

# Supplementary Information

**Title:** Cyclic block Copolymer Microchannel Fabrication and Sealing for Microfluidics

Application

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**Table S1** Comparison of general thermal and mechanical properties of COC, COP and CBC

Material	COC	COP	CBC
Trade name	Topas	Zernor	Puratran
Density (g/cm <sup>3</sup> )	1.01	1.01	0.94
Glass transition temperature (°C)	62 - 177	100 - 102	117 - 133
Flexural modulus (GPa)	2.4 – 3.2	2.1	2.2 – 2.6
Tensile modulus (GPa)	1.26 – 3.2	-	2.2 – 2.6
Water absorption (%)	0.01	<0.01	<0.01

\* Property data obtained from the material datasheet [1-3]

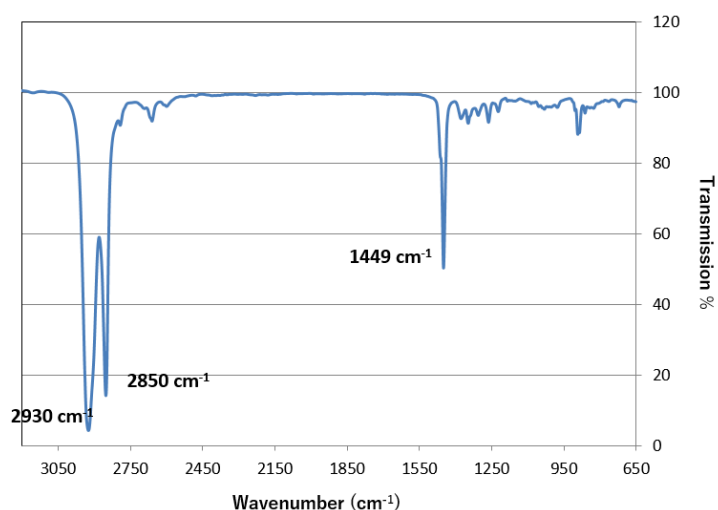
Material	COC	COP	CBC-1	CBC-2
Glass transition temperature (°C)	78	100	117	115
Deflection temperature (°C)	68	80	67	75
The lowest bonding temperature (°C)	68	90	57	75
The highest bonding strength (mJ/cm <sup>2</sup> )	<b>0.404</b>	<b>1.077</b>	<b>6.081</b>	<b>1.199</b>

**Table S2** Comparison of chemical resistance properties of COC, COP and CBC

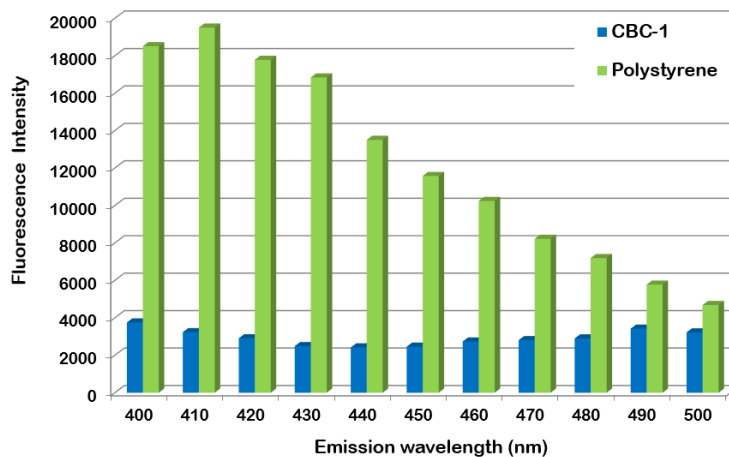
Solvent	COC (Topas)		COP (Zeonor)		CBC (Puratran)	
Hydrochloric acid	O	36%	O	10%	O	36%
Sulphuric acid	O	40%	O	10%	O	40%
Acetic acid	O	> 99%	O	10%	O	> 99%
Nitric acid (65%)	O		O		O	
Caustic soda solution (50%)	O		O		O	
Ammonia solution 33%	O		–		O	
Methanol	O		O		O	
Ethanol	O		O		O	
Isopropanol	O		O		O	
Acetone	O		O		O	
Butanone	O		–		O	
Methylene chloride	X		–		–	
n-Pentane	X		X		–	
Heptane	X		X		–	
Toluene	X		X		–	
Hexane	X		X		–	
Naphtha	X		–		–	
Oleic acid	X		–		–	

O : resistance X : not resistant \_ : unknown

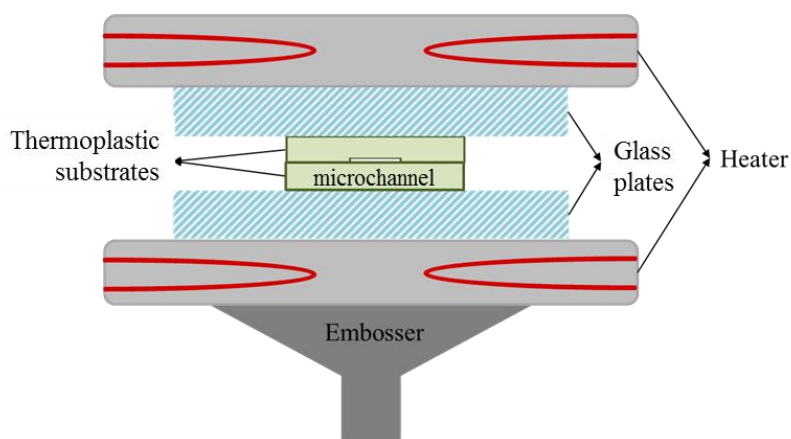
\* Property data obtained from the material datasheet [1-3]



**Figure S1.** The Fourier Transform Infrared Spectroscopy (FTIR) analysis of CBC. The FTIR analysis was performed on Fourier-Transform Infrared Spectroscopy (FT-IR) instruments (PerkinElmer Frontier™) and the CBC was dissolved in cyclohexane in 1% weight ratio. The characteristics peak for CBC :  $sp^3$  C-H stretching occur at 2850-2930  $cm^{-1}$ ,  $CH_2$  bending at 1449  $cm^{-1}$



**Figure S2.** Auto-fluorescence measurement of CBC-1 comparing to polystyrene. The auto-fluorescence data was obtained in spectrofluorometer (HORIBA Scientific, FluoroMax-4) excitation at 350nm.



**Figure S3.** Experiment setup for thermal fusion and UV/Ozone bonding

#### Reference:

1. Topas brochure cyclic olefin copolymer. [http://www.topas.com/sites/default/files/files/TOPAS\\_Brochure\\_E\\_2014\\_06%281%29.pdf](http://www.topas.com/sites/default/files/files/TOPAS_Brochure_E_2014_06%281%29.pdf) 2014.
2. Puratran cyclic block copolymer datasheet. [http://www.usife.com/USIWebFiles/Product/CBC-Puratran\\_en.pdf](http://www.usife.com/USIWebFiles/Product/CBC-Puratran_en.pdf) 2016.
3. Zeonor cyclic olefin polymer datasheet. <http://www.zeon.co.jp/content/200181692.pdf> 2012.