

The Summer Undergraduate Research Fellowship (SURF) Symposium
4 August 2016
Purdue University, West Lafayette, Indiana, USA

Laser-assisted microchanneling on PMMA substrate utilizing two-pass fabrication method

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ABSTRACT

Microchannel is widely used in microfluidic devices for mixing, chemical reaction, detection, particle separation and etc. CO₂ laser-based microchanneling of PMMA as a low cost, rapid, noncontact fabrication method has attracted the attention of industry. However, the typical V-shape grooves fabricated by CO₂ laser microchanneling have limitations since the V-shape grooves will affect the flow behavior and heat transfer of the fluid, which are important to the performance of microfluidic devices. A two-pass fabrication method is proposed and investigated in this paper to improve the quality of the PMMA microchannel fabricated by CO₂ laser. It was found that by using this method, a trapezoidal shape groove can be formed. Such a microchannel is of higher quality compared with the V-shape groove microchannel.

KEYWORDS

CO₂ laser, PMMA, Microchannel