Getting Data

You can easily obtain spectra from your Tracer using the S1PXRF software. This enables you to see your spectrum as it is gathered, and do both qualitative and quantitative analysis.

This guide will take you step by step, button click by button click, through using S1PXRF and your Tracer

Getting Data

Step 1

Setting up for Analysis

S1PXRF - 14-Jul-2013 09:16:39

File Setup ID DownLoad Timed Tube Help

Clear | OB40Archibarca35 | INST FILE # | KTI (.PDZ 40.00kV, 12.50µA)

This is the home screen after launching S1PXRF. At this point, you are not connected to the instrument

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

Cnt:0 | LSec:0 | Chan:3.825 | Kev:0.0766 | Det:-15.0C | Amb:101.4F | Raw:2,224.68 | Valid:2,147.68

evch:20.0236 | Vac:559 | Shift:0.00000 | TRACERTurbo

9:16 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:17:01

File Setup ID DownLoad Timed Tube Help

Open...
Save As...
PDZ Preview...
Print ...
Printer Setup ...
Copy To Clipboard
Exit

OB40Archibarca35 INST FILE # KTI (.PDZ 40.00kV, 12.50µA)

The first step - and this is particularly important when opening the program for the first time, is to load a preexisting file. This way, you add in settings specific to your instrument.

To do this, click ‘File’ and then ‘PDZ Preview...’

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

Cnt:0 LSec:0 Chan:3.825 Kev:0.0766 Det:-15.0C Amb:101.4F Raw:2,224.68 Valid:2,147.68

evch:20.0236 Vac:559 Shift:0.00000 TRACERTurbo

9:17 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:17:25

File Setup ID DownLoad Timed Tube Help

Clear A OB40Archibarca35 INST FILE # KTI (.PDZ 40.00kV, 12.50µA)

Read File

Obsidian T3... ▸ Obsidian Cal Data

Search Obsidian Cal Data

Organize New folder

Favorites
Desktop
Downloads
Photo Stream
Recent places

Libraries
Documents
Music
Pictures
Videos

Computer
BOOTCAMP (C:)
Lincoln (D:)

Network

Name	Date modified	Type
OB40Archibarca35.pdz	12/6/2011 7:07 PM	PDZ File
OB40Basaltic_Plateau20.pdz	12/6/2011 12:44 PM	PDZ File
OB40Big_Southern_Butte06.pdz	12/6/2011 11:15 AM	PDZ File
OB40Blue_Mountain04.pdz	12/6/2011 11:03 AM	PDZ File
OB40Burns_Green15.pdz	12/6/2011 12:05 PM	PDZ File
OB40Cannonball1_22.pdz	12/6/2011 1:01 PM	PDZ File
OB40Casa_Diablo10.pdz	12/6/2011 11:37 AM	PDZ File
OB40Cerro_del_Medio28.pdz	12/6/2011 1:32 PM	PDZ File
OB40Chickahominy26.pdz	12/6/2011 1:22 PM	PDZ File
OB40Cougar_Mountain29.pdz	12/6/2011 1:37 PM	PDZ File
OB40Davis_Creek27.pdz	12/6/2011 1:27 PM	PDZ File
OB40East_Medicine_lake12.pdz	12/6/2011 11:49 AM	PDZ File
OB40El_Paraiso24.pdz	12/6/2011 1:12 PM	PDZ File
OB40El_Peceno40.pdz	12/6/2011 7:52 PM	PDZ File
OB40Glass_Buttes03.pdz	12/6/2011 10:56 AM	PDZ File
OB40Grasshopper_Flat13.pdz	12/6/2011 11:54 AM	PDZ File

File name: OB40Archibarca35.pdz

PDZ data (*.pdz)

Open Cancel

PDZ Preview

Path OK

Name	Date
OB40KES_276_18	12/06/2011 13:34:14
OB40Inman_Creek14	12/06/2011 12:59:26
OB40Big_Southern_Butte06	12/06/2011 12:15:04
OB40Basaltic_Plateau20	12/06/2011 13:44:18

Select a file run with your model of instrument, which is generally a Tracer III V+ or Tracer III SD. To see which instrument you have, look at your serial number.

25.76 29.43 33.11 36.79

Amb:101.4F Raw:2,224.68 Valid:2,147.68

evch:20.0236 Vac:559 Shift:0.00000 TRACERTurbo

9:17 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:17:46

File Setup ID DownLoad Timed Tube Help

Clear A OB40Archibarca35 INST FILE # KTI (.PDZ 40.00kV, 12.50µA)

The name of the file you have selected will appear in the window above

A spectrum will appear in red

You can select other files in the 'PDZ Preview' menu

PDZ Preview

Path OK

Name	Date
OB40Guadalupe_Victoria02	12/06/2011 11:48:56
OB40Gregory_Creek38	12/06/2011 20:28:40
OB40Grasshopper_Flat13	12/06/2011 12:54:26
OB40Glass_Buttes03	12/06/2011 11:56:22
OB40El_Peceno40	12/06/2011 20:52:28
OB40El_Paraiso24	12/06/2011 14:12:34
OB40East_Medicine_lake12	12/06/2011 12:49:36
OB40Davis_Creek27	12/06/2011 14:27:06
OB40Cougar_Mountain29	12/06/2011 14:37:20
OB40Chickahominy26	12/06/2011 14:22:32
OB40Cerro_del_Medio28	12/06/2011 14:32:26
OB40Casa_Diablo10	12/06/2011 12:37:14
OB40Cannonball1_22	12/06/2011 14:01:38
OB40Burns_Green15	12/06/2011 13:05:28
OB40Blue_Mountain04	12/06/2011 12:03:58
OB40Big_Southern_Butte06	12/06/2011 12:15:04
OB40Basaltic_Plateau20	12/06/2011 13:44:18
OB40Archibarca35	12/06/2011 20:07:42

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

Cnt:1821 LSec:240.79 Chan:3.825 Kev:0.0766 Det:-15.0C Amb:101.4F Raw:2,224.68 Valid:2,147.68

evch:20.0236 Vac:559 Shift:0.00000 TRACERTurbo

9:17 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:17:58

File Setup ID DownLoad Timed Tube Help

Clear

Port

Baud Rate

hibarca35

INST FILE #

KTI (.PDZ 40.00kV, 12.50µA)

You are not yet connected to your instrument, to do that you will need to tell the software where to find it

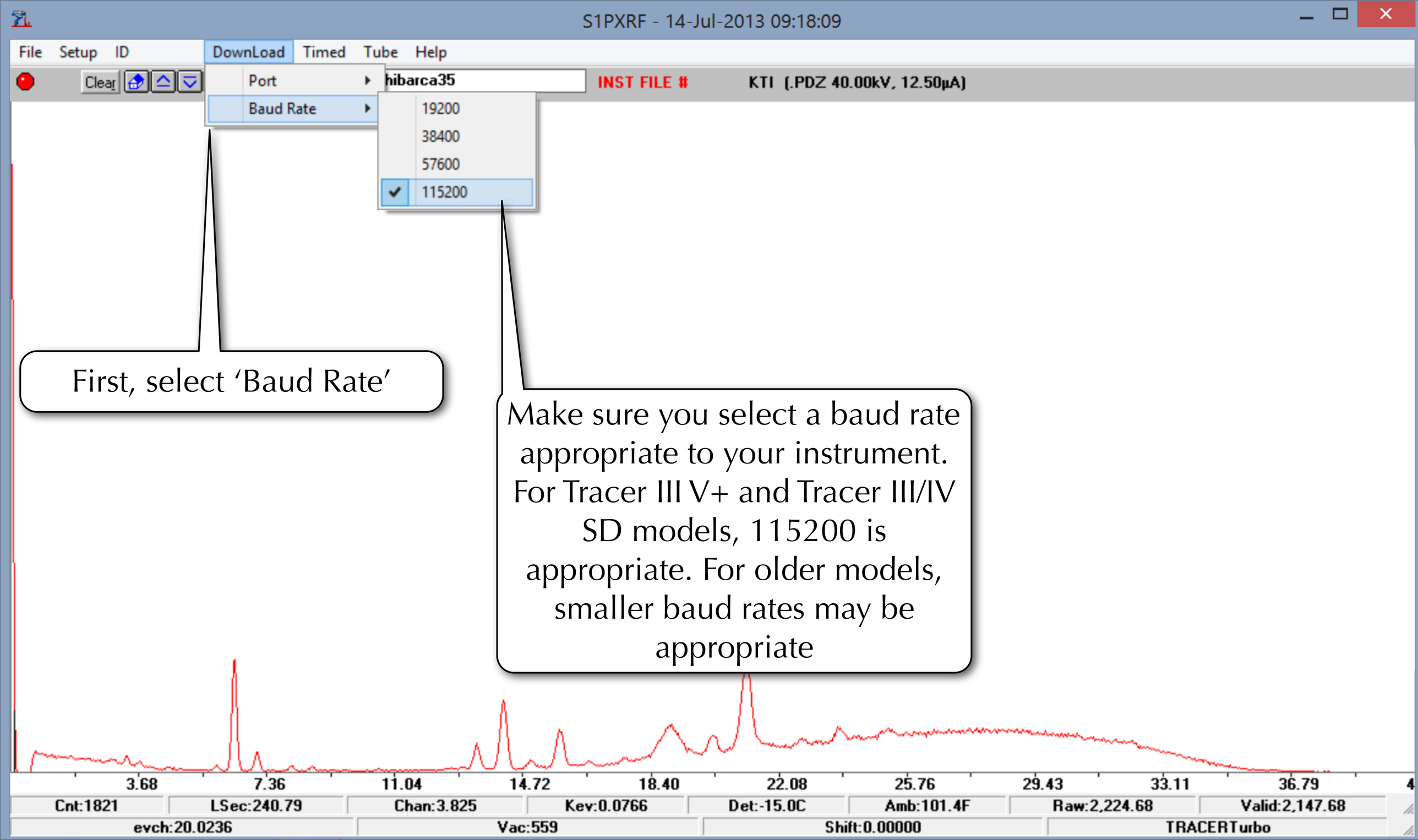
The options for this menu can be found under the 'DownLoad' menu

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

Cnt:1821 LSec:240.79 Chan:3.825 Kev:0.0766 Det:-15.0C Amb:101.4F Raw:2,224.68 Valid:2,147.68

evch:20.0236 Vac:559 Shift:0.00000 TRACERTurbo

9:17 AM
7/14/2013


S1PXRF - 14-Jul-2013 09:18:09
File
Setup
ID
DownLoad
Timed
Tube
Help
Clear
Port
Baud Rate
hibarca35
INST FILE #
KTI (.PDZ 40.00kV, 12.50µA)
19200
38400
57600
115200
First, select 'Baud Rate'
Make sure you select a baud rate appropriate to your instrument. For Tracer III V+ and Tracer III/IV SD models, 115200 is appropriate. For older models, smaller baud rates may be appropriate
3.68
7.36
11.04
14.72
18.40
22.08
25.76
29.43
33.11
36.79
Cnt:1821
LSec:240.79
Chan:3.825
Kev:0.0766
Det:-15.0C
Amb:101.4F
Raw:2,224.68
Valid:2,147.68
evch:20.0236
Vac:559
Shift:0.00000
TRACERTurbo
9:18 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:18:21

File Setup ID DownLoad Timed Tube Help

Clear

Port

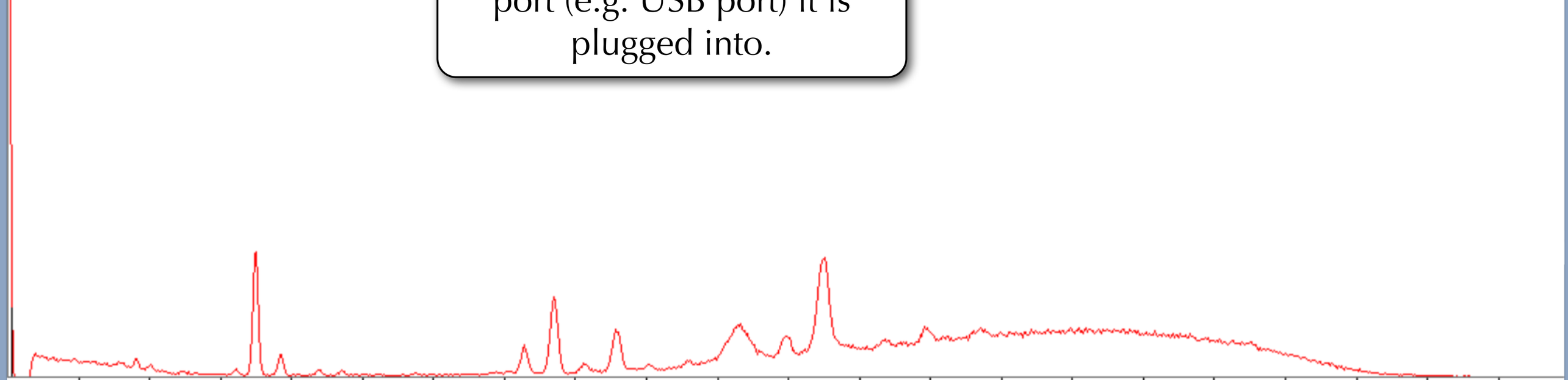
Baud Rate

COMM 4

INST FILE #

KTI (.PDZ 40.00kV, 12.50µA)

To connect to your instrument, you will need to select the communications port (e.g. USB port) it is plugged into.



9:18 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:18:36

File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI (.PDZ 40.00kV, 12.50µA)

If you are not connected to the right port, then you will receive a message like this

The instrument could not be found

No valid response was received from the instrument.

Abort Retry Ignore

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

Cnt:1821 LSec:240.79 Chan:3.825 Kev:0.0766 Det:-15.0C Amb:101.4F Raw:2,224.68 Valid:2,147.68

evch:20.0236 Vac:559 Shift:0.00000 TRACERTurbo

9:18 AM
7/14/2013

Devices and Printers

Control Panel ▸ All Control Panel Items ▸ Devices and Printers

Search Devices an...

Add a device Add a printer Remove device

VITO-TOSHIBA2

Printers (4)

DUCK

Fax

Microsoft XPS Document Writer

Send To OneNote 2010

Unspecified (2)

Prolific USB-to-Serial Comm Port (COM3)

Serial Adaptor

Prolific USB-to-Serial Comm Port (COM3) Model: USB-Serial Controller
Category: Unknown

You will need to open up 'Devices and Printers' which can be found either in the Start menu or in Control Panel

The Tracer will be under the 'Unspecified' category, and will be listed as 'Prolific USB-to-Serial Com Port'. The number underneath, in this case 'Com3', is the port your Tracer is located. Remember this number

Click to add notes

Slide 9 of 49 "Office Theme" 63%

9:19 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:19:33

File Setup ID DownLoad Timed Tube Help

Port ▸ ✔ COMM 4

Baud Rate ▸

Clear

INST FILE #

KTI (.PDZ 40.00kV, 12.50µA)

To change the Com Port number, click on the current setting

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

Cnt:1821 | LSec:240.79 | Chan:3.825 | Kev:0.0766 | Det:-15.0C | Amb:101.4F | Raw:2,224.68 | Valid:2,147.68

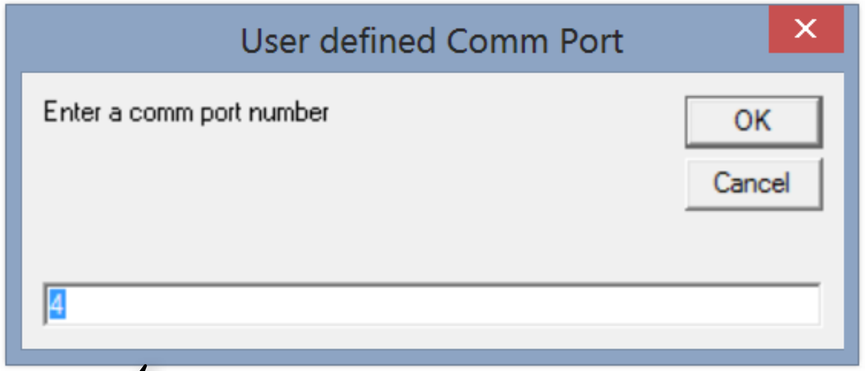
evch:20.0236 | Vac:559 | Shift:0.00000 | TRACERTurbo

9:19 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:19:46

File Setup ID DownLoad Timed Tube Help

Clear A OB40Archibarca35 INST FILE # KTI (.PDZ 40.00kV, 12.50µA)



This will open up a small window where you can enter in a new com port number

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

Cnt:1821 LSec:240.79 Chan:3.825 Kev:0.0766 Det:-15.0C Amb:101.4F Raw:2,224.68 Valid:2,147.68

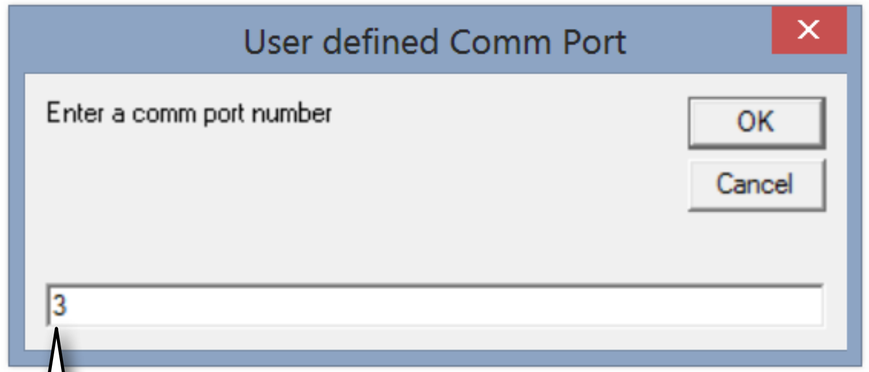
evch:20.0236 Vac:559 Shift:0.00000 TRACERTurbo

9:19 AM
7/14/2013

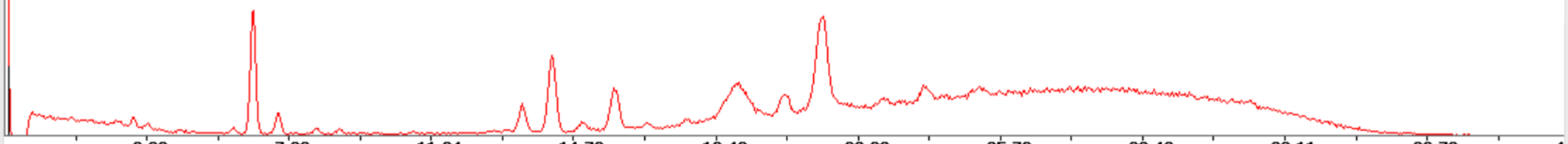
S1PXRF - 14-Jul-2013 09:19:57

File Setup ID DownLoad Timed Tube Help

Clear A OB40Archibarca35 INST FILE # KTI (.PDZ 40.00kV, 12.50µA)



Enter the correct number as identified in the ‘Devices and Printer’ menu. In this example, that number was 3



Cnt:1821 LSec:240.79 Chan:3.825 Kev:0.0766 Det:-15.0C Amb:101.4F Raw:2,224.68 Valid:2,147.68

evch:20.0236 Vac:559 Shift:0.00000 TRACERTurbo

9:19 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:20:09

File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

A 'Start' button will appear as well

Once you are connected, the red dot will turn green

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

Cnt:1821 LSec:240.79 Chan:3.825 Kev:0.0766 Det:-15.0C Amb:101.4F Raw:2,224.68 Valid:2,147.68

evch:20.0236 Vac:559 Shift:0.00000 TRACERTurbo

9:20 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:20:37

File Setup ID DownLoad Timed Tube Help

Instrument Setup...
Calibration...
Display & Color...
Spectrum Overlay...
Other Options...
Group Conversion...
Select Coef (SRZ, CFZ or PMZ file)
Get ROI Data...

ibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

Once connected, navigate to ‘Setup’ and then ‘Instrument Setup’

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

Cnt:1821 LSec:240.79 Chan:3.825 Kev:0.0766 Det:-15.0C Amb:101.4F Raw:2,224.68 Valid:2,147.68

evch:20.0236 Vac:559 Shift:0.00000 TRACERTurbo

9:20 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:20:52

File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35

A window will open up next

Back Scatter, when selected, provides a safety feature - your instrument will shut off automatically if X-rays are not all accounted for. However, this can also prevent measurements for small objects. You can temporarily turn it off for some measurements

DPP setup information

Number of Channels:

256
512
1024
2048
4096

2 Bytes per Channel

Back Scatter

Motorola format

Even Parity

Accumulation Mode

Advance Header

S1 Mode

Done

PC Trigger

Settings on the left are set when you open an existing PDZ file

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

Cnt:1821 LSec:240.79 Chan:3.825 Kev:0.0766 Det:-15.0C Amb:101.4F Raw:2,224.68 Valid:2,147.68

evch:20.0236 Vac:559 Shift:0.00000 TRACERTurbo

9:20 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:21:03

File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

In this case, Back Scatter is turned off

DPP setup information

Number of Channels:

256
512
1024
2048
4096

2 Bytes per Channel

Motorola format

Even Parity

Accumulation Mode

Advance Header

S1 Mode

Back Scatter

Done

PC Trigger

After this, you can click 'Done'

Selecting PC Trigger will give your computer control over the instrument - this is the best setting for gathering data

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

Cnt:1821 LSec:240.79 Chan:3.825 Kev:0.0766 Det:-15.0C Amb:101.4F Raw:2,224.68 Valid:2,147.68

evch:20.0236 Vac:559 Shift:0.00000 TRACERTurbo

9:21 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:21:27

File Setup ID DownLoad Timed Tube Help

Start Clear A OB4

Live Settings
PDZ Settings
KTI Tube ▸ Read

INST FILE #

KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

The next step for setting up your Tracer is navigating to ‘Tube’, ‘KTI Tube’, and ‘Read’. This will open up a menu that allows you to change energy, current, and filter parameters on your Tracer

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

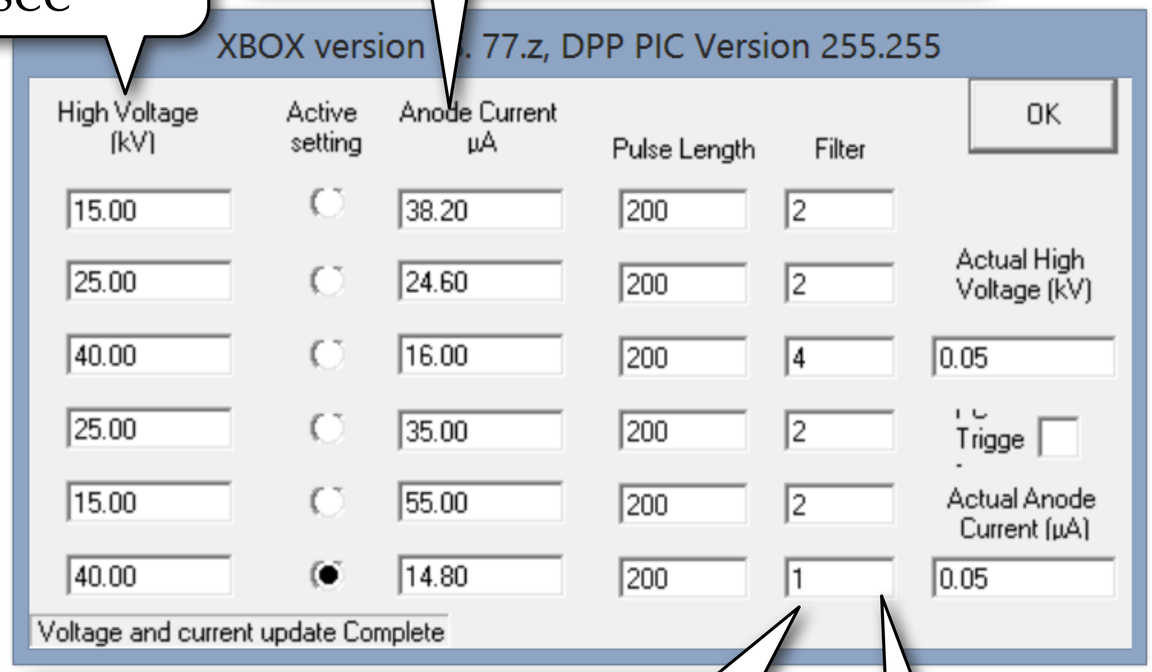
Cnt:1821 LSec:240.79 Chan:3.825 Kev:0.0766 Det:-15.0C Amb:101.4F Raw:2,224.68 Valid:2,147.68

evch:20.0236 Vac:559 Shift:0.00000 TRACERTurbo

9:21 AM
7/14/2013

Here, you have a range of energies in keV. These determine what elements you are able to see

The Anode Current determines how many photos you send into your sample



The Filter (for Tracer IV systems) determines what filter is being used in your measurement

1 - Yellow Filter (1mil Al, 1 mil Ti)
2 - No Filter
3 - Red Filter (1 mil Al, 1 mil Ti, 1 mil Cu)
4 - Green Filter (1 mil Al, 1 mil TI, 6 mil Cu)
5 - Blue Filter (1 mil Ti)

S1PXRF - 14-Jul-2013 09:22:15

File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

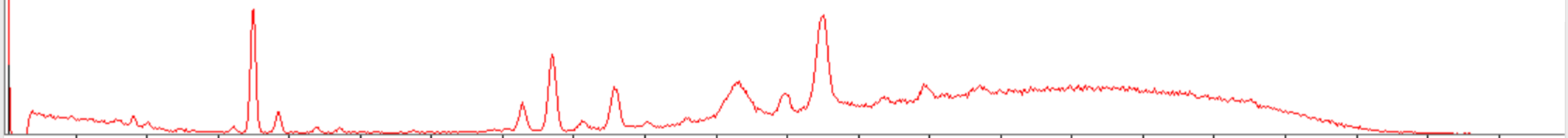
XBOX version 8. 77.z, DPP PIC Version 255.255

OK

High Voltage (kV)	Active setting	Anode Current µA	Pulse Length	Filter	
15.00		38.20	200	2	
25.00		24.60	200	2	Actual High Voltage (kV)
40.00		16.00	200	4	40.15
25.00		35.00	200	2	PC Trigge ✔
15.00		55.00	200	2	Actual Anode Current (µA)
40.00	●	14.80	200	1	14.85

Voltage and current update Complete

Select 'PC Trigger' to turn on the beam in your Tracer



Cnt:1821 | LSec:240.79 | Chan:3.825 | Kev:0.0766 | Det:-15.0C | Amb:101.4F | Raw:2,224.68 | Valid:2,147.68

evch:20.0236 | Vac:559 | Shift:0.00000 | TRACERTurbo

9:22 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:22:15

File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

XBOX version 8. 77.z, DPP PIC Version 255.255

OK

High Voltage (kV)	Active setting	Anode Current µA	Pulse Length	Filter	
15.00		38.20	200	2	
25.00		24.60	200	2	Actual High Voltage (kV)
40.00		16.00	200	4	40.15
25.00		35.00	200	2	Trigge ✔
15.00		55.00	200	2	Actual Anode Current (µA)
40.00		14.80	200	1	14.85

Voltage and current upda Complete

With 'PC Trigger' on, you can see the voltage (keV) and current (µA) update to confirm your settings

Here, we have 40 keV and 14.8 µA selected

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

Cnt:1821 LSec:240.79 Chan:3.825 Kev:0.0766 Det:-15.0C Amb:101.4F Raw:2,224.68 Valid:2,147.68

evch:20.0236 Vac:559 Shift:0.00000 TRACERTurbo

9:22 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:22:33

File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

XBOX version 8. 77.z, DPP PIC Version 255.255

High Voltage (kV)	Active setting	Anode Current µA	Pulse Length	Filter	
15.00	○	38.20	200	2	
25.00	○	24.60	200	2	Actual High Voltage (kV)
40.00	○	16.00	200	4	14.85
25.00	○	35.00	200	2	Trigge ☑
15.00	●	55.00	200	2	Actual Anode Current (µA)
40.00	○	14.80	200	1	55.70

OK

Voltage and current upda Complete

You can see your voltage and current change after making a new selection

Select a new setting by clicking one of the buttons

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

Cnt:1821 LSec:240.79 Chan:3.825 Kev:0.0766 Det:-15.0C Amb:101.4F Raw:2,224.68 Valid:2,147.68

evch:20.0236 Vac:559 Shift:0.00000 TRACERTurbo

9:22 AM
7/14/2013

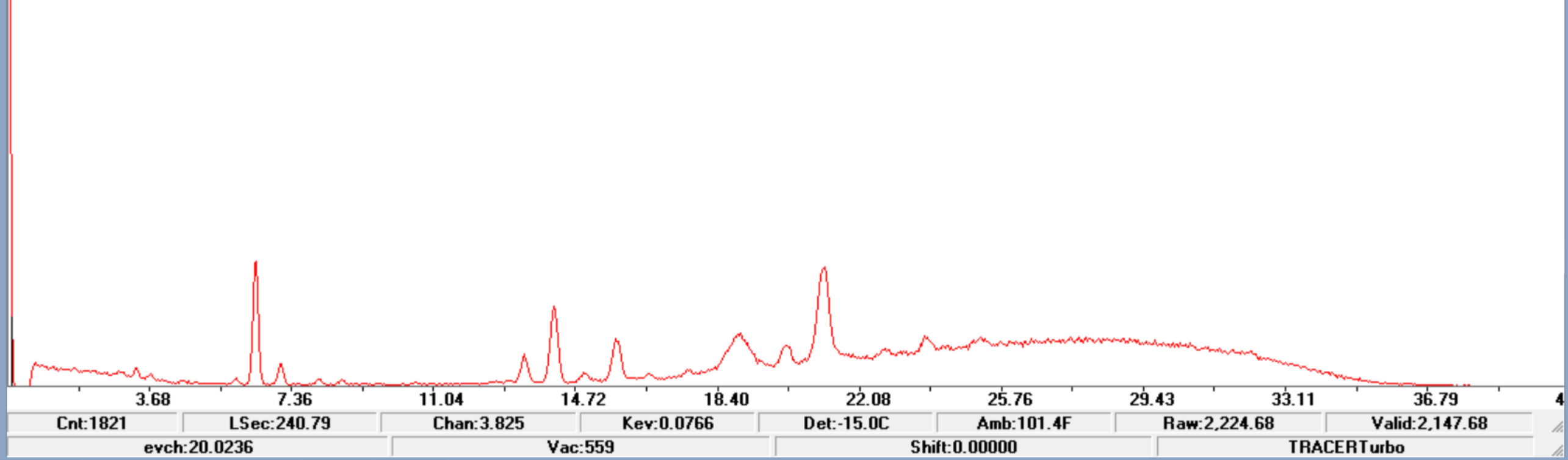
S1PXRF - 14-Jul-2013 09:23:01

File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

Your chosen settings should be visible here

Now, you are ready to begin taking measurements



Cnt:1821 | LSec:240.79 | Chan:3.825 | Kev:0.0766 | Det:-15.0C | Amb:101.4F | Raw:2,224.68 | Valid:2,147.68

evch:20.0236 | Vac:559 | Shift:0.00000 | TRACERTurbo

9:23 AM
7/14/2013

Getting Data

Step 2

Collecting Data

S1PXRF - 14-Jul-2013 09:23:53

File Setup ID DownLoad Timed Tube Help

Stop Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

Place an object on the nose of the Tracer and click ‘Start’ to begin a measurement. The ‘Start’ button will instantly turn to a ‘Stop’ button

A spectra will appear a fraction of a second later (you will see a red light come on your Tracer first).

3.68 7.36 11.04 14.72 18.40 22.08 25.76 29.43 33.11 36.79

Cnt:9 LSec:0.94 Chan:3.825 Kev:0.0766 Det:-15.5C Amb:95.1F Raw:11,019.11 Valid:10,644.37

evch:20.0236 Vac:715 Shift:0.00000 TRACERTurbo

9:23 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:24:19

File Setup ID DownLoad Timed Tube Help

Stop Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

You can click 'Stop' to end a measurement at any time

As the Tracer measures, you can see a red counter in the bottom left of the screen increase - this is how may seconds you have been measuring

As you measure, the spectra will become more and more smooth as error is averaged out

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.91 4

Cnt:120 LSec:12.22 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:96.5F Raw:13,252.13 Valid:12,745.74

evch:20.0897 Vac:714 Shift:0.00000 TRACERTurbo

9:24 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:28:34

File Setup ID DownLoad Timed Tube Help

Start Clear OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

After clicking ‘Stop’, the ‘Start’ button will return

After stopping your measurement, you the counter will turn black and keep the total amount of time you were measuring visible

Here, more time results in a cleaner measurement

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.92

Cnt:356 LSec:40.42 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:100.8F Raw:13,067.02 Valid:12,601.06

evch:20.0899 Vac:715 Shift:0.00000 TRACERTurbo

9:28 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:28:34

File Setup ID DownLoad Timed Tube Help

Start Clear OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

Keep an eye on your count rates. Too many, and your Tracer will not analyze the data correctly. For Tracer II/IV S systems, make sure the count rate is below 100,000. For Tracer II/IV V+ systems, make sure it is below 10,000.

In this case, we have a Tracer IV SD, so we are fine with a count rate of around 13,000.

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.92

Cnt:356 LSec:40.42 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:100.8F Raw:13,067.02 Valid:12,601.06

evch:20.0899 Vac:715 Shift:0.00000 TRACERTurbo

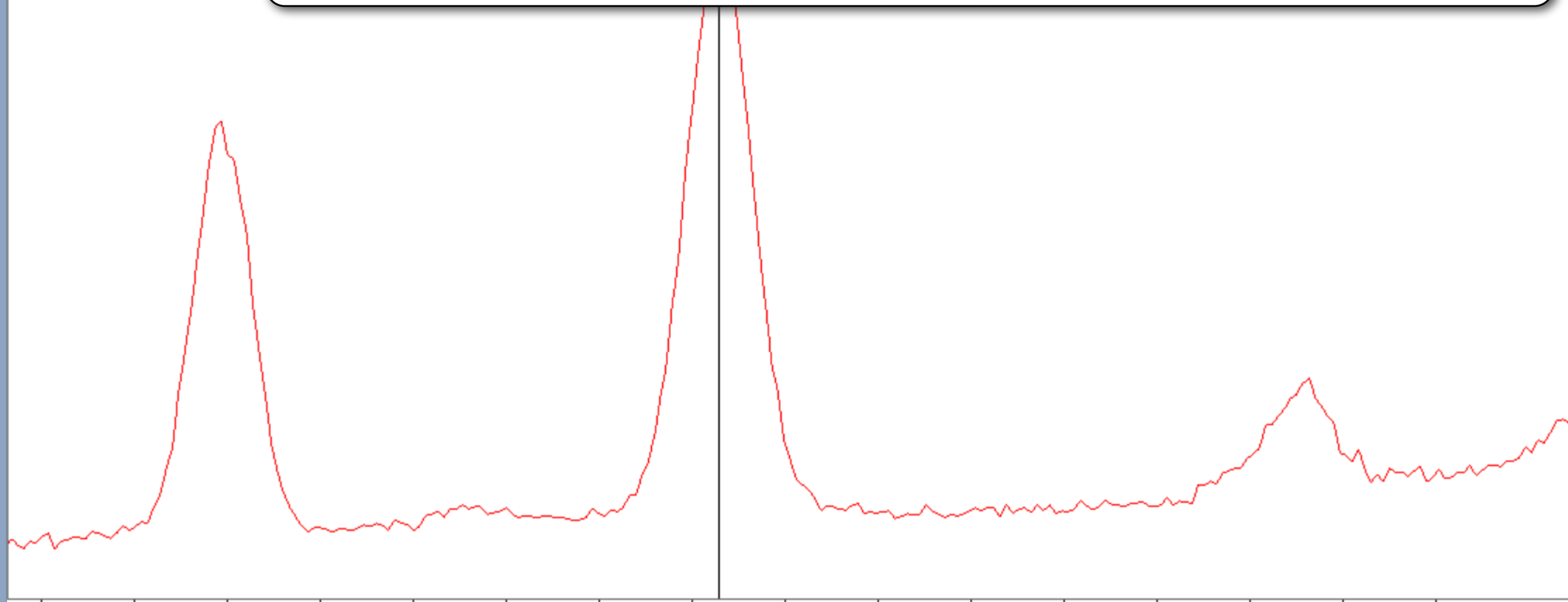
9:28 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:28:58

File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

Click the '<>' button to expand your window to focus on specific elements. You can also press the Up and Down buttons on your keyboard. You can also click (or on tablets touch) and spread your spectra as well



Cnt:3295 LSec:40.42 Chan:784.537 Kev:15.7613 Det:-15.0C Amb:100.8F Raw:13,067.02 Valid:12,601.06

evch:20.0899 Vac:715 Shift:0.00000 TRACERTurbo

9:28 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:29:09

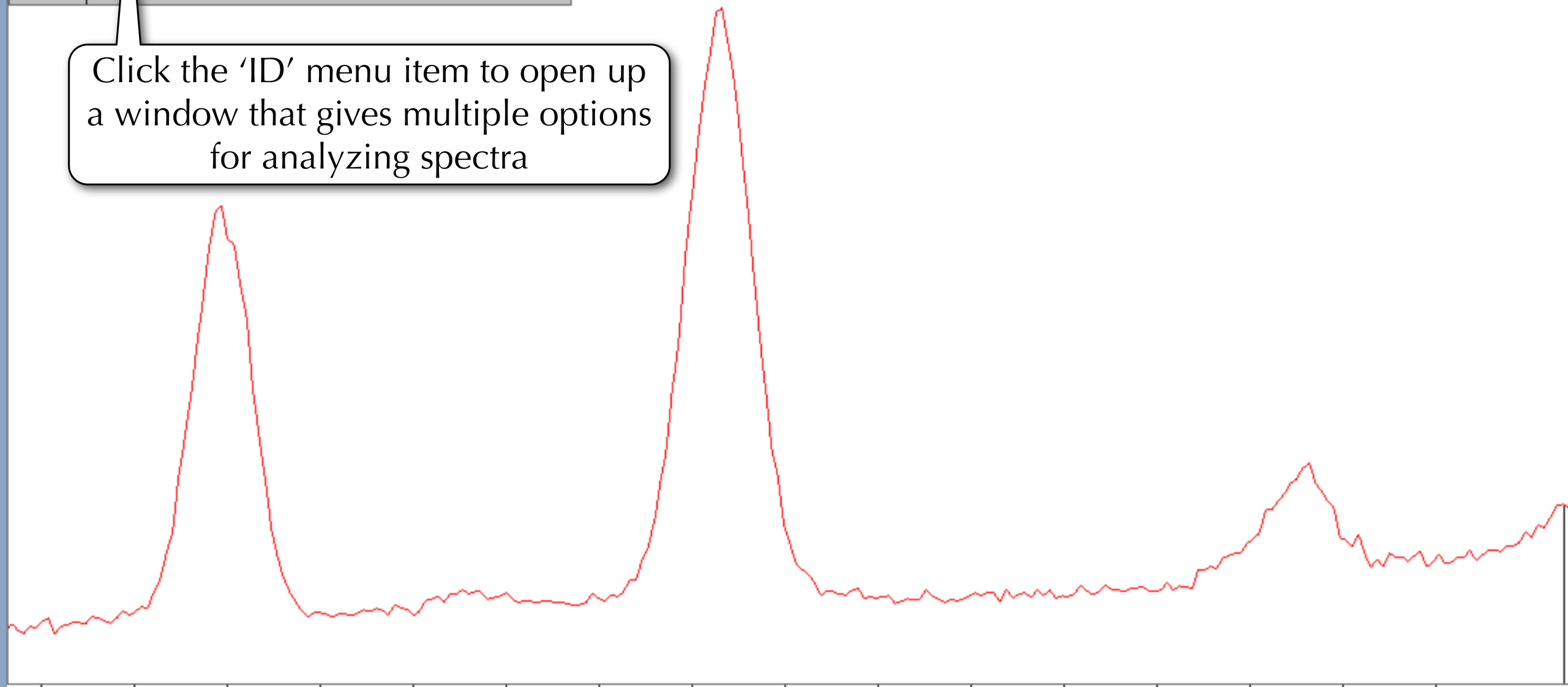
File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

PeakID Clear All Elem Elem List:

R M Del Z- Z+

Click the 'ID' menu item to open up a window that gives multiple options for analyzing spectra



13.86 14.46 15.07 15.67 16.27 16.88 17.48 18.08

Cnt:881 LSec:40.42 Chan:921.314 Kev:18.5091 Det:-15.0C Amb:100.8F Raw:13,067.02 Valid:12,601.06

evch:20.0899 Vac:715 Shift:0.00000 TRACERTurbo

9:29 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:29:21

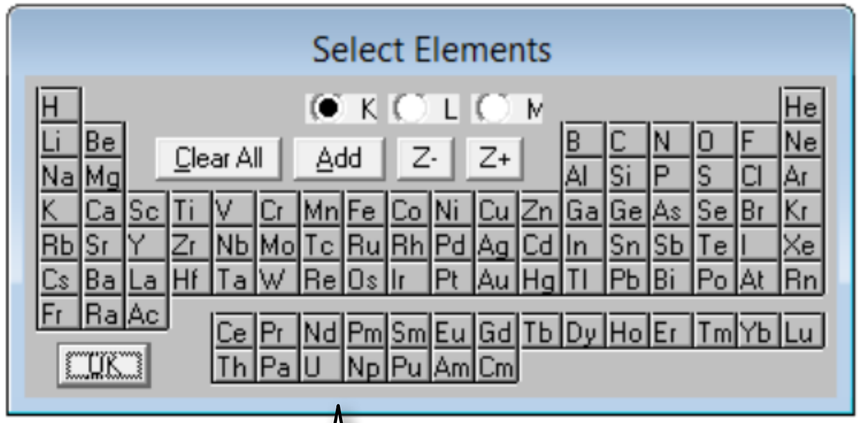
File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

PeakID Clear All Elem Elem List:

R M Add Del Z- Z+

Click ‘Elem’ to open up a periodic table



The periodic table is the way in which we navigate the spectra

13.86 14.46 15.07 15.67 16.27 16.88 17.48 18.08

Cnt:881 LSec:40.42 Chan:921.314 Kev:18.5091 Det:-15.0C Amb:100.8F Raw:13,067.02 Valid:12,601.06

evch:20.0899 Vac:715 Shift:0.00000 TRACERTurbo

9:29 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:29:31

File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

PeakID Clear All Elem ZrKa1 Elem List:

R M Add Del Z- Z+

K-alpha for Zirconium

Select Elements

ZrKa1 - 40 K L M

Clear All Add Z- Z+

OK

If we click on ‘Zr’, or Zirconium, a blue line will mark where that element lies

K-beta for Zirconium

13.86 14.46 15.07 15.67 16.27 16.88 17.48 18.08

Cnt:881 LSec:40.42 Chan:921.314 Kev:18.5091 Det:-15.0C Amb:100.8F Raw:13,067.02 Valid:12,601.06

evch:20.0899 Vac:715 Shift:0.00000 TRACERTurbo

9:29 AM 7/14/2013

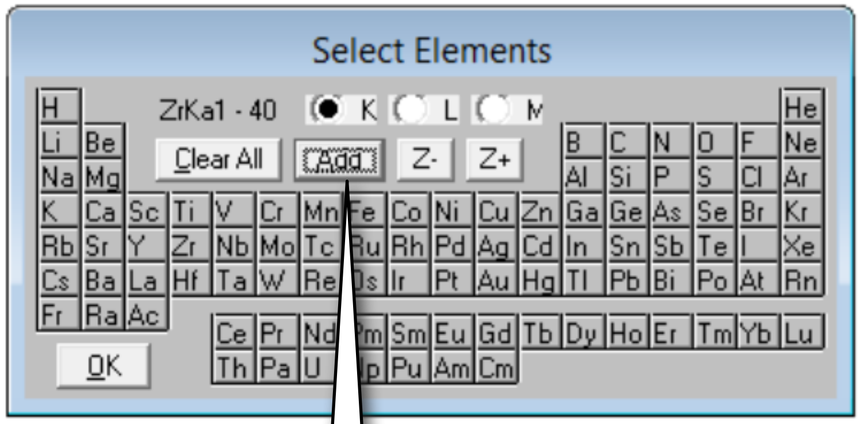
S1PXRF - 14-Jul-2013 09:29:44

File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

PeakID R M Clear All Add Del Elem ZrKa1 Z- Z+ Elem List: ZrKa1

ZrKa1



You can label the k-alpha peak by clicking the 'Add' button

13.86 14.46 15.07 15.67 16.27 16.88 17.48 18.08

Cnt:881 LSec:40.42 Chan:921.314 Kev:18.5091 Det:-15.0C Amb:100.8F Raw:13,067.02 Valid:12,601.06

evch:20.0899 Vac:715 Shift:0.00000 TRACERTurbo

9:29 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:30:08

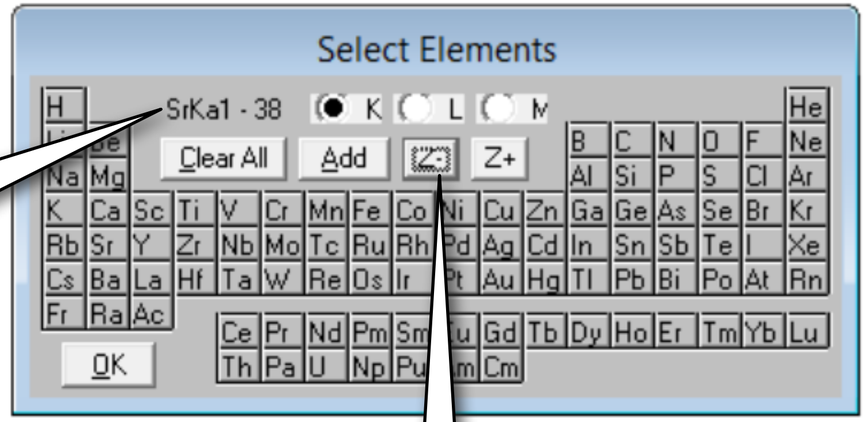
File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

PeakID R M Clear All Add Del Elem SrKa1 Elem List: ZrKa1 Z- Z+

ZrKa1

The element currently selected is displayed in the top left. In this case, it is Strontium



You can click the 'Z-' button to move down the spectrum

K-alpha for Strontium

K-beta for Strontium

13.86 14.46 15.07 15.67 16.27 16.88 17.48 18.08

Cnt:881 LSec:40.42 Chan:921.314 Kev:18.5091 Det:-15.0C Amb:100.8F Raw:13,067.02 Valid:12,601.06

evch:20.0899 Vac:715 Shift:0.00000 TRACERTurbo

9:30 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:30:18

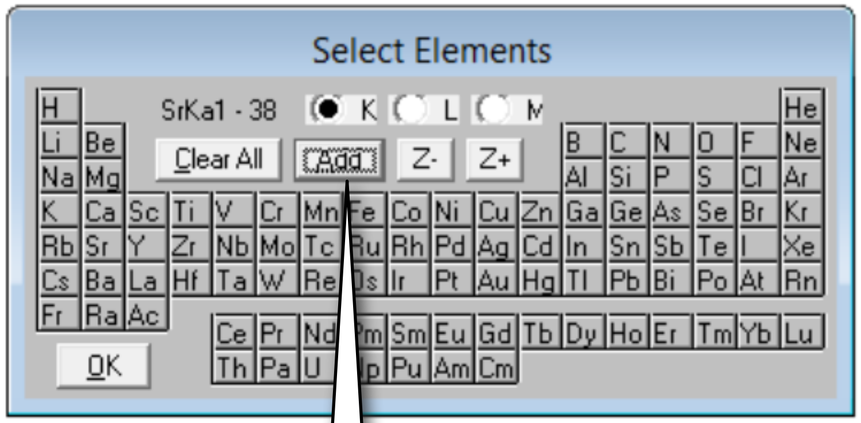
File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

PeakID R M Clear All Add Del Elem SrKa1 Z- Z+ Elem List: SrKa1

SrKa1

ZrKa1



You can label the k-alpha peak by clicking the 'Add' button for multiple elements

13.86 14.46 15.07 15.67 16.27 16.88 17.48 18.08

Cnt:881 LSec:40.42 Chan:921.314 Kev:18.5091 Det:-15.0C Amb:100.8F Raw:13,067.02 Valid:12,601.06

evch:20.0899 Vac:715 Shift:0.00000 TRACERTurbo

9:30 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:30:41

File Setup ID DownLoad Timed Tube Help

Timed Assays...
Auto...

Start Clear A

INST FILE #

KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

PeakID Clear All Elem

R M Add Del Z- Z+

Select Elements

K L M

H He
Li Be B C N O F Ne
Na Mg Al Si P S Cl Ar
K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr
Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe
Cs Ba La Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Rn
Fr Ra Ac

Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu
Th Pa U Np Pu Am Cm

Clear All Add Z- Z+ OK

You can click the 'Home' button to return to see the whole spectrum

To take a controlled measurement, select 'Timed' then 'Timed Assays...'

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.92

Cnt:356 LSec:40.42 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:100.8F Raw:13,067.02 Valid:12,601.06

evch:20.0899 Vac:715 Shift:0.00000 TRACERTurbo

9:30 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:30:59

File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

PeakID Clear All Elem Elem List:

R M Add Del Z- Z+

A window will then open up

Select Test Length

Test Time: 120

Multiple Runs

File Types

TXT CSV

PDZ Autosave

OK Cancel

You can select the amount of time you wan to assay. Typically 2 - 3 minutes is used, but sometimes 5-10 minutes can be used for important measurements

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.92

Cnt:356 LSec:40.42 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:100.8F Raw:13,067.02 Valid:12,601.06

evch:20.0899 Vac:715 Shift:0.00000 TRACERTurbo

9:30 AM
7/14/2013

Always select to save as a ‘PDZ’ file - this is the file format for other Bruker software.

‘TXT’ and ‘CSV’ can be used in Excel and other programs - but this is the raw data, it may only be useful to advanced users

Make sure Autosave is selected

After you have selected settings, press the ‘OK’ button

File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35

PeakID Clear All Elem Elem List:

R M Add Del Z- Z+

Select Test Length

Test Time: 120 secs

Multiple Runs

File Types

TXT CSV

PDZ Autosave

OK Cancel

He Ne Ar Kr Xe Rn

N O F

P S Cl

As Se Br

Sb Te I

Bi Po At

Er Tm Yb Lu

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.92

Cnt:356 LSec:40.42 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:100.8F Raw:13,067.02 Valid:12,601.06

evch:20.0899 Vac:715 Shift:0.00000 TRACERTurbo

9:30 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:31:34

File Setup ID DownLoad Timed Tube Help

Start Clear A OB40Archibarca35 INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

Save File

Test Data Search Test Data

Organize New folder

Favorites
Desktop
Downloads
Photo Stream
Recent places

Libraries
Documents
Music
Pictures
Videos

Computer
BOOTCAMP (C:)
Lincoln (D:)

Name Date modified Type

No items match your search.

File name: iPhone Spectra Yellow Filter

Save as type: PDZ data (*.pdz)

Hide Folders Save Cancel

Select Elements

K L M

Clear All Add Z- Z+

OK

You will next be prompted to save the file. Pick a descriptive name, and make sure to keep data organized - you will gather a lot of it

Click ‘Save’ when done

25.84 29.53 33.22 36.92

Amb:100.8F Raw:13,067.02 Valid:12,601.06

evch:20.0899 Vac:715 Shift:0.00000 TRACERTurbo

9:31 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:33:21

File Setup ID DownLoad Timed Tube Help

Stop Clear A iPhone Spectra Yellow Filter INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 12.50µA)

PeakID Clear All Elem Elem List:

R M Add Del Z- Z+

Select Elements

K L M

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac															

Clear All Add Z- Z+

OK

Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	
Th	Pa	U	Np	Pu	Am	Cm								

Your measurement will begin. You will see a countdown from your selected time here

3.69 7.38 11.07 14.76 18.45 22.14 25.83 29.52 33.22 36.91

Cnt:854 RSec:30.70 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:101.4F Raw:13,077.66 Valid:12,576.60

evch:20.0850 Vac:716 Shift:0.00000 TRACERTurbo

9:33 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:34:02

File Setup ID DownLoad Timed Tube Help

Start Clear A iPhone Spectra Yellow Filter INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID Clear All Elem Elem List: R M Add Del Z- Z+

Select Elements

K L M

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac															

Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	
Th	Pa	U	Np	Pu	Am	Cm								

Clear All Add Z- Z+ OK

When you are finished, the total measurement time will be displayed in black

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.91

Cnt:1148 LSec:120.32 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:102.1F Raw:13,072.34 Valid:12,585.11

evch:20.0897 Vac:-1 Shift:0.00000 TRACERTurbo

9:34 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:34:14

File Setup ID DownLoad Timed Tube Help

Instrument Setup...
Calibration...
Display & Color...
Spectrum Overlay...
Other Options...
Group Conversion...
Select Coef (SRZ, CFZ or PMZ file)
Get ROI Data...

pectra Yellow Filter | INST FILE # | KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

Peak | List:

R

Select Elements

K L M

Clear All | Add | Z- | Z+

OK

If we want to compare two measurements, we can go to 'Setup and 'Spectrum Overlay...'

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.91

Cnt:1148 | LSec:120.32 | Chan:3.825 | Kev:0.0768 | Det:-15.0C | Amb:102.1F | Raw:13,072.34 | Valid:12,585.11

evch:20.0897 | Vac:-1 | Shift:0.00000 | TRACERTurbo

9:34 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:34:26

File Setup ID DownLoad Timed Tube Help

Start Clear A iPhone Spectra Yellow Filter INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Elem Elem List: Add Del Z- Z+

Select Elements

K L M

H Li Be Na Mg B C N O F Al Si P S Cl K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Cs Ba La Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Fr Ra Ac Ce Pr Nd Pm Sm Eu Gd Tb Ho Er Tm Yb Th Pa U Np Pu Am Cm

Clear All Add Z- Z+ OK

Spectrum Ove...

- +

Move A >> B

Clear B

OK

Normalize

This will open a new window to the right. Click 'Move A >> B' to move the current spectra to the background

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.91

Cnt:1148 LSec:120.32 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:102.1F Raw:13,072.34 Valid:12,585.11

evch:20.0897 Vac:-1 Shift:0.00000 TRACERTurbo

9:34 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:34:39

File Setup ID DownLoad Timed Tube Help

Start Clear A/B iPhone Spectra Yellow Filter/ INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Elem Elem List: Add Del Z- Z+

Select Elements

K L M

H Li Be Na Mg K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd Cs Ba La Hf Ta W Re Os Ir Pt Au Hg Fr Ra Ac

Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Th Pa U Np Pu Am Cm

B C N O F Al Si P S Cl Ga Ge As Se Br In Sn Sb Te I Tl Pb Bi Po At

Clear All Add Z- Z+ OK

Spectrum Ove...

- + Move A >> B Clear B OK Normalize

After moving A to B, the original spectra will turn blue.

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.91

Cnt:1148 LSec:120.32 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:102.1F Raw:13,072.34 Valid:12,585.11

evch:20.0897 Vac:-1 Shift:0.00000 TRACERTurbo

9:34 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:35:13

File Setup ID DownLoad Timed Tube Help

Start Clear A/B iPhone Spectra Yellow Filter/ INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

Save File

Test Data Search Test Data

Organize New folder

Favorites
Desktop
Downloads
Photo Stream
Recent places

Libraries
Documents
Music
Pictures
Videos

Computer
BOOTCAMP (C:)
Lincoln (D:)

Name	Date modified	Type
iPhone Spectra Yellow Filter.pdz	7/14/2013 9:33 AM	PDZ File

File name: Hotel Glass Yellow Filter

Save as type: PDZ data (*.pdz)

Hide Folders Save Cancel

Select Elements

K L M

Clear All Add Z- Z+

OK

Spectrum Ove...

- +

Move A >> B

Clear B

OK

Normalize

Once again, you can go to 'Timed Assay' and save a file. Make sure all conditions are the same (energy, current, filter, time, and atmosphere)

25.84 29.53 33.22 36.91

Amb:102.1F Raw:13,072.34 Valid:12,585.11

evch:20.0897 Vac:-1 Shift:0.00000 TRACERTurbo

9:35 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:36:07

File Setup ID DownLoad Timed Tube Help

Stop Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem H Ka1 Z- Z+ Elem List:

Select Elements

H Ka1 - 1 K L M

Clear All Add Z- Z+ OK

H He
Li Be B C N O F Ne
Na Mg Al Si P S Cl Ar
K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr
Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe
Cs Ba La Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Rn
Fr Ra Ac
Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu
Th Pa U Np Pu Am Cm

trum Ove... + ove A >> B Clear B OK Normalize

You will see the new spectra (red) grow over the old spectra (blue)

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.91 4

Cnt:416 RSec:79.45 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:100.1F Raw:9,774.13 Valid:9,476.14

evch:20.0897 Vac:712 Shift:0.00000 TRACERTurbo

9:36 AM
7/14/2013

Getting Data

Step 3

Navigating and Analyzing Spectra

S1PXRF - 14-Jul-2013 09:37:37

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID Clear All Elem H Ka1 Elem List:

R M Add Del Z- Z+

The spectra may not match exactly, as there are many things that can affect the measurement, including differences in composition and density

Select Elements

H Ka1 - 1 K L M

Clear All Add Z- Z+

OK

trum Ove...

+

ove A >> B

Clear B

OK

Normalize

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.91

Cnt:1204 LSec:120.71 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:37 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:37:47

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem H Ka1 Z- Z+ Elem List:

In this case, we are going to normalize to the Compton Peak - in Tracers this peak can be found at 18.5 keV. The Compton peak is determined by the elastic scatter of Rhodium, and it can be a proxy for the density of light elements (like Carbon, Oxygen, and Nitrogen)

Select Elements

H Ka1 - 1 K L M

Clear All Add Z- Z+ OK

trum Ove... + ove A >> B Clear B OK Normalize

To account for differences, you can use the 'Normalize' button in the Spectrum Overlay window.

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.91

Cnt:3963 LSec:120.71 Chan:946.493 Kev:19.0140 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:37 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:38:06

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem H Ka1 Z- Z+ Elem List:

Select Elements

H Ka1 - 1 K L M

Clear All Add Z- Z+

OK

Spectrum Ove...

- + Move A >> B Clear B OK NO Normalize

After normalization, the area you selected will be 'matched', and the rest of the spectra adjusted accordingly

When you click the 'Normalize' button, it will change to 'NO Normalize'

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.91

Cnt:3981 LSec:120.71 Chan:948.317 Kev:19.0507 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:38 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:38:23

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem SiKa1 Z- Z+ Elem List: SiKa1

Click the 'Add' button once you have selected an element

Select Elements

SiKa1 - 14 K L M

Add Z- Z+

OK

Once you have selected and labeled the element, it's peak will be identifiable

To begin analyzing your data, select an element from the periodic table. You can begin with a light element, such as Silica, and work your way up

SiKa1

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.91

Cnt:3981 LSec:120.71 Chan:948.317 Kev:19.0507 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:38 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:38:47

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem S Ka1 Z- Z+ Elem List: SiKa1

Select Elements

S Ka1 - 16 K L M Clear All Add Z- Z+ OK

You can move up the periodic table by clicking the 'Z+' button

trum Ove... + ove A >> B Clear B OK Normalize

SiKa1

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.91

Cnt:3981 LSec:120.71 Chan:948.317 Kev:19.0507 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:38 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:39:05

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem K Ka1 Z- Z+ Elem List: K Ka1

Here, we can see a difference between the two elements - the presence of Potassium in the iPhone (blue spectrum) and its lower abundance in the hotel glass (red spectrum). Potassium can make glass stronger and more resistant to scratches

Select Elements

K Ka1 - 19 K L M

Clear All Add Z- Z+ OK

H He Li Be B C N O F Ne Na Mg Al Si P S Cl Ar K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe Cs Ba La Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Rn Fr Ra Ac

Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu Th Pa U Np Pu Am Cm

trum Ove... + ove A >> B Clear B OK Normalize

SiKa1 K Ka1

1.21 2.41 3.62 4.82 6.03 7.23 8.44 9.64

Cnt:188 LSec:120.71 Chan:169.603 Kev:3.4071 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:39 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:39:17

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Elem CaKa1 Del Z- Z+ Elem List: CaKa1

Select Elements

CaKa1 - 20 K L M

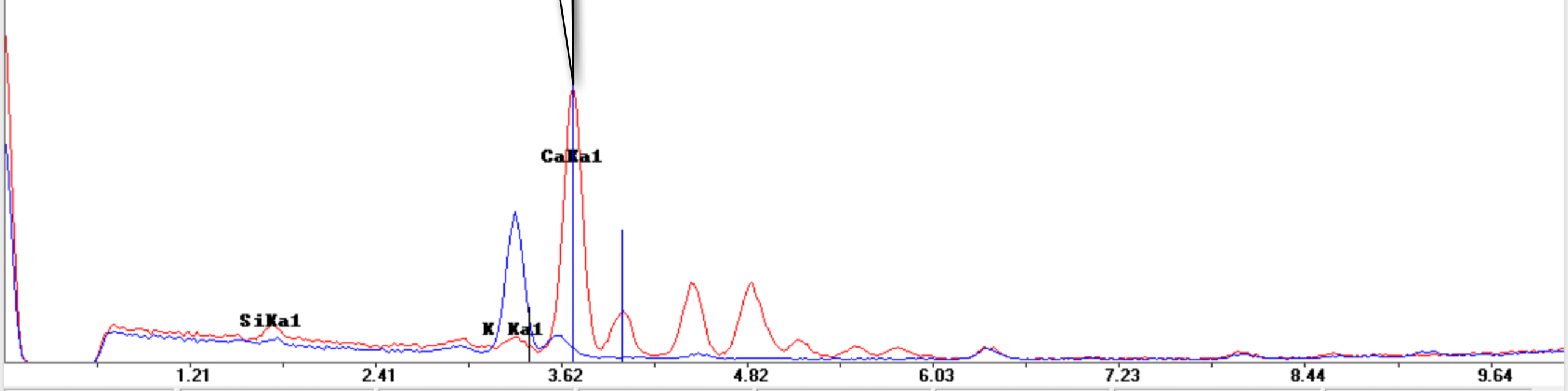
Clear All Add Z- Z+ OK

H He Li Be B C N O F Ne Na Mg Al Si P S Cl Ar K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe Cs Ba La Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Rn Fr Ra Ac

Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu Th Pa U Np Pu Am Cm

trum Ove... + ove A >> B Clear B OK Normalize

The hotel glass, in contrast, has more Calcium



Cnt:188 LSec:120.71 Chan:169.603 Kev:3.4071 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:39 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:39:31

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem TiKa1 Z- Z+ Elem List: CaKa1

Select Elements

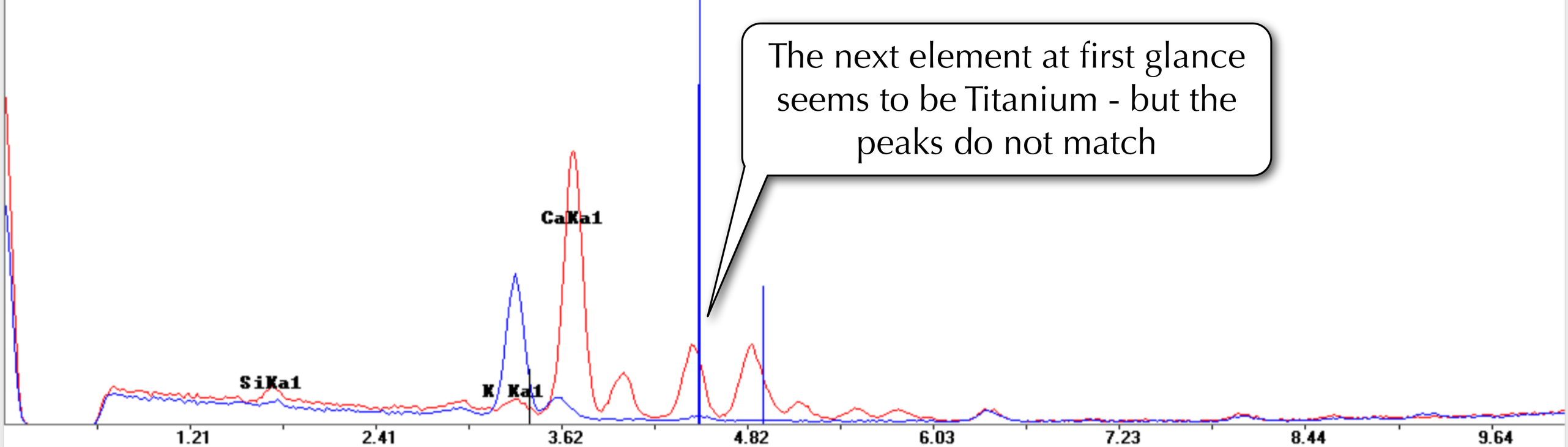
TiKa1 - 22 K L M

Clear All Add Z- Z+ OK

H He
Li Be B C N O F Ne
Na Mg Al Si P S Cl Ar
K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr
Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe
Cs Ba La Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Rn
Fr Ra Ac
Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu
Th Pa U Np Pu Am Cm

trum Ove... + ove A >> B Clear B OK Normalize

The next element at first glance seems to be Titanium - but the peaks do not match



Cnt:188 LSec:120.71 Chan:169.603 Kev:3.4071 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:39 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:39:44

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem BaLa1 Elem List: BaLa1 Z- Z+

In case of a mismatch, check the 'L' shell for a heavier element

Select Elements

K L M

Clear All Add Z- Z+

OK

It is always good to check the L shell. In this case, the element is actually Barium

CaKa1

SiKa1

K Ka1

BaLa1

1.21 2.41 3.62 4.82 6.03 7.23 8.44 9.64

Cnt:188 LSec:120.71 Chan:169.603 Kev:3.4071 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:39 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:40:18

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

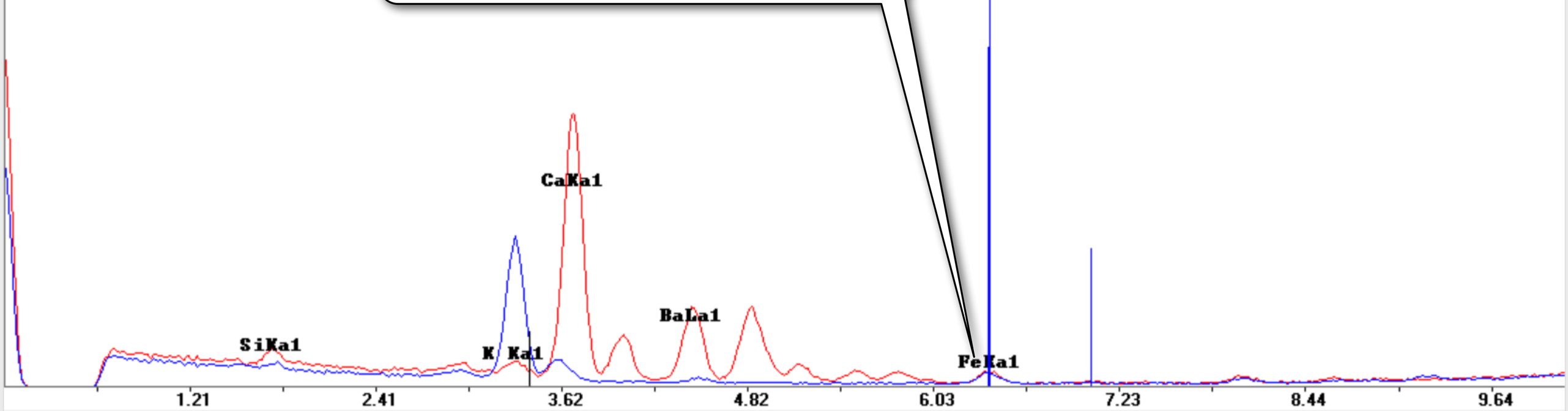
PeakID R M Clear All Add Del Elem FeKa1 Z- Z+ Elem List: FeKa1

Select Elements

FeKa1 - 26 K L M

Clear All Add Z- Z+ OK

Both the iPhone glass (in blue) and the hotel glass (in red) have comparable amounts of iron



Cnt:188 LSec:120.71 Chan:169.603 Kev:3.4071 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:40 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:40:32

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

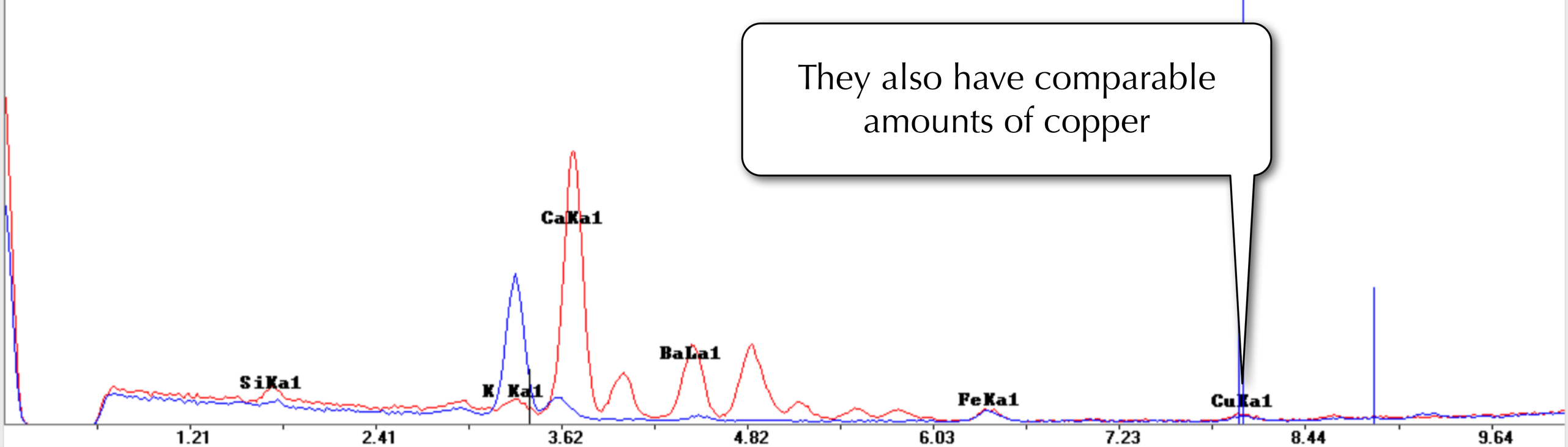
PeakID R M Clear All Add Del Elem CuKa1 Z- Z+ Elem List: CuKa1

Select Elements

CuKa1 - 29 K L M

Clear All Add Z- Z+ OK

They also have comparable amounts of copper



Cnt:188 LSec:120.71 Chan:169.603 Kev:3.4071 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:40 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:40:44

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Add Del Clear All Elem CuKa1 Z- Z+ Elem List: CuKa1

Click on the home button to return to the entire spectrum

Select Elements

CuKa1 - 29 K L M

Clear All Add Z- Z+ OK

H He Li Be B C N O F Ne Na Mg Al Si P S Cl Ar K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe Cs Ba La Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Rn Fr Ra Ac

Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu Th Pa U Np Pu Am Cm

trum Ove... + ove A >> B Clear B OK Normalize

CaKa1 BaLa1 SiKa1 K Ka1 FeKa1 CuKa1

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.91

Cnt:1204 LSec:120.71 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:40 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:41:22

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Elem AsKa1 Del Z- Z+ Elem List: AsKa1

Here, it can be seen that the hotel (drinking) glass, in red, has Arsenic present. It is not uncommon to find unexpected elements

Select Elements

AsKa1 - 33 K L M

Clear All Add Z- Z+ OK

H He
Li Be B C N O F Ne
Na Mg Al Si P S Cl Ar
K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr
Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe
Cs Ba La Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Rn
Fr Ra Ac
Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu
Th Pa U Np Pu Am Cm

trum Ove... + ove A >> B Clear B OK Normalize

AsKa1 CuKa1 ZnKa1

8.44 9.64 10.85 12.05 13.26 14.46 15.67 16.87

Cnt:371 LSec:120.71 Chan:605.049 Kev:12.1548 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:41 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:42:12

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem TcKa1 Z- Z+ Elem List: ZrKa1

Spectrum Ove... - + Move A >> B Clear B OK NO Normalize

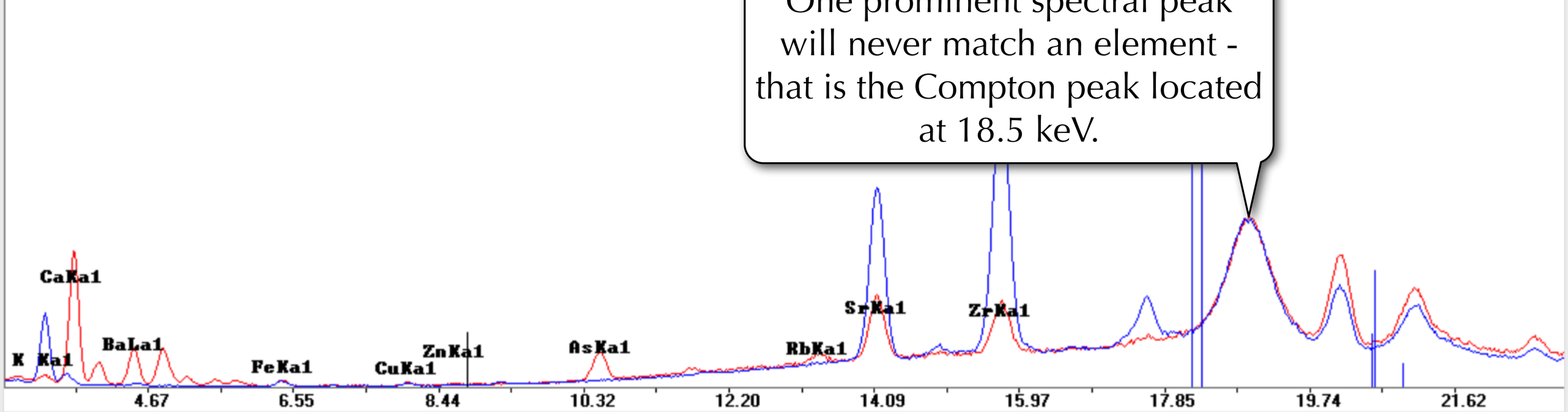
Select Elements

TcKa1 - 43 K L M Clear All Add Z+ OK

H												B	C	N	O	F	He
Li	Be											Al	Si	P	S	Cl	Ne
Na	Mg											Ga	Ge	As	Se	Br	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	In	Sn	Sb	Te	I	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	Tl	Pb	Bi	Po	At	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg						Rn
Fr	Ra	Ac															

Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Th	Pa	U	Np	Pu	Am	Cm							

One prominent spectral peak will never match an element - that is the Compton peak located at 18.5 keV.



Cnt:84 LSec:120.71 Chan:438.679 Kev:8.8126 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:42 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:42:45

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem RhKa1 Z- Z+ Elem List: RhKa1

Select Elements

RhKa1 - 45 K L M Clear All Add Z- Z+ OK

Spectrum Ove... - + Move A >> B Clear B OK NO Normalize

Rhodium will always be in your spectrum, as it is the x-ray source in the Tracer.

ZrKa1

RhKa1

16.27 17.48 18.68 19.89 21.09 22.30 23.50 24.71

Cnt:1205 LSec:120.71 Chan:1017.866 Kev:20.4478 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:42 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:43:03

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem PdKa1 Z- Z+ Elem List: PdKa1

Select Elements

PdKa1 - 46 K L M Clear All Add Z- Z+ OK

Spectrum Ove... - + Move A >> B Clear B OK NO Normalize

Palladium will be present as well, it is the collimator around the detector

ZrKa1 RhKa1 PdKa1

16.27 17.48 18.68 19.89 21.09 22.30 23.50 24.71

Cnt:1418 LSec:120.71 Chan:1066.649 Kev:21.4278 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:43 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:43:26

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Elem SnKa1 Del Z- Z+ Elem List: SnKa1

Select Elements

SnKa1 - 50 K L M Clear All Add Z- Z+ OK

Spectrum Ove... - + Move A >> B Clear B OK NO Normalize

Tin is present in the iPhone (in blue), and absent from the hotel glass (in red)

RhKa1

PdKa1

SnKa1

17.78 19.66 21.55 23.43 25.31 27.20 29.08 30.96 32.85 34.73

Cnt:725 LSec:120.71 Chan:1259.504 Kev:25.3021 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:43 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:43:46

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem BaKa1 Z- Z+ Elem List: BaKa1

Select Elements

BaKa1 - 56 K L M Clear All Add Z- Z+ OK

Spectrum Ove... - + Move A >> B Clear B OK NO Normalize

Earlier, the L-shell of Barium was visible in the hotel glass (red spectrum). It is also visible in the Ks-shell. Barium is the beginning of the heavy elements for which you switch to the L-shell for best detection

SnKa1

BaKa1

24.63 26.52 28.40 30.28 32.17 34.05 35.93 37.82 39.70 41.58

Cnt:745 LSec:120.71 Chan:1602.026 Kev:32.1830 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:43 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:44:15

File Setup ID DownLoad Timed Tube Help

Start Clear A/B Hotel Glass Yellow Filter/iPhone Spe INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem BaKa1 Z- Z+ Elem List: BaKa1

Select Elements

BaKa1 - 56 K L M Clear All Add Z- Z+ OK

Spectrum Ove... - + Move A >> B Clear B OK Normalize

Barium L-shell

Barium K-shell

CaKa1 SiKa1 K Ka1 BaLa1 FeKa1 CuKa1 ZnKa1 AsKa1 RbKa1 SrKa1 ZrKa1 RhKa1 PdKa1 SnKa1 BaKa1

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.91

Cnt:1204 LSec:120.71 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:44 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:44:24

File Setup ID DownLoad Timed Tube Help

Start Clear A Hotel Glass Yellow Filter INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem BaKa1 Z- Z+ Elem List: BaKa1

Select Elements

BaKa1 - 56 K L M Clear All Add Z- Z+

Spectrum Ove... - + Move A >> B Clear B OK Normalize

To remove the blue background spectrum, click 'Clear B' in the Spectrum Overlay window

CaKa1 SrKa1 ZrKa1 PdKa1 BaLa1 AsKa1 RbKa1 SnKa1 BaKa1 SiKa1 K Ka1 FeKa1 CuKa1 ZnKa1

3.69 7.38 11.07 14.77 18.46 22.15 25.84 29.53 33.22 36.91

Cnt:1204 LSec:120.71 Chan:3.825 Kev:0.0768 Det:-15.0C Amb:102.8F Raw:9,731.71 Valid:9,439.02

evch:20.0889 Vac:716 Shift:0.00000 TRACERTurbo

9:44 AM 7/14/2013

Getting Data

Step 4

Quantifying Data

S1PXRF - 14-Jul-2013 09:45:11

File Setup ID DownLoad Timed Tube Help

Start Clear Hotel Glass Yellow Filter INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem Z- Z+ Elem List:

Select Elements

K L M

H He
Li Be B C N O F Ne
Na Mg Al Si P S Cl Ar
K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr
Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe
Cs Ba La Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Rn
Fr Ra Ac
Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu
Th Pa U Np Pu Am Cm

Clear All Add Z- Z+ OK

Spectrum Ove...

- + Move A >> B Clear B OK Normalize

In this metal, we can see clearly defined peaks

3.69 7.38 11.07 14.76 18.45 22.14 25.84 29.53 33.22 36.91

Cnt:31 LSec:3.74 Chan:3.825 Kev:0.0768 Det:-15.5C Amb:94.7F Raw:41,871.66 Valid:38,009.63

evch:20.0857 Vac:715 Shift:0.00000 TRACERTurbo

9:45 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:45:47

File Setup ID DownLoad Timed Tube Help

Start Clear A Hotel Glass Yellow Filter INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID R M Clear All Add Del Elem RnKa1 Z- Z+ Elem List: MoKa1

Select Elements

RnKa1 - 86 K L M Clear All Add Z- Z+ OK

Spectrum Ove... - + Move A >> B Clear B OK Normalize

FeKa1

CrKa1

NiKa1

MoKa1

These include Chrome, Iron, Nickel, and Molybdenum

3.69 7.38 11.07 14.76 18.45 22.14 25.84 29.53 33.22 36.91

Cnt:0 LSec:3.74 Chan:1903.929 Kev:38.2417 Det:-15.5C Amb:94.7F Raw:41,871.66 Valid:38,009.63

evch:20.0857 Vac:715 Shift:0.00000 TRACERTurbo

9:45 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:46:03

File Setup ID DownLoad Timed Tube Help

Instrument Setup...
Calibration...
Display & Color...
Spectrum Overlay...
Other Options...
Group Conversion...
Select Coef (SRZ, CFZ or PMZ file)
Get ROI Data...

ss Yellow Filter | INST FILE # | KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

Peak | R | List: MoKa1

Select Elements

RnKa1 - 86 K L M

Clear All | Add | Z- | Z+ | OK

We can quantify these results using 'Select Coef (SRZ, CFZ, or PMZ file)' in the 'Setup' menu

CrKa1
NiKa1
MoKa1

3.69 7.38 11.07 14.76 18.45 22.14 25.84 29.53 33.22 36.91

Cnt:0 | LSec:3.74 | Chan:1903.929 | Kev:38.2417 | Det:-15.5C | Amb:94.7F | Raw:41,871.66 | Valid:38,009.63

evch:20.0857 | Vac:715 | Shift:0.00000 | TRACERTurbo

9:46 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:46:50

File Setup ID DownLoad Timed Tube Help

Start Clear A Hotel Glass Yellow Filter INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

Read File

« 2430 UF obsidian... ▸ T3S2430 ▸ Search T3S2430

Organize New folder

Favorites
Desktop
Downloads
Photo Stream
Recent places

Libraries
Documents
Music
Pictures
Videos

Computer
BOOTCAMP (C:)
Lincoln (D:)

Network

Name

Obsidian T3S2430
T3S2430 Calibration Spectra
T3S2430 Emperical Cals
T3S2430 S1GEN2 FlashCard

3/20/2013 7:12 AM File folder

File name: Coeff data (*.CFZ;*.SRZ;*.PMZ)

Open Cancel

This will open a window to find a calibration file. Navigate to your instrument's serial number (in this case, T3S2430)

The calibration files for metals are located in the 'Empirical Cals' folder

Select Elements

Ka1 - 86 K L M

ear All Add Z- Z+

25.84 29.53 33.22 36.91

Amb:94.7F Raw:41,871.66 Valid:38,009.63

evch:20.0857 Vac:715 Shift:0.00000 TRACERTurbo

9:46 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:47:05

File Setup ID DownLoad Timed Tube Help

Read File

T3S2430 ▸ T3S2430 Emperical Cals

Search T3S2430 Emperical Cals

Organize New folder

Favorites
Desktop
Downloads
Photo Stream
Recent places

Libraries
Documents
Music
Pictures
Videos

Computer
BOOTCAMP (C:)
Lincoln (D:)

Network

Name	Date modified	Type
AL1.CFZ	1/11/2013 11:44 AM	CFZ File
AL1.SRZ	1/11/2013 11:43 AM	SRZ File
ALV1.SRZ	1/11/2013 11:44 AM	SRZ File
ALV11.CFZ	1/11/2013 11:44 AM	CFZ File
ALV12.CFZ	1/11/2013 11:44 AM	CFZ File
AU1.CFZ	1/11/2013 11:43 AM	CFZ File
AU1.SRZ	1/11/2013 11:43 AM	SRZ File
CO1.CFZ	1/11/2013 11:43 AM	CFZ File
CO1.SRZ	1/11/2013 11:43 AM	SRZ File
CU1.CFZ	1/11/2013 11:43 AM	CFZ File
CU1.SRZ	1/11/2013 11:43 AM	SRZ File
CU2.CFZ	1/11/2013 11:43 AM	CFZ File
FE1.CFZ	1/11/2013 11:43 AM	CFZ File
FE1.SRZ	1/11/2013	
FE2.CFZ	1/11/2013	
NI1.CFZ	1/11/2013	

File name: FE1.CFZ

Coef

Open Cancel

DZ 40.00kV, 14.80µA)

Select Elements

K L M

Add Z- Z+

																	He
								B	C	N	O	F	Ne
								Al	Si	P	S	Cl	Ar
Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
U	Np	Pu	Am	Cm							

Since Iron is the dominant element in this spectra, we will use the FE1.CFZ file

29.53 33.22 36.91

Cnt:0 LSec:3.74 Chan:1903.929 Kev:38.2417 Det:-15.5C Amb:94.7F Raw:41,871.66 Valid:38,009.63

evch:20.0857 Vac:715 Shift:0.00000 TRACERTurbo

9:47 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:47:17

File Setup ID Conc FE1 DownLoad Timed Tube Help

Start Clear A Hotel Glass Yellow Filter INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

PeakID Clear All Elem TiKa1 Elem List: TiKa1

R M Add Del Z- Z+

Select Elements

TiKa1 - 22 K L M

Clear All Add Z- Z+

OK

We can click the 'Conc' button, now available in the menu bar, to obtain our quantified results

FeKa1

CrKa1

MoKa1

NiKa1

CoKa1

MnKa1

V Ka1

TiKa1

CuKa1W Lb1

3.69 7.38 11.07 14.76 18.45 22.14 25.84 29.53 33.22 36.91

Cnt:0 LSec:3.74 Chan:1903.929 Kev:38.2417 Det:-15.5C Amb:94.7F Raw:41,871.66 Valid:38,009.63

evch:20.0857 Vac:715 Shift:0.00000 TRACERTurbo

9:47 AM 7/14/2013

S1PXRF - 14-Jul-2013 09:47:36

File Setup ID Conc FE1 DownLoad Timed Tube Help

Start Clear A Hotel Glass Yellow Filter INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

Result Table

Copy Save-Inte

Hotel Glass Yellow Filter	07-14-2013 09:47:25	Concentration (FE
TiKa1	0.0020568686	0.086126619
V Ka1	0.0026004382	0.032601909
CrKa1	0.2237540267	22.725950990
MnKa1	0.0465116729	1.749850070
FeKa1	0.5244142514	64.936527879
CoKa1	0.0376943989	0.531770488
NiKa1	0.0356112622	2.112258123
CuKa1	0.0028178025	0.236141518
W Lb1	0.0003884333	0.120002285
MoKa1	0.1241508452	3.694419234

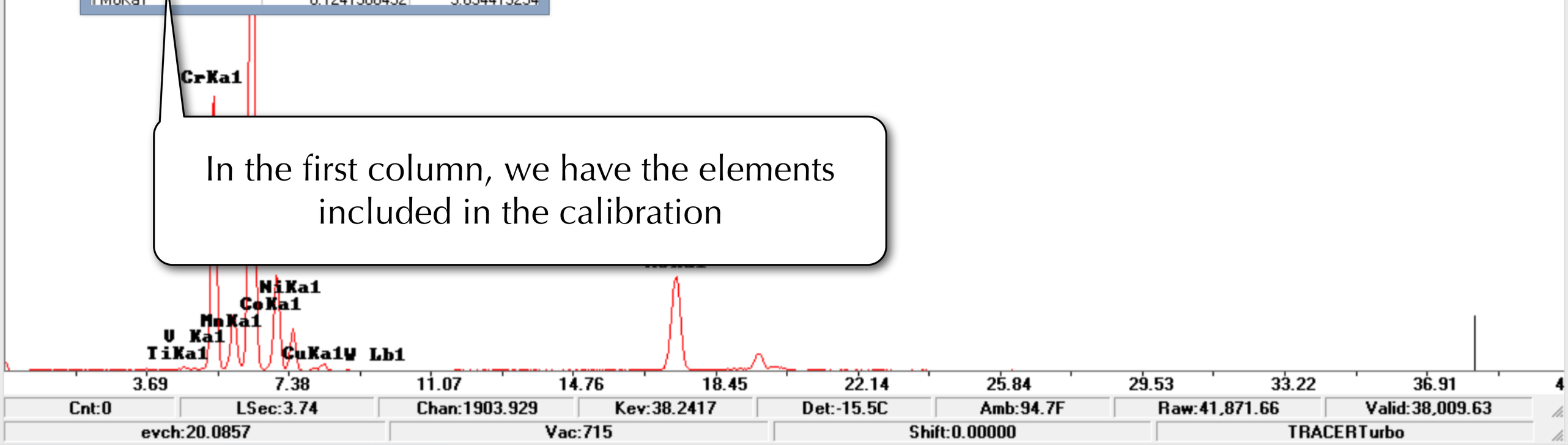
Select Elements

TiKa1 - 22 K L M

Clear All Add Z- Z+

OK

In the first column, we have the elements included in the calibration



Cnt:0 LSec:3.74 Chan:1903.929 Kev:38.2417 Det:-15.5C Amb:94.7F Raw:41,871.66 Valid:38,009.63

evch:20.0857 Vac:715 Shift:0.00000 TRACERTurbo

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7/14/2013

S1PXRF - 14-Jul-2013 09:47:36

File Setup ID Conc FE1 DownLoad Timed Tube Help

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NiKa1	0.0356112622	2.112258123
CuKa1	0.0028178025	0.236141518
W Lb1	0.0003884333	0.120002285
MoKa1	0.121508452	3.694419234

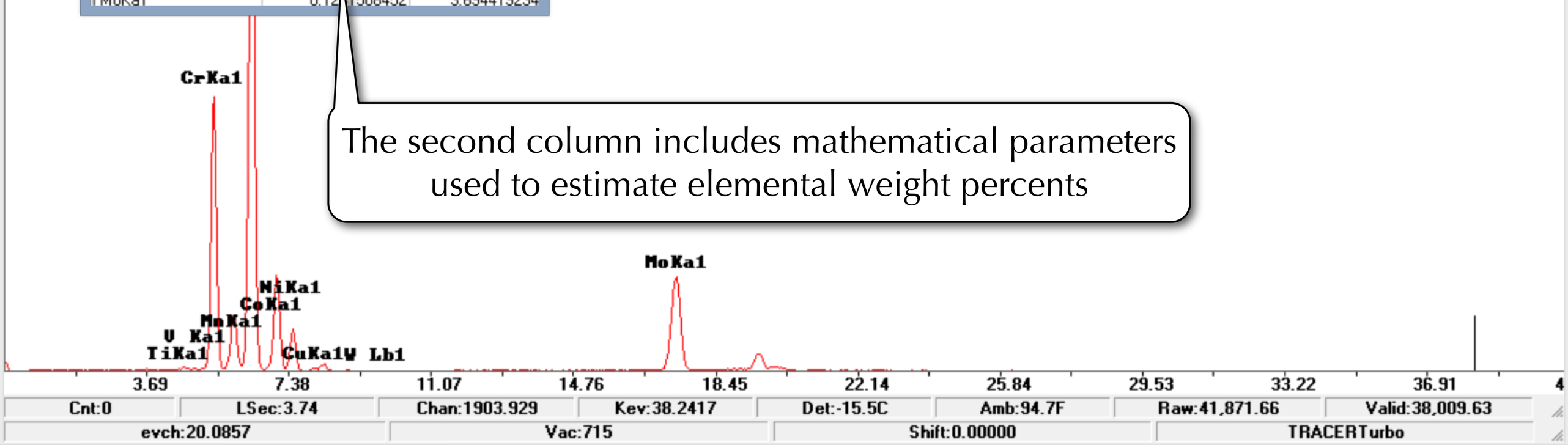
Select Elements

TiKa1 - 22 K L M

Clear All Add Z- Z+

OK

The second column includes mathematical parameters used to estimate elemental weight percents



Cnt:0 LSec:3.74 Chan:1903.929 Kev:38.2417 Det:-15.5C Amb:94.7F Raw:41,871.66 Valid:38,009.63

evch:20.0857 Vac:715 Shift:0.00000 TRACERTurbo

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7/14/2013

S1PXRF - 14-Jul-2013 09:47:36

File Setup ID Conc FE1 DownLoad Timed Tube Help

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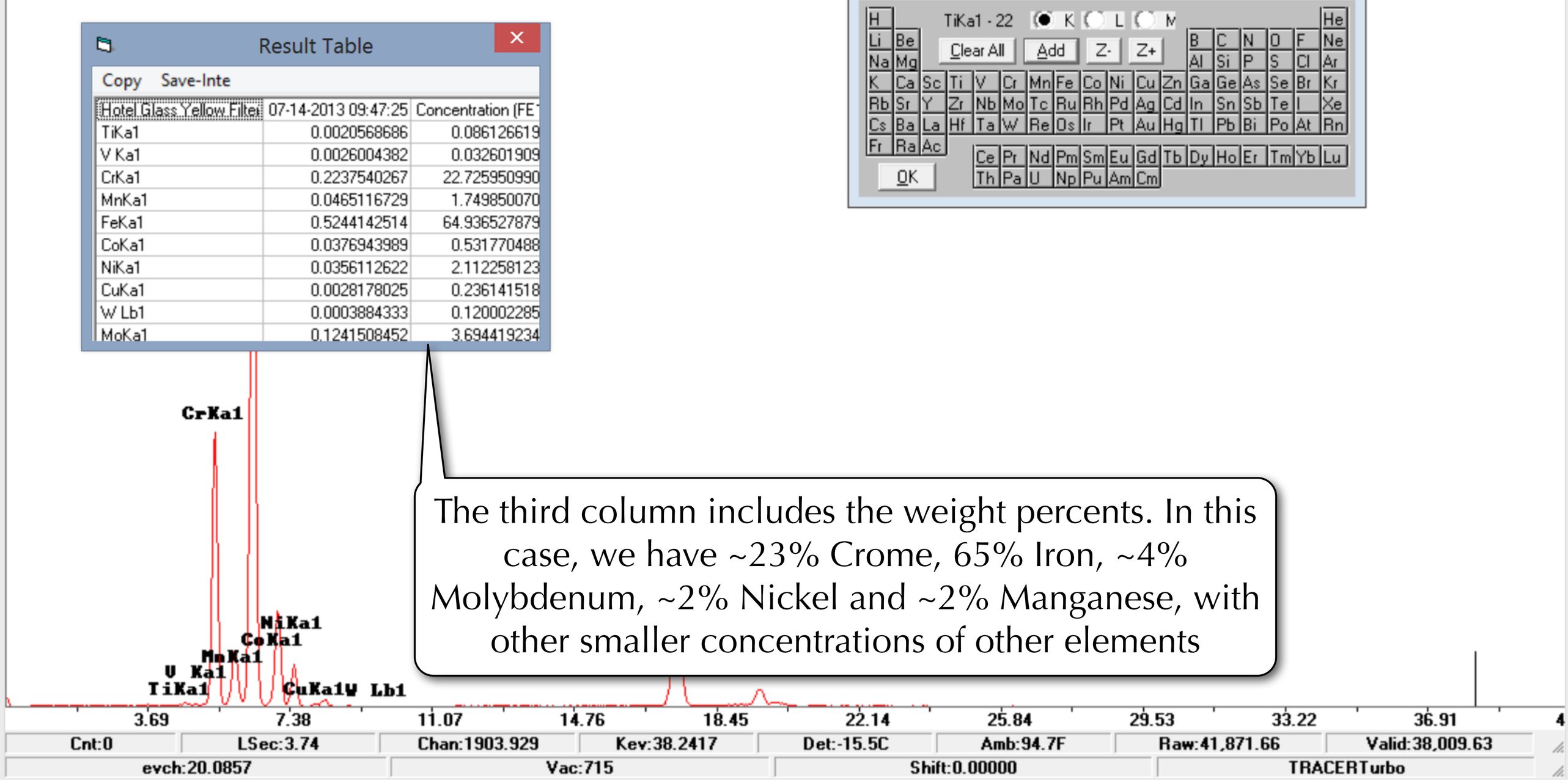
MoKa1	0.1241508452	3.694419234

Select Elements

TiKa1 - 22 K L M

Clear All Add Z- Z+

OK



The third column includes the weight percents. In this case, we have ~23% Crome, 65% Iron, ~4% Molybdenum, ~2% Nickel and ~2% Manganese, with other smaller concentrations of other elements

9:47 AM
7/14/2013

S1PXRF - 14-Jul-2013 09:47:50

File Setup ID Conc FE1 DownLoad Timed Tube Help

Start Clear A Hotel Glass Yellow Filter INST FILE # KTI 40.00kV, 14.80µA (.PDZ 40.00kV, 14.80µA)

Result Table

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W Lb1	0.0003884333	0.120002285
MoKa1	0.1241508452	3.694419234

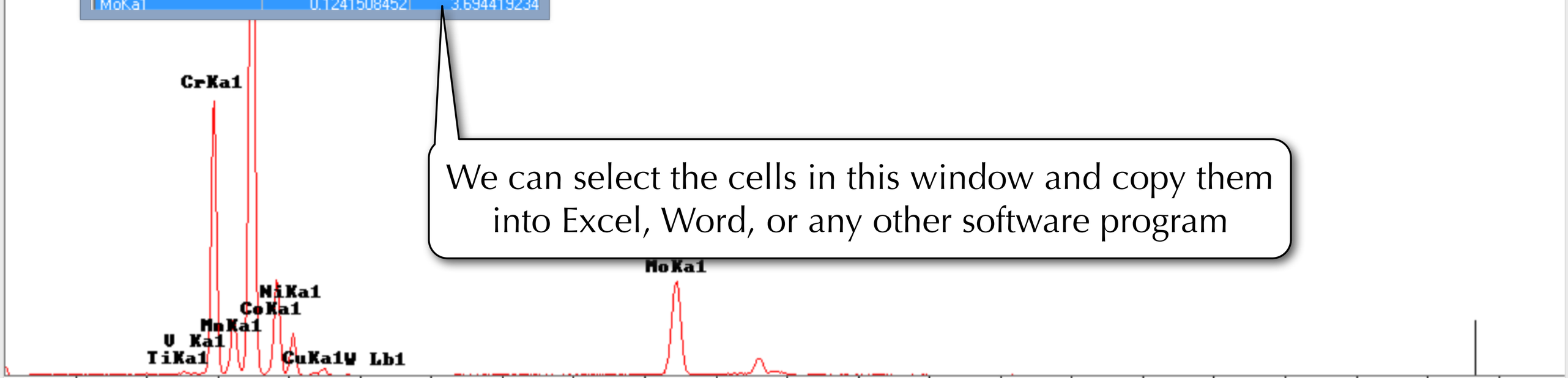
Select Elements

TiKa1 - 22 K L M

Clear All Add Z- Z+

OK

We can select the cells in this window and copy them into Excel, Word, or any other software program



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7/14/2013