Fig. S1. Fabrication process for the temperature control device.

This figure summarizes the fabrication process of the disposable PDMS temperature control device. 1) The temperature control channels are a network of twelve 200 µm wide X 100 µm high, 1 cm long channels separated by 100 µm wide walls. 2) The yeast channel is 5 µm high. 3) Combining the two layers of channels onto the glass cover slip completes the microfluidic temperature control chamber. Drawings are not to scale.

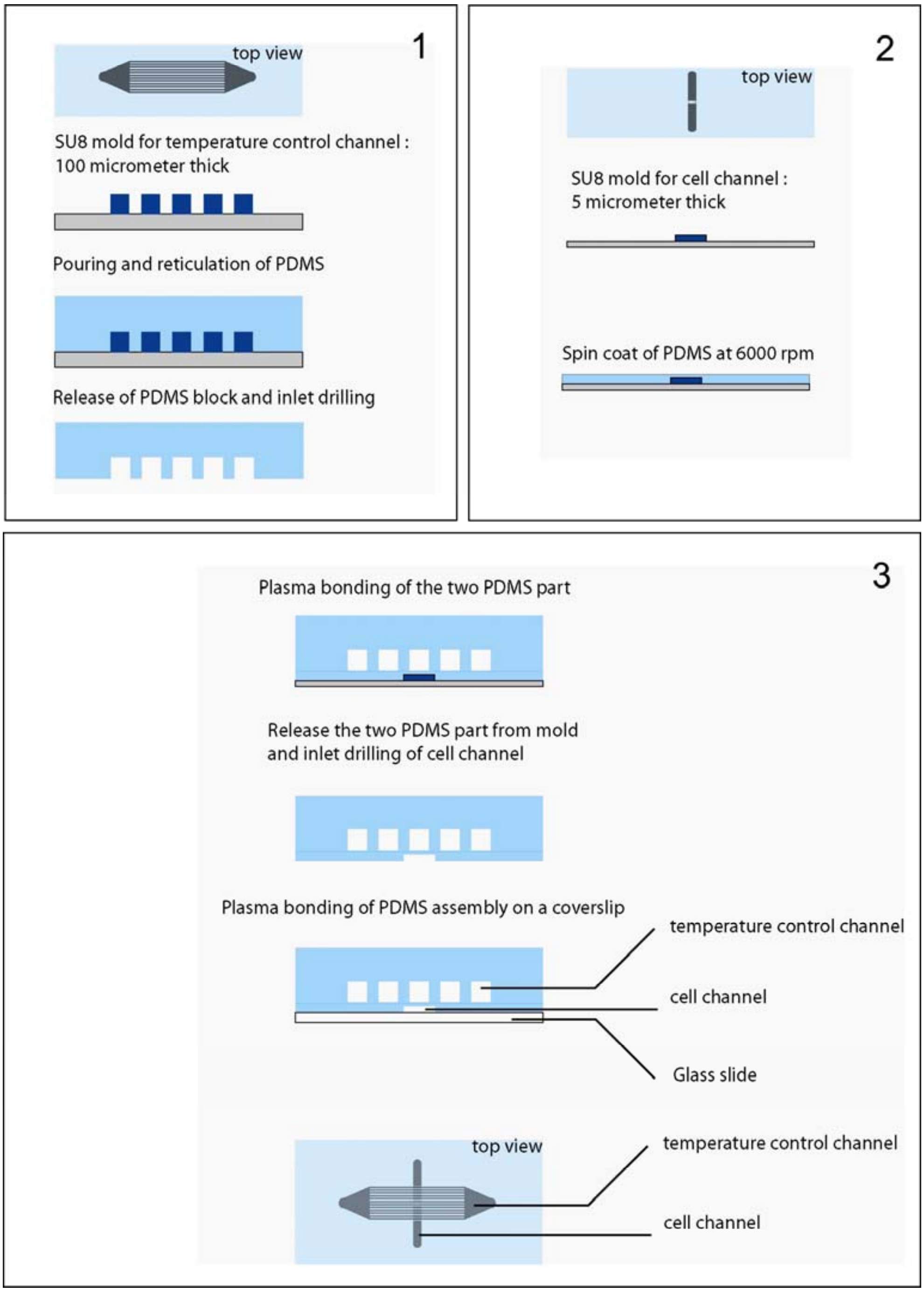
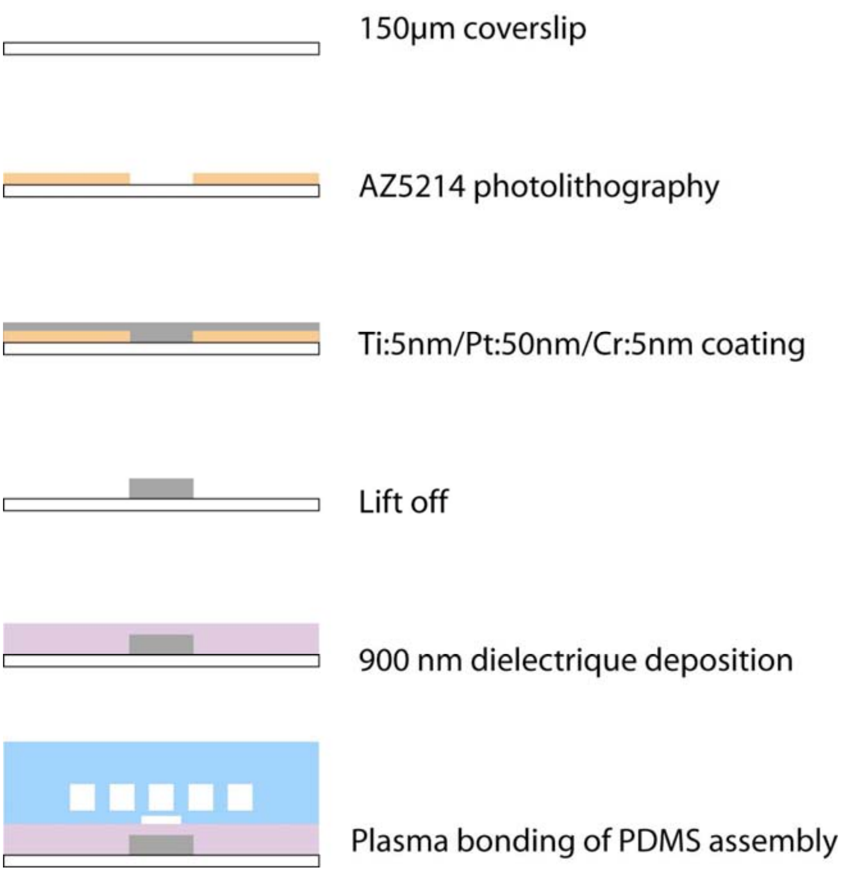


Fig. S2. Fabrication of the "thermometer".

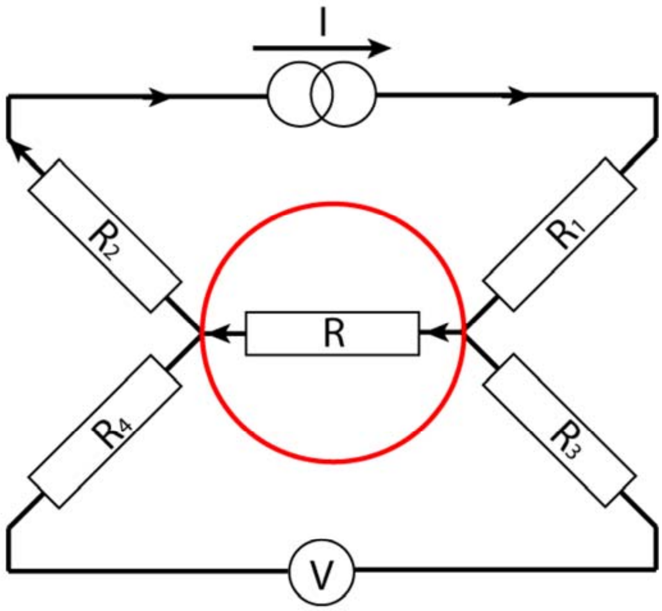
Photolithography and platinum deposition onto a glass cover slip serve as the initial temperature measuring device. Drawings are not to scale.



Supplementary Material (ESI) for Lab on a Chip

Fig. S3. Schematic of 4-wires measurement method and shape of platinum sensor.
A. The 4-wires method uses a voltmeter and a current to measure electrical resistance. This method enables measuring a resistance without the influence of the connecting wire. Since the voltmeter has a theoretical infinite resistance, no current circulate in its electrical branch. Thus, the voltage measured by the voltmeter become: $V= R_4 \bullet 0 + R \bullet I + R_3 \bullet 0 = R \bullet I$. Knowing V and the current I, given by the current source, we are able to calculate the resistance R only between the intersection (red circle) of the connecting wire.
B. Using the 4-wires measurement method described above, and the platinum strip with the shape presented, where electric platinum strip enter in contact under the fluidic region, we are able to deduce the resistance only under the microfluidic channel (blue).

A



B