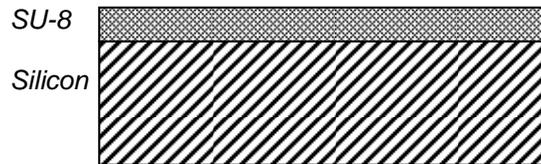


Fabrication of Molds Using SU-8 Resist

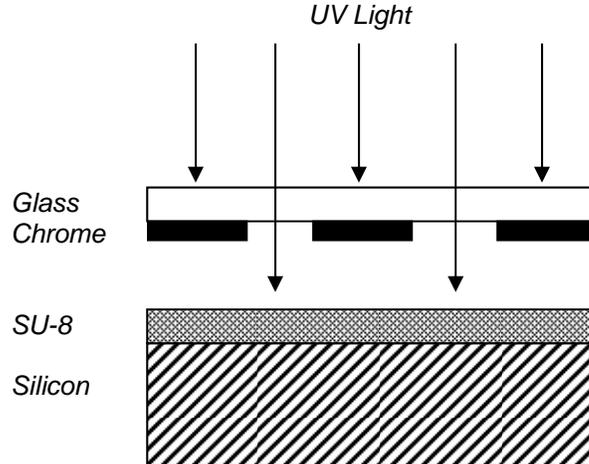
SU-8 is a negative acting resist that can be purchased from Microchem in various thickness formulations from 1um to >100um (see <http://www.microchem.com/Prod-SU82000.htm>). SMIF supplies the SU8-10 formulation which can be coated to a thickness of 10um to 25um depending on spin speed, as well as the SU-8 developer. Spin speed curves and other processing information for the SU8-10 resist can be found at http://www.microchem.com/pdf/SU8_2-25.pdf.

Standard Process for a 15um thick SU-8 Layer (bake, exposure, and develop times may need to be adjusted for other thickness formulations)

1. Begin with a clean silicon wafer. A piranha clean of the silicon wafer prior to SU-8 coating, followed by baking at 125C for 5 minutes will help with adhesion
2. **Spin coat** SU8-10 using the Headway spinner.
 - a. Dispense SU-8 onto the silicon wafer
 - b. Spin at 500 rpm for 5 seconds followed by 2000 rpm for 30 seconds (produces a 15-16um thick SU-8 layer)



3. **Soft bake** the coated wafer on a first hotplate for 2 minutes at 65C immediately followed by a second hotplate for 5 minutes at 95C.
4. **Expose** the wafer on PHOTO2 for 13 seconds using hard contact.



5. **Post exposure bake** on a first hotplate for 1 minute at 65C immediately followed by a second hotplate for 2 minutes at 95C. Allow to cool.
6. **Develop**
 - a. 3 minutes 30 seconds in a beaker with SU-8 Developer at room temperature with slight agitation.
 - b. Rinse with Isopropyl Alcohol (IPA)
 - c. Dry with a nitrogen gun

Dow Corning Sylgard PDMS 184 Kit

Please see the website below for all of the pertinent information related to mixing ratios for the elastomer and curing agent contained in the Dow Corning Sylgard 184 PDMS Kit.

<http://www.dowcorning.com/applications/search/products/details.aspx?prod=01064291>

IMPORTANT: Prior to pouring your PDMS, the mold should be treated with an HMDS spin coat. This HMDS monolayer will act as a release agent for the PDMS. It is a necessary step in the process. Without it, removing the cured PDMS from the mold can be quite difficult. SMIF provides Microprime P-20 Primer, which is HMDS based and works quite well. Pure HMDS may be purchased by users as well but it is typically not necessary.

Spin ~ 2ml of the Microprime P-20 or Pure HMDS on your mold using the Spin Coat Hoods in the photo area inside the cleanroom. (1500 to 3000 rpm for 30 seconds. Do NOT bake.)

1. The elastomer and curing agent should be mixed thoroughly in a plastic beaker for 5 minutes minimum.
2. This will create air bubbles that are trapped in the liquid PDMS.
3. The beaker filled with liquid PDMS must be placed in a Desiccator and pumped under vacuum for ~ 30 minutes. This will remove the air bubbles prior to pouring. (SMIF provides a Desiccator and vacuum line in our Bio Bay inside the cleanroom.)
4. Once pumping is complete, place your SU8 mold in a plastic or glass container and pour the PDMS to your required thickness.
5. Place the container with the mold and the poured PDMS into the bake oven, also located in the Bio Bay inside the cleanroom, and cure it for ~ 1hr at 90C.
(NOTE: Curing times and temps may be varied in order to alter the properties of the PDMS mold. See the website listed above for specific guidelines for curing.)
6. Remove the cured PDMS and your mold from the container using a razor blade.
7. Peel the PDMS from the mold slowly and carefully.