



University of Pittsburgh

Nanoscale Fabrication & Characterization Facility

Plassys E-Beam Evaporator Users Guide



The model MEB 550-S provides thin film coating and Argon ION etching. Our system is equipped with 6 kW, 8-15cc pocket e-Gun, thickness monitoring, sample heater, and direct temperature monitoring. A variety of evaporation source materials are available. The system has an ultimate vacuum on the order of 1.1×10^{-8} mbar.

Operation Procedure:

- 1) Log into both “Cr-Cleanroom” and “CR-Deposition System Sputter Plassys” using FOM
- 2) Log into the Plassys software using the login and password of “operator”.
- 3) Note the system pressure before venting. It should be near or below 2e-7 mbar unless recently open.
- 4) Verify the system software is free on any alarms. If it is not seek support from the NFCF staff to resolve.
- 5) Vent the system by pressing the vent button for the load lock. Press “confirm” to continue the vent process.
- 6) If the system does not vent, verify you are logged into FOM. If the system still will not vent, log out of FOM and then log back in.
- 7) Do not leave the system venting/vented. It must be pumping unless you are loading your samples. Leaving the system venting drains our N2 supply!!
- 8) Once the load lock is vented, the load lock atmosphere light will turn on. “ATM LL”.
- 9) Open the top lid and gently remove the sample holder. It is held in place using a press, twist and lock mechanism.
- 10) Replace the aluminum center piece of the sample holder with the molybdenum piece if you are running any heat during your process.**
- 11) Mount your sample on the holder using the supplied clips, wire mounts or kapton tape.
- 12) Re-install the sample holder by pressing it into the alignment cutouts, twisting and releasing. Be careful of the heater and the thermocouple when removing and installing the sample holder.

- 13) Verify the o-ring is clean of particles. If necessary clean o-ring with wipe and IPA. Close the lid and press the pump button for the load lock.
- 14) To edit and/or verify the thickness of the desired films, click the edit process tab. Then select the file tab and open the desired process in the folder created for your group.
- 15) Once the file has loaded, enter the desired thickness in the thickness column and remember to save the file and exit the editor window.
- 16) Custom processes can be created by using drag and drop from the sub-process folders. Arrange the sub-processes to create a custom process.
- 17) Press the run recipe tab, click the recipe browse button and select the desired recipe. To create new recipes or make changes to sub-processes, contact NFCF staff. They have control of the master sub-process list for each material.
- 18) Execute the recipe and watch as the steps are carried out.
- 19) You will need to verify the beam position during the process:
 - a. Open shutter and verify beam position.
 - b. Verify that the material is present and over 50% full.
 - c. Only turn the film knob when it is coated and only turn it counter-clockwise.
 - d. Use polarizing lens for looking at bright sources.
 - e. Remember to close the shutter.
- 20) Note that the deposition begins when the rate is within 10% of the set point. It can be started sooner by pressing the "skip" button.
- 21) When the process has completed, vent the load lock, remove the sample holder and your sample.
- 22) Place the sample holder back in the load lock and pump the load lock down. **Make certain the center piece is firmly attached with clips!**
- 23) Log out of FOM.

Machine capabilities:

- 1) Glancing angle deposition from 1-355 degrees with an accuracy and reproducibility of 0.1 degrees.
- 2) Substrate heating up to 700 degrees C with Moly holder.
- 3) Substrate rotation up to 5 RPM.
- 4) Passive cooling with carrier heatsink.

Source Materials for use with Plassys e-Beam Evaporator

Titanium

Gold

Nickel

Silver

Gold Palladium

Aluminum

Iron Cobalt Boron

Tungsten

Platinum

Chromium