

Observation guide in the LV mode

Image observation in the low vacuum mode

1. Vent the specimen chamber to atmospheric pressure and mount the specimen you want to observe.
2. Change the [Vac. mode] shown on the active data display to [LV] and evacuate the specimen chamber.
Wait until the text icon changes to [HT OFF]. (It takes about 3 minutes 30 seconds in the case of JSM-6480 series. It takes about 1 minute 30 seconds in the case of JSM-6380 series.)
3. Click [HT OFF] button to turn it [HT ON].
4. Set the accelerating voltage to [15kV], and the pressure in the specimen chamber to [30Pa].
5. Set the spotsize to [30 to 40] and the Shadow level on the BEIW menu to [1].
The spot size set to [30 to 60] in the case of JSM-6380 series.
6. Click [View] button.
7. Set up the specimen stage to the specimen center.
For JSM-6480 series, set X= 0mm and Y= 0mm.
For JSM-6380 series, set X= 23mm and Y= 25mm.
8. Click [ACB] to activate automatic contrast and brightness.
9. Click [AFD] to activate Autofocus.
Use the exposure marker displayed by [Scan1] as a guide for appropriate brightness setting.
Brightness is approximately appropriate when the marker has come to the center. However, the optimum brightness varies slightly with the specimen.
If it is not easy to check the image when the marker is in the center, increase the spot size and click the [ACB] button again.

If no image is displayed as a result of the above operations, perform the following operation and try again.

1. Vent the specimen chamber to atmospheric pressure, mount an appropriate specimen (an empty specimen holder will do) and evacuate the chamber in the [HV] vacuum mode.
2. Set the working distance to 10mm.
For JSM-6480 series, set the Z-coordinate position to 10mm
For JSM-6380 series, turn the Z-knob of the specimen stage to set the Z-scale to 10
3. Click [WD ※※mm] of the active data display and then double-click [WD 10mm] in the list. (This accomplishes coarse adjustment of the focus)
4. Click [HT OFF] button so that [HT ON] appears.
5. Click the [Gun] button.
6. Select [Semi Auto] and click the [Start] button.
If the error message is displayed, check the filament.
7. Upon completion of Auto Gun Alignment, click the [HT ON] button so that [HT OFF] appears.

【Guide for observing conditions】

Specimen	Pressure	Spotsize
Biological specimen containing much moisture	50 to 70Pa	30 to 60
Dry paper, cloth and resin, etc.	20 to 30Pa	30 to 40

Whenever inserting a specimen containing much moisture, insert the specimen in the low vacuum mode.

Some specimens are susceptible to damage by electron beam irradiation. Therefore, increase the spot size slowly starting from about [30] while checking the image quality.

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Checking charge-up

Bombarding a nonconductive specimen surface with electron beams electrically charges the specimen. This charge buildup will be observed as unusual nonuniformity of brightness in the area being observed or as a shift of the field of view during slow scanning at Scan3 or more. The amount of charging varies with the electron energy (the accelerating voltage) of the electron beam with which the specimen is bombarded, beam current, scanning area (magnification), scanning speed and other factors. For instance, the higher the magnification, the higher the electron beam irradiating and the amount of charge buildup also increases. As a result, the specimen may be charged during photography, even though it is not charged during observation. Eliminate and check charge buildup according to the following procedure.

1. Increase magnification by about four steps over the current magnification.
2. Click [Scan1] or [Scan3] button and check if the specimen charges.
3. If the specimen charges up, regulate the pressure using the adjustment button in the Low Vacuum Control tool. Increasing the pressure will reduce charge buildup.

Observation at the lowest magnification

~ Setting parameters for observation and photography of entire specimen ~

1. Set the working distance to 48mm.
For JSM-6480 series, set the Z-coordinate position to 48mm
For JSM-6380 series, turn the Z-knob of the specimen stage to set the Z-scale to 48
2. Click [WD ※※mm] of the active data display and then [WD 48mm] in the list. (This accomplishes coarse adjustment of the focus)
3. Set the accelerating voltage to [10 to 20kV] and click [View] button.
4. Set the pressure in the specimen chamber, referring to **Guide for observing conditions**.

To obtain a sharp image at high magnification

- a) Use a short working distance (WD).

WD20 to 15mm	Resolution is not too poor, but focal depth can be assured.
WD15 to 10mm	Resolution improves and specimen can be tilted slightly.
WD10 to 8mm	At $\times 10,000$ or when the highest resolution is required.

With WD 8mm, the specimen cannot be tilted. Take care not to allow the specimen observation surface to protrude above the specimen holder surface.
- b) Decreasing the working distance will increase the intensity of the detected signal of the backscattered electron detector, allowing the spot size to be reduced. Decrease the spot size while checking the exposure meter displayed after Scan 1.
- c) With a short working distance (WD), charge buildup increases compared with a long working distance. Therefore, if the working distance is decreased, increase the pressure in the specimen chamber as required while checking the charge buildup condition.