



## **Usage Policies Notebook for AMST Molecular Vapor Deposition System MVD 100**

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## Emergency Plan for AMST MVD 100

### Standard Operating Procedures for Emergencies

#### Contact information

Person	Phone number
Lab Manager	Jake Hes, 949-824-8239 (day), 562-522-8328 (alternate)
Director	G.P. Li: 949-824-4194 (day), 949-824-2047 (alternate)
Staff	Mo Kebaili: 949-824-8239 (day), 949-494-5892 (alternate)
Super User	Carlos Ruiz (818) 527-6349 (Anytime, voicemail or text only)

#### Hazardous chemicals, gases, and conditions

Hazard name	Description of hazard
Vacuum	Implosion
High temperature	Burn or ignition source
High voltage	Electrical shock, ignition source
Isopropyl alcohol	Flammable solvent
FDTS Vapor	Harmful (see the MSDS of Heptadecylfluoro 1,1,2,2 Tetrahydrodecyl Trichlorosilane)



# Usage Policies for AMST Molecular Vapor Deposition System MVD 100

## Standard policies for usage

AMST MVD 100 is a molecular vapor deposition system that can deposit single molecule layer (or monolayer) by layer in order to modify the surface properties of the devices. With the current setup in the BiON cleanroom, the system can deposit FDTS\* with the thickness of a few nanometers onto the substrates to make them extremely hydrophobic.

\* Note: FDTS stands for Heptadecylfluoro 1,1,2,2 Tetrahydrodecyl Trichlorosilane.

## Contact information

The INRF / BiON staff or the lab manager can be reached at 824-8239 or 824-9831.

## Authorized users

Only the INRF/BiON registered users who have completed the training and passed the certification may use this equipment. The users may only use the portion of the system for which they have been trained.

## Training

The users must have received direct training from the staff in order to use this equipment. The users are expected to understand the nature of the system, as well as the proper control and use of the crystal monitor. Training varies slightly, depending on the material to be deposited on the substrate. Contact the staff for details or to arrange for a training session.

## Usage logs

The users are required to log all activity in the log sheets provided. All users must log when they use the evaporator (date and time), which material they deposited, and when they completed their process in the user log sheet. If the users notice anything unusual, they should record it in the user log sheet, and add details in the maintenance log sheet. Any maintenance to the tool must be logged in the maintenance log sheet (maintenance staff only).

## Safety equipment

There is no specific safety equipment for use on this tool, however, cleanroom gloves and tweezers should be used when handling substrates in the evaporator chamber. Care should be taken not to avoid hitting their head on the chamber or pinching their fingers upon lowering the hoist.

## Safety

Follow the INRF / BiON lab safety rules

RF Hazard: The system uses RF power to generate plasma for chamber cleaning and substrate pre-treatment.

Chemical Hazard: Do not vent the chamber before purging process finishes. Report to the staff immediately if suspect there is a vapor leak. Some chemicals used in the system are flammable and toxic.

Emergency shut down: In case of emergency, shut down the whole system by pressing the red emergency button. Do not attempt to fill FDTS vessel. All FDTS fills will be performed by INRF Staff. Please contact staff if any suspicious odor is detected.

## **Standard equipment and materials**

The laboratory provides the following gas: N<sub>2</sub>. Other gases must be cleared with the lab manager.

## **User maintenance**

Please clean substrates prior to use

## **Waste disposal**

Dispose of broken glass and broken wafers in the appropriate container. Dispose of alcohol soaked wipes in a waste container marked for flammable solid waste.

## **Scheduling**

Reservation can be done on-line also the system can be used on a first-come, first served usage if no reservation was made.

## **Other issues**

Users should record the base pressure on the log sheet prior to venting the chamber.

Users should remain physically present at the tool during evaporation to monitor the deposition rate and the current set point, and they should also monitor the chamber pressure during operation.

On completion of the evaporation, the system should be left in the idle mode, with the high vacuum valve open. Users should record the roughing time into the log sheet.

Any new materials introduced into the system need to be cleared with the lab manager or the staff.

At no time should a user adjust a system pressure regulator.

## **Non-standard use**

Users may not modify any hardware on this equipment. For the usage of non-standard processes, gases or materials, contact the staff or the lab manager.

# Usage Notes for AMST Molecular Vapor Deposition System MVD 100

## Guide for using MVD 100 correctly

### Procedures

1. Log into the login computer if there is no problem commented by the last user on the log sheet. See Fig. 1.



Fig. 1

2. Go to the mechanical chase room. *Do NOT go in if there is liquid or other suspicious material on the floor.*
  - Open the oxygen valve. See Fig. 2A.
  - Make sure the chiller and the dry pump are on. See Fig. 2B.
  - Go back to the tool room.



A



B

Fig. 2

3. Log into the MVD tool with the password the trainer has assigned to you. See Fig. 3.



Fig. 3

4. Temperature settings
  - Touch “Temp Control” button in Main Menu.
  - Touch the “Line Supply 3” button and the “Chamber Temperature” button to turn them on.

- Touch the “Line 1” and “Line 3” buttons to turn them on. See Fig. 4.  
**DO NOT TURN ON LINE 1 ON THE LEFT COLUMN (the #### button)**



Fig. 4



Fig. 5

#### 5. Load sample(s)

- Touch “Chamber Routines” in Main Menu. See Fig. 5.
- Touch “Vent” and wait until the chamber lid is loosen. The screen will indicate when the chamber is completely vented.
- Open the lid and observe the chamber if it is clean or not. If not (usually there are small white particles), spray the cleanroom wipe with IPA and wipe the chamber and the lid with it.
- Load the sample(s) at the center area of the chamber. See Fig. 6.



Fig. 6

- Close lid and touch “Pumpdown” while applying force to the lid to ensure vacuum. The screen will say “Idle” when the pumpdown procedure is complete.
- #### 6. Touch “Process Sequences”. Touch the orange button for the “Multi-layer” sequence. Load and select an desired sequence. Click “Yes” on the pop-up menu. See Fig. 7.



Fig. 7

- #### 7. Touch “Process Sequences”. Touch the green button for the “Multi-layer” sequence to run it. It takes about 3.5 hours for a 6-layer deposition.
- #### 8. Write down the oxygen flow rate, the setting RF power, the forward and reflected powers on the log sheet

9. Write down the information of the processing cycles. See Fig. 8. Do NOT leave before the first cycle is finished. It takes about 4 hours to finish the 6 cycles. The machine state reads “Idle” (written in white on the monitor) when the process is done. Inform the staff if there is any fault (written in red) on the screen.

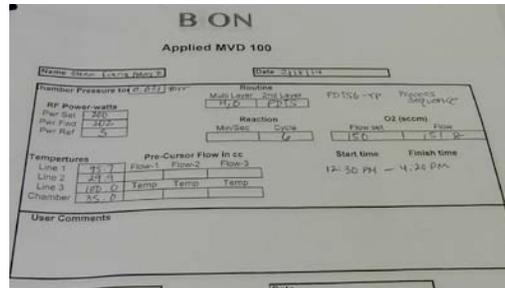


Fig. 8

10. Unload sample(s)
- Touch “Chamber Routines”.
  - Touch “Vent” and wait until the chamber lid is loosen.
  - Open the lid.
  - Unload the sample(s).
  - Close lid and touch “Pumpdown” while applying force to the lid to ensure vacuum.
  - Tough “Main Menu”. Touch “Temperature Control.” Touch the “Line Supply 3” button and the “Chamber Temperature” button to turn them OFF.
11. Log out the MVD tool.
12. Comment on the log sheet.
13. Go to the mechanical chase room and close the oxygen valve.
14. Log out the login computer.