

## Warning

After checking if the following conditions are satisfied only, one should enter the lab to start the system: -

1. The water lines should be ON.
2. The Oxygen and CHF<sub>3</sub> cylinder should have pressure of 2bar.
3. The AHU in the lab is working → There is no condensation of water along water lines going into the system.
4. Make sure that the processes you want to run are contamination protocol compliant.
5. Always keep chamber in vacuum condition.
6. Maximum Process time: 10minute
7. One can execute 10 min cycles with a 10 min gap.
8. Maximum 100Watt RF supply can be used.
9. Maximum 0.2mbar pressure should be kept during process if more pressure is required please take prior permission from process committee.
10. Should provide complete Sample history (fill in online equipment usage request module).
11. Logbook must be filled.
12. Any failure runs and equipment malfunction must report to SO/process committee.

## SOP

- Initially vent the chamber.
- Clean chamber from inside with IPA.
- Keep your substrate inside.
- Check gate valve is 100% closed.
- Switch on the all switch and start the rotary pump.
- Wait for 2-3 minute as gas line vent.
- Open the gate valve 100% position.

- Open the valve between MFC & Chamber.
- Wait till the pressure reaches 0.2 mbar check by using pirani gauge.
- Start the turbo controller back switch and wait till

#### Program initialization

- Start the turbo pump. Wait till the speed reaches 990Hz
- Check vacuum by using penning gauge and wait till it reaches  $3.5 \times 10^{-4}$  mbar.
- Close gate valve to 90%.
- Check your switch of MFC controller is in CLOSED position.
- Set the value of your required gas using MFC Controller. Then open the both butterfly keys of your required gas like O<sub>2</sub> and CHF<sub>3</sub>. & keep MFC controller switch in center (OPEN) position
- Switch on the RF generator and then set require power with rotator knob.
- Switch on the RF power.
- Set Gas pressure to strike plasma to 0.1mbar.
- As plasma strike check reflected power is in single digit or larger if it is more than 10 than set the reflected power to single digit using matching network and do the process for your require time.
- As require time over switch off RF power and set value of power to zero.
- Switch off RF generator
- Then close the both butterfly keys of your required gas like O<sub>2</sub> and CHF<sub>3</sub>. & keep MFC controller switch in close position
- Wait for 2 minutes and close gate valve to 100% position.
- Switch off the turbo pump and wait as the speed will drop from 990Hz to 750Hz.
- As it reaches 750Hz then switch off rotary pump. Wait till the process chamber is fully vented (turbo pump speed is at 0Hz).
- Switch off turbo controller power.
- Take out your sample and close the process chamber.
- Switch on rotary pump and take a vacuum up to 0.1mbar by looking at pirani gauge. Follow step 5, 6, 7 to get vacuum.
- Close gate valve to 100% position.
- Switch off rotary pump.
- Switch off all switches.

**Na<sup>+</sup> and K<sup>+</sup> are not allowed And for outside/ NCPRE/ Org electronics lab samples, contact SO/ Process engineer.**