Supplementary information

Pressure tolerance test

To determine the pressure tolerance of our SPHMC, it was first obstructed by epoxy at one end and was connected to an air source at the other end. Then, air pressure was increased when the connector was submerged in water to monitor the emergence of air bubbles. The nano-liter sample injector, the PDMS plug and the female SPHMC were tested in a similar manner. The result was shown in Table. 1. This is beyond the requirements of most microfluidic applications that typically operate within the pressure regimes of 20 psi or less.

	SPHMC	**Nano-liter sample injector**	**PDMS plug**	**Female SPHMC**
Maximum tolerant pressure (psi)	45	30	>45	30

Table. 1

One-step forming method

In general, puncher is used to create inlets of a poly (dimethylsiloxane) (PDMS) device. This method is quite simple and effective. However, when the number of inlets increased, the serial punching of inlets turned out to be a tedious and time-consuming task. Therefore, we introduced a method that was based on a pin-header mold, casting all the inlet holes and channels at the same time.

A 2.54 mm spacing pin-header mold was first fabricated by replacing the metal pins in the pin-header (Digikey Supply) using hollow 24-gauge needles. These needles were obtained by heating and removing plastic Luer hubs of 1.5" blunt needles (Amazon Supply) and then fixed with epoxy. Using this two-step procedure, a pin-header mold was developed: these needles were spaced 2.54 mm apart as shown in Fig. S1. For the microfluidic device, a silicon wafer mold was fabricated by standard soft lithography: the spacing in the inlet structure was fixed at 2.54 mm, which is same as the pin-header mold. The backside of silicon wafer mold was stuck at the bottom of a Petri dish (Dow Corning) using a double-faced adhesive tape. The pin-header mold was inserted into a PMMA holder and was placed on the front side of the silicon wafer. After that hollow needles were carefully aligned to the inlet structure. As hollow needles can be magnetized, a NdFeB magnet (Qineng, China) was placed on the backside of Petri dish to fix pin-header mold at the right place. A heavy object was put on the pin-header mold: this would ensure close contact during further pouring and curing steps of PDMS. PDMS (Sylgard 184, 10:1 monomer: curing agent) were mixed and degassed. Thereafter, it was poured into a Petri dish and cured in an oven at 75°C for at least 1 h. Then, we carefully peeled off cured PDMS to remove the pin-header mold. With the help of this process, a PDMS device was constructed, and 2.54 mm spacing inlets holes were drilled in the positions of these pins. Finally, this PDMS slab was either bonded to a glass substance or PDMS, and the final chip was obtained. Thus, a one step process was used to construct a PDMS elastomer microfluidic device having 2.54 mm spaced inlets.

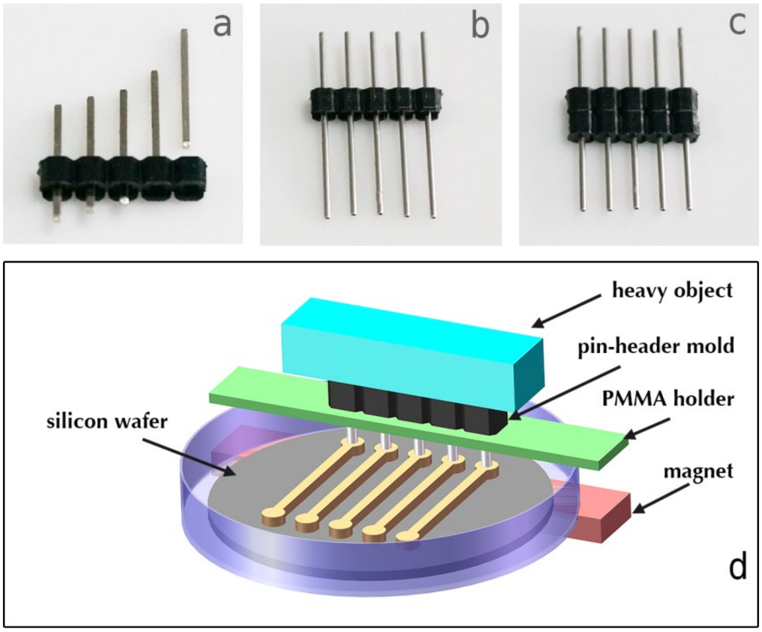

Fig. S1 Process flow for fabricating pin-header molds. Metal pins were removed from pin-header to get a pin-header block (a). Five hollow 24-gauge needles were inserted into the pin-header block (b). Another pin-header block was fixed to reinforcing the pin-header mold. (c). The pin-header mold was then inserted into a PMMA holder with five holes to keep balance. A heavy object was put on the pin-header mold to avoid the gap between metal pins and the silicon wafer. A NdFeB magnet was placed on the backside of the silicon wafer to fix pin-header mold at the right place (d).

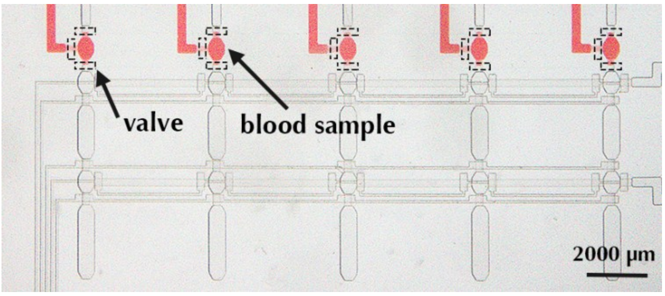

Fig. S2 The picture showed the result of dead-end filling. The height of the chambers was 250 μm and the volume of it was 100 nl. There were three valves around the each sample chamber to control the liquid. Since these valves filled with water, they can hardly be seen.