ADHESION PROMOTION

UNIVERSITY OF LOUISVILLE
Micro/Nano Technology Center

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OVERVIEW

Adhesion promotion is a term applied to the various techniques used to help photoresist stick to the surface during photolithography. Adhesion promotion is not needed for all lithography processes as photoresist usually is able to adhere to Silicon adequately. However, there may be situations where adhesion promotion is necessary such as: A different substrate than Silicon, older or expired photoresist, a rough surface, or very small features. The University of Louisville has two types of adhesion promotor that can be used with positive photoresists.

The photolithography bay has a bottle of Surpass 4000 that can be used free of charge by anyone who needs better adhesion for their lithography. This method of adhesion promotion is quick and easy to perform and does a good job in helping photoresist stick to the surface. This is probably the method that most users will explore and they generally will only move on to vapor prime if this method proves insufficient.

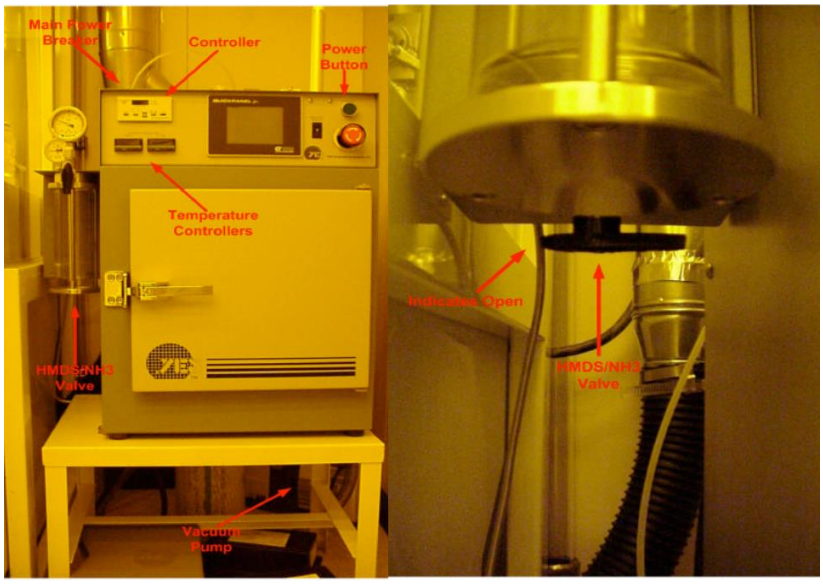
The YES Image Reversal oven also has a program that allows it to fill the chamber with a vaporous adhesion promotor that many people find more effective than the spin-on promotor. This method is more time consuming, but at least has the advantage that multiple wafers can be processed simultaneously. If you do process multiple wafers it is important to remember that adhesion promotor works partially by preventing water from effecting the adhesion of the photoresist, so make sure to apply photoresist quickly so condensation is less of a factor.

SURPASS 4000 ADHESION PROMOTOR

NOTE: Reference the Photoresist Coating SOP if you need information on how to operate the spinners.

1. Bake your wafer to remove water vapor (advised - not required).
2. Spin Surpass 4000 at 3000 RPM for 30 sec.
3. While the wafer is still on the spinner, use the IPA squirt bottle from the wet bench to wet the surface of the wafer.
4. Run the same spin process (3000 RPM for 30 sec) this will allow the surface of the wafer to dry completely.
5. You can now apply and spin your photoresist as you normally would. All spin speeds, exposure times, and development times should be unchanged from normal processing without adhesion promotor.

YES IMAGE REVERSAL OVEN – VAPOR PRIME



System Start-Up

1. Don't forget to login into your FOM account and login to the tool
2. Turn **ON** power to the oven using the breaker located on the back, left corner.
3. Press green **Power On** button
4. Turn **ON** vacuum pump located behind oven on the floor.
5. Open N_2 valve located on wall behind oven.

Vapor Prime

1. Turn HMDS/NH_3 valve to HMDS position (located behind glass cylinder, short end of knob indicates valve selection)
2. Select **1** on the Thumbwheel.
3. Set temperature for front/rear zones. Press and hold **SET BUTTON** (far left), set temperature to desired setting.

NOTE: Oven must be at set temperature before beginning processing.

Front Zone: 150°C
Rear Zone: 150°C

4. Press S.P. on the controller and check each set point

   Recommended Settings

Set point 1 (Display Set Point)	600 Torr
Set point 2 (Set Point 2)	10 Torr
Set point 3 (Alarm 3 Low Limit)	1 Torr
Set point 4	no recommendation

5. Using the touch screen press:

   GOTO Alarms Panel
   GOTO Process Variables

6. Enter Process Variables

   Recommended Process Variables:

Number of dehydration cycle purges:	3
Number of exit cycle purges:	2
Process duration:	300 seconds

7. Press GOTO OPERATOR PANEL
8. Load Samples
9. When oven has stabilized at set temperature, press START
10. When Process is complete Shutdown oven

Total time for the recommended process is approximately 31 minutes

Shutdown

1. Turn OFF breaker on back of oven.
2. Turn OFF vacuum pump.
3. Turn OFF N_2.
4. Logout from the tool in your FOM account.