

SEM JSM-7600F Quick Operating Instruction Manual

IMPORTANT!!!

- Be careful not to let the air inside the chamber when inserting the sample using the exchange rod (turbo pump can be damaged).
- Check the "RBEI" detector. It has to be "OUT".
- When the exchange rod is in a horizontal position, **DO NOT** rotate, move left/right or up/down, but push it **STRAIGHT** into the microscope.
- Use the "IR camera" when moving or tilting the sample.
- Sample should be at the same height and aligned with the edge of the holder.
- **DO NOT** change the objective aperture and **DO NOT** move the buttons for mechanical centering of the aperture.
- **DO NOT** touch any cables behind the microscope column.
- Be careful with powder and magnetic samples. They should be well mounted on the holder and also consult with Zoran.
- Use latex gloves for preparation and inserting the sample in the microscope.
- For details read the instructions for JEOL JSM 7600F.

STARTING

- Run **PC-SEM** program → Guest
- Turn on the "**IR camera and detector**" (use the remote control: **POWER** and **VIDEO**).
- Check the "**Observation window**" (it should be **OFF**). The valve between the UHV column and chamber is **CLOSED**.
- The holder must be in **EXCHANGE** position (green light) and "Stage map" is set to $X = 0$, $Y = 0$, $Z = 38$, $T = 0$ and $R = 0$.
- Check that the "**ZFC**" is active (green icon).

INSERTING the SAMPLE

- Press "**VENT**" and wait until the chamber is filled with air.
- Open the airlock door and insert the sample into the holder (the arrows on the holder are parallel with the sledge).
- Before closing the sample exchange chamber (pre chamber), check that the door's O-ring is free of dust and dirt and correctly positioned in the groove.
- Close the chamber and press "**EVAC**" and wait for the pressure $< 3 \cdot 10^{-3}$ Pa (green light stops flashing).
- Lower the specimen-exchange rod horizontally **without pulling along its axis**. Fully insert the specimen-exchange rod, keeping the holder horizontal, until you feel it come to a firm stop. Look at the chamber live image. After confirming that the **HLDR** light has lit up, **fully** retract the exchange rod horizontally until the plastic stopper snaps

and comes up. Let the rod sit on the stopper and then tilt up the exchange rod **without pulling along its axis**.

- Click on the **Specimen Offset** button in the graphical user interface (GUI) and select from the list the holder you installed (26 mm/12,5 mm).
- Define "Specimen Surface Offset" (0 if the sample is aligned with the edge of a holder). If your sample has an offset (in mm) measure the height difference and enter it in the specimen surface offset field of the specimen holder pop-up window
- Select **WD = 15 mm** and press "OK".

OBTAINING an IMAGE

- Wait until the **pressure** in the microscope is $< 5 \cdot 10^{-4}$ Pa.
- Set the "Observation window" (ON).
- Select "SEI" or "LEI" detector.
- Select the "Accelerating voltage and current": LC between 5 and 10.
- Turn on "LOW MAG" and find the sample.
- Turn off "LOW MAG".
- Press "ACB" (Auto Contrast/Brightness).
- Sharpen the image using +Z, -Z (with trackball)
- **At higher magnification** (> 20000x) focus the image using the "FOCUS".
- Press "WOBBLER" to check if the electron beam is centered (symmetrical "breathing"). If not use buttons "X" and "Y" (slowly).
- Press "STIG" to correct the astigmatism (use the buttons "X" and "Y").
- Change the "WD", "accelerating voltage", "current" and "detectors" (to get an optimal image).
- For using the "LEI" detector set the **WD \geq 15**.

IMAGE CAPTURE

- Click on "PHOTO" icon.
- Select "EXPORT" when saving (to have marker, magnification etc. on the image).
- Save the image to your folder.
- **Turn off** the button "FREEZE".

ROTATING and TILTING the sample

- You can manipulate the rotation mechanical (+R, -R) or **preferably** electronically using the rotation of electron beam ("Image Rotation").
- Tilt the sample manually using the +T and -T. Always check the Table 2–10 (maximum allowed tilt for used WD) in official manual and use **IR camera**.
- **!!!** To use the "RBEI" detector at **WD 15** first insert the detector and then tilt the sample manually and slowly. **Use the IR camera!!!** Maximum tilt at WD 15 for holder 26 mm is 5°, and for holder 12,5 mm is 10°.

BACK SCATTERED IMAGE

- There are two **BSE** detectors in the microscope:
 - The first is in the object lens “in-lens” RIBE detector
 - The second detector is RBEI detector; which is when used inserted into the chamber
 - Usually you will use RBEI detector
- **Important! Be very careful when you are inserting the RBEI detector into the chamber that you will not hit the sample! If the sample is aligned with the edge of the holder, then you have to have WD = 15 mm or more (up to 25 mm), and never less!**
- Choose in the program the “BSE” detector –“COMPO (RBEI)” or. “COMPO2 (RIBE)”
- For BSE image use the “FINE” scan
- Before switching to the BSE detector focus picture in “SEI” or “LEI” mode!

Using EDS

- Set the “WD” 15 mm.
- Turn on “INCA” program (third monitor from the left).
- Login as “INCAOperator”. You **do not need** a password.
- Open your “PROJECT” and follow the scheme. At the end of your work, save it in “INCA Document folder”.
- Use “on-line instructions” using Help/Bubble Help or use instruction you got at workshop.
- **Logout** from “INCA” program at the end of your work!!!

REMOVING the SAMPLE and LOG OUT

- “**Observation window**” must be on **OFF**.
- Check that “RBEI” detector is **OUT**.
- Press “EXCHANGE position” (green light turns on) and wait that holder moves into X = 0, Y = 0, Z = 38, T = 0 and R = 0 position.
- Remove the sample as described previously in section inserting the sample
- Press “VENT” and wait until the prechamber is filled with air. The “VENT” button blinks until the chamber reaches atmospheric pressure and then becomes solid green.
- Open the specimen exchange chamber and take out the specimen holder. Remove the specimen from holder and store holder into holder box.
- Close the chamber and press “EVAC”.
- CLOSE /LOG OUT from the microscope active window

Write down your session into the notebook “SEM JSM 7600 F”!!! Report any problem in the comment section.