



Electron Microscopy Center (212) 650-8591

The City College of New York

Mail comments to morales@sci.ccny.cuny.edu

TEM specimen loading:

1. Remove the specimen stage from the microscope. There is no need to press the red plastic pin when the stage is being removed. Pull out the metal rod, turn it to the 1 o'clock position, pull it out a bit more. Open the airlock by turning the larger wheel counterclockwise (use your right hand). Use the aluminum pin to pull out the stage. Be sure not to touch the stage with your hands, if you do, let me know so that I can clean it.
2. Load the grid on the stage: first, position the stage on its holder, turn the tip of the stage upright using the wrench, remove the screw cap with the golden pin (the screw cap is like bottle cap, the four leaves the golden pin tighten around the screw cap when the ring is GENTLY pressed down). Remove the old grid and load the new grid. After loading the new grid, replace the cap (clockwise), retract the ring and pull away the golden pin.
3. Insert the specimen stage into the airlock.
4. Turn the airlock wheel clockwise, remember to use your right hand.
5. Press the red plastic pin on the metal rod, which is now at the 1 o'clock position, the stage will be pulled into the airlock. If the stage is not pulled in, the airlock wheel needs to be turned clockwise further.

The next two steps are critical, if done improperly, you run the risk of inserting air into the column and delaying your work. If you get a "CHECK VAC" red light, wait for the red light to turn off before proceeding.

6. Turn on the airlock pump by pressing the green button on the left microscope panel. You will hear the turbo pump engage. Proceed quickly to step 7.
7. Quickly turn the rod to the three o'clock position and wait 7 minutes.
8. Turn the rod to the 6 o'clock position and gently push it into the microscope (do not press the red pin at this point). Do not force it in; be gentle. Check that there is no vacuum error before proceeding. The vacuum readout will fluctuate briefly, let the vacuum recuperate to 4-6 or 3-6 before proceeding.
9. Press the red plastic pin once to release the stop and gently push the rod into the microscope. The rod should now be halfway into the scope.
10. Press the red plastic pin again and gently push the rod all the way in.

11. Make sure the magnification is at 150x, the contrast aperture holder is out (all the way counterclockwise), and the condenser (K2) knob is turned clockwise all the way.

12. Open the V3 valve, press the green BEAM button and the red FIL button. You should now see the grid on the fluorescent screen.



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Zeiss EM 902 Contrast Aperture Centering Instructions

1. Make sure you are looking through a thin section or a carbon film. This method works only if the beam is projected through a thin section or carbon film.
2. Increase the magnification to 7000x and focus the condenser to the crossover point, use the K2 knob.
3. Center the beam using the BEAM ALIGNMENT knobs located on the right side panel.
4. Insert the 60 um contrast aperture by turning the aperture changer clockwise to the second click (1st click = 90um; 2nd click = 60um; 3rd click = 30um). Warning: when introducing the aperture, be very careful not to touch the two black knobs on the aperture changer, if you do, the aperture will move way off center and block the beam completely.
5. Turn the MODE knob from HR to D (one click counterclockwise). There should be two circles visible on the fluorescent screen, a smaller bright circle (diffraction spot) and an outer circle (the aperture). Center the outer circle relative to the smaller bright circle using the two black knobs on the aperture changer. If the circles are blurry, sharpen them by turning the diffraction focusing knob (the inner knob in the medium focusing knob).
6. When the aperture is centered, turn the MODE knob from D to HR (one click clockwise).
7. The specimen can now be viewed at magnifications of 3,000x to 250,000x.



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Using the CCD camera and iTEM:

Before using the CCD camera, center the contrast aperture.

1. Open the nitrogen tank for the camera by turning the metal valve counterclockwise; a couple of turns is sufficient.
2. Turn on the MegaView control box; the light in the red switch turns on.
3. Insert the CCD camera into the beam path by pressing the green button on the camera mouse, the green light turns off and the red light turns on.
4. Logon in the computer as USER, the password is 1234. The computer is normally left on but the monitors are turned off to conserve energy.
5. Double click on the iTEM icon located on the desktop.
6. Click on the intelligent exposure icon (pink X on the tool bar). This opens a panel with two buttons: a VIDEO and a PHOTO camera.
7. Click on the video icon in the intelligent exposure panel, this turns on the CCD and displays a video preview of the sample. The video image can be on either monitor. It is better to have the video preview on monitor #2 since the image will be bigger and easier to focus.
8. Select a magnification, adjust the condenser (K2) so that a bright spot (beam cross over) is visible on the video preview, center the beam using the beam alignment knobs located on the right panel, then spread the beam (slowly turn the K2 knob clockwise) so that the illumination is even on the video preview.
9. Focus the image using the coarse and medium focusing knobs on the right panel.
10. Take a digital image by clicking on the PHOTO camera button in the intelligent exposure panel. As soon as the picture is taken, a new window opens, select the magnification and click OK. The image is stored in one of 64 image buffers available. Image buffers are stored in RAM, if the program crashes or if you quit the program without saving the images, the images are lost.
11. Repeat steps 8-10 to take more images.

12. When finished, turn off the video preview by clicking on the VIDEO button in the intelligent exposure panel then click cancel in the magnification window. Take the CCD camera out of the microscope by pressing the red button on the camera mouse, turn off the filament, close the V3 valve, remove the contrast aperture, turn the K2 knob fully clockwise, and change the magnification to 150X. If you are done for the day, turn off the main switch on the MegaView control box (the red light goes off), and close the nitrogen gas for the camera (turn the metal valve fully clockwise). Remove your grid and reload the stage as if you were loading a new sample to the 3'oclock position, wait 7 min, turn the key to 0.



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Zeiss EM 902 Switch-Off Instructions

1. Turn the CCD off by clicking on the video icon in the intelligent exposure panel. When the magnification window appears click cancel.
2. Move the camera out of the beam path by pressing the red button on the camera mouse.
3. Turn off the MegaView control box; the red light goes off.
4. Close the nitrogen gas for the camera, turn the metal valve clockwise.
5. Turn off the filament (press the FIL button to the out position).
6. Close the V3 valve (this automatically turns off the BEAM).
7. Remove the contrast aperture (turn the aperture changer counterclockwise all the way).
8. Change the magnification to 150X and turn the condenser knob (K2) all the way clockwise.
9. Remove the grid and load the stage (with the screw cap) back into the microscope airlock following the sample loading instructions. Bring the holder to the three o'clock position following the sample loading instructions. Exercise the same level of care as if you were loading a sample. Wait for 7 min.
10. Turn the microscope key to "0". There will be a hissing sound while the column is filled with nitrogen. Make sure there are no red error lights on the left side panel. The nitrogen tank for the microscope is left open.