520.495/580.495 Microfabrication Laboratory

Laboratory Assignment

SU-8 Patterning

I. Prelab Work:

1. Visit the MicroChem website. From the data given in the SU8 data sheet determine the exposure dose for a 500µm thick layer of SU8-100.

2. Given that the desire exposure for the SU8-100 at a thickness of 500µm from the calculation above and that the output of the mask aligner is $0.6 mW/cm^2$. How long should we expose the wafers?

3. Note that unlike the photoresists that we have used in a previous step, SU8 requires a post-development bake. Why do we need this?

II. Lab Work:

A. SU-8 Photolithography

1. Fill a 500mL beaker with 400mL of nano-SU8 XP developer. Fill a 500mL beaker with 400mL isopropanol for rinsing the wafers following development.
2. Set wafer on to the chuck of the photo mask aligner, and align the wafer with the mask. Make sure that you have the proper mask on the aligner and that the mask is oriented in the proper direction. Set exposure timer to the time calculated in the pre-lab. **Turn away from the aligner during exposure**.
3. Post-Exposure Bake: Place the wafer on a hot plate at 65^oC for 20 minutes then transfer to a hotplate at 95^oC for 40 minutes.
4. Develop SU-8 photo-epoxy by immersing the wafer in the developer for approximately 30 minutes. IMPORTANT: Do not over develop.
5. Rinse the wafer by immersing the wafer in the beaker of isopropanol for 5 minutes. If a solid white film forms, the wafer is not fully developed, continue to develop. After the wafer is fully developed dry it using the filtered nitrogen gun, and inspect the wafer under the microscope.
6. Characterize the thickness of the SU8 layer using the microscope and micro-calipers.
7. Hard bake the SU8 on a hotplate or in a convection oven at 200^oC overnight. Your TA will complete this step for you.

III. Postlab Work:

1. Compare the thickness of the SU8 layer measurements with the expected thickness. Explain any discrepancies.

2. Given that we will be using these structures to electrically characterize solutions. Why is it desirable to form such a thick layer of SU8?

Lab procedure prepared by J. Blain and A.G. Andreou, Fall 2002