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OPERATING INSTRUCTIONS

after Betriebssicherheitsverordnung

UNIVERSITÄT DUISBURG ESSEN
Offen im Denken
Fakulty of Chemistry

Institute: AAC | Work place: AAC Labs | Activity: Laboratory work

EQUIPMENT

Agilent ICP-MS 7500 CE

DANGERS FOR HUMANS AND ENVIRNOMENT

- By high-frequency alternating electric fields.
- Due to hot surfaces.
- By suffocating gases (Argon).
- • Acids, solvents.
- UV radiation of the plasma.

PROTECTIVE MEASURES AND RULES OF CONDUCT

Do not remove the front or back cover of the device. High voltages and high-frequency radiation of the RF power supply unit can endanger you.
Connect the Agilent 7500 to a grounded electrical outlet, otherwise there is a risk of electric shock. Furthermore, the protective conductor must not be interrupted inside or outside the device.

The exhaust gases of the plasma and the vacuum system must be discharged through the exhaust ventilation system. Inadequate exhaust air may cause gaseous substances, pump fluid, ozone and other toxic combustion products to accumulate in the laboratory.

The ventilation slots of the Agilent 7500 must never be masked during operation.

Make sure that the power switch on the back of the unit is OFF when the unit is moved. Please note in addition that all cables have been disconnected between other components and the supply cables are no longer connected. For a small movement of the device, the cables and lines do not necessarily have to be disconnected.

The Agilent 7500 weighs just over 175 kg, which means it has to be lifted by more than four people, or better, a mechanical lift. It is always important to pay attention to the safety of the persons involved.

During installation or after transporting the device, it must be checked for leaks using a suitable device.

Handle fragile glass components with care. Do not over-tighten nuts and staples as the glass may burst if the pressure is too high.

If you have a pacemaker or similar implanted device, consult your physician before using this device. ICP-MS may interfere with the function of cardiac pacemakers.

Never open the front door while the unit is in operation. Never look directly into the plasma, as this may result in eye damage or blindness. Although the device is equipped with a UV-blocking safety window, it is recommended to wear laboratory safety glasses made of UV-blocking glass.

The goggles also protect against liquids. Always wear safety goggles when handling samples, servicing equipment or emptying the waste container.
Dry liquid leaks with a dry cloth and repair large leaks. Follow the safety instructions in the safety data sheet.

Before you start a cleaning or decontamination procedure that is not specified by Agilent, contact Agilent to confirm that this method is appropriate for your device.

Close all covers before switching on the device.Check the ventilation system for its function via the discharge pipe and the drain.

Wait for the unit to cool down before performing any maintenance. Wait at least 10 minutes after shutting off the plasma before touching the Torchbox and surrounding parts. Attach the Torchbox Cover after servicing.

Check the condition of the cables and replace them if necessary.

The centrifugal pump constantly separates out oil mist, even if the device is not in analysis mode. Make sure that the ventilation system is always in operation. Likewise, hydrogen can escape from the Collision Cell into the air, which is why the ventilation system should also be switched on in standby mode.

Make sure the ventilation system is always working effectively. The exhaust system for the Agilent 7500 must have a capacity of 7-8 m^3 / min. Do not start the plasma before making sure that these exhaust air values are available.

Make sure that the spray chamber is well sealed by the O-ring, otherwise organic solvents may leak and constitute a potential fire hazard.

If you want to replace the hoses of the pumps, stop the pump before removing it. Rinse the tubing with water if fluid has accumulated in it. Before opening the vacuum chamber, the device should be switched off. Otherwise there is a risk of being exposed to high voltages.

If you add an additive to the coolant to help prevent freezing, do not use more than 10% by volume. It reduces cooling efficiency and could overheat parts of the Agilent 7500.

If there is any uncertainty about a particular fluid, it should not be used until the manufacturer confirms that the fluid is not hazardous.

Check the acid concentration. Continuous aspiration of highly concentrated acids can attack the interior of the instrument. Refer to the Agilent 7500 Series ICP-MS Tuning & Application Manual for more details on acid concentrations.

Handle solvents with care. Prepare samples and transfer acids only in fume cupboards with adequate air extraction.

Wear gloves when working with acids and solvents.

Use solvents such as methanol and acetone only in well-ventilated rooms.

Wear goggles when working with liquids in general.

Seal volatile samples to minimize leakage and potential explosion hazards.

Repair leaks immediately. If there is a leak inside the unit, you must immediately contact the Customer Service Contact Center.

Use peristaltic pumps that are compatible with the solvent used, as otherwise corrosion may occur.

The oil of the centrifugal pump is flammable and should be kept away from fire.

If the skin, mouth or eyes are contaminated with pump oil, you should immediately wash the affected area with plenty of water and consult a doctor. Likewise, the pump oil may be hot and cause burns.

Hydrofluoric acid or other solvents that remain in the spray chamber can be dangerous if they come into contact with the skin or run on the tray. Before removing the spray chamber from the cooler, wash it with pure water at high flow rate and ventilate the chamber for 1-2 minutes.

The waste container contains the waste water of the spray chamber, which can be toxic. Improper use of the waste container can result in an explosion or fire if combustible substances are in the waste. Corrosion of the container and the connection can lead to leaks and damage the instrument and injure the user. If the waste container contains toxic substances, follow the accepted laboratory procedures for the safe disposal of hazardous waste.

Make sure that the waste container is well vented (for example, through a fume cupboard) to prevent the gases from entering the laboratory.
Clean the waste container with water each time you empty it. If the waste container contains organic solvents, clean it with acetone and allow the container to dry well.

If using organic solvents, use a sufficient size of the waste container of suitable resistant material. Use plastic waste containers with lids, never glass containers. Place the waste container so that the liquid level is easy to read. Empty the waste container regularly before igniting the plasma. Also, empty the container when changing from aqueous to organic solvents.

Connect the spray chamber tightly via the peristaltic pump via the waste hose to the waste container. Never bend the hose.

Check the waste container regularly for wear. If the hoses become brittle and cracked, replace them. Organic solvents cause greater wear than aqueous solvents.

Do not use methanol or acetone to clean the lenses, as this can cause a fire hazard in an ultrasonic bath.

Secure the cylinder valve caps and move the cylinders only with an approved handcart.

Protect a gas cylinder that is stored outside against the sun. Place the bottle on a surface above the ground.

Attach the argon hoses firmly to the unit and to the gas source. Turn the hoses so that they can not be damaged or crushed. Check for leaks by using soap solution or an electronic leakage detector.

Provide adequate ventilation around the gas cylinder, especially if stored in a small room.

Hydrogen is flammable over a wide range of concentration. At atmospheric pressure, hydrogen in air is between 4% and 75% flammable.

Hydrogen has the highest flammability of all gases and requires a very low ignition energy. Hydrogen burns with an invisible flame and is therefore often invisible in daylight.

The ICP-MS can switch itself off due to internal or external interference. When the ICP-MS shuts down, there may still be hydrogen in the vacuum system. Therefore, hydrogen can slowly accumulate in the vacuum pump tubes and be led through the centrifugal pump oil mist filters into the vent. Make sure that the hood is constantly in operation.

Turn off the hydrogen gas supply if there is a power failure.

First turn off the hydrogen flow at its source before opening the vent valve or otherwise allowing ambient air to flow into the ICP-MS.

A power failure is the most common cause of hydrogen accumulation in the ICP-MS.

RESPONSE TO MALFUNCTIONS

Shut down device immediately, faults must be reported to:

Maria Madani.

BEHAVIOR IN CASE OF ACCIDENT / FIRST AID

- Keep calm.
- Call first responders.
- Emergency call: 0112
- Report report every accident prompt.

MAINTENANCE / DISPOSAL

- Maintenance only by authorized, competent persons.
- Switch off the device and disconnect it from the mains.
- Regular inspection of wearing parts.