Electronic Supplementary Material (ESI) for Lab on a Chip

Solid phase DNA extraction on PDMS and direct amplification

Laura Pasquardini,[*a] Cristina Potrich,[a;b] Marzia Quaglio,[c] Andrea Lamberti,[c;e] Salvatore Guastella,[e] Lorenzo Lunelli,[a;b] Matteo Cocuzza,[d;e] Lia Vanzetti,[a] Candido Fabrizio Pirri,[c;e] and Cecilia Pederzolli[a]

[a] *FBK - Fondazione Bruno Kessler, Center for Materials and Microsystems, via Sommarive, 18 I-38123 Povo (Trento), Italy. Fax: +39-0461-314591; Tel: +39-0461-314494; E-mail: pasqua@fbk.eu*

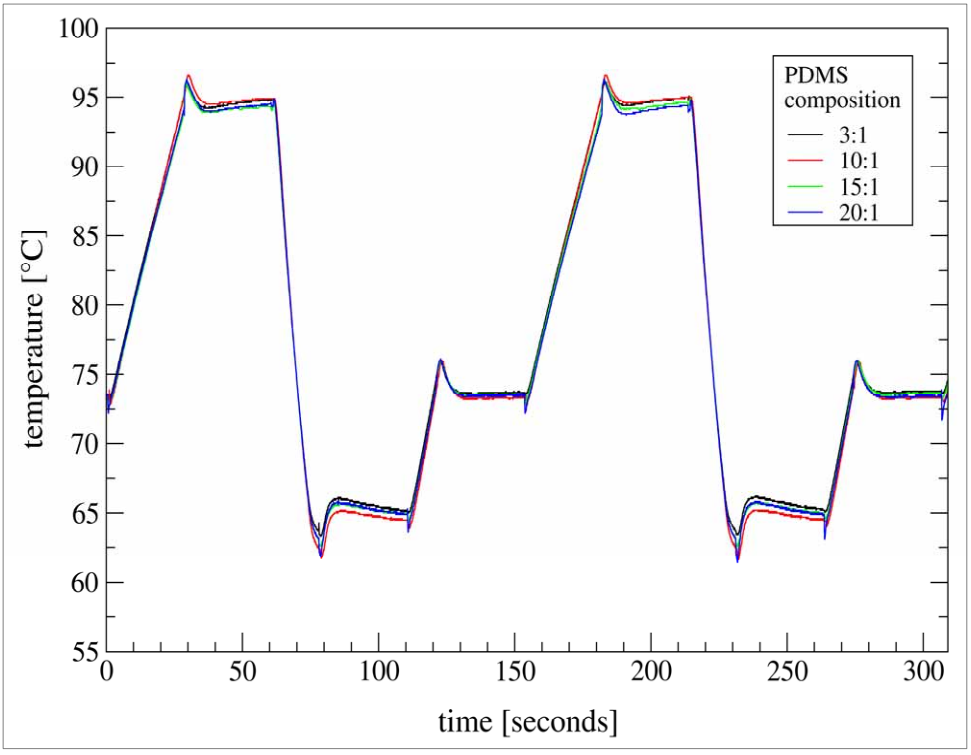
[b] *CNR - Consiglio Nazionale delle Ricerche, Istituto di Biofisica, via alla Cascata 56/C, I-38123 Povo (Trento), Italy*

[c] *CSHR - Center for Human Space Robotics, IIT - Fondazione Istituto* Italiano di Tecnologia, Corso Trento 21, 10129 Torino, Italy

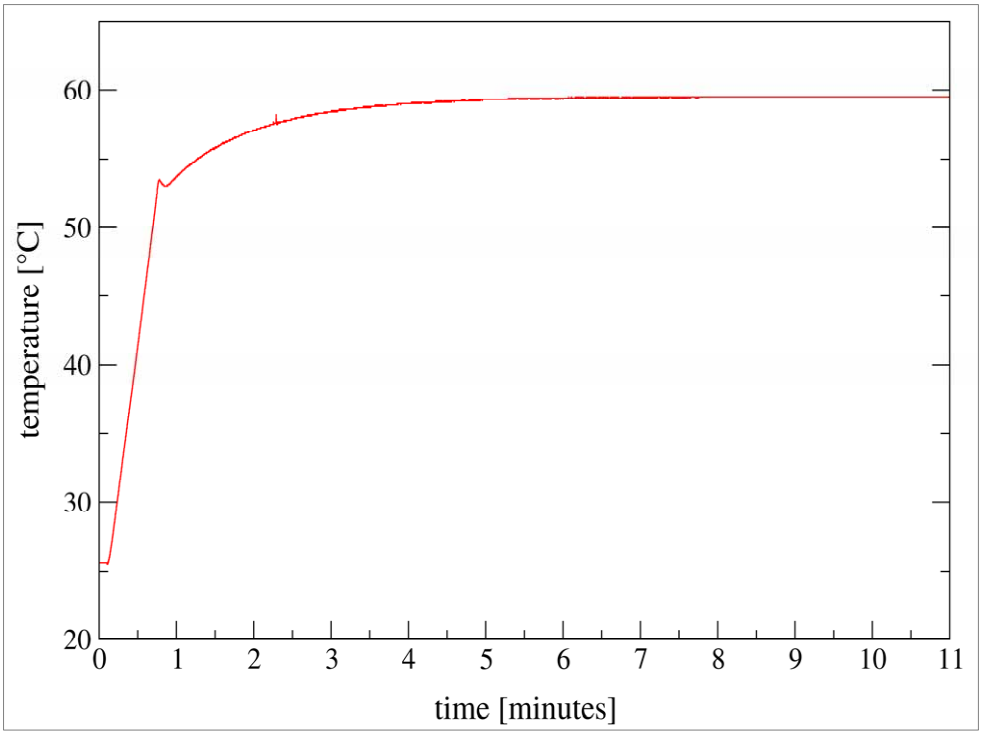
[d] *CNR-IMEM, Parco Area delle Scienze 37a, 43124 Parma, Italy*

[e] *Chilab – Materials and Microsystems Laboratory, Materials Science & Chemical Engineering (DISMIC) Department, Politecnico di Torino, C.so Duca degli Abruzzi 24, 10129 Torino, Italy*

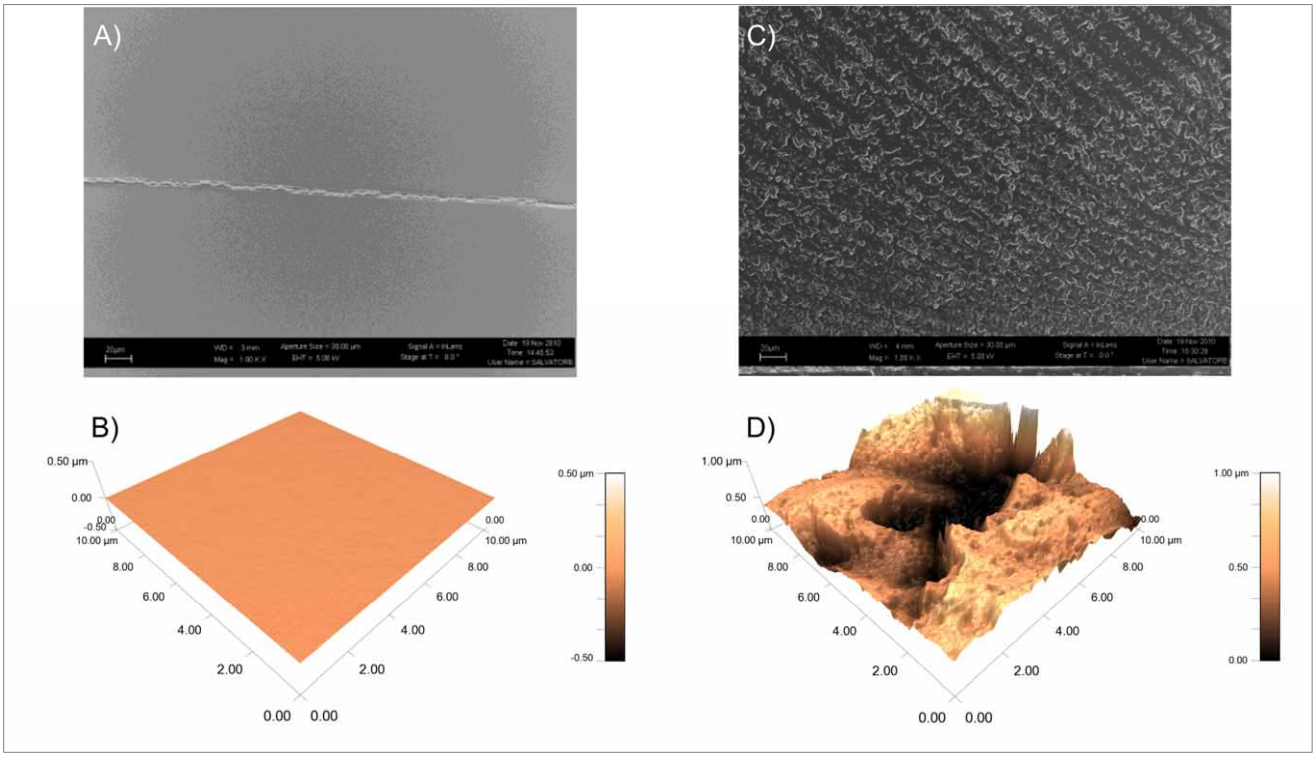
The temperature profile inside the PDMS chip was measured using a thermocouple type K. Data were recorded with a Keithley 2601 Sourcemeter every 1/10 second. The thermocouple was directly inserted inside the PDMS chamber and the temperature was recorded during the PCR cycles (Suppl.Fig.1) or the lysis process (Suppl.Fig.2).
The on-chip measured temperatures during the PCR cycle were about 95°C, 65°C and 73°C.



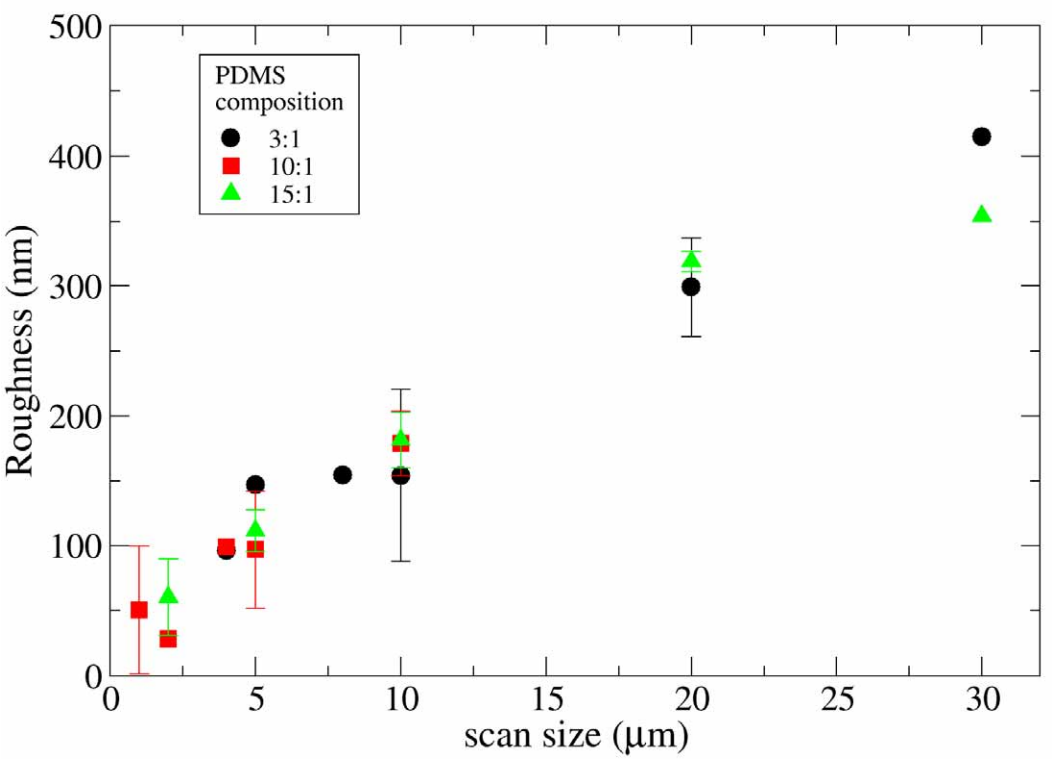
Suppl.Fig.1: Temperature profile measured during PCR cycles on PDMS chips with different polymer to curing agent ratios (3:1, 10:1, 15:1, 20:1)



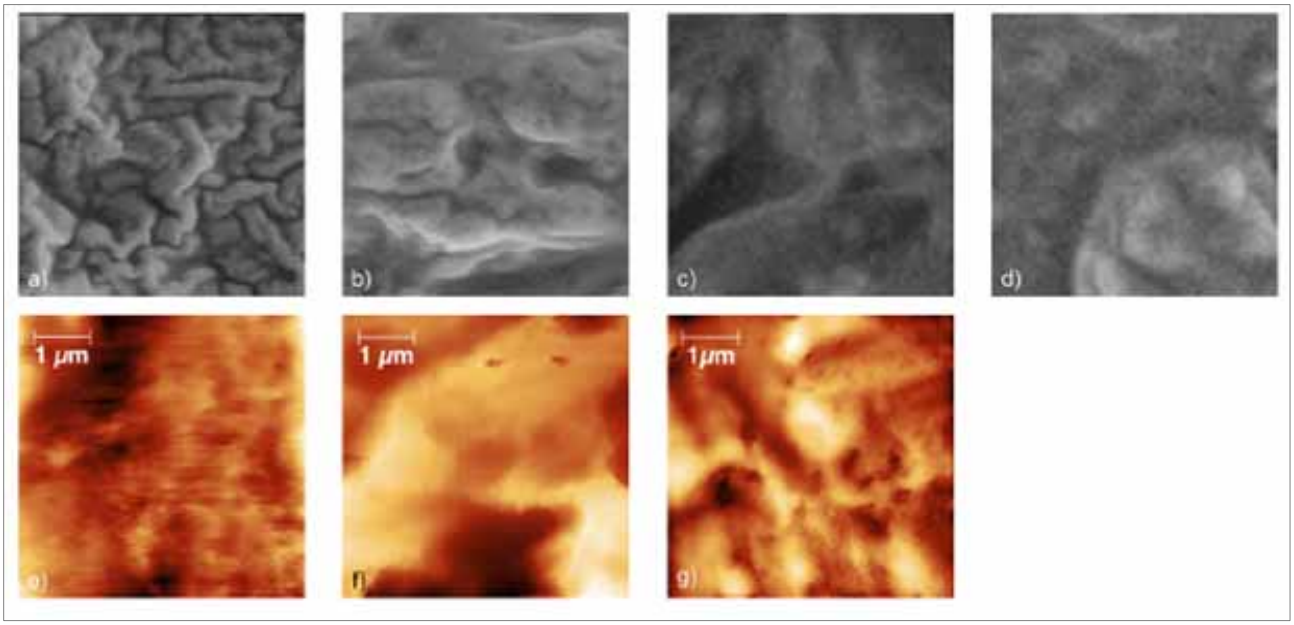
Suppl.Fig.2: Temperature profile during lysis step measured on PDMS chip (10:1). The temperature becomes stable at 59°C with a temperature variation of about 1°C measured on different chips.



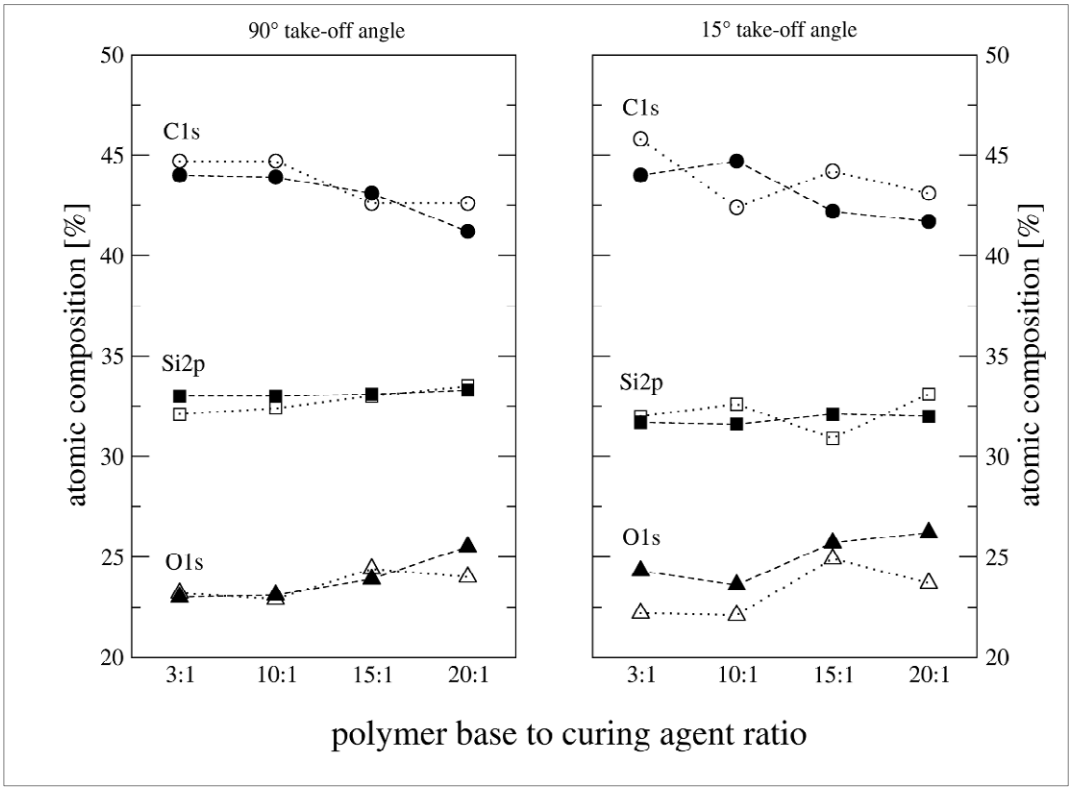
Suppl.Fig.3: Morphology of 10:1 PDMS-chip. Bottom surfaces (panels A and B) and reaction chamber surfaces (panels C and D) were characterised with FESEM (upper row) and AFM (lower row). AFM images with area of 10x10 µm^2 are shown. Measurements have been performed in liquid environment.



Suppl.Fig.4: Roughness of reaction chambers obtained with different PDMS compositions, measured by AFM in liquid environment on different scan sizes.



Suppl.Fig.5: Micrographs of reaction chambers obtained with different polymer base to curing agent ratios : (a,e) 3:1, (b,f) 10:1, (c,g) 15:1 and (d) 20:1. FESEM images (upper row) and AFM (lower row) scans on samples in liquid environment are reported. The scan area is 5x5 μm^2. AFM images were modified with a shadowing algorithm to enhance the visualization of details.



Suppl.Fig.6: Elemental composition (atomic percentage) determined by XPS for bottom surface and reaction chamber with different polymer base to curing agent ratios, obtained from the integrated area of the deconvoluted core lines at 90° (left) and 15° (right) take-off angles. Open symbols refer to reaction chamber, filled symbols refer to bottom surface.