Supplementary information

"Temperature controlled tensiometry using droplet microfluidics"

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SI Fig. 1. Rhodamine B absorption measurements inside the epoxy-based transparent microdevice containing the microheater. The fluorescent intensities are measured along the transverse flow direction (along Y) in the microdevice (marked in red dotted line) under a flow rate of 200 μ l/hr. A small amount of surface adsorption of Rhodamine B saturated at time = 10 min, due to its adsorption to negatively charged epoxy surface.



SI Fig. 2. The resistance is plotted against the temperature of the temperature sensor. The symbols and the solid line correspond to the experimental data and linear curve fitting, respectively. The temperature sensor is connected to one channel of the digital multimeter (Keithley, 2700 with 1300 switch module) while the K-type thermocouple is connected to the other channel of the multi-meter, with which the resistance-temperature relation was obtained.



SI Fig. 3. Shear viscosities (at shear rate of 500 s⁻¹) of mineral oil, silicon oil, and 50 wt% aqueous glycerol solutions are plotted against temperature. A strain-controlled rheometer (ARES-G2, TA instruments) with a steel heat break parallel plate (40 mm in diameter) was used for the rheological measurements.



SI Fig. 4. Rhodamine B solution flows at the flow rate of 200 μ l/hr, and the fluorescent intensity of Rhodamine B inside an epoxy-based transparent SU-8 microchip was measured by a fluorescent microscope (Nikon, Eclipse Ti-U) at y = -100, 0, and 100 μ m. The temperature is fixed at 40 °C. The temperature gradient along the flow direction (x) is plotted along x-direction at three different y-locations, y = -100, 0, and 100 μ m.

SI video: Droplet deformation along the flow direction at various temperatures (22-70 °C), at the flow rate of 1000 μ l/hr.