Microfluidics 4: PDMS Chip Soft Lithography V.2

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ABSTRACT

Microfluidics materials are of various types and application-specific. PDMS is one of the most preferred and cost-effective solutions for research and low-volume manufacturing. After having the mold, PDMS replicas are generated by a technique called soft-lithography. This protocol describes the preparation of PDMS microchannels using SU8 molds or 3D Printed molds by the soft lithography technique.

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MATERIALS TEXT

PDMS material; Dow Corning, Sylgard 184

SAFETY WARNINGS

* All the related steps must be done in a clean room classD (minimum).

* Please learn well about the hazards of Sylgard 184 chemicals.

BEFORE STARTING

This protocol is also called "soft lithography" in the literature the reference protocol is taken from the manual of Sylgard 184 silicone elastomer, Dow-Corning.

PDMS constituents are mixed in 10:1; Sylgard184 monomer: Hardening agent 5m

Components are mixed well in a tube or beaker using a glass stick.

Hard mixing of ingredients causes air bubbles inside which may disappear for more than an hour.

In order to remove air bubbles quickly there are two main options;
1- The mixture is centrifuged at 500g for 1 minute.
2- The mixture is exposed to a vacuum inside the chamber.

Centrifuge

Sigma **s**

Vacuum

Vacuum Chamber with Vaccum Pump **V**

This step is performed inside class2 laminar flow hood cabinet

Pour the mixture on the SU8 mold or 3D printed mold in a Petri plate and leave it for around 30 minutes at room temperature. 3h 30m

Leaving for 30 minutes at RT is necessary when air bubbles are showed up during the pouring. If there is no air bubbles then advance directly.

If there are air bubbles reply tovacuum chamber degassing on PDMS poured mold.

Petri plate is heated at 75°C for 2 hours on a heater plate device or heater oven.

Hot Plate

Electromag **LB.EM.M4060**

Heater Oven

Heater Oven **30-100C**

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The excess of mixed PDMS (but not heated) can be stored in a refrigerator (+4°C) up to one week. 1w

Just take from the refrigerator and pour on a new mold and incubate.

Longer duration for storage is not suggested since PDMS can polymeraze even at lower temperatures

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