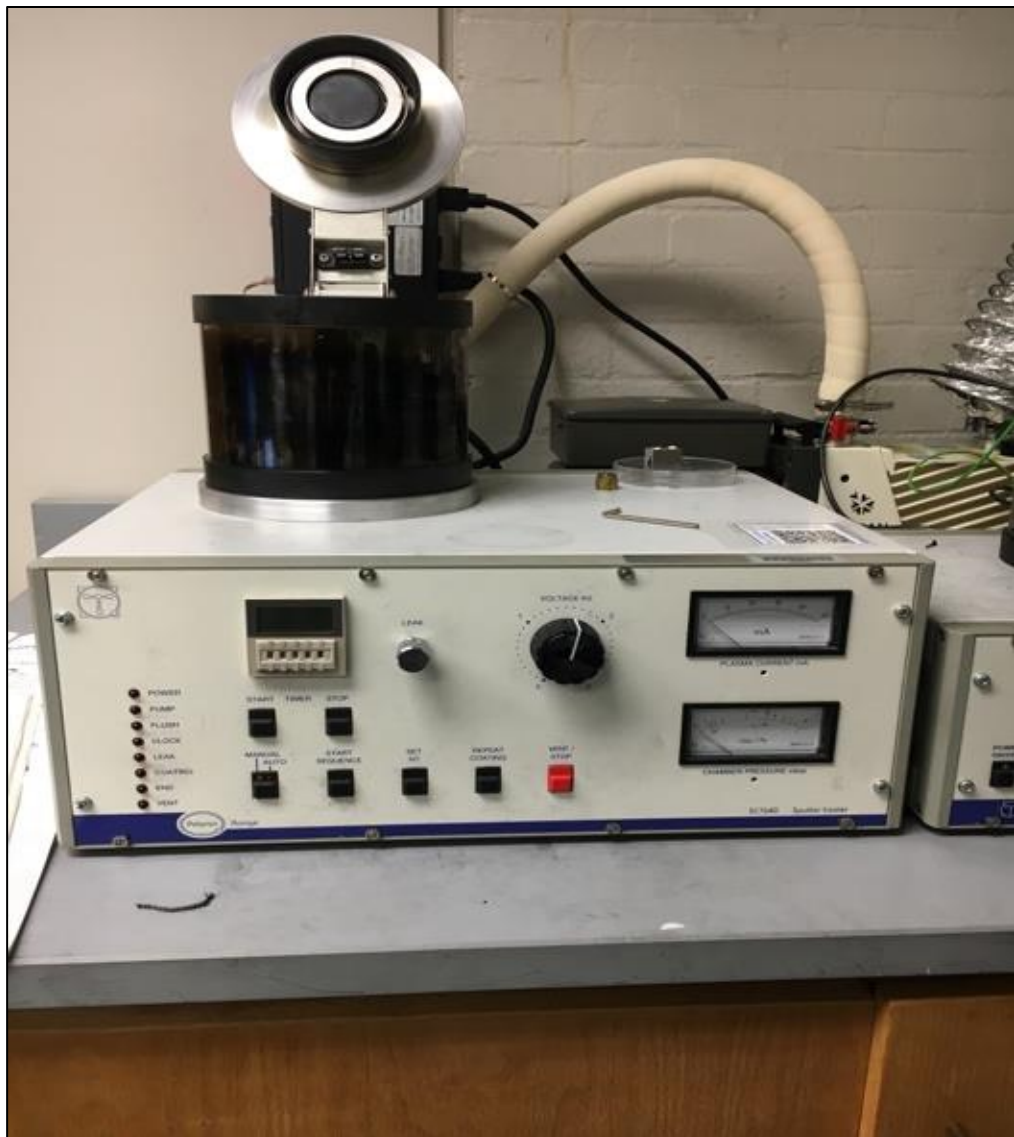


# Polaron SC7640 Guide



## Sputter Coater Quick Start Guide

The following instructions are provided as a Quick Start Guide for powering up and running qualitative measurements on Quorum Technologies' SC7640 High Resolution Sputter Coater and its CA7625 Carbon Coating Accessory.



**Warning:** While this system under normal usage poses relatively little operational hazards, improper usage of the Sputter Coater, specifically with the CA7625 Carbon Accessory, may lead to potential health risks. Use the machine only for its intended usage and cease operations if in doubt of the machine's integrity. Contact the DMSE for training information.

## System Overview

### Purpose

The SC7640 High Resolution Sputter Coater and its CA7625 Carbon Coating Accessory is an extremely versatile sputter coater that is designed to produce even, thin sample coatings onto a given sample(s) for SEM/EDS usage.

#### Strengths:

- Low maintenance and long lifetime
- Interchangeable mounting heads
- Coating Thickness Uniformity > 10%

#### Limitations:

- Harder to directly measure deviance
- Careless usage can lead to contamination from the environment or outgassing
- Difficult to control the Leak Valve

## Determining Thickness

$$d = KIVT$$

d = Coating Thickness in Angstroms

K = Constant (Argon w/ Pt = .9)

I = Plasma Current

V = Applied Voltage

T = Sputtering time in seconds

When coating with Platinum, use the following equation to aid in your calculations. The following curve gives an experimentally determined sputtering rate for Platinum in Argon as a function of voltage and current. For Carbon, the standard thickness created is 2-3 nm.

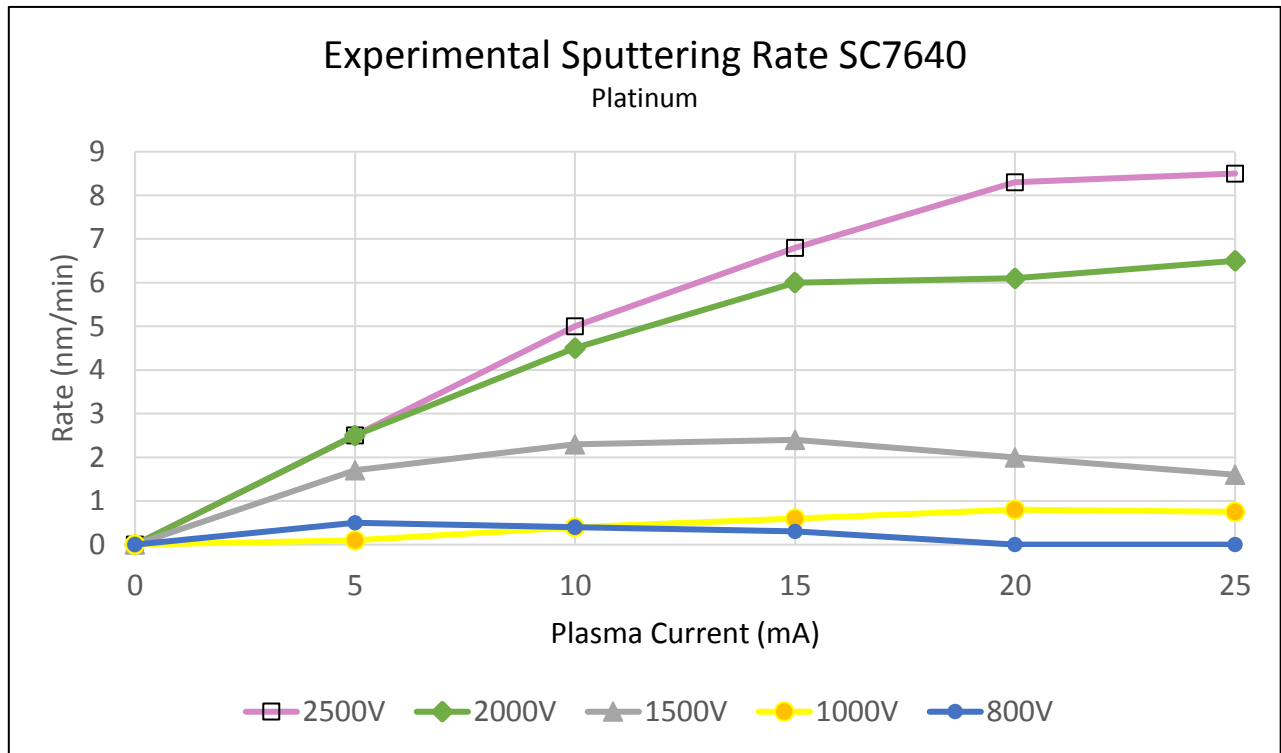


Figure 1: The experimental sputtering rate for the SC7640 using Platinum with Argon

## Operating the Sputter Coater

### Switching the Stage (Optional)

- 1) Remove the Allen screws using a 3mm Allen Wrench.
- 2) Pull out the stage.
- 3) (Dynamic Stage Only) Connect the power wires if inserting from red to blue and black to brown. Else disconnect them.
- 4) Place the Allen screws back into the mount.

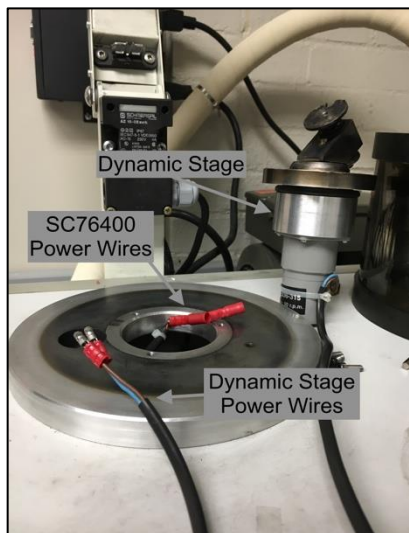


Figure 2.1: The dynamic stage for the SC76400

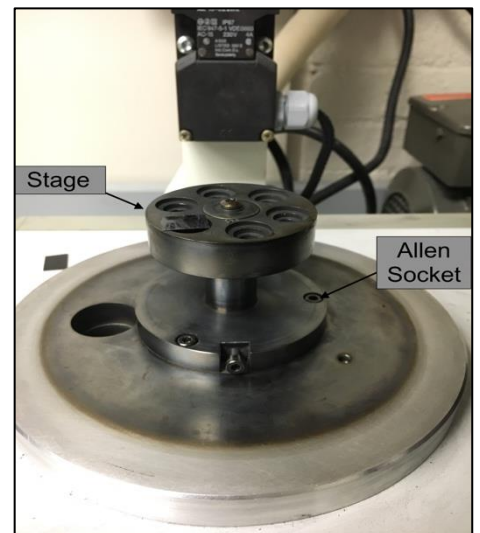


Figure 2.2: The static stage for the SC76400

## Using the SC7640 Platinum Coater

- 1) Determine the desired coating thickness using the thickness equation.
- 2) Raise the vacuum chamber top plate.
- 3) Mount your sample(s) onto the sample stage.
- 4) Lower the vacuum chamber top plate and ensure a clean and uniform seal.
- 5) Turn on the Argon Gas.
- 6) Turn on the Sputter Coater from the back.
- 7) Set the *Voltage* (typically kept between 1 and 1.5kV) and timer to the desired settings.
- 8) Click on *Manual/Auto* to select *Auto*.
- 9) Click on *Start Sequence* to begin the program.
- 10) When the *Coating* light is illuminated, adjust the *Leak* valve to adjust the current.
- 11) Press and hold the *Vent Stop* button for 30 seconds when the *End* light is illuminated.
  - If a thicker coating is needed: click on *Repeat Coating*.
- 12) Turn off the Argon supply.
- 13) Turn off the sputter coater.
- 14) Remove the samples.



Figure 2.3: The control panel for operating the SC76400

## Using the CA7625 Carbon Coater



**Warning:** Do NOT look directly at the light during the evaporation process. The bright light could cause permanent eye damage. Also, the Carbon source will be very HOT. Avoid contact with the heated surfaces.



Figure 2.4: The control panel for the CA7625



Figure 2.5: The CA7625 control panel with its head

- 1) Turn on the Argon Gas.
- 2) Place a 2" piece of Carbon string between the electrodes. Ensure that there is slack in the middle.
- 3) Raise the vacuum chamber top plate.
- 4) Place the Carbon Coater head onto the SC7640 Coater.
- 5) Turn the shutter to cover the filament.
- 6) Turn on the SC7640 and the CA7625.
- 7) Switch the SC740 to *Manual Mode* using the *Manual/Auto* button and press *Start Sequence*.
- 8) Wait until the LED next to LEAK is lit solid red.
- 9) On the Carbon Coater Accessory, turn the voltage to 0 and then turn on the *Outgas* by pressing the button.
- 10) Change the voltage until the current reads 10 amps and wait for 10 seconds.
- 11) Turn the *Outgas* off.
- 12) Rotate the shutter to the open position.



Figure 2.6: The bottom of the Carbon Coater head

- 13) Hold the *Coat* button and gradually raise the voltage until the carbon fiber blows; release the *Coat* button as soon as it blows.
- 14) Click on *End Sequence*.

**Notice:** For any problems not covered under this section, contact Bryan Crawford at (865) 257-3564 or [bcrawf12@jhu.edu](mailto:bcrawf12@jhu.edu).