AGS Reactive Ion Etcher Operating Instructions

This machine to be used by authorized personnel only. For training, questions, problems, consultation and troubleshooting contact Cleanroom Engineer or Lab Manager.

Reserve equipment and begin session in iLabs before using.

- 1) Make sure the Operate Screen is being displayed, see Fig.1
- 2) If needed, Log-in on the main page to get to the operating menu:
 - a. <u>Username</u>: Lab User, <u>Password</u>: labuser, see <u>Fig.2</u>
 - b. If you cannot access the operating menu, please contact an NMFC staff member for assistance.
- 3) On the operating menu, click the **Continue** button at the bottom of the screen to vent the chamber.
- 4) Wait for the chamber to vent to atmosphere and for the green <u>Unload</u> button to appear on the bottom of the screen. See <u>Fig.3</u>
- 5) Using both hands, press and hold the two green buttons on the chamber lid to raise it. See <u>Fig.4</u>
- 6) Raise the chamber until you have sufficient access to place your sample/wafer on the platen.
- 7) Make sure the quartz liner is sitting on the platen.
- 8) Place samples/wafers on the quartz liner. Samples cannot be greater than 0.5" in height.
- 9) Lower the lid by pressing and holding the two red buttons on the chamber top. Once the lid is lowered all the way, a green **Ready** button will appear on the bottom of the screen. See <u>Fig.5</u>
- 10) Using the mouse, click on and select a process recipe from the menu above the **Ready** button on the operating screen.
- 11) Click on the **Start** button on the bottom of the screen to start the recipe. The chamber will begin the pumpdown and process.
- 12) Upon process completion, the green **<u>U</u>nload** button should appear on the bottom of the screen. Using both hands, press and hold the two green buttons on the chamber lid to raise the lid.
- 13) Remove work from process chamber. Lower the lid by pressing and holding the two red buttons on the chamber top.
- 14) Select the HOLD recipe from the menu above the Ready button to place chamber under vacuum. You must always leave the chamber under vacuum when done using the tool.

| | | Baseline Recipes | | | | |
|--------------------|----------------|------------------|----------|------------|---------|--|
| Parameter | | Ashrate | Oxide_ER | Nitride_ER | Poly_ER | |
| O2 (sccm) | MFC1 (20 max) | 20 | 0 | 4 | 0 | |
| CF4 (sccm) | MFC2 (42 max) | 0 | 0 | 40 | 0 | |
| SF6 (sccm) | MFC3 (26 max) | 0 | 0 | 0 | 20 | |
| Ar (sccm) | MFC4 (139 max) | 0 | 4 | 0 | 15 | |
| CHF3 (sccm) | MFC5 (34 max) | 0 | 34 | 0 | 0 | |
| H2 (sccm) | MFC6 (101 max) | 0 | 0 | 0 | 0 | |
| Pressure (mTorr) | | 100 | 60 | 50 | 100 | |
| Power (Watt) | | 300 | 250 | 250 | 180 | |
| Process Time (min) | | 5 | 2 | 2 | | |
| Xover Press | | 150 | 150 | 150 | 150 | |
| Pump Down (min) | | 2 | 2 | 2 | 2 | |
| Cycle Purge | | 0 | 1 | 1 | 1 | |

 Table 1 – ASG Plasma Etcher Process Parameters for Basic Process Recipes

 Table 2 – AGS Plasma Etcher Film Etchrates (data collected spring, 2007)

| Etched Film | Underlying Film | Tool Recipe | Substrate diameter (in) | Average Etchrate (Ang/min) | Uniformity | Etch time (min) |
|------------------------|---------------------|----------------|-------------------------------|----------------------------------|------------|--------------------|
| Thermal Oxide | Silicon | Oxide_ER | 4 | 590 | 3.0 | 1 |
| Photo Resist | Silicon | Ashrate | 4 | 3880 | 2.9 | 2 |
| LS Nitride | Silicon | Nitride_ER | 6 | 1207 | 2.4 | 0.5 |
| Low Temp Oxide(LTO) | Silicon | Oxide_ER | 6 | 571 | 6.6 | 1 |
| Poly Silicon | Oxide on Silicon | Poly_ER | 6 | 1460 | 3 | 1 |



Fig. 1- Operating Menu



Fig. 4- Push & hold buttons to open and close chamber



Fig. 2- Windows Log-In Screen



Fig. 5- Chamber is ready to run a process



Fig. 3– Chamber ready to be opened