Operating Instructions for the Thermal Evaporator

Pump Down:

Make sure that the vacuum pump is running, power to equipment is on and there is sufficient pressure of compressed air reaching the instrument.

l) Check and Load Chamber

   a. Check filament integrity, change if necessary. USE ONLY ALUMINA-COATED TUNGSTEN WIRE CONICAL BASKET FILAMENTS.

   b. Fasten crucible to electrodes – one leg to each electrode.

   c. Check substrates and that filament can be seen when bell jar on baseplate. Fasten substrates to heat sink.

   d. Load material into crucible. See Fig. 2

   e. Make sure that the baseplate and bell jar are covered inside with aluminum foil to minimize the coating on the chamber apparatus by the evaporated metal.

2) Place bell jar.

   a. Center bell jar on platen - insure an approximately equal distance between sides of the bell jar seal and the edge of the chamber base plate.

3) Pump Down Chamber –

   a. Press the PWR button on the Varian 843 ion gauge controller.
   b. Switch PUMPDOWN/SEAL/VENT switch to PUMPDOWN (upper left switch, up position) See Fig. 1
   c. Wait for TC1 pressure to reach 50m Torr on the Varian 843 ion gauge controller.
   d. Turn on the TCP310 turbomolecular pump controller.
   e. Wait for pump speed to reach maximum.

4) Press "ON" switch on the Varian 843 ion gauge controller and check that the ion gauge is ON and the “EM” switch light is on as well.*

5) Set ion gauge controller range to LOG.

6) Wait until chamber pressure is 5x10-6 Torr.

* Turn off ion gauge power if leaving chamber pump down for an extended time e.g. overnight or longer

Deposition:

1) Assure that the rightmost rheostat is set to 0.
2) Turn on power to rheostat (use the rheostat on the right)
3) Warm the filament by slowly increasing power. The filament should begin turning orange.
4) Increase the voltage slowly until the pointer reaches the number corresponding to the desired power for the evaporation material used.
5) Observe the filament and wait for the filament to reach the maximum temperature.
6) Leave the rheostat at a desired setting until all the material in the crucible is evaporated.
7) Slowly decrease the power setting until the rheostat power setting is 0 and the filament no longer glows.
8) Turn rheostat power off.

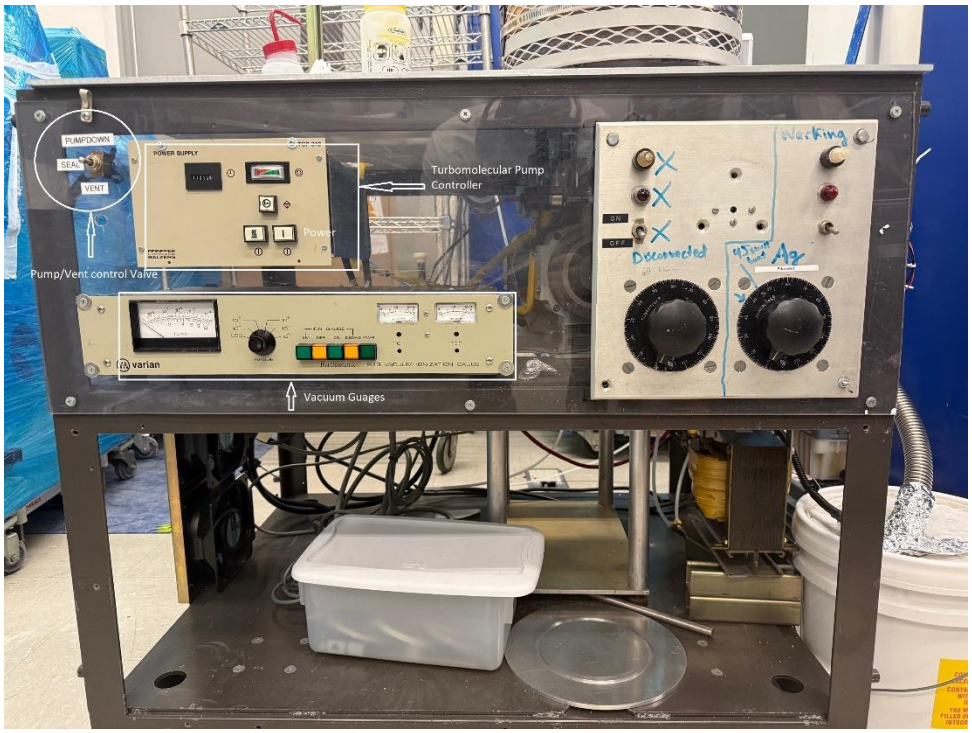

Figure 1 Thermal PVD Front View Control Location

Figure 2 Alumina-coated Tungsten Wire Crucible

Vent System to Atmosphere:

1. Turn off the ion gauge by pressing the "OFF" button on the Varian controller.
2. Turn off TCP turbomolecular pump control. Switch light will dim.
3. Wait until the switch light goes out.
4. Momentarily flip PUMPDOWN/SEAL/VENT switch to VENT then to SEAL to allow some air to slow pump turbine.
5. Wait 10 minutes for the pump to decrease speed.
6. Flip PUMPDOWN/SEAL/VENT switch to VENT
7. Allow 5 min for the chamber to fully vent.
8. Flip PUMPDOWN/SEAL/VENT switch to SEAL
9. Remove bell jar from base plate.