Electronic Supplementary Information

A handheld stamping process to fabricate microfluidic paper-based analytical devices with chemically modified surface for clinical assays

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Paper surface nature with and without paraffin

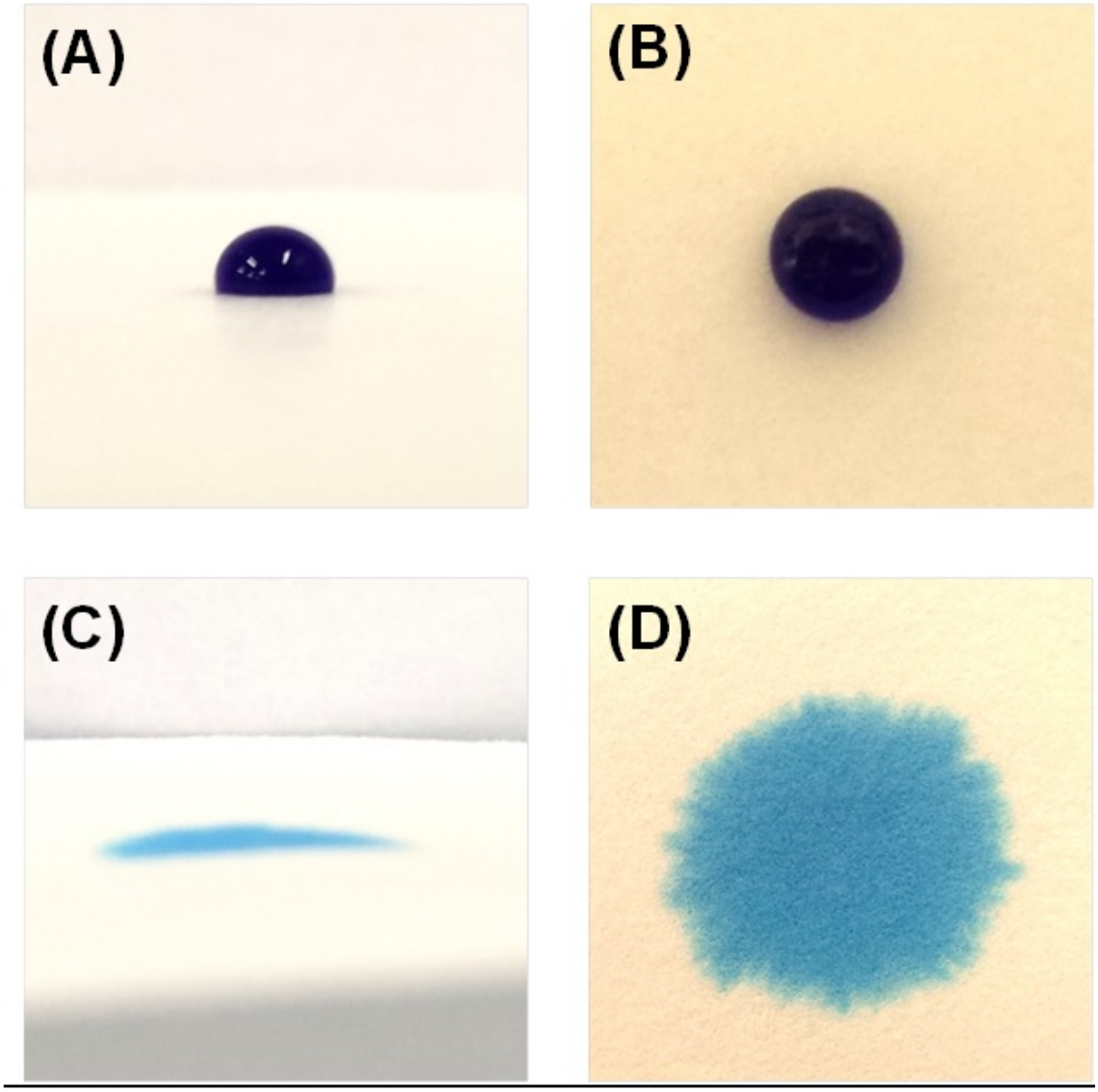

Fig. S-1 Optical images showing the (A, B) hydrophobic and (C, D) hydrophilic properties after and before the impregnation of paraffin on paper surface by the stamping process. Images were captured after the adding of 10 μL of a dye solution.

Lateral flow on μPADs fabricated with different stamping times.

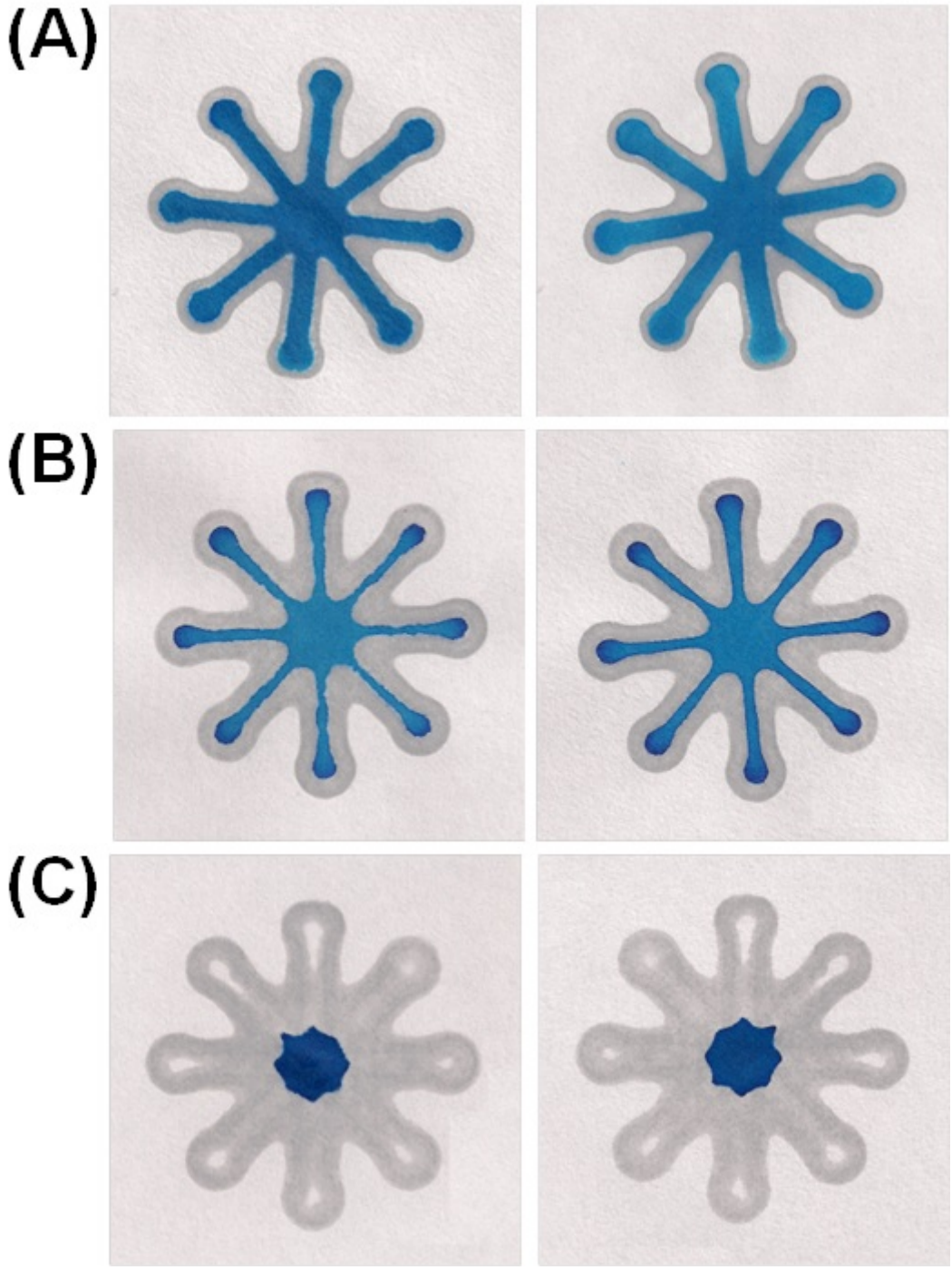

Fig. S-2 Optical images showing the filling of paper channels by lateral flow. Images (A), (B) and (C) depict the distribution of the sample on μPADs stamped during 2, 5 and 10 s, respectively. Left and right images mean the back and the front views, respectively.

Effect of the stamping time on the amount of paraffin transferred on paper and device-to-device reproducibility

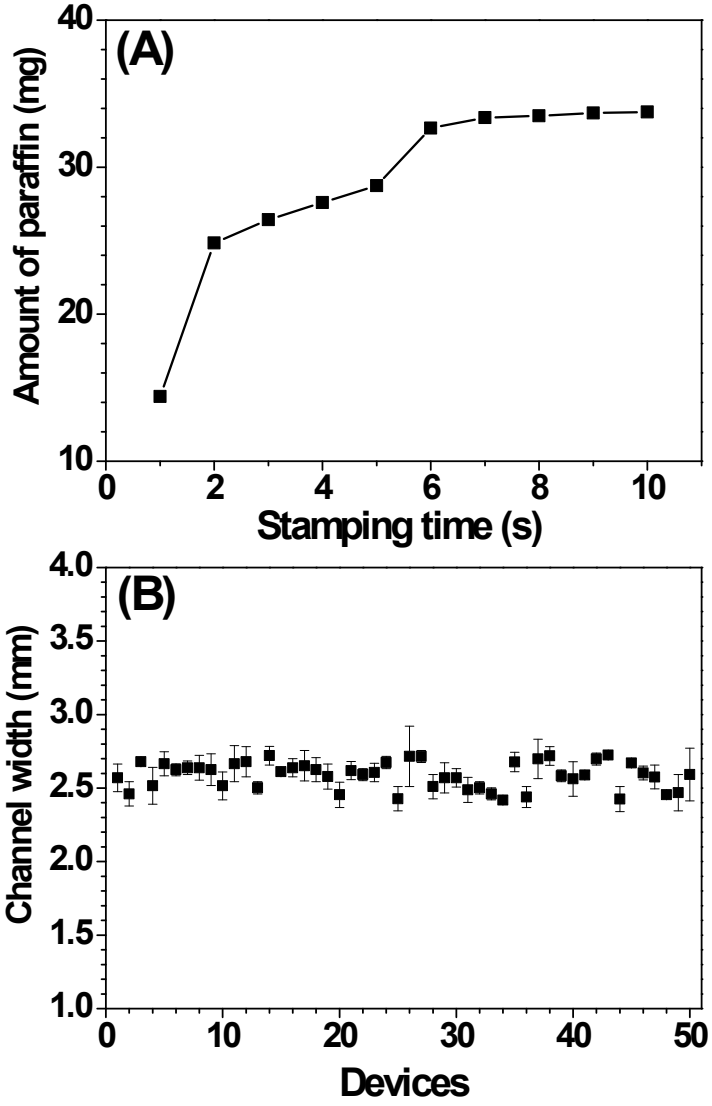

Fig. S-3 Presentation of (A) the amount of paraffin transferred on n-paper as function of the stamping time, and (B) channel width reproducibility for multiple stamped μPADs. In (B), the stamping time was fixed in 2 s.

Spectroscopic Characterization

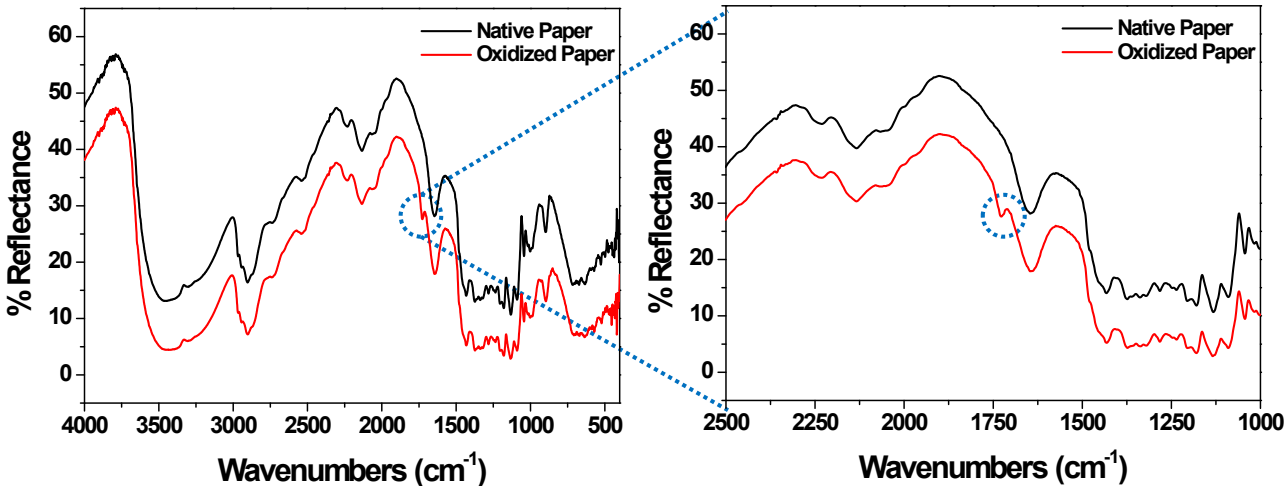

Fig. S-4 Diffuse reflectance infrared fouriertransform spectra for native and oxidized paper surfaces.

Simultaneous clinical assays

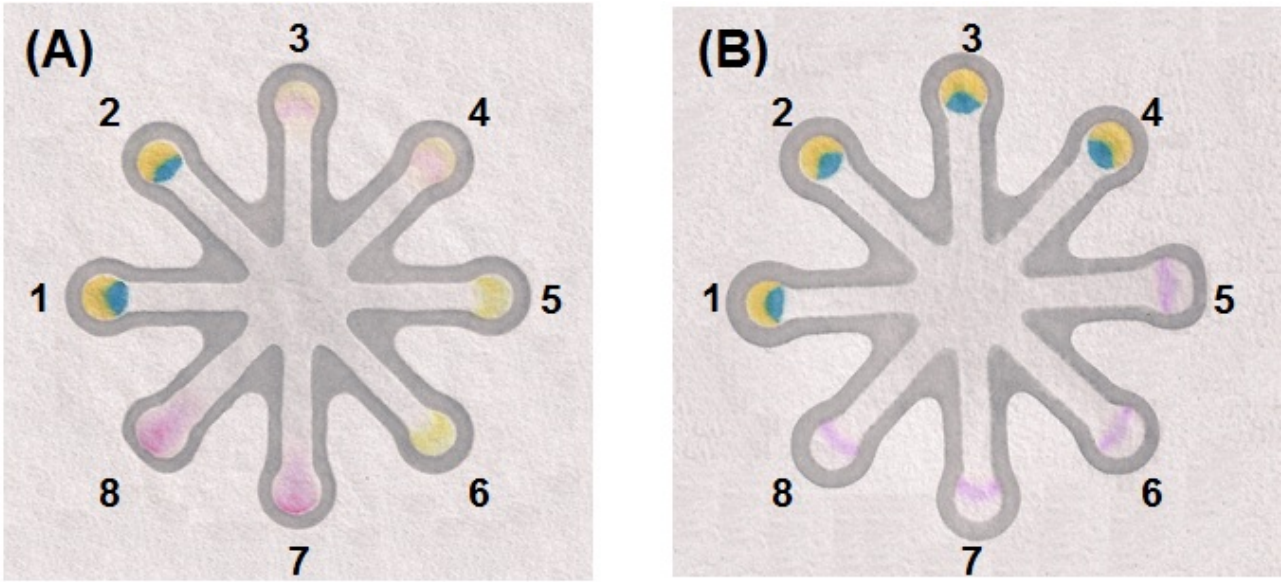

Fig. S-5 Scanned images of typical clinical assays performed on (A) oxidized and (B) native μPADs. In (A), zones 1-2, 3-4, 5-6 and 7-8 display images for BSA, nitrite, glucose and uric acid, respectively. In (B), zones 1-4 and 5-8 indicate the sensing areas for BSA and nitrite, respectively.

Analytical performance

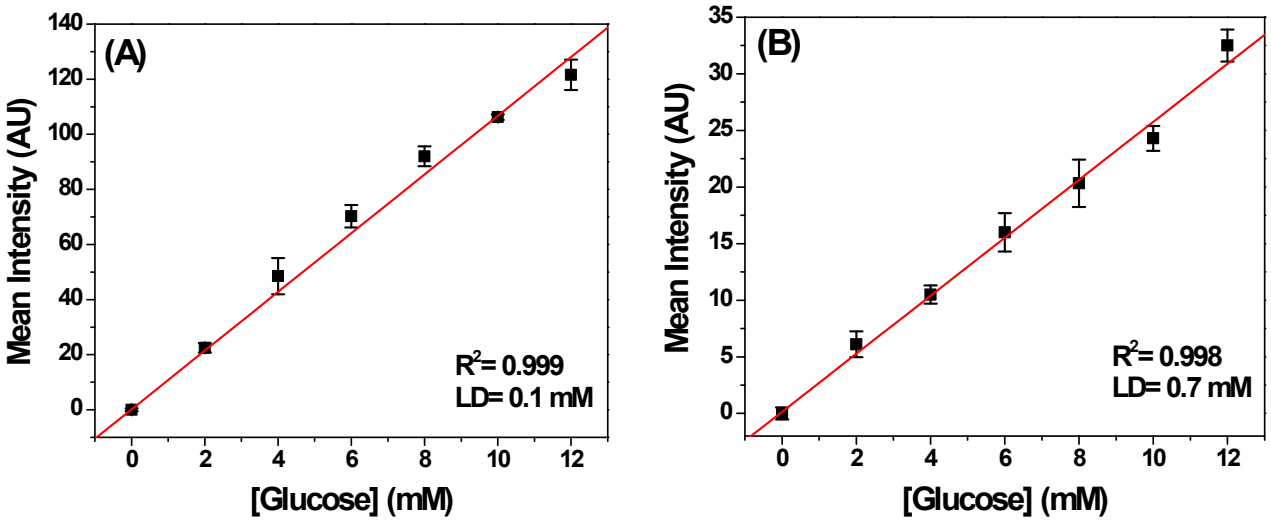

Fig. S-6 Analytical curves for glucose on (A) native and (B) oxidized μPADs.