

Summarization of soft-lithography and PDMS fabrication

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Create Mold

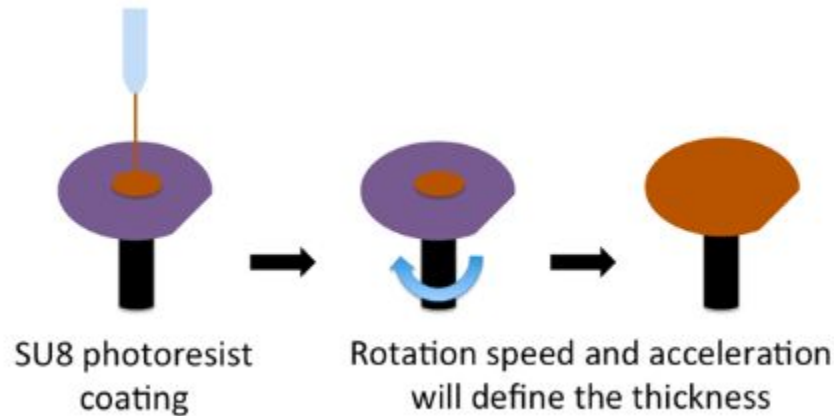
Firstly, we must create a microfluidic design. It was told to us that we were required to make it small enough that at least three other designs could co-exist with ours.

Substrate Preparation

We must inspect and clean the wafer that we plan on using. Since ours were new all we had to do was take a tissue and wipe for any small dust particles.

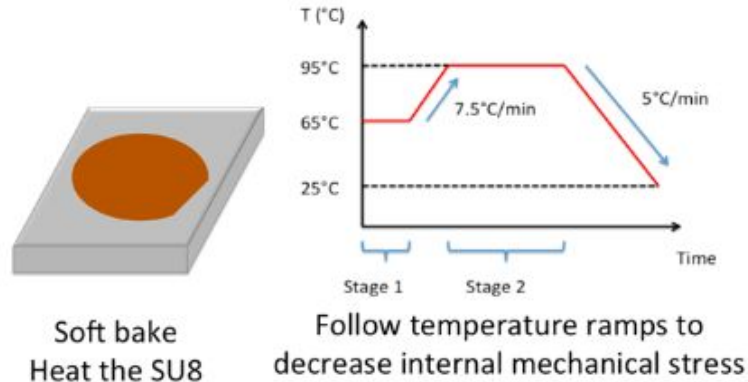
Spin-Coat

The next step is to place and secure the wafer on the spin coater and create a photoresist layer of a desired thickness. The photoresist layer consists of a thick epoxy resin, so it must be spun at high accelerations to create an even thickness.



Soft-Bake

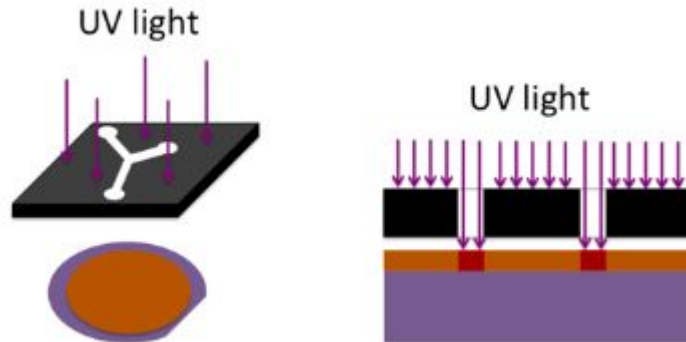
At this point we need to make the photoresist a little more solid before we continue. This is done with a process called a soft bake. In a soft bake there will be two hot plates set at two different temperatures, 65 and 95 degrees Celsius and you will set the wafer there for a specified amount of time. I believe in our case it was 5 and 10 minutes respectively. Let cool.



UV Exposure

While this is happening you should have your UV device prepped to use.

After Soft-baking we expose the wafer to a concentrated amount of UV light for a specific amount of time. In our case it was about 120 seconds. Wait for the wafer to cool before exposing.

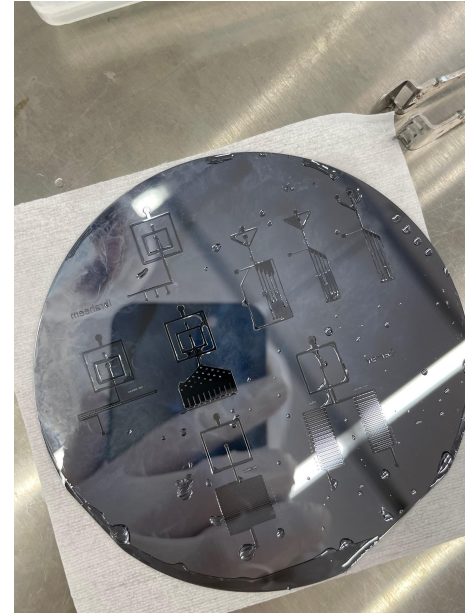


Post Bake

After UV, you follow the same baking procedure as before. This is done so the necessary amount of energy enters the system to continue the reaction the UV exposure set up.

Development

From here you can develop the photoresist in a developer. We used a machine that creates a chemical reaction and develops the substrate. From here you clean with isopropanol and an air jet.



Optional: Hard Bake

This wasn't done for us, but an optional hard bake can be done. This helps cracks and breaks with the final output.

Mixing and degassing PDMS

Mix the elastomer mixture and degas it under a vacuum for a specific amount of time. From there you can transfer the mixture to the master mold.

Bake at 80

Bake the entire system at 80 Celsius, then let it completely cool.

From this point you can cut and separate each individual structure.

Plasma Treatment

Remove all debris. Then treat the surface and glass slide using oxygen plasma. From there you can bond both pieces together and have a sealed microfluidic device.