NanoFabrication Facility
ADVANCED SCIENCE RESEARCH CENTER

Standard Operating Procedure: **Sputter Coat**

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Hardware Description and Principle of Operation

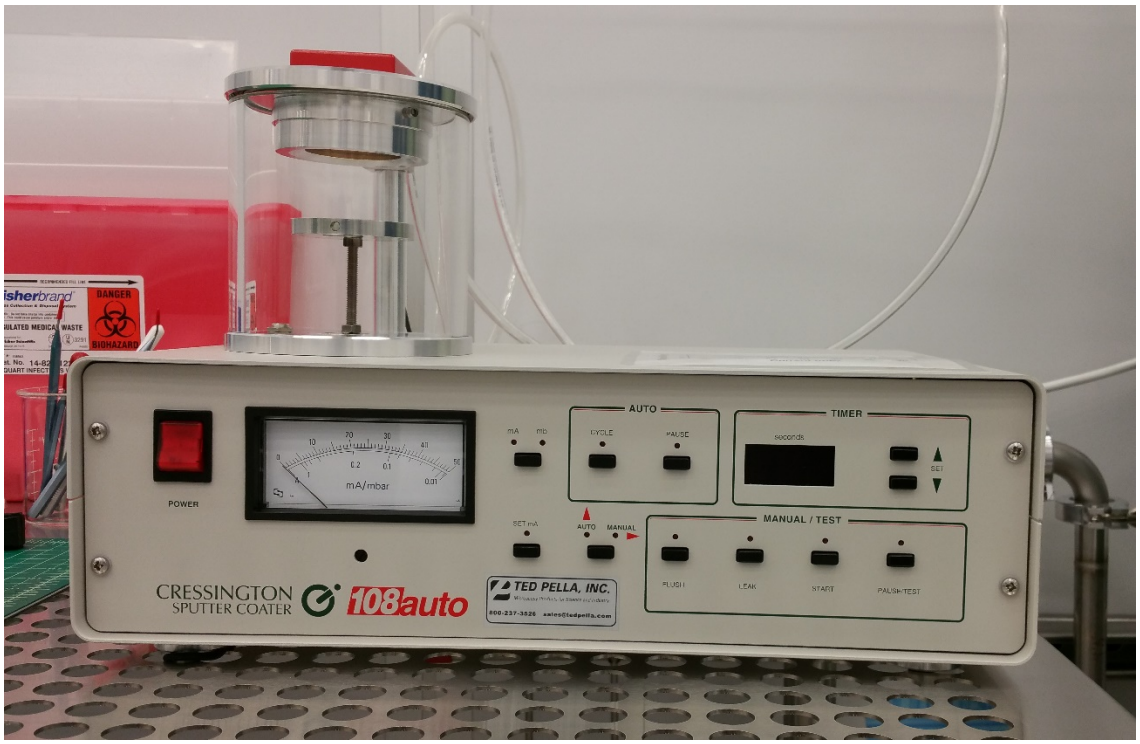
Cressington 108 Auto Sputter Coater

Non-conducting samples placed in an electron microscope will build up charge on the surface, thereby diminishing image quality. One way to reduce the effects of surface charging is to coat the sample with a conductive material to give the electrons used to image the sample a path to ground. Sputter coating with Au or Au:Pd is one method to achieve this. Sputter coating uses ionized argon to vaporize gold atoms from a target and deposit them in a thin layer onto a sample.

Material Requirements

Equipment: substrate and tweezers

Personal Protective Equipment: nitrile gloves



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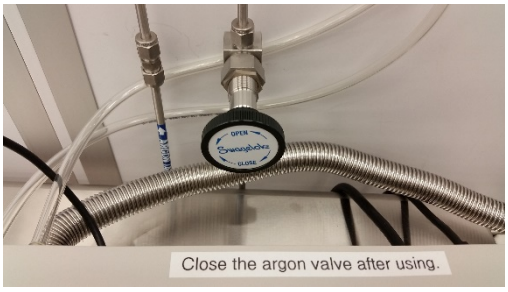
Procedure

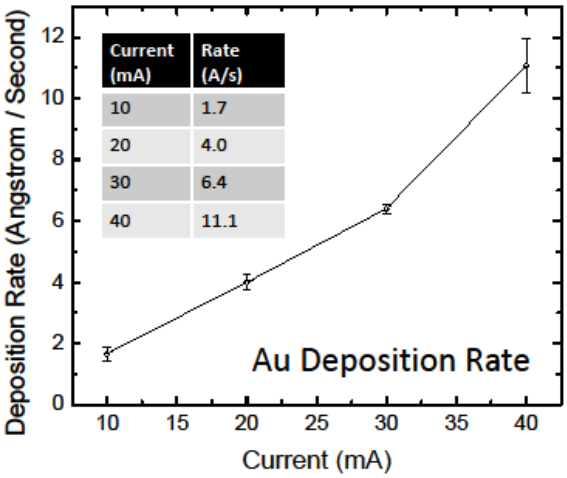
Estimated Time: ~20 minutes

Load Sample



1. Open the valve to the Argon vent line.
2. Once the chamber has vented, close the Argon valve. Note: As long as the tool is off, the internal vent valve is open, so the tool will continuously flow Argon if the external valve is left open.
3. Open the chamber lid and remove the glass jar of the sputter chamber, placing it on a wipe. Be careful not to break or chip the glass, especially along the rims where it must form a seal. Do not place it on a hard or rough surface.
4. Place your sample on the sample holder.
5. Replace the glass jar over the sample and close the chamber lid.
6. Turn on the power to the system.
7. The pump will turn on and begin pumping the chamber. Check the seals to make sure there are no leaks and the chamber is pumping normally.

Edit Recipe



1. Determine the current and time of the sputtering you will need in order to get the thickness of gold you require. Use the graph of sputtering rates for different current settings.
2. Hold down **SET mA** to display the set current in the timer display. Use the up and down arrows next to the display to change the setting.
3. Hold down **PAUSE/TEST** and use the up or down arrows next to the timer display to set the time.

Run Recipe

1. Once the chamber is pumped down to around 0.01 mbar, flush the chamber with argon 2-3 times. Press **FLUSH** once to turn on the flow of Argon in the chamber and then press it again to turn it off. Allow the chamber to pump back down to around 0.01 mbar between flushes.

2. Turn on the flow of Argon to be ionized during the sputtering by turning on **LEAK**. Allow the chamber pressure to stabilize at 0.08 mbar.
3. Press **START** to begin the sputtering. A purplish glow from ionized Argon should be visible around the gold sputtering target in the lid of the chamber while the timer counts down from the set time.
4. Once the sputtering has ended, turn off **LEAK**.
5. Flush the chamber once more.
6. Turn off the power to the system.

Unload Sample

1. Open the valve to the Argon vent line.
2. Once the chamber is finished venting, close the valve to the Argon vent line.
3. Open the chamber lid and remove the glass jar of the sputter chamber, placing it on a wipe. Be careful not to break or chip the glass, especially along the rims where it forms a seal. Do not place it on a hard or rough surface.
4. Remove your sample.
5. Wipe the inside of the glass jar and the sample holder with IPA to remove the gold that has been deposited. Replace the glass jar over the sample holder and close the chamber lid.
6. Turn on the tool for a minute to pump the chamber and leave it at vacuum.

Emergency Stop

- If the tool begins to malfunction, turn off the power. Be sure the argon valve is turned off also.

Allowed Activities

- Users can set the power and time as necessary, but they should not deposit more than 20nm of gold without staff permission.

Disallowed Activities

- Users are not allowed to deposit more than 20nm of gold without staff permission.

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What to watch out for during operation

- Check for plasma by looking for plasma glow discharge underneath the top of the chamber.
- Make sure to turn off the valve for the venting argon when finished with the tool.

Common Troubleshooting Tips

- If chamber is not pumping down, carefully shift the glass jar from side to side to catch a seal with the top and bottom of the chamber.

When to call staff?

- If the plasma will not ignite.

Badger Criteria

Report Problem:

- If the plasma will not ignite.

Shutdown:

- The tool will not power on, though first check to be sure it is enabled.

Revision History: