Rapid fabrication and characterization of PDMS microfluidics device using printed conductive silver ink

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Abstract

Currently, new fabrication methods for rapid prototyping of microfluidic devices has bring attention among researchers from various fields. The main reason is the use of lithographic equipment in standard fabrication method for master fabrication require trained personnel and high cost disposable materials. In this paper, a new fabrication method via printed conductive silver ink is introduced in order to minimize the current fabrication process through elimination of the photolithography process. As a result, a usable, faster and cost effective prototyping process of a microfluidic based biosensor devices able to be produced. In this method, the conductive silver ink was used to create a master template contains microchannel onto glass-reinforced epoxy laminate sheets (FR-4). Then, Polydimethylsiloxane (PDMS) were used to replicate the structure. Next, the digital microscope was used to obtain images to demonstrate geometry fluidics structure with channel dimension up to 200 mu m width. Moreover, a 3D profilometer was used to evaluate their thickness and roughness of the microfluidics structure. The stability test demonstrates the consistency of flow sequence inside the serpentine and separation channel. (C) 2019 Elsevier Ltd. All rights reserved.

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1. Fabrication of topologically complex three-dimensional microfluidic systems in PDMS by rapid prototyping