

Device Photolithography Process

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(Dated: August 20, 2004)

Things will go a little faster if you prepare the hotplates at the appropriate temperatures and warming up the mask aligner before starting any work.

1. Cleaning Step

- (a) Rinse in Trichloroethylene (TCE) for 5 minutes.
- (b) Rinse in Acetone for 5 minutes.
- (c) Rinse in Isopropanol (IPA) for 5 minutes.
- (d) Blow dry with compressed Nitrogen gas.
- (e) Singe on the center of a hotplate at 200° C for 5 minutes.

2. Spin Resists

- (a) Sign the logbook for spinner usage.
- (b) Spin on *Microchem* LOR 3A using dynamically with a 5 second spin up at 500 RPM and use a 5000 RPM spin with a ramp time of 1 second for 45 seconds.
- (c) Soft bake on hotplate for 5 minutes at temperature 190° C.
- (d) Spin on S1813 photoresist at 5000 rpm with a ramp time of 1 second for 45 seconds via dynamic application.
- (e) Singe on hot plate for 2 minutes at 115° C.

3. Develop

- (a) Use mask aligner to perform photolithography with appropriate mask. Expose for 4 seconds.
- (b) Rinse in CD-26 for 45 seconds to remove photoresist.
- (c) Rinse in de-ionized water for 5 seconds.
- (d) Blow dry with compressed Nitrogen gas.
- (e) Bake on hotplate at 125° C for 5 minutes.
- (f) Rinse in CD-26 for variable for 40 seconds to remove the LOR 3A.
- (g) Rinse in de-ionized water for 5 seconds.
- (h) Blow dry with compressed Nitrogen gas.

4. Finish and prepare for metal deposition

- (a) Observe under red filter optical microscope.
- (b) Dip in Ammonium Hydroxide for 2 seconds and rinse in de-ionized water. Blow dry with N₂ gas and place immediately in thermal evaporator.

If you are making the mesas, skip steps involving LOR 3A application as it is not necessary. That is, skip steps 2b, 3e, 3f, 3g.

To remove the LOR 3A and 1813 photoresist (e.g. to start a new sample):

1. Use Nanoremove PG on a hotplate at 80° C, careful not to exceed 85°.
2. Leave for at least 30 minutes.
3. Rinse in IPA.

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