Title: Carbon coating SEM samples

OBJECTIVE:

To coat samples for scanning electron microscopy analysis by using a Denton Vacuum (DV-502)

MATERIALS:

1) DV-502 operators manual

2) EBTEC carbon rods (CR-120-1)

PROCEDURES:

Turning on the Coater from a Cold Start to a High Vacuum:

1. Turn diffusion pump water all the way by turning the valve counterclockwise.
2. Turn the main power switch on.
3. Turn the mechanical pump switch on.
4. Turn the thermocouple switch on, and to the TC1 position.
5. Open the backing valve all the way by turning it counterclockwise. Wait until the vacuum gauge reads below 100 millitorr..
6. Turn the Diffusion Pump switch on and wait approximately 30 minutes.
7. Close the backing valve until it is in all the way.
8. Open the roughing valve all the way by turning it counterclockwise.
9. When the thermocouple gauge reads a pressure less than 70 millitorr, then close the roughing valve all the way and open the backing valve all the way.
10. Open the main valve by lifting the lever up.
11. Turn the discharge gauge knob to the 10 position and press the vacuum read button. At this time both red lights should come on. Then turn the discharge gauge to the

zero position and adjust to zero. Leave on zero when you are not monitoring the vacuum pressure.

Shutting the Coater Down from a High Vacuum:

1. Turn the discharge gauge, the thermocouple gauge and the diffusion pump off.
2. Wait fifteen minutes or more and then close the Main Valve.
3. Wait an additional fifteen minutes or more , then close the backing valve.
4. Wait another hour and a half then turn off the mechanical pump and the main power.
5. Turn off the diffusion pump water supply.

CARBON COATING SAMPLES:

Loading Samples and Coating:

1. After the coater has come to a high vacuum, the coater is ready to coat.
2. Close the main valve.
3. Open the chamber vent. When the rush of air has ceased remove the glass cell from the system.
4. Load a sharpened carbon rod into the filament holder.
5. Load a blank aluminum disc into the coater as well as the samples to be coated.
6. Place the glass jar back on the coater.
7. Close the chamber vent.
8. Close the backing valve.
9. Open the roughing valve and proceed to step #9 of "Turning on Coater from a Cold Start".

10. When the vacuum has reached a sufficient pressure, carbon coating can be initiated. The lower the vacuum, the better the coating.

11. Turn the voltage knob up so that a current of 20 amperes is maintained for approximately five seconds.

12. Turn the rotary drive on to spin the sample carousel.

13. Eye protection is suggested to view the discharge. Turn the voltage knob up so that the sharpened carbon rod is evaporated rapidly. (greater than 34 amperes). Once the filament rod has burned up, stop and turn the filament adjust to zero.

14. Stop the rotary drive and speed control.

15. Turn the filament power and rotary drive switches off.

16. Go to "Loading Sample" section, procedure #2 and #3 to unload the sample discs from inside the chamber.

RESULTS

A good carbon coat has been made.

REFERENCES:

Denton Vacuum DV-502 Manual