Balzers Sputter Coater SCD 050

The SCD 050 is a bench top, sputter deposition system designed for thin films on substrates up to 6 inches. Morphology and thickness is user controlled using power, pressure, working distance, and a Syscon Instruments STM-100/MF thin film monitor. Thickness can be time controlled or crystal monitor controlled. A complete process takes about a half hour. It is also capable of cathode etching.

Biological and temperature sensitive specimens are sputter coated at greater working distance and at lower sputter current and therefore will have longer sputter times.

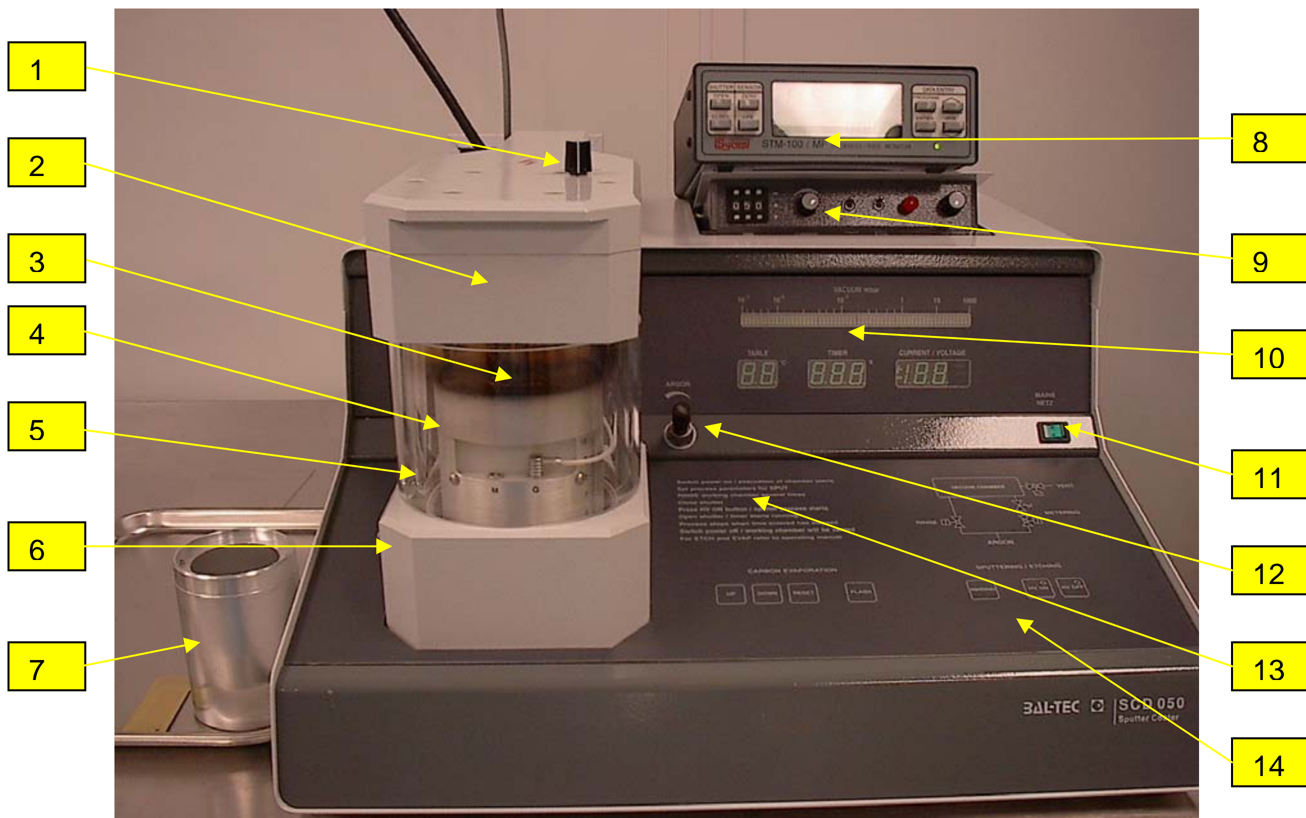
General Instructions

1) No buddy system restrictions.
2) Coordinate optional large chamber set up with staff.
3) Replace targets in provided, marked containers.
4) Pump down chamber to 0.5mbar after you are done.
5) Glass chamber should be cleaned only at cleaning station with approved cleaners.
6) Remarks at sign off should always include metals used.
7) Notify staff concerning any operating problems encountered in remarks section when signing off.
8) Clean up after you are done with your work.

Metal Targets Available

1) Gold
2) Chrome
3) Molybdenum
4) Nickel
5) Titanium
6) Tungsten
7) Silver
8) Platinum
9) Copper
10) Gold Palladium
11) Cobalt
12) Iron

Front Panel Controls, Indicator, and Knob Settings



(1) Shutter Dial
(2) Sputter head and arm
(3) Sample Stage/Cathode
(4) Glass cylinder
(5) Implosion Shield
(6) Chamber base
(7) Target positioning tool
(8) Syscon STM-100 Thickness/Rate Monitor
(9) Process selection panel
(10) Display panel
(11) Main Power switch (Nitrogen purge)
(12) Manual gas dosing valve (Argon)
(13) Operating Checklist
(14) Control Panel

Operating Instructions

The system will be on when you start.
Clean and prepare your samples first.
There is no target installed when you start. Select the target and check the back where each one is scribed for identification.

Installing or Changing the Target.

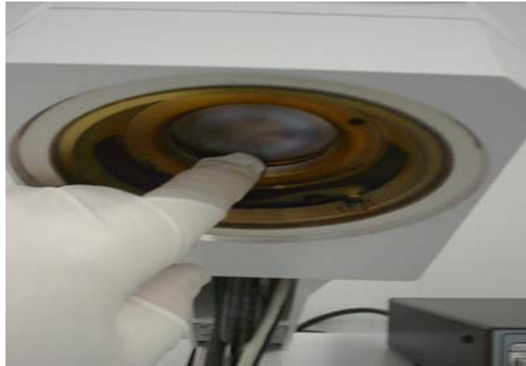


Figure 1

Turn off Main power.
Nitrogen purges the chamber while power is off.
Raise Sputter Head and prop in place using PVC piece.
Turn shutter knob to open shutter.
Remove anode ring (Figure 1).

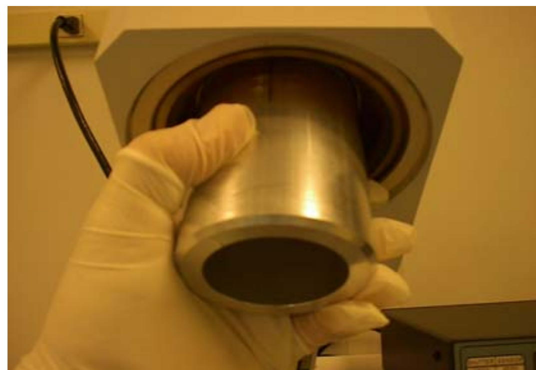


Figure 2

Snap the carrier pins of target positioning tool into two holes of target holder ring (Figure 2) and turn counterclockwise to remove.
Place foil target scribed side facing you on the target support ring.
Place the supporting ring with target on the magnet head.

Position the target supporting ring into slots and turn the position ring tool clockwise until it locks.
Replace anode ring.
Close the shutter.

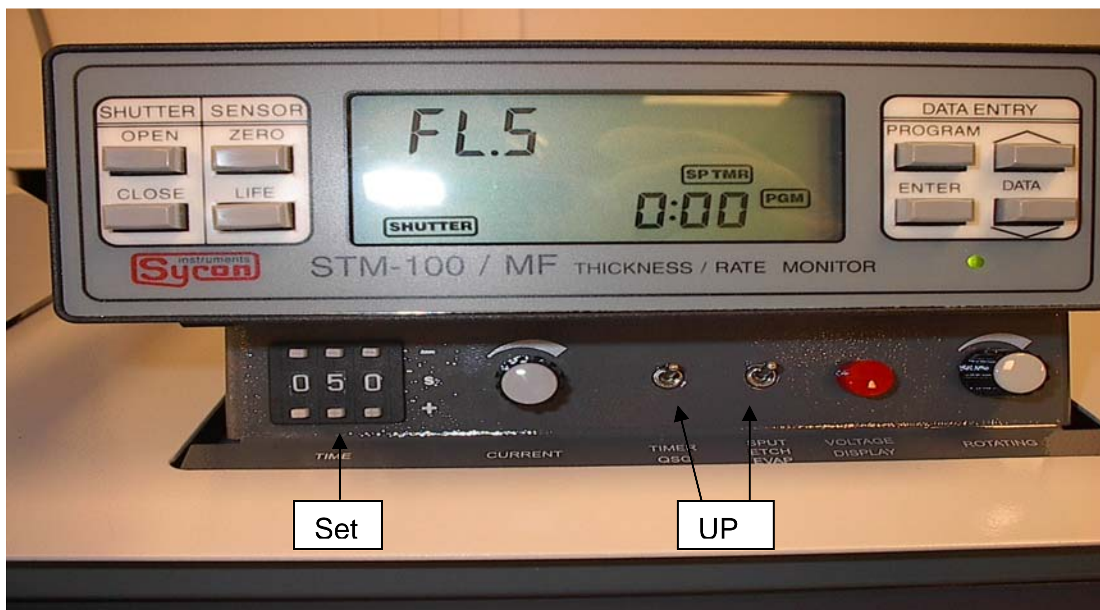
Remove the implosion shield and glass chamber.
Adjust working distance height measured from upper rim of chamber base.
The working distance should be increased for temperature sensitive materials.
The working distance is normally kept at ~ 50mm.

The STM-100 should be in the FL.1 through 9 mode. They are listed on last page of this manual. Press Program Button. Use Up/Down arrows labeled DATA to change Film #.
Press ENTER button to program or verify density and Z factor and final thickness. Cycle back to the film parameter mode which

Press the LIFE button on the STM-100 while in the Film mode. If life is below 70%, change the crystal. To do this, on the substrate chuck locate the crystal holder. Using the crystal snatcher, match the pins to the holes, and give the top one full turn. The top should come out or you may have to use a small instrument to flip it up. Replace the crystal, and attach the cover by turning one full clockwise turn. Push LIFE once again and the display should read > 97%. Then push Zero.

Center the sample on stage. Use Kapton tape to secure very light samples.
Check bottom and top seals of glass chamber for cleanliness, and if necessary, wipe with a texwipe and IPA.
Attach implosion shield. The pin of the plug must latch in the slot of the socket.
Close the chamber by lowering sputter head arm.
Close shutter with dial at this time.
Turn on Main switch to start pumping the chamber while pushing the head down to maintain a vacuum. Pump down to 5×10^{-2}.

Sputtering with Time Control



Select timed sputter process by flipping timer and sputter switches to the UP position; TIMER vs. QSR.

Set time from 1 to 999 seconds.

Rinse with argon by pressing touch pad. Rinsing (purging) of the chamber makes it easier to remove unwanted gasses, especially water vapor. Light goes green while pad is held down. Repeat 3 times.

Pump down the chamber to 0.05 (5×10^{-2}) mbar.
Turn on high voltage (HV), and set current to power setting based on source metal.

Adjust working pressure with argon valve to approximately 5×10^{-2} mbar. Allow to stabilize for 1 minute minimum. The first sputtering will be removing native oxide.

Open shutter.
The timer will then count up to your preset time to your preset time.
When finished, the power automatically shuts off.
Close shutter.

Turn off Main power switch and nitrogen purge begins
When at atmosphere, lift sputter arm and prop and remove samples.
Remove target following installation/changing instructions as before.

The anode ring may be warm. When removing, give the system a few minutes to cool off while taking out your samples.

Fill out Log, note target(s) used and thicknesses.

Using Syscon STM-100 Thickness Rate Monitor

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Select film number by pushing the up or down data button.
Press Program and check parameters.
Toggle through each with the Enter button. Values for those not displayed may be found on the bottom of this instrument.

Continue through values and return to Film number screen.
Press program key to display deposition parameters.
Press Zero to reset display.

Select QSR sputter process by flipping timer/QSR switch down. Select shutter open by pressing open button.

Rinse with argon by pressing touch pad. Rinsing (purging) of the chamber makes it easier to remove unwanted gasses, especially water vapor. Light goes green while pad is held down. Repeat 3 times.

Pump down the chamber to 5×10^{-2} mbar.
Turn on high voltage (HV), and set current to power setting based on source metal.

Adjust working pressure with argon valve to approximately 0.05 mbar. Allow to stabilize for at least 1 minute. The first sputtering will be removing native oxide.

When finished, the power automatically shuts off.
Close shutter.
Turn off Main power switch and purge begins. Close argon needle valve and turn down power to zero.
When at atmosphere, lift sputter arm and remove samples.
Remove target following installation/changing instructions as before.

When finished, turn unit back on and pump down to .5 mbar. Unplug pump and leave system power on.

Log out and note target(s) used and thicknesses.

Bal-Tec Sputter Coater
SCD 050

Operating Instructions

Nanobiotechnology

Room 110

Hex# 073