

Plasma Enhanced Chemical Vapor Deposition (PECVD) System

When you first arrive at the machine, it should be in standby mode. That is, the chamber will be under vacuum and the turbo pump may or may not be in standby mode.

Background

Pumps

The system has two vacuum pumps attached to it. The **roughing pump** can reduce the vacuum pressure in the chamber to ~200 mTorr. To get smaller pressures (less than ~200 mTorr) you have to use the **turbo pump** in conjunction with the roughing pump. Our processes almost always require pressures less than 200 mTorr.

Valve toggle switches

A schematic diagram of all valves for the system is present on the top panel (panel A).

Switch UP = OPEN = ON

Switch DOWN = CLOSED = OFF

Important points

The GATE and ROUGHING VALVES should never be open at the same time.

Procedure

A. Venting the chamber

- 1) If the STBY light (panel H) is lit, press the button to disengage standby mode. The needle in the gauge above the button should move to the right. **If not, contact Stefan Ufer.** If the needle moves to the left, the turbo pump is being flooded with air and will soon shut down.
- 2) Close GATE VALVE (panel A). If you do not hear a hissing noise, open GATE VALVE and close again. You may need to do this a few times. If you do not hear a hissing, contact Stefan Ufer.
- 3) Turn off the ion gauge (IG, panel F) by pressing the IG1 button. The ion gauge measures very low pressures in the chamber.
- 4) Close BARATRON VALVE (panel A).
- 5) Turn CHAMBER VENT (panel A) on. You should see the pressure increasing in readout A (panel F).
- 6) Wait until pressure on readout A (panel F) is 7.6 +2 (760 Torr). If you go to step 7 before the pressure is at atmosphere, you risk ruining the chamber hoist motor.
- 7) Turn off the CHAMBER VENT VALVE so nitrogen won't be pumped into the chamber while you have it open.
- 8) Lower chamber bottom with the beige control panel (hanging near the chamber). Use the down arrow to lower the chamber bottom ~5 in.

B. Pumping the chamber down

- 1) Place your samples directly on the chamber bottom.
- 2) Raise the chamber bottom with the beige control panel (up arrow). Gently guide the chamber bottom by slightly lifting up on the front. Release the up arrow once the bottom is in close proximity with the chamber.
- 3) Close FORELINE VALVE (panel A) and wait until hissing is gone.
- 4) Open ROUGHING VALVE (panel A). The pressure on readout A (panel F) should start to decrease. If the pressure on readout B starts to increase, close ROUGHING VALVE and open FORELINE VALVE (panel F). Contact Stefan Ufer.
- 5) When readout A (panel F) reads 2.0 -1 (200 mTorr), close ROUGHING VALVE (panel A), open FORELINE VALVE (panel A), and open GATE VALVE (panel A).
- 6) Open BARATRON VALVE (panel A). Turn on IG (panel F) by pressing the IG1 button.

C. Introducing O₂ into the chamber

- 1) Push the up arrow (panel C) a few times until screen (panel C) becomes visible.
- 2) Push 2 - extended display mode.
- 3) Turn on O₂ valve (panel A). The IG1 readout will go blank; this is OK.
- 4) Press ON 1 ON 0/ALL (panel C).
- 5) Watch pressure on red LED readout (panel B). Turn knob next to readout 2 clicks clockwise, from OPEN to AUTO (panel B). This knob controls the baffle valve which in turn controls the introduction of O₂ into the chamber. The display should read 50 mTorr.

D. Run plasma

- 1) Turn on POWER (panel D).
- 2) Turn on RF (panel D).
- 3) Turn POWER LEVEL (panel D) clockwise until needle indicator on top of chamber points to 100 W. Note, this will be half way between 0 and 20, since the values on the dial should be $\times 5$. If the bottom needle is not near 0, contact Stefan Ufer.
- 4) Start timer. Start with 20 s and adjust as needed for bonding the PDMS to glass.
- 5) Turn POWER LEVEL (panel D) counter-clockwise once desired amount of time has passed.
- 6) Turn off RF (panel D).
- 7) Turn off POWER (panel D).

E. Turning off the O₂ supply

- 1) Turn knob next to readout (panel B) two clicks counter clockwise from AUTO to OPEN.
- 2) Press OFF 1 OFF 0/ALL (panel C).
- 3) Close O₂ valve (panel A).
- 4) Hit ESC and then the down arrow multiple times to dim the screen.

F. Finishing up

- 1) Vent the chamber and remove your samples.
- 2) If you are the last person for the day using the PECVD, be sure to pump the chamber down and leave in standby mode (by pressing the STBY button once you've complete the steps in section B).

Last updated 1/3/05
Prepared for the Tiny Biotools Lab

Change log