Electronic Supplementary Material (ESI) for Lab on a Chip.

SUPPLEMANTARY INFORMATION

Roll-to-roll fabrication of integrated PDMS-paper microfluidics for nucleic acid amplification

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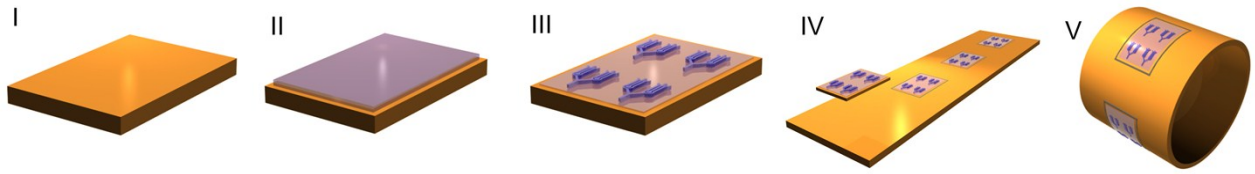

Fig S1. Illustration of the imprinting tool fabrication. (I) Ni sheets were coated and cured with (II) UV-curable resist acting as an adhesion promoter layer. (III) Fluidic structures were lithographically patterned on the coated sheets using the same UV-curable material as the adhesion promoter layer. (IV) Lithographically processed Ni sheets were welded onto a large Ni sheet. (V) The large Ni sheet with welded smaller Ni sheets was rounded and welded at the facets to form a sleeve for an imprinting cylinder.

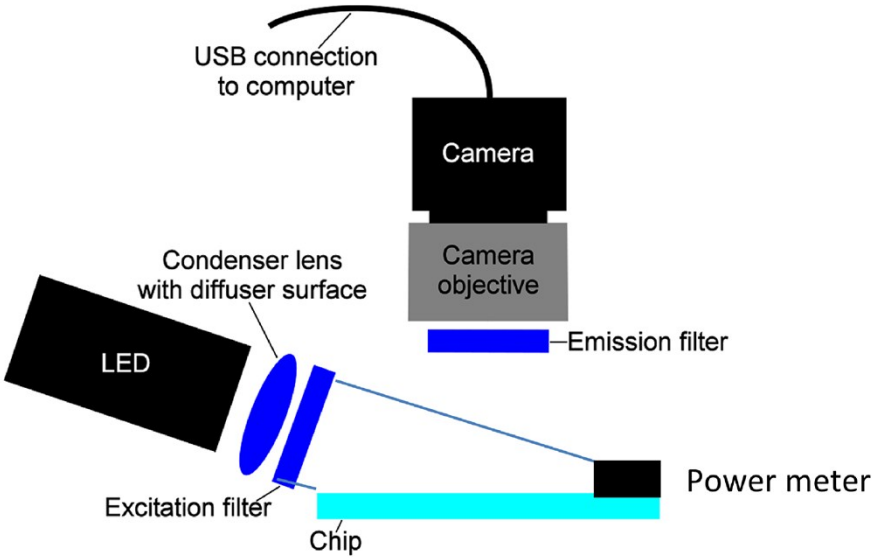

Fig S2. Optical setup used in fluorescence measurements. LED light source with condenser lens, diffuser and band pass excitation filter was used to excite fluorescence emission. Intensity was monitored with a power meter when studying the suppression of paper autofluorescence by Al-coating and the enhancement of the fluorescence signal by highly reflective surface.

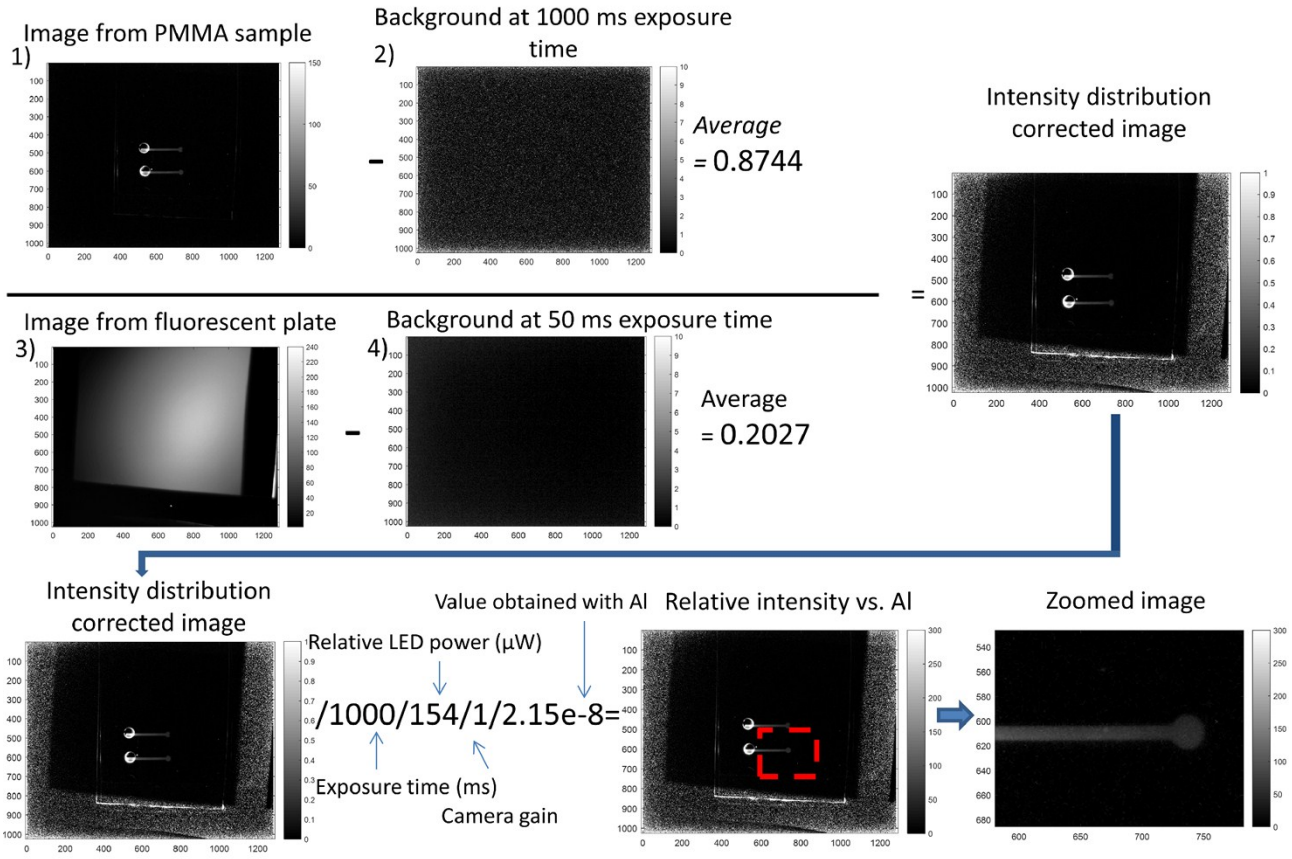

Fig S3. Example calculation of the fluorescence intensity. Delivered from the raw data (Fig. 3d, PDMS channel on PMMA). Initially four images were taken including 1) actual image from the PDMS sample, 2) background image with the same camera settings as actual image (here 1000 ms exposure time, 154 µW relative LED power, gain 1 x) as the sample image, 3) image from a fluorescent plate and 4) background image with the same camera exposure time as fluorescent plate (here 50 ms). The background levels were averaged over the image area and the obtained value was subtracted from the sample image pixel values and fluorescent plate image pixel values. After background level deduction, the sample image pixel values were divided with fluorescent pixel values resulting in intensity distribution corrected image. These pixel values were then divided by the exposure time, relative LED power and camera gain and finally normalized with the intensity value obtained for Al-coated paper background. Intensity was calculated as an average intensity in reaction chamber area. Dashed line indicates the zoomed area from the whole captured area.

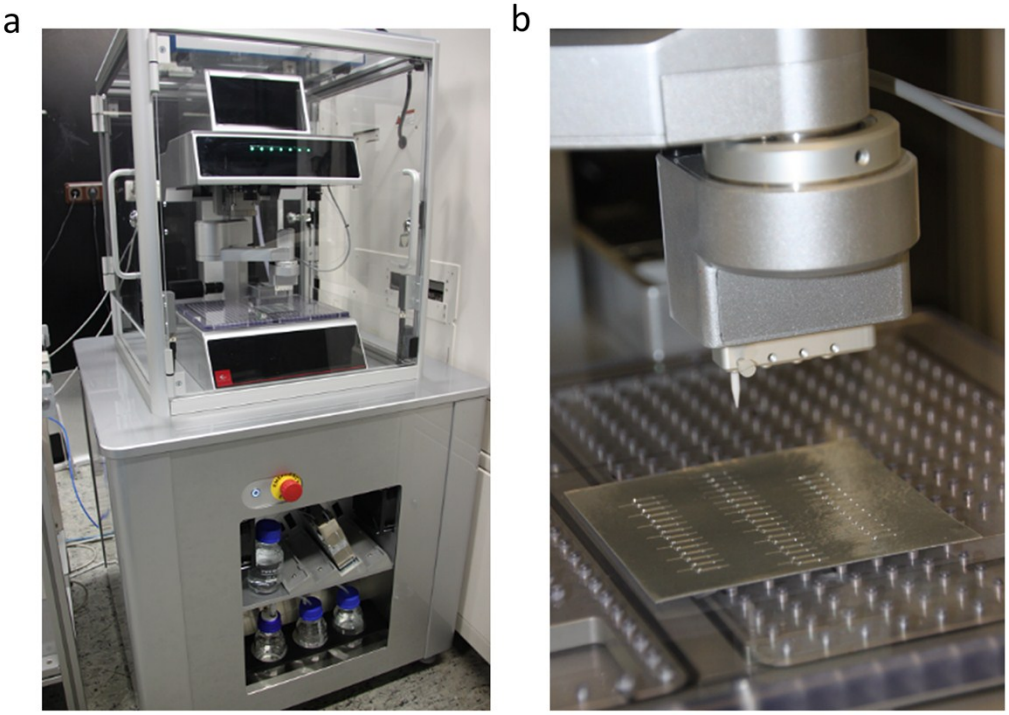

Fig S4. Roll-to-roll compatible reagent dispenser. **a** Photograph from the overall unit. **b** Photograph from the dispense head above a sheet with roll-to-roll processed PDMS microfluidics.

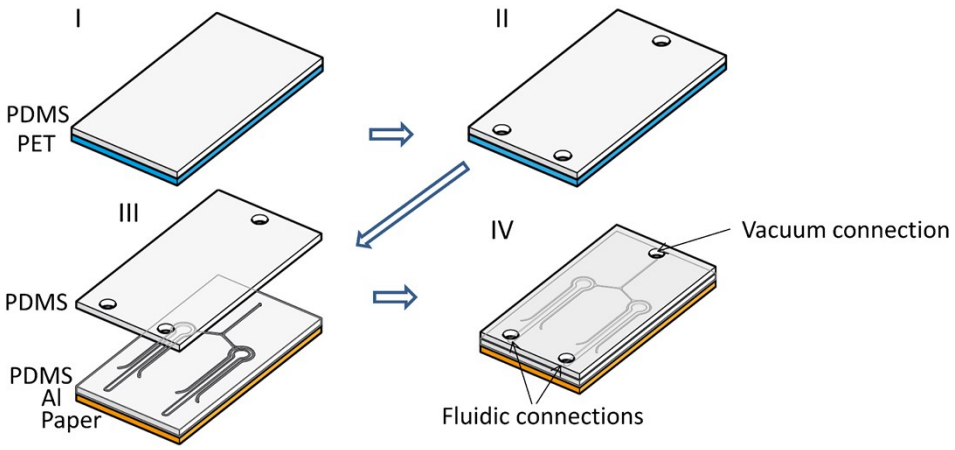

Fig S5. Lid assembly. Method include: I roll-to-roll casting of PDMS on PET by thermal imprinting with a blank rolling cylinder, II punching of vias for fluidics and vacuum connection, III removal of PET carrier and IV oxygen plasma bonding of lid with fluidics.

Fig S6. Schematic of the chamber filling method. Devices with one vacuum connection and two fluidic connections were used in this work. When filling the fluidic channels, the vacuum channels were connected to a vacuum pump. Rubber sealing was used to seal the connection. Liquid samples (coloured water or LAMP reagents) were pipetted into fluidic connections.