

## Two-Step Patterning of Microfluidic Structures in Paper by Laser Cutting and Wax Printing for Mass Fabrication of Biosensor

**Authors :** Bong Keun Kang, Sung Suk Oh, Jeong-Woo Sohn, Jong-Ryul Choi, Young Ho Kim

**Abstract :** In this paper, we describe two-step micro-patterning by using laser cutting and wax printing. Wax printing is performed only on the bridges for hydrophobic barriers. We prepared 405nm blue-violet laser module and wax pencil module. And, this two modules combine x-y plot. The hollow microstructure formed by laser patterning define the hydrophilic flowing paths. However, bridges are essential to avoid the cutting area being the island. Through the support bridges, microfluidic solution spread out to the unnecessary areas. Chromatography blotting paper was purchased from Whatman. We used 20x20 cm and 46x57 cm of chromatography blotting paper. Axis moving speed of x-y plot was the main parameter of optimization. For aligning between the two patterning, the paper sheet was taped at the bottom. After the two-step patterning, temperature curing step was done at 110-130 °C. The resolution of the fabrication and the potential of the multiplex detection were investigated.

**Keywords :**  $\mu$ PADs, microfluidic, biosensor, mass-fabrication

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