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Prepared for the Tiny Biotools Lab

Procedure for making SU-8-2050 masters in the BMMSL

Clean and spin

1) Turn spinner ON and center wafer on 3” chuck.
2) Engage vacuum using the foot pedal. Make sure wafer is centered by setting the spin speed at a low RPM value and observing the wafer. Adjust as necessary.
3) Set speed to 3500 RPM and spray wafer with acetone twice followed by isopropyl alcohol (IPA) twice. Let the wafer spin for a few seconds.
4) Place wafer on a 125 °C hotplate. Let bake 5 min. Remove wafer and place on a clean wipe.
5) Turn hotplate OFF then ON and let cool to 65 °C. Set hotplate temperature to 65 °C.
6) Center wafer on 3” chuck.
7) Turn dispensing unit ON and place a grey dispensing tip on the SU-8 syringe. Attach the syringe to the dispensing unit.
8) Set dispensing unit pressure to 5 PSI and time to 60 s.
9) Use the foot pedal to start dispenser. Starting in the center of the wafer, dispense SU-8 in a swirl outward until timer stops.
10) Disengage vacuum on the spinner. Set timer knob to 40 s.
11) Engage vacuum. Turn speed knob to 500 RPM and wait 10 s. SLOWLY (250 RPM s^{-1}) increase spin speed up to 2000 RPM.
12) When wafer stops, turn spin speed down to 0 and timer up to 120. Disengage vacuum.
13) Engage vacuum, set the wafer spinning at a very slow speed (60 RPM), and remove edge bead in one of two ways: A) With a weigh spatula, or B) with an acetone-soaked swab.
14) Disengage vacuum, remove wafer, and wipe off any SU-8 tendrils or excess SU-8 on the bottom of the wafer.
15) Place wafer on a 4” wafer on the hotplate. Once all wafers are on the hotplate, set it to 95 °C for 35 min and cover with Al foil top. Enable AUTO OFF. It takes about 1 h for the hotplate to cool to room temperature.

Expose

16) Turn nitrogen on in dressing room.
17) Once the hotplate is cool (step 16), carefully separate 3’’ wafers from 4’’ wafers using a razor blade.
18) On the exposure unit, build a sandwich with wafer, film, and filter glass. Make sure the emulsion (dull) side of the mask is down.
19) Set exposure energy to 1400 mJ/cm^2 (700 on the dial, two exposures each wafer).
20) Press EXPOSURE GAP then EXPOSE.
21) When the first exposure is done, press EXPOSURE GAP again, then MASK RAISE. Lift the mask frame slightly to reset the system.

22) Press EXPOSURE GAP then EXPOSE. When the second exposure is done, reset the system and remove your materials.
23) Don't forget to turn off the nitrogen tank in the dressing room!
24) Place wafer back on hotplate. When all wafers have been positioned, set hotplate to 95 °C for 45 min. Enable AUTO OFF.

Develop

25)
26)

When done, separate 3'' wafers from 4'' wafers; pour just enough SU-8 developer in a crystallization dish to cover the wafer; place one wafer in dish and periodically swirl until all unexposed PR is removed; wait 3 additional minutes; on the second wafer, wait 5 min once all SU-8 is gone

Rinse with IPA; if white residue appears, rinse with acetone (2-3 sec) and then with IPA; blow dry with nitrogen

Bake on hotplate at 150C for 30 min

Change log