

Supplementary Information

Toward practical application of paper-based microfluidics for medical diagnostics: state-of-the-art and challenges

*Kentaro Yamada,[#] Hiroyuki Shibata,[#] Koji Suzuki, Daniel Citterio**

Department of Applied Chemistry, Keio University, 3-14-1 Hiyoshi, Kohoku-ku, Yokohama
223-8522, Japan. Fax: +81 45 566 1568; Tel: +81 45 566 1568

[#]These authors equally contributed to this work

*To whom correspondence should be addressed. Email: citterio@aplc.keio.ac.jp

Investigation on popularity of patterning methods

In the first publication by the Whitesides group in 2007, the paper-based microfluidic device was fabricated by means of photolithography.[1] Later, the wax printing method has been introduced by two independent research groups in 2009.[2, 3] As of the end of 2013, wax printing was the most prevailing technique according to a literature review conducted by Mace and Deraney.[4] While alternative patterning methods have been continuously developed, our opinion is that wax printing-based patterning still occupies the leading position in the field of μ PAD development. This assumption was verified by surveying more recent publications following the literature review by Mace and Deraney[4] with some modifications.

We used the Web of ScienceTM (Thomson Reuters) as search engine. Scanned publications were limited based on the following criteria: 1) paper was published between January 2011 and December 2016, 2) paper is written in English, 3) paper is an original research article, and 4) the topic meets the conditions of “Title: paper-base*” OR “Title: patterned paper” OR “Title: paper device*” AND “microfluidic*”. 199 results were found based on the above conditions. Of those publications, 14 were removed from the survey because of probably mistakenly-categorized review articles, missing relation to paper microfluidics, or the lack of access right to the original article.

The result is summarized in Figure S1. Of 190 descriptions of patterning methods in the remaining 185 publications, 75 were related to the wax printing method. The decrease in the fraction of wax printing-based approaches (40 % as compared to 48 % in the end of 2013) is attributed to the generally increased diversity of patterning techniques. Most common alternative techniques include craft cutting, inkjet printing, photolithography, and laser cutting (12~19 counts for each technique). In some cases (7~8 counts per technique), drawing, stamping, and

screen printing methods are also used. The remaining fraction is composed of more than 15 different techniques with the number of usage of 5 or less.

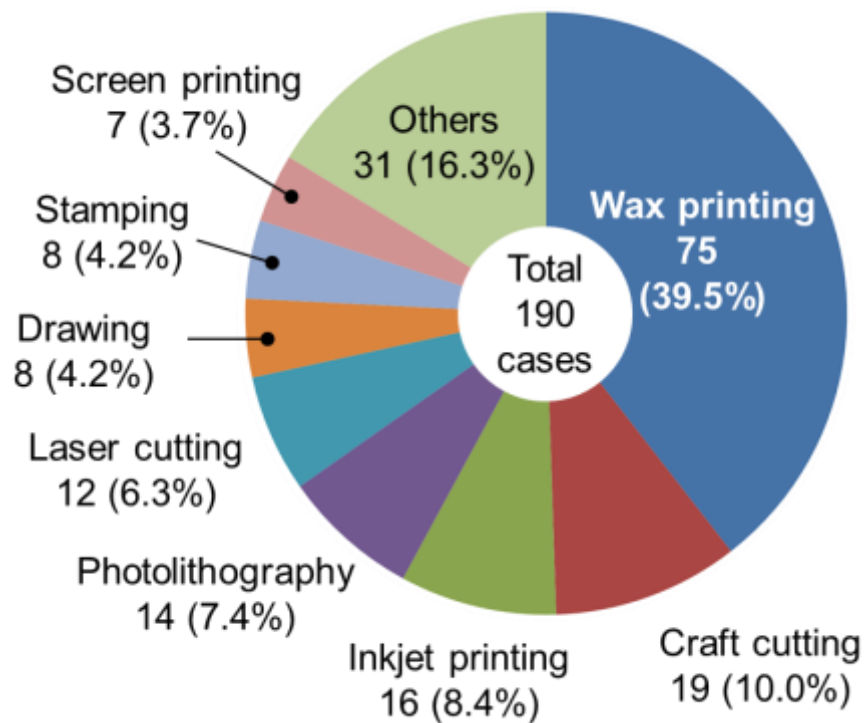


Figure S1. Classification of literature publications on μ PADs according to the implemented patterning technique.

References

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