

# AZtech EDX Operation Instruction

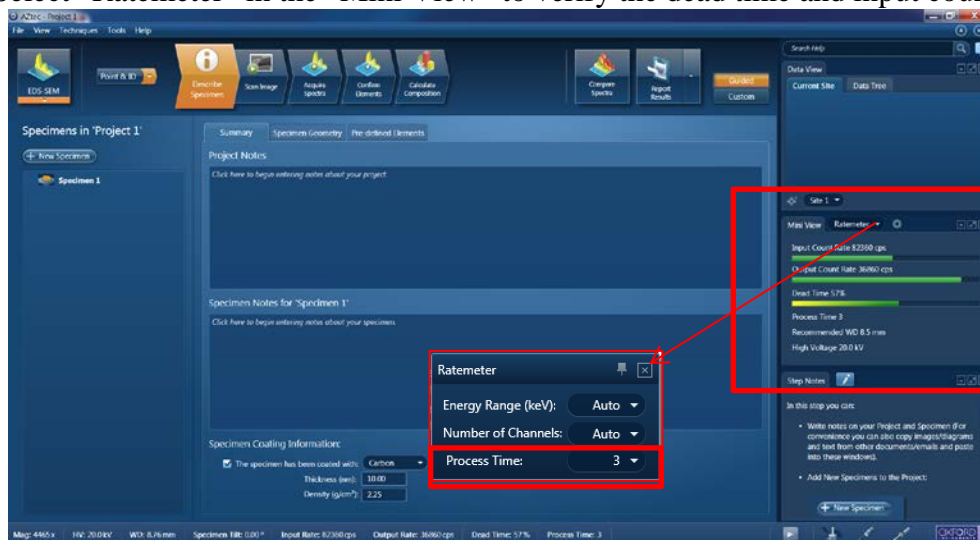
## Preparation process:

1. Please refer to the SEM operation manual to align the microscope and acquire a good SEM picture on the region of interest, before you begin the EDS analysis of your sample.
2. Open the Aztech software, you will see the following user interface.



You will be able to enter project notes and specimen notes for the sample in “Describe Specimen” on this page.

3. Insert the EDS detector into the chamber by pressing the button. Then choose the “position” of the detector and “glide in” the detector
4. Select “Ratemeter” in the “Mini View” to verify the dead time and input count rate.



20kV and Process time 3 is recommended for unknown samples. For low kV analysis use Process Time 5. At any given process time adjust the spot size (beam current) to yield a dead time around

45% on pure Cu (Cu tape is OK).

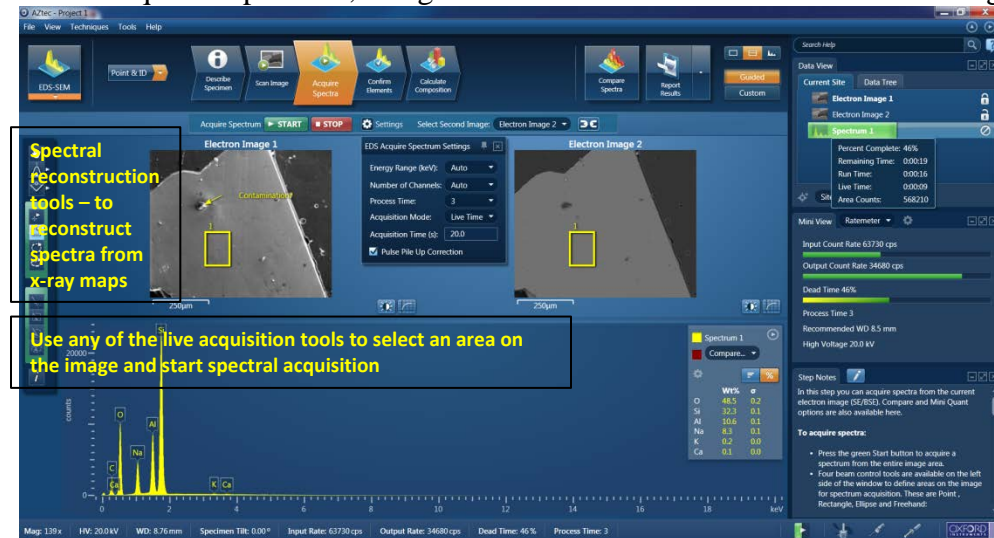
5. If you want accurate **un-normalized** quantitative analysis results, you must perform the Beam Measurement routine. Any change in the microscope settings such as accelerating voltage or lens control will lead to the change in the beam current. Under these circumstances you must perform the Beam Measurement routine before you do accurate quantitative analysis. Note: you do not need to perform the Beam Measurement routine if you are only interested in Qualitative Analysis or Normalized Quantitative Analysis.

### Obtain an EDX spectrum:

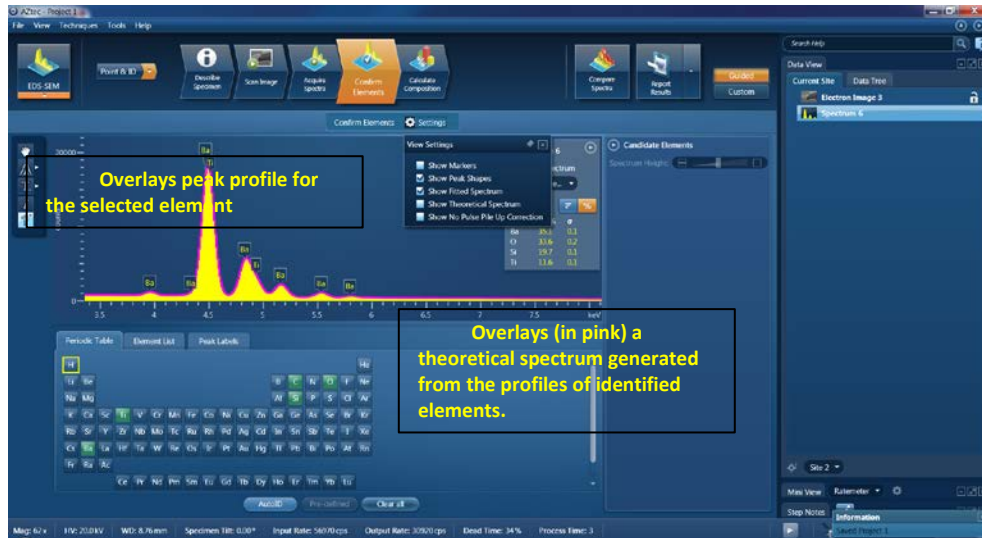
1. Select point & ID mode, press scan image and obtain an image at the region of interest.



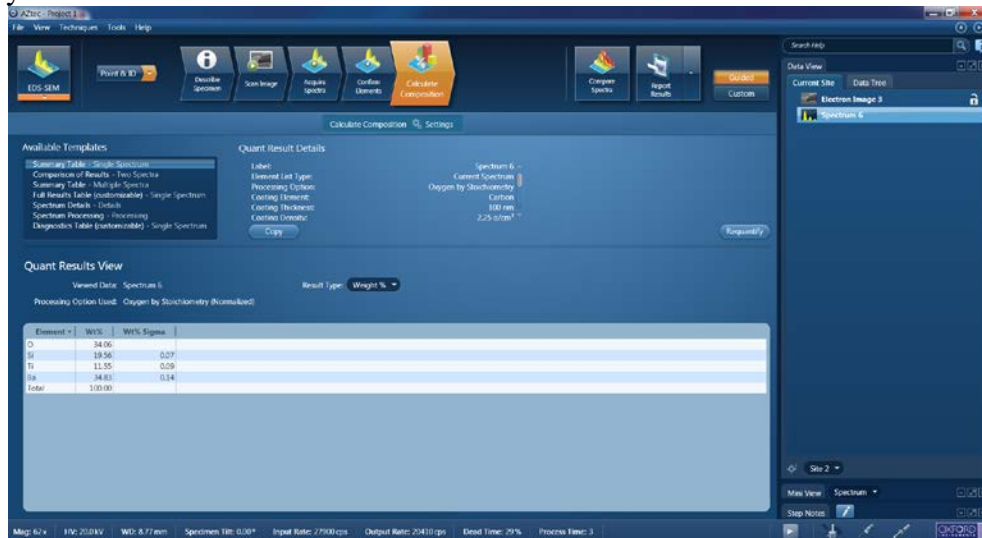
2. Start to acquire a spectrum, using different tools to select the area on the image.



3. Confirm the elements in the spectrum. You can see the elements automatically selected by the software to match your spectrum. You can also manually add or delete elements from the periodic table.




#### 4. Quantify the result.

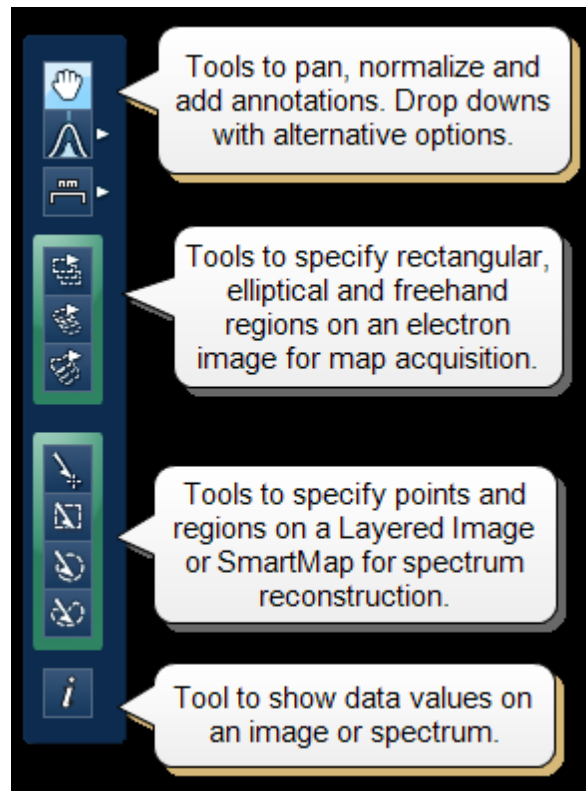


### EDX mapping:

In this step, you can acquire X-ray maps from the full frame or selected regions of the specimen. The maps show the spatial distribution of all elements in the specimen. The results can be displayed as a Layered Image, where colors for each element are mixed together and overlaid on the electron image, or as individual maps. Spectra from selected regions can be reconstructed during or after data acquisition.



1. Move to the region of interest and push the following button  to start acquiring EDX maps.
2. The actual region for EDX mapping can be determined by using a map acquisition tool, such as Rectangle, Ellipse and Freehand tools, available from the toolbar.



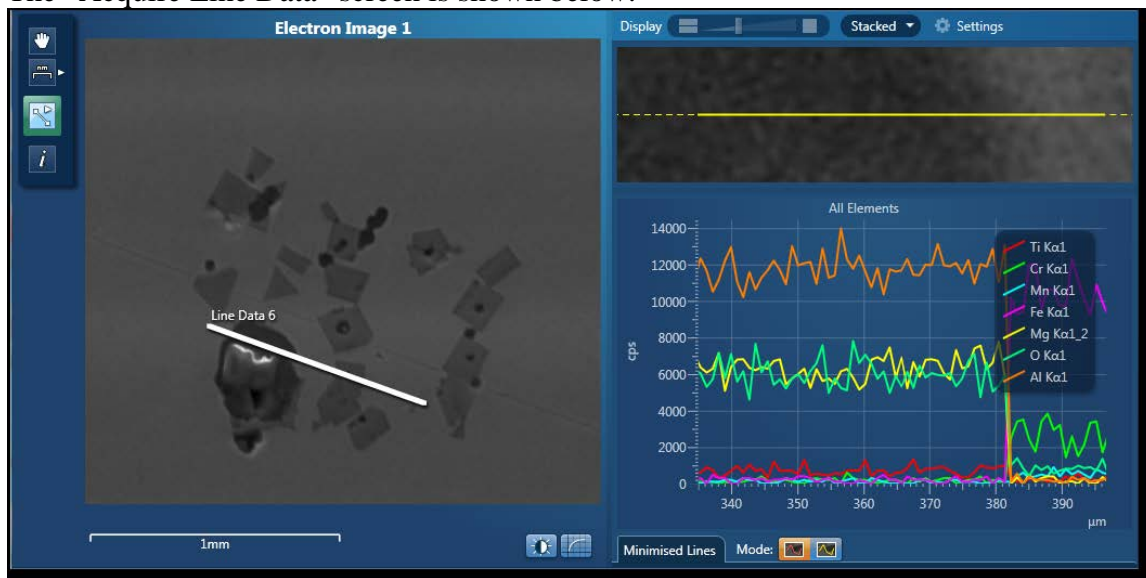
3. A layered image, element maps and an electron image/s (SE/BSE) are displayed. You can choose how you wish to view your data from Standard, Interactive or Summary view available from the drop-down list. You can also adjust the slider bar to choose the number of maps per row.
4. In the map display settings you can sort maps alphabetically, by atomic number or by maximum map intensity. You can also smooth maps by choosing the smoothing level from the Settings.
5. You can choose the color for your maps, adjust intensities and decide which maps to add to the Layered image. Alternatively, you can let the software do this automatically. Pressing the AutoLayer button (which is located in the bottom right hand corner of the Map Display window) will automatically scale and color all the maps and select the best ones to provide an effective color image that delineates regions of different composition. Maps will be auto-brightness corrected and those that show similar structure will be assigned the same color. Maps that are very noisy will be shown in grey. The most significant map for each assigned color will be added to the Layered Image.
6. Once you are satisfied with the EDX maps obtained, you can stop the acquisition process and save the project.

### **Line scan**

In this step you can acquire element linescans along a line defined on the electron image or

map.

1. To acquire linescans: Select the Acquire Line tool from the toolbar on the left.
2. Click on the image to set the start point and then drag the mouse to define the line. Release the mouse to set the end point. A line with start and end points is defined on the image.
3. Press “start” to start acquisition. A relevant section of the image is zoomed and rotated above the Linescan viewer. This action aligns the defined line horizontally to match the x-axis of the Linescan viewer. Element linescans start to populate the Linescan viewer from left to right as the data is being acquired. The elements for which linescans are being acquired are chosen in the “Describe Specimen” step selecting either the Auto ID option or Pre-defined Elements or both. The “Acquire Line Data” screen is shown below:



4. After the linescan is performed, Right click on the linescan viewer to access the Export menu. It has five different ways of exporting the linescans: Save As, Copy, Print and Email. The exported image includes the relevant information from the Caliper or Show data values tool.

### **When FINISHED**

Bring the detector all the way out  
CLOSE THE AZTECH SOFTWARE.  
LOG OFF THE COMPUTER.

**Emergency Information:**

Medical Emergencies: Contact 911 and Public Safety (609) 258-1000

Room / facility emergencies: Contact Public Safety (609) 258-1000

Issues related to the instrument:

1. Contact IAC Staff.
2. Leave system as is, Do Not disable vacuum system.
3. Try to shut off the High Tension.

Audible/Siren Emergency Alerts:

Follow previous steps 2 & 3 and leave the building.

**Emergency Contact Information:**

Nan Yao: Office (609)258-6394; Cell (908) 922-2236 Email: [nyao@princeton.edu](mailto:nyao@princeton.edu)

John Schreiber: Office (609)258-0034; Cell (215) 431-4670 Email: [js51@princeton.edu](mailto:js51@princeton.edu)

Paul Shao: Office (609)258-3851; Cell (847) 721-086 Email: [pshao@princeton.edu](mailto:pshao@princeton.edu)