SUPPLEMENTARY MATERIAL

Direct writing of optical microresonators in lab-on-chip for label-free biosensing

L. Kelemen†[a], E. Lepera†[b], B. Horváth[a], P. Ormos[a], R. Osellame[b] and R. Martínez Vázquez*[b]

Fiber alignment.

The optical fiber connections into the device follows the already well stablished "pigtail" bonding method used in integrated optics. First, the fibers are stripped in order to remove the jacket and to leave a non protected section, long enough to fill the whole microchannel. The fiber is also cleaved to achieve a clean end-facet orthogonal to the fiber core. Afterwards, an input and an output fibers are inserted inside the dedicated channels with the help of two micromanipulators (3-axis NanoMax™ flexure stages, Thorlabs). The fibers are already connected to the laser source on one side and to the optical spectrum analyzer on the other side, a fine alignment of the fibers is performed by monitoring the signal strength and the resonance depth in the transmitted spectra. When the signal is optimized, a small quantity of glue is deposited onto the fiber channel entrance where it partially fills the gap between the fiber and the channel walls by capillarity. Curing with an UV LED is performed before the glue reaches the tip of the fiber to improve the reliability of the device. In fact, the cured resin can degrade after continuous exposure with intense light during the device operation.

Figure S1. Graphical scheme of the fabrication process.

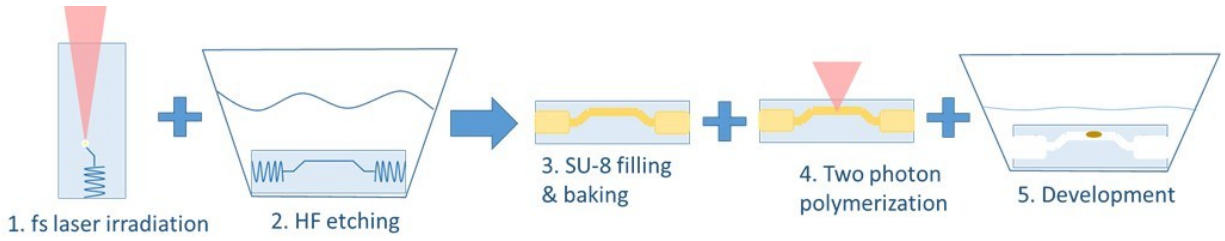
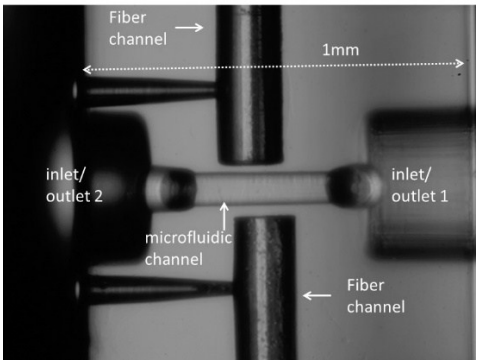


Figure S2. Microscope picture of the chip with components details.



Equation for the linear fitting of refractive index change versus wavelength in Figure 4(b)

$y=m\,\Delta n + y_0$; with m=(61±1)nm, y_0=-(0.03±0.01)nm, R^2=0.998

Equation for the exponential fitting of wavelength shift versus streptavidin solution incubation time in Figure 5(b)

$\delta\lambda=A_1\, e^{-(t/t1)} + \delta\lambda_0$; *with* $\delta\lambda_0$=(3.6 ±0.1)nm, $A1$=-(3.7±0.2)nm, $t1$=(4.8±0.5)h