

ECE 220A/Mat 215A OXIDATION PROCEDURE

Oxidation of silicon is to be carried out in the silicon oxidation furnace. Make sure that the furnace is clean and uncontaminated. Both dry and wet oxidation can be carried out in the same furnace. If you will be changing the furnace temperature **make sure that you allow enough time for the furnace to come to equilibrium at its new temperature setting.** Check the chart next to the furnace to determine the required oxidation time for desired oxide thickness.

1. Clean the wafers in acetone (ACE) and isopropyl alcohol (ISO) for 1 minute each.
2. Remove the native oxide by etching it in buffered HF for 45 seconds. Rinse the samples in the DI cascade (2 minutes in each stage).
3. Check the Gasonics controller and make sure that the valves are open. The N_2 light should be ON and O_2 , H_2 and HCl should be off. Mode switch should be in manual position.
4. Turn on the O_2 and let the furnace purge for 10 minutes. The N_2 is turned off automatically.
5. Remove the boat from the mouth of the furnace onto the appropriate boat holder. Load your samples onto the boat.
6. Place the boat in the mouth of the furnace and wait for 5 minutes.
7. Push the boat in to the flat temperature zone over a period of 3 minutes.
8. Wait 10 minutes for the sample to warm up to the furnace temperature.
9. For dry oxide growth, start timing the growth at this stage. For wet oxide growth, turn ON the hydrogen and inspect gas inlet at the end of the furnace to verify that the hydrogen burning. Keep the H_2 on for the desired wet oxidation time.
10. For dry oxidation, turn off the O_2 at the end of the desired oxidation time. For wet oxidation turn off the H_2 , wait 5 minutes and then turn off the O_2 .
11. The N_2 comes on automatically when you turn off the oxygen. Anneal the samples in N_2 for 10 minutes.
12. Pull the boat out to the mouth of the furnace over a 3 minute interval; Let it cool at the mouth of the furnace for 5 minutes.
13. Unload your samples from the boat and place the boat back in the mouth of the furnace. Leave the Gasonics controller on.