

# Denton Desk IV Sputter Instruction Manual

In emergency, please contact:

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## Reservation

Reservations are made using FOM software (Facility On-line Manager, <http://fom.uncc.edu/>). User must apply an FOM account and use FOM to make reservations and log in/out online. **ONLY** trained users have permissions to make reservations and operate this SEM.

## Preparation:

1. Be sure that the chamber is vented (mechanical pump is off). The chamber is normally left as vented after each coating.
2. Grasp the underside of the sputter head between the vertical post and the stainless steel cylinder. Lift the head vertically about 1 inch, and then swing the head horizontally to the left. When the head is clear of the top of the cylinder, grasp the front edge of the sputter head and rotate the head counter-clockwise so that the head faces up at 45°.
3. Check the sputter target on the head. (Double check the record of the target used last time on the login sheet). The SEM lab provides Gold and Platinum targets.  
*Ask Dr. Haitao Zhang, if you want to coat carbon. If you want to coat other materials, you should have your own targets and ask for permission in advance.*
4. Load your samples onto to the sample holder. If necessary, you can use double side copper or carbon tapes (in SEM sample preparation area) to keep the samples from falling from the holder.  
*Note: no other tapes are allowed to use in the vacuum system.*
5. Replace the sputter head onto the cylinder by reversing the step 2.

## Pumping:

6. On the LCD monitor, press the [Vacuum] from the Main Menu to select, and then switch on the rough pump. A vacuum pressure window will display ~967 mTorr. After ~1 min the reading will start to drop.
7. **Wait at least 10 min till the pressure goes below 200 mTorr.** Then turn on the Turbo pump. The pressure will further decrease to a minimum reading (~25 mTorr). **Wait at least 20 min** for system reach to a background vacuum pressure about  $5 \times 10^{-6}$  Torr.

## Setting and coating:

8. Select [MAIN] to go back to the Main Menu, and select the [Manual Sputter].
9. Open the Gas Valve. After the pressure reading stabilizes, adjust the Gas Flow Control Knob to set the pressure at ~ 30 mTorr (5mTorr above the minimum pressure reading).
10. Set the Rotation Setpoint to ~30%, turn on the Rotation.
11. Set the Sputter Setpoint to ~30%. Note: 0 – 100% = 0 – 50 mA.  
*Note: for soft material as Gold, you can set the power to 15% to get a slower deposition rate.*
12. **Before coating, turn on the Thickness Monitor.** When the monitor shows P FAIL, press [STOP] to clear the message.
13. On the Thickness Monitor, press [FILM NUMBER] and use the up/down arrows to choose the right Film number for your target.

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Film Number	Target Material	Calibrated Tooling Factor
1	Platinum (Pt)	483.2
2	Gold (Au)	525.8
3	Nickel (Ni)	103.7
4	Silver (Ag)	426.4
5	Palladium (Pd)	295.5
6	Titanium (Ti)	133.3
7	Tungsten (W)	406.0
8	Copper (Cu)	To be decided
9	Molybdenum (Mo)	814.3

14. On the Thickness Monitor, press [START] to zero the deposition rate and the coating thickness.

*Note: the deposition rate is in unit of Å/sec, and the thickness is in KÅ (so 0.01 KÅ = 1nm).*

15. Turn on the Sputter Power. Sputtering begins and a glow discharge can be seen through the glass window. Please record the current for later reference:

**Setpoint: 30%**                      **Current:** \_\_\_\_\_

**Setpoint: 15%**                      **Current:** \_\_\_\_\_

16. When the desired coating thickness is reached, turn off the Sputter Power immediately. Press [STOP] on the Thickness Monitor.

### Turning off and unloading:

17. Turn off the rotation, and the Gas Valve. Turn off the Thickness Monitor.

18. Turn off the Turbo Pump. **Wait at least 10 min before vent the chamber by turning off the Rough Pump.**

19. Open the Sputter Head and take out your samples.

20. Replace the Sputter Head.