# Oxford RIE Standard Operation Procedure

03/14/18

1. Logging in:

Check the status from last user. Write down on the logbook the current **date**, your **name**, **sample substrate**, **recipe,** and process **time**. **If you use an edited recipe, please write down the details of it: all gases and their flow rates, pressure, and power.**

On Oxford PC4500 software, click the **round button** on top left, then go to **User Log In** under **Utilities**.
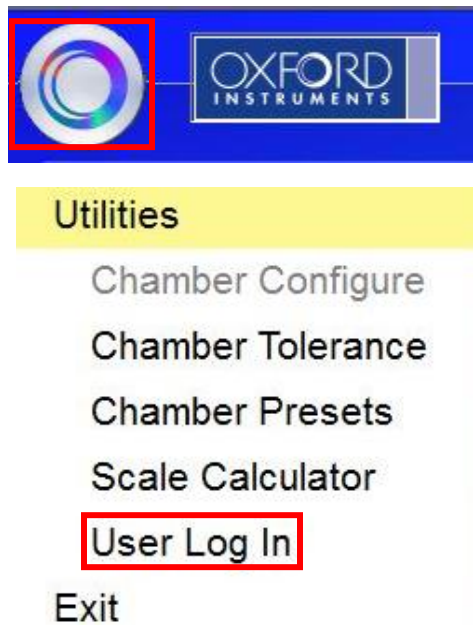

Enter your username and password and click **Verify**. If you are successfully logged in, you will see your username under Current User. Click **OK** to go back.

2. Chamber venting:

Click the top left button, go to **System -> Pumping**. You will see the status of all the pumps and valves, the pumping/venting **status bar**, and three control buttons: **Evacuate**, **Stop** and **Vent**.

Press **Stop**, current pumping will stop, then press **Vent** to start venting**.** The status bar will show "Turbo backing delay", then "Purging" and finally "Venting to atmosphere". Wait for all the countdowns to finish (about 4 min).
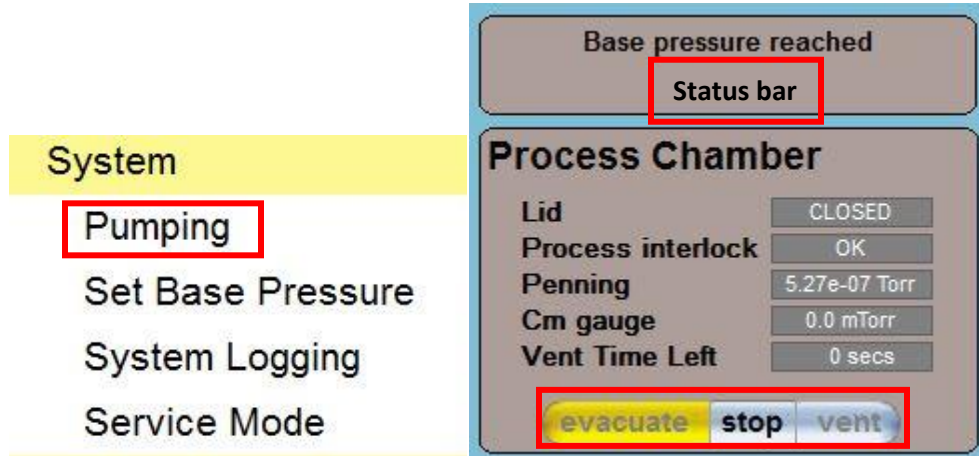

3. Sample loading:

On the machine, switch **Lid Control** to **Open**. **Press and hold BOTH Start buttons until the lid is completely open** (the lid will go up and then rotate to the side). Load your sample onto the stage. If it slides around, you can attach **CLEAN** glass slides with Kapton tape onto the stage to secure it. Make sure the sealing ring area and the stage is clean before closing the lid. If not, clean it with **DRY** wipe or nitrogen gun. **Use IPA or water only when necessary.**

Sealing Ring
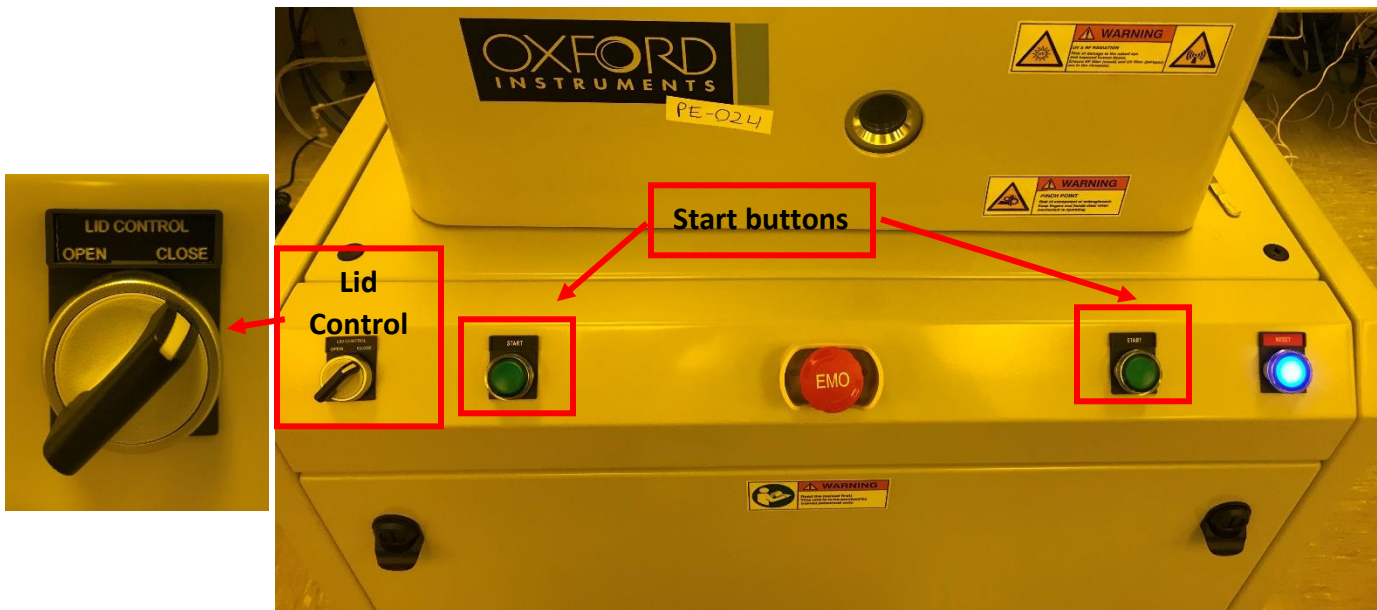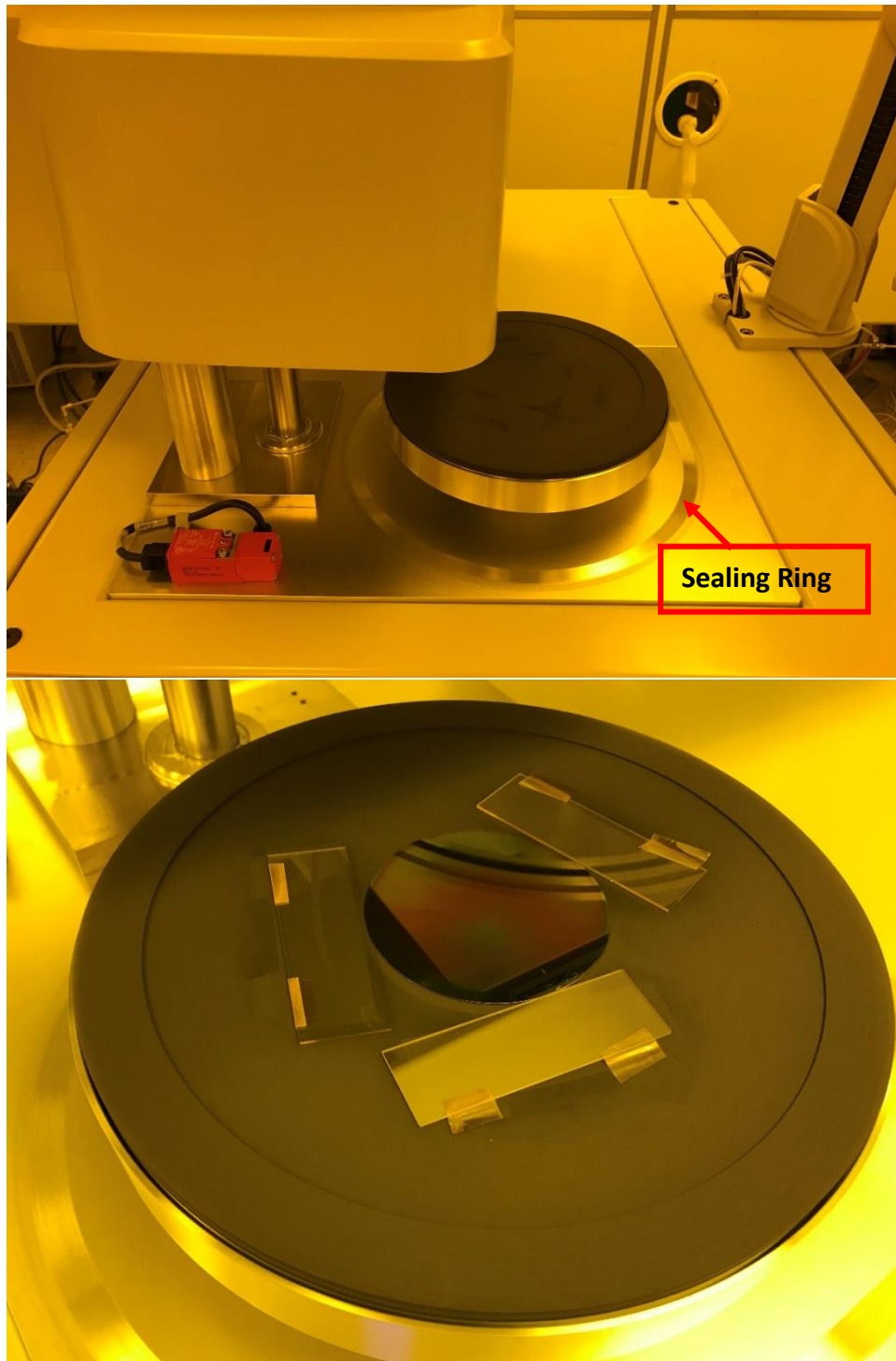
4. Chamber pumping:

After loading, switch **Lid Control** to **Close**. **Press and hold BOTH Start buttons** until the lid closes completely. Go to **System**->**Pumping**. Press **Stop** -> **Evacuate**. Enter a **wafer name** to tell the system there's wafer in the chamber, or press **cancel** if there's none.

Load Wafer or pump chamber

Enter Wafer name(OK) Pump empty chamber(CANCEL)

Ok   Cancel
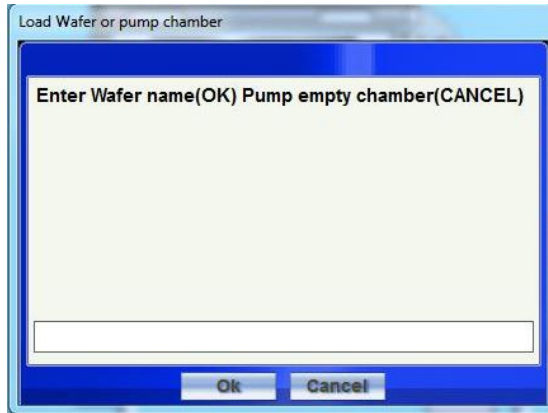
At first the bypass valve will open to start pumping slowly, then it will close and the main valve will open for faster pumping. At last the main valve will close and the chamber will be pumped by the Turbo pump. When pumping is finished, you will see **"Base pressure reached"** at the status bar. The whole pumping process will take about 4 min.
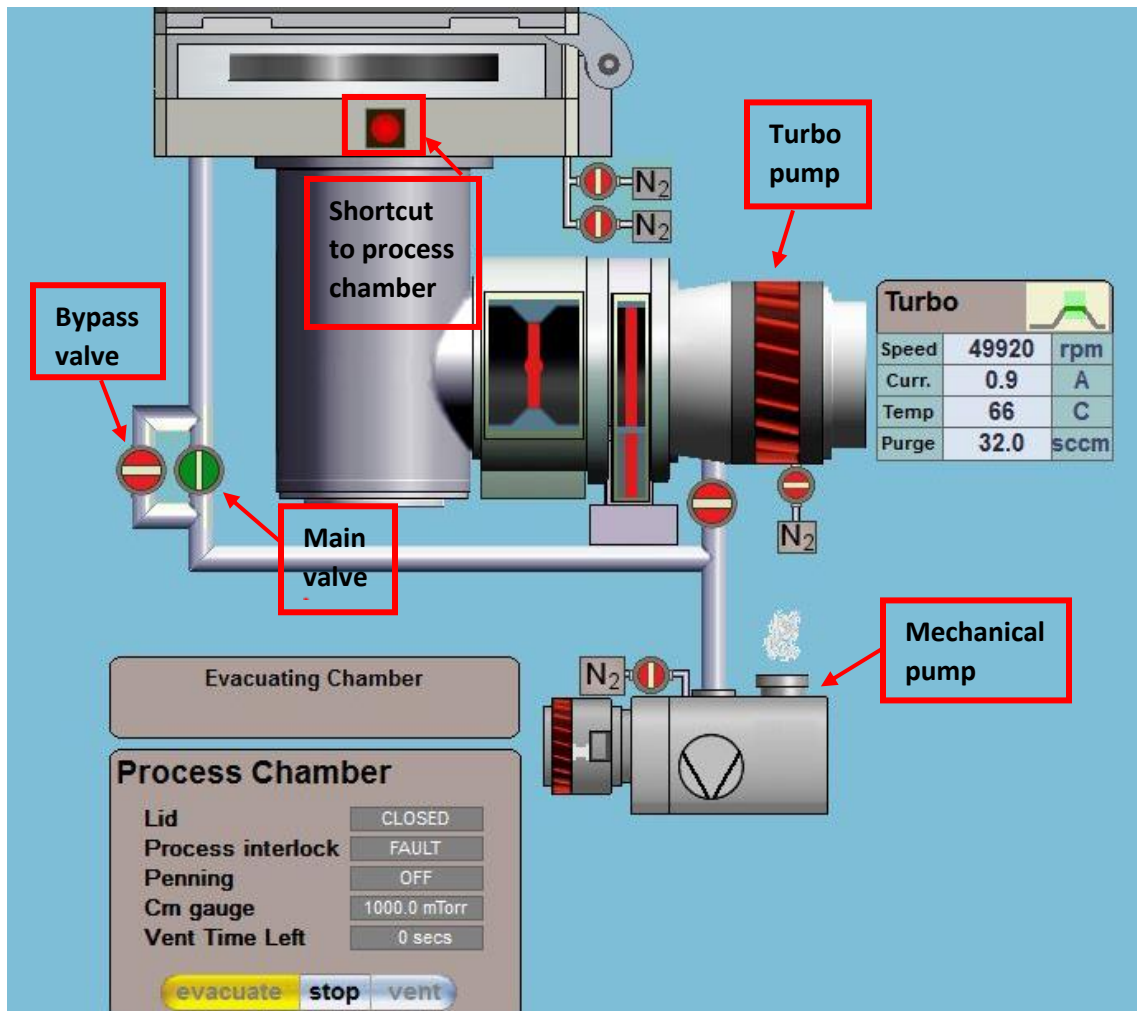
5. Recipe loading and editing:

Go to **Processing**-> **Recipes**. Press **Load** and choose the recipe you would like to load.
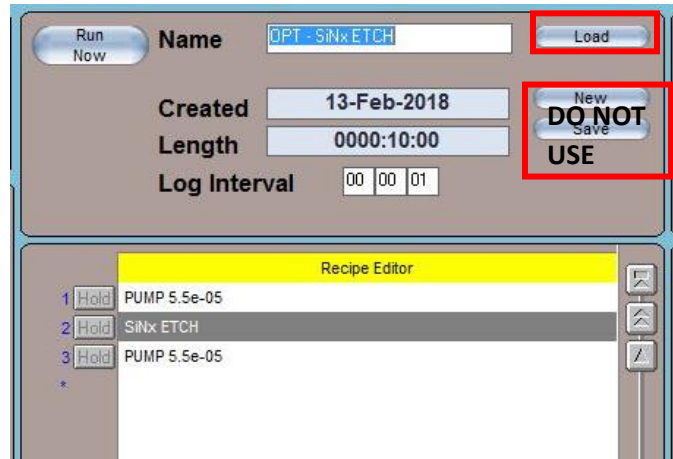
Right now, there are four default recipes available:

1. **OPT - Chamber Clean:** O2 cleaning of the chamber. Run **at least 10 min** every time you are done with all your processes.

2. **OPT – Chamber Clean - EP:** Cleaning the chamber with end point detection.

3. **OPT-SiNx ETCH:** to etch silicon nitride;

4. **OPT-SiO2 ETCH:** to etch silicon dioxide.
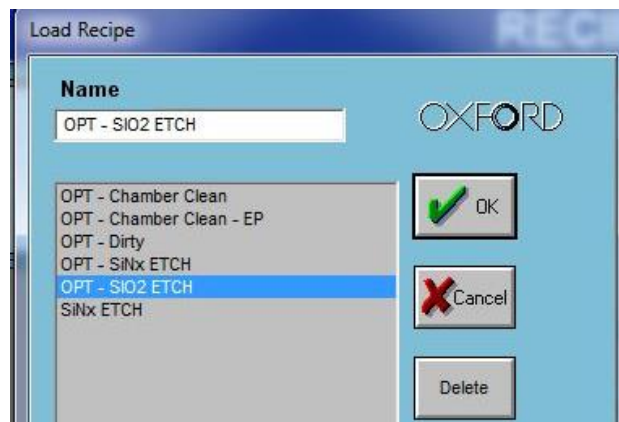
Click **Yes** in the pop-up window to confirm you want to overwrite current recipe.
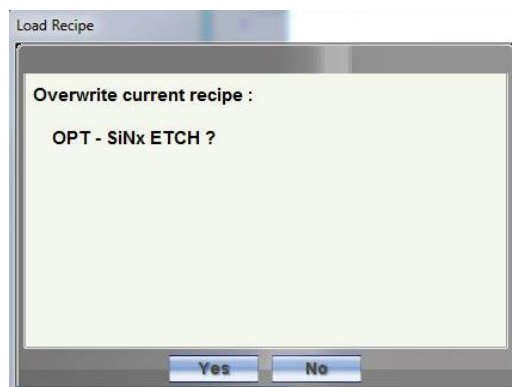
To edit the recipe, **left click the step** you want to edit in the step list, then click **Edit Step** to edit the process. You can edit a process temporarily, but **you are NOT allowed to permanently save the change by clicking "Save" in the recipe loading screen**.
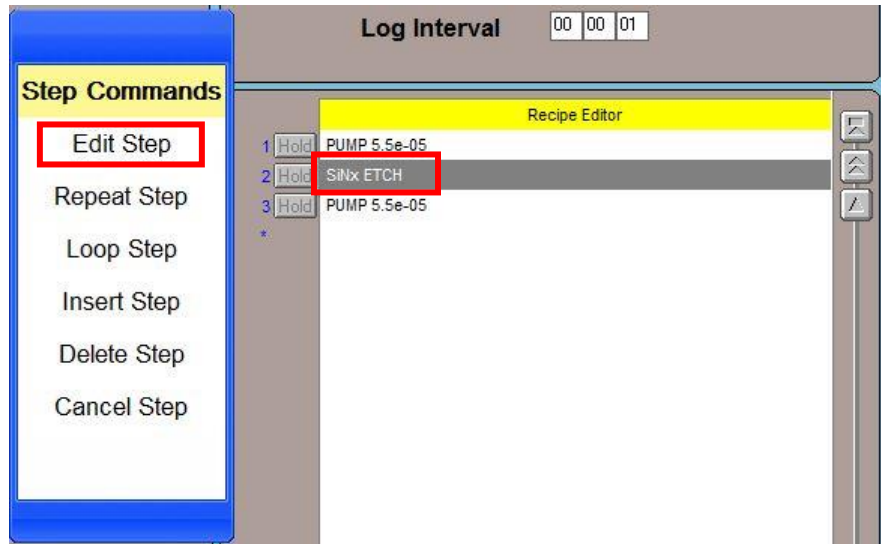

At the Process Step Edit screen, you can change **gas and flow rate**, **step time**, **pressure** and **power**. Don't change chiller temperature and other settings. **Please keep a single process run within 30 min and allow 10 min cool-down between long runs.** After finishing editing, press **Enter** on keyboard or click **Save in the Process Step Edit screen** (not the recipe loading screen) to confirm change and go back to recipe loading screen.
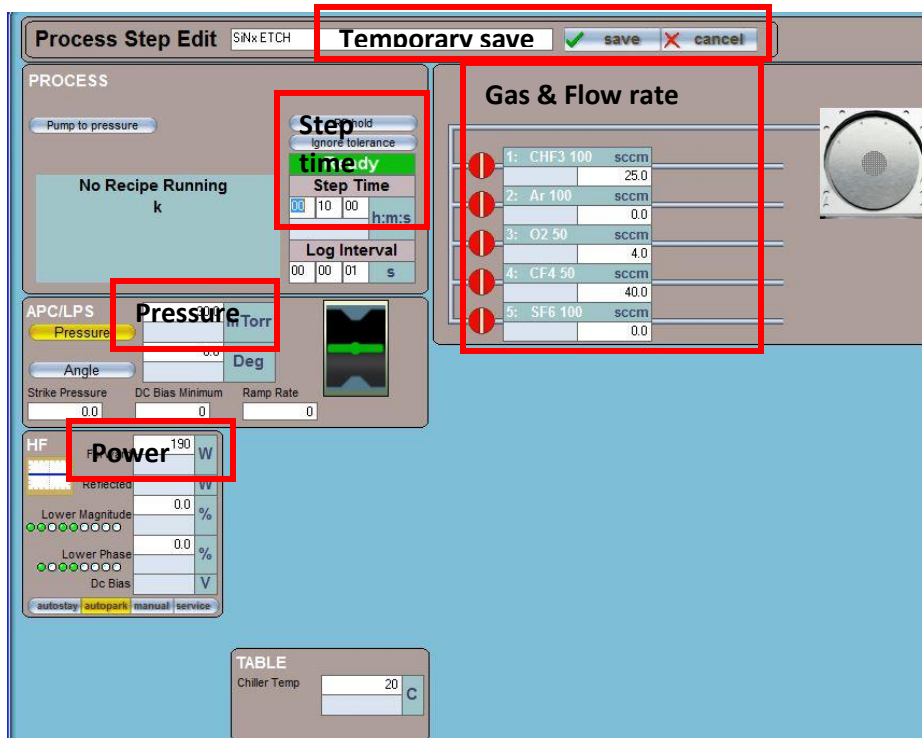
6. Recipe running:

After double-checking all recipe parameters, click **Run Now** in the recipe loading screen to start your process. Once process starts, you will be able to see the plasma through the viewing window on the chamber.
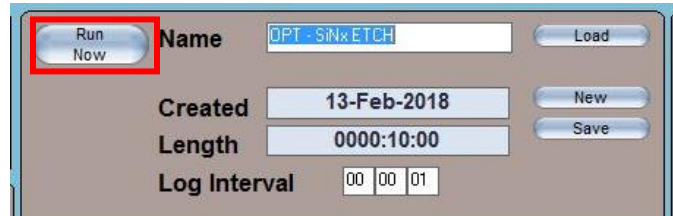

Monitor the status of your process by going to **Processing**-> **Process Chamber**. You can **stop/pause** your process by pressing the corresponding buttons. You can use [button] button to switch between the Pumping screen and the Process Chamber screen.
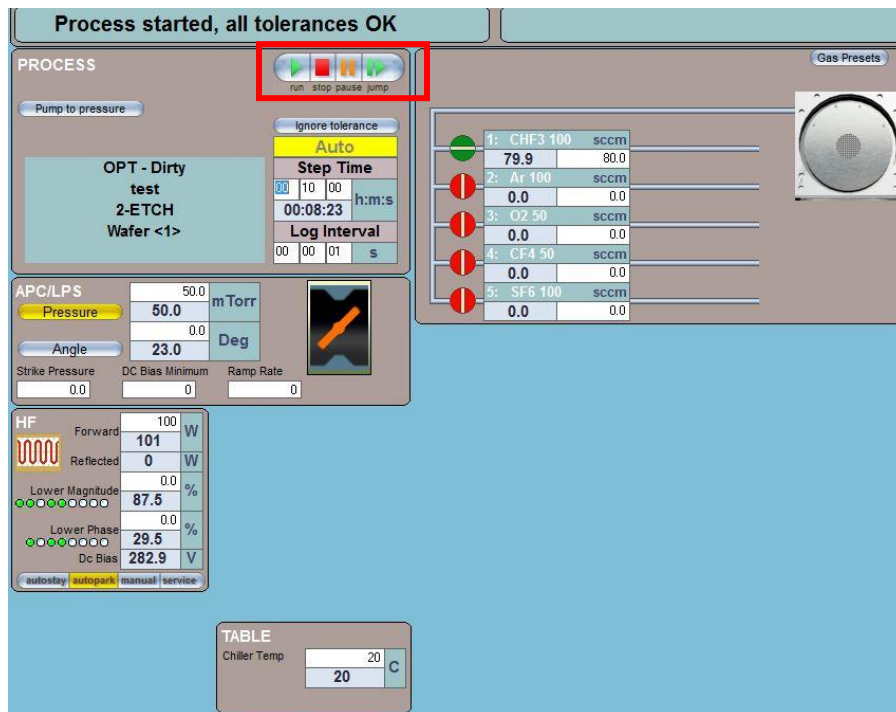
When process is finished, there will be a **Yellow alert** on top. Click it and choose **Accept**.

If you have more processes to do, simply repeat **step 5 and 6** to load and run recipes until you finish. Click **Yes** on the pop-up window to confirm you have a second process to run on the same wafer.
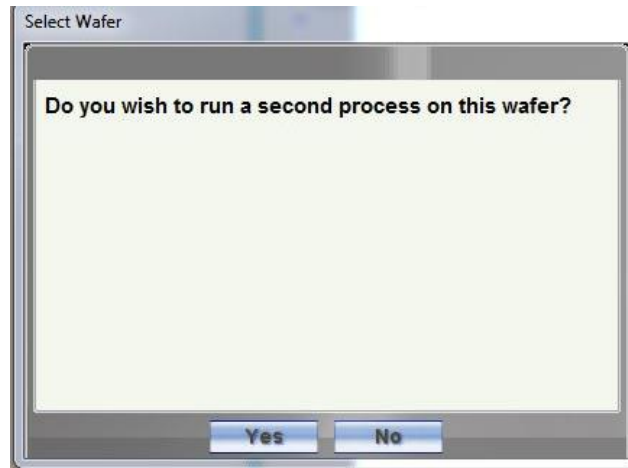
7. Sample unloading and chamber pumping:

To unload sample, repeat **step 2 and 3**. If all your processes are done, do **step 4 to bring the chamber back to vacuum**. When asked for the wafer name, click **Cancel** to indicate no wafer is in the chamber. After pumping down, **run a Chamber Clean recipe for AT LEAST 10 min (required).**

8. Logging out:

Go to **System**->**User Log In**, and click **Verify**, the status will become **View Only**. Do not exit the software. Log out on the logbook. If you encounter any problems, please notify Donghai or Superuser immediately and write it down on the logbook.