

A simple and low cost method for paper-based microfluidic analytical devices

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Paper-based microfluidic devices (μ PADs) are applied in various fields, are inexpensive, simple, and do not require external power. The first fabrication methods for the μ PAD were expensive and complicated photolithography. After that, several fabrication methods for patterning hydrophobic barriers have been reported, including, Wax printing. However, wax printing has disadvantages such as incompatibility with some organic solvents and low thermal resistance. Meanwhile poly(dimethylsiloxane) (PDMS) is widely used because of its chemical inertness, low polarity and low electrical conductivity. In here we presents a simple and low-cost method for patterning PDMS barriers in the chromatographic paper for the flexible μ PADs. To fabricate a PDMS-based μ PAD, the PDMS is printed by contacting with the paper surface using an acrylic stamp that have a specific shape of the pattern formed by the laser machine. We show that, by optimizing the conditions including thickness of PDMS solution and contacting time, the hydrophobic barrier can be formed to induce solution flow in the specific region. In conclusion, we demonstrate that μ PAD fabrication is simple, inexpensive and scalable.