

3-Gun Sputter System

You may use the sputter system after receiving training from the facility staff. Reserve all necessary time in FOM and notify the facility staff at least 24 hours in advance to request target changes. Fill out a log sheet and log on and off in FOM each time you perform a deposition. When you finish, the system should be left in the fully pumped state.

To load substrates and pump down:

- 1) If necessary, turn the ion gauge off (MENU – IG OFF).
- 2) Close the gate valve by flipping the appropriate toggle on the control panel down.
- 3) Gradually open the vent valve (manual valve with black knob) and winch the lid cable to slight tension.
- 4) When venting is complete, close the vent valve (do not over-tighten) and winch the lid fully open.
- 5) Verify that the desired targets are in place and the magnet board is correct. For listed tooling factors to be valid, position the guns at the proper heights, with the etched mark 4.75" above the textured o-ring collar (4.25" above the locking collar if one is in use). Any gun not in use should be covered with a blank 'target'.
- 6) Press XTAL on the Inficon QCM controller to check the crystal life and request a change if the reading is over 10%.
- 7) Place substrate(s) on the appropriate stage. Secure in place with a small piece of Kapton or carbon tape if desired.
- 8) Move the stage shutter into the closed position (i.e. over the stage – see sign on chamber for dial positions).
- 9) Close the lid in the proper orientation and make sure it is seated properly.
- 10) To pump out the chamber:
 - a. Flip up the control panel toggles to turn on the rough pump and then open the roughing valve.
 - b. Wait for the pressure to reach 2 torr (as read on the CG2 line; this takes about 1 1/2 minutes).
 - c. Close the roughing valve and turn off the roughing pump (in that order) by flipping the two toggles down.
 - d. Open the gate valve by flipping the appropriate toggle on the control panel up.
- 11) Turn on the ion gauge (MENU – IG ON) and pump for an appropriate time before sputtering ($P < 10^{-5}$ torr).
- 12) If necessary, turn on stage heater and/or rotation (see back side for specific procedures).

To sputter:

- 1) Connect appropriate power supplies to gun(s) to be used.
- 2) Turn off the ion gauge.
- 3) On the mass flow controller, activate argon flow. With the green LED (move up and down with arrow buttons) on channel A1, press SETPOINT and then ENTER. Repeat as necessary for other channels/gases used for reactive processes. See back side for details on QCM controller operation.
- 4) Reduce the aperture of the gate throttle array by flipping the "Pump Array" switch to ACTIVE.
- 5) If necessary, adjust the throttle array micrometer to set the desired sputter pressure (as read on the CG2 line; apply gas corrections as necessary as indicated by the table attached to the gauge).
- 6) Program the film density, z-ratio, and tooling factor into the Inficon QCM controller. (See notes on back.)
- 7) Open the cooling water master valve (front left leg of rack) to begin flow. **Make sure water is flowing to the guns.**
- 8) Program and activate the appropriate power supply (specific instructions on back) to begin sputtering, and pre-sputter the target as necessary. NOTE – In order to prevent the viewport from becoming coated, do not leave the viewport shutter open for more than a few seconds at a time while sputtering is active.
- 9) When pre-sputtering is complete, open the shutter and zero the total thickness reading on the monitor by pressing ZERO (not the numeral 0).
- 10) When desired film thickness is obtained, deactivate the power supply.
- 11) If multiple film layers are required, close the stage shutter and repeat steps 8-10 for each subsequent film.
- 12) Turn off sputter gas flow (CLOSE – ENTER) and open the gate throttle (switch up) to return to base pressure.
- 13) Turn off the cooling water flow by closing the valve.
- 14) If applicable, turn off the heated or rotating stage and wait for the stage to cool.

To remove substrate(s), vent by repeating steps 2-4 above, and then pump down by repeating 9-10.