Oxford Plasma Enhanced Chemical Vapor Deposition (PECVD) Standard Operating Procedure

These instructions are intended for reference only, and will not replace the thorough training required for proper system operation. Contact a clean room staff member with questions or to report a system problem.
1. Enable the tool in BADGER

2. Navigating the system screens
   Clicking the circle in the upper left corner of the window will open a pull down menu which will allow navigation to the different screens used in tool operation.
### 3. VERIFY SYSTEM STATUS

Software should always be running and system should be *pumped down*. The temperature is set based upon the process you wish to run. Currently there are processes available at 150°C and 300°C. If the chamber is not at the desired temperature a thermalization recipe can be run in order to set the tool to the desired set point. Going up in temperature is much faster than going down.
4. **CHECK RECIPE WINDOW**
Check which recipe was run last. The prior user should have run a ‘CLEAN’ recipe upon completion of their processing. If this is in question or if additional assurances are required to avoid cross contamination, run a ‘CLEAN’ recipe. Otherwise proceed to step 7.

5. **CLEAN:**
Double-click on the recipe you wish to run. The clean recipes are the 1X) series.

The ‘CLEAN’ recipe serves to remove all prior deposits from the chamber walls and table.
### 6. Initiating recipe start
The left side of the screen has the selected recipe and steps. Clicking the green arrow will start the selected recipe. This will be used every time you start a recipe.

### 7. Seasoning the chamber
Seasoning the chamber serves to seal contaminants in place prior to processing. In the case of PECVD, this is generally necessary for silicon nitride and amorphous silicon films since any oxygen on the chamber walls will react preferentially with silicon.
8. **Process Completed**

The series of screen shots to the right will come up post process.

Click ‘okay’ in the blue bordered box.

Click the amber border surrounding the screen. Another pop up will appear.

(this series of screens will be visited again later in the SOP as it they are common to the completion of any recipe)
9. **Venting the chamber**

   Navigate to the ‘pumping’ screen (as step 2 of SOP). Click ‘stop’ then click ‘vent’. It will take a couple minutes while the system runs through its purge cycle and vents the chamber.
10. **Loading samples**

Open the chamber by placing the ‘chamber position selector switch’ (circled in green) to ‘chamber up’. Rotate the ‘hoist activation knobs’ in the direction indicated by the red arrows, and continue to hold, in order to fully open the chamber. The bottom photo illustrates a full open position. Place samples on the stage, move the ‘chamber position selector switch’ to ‘chamber down’, rotate the ‘hoist activation knobs’ to close the chamber.
11. **Evacuating the Chamber**

Navigate to the ‘pumping’ screen (as step 2 of SOP). Click ‘stop’ then click ‘evacuate’. It will take a couple minutes until the system reaches chamber base pressure. (25 mTorr)

12. **REVIEW AND EDIT RECIPE**

Select the recipe corresponding to the temperature and film that you wish to deposit. Double click the step in which the deposition will occur (generally this is labeled ‘strike’). Edit the time accordingly to achieve desired thickness. Be sure to save at the step edit and at the recipe edit.

You can now run your recipe by clicking the green arrow.
13. **Process Completed:**
   A series of a screens will pop up signifying the end of the run (as in step 8 of the SOP).

14. **Film properties:**
   Can be located at Google Docs link:
   https://docs.google.com/spreadsheets/d/1M3Q0IjssNKjg-6wQrymVsM5Kdv4QG1aHHbfOVNaB3HQc/edit?usp=sharing

15. **Venting the Chamber**
   Navigate to the ‘pumping’ screen (as step 2 of SOP). Click ‘stop’ then click ‘vent’. It will take a couple minutes while the system runs through its purge cycle and vents the chamber.
| 16. **Unloading Samples**  
Open the chamber by placing the ‘chamber position selector switch’ (circled in green) to ‘chamber up’. Rotate the ‘hoist activation knobs’ in the direction indicated by the red arrows, and continue to hold, in order to fully open the chamber. The bottom photo illustrates a full open position. Place samples on the stage, move the ‘chamber position selector switch’ to ‘chamber down’, rotate the ‘hoist activation knobs’ to close the chamber. | ![Image of chamber](image1.jpg)  
![Image of chamber](image2.jpg) |
17. **Evacuating the Chamber**  
Navigate to the ‘pumping’ screen (as step 2 of SOP). Click ‘stop’ then click ‘evacuate’. It will take a couple minutes until the system reaches chamber base pressure. (25 mTorr)

18. **Clean Chamber**  
Double-click on the recipe you wish to run. The clean recipes are the 1X) series.

The ‘CLEAN’ recipe serves to remove all prior deposits from the chamber walls and table.
19. **Selecting clean recipe run time**
Clean time should match the duration of the prior depositions (ie 20 minute deposition of SiO2 should be followed by a 20 minute clean).
You can now run your recipe by clicking the green arrow.

20. **BADGER LOGOUT:** Don’t forget to disable the tool in badger after you’re done.