CORAL Name: RTA-1100C-ASOne150

Location: 2L, room 12-1110A
Purpose: Rapid Thermal Processing
Contact: Eric Lim, Dennis Ward

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Introduction

The RTA-1100C-ASOne uses quartz lamps to rapidly heat samples in a variety of ambient atmospheres. Gases available are Nitrogen (N_2), Oxygen (O_2), Ammonia (NH_3) and forming gas (95% N_2 / 5% Hydrogen (H_2)). Smaller samples can be run on a Si handle wafer. 150mm Si wafers can be run by removing the handle wafer and placing the wafer directly on the quartz pins. Temperature is measured using a high temperature pyrometer which will not register temperatures below 285°C. The system can ramp temperature as quickly as 150°C/sec but high ramp rates can lead to problems with slip lines and dislocations on the Si handle wafers.



Samples must have an RCA clean before running. Metals and photoresist are not allowed in the system and organics in general are prohibited.

Safety

Hazards present on system are high temperature parts, possible pinch/crush points, high voltage and pressurized gases. Parts and samples can be at high temperatures during and after processing, exercise care when removing samples or parts from the chamber.

Mechanical pinch/crush points exist with the chamber lid. Two struts normally hold the chamber open for loading/unloading samples. Please use two hands when opening and closing the chamber and keep fingers and other body parts clear when closing the chamber.

N_2 and forming gas displace oxygen and can cause rapid suffocation. O_2 is a strong oxidizer and can cause or intensify a fire. NH_3 is a toxic and flammable gas and can form explosive mixtures with air. Under normal operation the user is protected from these hazards by the system software, tool panels and interlocks, and the Toxic Gas Monitoring System (TGMS). Do not attempt to open or remove any panels as you risk exposing yourself (and others) to these hazards.

If the tool is behaving dangerously or making loud noises, press the red EMO button, alert the staff, and shutdown the system on Coral. DO NOT attempt to re-energize the tool!

User Qualifications and Responsibilities

During training you will learn to load samples and run recipes. To be considered qualified you need to be trained by the staff in charge, be up to date with your safety trainings and have a PTC approved process. Samples must have an RCA clean before running. Metals and photoresist are not allowed in the system and org anics in general are prohibited. Circumventing these restrictions or running processes/materials that have not been approved by the PTC can lead to disqualification from the tool.

Users are expected leave the Si handle wafer in the chamber, to close and lock the chamber and log out of their account when they have finished using the tool.

If you encounter any problems or notice anything unusual while operating the machine, report the issue in CORAL so that the staff can address it in a timely fashion.

Operating Procedures

Make CORAL reservations ahead of time for the RTA-1100C-ASOne150. Verify that the system is not being used before you engage on CORAL. The software checks CORAL status, so you need to engage before you can run any recipes.

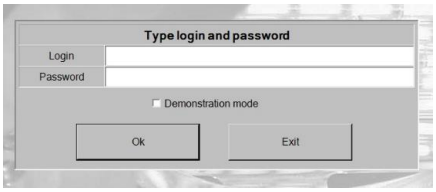
Starting software and logging in

1. If it is not already open, start the Annealsoft control program by double-clicking the icon on the desktop.



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2. Log in to the software using the credentials provided for your research group.

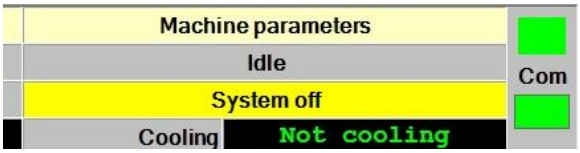


3. You should be on the process screen, if not, click on **Process** in the navigation area:



Loading samples

4. If the software indicates the machine is off:



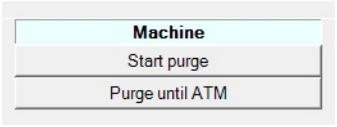
Turn it on by pressing the green button on the front panel.



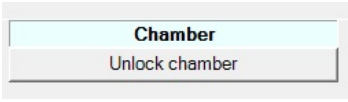
5. If the chamber is not at atmospheric pressure



Click on **Purge until ATM** to vent the chamber.



6. Click **Unlock chamber** in the Chamber section of the screen, then use two hands on the front bar to lift open the chamber lid.



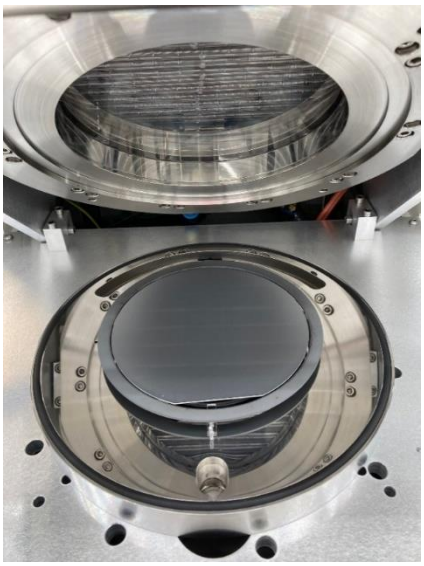


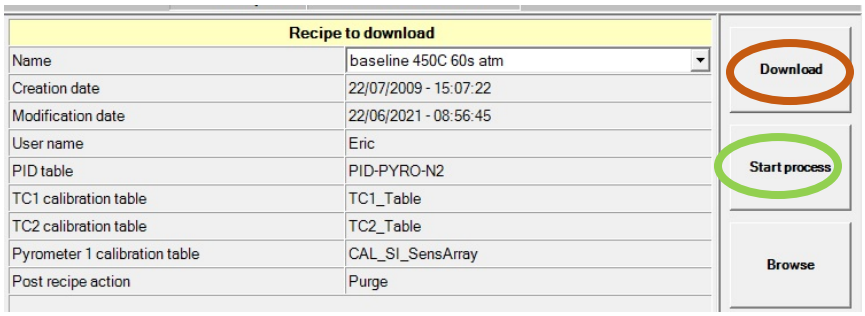
Figure 1 chamber open

7. Place your samples on the Si handle wafer.

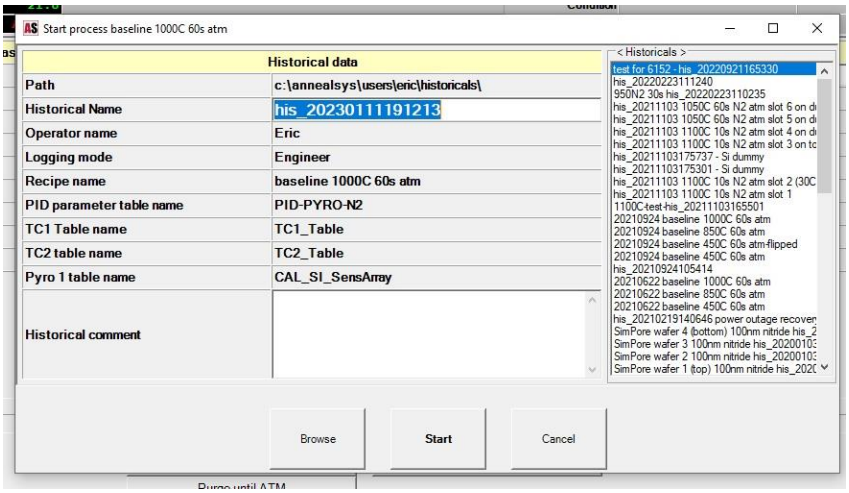
8. Using two hands, slowly lower the chamber lid, engage the handle then click **Lock** on the chamber section of the screen.

Downloading and running a recipe

9. Select the recipe you want to run from the drop-down menu then click **Download**.



10. Click on **Start process.** You should get a pop-up window that will ask you for a filename for the data file. Default is “his_” followed by a date/timestamp. You can modify the filename if you wish. Click on **Start** to start the recipe.



11. Once the recipe is running the current values for process parameters will be updated in the system status area, and the lower portion of the screen will show a plot of the process parameters.



12. Once the recipe has finished, a window will pop up saying the recipe has finished successfully. Click **OK** to dismiss the window. If the pop up window has an error message instead, please report a problem in CORAL and include the error message.

13. Unlock and open the chamber, remove your samples and repeat the preceding steps to run your next sample.

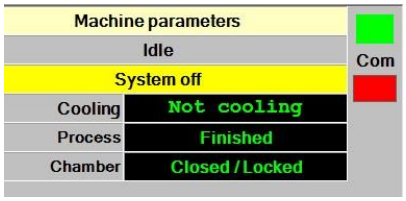
Finishing up and logging out

14. Once you are finished running all of your samples, make sure the Si handle wafer is in the chamber, then close and lock the chamber lid.

15. Turn off the machine by pressing the red button on the front panel of the tool.



16. The Alarm light will go red, you can reset the alarm by clicking on the red box in the machine status area, it will turn green once the alarm is reset.



17. Use the **Shut down** button to exit the software.



18. Disengage the RTP-1100C-ASOne150 on CORAL.

Appendices

Notes

- Smaller samples can be run on a Si handle wafer. 150mm Si wafers can be run by removing the handle wafer and placing the wafer directly on the quartz pins.

- Temperature is measured using a high temperature pyrometer which will not register temperatures below 285°C.

- The system can ramp temperature as quickly as 150°C/sec but high ramp rates can lead to problems with slip lines and dislocations on the Si handle wafers.
- Samples must have an RCA clean before running.
- Metals and photoresist are not allowed in the system and organics in general are prohibited.

Troubleshooting

Difficulty engaging lid handle

If you have trouble engaging the handle when closing the lid, open the chamber and check if the chamber o-ring has pulled out of the groove. Press the o-ring back into the groove if necessary, and try again.