UFNF STS PECVD
SOP

Description and materials notes:

The PECVD STS tool is used to deposit silicon nitride and silicon dioxide films. The system is equipped with 13.56 MHz and 187.5 kHz frequencies and is capable of mixed frequency recipes. The temperature of the system is normally kept at 300 °C. Therefore, only the materials that are stable at these temperatures are allowed in the system. Use only clean METAL tweezers. You can process up to 4 of 4" wafers per run. Only Staff Approved materials may be introduced to this system. **THE SYSTEM MAY ONLY BE RUN FROM 8AM – 5PM MON-FRI.** UFNF Staff must be available to run this tool. Fill out the PECVD Excel Logbook on the desktop of the computer near the lab entrance. Record each process executed and the estimated total film thickness for each recipe.

Prerequisites for operating the STS PECVD Tool:

a) Receive “one on one” training and certification from UFNF Staff.
b) Obtain a UFNF ID (if you do not already have one) by completing the UFNF Lab Use Request Form.

Safety

- **Heat** – The chamber is 300° C and should never be touched.
- **Gases** – This PECVD system uses 2% Silane, 5% Anhydrous Ammonia/N2, Nitrous Oxide, Carbon Tetraflouride (Halocarbon 14) 80%/O2. Absolutely no one except UFNF Staff may access the gas cabinets and gas supply bottles to this system.
- **Buddy System** – *this system may only be turned on by UFNF Staff and only be operated when UFNF Staff are available.*
- **Lab Gas Detection Alarm** -The gases supplied to this system (among others throughout the lab) are monitored by leak detection sensors inside the lab and gas cabinets in the service corridor. If an alarm occurs, the red beacon and audible alarm In the southeast corner of the lab will sound. EVACUATE IMMEDIATELY. UFNF Staff will be notified immediately. If a High Level leak detection occurs, the entire Physics building will be evacuated.
- **High Voltage** - High Voltage Radio Frequency is used throughout the system. System maintenance may only be performed by STS or UFNF Staff. Do not remove any tool covers or defeat any interlock on this system.
- **Moving Components** - The User must exert caution when opening and closing the chamber lid. Your fingers after being violently detached by the chamber lid will prevent the system from reaching base pressure.

1.0 Pre-Operation

1.1 Tool Reservations may be made via the UFNF Reservation Page. http://www.phys.ufl.edu/nanofab/reservations.html
1.2 WARNING - No solvents are allowed near the machine.
1.3 Fill out the PECVD Excel Logbook on the desktop of the computer near the lab entrance.

2.0 Loading the sample & starting process

2.1 Use the arrow keys on the keyboard to Choose "vent" (F3) from the menu then push enter
2.2 Choose "open valve" (F1), enter
2.3 The chamber is vented when the 2 blue push button lid lights on the front of the system are illuminated.
2.4 Depress the 2 blue push buttons in unison and hold in until the chamber lid is completely up.
2.5 If the chamber is flaking, notify UFNF Staff.
2.6 Use stainless steel tweezers to place sample(s). If you have multiple small samples it's best to place them on top of a clean dummy wafer. WARNING: TAKE GREAT CARE NOT TO TOUCH ANYWHERE INSIDE THE CHAMBER. Gloves and fingers will melt.
2.7 When ready to close the lid. Depress "close valve" (F1) on the keyboard and depress the 2 blue push buttons in unison and hold in until the chamber lid is completely down.
2.8 You are then prompted to select a recipe. Use the following rules for recipe selection.

The recipe naming convention is as follows:

1st character: L=low freq, H=high freq, M=multi freq
2nd character: O=SiO2, N=SiN
Remaining characters=thickness in Angstroms
EXAMPLE: 7500A of low frequency SiO2 would be LO7500A

2.9 If you need a thickness not provided, you may run more than one recipe on the same sample or contact UFNF Staff.
2.10 Arrow to your recipe and depress enter.
2.11 The chamber will automatically pump down. It starts with a slow pump down and will give an error "pump down time exceeded". Ignore the error.
2.12 When pump down is complete, F1-F4 prompts will appear. Depress F1 "Deposit" to start your process.
2.13 To change the recipe without unloading the sample, depress F2 New Process.

3.0 Unloading the sample

3.1 When the process is completed, the program will go through an automated chamber and gas line purge. Be patient, it takes approximately 5 minutes.
3.2 Then choose (F3) “vent”.
3.3 When the system is at atmosphere, the 2 blue lights on the front will illuminate. You may then press “Open Lid” and open the lid by depressing the 2 blue light switches until the lid is completely open.
3.4 Unload your wafer using metal tweezers. Caution the chamber surfaces are at 300 ° C.
3.5 Choose "Close Lid" (F1) and depress the 2 blue light switches until the lid is completely closed.
3.6 This will start to pump down the chamber. Reselect your recipe. Then the system will be returned to standby mode
3.7 Verify that you have recorded each recipe that you have executed. This information is critical for UFNF Staff to keep the system properly cleaned and seasoned.

4.0 Modifying a program:

4.1 UFNF Staff will perform all recipe modifications.

5.0 Cleaning the Chamber:

All chamber cleans will be performed by UFNF Staff.

updated 4/25/06, rev 2, B. Lewis