

## DOUG SPUTTER SYSTEM

October 21 2013



**Location:** 10k PVD area

**Primary Trainer:** Les Schowalter (587-879-1516), [les.schowalter@ualberta.ca](mailto:les.schowalter@ualberta.ca)

### OVERVIEW

Doug sputtering tool has three sources, one source will allow sputtering of magnetic materials. Co-sputtering and reactive O<sub>2</sub> and N<sub>2</sub> sputtering are some of the processes this tool is capable of. RF back etch adds to the versatility of this system. This tool has a 6" platen for larger substrates. Substrate heating is allowed to 150C providing the heat shield is used.

### SAFETY PRECAUTIONS

Be careful when lowering the top make sure fingers are out of the way.  
If RF reflected power is very high shut off the power to the RF generator.

Some materials are not compatible with a vacuum system; if you aren't sure of your material please see the primary trainer.

***If you are bringing any new materials into the NanoFab for use in your process, it is necessary to fill out a chemical import form (available on our website, <http://www.nanofab.ualberta.ca>) and supply an MSDS data sheet to Stephanie Bozic.***

## OPERATING INSTRUCTIONS

### OPENING AND LOADING

- 1.0 Press “emis” on the multi gauge controller to turn off the ion gauge then press “channel” until TC1 is shown and nothing on the bottom right.
- 2.0 Close the Baratron valve, then close the cryo gate valve. Make sure the cryo temperature is below 20K before proceeding.
- 3.0 Flip up the chamber vent switch, you will be at atmosphere when 760 Torr is reached. Close chamber vent when atmosphere is reached.
- 4.0 Press the button on the hoist to lift top of chamber and swing top away when substrate holder is high enough.
- 5.0 Put on gloves for the next steps.
- 6.0 Load desired targets; please note that gun three is for magnetic materials and reactive sputtering but can also be used for other materials.
- 7.0 Check the inside of the chamber for flaking and other debris; vacuum as required.
- 8.0 If the glass view port is coated with metal, pull out and replace glass. Please use IPA to clean glass on all six sided before installing.
- 9.0 Make sure the dark space shield has adequate spacing. Most targets are ¼” thick and the dark space shield shouldn’t be on any notch, targets such as Au and Pt are thinner and can go onto the smallest notch. Check spacing with the voltmeter, you should have an open circuit providing you have the meter on the channel that gives you an audible signal.
- 10.0 Test and close the shutters.
- 11.0 Load your substrate(s)
- 12.0 Lower the top of the chamber.

### Pump Down

- 1.0 Open the chamber roughing valve one turn and rough until 350 Torr is reached then open the valve all the way. Rough out until 300 mTorr is reached then close the roughing valve.
- 2.0 Open the cryo gate valve.
- 3.0 Open the Baratron valve.
- 4.0 Press “channel” on the multi gauge controller until BA1 is shown in the lower right of the display, then press “emis”. It usually takes one hour to reach low -6 Torr range.

## Deposition

- 1.0 Press “emis” on the multi gauge to turn off the filament, then press “channel” until aux1 is shown in the lower section of the display.
- 2.0 If the display on the gas control panel is dark press any button on the panel to activate it. Press “on 1” to activate Ar, this is set to 50sccm by default.
- 3.0 Close the cryo gate valve about 3.75 turns to reach 7.0 mTorr.
- 4.0 If you are using gun one or two move the appropriate light switch to the up position.
- 5.0 Set the desired power on the power supply. Please note Au and Pt maximum is 75 watts.
- 6.0 Turn on substrate rotation using switch on right side, typical setting is 3.
- 7.0 Enter the sputter time plus precondition time on a timer.
- 8.0 Press “start” on the power supply and condition the target for the specified length of time.
- 9.0 Open the shutter, when done press “stop” on the power supply and close the shutter.
- 10.0 Repeat procedure with other gun(s) if required.
- 11.0 When you are finished sputtering press “off 1” on the gas control panel.
- 12.0 Turn off the power supplies.
- 13.0 Turn off rotation.
- 14.0 Press “channel” on the multi gauge controller until TC1 is shown and nothing else in the lower right section of the display.
- 15.0 Close the Baratron valve.
- 16.0 Close the cryo gate valve.
- 17.0 Flip up the chamber vent switch for a second to put a few Torr of N2 into the chamber.
- 18.0 In five minutes follow from Step three to step five in venting and loading section.
- 19.0 Please take target(s) out of tool when finished.
- 20.0 Follow the instructions on pump down section to finish. Note that you don’t have to start with slow pump down.

***If you encounter an unexpected error or require assistance please contact the primary or secondary trainer listed above. Should they not be available, please contact any staff member for assistance.***

### APPROVAL

**Qualified Trainer:** Les Schowalter  
**Training Coordinator:** Stephanie Bozic