PlasmaEtch PE-50 Standard Operating Procedure

NYU Tandon School of Engineering Nanofabrication Facility
Figure 1: PlasmaEtch PE-50

- Plasma Process Indicator
- Plasma Chamber
- Process Gas Valves
- Control Panel

Figure 2: PlasmaEtch PE-50 Control Panel

- "Up," "Left," "Right," "Down" Arrow Keys
- "Enter" Key
1. Startup
   a. Enable tool in Badger Software. Enabling tool will allow process gases to flow.

2. Command Entry (See Fig. 2)
   a. Press “Enter” key to initialize power
   b. Press “Enter” key again to go into the commands menu
   c. Pushing the “left” or “right” arrow key from the “Commands” menu will take you to the “set-up” menu. Press the “Enter” key to access the settings. System timers and other set-up parameters are entered in this area
   d. Use the “left” and “right” arrow keys to find a menu item within a menu area. Use the “up” arrow key to go to a previous menu area. Use the “enter” key to select a menu item.

3. Tool Operation Settings
   a. Plasma Time: 00:00 to 59:59; set time then press “enter”
   b. Vacuum Set Point: 1.0 to 1000.0 mTorr – Vacuum level set point required before gases are introduced into the chamber. Set the value then press “enter”
   c. Atmospheric Vent: 0-59.59 minutes – Time allowed for chamber to vent to atmosphere when “CYCLE STOP” is initiated. Set value then press “enter”
   d. Purge Vent: 0-59 seconds – Time allowed for purge air to be introduced in the chamber at the completion of a cycle. Set value then press “enter”
e. Gas Stability: 0-59 seconds – Delay before RF Power is applied after process gases are on. Set value then press “enter”

f. Vacuum Alarm: 0-59.59 minutes – Amount of time required to pump the system down to vacuum set point before initiating an alarm. Set value, then press “enter”

4. Tool Operation
a. After the last operation setting has been input, press the “up” key to go to the setup menu
b. Press the “left” or “right” key(s) to cycle through the different menus, until “commands” menu is reached
c. Press the “Enter” key to access the “Commands” menu.
d. Select the “Plasma” command.
e. Load the material to be processed. Close the chamber door.
f. Run a 15-minute warm up cycle to allow the system to stabilize before processing material.
g. Actuate the “Enter” key to start the cycle. The vacuum pump will start, and the chamber vacuum reading will be displayed.
h. The vacuum chamber will pump down to set point, process gases will enter the chamber.

5. Run process
a. The vacuum chamber will pump down to set point, process gases will enter the chamber.
b. The process gases entering the chamber will become stabilized
c. RF power will be applied to the process gases, creating a plasma. The plasma process timer will start. The plasma process indicator will light up to signal that the plasma process is occurring (See Fig. 1)

6. Process complete
   a. Process timer stops, plasma process indicator light turns off
   b. RF power is turned off
   c. Plasma glow is extinguished
   d. Process gas valves are turned off
   e. Vacuum pump is turned off
   f. Chamber vent valve is opened for time set in “Purge Timer”.
   g. Chamber is pumped down to vacuum set point in “Vacuum Set” parameter
   h. After the vacuum set point is reached, the process is complete
   i. The “Plasma Cycle Complete” message will be displayed in the system status area
   j. The vacuum chamber will be vented according to the time programmed in the “Atmospheric Vent” timer setting in the set-up menu.
   k. Remove sample from tool and log off tool from Badger system.