CORAL Name: RTA-1100C-ASMicro

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

Contents

Introduction 1
Safety 1
User Qualifications and Responsibilities 2
Operating Procedures 2
Appendices 6
Notes 6
Starting the Windows XP virtual machine 7

Introduction

The RTA-1100C-ASMicro uses quartz lamps to rapidly heat samples in a variety of ambient atmospheres. Gases available are Nitrogen (N_2), Ammonia (NH_3) and forming gas (95% N_2 / 5% Hydrogen (H_2)). Samples (<50mm diameter) are run in a SiC coated graphite susceptor. Temperature is measured using a Type-K thermocouple inserted into the side of the susceptor. The ramp rate is limited to 20°C/sec to prevent cracking of the susceptor parts.



HSQ is allowed, but other photoresists 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.

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!

Mechanical pinch/crush points exist with the chamber door. The door slides open along a center rail, but tension from the water lines can cause the door to close. Please be careful and keep fingers and other body parts clear when closing the chamber.

N_2 and forming gas displace oxygen and can cause rapid suffocation. NH_3 is a toxic and flammable gas and can form an 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.

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.
- HSQ is allowed, but other photoresists are not allowed in the system and organics 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.
- Any metal contact will cause the SiC coating on the susceptor parts to degrade and fail, so it is important to use the provided PEEK soft-tip tweezers when handling the susceptor, susceptor lid, or when loading/unloading samples from the susceptor. Metal tweezers will damage the SiC coating on the susceptor.
- Users are expected to replace the Si carrier 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

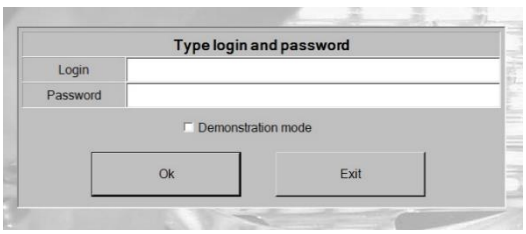
Make CORAL reservations ahead of time for the RTA-1100C-ASMicro. Verify that the system is not being used before you engage on CORAL. The software checks CORAL status, so you need to engage before you can run any recipes.

Starting software and logging in

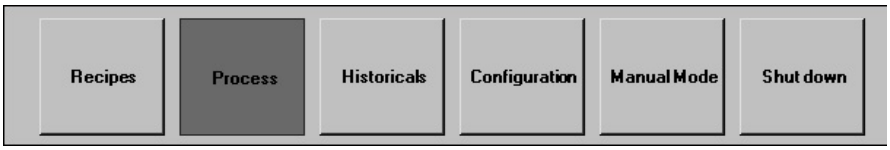
1. If it is not already open, start the AnnealSoft control program by double-clicking the icon on the desktop.

   If you do not see this icon, please see the appendix "Starting the Windows XP virtual machine".
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:

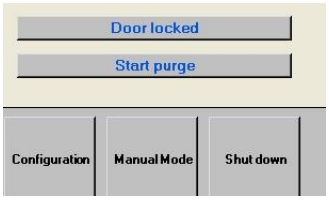


Loading samples

4. Turn on the system by pressing the green "ON" button on the front panel.
   The orange light between the green and red buttons should turn on.



5. Click **Door locked** in the lower section of the screen to unlock the chamber.



6. Unscrew and remove the two black handled knobs holding the door in place and carefully slide the door and tray out of the chamber.



Figure 1 chamber knobs

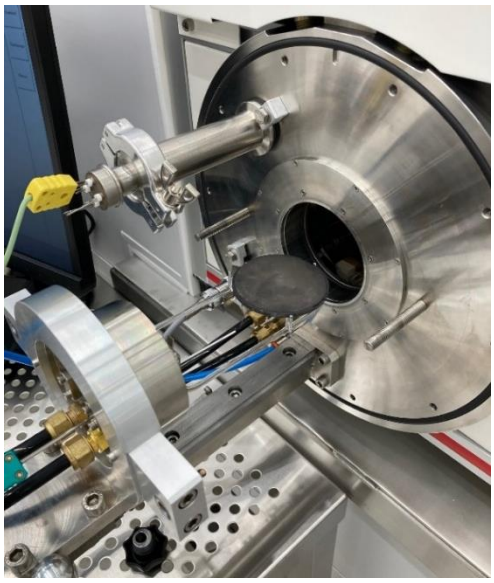


Figure 1 chamber open

7. Use the PEEK tweezers (not metal tipped!) to remove the lid from the susceptor and place it on the quartz plate.

NOTE: Any metal contact will cause the SiC coating on the susceptor parts to degrade and fail, so it is important to use the provided PEEK tweezers when loading and unloading samples.

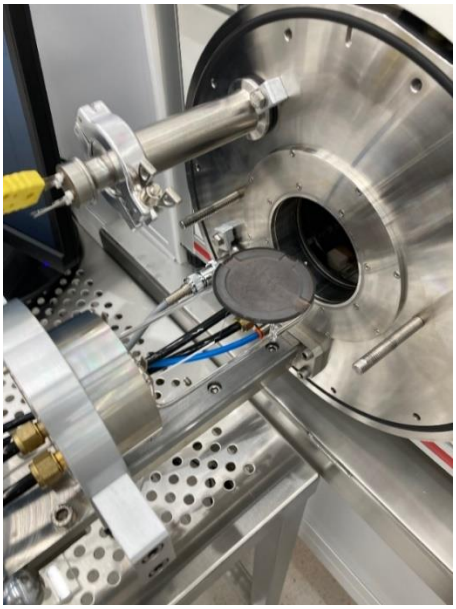
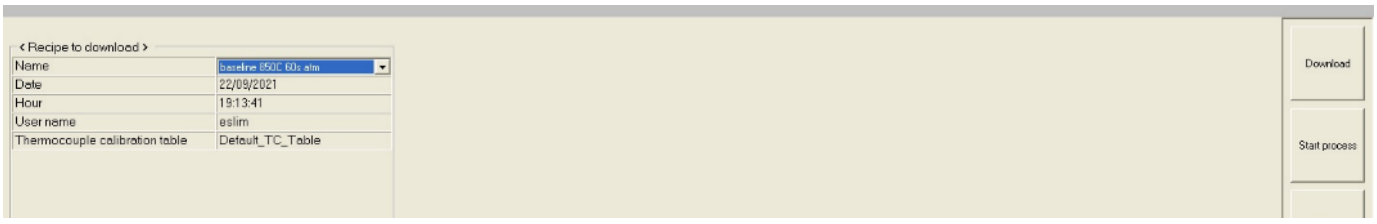


Figure 2 Susceptor with lid off

8. Place your samples in the susceptor recess and replace the lid.
9. Carefully slide the tray back into the chamber and screw on the black handled knobs to hold the door closed.
10. click **Door unlocked** on the lower section of the screen to lock the chamber

Downloading and running a recipe

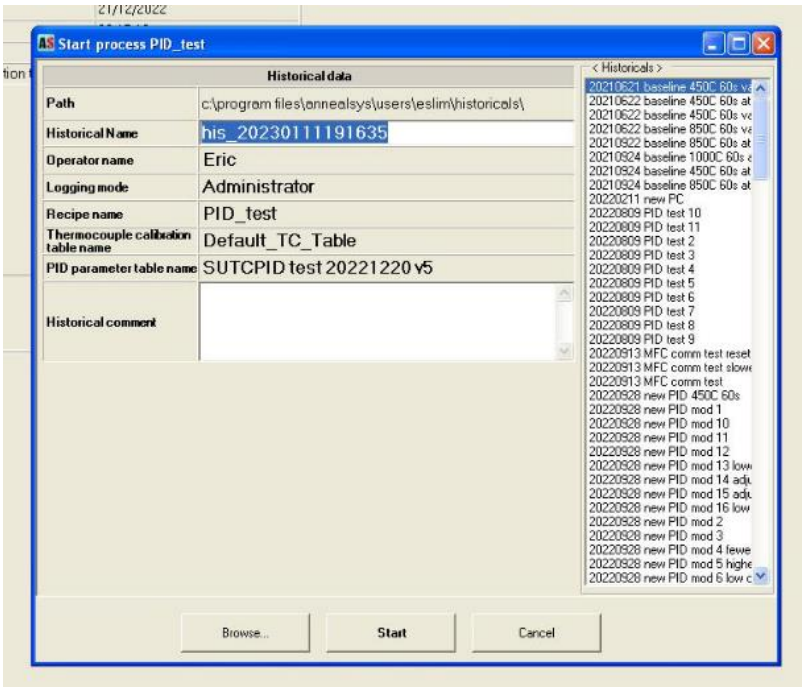
11. Select the recipe you want to run from the drop-down menu then click **Download**.



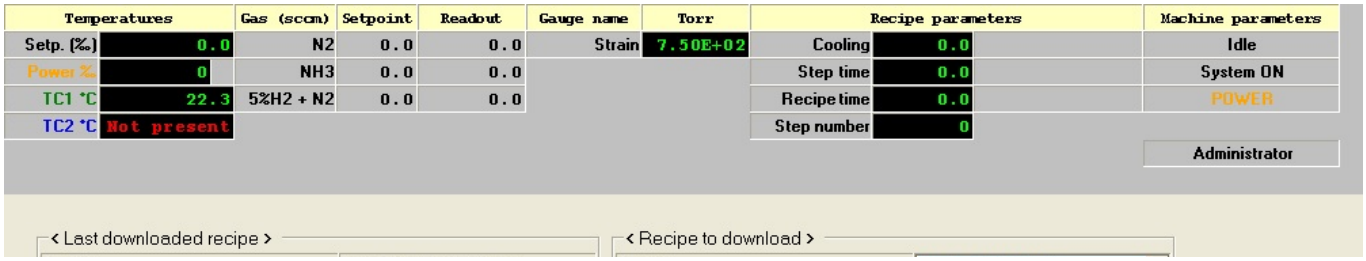
12. Click on Start process



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.



13. 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.



14. 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.

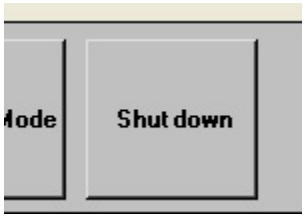
15. Unlock and open the chamber, remove your samples and repeat the preceding steps to run your next sample.

Finishing up and logging out

16. Once you are finished running all of your samples, make sure the susceptor lid is back in place, close and lock the chamber lid.
17. Turn off the machine by pressing the red button on the front panel of the tool



18. The orange light between the green and red button should go out.
19. Use the **Shutdown** button to close the software and return to the Windows XP desktop.





20. Disengage the RTP-1100C-ASMicro on Coral.

Appendices

Notes

- Samples (<50mm diameter) are run in a SiC coated graphite susceptor.
- Temperature is measured using a Type-K thermocouple inserted into the side of the susceptor.
- The ramp rate is limited to 20°C/sec to prevent cracking of the susceptor parts.
- HSQ is allowed, but other photoresists are not allowed in the system and organics in general are prohibited.
- Any metal contact will cause the SiC coating on the susceptor parts to degrade and fail, so it is important to use the provided PEEK soft-tip tweezers when handling the susceptor, susceptor lid, or when loading/unloading samples from the susceptor. Metal tweezers will damage the SiC coating on the susceptor.

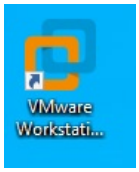
Starting the Windows XP virtual machine

The AnnealSoft software runs on a Windows XP virtual machine. Normally the system the desktop should look like this:

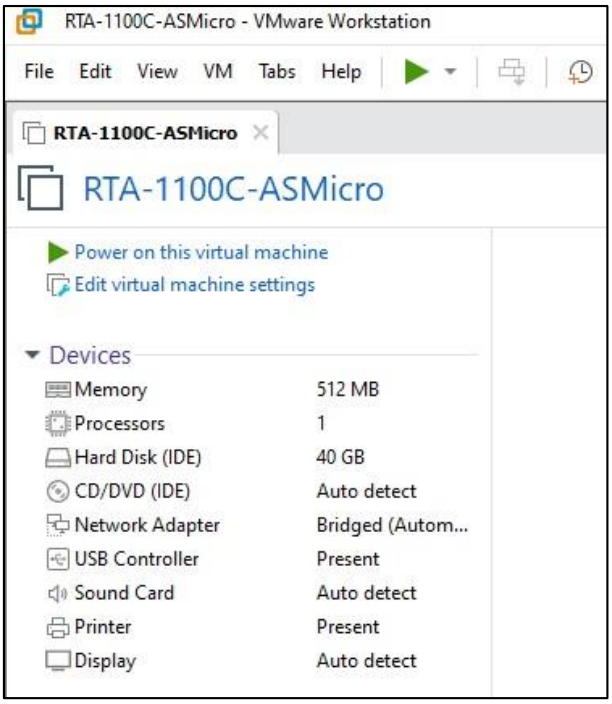


If not, either the virtual machine window is minimized or not running.

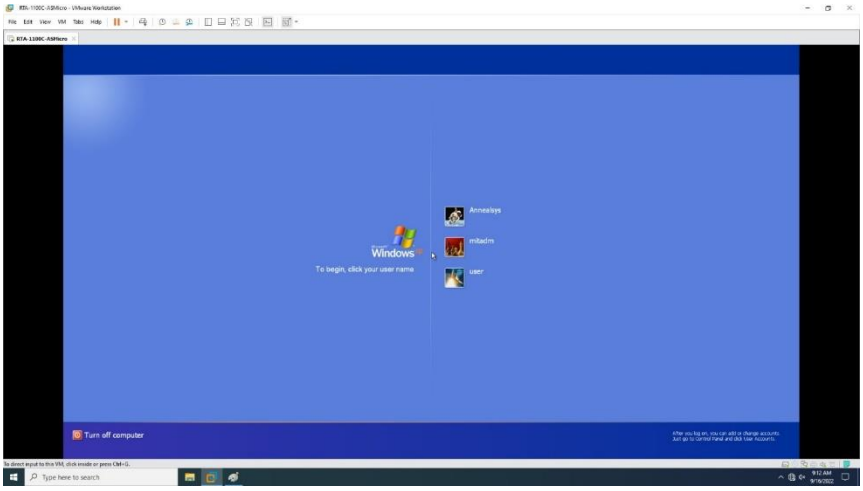
To start the Windows XP environment, open the VMWare workstation by double-clicking this icon:



And power on the RTA-1100C-ASMicro virtual machine.



Once the XP environment has started up…



Log in as user (password is user), then enter full screen mode by clicking this icon:



At this point you should be able to proceed with the normal operating procedure.