JSM-6335F Field Emission SEM

Log In
1. Log in to Windows with your own Username and Password. Open JEOL program.
2. Open Gun Maintenance window. (Select “Maintenance” from menu bar, then “Gun.”)
3. Open Penning Gauge window. (Click on PVG icon.)
4. Record Penning Gauge and SIP-2 vacuum values in logbook.

Sample Insertion
1. Confirm that stage is in proper exchange position:
   
<table>
<thead>
<tr>
<th>T (tilt)</th>
<th>Z</th>
<th>X</th>
<th>Y</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>00.0</td>
<td>39</td>
<td>25</td>
<td>35</td>
<td>00.0</td>
</tr>
</tbody>
</table>

   If settings are not as indicated above, set T and Z manually; set X, Y, and R with software:
   Select "Stage" menu, then "Exchange Window." Click on "Exchange."
2. Wear gloves. Mount sample onto appropriate holder. Screw specimen holder onto end of exchange rod.
3. Place rod assembly into airlock chamber and press PUMP/VENT button. Wait ~2 minutes for green light to go off.
4. Open gate valve by turning knob 1/4 turn CCW (toward front) and then pull knob straight out.
5. Slide the exchange rod into the specimen chamber until specimen holder is seated onto the dovetail. You may check that the holder is properly seated by turning gently CW. (You should feel resistance.) Unscrew the rod CCW, making sure that the rod is fully unscrewed from the specimen holder.
6. Retract the exchange rod to the locked position. Close the gate valve by pushing fully in and turning 1/4 turn CW (toward back) until firmly closed.
7. Vent the airlock chamber by pressing the VENT/PUMP button. The green light in the button will come on. Remove the exchange rod.

Generate the Electron Beam
1. Wait for HT icon to turn blue. (PVG–Penning Gauge–below 1.5 x 10^{-3})
2. Open Column Control window. (Select "Control" from menu bar, then "Column.")
3. Choose accelerating voltage (maximum 20.0; minimum 0.5). Set "Emission" to 12 µA and "Auto Reset" to "CONST."
4. Click HT icon. (Turns green.)

Obtain an Image
1. Image should appear when Emission reaches 12 µA. Check that FREEZE button is not lit.
2. Adjust CONTRAST and BRIGHTNESS. FOCUS image.
3. Set appropriate Working Distance (WD) with the stage Z control:
   a. Turn Z-control one step (i.e. from 39 to 25), then refocus image. Observe actual WD on computer screen, lower right.
   b. Continue to reduce WD in steps and refocus until appropriate value is displayed.
      (Normally 8 mm WD. Use 4 – 6 mm for higher resolution. Use 15 mm for BEI.)

BE MINDFUL THAT A LARGE SAMPLE OR HIGH TILT ANGLE MAY CAUSE SAMPLE TO HIT THE SEM OBJECTIVE LENS CAUSING SEVERE DAMAGE! Joystick stage control may not operate at Z = 4 mm WD.
**Gun Alignment**

1. Press RDC IMAGE button to select reduced image view. Select a low magnification.
2. Slide "Probe Current" slider on (Column Control window) to the right to 14.
   
   If screen becomes dark when slider is moved to 14, move slider to left until image is seen.
3. Press ALIGN button. Maximize image brightness with X, Y knobs on knobset.
   
   If Probe Current is set to value other than 14, move slider by steps to right, aligning gun at each step until image brightness is maximized with Probe Current set to 14.
4. When done, set "Probe Current" slider to 7, or choose other value for "Probe Current."
5. Turn Gun Align off by pressing STIG button.

**Objective Aperture Alignment**

1. Check RDC IMAGE button lit to select reduced image view. Set magnification to 10,000X-20,000X.
2. Focus image. Correct astigmatism if necessary.
3. Turn Objective Lens Wobbler on by pressing WOBB button.
4. Adjust X, Y knobs on to stop image movement.
5. Turn Wobbler off by pressing STIG button.

**Astigmatism Correction**

1. Obtain best focus with FOCUS knob. (Easiest to see at high magnification.)
2. Turn FOCUS knob to over- and under-focus. If image "stretches" in orthogonal directions while going from over- to under-focus, stigmatism needs to be corrected.
3. Obtain best focus with FOCUS knob. Improve focus with X, Y knobs while STIG button is lit.
4. Re-check for astigmatism by turning FOCUS knob to over- and under-focus image.

**Sample Removal**

1. Turn off accelerating voltage by clicking on HT icon. Icon turns blue.
2. Return stage to the exchange position by selecting "Stage" menu, then "Exchange Window." Click on "Exchange."
3. Return Z setting to 39 by manually turning the Z-control knob. Return tilt manually to 00.0.
4. Place exchange rod into airlock chamber and press PUMP/VENT button. Wait for green light to go off.
5. Open gate valve by turning knob 1/4 turn CCW (toward front) and then pull knob straight out.
6. Slide the exchange rod into the specimen chamber. Screw the rod into the specimen holder CW, making sure that the rod is fully screwed into the specimen holder.
7. Retract the exchange rod to the locked position. Close the gate valve by pushing fully in and turning 1/4 turn CW (toward back) until firmly closed.
8. Vent the airlock chamber by pressing the VENT/PUMP button. The green light in the button will come on. Remove the exchange rod.