

Analysis of Ferrites as Pressed Pellets

Instrument: ARL 9900 XP
Application No.: Excerpt from report XR-05-094
Date: 7 August 2005

Analysis of Ferrites as Pressed Pellets

Instrument : ARL 9900 XP
Author : Laederach Pierre-André / Didier Bonvin
Report nr. : excerpt from report XR-05-094
Date : 7 August 2005

Received Samples:

One set of samples was submitted for analysis.

1. One set of seven Ferrite powder samples.

All these samples are submitted with concentration except Ferrite powder “CPU 600” and “CSR 900” where no concentrations are given.

Analytical request:

Use Samples submitted to set up measuring condition of each analytical channel.

Make calibration curve of each elements and calculate the instrument detection limit.

Accuracy test: successive analysis 10 times to calculate concentration average and standard deviation.

Repeat accuracy test 24 hours later without standardization instrument.

Instrument:

An **ARL 9900 XP XRF-XRD** spectrometer has been used to derive these results. It is fitted with a **Rh anode** X-Ray tube type 5GN and integrated XRD system. The geometry of the instrument is optimized to provide the highest sensitivity. The integration of an innovative X-Ray diffraction system allows both techniques to be fitted into the same instrument. Ease of operation is obtained through the state-of-art **WinXRF 3.2-1** software running under Windows XP® Professional environment.

It can be equipped with fixed channels that offer fast analysis, high sensitivity and rapid processing because each one is dedicated to detecting and analyzing just single element. The **ARL 9900** can be equipped with up to 32 monochromators for simultaneous analysis.

Sample preparation:

Ferrite samples have been submitted in powder form. They were pressed as received in a preformed boric acid support. An “Herzog HTP 40” press was used with a pressure of 20 tons maintained for 20 seconds. No binder was used for pressed pellets.

Analysis:

For each quality, fixed channel was used when this one is available. The remaining elements have been measured using Universal goniometer.

The Instrument detection Limit (IDL) can be derived from three times the Standard deviation of numerous successive measurements. This method requires very pure samples that allow us to measure the background fluctuation. That was the case only with Ferrite powder sample Std 01. In order to calculate the ILD value, sample Std 01 for Ferrite quality was measured 20 times, and the standard deviation obtained multiplied three times. The results obtained were reported in their respective tables.

Results:

Appendix 1 shows the analytical conditions used for the measurements and summary of results.

- Qualitative scanning can be found in Appendix 2
- Regression results in Appendix 3
- Repeatability measurements used for IDL in Appendix 4
- Accuracy of first and second day in Appendix 5

I hope that those results will give you satisfaction and of course, if you have any questions or remarks concerning these data, do not hesitate to contact us.

Yours sincerely,

Laederach Pierre-André *Applications specialist XRF.*

Appendix 1

(C) Powder (Ferrite) Std 01

Type of X-Ray Tube		End window		Target:		Rh				1 st day	2 nd day	
Element	Sample holder aperture dia.(cm)	X-Ray tube exciting		Crystal Type	2 Theta angle and spectrum		Detector type	Counting Time (sec)	Take off Angle	IDL in ppm	S.DEV	S.DEV
		kV	mA		spectral	order						
Si	2.9	40	90	PET	109.00	1 ^{er}	FPC	24	40°	20	0.0005	0.0006
Ca	2.9	40	90	LiF200	113.068	1 ^{er}	FPC	24	40°	3	0.0002	0.0002
Mn	2.9	40	90	LiF200	Fixed	1 ^{er}	ExKr	40	42°	6	0.0002	0.0003
Al	2.9	40	90	PET	144.61	1 ^{er}	FPC	24	40°	7	0.0003	0.0002
P	2.9	40	90	Ge111	140.93	1 ^{er}	FPC	24	40°	4	0.0001	0.0001
Cu	2.9	40	90	LiF200	Fixed	1 ^{er}	SC	40	42°	3	0.0001	0.0001
Ni	2.9	40	90	LiF200	Fixed	1 ^{er}	SC	40	42°	7	0.0002	0.0001
Cr	2.9	40	90	LiF200	Fixed	1 ^{er}	ExKr	40	42°	4	0.0001	0.0001
Na	2.9	40	90	AX06	23.494	1 ^{er}	FPC	40	40°	44	0.0030	0.0029
Cl	2.9	40	90	Ge111	92.761	1 ^{er}	FPC	24	40°	6	0.0002	0.0002

Appendix 1

(C) Powder (Ferrite) Std 01

Type of X-Ray Tube		End window		Target:		Rh				1 st day	2 nd day	
Element	Sample holder aperture dia.(cm)	X-Ray tube exciting		Crystal Type	2 Theta angle and spectrum		Detector type	Counting Time (sec)	Take off Angle	IDL in ppm	S.DEV	S.DEV
		kV	mA		spectral	order						
Si	2.9	40	90	PET	109.00	1 ^{er}	FPC	24	40°	20	0.0005	0.0006
Ca	2.9	40	90	LiF200	113.068	1 ^{er}	FPC	24	40°	3	0.0002	0.0002
Mn	2.9	40	90	LiF200	Fixed	1 ^{er}	ExKr	40	42°	6	0.0002	0.0003
Al	2.9	40	90	PET	144.61	1 ^{er}	FPC	24	40°	7	0.0003	0.0002
P	2.9	40	90	Ge111	140.93	1 ^{er}	FPC	24	40°	4	0.0001	0.0001
Cu	2.9	40	90	LiF200	Fixed	1 ^{er}	SC	40	42°	3	0.0001	0.0001
Ni	2.9	40	90	LiF200	Fixed	1 ^{er}	SC	40	42°	7	0.0002	0.0001
Cr	2.9	40	90	LiF200	Fixed	1 ^{er}	ExKr	40	42°	4	0.0001	0.0001
Na	2.9	40	90	AX06	23.494	1 ^{er}	FPC	40	40°	44	0.0030	0.0029
Cl	2.9	40	90	Ge111	92.761	1 ^{er}	FPC	24	40°	6	0.0002	0.0002

Appendix 2

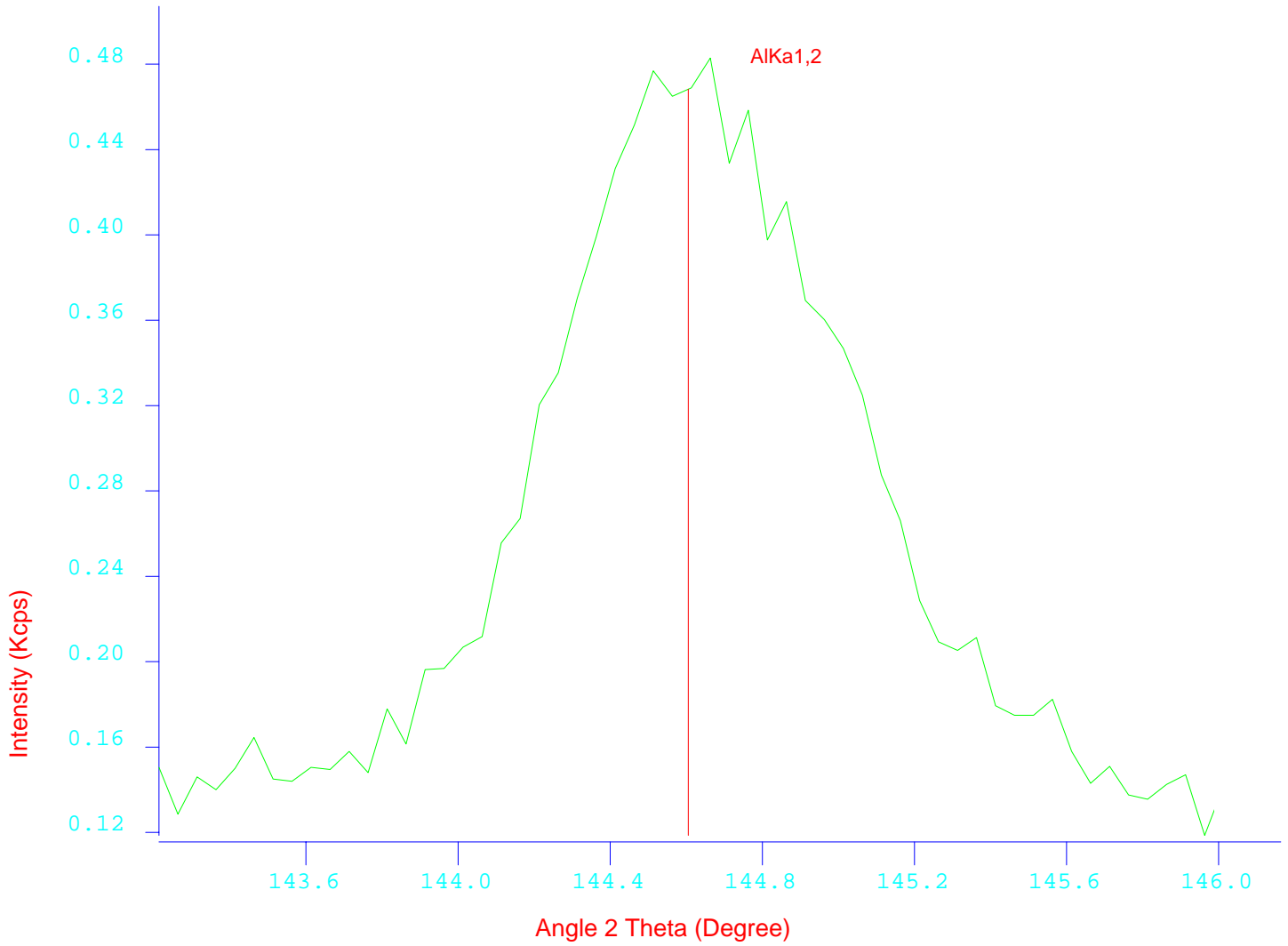
Qualitative scans

Goniometer Scan Graphics

File Name: 1_ALKA.SCN

File Date: 26.07.2005 14:33:16

Scan 1: 1_ALKA (), from: __TMP_01, XRF Gonio: 1, 60 steps



Identification Report:

Scan 1
Sample Name: W
Sample Number: 408
Goniometer: XRF 1
Crystal: PET
Detector: FPC
Collimator: 0.60
PBD: None
kV/mA: 40/90

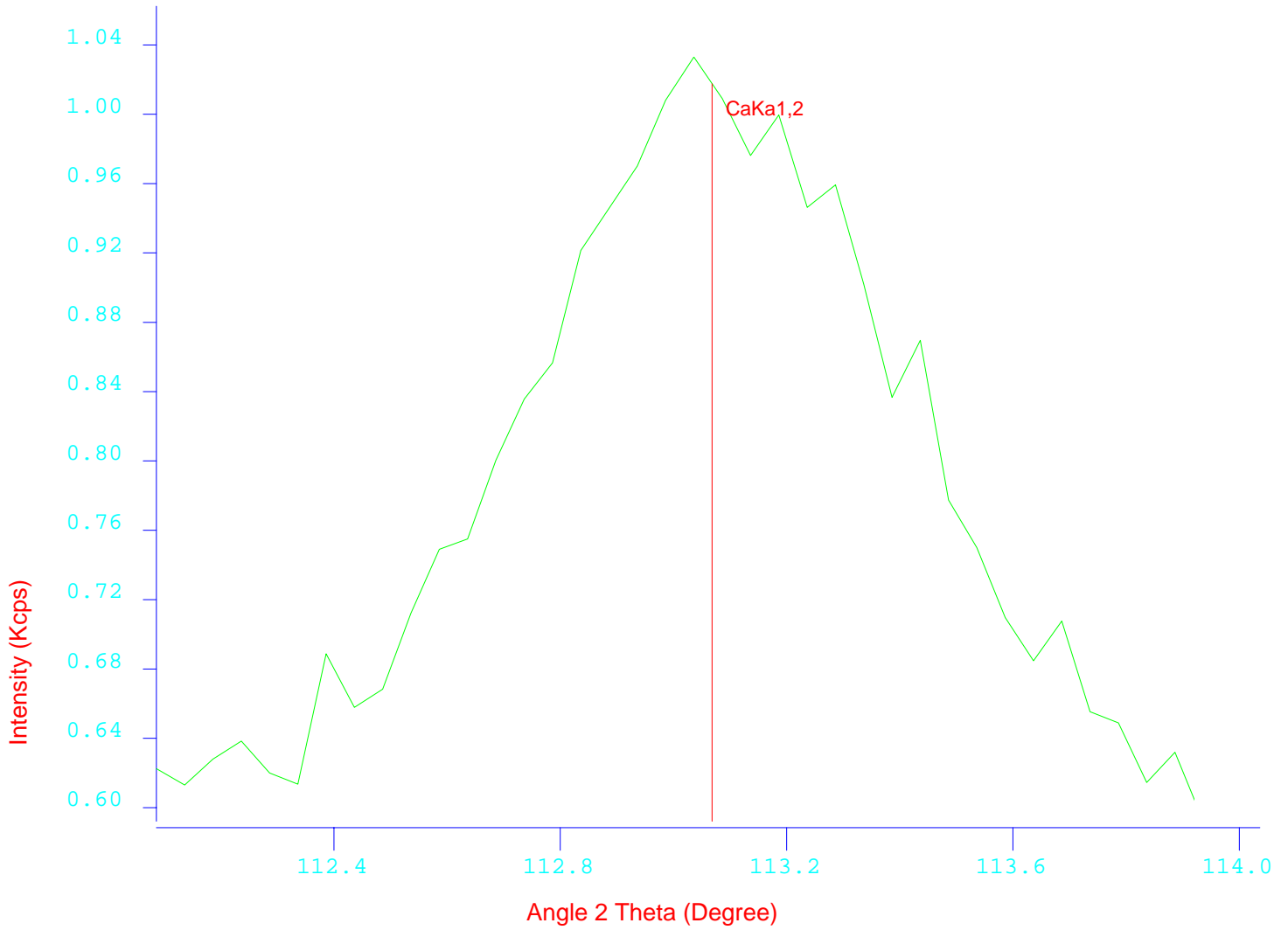
Line	Scan 1	Scan 2	Scan 3	Angle (deg)
AlKa1,2	0.4683			144.6057

Goniometer Scan Graphics

File Name: 1_CAKA.SCN

File Date: 26.07.2005 14:36:20

Scan 1: 1_CAKA (), from: __TMP_01, XRF Gonio: 1, 40 steps



Identification Report:

	Scan 1
Sample Name:	Std
Sample Number:	5
Goniometer:	XRF 1
Crystal:	LiF200
Detector:	FPC
Collimator:	0.60
PBD	None
kV/mA:	40/90

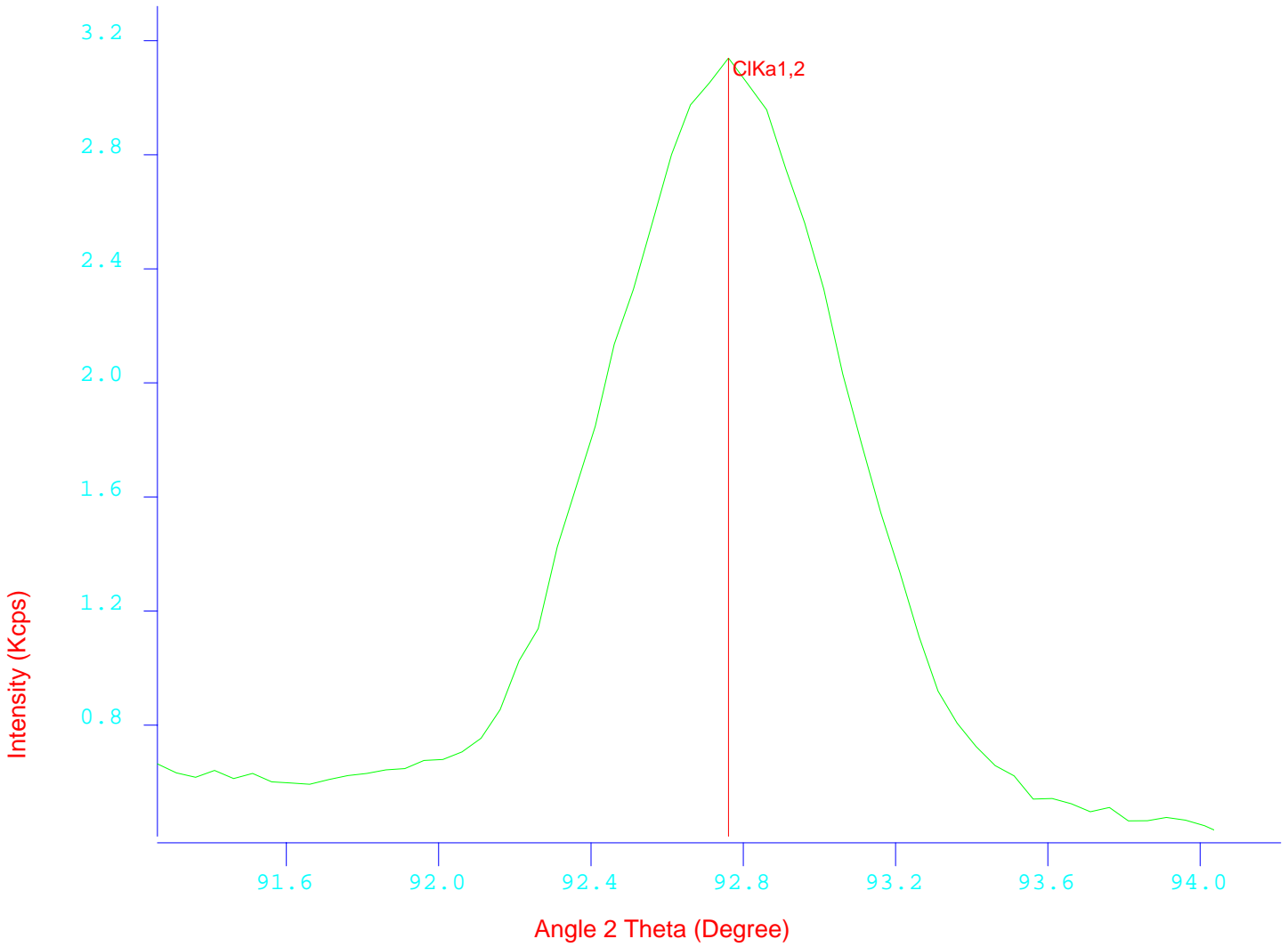
Line	Intensity (Kcps)			Angle (deg)
	Scan 1	Scan 2	Scan 3	
CaKa1,2	1.0176			113.0685

Goniometer Scan Graphics

File Name: 1_CLKA.SCN

File Date: 26.07.2005 14:36:46

Scan 1: 1_CLKA (), from: __TMP_01, XRF Gonio: 1, 60 steps



Identification Report:

Scan 1
Sample Name: Ck
Sample Number: 100
Goniometer: XRF 1
Crystal: Ge111
Detector: FPC
Collimator: 0.60
PBD: None
kV/mA: 40/90

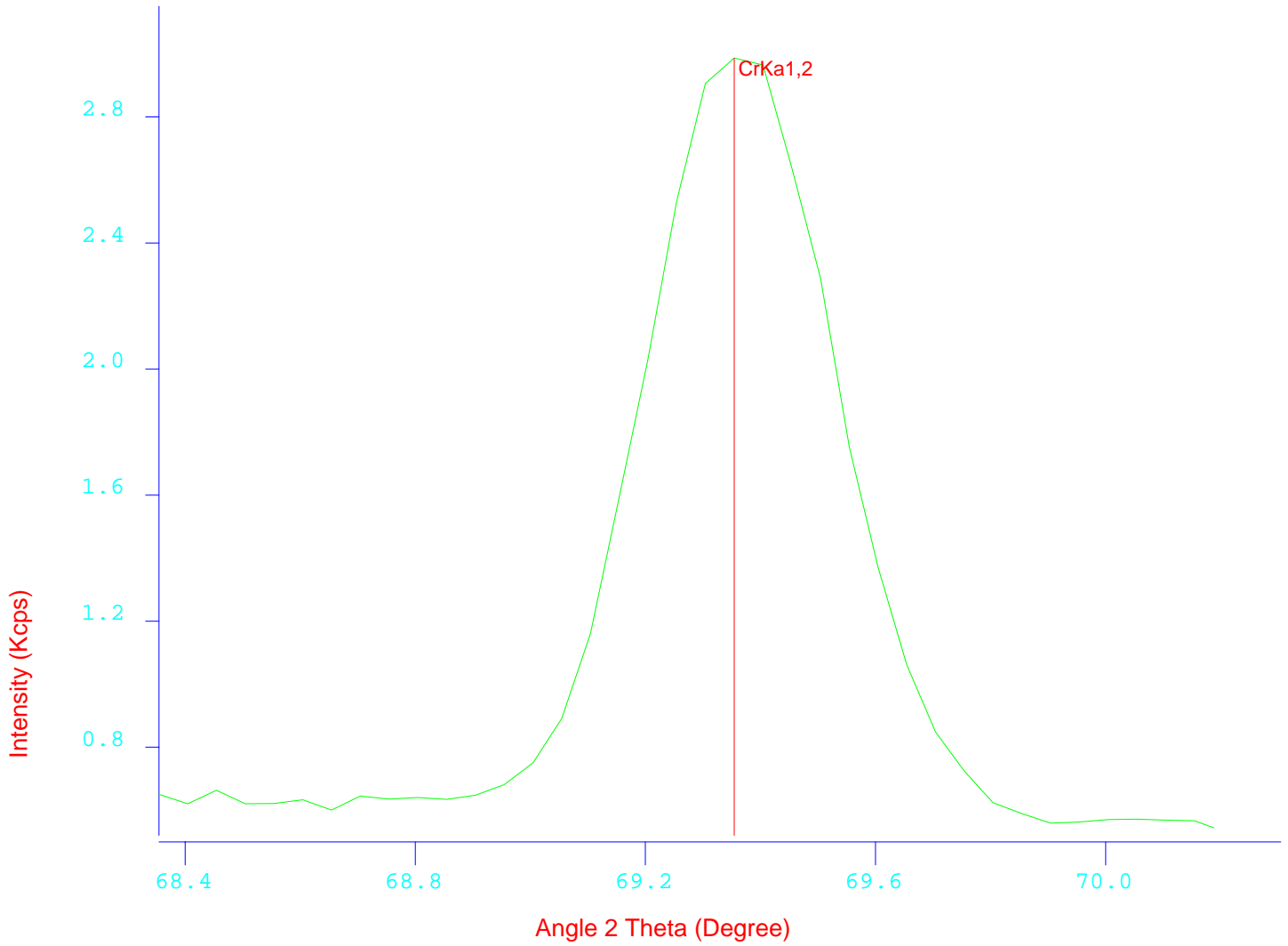
Line	Scan 1	Scan 2	Scan 3	Angle (deg)
ClKa1,2	3.1389			92.7613

Goniometer Scan Graphics

File Name: 1_CRKA.SCN

File Date: 26.07.2005 12:51:52

Scan 1: 1_CRKA (), from: __TMP_01, XRF Gonio: 1, 40 steps



Identification Report:

Scan 1
Sample Name: W
Sample Number: 408
Goniometer: XRF 1
Crystal: LiF200
Detector: FPC
Collimator: 0.25
PBD: None
kV/mA: 40/90

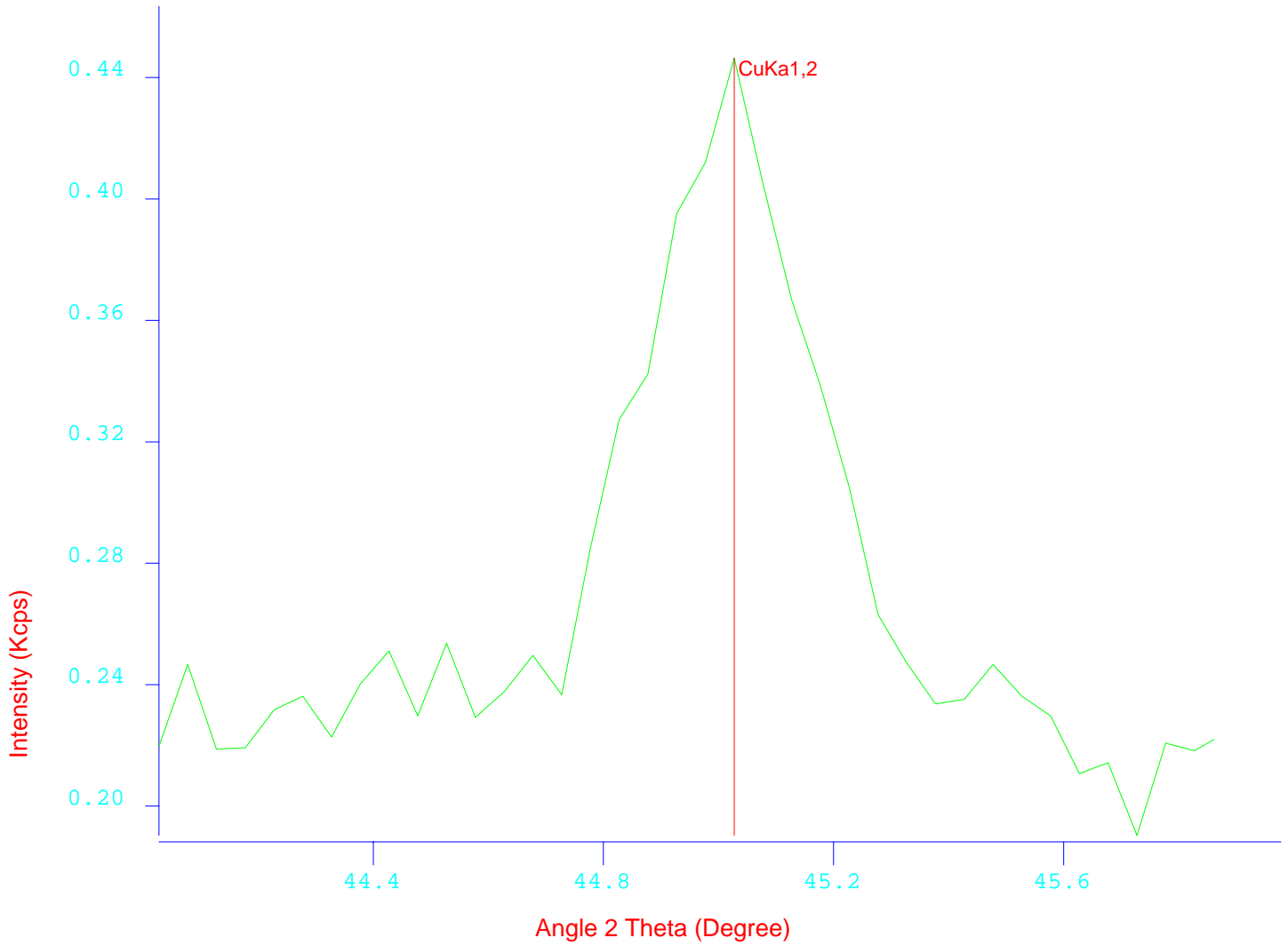
Line	Scan 1	Scan 2	Scan 3	Angle (deg)
CrKa1,2	2.9867			69.3544

Goniometer Scan Graphics

File Name: 1_CUKA.SCN

File Date: 26.07.2005 12:58:44

Scan 1: 1_CUKA (), from: __TMP_01, XRF Gonio: 1, 40 steps



Identification Report:

Scan 1
Sample Name: STD
Sample Number: 5
Goniometer: XRF 1
Crystal: LiF200
Detector: SC
Collimator: 0.25
PBD: None
kV/mA: 40/90

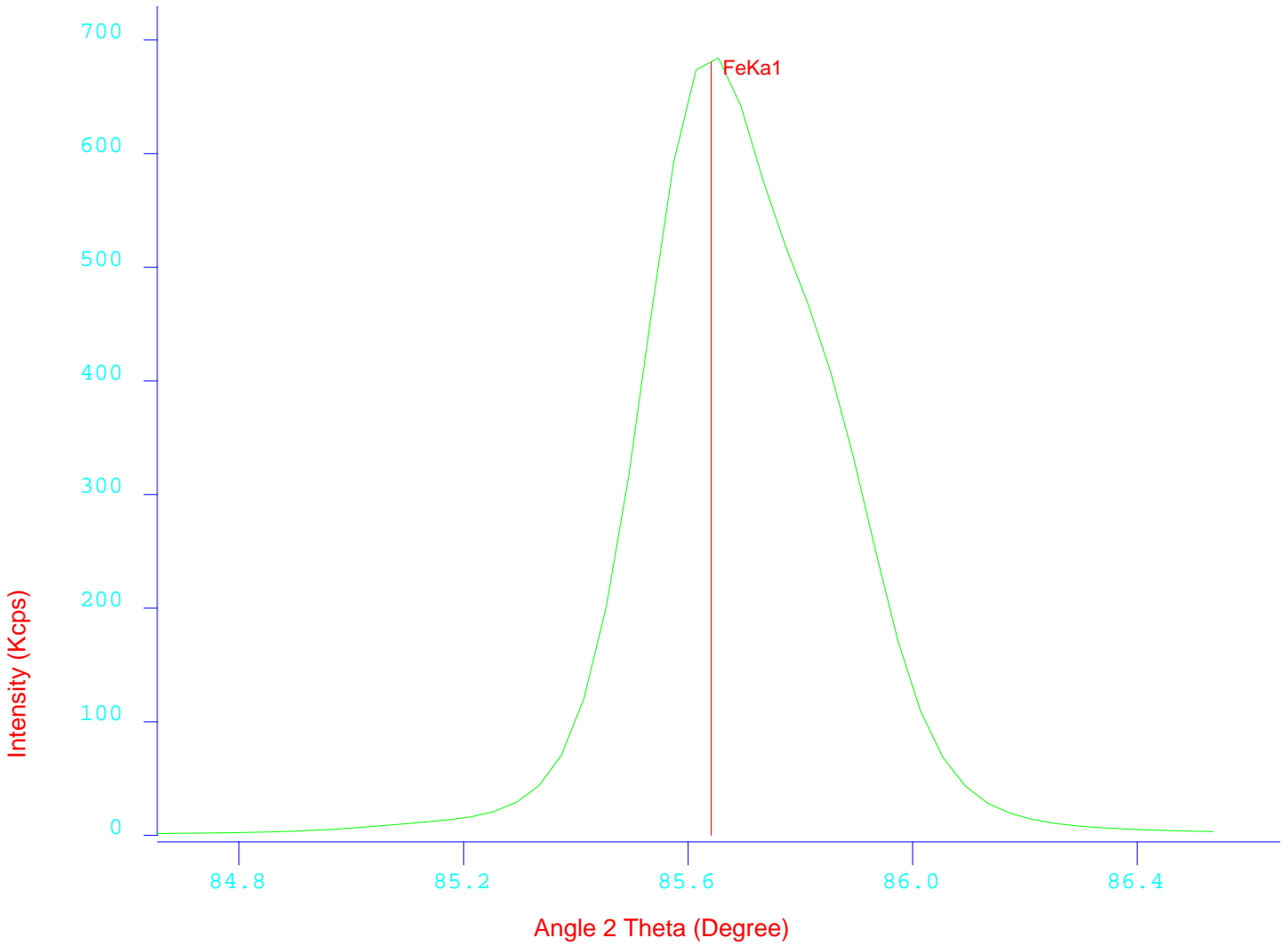
Line	Scan 1	Scan 2	Scan 3	Angle (deg)
CuKa1,2	0.4464			45.0274

Goniometer Scan Graphics

File Name: 1_FEKA.SCN

File Date: 26.07.2005 14:37:50

Scan 1: 1_FEKA (), from: __TMP_01, XRF Gonio: 1, 51 steps



Identification Report:

Scan 1
Sample Name: W
Sample Number: 408
Goniometer: XRF 1
Crystal: LiF220
Detector: SC
Collimator: 0.15
PBD: None
kV/mA: 40/90

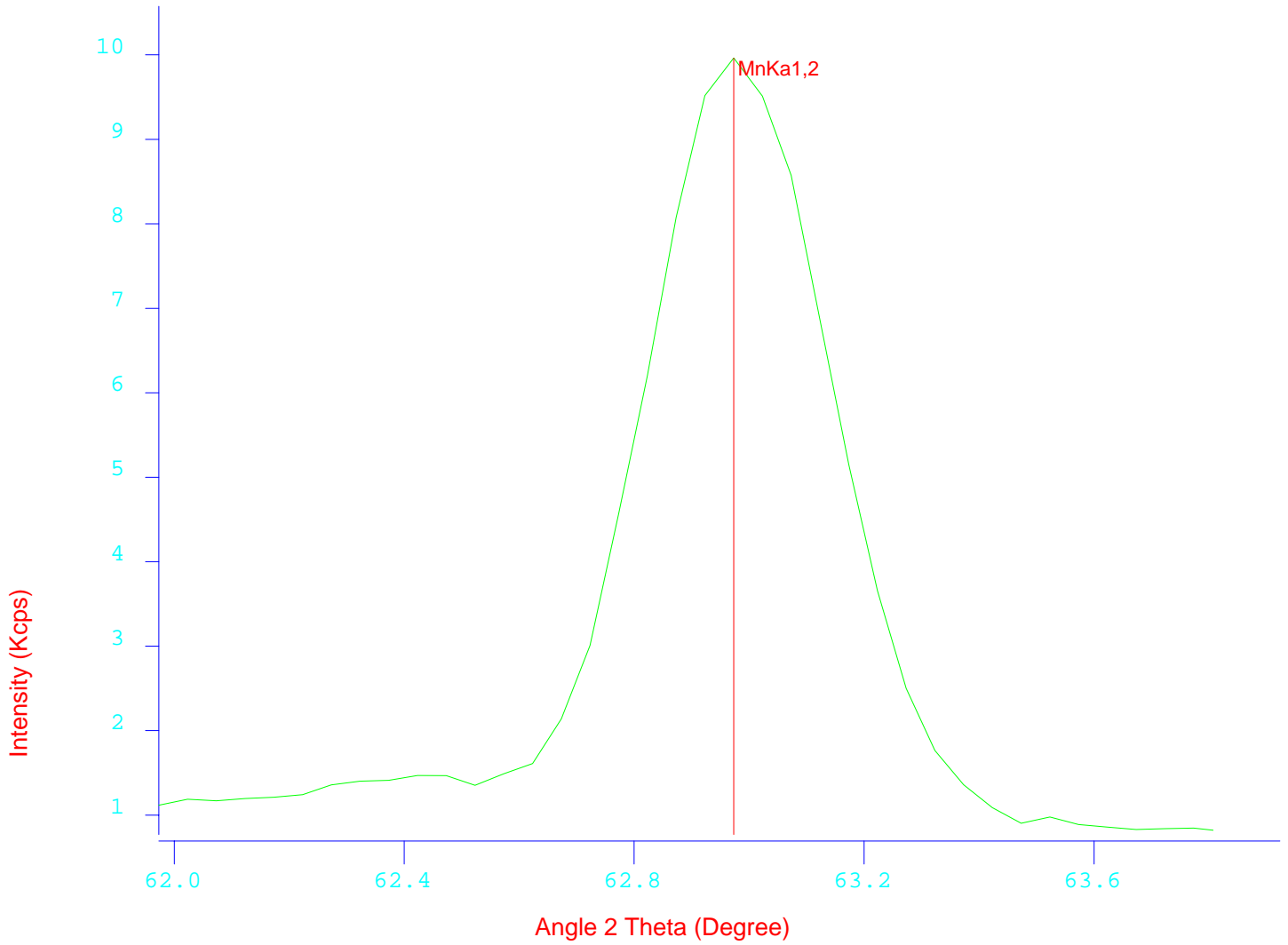
Line	Scan 1	Scan 2	Scan 3	Angle (deg)
FeKa1	680.6728			85.6412

Goniometer Scan Graphics

File Name: 1_MNKA.SCN

File Date: 26.07.2005 12:53:18

Scan 1: 1_MNKA (), from: __TMP_01, XRF Gonio: 1, 40 steps



Identification Report:

Scan 1
Sample Name: W
Sample Number: 408
Goniometer: XRF 1
Crystal: LiF200
Detector: FPC
Collimator: 0.25
PBD: None
kV/mA: 40/90

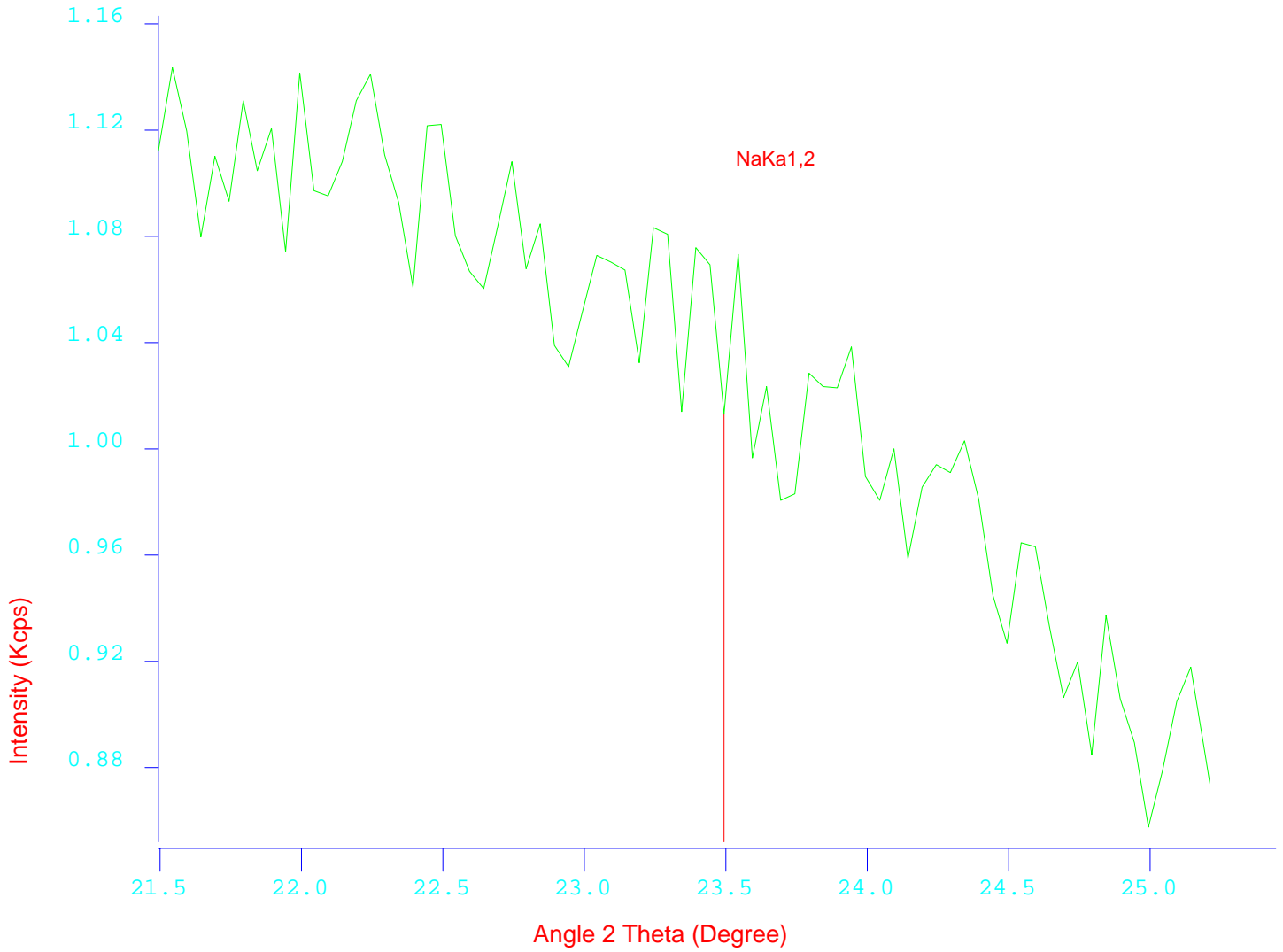
Line	Scan 1	Scan 2	Scan 3	Angle (deg)
MnKa1,2	9.9631			62.9731

Goniometer Scan Graphics

File Name: 1_NAKA.SCN

File Date: 26.07.2005 14:38:48

Scan 1: 1_NAKA (), from: __TMP_01, XRF Gonio: 1, 80 steps



Identification Report:

Scan 1
Sample Name: CSR
Sample Number: 409
Goniometer: XRF 1
Crystal: AX06
Detector: FPC
Collimator: 0.60
PBD: None
kV/mA: 40/90

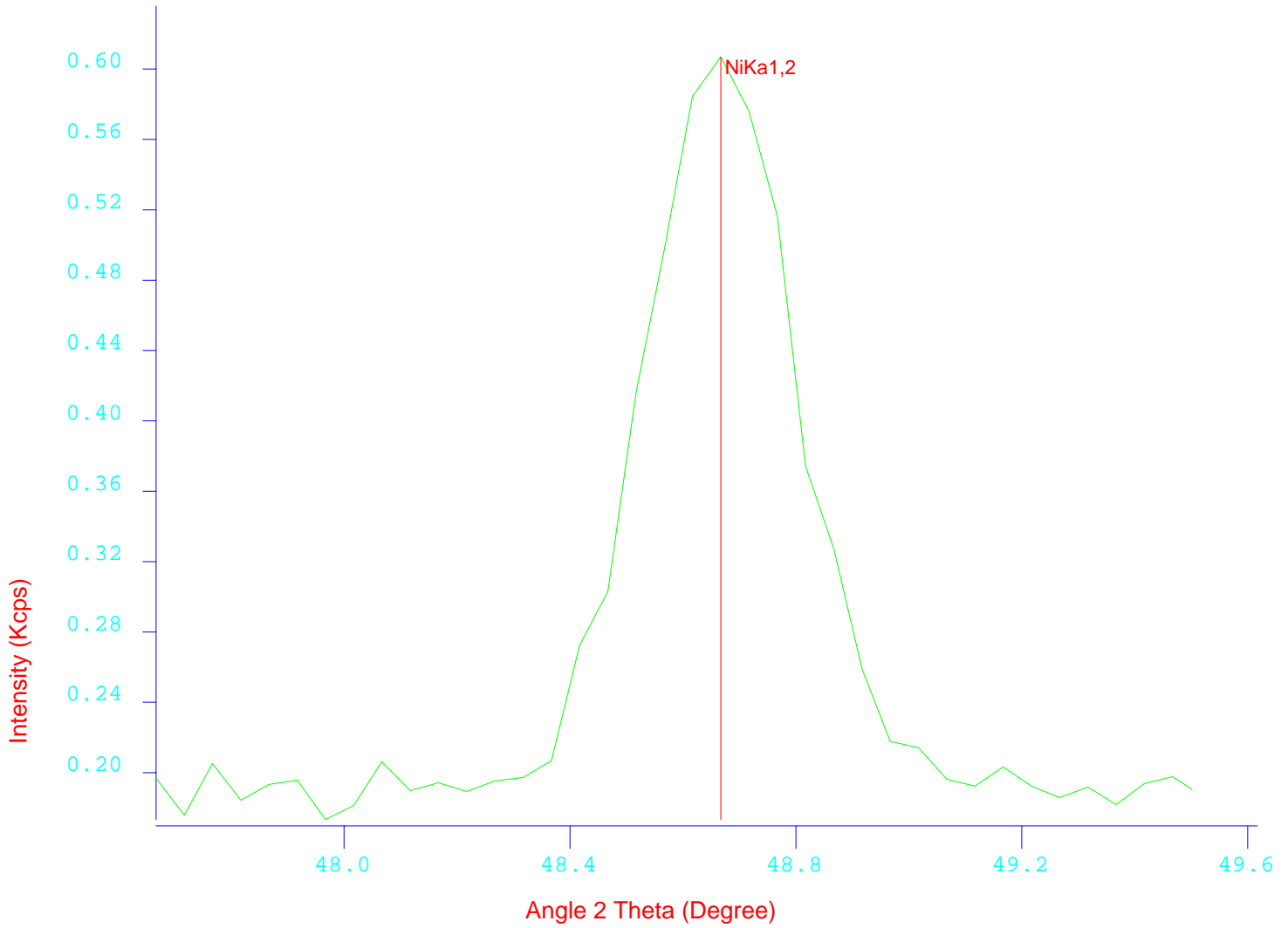
Line	Scan 1	Scan 2	Scan 3	Angle (deg)
NaKa1,2	1.0130			23.4941

Goniometer Scan Graphics

File Name: 1_NIKA.SCN

File Date: 26.07.2005 14:39:12

Scan 1: 1_NIKA (), from: __TMP_01, XRF Gonio: 1, 40 steps



Identification Report:

Scan 1
Sample Name: W
Sample Number: 408
Goniometer: XRF 1
Crystal: LiF200
Detector: SC
Collimator: 0.25
PBD: None
kV/mA: 40/90

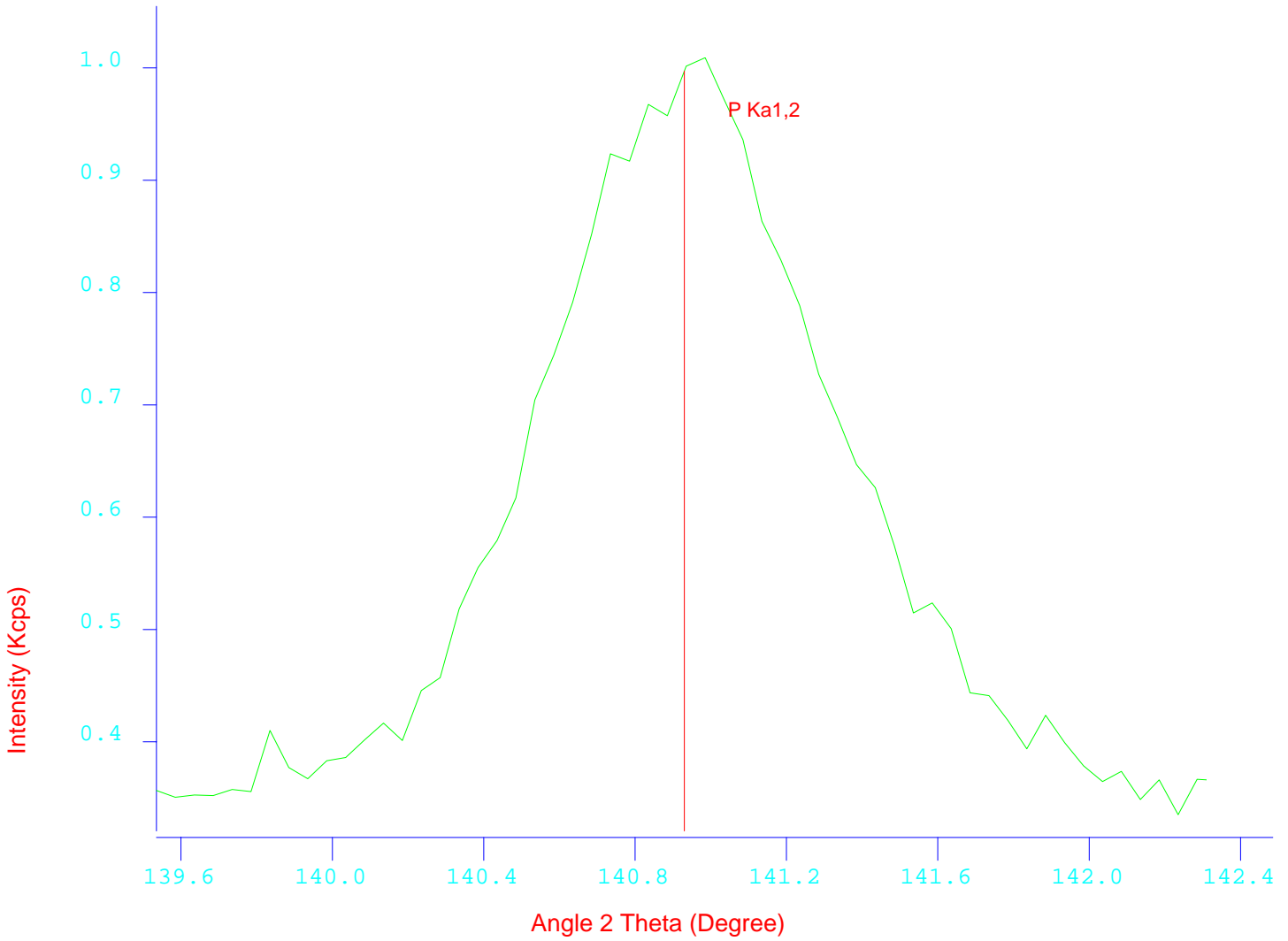
Line	Scan 1	Scan 2	Scan 3	Angle (deg)
NiKa1,2	0.6069			48.6670

Goniometer Scan Graphics

File Name: 1_PKA.SCN

File Date: 26.07.2005 14:39:38

Scan 1: 1_PKA (), from: __TMP_01, XRF Gonio: 1, 60 steps



Identification Report:

Scan 1
Sample Name: W
Sample Number: 408
Goniometer: XRF 1
Crystal: Ge111
Detector: FPC
Collimator: 0.60
PBD: None
kV/mA: 40/90

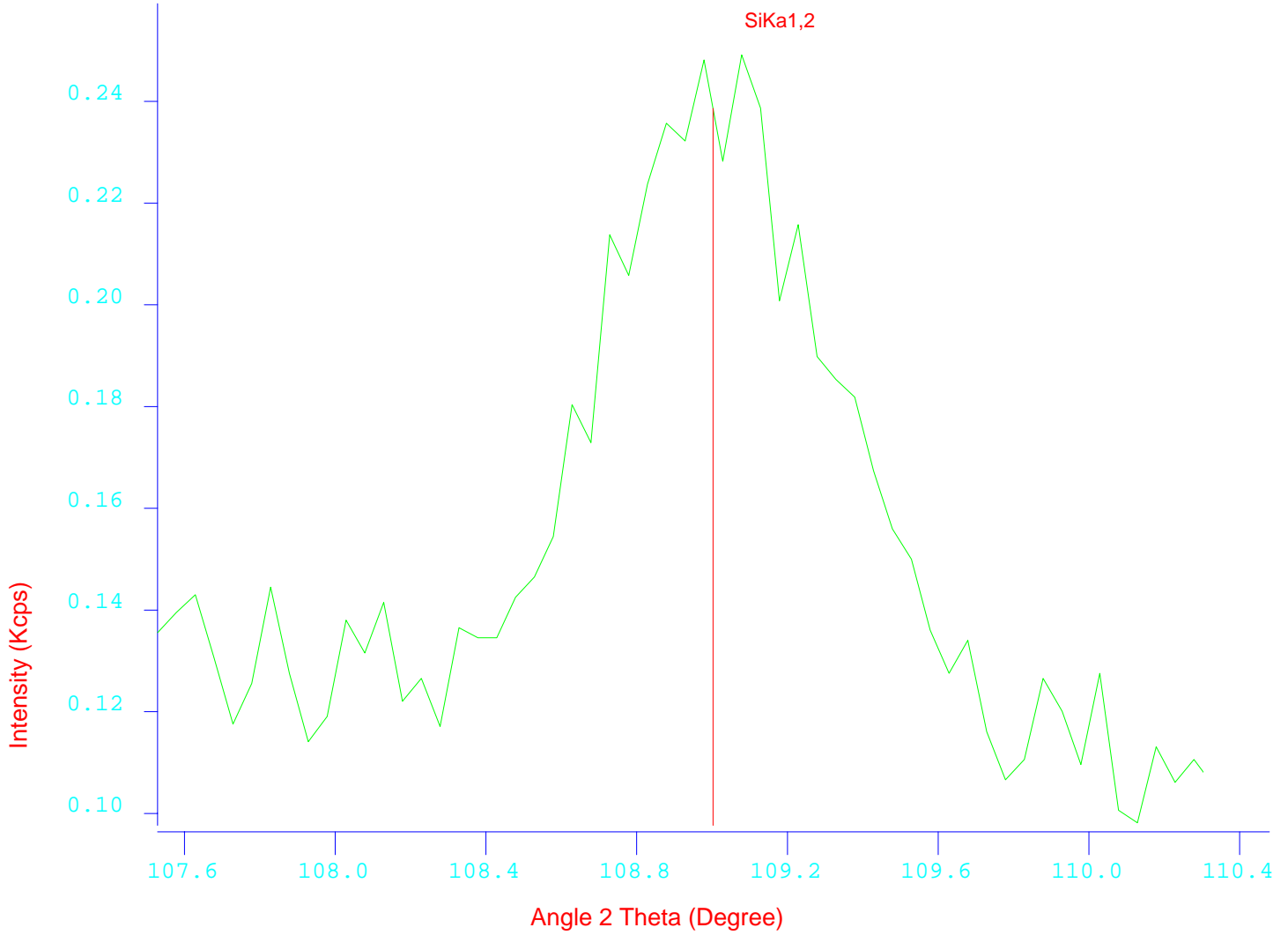
Line	Scan 1	Scan 2	Scan 3	Angle (deg)
P Ka1,2	0.9972			140.9302

Goniometer Scan Graphics

File Name: 1_SIKA.SCN

File Date: 04.08.2005 16:18:04

Scan 1: 1_SIKA (), from: __TMP_01, XRF Gonio: 1, 60 steps



Identification Report:

	Scan 1
Sample Name:	Std
Sample Number:	5
Goniometer:	XRF 1
Crystal:	PET
Detector:	FPC
Collimator:	0.60
PBD	None
kV/mA:	40/90

Line	Intensity (Kcps)			Angle (deg)
	Scan 1	Scan 2	Scan 3	
SiKa1,2	0.2386			109.0024

Appendix 3

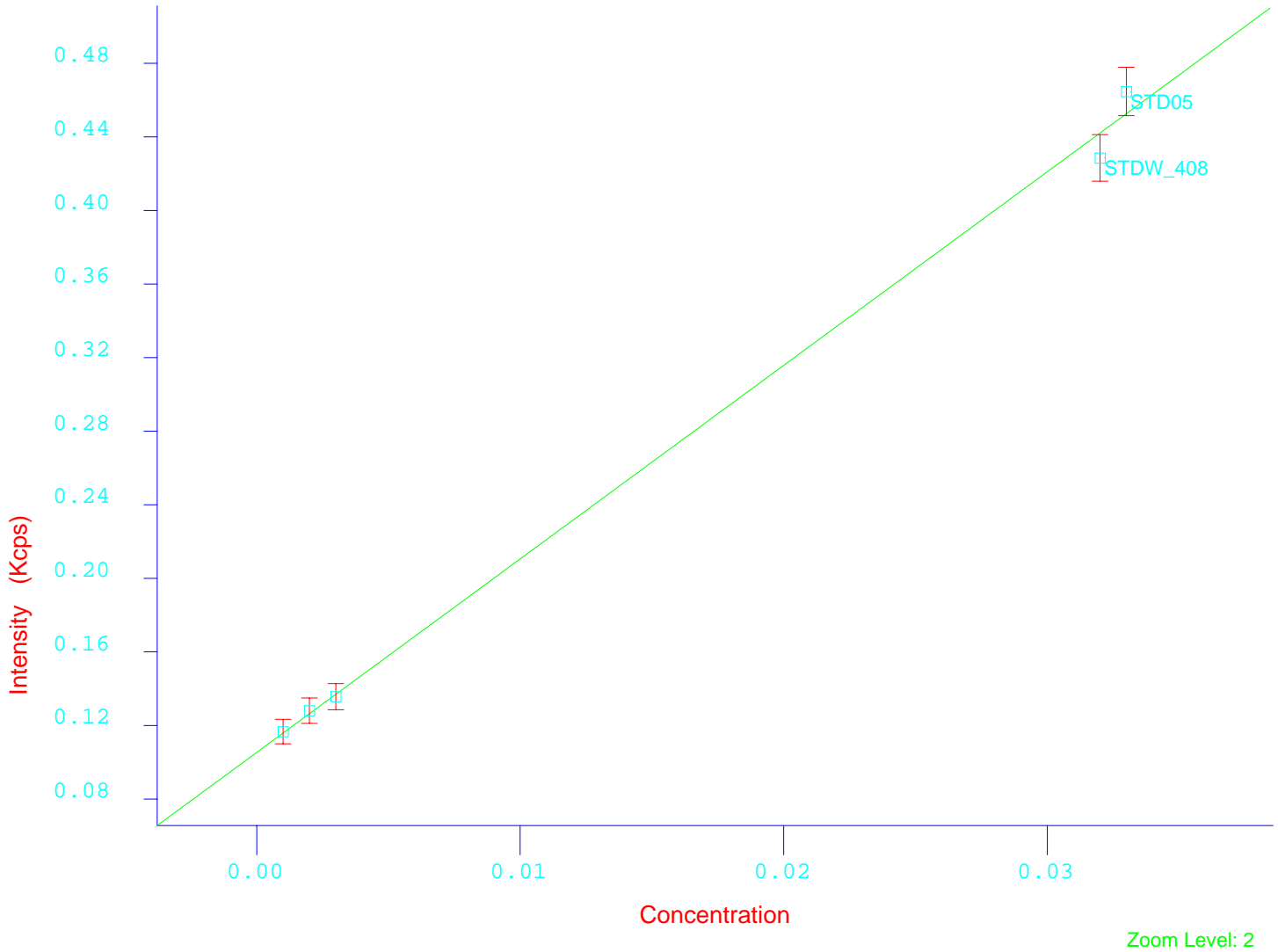
Regression Results

MVR Graphical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
Analytical Program: 05-094-A.PRG
Number of Interfering Channels: 0 Number of Samples: 5

Analyte: AlKa1,2 LOD (24 s): 6.0 ppm BEC: 0.010 % Q: 10.524 Kcps/% SEE: 0.0010

Base Curve without Corrections



MVR Numerical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
 Analytical Program: 05-094-A.PRG
 Number of Interfering Channels: 0 Number of Samples: 5
 Analyte Line: AlKa1,2 Correction Method: None

Coefficients for base curves:

Min: Max: A0: A1: A2: A3:
 Unused Unused -0.01000 0.09502 Unused Unused

Coefficients for interfering channels:

Sample Name	Sample Number	Weight	K.cps	--Concentration--		--Difference--	
				Nominal	Calc'd	Absolute	%
STD	W_410	1.00	0.1357	0.00300	0.00289	-0.00011	-3.77
STD	W_408	1.00	0.4647	0.03300	0.03415	0.00115	3.49
STD	CK_100	1.00	0.1281	0.00200	0.00216	0.00016	8.21
STD	05	1.00	0.4286	0.03200	0.03072	-0.00128	-4.01
STD	01	1.00	0.1167	0.00100	0.00108	0.00008	8.13

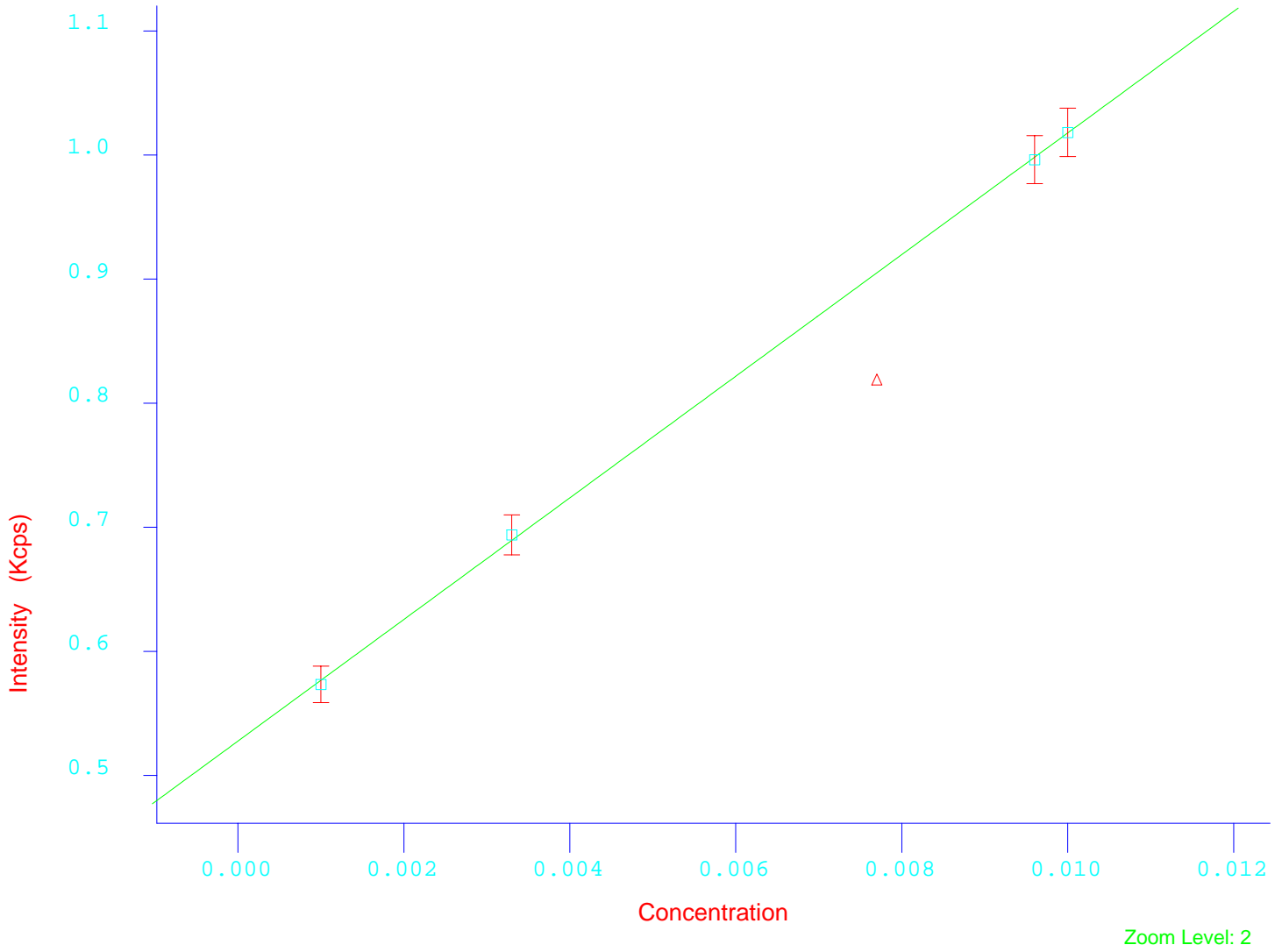
Standard error of estimate: 0.00100
 BEC: 0.010005
 Q: 10.524014
 LOD (24 s): 6.0

MVR Graphical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
Analytical Program: 05-094-A.PRG
Number of Interfering Channels: 0 Number of Samples: 5

Analyte: CaKa1,2 LOD (24 s): 2.9 ppm BEC: 0.011 % Q: 49.009 Kcps/% SEE: 0.0001

Base Curve without Corrections



MVR Numerical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
 Analytical Program: 05-094-A.PRG
 Number of Interfering Channels: 0 Number of Samples: 5
 Analyte Line: CaK_{1,2} Correction Method: None

Coefficients for base curves:

Min: Max: A0: A1: A2: A3:
 Unused Unused -0.01077 0.02040 Unused Unused

Coefficients for interfering channels:

Sample Name	Sample Number	Weight	K.cps	--Concentration--		--Difference--	
				Nominal	Calc'd	Absolute	%
STD	W_410	1.00	0.6939	0.00330	0.00339	0.00009	2.79
STD	W_408	1.00	1.0182	0.01000	0.01001	0.00001	0.11
STD	CK_100	0.00	0.8167	0.00770	0.00590	-0.00180	-23.39
STD	05	1.00	0.9963	0.00960	0.00956	-0.00004	-0.39
STD	01	1.00	0.5734	0.00100	0.00093	-0.00007	-6.52

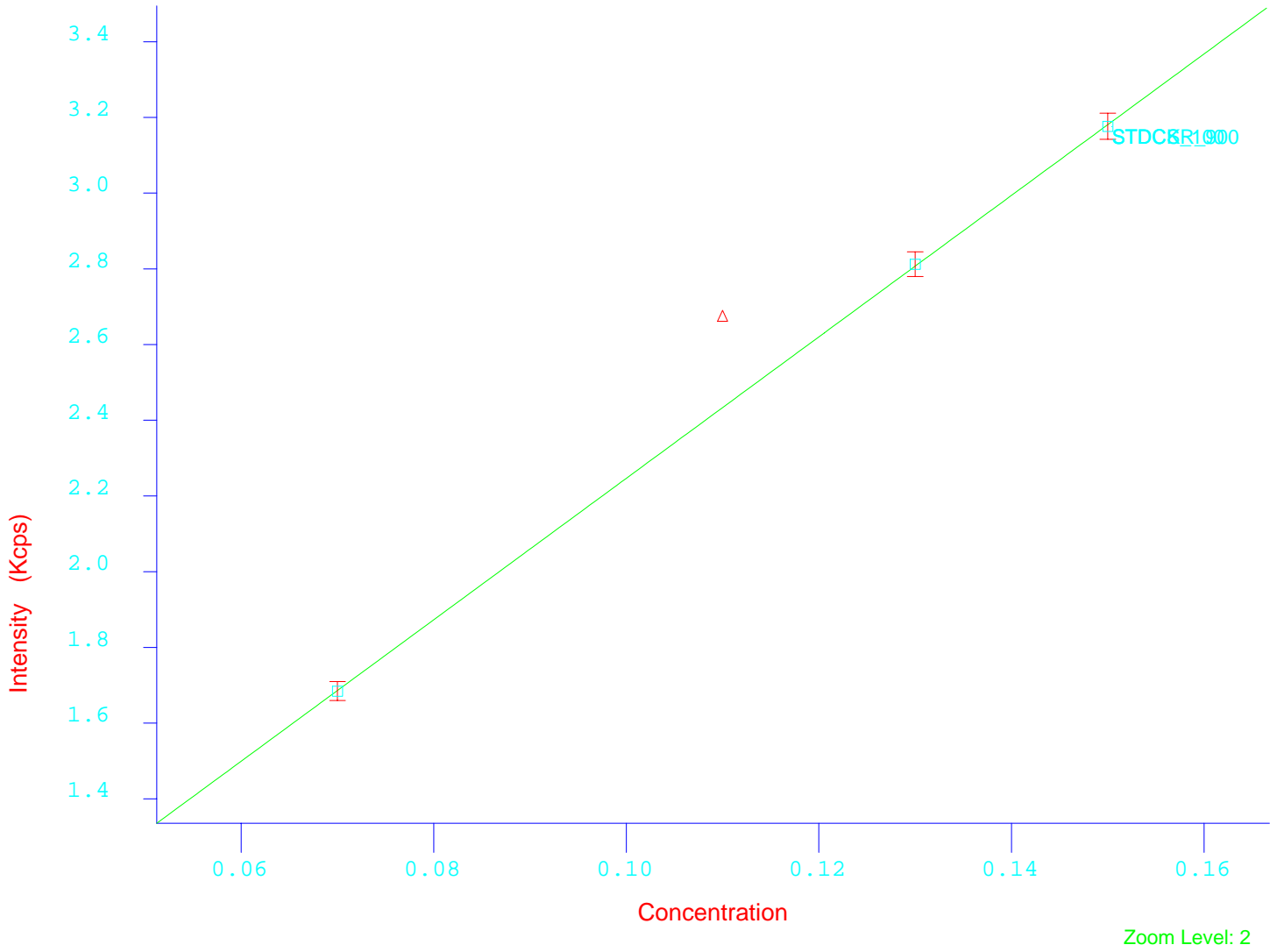
Standard error of estimate: 0.00008
 BEC: 0.010766
 Q: 49.009497
 LOD (24 s): 2.9

MVR Graphical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
Analytical Program: 05-094-A.PRG
Number of Interfering Channels: 0 Number of Samples: 4

Analyte: ClKa1,2a LOD (24 s): 6.4 ppm BEC: 0.020 % Q: 18.684 Kcps/% SEE: 0.0004

Base Curve without Corrections



MVR Numerical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
 Analytical Program: 05-094-A.PRG
 Number of Interfering Channels: 0 Number of Samples: 4
 Analyte Line: ClKa1,2a Correction Method: None

Coefficients for base curves:

Min: Max: A0: A1: A2: A3:
 Unused Unused -0.02024 0.05352 Unused Unused

Coefficients for interfering channels:

Sample Name	Sample Number	Weight	K.cps	--Concentration--		--Difference--	
				Nominal	Calc'd	Absolute	%
STD	W_408	1.00	1.6847	0.07000	0.06993	-0.00007	-0.10
STD	CSR_900	0.00	2.6682	0.11000	0.12257	0.01257	11.43
STD	CPU_600	1.00	2.8123	0.13000	0.13028	0.00028	0.22
STD	CK_100	1.00	3.1768	0.15000	0.14979	-0.00021	-0.14

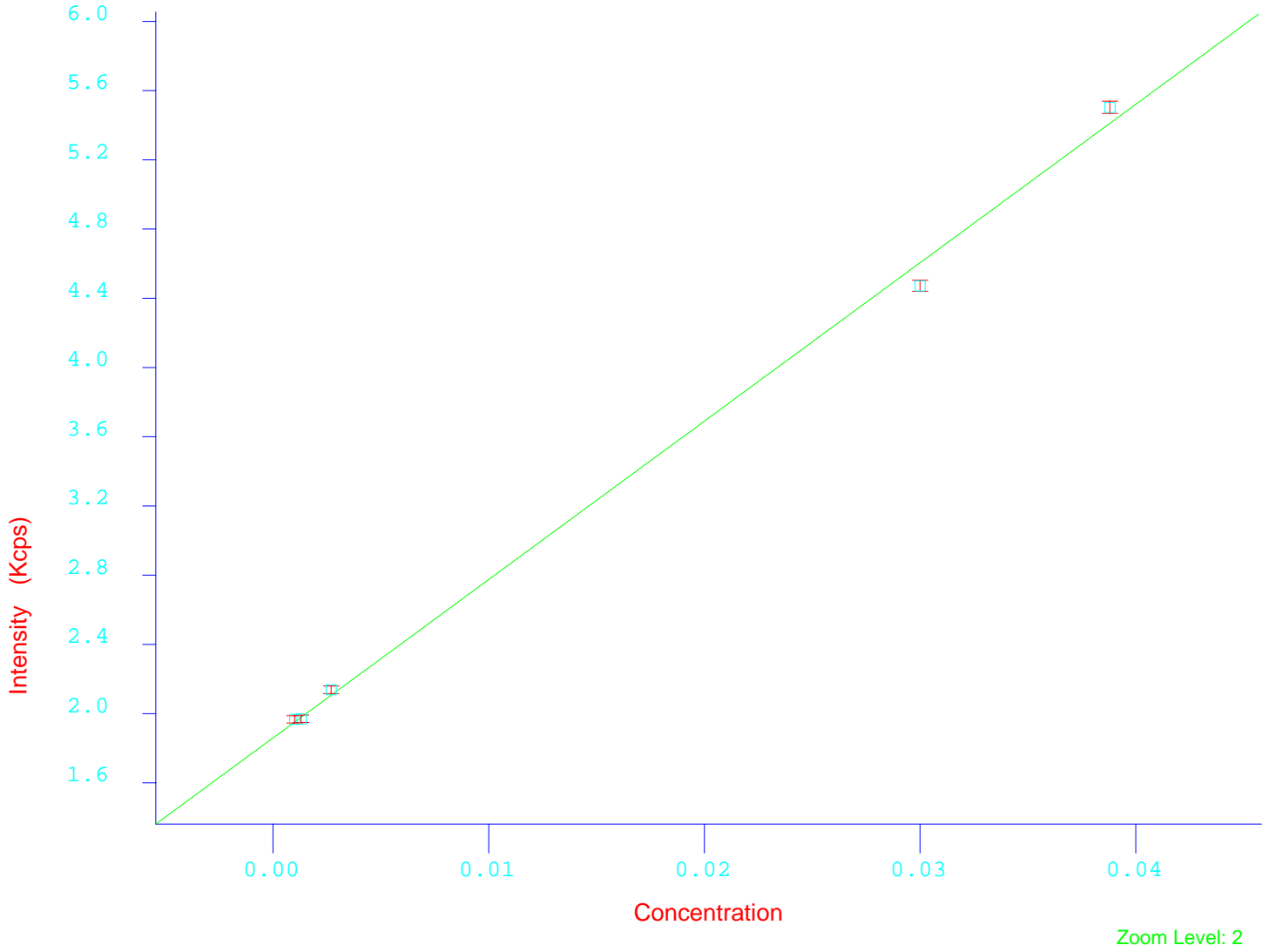
Standard error of estimate: 0.00036
 BEC: 0.020239
 Q: 18.683919
 LOD (24 s): 6.4

MVR Graphical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
Analytical Program: 05-094-A.PRG
Number of Interfering Channels: 0 Number of Samples: 5

Analyte: CrKa_m LOD (40 s): 2.2 ppm BEC: 0.020 % Q: 91.537 Kcps/% SEE: 0.0011

Base Curve without Corrections



MVR Numerical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
 Analytical Program: 05-094-A.PRG
 Number of Interfering Channels: 0 Number of Samples: 5

Analyte Line: CrKa_m Correction Method: None

Coefficients for base curves:

Min:	Max:	A0:	A1:	A2:	A3:
Unused	Unused	-0.02031	0.01092	Unused	Unused

Coefficients for interfering channels:

Sample Name	Sample Number	Weight	K.cps	--Concentration--		--Difference--	
				Nominal	Calc'd	Absolute	%
STD	W_410	1.00	2.1381	0.00270	0.00305	0.00035	12.84
STD	W_408	1.00	5.5038	0.03880	0.03981	0.00101	2.62
STD	CK_100	1.00	1.9705	0.00130	0.00122	-0.00008	-6.48
STD	05	1.00	4.4720	0.03000	0.02854	-0.00146	-4.85
STD	01	1.00	1.9672	0.00100	0.00118	0.00018	17.92

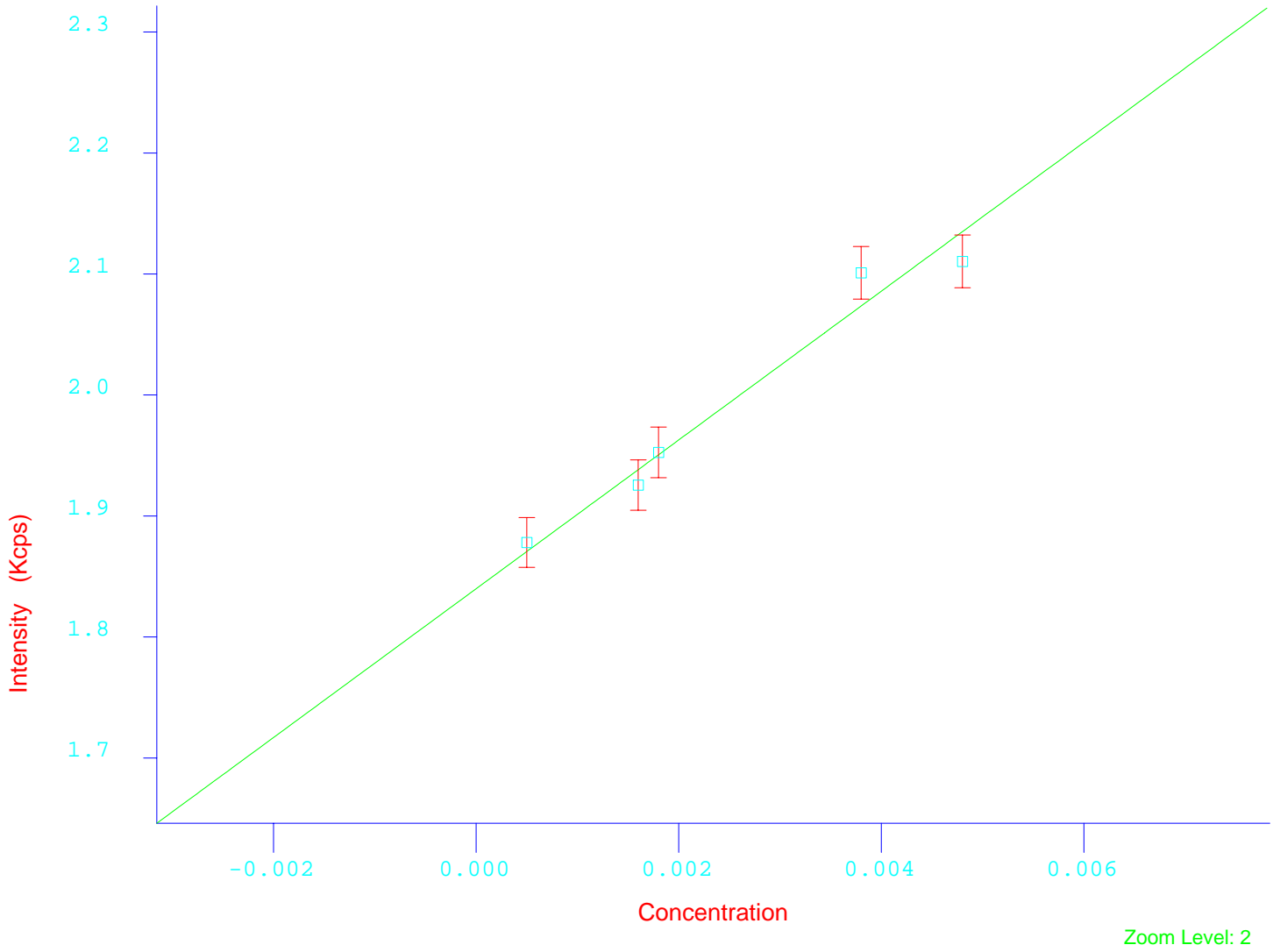
Standard error of estimate: 0.00105
 BEC: 0.020312
 Q: 91.536624
 LOD (40 s): 2.2

MVR Graphical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
Analytical Program: 05-094-A.PRG
Number of Interfering Channels: 0 Number of Samples: 5

Analyte: CuKa_m LOD (40 s): 3.3 ppm BEC: 0.030 % Q: 61.489 Kcps/% SEE: 0.0004

Base Curve without Corrections



MVR Numerical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
Analytical Program: 05-094-A.PRG
Number of Interfering Channels: 0 Number of Samples: 5

Analyte Line: CuKa_m Correction Method: None

Coefficients for base curves:

Min: Max: A0: A1: A2: A3:
Unused Unused -0.02992 0.01626 Unused Unused

Coefficients for interfering channels:

Table with 8 columns: Sample Name, Sample Number, Weight, K.cps, --Concentration-- Nominal, --Concentration-- Calc'd, --Difference-- Absolute, --Difference-- %. Rows include STD W_410, STD W_408, STD CK_100, STD 05, and STD 01.

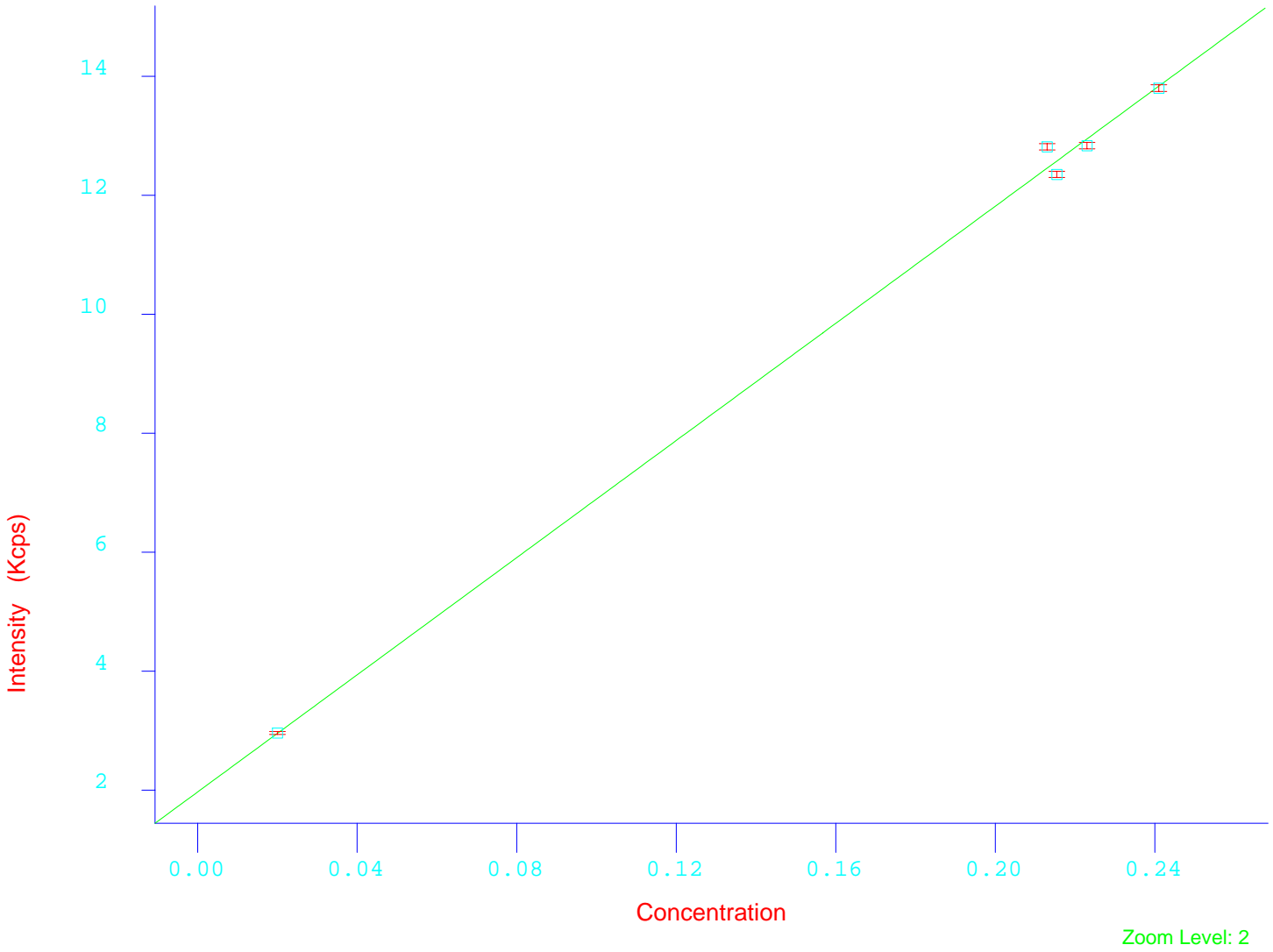
Standard error of estimate: 0.00037
BEC: 0.029921
Q: 61.488926
LOD (40 s): 3.3

MVR Graphical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
Analytical Program: 05-094-A.PRG
Number of Interfering Channels: 0 Number of Samples: 5

Analyte: MnKa_m LOD (40 s): 4.3 ppm BEC: 0.040 % Q: 49.231 Kcps/% SEE: 0.0051

Base Curve without Corrections



MVR Numerical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
 Analytical Program: 05-094-A.PRG
 Number of Interfering Channels: 0 Number of Samples: 5

Analyte Line: MnKa_m Correction Method: None

Coefficients for base curves:

Min:	Max:	A0:	A1:	A2:	A3:
Unused	Unused	-0.04001	0.02031	Unused	Unused

Coefficients for interfering channels:

Sample Name	Sample Number	Weight	K.cps	--Concentration--		--Difference--	
				Nominal	Calc'd	Absolute	%
STD	W_410	1.00	12.8351	0.22300	0.22070	-0.00230	-1.03
STD	W_408	1.00	12.8154	0.21300	0.22030	0.00730	3.43
STD	CK_100	1.00	12.3528	0.21540	0.21090	-0.00450	-2.09
STD	05	1.00	13.8026	0.24100	0.24035	-0.00065	-0.27
STD	01	1.00	2.9613	0.02000	0.02014	0.00014	0.71

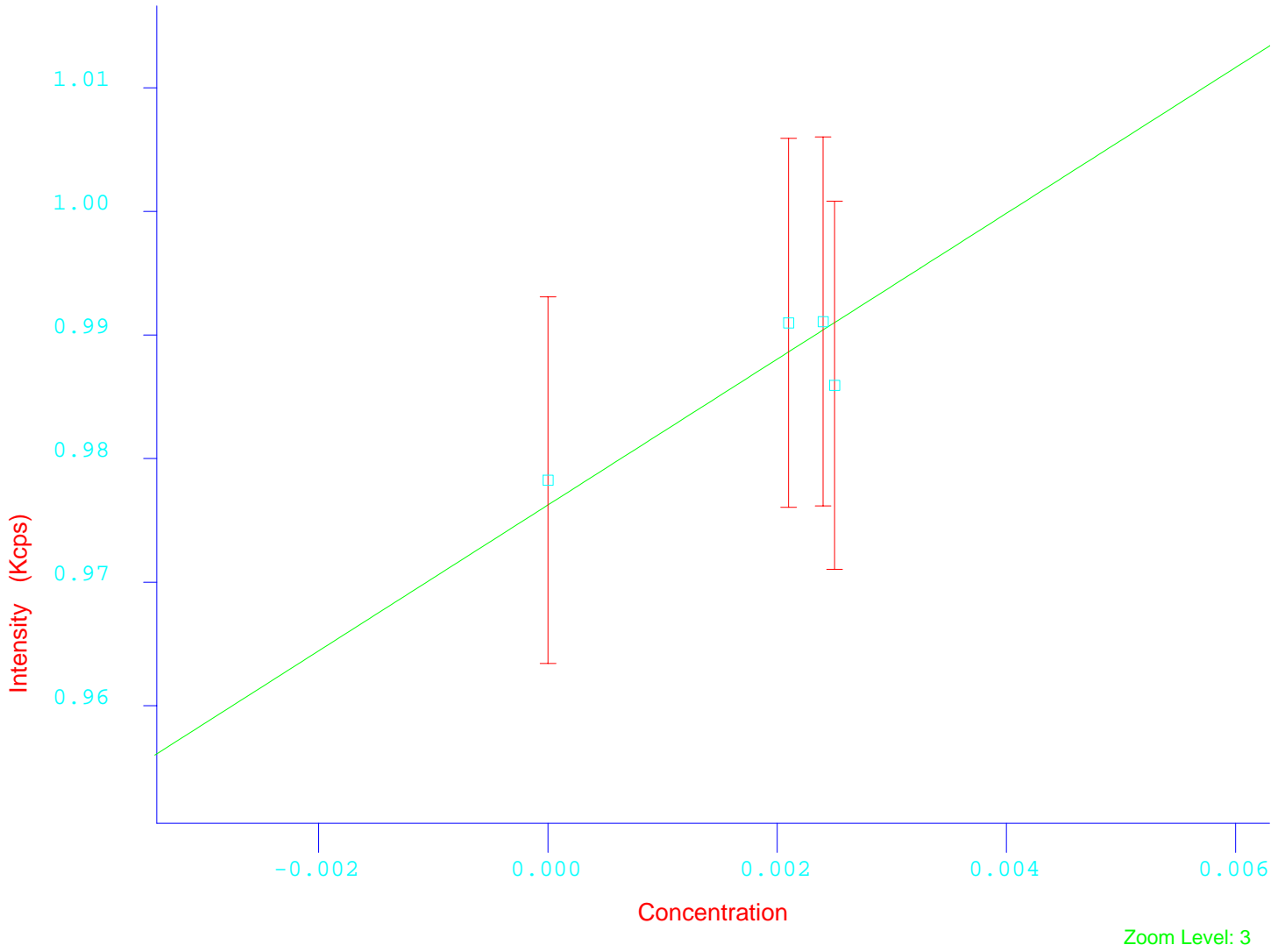
Standard error of estimate: 0.00514
 BEC: 0.040010
 Q: 49.231151
 LOD (40 s): 4.3

MVR Graphical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
Analytical Program: 05-094-A.PRG
Number of Interfering Channels: 0 Number of Samples: 4

Analyte: NaKa1,2 LOD (40 s): 25.1 ppm BEC: 0.165 % Q: 5.901 Kcps/% SEE: 0.0007

Base Curve without Corrections



MVR Numerical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
 Analytical Program: 05-094-A.PRG
 Number of Interfering Channels: 0 Number of Samples: 4
 Analyte Line: NaKa1,2 Correction Method: None

Coefficients for base curves:

Min: Max: A0: A1: A2: A3:
 Unused Unused -0.16543 0.16946 Unused Unused

Coefficients for interfering channels:

Sample Name	Sample Number	Weight	K.cps	--Concentration--		--Difference--	
				Nominal	Calc'd	Absolute	%
STD	CSR_900	1.00	0.9859	0.00250	0.00164	-0.00086	-34.30
STD	CPU_600	1.00	0.9910	0.00210	0.00250	0.00040	18.98
STD	CK_100	1.00	0.9911	0.00240	0.00252	0.00012	4.90
STD	01	1.00	0.9783	0.00000	0.00034	0.00034	>500

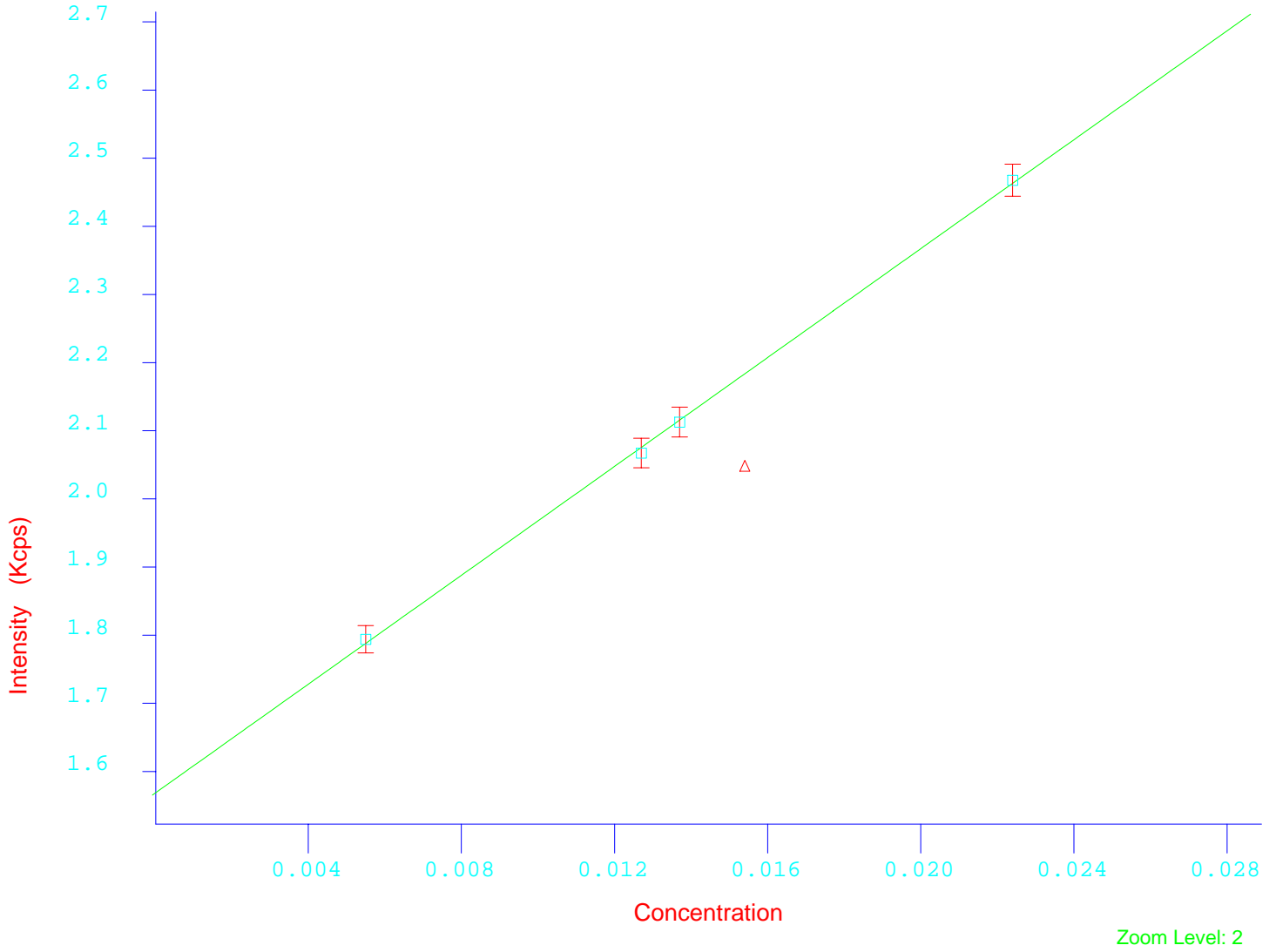
Standard error of estimate: 0.00072
 BEC: 0.165431
 Q: 5.901186
 LOD (40 s): 25.1

MVR Graphical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
Analytical Program: 05-094-A.PRG
Number of Interfering Channels: 0 Number of Samples: 5

Analyte: NiKa_m LOD (40 s): 4.7 ppm BEC: 0.039 % Q: 39.952 Kcps/% SEE: 0.0002

Base Curve without Corrections



MVR Numerical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
 Analytical Program: 05-094-A.PRG
 Number of Interfering Channels: 0 Number of Samples: 5

Analyte Line: NiKa_m Correction Method: None

Coefficients for base curves:

Min:	Max:	A0:	A1:	A2:	A3:
Unused	Unused	-0.03925	0.02503	Unused	Unused

Coefficients for interfering channels:

Sample Name	Sample Number	Weight	K.cps	--Concentration--		--Difference--	
				Nominal	Calc'd	Absolute	%
STD	W_410	1.00	2.0674	0.01270	0.01250	-0.00020	-1.61
STD	W_408	1.00	2.4677	0.02240	0.02252	0.00012	0.52
STD	CK_100	1.00	2.1127	0.01370	0.01363	-0.00007	-0.50
STD	05	0.00	2.0442	0.01540	0.01192	-0.00348	-22.63
STD	01	1.00	1.7942	0.00550	0.00566	0.00016	2.87

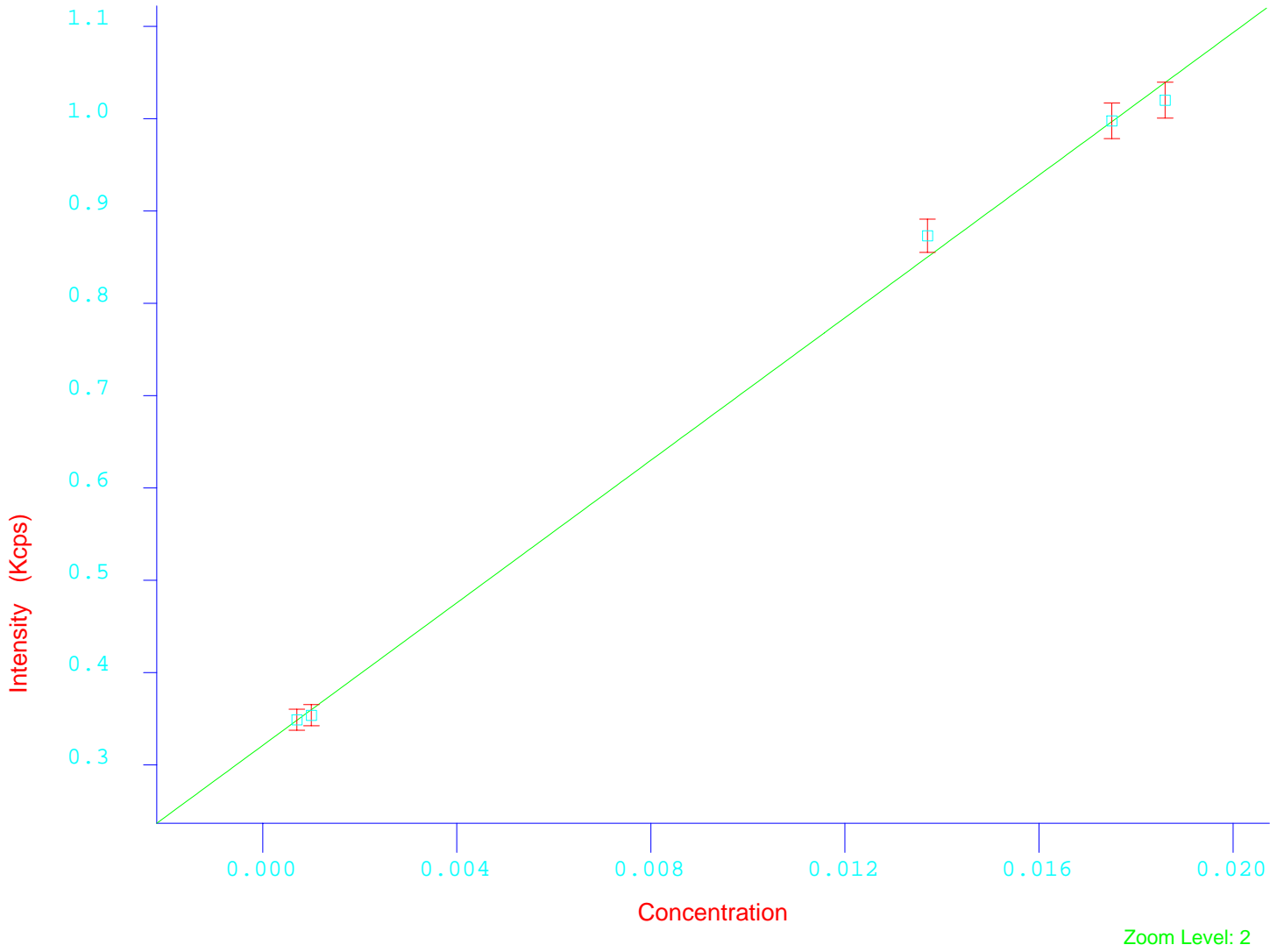
Standard error of estimate: 0.00021
 BEC: 0.039250
 Q: 39.952391
 LOD (40 s): 4.7

MVR Graphical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
Analytical Program: 05-094-A.PRG
Number of Interfering Channels: 0 Number of Samples: 5

Analyte: P Ka1,2a LOD (24 s): 2.8 ppm BEC: 0.008 % Q: 38.602 Kcps/% SEE: 0.0005

Base Curve without Corrections



MVR Numerical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
 Analytical Program: 05-094-A.PRG
 Number of Interfering Channels: 0 Number of Samples: 5

Analyte Line: P Ka1,2a Correction Method: None

Coefficients for base curves:

Min: Max: A0: A1: A2: A3:
 Unused Unused -8.31908e-3 0.02591 Unused Unused

Coefficients for interfering channels:

Sample Name	Sample Number	Weight	K.cps	--Concentration--		--Difference--	
				Nominal	Calc'd	Absolute	%
STD	W_410	1.00	0.3538	0.00100	0.00085	-0.00015	-15.33
STD	W_408	1.00	0.9977	0.01750	0.01753	0.00003	0.15
STD	CK_100	1.00	1.0201	0.01860	0.01811	-0.00049	-2.65
STD	05	1.00	0.8732	0.01370	0.01430	0.00060	4.39
STD	01	1.00	0.3489	0.00070	0.00072	0.00002	2.83

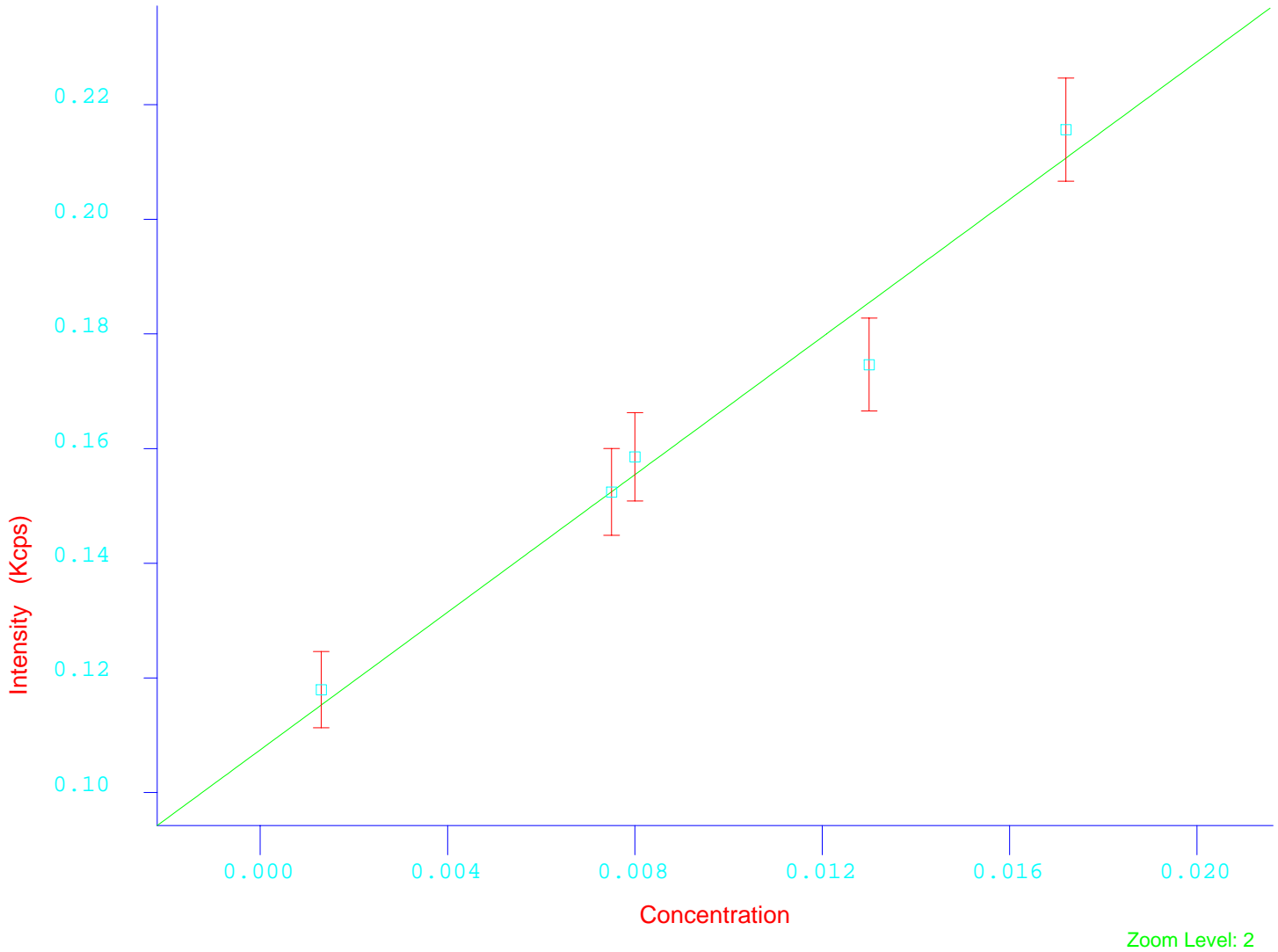
Standard error of estimate: 0.00046
 BEC: 0.008319
 Q: 38.602031
 LOD (24 s): 2.8

MVR Graphical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
Analytical Program: 05-094-A.PRG
Number of Interfering Channels: 0 Number of Samples: 5

Analyte: SiKa1,2a LOD (24 s): 10.6 ppm BEC: 0.018 % Q: 6.001 Kcps/% SEE: 0.0012

Base Curve without Corrections



MVR Numerical Results

Matrix Name: 05-094-A Sub-group Name: 05-094-A
 Analytical Program: 05-094-A.PRG
 Number of Interfering Channels: 0 Number of Samples: 5

Analyte Line: SiKa1,2a Correction Method: None

Coefficients for base curves:

Min: Max: A0: A1: A2: A3:
 Unused Unused -0.01790 0.16664 Unused Unused

Coefficients for interfering channels:

Sample Name	Sample Number	Weight	K.cps	--Concentration--		--Difference--	
				Nominal	Calc'd	Absolute	%
STD	W_410	1.00	0.1524	0.00750	0.00750	-0.00000	-0.02
STD	W_408	1.00	0.1586	0.00800	0.00852	0.00052	6.49
STD	CK_100	1.00	0.1747	0.01300	0.01120	-0.00180	-13.85
STD	05	1.00	0.2156	0.01720	0.01803	0.00083	4.82
STD	01	1.00	0.1180	0.00130	0.00175	0.00045	34.82

Standard error of estimate: 0.00121
 BEC: 0.017905
 Q: 6.000806
 LOD (24 s): 10.6

Appendix 4

Repeatability measurements for determination of
Instrumental Detection Limit (IDL)

Ferrite powder (Pressed Pellets) Repeatability measurements for IDL determination.

Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
11:37:16	STD	01	1	0.0111	0.0016	0.0030	0.0004	0.0049	0.0014	0.0015	0.0199
11:40:10	STD	01	2	0.0057	0.0012	0.0036	0.0005	0.0050	0.0013	0.0012	0.0201
11:43:04	STD	01	3	0.0066	0.0014	0.0033	0.0007	0.0049	0.0012	0.0012	0.0199
11:45:58	STD	01	4	0.0050	0.0012	0.0029	0.0005	0.0051	0.0013	0.0013	0.0196
11:48:52	STD	01	5	0.0064	0.0018	0.0022	0.0006	0.0056	0.0013	0.0011	0.0200
11:51:46	STD	01	6	0.0062	0.0011	0.0034	0.0007	0.0052	0.0013	0.0013	0.0200
11:54:40	STD	01	7	0.0057	0.0016	0.0042	0.0004	0.0054	0.0014	0.0011	0.0199
11:57:34	STD	01	8	0.0067	0.0014	0.0037	0.0005	0.0054	0.0015	0.0013	0.0201
12:00:28	STD	01	9	0.0056	0.0014	0.0036	0.0006	0.0052	0.0012	0.0014	0.0199
12:03:22	STD	01	10	0.0070	0.0015	0.0036	0.0007	0.0054	0.0013	0.0014	0.0199
12:06:14	STD	01	11	0.0067	0.0015	0.0034	0.0006	0.0050	0.0013	0.0015	0.0197
12:09:08	STD	01	12	0.0061	0.0014	0.0046	0.0008	0.0053	0.0017	0.0012	0.0202
12:12:04	STD	01	13	0.0069	0.0016	0.0041	0.0005	0.0053	0.0012	0.0013	0.0196
12:14:56	STD	01	14	0.0069	0.0017	0.0033	0.0006	0.0051	0.0013	0.0014	0.0198
12:17:50	STD	01	15	0.0090	0.0012	0.0048	0.0006	0.0053	0.0014	0.0013	0.0199
12:20:44	STD	01	16	0.0071	0.0011	0.0046	0.0007	0.0050	0.0014	0.0013	0.0202
12:23:38	STD	01	17	0.0068	0.0013	0.0037	0.0005	0.0054	0.0013	0.0014	0.0204
12:26:32	STD	01	18	0.0088	0.0013	0.0045	0.0009	0.0049	0.0015	0.0013	0.0201
12:29:26	STD	01	19	0.0088	0.0017	0.0041	0.0006	0.0050	0.0014	0.0015	0.0200
12:32:20	STD	01	20	0.0083	0.0013	0.0045	0.0005	0.0050	0.0014	0.0014	0.0197
12:32:22	STD	01	Average	0.0071	0.0014	0.0038	0.0006	0.0052	0.0014	0.0013	0.0199
			St Dev	0.0015	0.0002	0.0007	0.0001	0.0002	0.0001	0.0001	0.0002
			LoD	44	7	20	4	6	3	4	6

Ferrite powder (Pressed Pellets)

Repeatability measurements for IDL determination.

Time	Sid1	Sid2	Type	NiO	CuO
11:37:16	STD	01	1	0.0059	0.0008
11:40:10	STD	01	2	0.0058	0.0008
11:43:04	STD	01	3	0.0059	0.0006
11:45:58	STD	01	4	0.0057	0.0007
11:48:52	STD	01	5	0.0057	0.0006
11:51:46	STD	01	6	0.0056	0.0007
11:54:40	STD	01	7	0.0061	0.0008
11:57:34	STD	01	8	0.0057	0.0006
12:00:28	STD	01	9	0.0058	0.0005
12:03:22	STD	01	10	0.0055	0.0008
12:06:14	STD	01	11	0.0055	0.0006
12:09:08	STD	01	12	0.0057	0.0008
12:12:04	STD	01	13	0.0056	0.0008
12:14:56	STD	01	14	0.0057	0.0007
12:17:50	STD	01	15	0.0054	0.0007
12:20:44	STD	01	16	0.0055	0.0005
12:23:38	STD	01	17	0.0053	0.0007
12:26:32	STD	01	18	0.0053	0.0007
12:29:26	STD	01	19	0.0058	0.0007
12:32:20	STD	01	20	0.0053	0.0006
12:32:22	STD	01	Average	0.0056	0.0007
			St Dev	0.0002	0.0001
			LoD	7	3

Appendix 5

Accuracies and precision tests

Accuracy measurements

Date	Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
06-août-05	15:57:44	STD	01	0	0.0036	0.0017	0.0038	0.0005	0.0061	0.0015	0.0014	0.0200
06-août-05	16:23:00	STD	01	0	-0.0023	0.0011	0.0037	0.0005	0.0064	0.0010	0.0013	0.0198
06-août-05	16:48:14	STD	01	0	-0.0018	0.0009	0.0032	0.0007	0.0067	0.0011	0.0012	0.0202
06-août-05	17:13:30	STD	01	0	0.0008	0.0009	0.0037	0.0006	0.0061	0.0011	0.0013	0.0199
06-août-05	17:38:44	STD	01	0	0.0019	0.0010	0.0037	0.0005	0.0063	0.0013	0.0011	0.0201
06-août-05	18:04:00	STD	01	0	0.0030	0.0013	0.0036	0.0005	0.0063	0.0012	0.0013	0.0197
06-août-05	18:29:14	STD	01	0	0.0036	0.0014	0.0045	0.0007	0.0061	0.0014	0.0013	0.0202
06-août-05	18:54:28	STD	01	0	0.0045	0.0013	0.0047	0.0005	0.0067	0.0014	0.0012	0.0197
06-août-05	19:19:40	STD	01	0	0.0061	0.0016	0.0041	0.0006	0.0062	0.0014	0.0013	0.0197
06-août-05	19:44:56	STD	01	0	0.0067	0.0017	0.0044	0.0006	0.0062	0.0014	0.0012	0.0202
				Average	0.0026	0.0013	0.0039	0.0006	0.0063	0.0013	0.0013	0.0199
				St Dev	0.0030	0.0003	0.0005	0.0001	0.0002	0.0002	0.0001	0.0002
Date	Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
07-août-05	16:21:30	STD	01	0	0.0033	0.0013	0.0043	0.0006	0.0064	0.0014	0.0013	0.0201
07-août-05	16:46:48	STD	01	0	-0.0028	0.0008	0.0025	0.0007	0.0065	0.0008	0.0012	0.0197
07-août-05	17:12:06	STD	01	0	-0.0034	0.0008	0.0033	0.0006	0.0069	0.0009	0.0013	0.0201
07-août-05	17:37:22	STD	01	0	-0.0006	0.0011	0.0034	0.0006	0.0065	0.0011	0.0011	0.0205
07-août-05	18:02:36	STD	01	0	0.0013	0.0010	0.0039	0.0007	0.0067	0.0010	0.0012	0.0197
07-août-05	18:27:52	STD	01	0	0.0037	0.0012	0.0039	0.0007	0.0071	0.0012	0.0012	0.0204
07-août-05	18:53:02	STD	01	0	0.0025	0.0011	0.0042	0.0007	0.0067	0.0013	0.0011	0.0203
07-août-05	19:18:18	STD	01	0	0.0028	0.0013	0.0039	0.0007	0.0067	0.0013	0.0013	0.0201
07-août-05	19:43:32	STD	01	0	0.0047	0.0013	0.0044	0.0008	0.0067	0.0013	0.0012	0.0203
07-août-05	20:08:48	STD	01	0	0.0040	0.0013	0.0038	0.0009	0.0066	0.0013	0.0014	0.0201
				Average	0.0015	0.0011	0.0038	0.0007	0.0067	0.0011	0.0012	0.0201
				St Dev	0.0029	0.0002	0.0006	0.0001	0.0002	0.0002	0.0001	0.0003

Accuracy measurements

Date	Time	Sid1	Sid2	Type	NiO	CuO
06-août-05	15:57:44	STD	01	0	0.0057	0.0005
06-août-05	16:23:00	STD	01	0	0.0052	0.0005
06-août-05	16:48:14	STD	01	0	0.0058	0.0008
06-août-05	17:13:30	STD	01	0	0.0055	0.0007
06-août-05	17:38:44	STD	01	0	0.0060	0.0007
06-août-05	18:04:00	STD	01	0	0.0056	0.0007
06-août-05	18:29:14	STD	01	0	0.0056	0.0007
06-août-05	18:54:28	STD	01	0	0.0057	0.0009
06-août-05	19:19:40	STD	01	0	0.0054	0.0008
06-août-05	19:44:56	STD	01	0	0.0058	0.0008
				Average	0.0056	0.0007
				St Dev	0.0002	0.0001
Date	Time	Sid1	Sid2	Type	NiO	CuO
07-août-05	16:21:30	STD	01	0	0.0056	0.0007
07-août-05	16:46:48	STD	01	0	0.0056	0.0006
07-août-05	17:12:06	STD	01	0	0.0057	0.0008
07-août-05	17:37:22	STD	01	0	0.0059	0.0006
07-août-05	18:02:36	STD	01	0	0.0057	0.0008
07-août-05	18:27:52	STD	01	0	0.0055	0.0005
07-août-05	18:53:02	STD	01	0	0.0055	0.0007
07-août-05	19:18:18	STD	01	0	0.0055	0.0007
07-août-05	19:43:32	STD	01	0	0.0058	0.0009
07-août-05	20:08:48	STD	01	0	0.0058	0.0008
				Average	0.0056	0.0007
				St Dev	0.0001	0.0001

Accuracy Measurements

Date	Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
06-août-05	16:01:22	W	408	0	0.0023	0.0344	0.0090	0.0175	0.0705	0.0101	0.0399	0.2206
06-août-05	16:26:38	W	408	0	-0.0020	0.0329	0.0078	0.0177	0.0714	0.0102	0.0397	0.2207
06-août-05	16:51:50	W	408	0	0.0005	0.0342	0.0087	0.0177	0.0722	0.0102	0.0403	0.2212
06-août-05	17:17:06	W	408	0	0.0028	0.0341	0.0088	0.0175	0.0721	0.0103	0.0397	0.2212
06-août-05	17:42:22	W	408	0	0.0008	0.0348	0.0081	0.0178	0.0709	0.0105	0.0399	0.2207
06-août-05	18:07:36	W	408	0	0.0027	0.0347	0.0087	0.0175	0.0713	0.0104	0.0399	0.2209
06-août-05	18:32:52	W	408	0	0.0038	0.0338	0.0088	0.0174	0.0719	0.0099	0.0396	0.2208
06-août-05	18:58:04	W	408	0	0.0018	0.0349	0.0091	0.0175	0.0716	0.0104	0.0397	0.2210
06-août-05	19:23:18	W	408	0	0.0049	0.0343	0.0094	0.0178	0.0721	0.0104	0.0399	0.2206
06-août-05	19:48:30	W	408	0	0.0063	0.0338	0.0089	0.0177	0.0731	0.0102	0.0400	0.2203
				Average	0.0024	0.0342	0.0087	0.0176	0.0717	0.0103	0.0399	0.2208
				St Dev	0.0024	0.0006	0.0005	0.0001	0.0007	0.0002	0.0002	0.0003
Date	Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
07-août-05	16:25:08	W	408	0	0.0005	0.0342	0.0086	0.0175	0.0716	0.0102	0.0400	0.2206
07-août-05	16:50:26	W	408	0	-0.0035	0.0335	0.0084	0.0176	0.0720	0.0101	0.0397	0.2203
07-août-05	17:15:42	W	408	0	0.0009	0.0343	0.0080	0.0176	0.0720	0.0101	0.0398	0.2207
07-août-05	17:40:58	W	408	0	-0.0009	0.0339	0.0085	0.0178	0.0728	0.0103	0.0396	0.2211
07-août-05	18:06:14	W	408	0	0.0001	0.0346	0.0086	0.0176	0.0733	0.0104	0.0397	0.2210
07-août-05	18:31:28	W	408	0	0.0013	0.0338	0.0088	0.0177	0.0725	0.0106	0.0400	0.2203
07-août-05	18:56:40	W	408	0	0.0023	0.0343	0.0080	0.0175	0.0728	0.0105	0.0396	0.2207
07-août-05	19:21:54	W	408	0	0.0037	0.0342	0.0086	0.0175	0.0728	0.0106	0.0396	0.2207
07-août-05	19:47:10	W	408	0	0.0032	0.0343	0.0084	0.0175	0.0734	0.0104	0.0400	0.2206
07-août-05	20:12:24	W	408	0	0.0024	0.0343	0.0087	0.0176	0.0740	0.0105	0.0399	0.2206
				Average	0.0010	0.0341	0.0084	0.0176	0.0727	0.0104	0.0398	0.2207
				St Dev	0.0021	0.0003	0.0003	0.0001	0.0007	0.0002	0.0002	0.0003

Accuracy Measurements

Date	Time	Sid1	Sid2	Type	NiO	CuO
06-août-05	16:01:22	W	408	0	0.0226	0.0034
06-août-05	16:26:38	W	408	0	0.0223	0.0034
06-août-05	16:51:50	W	408	0	0.0221	0.0033
06-août-05	17:17:06	W	408	0	0.0228	0.0032
06-août-05	17:42:22	W	408	0	0.0226	0.0035
06-août-05	18:07:36	W	408	0	0.0225	0.0032
06-août-05	18:32:52	W	408	0	0.0227	0.0031
06-août-05	18:58:04	W	408	0	0.0225	0.0032
06-août-05	19:23:18	W	408	0	0.0226	0.0032
06-août-05	19:48:30	W	408	0	0.0228	0.0030
				Average	0.0226	0.0032
				St Dev	0.0002	0.0002
Date	Time	Sid1	Sid2	Type	NiO	CuO
07-août-05	16:25:08	W	408	0	0.0226	0.0031
07-août-05	16:50:26	W	408	0	0.0229	0.0029
07-août-05	17:15:42	W	408	0	0.0229	0.0030
07-août-05	17:40:58	W	408	0	0.0221	0.0030
07-août-05	18:06:14	W	408	0	0.0225	0.0030
07-août-05	18:31:28	W	408	0	0.0224	0.0029
07-août-05	18:56:40	W	408	0	0.0228	0.0031
07-août-05	19:21:54	W	408	0	0.0224	0.0029
07-août-05	19:47:10	W	408	0	0.0228	0.0032
07-août-05	20:12:24	W	408	0	0.0229	0.0028
				Average	0.0226	0.0030
				St Dev	0.0003	0.0001

Accuracy Measurements

Date	Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
06-août-05	16:04:58	W	410	0	-0.0006	0.0023	0.0073	0.0008	0.0742	0.0036	0.0029	0.2201
06-août-05	16:30:14	W	410	0	-0.0004	0.0031	0.0066	0.0010	0.0745	0.0033	0.0028	0.2208
06-août-05	16:55:28	W	410	0	0.0001	0.0027	0.0074	0.0009	0.0756	0.0033	0.0028	0.2208
06-août-05	17:20:42	W	410	0	0.0019	0.0031	0.0071	0.0011	0.0759	0.0035	0.0029	0.2204
06-août-05	17:45:58	W	410	0	0.0019	0.0028	0.0074	0.0008	0.0768	0.0036	0.0029	0.2204
06-août-05	18:11:12	W	410	0	0.0028	0.0027	0.0077	0.0011	0.0764	0.0035	0.0029	0.2206
06-août-05	18:36:28	W	410	0	0.0033	0.0030	0.0076	0.0009	0.0762	0.0038	0.0030	0.2208
06-août-05	19:01:40	W	410	0	0.0042	0.0036	0.0077	0.0009	0.0777	0.0035	0.0031	0.2202
06-août-05	19:26:54	W	410	0	0.0039	0.0040	0.0077	0.0010	0.0770	0.0037	0.0029	0.2205
06-août-05	19:52:06	W	410	0	0.0048	0.0039	0.0080	0.0007	0.0769	0.0040	0.0028	0.2203
				Average	0.0022	0.0031	0.0075	0.0009	0.0761	0.0036	0.0029	0.2205
				St Dev	0.0019	0.0006	0.0004	0.0001	0.0011	0.0002	0.0001	0.0003
Date	Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
07-août-05	16:28:46	W	410	0	-0.0032	0.0030	0.0073	0.0008	0.0748	0.0036	0.0029	0.2207
07-août-05	16:54:04	W	410	0	-0.0042	0.0029	0.0061	0.0009	0.0769	0.0034	0.0030	0.2210
07-août-05	17:19:20	W	410	0	-0.0027	0.0024	0.0076	0.0009	0.0765	0.0035	0.0030	0.2203
07-août-05	17:44:34	W	410	0	0.0001	0.0027	0.0082	0.0011	0.0774	0.0034	0.0031	0.2202
07-août-05	18:09:50	W	410	0	0.0009	0.0027	0.0075	0.0008	0.0777	0.0035	0.0030	0.2211
07-août-05	18:35:04	W	410	0	0.0013	0.0030	0.0074	0.0011	0.0774	0.0036	0.0031	0.2208
07-août-05	19:00:16	W	410	0	0.0002	0.0030	0.0081	0.0008	0.0789	0.0038	0.0029	0.2215
07-août-05	19:25:32	W	410	0	0.0002	0.0028	0.0080	0.0010	0.0774	0.0034	0.0029	0.2205
07-août-05	19:50:46	W	410	0	0.0022	0.0033	0.0076	0.0008	0.0785	0.0039	0.0031	0.2213
07-août-05	20:16:02	W	410	0	0.0043	0.0032	0.0085	0.0010	0.0791	0.0037	0.0030	0.2210
				Average	-0.0001	0.0029	0.0076	0.0009	0.0775	0.0036	0.0030	0.2208
				St Dev	0.0026	0.0003	0.0007	0.0001	0.0013	0.0002	0.0001	0.0004

Accuracy Measurements

Date	Time	Sid1	Sid2	Type	NiO	CuO
06-août-05	16:04:58	W	410	0	0.0126	0.0019
06-août-05	16:30:14	W	410	0	0.0130	0.0018
06-août-05	16:55:28	W	410	0	0.0126	0.0019
06-août-05	17:20:42	W	410	0	0.0126	0.0019
06-août-05	17:45:58	W	410	0	0.0130	0.0019
06-août-05	18:11:12	W	410	0	0.0130	0.0018
06-août-05	18:36:28	W	410	0	0.0128	0.0019
06-août-05	19:01:40	W	410	0	0.0123	0.0019
06-août-05	19:26:54	W	410	0	0.0130	0.0017
06-août-05	19:52:06	W	410	0	0.0129	0.0018
				Average	0.0128	0.0018
				St Dev	0.0002	0.0001
Date	Time	Sid1	Sid2	Type	NiO	CuO
07-août-05	16:28:46	W	410	0	0.0127	0.0019
07-août-05	16:54:04	W	410	0	0.0127	0.0017
07-août-05	17:19:20	W	410	0	0.0127	0.0021
07-août-05	17:44:34	W	410	0	0.0129	0.0018
07-août-05	18:09:50	W	410	0	0.0127	0.0018
07-août-05	18:35:04	W	410	0	0.0127	0.0018
07-août-05	19:00:16	W	410	0	0.0127	0.0019
07-août-05	19:25:32	W	410	0	0.0130	0.0018
07-août-05	19:50:46	W	410	0	0.0126	0.0019
07-août-05	20:16:02	W	410	0	0.0128	0.0017
				Average	0.0127	0.0018
				St Dev	0.0001	0.0001

Accuracy Measurements

Date	Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
06-août-05	16:08:34	STD	05	0	-0.0018	0.0302	0.0187	0.0144	0.0652	0.0095	0.0285	0.2405
06-août-05	16:33:50	STD	05	0	-0.0029	0.0315	0.0180	0.0143	0.0658	0.0098	0.0286	0.2399
06-août-05	16:59:04	STD	05	0	-0.0022	0.0312	0.0191	0.0144	0.0652	0.0098	0.0284	0.2403
06-août-05	17:24:20	STD	05	0	0.0020	0.0306	0.0196	0.0141	0.0663	0.0097	0.0287	0.2399
06-août-05	17:49:34	STD	05	0	0.0009	0.0310	0.0191	0.0143	0.0662	0.0095	0.0286	0.2402
06-août-05	18:14:48	STD	05	0	0.0020	0.0311	0.0199	0.0145	0.0656	0.0097	0.0285	0.2404
06-août-05	18:40:02	STD	05	0	0.0027	0.0305	0.0195	0.0141	0.0676	0.0100	0.0286	0.2401
06-août-05	19:05:16	STD	05	0	0.0018	0.0306	0.0199	0.0140	0.0663	0.0098	0.0287	0.2400
06-août-05	19:30:32	STD	05	0	0.0053	0.0316	0.0198	0.0140	0.0657	0.0101	0.0284	0.2402
06-août-05	19:55:42	STD	05	0	0.0033	0.0315	0.0198	0.0140	0.0671	0.0101	0.0286	0.2401
				Average	0.0011	0.0310	0.0193	0.0142	0.0661	0.0098	0.0286	0.2402
				St Dev	0.0026	0.0005	0.0006	0.0002	0.0008	0.0002	0.0001	0.0002
Date	Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
07-août-05	16:32:22	STD	05	0	-0.0030	0.0301	0.0186	0.0142	0.0656	0.0099	0.0284	0.2401
07-août-05	16:57:40	STD	05	0	-0.0039	0.0316	0.0180	0.0141	0.0659	0.0096	0.0286	0.2413
07-août-05	17:22:56	STD	05	0	-0.0017	0.0306	0.0182	0.0142	0.0668	0.0097	0.0284	0.2408
07-août-05	17:48:10	STD	05	0	-0.0023	0.0312	0.0183	0.0143	0.0659	0.0099	0.0286	0.2403
07-août-05	18:13:26	STD	05	0	0.0011	0.0302	0.0184	0.0145	0.0671	0.0097	0.0285	0.2402
07-août-05	18:38:38	STD	05	0	0.0019	0.0306	0.0192	0.0144	0.0663	0.0098	0.0284	0.2406
07-août-05	19:03:52	STD	05	0	0.0008	0.0314	0.0192	0.0139	0.0663	0.0096	0.0285	0.2404
07-août-05	19:29:08	STD	05	0	0.0017	0.0308	0.0196	0.0140	0.0667	0.0095	0.0287	0.2408
07-août-05	19:54:22	STD	05	0	0.0032	0.0311	0.0192	0.0144	0.0663	0.0098	0.0284	0.2407
07-août-05	20:19:38	STD	05	0	0.0035	0.0323	0.0205	0.0142	0.0661	0.0099	0.0288	0.2400
				Average	0.0001	0.0310	0.0189	0.0142	0.0663	0.0097	0.0285	0.2405
				St Dev	0.0026	0.0007	0.0008	0.0002	0.0005	0.0001	0.0002	0.0004

Accuracy Measurements

Date	Time	Sid1	Sid2	Type	NiO	CuO
06-août-05	16:08:34	STD	05	0	0.0120	0.0038
06-août-05	16:33:50	STD	05	0	0.0126	0.0036
06-août-05	16:59:04	STD	05	0	0.0122	0.0034
06-août-05	17:24:20	STD	05	0	0.0126	0.0035
06-août-05	17:49:34	STD	05	0	0.0121	0.0032
06-août-05	18:14:48	STD	05	0	0.0120	0.0036
06-août-05	18:40:02	STD	05	0	0.0122	0.0036
06-août-05	19:05:16	STD	05	0	0.0121	0.0035
06-août-05	19:30:32	STD	05	0	0.0122	0.0035
06-août-05	19:55:42	STD	05	0	0.0124	0.0033
				Average	0.0122	0.0035
				St Dev	0.0002	0.0002
Date	Time	Sid1	Sid2	Type	NiO	CuO
07-août-05	16:32:22	STD	05	0	0.0124	0.0031
07-août-05	16:57:40	STD	05	0	0.0120	0.0031
07-août-05	17:22:56	STD	05	0	0.0119	0.0032
07-août-05	17:48:10	STD	05	0	0.0124	0.0031
07-août-05	18:13:26	STD	05	0	0.0126	0.0031
07-août-05	18:38:38	STD	05	0	0.0122	0.0033
07-août-05	19:03:52	STD	05	0	0.0121	0.0033
07-août-05	19:29:08	STD	05	0	0.0122	0.0031
07-août-05	19:54:22	STD	05	0	0.0122	0.0032
07-août-05	20:19:38	STD	05	0	0.0124	0.0032
				Average	0.0122	0.0032
				St Dev	0.0002	0.0001

Accuracy Measurements

Date	Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
06-août-05	16:12:10	CPU	600	0	0.0003	0.0017	0.0086	0.0011	0.1350	0.0055	-0.0005	0.2391
06-août-05	16:37:26	CPU	600	0	-0.0014	0.0017	0.0094	0.0010	0.1374	0.0053	-0.0004	0.2399
06-août-05	17:02:40	CPU	600	0	-0.0005	0.0017	0.0089	0.0010	0.1375	0.0057	-0.0004	0.2390
06-août-05	17:27:56	CPU	600	0	0.0016	0.0016	0.0089	0.0011	0.1392	0.0055	-0.0005	0.2392
06-août-05	17:53:10	CPU	600	0	0.0031	0.0016	0.0099	0.0010	0.1394	0.0056	-0.0004	0.2389
06-août-05	18:18:24	CPU	600	0	0.0045	0.0020	0.0093	0.0012	0.1385	0.0057	-0.0005	0.2388
06-août-05	18:43:38	CPU	600	0	0.0056	0.0013	0.0094	0.0011	0.1399	0.0056	-0.0004	0.2397
06-août-05	19:08:52	CPU	600	0	0.0049	0.0020	0.0096	0.0009	0.1404	0.0058	-0.0004	0.2391
06-août-05	19:34:06	CPU	600	0	0.0055	0.0017	0.0102	0.0012	0.1405	0.0056	-0.0004	0.2392
06-août-05	19:59:20	CPU	600	0	0.0044	0.0016	0.0090	0.0013	0.1408	0.0058	-0.0006	0.2393
				Average	0.0028	0.0017	0.0093	0.0011	0.1389	0.0056	-0.0004	0.2392
				St Dev	0.0026	0.0002	0.0005	0.0001	0.0018	0.0002	0.0001	0.0003
Date	Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
07-août-05	16:35:58	CPU	600	0	-0.0018	0.0016	0.0087	0.0014	0.1385	0.0055	-0.0005	0.2389
07-août-05	17:01:16	CPU	600	0	-0.0018	0.0011	0.0082	0.0010	0.1390	0.0052	-0.0004	0.2392
07-août-05	17:26:32	CPU	600	0	0.0005	0.0015	0.0088	0.0009	0.1399	0.0053	-0.0005	0.2399
07-août-05	17:51:46	CPU	600	0	0.0016	0.0014	0.0084	0.0013	0.1404	0.0054	-0.0004	0.2400
07-août-05	18:17:02	CPU	600	0	0.0034	0.0016	0.0091	0.0010	0.1403	0.0057	-0.0005	0.2392
07-août-05	18:42:14	CPU	600	0	0.0030	0.0020	0.0096	0.0012	0.1408	0.0057	-0.0005	0.2400
07-août-05	19:07:28	CPU	600	0	0.0004	0.0018	0.0096	0.0011	0.1409	0.0057	-0.0005	0.2392
07-août-05	19:32:44	CPU	600	0	0.0041	0.0018	0.0086	0.0010	0.1406	0.0056	-0.0005	0.2396
07-août-05	19:57:58	CPU	600	0	0.0041	0.0017	0.0095	0.0011	0.1413	0.0057	-0.0005	0.2403
07-août-05	20:23:14	CPU	600	0	0.0034	0.0019	0.0091	0.0011	0.1421	0.0058	-0.0006	0.2396
				Average	0.0017	0.0016	0.0089	0.0011	0.1404	0.0056	-0.0005	0.2396
				St Dev	0.0023	0.0003	0.0005	0.0002	0.0011	0.0002	0.0001	0.0005

Accuracy Measurements

Date	Time	Sid1	Sid2	Type	NiO	CuO
06-août-05	16:12:10	CPU	600	0	0.0088	0.0007
06-août-05	16:37:26	CPU	600	0	0.0087	0.0005
06-août-05	17:02:40	CPU	600	0	0.0089	0.0007
06-août-05	17:27:56	CPU	600	0	0.0088	0.0007
06-août-05	17:53:10	CPU	600	0	0.0091	0.0006
06-août-05	18:18:24	CPU	600	0	0.0087	0.0006
06-août-05	18:43:38	CPU	600	0	0.0089	0.0007
06-août-05	19:08:52	CPU	600	0	0.0087	0.0009
06-août-05	19:34:06	CPU	600	0	0.0088	0.0009
06-août-05	19:59:20	CPU	600	0	0.0089	0.0008
				Average	0.0088	0.0007
				St Dev	0.0001	0.0001
Date	Time	Sid1	Sid2	Type	NiO	CuO
07-août-05	16:35:58	CPU	600	0	0.0090	0.0007
07-août-05	17:01:16	CPU	600	0	0.0086	0.0007
07-août-05	17:26:32	CPU	600	0	0.0088	0.0009
07-août-05	17:51:46	CPU	600	0	0.0086	0.0008
07-août-05	18:17:02	CPU	600	0	0.0088	0.0009
07-août-05	18:42:14	CPU	600	0	0.0088	0.0006
07-août-05	19:07:28	CPU	600	0	0.0086	0.0004
07-août-05	19:32:44	CPU	600	0	0.0090	0.0007
07-août-05	19:57:58	CPU	600	0	0.0088	0.0007
07-août-05	20:23:14	CPU	600	0	0.0090	0.0007
				Average	0.0088	0.0007
				St Dev	0.0002	0.0001

Accuracy Measurements

Date	Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
06-août-05	16:15:46	CK	100	0	0.0011	0.0022	0.0105	0.0181	0.1518	0.0056	0.0012	0.2107
06-août-05	16:41:02	CK	100	0	0.0013	0.0022	0.0117	0.0180	0.1544	0.0057	0.0011	0.2103
06-août-05	17:06:16	CK	100	0	0.0026	0.0021	0.0113	0.0181	0.1530	0.0057	0.0012	0.2103
06-août-05	17:31:32	CK	100	0	0.0022	0.0021	0.0108	0.0179	0.1542	0.0058	0.0012	0.2106
06-août-05	17:56:46	CK	100	0	0.0053	0.0022	0.0118	0.0179	0.1551	0.0061	0.0010	0.2110
06-août-05	18:22:00	CK	100	0	0.0035	0.0021	0.0118	0.0176	0.1550	0.0062	0.0012	0.2104
06-août-05	18:47:14	CK	100	0	0.0066	0.0019	0.0122	0.0179	0.1564	0.0058	0.0013	0.2107
06-août-05	19:12:28	CK	100	0	0.0077	0.0027	0.0123	0.0179	0.1563	0.0062	0.0012	0.2106
06-août-05	19:37:42	CK	100	0	0.0047	0.0025	0.0124	0.0176	0.1568	0.0059	0.0012	0.2108
06-août-05	20:02:54	CK	100	0	0.0071	0.0026	0.0127	0.0178	0.1570	0.0061	0.0013	0.2102
				Average	0.0042	0.0022	0.0117	0.0179	0.1550	0.0059	0.0012	0.2106
				St Dev	0.0024	0.0003	0.0007	0.0002	0.0017	0.0002	0.0001	0.0002
Date	Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
07-août-05	16:39:34	CK	100	0	-0.0007	0.0018	0.0111	0.0177	0.1536	0.0056	0.0014	0.2100
07-août-05	17:04:52	CK	100	0	-0.0009	0.0021	0.0120	0.0181	0.1538	0.0056	0.0013	0.2104
07-août-05	17:30:08	CK	100	0	0.0019	0.0018	0.0116	0.0179	0.1539	0.0057	0.0012	0.2109
07-août-05	17:55:22	CK	100	0	0.0030	0.0018	0.0118	0.0181	0.1539	0.0058	0.0012	0.2106
07-août-05	18:20:38	CK	100	0	0.0038	0.0022	0.0118	0.0179	0.1563	0.0059	0.0013	0.2102
07-août-05	18:45:48	CK	100	0	0.0049	0.0024	0.0120	0.0179	0.1552	0.0058	0.0012	0.2105
07-août-05	19:11:04	CK	100	0	0.0064	0.0023	0.0125	0.0182	0.1564	0.0059	0.0012	0.2102
07-août-05	19:36:20	CK	100	0	0.0060	0.0026	0.0114	0.0179	0.1566	0.0060	0.0011	0.2107
07-août-05	20:01:34	CK	100	0	0.0058	0.0026	0.0128	0.0180	0.1571	0.0057	0.0012	0.2108
07-août-05	20:26:50	CK	100	0	0.0037	0.0025	0.0122	0.0179	0.1581	0.0060	0.0014	0.2098
				Average	0.0034	0.0022	0.0119	0.0180	0.1555	0.0058	0.0013	0.2104
				St Dev	0.0026	0.0003	0.0005	0.0001	0.0016	0.0001	0.0001	0.0004

Accuracy Measurements

Date	Time	Sid1	Sid2	Type	NiO	CuO
06-août-05	16:15:46	CK	100	0	0.0137	0.0016
06-août-05	16:41:02	CK	100	0	0.0137	0.0017
06-août-05	17:06:16	CK	100	0	0.0140	0.0014
06-août-05	17:31:32	CK	100	0	0.0139	0.0016
06-août-05	17:56:46	CK	100	0	0.0139	0.0015
06-août-05	18:22:00	CK	100	0	0.0140	0.0017
06-août-05	18:47:14	CK	100	0	0.0138	0.0016
06-août-05	19:12:28	CK	100	0	0.0138	0.0016
06-août-05	19:37:42	CK	100	0	0.0137	0.0014
06-août-05	20:02:54	CK	100	0	0.0137	0.0015
				Average	0.0138	0.0015
				St Dev	0.0001	0.0001
Date	Time	Sid1	Sid2	Type	NiO	CuO
07-août-05	16:39:34	CK	100	0	0.0137	0.0014
07-août-05	17:04:52	CK	100	0	0.0139	0.0015
07-août-05	17:30:08	CK	100	0	0.0141	0.0017
07-août-05	17:55:22	CK	100	0	0.0137	0.0014
07-août-05	18:20:38	CK	100	0	0.0140	0.0014
07-août-05	18:45:48	CK	100	0	0.0138	0.0014
07-août-05	19:11:04	CK	100	0	0.0138	0.0012
07-août-05	19:36:20	CK	100	0	0.0139	0.0014
07-août-05	20:01:34	CK	100	0	0.0137	0.0018
07-août-05	20:26:50	CK	100	0	0.0140	0.0014
				Average	0.0139	0.0015
				St Dev	0.0002	0.0002

Accuracy Measurements

Date	Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
06-août-05	16:19:24	CSR	900	0	-0.0016	0.0012	0.0058	0.0007	0.1249	0.0047	0.0006	0.2185
06-août-05	16:44:38	CSR	900	0	-0.0007	0.0014	0.0059	0.0007	0.1265	0.0052	0.0006	0.2186
06-août-05	17:09:52	CSR	900	0	0.0007	0.0011	0.0061	0.0006	0.1273	0.0053	0.0007	0.2188
06-août-05	17:35:08	CSR	900	0	0.0016	0.0014	0.0071	0.0007	0.1276	0.0053	0.0007	0.2184
06-août-05	18:00:22	CSR	900	0	0.0009	0.0018	0.0064	0.0008	0.1283	0.0051	0.0006	0.2189
06-août-05	18:25:36	CSR	900	0	0.0022	0.0016	0.0067	0.0007	0.1283	0.0054	0.0006	0.2187
06-août-05	18:50:50	CSR	900	0	0.0036	0.0018	0.0060	0.0008	0.1280	0.0055	0.0007	0.2179
06-août-05	19:16:04	CSR	900	0	0.0053	0.0018	0.0072	0.0007	0.1296	0.0053	0.0007	0.2178
06-août-05	19:41:18	CSR	900	0	0.0048	0.0016	0.0075	0.0009	0.1286	0.0053	0.0007	0.2183
06-août-05	20:06:30	CSR	900	0	0.0059	0.0013	0.0074	0.0006	0.1291	0.0054	0.0007	0.2186
				Average	0.0023	0.0015	0.0066	0.0007	0.1278	0.0052	0.0006	0.2184
				St Dev	0.0026	0.0003	0.0007	0.0001	0.0014	0.0002	0.0001	0.0004
Date	Time	Sid1	Sid2	Type	Na2O	Al2O3	SiO2	P2O5	Cl	CaO	Cr2O3	MnO
07-août-05	16:43:12	CSR	900	0	-0.0032	0.0011	0.0061	0.0007	0.1263	0.0050	0.0005	0.2182
07-août-05	17:08:28	CSR	900	0	-0.0027	0.0010	0.0067	0.0007	0.1263	0.0051	0.0007	0.2188
07-août-05	17:33:44	CSR	900	0	-0.0017	0.0015	0.0068	0.0008	0.1279	0.0052	0.0005	0.2185
07-août-05	17:59:00	CSR	900	0	-0.0001	0.0012	0.0075	0.0009	0.1282	0.0052	0.0005	0.2184
07-août-05	18:24:14	CSR	900	0	0.0010	0.0011	0.0071	0.0007	0.1284	0.0052	0.0006	0.2188
07-août-05	18:49:26	CSR	900	0	0.0029	0.0015	0.0062	0.0009	0.1278	0.0053	0.0007	0.2184
07-août-05	19:14:40	CSR	900	0	0.0021	0.0016	0.0065	0.0007	0.1292	0.0052	0.0005	0.2184
07-août-05	19:39:56	CSR	900	0	0.0016	0.0014	0.0071	0.0007	0.1298	0.0054	0.0006	0.2185
07-août-05	20:05:10	CSR	900	0	0.0025	0.0015	0.0072	0.0006	0.1287	0.0055	0.0007	0.2184
07-août-05	20:30:26	CSR	900	0	0.0044	0.0018	0.0075	0.0006	0.1294	0.0055	0.0006	0.2184
				Average	0.0007	0.0014	0.0069	0.0007	0.1282	0.0053	0.0006	0.2185
				St Dev	0.0025	0.0003	0.0005	0.0001	0.0012	0.0001	0.0001	0.0002

Accuracy Measurements

Date	Time	Sid1	Sid2	Type	NiO	CuO
06-août-05	16:19:24	CSR	900	0	0.0098	0.0008
06-août-05	16:44:38	CSR	900	0	0.0097	0.0006
06-août-05	17:09:52	CSR	900	0	0.0096	0.0006
06-août-05	17:35:08	CSR	900	0	0.0100	0.0005
06-août-05	18:00:22	CSR	900	0	0.0098	0.0008
06-août-05	18:25:36	CSR	900	0	0.0098	0.0006
06-août-05	18:50:50	CSR	900	0	0.0101	0.0006
06-août-05	19:16:04	CSR	900	0	0.0097	0.0005
06-août-05	19:41:18	CSR	900	0	0.0099	0.0007
06-août-05	20:06:30	CSR	900	0	0.0095	0.0006
				Average	0.0098	0.0006
				St Dev	0.0002	0.0001
Date	Time	Sid1	Sid2	Type	NiO	CuO
07-août-05	16:43:12	CSR	900	0	0.0097	0.0007
07-août-05	17:08:28	CSR	900	0	0.0095	0.0007
07-août-05	17:33:44	CSR	900	0	0.0101	0.0004
07-août-05	17:59:00	CSR	900	0	0.0102	0.0003
07-août-05	18:24:14	CSR	900	0	0.0097	0.0006
07-août-05	18:49:26	CSR	900	0	0.0101	0.0005
07-août-05	19:14:40	CSR	900	0	0.0098	0.0006
07-août-05	19:39:56	CSR	900	0	0.0097	0.0005
07-août-05	20:05:10	CSR	900	0	0.0099	0.0006
07-août-05	20:30:26	CSR	900	0	0.0097	0.0004
				Average	0.0098	0.0005
				St Dev	0.0002	0.0001