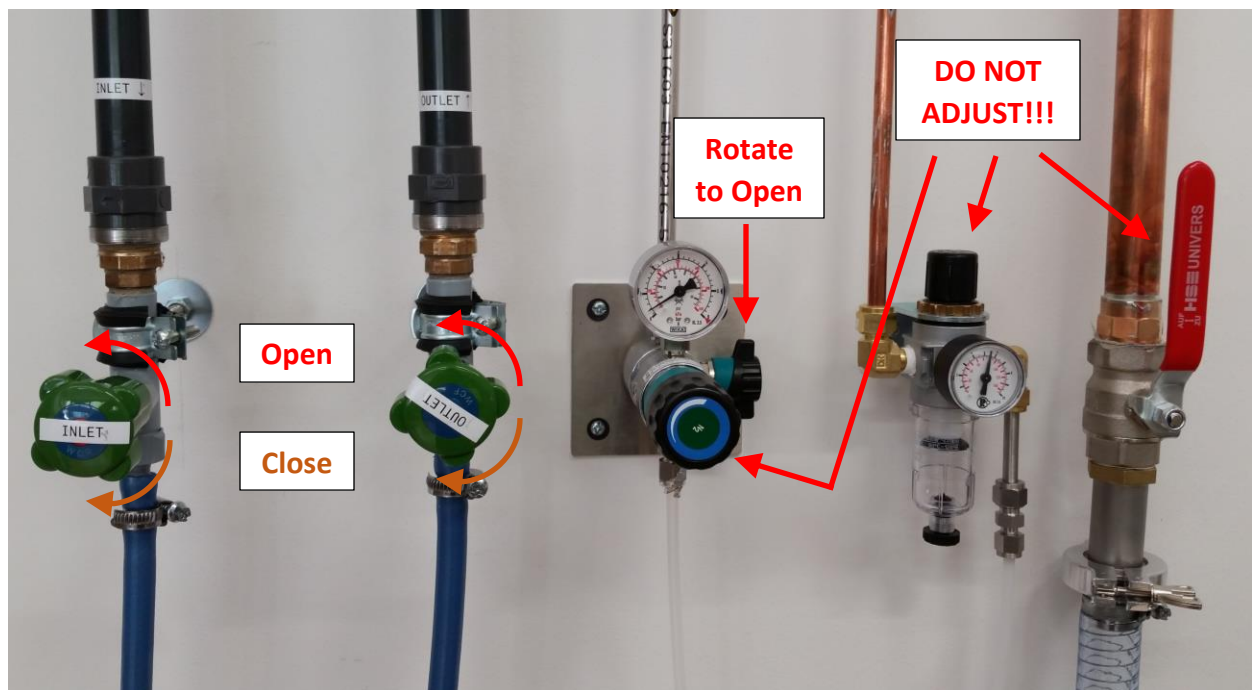


Nano36 Thermal Evaporator Standard Operating Procedure for Cr → Au

If you want to evaporate other metals, please consult either Kirill Greben or Ben Weintrub.

1. Startup checklist:

- Open the water outlet line by rotating the knob labeled “OUTLET” counterclockwise.
- Open the water inlet line by rotating the knob labeled “INLET” counterclockwise.
- Open the nitrogen line (valve switch is horizontal when open). ***Do not*** adjust the regulator, the pressure *should* already be set to ≈50 PSI.
- The CDA line *should* already be open and already set to ≈80 PSI.
- The exhaust line *should* already be open.





2. On the touchscreen, press “RECIPE”, then press “VENT” to vent the chamber to room pressure ≈770 torr. When the venting procedure is finished, press the green “DONE” button on the touchscreen. It is now safe to open the chamber door.

NEVER OPEN THE CHAMBER DOOR WHEN THE CHAMBER IS UNDER VACUUM!!!

ALWAYS USE CLEAN GLOVES WHEN HANDLING ANYTHING INSIDE THE DEPOSITION CHAMBER!!!

3. Get fresh gloves and load your sample(s):

- Prepare a clean surface of cleanroom wipes to place the sample holder on.
- Move the substrate shutter out of the way by pressing “SUBST” on the touchscreen, then press the grey “SBST” button.
- Remove the sample holder from the chamber and place it on the cleanroom wipes.

- Secure your samples to the sample holder with the metal clamps on the sample holder.
 - Carefully replace the sample holder inside the chamber, and close the substrate shutter by pressing the green “SBST”.
4. Load/Replace the metal sources (if needed):
 - Gold: place a gold pellet in the boat.
 - Chromium:
 - i. Move the source shutter out of the way by pressing “DEP” on the touchscreen, then press .
 - ii. Carefully loosen the two screws that clamp down the tungsten/chromium rod and remove it.
 - iii. Carefully place the new tungsten/chromium rod where the old one was and tighten the screws.
 - iv. Close the source shutter by pressing  on the touchscreen.
 5. Inspect the large O-ring on the perimeter of the chamber door for debris, cracks/scratches, or anything out of the ordinary. If cleaning is needed, get a fresh cleanroom wipe, wet the wipe with IPA, and use it to gently/carefully wipe down the O-ring. Be careful to not scratch or damage the O-ring since damaging it may cause the system to no longer hold low pressures. Close the chamber door.
 6. Pump the chamber by pressing “RECIPE”, then press “PUMP DOWN”.
 7. Wait until the chamber pressure reaches the desired value, and press the green “DONE” button on the touchscreen. A typical deposition pressure is $\approx 10^{-6}$ torr or lower.
 8. On the touchscreen press “DEP”, then press the grey “FTC OFF” button, then press the grey “PWS1 OFF” button. Both of these buttons should now be green. Control is now switched to the FTC-2800 screen.
 9. On the FTC-2800 screen, make sure the current recipe is “Cr_then_Au” (current recipe is shown at the top of the screen). If the current recipe is something else, change the current recipe by pressing “Process Menu...”, use the knob to choose “Cr_then_Au”, press “Select”, and then return to the main screen by pressing “Main Screen”.
 10. Press “Quick Edit...”, and set the desired thickness, “Fnl Thk”, of each metal layer using the knob. **DO NOT CHANGE ANYTHING ELSE ON THIS SCREEN!!!** After setting the desired thickness of each layer, return to the main screen by pressing “To Main”.
 11. Before beginning the deposition process, make sure that you are starting with the correct metal layer (usually Cr) by checking the top of the screen to the right of “Cr_then_Au” (layer 1 = Cr, layer 2 = Au).
 12. Begin the deposition process by pressing the green “Start Layer” button. This will begin the ramp/soak phases of the evaporation recipe. After the ramp/soak phases are over, the substrate shutter will open, exposing your sample to the evaporated Cr. After the Cr layer is deposited, you need to manually start the Au layer by pressing the green “Start

Layer” button. Pay attention to the deposition rate during evaporation, and report any irregularities in the logbook.

13. After the deposition process is completed, press the green “PWS1 ON” button on the touchscreen, and then press the green “FTC ON” button. Both buttons should now be grey.
14. Begin the venting process by pressing “RECIPE” on the touchscreen, and then press “VENT”. The chamber will not begin to vent until the turbo pump speed, “TBO SPD”, falls below 50%. After the venting process is completed, press the green “DONE” button on the touchscreen. It is now safe to open the chamber door.

NEVER OPEN THE CHAMBER DOOR WHEN THE CHAMBER IS UNDER VACUUM!!!

ALWAYS USE CLEAN GLOVES WHEN HANDLING ANYTHING INSIDE THE DEPOSITION CHAMBER!!!

15. Get fresh gloves and unload your sample(s):
 - Prepare a clean surface of cleanroom wipes to place the sample holder on.
 - Move the substrate shutter out of the way by pressing “SUBST” on the touchscreen, then press the grey “SBST” button.
 - Remove the sample holder from the chamber and place it on the cleanroom wipes.
 - Remove your samples from the sample holder.
 - Carefully replace the sample holder inside the chamber, and close the substrate shutter by pressing the green “SBST”.
16. Inspect the O-ring on the chamber door again for any debris, cracks/scratches, or anything out of the ordinary. Clean the O-ring if necessary. Close the chamber door.
17. Pump the chamber to ≈ 0.1 torr by pressing “VAC” on the touchscreen, then press the grey “ROUGH PUMP” button, and then press the grey “TURBO BACKING” button.
18. After the chamber pressure reaches ≈ 0.1 torr, press the green “TURBO BACKING” button, and then press the green “ROUGH PUMP” button.
19. Shutdown checklist:
 - Close the water inlet line by rotating the knob labeled “INLET” clockwise.
 - Close the water outlet line by rotating the knob labeled “OUTLET” clockwise.
 - Close the nitrogen line (valve switch is vertical when closed). **Do not** adjust the regulator, the pressure should always be set to ≈ 50 PSI.
 - The CDA line should always be open and already set to ≈ 80 PSI.
 - The exhaust line should always be open.