

# Operating Instructions Old RIE

## Starting the system

- Start the chiller (in room next to the Old RIE lab) and confirm that the wall fan is on.
- Open lower door and press 'System On', then 'Pump On'.
- Start Turbopump (press soft 'start' key) and make sure the turbo load lights go all on then off again.
- Open the software (Password for the PC is 'eme'). When it's loaded, click on 'log-on' button. Select user CSES, click OK and then enter password 'solar'.

## Manually venting the chamber

Prior to opening the chamber, it should be properly vented to ensure the removal of any remaining gases and to equalise the pressure with the atmosphere. Venting can be accomplished either manually or automatically as the final step of a recipe. The steps for manually venting the chamber are as follow:

- Put system in Manual mode (via the *Manual/Recipe* selector switch)
- Set 'Process Time' to 2 minutes (00:02:00)
- Set 'Base Press' to  $1 \times 10^{-3}$  Torr
- Select the 'Vent' check box
- Press Run Process button 'Start'

The chamber will now pump down to the base pressure, maintain that pressure for the specified time and will then be vented with N<sub>2</sub> gas.

## Cleaning the chamber

Before etching samples, the chamber may need to be cleaned using oxygen plasma for a short duration (typically 15-30 minutes) or a longer duration (typically 60 minutes), depending on its previous usage.

### Edit the cleaning recipe:

- Put system in Recipe mode (via the *Manual/Recipe* selector switch)
- Click on 'EDIT'
- Click on 'Load,' then find and open the recipe for oxygen plasma cleaning (the recipe name is 'Clean RIE' or whatever the users have renamed it).
- Set the cleaning duration in step 2 of the recipe. In this step, also set the process pressure, RF power, and oxygen flow. The typical setpoints are 0.1 Torr, 200W, and 100 sccm. Ensure the O<sub>2</sub> checkbox between the Gas and Flow columns is selected to introduce oxygen into the chamber.
- Click on 'Save Step' and then 'Save File As' to save the modified recipe. Note that the file only can be saved in the 'CSES' folder, which matches the username used for logging in. Click on 'OK' and then 'Quit'.

### Carry out cleaning run:

- Ensure the system is in Recipe mode (via the *Manual/Recipe* selector switch)
- Click on 'Load' to select the oxygen cleaning recipe edited above
- Press 'Start' button under 'Run Process' to run the recipe.

- Monitor the process to ensure it proceeds correctly according to the recipe.

Once the recipe finishes, the chamber will vent automatically as the recipe should include the Vent step mentioned above. The chamber is then ready to be opened.

## Etching samples

### Loading/unloading samples

The chamber is ready to be opened after performing the manual venting step (see above) or running a recipe that includes a venting step.

- To open the chamber, turn the knob next to the chamber to the 'Open' position on the chamber housing. Press and hold both black hoist buttons simultaneously until chamber lid fully opens. Place samples in the centre of the quartz plate.
- To close the chamber, turn the knob to the 'Close' position, then simultaneously press and hold the two buttons until the lid fully closes.

### Edit etching recipe

- To edit a recipe, change the system to 'Recipe' mode
- Click on 'EDIT'
- Click on 'Load,' then find and open your recipe
- Modify parameters if needed.
- Click on 'Save Step' and then 'Save File As' to save the modified recipe. Note that the file only can be saved in the 'CSES' folder, which matches the username used for logging in. Click on 'OK' and then 'Quit'.

### Perform sample etching

- Ensure the system is in 'Recipe' mode
- Click on 'Load' to select your recipe
- Press 'Start' button under 'Run Process' to run the recipe.
- Monitor the process to ensure it proceeds correctly according to the recipe.

## Shutting down the system

Once all processes are complete, the chamber needs to be pumped down while the lid is pro

- Change the system to 'Manual' mode
- Set 'Process Time' to 30 seconds (00:00:30)
- Set 'Base Press' to  $1 \times 10^4$  Torr
- Press 'Start' button to pump down the chamber.

Once the chamber has pumped down to below base pressure, the program can be closed.

- Press 'Logoff' and then 'End'. Leave the PC on.

To shut down the system:

- Stop the Turbopump.
- Press 'Pump Off' button to turn off the pump and then press 'System Off' button to turn off the system.
- Switch off the Chiller.