

**Cooke Vacuum Evaporator - Operating Instructions**

1. If the system is under vacuum, vent using the vent valve switch (1). You have to turn the vent valve off if you would like to hoist up the glass dome (bell jar) to get access of the inner chamber (use switch (2) to hoist the dome up or down). Make sure the dome clears from any obstructions on the way up or down.
2. There are two sets of electrodes. For Au coating use the one in the back. Use a wire basket and ~5" Au wire (0.5 mm diameter) for ~100 nm coating/ thin film. Make sure that the wire is made into a ball with a point so it can fit better inside the basket.
3. Load samples in the sample holders and lower the dome (bell jar).
4. Turn mechanical pump on (switch (3)) and turn on the fan to remove oil fumes (A).
5. Turn roughing valve on (switch (4)) for a while. Turn off the roughing valve (switch (4)) before turning the foreline valve on (switch (5)) in step 6.
6. Turn the foreline valve on (switch (5)) (for a little while) – until the pressure (lower reading - middle reading is for the bell jar) is less than  $3 \times 10^{-2}$  Torr. Turn off the foreline valve (switch (5)).
7. Then turn on the roughing valve (switch (4)) again- allow the system to pump overnight (pressure should go below  $10^{-2}$  Torr).
8. The next day: turn roughing valve off (switch (4)).
9. Turn the foreline valve on (switch (5)). Plug in the water cooler (B). Turn on the diffusion pump (switch (6)) - (~1/2 hour) until the pressure (bottom reading) is less than  $10^{-2}$  Torr.
10. If the chamber (middle gauge) is below  $3 \times 10^{-2}$  Torr, then open the high vacuum valve (switch (7)). If not, switch back to the roughing valve until it is, but no longer than 3 min. (Do not open the high vacuum valve unless the chamber is below  $3 \times 10^{-2}$  Torr)
11. Turn ion gauge on (C) – (upper reading). Switch in near the gauge pressure reading box. (Do not press the degas button)
12. Cool diffusion pump with liquid N<sub>2</sub> (two small dewars) (D).
13. Big round knob on the bottom (E) should be set at 2 for use of the back electrodes.
14. Toggle on the power supply (F).
15. Turn on thickness (quartz) monitor (G) and press the STOP button and then the START button to zero the thickness of the quartz monitor.

16. Turn the round knob (H) on the power supply **slowly** to increase voltage to ~85-95 setting. Sputtering rate on the quartz monitor should be ~ 0.2-0.6 Å/sec.
17. After the desired thickness of the coating has been reached, turn the knob (H) down **slowly**, to anneal the tungsten basket.
18. Power off – Turn off the toggle (F).
19. Leave water on. Turn off ion gauge (C). Turn thickness (quartz) monitor off (G).
20. Close high vacuum valve (switch (7)) and turn diffusion pump off (switch (6)). Leave the mechanical pump on, the foreline valve open, water on for 1 hour or overnight.
21. Turn the water off. The foreline valve and the mechanical pump can be left on when you vent. Also they can be turned off. When this is done you can turn the fan off.
22. Let the system cool (30 min) before removing the samples from the chamber.
23. When you are done, leave the chamber under pressure – using the mechanical pump for a while.

