

Trion PECVD

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Location: In fab next to gowning.

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Secondary Trainer: Scott Munro (587-879-1517), smunro@ualberta.ca

OVERVIEW

This tool is used for SiO₂ deposition up to two microns and SiN up to one micron.

SAFETY PRECAUTIONS

The chuck is very hot, typically 300C to 350C please use wafer tweezers to put on and remove your substrate(s) from the chuck.

The lid is heavy use caution when raising or lowering the lid.

Please see the primary trainer if you are uncertain about the substrate material you want to put in the tool.

If you are bringing any new materials into the NanoFab for use in your process, it is necessary to fill out a chemical import form (available on our website, <http://www.nanofab.ualberta.ca>) and supply an MSDS data sheet to Stephanie Bozic.

OPERATING INSTRUCTIONS

PECVD Nitride

- 1.0 Check the logbook to see if the last user had performed a clean, if it has press **“LOAD/EDIT RECIPE”** press **“RECIPE FROM DISK”** press **“NITRIDE CONDITIONING”** enter the new time (usually 800 seconds) press **“EXIT”**, press **“AUTOMATIC PROCESS CONTROL”**.
- 2.0 After the pre-deposition is finished, press **“VENT REACTOR”**, the chamber will go through 4 purge pump cycles prior to venting. This will take about three minutes.
- 3.0 Open the lid, if you are depositing on a full 4” substrate place silicon pieces around the outer area of the chuck so your substrate is at center; place your substrate on the chuck.
- 4.0 Close the lid press **“LOAD/EDIT RECIPE”** press **“RECIPE FROM DISK”** press **“NITRIDE”** press **“STEP”** enter **“3”** press **“TIME”** and input the time in seconds you require for your deposition. Press **“EXIT”**. Press **“AUTOMATIC PROCESS CONTROL”**.
- 5.0 When your process is complete press **“VENT REACTOR”**.
Remove your substrate, if you have more substrates you can repeat the process until the area around the chuck and the chamber lid starts to flake.
- 6.0 When you are finished with all processing, you will need to perform a clean. For nitride a clean is 1.5X of your total deposition time including pre-deposition to a maximum of 3600 seconds. Over 1 um of nitride will require Clean & Cool.
- 7.0 To clean press **“LOAD/EDIT RECIPE”** press **“RECIPE FROM DISK”** press **“CLEAN”**, press **“TIME”** and input the time in seconds (to a maximum of 3600) **“EXIT”**, then press **“AUTOMATIC PROCESS CONTROL”**.
- 8.0 If your clean time is over 3600 seconds a different clean is required. Press **“LOAD/EDIT RECIPE”** press **“RECIPE FROM DISK”** press **“CLEAN & COOL”** press **“EXIT”** press **“AUTOMATIC PROCESS CONTROL”**. This will clean for 3600 seconds with an additional step of cooling the chuck so a physical clean can be performed. Please email the primary trainer if Clean & Cool is used so the physical clean can be done after the chuck cools.
- 9.0 If clean and cool is complete and the chuck has cooled to below 30C a physical clean can be performed. Clean all areas including shower head with DI water; repeat with IPA.
Close the lid and perform a clean cycle for 1200 seconds. It will take about 20 minutes for the chuck to warm up before the clean starts.

PECVD OXIDE

1.0 Check the logbook to see if the last user had performed a clean, if it has press **“LOAD/EDIT RECIPE”** press **“RECIPE FROM DISK”** press **“OX-COND”** press **“EXIT”**. Press **“AUTOMATIC PROCESS CONTROL”** this will condition the chamber for 500 seconds.

2.0 After the pre-deposition is finished, press **“VENT REACTOR”**, the chamber will go through 4 purge pump cycles prior to venting. This will take about three minutes.

3.0 Open the lid, place silicon pieces around the outer area of the chuck so your substrate is at center; place your substrate on the chuck.

4.0 There is a new oxide process called New Oxide which improves on uniformity as well it has a few chamber gas conditioning steps. Please follow the next step for this or go to step 5.

Close the lid press **“LOAD/EDIT RECIPE”** press **“RECIPE FROM DISK”** press **“New Oxide”** press **“STEP”** enter **“3”** press **“TIME”** and input the time in seconds you require for your deposition. Press **“EXIT”**. Press **“AUTOMATIC PROCESS CONTROL”**.

5.0 For the old oxide recipe: Close the lid press **“LOAD/EDIT RECIPE”** press **“RECIPE FROM DISK”** press **“OXIDE”** press **“EXIT”**. Press **“TIME”** enter time, then press **“EXIT”**, press **“AUTOMATIC PROCESS CONTROL”**.

6.0 When your process is complete press **“VENT REACTOR”**.

Remove your substrate, if you have more substrates you can repeat the process until the chamber lid starts to flake. You can deposit up to 2um without much flaking.

7.0 When you are finished with all processing, you will need to perform a clean. For oxide a clean is 2X of your total deposition time including pre-deposition to a maximum of 3600 seconds.

8.0 To clean press **“LOAD/EDIT RECIPE”** press **“RECIPE FROM DISK”** press **“CLEAN”**, press **“TIME”** and input the time in seconds (to a maximum of 2000) **“EXIT”**, then press **“AUTOMATIC PROCESS CONTROL”**.

9.0 If your clean time is over 2000 seconds a different clean is required. Press **“LOAD/EDIT RECIPE”** press **“RECIPE FROM DISK”** press **“CLEAN & COOL”** press **“EXIT”** press **“AUTOMATIC PROCESS CONTROL”**. This will clean for 3600 seconds with an additional step of cooling the chuck so a physical clean can be performed.

10.0 If clean and cool is complete and the chuck has cooled to below 30C a physical clean can be performed. Clean all areas including shower head with DI water; repeat with IPA.

Close the lid and perform a clean cycle for 1200 seconds. It will take about 20 minutes for the chuck to warm up before the clean starts.

TROUBLESHOOTING

Since this tool needs extensive cleaning and time between processes the tool might not be available for multiple users during the same day. Users are encouraged to follow the steps to physically clean the chamber so you can proceed with your process in a timely manner.

Although the PECVD has been consistent with its deposition rate if you require an exact thickness please perform a test using the same size sample, using deposition rates posted in the logbook can be a good guide but not always correct.

When booking the tool please write in the comment section what you are depositing and total thickness of film.

If you encounter an unexpected error or require assistance please contact the primary or secondary trainer listed above. Should they not be available, please contact any staff member for assistance.

APPROVAL

Qualified Trainer: Les Schowalter

Training Coordinator: Stephanie Bozic