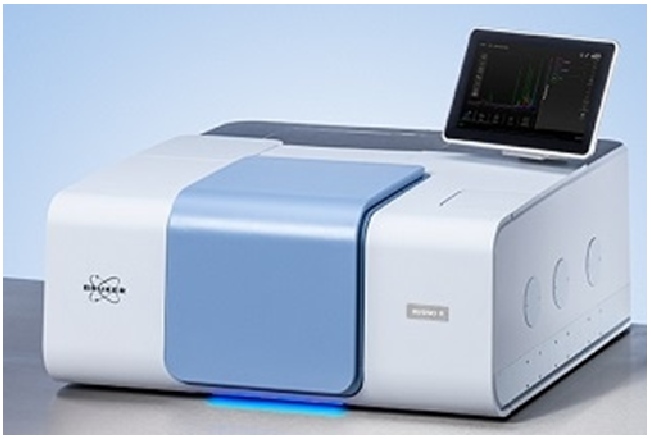
全場式紅外光譜儀

操作手冊

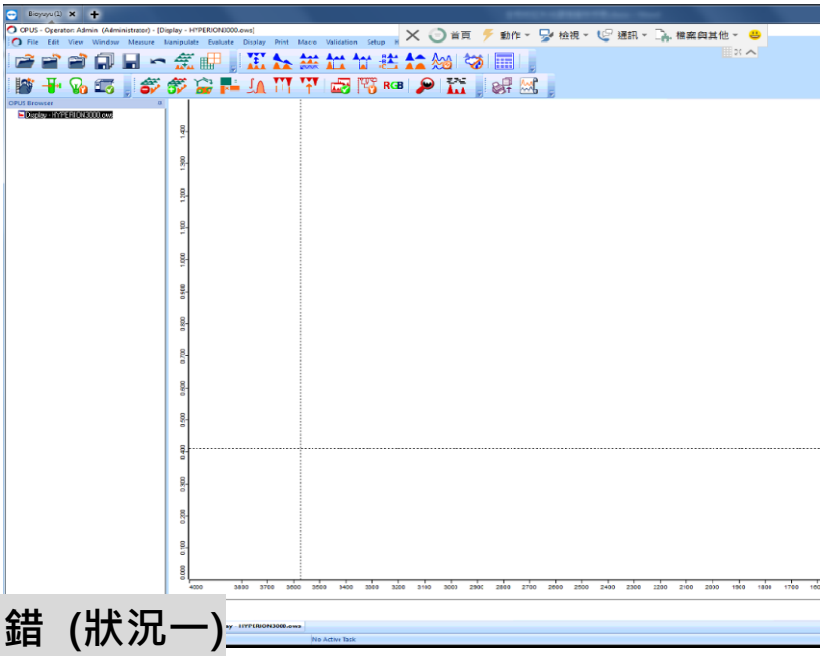
Focal-Plane Array Infrared Microsprctrocopy

User Manual



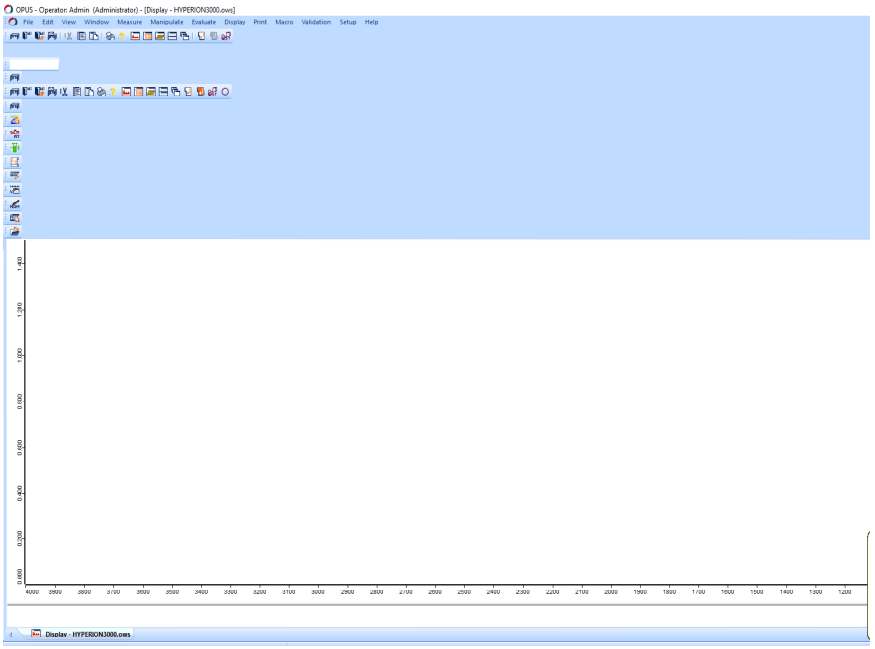
BL14A1 紅外光束線實驗站

OPUS8.1 軟體正確開啟畫面



軟體畫面出錯 (狀況一)

Hypersion3000.ows 出錯時顯示畫面



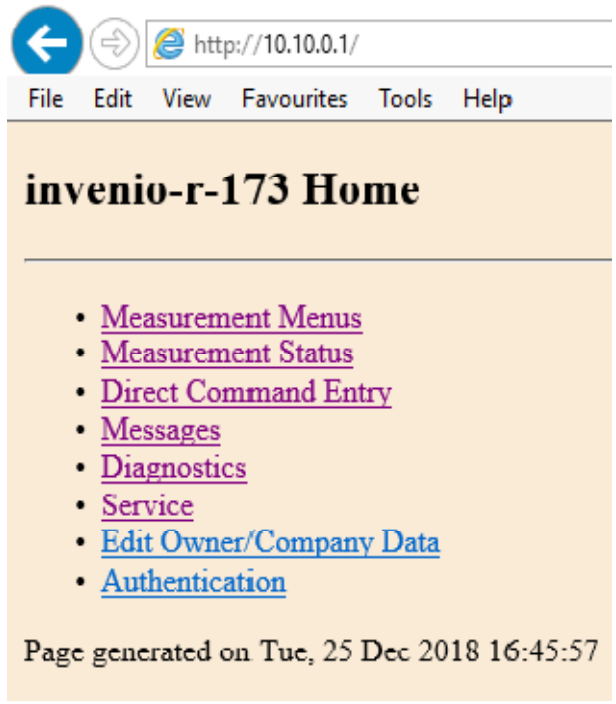
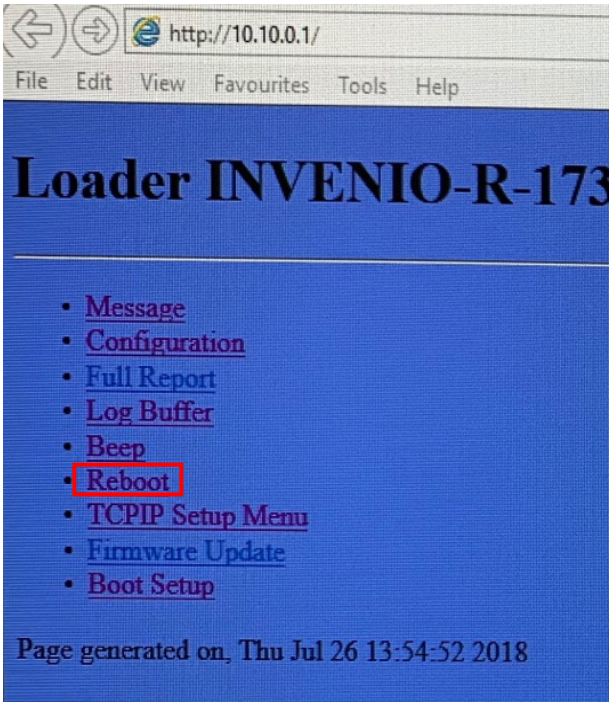
處理方法：複製備份的 Hypersion3000.ows 檔案，並覆蓋原始檔案

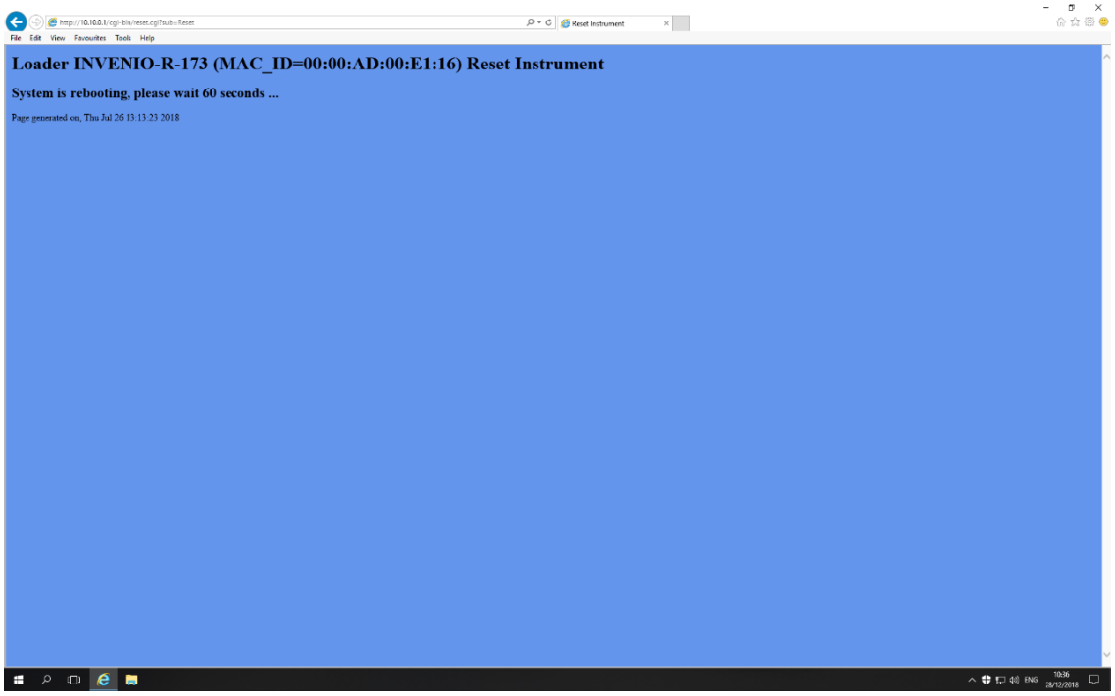
複製檔案路徑（c:/INV-R173/Hypersion3000.ows）

覆蓋原始檔案路徑(c:/Users/Public Documents/Bruker/OPUS_8.1.29)

IE 連線出錯 (狀況二)

錯誤連線後畫面處理方法：Reboot → Reset

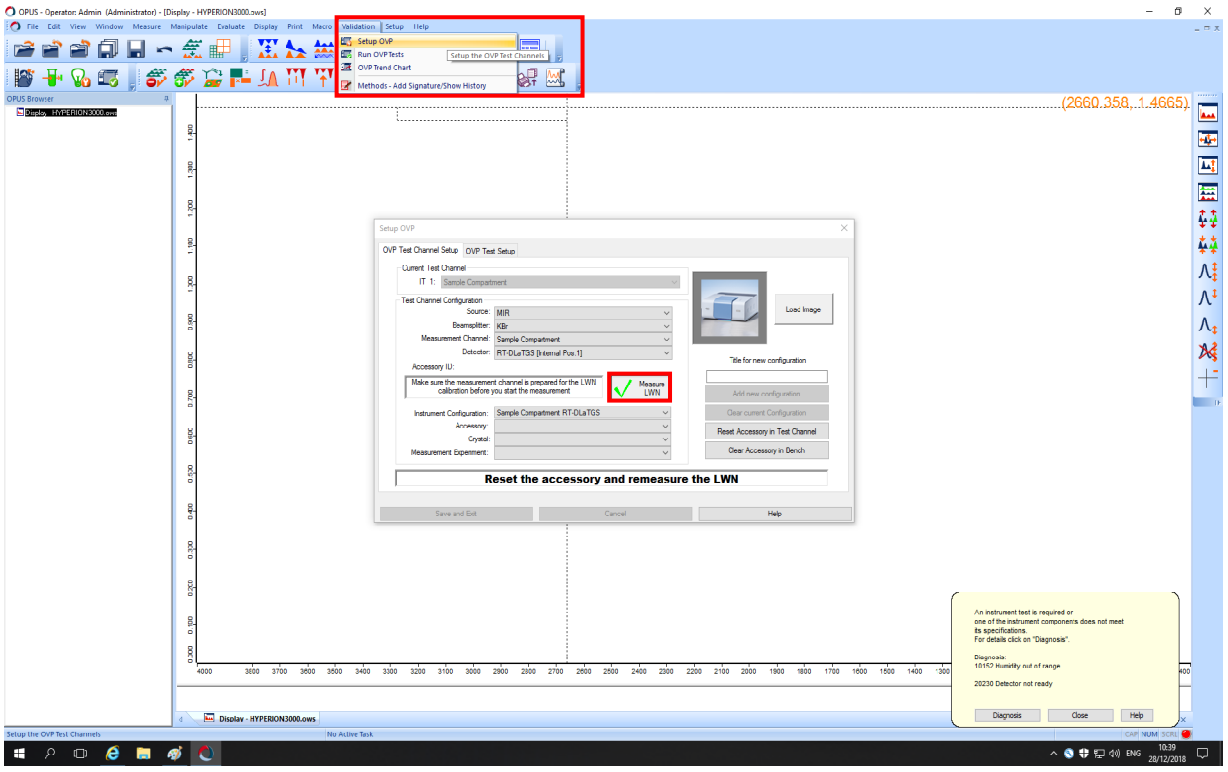
正確連線後畫面	錯誤連線後畫面
	



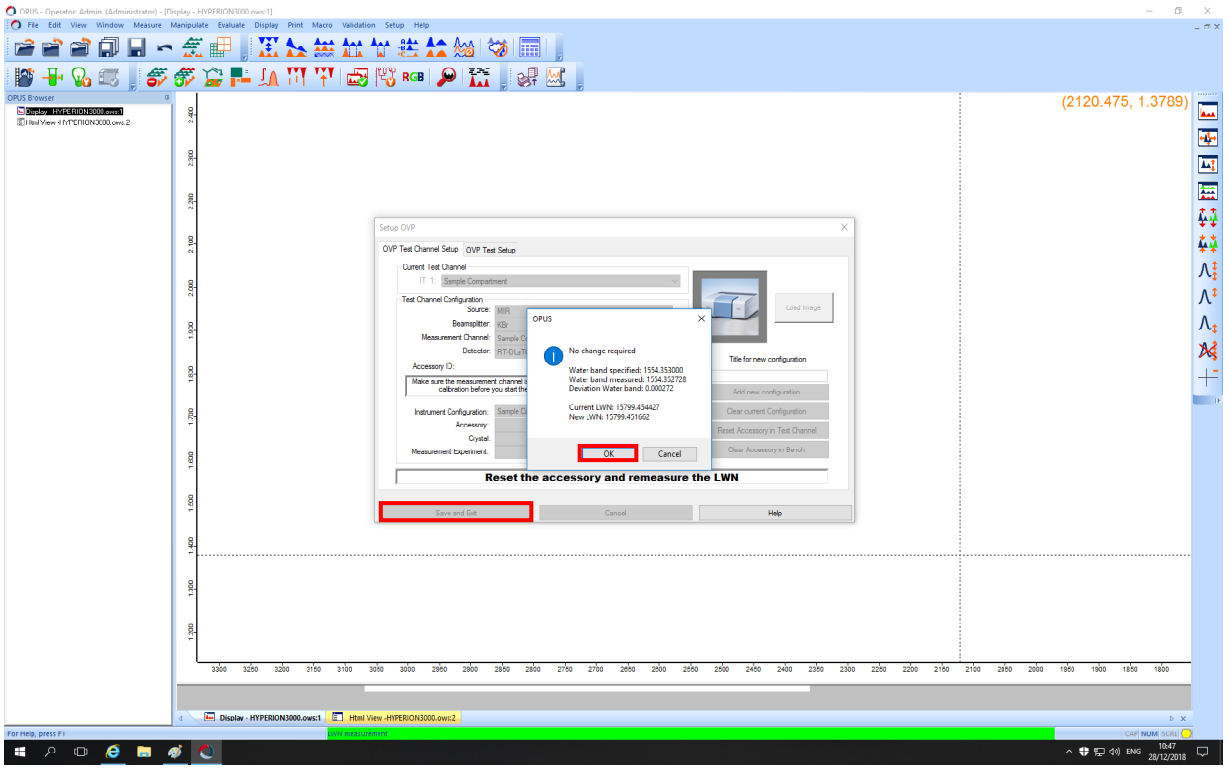
→回復至正確連線畫面

開啟 OPUS8.1 軟體→Validation 視窗下 Setup OVP

→執行 Measure LWN（重新連線及校正）



→完成後顯示畫面如下→OK→Save and Exit



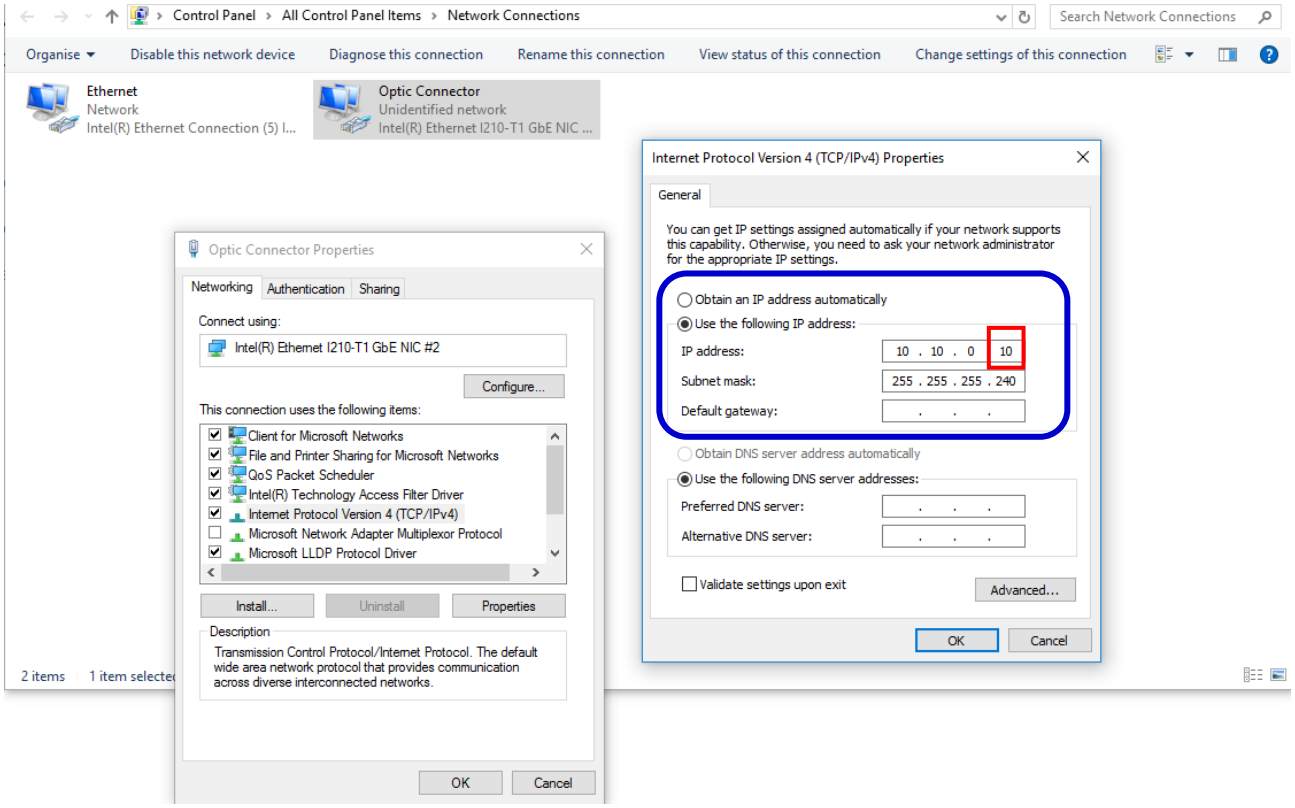
IE 連線出錯 (狀況三)

電腦網路的連接訊息→開啟 IE 無法連線至 Http://10.10.0.1

解決方式

變更 IP address: 10.10.0.10 (將 10 更改 1, 20, 40, 100...)

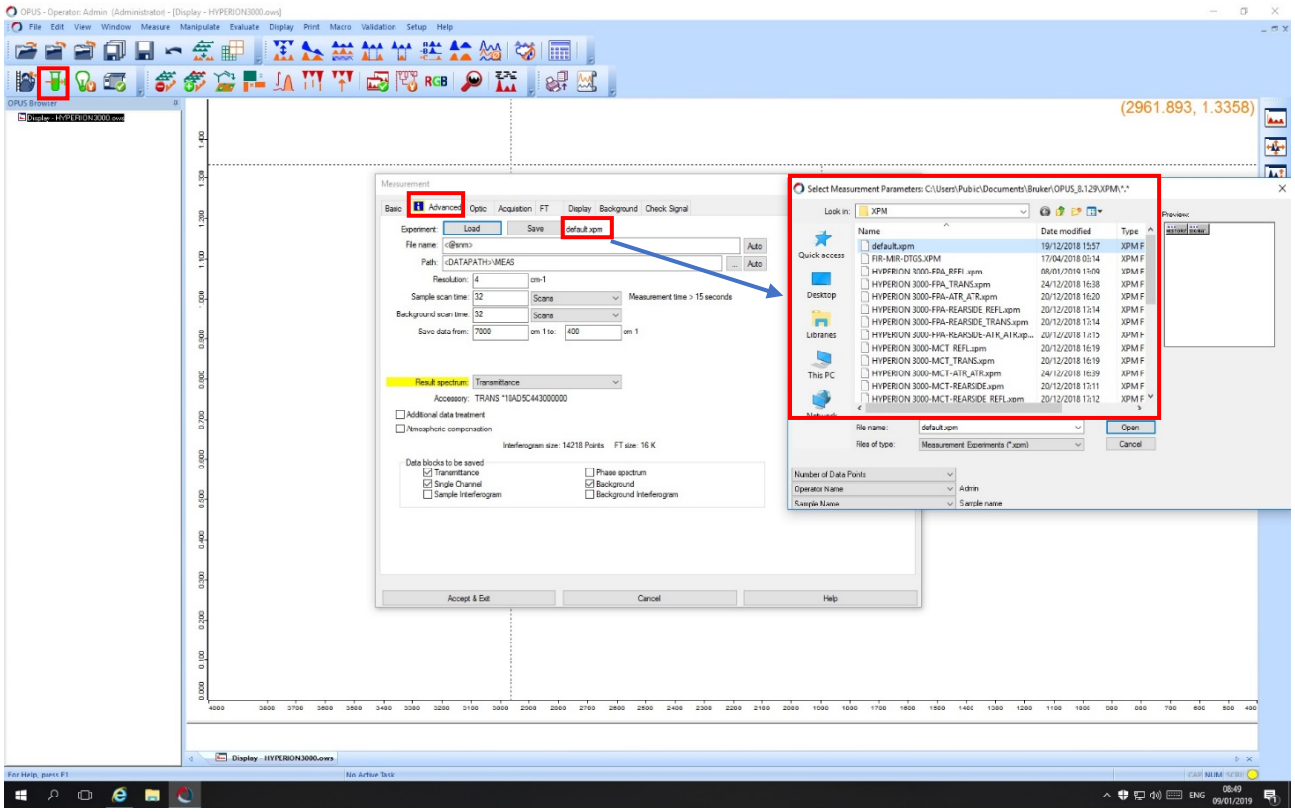
直至 IE 可以連線到**正確畫面**



操作軟體

OPUS8.1 開啟 Advanced Data Collection→ Advance

→ Load: default.xpm



Optic setting→ Check signal

Optic 偵測器/光圈/掃描速度之參數設定

Detector	RT-DTGS (pos.1)	Ln-MCT (pos.2)
Aperture	6 mm	1 mm
Scan velocity	10 kHz	20 kHz

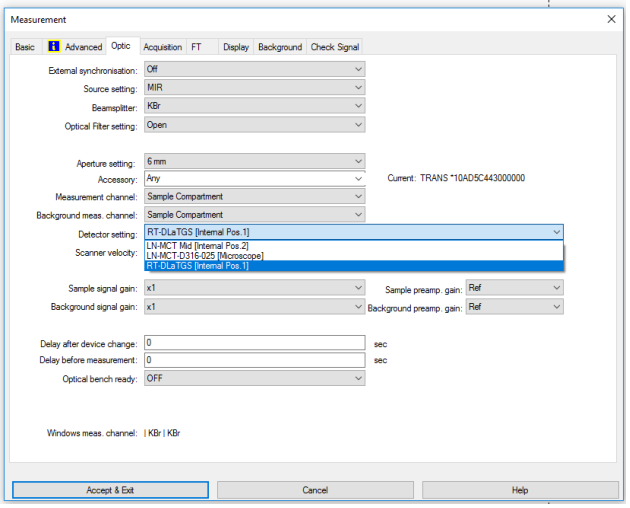
以偵測器 RT-DLaTGS 為例

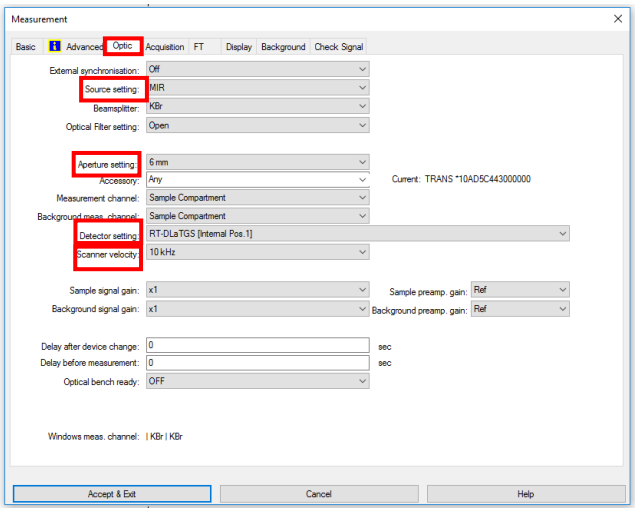
光源可以選擇: MIR 或 Backward Input (External 外接式水冷光源)

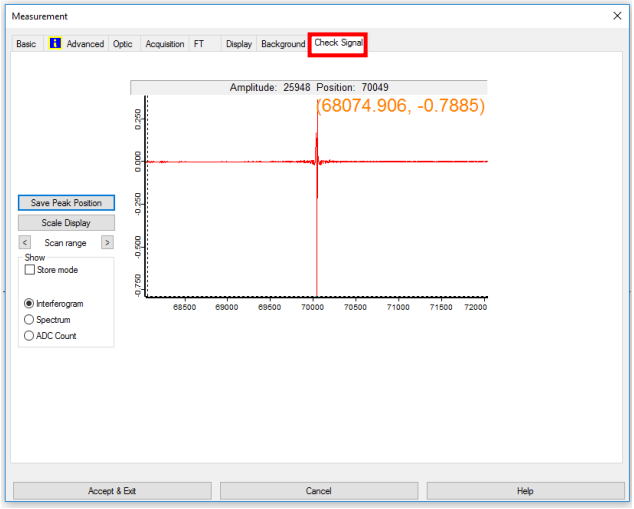
Optic 參數設定

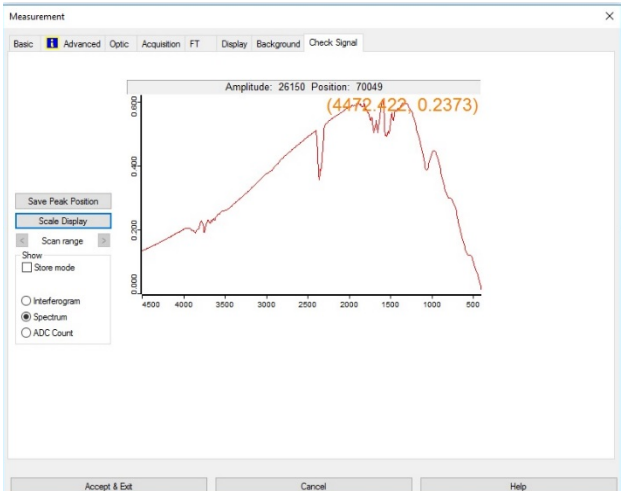
偵測器:**RT-DLaTG**　　光圈: **6 mm**　　掃描速度: **10 kHz**

Check signal: Amp.≧ 25000,　Position:~7000









進行 FPA scans 之前須確認是否已手動開啟 FPA 偵測器（重要！）

→沒有開啟 FPA 偵測器則會導致軟體故障，須回到 PAGE1：複製備份的 Hypersion3000.ows 檔案，並覆蓋原始檔案

進行 FPA scans

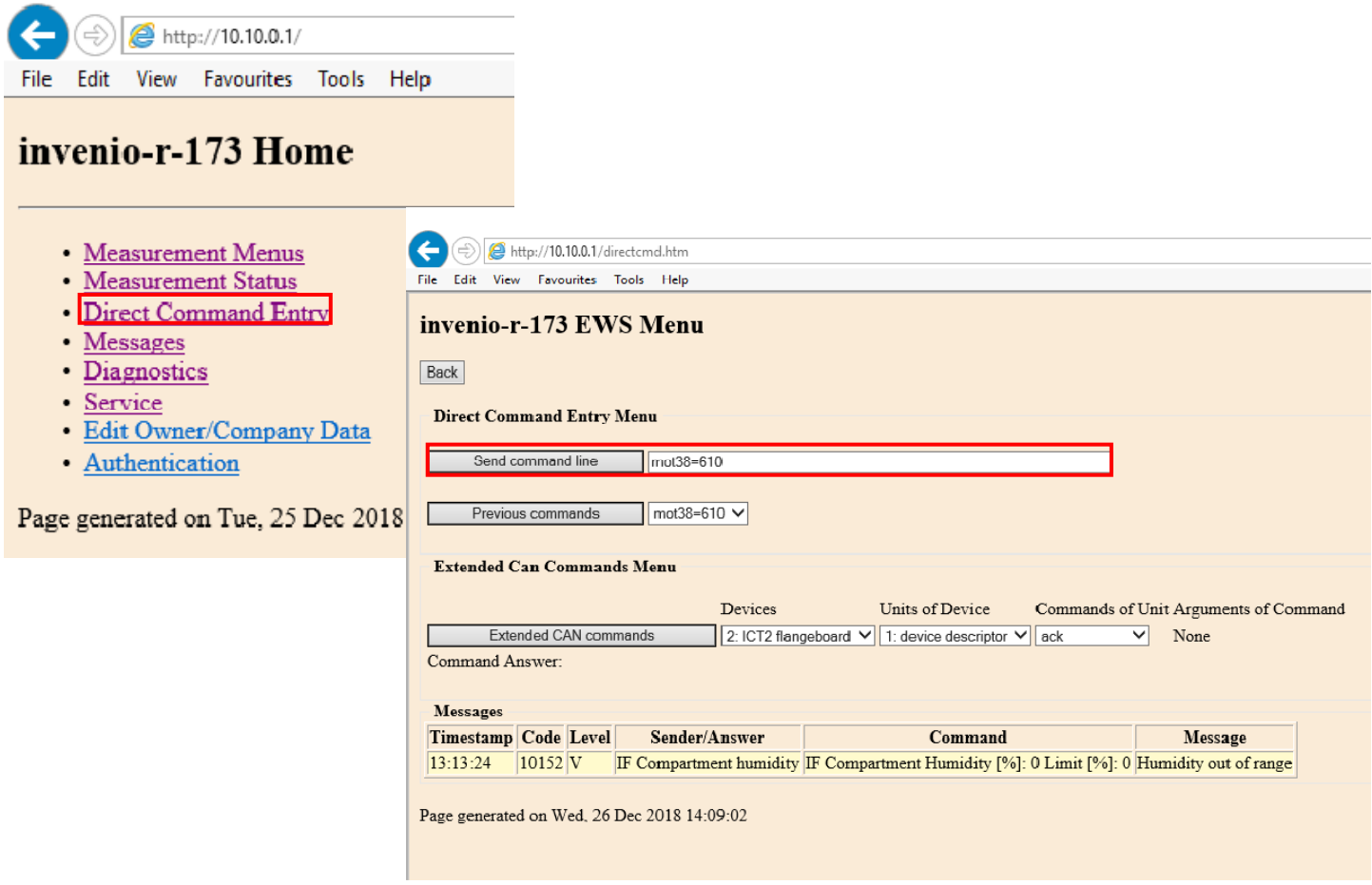
I E 點選 Direct Command Entry，設定顯微鏡內部的鏡子切換偵測器參數

1. 選擇顯微鏡上的 FPA 偵測器：輸入 mot38=610

→ send command line

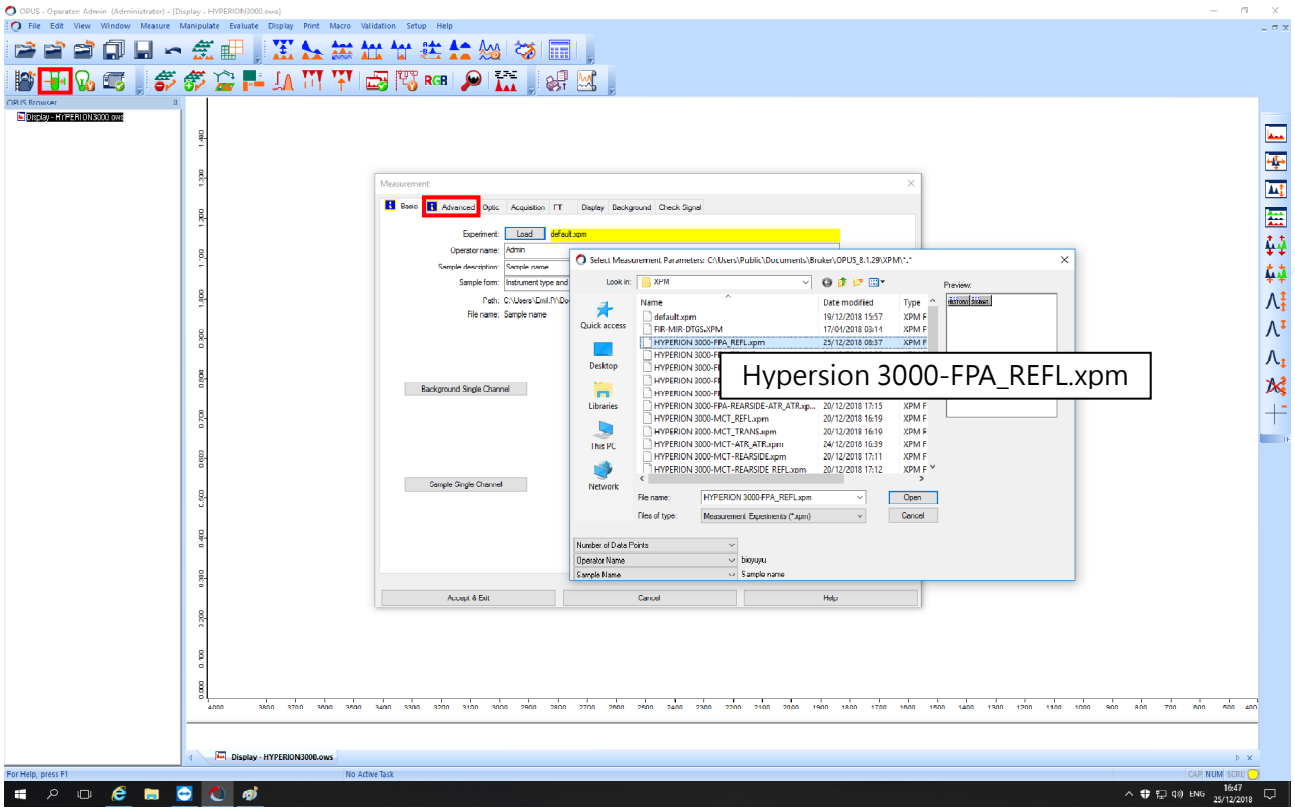
2. 選擇顯微鏡上的 MCT 偵測器：輸入 mot38=0

→ send command line



回到 Advanced Data Collection→Advance→Load

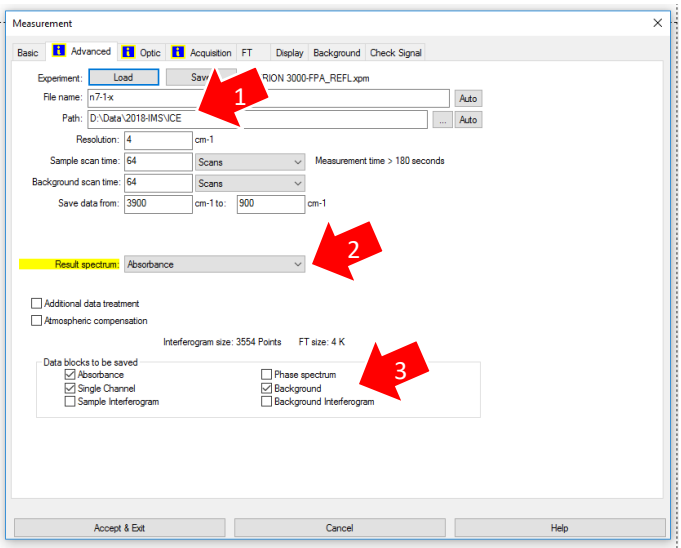
→Hypersion 3000-FPA_REFL.xpm



Optic 頁進行掃描參數設定與確認

掃描參數設定→Accept & Exit

(切記 1.勿更改 * .xpm 之檔名 2. 勿 Check signal)

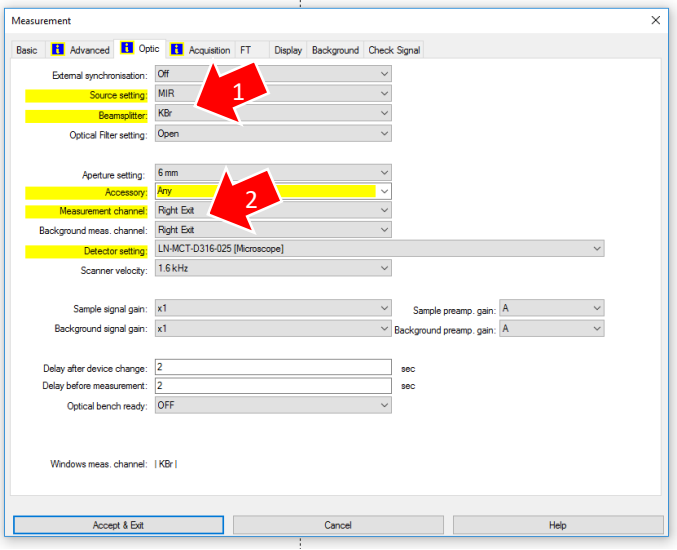


Advanced

1.樣本命名與儲存路徑

2.光譜量測方式選擇

3.儲存的檔案類形

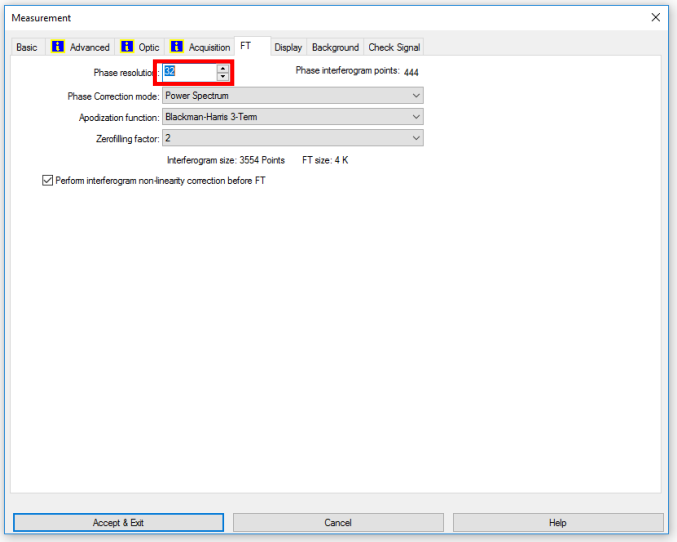


Optic

1.中紅外光 / KBr 分光鏡

2.量測 channel：Right Exit

為主機右側出光進行分析

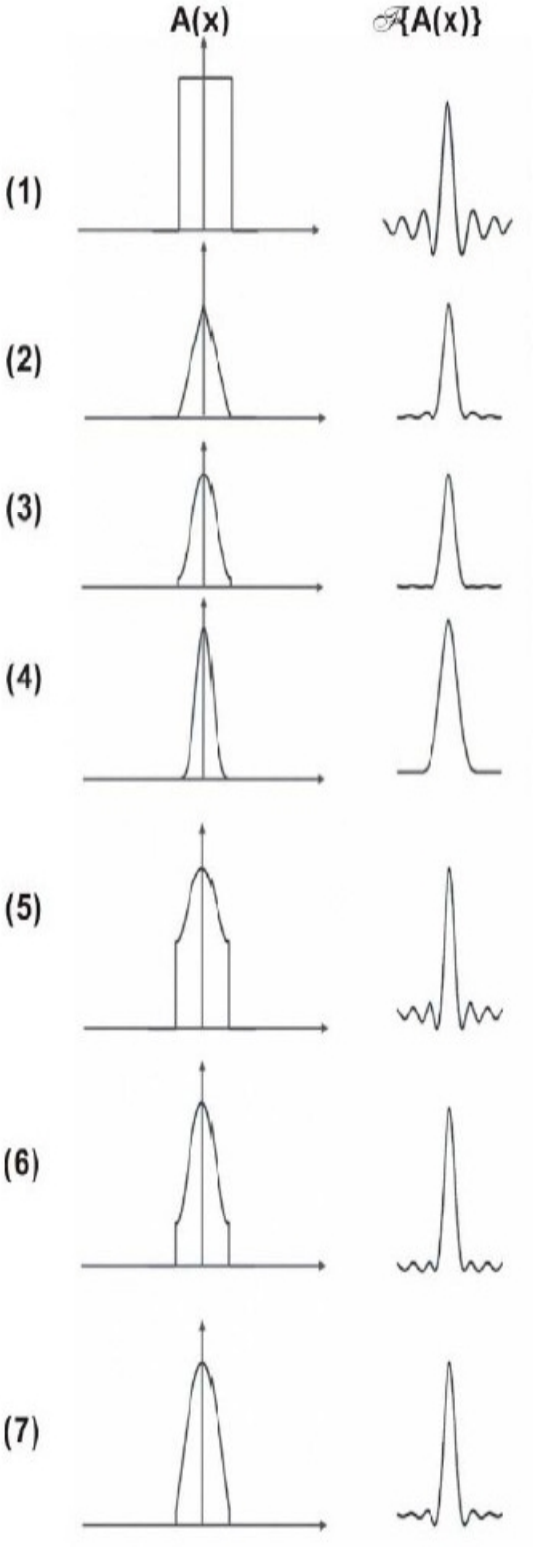


FT Phase resolution 設定

Advanced resolution=4 / 8

FT Phase resolution= 32 / 64

Parameter	Explanation
Phase resolution	With this parameter, you can determine how precise the phase is to be determined. Note: Set the phase resolution in such a way that the number of phase interferogram points amounts at least to 250.
Phase correction mode	The purpose of a phase correction is to correct asymmetric interferograms. This kind of correction increases the interferogram symmetry. Note: A phase correction is always necessary because the interferograms are never perfectly symmetric.[1] Select a suitable phase correction mode. + For detailed information about the available options, see the following table. + **Note:** In case of doubt, use the default parameter setting for the spectrometer configuration in question. The default parameter settings for the individual spectrometer configuration are stored in the supplied experiment file (.XPM). See also the user manual of the spectrometer in question.
Apodization function	The purpose of apodizing is to compensate for spectral artefact „leakage"[2]. The apodization function has an influence on the line width and the height of side lobes. Select a suitable option which represents a good compromise. In case of doubt, use the default parameter setting for the spectrometer configuration in question. + **Note:** The default parameter settings for the individual spectrometer configuration are stored in the supplied experiment file (.XPM). See also the user manual of the spectrometer in question.
Zerofilling factor	The purpose of zerofilling is to compensate for the so called „picket-fence effect".[3] Zero filling means adding zeros to both ends of the interferogram before the Fourier transformation is perform. In doing so, zerofilling increases the number of points per wavenumber in the spectrum. Increasing the number of frequency sampling positions reduces the error caused by the picket-fence effect. As as result, the depiction improves by sharper lines (a mere cosmetic effect). Thus zerofilling the interferogram has the effect of interpolating the spectrum. Select a suitable zerofilling factor. (The available zerofilling factors are of 2^{nd} order within the range between 1 and 512.) Hint: In most cases, doubling the interferogram size (i.e. zerofilling factor 2) is advisable. + **Note:** In case of doubt, use the default parameter setting for the spectrometer configuration in question. The default parameter settings for the individual spectrometer configuration are stored in the supplied experiment file (.XPM). See also the user manual of the spectrometer in question.



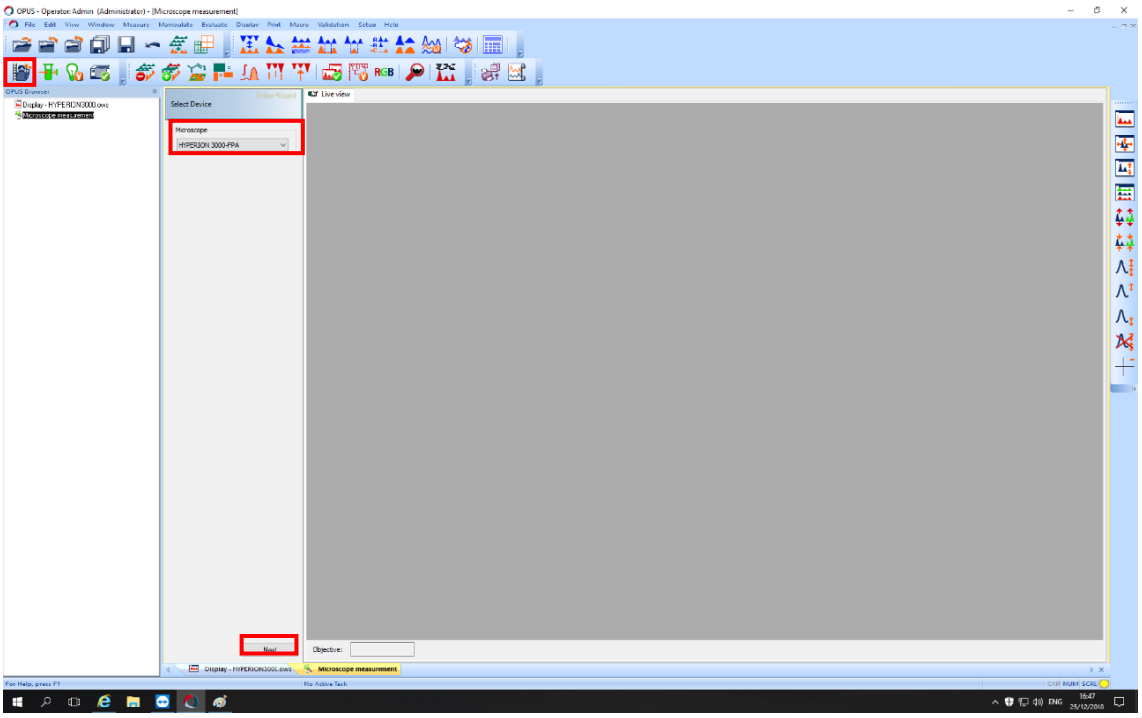
Phase correction mode	
Mertz	This phase correction mode is the standard phase correction procedure.
Mertz Signed	This phase correction mode is a modified *Mertz* function which is used if the single channel spectrum is expected to contain negative contributions.
Power Spectrum	This phase correction mode can be used instead of *Mertz* or *Forman*, but only for double-sided interferogram, if the spectrum includes wide ranges of low light intensity (total absorption, Raman, emission). Disadvantage: Up to $\sqrt{2}$ more noise compared with *Mertz* or *Forman*.
Mertz / No Peak Search	This phase correction mode is like *Mertz*, except for the fact that the ZPD[1] is not automatically searched for. The currently stored peak position in the spectrum is used instead.
Mertz Signed / No Peak Search	This phase correction mode is like *Mertz Signed*, except for the fact that the ZPD is not automatically searched for. The currently stored peak position in the spectrum is used instead.
Power / No Peak Search	This phase correction mode is like *Power Spectrum*, except for the fact that the ZPD is not automatically searched for. The currently stored peak position in the spectrum is used instead.
Mertz / Stored Phase	This phase correction mode is like *Mertz*, however the phase is not recalculated but it is based on the existing data which have been calculated by using the regular *Mertz* method. This phase correction mode can be useful if the single-channel spectrum includes less-defined ranges (i.e. an undefined phase) which frequently occurs in case of emission spectra. Furthermore, this phase correction mode can be useful if the spectra are expected to contain negative contributions. In this case, the phase stored should derive from a spectrum with absolute positive values.
No / Save complex data	With this phase correction mode being selected, the data are not phase-corrected but Fourier-transformed in a complex way and stored as real part and imaginary parts.
Forman	Mathematically, this phase correction mode is equivalent to Mertz. But in contrast to the Mertz method, it offers a slightly higher precision which, however, required a longer computing time.

削足函數及其對應之儀器譜線形狀函數：(1) boxcar；(2) Bartlet；(3) Hamming；(4) 3-term Blackman-Harris；(5) N-B weak；(6) N-B medium；(6) N-B strong 函數

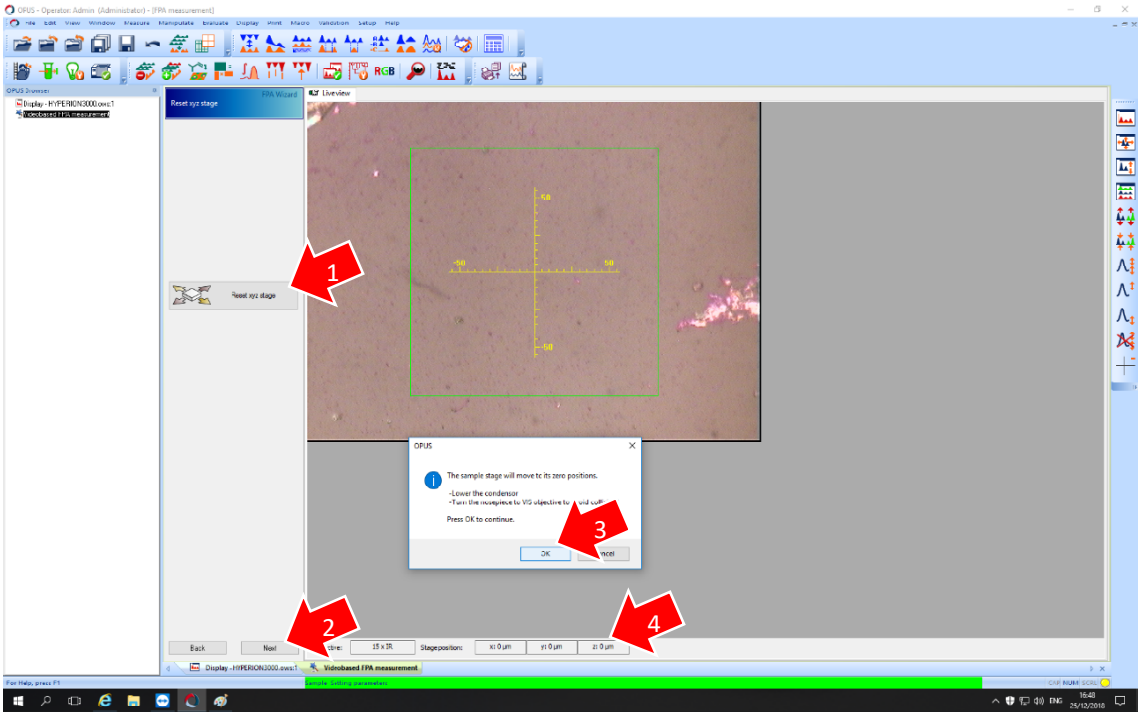
OPUS8.1

開啟 Start Video Wizard →Select device(選擇設備)Microscope

下拉選擇 HYPERION 3000-FPA→Next



Reset xyz stage (第一次開機啟動軟體需進行平台歸零)→ok → Next

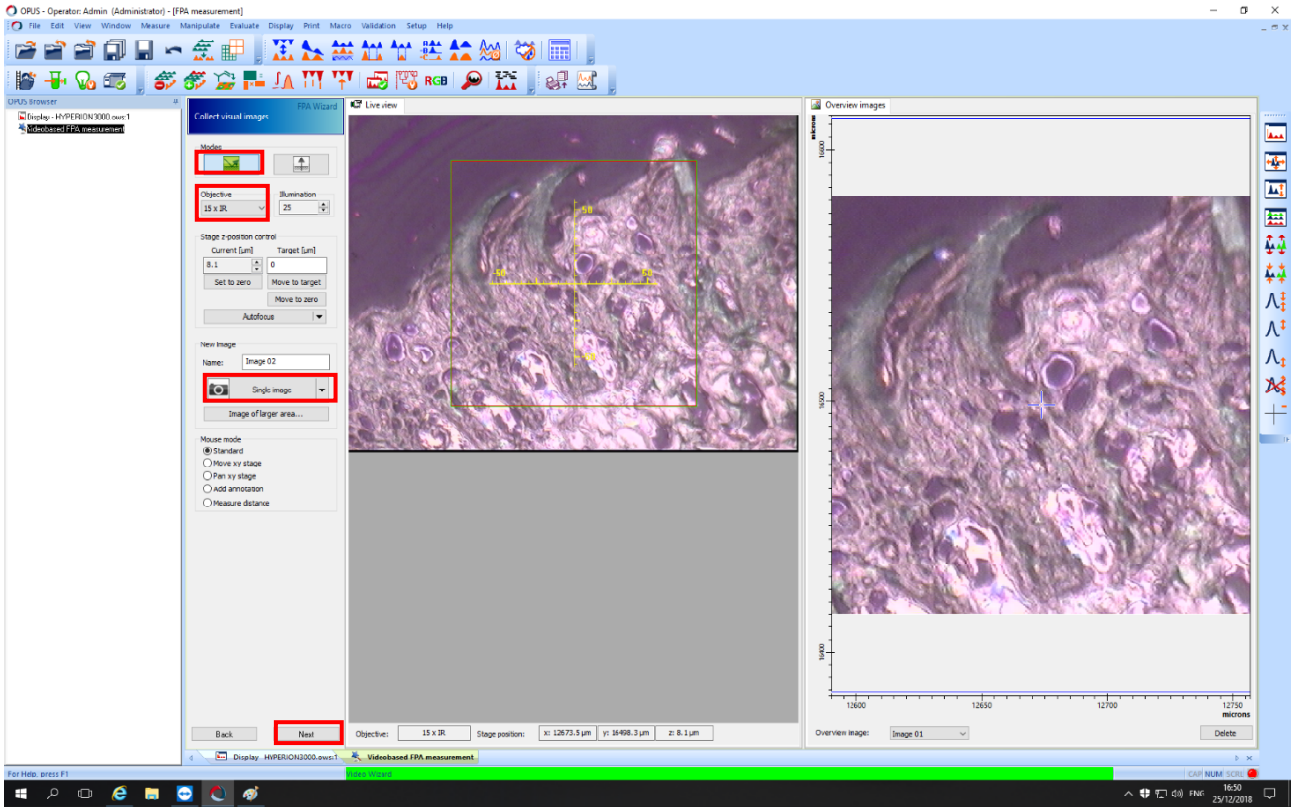


確認歸零時，stage position X,Y 皆為 0 ，出現負值掃描時會當機

OPUS8.1 **FPA 掃描參數設置**

確認量測模式 反射式或穿透式 → 鏡頭選擇 15x IR

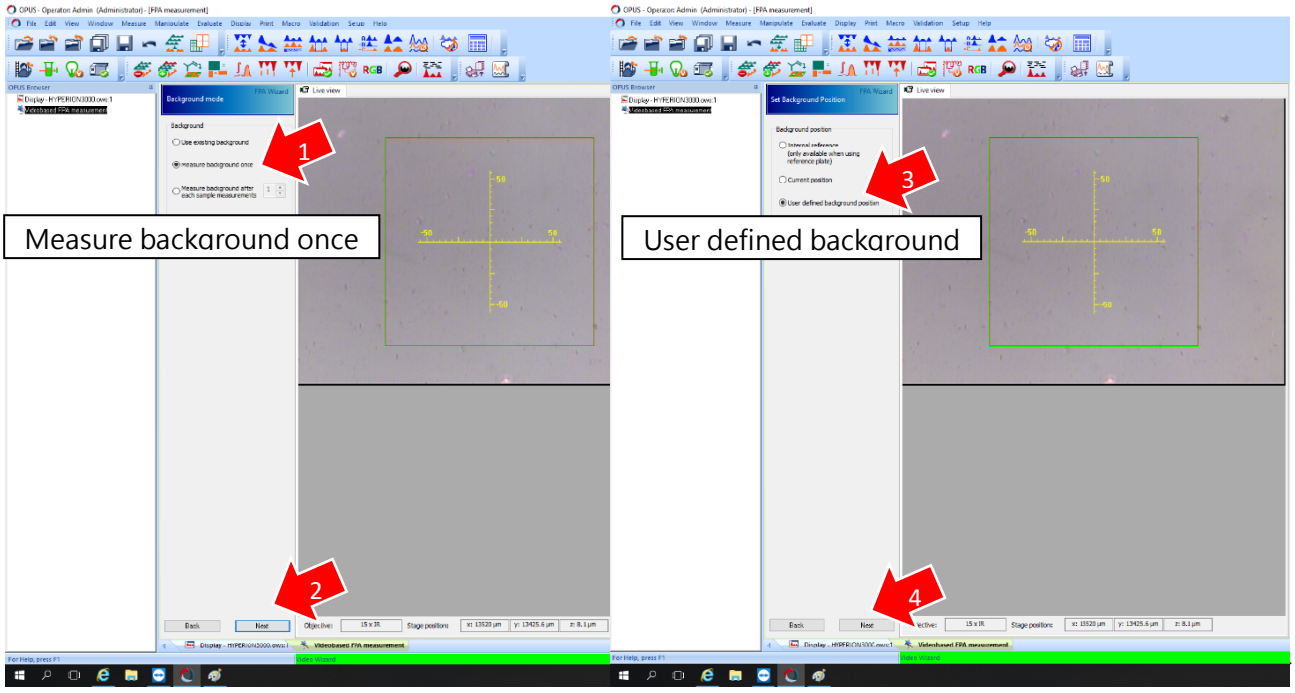
→移動樣品至量測點並對焦→ Single image(拍照)→ Next



設定背景

Measure background once → Next →

User defined background position → Next



Measure Background 背景取樣

Set background position → 確認移至背景點後 → OK

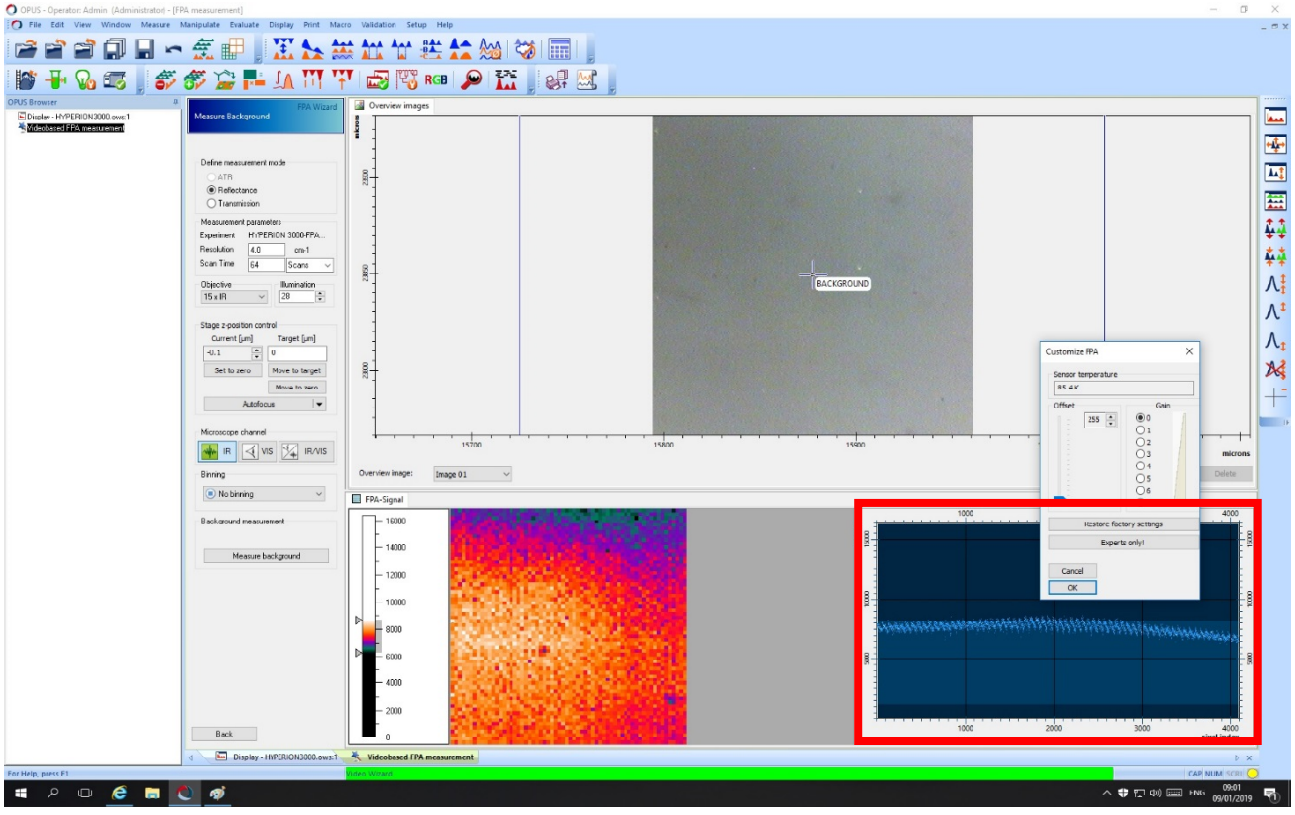
→設定 FPA 偵測器參數，在右下角視窗按滑鼠右鍵

→ Customize Focal Plane Array Setting

Customize FPA 參數設定

offset : 255 / Gain: 0 → OK

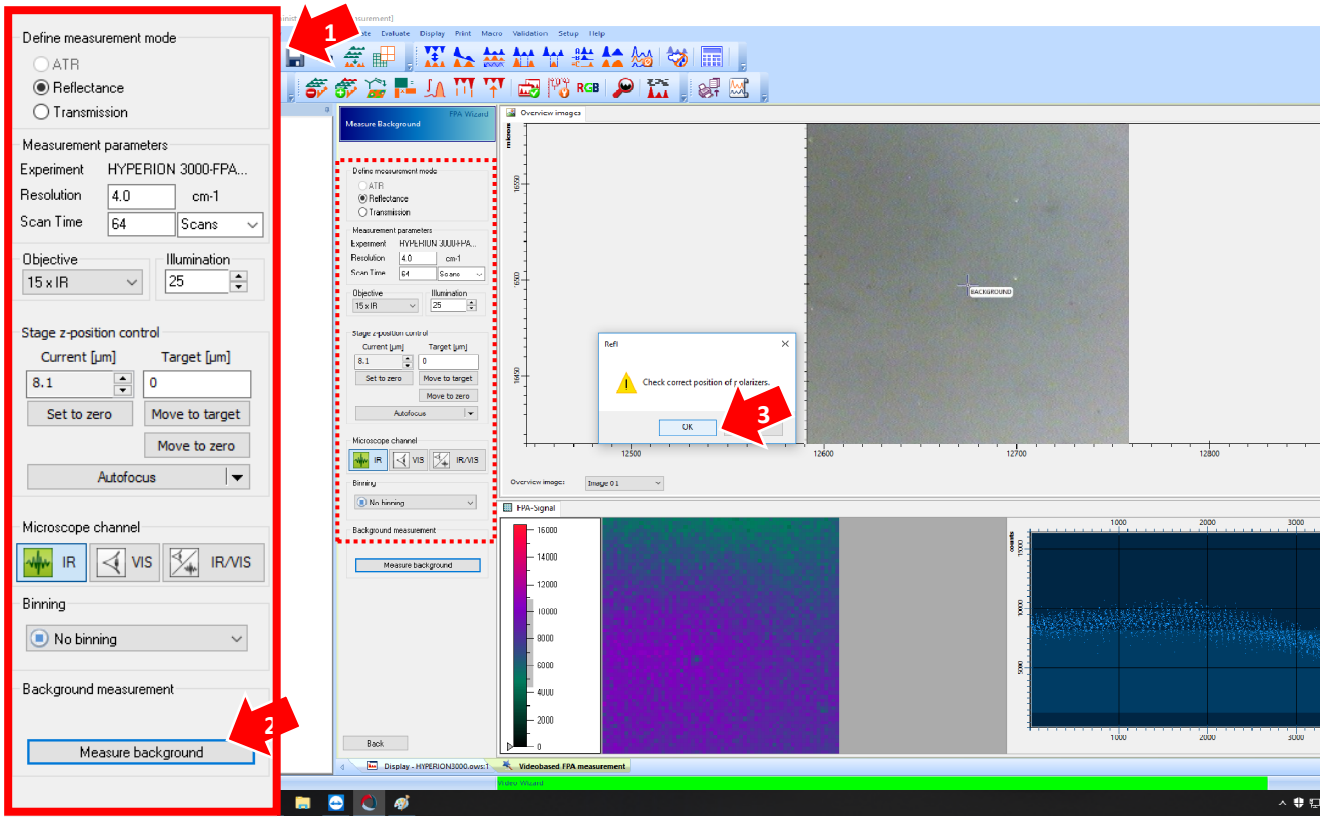
(確認偵測器訊號上 4096 點的強度皆位於~10000 以下)



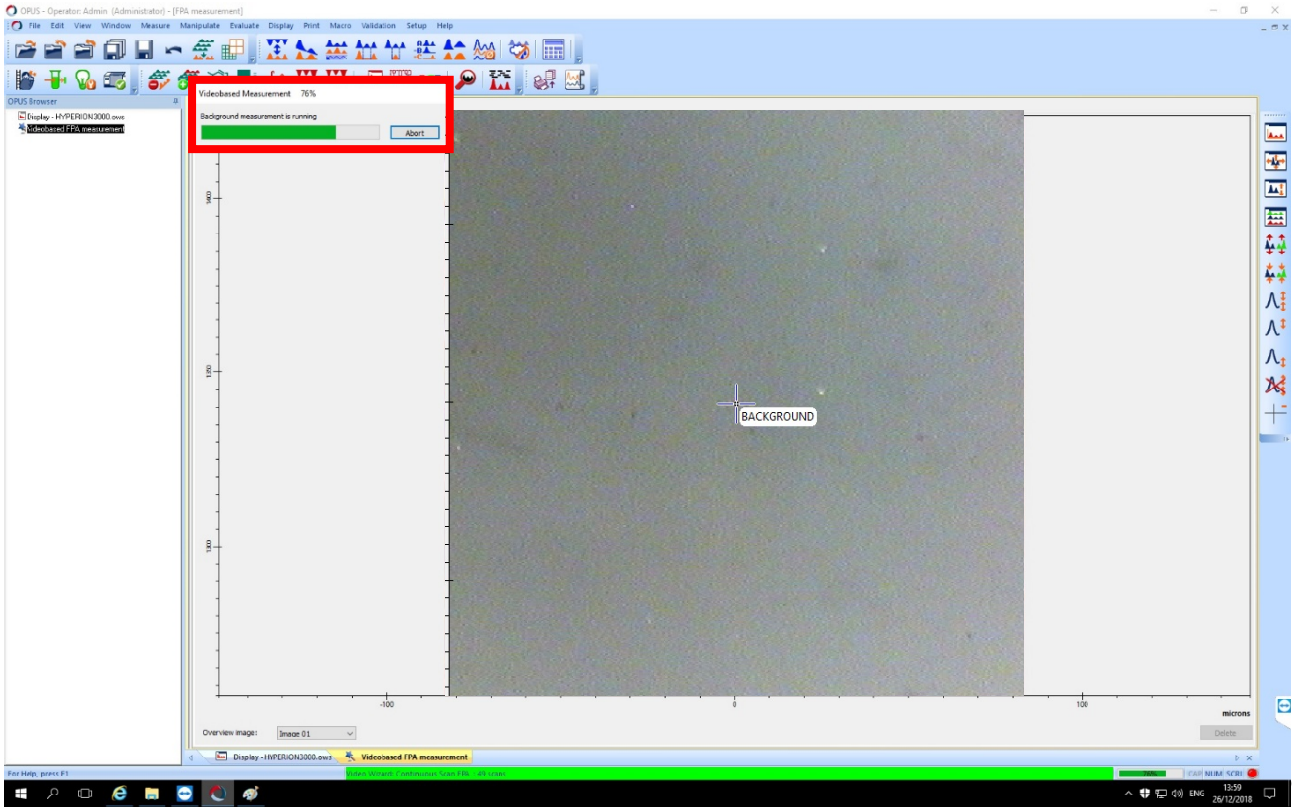
Measure Background

確認左側参数 → Measure Background →

Check correct position of polarizers → OK



背景量測中 Background measurement is running



樣品量測

1 Measure position 設定

→2 在上方影像拉取 1:1 方框

或 3 輸入中心點

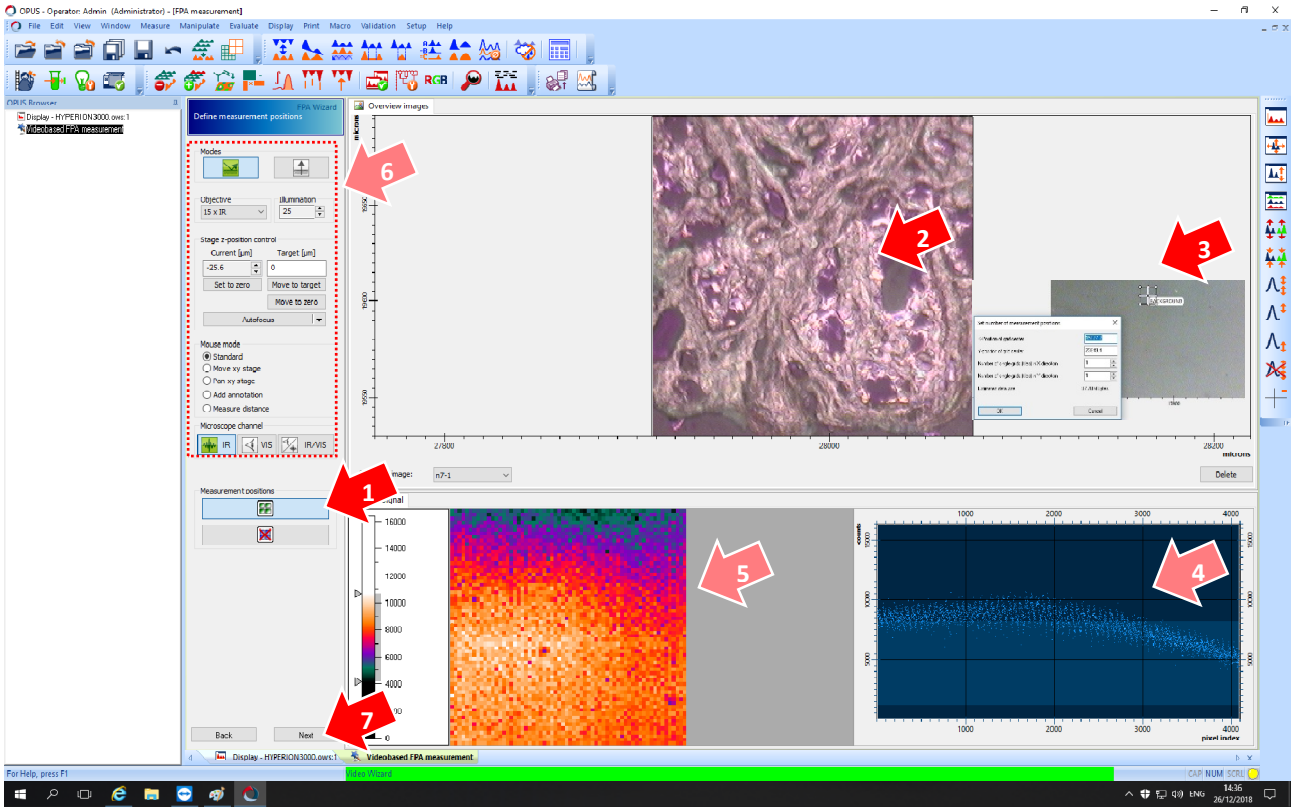
→4 FPA-Signal 右下方按右鍵 Customize Focal Plane Array Setting

設定 Gain=0

→5 滑鼠左鍵 double click FPA 偵測器畫面

→6 確認左側 Modes/Objective/Microscope channel 參數及切換 IR

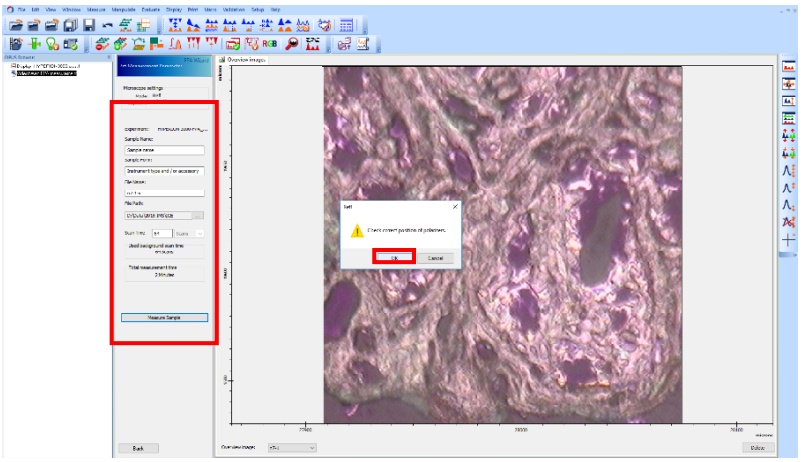
→ Next



設定樣品量測參數

(命名 File Name/儲存路徑 File Path/掃描次數 Scan time)

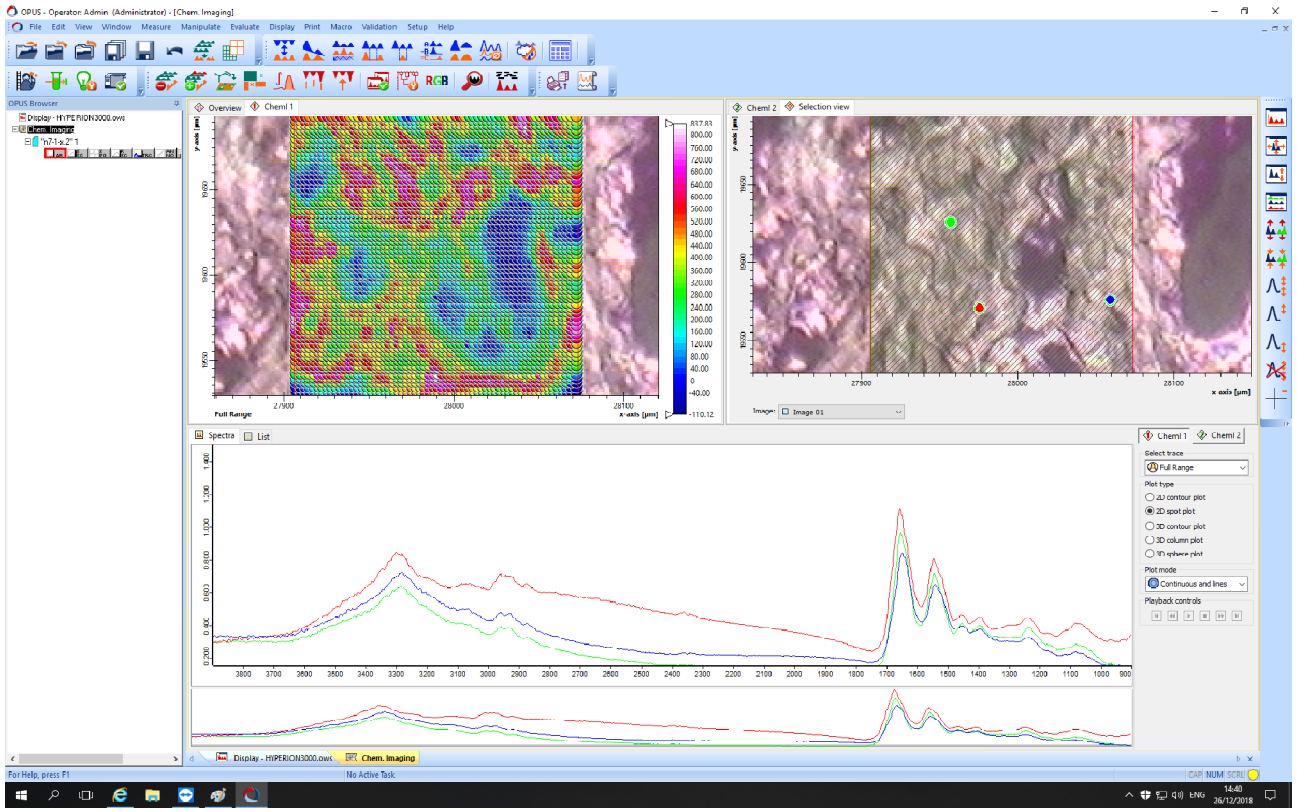
→ Measure Sample → Check correct position of polarizers → OK



樣本量測中 Sample measurement is running

量測完成 → End or Repeat

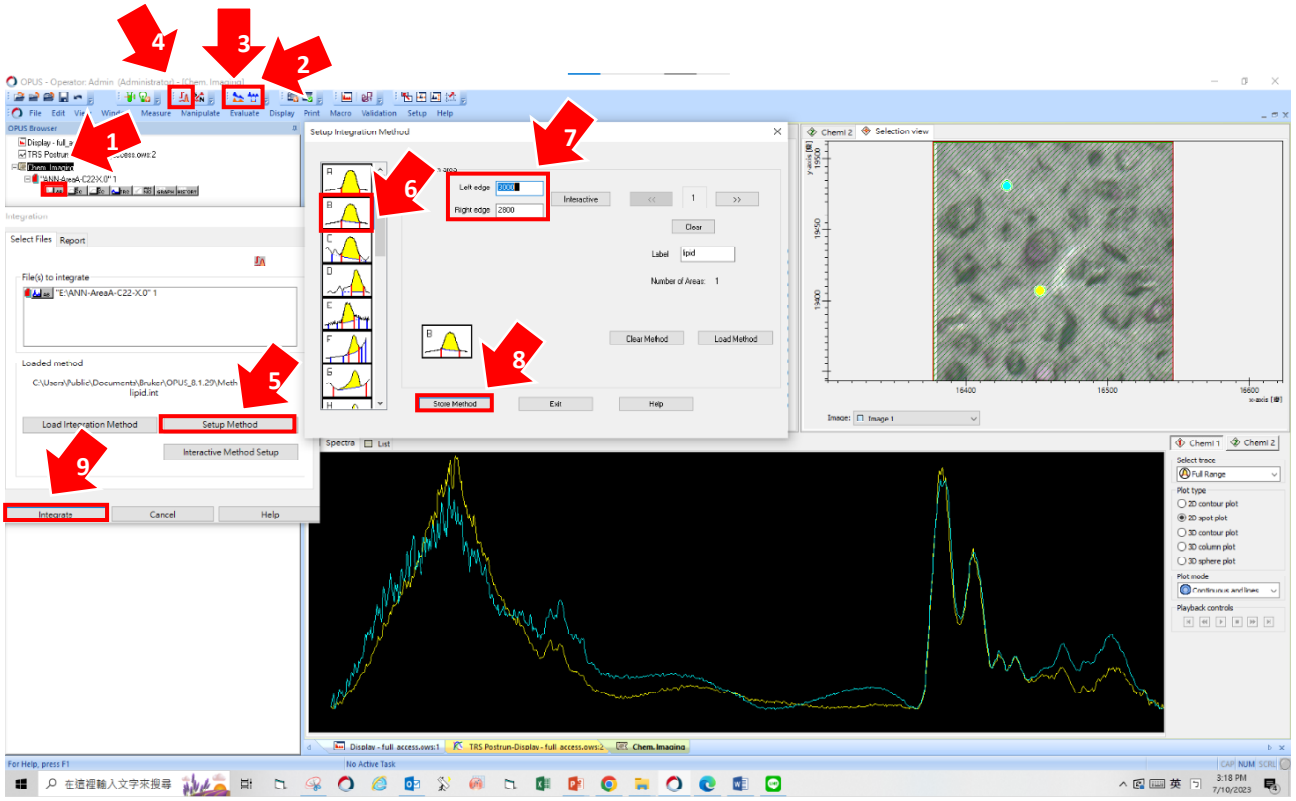
及產生光譜影像(Full Range)



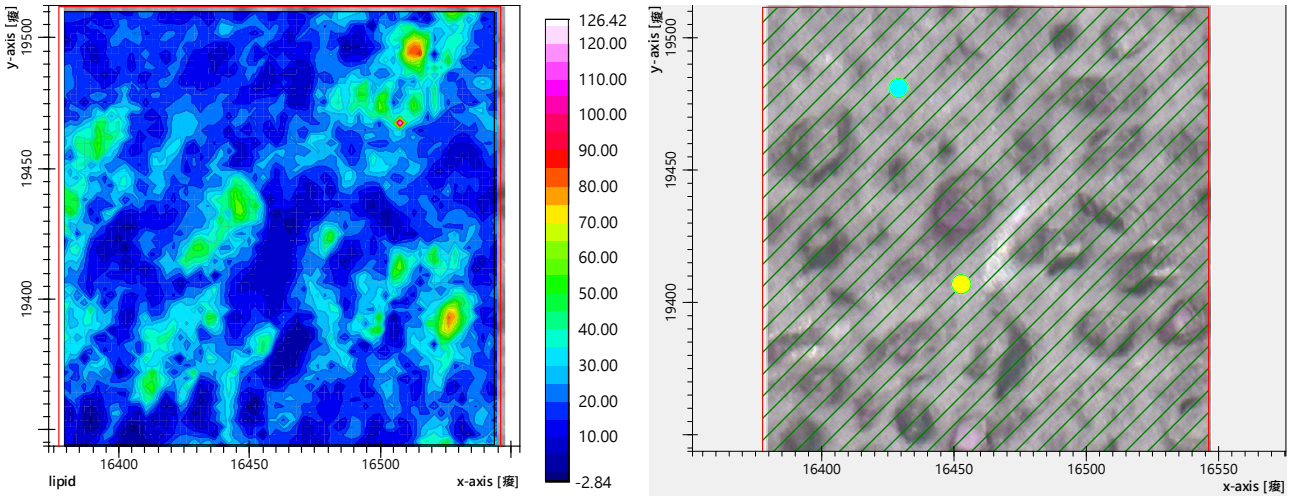
光譜影像處理:

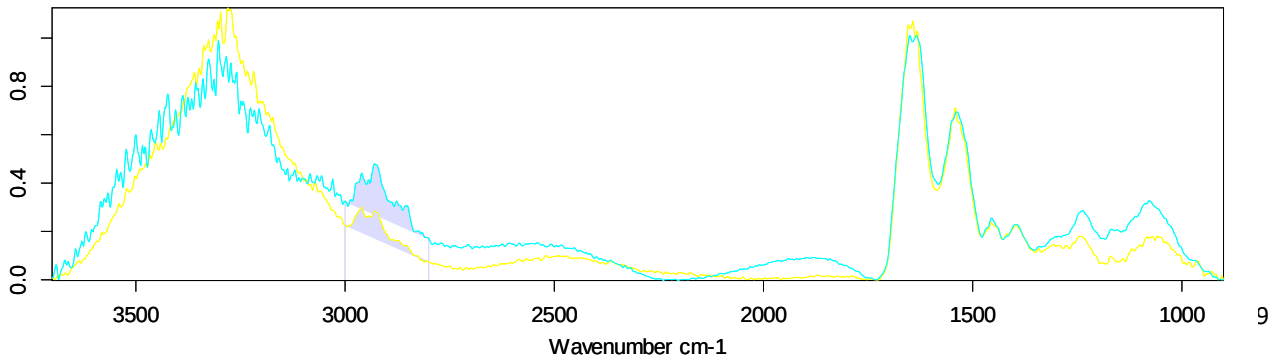
→ cut:3700-900 cm^{-1}→ Autobaseline by Rubberband correction→

Integration→ setup method and region for chemical image



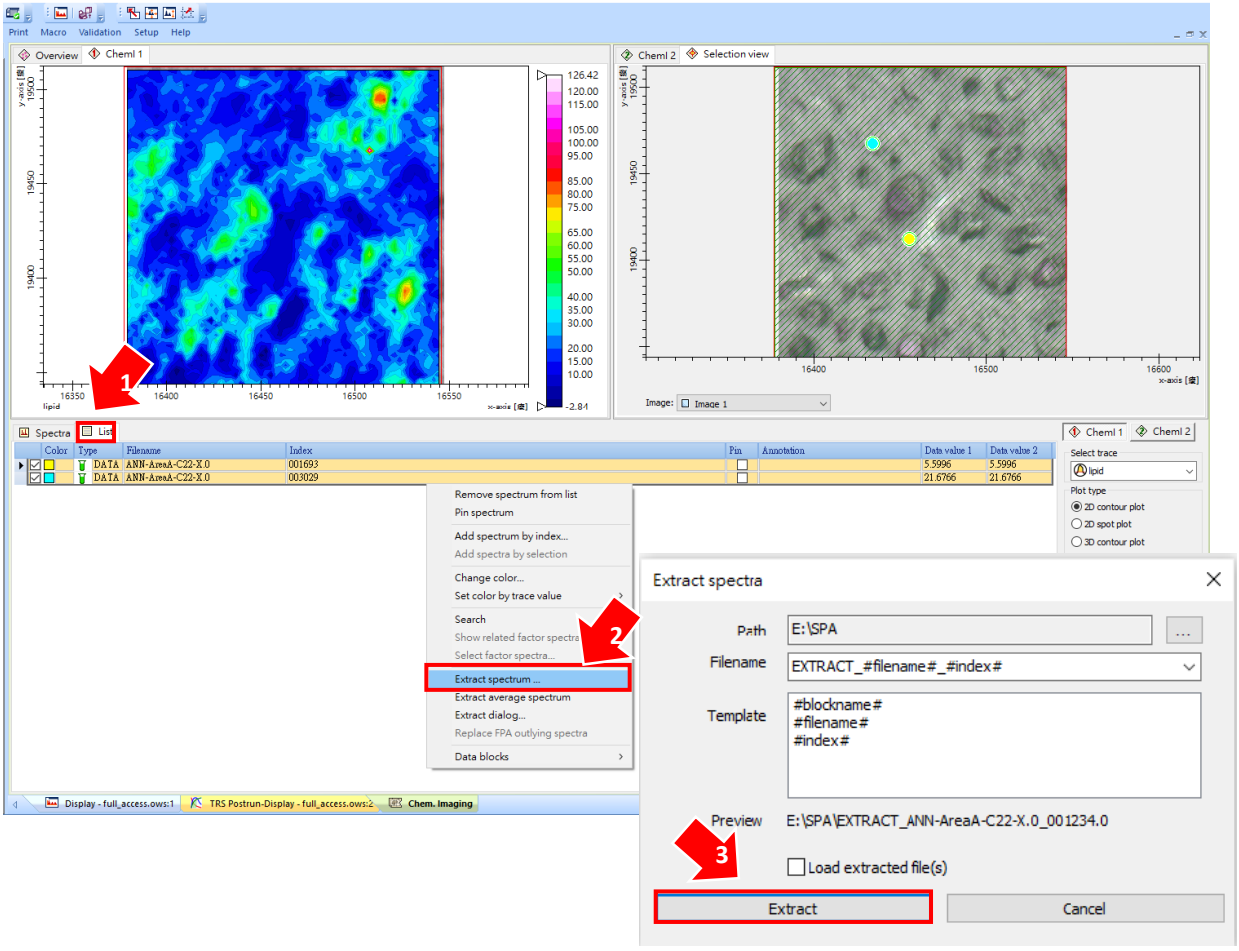
Chemical Imaging **7/10/2023 3:19:37 PM**





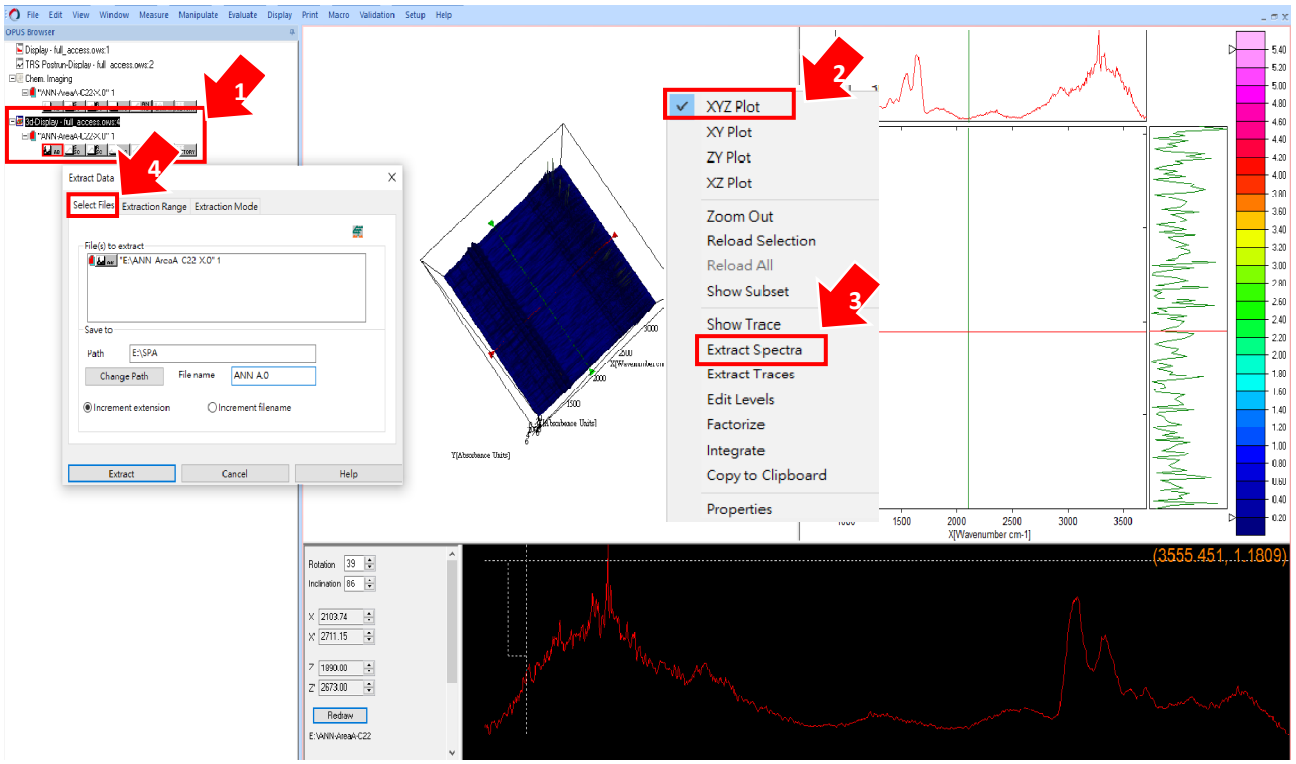
單光譜擷取處理:

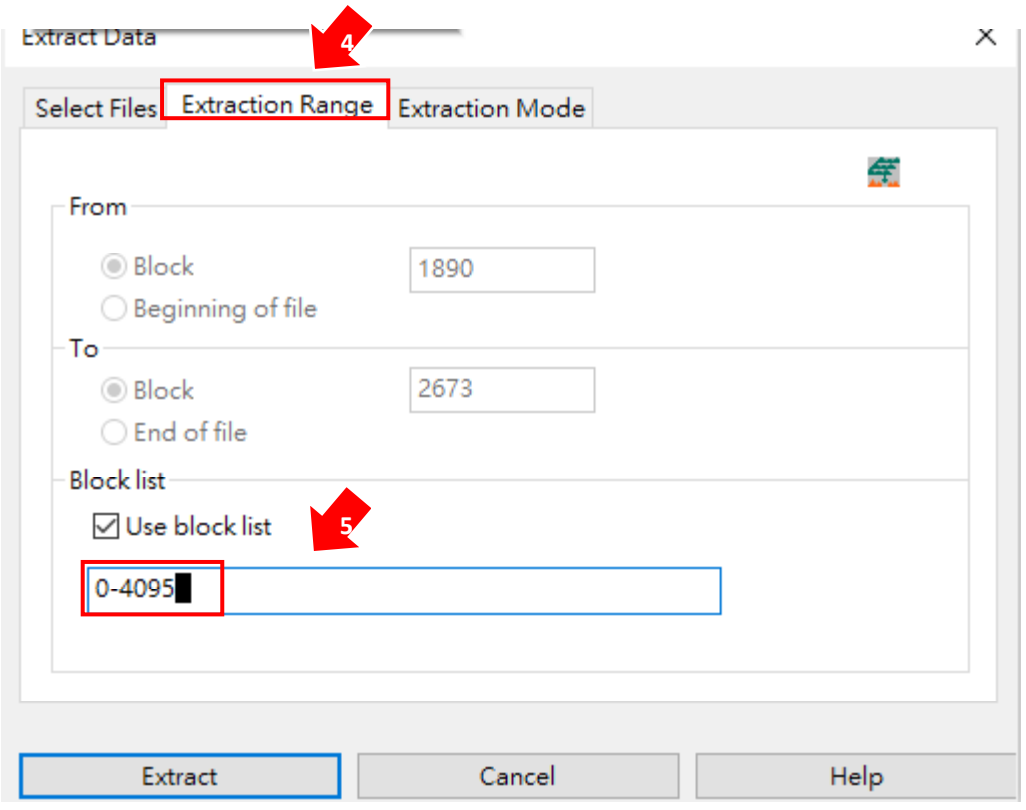
點選光譜→切換至 list→選擇要存取光譜→按右鍵→Extract spectra →輸入檔名及存取位置→ Extract

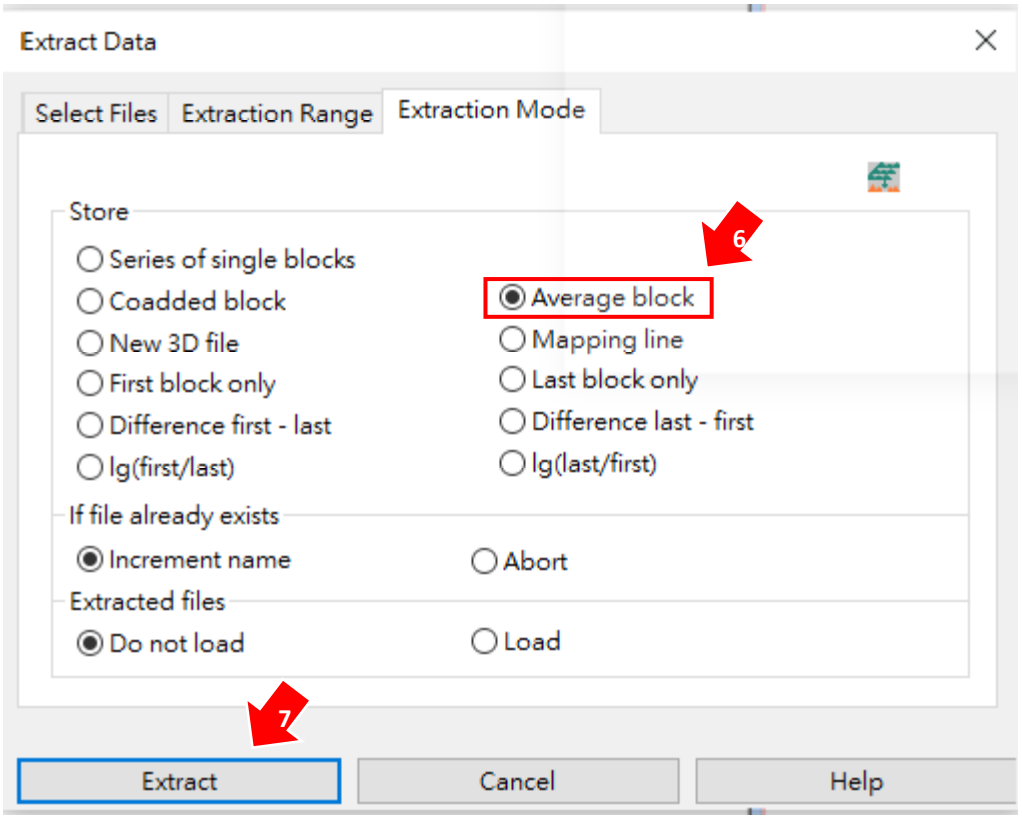


平均光譜擷取處理:

開啟 3D window→點選  至 XYZ plot 視窗→按右鍵→Extract spectra→輸入檔名及存取位置→ 切換至 Extraction region 頁面→輸入 0-4095(即為 64*64=4096 點光譜)→ 切換至 Extraction mode 頁面 →選擇 Average block→ Extract


1
2
3
4
XYZ Plot
XY Plot
ZY Plot
XZ Plot
Zoom Out
Reload Selection
Reload All
Show Subset
Show Trace
Extract Spectra
Extract Traces
Edit Levels
Factorize
Integrate
Copy to Clipboard
Properties
Extract Data
Select Files
Extraction Range
Extraction Mode
Extract
Cancel
Help


4
Extract Data
Select Files
Extraction Range
Extraction Mode
From
Block
1890
Beginning of file
To
Block
2673
End of file
Block list
Use block list
5
0-4095
Extract
Cancel
Help



輸出光譜以 Origin 繪圖