

JXA-8530F Plus操作



JXA-8530F

- 一、開/關機方式
- 二、Load/UnLoad sample
- 三、主要視窗介紹
- 四、Qual定性分析(未知元素尋找)
- 五、Line線分析
- 六、Map面分析
- 七、Quant分析
- 八、Std建立標準檢量線
- 九、OffQnt重新定量分析
- 十、User Recipe
- 十一、影像位置紀錄
- 十二、PHA設定更動(peak overlap使用)
- 十三、數據處理

一、開/關機方式

關

開（開機要待 30min 真空啟動）

stage 在 exchange 位置

關

開

電腦軟體



關

開

OPE power



關

開

主機台後方電源



關

開

冰水機



關

開

Vacuum power
(關機必需等待 10minTMP 停止)



關

開

main power



關

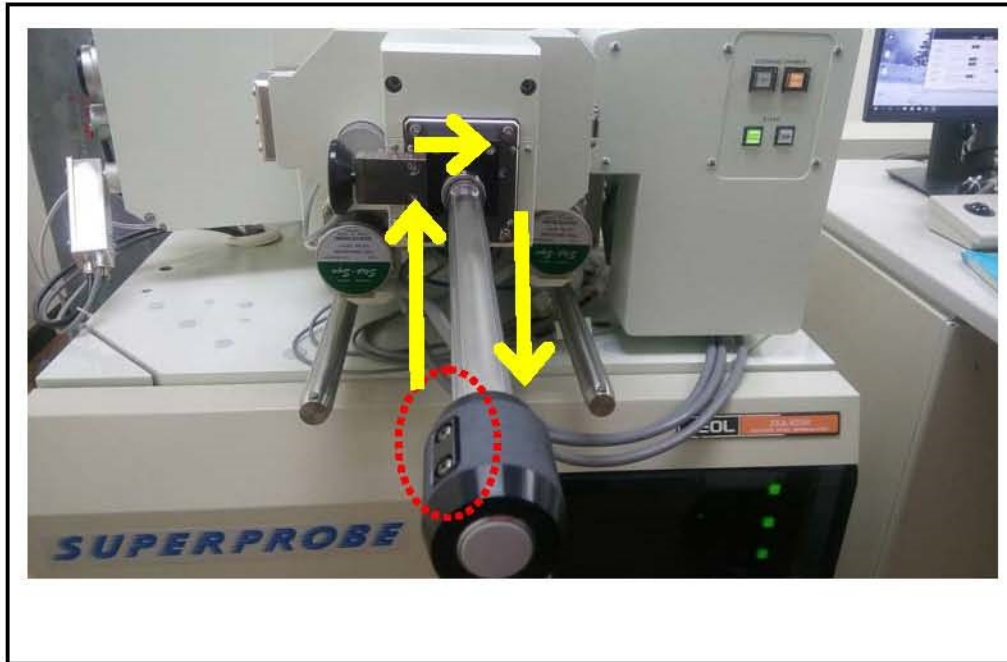
開

power panel



二、Load / Unload 樣品

Load sample



Unload sample



三、主要視窗介紹

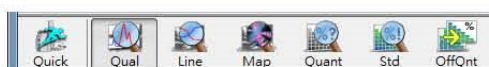
功能鍵

主要設定操作視窗

輔助視窗(一)

輔助功能視窗(二)

功能鍵



Quick:快速索引

Qual:尋找未知元素, 定性分析

Line:線分析

Map:面分析

Quant: 定量分析

Std:建立標準檢量線

OffQnt: 分析完後, 再重新分析, 包含定量點, 定量面





Start: 設定分析條件後執行

Stop: 停止執行

Monitor: 觀測執行中的畫面



Data: 資料總管

Serial: 可以設定好幾個分析程序，再一起執行

Periodic: 開啟元素週期，方便選取及提供資訊

Search: 訊號接收強度

PHA: Pulse height analyzer 設定

(即設定 SCA Single Channel Analyzer)

Std Mng: 標準樣品位置快速定位



OM Mon.: 光學影像

SPC: Spectrometer control 監控

P-TRKG: 影像追蹤



OM 光學自動對焦



齒輪 backlash 校正

Z 軸調整

四、Qual 定性分析(未知元素尋找)



定性分析流程：

Step1 設定檔案及檔名：Path / Project Name

Step2 設定電流：Electron Optics Condition

Step3 設定位置：Analysis Position Condition

Step4 設定分析參數：Spectrum Scanning Condition

Step5 執行：Acquire

The screenshot shows the Qual software interface with the following components and step annotations:

- Step 1:** Project Name (JEOL-DATA) and Path (C:\EpmaData) fields.
- Step 2:** Electron Optics Condition panel, showing Accelerating Voltage [kV] (15.0) and Probe Current [A] (1.00 x 10⁻⁸).
- Step 3:** Analysis Position Condition panel, showing Stage Position [mm] (X: 0.0000, Y: 0.0000, Z: 8.0000) and a table for No., Comment, Scan, X, Y, Z, Beam.
- Step 4:** Spectrum Scanning Condition panel, showing a table for No., CH, Const., Start (mm), End (mm), Dwell (ms), Start (mm), Acq. time (s).
- Step 5:** The Acquire button in the Qualitative Analysis panel.

Step1:

設定檔案及檔名：Path / Project Name





檔案名稱

自動產生序號

存檔路徑

Step2 設定電流: Electron Optics Condition

電流設定

搭配 PCD in, 讀取 SEM 機台電流值

確定後, 讀取 SEM 參數

Step3 設定位置 :Analysis Position Condition

簡易版:

Step1: 讀取位置

詳細設定

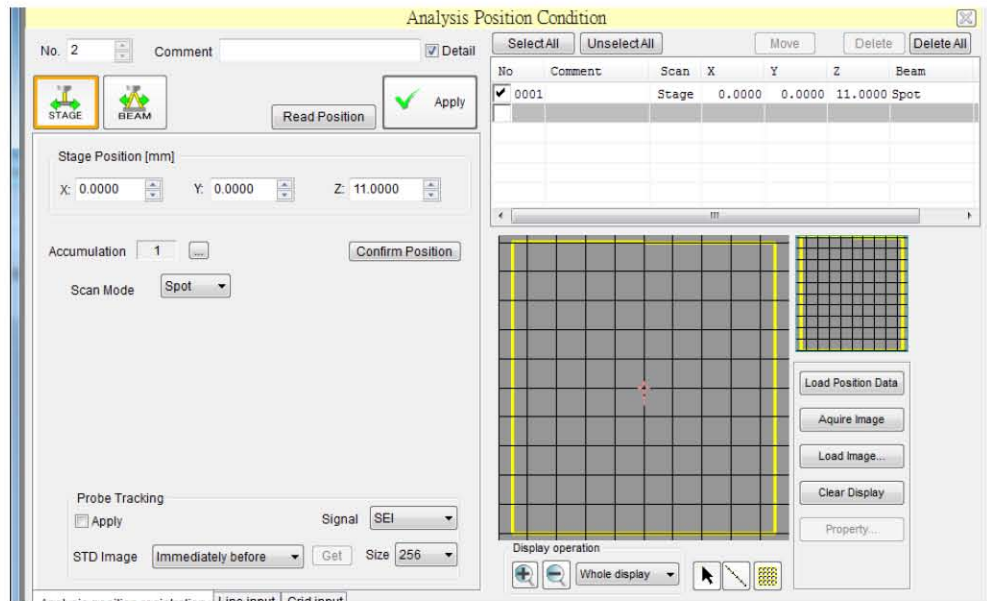
Step2: 設定位置

Detail 詳細設定:

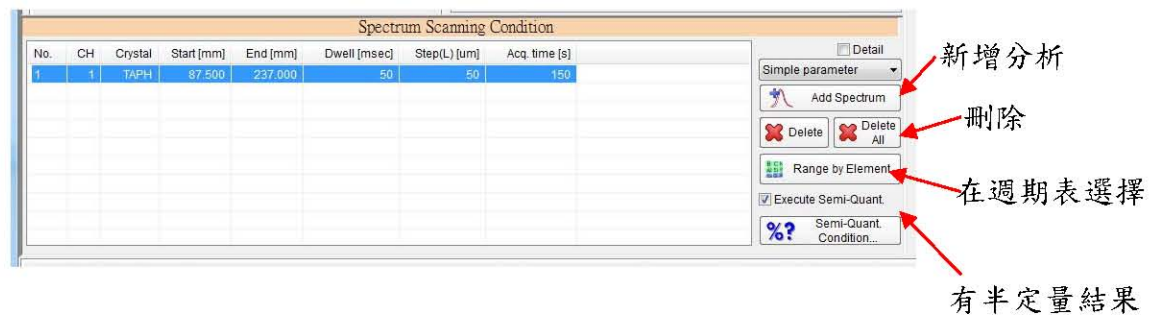
位置有二種方式設定

Stage: 主要以 3000 倍率以下為主,

Beam: 以 3000 倍以上(5000 倍以上更好)為主



Step4 設定分析參數: Spectrum Scanning Condition
簡易版



Detail 設定

Step2: 按滑鼠左鍵，選擇要更改參數

Step1: 新增分析

Spectrum Scanning Condition

No.	CH	Crystal	Start [mm]	End [mm]	Dwell [msec]	Step(L) [μm]	Acq. time [s]
1	1	TAPH	87.500	237.000	100	50	299
2	1	LDE2H	87.500	237.000	200	100	299
3	2	LDE1	61.500	256.500	200	100	390
4	2	TAP	61.500	256.500	100	50	390
5	3	PETJ	61.500	256.500	100	50	390
6	3	LIF	61.500	256.500	100	50	390
7	4	PETH	87.500	237.000	100	50	299
8	4	LIFH	87.500	237.000	100	50	299

Detailed Setting

Channel: 1 Crystal: TAPH

Start [mm]: 87.500 End [mm]: 237.000

Step(L) [μm]: 50 Acq. Time[s]: 299

Time [msec]: 100

PHA condition

Gain: 32

Hv [V]: 1694

Base level [V]: 0.70

Window [V]: 9.30

Diff / Int: Diff

Specify

Step3 設定分析範圍

滑鼠可直接拖曳

Time(msec): 常用 100~200 msec

設定好參數，要按 Apply

Detailed Setting

Channel: 2 Crystal: TAP

Start [mm]: 133.577 End [mm]: 218.278

Step(L) [μm]: 50 Acq. Time[s]: 85

Time [msec]: 50

PHA condition

Gain: 32

Hv [V]: 1690

Base level [V]: 0.70

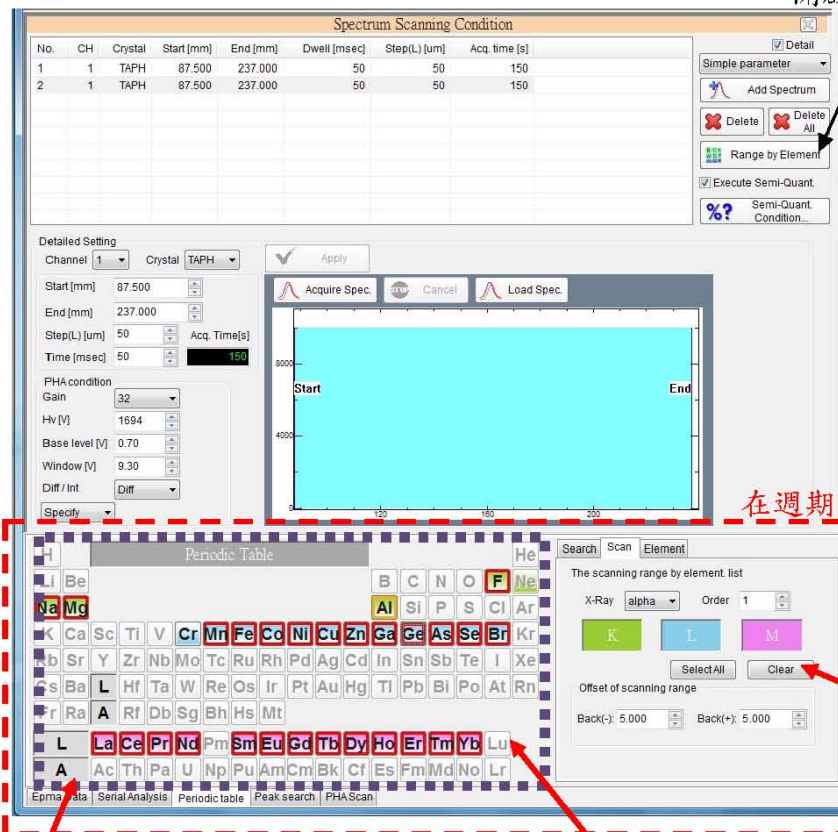
Window [V]: 9.30

Diff / Int: Diff

Specify

Apply

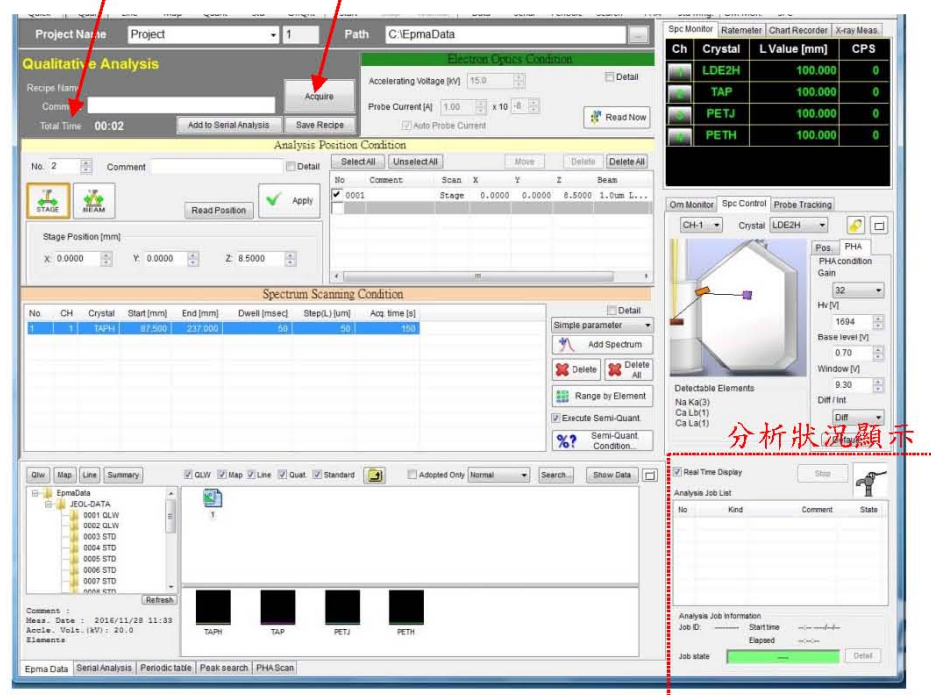
開啟週期表, 選元素



Step5 執行: Acquire

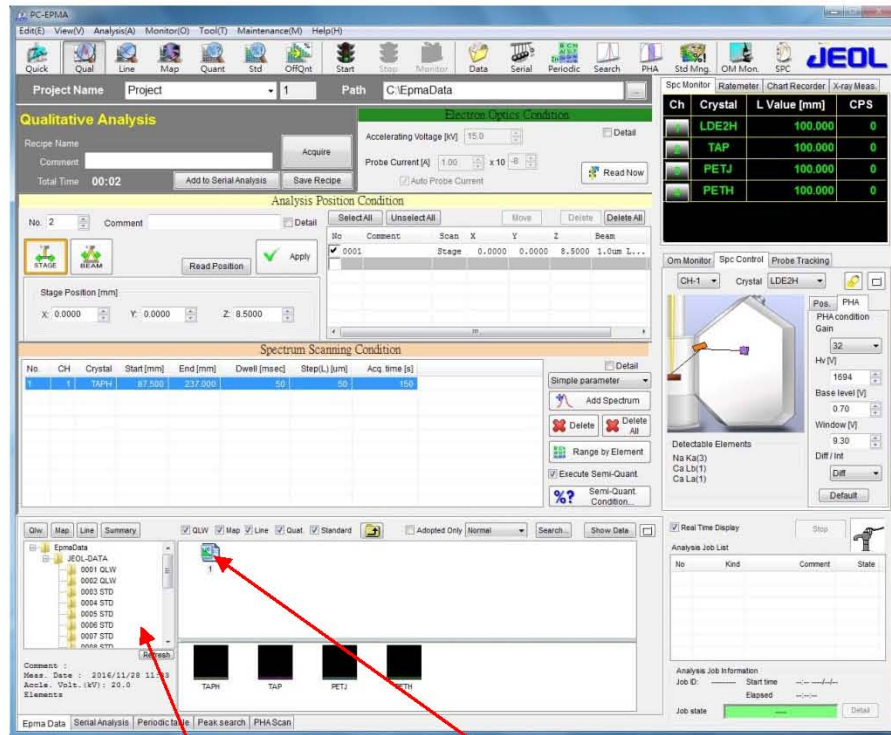
確定分析時間

開始分析



定性分析數據處理

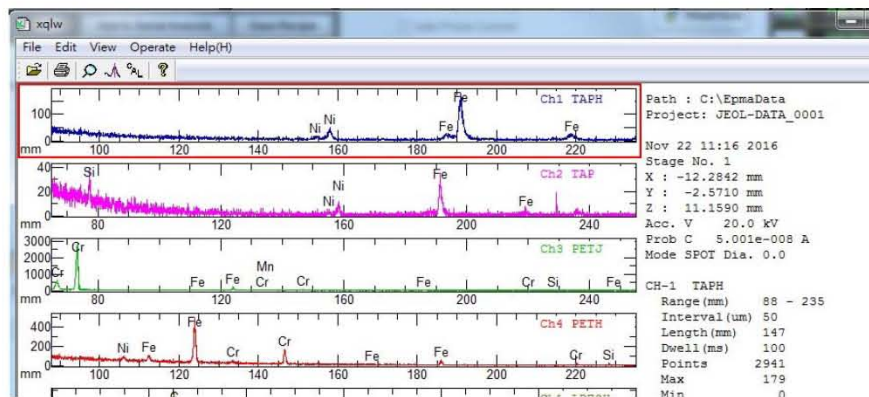
a. 顯示結果



在 Epma Date 檔案尋找檔案

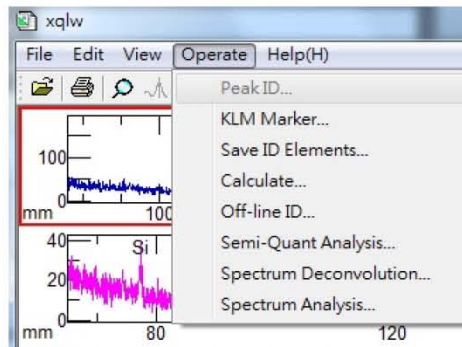
滑鼠連擊二下

出現分析結果



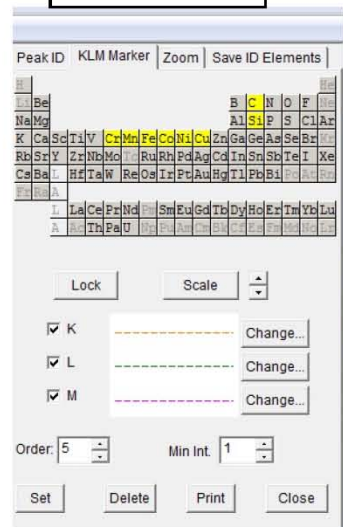
在 peak 訊號足夠時，光譜會自動標示元素，但也可手動標

Operate/ Peak ID



1 新增標示

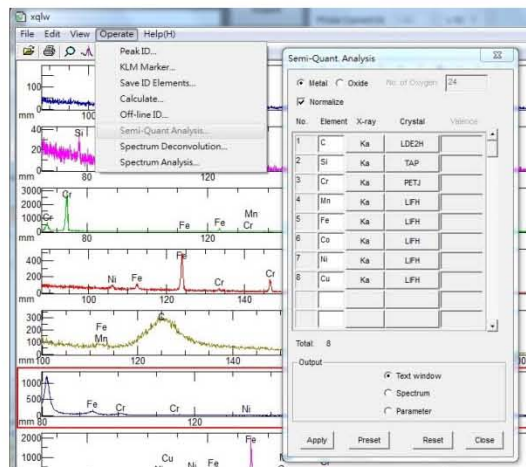
3 存入設定



2 設定確定

顯示定量結果

Operate/ Semi-Quant Analysis,



Unknown Specimen No. 1

Path : KpmData Project : JEDL-DATA/0001 0001

Position No. : 1 Comment :

Stage : X= -12.2842 Y= -2.5710 Z= 11.1590

Acc. Voltage : 20.0 (kV) Probe Dia. : 1.0 Scan : On Mag : 10

Based on Run 22 11116 2016

WDS only No. of accumulation : 1

Cur. (A) : 5.001E-006

Element	Crystal	Peak (nm)	BO (mm)	BO (mm)	Net (cps)	Bg (cps)	Bpe (cps)	K-ratio (K)
1 C	LDE2H	125.000	11.100	39.500	1420.6	266.4	55.0	0.4255
2 Si	TAP	77.250	1.450	3.950	206.0	116.7	70.0	0.157
3 Cr	PET2	73.250	4.000	3.900	29349.5	570.4	430.2	21.629
4 Mn	LIFM	146.350	3.950	3.100	1306.7	130.0	140.0	1.4517
5 Fe	LIFM	134.650	3.950	3.400	59598.7	170.0	230.1	67.232
6 Co	LIFM	124.650	3.950	4.050	415.7	340.1	200.0	0.460
7 Ni	LIFM	115.450	3.200	3.600	6789.0	313.4	236.8	7.263
8 Cu	LIFM	107.300	3.900	2.600	432.5	405.2	346.8	0.474

Total: 8

Output

☒ Text window

☐ Spectrum

☐ Parameter

Apply Preset Reset Close

DAF Metal

Element	Mass (t)	Atom (t)	K (t)	DAF
C	1.679	9.0951	0.4255	9.0337
Si	0.261	0.4800	0.157	1.6911
Cr	19.055	18.9346	21.629	0.8513
Mn	1.456	1.5366	1.4517	1.0216
Fe	68.364	63.2501	67.232	1.0266
Co	0.440	0.4097	0.460	1.0453
Ni	7.812	6.8752	7.263	1.0888
Cu	0.525	0.4260	0.474	1.1154

Total 100.000 100.0000 99.627 Norm.F = 0.991

五、Line 線分析

Line 分析流程

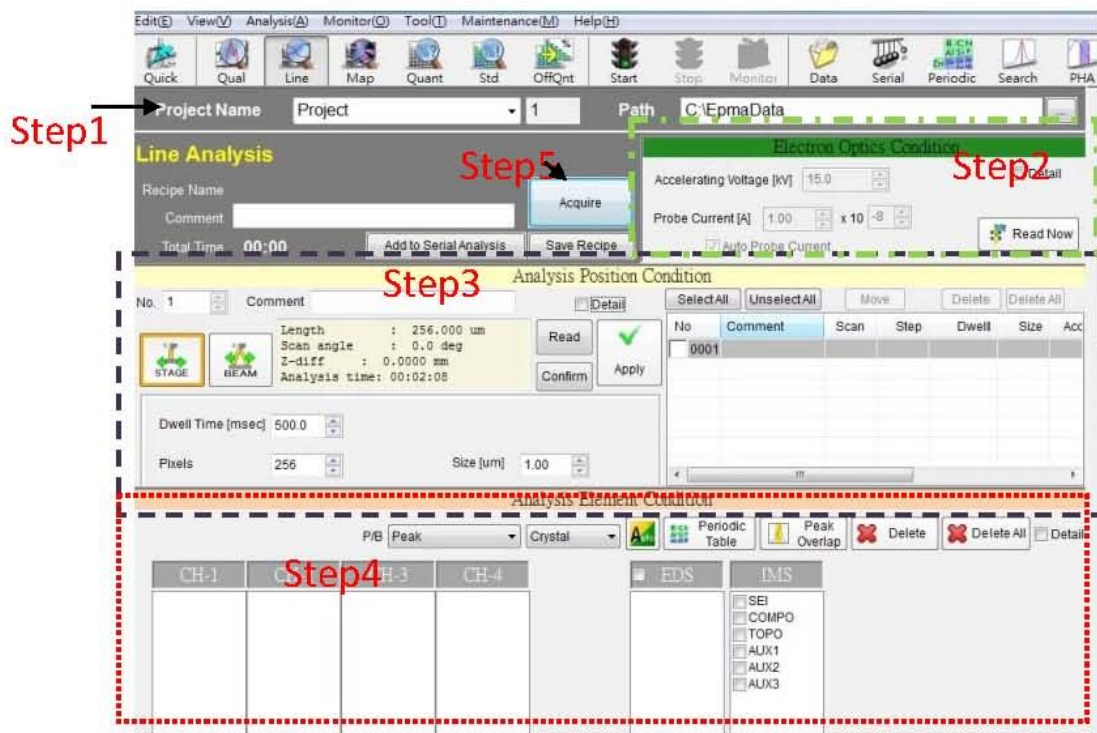
Step1 設定檔案及檔名: Path / Project Name

Step2 設定電流: Electron Optics Condition

Step3 設定位置 :Analysis Position Condition

Step4 設定分析參數: Analysis Element Condition

Step5 執行:Acquire



Step3 設定位置 :Analysis Position Condition

Analysis Position Condition

No. 1 Comment

☒ Detail

Length : 256.000 μm
Scan angle : 0.0 deg
Z-diff : 0.0000 mm
Analysis time: 00:02:08

Dwell Time [msec] 500.0

Pixels 256 Size [μm] 1.00

Accumulation 1

Two points Direction

	X	Y	Z
1.Start	0.1280	0.0000	8.0000
2.End	-0.1280	0.0000	8.0000

Scan Mode Spot

Lock pixel

☐ Z correction

Normal Area

No	Comment	Scan	Step	Dwell	Size	Acc
0001						

Display operation

Analysis Position Condition

No. 1 Comment

☒ Detail

Length : 256.000 μm
Scan angle : 0.0 deg
Z-diff : 0.0000 mm
Analysis time: 00:02:08

Dwell Time [msec] 500.0

Pixels 256 Size [μm] 1.00

Accumulation 1

Two points Direction

Point to set Center

Scan Direction

☐ Z correction

Normal Area

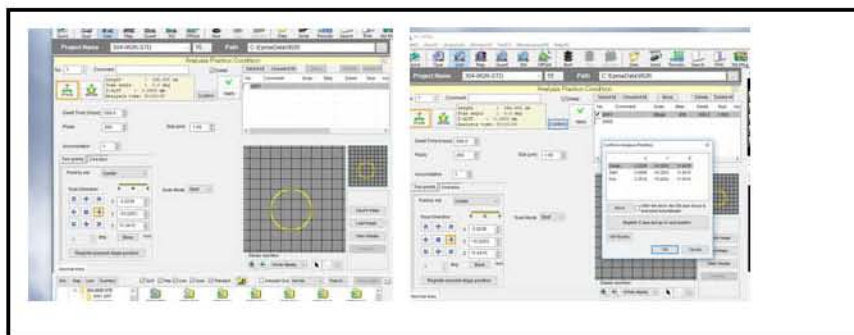
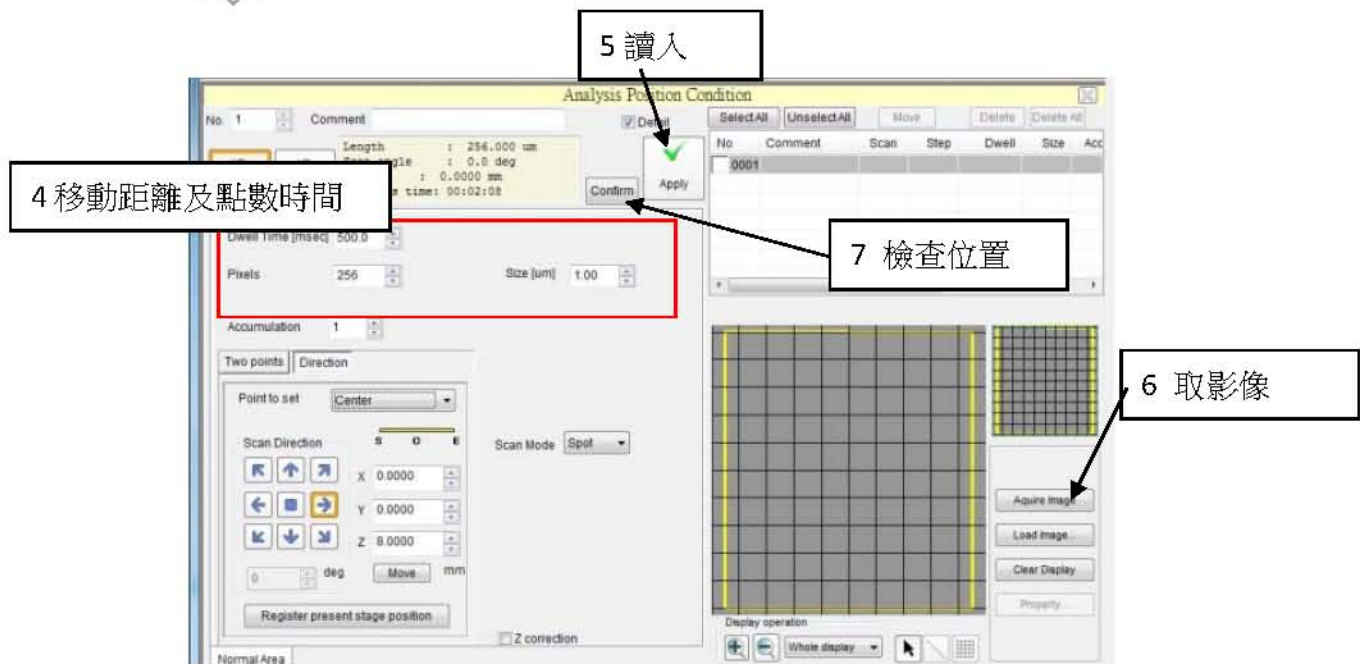
No	Comment	Scan	Step	Dwell	Size	Acc
0001						

Display operation

1 方式 CENTER 最常用

3 移動方向

2 記錄讀值



Step4 設定分析參數: Analysis Element Condition
簡易版

Analysis Element Content

CH-1	CH-2	CH-3	CH-4
	Ni(TAP)	Cu(LIF)	Fe(LIFH) Ti(PETH)

PB Peak ▾
Crystal ▾
 Ni

Periodic Table

Peak Overlay

Delete

Delete All

Detail

Ni

Channel ▾ 2
Crystal TAP ▾ Rd
Peak pos 158.317 ↕ Set
PHA condition Gain 32 ▾
Hv [V] 1690 ▾
Base level [V] 0.70 ▾
Window [V] 9.30 ▾
Diff / Int Diff ▾
Specify ▾

Name Ni_CH2_TAP_La
Add in the data base

Acquire Spec.
 Cancel
 Load Spec.

Periodic Table

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	L	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn						
Fr	Ra	A	Rf	Db	Sg	Bh	Hs	Mt															
L	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu								
A	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr								

Search Element
Qual ID

☒ Optimization

Select from data base
Apply
Move

Name	CH	X-Ray	Cry.	Pos.	mm

Epma Data Serial Analysis Periodic table Peak search PHAScan

六、Map 面分析

Map 分析流程

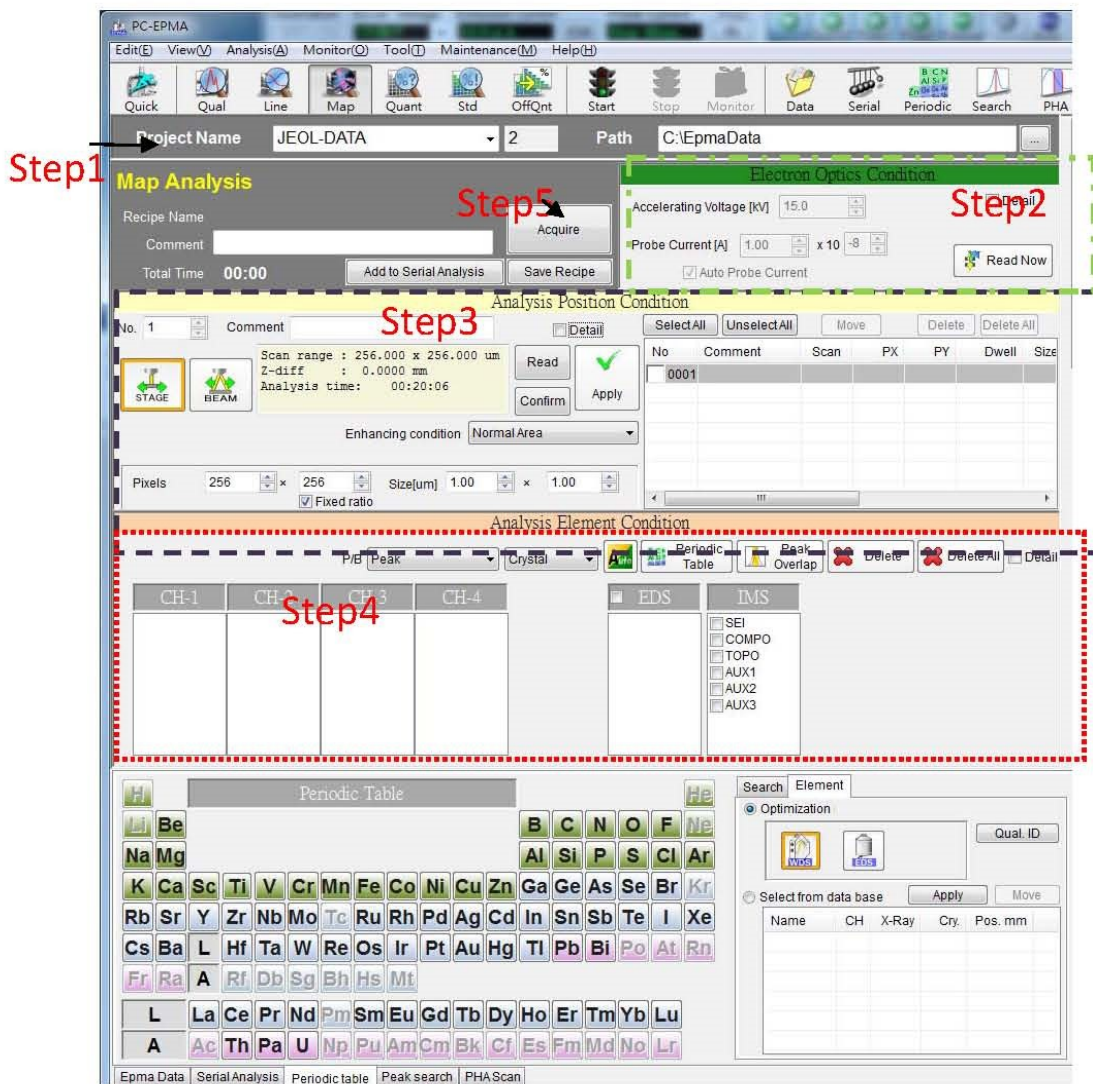
Step1 設定檔案及檔名: Path / Project Name

Step2 設定電流: Electron Optics Condition

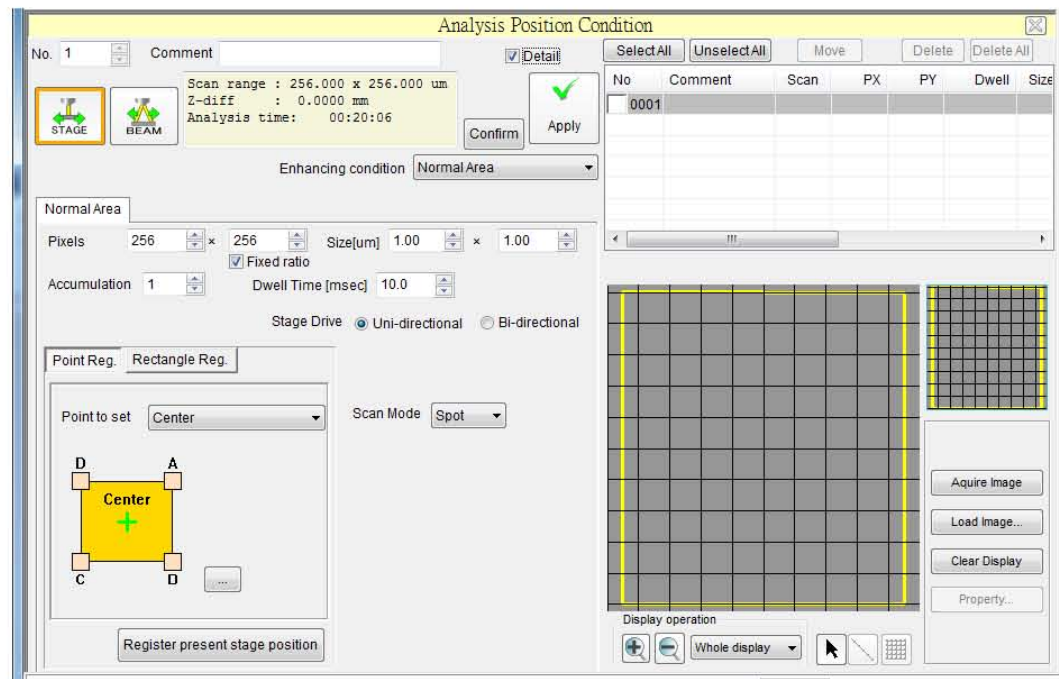
Step3 設定位置 :Analysis Position Condition

Step4 設定分析參數: Analysis Element Condition

Step5 執行:Acquire

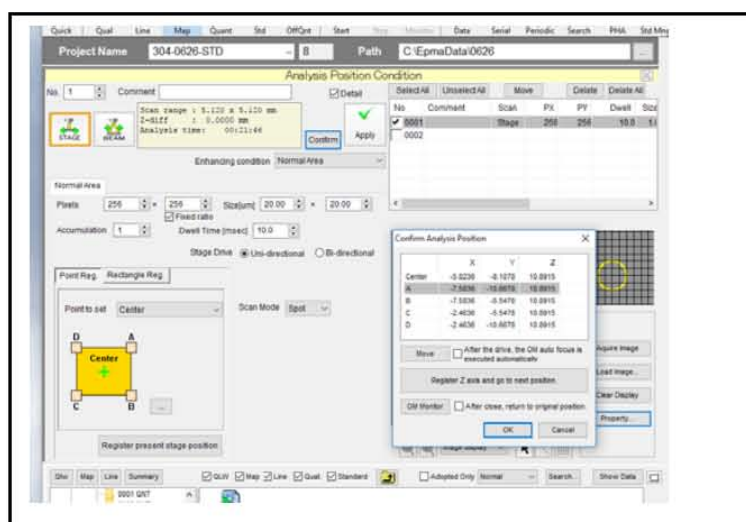


Step3 設定位置 :Analysis Position Condition



按confirm/ 出現Confirm Analysis Position

檢查每一個位置 Z軸 (OM 檢查)



Step4 設定分析參數: Analysis Element Condition 簡易版



Detail詳細版:

Analysis Element Condition

PS Peak Crystal Periodic Table Peak Overlap Delete Delete All Detail

CH-1	CH-2	CH-3	CH-4
Cr(TAPM)	Si(CHN)	Cu(LF)	Ti(PEH)

EDS EDS

VO6 parameter

X-Ray: **Si**
Order: **1**
Name: **Si_CH2_TAP_Ka**
Add in the data base

Channel: **2**
Crystal: **TAP** Rd
Peak pos: **77.297** Set
PMA condition
Gain: **92**
Hu (V): **1500**
Base level (V): **0.70**
Window (V): **9.30**
Diff/Int: **Diff**
Specify

Acquire Spec Cancel Load Spec



Periodic Table

Search Element

Optimization

Select from data base Apply Move

Name	CH	X-Ray	Qty	Pos. mm

Epma Data Serial Analysis Periodic table Peak search PMA Scan

七、Quant 分析

Quant 分析流程

Step1 設定檔案及檔名: Path / Project Name

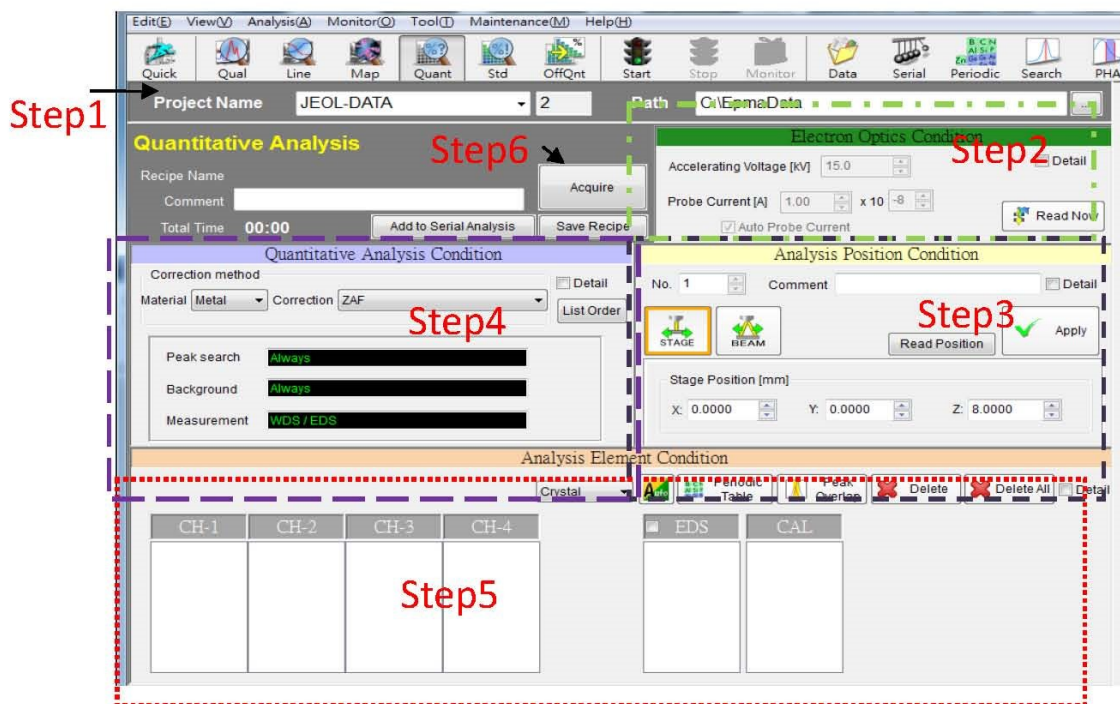
Step2 設定電流: Electron Optics Condition

Step3 設定位置 :Analysis Position Condition

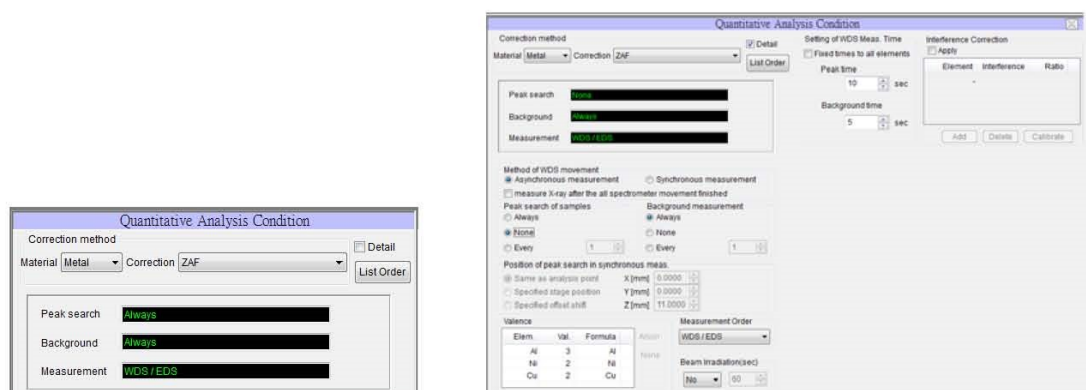
Step4 設定定量參數: Quantitative Analysis Condition

Step5 設定分析參數: Analysis Element Condition

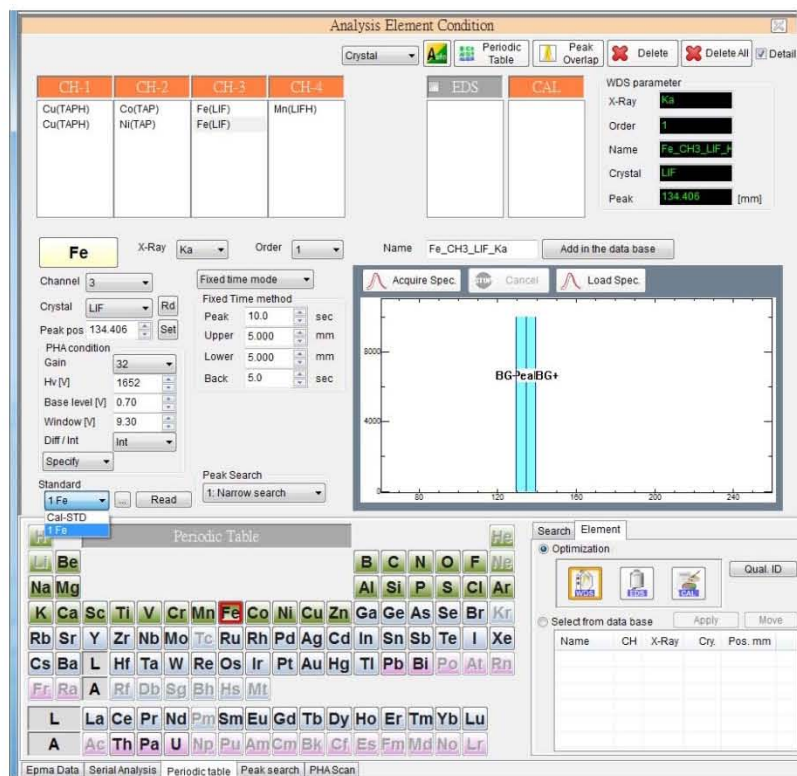
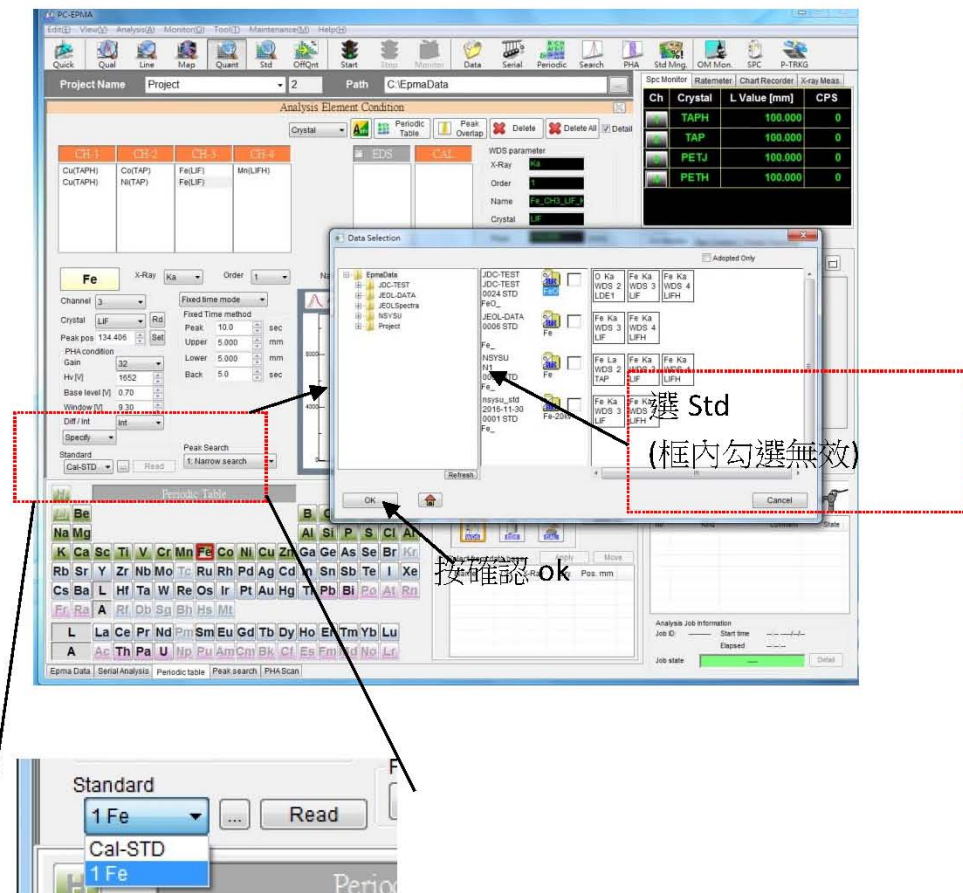
Step6 執行:Acquire



Step4 設定定量參數: Quantitative Analysis Condition

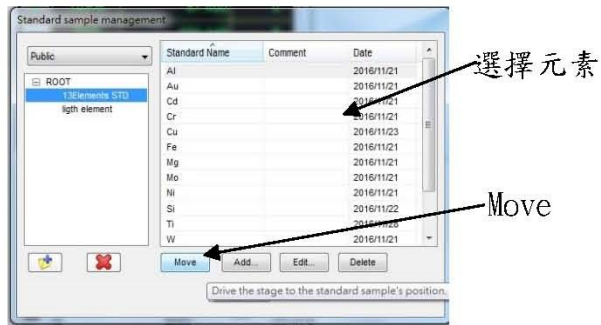
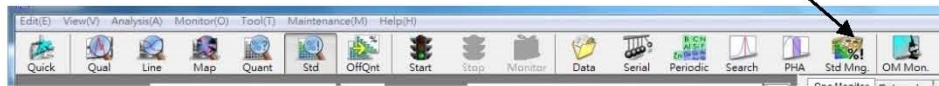


Step5 設定分析參數: Analysis Element Condition

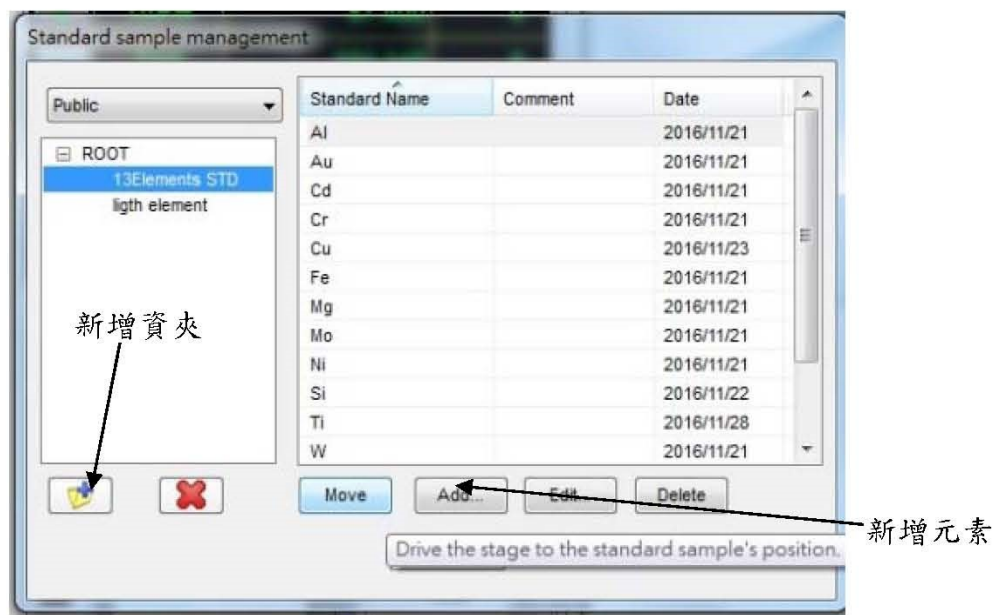


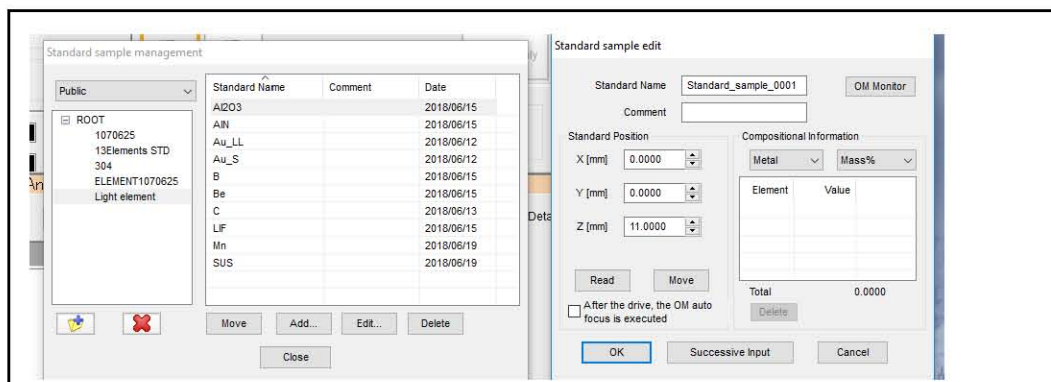
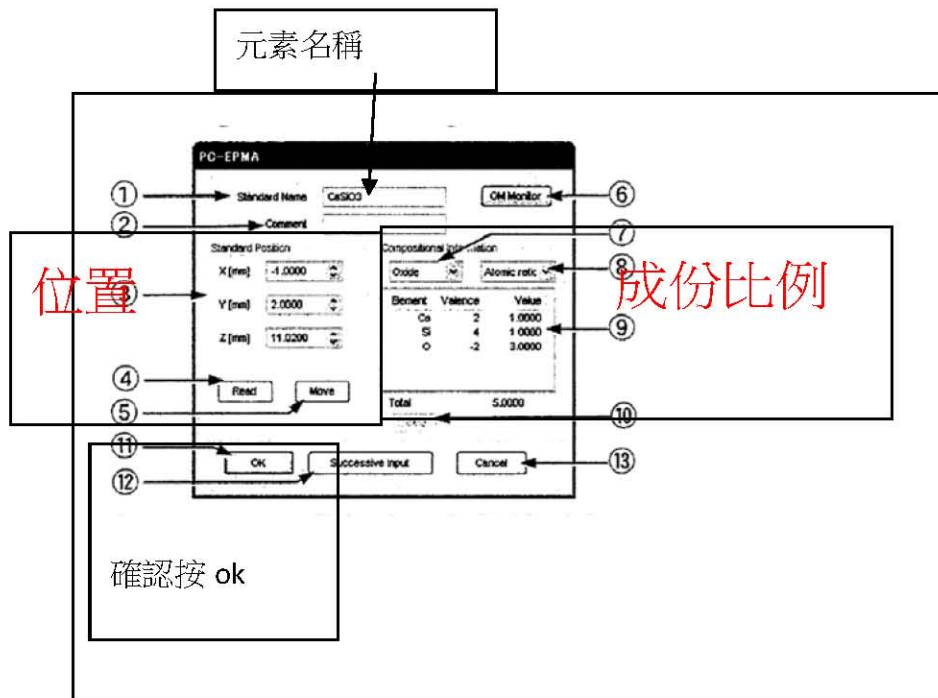
八、Std 建立標準檢量線

按 Std Mng 快速找到標準樣品位置



先建立 STD 樣品的位置座標及成份





Std 建立流程:

Step1 設定檔案及檔名: Path / Project Name

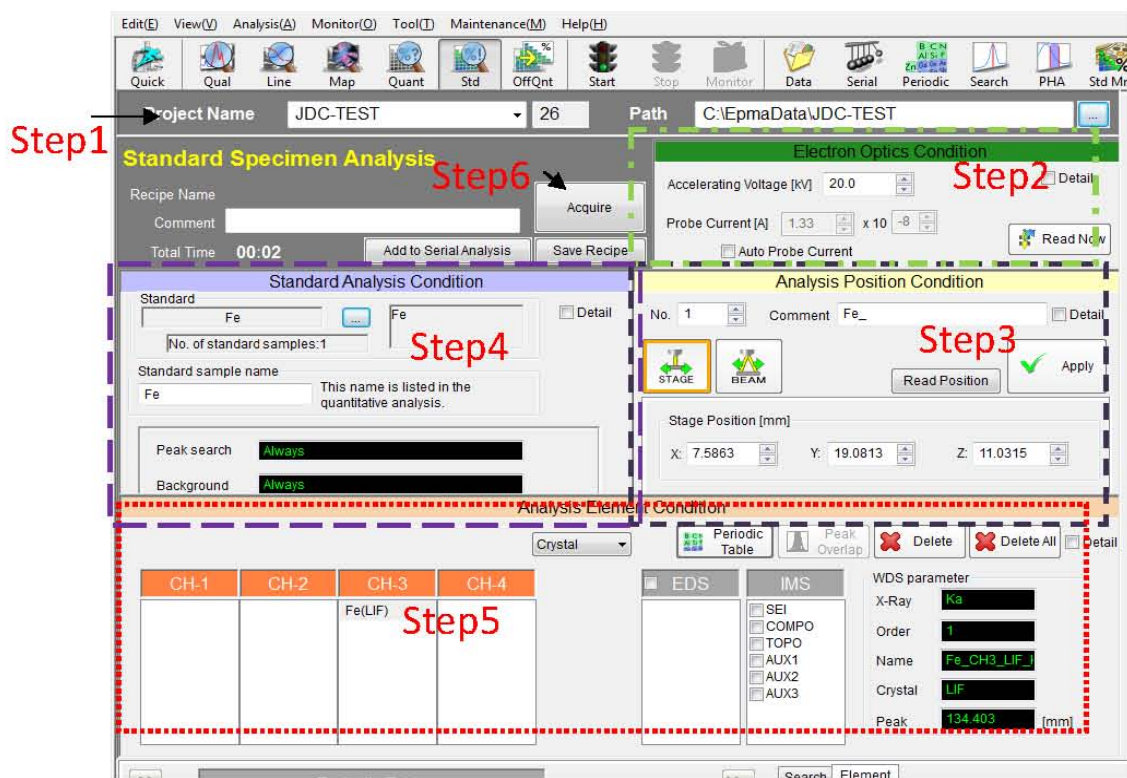
Step2 設定電流: Electron Optics Condition

Step3 設定位置 :Analysis Position Condition

Step4 設定 Std 分析參數: Standard Analysis Condition

Step5 設定元素分析參數: Analysis Element Condition

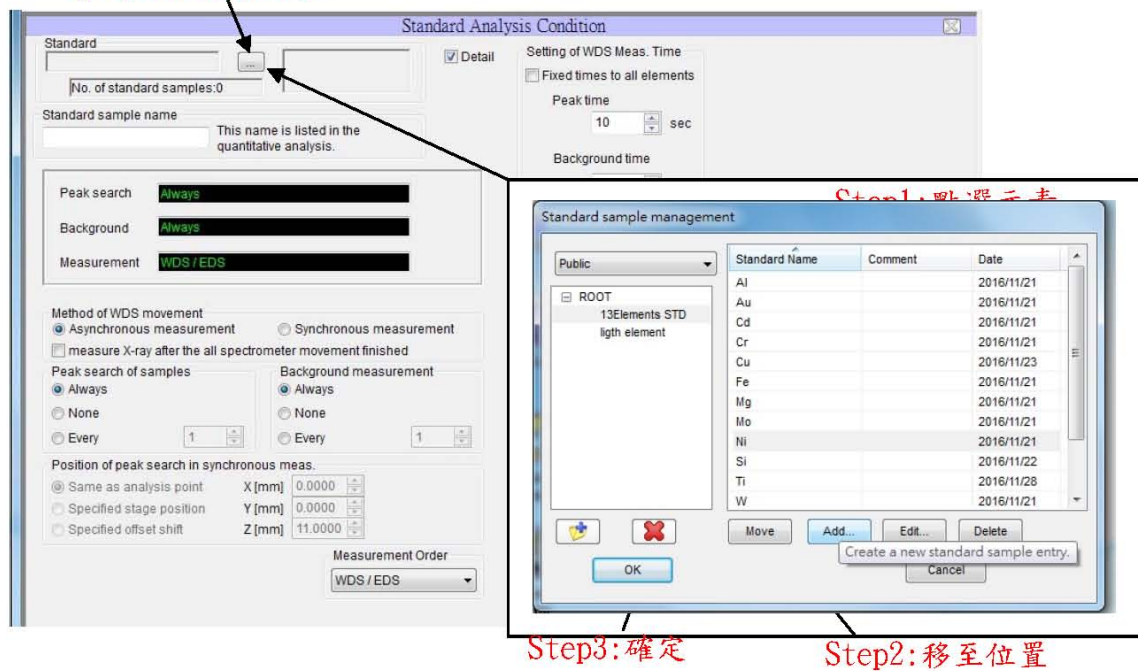
Step6 執行:Acquire



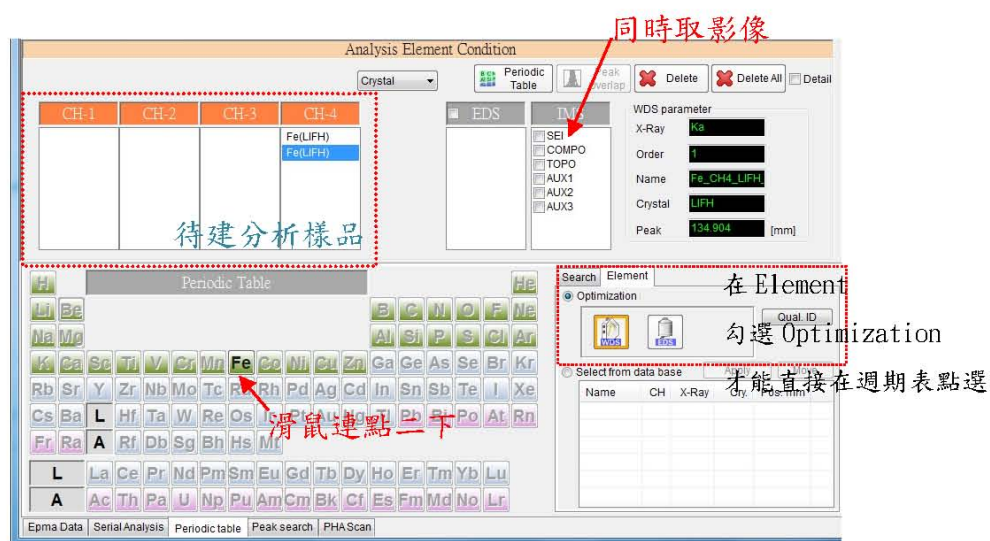
1.Path :注意檔案位置必須在 C : \ EpmaData \

Step4 設定 Std 分析參數: Standard Analysis Condition

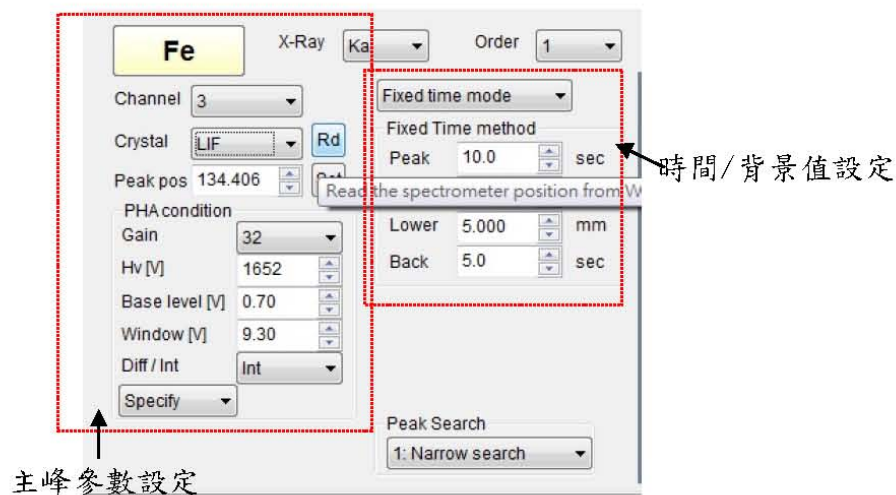
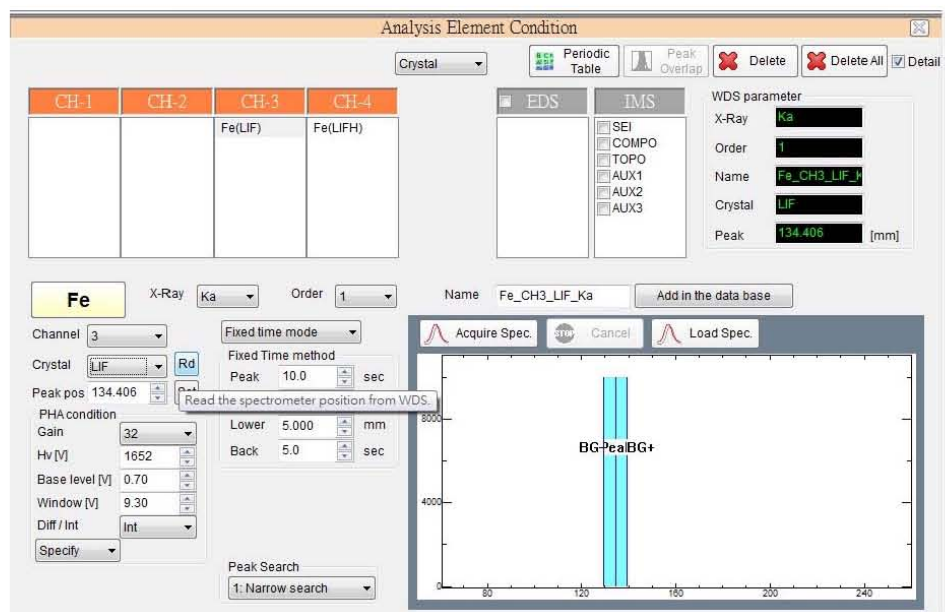
移到 Std 元素位置



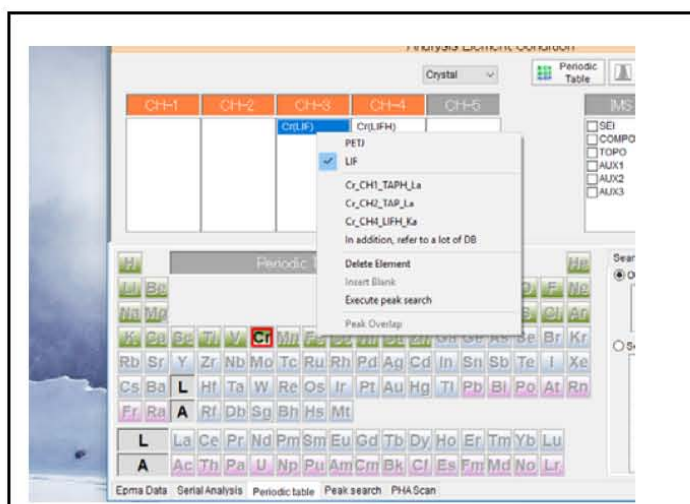
Step5 設定元素分析參數: Analysis Element Condition



Detail : 詳細設定

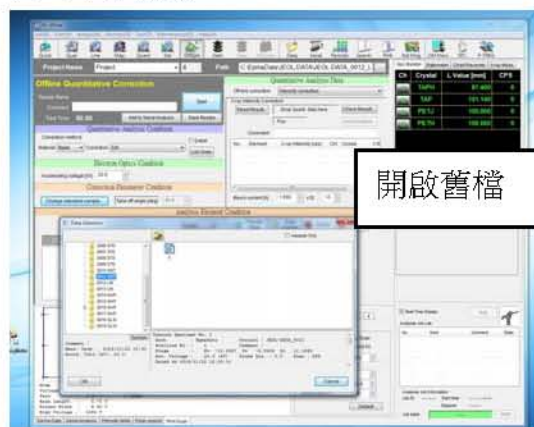


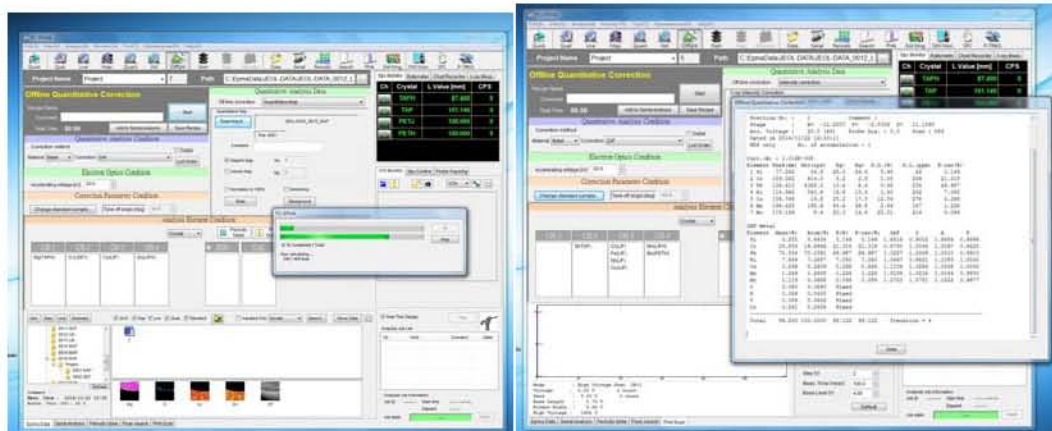
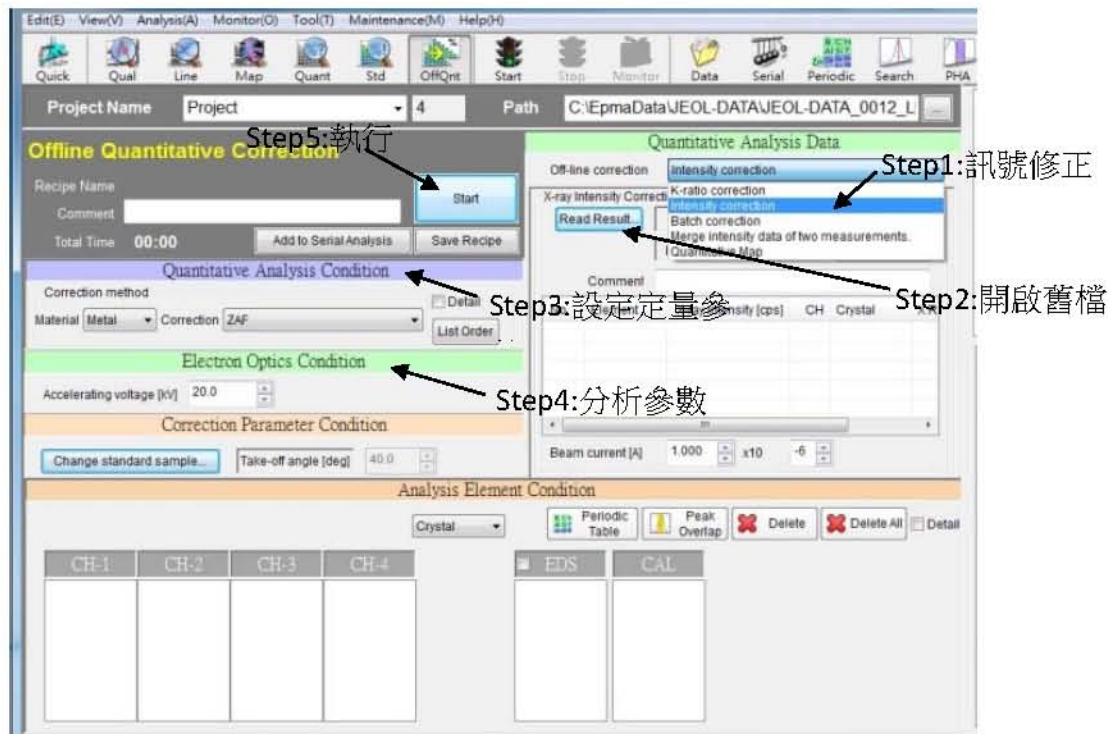
按滑鼠右鍵/ 出現快選可更換不同晶體



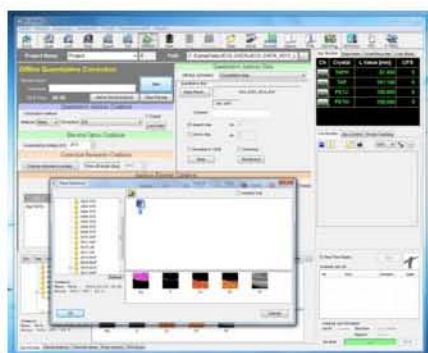
七. OffQnt 重新定量分析

重新計算濃度





Map 轉換 Quant Map
開啟舊檔



設 Quantitative Map

Off-line correction ☒ Intensity correction

X-ray Intensity Corrected

Read Result

K-ratio correction

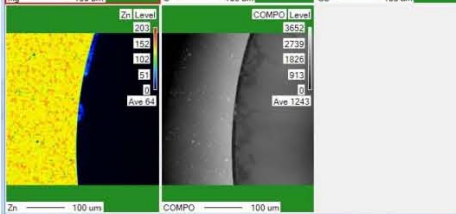
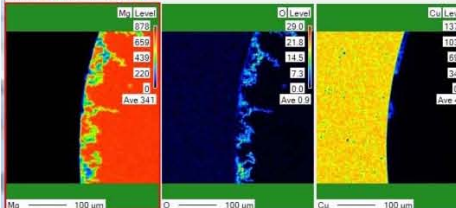
Batch correction

... Merge intensity data of two measurements.

Quantitative Map

Comment

No.	Element	X-ray intensity [cps]	CH	Crystal	X R
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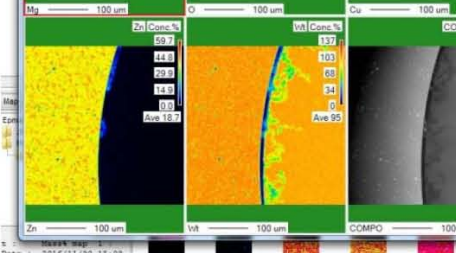
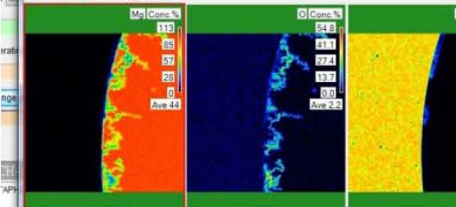
Path : C:\EpmData
Project: JEOL-Data_0015_MAP

2016/11/22 T 03:08:38
Stage Scan
Acct: V 20.0 KV
Prob: C 9598E-009A
Mode: SPOT
Pilot Diam: 0.0 (um)
DwellTime: 0.00
Stage No.: 1
X: 170.7355 mm
Y: 149.714 mm
Z: 12.9775 mm
Direction: Single
Points: 402X400
Retraction(X): 1.00
Y: 1.00
Length (mm) X:400.00
Y:400.00

Mg WD6 1th TAPH
Ka Order 1
Peak Pos. 107.40000 mm
Accum.: 1
Max: 876.0000
Min: 0.0000
Avg: 340.6999
A.B. value 0.0000, 0.0000
S.Drive 1.0609

O WD6 2th LDE1
Ka Order 1
Peak Pos. 110.04300 mm
Accum.: 1
Max: 29.0000
Min: 0.0000
Avg: 0.878

```



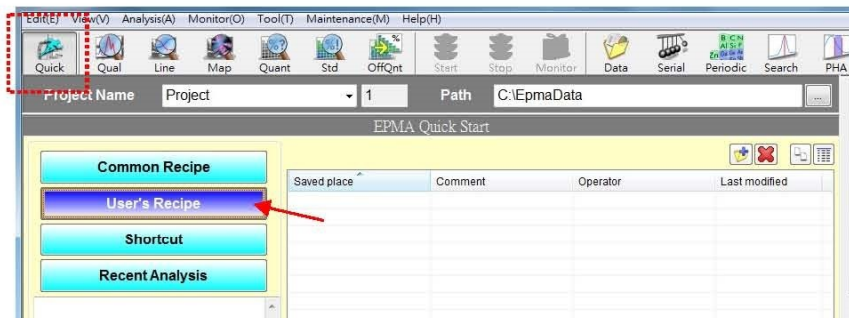
Path C:\EpmData
Project, Object_MAP
Mass% map: 1

2016/11/30 T-F 03:08:30
Stage Scan
Acc V 20.0 V
Mod: SPOT
Prob Dura 0.0 (um)
Dwell/line 20.00
Stage No. 1
X: 10.7353 mm
Y: 14.9714 mm
Z: 10.9715 mm
Direction: Single
Points: 400 X 400
Interval/um X:1.00
Y:1.00
Length (um) X:400.00
Y:400.00

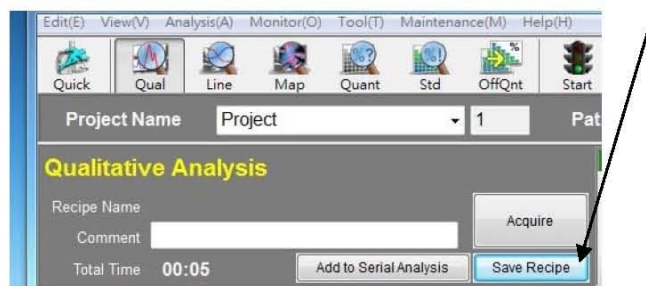
Mag WDS 1ch TAPH
Ka Order: 1
Peak Pos: 107.4600 mm
Accum 1
Max 113.1900
Min 0.0000
Ave 44.013
AB value 500 1000.0 0.0000
S Offset 1.0430

0 WDS 3ch LDE1
Ka Order: 1
Peak Pos: 110.0430 mm
Accum 1
Max 54.776
Min 0.0000
Ave 2.152

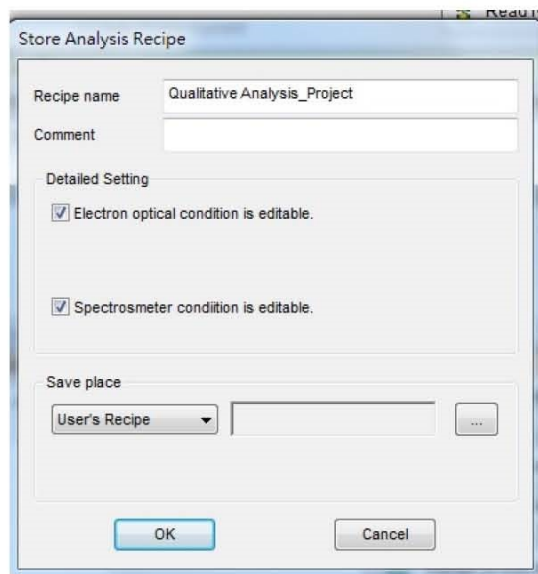
十、User Recipe 建立



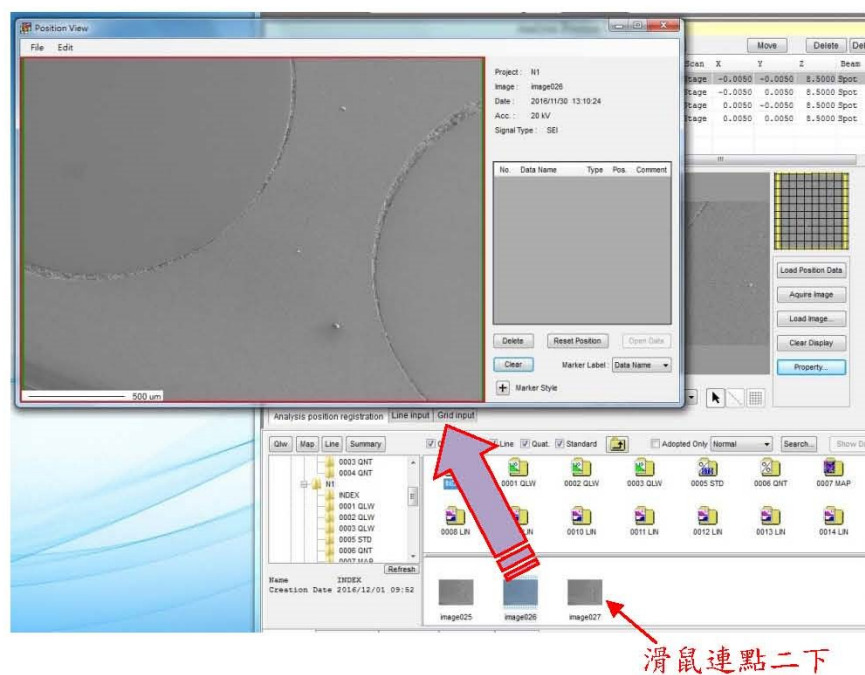
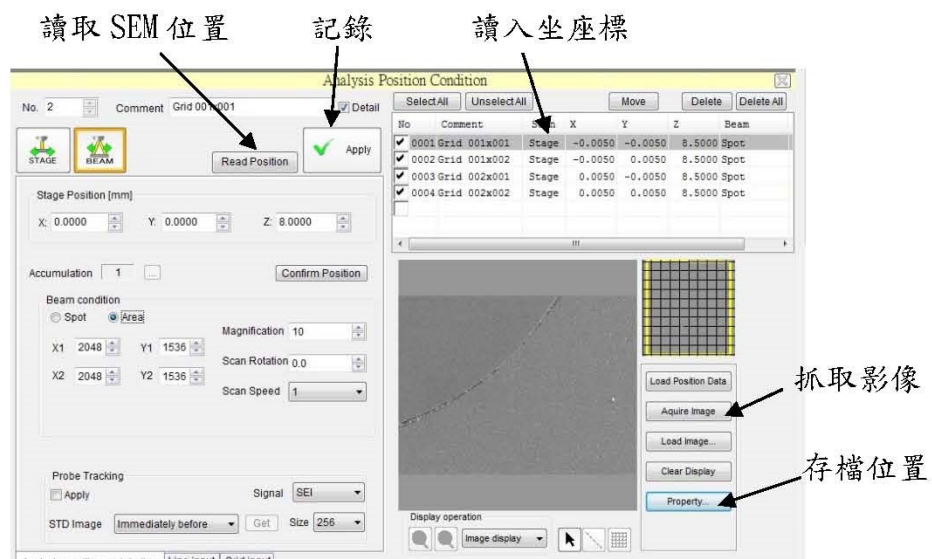
在主要分析模式中設定好所有參數，再按 Save Recipe

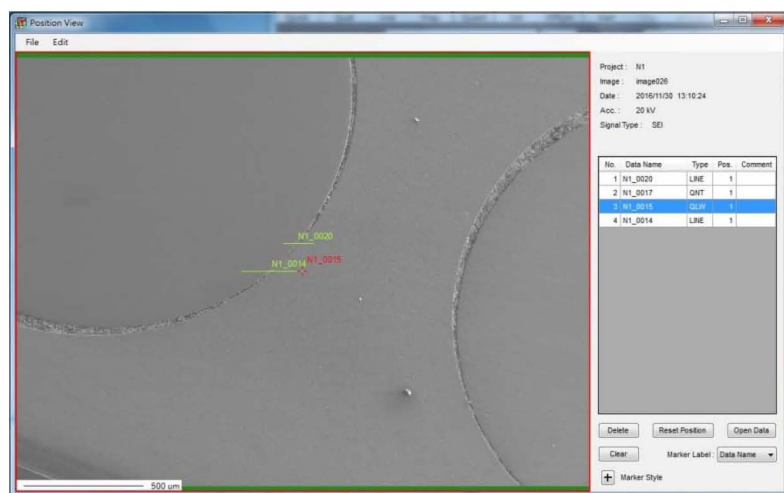
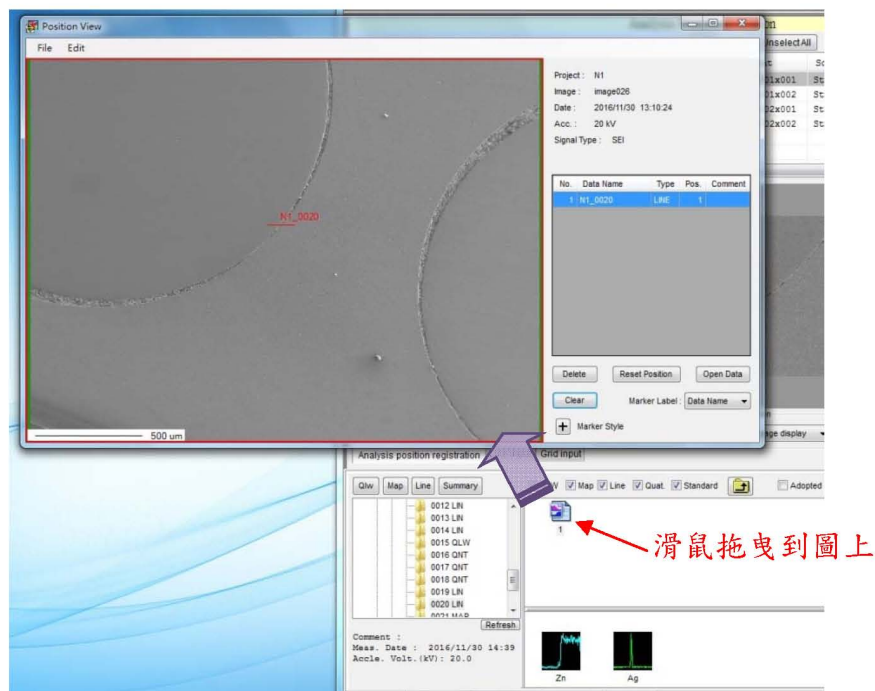


存入分析參數，按入 ok 即可



十一、影像位置記錄





可在同一張圖上新增很多位置

十二、PHA設定更動(peak overlap 使用)

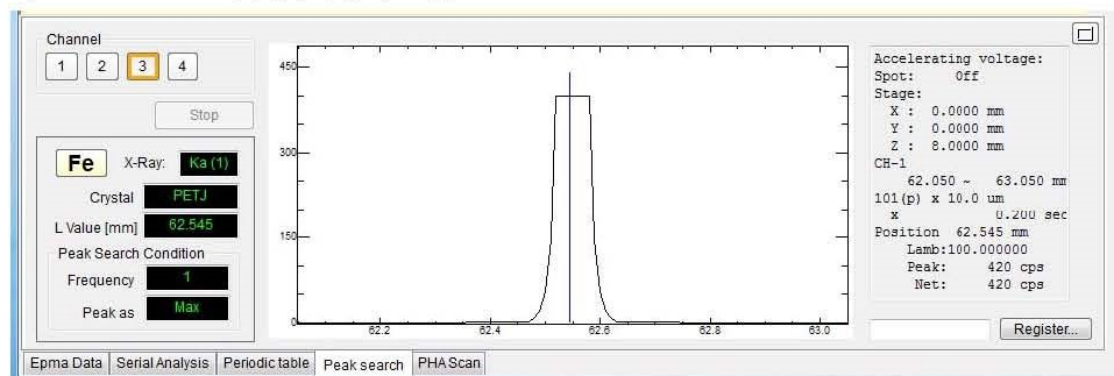
Step2: 滑鼠點選元素

Step3: 設定參數

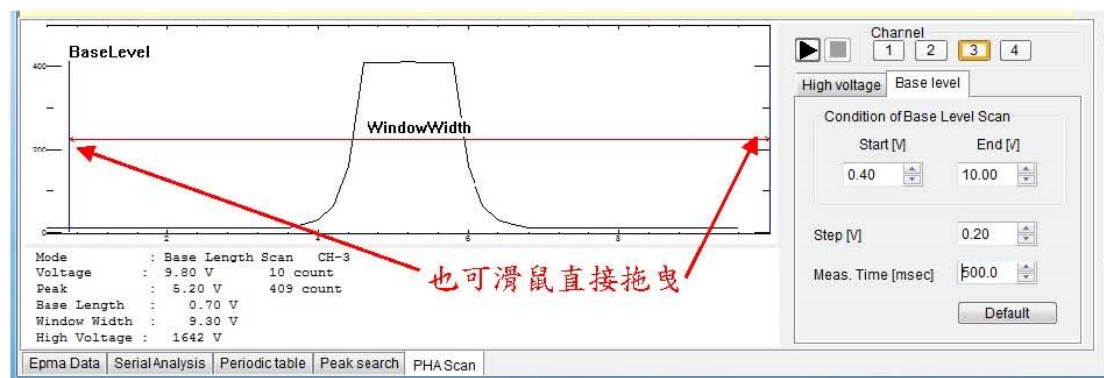
Step1: 到 Periodic table 週期表

Step4: 執行

到 Peak search 視窗，觀測訊號



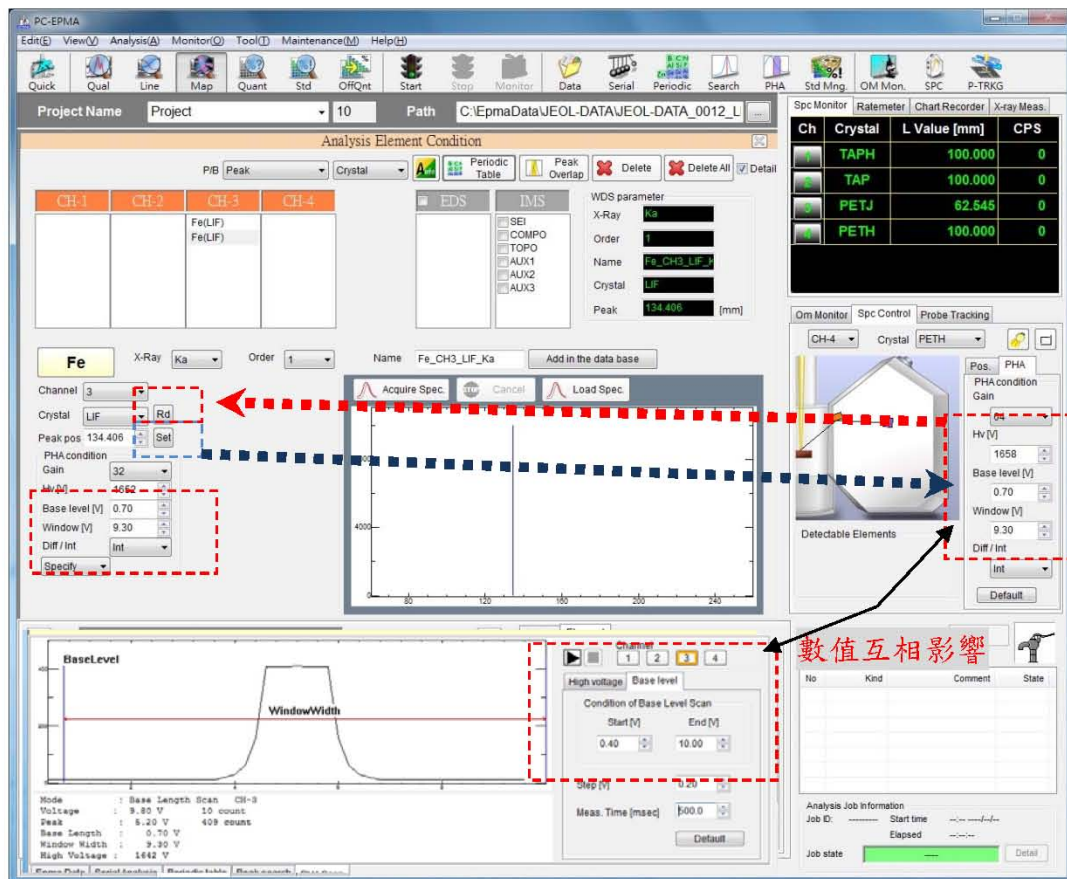
到 PHA Scan 視窗



在 Base Level 設可接收範圍 Star(v)~ End(v)

Step 設定: 0.1 或 0.2

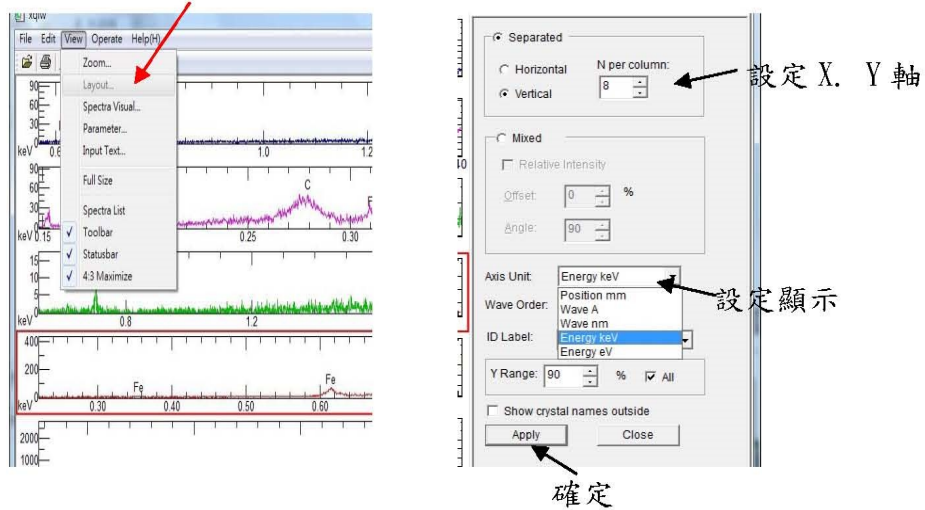
Meas Time: 500 或 1000 (手冊 0.1 / 1000 ; 原廠人員 0.2/500)



十三、數據處理

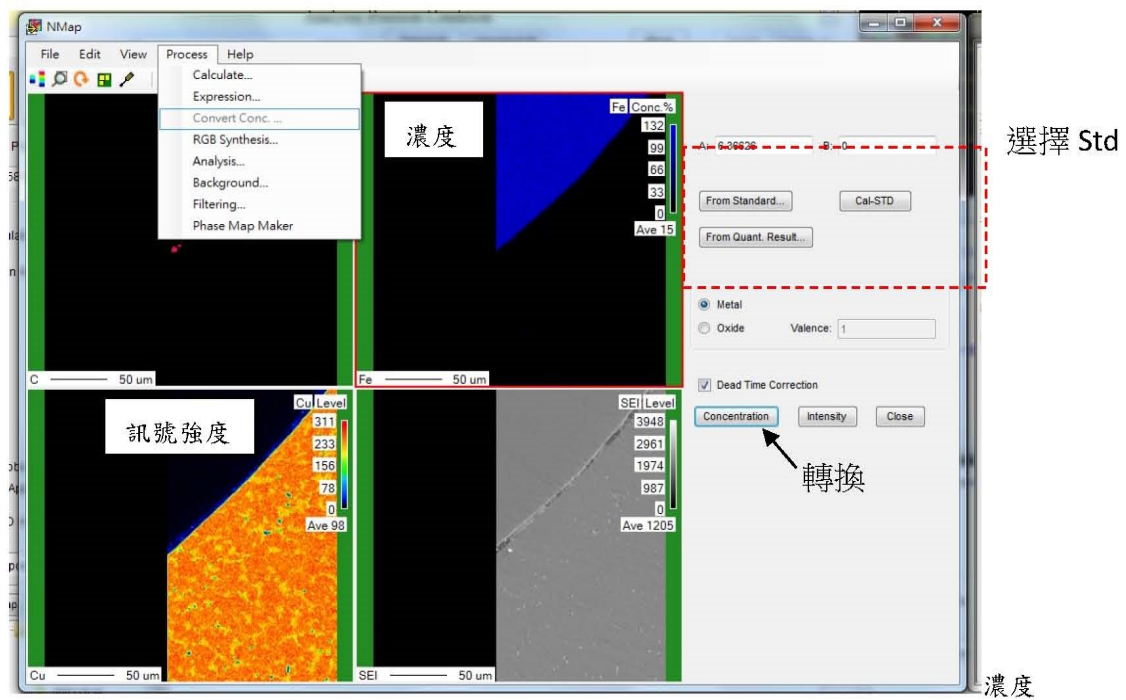
A. 顯示座標變更 (Position mm/ K ev / Wave)

分析結果 View/ Layout

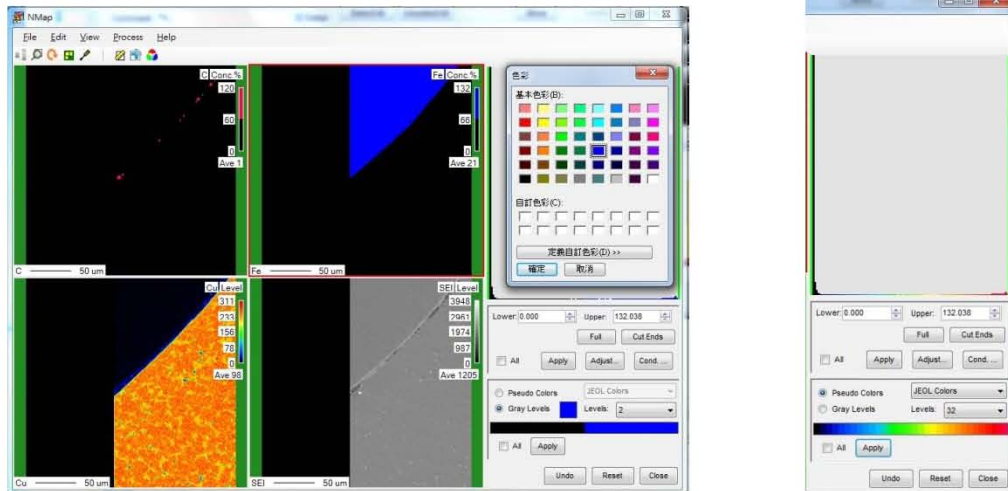


B. Map 訊號分佈圖 轉成定量圖

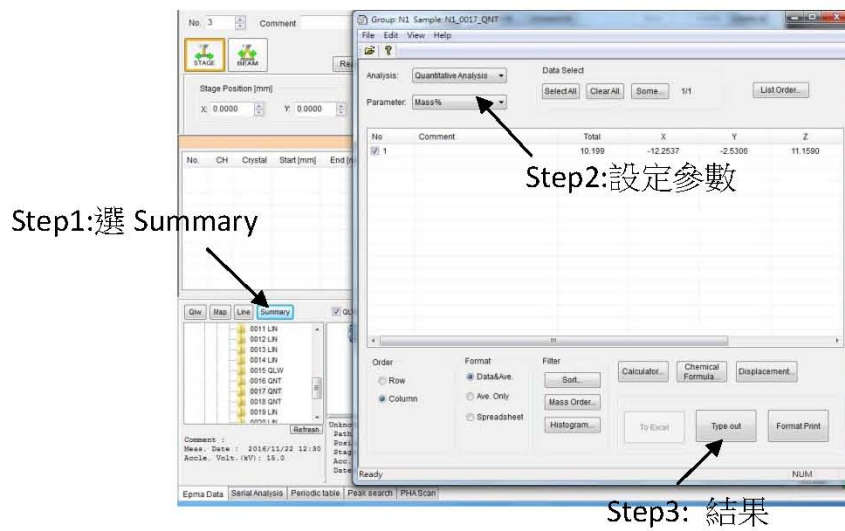
Process/ Convert Conc. 開啟小視窗

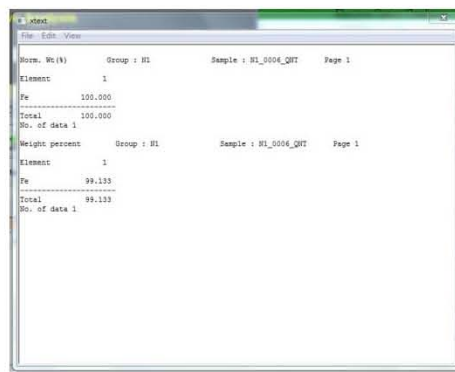
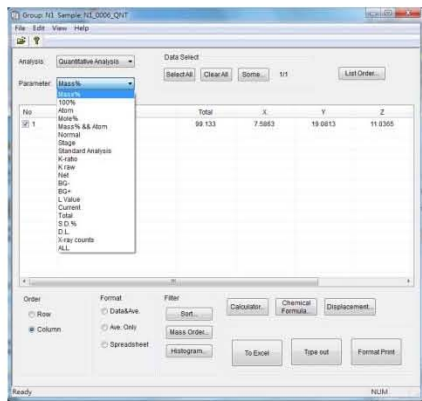


C. Map 圖顏色更改



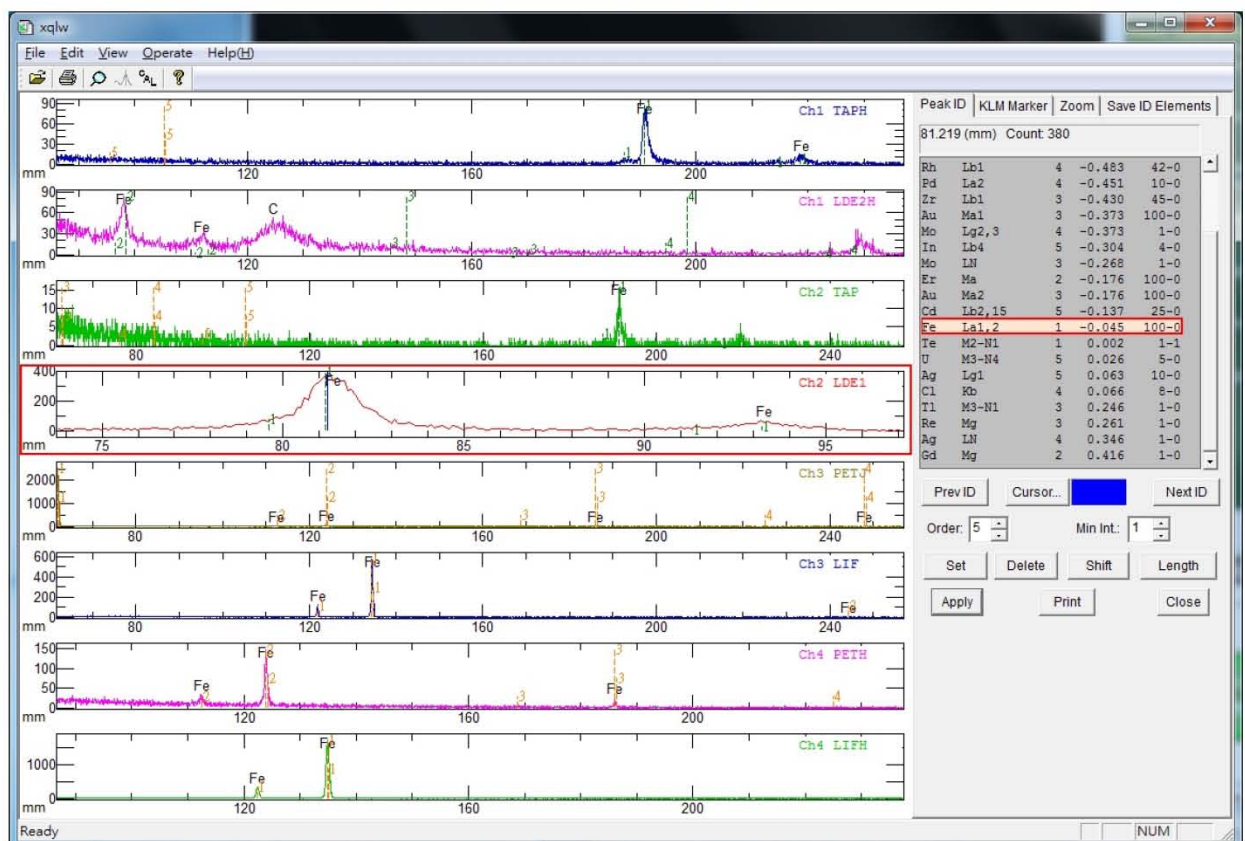
D. Quant 結果 normalize (100%)

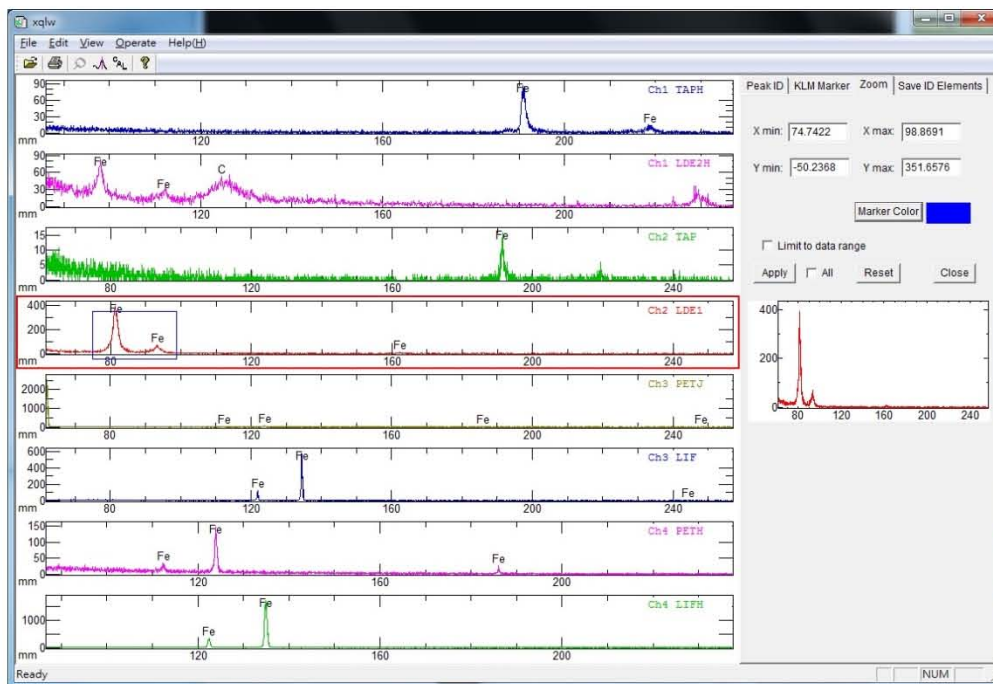




E. 未知元素分析

在分析結束後，電腦會自動標示元素，但在訊號過低時，可自行標註





機台規格介紹

分光器種類 X-ray Spectrometer

Type	XCE XM-86010	XCE (FCS) XM-86040	H XM-86030	TXE XM-86020
Rowland circle range(mm)	140	140	100	140
Spectrometer drive range(mm)	61.5~260	70~260	86.4~240.5	60.5~260
Type of detector	GPC/XPC	GPC	GPCH/XPCH	GPC/XPC
Number of Crystal	2	4	2	2
features	高解析	全方位 可分析所有元素	高感度 低濃度	Large crystal 針對輕元素

PHA (Pulse Height Analyzer)電荷脈衝分析儀

將類比訊號轉為數位訊號