

Large instrument repair and maintenance (125- 126)

JSM 5610LV Routine Maintenance of Scanning Electron Microscope and common troubleshooting

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Summary:In the daily maintenance and management of the scanning electron microscope, the indoor environmental factors should be well controlled, the inside of the electron microscope should be kept in a high vacuum state for a long time, and the auxiliary equipment should be checked regularly to see if it meets the requirements. Method of exclusion.

Key words:Scanning Electron Microscope; Routine Maintenance Management;

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With the development of science and technology, the application of electron microscope has become more and more

The more extensive, the greater the impact on technology, especially for the development of nanotechnology

A huge boost, but the electron microscope is sophisticated and expensive, which requires specialized management, Use and maintenance knowledge, guarantee its place

In the normal working state, it can better serve scientific research and production. This article is aimed at the JSM 5610LV Scanning electron microscope, briefly talk about its daily maintenance and troubleshooting.

1 routine maintenance

(1)Keep the electron microscope room clean, dust-free, using air conditioning, dehumidification, etc.

section, control the indoor environmental factors, so that the indoor temperature is 15~ 25 between, the humidity is 50% the following.

(2)Keep the electron microscope in a certain vacuum state for a long time, the degree of vacuum

General requirements are in 10⁻³ Torr above. Even when the electron microscope is not working, it should also be evacuated regularly. During the rainy season smoke once, other seasons pump once to prevent corrosion of the electron microscope tube and the internal components of the energy spectrometer.

(3)Check the mechanical pump frequently (DP) oil level, see its liquid level

Whether it is at the level of the oil level scale line of the window, if it is below the level of the oil level scale line of the window, the mechanical pump oil should be added immediately. If it is observed that the oil in the mechanical pump window is brown, the mechanical pump should be replaced immediately (DP) Oil.

(4)Regularly replace the diffusion pump inside the electron microscope (RP) Oil.

(5)Regularly clean the movable diaphragm in the lens barrel, sample table, electronic

Gun chamber and other easily contaminated parts to ensure the normal operation of the electronic optical path. During cleaning, the diaphragm is heated and cleaned with a vacuum sprayer, and the sample stage and the electron gun

chamber are dipped in cotton balls with alcohol, acetone 1:1 Mixture scrub.

(6)Regularly check the circulating water condition, if the water level is lower than the warning line, it should be

Immediately add pure water. If the circulating water is turbid and deteriorated, the circulating water should be replaced

immediately to prevent clogging and scaling of the circulating system, which will affect the working efficiency of the water circulating system.

(7)Regularly turn on the component imaging system, topological imaging system, Stereoscopic imaging system, etc.

Functional system to prevent the aging of electrical components. The time of each opening should not be less than 1 h.

(8)regular inspection of electron microscopy. Whether the radiation leaks, strengthen the prevention protective measures to ensure personal safety.

2 Troubleshooting of common faults

When the electron microscope fails, the general part of the fault should be judged first. position or cause, and then check step by step to minimize the scope of the failure, and finally find out the cause of the failure or specific components, and then solve the problem. JSM 5610LV Several common troubleshooting methods for scanning electron microscopes.

twenty one Fault 1

Fault phenomenon: The screen displays the image, but the image is jittery, blurry, and the upper and lower lines are not clear.

Reason: There are many reasons to make the image unclear, the reason for this example Yes, during operation, dynamic focus balance was inadvertently enabled

(Dynamic Focus Correction) Function, the electron microscope generates an alternating magnetic field, which makes the focal length jitter, causing the image to shake and blur. And the upper and lower lines are not clear.

Solution: Turn off the dynamic focus balance function.

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twenty two Fault2

Fault phenomenon: crash, the function keys such as focal length and magnification are out of order, not working, especially the power switch of the tungsten lamp of the electron microscope. Ready Can't close.

Reason: Misoperations such as adjusting the magnification too fast, etc., related to the mirror. The program is not smooth.

Solution: Turn off the electron microscope and restart the electron microscope.

twenty three Fault3

Fault phenomenon: When the electron microscope is turned on and pressurized, the screen does not display image!! Black screen.

Reason: The filament is blown and the power is not turned on or the brightness displayed on the screen is not correct.

Inappropriate ratio.

Solution: First open the electron gun (Gun) icon, check the quality of the tungsten filament. If it is not powered on, it means that the tungsten filament is burnt, and the filament should be replaced; if it is powered on, adjust the contrast and brightness until the image is called out and clear.

twenty four Fault4

Fault phenomenon: electron microscope sample stage Z The axis shows a value of zero, AFC, ACD, A Stand other automatic functions cannot be implemented.

Reason: Electron microscope EOS circuit board A/D converter MP8775AN malfunctioning, automatic functions cannot be implemented, Z sensor no output.

Solution: replace the electron microscope EOS circuit board A/D converter MP8775AN.

2.5 Fault5

Fault phenomenon: During the scanning process of the electron microscope, when SPOT SIZE the value setting is 16, the displayed image is normal; when SPOT SIZE value set greater than 17, the displayed image is jittery and accompanied by

discharge phenomenon.

Reason: The tungsten filament of the electron microscope is about to burn out, and it is elusive state, current offset through tungsten filament. The excited electrons are thus unstable, when SPOT SIZE value set greater than 17. When the primary magnetic lens converges the electron beam, it is unstable, which affects the imaging effect.

Solution: Replace the tungsten filament of the electron microscope and perform an alignment

The series can be adjusted.

3 Epilogue

Have a high sense of responsibility, do a good job in the daily maintenance of the electron microscope, have it is a basic requirement for electron microscope operators to prepare certain troubleshooting skills. Only by doing these points can the electron microscope function better and serve scientific research.

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Daily Maintenance and Familiar Faults Clearance of JSM 5610LV

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Abstract: During the daily maintenance and management of SEM, we should better control the factors of the indoor environmental and keep the interior of SEM at a high vacuum state and check the ancillary equipment whether they reach the demands or not timely. Finally, the methods of fault clearance such as halt, black screen and image show abnormality of SEM is introduced in this paper.

Key words: SEM ; maintenance and management; fault clearance

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