PVD 5 – Lesker Thermal Evaporator
Standard Operating Procedure

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Revision: 1.3— Last Updated: November 13/2014, Revised by Chris Balicki

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Overview

This document will provide a detailed operation procedure of the PVD 5 System. Formal Training is required for all users prior to using the system.

Revision History

#	Revised by:	Date	Modification
0	Chris Balicki	2010/09/23	Document Initial Release
1	Chris Balicki	2011/02/21	Ion Gauge Protection
2	Chris Balicki	2012/11/14	Multiple Changes to Procedures
3	Chris Balicki	2014/11/13	Minor Changes
4			

Document No.   4DSOP000X

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General Information

The NRC 3115 Thermal Evaporator Deposition System (PVD 5) is a custom built system designed and man-ufactured by the SFU Technical Centre. Two, independently powered, sources are house in the process chamber, thus providing co-deposition capability. The system can process samples up to 4″ in diameter. Materials approved include: Chromium, Gold, Silver, and Copper. The system is simple and easy to operate. However, the lack of automation does require a good understanding of vacuum operation.

Operation

System Startup

1. Confirm that air pressure & water flow is available.
2. Confirm that the Fore, Chamber Rough, Hi-Vac, and Air Release valves are all closed.
3. Turn on system power via the Main Power Switch. Wait for the self-venting to finish.
4. Turn on the mechanical pump.
5. Open the Fore valve.
6. Wait until foreline pressure falls below 100mTorr.
7. Turn on the diffusion pump.
8. Allow for 1/2hr for the diffusion pump to come up to temperature and start pumping.

Chamber Venting

Wait 5min for chamber internals to cool if venting after a deposition.

1. Confirm that the Chamber Rough, Hi-Vac, and Air Release valves are all closed.
2. If the diffusion pump is on, confirm that the Fore valve is open.
3. If it is on, turn off the ion gauge.
4. Open the Air Release valve.
5. Wait until the coarse chamber pressure gauge has increased past 0 inHg and has stopped moving.
6. Close the Air Release valve.
7. Lift the bell jar to its highest position.

Wait another 10min for chamber internals to cool if venting after a deposition. While wearing gloves, perform chamber tasks as required. Please contact the Nanofabrication Staff if in need of assistance.

Chamber Pump Down

1. Lower the bell jar carefully, ensuring that the o-ring does not collide with the shields.
2. Close the Fore valve and monitor the foreline pressure. If the foreline pressure rises too quickly, re-open the Fore valve and wait 5min before trying again.

IMPORTANT! The Fore valve and Chamber Rough valve should NEVER be open simultaneously as this can damage critical components and compromise vacuum integrity.

3. Open the Chamber Rough valve. Rough the chamber to <100mTorr. While roughing the chamber, ensure that the foreline pressure does not increase past 100mTorr. If it does, close the Chamber Rough valve, WAIT 5 SECONDS, open the Fore valve and wait until the foreline pressure has decreased again to near zero, and again, close the Fore valve and open the Chamber Rough valve to continue chamber roughing.
4. Once chamber pressure is <100mTorr, close the Chamber Rough valve.
5. Open the Fore valve (ensure the foreline pressure is near zero).
6. Open the Hi-Vac valve.
7. Turn on the ion gauge.
8. Allow 1hr for chamber to reach <5.0E-6 Torr. Allow for more pump down time to reach lower pressures.

Liquid Nitrogen may be used prior to the deposition to help lower the base pressure. Please contact the Nanofabrication Staff if in need of assistance.

System Shutdown

Perform the Chamber Venting procedure prior to system shutdown.

1. Remove all samples off of the substrate holder, remove and return all source materials to their respective storage areas, reassemble the chamber shields, and leave the substrate holder inside the chamber.
2. Lower the bell jar carefully, ensuring that the o-ring does not collide with the shields.
3. Close the Fore valve and monitor the foreline pressure. If the foreline pressure rises too quickly, re-open the Fore valve and wait 5min before trying again.

IMPORTANT! The Fore valve and Chamber Rough valve should NEVER be open simultaneously as this can damage critical components and compromise vacuum integrity.

4. Open the Chamber Rough valve. Rough the chamber to <100mTorr. While roughing the chamber, ensure that the foreline pressure does not increase past 100mTorr. If it does, close the Chamber Rough valve, WAIT 5 SECONDS, open the Fore valve and wait until the foreline pressure has de-

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creased again to near zero, and again, close the Fore valve and open the Chamber Rough valve to continue chamber roughing.

5. Once chamber pressure is <100mTorr, close the Chamber Rough valve. <u>WAIT 5 SECONDS.</u>
6. Open the Fore valve (ensure the foreline pressure is near zero).
7. Open the Air Release valve and vent chamber to -10inHg (this ensures that the chamber stays clean under vacuum, while minimizing the force on the bell jar.

If there is another user scheduled later in the day, it is safe to leave the pumps on and conclude the procedure here. However, if you are the last user for the day, the system and both pumps must be shut off. If so, proceed to step 10.

8. Turn off the diffusion pump.
9. Allow 1/2hr for the diffusion pump to cool sufficiently.
10. Confirm that the diffusion pump temperature is <90°C.
11. Close the Fore valve.
12. Turn off the mechanical pump. Wait for the self-venting to finish.
    Turn off system power via the Main Power Switch.

References and Files

Supplemental Documentation Folder:

- Operating Procedure, by SFU Technical Centre

- Sycon STM-100 Thickness Rate Monitor Manual

Contact Information

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