CPA
RF Sputtering
Users Guide
Eric Sundholm
8-23-2007

Standby Condition: be sure that the tool is in this state before and after you use it.

1. Cooling Water – ON (Both to the RF power supply/sputter guns, and to the Diffusion pump)
2. Compressed air - ON
3. RF Power Supply – ON (but NO RF power being delivered, DC to supply only)
4. Gas Cylinders – OFF
5. Both sets (large and small) gas switches – OFF
6. Swage-lok Gas Valve – Closed
7. Pump mode – High Vac
8. Ion Gauge (EMIS) - ON
9. Load Lock Pump is Unplugged
10. Load Lock Rough Valve – Neutral (Closed)
11. Gate Valve - Closed

TC1 = load lock
TC2 = foreline
Startup:

Note: if the RF power supply has been switched off (i.e. power outage) then it needs to warm up for at least 30min prior to use.

1. Plug in cord to load lock pump
2. Record base pressure read on Ion gauge
3. Fill cold trap with liquid nitrogen (LN2) (paying attention to when the pressure needs releasing or liquid added)
4. Read base pressure after LN2 was added

*Report above readings in log book

5. Gas Cylinder(s) – Open
6. Switch large gas switches on (back of tool, opposite gas cylinders)
7. Zero the Cap-Man gauge (located lower right of the tool’s front, use small pocket screwdriver)

Load Substrates:

1. Switch load lock pump to Vent
2. Once door opens, switch load lock pump in Neutral
3. Load substrates on trolley
4. Switch load lock pump to Rough
5. Pump down load lock to ~50 mTorr

*Leave load lock pump in rough until noted later...

6. Turn off the Ion Gauge
7. Back off the throttle valve micrometer out of the way so that the throttle valve does not slam into it.

*This should have been done during shutdown from the last run, but double check it

8. Change pump mode to Throttle
9. Switch gauge display to foreline (TC2)
10. Switch on Argon gas (small switch)

*This gas will be used to raise chamber pressure above that of the load lock for clean transition of the substrates to the main chamber

11. Open Swage-loc gas valve
12. Switch pump mode to Standby
13. Watch Cap-Man gauge and shut off gas at the Swage-loc and also the small switch when pressure is above load lock pressure
14. Open gate valve
15. Quickly run substrates in on trolley (so that the trolley hopefully jumps the gap to the next set of tracks)
16. Continue moving substrates using other track until substrates are in front of the unused gun (gun NOT in use for this run)
17. Close the gate valve
18. Switch the load lock pump to neutral
19. Make sure that the shutter is closed over the gun IN USE
20. Make sure that the Cap-Man gauge reads below 100 mTorr (if higher switch pump mode to rough until Cap-Man gauge is below 100 mTorr)
21. Change pump mode to High Vac
22. Wait until Cap-Man gauge zeros again and switch on Ion Gauge
23. Continue pumping until chamber pressure is $5 \times 10^{-6}$ Torr

Run Deposition:

1. Change pump mode to Throttle
2. Switch on both Argon and Oxygen (small switches)

*Both gases (Ar and O$_2$) should be on at this time

3. Open Swage-lok gas valve
4. Adjust throttle micrometer to read 5 mTorr
5. Check to make sure correct gun is connected to RF matching network, and that the RF power is turned down
6. Switch on RF power

*RF power should be at 50 watts and a plasma glow discharge should be seen

7. Increase RF power by "10" on the dial every two minutes until desired power in watts is reached
8. Pre-sputter for desired time ~10 min, regular lamp fired, saw atm.
9. Open shutter and move substrates into glow discharge
10. Deposit thin film for desired time/thickness

*Deposition now complete...

End run:

1. Move substrates out of glow discharge and back in front of unused gun
2. Close shutter
3. Decrease RF power by "10" on the dial every two minutes until 50 watts is reached
4. Switch off RF power
5. Switch off Oxygen gas (small switch)
6. Switch load lock pump to Rough
7. Pump down load lock to ~50 mTorr
8. Back off the throttle valve micrometer out of the way so that the throttle valve does not slam into it.
9. Switch pump mode to Standby
10. Watch Cap-Man gauge and shut off gas at the Swage-lok and small switch (Argon) when pressure is above load lock pressure
11. Open gate valve
12. Quickly run substrates in on trolley (so that the trolley hopefully jumps the gap to the next set of tracks)
13. Continue moving substrates using other track until substrates are in front of the load lock door
14. Close the gate valve
15. Switch the load lock pump to neutral
16. Make sure Cap-Man gauge reads less than 100 mTorr (if higher switch pump mode to rough until Cap-Man gauge is below 100 mTorr)
17. Change pump mode to High Vac
18. Wait until Cap-Man gauge zeros again and switch on Ion Gauge

Remove Substrates:
1. Switch load lock pump to Vent
2. Once door opens, switch load lock pump in Neutral
3. Remove substrates
4. Place trolley back into load lock
5. Switch load lock pump to Rough
6. Pump down load lock to ~50 mTorr
7. Switch load lock pump to Neutral

*If more processing is desired move to “load substrates”, or if finished move to “shutdown”

Shutdown:
1. Switch all gases off (both switches)
2. Shut off gas cylinders
3. Double check status of tool matches front page of this document
CPA TLC

☑ 15 minute presputter (Brian)
☑ Start 10 minute run (Brian)
☐ End 10 minute run (Daniel)

1. Move substrate trolley in front of other gun
2. Ramp down power by 10 on the dial every 2 min.
3. Turn off power when dial reads 60 (sow)
4. Turn off Ar & O₂ MFC switches
5. Close gas line valve into chamber
6. Back micrometer throttle control all the way out
7. Switch to hi-vac
8. Leave in this state

☐ Thanks!