

TFE ITO Sputter System

The TFE ITO Sputter tool is a dedicated oxide sputter tool for high throughput wafer processing. It comes with two pallets, a 9 x 4" wafer palette and a 4 x 6" wafer palette. It has three targets, two DC/Pulsed DC and one DC/Pulsed DC/RF. Currently, only the DC/Pulsed DC/RF target (T3) is loaded with ITO. T1 and T2 has stainless steel targets for conditioning/testing. The tool is also equipped with an etch station, which can do DC or RF plasma of Ar or O₂. The tool is equipped in the etch station with pre-deposition substrate heating up to 350C. There is no mid deposition substrate heating.

For processing the tool can sputter with Ar or Ar/O₂ plasma with tuning parameters such as chamber pressure, %O₂, plasma power, scan speed, #'s of scans, and pre-deposition etch/heating. The tool can operate in either fixed position mode, or scanning mode, with scanning mode providing significantly better uniformity. Deposition rates of ITO of 40nm/min can be easily achieved.

Hardware Overview Images



Prerequisites for operating the TFE ITO system:

- a) Obtain a NRF ID (if you do not already have one) by completing the [NRF Lab Use](#)

[Request Form](#) and safety training.

- b) Receive “one on one” training and certification from NRF Staff. Discuss your process with a staff member.

Safety

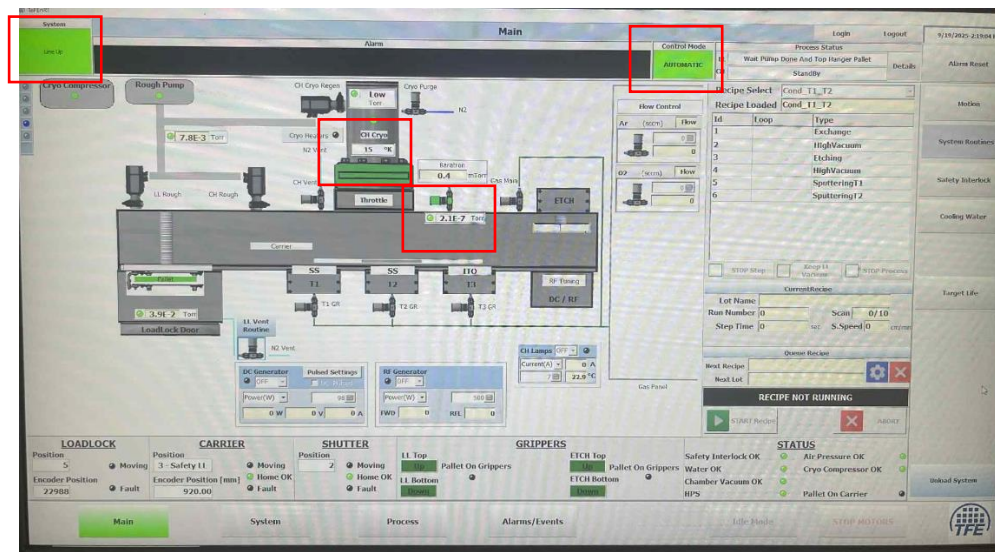
- **HOT Components** - The User must observe caution when unloading samples from the load lock when substrate heating was used. The palette can be very hot ($>200^{\circ}\text{C}$) when immediately removed from the process chamber. Sufficient cooling time must be allowed prior to sample handling.

Pre-Operation

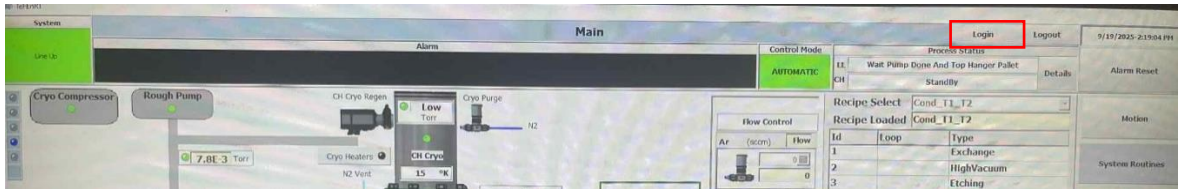
- Tool Reservations may be made via the NRF Reservation Page. <http://nimet.ufl.edu/servicecenter/resources/default.asp>
- Change gloves. WARNING No solvents or liquids are allowed near the machine, change your gloves before operation!!

Operating Procedure:

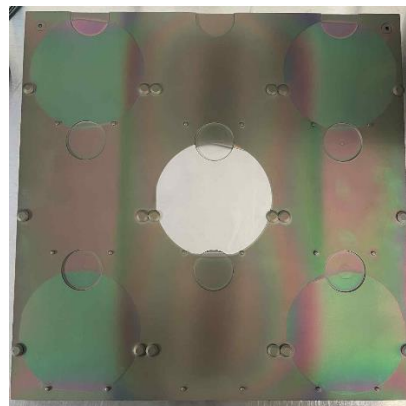
1. Login to the TUMI system and input the thickness of material you will be depositing.
2. Looking at the tool main computer check 4 things prior to operation as seen outlined in red boxes below.
 - a. Line Up in green in the top left corner.
 - b. Control Mode green in Automatic. (If its in manual please call staff to swap this.)
 - c. The Cryo temperature $<20\text{K}$.
 - d. Chamber pressure less than $1\text{E}-6$.
 - e. If all of these are correct and there are no alarms the tool is ready for use.



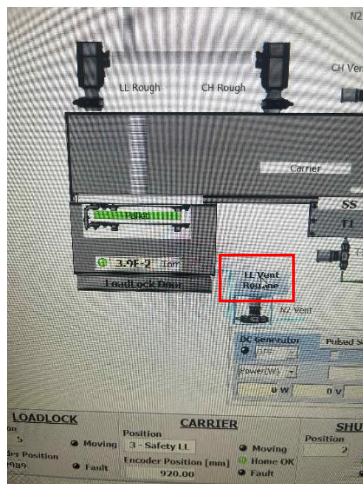
3. Login to the user account by clicking login.
 - a. Username is NRF User, password is nrf.



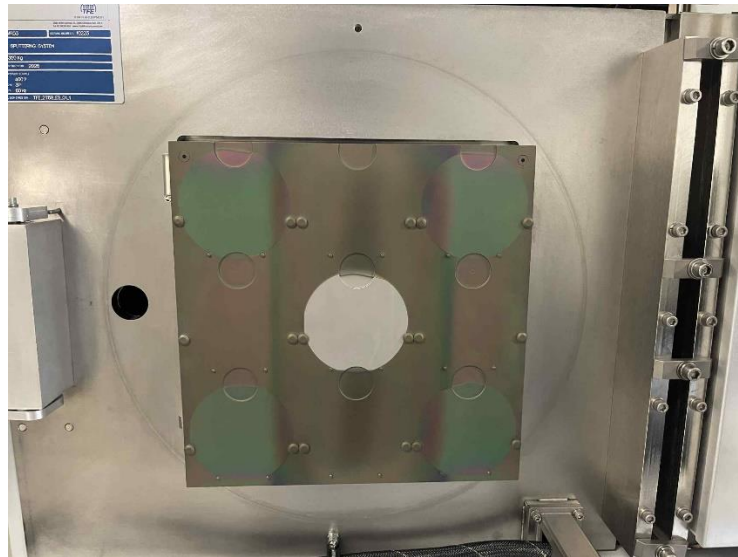
4. Load either the 4" or 6" pallet with your wafers. On the 4" pallet the center has the best uniformity. If you are doing pieces, they will need to be mounted to a carrier 4" or 6" wafer prior to deposition.



5. To load your sample, click the LL Vent Routine blue button. This will bring the loading arm into the load position and vent the load lock.
 - a. Once the door of the loadlock is vented, open the door to stop the vent alert sound. This noise is normal, it just indicates the loadlock is done venting.



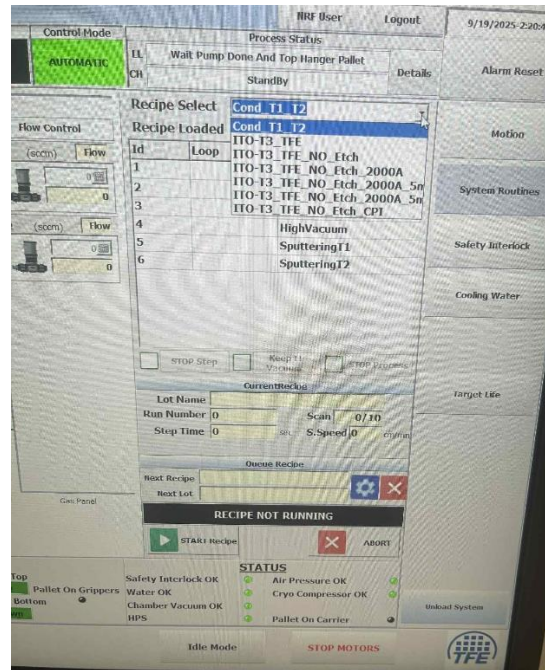
6. Place the pallet on the front pallet holder position. The prongs sit nicely in their spot and confirm its secured in place. Failure to do so could lead to the pallet being dropped in the tool and the system needing to be vented to recover the samples. Recovery can take 24 hours, so ensure this is done properly and carefully every single time.



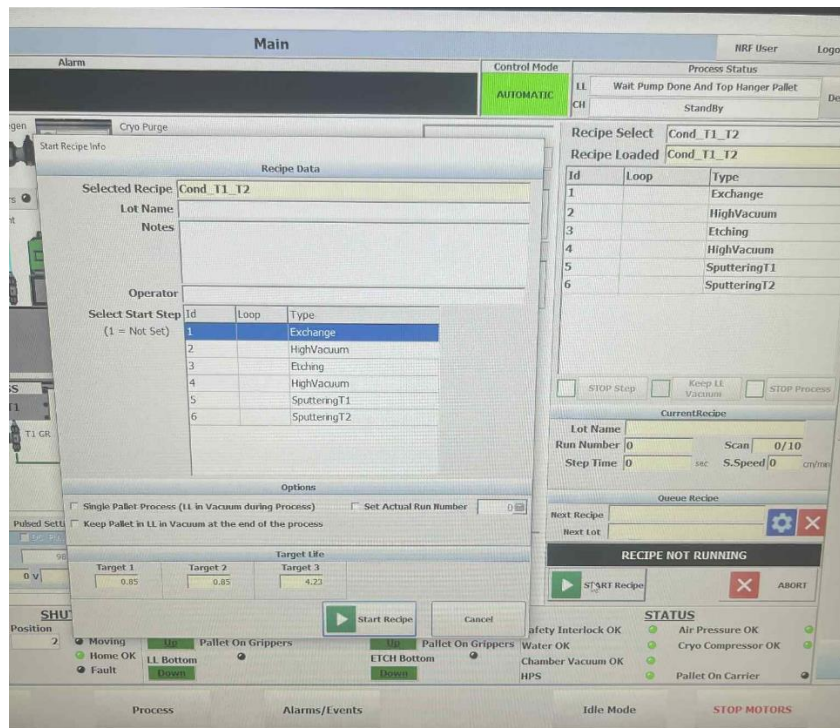
- a. Close the load lock door after loading and the tool will automatically begin pumping down the load lock.



7. To run your process, go to the recipe select drop down menu and select the desired recipe. If the desired thickness is not available, please consult staff with making a recipe for your process.



8. Once your recipe is selected click START Recipe. This will open the Start Recipe Info menu. Make sure to have the Select Start Step be step 1 as shown below.
 - a. Click in the options the check box for Single Pallet Process.
 - b. If doing multiple metals on one pallet click: Keep Pallet in LL in Vacuum at the end of the process.
 - c. You can add a Lot name or notes for your records.
 - d. Once satisfied with the run, press Start Recipe.



9. While the process is running, watch for any alarms or errors. If something pops up please consult staff. Once your run is done, it will be moved back to the load lock.
 - a. If you did not click “Keep Pallet in LL in Vacuum at the end of the process” the load lock will vent at the end of the process for you to retrieve your samples.
 - b. If you did click “Keep Pallet in LL in Vacuum at the end of the process” either run the next process or click LL Vent Routine to unload your sample.
 - c. While unloading, if you have more samples to run, load the next sample prior to closing the load lock door.
10. Make sure to logout of the tool by clicking logout and logout of the TUMI.