LOR Photoresist Process

LOR resists are designed for applications involving high resolution, imaging, process tuning and deposition line width control as well as being used in bilayer formats. This resist is based upon polydimethylglutarimide (PMGI) a structural surface for micro fabrication of various types of devices.

Cleaning

1) Your tweezers should be cleaned before handling your Si wafers. Pre-set your hotplate for a pre-bake temperature (this will allow your hotplate to reach a constant temperature while you continue with your sample cleaning). The Si sample or substrate should be cleaned properly (organics): overnight immersion in Nanostrip, at least 45 minutes in a hot piranha solution, an RCA treatment or oxygen plasma ashing can be done to clean the surface of your substrate.

2) Thoroughly rinse or sonicate your substrate in both acetone and then isopropanol alcohol (IPA) solvents then dry with nitrogen gun.

Process

The CEPSR Clean Room stores refrigerated, pre-dispensed bottles of the following LOR resists: 1A, 3A and 5A. When the bottle is empty, discard any residual resist into the 5 gallon resist waste container under the spinners in the large yellow room. Rinse the bottle three times with DI water. Place the rinsed bottle near the 5 gallon solvent waste container located next to the eye wash in the large yellow room for a cleanroom staff member to pick it up for proper disposal.

1) If surface dehydration is needed, bake wafer for 5 minutes at 200 degrees centigrade on a hotplate.

2) After cooling to room temperature, place substrate onto spinner and set your spin parameters.

3) Use a pipet or filtered syringe to deposit the resist onto the wafer.

4) Start the spin process. Your spin parameters should be optimized for the wafer size and shape and, in addition, the spin curves for each LOR resist should be studied to determine best spin conditions for the particular device.

5) After spin, it is recommended to perform a 150 to 200 degrees centigrade bake, this pre bake aids in the undercut controllability. This step, again, should be optimized (perhaps a matrix construction of various parameters will help determine the best for your device).

6) Edge bead removal can be done with EBR PG.

Post Exposure

LOR does not require a PEB (post exposure bake). However, depending upon your device and its functions, it may be beneficial to consult patterning resist manufacturing process from MicroChem. LOR and PMGI resists are developed using various MIF (metal ion free) and metal ion...
containing developers. The thickness of your LOR resist will have a significant dependence on the total developing time as well as the pre-process conditions such as cleaning, bakes and spin coverage. The following can be used as a starting point for liftoffs, especially for bi-layer devices:

1) Insert your sample into Remover PG in two beakers or dishes; one at 60 degrees centigrade for 30 minutes for the first immersion

2) Then insert fully into the second (rinse) at 60 degrees centigrade as well. Ultrasonic agitation is recommended which will improve removal of the regions exposed with radiation.

3) Rinse with DI water or IPA and dry with nitrogen gun.