



Quick Guide for JCM-7000, NeoScope™

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Introduction

This training guide will take the user through a general overview of the instrument and the software interface highlighting the most commonly used features of the software.



Instrument Overview



JCM-7000 Main Unit



PC



Rotary Pump



Power Supply



With EDS Option



EDS Power Supply



Digital Pulse Processor

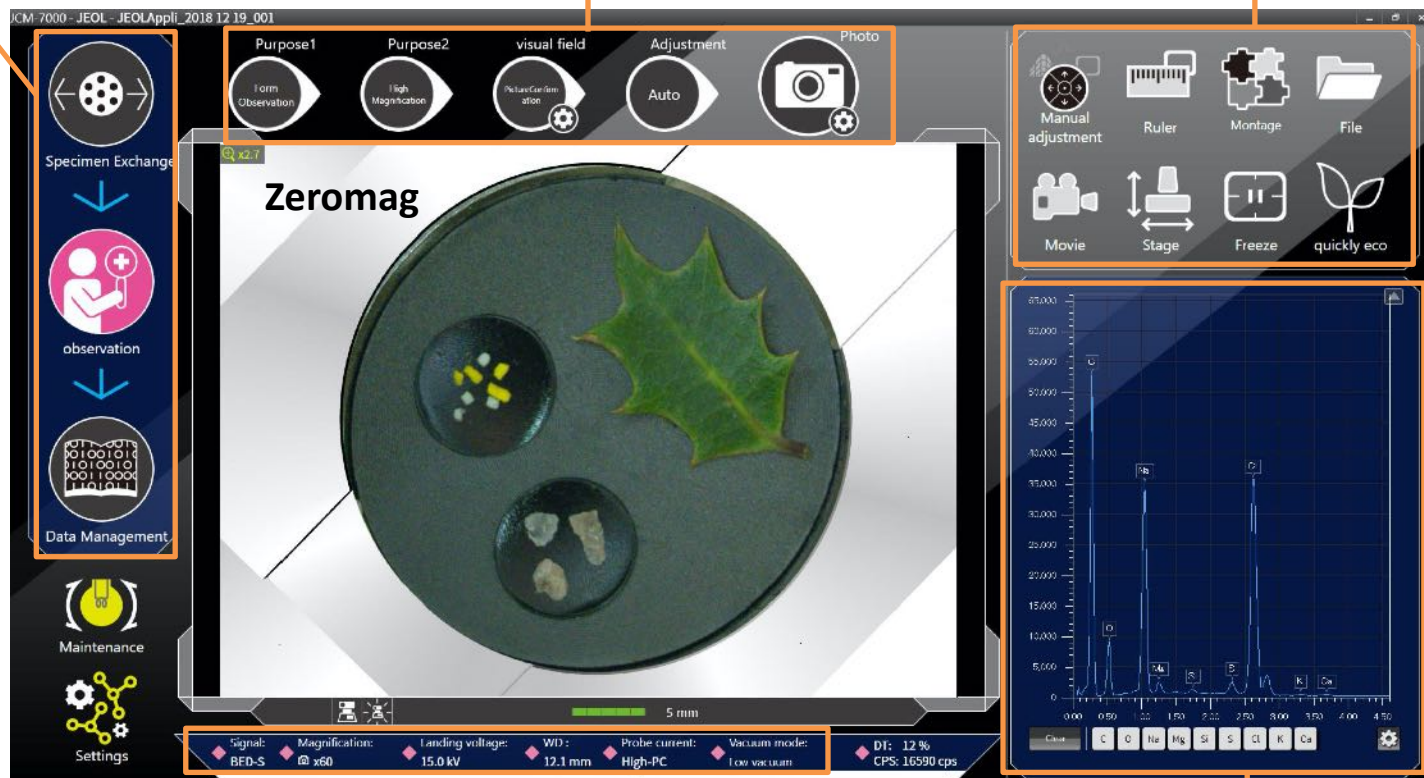
Fits in Power Supply Box

Software Interface Overview

Guided Workflow

Observation Settings

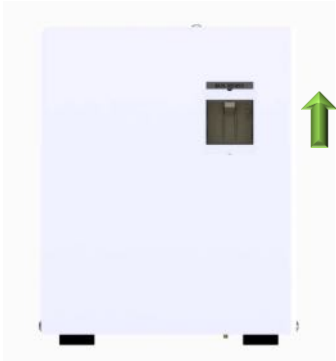
Advanced Functions



Manual Condition Setting

Live EDS Spectrum
Real Time

Start Up



Turn on the Main Power Supply.

When EDS is installed, turn on the EDS power supply and Digital Pulse Processor

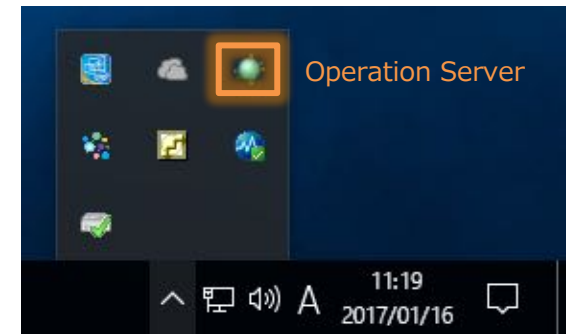


Push the **Power** button on the main unit (Blue LED will turn on)

Turn on the PC

From the System Tray of PC, confirm the **Operation Server is running**. The Operation Server should start automatically (a message will be displayed). **Operation Server** icon is green when running.

Double click on the **SEM Operation EZ** icon to start the SEM software



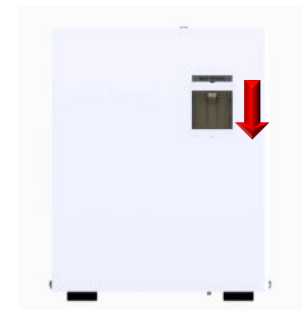
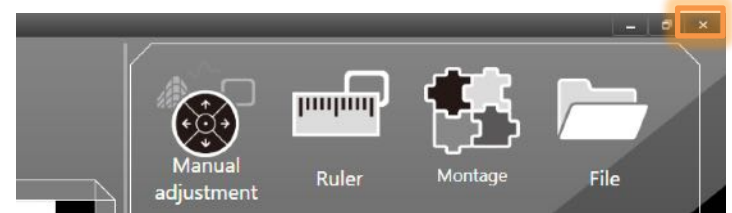
Shutdown

Remove specimen and evacuate the chamber. Close the SEM control software by clicking on the 'x' button on the upper-right of the SEM software interface. An **Exit SEM Control Software** message box will appear, click on the **Yes (Y)** button.

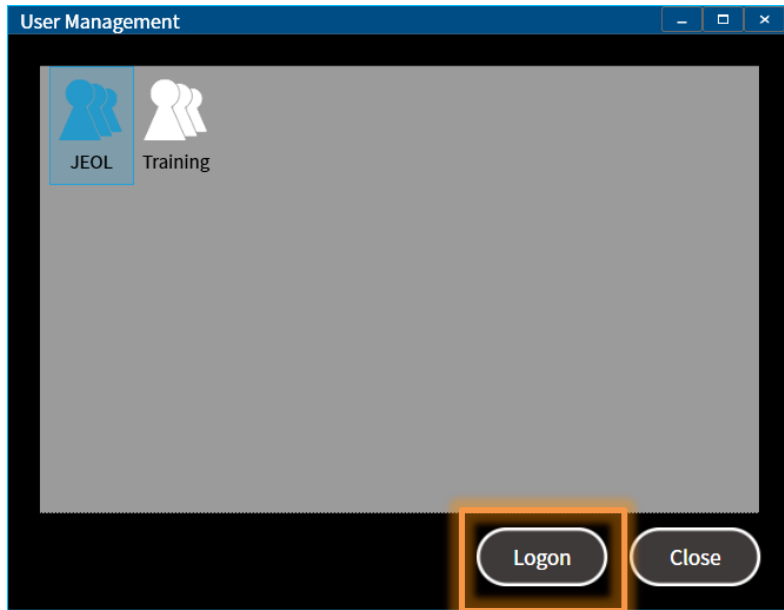
Shutdown PC

Turn off the power to the main SEM unit by pushing on the Power button (blue LED will turn off)

Turn off the Power Supply box. If EDS is installed, turn off the EDS power supply and the digital pulse processor unit.



Software Start Up – Logon



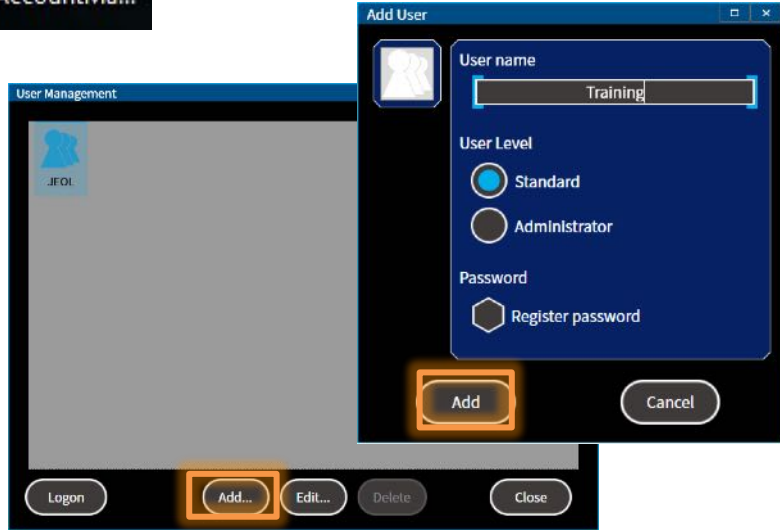
When the software starts, the **User Management** window is displayed. Click on your User name and then Click **Logon**. The Software will open to the **Specimen Exchange** window.

There are 2 categories of User: Administrator and Standard. An Administrator can add, edit or delete users. Standard users only have control of their own profile.

Note: The default icon for an Administrator User is displayed as blue and for a Standard User it is displayed as white in color.

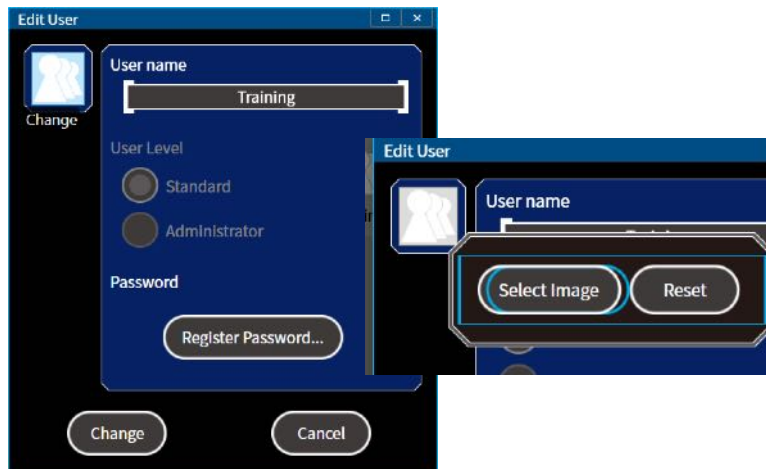
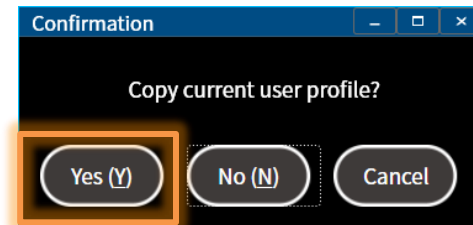
Account Manager - Creating A User

Managing User accounts is through the **AccountManager** software (separate application). To add/delete a User account, select this icon before launching the SEM software (**SEM Operation EZ**)



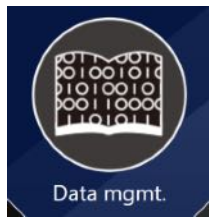
To add a User, Click on the **Account Manager** software then click on **Add...** Next, type in a **User name**, select the **User Level** and if you want to password protect a User account, check **Register password**. Next click on **Add** in the **Add User** window.

A window will pop up asking to 'Copy current user profile?'. Click **Yes**.

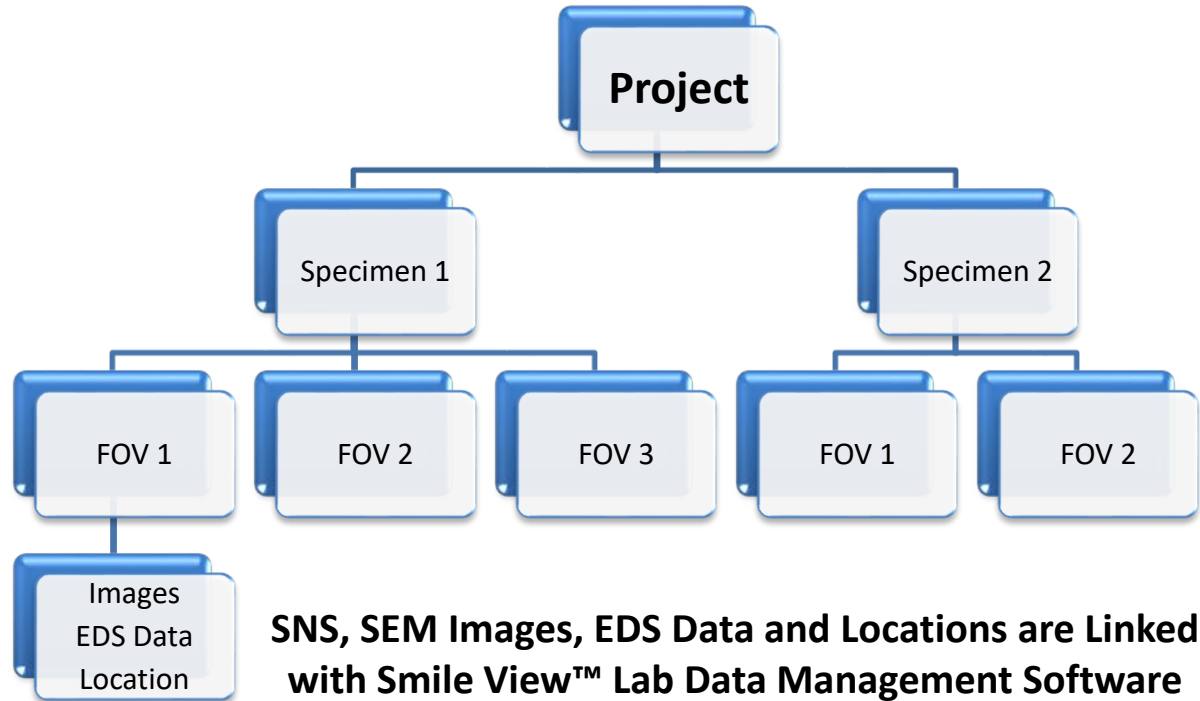


As an Administrator, it is possible to **Register Password** or even change the User icon to any image.

Data Management



Opens



Images and EDS data are stored automatically in a **Project** file. Therefore, the first step in your workflow is to create a new **Project** or open an existing **Project**. Next is to create a new **Specimen** or open an existing Specimen name.

All images, EDS and location data will be stored for each sample under the **Project** name and **Specimen** name defined by the User. Access this data through **Smile View™ Lab**.

Software Start Up – Specimen Exchange



Once logged in, the **Specimen Exchange** window is displayed.

Follow the steps in this window to insert a specimen.

When the specimen is inserted and the SEM chamber door is closed, the system will automatically evacuate.

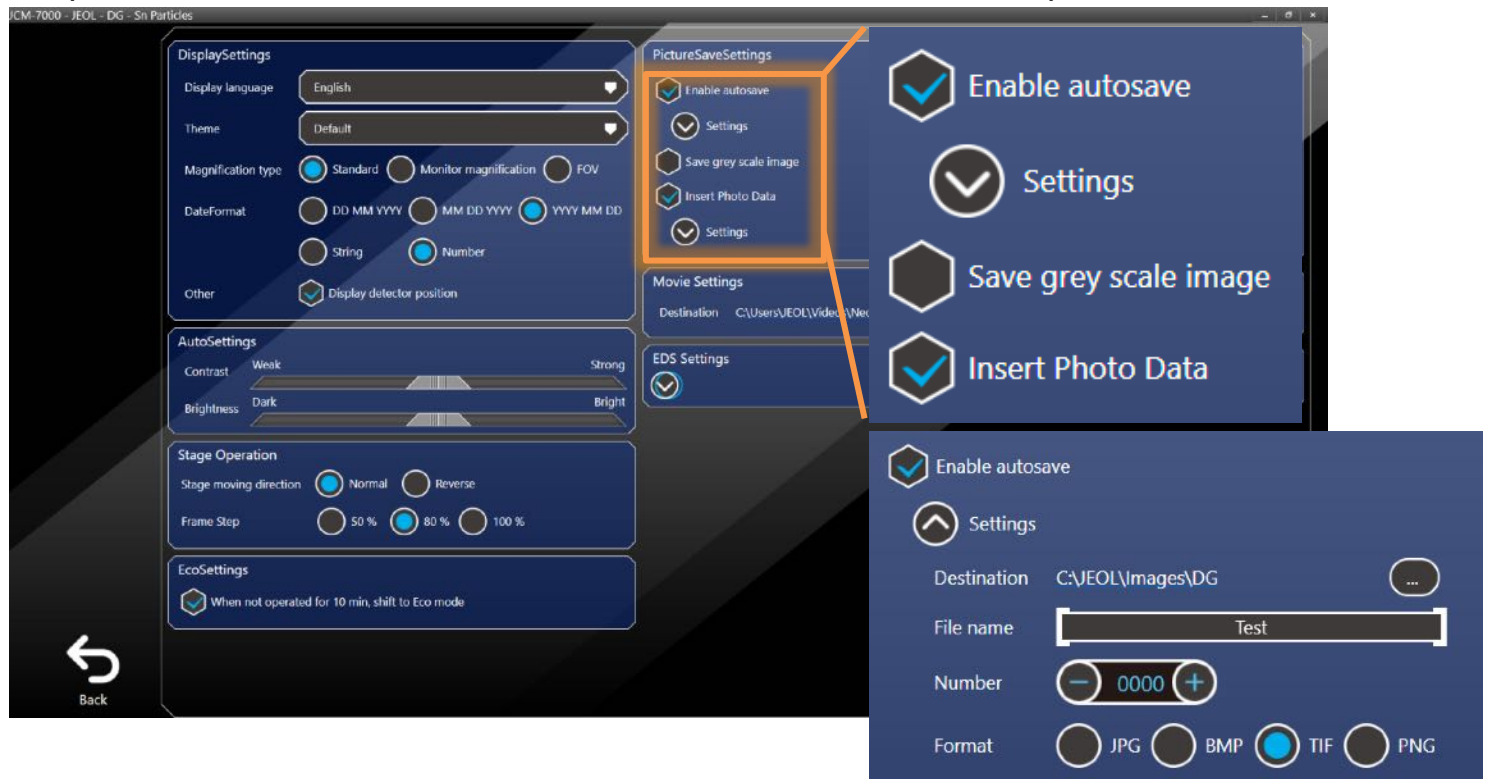
If the **SNS** (Stage Navigation System) option is installed, a picture of the specimen on the holder will automatically be taken on closing the door.

The screenshot shows the 'Specimen Exchange' window of the SEM software. The window title is 'JCM-X000 - JEOL - #Unclassified - Smp_006'. On the left is a vertical navigation menu with icons and labels: 'Specimen exch.' (selected), 'Observation', 'Data mgmt.', 'Maintenance', and 'Settings'. The main area contains five numbered steps: 1. Press the VENT button and take out the sample from the instrument. (Includes a 'VENT' button and a progress bar from 'Start' to 'End'). 2. Please choose the project name and sample data name. (Includes input fields for 'Project name' with value '#Unclassified' and 'Specimen Data Name' with value 'Smp_001', and buttons for 'Change' and 'Reference'). A callout box says 'Input a Project name or open an existing Project here.' 3. Please select the specimen holder to use. (Includes two circular icons for '32mm' and '80mm' holders). 4. Please select the observation condition. (Includes three radio button options: 'High vacuum Conductive sample' (selected), 'Low vacuum Nonconductive sample', and 'CF vacuum Outgassing_nonconductive sample'). 5. Please attach the specimen to the instrument and close the door. On the right side of the window is a 3D CAD model of the SEM chamber with its door open, showing the specimen holder inside. Below the model are two circular navigation buttons.

Note: It is important to specify a **Project name** by either opening an existing one or creating a new one in step 2. All data will be stored to the **Project name** and **Specimen Data Name** displayed in this window.

Save Settings

In addition to the SEM image data saving to a Project file, it is possible to also automatically save the image data in a Windows directory in Tiff, BMP, JPEG or PNG format. From the **Specimen Exchange** window, select the **Settings** icon and make sure that **Enable autosave** is checked in **PictureSaveSettings**. For the data bar to be included, the **Insert Photo Data** must be checked. Set the **Destination** (directory path), **Filename** and select an image **Format**. When images are saved to a directory they will save to the defined **File name** and auto increment by **Number**.



Note: EDS data will be stored in the Project file and can be Exported to Word, PowerPoint or PDF from the Smile View™ Lab Data Management software.

Settings – Eco Mode

The screenshot shows the 'Settings' window for a JEOL SEM system. The window is titled 'JCM-7000 - JEOL - DG - Sn Particles'. It contains several settings panels:

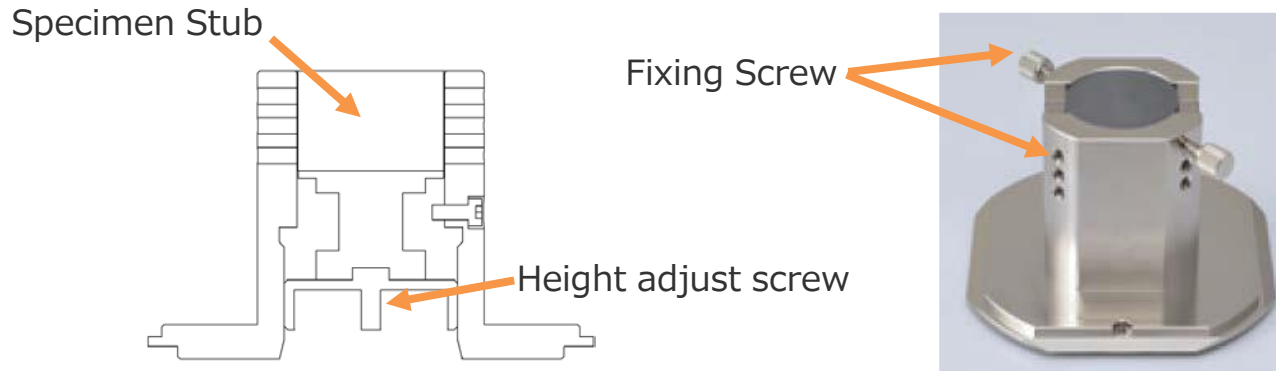
- DisplaySettings:** Includes options for Display language (English), Theme (Default), Magnification type (Standard, Monitor magnification, FOV), DateFormat (DD MM YYYY, MM DD YYYY, YYYY MM DD, String, Number), and Other (Display detector position).
- AutoSettings:** Includes sliders for Contrast (Weak to Strong) and Brightness (Dark to Bright).
- Stage Operation:** Includes Stage moving direction (Normal, Reverse) and Frame Step (50%, 80%, 100%).
- EcoSettings:** This panel is highlighted with an orange border and contains a checked checkbox for 'When not operated for 10 min, shift to Eco mode'.
- PictureSaveSettings:** Includes checked checkboxes for 'Enable autosave', 'Insert Photo Data', and a 'Settings' dropdown.
- Movie Settings:** Includes a 'Destination' field set to 'C:\Users\JEOL\Videos\NeoScope' with a browse button.
- EDS Settings:** Includes a checked checkbox.

A 'Back' button with a left-pointing arrow is located in the bottom-left corner.

In **EcoSettings**, the system can be set to Eco mode when the SEM shows no activity after 10 minutes. Ecomode is activated if checked. This will turn off the electron beam.

Specimen Preparation

32 mm Holder – Included with the SEM



The standard holder that comes with the instrument holds a 32mm insert (stub). Mount the specimen to stub and insert in holder. Adjust the height using the height adjustment screw so that the specimen is flush with the top surface of the holder. At this position, the Working Distance is $\sim 12\text{mm}$ and will clear the height guard plate mounted on the SEM chamber opening. This is the correct position for EDS analysis and high resolution imaging.



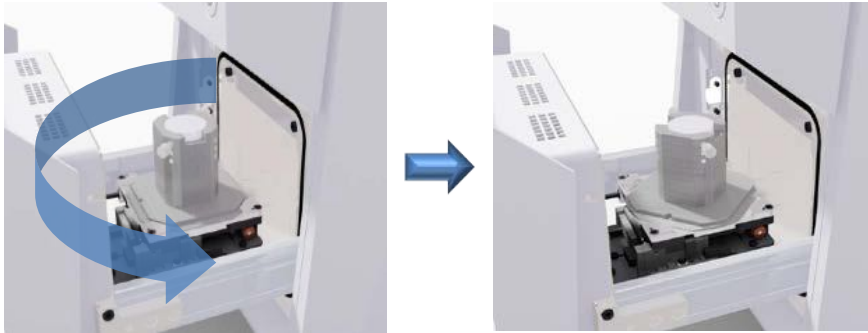
Specimen Exchange



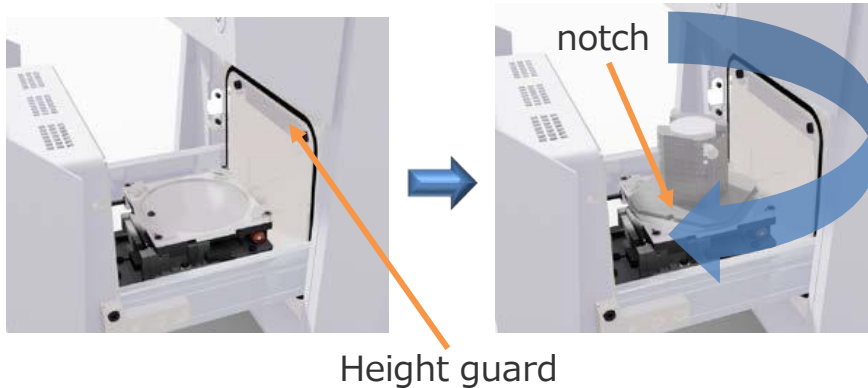
When changing specimens, vent the chamber by either clicking on the **Specimen exch.** button and then click **Vent** or alternatively push the Vent button on the main instrument. If vent is selected on the instrument panel, the software will automatically switch to the **Specimen exch.** window.

Note: When the system is fully vented, the chamber door will open automatically.

Specimen Exchange



To take out a holder, turn counter clockwise 45° and lift out.



To insert a holder, make sure the notch on the holder is facing the front and turn clockwise 45° to fix in place.

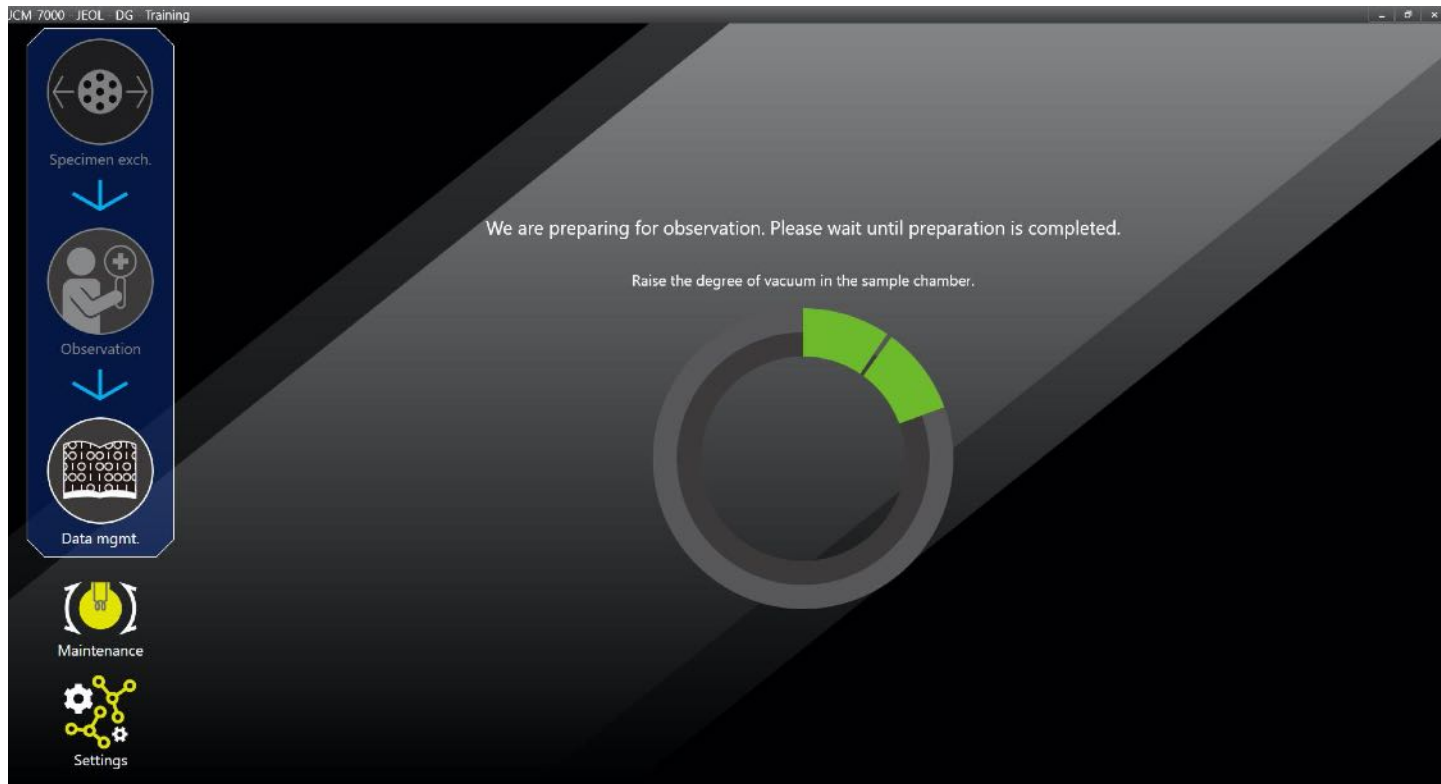
Take care that the specimen can clear the height guard.

Push and hold the door closed until the **Vent** button starts blinking (Blue LED) on the instrument panel.



Software Start Up – Specimen Exchange

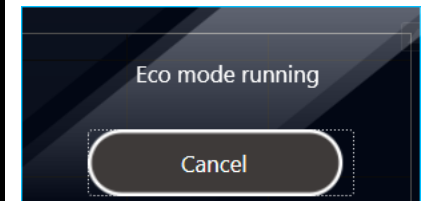
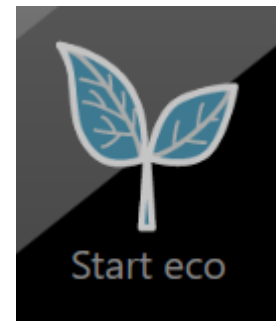
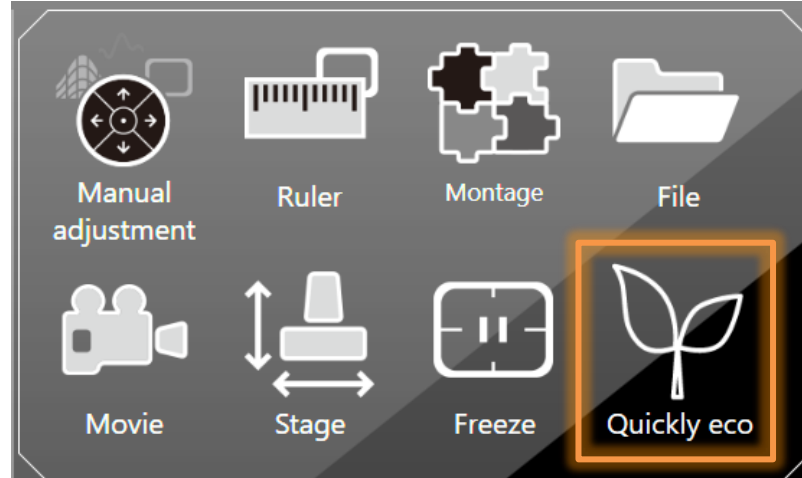
Once the SEM chamber door is closed. The system will automatically evacuate the chamber and the following window will be displayed on the software interface. Evacuation time is ~3 minutes.



Once the evacuation is completed, the filament will turn on and the auto functions will activate to display a low magnification SEM image.

Turning On/Off Electron Beam

Once the evacuation is completed, the filament will turn on and the auto functions will activate to display a low magnification SEM image. For turning the beam on/off within the **SEM Observation** screen, click on **Quickly eco**



Main Observation Screen

Automatic condition setting based on application: low mag, high mag, EDS analysis

Advanced Functions

The screenshot displays the JEOL SEM observation software interface. The central area shows a specimen with a magnification of $\times 2.7$. The interface includes several panels:

- Top Panel:** Purpose1 (Form Observation), Purpose2 (High Magnification), visual field (Picture Confirmation), Adjustment (Auto), and Photo.
- Left Panel:** Specimen Exchange, observation, Data Management, Maintenance, and Settings.
- Right Panel (Advanced Functions):** Manual adjustment, Ruler, Montage, File, Movie, Stage, Freeze, and quickly eco.
- Bottom Panel (Manual Condition Setting):** Signal: BEI-S, Magnification: $\times 80$, Landing voltage: 15.0 kV, WD: 12.1 mm, Probe current: High-PC, Vacuum mode: Low vacuum, DI: 12%, CPS: 16590 cps.
- Bottom Right Panel (Live EDS Spectrum):** A real-time EDS spectrum showing peaks for C, O, Nb, S, B, Cl, K, and Ca. The x-axis represents energy in keV (0.00 to 4.50), and the y-axis represents counts (0 to 65,000).

Manual Condition Setting

Live EDS Spectrum
Real Time

Automatic SEM Condition Setting

Purpose1 sets the observation purpose where **Purpose2** sets the observation conditions

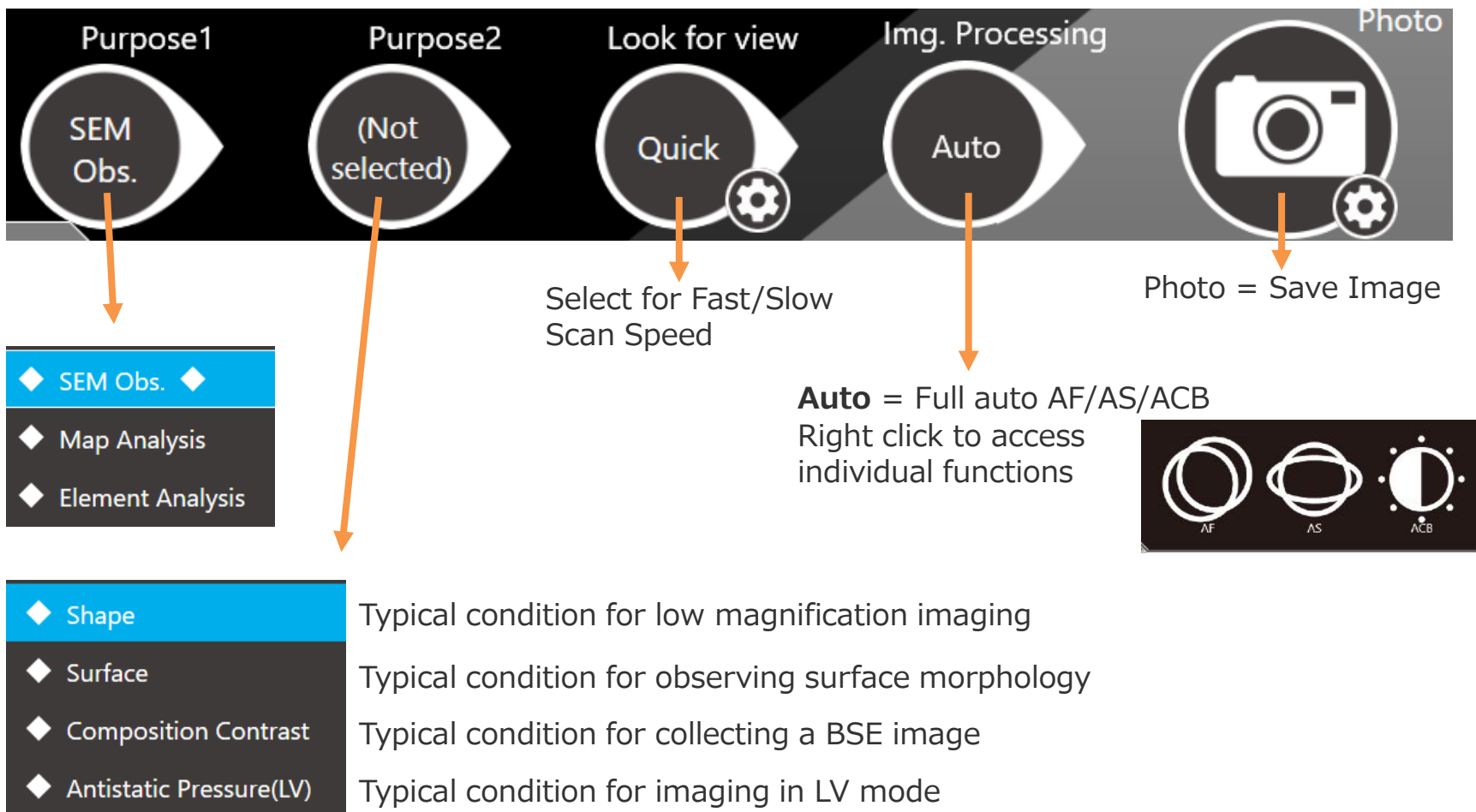
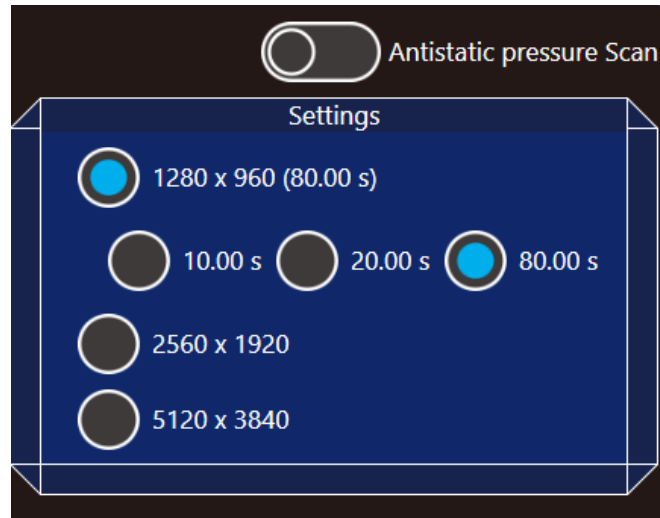


Photo - Collecting an Image



Clicking on the gear icon allows you to change scan settings. Right click to access the **Settings** window.



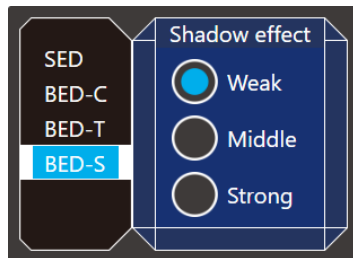
Scan speeds and image pixel resolution choices for the **Photo** scan

Manual SEM Condition Setting

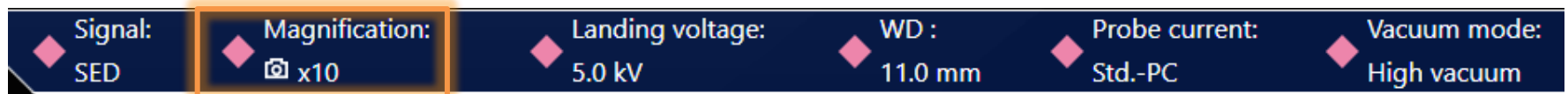
Current viewing conditions are displayed on the bottom of the display. Click in the area to manually change these conditions.




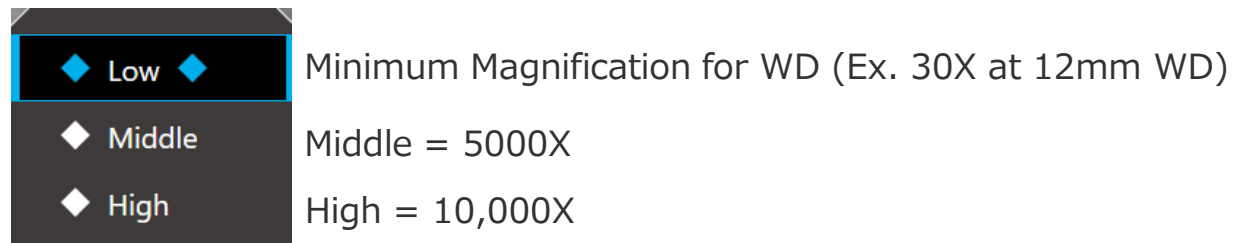
To change detectors click on the  marker by **Signal:** to open the Signal window.



This allows you to change detectors or modes of the BSE detector.




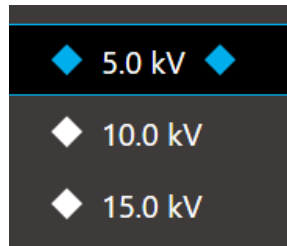
Change magnification clicking on the  marker by **Magnification:** to display the Low/Middle/High window. Alternatively scroll with the mouse wheel within the live image display to the desired magnification. Hover in this area with mouse to display the FOV.




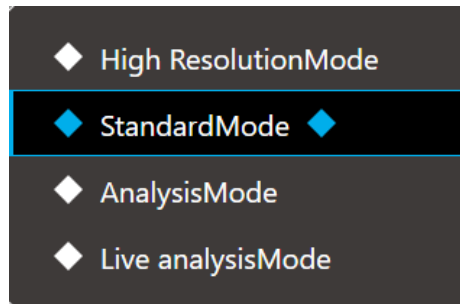
Manual SEM Condition Setting



To change the accelerating voltage click on the  marker by **Landing voltage:** and select from 5kV, 10kV or 15kV.



To change the probe current click on the  marker by **Probe current:** and select from the choices in the **Probe current** window




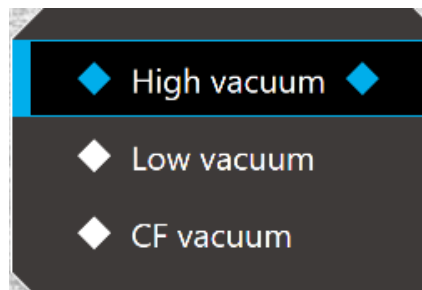
Low-PC. Optimized for high magnification imaging

Std.-PC Optimized for general imaging

High-PC Higher probe current for EDS

Map-PC Highest probe current for EDS, Optimized for Live Analysis

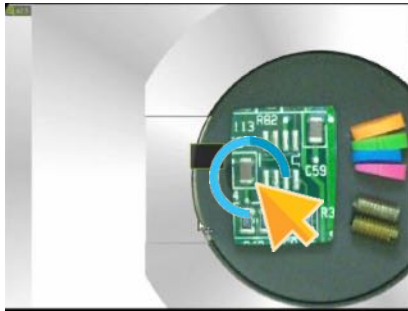
To change from High vacuum to Low vacuum click on the  marker by **Vacuum mode:** and select from the choices in the **Vacuum mode** window



Note: In **Low vacuum** or **CF vacuum** modes, the BSE detector is automatically selected.

CF vacuum (charge free) adds more air into the sample chamber to aid in eliminating charging artifacts in nonconductive specimens.

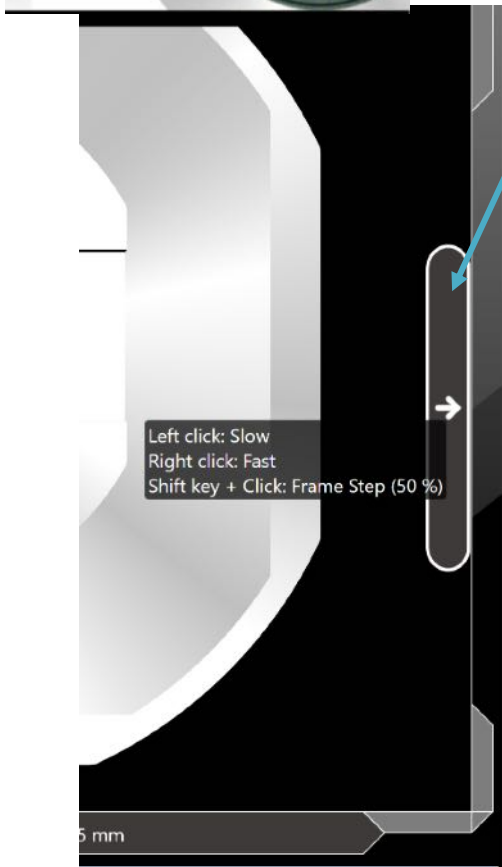
Sample Navigation



With Zeromag, click anywhere on the color image (with SNS option) or holder graphic to move to that location

Other ways to move include:

- click-to-center
- drag-and-drop
- Hold cursor down at edge of live image display
 - (slow, fast and user defined frame step)

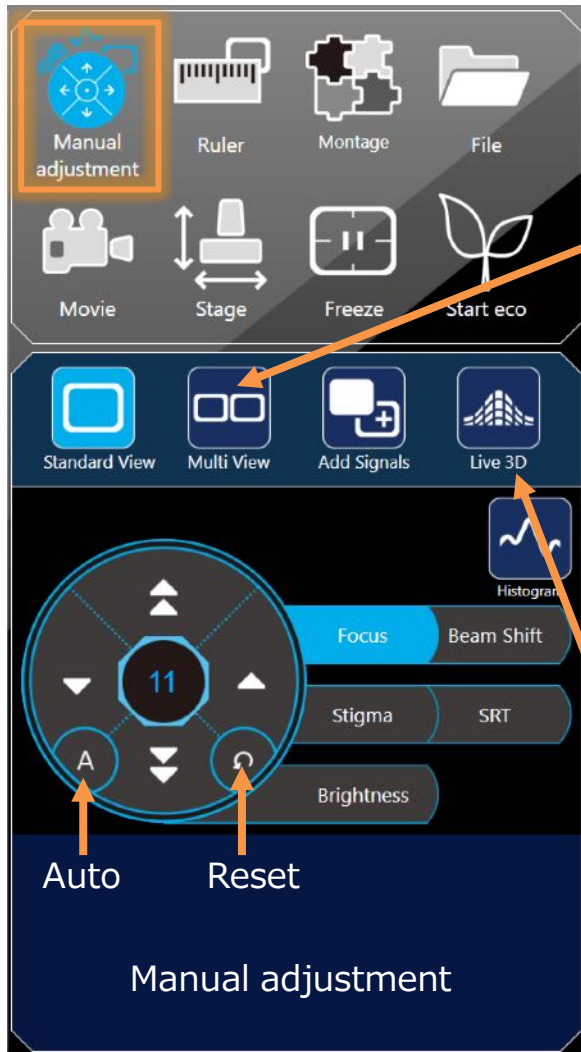


Name	X [mm]	Y [mm]	T [°]	Specimen holder
Area 1	0.47	-0.96	0	32mm
Area 2	-6.54	6.77	0	32mm

Access the Stage control display by clicking on the **Stage** button.

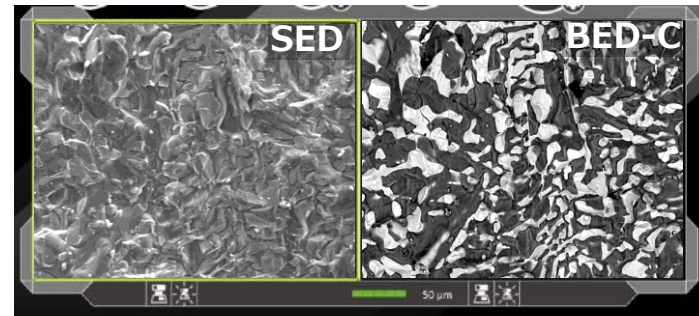
- Type in coordinates
- Store and recall stage positions
- Cross hairs show beam position on graphic of specimen holder or color image (with SNS option)
- Can click on the graphic or SNS image to move

Manual Image Adjustment



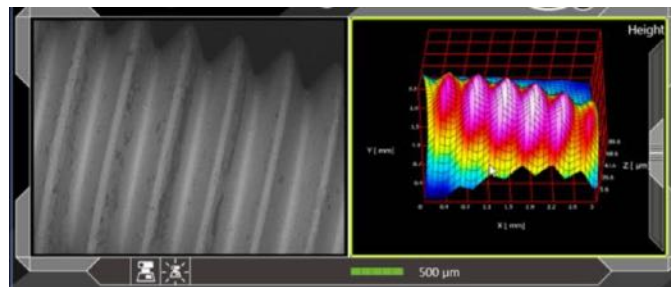
Selecting **Manual adjustment** provides access to manual adjustment window. Highlight function to manually adjust then scroll with mouse or click on arrows to make adjustments.

Selecting **Multi View** lets you display the live image from 2 detectors simultaneously (SE and BSE). Both images will be saved.



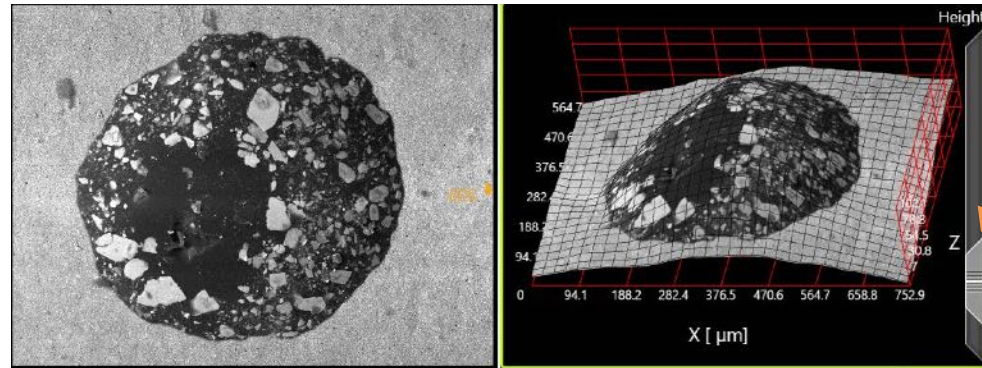
Selecting **Add Signals** shows a mixed signal image from 2 detectors where the User can adjust the contribution from each signal. Note: 3 Images will be saved when collecting a photo: Mixed image 'Add', SE and BSE.

Selecting **Live 3D** activates each quadrant of the BSE detector to construct a live 3D reconstructed surface image.



Live 3D Imaging

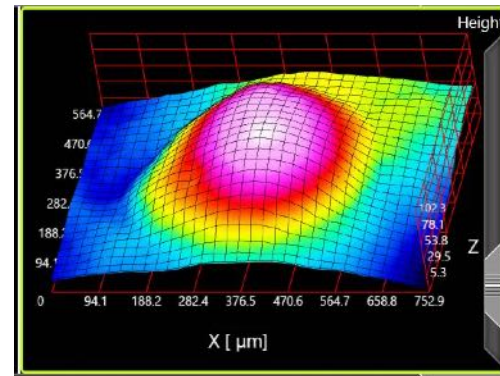
To observe a live 3D image, select the **Manual adjustment** button and then select the **Live 3D** button. This activates the quadrants of the BSE detector, sets ACB and displays the live 3D image. The 3D image is interactive in that you can change the view angle and zoom in/out by drag and drop and scrolling with mouse wheel in the Live 3D display.



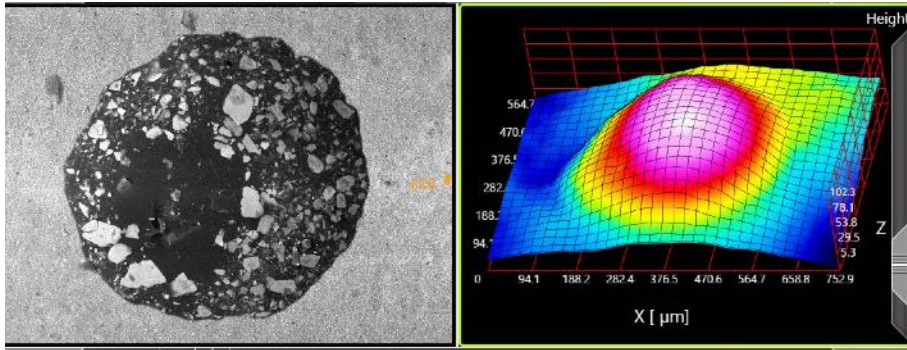
Adjust amplitude of Z-height

Colorize 3D image based on height by checking **Color map**, add grid lines and correct for brightness.

If you know the specimen height, it is possible to calibrate to improve accuracy.



Live 3D Imaging



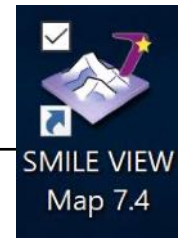
Collecting a **Photo** will save 5 images. The signal on the left-side of the dual live image display along with images from the 4 quadrants of the BSE detector. Filename nomenclature is:

1. *Filename_signal_1_count.extension*
2. *Filename_BED-A1_count.extension*
3. *Filename_BED-A2_count.extension*
4. *Filename_BED-B1_count.extension*
5. *Filename_BED-B1_count.extension*

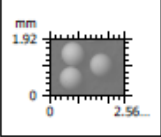
Note: To create a 3D surface reconstruction and analyze the reconstructed image, Smile View™ Map software (Option) is required.

With Smile View™ Map (SVM), once an image is collected, the SEM software will open a dialog box prompting the startup of the SVM software. Click the **Yes** button to automatically launch the SVM software and the data will open to a default template which generates a reconstructed surface and cross-section cut-out.

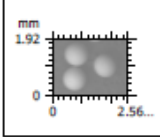
Smile View™ Map - Option



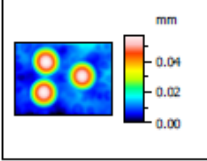
Default Template



mm
1.92
0 2.56

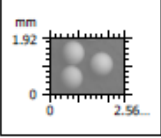


mm
1.92
0 2.56

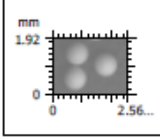


mm
0.04
0.02
0.00

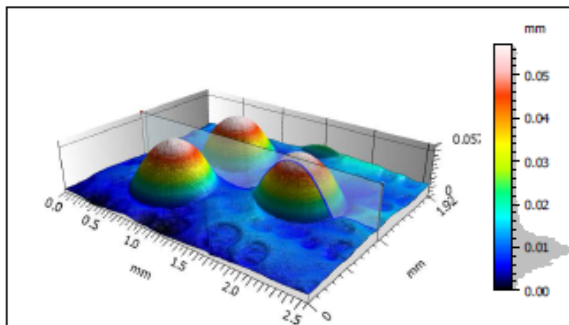
Identity card	
Name:	0deg_B2
Measured by:	?
File path:	C:\US...\0deg_B2.bmp
Created on:	9/14/2017 4:01:12 PM
SEM measurement conditions	
Signal	BED-C
Magnification	x50
WD	9.9 mm
F.O.V.	2.560mmx1.920mm
Acceleration voltage	30.0 kV
Probe current	50.0
Vacuum mode	HV
Scan rotation	0 °
Image size	640x480



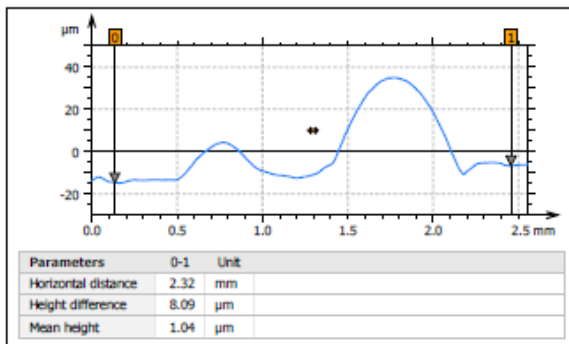
mm
1.92
0 2.56



mm
1.92
0 2.56



ISO 25178	
Height Parameters	
Sq	0.0134 mm
Ssk	1.59
Sku	4.36
Sp	0.0413 mm
Sv	0.0159 mm
Sz	0.0571 mm
Sa	0.0102 mm



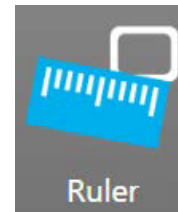
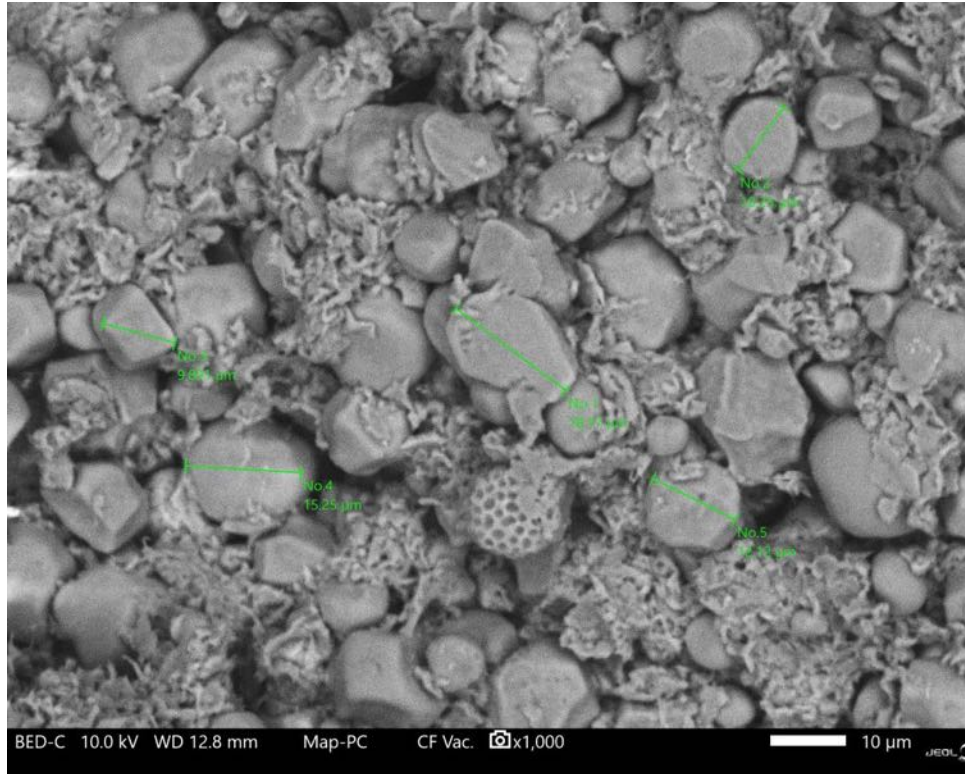
Identity card	
Name:	0deg_A1 > Reconstructed u...
Axis: X	
Length:	2.56 mm
Size:	640 points
Spacing:	4.00 μm
Offset:	0.00 mm
Axis: Z	
Length:	49.9 μm
Min:	-7.08 μm
Max:	42.8 μm
Size:	35306 digits
Spacing:	1.41 nm

State-of-the Art Surface Metrology Software from Digital Surf, Inc. Mountains Map7 for SEM.

With this option:

- Automatically construct a 3D model and display from SEM images
- Numerous surface metrology functions (height, roughness, waviness...)
- Image processing functions (coloring, filtering...)
- ISO, JIS... compliant13

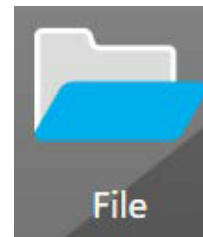
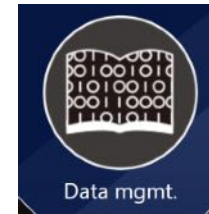
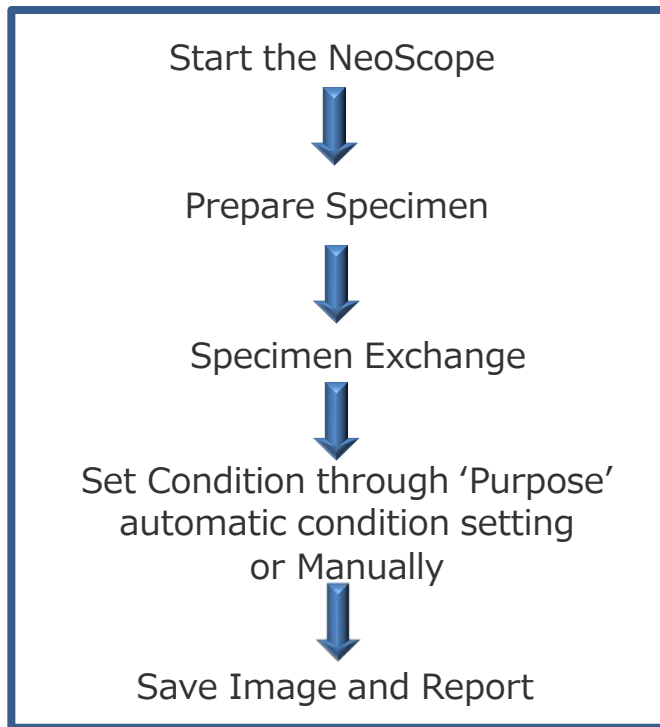
Measurement with Ruler



No.	Value	[unit]
1	18.17	μm
2	10.25	μm
3	9.891	μm
4	15.25	μm
5	12.12	μm

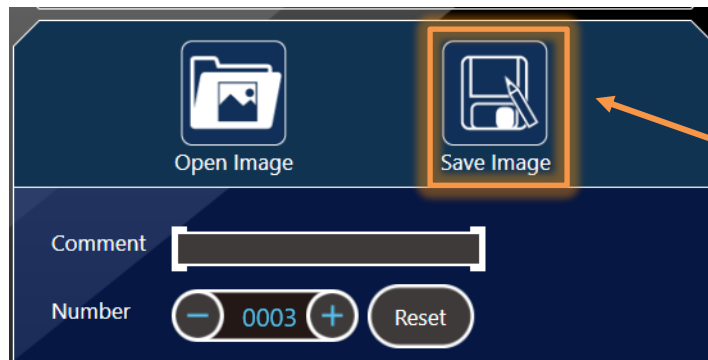
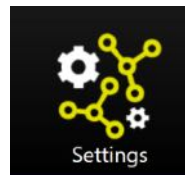
Basic measurement functions are built in – Data is displayed on the image and also output as CSV file. Additional measurement features as well as changing font/color can be accessed through the data management software.

Summary of Imaging Workflow



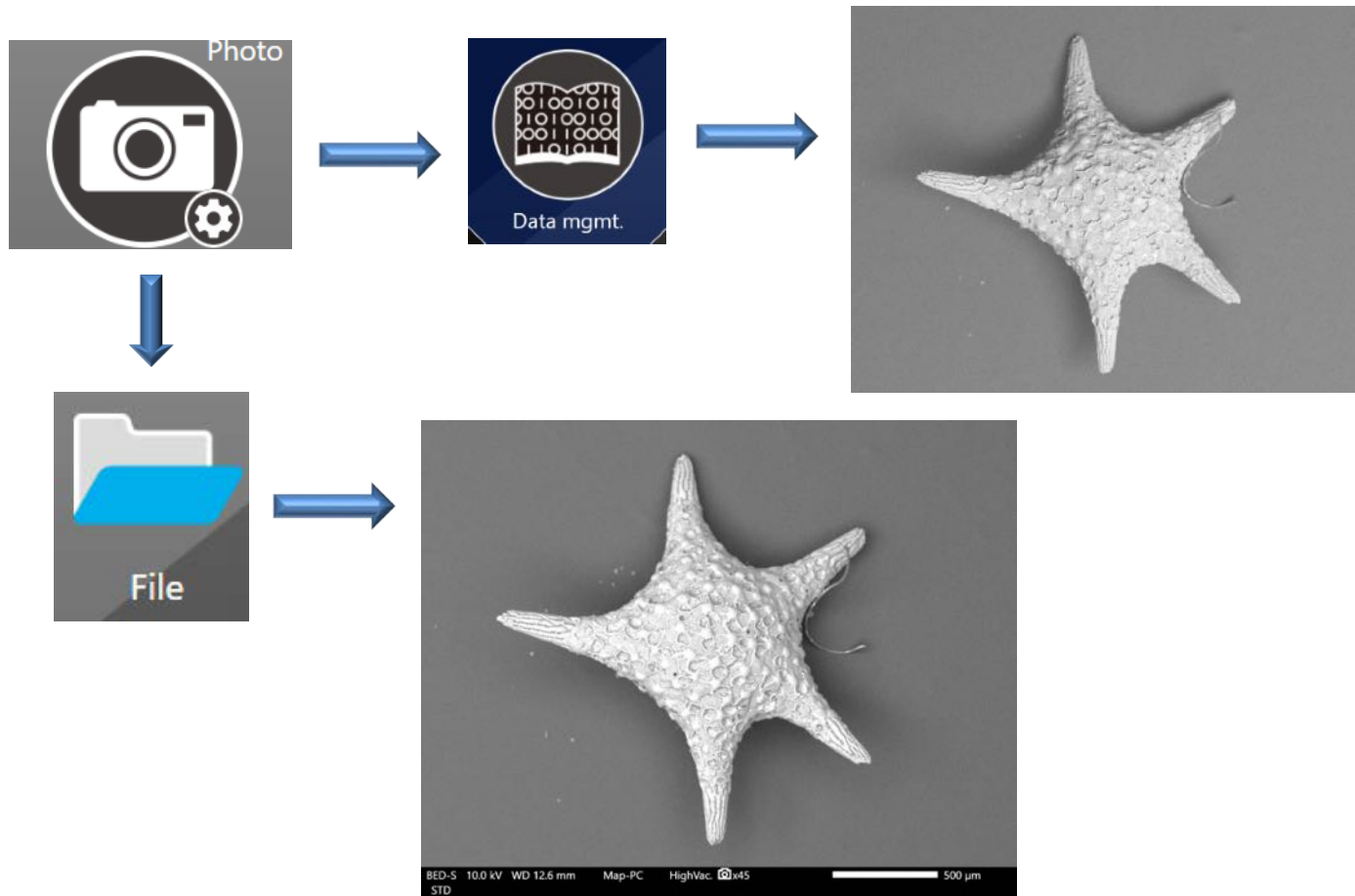
By selecting the **Photo** button, the image is captured and automatically stored to the selected Project. Access and reporting is through **Data mgmt.**

In addition, the image can be saved to a Windows directory by selecting the **File** button. If **Enable autosave** is checked under **PictureSaveSettings** from the **Settings** window, then the images will be saved with the filename and to the directory specified. Each time **Save Image** is checked, the extension number will increment.



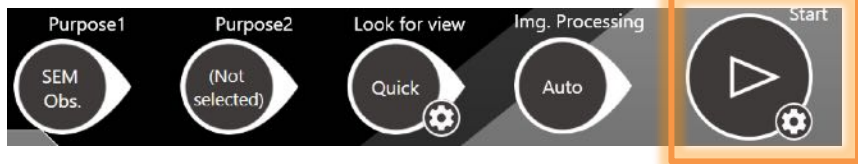
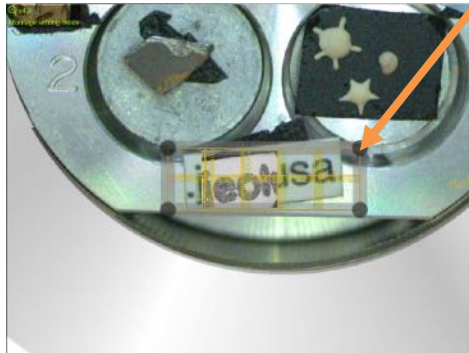
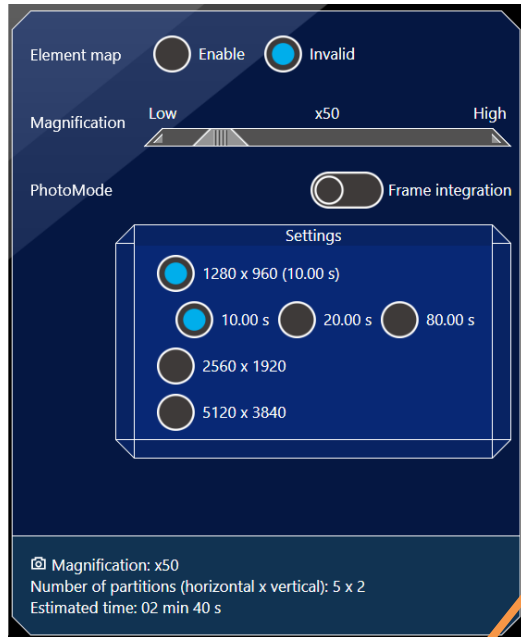
If **Enable autosave** is not checked, when **Save Image** is selected a Windows dialog box will open where you can set the filename and path manually.

Saving Images



The image must be saved from the **File** icon in order to have the data bar. From **Data mgmt.**, the image information is stored and can be listed on reports but will not be on the image.

Automated Montage

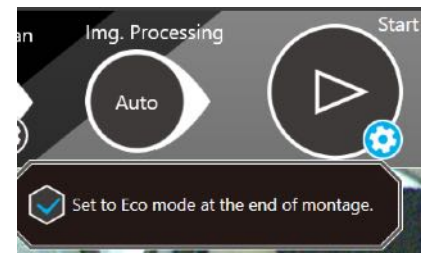


Automated montage is built-in, including the ability to collect and stitch EDS maps. Maximum is a 15 x 15 tile array.

To collect a montage, set the desired magnification and click on the **Montage** button. A box will pop up on the live image display. Drag and expand the box over the region of interest. The number of tiles will be automatically set based on the magnification. Select the pixel resolution for each image and scan speed (with 1280 x 960 pixel image). An estimate of the time required for the Montage will display at the bottom.

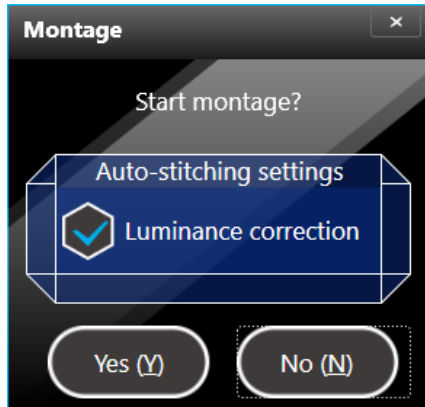
Click on **Start** on the top tool bar to start the montage collection.

The montage image is stored directly in the Project and can be accessed from the **Data management** software.



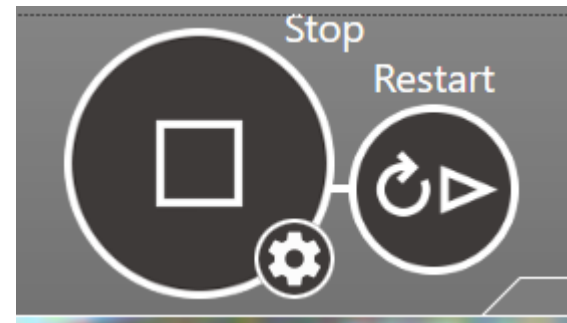
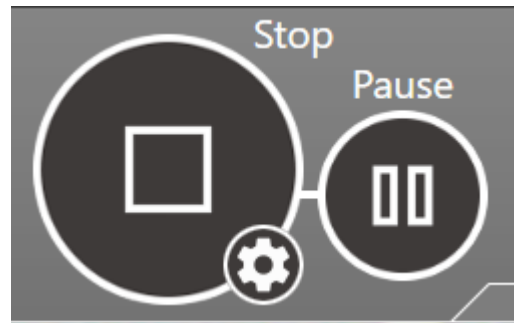
Note: The gear button will open a window to allow you to set **Eco mode** at the end of a montage (beam off).

Automated Montage



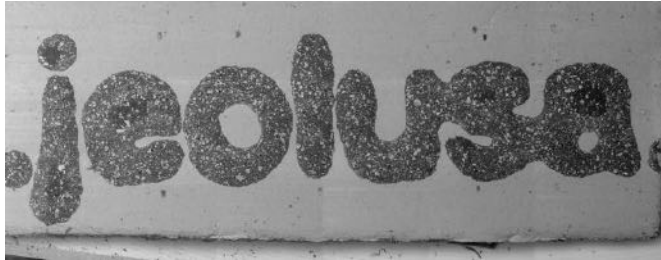
When clicking on the **Start** button, a **Montage** window will pop up. Select **Yes (Y)**. If **Luminance correction** is checked the brightness will be corrected for each image.

You can **Stop**, **Pause**, and **Restart** Montage collection at anytime. Editing or access to the Montage results is through the **Data Management** software.



Automated Montage Example

Mon_BED-S_001



500 μm

Signal BED-S
Landing Voltage 15.0 kV
FOV 8.533 x 3.328 mm
Probe Current Mode Map-PC
Vacuum Mode Low Vac.
Number of Fields 6 x 3
Field Magnification x75

Mon_Ca_K_001



500 μm

Items	Value
measurement conditions	
Acceleration voltage	15.00 kV
Probe current	-
Magnification	x 75
Process time	T1
Resolution	256 x 192
Dwell time	0.02 ms
Live time scan	OFF
Number of frames	50
Measurement detector	First
Live time	44.51 seconds
Real time	49.16 seconds
Dead time	9.00 %
Count rate	28102.00 CPS

SEM Settings for EDS

A typical SEM starting condition for EDS analysis is as follows:

- Accelerating Voltage – Set to 15kV
- Probe Current – Set to Analysis Mode or Live Analysis Mode (for optimum EDS count rate)
- The analytical working distance (AWD) is 12mm. Adjust the specimen height to be flush with the surface of the holder.



Signal: BED-C	Magnification: x430	Landing voltage: 15.0 kV	WD : 12.5 mm	Probe current: High-PC	Vacuum mode: HighVac.	DT: 17 % CPS: 41108 cps
------------------	------------------------	-----------------------------	-----------------	---------------------------	--------------------------	----------------------------

SEM Settings for EDS

The EDS count rate is shown on the lower right section of the Manual tool bar. Note the effect of the probe current on the EDS count rate. It is good to have at least a few thousand counts to provide efficient collection of EDS data.

High ResolutionMode = Low-PC

Signal: SED	Magnification: x330	Landing voltage: 15.0 kV	WD : 12.5 mm	Probe current: Low-PC	Vacuum mode: HighVac.	DT: 2 % CPS: 1183 cps
----------------	------------------------	-----------------------------	-----------------	--------------------------	--------------------------	--------------------------

StandardMode = Std.-PC

Signal: SED	Magnification: x330	Landing voltage: 15.0 kV	WD : 12.5 mm	Probe current: Std.-PC	Vacuum mode: HighVac.	DT: 4 % CPS: 4726 cps
----------------	------------------------	-----------------------------	-----------------	---------------------------	--------------------------	--------------------------

AnalysisMode = High-PC

Signal: SED	Magnification: x330	Landing voltage: 15.0 kV	WD : 12.5 mm	Probe current: High-PC	Vacuum mode: HighVac.	DT: 16 % CPS: 40488 cps
----------------	------------------------	-----------------------------	-----------------	---------------------------	--------------------------	----------------------------

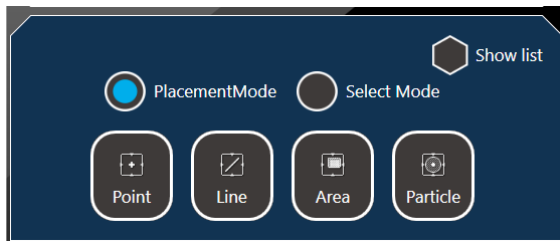
Live AnalysisMode = Map-PC

Signal: SED	Magnification: x330	Landing voltage: 15.0 kV	WD : 12.5 mm	Probe current: Map-PC	Vacuum mode: HighVac.	DT: 28 % CPS: 73088 cps
----------------	------------------------	-----------------------------	-----------------	--------------------------	--------------------------	----------------------------

EDS Analysis

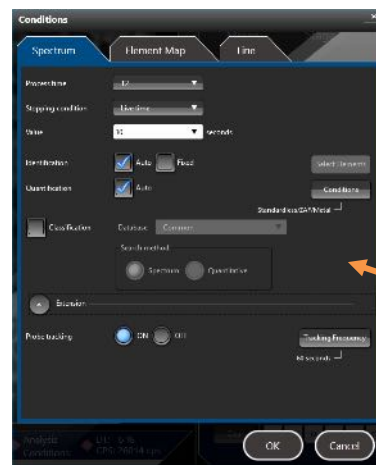
To Perform EDS analysis, set **Purpose1** to **Element Analysis**. **Purpose2** can be set to **Quant**.

When **Element Analysis** is selected, it is possible to select **Point** analysis, **Line** scan, partial **Area** analysis or select an area based on grey scale value (**Particle**). Multiple points etc. can be selected within one field of view.



Select Mode is an instant point analysis. Click on an area and the live spectrum from that point is shown.

Note: The data is not saved in Select Mode. This is meant as an instant analysis or survey. Use **PlacementMode** to save data to the Project.



When selecting the **Element Analysis** or **Map Analysis** for **Purpose1**, You will see the addition of **Analysis Conditions**: on the bottom tool bar. Clicking on the **Analysis Conditions**: will open the EDS **Conditions** window. Set up the analysis conditions prior to selecting the areas to be analyzed.

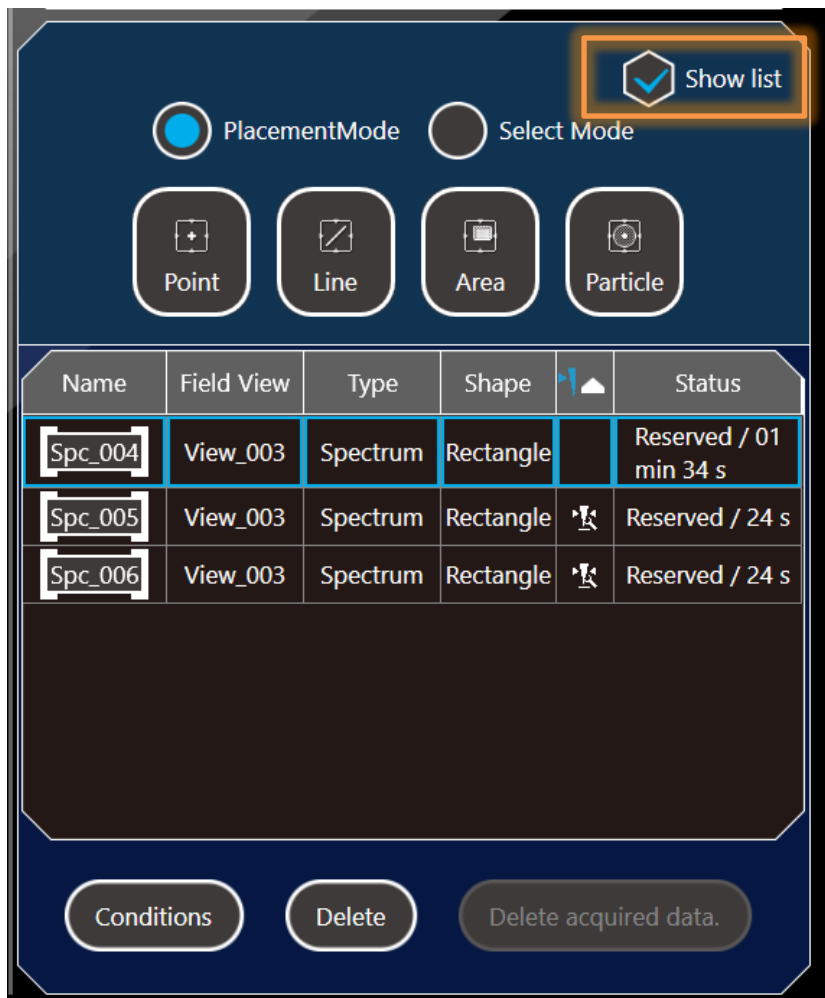
EDS Analysis

The image displays the JEOL EDS analysis software interface, divided into three main sections:

- Conditions Window (Left):** A configuration panel for the analysis. It includes tabs for Spectrum, Element Map, and Line. Key settings include:
 - Process time: 12
 - Stopping condition: Hardtime
 - Save: 11 seconds
 - Identification: Auto (checked), Fixed
 - Quantification: Auto (checked), Cond. Base
 - Classification: Database: Common
 - Search method: Spectrum
 - Probe tracking: ON
- Main Analysis Window (Center):** Shows a grayscale SEM image of a sample with numerous particles. A specific region is highlighted and labeled "Area" with a yellow box. Other labels include "Particle" and "Point". A "Start" button is highlighted with an orange box. A tooltip indicates "Transition to Eco mode after analysis." The bottom status bar shows:
 - Signal: BED C
 - Magnification: x2,000
 - Landing voltage: 15.0 kV
 - WD: 12.3 mm
 - Probe current: High PC
 - Vacuum mode: HighVac
 - Analysis Conditions: (highlighted with an orange box)
 - DT: 4% CPS: 40 cps
- Control Panel (Right):** A toolbar with various functions:
 - Manual adjustment, Ruler, Montage, File
 - Movie, Stage, Freeze, Start eco
 - PlacementMode (selected), Select Mode
 - Point, Line, Area, Particle
 - A spectrum graph showing intensity vs. energy (keV) with peaks for O, C, N, Si, Fe, and Pt.

Set up your analysis conditions from the **Conditions** window. Select the area(s) of interest then click on **Start**.

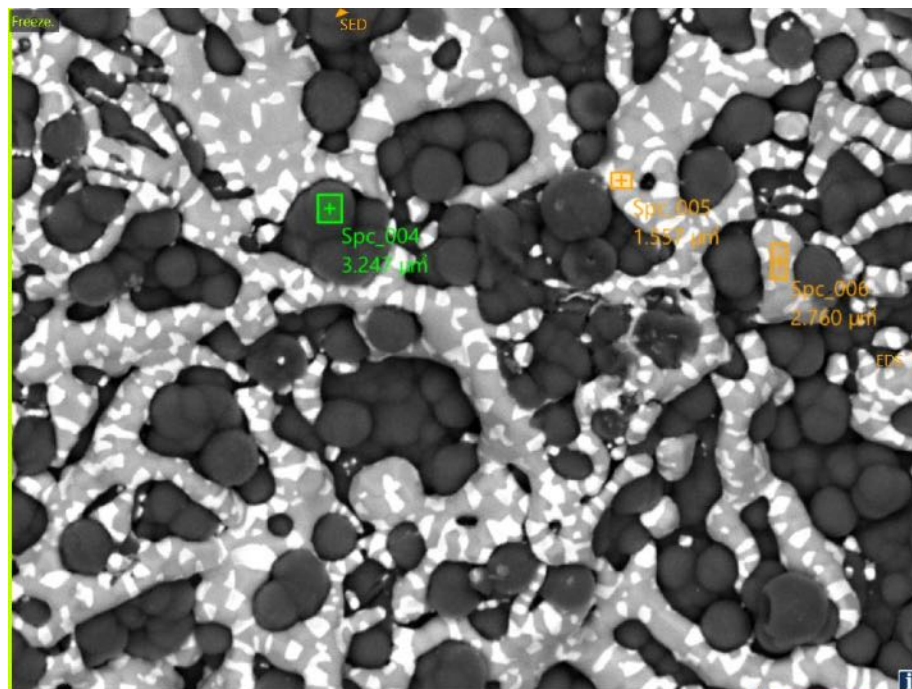
EDS Analysis



The screenshot shows the EDS software interface. At the top right, the 'Show list' checkbox is checked and highlighted with an orange box. Below it are two radio buttons: 'PlacementMode' (selected) and 'Select Mode'. There are four buttons for selection: 'Point', 'Line', 'Area', and 'Particle'. Below these is a table with the following data:

Name	Field View	Type	Shape	Status
Spc_004	View_003	Spectrum	Rectangle	Reserved / 01 min 34 s
Spc_005	View_003	Spectrum	Rectangle	Reserved / 24 s
Spc_006	View_003	Spectrum	Rectangle	Reserved / 24 s

At the bottom of the interface are three buttons: 'Conditions', 'Delete', and 'Delete acquired data.'.



With **Show list** checked, it is possible to delete selections, change order of analysis and even modify analysis conditions.

EDS Analysis

JCM-7000 - JEOL - DG - Training

Purpose1 Purpose2 Quick scan Img. Processing Stop Pause Skip

Element Analysis (Not selected) Slow Auto

Manual adjustment Ruler Montage File

Movie Stage Freeze Start eco

Specimen exch. Observation Data mgmt. Maintenance Settings

Spectrum analysis in progress

Standardless Normalize to 100% ZAF

Element	Line	Mass%	Atom%
C	K	6.63±0.22	20.55±0.69
O	K	1.65±0.11	3.85±0.26
Al	K	32.92±0.37	45.40±0.51
Cr	K	0.66±0.09	0.47±0.06
Co	K	4.76±0.30	3.01±0.19
Ni	K	37.37±0.92	23.68±0.58
Pt	M	15.99±0.42	3.05±0.08
Total		100.00	100.00

Intensity [Counts]

Energy [keV]

10 µm 0 min 36 s

Signal: BED-C Magnification: x2,000 Landing voltage: 15.0 kV WD: 12.3 mm Probe current: High-PC Vacuum mode: HighVac Analysis Conditions: DT: 15 % CPS: 35356 cps

PlacementMode Select Mode

Point Line Area Particle

Name	Field View	Type	Shape	Status
Spc_001	View_002	Spectrum	Point	Completed
Spc_002	View_002	Spectrum	Rectangle	Analyzing / 12 s
Spc_003	View_002	Spectrum	Particle	Reserved / 24 s

Conditions Delete Delete acquired data.

When data is being acquired, it is possible to work interactively on the spectrum and qualitative results.

EDS Analysis

The screenshot displays the JEOL EDS analysis software interface. The main window is titled "JCM-7000 - JEOL - DG - Training". The interface is divided into several sections:

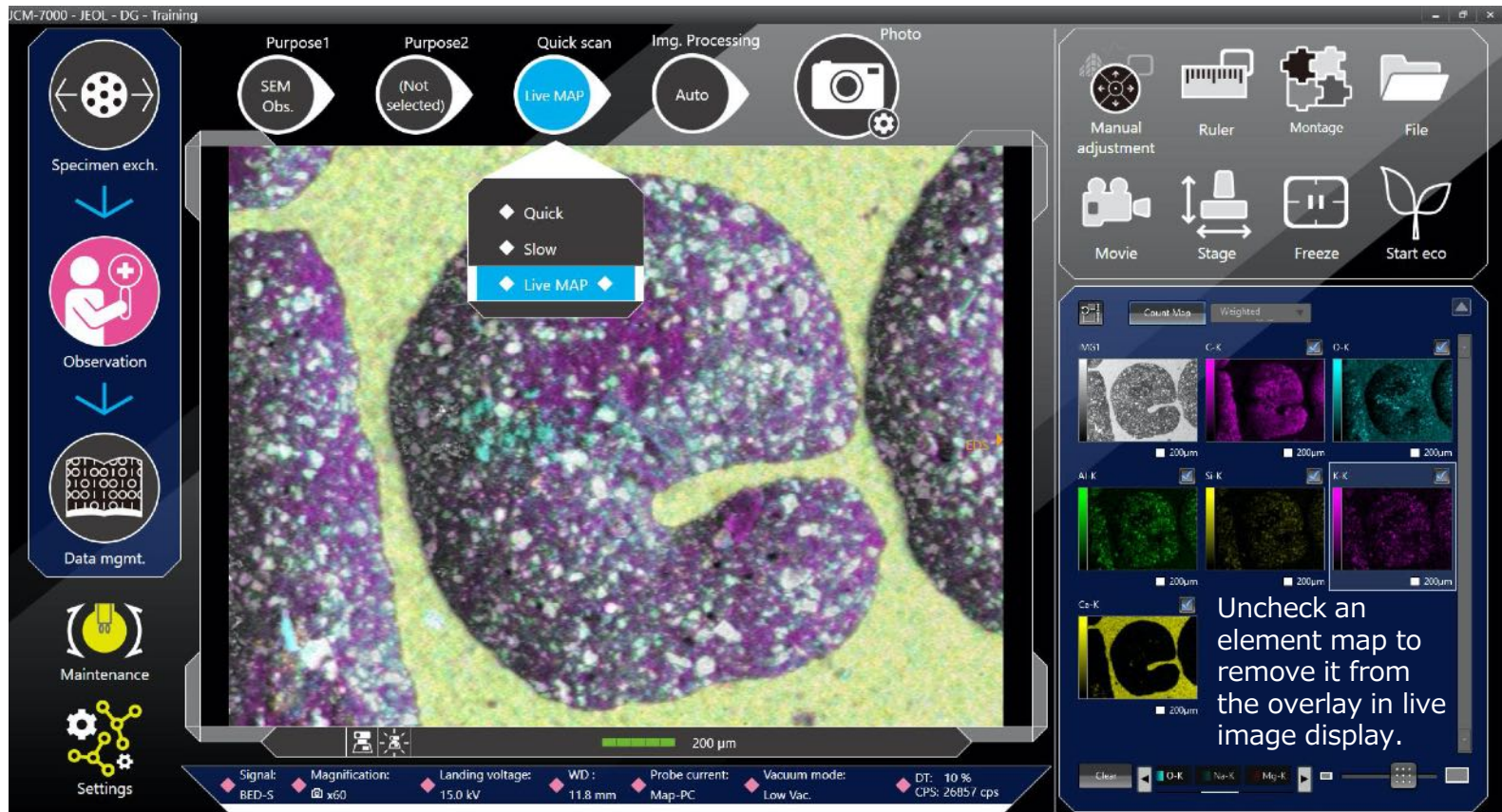
- Top Bar:** Contains "Purpose1" (Element Analysis), "Purpose2" (Not selected), "Quick scan" (Quick), and "Img. Processing" (Auto).
- Left Panel:** Includes "Specimen exch.", "Observation", "Data mgmt.", "Maintenance", and "Settings".
- Central Image:** Shows a specimen image with a green rectangular region of interest (ROI) selected. The ROI is labeled "Spc_007" and "20.0000um".
- Element Table:** A table showing the results of the EDS analysis. The table has columns for Element, Line, Mass%, and Atom%.
- EDS Spectrum:** A graph showing Intensity (Counts) versus Energy (keV). The spectrum shows peaks for Sn, Zn, and Mg. The fitting ratio is 0.0260.
- Right Panel:** Contains various tool icons such as "Manual adjustment", "Ruler", "Montage", "File", "Movie", "Stage", "Freeze", and "Start eco".
- Bottom Panel:** Displays technical parameters: Signal: SED, Magnification: x550, Landing voltage: 15.0 kV, WD: 11.8 mm, Probe current: High-PC, Vacuum mode: HighVac., Analysis Conditions: DT: 2%, CPS: 44 cps.

The "Cancel" button is highlighted in the bottom right corner of the interface.

Element	Line	Mass%	Atom%
C	K	8.80±0.07	26.81±0.21
O	K	20.77±0.32	47.50±0.74
Mg	K	0.94±0.04	1.41±0.06
Zn	K	11.33±0.34	6.34±0.19
Sn	L	58.16±0.33	17.93±0.10
Total		100.00	100.00

Once an the EDS analysis is completed, select **Cancel** button to bring you back to the main observation screen.

EDS Map – Live Map



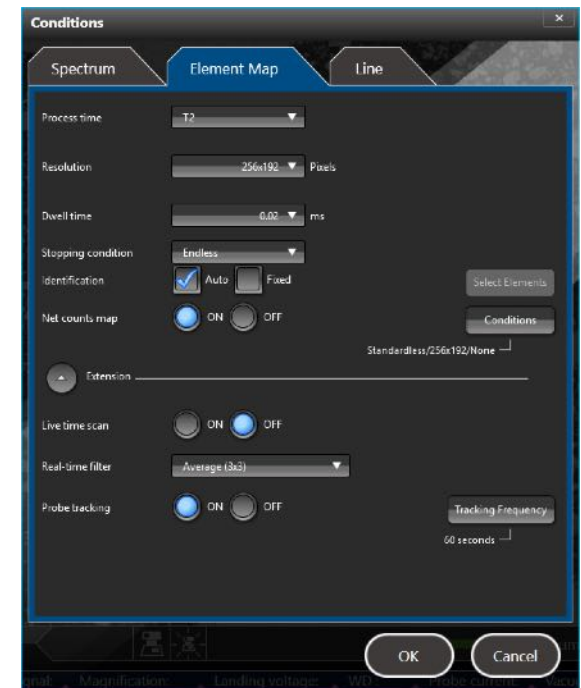
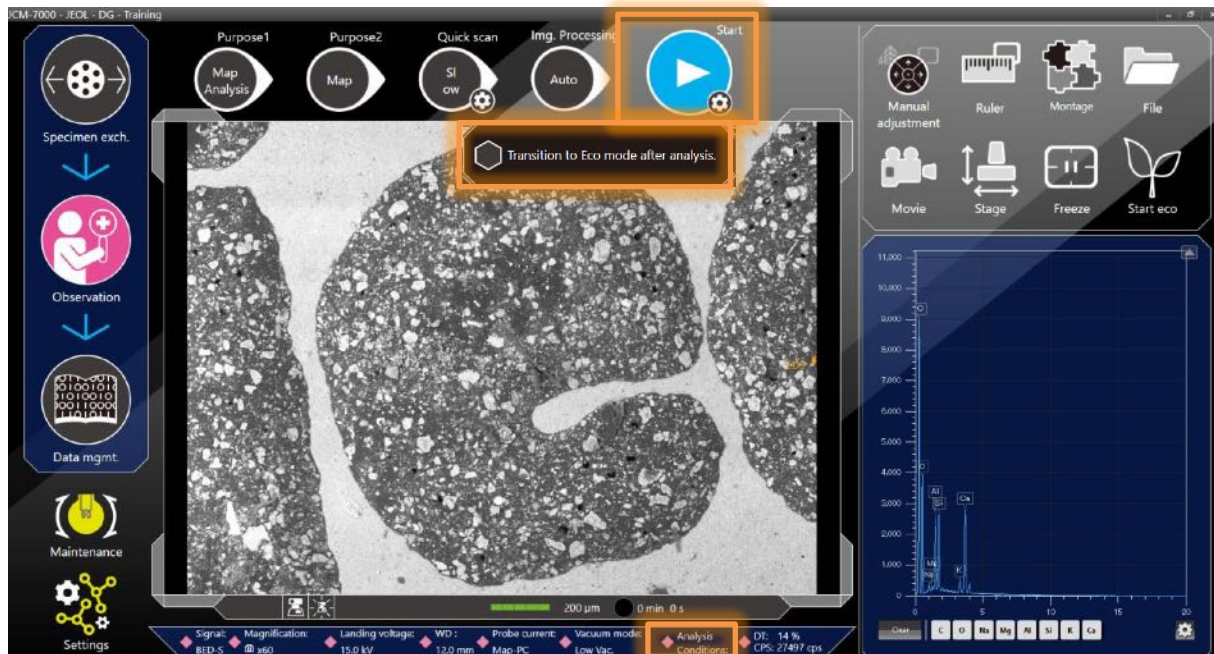
From the **Quick scan** button, the options are **Quick** (fast scan), **Slow** (slow scan) or **Live Map**. The **Live Map** will show a real time elemental map where the element maps are superimposed on the live SEM image. This data is not stored. To collect and save a spectral map data set, set **Purpose1** to **Map**.

EDS Map – Live Map and Live 3D



With **Live 3D** imaging activated, select **Live Map** to superimpose the **Live Map** overlay signal on the **Live 3D** image.

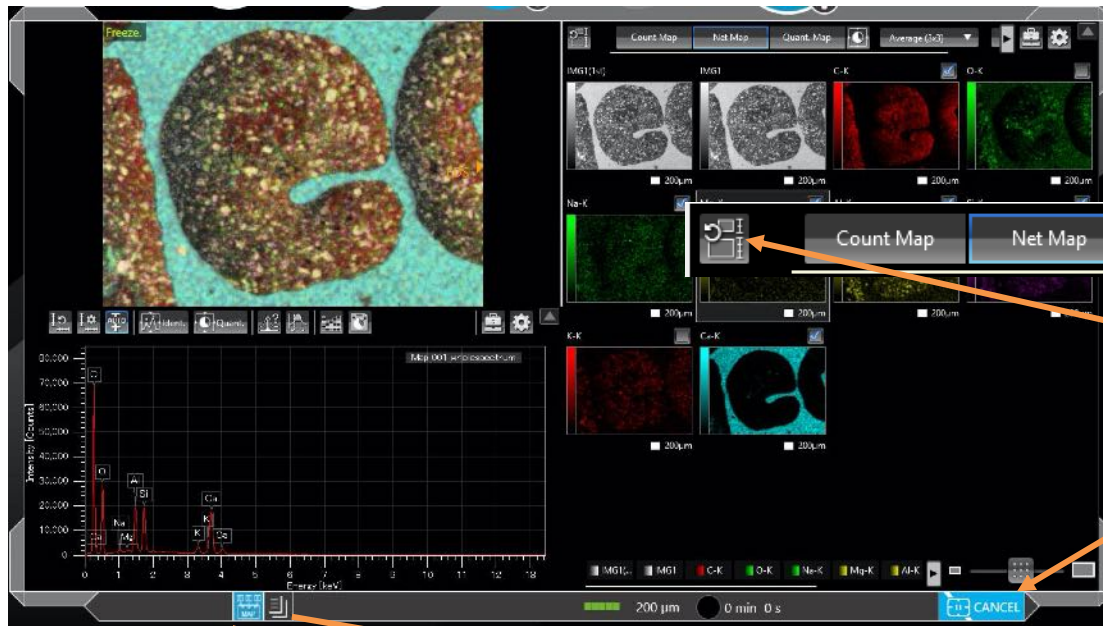
EDS Map – Collect and Save



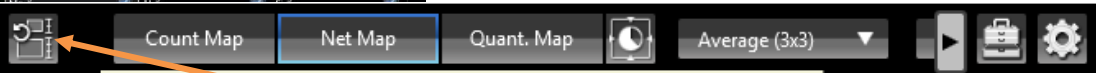
Click on **Purpose1** and select **Map Analysis**. You can click on **Purpose2** and select **Map** to automatically set up SEM conditions appropriate for most map collection or set conditions manually. You will see the addition of **Analysis Conditions**: on the manual condition setting tool bar. Clicking on the ♦ marker by **Analysis Conditions**: will open the EDS **Conditions** window. Set up the **Element Map** analysis conditions prior to starting the map collection.

Once ready click on **Start**. From the gear icon, if '**Transition to Eco mode after analysis.**' is checked, the system will automatically go to Eco mode (beam off) when the map collection is completed.

EDS Map – Collect and Save



You can interactively work with a map data set while it is collecting such as: add/remove elements, change scale view **Count** Map versus **Net** Map etc.



Auto scales the X-ray Maps within the map window

Brings you back to **SEM Observation** mode

Sets map overlays on the SEM image

Send map data directly to a report



Scale Functions

Qualitative Analysis

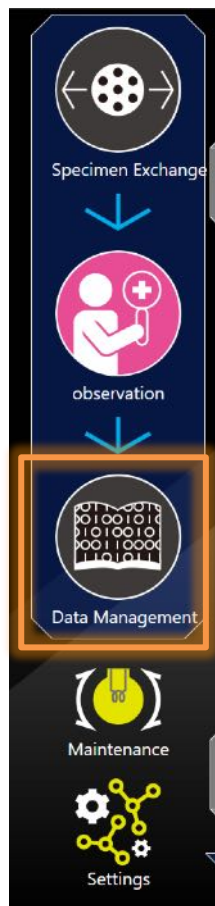
Quantitative Analysis

VID – Synthetic Spectrum based on elements identified

Shows quantitative results
Opens periodic table

Data Management - Smile View™ Lab

To access the SEM and EDS data, click on the **Data Management** button. This will launch the **Smile View™ Lab** software.



The screenshot shows the Smile View™ Lab software interface. The window title is 'Project - Data Control'. The interface is divided into several sections:

- Top Navigation:** Home, Setting, Admin, Help.
- Toolbars:** Copy Project, Import, Export, Search, Data Display Switching, Recycle Bin.
- Project Window:** Shows a tree view of the project structure. The selected path is 'DG > Sn Particles'. The main area displays 'Project window'.
- Sample Window:** Shows a SEM image of a sample with a 'Signal type: BED-A1' and 'Image opacity' controls. The image is labeled 'Sample window'.
- Data Window:** Shows a table of data for the selected project. The title is 'Data window showing data for Project Selected'.


Mark	Name	User Name	Date Created	Date Modified	Folder Name	Data Type	Comment	Class Name	
	Sem BED-C 001	dguarrera	2019/03/20 10:40	2019/03/20 10:40	DG\Sn Particles\View 002	Fov Image			
	Spc_002	dguarrera	2019/03/20 10:34	2019/03/20 10:34	DG\Sn Particles\View_001	Spectrum		2	
	Spc_001	dguarrera	2019/03/20 10:34	2019/03/20 10:34	DG\Sn Particles\View_001	Spectrum		2	
	Sem_SED_001	dguarrera	2019/03/20 10:34	2019/03/20 10:34	DG\Sn Particles\View_001	Fov Image			
	Sn Particles	dguarrera	2019/03/20 10:30	2019/03/20 10:30	DG\Sn Particles	Sample Image			
	View 003				DG\Sn Particles\View_003				
	Sem_BED B2_001	dguarrera	2019/03/20 10:49	2019/03/20 10:49	DG\Sn Particles\View_003	Fov Image			
	Sem_BED-B1_001	dguarrera	2019/03/20 10:49	2019/03/20 10:49	DG\Sn Particles\View_003	Fov Image			
	Sem_BED-A2_001	dguarrera	2019/03/20 10:49	2019/03/20 10:49	DG\Sn Particles\View_003	Fov Image			
	Sem_BED-A1_001	dguarrera	2019/03/20 10:49	2019/03/20 10:49	DG\Sn Particles\View_003	Fov Image			
	Sem BED C_002	douarrera	2019/03/20 10:49	2019/03/20 10:49	DG\Sn Particles\View_003	Fov Image			

Data Management - Smile View™ Lab

From the Project window, you can search, arrange, edit, import/export, delete and otherwise work with the Project and data within that Project.


Projects are indicated by the file folder icon.


Within the Project folder are the Specimen, FOVs for the Specimen and data within that field of view

 Sample icon

 FOV icon

 Sample image icon

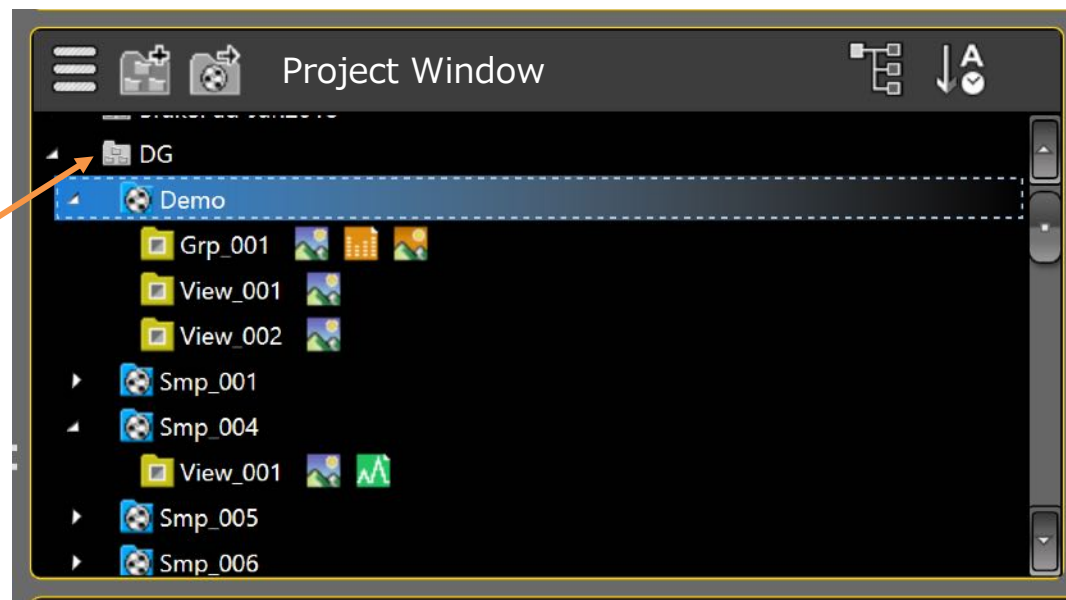
 EDS spectrum icon

 EDS map icon

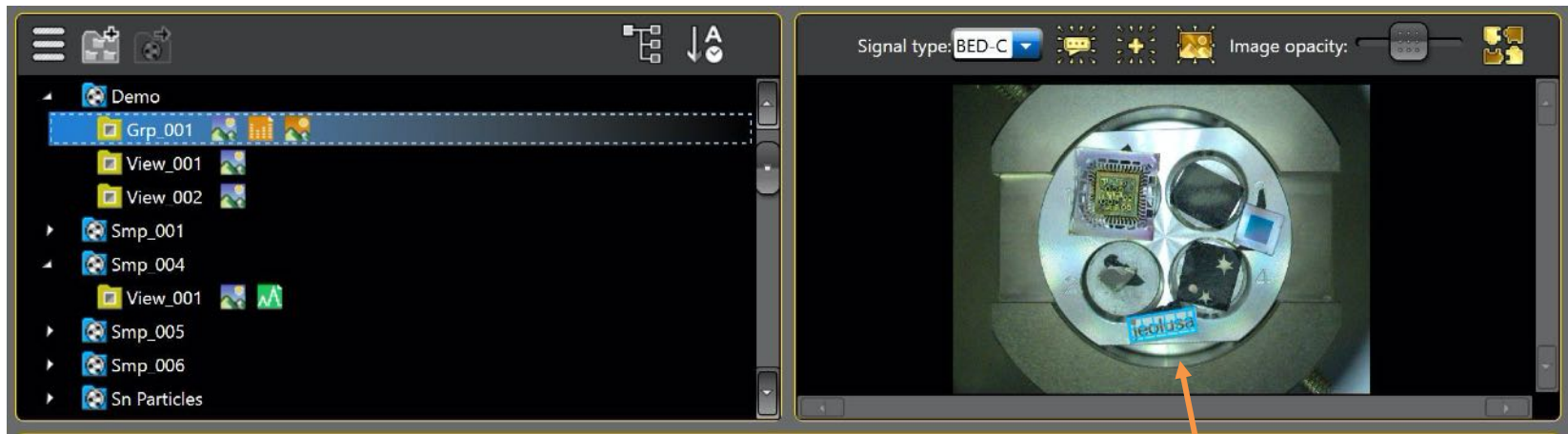
 EDS Pop-up spectrum icon
(extracted spectrum)

 EDS montage map icon

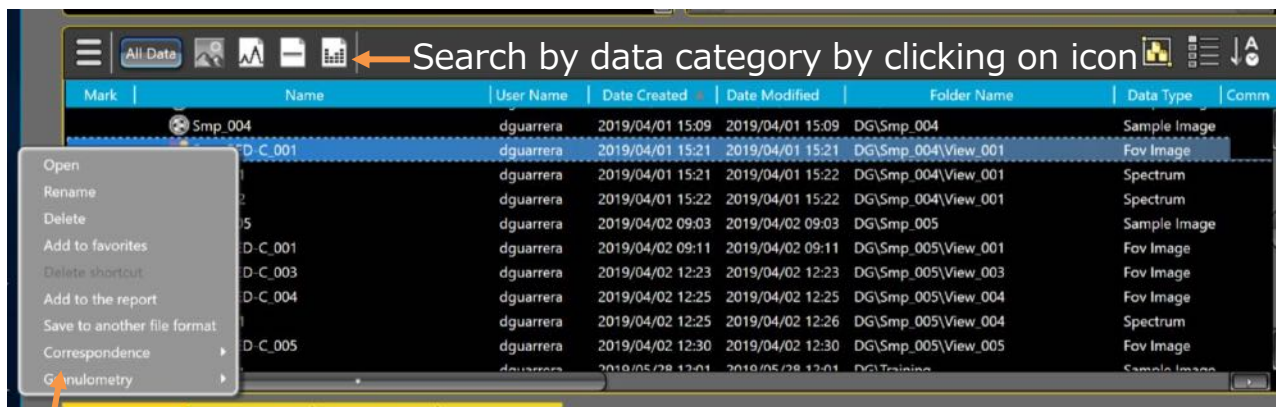
 EDS line scan icon



Data Management - Smile View™ Lab



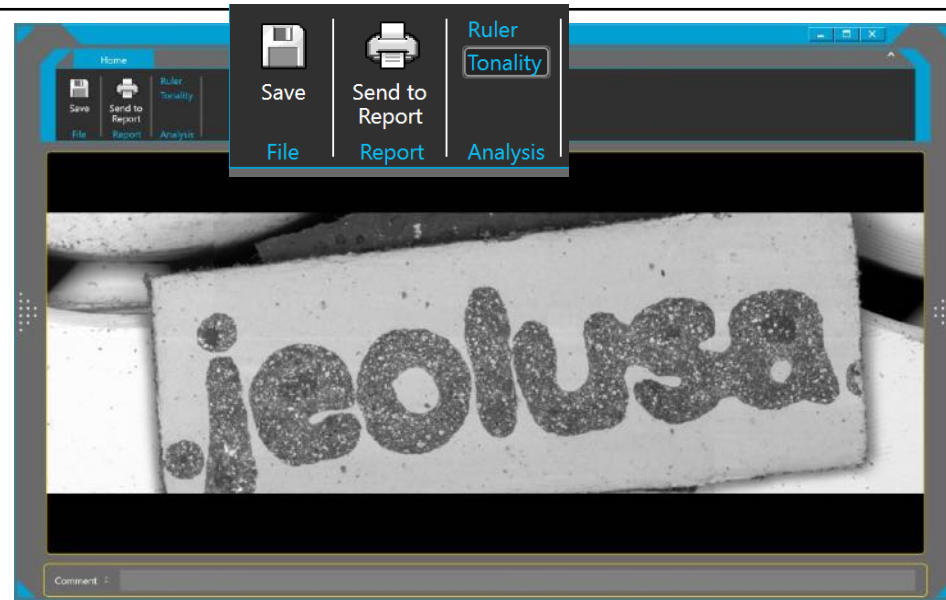
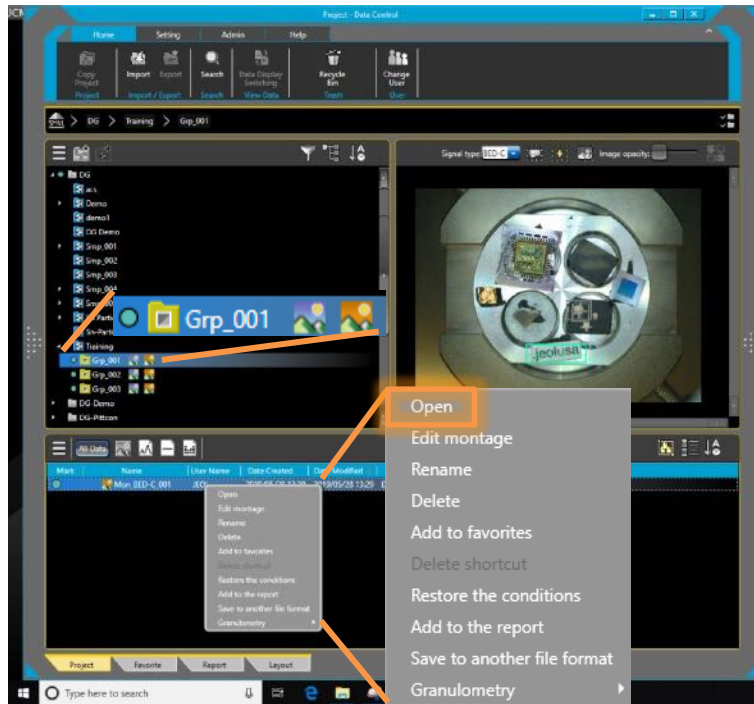
By selecting a specimen or FOV within a specimen, the specimen image (SNS color image or holder graphic) along with analysis locations are displayed in the Specimen window. This example shows montage data which includes images and maps.



From the data window, search, open, export and send data to a report...

Open dialog box with a Right Click

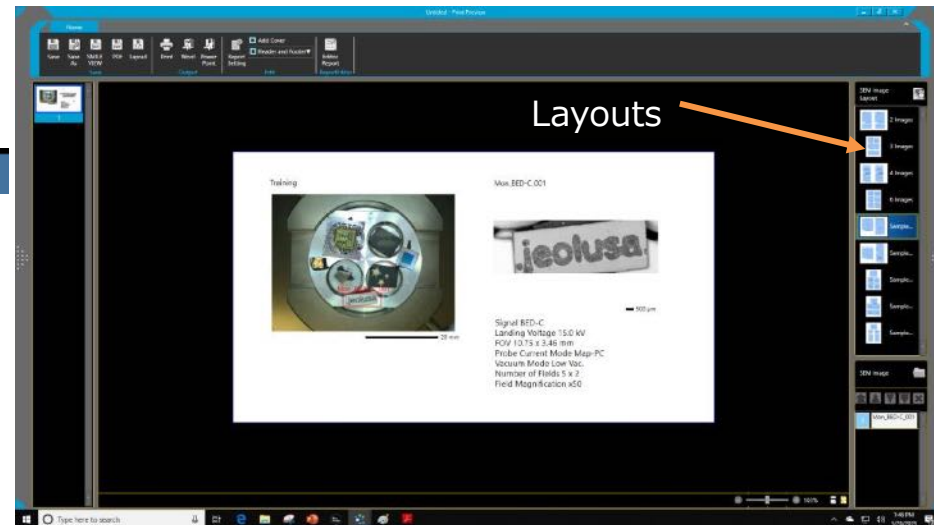
Working with Automated Montage Data



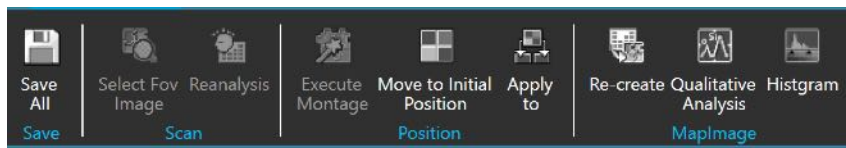
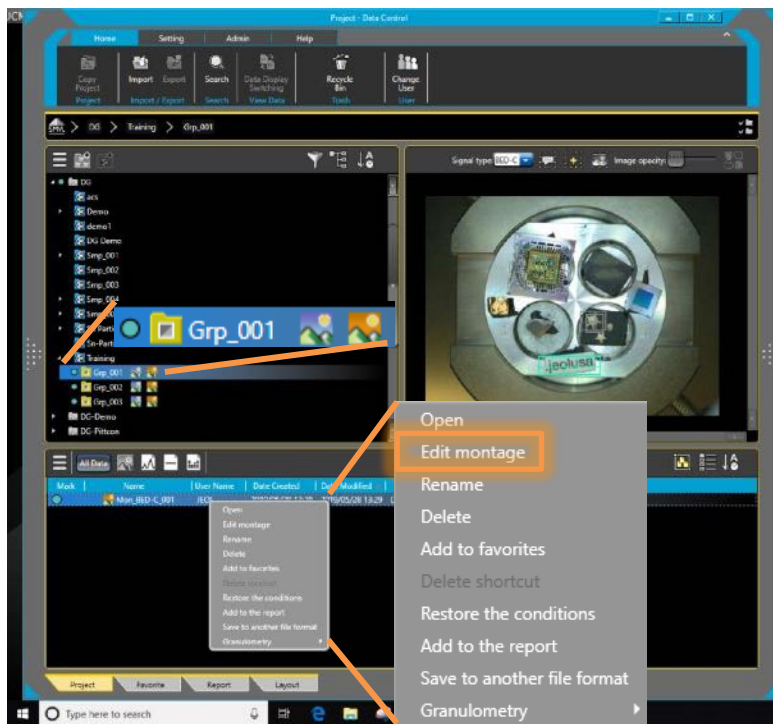
The **Grp** icon indicates Montage data 

Open data to adjust image, make measurements or send to a report.

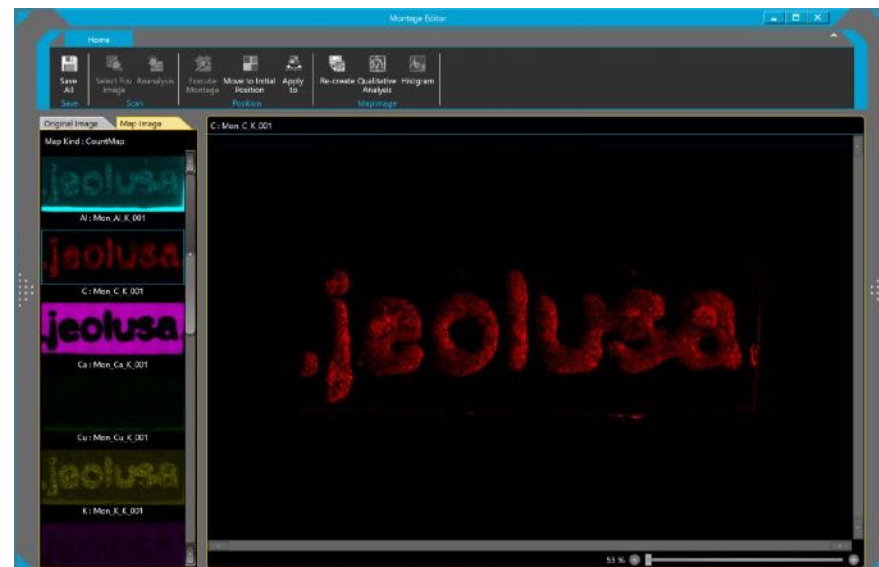
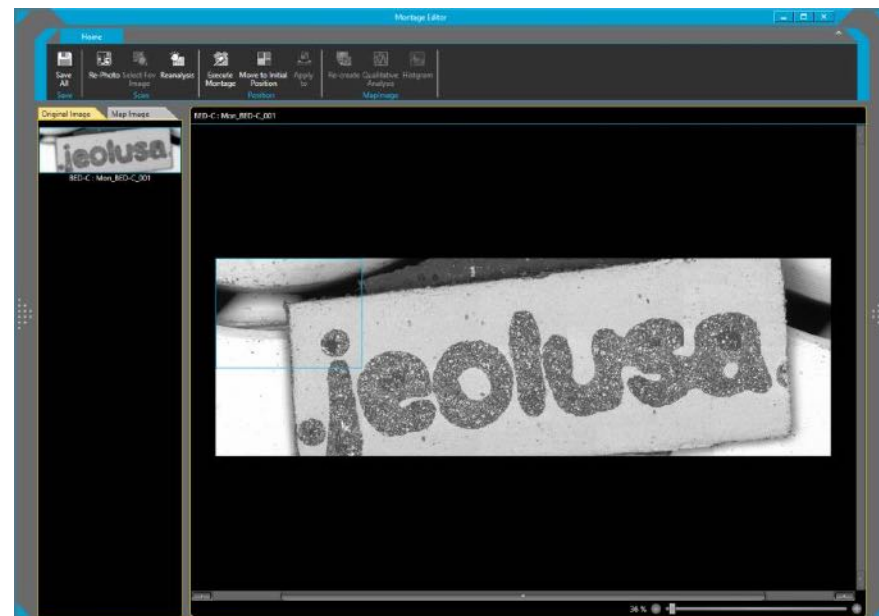
Report layouts shown are based on data type, in this instance – image layouts. Choose/change a layout and the data will automatically update to the chosen layout.



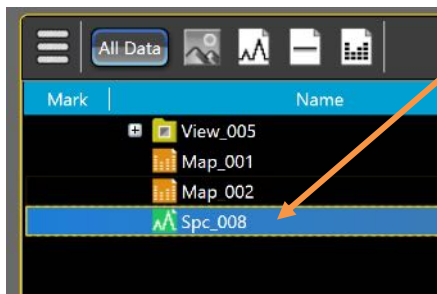
Working with Automated Montage Data



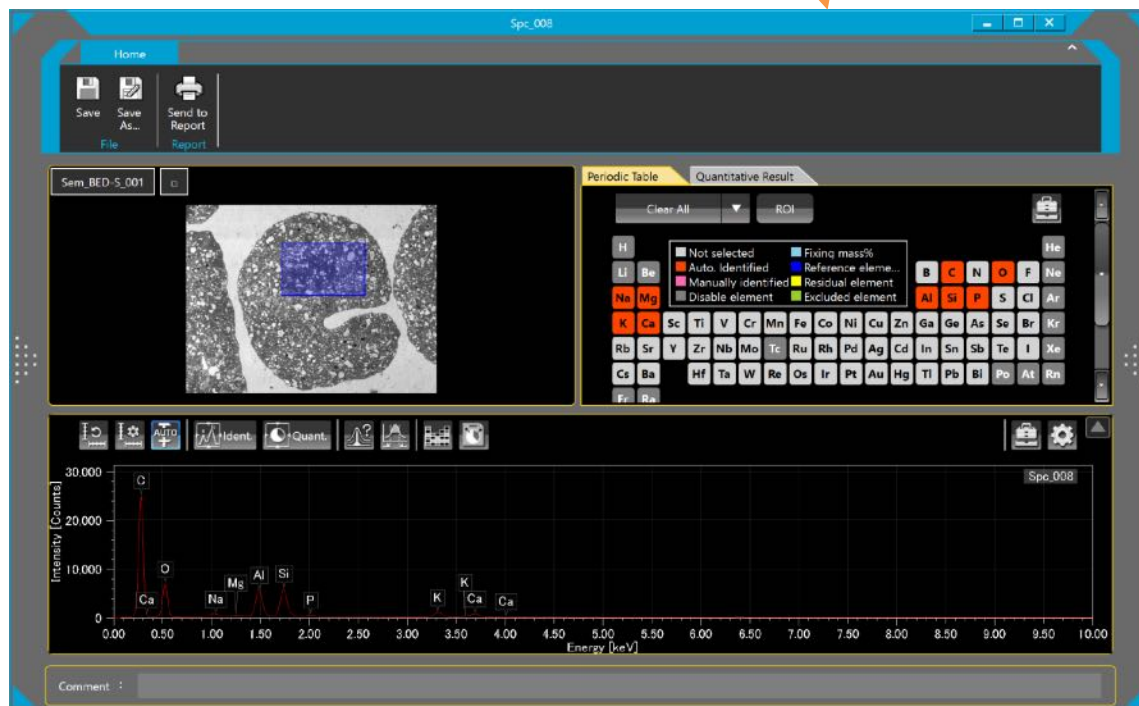
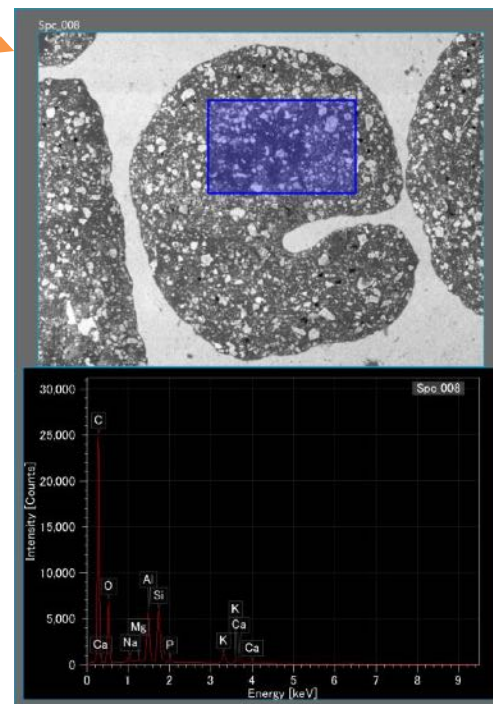
From Edit montage, adjust images, move to and reanalyze. With EDS, can toggle between image and map views.



Data Management - Smile View™ Lab



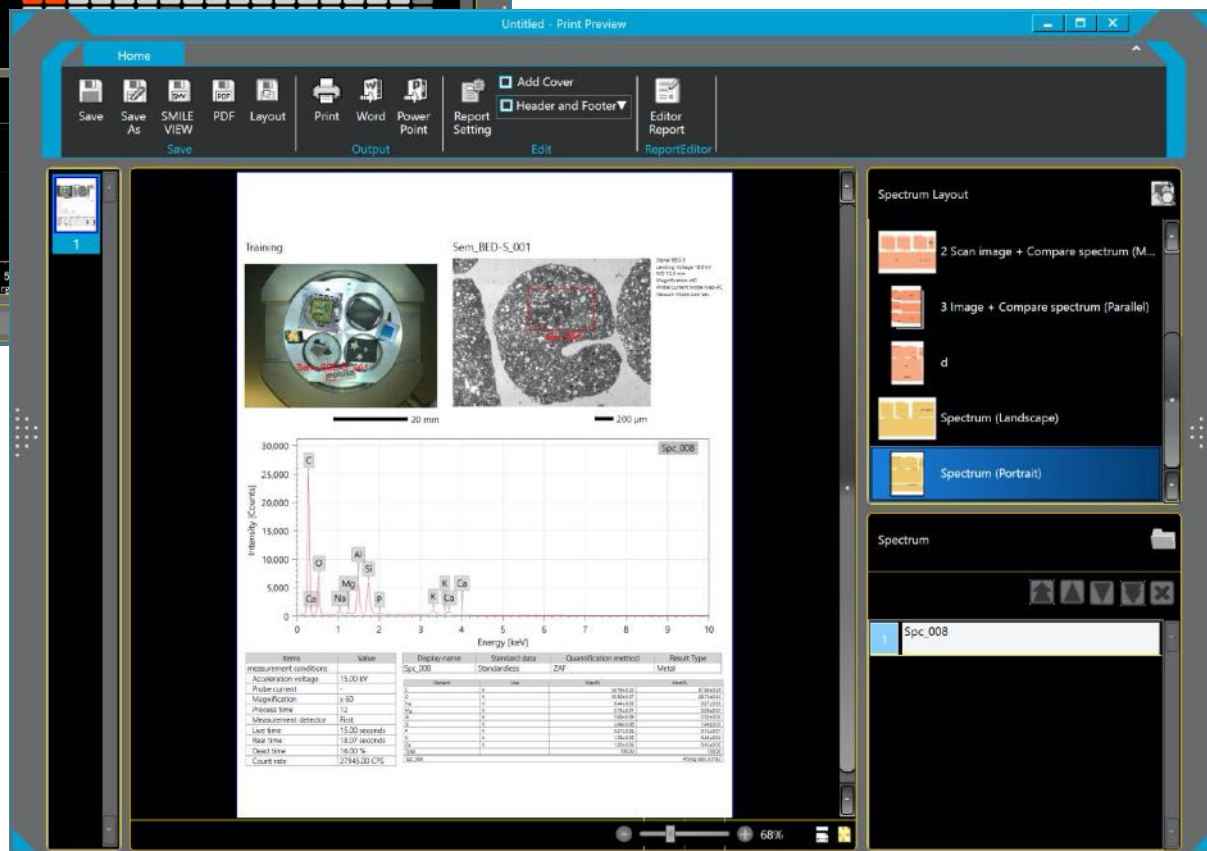
Click on data for a quick view.
Right click on data to open and work with data as well as send to a report.



Data Management - Smile View™ Lab



Click on **Send to Report** to open the **Print Preview** window where you can select the report layout, print, save, export the report to PDF, Word or Power Point...



The report layouts shown are based on the data type chosen. The data will automatically update to the layout selected.

A Lay Editor is available that allows you to modify existing layouts as well as create new layouts.

Working with EDS Spectrum Data



Toggle between **Periodic Table** view and **Quantitative Result**. From Periodic table, add/remove elements



Scale Functions

Qualitative Analysis

Quantitative Analysis

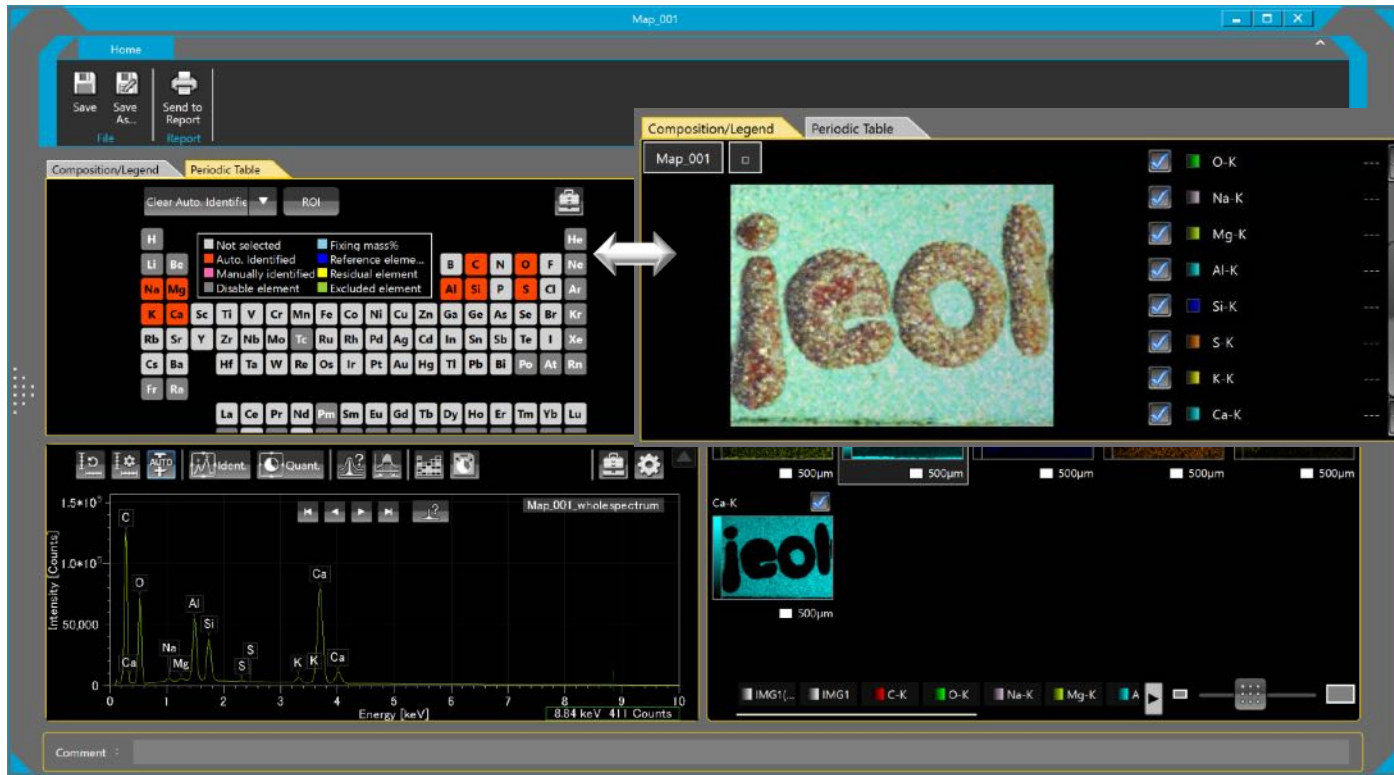
VID – Synthetic Spectrum based on elements identified

Shows quantitative results
Opens periodic table



Left click on element label to select style

Working with EDS Map Data



Toggle between **Composition/Legend** and **Periodic Table** view.

From **Periodic Table** view, add or remove elements. Switch X-ray lines for element map (example 'L' vs 'K' line).



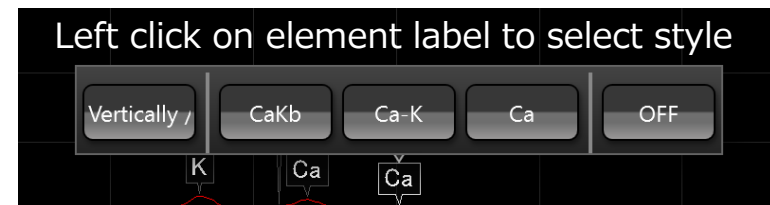
Scale Functions

Qualitative Analysis

Quantitative Analysis

VID – Synthetic Spectrum based on elements identified

Shows quantitative results
Opens periodic table



Left click on element label to select style

Working with EDS Map Data

The screenshot displays the JEOL EDS software interface. The main window is titled "Map_001". At the top, there is a "Home" menu with options for "Save", "Save As...", and "Send to Report". Below this is a "Composition/Legend" window showing a large EDS map of the word "jeol" and a list of elements with checkboxes: O-K, Na-K, Mg-K, Al-K, Si-K, S-K, K-K, and Ca-K. A "Theme Colors" dialog box is open, showing a grid of color swatches for "Standard Colors" and "Recent Colors".

An arrow points to the "Auto scales maps in map window" text, which is located above the "Map Window" area. This window displays a grid of EDS maps for various elements: IMG1(1st), IMG1, C-K, O-K, Na-K, Mg-K, Al-K, Si-K, S-K, K-K, and Ca-K. Each map is labeled with its element and a 500µm scale bar. The "jeol" logo is visible on several maps, such as the Ca-K map.

At the bottom left, there is a "Map_001.wholespectrum" window showing an EDS spectrum with peaks for C, O, Al, Si, Ca, Na, Mg, S, and K. The y-axis is "Intensity [Counts]" ranging from 0 to 1.5×10^5 , and the x-axis is "Energy [keV]" ranging from 0 to 10. The current energy is 8.84 keV with 411 counts.

At the bottom right, there is a "Comment" field.

Maps that are checked will be included on the overlay in the **Composition/Legend** window.

To change map color, click on color square in **Composition/Legend** window

Accessory – Tilt Rotation Motor Drive Holder

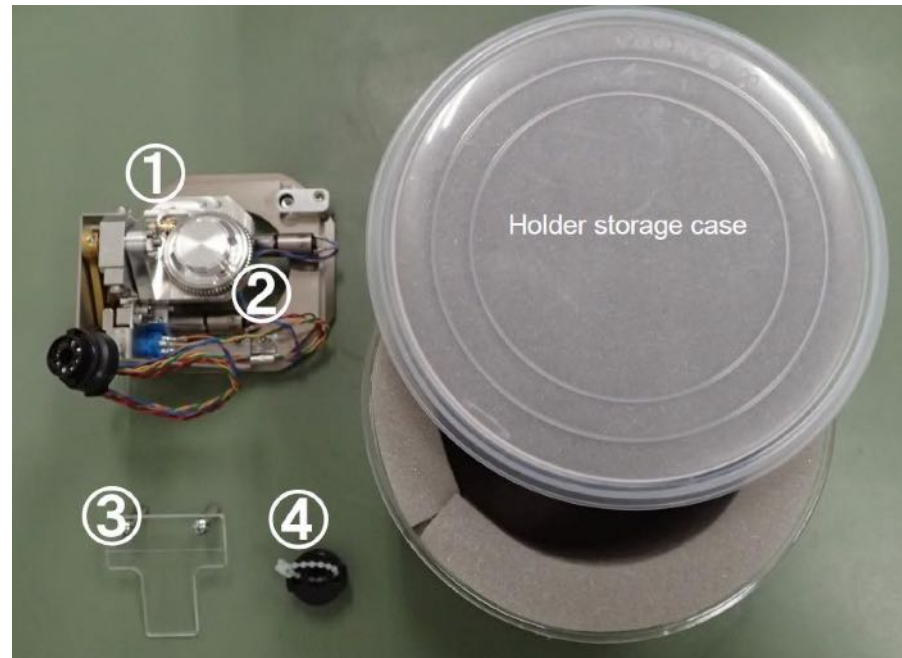


MP-01330TRMH

Tilt Rotation Motor Drive Holder has the following specifications:

- Tilt range: -10° to $+45^{\circ}$, 1° step
- Rotation: 360° continuous
- Motor control through software interface
- Maximum specimen size: 20mm (d) x 7mm (h)
- Minimum WD for observation: 12mm ($T=0^{\circ}$)

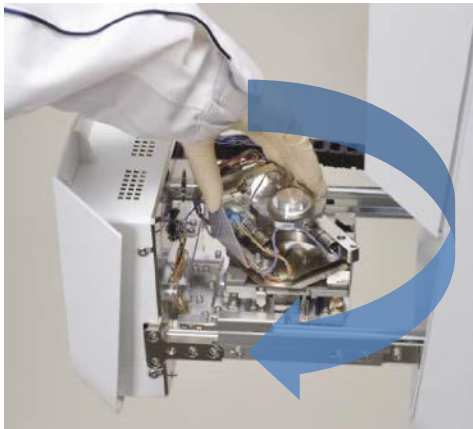
1. TRMH
2. Specimen ring for mounting to holder
3. Height Limit Plate
4. Connector cap



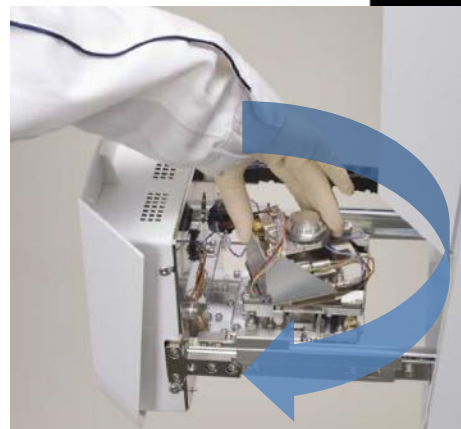
Accessory – Tilt Rotation Motor Drive Holder

To install the TRMH, select Specimen exchange and select the TRMH option for the holder selection. Vent the SEM chamber and once the stage door opens turn the power off to the SEM.

With the TRMH cable-side facing front, the TRMH can be installed by setting it and turning clockwise to fix in place. The normal tilt direction is toward the back, toward the SE detector. The TRMH can also be installed with it rotated by 90° for the tilt to be toward the EDS.

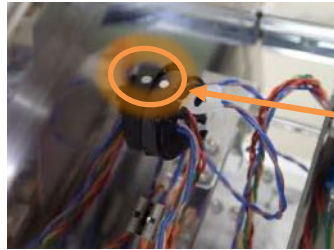


Tilt toward SE detector



Tilt toward EDS detector

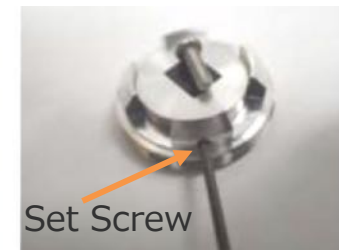
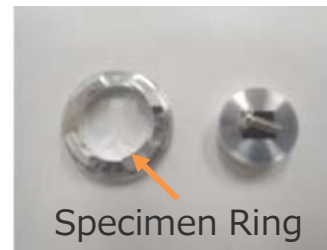
Accessory – Tilt Rotation Motor Drive Holder



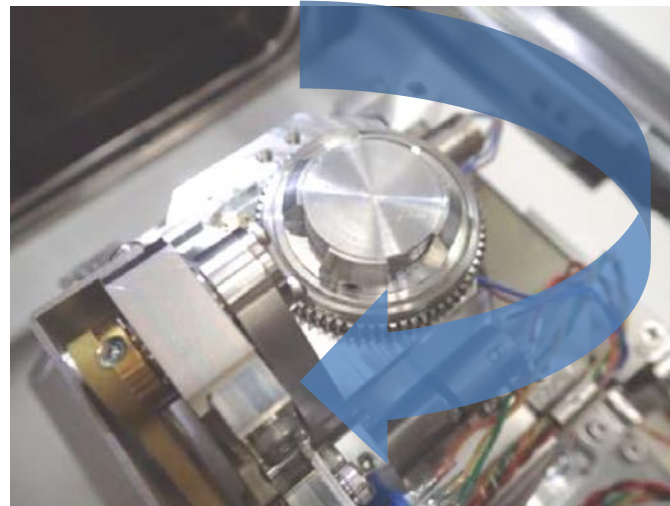
Connect the TRMH cable to the front chamber door. Match the mark on the connector with the mark of the tip connector-cable and insert the connector. Turn on Power to the main unit (Blue LED will turn on)



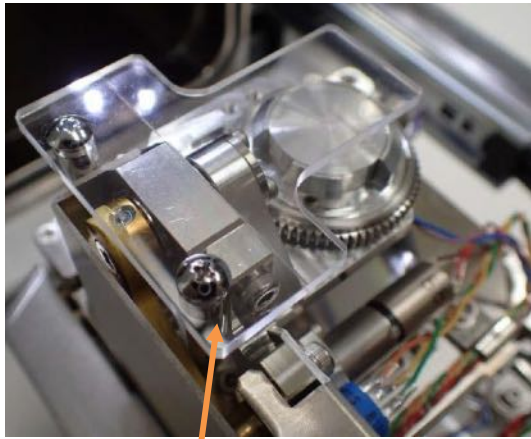
Mount a specimen on a 20mm (d) x 7mm (h) stub. Set specimen ring so that the threads are at the bottom and insert stub in ring. Fix in place with the set screw on ring. Fix specimen ring to TRMH by turning clockwise.



Note: Specimen that is flush with the holder will be positioned at 19mm WD.



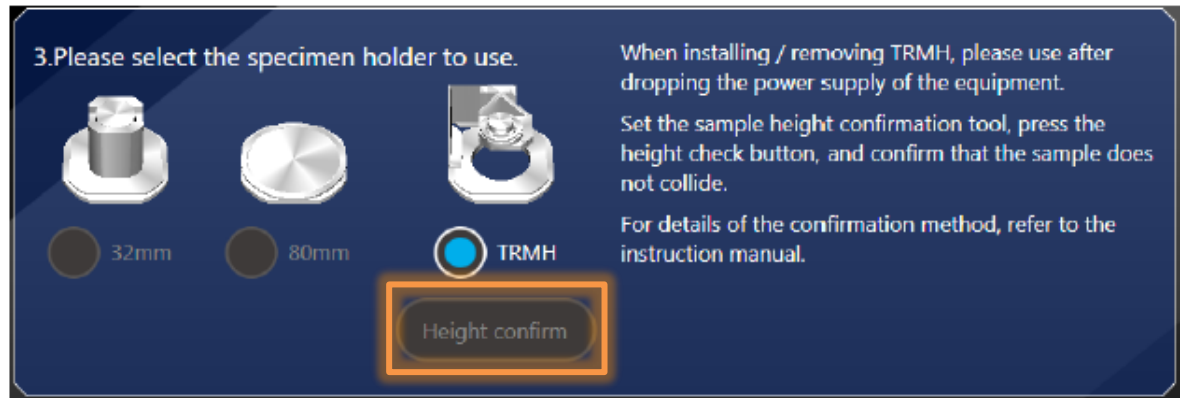
Accessory – Tilt Rotation Motor Drive Holder



Height Limit Plate

Use the **Height Limit Plate** to make sure the specimen is mounted in such a way to be within a safe limit of the stage tilt range. Place the **Height Limit Plate** on the TRMH with flat side up.

From the **Specimen Exchange** window on the SEM software, click on the **Height confirm** button in Step 3. The stage tilt will start. If the sample is mounted correctly, it will not collide with the **Height Limit Plate**. If the sample collides with the **Height Limit Plate**, then re-adjust the specimen height.

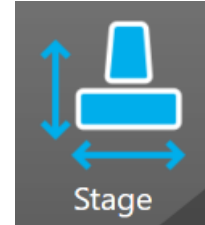


If the specimen height is set correctly, evacuate the chamber and start observation.

To exchange a sample, remember to set the tilt angle to $T=0^\circ$ prior to venting the chamber.

Accessory – Tilt Rotation Motor Drive Holder

From the **SEM Observation** window select the **Stage** button to access the tilt and rotation motor control.



Rotation control

Tilt control

X=0.00 mm
Y=0.00 mm
T=0°

Mode Absolute Relative

X [mm] Y [mm] T [°]

Move

Name	X [mm]	Y [mm]	T [°]	Specimen holder
2019 01 10 13:47:58	-0.15	-0.05	0	32mm
2019 01 10 13:48:14	0.00	0.00	0	32mm

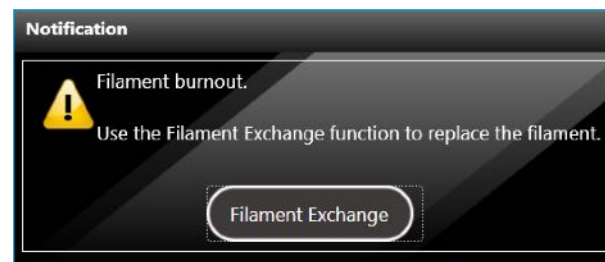
Save current position Delete Move

Can also numerically input a tilt angle.

Maintenance – Filament Exchange

When the tungsten filament burns out, a message will appear on the screen prompting for filament exchange.

Three Grids (Wehnelt-Filament) are included with the JCM-7000. The user can swap out the Grid or clean the Wehnelt and replace the filament.



Grid



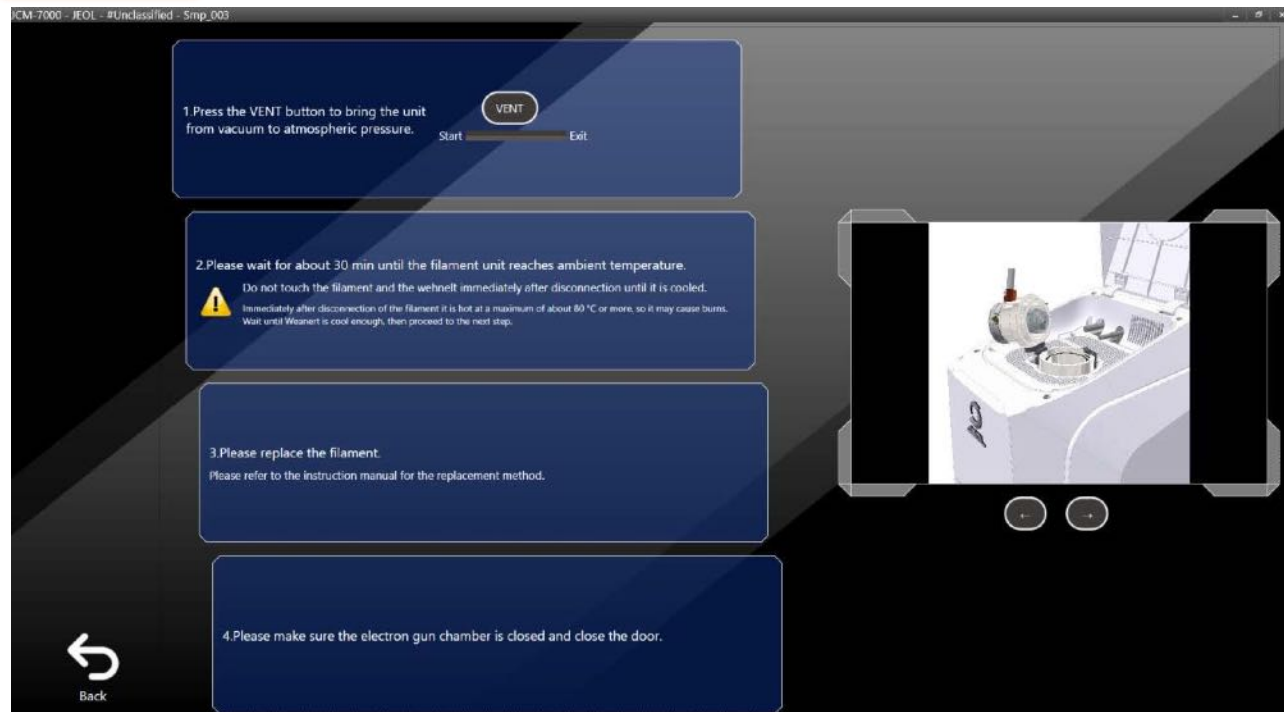
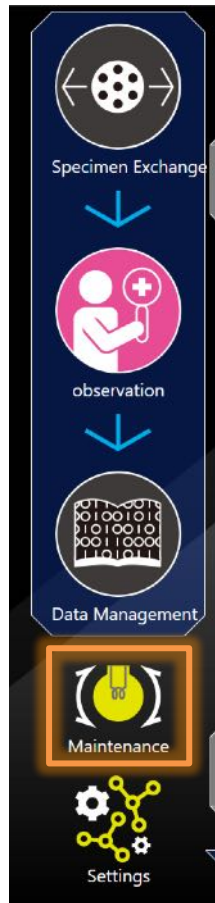
Wehnelt

Filament

Grid (Wehnelt + Filament) – P/N 804446491
W Filament (V Type), Box of 6 – P/N 813980968

Maintenance – Filament Exchange

Click on **Maintenance** button to access the maintenance screen. From the Maintenance screen click on the **Filament Exchange** button and follow the steps as shown in this Filament Exchange Navigation Screen.



Maintenance – Filament Exchange

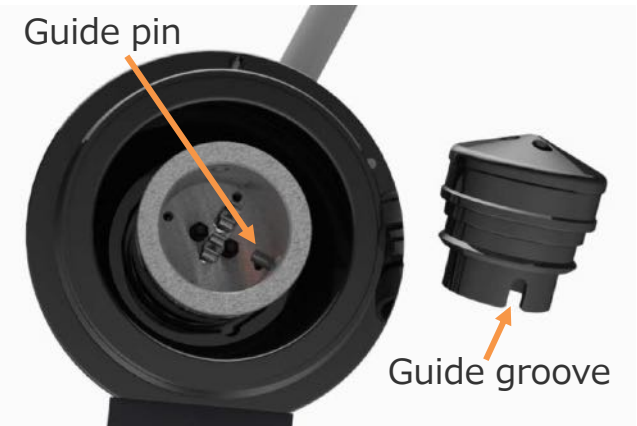
Changing the Grid



Vent system and open cover and electron gun



With Grid removal tool, pull out to remove Grid



Align Guide groove of new Grid with the Guide pin on electron gun and push Grid in.



Close and Evacuate

Maintenance – Filament Exchange



The Wehnelt can be cleaned and the filaments replaced. The filaments come pre-centered for easy exchange with no user alignment required to the Wehnelt.

The filament assembly is threaded. To remove, turn Wehnelt counter clockwise. Clean the Wehnelt thoroughly and replace with new filament.

Maintenance – Filament Exchange

Metal Polish Cleaning Procedure

POL and WENOL and PIKAL are metal polishes which are widely used to clean a Wehnelt

1. Carefully polish the Wehnelt with metal polish until the accumulated deposits are completely removed. A toothpick and cotton are good to reach all surfaces.
2. Polish the Wehnelt with clean cotton until no visible polishing paste residue remains.
3. Place the Wehnelt in a beaker of Acetone and ultrasonically clean for 3 to 5 min.
4. Place the Wehnelt in a beaker of Alcohol and ultrasonically clean for 3 to 5 min.
5. Place the Wehnelt in a final beaker of Alcohol and ultrasonically clean for 3 to 5 min.
6. Blow dry with an air duster or dry nitrogen or clean dry air (not from a compressor). Handle the clean Wehnelt with gloves.
7. Carefully inspect (under a low power stereo microscope, if available) for contamination.

If the Wehnelt isn't perfectly clean repeat the procedure.



Maintenance – Filament Exchange

MICRO-90 Cleaning Procedure for Stainless Steel Only

1. Mix MICRO-90 with water (~50%/50%) in a beaker.

Be Careful --- it's Strong! Read warnings. MICRO-90 is a concentrated aqueous cleaning solution usually used at 2% concentration for cleaning glassware. It is available from Laboratory suppliers and EM suppliers.

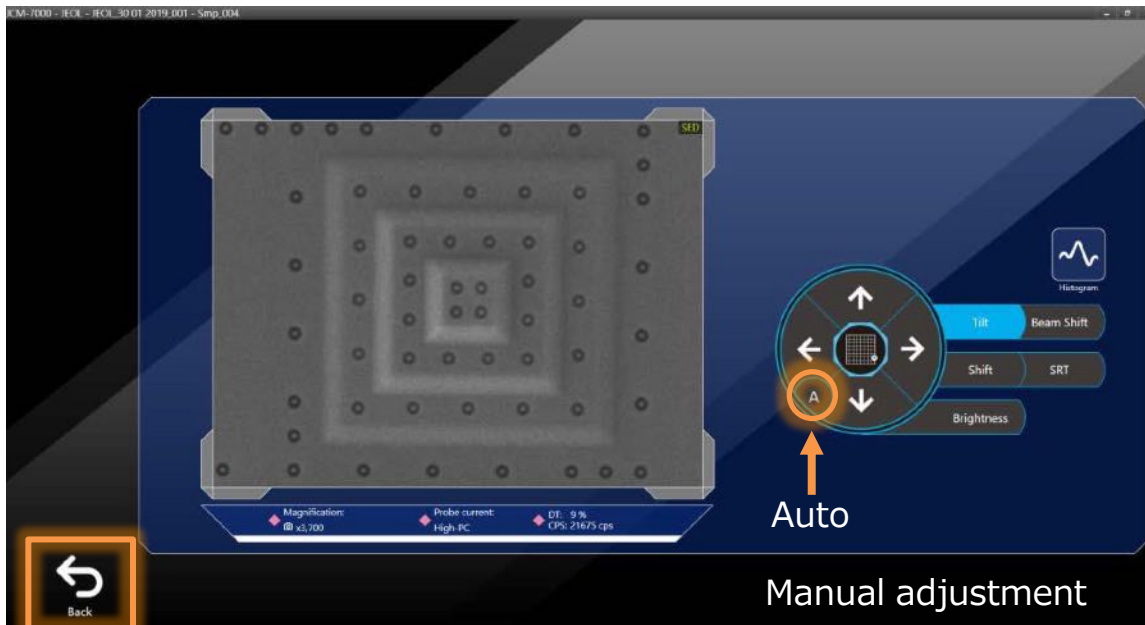
2. Place the Wehnelt into the beaker.
3. Place the beaker into an ultrasonic cleaner. Check after ~ 10 - 15 minutes.
4. If Wehnelt is clean (no more contamination deposits remaining) proceed to rinse step 6.
5. If Wehnelt is not clean (some contamination left), either:
 - a. clean in ultrasonic cleaner some more or
 - b. clean with toothpick and cotton and then clean in ultrasonic cleaner some more or
 - c. clean with toothpick and cotton and metal polish and then clean in ultrasonic cleaner some more
6. When Wehnelt is clean (no more contamination deposits remaining), rinse in running water for 5 - 10 minutes.
7. When completely rinsed (squeaky clean), place in alcohol in the ultrasonic cleaner for a few minutes to get rid of the water.
8. Blow dry with an air duster or dry nitrogen or clean dry air (not from a compressor). Handle the clean Wehnelt with gloves.
9. Carefully inspect (under a low power stereo microscope, if available) for contamination. If the Wehnelt isn't perfectly clean repeat the procedure.

Maintenance – Beam Axis Alignment

After a filament exchange, it is recommended to adjust the beam axis. This alignment can be done automatically via the **Maintenance** screen. Manual adjustment is also possible.



Click on the **Maintenance** button to access the Maintenance screen then click on **Beam Axis Adjustment**



Click on **Tilt** or **Shift** and Select 'A' for automatic adjustment. Alternatively, click (or click and hold) on the arrows until the brightest image is displayed.

Click the **Back** button to return to the main **Observation** screen

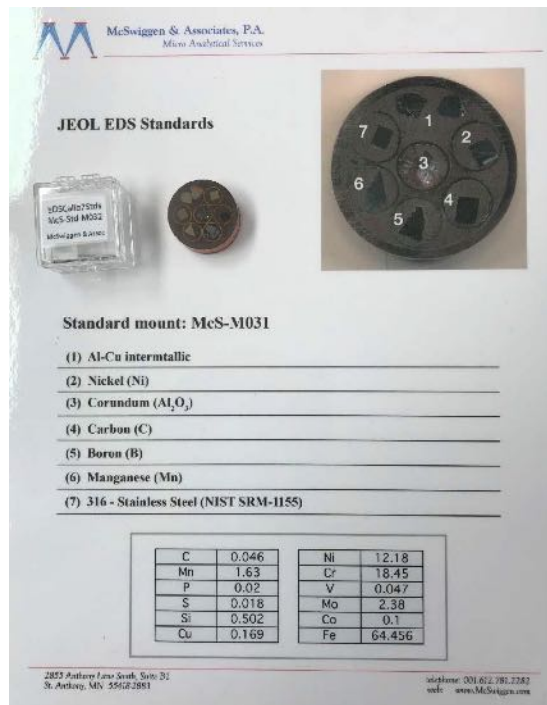
Maintenance - EDS Performance

Periodic checks of the EDS performance by examining a standard specimen is a good lab practice.

If the peak position of the elements present have shifted, qualitative and quantitative analysis may not be determined correctly.

If the EDS is used daily, it is recommended to check once per week.

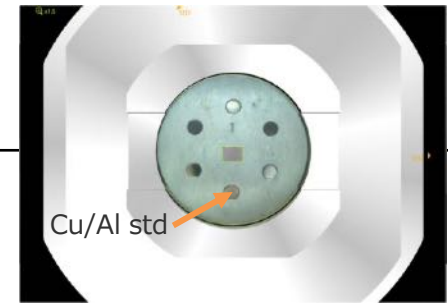
It is recommended to perform an Energy Calibration once per month.



P/N: JU2016574

McS-M031, McSwiggen standard includes: Cu/Al (intermetallic), Ni, Al₂O₃, C, B, Mn, 316SS

EDS Energy Calibration



A Cu/Al standard or Cu tape on an Al holder work well for the energy calibration check. The position of the Cu K α X-ray line should register at around 8.04 keV. If the peak position deviates by more than 5 eV, then an energy calibration should be performed.


Set the specimen up at 12mm WD and set the accelerating voltage to 15kV. Select a **Probe current** setting to provide around 20,000 cps or less.

If using Cu tape on an Al stub, set the sample up so that the display ratio of Cu to Al is $\sim 2:1$. Look for the Cu L X-ray Line to be nearly the same height as the Al K X-ray line.

Next click on the **Maintenance** button and from the **Maintenance** screen click on **EDS Energy Calibration**.



EDS Energy Calibration



The screenshot displays a software interface for EDS Energy Calibration. On the left side, there is a vertical navigation menu with two tabs: "Notifications" (highlighted with an orange border) and "Energy Calibration". The main content area is dark blue and contains the following text:

Last energy calibration done on:
[2019/05/29].

The **Notifications** tab indicates when the last calibration was done and when it is recommended to perform the next calibration.

Recommended date for next energy calibration:
[2019/06/28].

EDS Energy Calibration

Notifications

Energy Calibration

Sample

AlCu

Process time

T1

T2

Detector

First

Start

From the **Energy Calibration** tab, choose AlCu for the **Sample** then select **Process time T1** and **T2** and then click on **Start**.

EDS Energy Calibration

Notifications

Energy Calibration

Remaining time 1min 52s

69%

Details

Process time	Coeff. A before	Coeff. B before	Coeff. A	Coeff. B	Low energy peak (keV)	High energy peak (keV)	
Detector: First							
T1	0.0100	0.0027	0.0100	-0.1273	1.6132	8.1668	
T2	0.0100	0.0046	0.0100	0.0000	0.0000	0.0000	

Cancel

Once the calibration routine has completed, click on **OK**.

Notifications

Energy Calibration

Remaining time 0min 0s

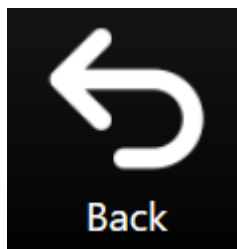
100%

It was completed successfully.

Details

Process time	Coeff. A before	Coeff. B before	Coeff. A	Coeff. B	Low energy peak (keV)	High energy peak (keV)	
Detector: First							
T1	0.0100	0.0027	0.0100	0.0009	1.4833	8.0297	
T2	0.0100	0.0046	0.0100	-0.0055	1.4911	8.0434	

OK



Click on the **Back** button to return to the main **Maintenance** screen and **Back** again to return to the **SEM observation** screen.



Sample Holders and Supplies

NeoScope™ - Model JCM-7000

Holders, sample mounts and supplies for use with our JCM-7000 Benchtop SEM.



HOLDERS

Description	Part Number	
80mm (d) x 7mm (h) Standard Holder Included with SEM	80446181	
32mm (d) Adjustable Height Holder Standard Holder Included with SEM Compatible with 32mm (d) Inserts	804446237 JU2016716	
51mm (d) Adjustable Height Holder Compatible with 51mm (d) Inserts	JU2016717	
1.25in (d) Adjustable Height Holder (31.75mm)	JU2016716	
1.5in (d) Adjustable Height Holder (38.10mm)	JU2016715	
14mm (d) Adjustable Height Insert Holder Compatible with 14mm (d) Inserts	JU2016728	

Holders

Description	Part Number	
<p>Vise Holder, Height Adjustable</p>	<p>JU2016738</p>	
<p>Top Reference Holder Fits 32mm (d) mounts</p>	<p>JU2016724</p>	
<p>Cryo Holder Includes 51mm (d) x 10mm (h) Cryo Block Requires 14mm (d) Adjustable Height Insert Holder (JU2016728)</p>	<p>JU2016723</p>	
<p>Brass Cryo Block 51mm (d) x 10mm (h)</p>	<p>JU2000872</p>	
<p>STEM Converter and Base</p>	<p>JU2015265</p>	
<p>Tilt-Rotation Motor Drive Holder Compatible with 25mm (d) x 6mm (h) Sample Mounts Tilt Range: -5° to +50° (1° step)</p>	<p>MP-01350TRMH2</p>	

Note: Holder designs may change slightly from images that appear in this brochure.

Aluminum Sample Mounts and Inserts

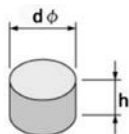
Description	Part Number	
32mm (d) x 5mm (h) Package of 10	780101278	
32mm (d) x 10mm (h) Package of 10	780101286	
51mm (d) x 5mm (h) Package of 10	780107537	
51mm (d) x 10mm (h) Package of 10	780107365	
32mm (d) x 10mm (h) Cambridge Pin Mount (Fits 3 or 1)	JU2016538	
32mm (d) x 10mm (h) Cambridge Pin Mount (Fits 4 or 1)	613210	
32mm (d) x 5mm (h) Cambridge Pin Mount (Fits 4 or 1)	JU2010349	
51mm (d) x 10mm (h) Cambridge Pin Mount (Fits 7)	613770	
51mm (d) x 5mm (h) Cambridge Pin Mount (Fits 7)	JU2015520	
4-Stub Insert 10mm (d) x 10mm (h) For 32mm Diameter Holders	780110544	
3-Stub Insert 12.5mm (d) x 10mm (h) For 32mm Diameter Holders	822143089	
CP Block Insert (fits 2) For 32mm Diameter Holders	JU2014243	
10-Stub Insert 10mm (d) x 10mm (h) For 51mm Diameter Holders	613203	
6-Stub Insert 12.5mm (d) x 10mm (h) For 51mm Diameter Holders	613200	

Sample Mounts and Inserts, 14mm (d)

Description	Part Number	
2 Slot Cross Section Insert	613218	
Cambridge Pin Mount Insert (1)	613079	
Mini Top Reference Insert	613197	
Insert for One (1) 10mm x 10mm Stub	613180	
Insert for One (1) 12.5mm x 10mm Stub	613311	
Mini Vise (90°)	613213	
Mini Vise (45°)	613214	
Mini Clamp (Flat Top)	613211	
Mine Clamp (45°)	613212	
14mm (d) Adjustable Height Insert Holder	JU2016728	


Note: Inserts in the table above fit the 14mm (d) Adjustable Height Insert Holder (P/N: JU2016728) purchased separately.

Sample Mounts



Part number	Size d x h (mm)	Material	Pack
613072	10 x 10	Aluminum	10
613073	10 x 5	Aluminum	10
780101235	10 x 5	Aluminum	10
613074	10 x 8	Aluminum	10
613167	12.5 x 10	Aluminum	10
822177251 (for TRMH)	20 x 7	Aluminum	1
783132913 (for TRMH)	20 x 5	Aluminum	10
783132905 (for TRMH)	20 x 10	Aluminum	10
780101286	32 x 10	Aluminum	10
780101278	32 x 5	Aluminum	10
780107365	51 x 10	Aluminum	10
780107357	51 x 5	Aluminum	10
600154297	10 x 10	Brass	10
600154289	10 x 5	Brass	10
JU2007939	12.5 x 10	Brass	10
780102185	12.5 x 5	Brass	10
600154271	32 x 10	Brass	10
600179303	32 x 5	Brass	10
600184277	10 x 10	Carbon	5
600154386	10 x 5	Carbon	5
783132883 (for TRMH)	20 x 10	Carbon	5
783132891 (for TRMH)	20 x 5	Carbon	5
780114515	32 x 10	Carbon	5
780114833	32 x 5	Carbon	5
780117077	10 x 10	Teflon	10
780117085	10 x 5	Teflon	10
780117093	32 x 10	Teflon	10
780117107	32 x 5	Teflon	10
782105033	51 x 5	Duracon	5
782105025	51 x 10	Duracon	5
780117093	32 x 10	Duracon	1
780117107	32 x 5	Duracon	1
780117077	10 x 10	Duracon	5
780117085	10 x 5	Duracon	5
780171268	12.5 x 10	Duracon	7
780171250	12.5 x 5	Duracon	7

Brass Cambridge Pin Mounts

Description	Part Number	
Pin Stub 10mm (d) x 5mm (h)	613403	
Pin Stub 10mm (d) x 10mm (h)	613204	
Pin Stub 12.5mm (d) x 5mm (h)	613402	
Pin Stub 12.5mm (d) x 10mm (h)	613205	

Lab Supplies

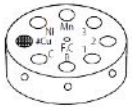



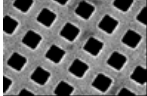
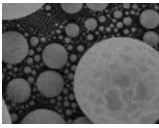
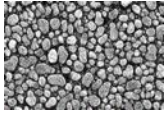


Tweezer Kit (Part Number: 372049) - Basic tools for SEM sample preparation. Includes:

Description	Part Number
Tweezer kit case (SEM & TEM)	420087
Scissor, small	420091
Screwdriver, minus (small)	420082
Screwdriver, plus (phillips)	420083
Screwdriver, 1.5mm	420084
Tweezer, no. 7 asa type, SS	420078
Tweezer, 3c type	420066
Tweezer, no. 2A	420074
Tweezer, no. 7 asa type, SS, T, SEM bend	JU2001074



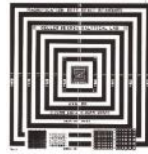
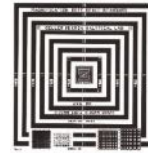

Precision (Jeweler's) Screwdriver Kit - Part Number: JU2013957

Samples and Standards

Description	Part Number	
EDS Standard Sample 32mm (d) x 10mm (h) Al Mount Mn, Ni, C, B, Cu-Mesh FC=Faraday Cup	780152999	
EDS Calibration Standard, 25mm (d) (C, Mn, Ni, B, 316SS, Al/Cu) In Conductive Mount McSwiggen Associates	JU2015561	
ZnO on 32mm (d) x 10mm (h) Aluminum Mount	804447829	
ZnO on 10mm (d) x 10mm (h) Brass Mount	JU2014427	
Grid (100μ Pitch) on 10mm(d) x 10mm (h) Aluminum Mount	613310	
Tin on Carbon, Mount Q 25mm (d) Mount	JU2015605	
Au on C, X50,000	780108027	
Sample Mount for Au on C Brass, 10mm (d) x 10mm (h)	JU2015004	
Sample Mount for Au on C Brass, 10mm (d) x 10mm (h)	780122372	
Adaptor for 25mm Mounts to fit 32mm Holder	JU2016539	




Note: To hold 25mm mounts in 32mm Holder requires the Adapter 25mm to 32mm (JU2016539)

Samples and Standards

Description	Part Number	
<p>MRS-3 Magnification Standard Traceable 10X to 50,000X</p> <p>Cr on Quartz, 25mm Mount</p>	JU2014212	
<p>MRS-3 Magnification Standard Non-Traceable 10X to 50,000X</p> <p>Cr on Quartz, 25mm Mount</p>	JU2014838	
<p>SEM Demonstration Standard</p> <p>The JN-1 Scanning Electron Microscope Demonstration Standard Specimen demonstration samples on two standard 12.7mm (1/2") pin stubs and a 25mm mounting adapter.</p> <p>1) six conductive samples: an integrated circuit chip, metal spheres, small set screw, ductile steel fracture, diatoms and a TEM grid</p> <p>2) five non-conductive samples: an <u>integrated circuit chip</u>, <u>paper</u>, <u>glass spheres</u>, <u>fabric</u> and <u>diatoms</u>.</p>	JU2011561 (JN-1)	

Note: To hold 25mm mounts in 32mm Holder requires the Adapter 25mm to 32mm (JU2016539)

Consumables

Description	Part Number	
<p>Grid Filament with Wehnelt</p>	804446491	
<p>Wehnelt W Filaments sold separately (Requires W Filament - Type V)</p>	804448400	
<p>W Filament (Type V), Box of 6</p>	813980968	
<p>RP Oil, 1L Bottle</p>	JU2010428	



User Guide Filament Exchange



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1. Introduction

This training guide will take the user through the process of filament exchange and cleaning on a JEOL JCM-7000 Neoscope



2. Process Overview

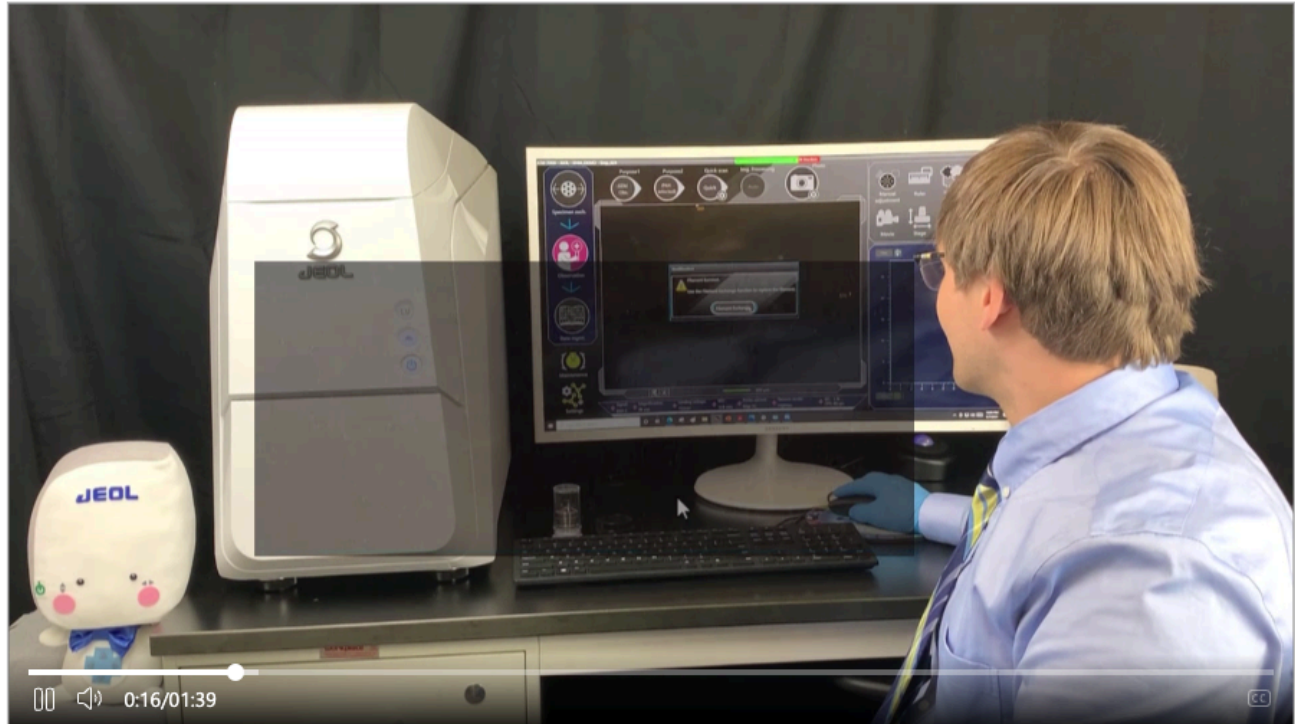
Quick and Easy
Filament
Exchange

*NEOSCOPE
JCM-7000*

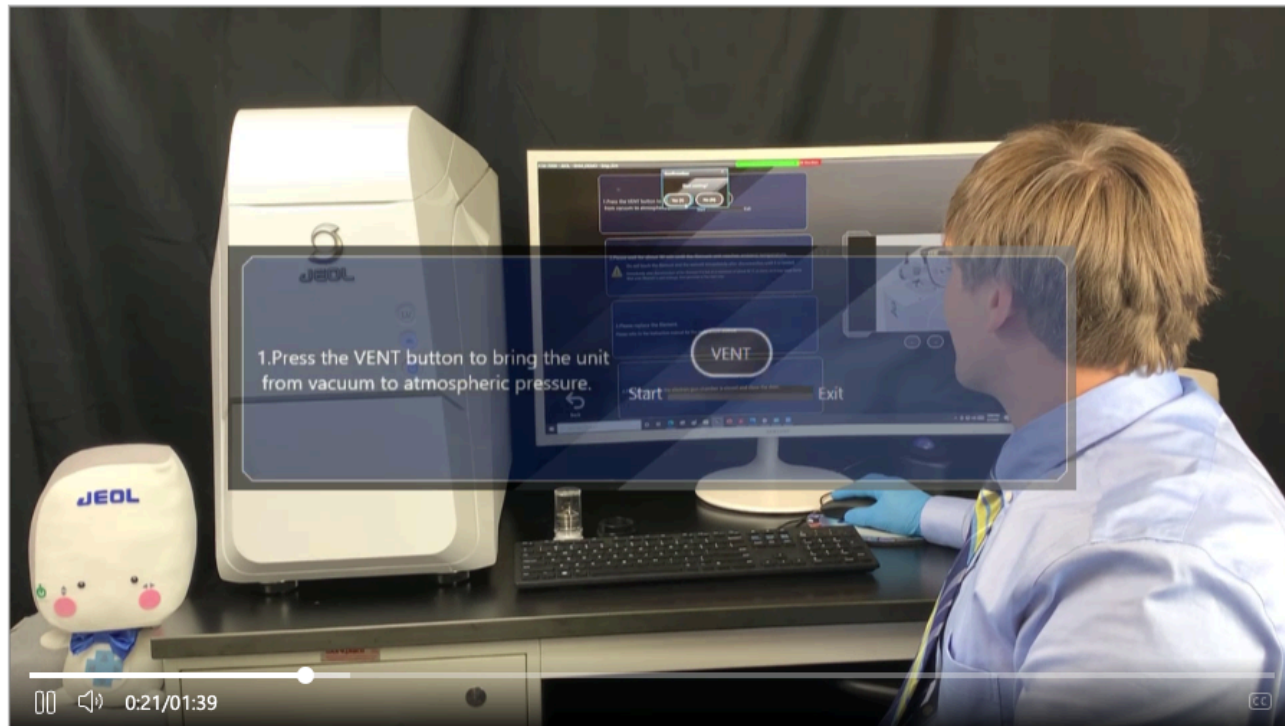
JEOL



2. Process Overview



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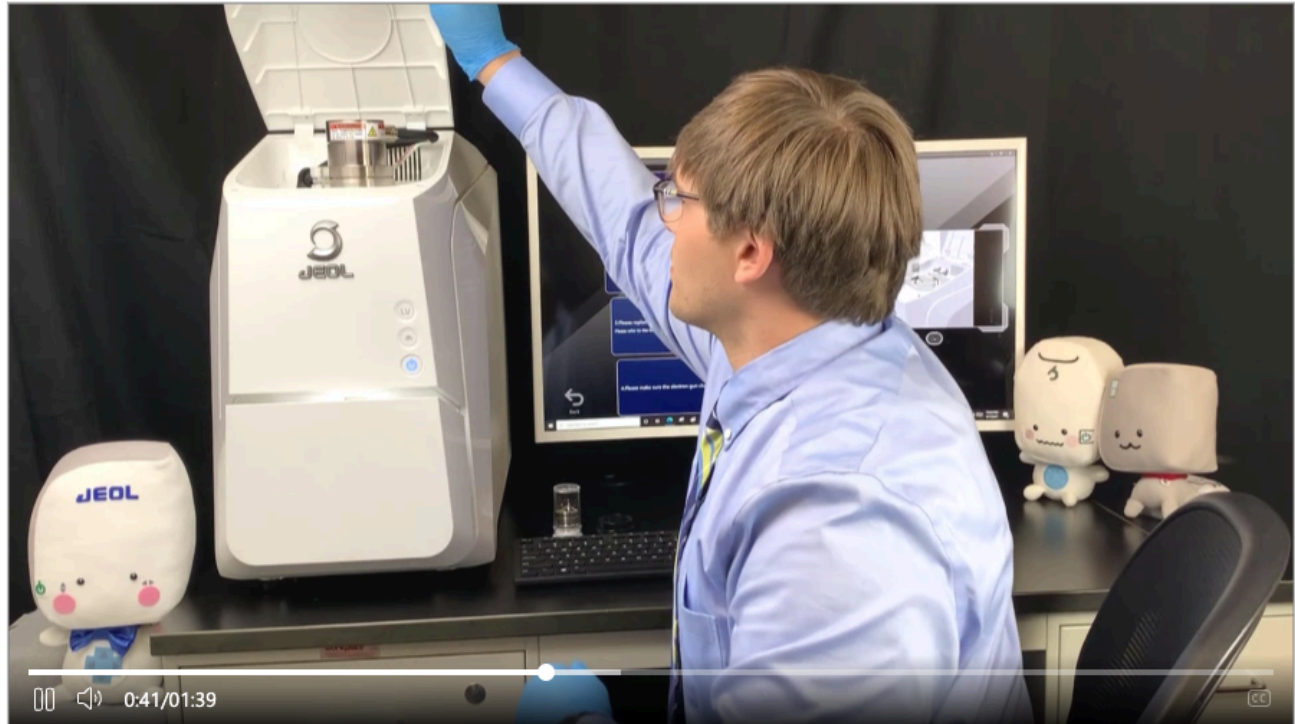
2. Process Overview



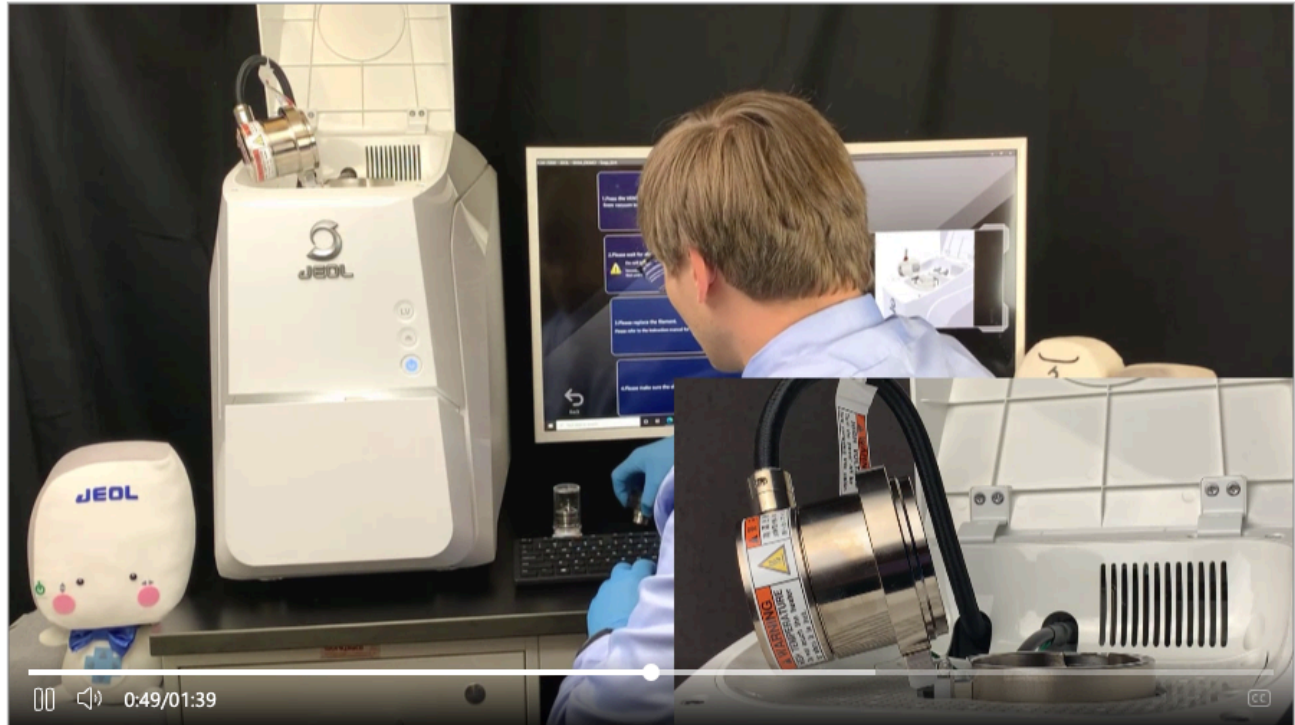
2. Process Overview



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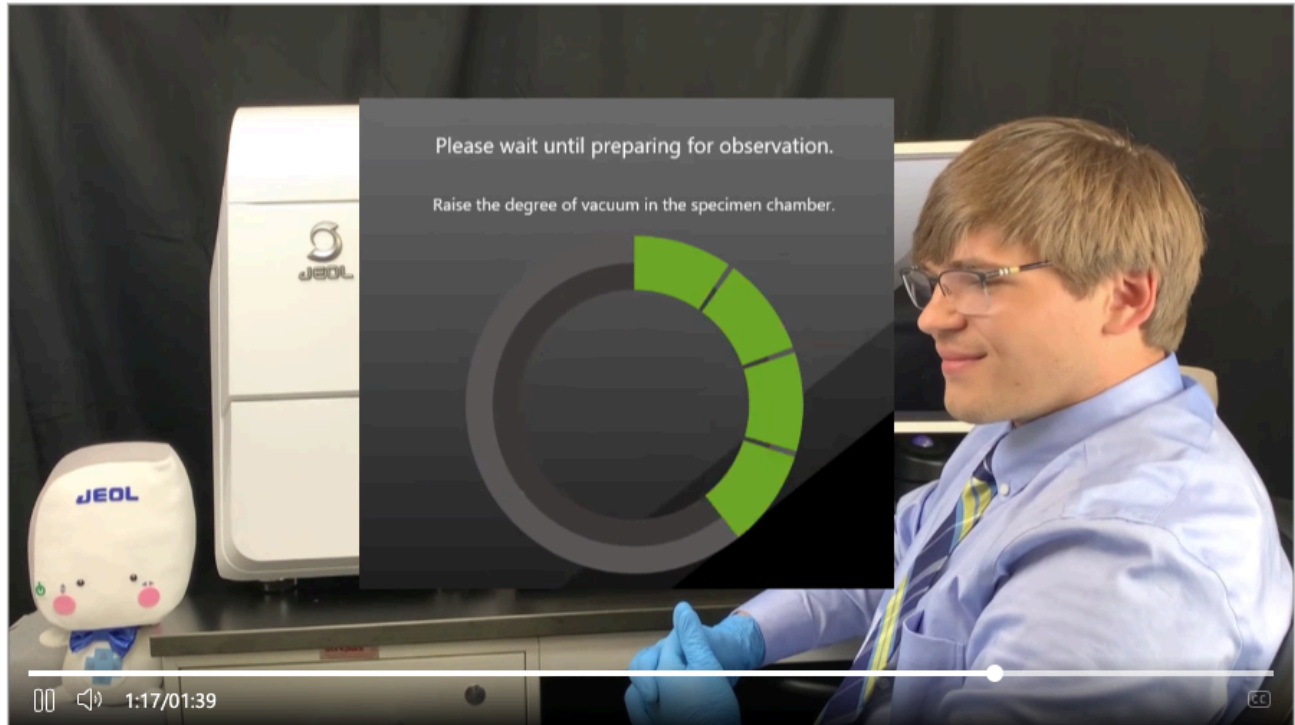
2. Process Overview



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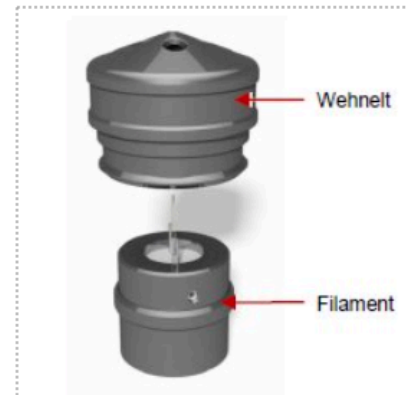
2. Process Overview

The screenshot displays the JEOL SEM software interface. At the top, a navigation bar includes 'Purpose1' (SEM Obs.), 'Purpose2' (Not selected), 'Quick scan' (Quick), 'Img. Processing' (Auto), and 'Photo'. The central area shows a grayscale SEM image of a sample with circular features. To the right, a toolbar contains icons for 'Manual adjustment', 'Ruler', 'Montage', 'File', 'Movie', 'Stage', 'Freeze', and 'Start eco'. Below the SEM image, a status bar provides technical details: Signal: BSE-C, Magnification: 40 x, Landing voltage: 15.0 kV, WD: 12.6 mm, Probe current: Map PC, Vacuum mode: HighVac, and C.P.C: 33.67 rpm. A bottom-left clock indicates the time 1:28/01:39. A bottom-right window shows an EDX spectrum with peaks labeled for Cu, Al, and Si.

Cleaning the Wehnelt Cap between uses

The Wehnelt is reusable but must be cleaned between uses. This is important to remove grime and filament deposits from the burned out filament. There are two ways to clean the Wehnelt cap after use.

- Metal Polish Cleaning Procedure
- Micro-90 Cleaning Procedure



Metal Polish Cleaning Procedure

POL and WENOL and PIKAL are metal polishes which are widely used to clean Wehnelts.

1. Disassemble the Wehnelt assembly. Throw away the used filament
2. Carefully polish the Wehnelt with metal polish until the accumulated deposits are completely removed. Q-tips and toothpicks covered with cotton are good to reach all surfaces.
3. Remove the polishing paste residue using acetone-soaked clean cotton until no visible residue remains.
4. Place the Wehnelt in a beaker of Acetone. Ultrasonically clean for 3 to 5 min.
5. Move Wehnelt to a beaker of Alcohol and ultrasonically clean for 3 to 5 min.
6. Place the Wehnelt in a final beaker of Alcohol and ultrasonically clean for 3 to 5 min.
7. Now handle the clean Wehnelt with gloves.
8. Blow dry with an air duster or dry nitrogen or clean dry air (not from a compressor).
9. Carefully inspect (under a low power stereo microscope, if available) for contamination. If the Wehnelt isn't perfectly clean repeat the procedure.
10. Reassemble using a new filament.

Micro-90 Cleaning Procedure

MICRO-90 is a concentrated aqueous cleaning solution usually used at 2% concentration for cleaning glassware. It is commonly available from Laboratory suppliers and EM suppliers. This solution is strong and hazardous, be careful and read all warnings before use. This solution is for stainless steel and glass only. Other metals may be etched by the cleaning solution.

1. Mix MICRO-90 with water (~50%/50%) in a beaker.
2. Place the Wehnelt into the beaker.
3. Place the beaker into an ultrasonic cleaner.
4. Check after ~ 10 - 15 minutes.
5. If Wehnelt is clean (no more contamination deposits remaining) proceed to rinse step 6. If Wehnelt is not clean (some contamination left), either:
 - a) clean in ultrasonic cleaner more or
 - b) clean with toothpick and cotton and then clean in ultrasonic cleaner more or
 - c) clean with toothpick and cotton and metal polish and then clean in ultrasonic cleaner more
6. When Wehnelt is clean (no more contamination deposits remaining), rinse in running water for 5 - 10 minutes. When completely rinsed (squeaky clean), place in Acetone in the ultrasonic cleaner a few minutes, then repeat with Alcohol.
7. Handle the clean Wehnelt with gloves.
8. Blow dry with an air duster or dry nitrogen or clean dry air (not from a compressor).
9. Carefully inspect (under a low power stereo microscope, if available) for contamination. If the Wehnelt isn't perfectly clean repeat the procedure.