

Intlvac Nanoquest Ion Mill Operation

1. Description

The Intlvac Nanoquest Ion Mill (see **Figure 1**) is used for non-chemical etching of thin films. To accomplish this, the chamber is first pumped down to low pressure of less than $5E-5$ torr and then back filled with Argon gas. The Argon is then ionized and accelerated by an electric field toward the substrate. This kinetically energized Ar atoms sputter and remove the film on the substrate. The tool also has a capability of depositing SiO₂ film to in-situ passivate and protect the etched surface.

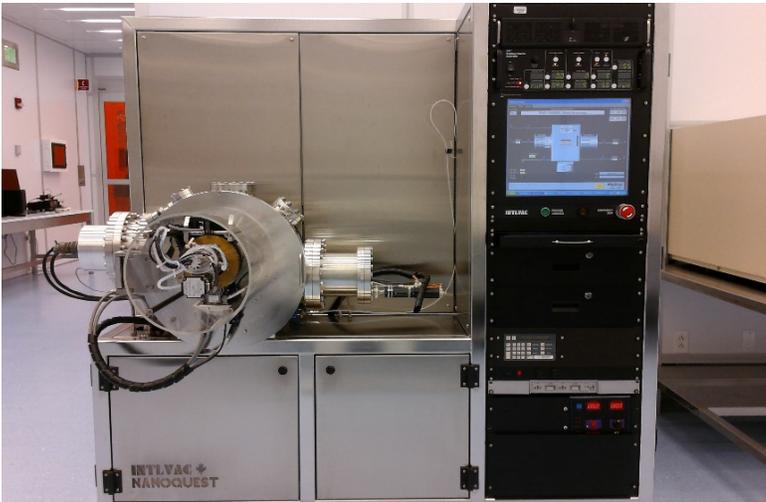


Figure 1 - The Intlvac Nanoquest Ion Mill Etching System

2. Operation

LOGGING/LOAD SAMPLE/PUMPDOWN

1. Go to **Chamber Tab** on the main chamber screen (Fig 2).
2. Click on **Log On** icon. Login with user name: “oper” without password.
3. Press **VENT** on **Chamber Tab** to vent the chamber.
4. Open door and set wafer (retaining ring need to secure wafer) or sample piece (tape needed to secure pieces) on the wafer stage.

Note: please pay extra attention to secure the sample piece on the stage to prevent pieces potentially falling into cryo pump.

5. Close door, seal the door by hands, and press **PUMP CHAMBER**.

Note: Chamber starts to pump after a few seconds delay. It takes approximately 10min to reach the cross-over pressure to open gate valve for cryo pump to pump the chamber to $5E-05$ torr or lower. System is ready to run a Profile (i.e recipe) at $5E-5$ Torr or lower.



Figure 2 - The chamber screen

START PROCESS

1. Go to **Profile Tab** on the main chamber screen (Fig 3).
2. Click on **Open...** icon on screen.
3. Choose profile you wish to process with. Users can change process time or stage angle (275 degrees is default) if they want to, but should leave other parameters alone. Note: Users logged in as the “oper” cannot save profiles (recipes).
4. Click **Upload** to upload the edited profile to the system microcontroller.
Note: If the edited profile is not uploaded, the process will be run using the original profile instead.
5. Go to **Chamber Tab**.
6. Verify chamber pressure is below 5E-5 torr. If it is, click on **Start Profile**.
7. Stage will start turning to the desired angle.
8. The ion source will start to warm-up for 01:30, the ion beam starts to warm-up for 01:30, and then etch starts.
9. When process is complete, the stage will automatically turn to 180 deg (sample unload position), the screen will prompt for **VENT**. Press **VENT CHAMBER** to start venting step.
10. When chamber is at atmosphere, open door, and remove wafer or pieces.



Figure 3 – The profile screen

PUMPDOWN CHAMBER

1. Close door, seal the door by hands, and press **PUMP CHAMBER**.
2. Do not leave until chamber is pumping down.
3. **Log off** ion mill.

Contact Paul Horng (x4827, horng@udel.edu) for assistance