Thermal Evaporator
(Edwards Auto 306)
September 2010
System Startup

• Turn the cooling water switch to **ON** – Do not adjust the flow rate.

• Turn the Auto 306 power switch to **ON**
  • Display Indicates: **POWER FAIL**

• Press **RESET**
  • Display Indicates: **STANDBY**

• Press **START**
  • Display Indicates: **PUMPS ON → BACKING → TURBO → START → SEALED**
Load the Chamber

- Turn **ON** the nitrogen flow on the wall
- When Display indicates **SEALED**, unclip the black plastic shield lock.
- Press **VENT**
- When the shield lifts, avoiding contact with the crystal holder.
- Take out the sample holder plate.
- Affix sample to holder with carbon tape.
- Place gold (silver, etc) in filament heater **A**.
- Filament heater **B** is **ALWAYS** reserved for Cr.
- Replace sample holder, lower shield and lock black clip.
Load the Chamber

• Press CYCLE
• Wait for the display to read: FINE PUMPING
• When the pressure reading is $5 \times 10^{-6}$ torr you may begin coating (this may take ~ 30 min).
Coat the Sample

- Ensure power control HT/LT is set to 0.
- If FILM THICKNESS MONITOR reading is not 0, press RUN pause then press RUN again until 0 appears and only LEDs to “crystal” and “nm” are on.
- Press DATA to highlight the LAYER.
- If LAYER is not 1, change to 1 with the down arrow - This coats a Cr layer first as an adhesion layer
- If an adhesion layer is not required, use the arrows to select 2 and press DATA until the LEDs are on for “crystal” and “nm”.
Coat the Sample

- Turn the LT selector to the 10V/B position for Cr coating.
- Switch the HT/LT selector to LT.
- Slowly rotate the power control on the HT/LT controller to obtain a current that is required for Cr evaporation. While increasing the current, ensure that:
  - Vacuum reading increases
  - The heating filament glows
  - The reading from the display on THICKNESS MONITOR increases from 0.
Coat the Sample

- Adjust the current value carefully until you get a satisfactory evaporation rate (~0.1 nm/s).
  - For Cr, a normal working current is ~ 40 amperes
  - **NEVER** use more than 80 amperes for Cr (the range of the meter is 100 amperes but damage can be done operating close to this limit)
- For an adhesion layer, 5 – 10 nm of Cr is sufficient
- When a suitable thickness is obtained, slowly decrease the current to 0.
- Turn the HT/LT selector to 0.
Coat the Sample – Layer 2

• Press **DATA** until the **LAYER** reading displays then change to **2** with the up or down arrows.

• Continue pressing **DATA** until only the LEDs corresponding to “crystal” and “nm” are on.

• Turn the HT/LT selector to **10V/A** for the second layer (gold, silver, etc).

• Note the thickness reading
Coat the Sample – Layer 2

- Adjust the current value carefully until you get a satisfactory evaporation rate.
  - For gold, a normal working current is ~ 20 amperes
  - **NEVER** use more than 40 amperes for layer 2 or it may burn out the tungsten filament.
- When a suitable thickness is obtained, slowly decrease the current to 0 by rotating back the power control knob.
- Turn the HT/LT selector to 0.
Unload the Chamber

- Press **SEAL**
  - Display reads: **SEALED**
- Unclip the plastic shield lock and press **VENT**
  - Display reads: **CHAMBER VENT**
- Wait until the plastic shield lifts then fully lift it up with your hands avoiding contact with the thickness crystal holder.
- Take out the sample holder and take off the coated samples
- Carefully lower the shield and clip the shield lock.
Unload the Chamber

- Press CYCLE
  - Display reads: FINE PUMPING
- Check the pressure setting on the display and when it reads ~ $10^{-5}$ torr press SEAL.
Shutting Down

- When display indicates SEALLED, press STOP.
  - Display Reads: TURBO STOP → STANDBY.
- When display indicates STANDBY, turn power to 0.
- Turn OFF nitrogen
- Wait ~ 30 minutes then turn recirculator OFF