semZeiss

STANDARD OPERATING PROCEDURE

CORAL Name: *semZeiss*

Model Number: Zeiss Supra-40

Location: ICL photo bay

What it does: High resolutiuon scanning electron microscope (SEM)

Introduction: This SEM is available for use with all sample types processed in the ICL or TRL, whether pieces or whole wafers, CMOS compatible or gold contaminated. This instrument provides high resolution electron beam imaging of samples mounted on a multi-axis stage. System software enables measurement, annotation and analysis as well as saving of images in various formats. Training on this instrument covers loading and unloading samples, image acquisition and enhancement Using various scanning and image smoothing methods, the use of two types of detectors, basic focUsing, and the use of the measurement and file saving features.

Safety: Safety glasses must be worn at all times while in the lab.

Procedure: Log into the MTL network on the SEM workstation.

Check CORAL to verify that you have the current reservation.

Engage the machine in CORAL.

Open and log in to the SmartSEM application.

USER= MTL
PASS= MTL

Use the Operations toolbar (lower right) to choose VAC and select VENT. The chamber will come to atmosphere in about a minute. While the system is venting mount your sample onto an appropriate sample holder and secure it by tension or by conductive adhesives.

Open the chamber door when it has vented. Fix your sample holder onto the round bracket fully and securely. Close the chamber door.

Select VAC from the lower operations toolbar and choose PUMP. You will be viewing the chamber interior via the IR camera. The right side of screen will display the SEM Control panel with six pulldown tabs:

GUN DETECTORS STAGE
VACUUM SCANNING APERTURES.

While the chamber pumps down (~ 200s), you can raise the sample, with the Z joystick, to within a reasonable distance of the lens cone and position your sample with the X-Y-Rotation joystick.

When the chamber vacuum is in the -5 range you can turn on the accelerating voltage, termed EHT (extreme high tension) . The EHT value can be set from the GUN tab of the SEM Control menu group.

Now switch from the camera view to one of two secondary electron detectors : Inlens or SE2. This can be done from the DETECTOR tab.

The initial acquisition of your image can be tricky and can be made easier if you :

a. lower magnification all the way down
b. use DETECTOR tab function AUTO BrightnessContrast BC
c. set working distance (WD) close to what you estimate is the actual distance from lens cone to your sample Using focus knob.
d. Increase EHT initially higher than you expect the sample requires.
e. Move stage in X & Y to identify a feature from your sample.

Use all the available controls: Mag, Focus, Stigmation, Contrast, Brightness, Scan speed, to improve the resolution and clarity of the image. Focus as you increase magnification. At high mag, improve X and Y stigmation. Use appropriate EHT for your sample. Use an appropriate aperture size (default is 30 um). Change detectors for a different image look/feel. Try different scanning speeds and methods.

There is a lot of software functionality available. Explore the various icons along the top and bottom toolbars for: measurement features, annotation tools, image saving, image controls and help libraries. Describing all the tools and functions is beyond the scope of this SOP.

When you are finished your inspection:

a. Shut Off EHT. Use lower toolbar tabs VAC, GUN, or EHT.
b. Vent the chamber. Use toolbar tabs VAC or GUN or EHT.
c. Return T (stage tilt) to 0 degrees.
d. Open chamber door and remove your sample from the stage.
e. Close chamber door and select PUMP from toolbar tabs.
f. Disengage CORAL. Close SmartSEM. Log off workstation.

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