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Microfluidics 1 - Mold Fabrication: Spin Coating of Photoresist V.3

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ABSTRACT

Microfluidic Lab-on-a-chip technology has several different materials and fabrication methods. PDMS (PolyDiMethylSiloxane) is a well-known material and due to its several advantages, it is one of the most prefered material. PDMS chip fabrication technique requires an initial master mold on which replicates can be done. Su8 is a photoresist resin used in MEMS technology for relatively thick structures. PDMS microfluidic chips fabrication is suitable for SU8+Si wafer molds. This protocol describes the coating of SU8 photoresist on silicon wafers by spin coating method in our laboratories.

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KEYWORDS

Microfluidics, Spin coating, SU8, Si wafer

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MATERIALS TEXT

Cleaning of wafer; Acetone
Cleaning of wafer; Isopropanol
Mold resin; SU8 Photoresist by MicroChem

SAFETY WARNINGS

* All the related steps must be done in a clean room classD (min) and under yellow or red light.

* All spin coating procedures must be performed inside the fume hood.

BEFORE STARTING

This protocol is derived from
[Reference: Processing guidelines for permanent epoxy negative photoresist SU8 2025, SU8 2035, SU8 2050 and SU8 2075, MicroChem company]

SpinCoater Instrument Adjustment 10m

1 Dispense 1ml of photoresist (SU8) resin for each inch (25mm) of Si wafer substrate diameter. 10m

Spin at 500 rpm for 10 seconds with an acceleration of 100 rpm/second.

Spin at "N" rpm for 30 seconds with an acceleration of 300 rpm/second.

Expected results of photoresist thickness:
40um film thickness with N=4000 rpm spin of SU8 2050
25um film thickness with N=4000 rpm spin of SU8 2025
75um film thickness with N=2000 rpm spin of SU8 2050
40um film thickness with N=2000 rpm spin of SU8 2025

The step is performed inside the Class 100.000 cleanroom and in a fume hood.

Spin Coater Run 1m

2 Place the wafer in the spin coater and run the device. 1m

Microscope slides, Si/SiO2 wafers, and glass/PMMA wafers are alternatives substrates.

Spin Coater
Laurell **WS-650MZ-23NPPB**

Soft Baking of SU8 Coated Wafer 15m

3 Soft baking is done depending on the thickness of the coated photoresist film. 15m
It is a few minutes of baking at 65^{o}C and 5-15 minutes of baking at 95^{o}C are applied.

Hot Plate
Electromag **LB.EM.M4060**

Stocking the Coated Wafer

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4 In a petri plate, covered tightly with aluminum foil, photoresist-coated wafers can be stored in the cleanroom at room temperature for approximately one month.

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