

MPXRD Manual for Thick Films

- MPXRD는 고출력 XRD로 측정전 전원을 켜줘야 합니다.
- SmartLab Studio 프로그램 하단 중앙에 Startup/Shutdown 탭을 클릭해줍니다.

The screenshot displays the SmartLab Studio II software interface. The main window is titled "SmartLab Studio II x64 v4.6.928.0 >>logged in as Default from Default group". The interface includes a menu bar (File, Home, View, Data Browser, Chart), a toolbar with various icons, and a taskbar at the bottom. The main display area shows a plot of Intensity (cps) versus $2\theta/\omega$ (degrees). The plot shows a red curve that starts at approximately 10^8 cps at $2\theta/\omega = 0.5$ and decreases to approximately 10^0 cps at $2\theta/\omega = 5$. The plot is titled "2 θ/ω " and the y-axis is labeled "Intensity, cps". The x-axis is labeled "2 θ/ω , °". A legend in the top right corner of the plot area indicates the data series: "Al_50mA_0.9Pa_stage5_36 0s/1".

On the left side, there are several panels: "Activities" (Package Activities, General, Utility, Default), "Flow Editor" (Reflectivity, Optics Alignment (PB), Sample Alignment (Thin Film), Reflectivity Measurement), and "Part Activities" (Sample Alignment, Change Optics, Measurement Activity). The "Reflectivity" panel in the Flow Editor is highlighted in yellow.

At the bottom of the main display area, there is a "Startup/Shutdown" button highlighted with a red box. A red arrow points to this button with the text "Click this".

The Windows taskbar at the bottom shows the system tray with the time "9:44 AM" and date "8/2/2024".

- Startup Run 버튼을 클릭한 후 기다려줍니다. 28분 소요.

The screenshot displays the SmartLab Studio II v4.6.928.0 software interface. The main window is titled "Startup/Shutdown" and contains a "Run" button highlighted with a red box. A red text overlay reads "Click the Run Button and wait for 28 min." The interface includes a menu bar (File, Home, View, Data Browser), a toolbar with various icons, and several panels: "Package Activities" (General, Utility, Default), "Part Activities" (Sample Alignment, Change Optics, Measurement Activity), "Flow Editor" (Reflectivity, Optics Alignment, Sample Alignment, Reflectivity Measurement), and "Startup/Shutdown" (Startup, Shutdown, Aging condition, After aging conditions). The "Startup" section shows a "Run" button, a "Stop" button, and a "Remaining time" display showing "00:00:00". The "Aging condition" section has "Use customized aging table" selected. The "After aging conditions" section has "XG set: Hold", "Voltage, kV: 20", and "Current, mA: 10". The "Shutdown" section has "XG off" selected. The bottom status bar shows "XRD Measurement | Ready" and the system clock "9:45 AM".

- 28분후 X-ray 출력을 확인하기 위해서 H/W Status 탭을 클릭하세요.

The screenshot displays the SmartLab Studio II v4.6.928.0 interface. The main window is titled 'Startup/Shutdown' and contains various control panels for 'Startup' and 'Shutdown'. The 'Startup' panel includes a 'Run' button, a 'Remaining time' display showing '00:00:00', and sections for 'Aging condition' and 'After aging conditions'. The 'Shutdown' panel includes a 'Run' button and options for 'XG off', 'Set to minimum', and 'Vacuum off'. The bottom navigation bar has several tabs: 'Activities', 'H/W Status', 'Startup/Shutdown', 'Data Visualization', 'Data Manager', 'Logging', 'User Manager', 'DB Manager', and 'Materials Manager'. The 'H/W Status' tab is highlighted with a red box. A red text overlay at the bottom left reads 'Click the H/W status'.

- Tube Voltage 45kV, Tube Current 200mA 에 도달하였는지 확인해주세요.
- 이 수치에 도달하지 못하였다면, 도달할 때까지 기다려주세요.

The screenshot displays the SmartLab Studio II software interface. The 'H/W Status' window on the left shows a table of hardware components and their current status. The 'Startup/Shutdown' window on the right shows configuration options for the instrument's operation.

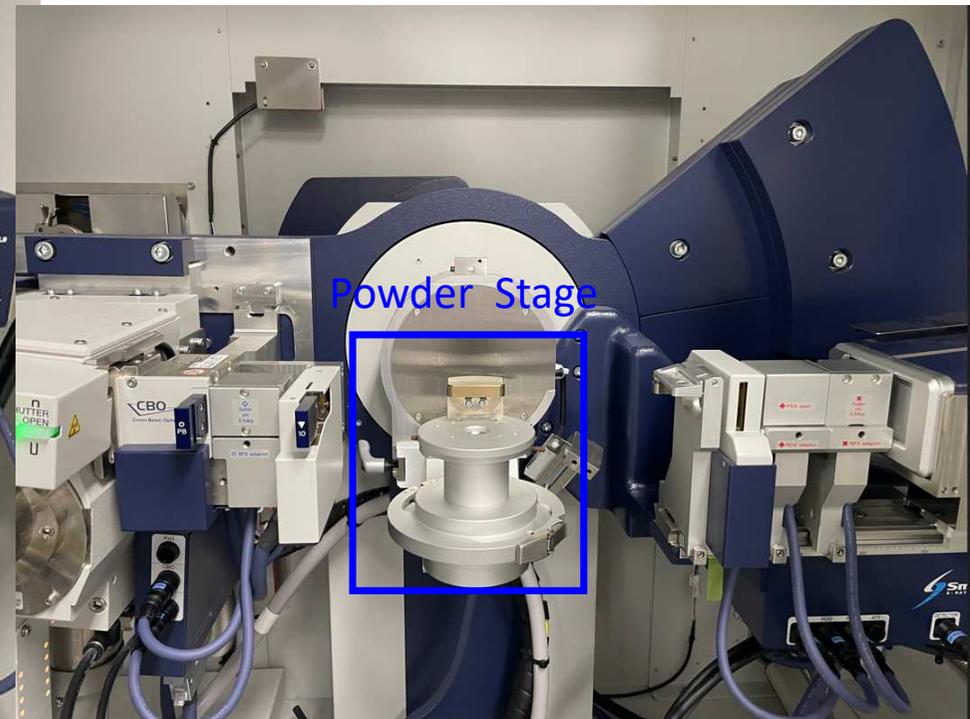
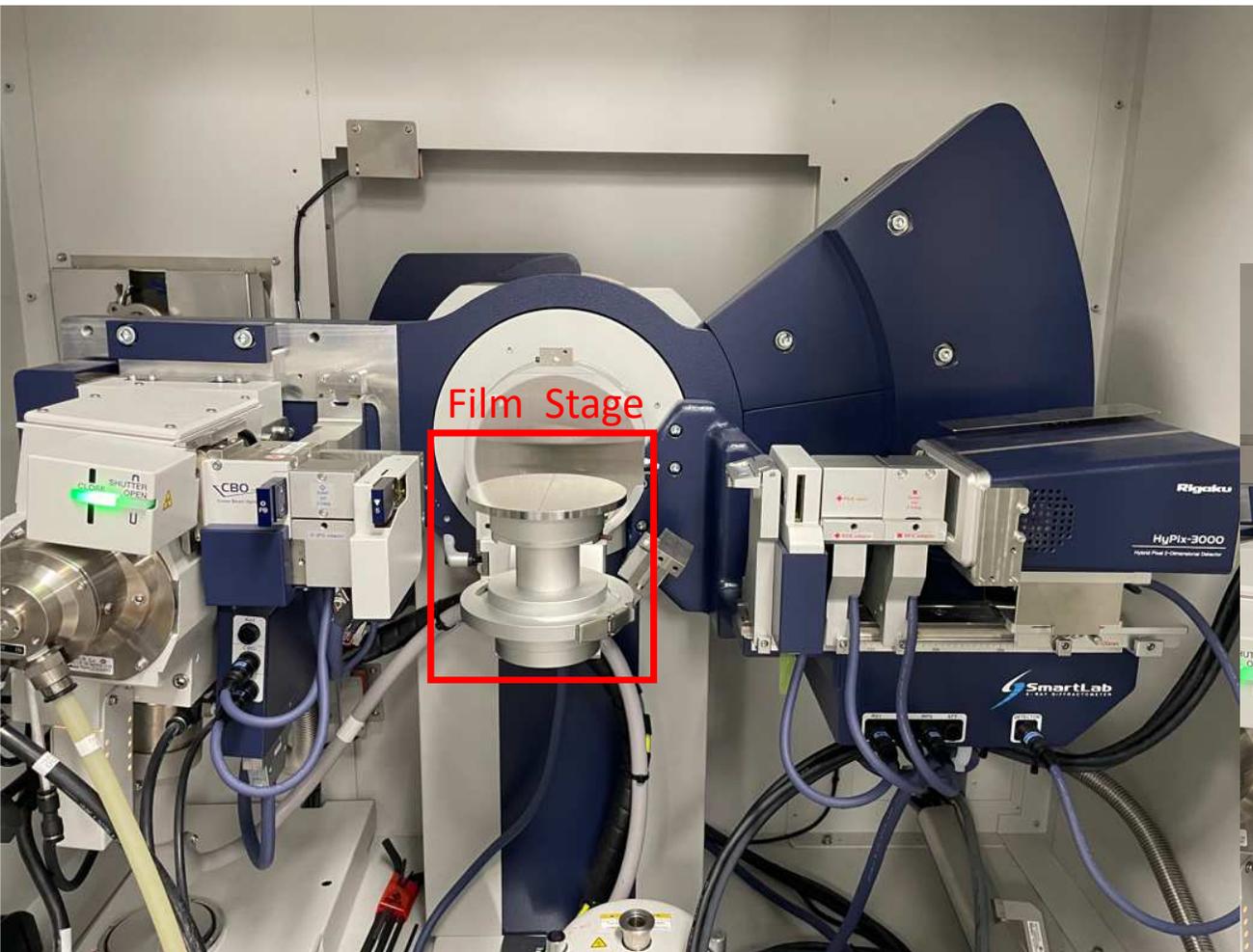
Name	Status
Axis	
2θ	0.0000 °
ω	0.0000 °
Sample	
Optics	
Attachment base	Standard attachment
Attachment head	Standard attachment head
Attachment option	None
Detector	
Detector	HyPix-3000 (horizontal)
X-ray generator	
Vacuum	On
X-ray	On
Shutter	Close
Tube voltage	45 kV
Tube current	200 mA
High voltage	112.000 mV
Operating time of the X-ray tube	8531.65 H
Operating time of the filament	8531.65 H
Operating time of the filament	8531.65 H
Operating time of the filament	-

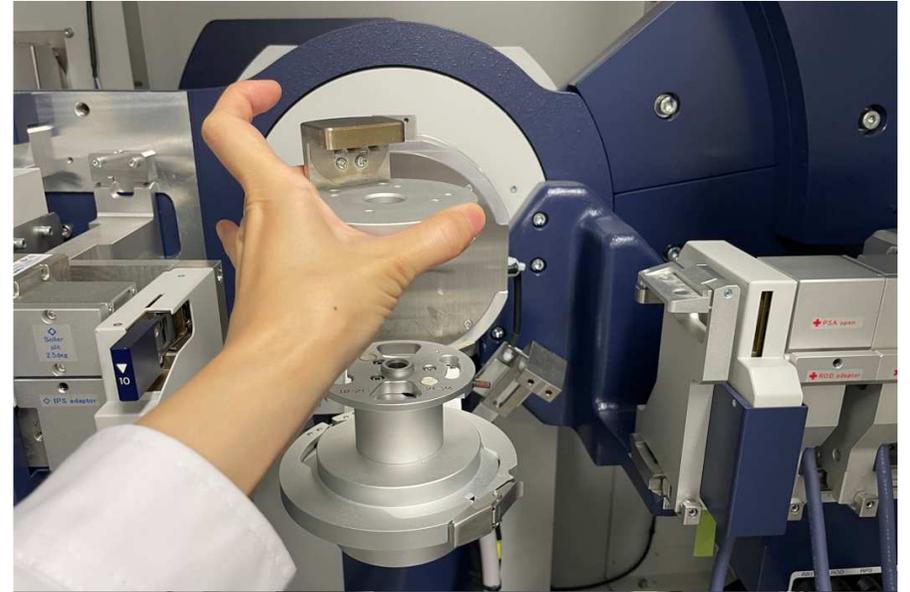
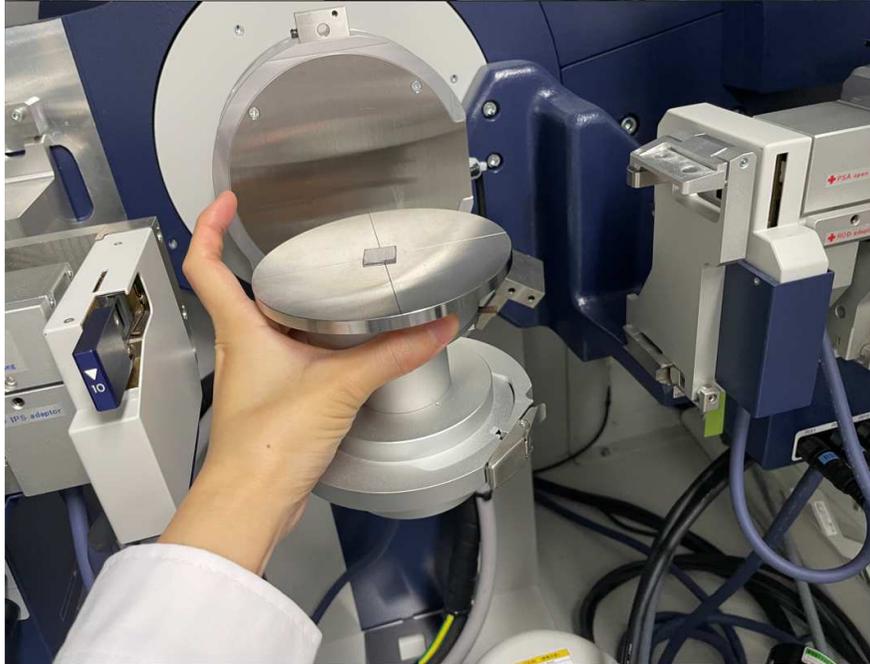
The 'Startup/Shutdown' window shows the following settings:

- Startup:** Run, Stop buttons. Remaining time: 00:00:00. Use timer: . Target times: Start (selected), End. Increase date: Specified, Days: 0. Date: 2024/07/20. Time: 08:00. Estimated back end: 2024/07/20 08:00:00.
- Aging condition:** Use aging table recommended from frequency of use. After replacing the target. Use customized aging table. After aging conditions. XG set: Hold. Voltage, kV: 20. Current, mA: 10. Calculated duration: 00:00:00. Aging table name: Not used for 2 days - 1 week. Set power: 9.0 kW (Voltage: 45 kV / Current: 200 mA).
- Shutdown:** Run button. XG off. Set to minimum. Vacuum off.

Check the Tube Voltage 45KV and Tube Current 200mA

- 도어 손잡이를 잡고 도어를 열어 주세요.
- Film Stage 위 +자 중앙에 시료를 두고, 도어를 닫아주세요.
- 만약 측정하러 왔을 때 Powder Stage로 되어 있다면 Film Stage로 변경해주세요.





- Film Size에 맞게 Length-limiting Silt 바꿔주세요. Silt을 끼울때 조심조심.
- 20도 이하의 측정을 하실 경우, Knife Edge를 부착해주세요. 자석으로 부착됩니다.
- 도어를 닫아주세요.



- 상단에 New Flow를 클릭하여 Flow Editor에 기존 Flow를 삭제해주세요.
- Package Activities에서 General(BB)를 더블 클릭해주세요.
- Sample Alignment를 클릭해주세요.

The screenshot displays the SmartLab Studio II v4.6.928.0 interface. The top menu bar includes File, Home, View, and Data Browser. The main workspace is divided into three panels: Package Activities, Flow Editor, and Display Area. In the Package Activities panel, 'General (BB)' is highlighted with a red box. A large blue arrow points from this box to the 'General (BB)' entry in the Flow Editor panel, which is also highlighted with a red box. Below it, 'Sample Alignment (Powder, Bulk)' is highlighted with a red box. The Display Area panel shows a plot of Intensity (cps) versus $2\theta/\omega$ (degrees). The plot shows a red line representing the data, with a legend indicating 'Al_50mA_0.9Pa_stage5_36 0s/1'. The x-axis ranges from 0.5 to 5.0, and the y-axis ranges from $1 \cdot 10^0$ to $1 \cdot 10^6$. The Windows taskbar at the bottom shows the time as 9:53 AM on 8/2/2024.

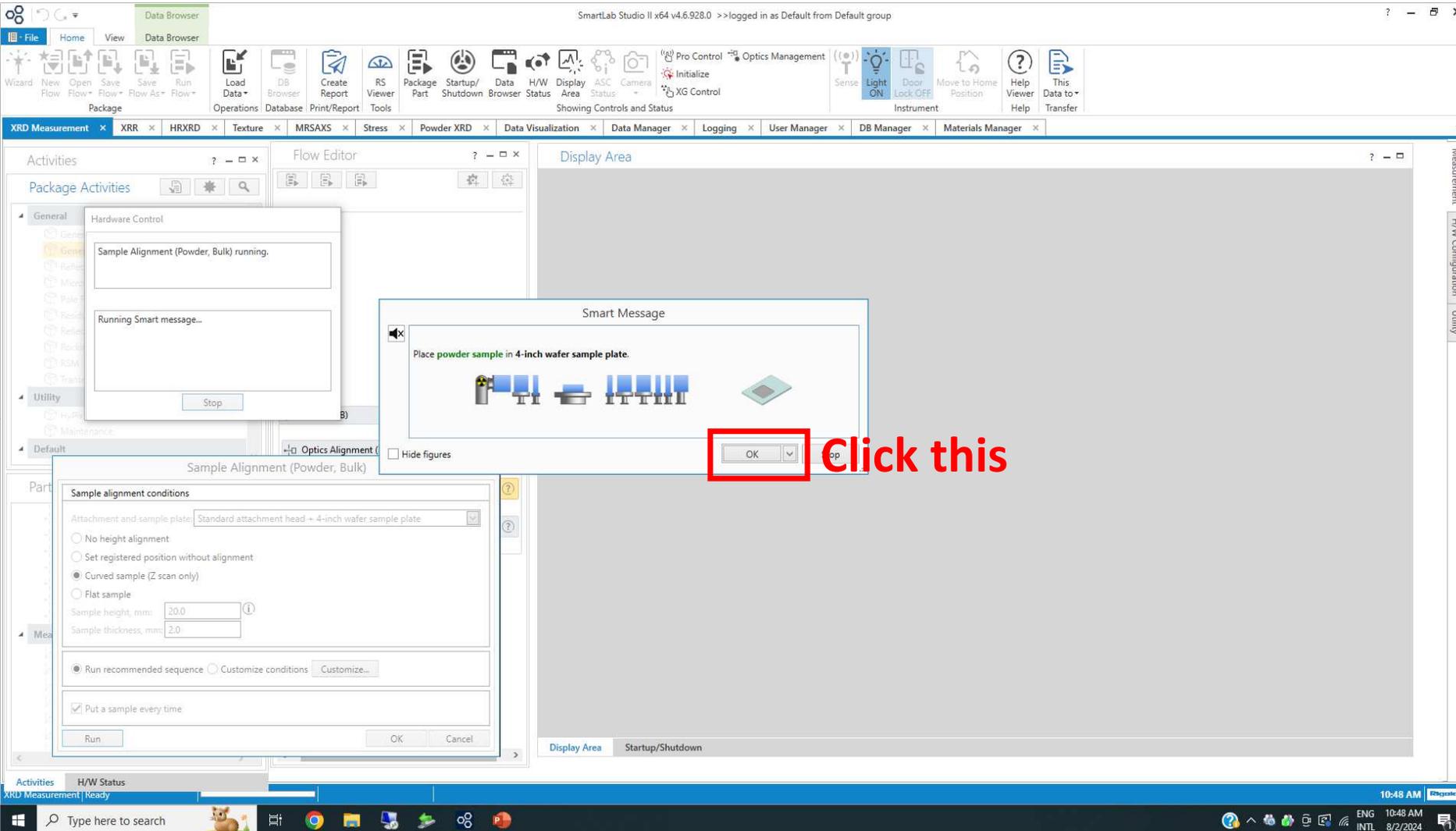
Double Click BB

Click Sample Alignment

- Attachment and Sample plate를 4-inch wafer plate를 클릭해주세요.
- Curved sample (Z-scan only)를 클릭해주세요.
- Run을 클릭해주세요.

Click 4-inch sample plate
For Films

- Smart Message 창이 뜨면 OK를 클릭해주세요.



- Z scan에서 계단모양의 Profile이 나오고 Flow sequence completed. 라는 문구가 나오면 OK를 클릭해주세요.

The screenshot displays the SmartLab Studio II software interface. The main window shows a plot of Intensity (cps) versus Z (mm). The plot shows a sharp peak at approximately -1.31 mm, indicating a step-like profile. A dialog box titled "XRD Measurement" is overlaid on the plot, displaying the message "Flow sequence completed." and an "OK" button. A red box highlights the "OK" button, and a red arrow points to it with the text "Click this".

Sample Alignment (Powder, Bulk) dialog box settings:

- Attachment and sample plate: Standard attachment head + 4-inch wafer sample plate
- Alignment options:
 - No height alignment
 - Set registered position without alignment
 - Curved sample (Z scan only)
 - Flat sample
- Sample height, mm: 15.0
- Sample thickness, mm: 2.0
- Run recommended sequence Customize conditions Customize...
- Put a sample every time

- Flow Editor에서 General Measurement(BB)를 클릭해주세요.

The screenshot displays the SmartLab Studio II software interface. The main window is titled "SmartLab Studio II x64 v4.6.928.0 >>logged in as Default from Default group". The interface is divided into several panels:

- Flow Editor:** Located in the center-left, it shows a tree view of activities. The "General (BB)" activity is highlighted with a red box, and a red arrow points to it with the text "Click this". Other activities listed include "Optics Alignment (BB)", "Sample Alignment (Powder, Bulk)", "General Measurement (BB)", "General Measurement", "Pole Figure Measurement", "Pole Figure Measurement (2D)", "Residual Stress Measurement", and "Residual Stress Measurement (2D)".
- Display Area:** Located on the right, it shows a plot of Intensity (cps) versus $2\theta/\omega$ (degrees). The plot shows a red line representing the data, with a legend indicating "Al_50mA_0.9Pa_stage5_36 0s/1". The y-axis ranges from $1 \cdot 10^0$ to $1 \cdot 10^8$, and the x-axis ranges from 0.5 to 5.0.
- Activities Panel:** Located on the left, it shows a list of activities under "Package Activities", "Part Activities", and "Measurement Activity".
- Bottom Panel:** Shows the Windows taskbar with the search bar, taskbar icons, and system tray showing the time as 9:53 AM on 8/2/2024.

- General Measurement(BB)에 시료를 로딩할 때 끼운 맞게 Length-limiting Silt을 선택해주세요.
- 측정 조건을 입력해주세요. File name 끝에 버튼을 눌러서 파일명을 저장하세요.
- Run을 클릭하세요.

SmartLab Studio II x64 v4.6.928.0 >>logged in as Default from Default group

General Measurement (BB)

Manual exchange slit conditions

Incident Soller slit: Soller slit 2.5°
 Length-limiting slit: 10 mm
 Receiving Soller slit: Soller slit 2.5°

K β filter condition
 K β filter: K β filter 1D for Cu

Detector conditions
 Detector: HyPix-3000 (horizontal)
 Monochromator: None
 Scan mode: 1D(scan)
 Energy mode: Standard

Measurement conditions

	Exec.	Range	Start, °	Stop, °	Step, °	Speed, °/min	Incident Slit, °	Receiving Slit #1, mm	Receiving Slit #2, mm	Comment	Options
1	<input checked="" type="checkbox"/>	Absolute	10.0000	20.0000	0.0200	2.0	1/2	20.000	Open		Set...
2	<input type="checkbox"/>	Absolute	3.0000	80.0000	0.0100	50.0	1/2	20.000	Open		Set...
3	<input type="checkbox"/>	Absolute	5.0000	80.0000	0.0100	50.0	1/2	20.000	Open		Set...
4	<input type="checkbox"/>	Absolute	5.0000	80.0000	0.0100	50.0	1/2	20.000	Open		Set...
5	<input type="checkbox"/>	Absolute	5.0000	80.0000	0.0100	50.0	1/2	20.000	Open		Set...
6	<input type="checkbox"/>	Absolute	5.0000	80.0000	0.0100	50.0	1/2	20.000	Open		Set...
7	<input type="checkbox"/>	Absolute	5.0000	80.0000	0.0100	50.0	1/2	20.000	Open		Set...
8	<input type="checkbox"/>	Absolute	5.0000	80.0000	0.0100	50.0	1/2	20.000	Open		Set...
9	<input type="checkbox"/>	Absolute	5.0000	80.0000	0.0100	50.0	1/2	20.000	Open		Set...
10	<input type="checkbox"/>	Absolute	5.0000	80.0000	0.0100	50.0	1/2	20.000	Open		Set...

Save measured data

Separate measured file

File name: D:\Data\NGEL\KHE\test.rasx

Sample name:

Memo:

Move to home position after the measurement completed.

Run real-time search match

Calculated scan duration: 7min 47s

Run

0089_Scan
2024Aug0
2-095937

-1.6 -1.4 -1.2

- 측정이 완료되면, Measurement Completed 창이 뜨면 OK를 클릭해주세요.
- 하단에 화살표를 아이콘을 클릭해주세요.

The screenshot displays the SmartLab Studio II v4.6.928.0 interface. The main window is titled "Display Area" and shows an XRD pattern plot with "Intensity, cps" on the y-axis (0 to 600) and "θ/2θ, °" on the x-axis (10 to 20). A prominent peak is visible at approximately 12.8°. The plot is labeled "test/1".

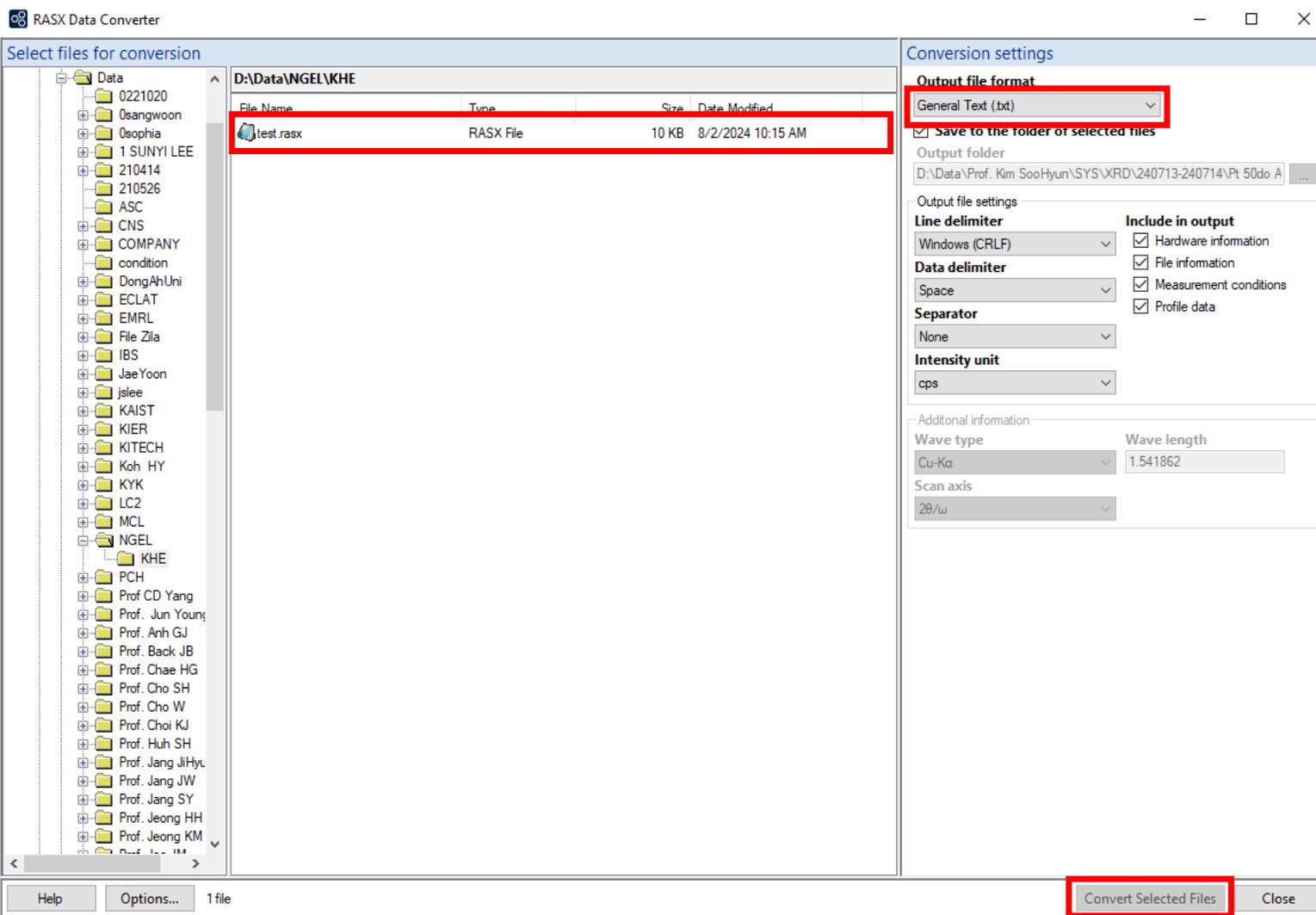
On the left side, there are two panels: "H/W Status" and "Flow Editor". The "H/W Status" panel contains a table with the following data:

Name	Status
Axis	
2θ	0.0000 °
ω	0.0000 °
Sample	
Optics	
Attachment base	Standard attachment
Attachment head	Standard attachment head
Attachment option	None
Detector	
Detector	HyPix-3000 (horizontal)
X-ray generator	
Vacuum	On
X-ray	On
Shutter	Close
Tube voltage	45 kV
Tube current	200 mA
IG voltage	120.00 mV
Operating time of the X-	8532.45 H
Operating time	
Operating time of the X-	8532.45 H
Operating time of the fil	8532.45 H
Operating time of the hii	-

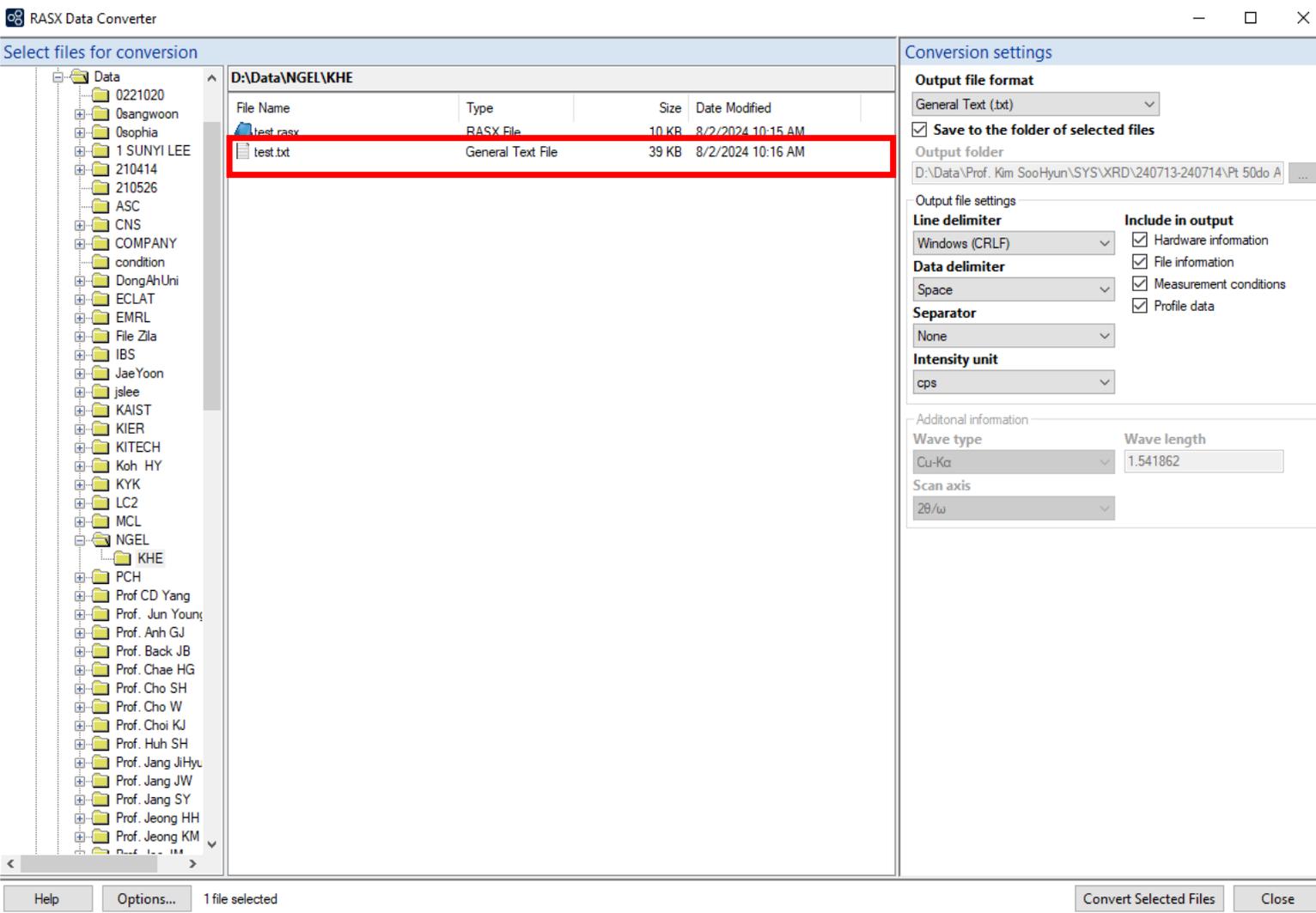
The "Flow Editor" panel shows a sequence of steps: General (PB), Optics Alignment (PB), Sample Alignment (Powder, Bulk), and General Measurement (highlighted in yellow with a red warning icon).

At the bottom of the interface, there is a Windows taskbar with a search bar and several icons. A red box highlights the "Measurement Completed" icon (a green arrow pointing right) in the taskbar.

- Rasx 파일을 클릭한 후, Output file 형식을 txt로 변경해주세요.
- Convert Selected Files를 클릭해주세요.



- 생성된 텍스트 파일은 NAS Server를 이용하여 업로드해주세요.
- USB 사용하시면 절대 안됩니다.



- SmartLab Studio 프로그램 하단 중앙에 Startup/Shutdown 탭을 클릭해줍니다.
- 상단 Shutdown XG off 체크후 Run을 클릭한 후, XRD measurement 창에서 Yes를 클릭해주세요.
- 도어를 열어 시료를 회수하고 도어를 닫아주세요.

