

# Amendments to the ICP-MS Hardware Manual (12/2006)

## Section 1

No amendments at this point

## Section 2

### Instrument Specifications

- note the room temperature and relative humidity values listed in the manual (page 2-22)
- since the instrument is cooled with a recirculator, not a chiller, during periods of hot, humid weather, the instrument may run hot and will shut itself down to avoid damage caused by overheating
- if this happens, monitor the temperature in the lab and decrease it if possible; if the temperature is fixed, wait for cooler weather before running the instrument again

### DRC Gas Specifications

- note that the DRC-e was designed to be used with methane
- if another gas (such as ammonia) is desired, a getter must first be purchased and installed which purifies the ammonia as it's introduced into the reaction cell
- as 12/31/2006, a getter has not been purchased for this instrument

## Section 3

No amendments at this point

## Section 4

### Peristaltic Pump and Drain

- aside from checking the tubing for flat spots and replacing when necessary, it's also important to optimize the tightness of the pump clamps to maximize the life of the tubing
- since the nebulizer will free aspirate (i.e. suck solution through the tubing, even when the peristaltic pump is off), turn off the plasma before doing this
- with the plasma off, clamp the tubing onto the peristaltic pump and loosen the clamp screws as far as you can
- turn the pump on and slowly tighten the clamp screws until solution moves smoothly through the sample and the drain tubing
- re-ignite the plasma and re-check the flow of solution

### Mechanical Pump Maintenance

- when changing the pump oil, use Varian pump oil (part no. N8122308) for both pumps; any other pump oil may not have the correct viscosity!
- when refilling the roughing pump with oil, fill to the top arrow (i.e. to  $\frac{3}{4}$  below the top of the glass window)

## Cleaning the Lens

- follow the instructions in the manual for shutting down the instrument and removing the lens
- once the lens is removed, the photon stop will be visible (thin circular metal piece that looks similar to the end of the lens)
- remove the photon stop and swab with 100% methanol (handle very carefully and with gloved hands!)
- soak another swab in 100% methanol and wipe the aperture (small hole inside the lens cavity, opposite from where the photon stop was removed)
- use a toothbrush and Soft Scrub to scrub the inside of the lens
- rinse well with water
- sonicate in a solution of 100% methanol for ~5 mins. to remove any excess soap
- use Kimwipes to VERY THOROUGHLY dry the outside and inside of the lens
- once the photon stop and lens have been reinstalled, run a lens voltage optimization and re-calibration the AutoLens
- if the cones and torch assembly weren't touched, you shouldn't need to do an XY adjustment or optimize the neb. flow

## Troubleshooting Section

### Comm. Error

- If there's a "Comm. Error" in the Instrument window, it's possible that the GPIB manager isn't communicating with the ELAN software
- Manually shut down the vacuum, turn off the computer, press the system reset button on the side of the instrument, press this button again, restart the computer, open the ELAN software and turn the vacuum back on

### Sensitivity Problem

There are many possible reasons for loss of sensitivity; here are a few suggestions that might be helpful:

- check to make sure the torch is pushed all the way onto the torch adapter. If it doesn't make good contact with the bottom o-ring, the oxides will increase
- check all gas connections to the torch; make sure they're put on correctly and that they're tight; make sure the Teflon tubing isn't resting against anything hot inside the torchbox
- if the gas connections are tight, remove them and inspect the Teflon tubing and screws for holes or tears; holes will increase the oxides
- make sure the bayonet mount is screwed all the way in (bayonet mount is the big silver thing that detaches from the ICP-MS once the spray chamber has been removed; it contains the torch, the torch support, etc.); this can be hard to screw down all the way; USE 2 HANDS!
- check the torch depth/spacing (with the black torch alignment tool)
- check the load coil spacing (i.e. the spacing between the RF coils); use the black thing the load coil came on to do this