



RESINA FURNACE

Operating Manual

This document contain a brief summary on how to operate the RESINA furnace.

Created by:

Raghd Saadieh

Delphine Leroy

Updated by

Feng Ni

Last edited: April 24th ,2015

Starting up the furnace

- Step 1:** Open up compressed air valve on the left of the furnace (Figure 1).
- Step 2:** Move to the right side of the furnace, you will find the water valves (Figure 2). First, open the water outlet valve (Figure 2A) and then the water inlet valve (Figure 2B). It is important to carry it in this order to prevent excessive water pressure in the tubes. You can check the water level on an indicator located at the bottom of the furnace (Figure 3). The water level (green) should be above the orange indicator.
- Step 3:** Open up the gas cylinder valve (always open the valve for inert gas and your choice of other process gas) and set pressure to one bar (Figure 4). Plug the argon sensor to the ABB gas analyzer (Figure 5). This will allow monitoring of the gas flow.
- Step 4:** Turn on the main power switch for the furnace located on the side (Figure 6). Directly after powering on, gas-purging cycle will begin. Green indicator on the front panel of the furnace will blink (Figure 7). The cycle usually takes 20minutes.

Preparing your sample and experiment

- Step 5:** After the cycle is complete, open the chamber (Figure 8). There is eight screws in total on the front plate and one additional screw at the bottom, which will allow you to raise and lower the chamber using the appropriate lever (Figure 9A). Place your crucible on the sample holder, raise it and close the chamber again. Do not tighten up the screws very much or else it will be very difficult to unscrew them after the experiment is completed
- Step 6:** Write the program corresponding to your experiment on the pc and save it. Launch it and it will be loaded into the furnace.

Running the experiment

- Step 7:** Press on the run cycle button on the front panel of the furnace. The vacuum pump will start automatically to evacuate the chamber. The pressure should reach 80mtorr in 20mins. If this is not achieved the gas purging starts again automatically. Once it is over, you can press the button run cycle again. If everything is fine, the program will run and heating will start in the furnace automatically.

Noting: Before vacuum, the vacuum valve, filter valve and gas in valve are supposed to be closed. While vacuuming, open the vacuum valve to make the graphite crucible vacuum. After vacuuming, close vacuum valve and open gas in valve and filter valve. (Figure 10)

Shutting down the furnace

- Step 8:** Once everything is finished, you have to repeat step to open op the chamber and pick up your sample. Be careful while handling your sample since it might still be warm. Once you are done close the chamber again, turn off the furnace and close the gas bottle.
- Step 9:** Finally close the compressed air valve and the water inlet than outlet valve.

In case of emergency

Press the red button on the front panel of the furnace (Figure 9B). It will automatically shut down the furnace and start gas-purging sequence.

Gas analyzer (ABB AO2020) operation

1. The gas analyzer is connected with a T-valve. (Figure 11). To calibrate the gas analyzer, the calibration gas goes directly to the gas analyzer by switching the valve to gas analyzer. To run the experiments, the process gas goes into the furnace by switching the valve to furnace.
2. Open protection gas N_2 purged into the gas analyzer and open the pumping machine.
3. The maximum of CO gas flow rate is 0.3l/min to make sure the data of CO concentration is stable
4. The pressure meter is used to stabilize the gas flowing into the gas analyzer. (Figure 12)

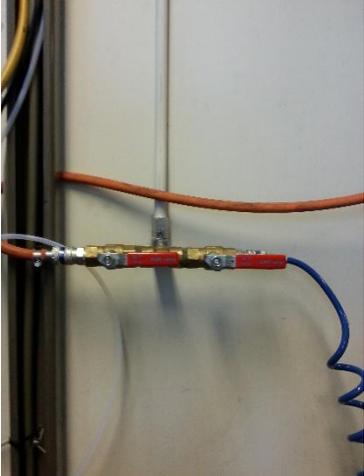
Figure 1: Compressed Air Valves	Figure 2: Water Valves	Figure 3: Water Level Indicator
		
Figure 4: Gas Valves	Figure 5: Mass Flow Controller	Figure 6: Furnace Power Switch
		
Figure 7: Furnace Front Panel	Figure 8: Furnace Chamber	Figure 9: Chamber Position Lever



Figure 10 vacuum



Figure 11 T-valve

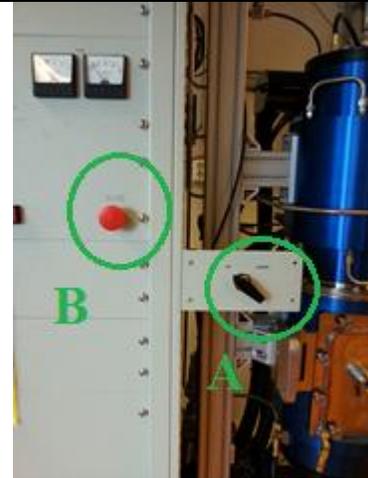


Figure 12 pressure meter

