Chapter [5.37]

Small Vacuum Oven for Polymer Curing

(vacoven2) (380)

1.0 Equipment Purpose

1.1 The Precision Scientific Vacuum Oven (vacoven2), located adjacent to the SEM coater, is available for baking and curing samples under vacuum.

2.0 Material Controls & Compatibility

2.1 vacoven2 can be used for curing and baking samples under vacuum in a range of temperatures from room to 170℃. Members have used it for Polydimethylsiloxane (PDMS), Santovac wafer bonding, curing, offgassing and photoresist bakeout.

2.2 Do not place beakers with flammable solvents inside the oven

3.0 Training Procedure & Applicable Documents

3.1 Member Qualify Tool

3.1.1 Timeline (estimated time to completion: 1 day)

3.1.2 Train and qualify with any qualified member. All qualified members are superusers on these tools.

4.0 Definitions & Process Terminology

4.1 **Curing** - processing meant to toughen or harden polymer material

4.2 **Degassing** - removal of unwanted gas from solvents

4.3 **Offgassing** - also known as *outgassing,* releasing of trapped gas from material

5.0 Safety

5.1 **Burn hazard.** Surfaces inside the oven may burn you. Avoid touching any inside oven surface when hot and wear appropriate hand protection.

5.2 Do not place beakers with flammable solvents inside the oven

5.3 Use heat resistant red rubber **hot hands** to remove your sample holder

5.4 **Researchers must consider the temperature limits of their sample holders.** Some plastics have limited use temperatures; never use a plastic container in a heated oven. Check with staff if you are not sure your sample holder can withstand operating temperature.

5.5 The oven may be left unattended when performing well understood, stable processes, during regular MNL Staff hours (8AM – 5PM) if labeled with a blue process identification tag. The oven should be periodically monitored. In the event a process requires oven use outside of regular Staff hours, members are responsible for conducting routine inspections that maintain a safe, well controlled process.

6.0 Process Data

6.1 This tool is not monitored for process parameters

6.2 Material use history data is collected upon enable and can be found in comment history of the tool in Mercury Client

7.0 Available Processes, Gases, Process Notes

7.1 Main processes include heating the sample at room temperature, heating the sample under vacuum and pumping vacuum on the sample at room temperature.

7.2 The oven is equipped with (See Figure 11.1)

7.2.1 Temperature control knob

7.2.2 Temperature gauge

7.2.3 Valve to the vacuum pump

7.2.4 Vacuum gauge

7.2.5 Backfill valve

8.0 Equipment Operation

8.1 Turn on the Power Switch

8.2 Place your sample inside using your own heat resistant cassette or sample holder and take care that your sample does not touch the walls. Close the door.

8.3 If vacuum is desired, make sure the backfill valve is closed, then open the pump valve by flipping the black switch up towards the ceiling.

8.4 To start the heating process set the temperature control knob to a desired value. Members report a temperature of about 130℃ at the setting of 5 to 6. Calibrate the temperature setting for your needs.

8.5 After finishing your process, turn the temperature control knob to zero. The oven backfills with N2. Close the pump valve by flipping the black switch into the horizontal position. Open the backfill valve slowly and let the chamber reach atmosphere (~760Torr). Take precaution not to touch hot inside surfaces when removing your sample.The inside of the door might be hot as well.

8.6 Turn off the N2 flow by closing the backfill valve. Please pump the chamber when you leave the tool.

9.0 Troubleshooting Guidelines

9.1 If the tool won't pump down check the door gasket for particles and wipe down with IPA and a Technicloth. Report a fault if condition persists.

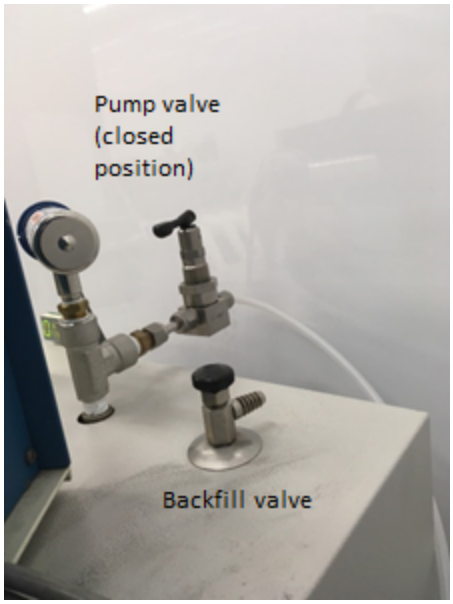
10.0 Study Guide

10.1 There is no online exam for this tool

11.0 ***Appendices***

11.1 Figures

Front of the oven



Valves at the back