CORAL Name: HMDS-YES-U10

Location: Bay 10U
Purpose: Lithography
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Introduction

The HMDS-YES is a vapor-prime vacuum oven that dehydrates sample surfaces and treats them with hexamethydisilazane (HMDS) as a pre-coat step in the photolithography process. HMDS creates a hydrophobic surface on the substrate, increasing the contact angle and improving photoresist adhesion as it is spun onto the wafer. The vapor prime methodology is the most controllable way to optimize the contact angle and avoid "over priming".
The HMDS-YES can accommodate samples ranging from small pieces up to 200 mm wafers. MIT.nano has metal cassettes designed to withstand the higher temperature of the vapor prime oven that can be used for 100 mm, 150 mm, and 200 mm substrates.



Safety

- The oven operates at 150C, so use caution when loading and unloading samples and cassettes to avoid thermal burns. Always use the dedicated handles to move the metal cassettes.
- Hexamethydisilazane is a corrosive, flammable and toxic liquid and can damage the respiratory system if inhaled. HMDS is also water reactive. The user is protected from these hazards during normal operation and the enclosure that houses the HMDS source is monitored by the toxic gas monitoring system (TGMS).
    - HMDS refill is a staff-performed operation, do not attempt to access the HMDS compartment.
    - Do not attempt to defeat any of the system interlocks or to use the system in an unapproved way as this may result in exposure.
- Organic materials such as photoresist or Teflon cassettes are not allowed in this oven as they will introduce contamination to the chamber and future samples. Only clean substrates should be put into this oven.

User Qualifications and Responsibilities

- Users must have a PTC approved process and must be trained and qualified by MIT.nano staff to use this system.

- Users must engage the tool in CORAL and remain engaged for the duration of use.
- Do not put unapproved samples or materials into this system.
- Do not attempt to open the oven door in the middle of a process.
- Do not interrupt another user's run.
- Report any equipment problems or malfunctions in CORAL for staff to address.

Operating Procedures

1. Reserve and engage the HMDS-YES Oven in CORAL.
2. Verify the system is not in use and is in the Reset State on the controller, do not interrupt a run that is in progress.
3. Load samples into an appropriate carrier:
4. For small samples use an aluminum or pyrex dish
5. For wafers use the appropriate size metal wafer carrier (100 mm, 150 mm and 200 mm sizes are available).
6. Open the oven door.
7. Load your sample(s) or wafers into the oven, being sure not to cover the vacuum port on the bottom of the chamber.
8. Close the oven door.
9. Select the recipe for your process:
    a. If the current recipe is incorrect, press the Enter Recipe Number box on the controller panel.
    b. Enter the recipe number you wish to use.

Recipe	Standard Photoresist
1	AZ 3312, AZ nLOF2020
3	AZ 10XT

10. Select the "Press To Start" button on the controller touchscreen.
11. The system will begin processing. A description of the sequence is in the Appendix.
12. After the sequence is finished, the Process Complete alert will sound. **WAIT! Do not open the chamber at this step!**
13. When the controller displays N2 Purge Off, it is safe to open the oven door and remove your samples.
14. Close the oven door.
15. Select the "Press To Reset" button on the controller.
16. Disengage from CORAL.

Appendix

Standard HMDS-YES Sequence:

1. Wafer Warm Up Delay.
2. Three Dehydration Vacuum and Nitrogen Vent cycles.
3. HMDS application cycle.
4. Three After Process Vacuum and Nitrogen Vent cycles
5. Atmospheric Wait and Nitrogen Purge cycle.