

Prepare evaporation source (when using an old wire start from step 5)

1. Start off by cutting a roughly 15cm piece of tungsten wire (18 gauge, approx. 1 mm in diameter)
2. Bend a nice V-shape in the middle of the wire
3. Shorten the wire appropriately
4. Pre-clean the wire by inserting the wire in the evaporator, pump down and heat the wire to make it glow (approx. 2 amps) for 5 mins
5. Inspect the wire, the V-shape that glows most brightly should be a clean grey color, if not repeat steps 1-4
6. Wrap approx. 1 foot (longer dimension of an A4 paper) of gold wire (Ted Pella .008" diameter; 29cm weighs about 0.176g) around the tip of the V
7. Attach source in the evaporator, make sure there are no unwanted contacts and center with the point of the V facing downwards

Prepare your grids

1. Use solid gold quantifoil (300 mesh; R1.2/1.3 produces roughly 1 $\mu$ m holes)
2. Inspect each grid under optical microscope (look for broken and crinkled carbon film, and impurities; discard poor grids)
3. Clean the grids with chloroform, acetone and isopropanol
4. Inspect them again
5. Place quantifoil grids, **carbon side up**, on a cleaned glass slide
6. Place a square cover slip at the other end of the slide
7. Place the loaded glass slide in the evaporator, make sure the source, grids and shutter are centered in the chamber

Evaporate

1. Pump down, wait until the vacuum reaches  $10^{-7}$  mbar range, use LN<sub>2</sub>
2. Insert shield between the source and the grids
3. Gradually increase current until the tungsten wire starts to glow red (approx. 1.2 amps with 18 gauge wire)
4. Continue increasing current slowly and observe the gold wire, once the wire starts to melt (approx. 1.4 amps with 18 gauge wire) stop and wait until the wire is completely molten
5. Once the gold droplet is formed raise the current by 0.05-0.1 amps and remove shield, current may drift during the evaporation process
6. Aim for 400-500Å thick layer of gold and deposit slowly, about 1Å per second (6min 40sec for 400Å & 8min 20sec for 500Å)
7. The glass slide will change color as gold is deposited on it, green is 150-200Å, the color darkens and turns gray as the gold layer thickens, gold colored layer is about 500Å thick
8. Turn off the current, leave in vacuum to cool down (10-20mins)
9. Remove grids from the evaporator

Carbon film removal

1. Inspect grids as before evaporation
2. Flip the grids around
3. Insert the grids in the plasma cleaner

4. Run “c removal” for 6 minutes to strip the carbon layer

|                      |             |                      |            |
|----------------------|-------------|----------------------|------------|
| Title                | c removal   | O2 Gas Flow          | 5.0 sccm   |
| Visible              | Yes         | H2 Gas Flow          | 0.0 sccm   |
| Cleaning Time        | 6:00        | Ar Gas Flow          | 45.0 sccm  |
| Vacuum Target        | 21 mTorr    | Gas Flow Timeout     | 20 seconds |
| Vacuum Range         | 0 mTorr     | Forward RF Target    | 38 W       |
| Pumping Switch Point | 20 Torr     | Forward RF Range     | 5 W        |
| Turbo Pump Speed     | 750 Hz      | Maximum Reflected RF | 5 W        |
| Pumping Timeout      | 120 seconds | RF Tuning Timeout    | 4 seconds  |
| Repeat               | No          | RF Tuning Attempts   | 3          |

5. Check your grids as before