

University of Minnesota Nano Fabrication Center

Standard Operating Procedure

5 Definitions

Process chamber: The top lid area that contains the gases and where the samples are placed.

Computer: The computer that controls the chamber opening and closing, recipe selection, and etch starting and stopping.

Blue Chamber Lift Buttons: These buttons need to be pressed both at the same time to operate the lid to open and close.

EMO: Press this if there the system is acting in a dangerous manner, as in liquid is spraying out of the system or if there is electrical sparks or smoke coming from the system. Press the button inward and contact a NFC staff member.

Pump Status Display: The LCD display should have a green box in the lower right corner, if not contact a NFC person to solve the problem.

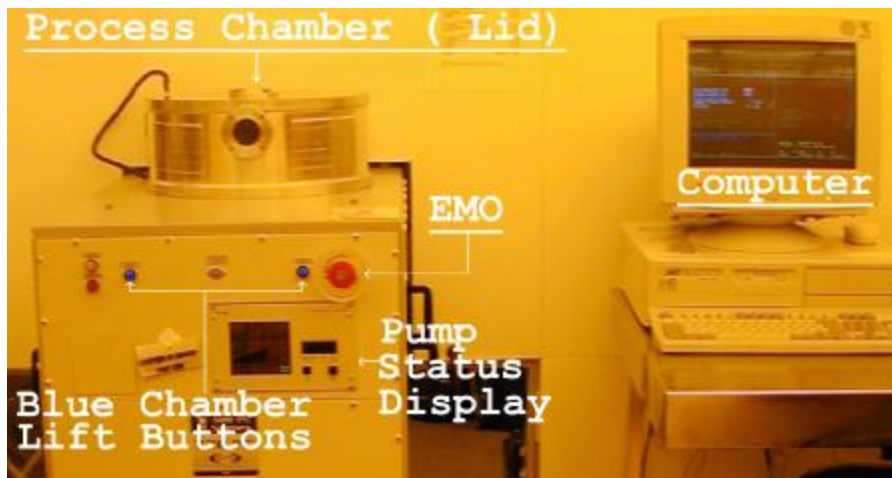


Photo 2: Location of key items of the STS etcher.

6 Operating Instructions

The instructions to run the system are easy; it only involves loading, unloading and selecting a process to run. The sequence for operation is listed below.

- Vent system
- Load samples
- Close lid
- Select recipe
- Etch samples
- Stop Etching
- Unload System

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VENT SYSTEM:

To VENT the system Press **F3** on the keyboard.

The screen will ask, **OPEN VENT VALVE ?** Press **F1** key to confirm venting.

The screen will now display, **Venting Chamber**. This takes about 30 Seconds.

The two buttons in front of the system will light up. Press and hold both buttons until the lid stops moving up and back.

LOAD SAMPLES:

Load your samples into the center of the gray platen area. This will give you better uniformity for the etching. The etch rate on the edge might not be as good as the center, but this depends on the etch recipe and the material being etched. Putting a clean glass slide next or several around your sample might help it from moving from the center. More than one sample or wafer can be loaded during the run. The etch rate does decrease as you add more material to etch. The decrease in etch rate could be from 5 to 25 % of a decrease.

CLOSE LID:

Once the samples are loaded, the chamber needs to be closed. Press the **F1** key again and press the two blue buttons and hold them until the lid is closed all the way down. HOLD the buttons two or three seconds longer after the chamber lid has stopped moving. This will make sure the lid is completely closed. Verify there is nothing the chamber lid will close down on when closed.

SELECT RECIPE:

The display on the screen will change and a list of recipes will appear. You can use the arrow keys or the Page Up or Page Down keys to scan for the correct recipe.

Once the correct recipe is hi-lighted press the **ENTER** or the **RETURN** key to select the recipe. This list of recipes can be brought up to re-select a recipe at a later time, it is called **NEW PROCESS**. While the recipe is being loaded from the computer the chamber pumps down. After the chamber is pumped down the display will change to the normal **TEXT** display screen.

ETCH SAMPLES:

At this time you can press **F1** to **ETCH** to start the etching recipe. Or **F2** to **NEW PROCESS** which will bring up the list of recipes that can be selected again, in case you wanted to select a different recipe. Press **F1** to start the etching. All recipes will run to the specified time (usually 30 – 60 minutes) or will need to be manually stopped.

STOP ETCHING:

When it is time to stop the etching, press the **F1** key labeled **ABORT** to end the etching. This is the only time that pressing **ABORT** is allowed, any other time will result in the system having an error.

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UNLOAD SYSTEM:

The etcher purges out the chamber when finished running a recipe. These four options are displayed: **F1 ETCH**, **F2 NEW PROCESS**, **F3 VENT**, **F4 EXIT**. The **F4** option is never used. Press the **F3** key to **VENT** the system to remove the samples. Close the lid and load another recipe or the **DEFAULT** recipe from the recipe list.

7 **Problems/Troubleshooting**

If the system happens to exit the program and ends at the DOS prompt, type the word **PROCESS** at the prompt and the system should return back to running the system software. You will have to reload in the recipe that you were using.

A problem that happens from time to time is that the two blue buttons do not light up after the **F3 VENT** option was selected. After about 2 minutes press the **F1** key and select the default recipe. This will have the system pumping down. Try again to VENT the system by pressing the **F3** key, doing this a second time seems to work.

A +24 VOLT error means that the pressure to the etcher is TOO low and it will not run until the supply pressure is high enough. This might a minutes to several hours. Contact a NFC person if this does not seam to change after a few minutes.

Another problem is that IF a person aborted a action while the timer was counting the system will error, the front pump display will have a red box showing the error. Contact a NFC personal to fix the problem. Pump status will have a red box on it.