

520.495/580.495 Microfabrication Laboratory

Laboratory Assignment

Aluminum Annealing and SU8 Coating

This week we will anneal the Aluminum on your wafers, characterize the structural and electrical properties of the electrode patterns and spin SU8 photo-epoxy.

Preliminaries:

1. All the cleaning procedures (except using spin/rinse/dryer) should be done in the hood. Aprons, protective sleeves, gloves, face shield, lab coat, and goggles must be worn during cleaning procedures. Wear plastic disposable gloves at all times.
2. Transfer wafers with tweezers; try to grasp the wafer at the same place each time, usually at the flat edge.

I. Prelab Work:

None; grade credit is given to post-lab work.

II. Lab Work:

A. Aluminum annealing

1. Insure oven is at 450°C, and nitrogen is flowing (100 on flow-meter scale).
2. Load the cleaned wafers onto quartz carrier.
3. Anneal for 30 minutes.

B. Characterization

1. Employ the alpha profilometer, to measure the thickness of the aluminum layer deposited last week. Make five measurements (one in the middle and four at the corners of the wafer).
2. Use the two probes, pushed down at the two ends of an elongated electrode structure on the wafer to measure its resistance. Make sure you note the width and the length of the structure in your notebook.

C. SU-8 Coating

This protocol is good for approximately 500 micron thick SU-8. The link to the Microchem web site has some excellent references to working with SU-8.

1. Spin 3mL of SU-8. Set spin speed at 700rpm for 60 sec with 5 sec acceleration and deceleration.
2. Soft bake at 65 degrees C for 30 minutes and then ramp the temperature up to 95 degrees C and hold at 95 degrees C for 8 hours. The T.A.s will complete the lab for you.

III. Postlab Work:

1. Why do we have to anneal the aluminum after deposition?
2. Compare the thickness of the aluminum film measured today with the estimate that you did last week. Discuss any reasons for discrepancy. Discuss your experimental findings about the uniformity of the deposited aluminum film.
3. Employ the theoretical models in Section 4.7 (Sheet resistance) to make an estimate for the resistivity for the aluminum thin film that you have deposited. How does it compare with typical aluminum sheet resistance (a material property).

Lab procedure prepared by A.G. Andreou, Fall 2002