

Design and fabrication of PDMS microchamber for fast reaction assays in biosensing application

Abstract

A simple design of a microchamber for use in reacting assays with limited sample availability has been proposed, analyzed using COMSOL 3.5 Multiphysics simulation and fabricated using soft-lithography technique. The design is based on differential pressure drop flow using capillary effect concept which has facilitated a number of interesting flow phenomena in micro-domains. For an average pressure drop of about 100/m in the setup, flow rates of about 0.5 to 0.8 $\mu\text{l/s}$ were obtained. The component a microchamber, three designs were tested (50, 70, 90 microns in width) to give a continuous open circuit flow. The system was designed and fabricated for continuous flow across sensing element where there is a requirement for low residence time due to fast reaction/diffusion rates. Also in this paper, is a sensitive and selective, also rapid, reliable, cost-effective, and suitable for in situ analysis polymer biosensor for new bio molecular approach for cancer and cancer related diseases detection at the early stage is demonstrated.

Keywords

Capillary; Comsol multiphysics; Fabrication; Microchannel; Microfluidics; PDMS; Soft lithography