

Title: Mold Fabrication System for Microfluidic Device

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KEYWORDS: Microfluidic device, Lithography, Inkjet Printing, Mold, Polydimethylsiloxane

DOMAIN: Material Science

SUMMARY:

The system uses the inkjet printing method to micro-fabricate polymeric mold on a substrate. The mold then can be used to cast intricate designs of microfluidic devices made up of polydimethylsiloxane (PDMS) solution. The system uses electrohydrodynamic (EHD) jet printing, where polymeric ink generates the mold. The system provides rapid prototyping of different features of channels with dimensions in a range of micrometers. These channels manipulate tiny amounts of fluids for various applications such as the rapid mixing of samples in microchannels and analyte focusing. The current system is finer than conventional techniques such as photolithography or electron-beam lithography, whereas these techniques are expensive and resource-intensive techniques.

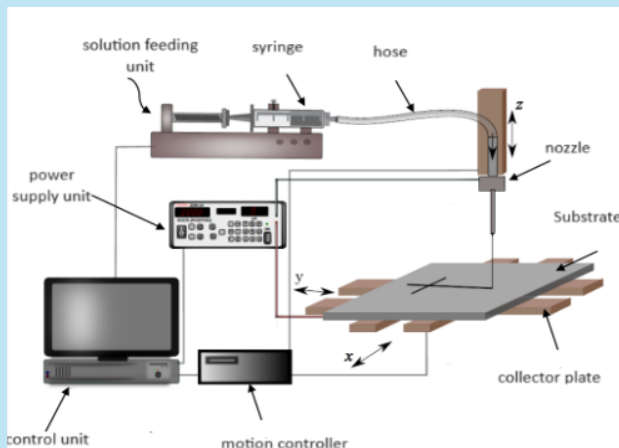
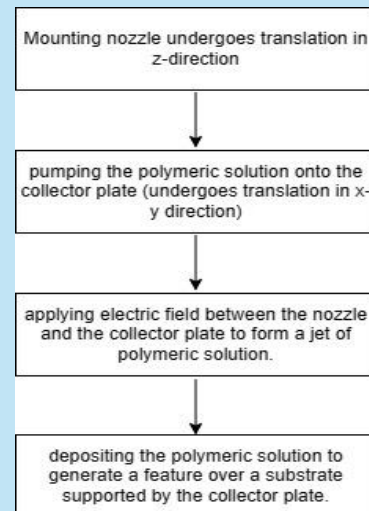


Figure: The system to design mold for microfluidic device.



Flow Chart description to construct the molds.

ADVANTAGES:

1. Cost-effective comparison to traditional devices.
2. The system can be used without the expensive clean room facility.
3. Rapid prototyping of master molds within a few minutes in a range of 10 μm resolution.
4. Reusable mold: multiple microfluidic devices can be replicated using the replica molding by reusing the master mold.

APPLICATION: Mold fabrication for Microfluidic Device.

SCALE OF DEVELOPMENT: A functional prototype of the system is available at the lab scale

TECHNOLOGY READINESS LEVEL: TRL 4

IP STATUS: Indian Patent Application No. 202211056031