

## Plasma Enhanced Chemical Vapor Deposition (PECVD) Operational Procedures

Revised 08/16/2001

- 1) Log in and record your procedure in the logbook.
- 2) Turn on Cool-flow recirculator. (2 toggle switches, and push start button)
- 3) Check the float in the N<sub>2</sub> tank in the outside corridor to be sure there's N<sub>2</sub> left and then open the valves on the large N<sub>2</sub> tank.
- 4) Plug in the white pump filter. This pumps the oil through three paper filters and activated alumina particles into the black pump. The black pump should not be turned on at this point.
- 5) Open the pure N<sub>2</sub> and O<sub>2</sub> valves (2 valves for each tank). These are the smaller tanks to the right of the silane tank
- 6) Open right most silver valve on wall, just left of "Semi-Group Inc" RIE machine
- 7) Switch on vacuum pump with the first white lever in the back of the PECVD system.
- 8) Check if silane line is under vacuum
- 9) Push and hold "manual" and press "rough" for roughing pump
- 10) Wait for the system to pump on down
- 11) If you push and hold the "read" button, then any of the other buttons, you can read the set point for each parameter. You can change the set point by pressing "set" and then using the keypad to adjust the settings.
- 12) Press "manual" and "gas 4" (which is the dilute silane). That sets the gas, and actually pumps out the line
- 13) When the gas flow is about 2, open the line on the wall with the "dilute silane" knob. The gas flow jumps back up.
- 14) Now we're pumping all the way to the valve opposite the regulator.  
NOTE: Do not go above a flow rate of 30% flow for the dilute silane.
- 15) Wait for the pressure to drop again
- 16) Turn off gas 4 by pressing "manual" & "gas 4". If the indicator light is on, then the gas has not been shut off.
- 17) Press "manual" & "gas 4"
- 18) Turn on the O<sub>2</sub> valve on wall.
- 19) Press "manual" "gas 3"
- 20) Turn off the roughing pump by pressing "manual rough"; there should be a slight hissing sound.
- 21) Press "manual vent". This lets N<sub>2</sub> into the chamber in order to vent it.
- 22) Open the chamber by pressing "manual hoist up"
- 23) Use methanol soaked paper to clean the top and bottom plates
- 24) Center the substrate in the middle of the bottom plate
- 25) Press "manual hoist down"
- 26) Now press manual rough" to start the roughing pump

- 27) Press "set timer"
- 28) Adjust the timer for the appropriate time interval (7.5 minutes is a good time).
- 29) Press "run". (This does not start the deposition yet.)
- 30) The machine will not make it up to 250C by the time the timer runs out. So press the "modify memory" key "set heater temp" and set it to 300C. This gives a faster ramp, which allows it to get up to the correct temperature of 250C in the time allowed. Keep checking the temperature to be sure it does not overheat. When you get to 250C, switch the set point back to 250C.
- 31) Now the processing begins. The machine lets the gases in and adjusts the pressure, and it turns on the plasma.
- 32) When you're finished with a run:
  - i. Turn off the roughing pump (roughing pump = vacuum pump)
  - ii. Turn off N<sub>2</sub>
  - iii. Turn off cooling recirculator (2 switches)
  - iv. Close off pure N<sub>2</sub> and O<sub>2</sub>
  - v. Turn of impure N<sub>2</sub>