




Mass Spectrometer Tuning Issues and Troubleshooting Methods



Fault Symptom:

When tuning parameters are adjusted, the change in tuning peak intensity is delayed.



Possible Causes and Solutions:

-  The ion source is contaminated.
Solution: Clean the ion source with methanol and acetone using ultrasonic cleaning for 15 minutes each.
-  The pre-quadrupole is contaminated.
Solution: Clean the pre-quadrupole rod with methanol and acetone using ultrasonic cleaning for 15 minutes each.
-  The ion source components are not properly installed, causing a poor circuit connection.
Solution: Remove the ion source and reinstall it correctly.

Fault Symptom:

Excessive ion energy and repulsion voltage are required when tuning the mass spectrometer.


Possible Causes and Solutions:

-  High ion energy is due to a polluted ion source, and high repulsion voltage is due to contamination of the pre-quadrupole and quadrupole rods.
Solution: Clean the ion source, pre-quadrupole rod, and quadrupole rod with methanol and acetone using ultrasonic cleaning for 15 minutes each, and perform routine maintenance.
-  The mass spectrometer is not optimally tuned.
Solution: Retune the mass spectrometer.

Fault Symptom:

The instrument response is not noticeable when tuning parameters are changed.




Possible Causes and Solutions:

-  The ion source may be short-circuited, or the circuit may be disconnected.
Solution: Remove the ion source and use a multimeter to check whether the circuit connections between components are functioning correctly.

Fault Symptom:

The tuning peak shape is poor, with a shoulder peak present.


Possible Causes and Solutions:

-  The mass spectrometer is not optimally tuned.
Solution: Retune the mass spectrometer.
-  The ion source is contaminated.
Solution: Clean the ion source with methanol and acetone using ultrasonic cleaning for 15 minutes each.
-  The analyzer is defective or damaged.
Solution: Inspect the analyzer for defects or damage.

Fault Symptom:

No reference peak appears during tuning.

Possible Causes and Solutions:

-  The reference standard (perfluorobutylamine) bottle is empty.
Solution: Add the reference standard to the sample bottle built into the mass spectrometer.

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- ⚙️ The reference standard pipeline is blocked.
Solution: Remove the pipeline and clean it with acetone using ultrasonic cleaning.
- ⚙️ Air leakage.
Solution: Check the height of the air peak at m/z 28. If it is greater than 10% of the helium peak at m/z 4, it indicates an air leak. Use a syringe to drop acetone at each interface, and observe the intensity change of the acetone molecular ion peak at m/z 58 to pinpoint the exact location of the leak.

Fault Symptom:

Tuning peaks are irregular and rough.

Possible Causes and Solutions:

- ⚙️ The ion source is contaminated.
Solution: Clean the ion source with methanol and acetone using ultrasonic cleaning for 15 minutes each.
- ⚙️ Filament aging.
Solution: Replace the filament.
- ⚙️ The mass spectrometer is not optimally tuned.
Solution: Retune the mass spectrometer.

Fault Symptom:

Peaks at m/z 18, 28, and 32 are greater than 10% of the helium peak at m/z 4.

Possible Causes and Solutions:

- ⚙️ Air leakage.
Solution: Perform leak detection and check the connection of the column.
- ⚙️ The helium supply is nearly exhausted, leading to impurity buildup in the gas cylinder.
Solution: Replace the carrier gas cylinder and install a degassing device.
- ⚙️ The newly cleaned ion source has not been dried.
Solution: Bake the ion source at 250°C.
- ⚙️ The column is contaminated.
Solution: Age the column.

Fault Symptom:

No ions are generated even though the filament is in good condition.

Possible Causes and Solutions:

- ⚙️ The ion source needs recalibration.
Solution: Recalibrate the ion source using a calibration tool.
- ⚙️ Severe air leakage.
Solution: Detect the leak and tighten the connections.

Fault Symptom:

High-mass peaks at m/z 502 and 614 do not appear during tuning.

Possible Causes and Solutions:

- ⚙️ The pre-quadrupole rod is short-circuited.
Solution: Remove the pre-quadrupole rod and dry it with helium or nitrogen.