Sputter Coating

Magnetron sputter coating is performed using ionized argon to create a plasma. The argon-ions are accelerated by high voltage and directed towards the source via a magnet where they collide with the target and displace surface atoms. Due to this collision the surface atoms are directed towards the area below the target and coat the sample. This coating process can be more directional (sputtering at better vacuum, low $10^{-2)}$ or diffuse (more even coating on a bigger surface and fissured samples, sputtering at high 10^{-2}). This also influences the coating rate (diffuse means slower rate) and the grain size (directional means finer grains). With the quartz thickness measurement (QSG) the layer thickness can be calculated as a result of the changed quartz crystal resonance frequency.

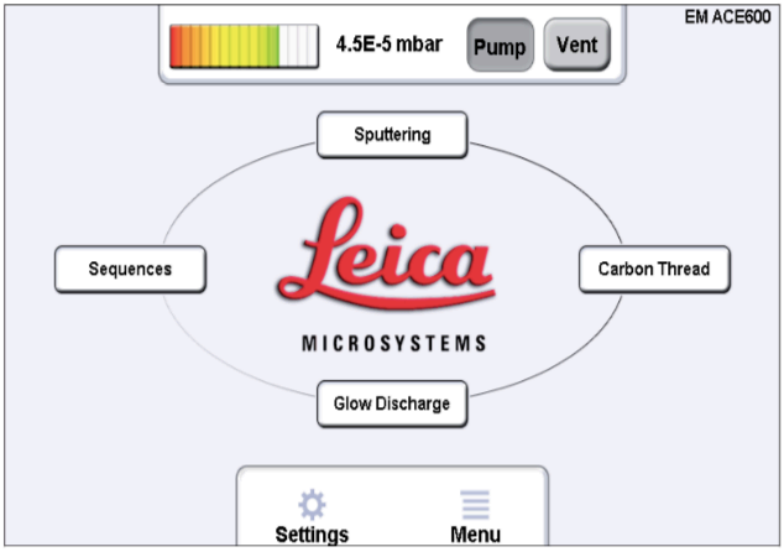
Targets the Facility Has:
Platinum
Palladium

Targets You Can Get:
Gold
Gold-Palladium
Platinum-Palladium Silver
Chromium
Tungsten
Iridium
Copper
Nickel

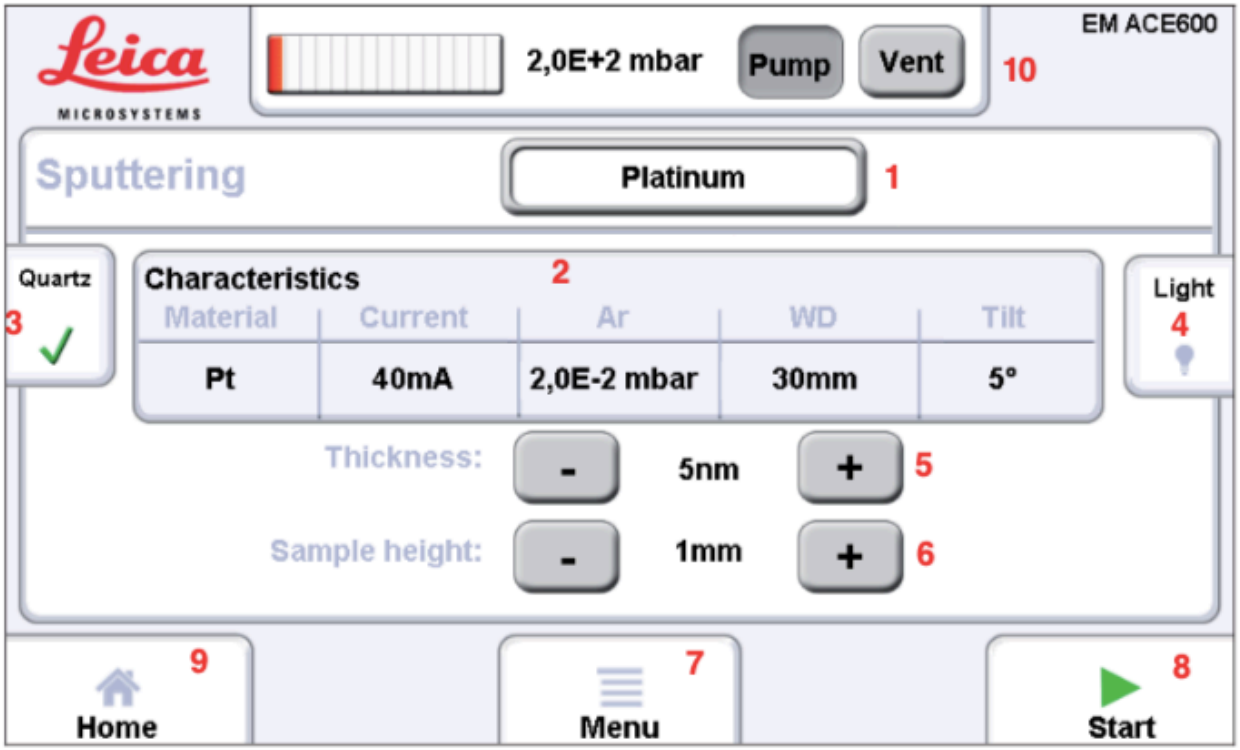
Sputter Coating Process:

Choose 

from the main menu screen:



The process setting screen will appear:



1. Drop down menu for protocols, the most recently used on top.
    a. **Choose the metal/protocol you want to run (typically platinum).**
2. Characteristic of chosen protocol (details see below).
3. **Enable quartz – green check mark will appear.**
4. Chamber light on/off
5. **Thickness: Adjust as you see fit (5nm is standard).**
6. **Sample height: 5mm standard if sample flat, if the sample is taller than the stub adjust the height (check this!!).**
7. Menu
8. Start to run the process.
9. Back to start screen.
10. Vacuum bar indicating current vacuum, allows to enable pump and vent.

Once you have all your settings correct **hit Start**.

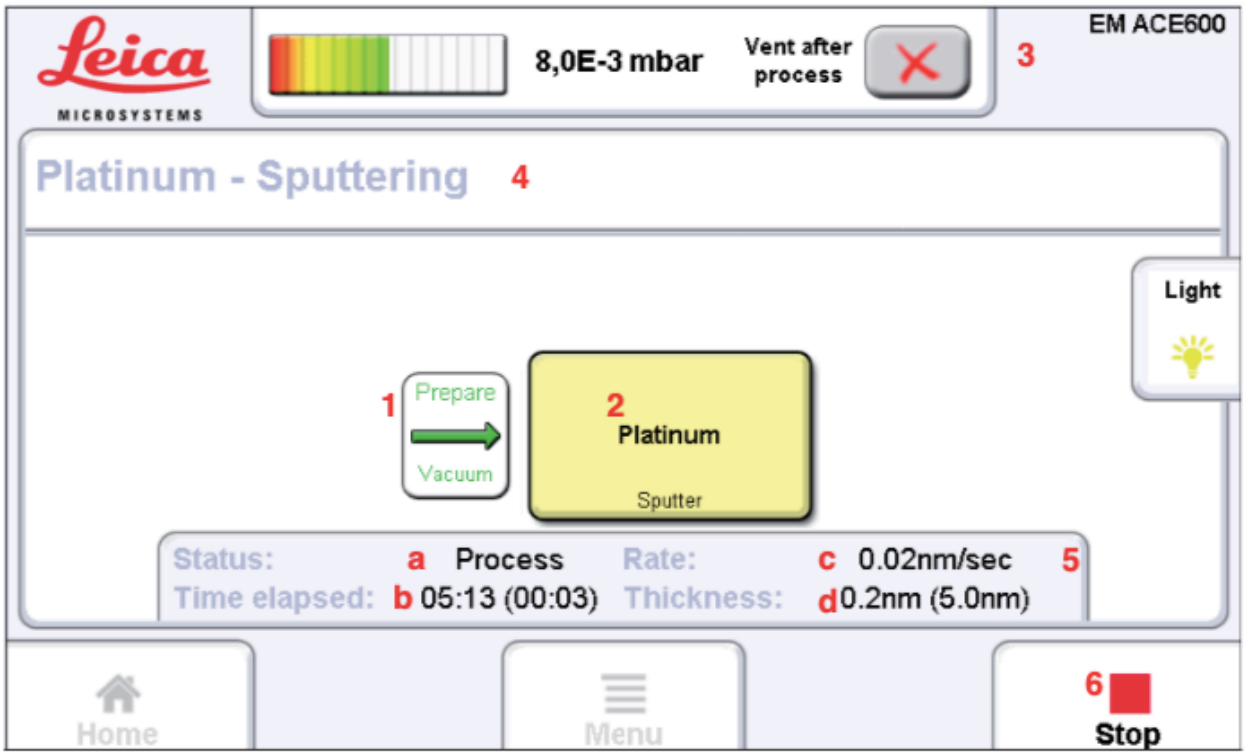
Click **Vent After Process.** 

This will turn into a green check mark.

Once your process is complete ($1.0E^{+3}$ mbar) **retrieve your samples.**
Close the tanks.

Let the machine pump down for a bit and then turn off the pump (do Not leave it vented).

This screen will appear after you hit Start:



1. Preconditions to be completed, details visible when tapping on it (see below), turns green when done.
2. Protocol which is performed: details visible when tapping on it (see below), turns yellow when in progress.
3. 'Venting after coating' is activated or deactivated. Can be changed at any time.
4. Status bar indicating what the instrument is doing at the moment.
5. Summary of the actual process status.
    a. Status (either idle, process or venting)
    b. Time since start button was pushed, value in brackets: time since protocol start (2)
    c. Current sputtering rate
    d. Accumulated thickness
6. Stopping the process at any time after confirming to stop.

When the sputtering vacuum is reached and stabilized, the high voltage switches on and the plasma starts.

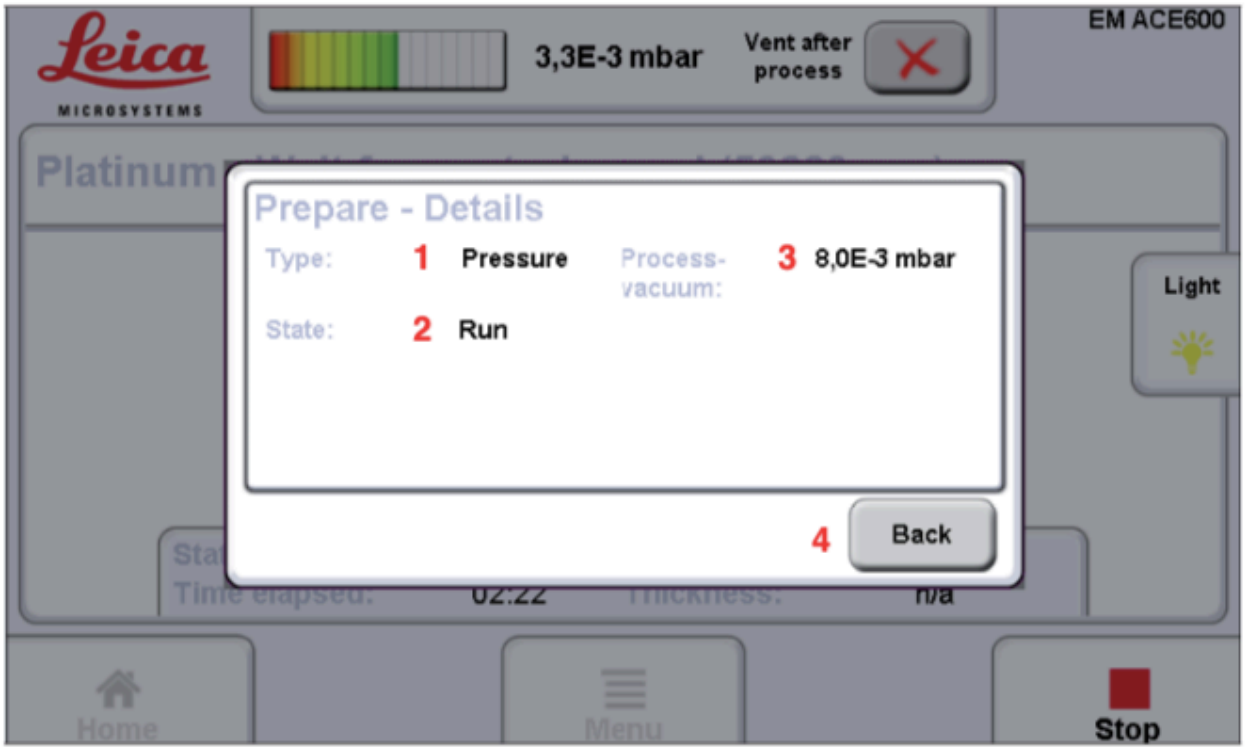
Hint, in case vacuum cannot stabilized or plasma is not stable check if the argon line is open.

Characteristics of chosen protocol in Detail:

Characteristics				
Material	Current	Ar	WD	Tilt
Pt	40mA	2,0E-2 mbar	30mm	5°

1 Material: target material
2 Current: sputter current
3 Argon: sputter/working vacuum
4 Working distance: the distance of sample surface to source 5 Tilt: Angle of the table to the horizontal.

Preconditions details when clicking on the box : 

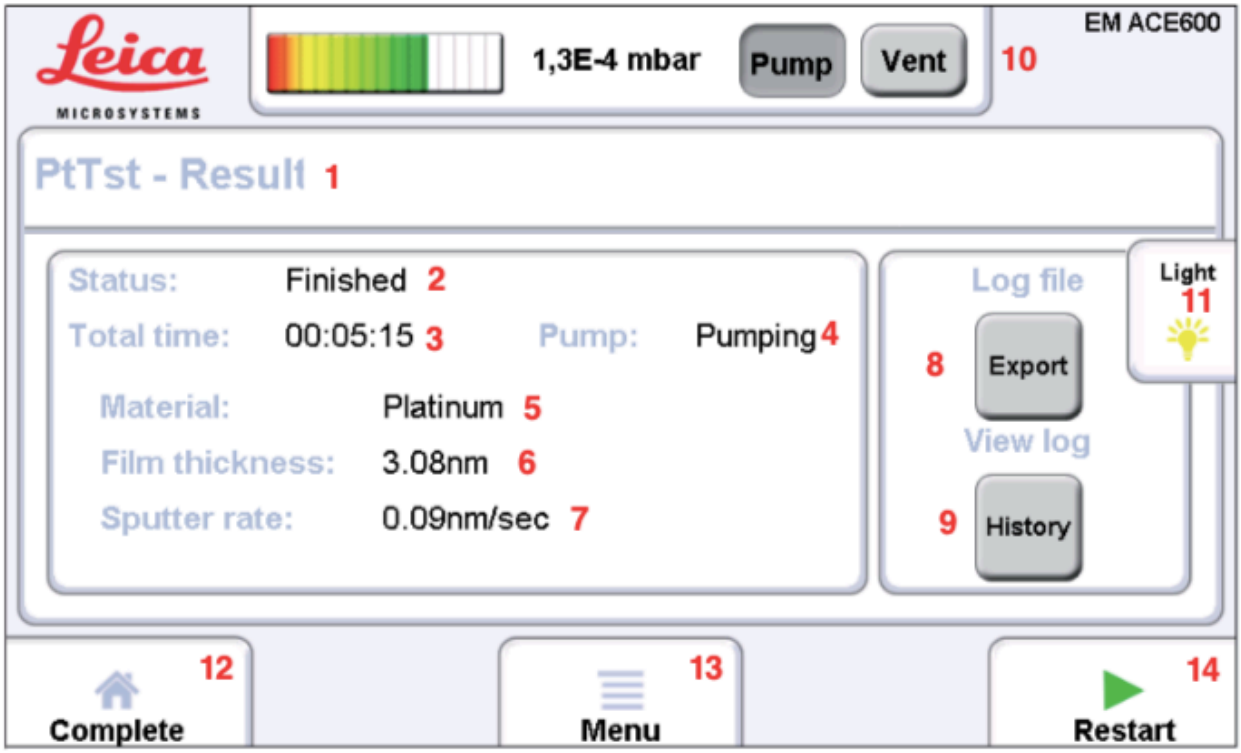


1. Type: condition to reach is pressure
2. State: process is running
3. Process vacuum: the process vacuum has to be reached to start the process
4. Back to running procedure screen

Protocol details when clicking on the box : 

1. System vents after process (true) or not (false).
2. Vacuum which needs to be reached before adjusting to sputter vacuum.
3. Desired thickness (3 or 4 terminates process, decided before starting).
4. Desired sputter time (4 or 3 terminates process, decided before starting).
5. Vacuum for sputtering
6. Sputter current
7. Target material
8. Back to running procedure screen.

Process is finished, summary screen is displayed:



1. Result of the process run.
2. Status indicates if process was run successfully or failed (finished, terminated, or failed).
3. Total time measured after the start button was pushed.
4. Instrument is pumping (vs. venting).
5. Used material
6. Final layer thickness achieved.
7. Average sputter rate in nanometers per second.
8. Export log files (USB needs to be attached).
9. View the log file to see exactly what happened at each step of time.
10. Vacuum bar indicating current vacuum, allows to enable pump and vent.
11. Chamber light on/off
12. ‘Complete’ and option to initialize the system (stage and shutter).
13. Access the menu
14. Restart the same process