Electronic Supplementary Material (ESI) for RSC Advances.

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Heat and pressure-resistant room temperature irreversible sealing of hybrid PDMS–thermoplastic microfluidic devices *via* carbon–nitrogen covalent bonding and its application for continuous-flow polymerase chain reaction

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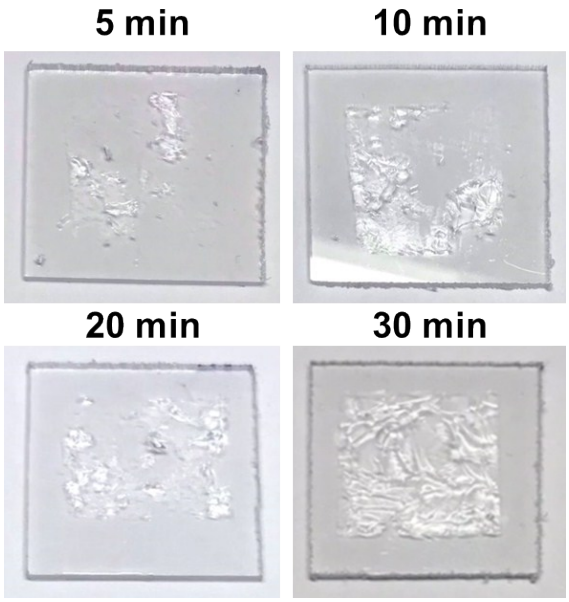

Fig. S1 Photos showing the reaction progress between the ECTMS coated PDMS and APTES coated PC with the lapse of time.

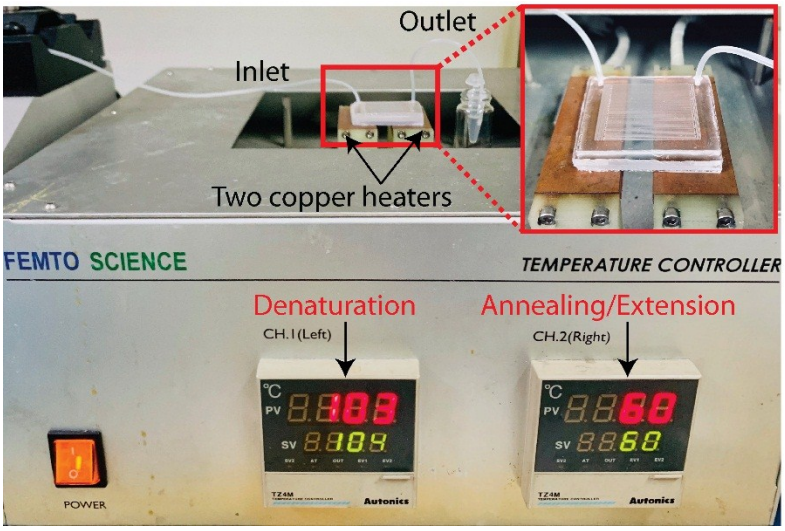

Fig. S2 A photo of the temperature controller used for performing on-chip CF-PCR.

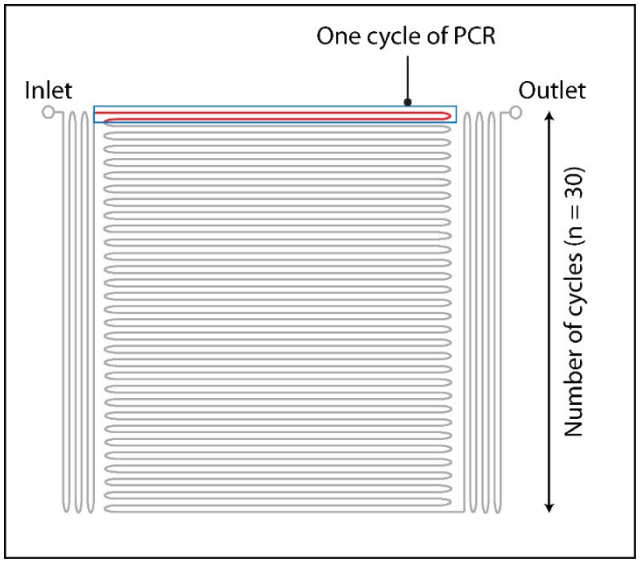

Fig. S3 A schematic illustration of the serpentine microchannel of the PDMS–PC microfluidic device used for 30 thermal cycles for CF-PCR.

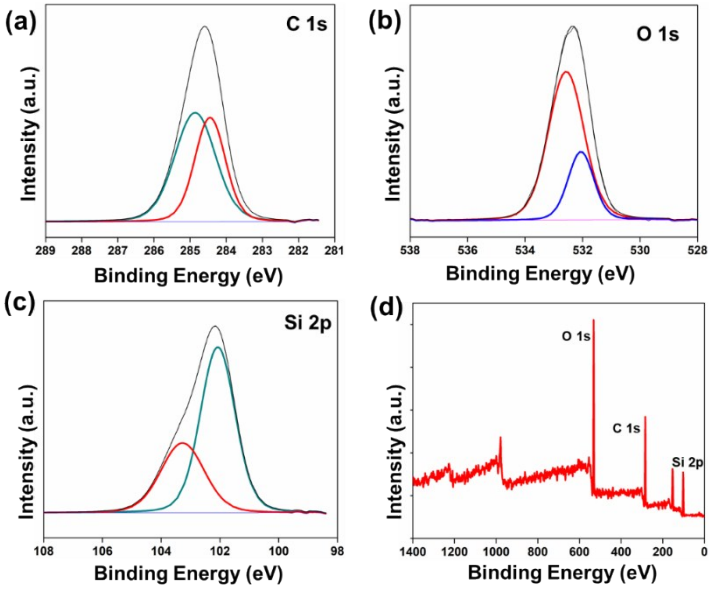

Fig. S4 High resolution XPS spectra for PDMS. (a) C1s, (b) O1s, (c) Si2p and (d) survey spectrum.

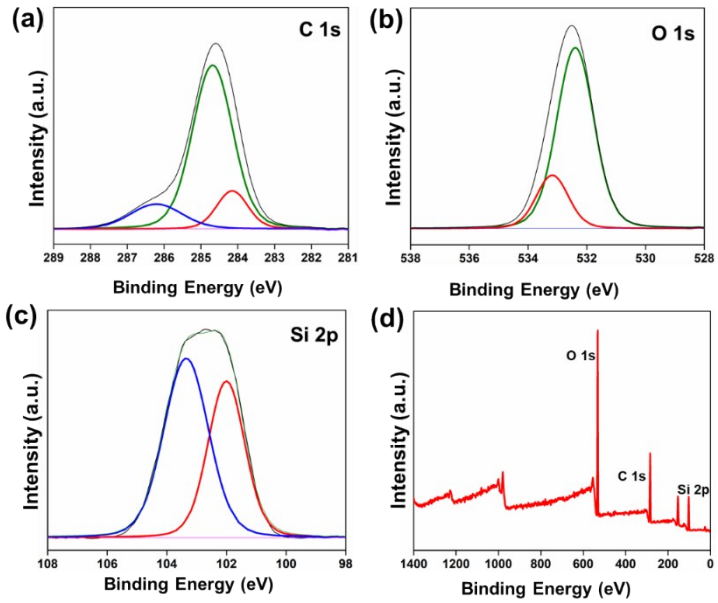

Fig. S5 High resolution XPS spectra for ECTMS modified PDMS. (a) C1s, (b) O1s, (c) Si2p and (d) survey spectrum.

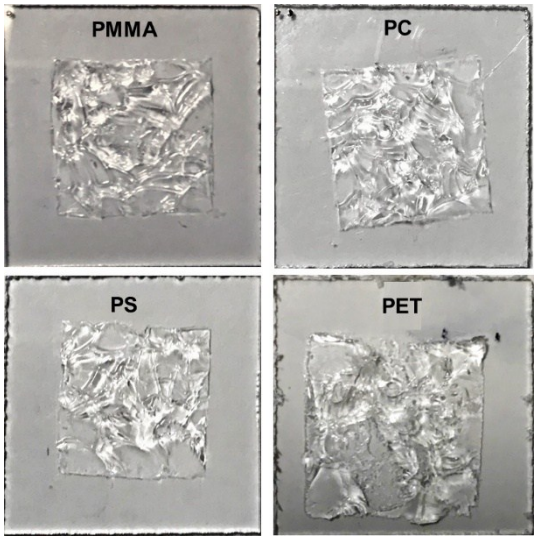

Fig. S6 Results of delamination test.

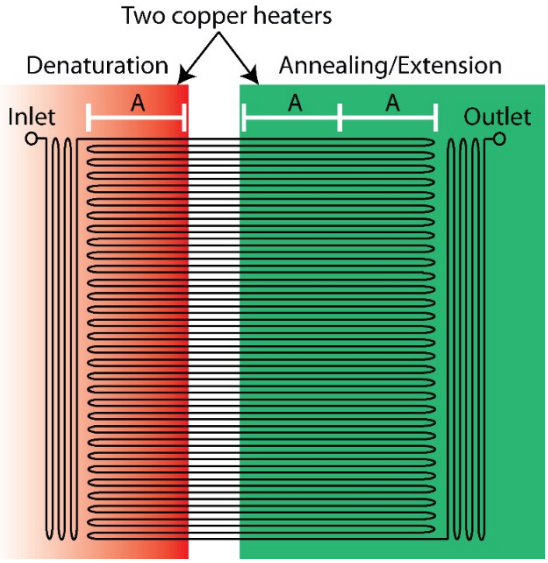

Fig. S7 A schematic illustration of the PDMS–PC microfluidic device placed on two copper heaters for controlling the temperature for CF-PCR. Red and green colors represent denaturation and annealing/extension zones, respectively. "A" is a length value.

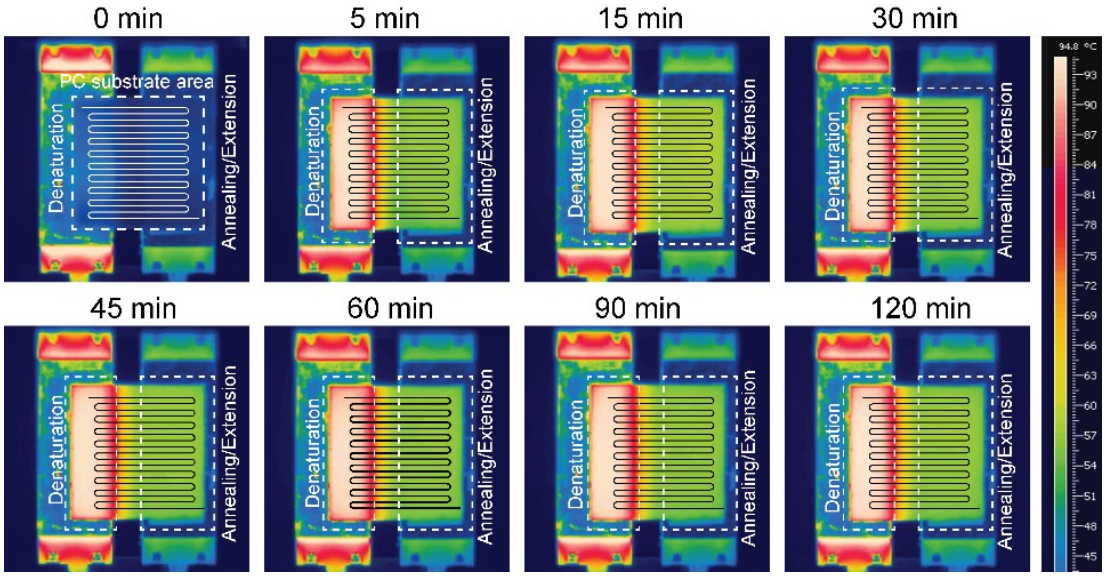

Fig. S8 The IR camera images showing the time-dependent temperatures of the surface of the PC substrate at 0, 5, 15, 30, 45, 60, 90, and 120 min after applying the heat from two copper heat blocks.

Table S1 Comparison of the bonding strengths

Bonding substrates	Bonding strength (kPa)	Silane reagent	Bonding time	Ref
PDMS–PMMA	**274.5**	**1 wt% APTMS and ECTMS**	**30 min**	**This work**
PDMS–PS	**591.7**			
PDMS–PC	**594.7**			
PDMS–PET	**510.0**			
PDMS–PMMA	180	1 wt% APTMS and GPTMS	1 h	*Lab Chip*, 2010, **10**, 1274–1280
PDMS–PC	178			
PDMS–PMMA	305.8	5 wt% APTMS	15 min	*Appl. Surf. Sci.*, 2015,**327**,233–240
PDMS–PC	219.7			
PDMS–PET	189.0			
PDMS–PS	475.7			
PDMS–PC	430	1 wt% APTMS	15 min	*Lab Chip*, 2011, **11**, 962–965
PDMS–COC	432			
PDMS–PMMA	385			
PDMS–PS	388			