 ± 0.13 µg/mL	Iron, Fe	300.0 ± 1.3 µg/mL
Lead, Pb	100.0 ± 0.4 µg/mL	Lithium, Li	20.00 ± 0.08 µg/mL
Magnesium, Mg	200.0 ± 0.8 µg/mL	Manganese, Mn	20.00 ± 0.08 µg/mL
Mercury, Hg	70.0 ± 0.3 µg/mL	Nickel, Ni	50.00 ± 0.22 µg/mL
Phosphorus, P	600.0 ± 2.7 µg/mL	Potassium, K	1 000 ± 4 µg/mL
Selenium, Se	200.0 ± 1.3 µg/mL	Silver, Ag	7.50 ± 0.03 µg/mL
Sodium, Na	300.0 ± 1.4 µg/mL	Strontium, Sr	20.01 ± 0.08 µg/mL
Thallium, Tl	200.0 ± 1.4 µg/mL	Vanadium, V	30.00 ± 0.13 µg/mL
Zinc, Zn	20.00 ± 0.09 µg/mL		

Density: 1.034 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
As	ICP Assay	3103a	100818
B	ICP Assay	3107	190605
Ba	ICP Assay	3104a	140909
Ba	Gravimetric		See Sec. 4.2
Be	ICP Assay	3105a	090514
Ca	ICP Assay	3109a	130213
Ca	EDTA	928	928
Cd	ICP Assay	3108	130116
Cd	EDTA	928	928
Ce	ICP Assay	3110	090504
Ce	EDTA	928	928
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
Hg	ICP Assay	3133	160921
Hg	EDTA	928	928
K	ICP Assay	3141a	140813
K	Gravimetric		See Sec. 4.2
Li	ICP Assay	3129a	100714
Li	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	Traceable to 3152A	S2-NA700842
Na	Gravimetric		See Sec. 4.2
Ni	ICP Assay	3136	120619
Ni	EDTA	928	928
P	ICP Assay	3139a	060717
P	Acidimetric	84L	84L
Pb	ICP Assay	3128	101026
Pb	EDTA	928	928
Se	ICP Assay	3149	100901
Sr	EDTA	928	928
Sr	ICP Assay	Traceable to 3153a	K2-SR650985
Tl	ICP Assay	3158	151215
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:

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

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

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_{ts} = 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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{ts} = 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

Low Silver Note: This solution contains "LOW" levels of Silver. Please store this entire bottle inside a sealed glass jar.

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

August 30, 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

- August 30, 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:

Thomas Kozikowski
Manager, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





Refine your results. Redefine your industry.

RD:05/14/2024

Certificate of Analysis

300 Technology Drive
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F: 540-585-3012
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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: Multi Analyte Custom Grade Solution
Catalog Number: WW-LFS-2
Lot Number: U2-MEB731108
Matrix: 5% (v/v) HNO₃
tr. HF
Value / Analyte(s):
200 µg/mL ea:
Silica,
80 µg/mL ea:
Antimony,
70 µg/mL ea:
Tin,
40 µg/mL ea:
Molybdenum,
20 µg/mL ea:
Titanium

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Antimony, Sb	80.1 ± 0.6 µg/mL	Molybdenum, Mo	40.03 ± 0.18 µg/mL
Silica, SiO ₂	200.2 ± 1.3 µg/mL	Tin, Sn	70.0 ± 0.4 µg/mL
Titanium, Ti	20.01 ± 0.13 µg/mL		

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

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
Mo	ICP Assay	3134	130418
Mo	Calculated		See Sec. 4.2
Sb	ICP Assay	3102a	140911
SiO ₂	ICP Assay	3150	130912
Sn	ICP Assay	3161a	140917
Ti	ICP Assay	3162a	130925
Ti	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, $X_{\text{CRM/RM}}$, 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:

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

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

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

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

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

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

March 17, 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 17, 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



Hydrochloric Acid, 36.5–38.0%
BAKER INSTRA-ANALYZED® Reagent
For Trace Metal Analysis

Receive date
9/29/24
Met diag.

 **avantor™**



Material No.: 9530-33
Batch No.: 22F0762009
Manufactured Date: 2022-05-10
Retest Date: 2027-05-09
Revision No.: 0

M6109
M6110
M6111

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 ppm
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 ppm
ACS – Free Chlorine (as Cl ₂)	≤ 0.5 ppm	< 0.5 ppm
Phosphate (PO ₄)	≤ 0.05 ppm	< 0.03 ppm
Sulfate (SO ₄)	≤ 0.5 ppm	< 0.3 ppm
Sulfite (SO ₃)	≤ 0.8 ppm	0.3 ppm
Ammonium (NH ₄)	≤ 3 ppm	< 1 ppm
Trace Impurities – Arsenic (As)	≤ 0.010 ppm	< 0.003 ppm
Trace Impurities – Aluminum (Al)	≤ 10.0 ppb	0.8 ppb
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 3.0 ppb
Trace Impurities – Barium (Ba)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Beryllium (Be)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Bismuth (Bi)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Boron (B)	≤ 20.0 ppb	< 5.0 ppb
Trace Impurities – Cadmium (Cd)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Calcium (Ca)	≤ 50.0 ppb	14.9 ppb
Trace Impurities – Chromium (Cr)	≤ 1.0 ppb	< 0.4 ppb
Trace Impurities – Cobalt (Co)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Copper (Cu)	≤ 1.0 ppb	< 0.1 ppb
Trace Impurities – Gallium (Ga)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Germanium (Ge)	≤ 3.0 ppb	< 2.0 ppb
Trace Impurities – Gold (Au)	≤ 4.0 ppb	0.2 ppb
Heavy Metals (as Pb)	≤ 100 ppb	< 50 ppb
Trace Impurities – Iron (Fe)	≤ 15 ppb	6 ppb

>>> Continued on page 2 >>>

Hydrochloric Acid, 36.5–38.0%
BAKER INSTRA-ANALYZED® Reagent
For Trace Metal Analysis



Material No.: 9530-33
Batch No.: 22F0762009

Test	Specification	Result
Trace Impurities – Lead (Pb)	≤ 1.0 ppb	< 0.5 ppb
Trace Impurities – Lithium (Li)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Magnesium (Mg)	≤ 10.0 ppb	0.8 ppb
Trace Impurities – Manganese (Mn)	≤ 1.0 ppb	< 0.4 ppb
Trace Impurities – Mercury (Hg)	≤ 0.5 ppb	0.1 ppb
Trace Impurities – Molybdenum (Mo)	≤ 10.0 ppb	< 3.0 ppb
Trace Impurities – Nickel (Ni)	≤ 4.0 ppb	< 0.3 ppb
Trace Impurities – Niobium (Nb)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Potassium (K)	≤ 9.0 ppb	< 2.0 ppb
Trace Impurities – Selenium (Se), For Information Only		< 1.0 ppb
Trace Impurities – Silicon (Si)	≤ 100.0 ppb	1.0 ppb
Trace Impurities – Silver (Ag)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Sodium (Na)	≤ 100.0 ppb	0.7 ppb
Trace Impurities – Strontium (Sr)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Tantalum (Ta)	≤ 1.0 ppb	< 0.9 ppb
Trace Impurities – Thallium (Tl)	≤ 5.0 ppb	< 2.0 ppb
Trace Impurities – Tin (Sn)	≤ 5.0 ppb	< 0.8 ppb
Trace Impurities – Titanium (Ti)	≤ 1.0 ppb	0.2 ppb
Trace Impurities – Vanadium (V)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Zinc (Zn)	≤ 5.0 ppb	0.8 ppb
Trace Impurities – Zirconium (Zr)	≤ 1.0 ppb	< 0.1 ppb

>>> Continued on page 3 >>>

Hydrochloric Acid, 36.5–38.0%
BAKER INSTRA-ANALYZED® Reagent
For Trace Metal Analysis

 **avantor™**

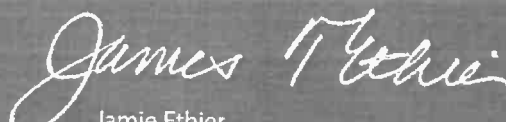


Material No.: 9530-33
Batch No.: 22F0762009

Test	Specification	Result
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For Laboratory, Research, or Manufacturing Use
Product Information (not specifications):
Appearance (clear, fuming liquid)
Meets ACS Specifications
Storage Condition: Store below 25 °C.

Country of Origin: USA
Packaging Site: Phillipsburg Mfg Ctr & DC


Jamie Ethier
Vice President Global Quality

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



SHIPPING DOCUMENTS

CLIENT INFORMATION

COMPANY: LEO INGWER INC
 ADDRESS: 62 W 47 St 1004
 CITY: NY STATE: NY ZIP: 10036
 ATTENTION: Matt Selig
 PHONE: 212 719 1342 FAX:

CLIENT PROJECT INFORMATION

PROJECT NAME: LI Copper Test
 PROJECT NO.: 1217 LOCATION: 62 W 47 St
 PROJECT MANAGER: Matt Selig NY NY
 e-mail: matthews@leoingwer.com 10036
 PHONE: 212 719 1342 FAX:

CLIENT BILLING INFORMATION

BILL TO: PO#: ADDRESS: CITY: STATE: ZIP: ATTENTION: PHONE:

ANALYSIS

DATA TURNAROUND INFORMATION

FAX (RUSH) DAYS*
 HARDCOPY (DATA PACKAGE): DAYS*
 EDD: DAYS*
 *TO BE APPROVED BY CHEMTECH
 STANDARD HARDCOPY TURNAROUND TIME IS 10 BUSINESS DAYS

DATA DELIVERABLE INFORMATION

☐ Level 1 (Results Only) ☐ Level 4 (QC + Full Raw Data)
☐ Level 2 (Results + QC) ☐ NJ Reduced ☐ US EPA CLP
☐ Level 3 (Results + QC) ☐ NYS ASP A ☐ NYS ASP B
 + Raw Data ☐ Other
☐ EDD FORMAT

CHEMTECH SAMPLE ID	PROJECT SAMPLE IDENTIFICATION	SAMPLE MATRIX	SAMPLE TYPE		SAMPLE COLLECTION		# OF BOTTLES	PRESERVATIVES									COMMENTS
			COMP	GRAB	DATE	TIME		1	2	3	4	5	6	7	8	9	
1. 12175	LI Copper Test 12pm		X		12/17	12pm	1	HN 03									
2. 12176	LI Copper Test 1pm		X			1pm	1										
3. 12177	LI Copper Test 2pm		X			2pm	1										
4. 12178	LI Copper Test 3pm		X			3pm	1										
5.																	
6.																	
7.																	
8.																	
9.																	
10.																	

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION INCLUDING COURIER DELIVERY

RELINQUISHED BY SAMPLER:	DATE/TIME:	RECEIVED BY:	Conditions of bottles or coolers at receipt:	☐ COMPLIANT	☐ NON COMPLIANT	☐ COOLER TEMP	3.1°C
1. 12/17/24		Matt Selig					
RELINQUISHED BY SAMPLER:	DATE/TIME:	RECEIVED BY:	Comments:				
2.		Fedex	12/17				
RELINQUISHED BY SAMPLER:	DATE/TIME:	RECEIVED BY:					
3. 12-18-24	10:25	CR					

Page ____ of ____

CLIENT: ☐ Hand Delivered ☐ Other
 CHEMTECH: ☐ Picked Up ☐ Field Sampling

Shipment Complete
☐ YES ☐ NO



284 Sheffield Street, Mountainside NJ 07092 (908)-789-8900 Fax : 908 789 8922

Laboratory Certification

Certified By	License No.
CAS EPA CLP Contract	68HERH20D0011
Connecticut	PH-0830
DOD ELAP (ANAB)	L2219
Maine	2024021
Maryland	296
New Hampshire	255424 Rev 1
New Jersey	20012
New York	11376
Pennsylvania	68-00548
Soil Permit	525-24-234-08441
Texas	T104704488