Electronic Supplementary Material (ESI) for Analytical Methods.

New strategies for stationary phase integration within centrifugal microfluidic platforms for applications in sample preparation and pre-concentration

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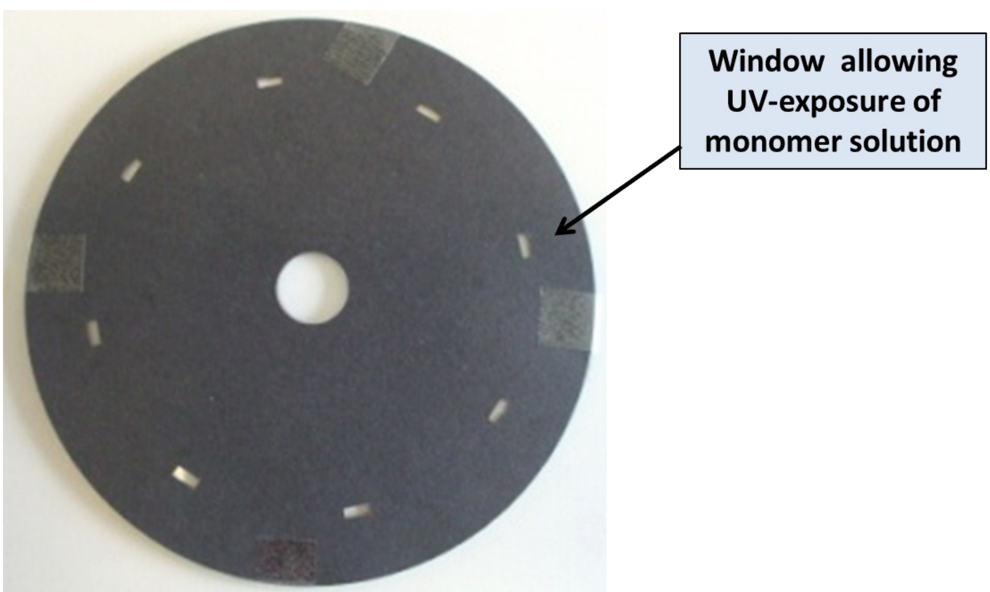

Fig. S-1 Customised mask used for polymer monolith photo-polymerisation.

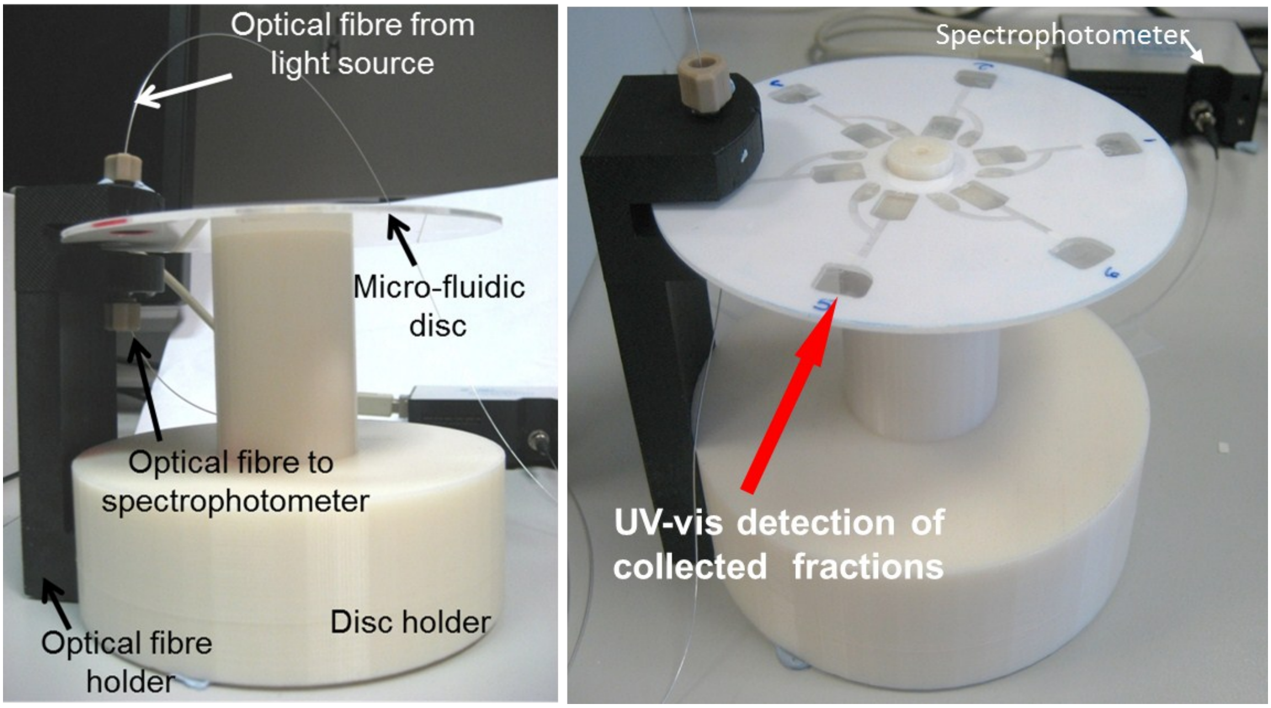

Fig. S-2 Set-up for on-disc UV-Vis detection utilising optical fibres aligned at the outlet reservoir for on-disc detection of collected fractions.

Estimation of pressure generated in an open microfluidic channel as a function of the speed of rotation

Although no column backpressures measurements were directly possible, pressures generated in the open microfluidic channels (i.e. no column present) under investigation were estimated below in an effort to illustrate how pressure in the channels varies as a function of the speed of rotation. The pressure difference (Δp_{ω}) required to pump a pressure-driven flow at the same mean velocity as that experienced by same fluid pumped by centrifugal forces through the same channel was calculated using the following equation [1]:

$$\Delta p_{\omega} = \rho \grave{r} \Delta r \omega^2$$

where ρ is the density of the fluid, $\grave{r}$ is the mean radial position of the plug in respect of the centre of rotation, Δr is the plug length, and ω is the angular velocity. Assumptions made: the plug fluid was water and the channel was straight, round and open (i.e. no column present). The resulting pressures were 4 KPa at 800 rpm, 15 KPa at 1500 rpm, 40 kPa at 2500 rpm, 47 KPa at 2700 rpm and 104 KPa a 4000 rpm. Although, these pressures are significantly lower than those being generated in channels integrating silica or carbon-monolith columns, they are still helpful for comparing relative values, e.g. pressure generated at 4000 rpm is 2.6 and 26 times higher than at 2500 rpm and 800 rpm, respectively.

[1] J. Ducreé, S. Haeberle, S. Lutz, S. Pausch, F. von Stetten, R. Zengerle, J. Micromech. Microeng. 17 (2007) S103–S115.