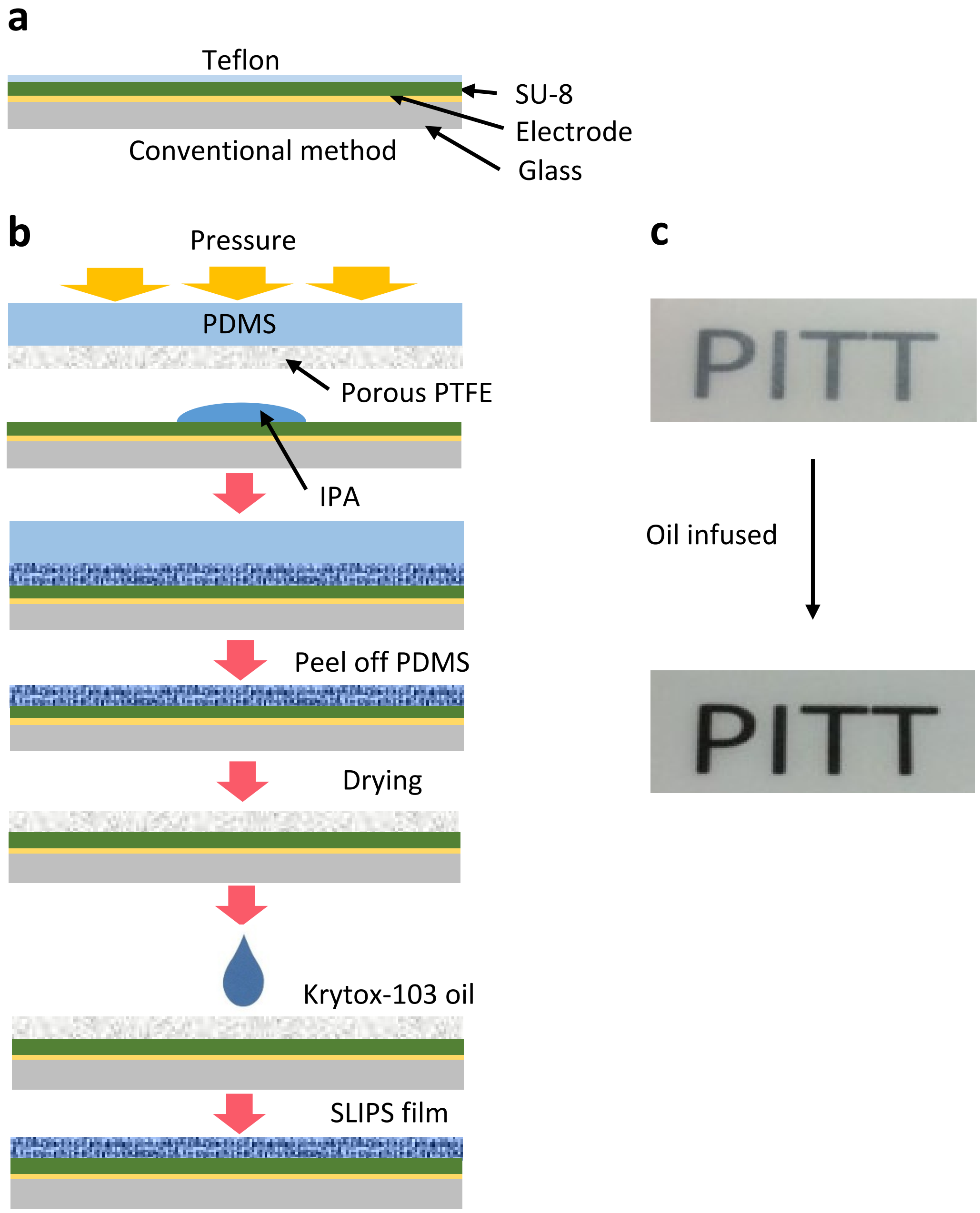
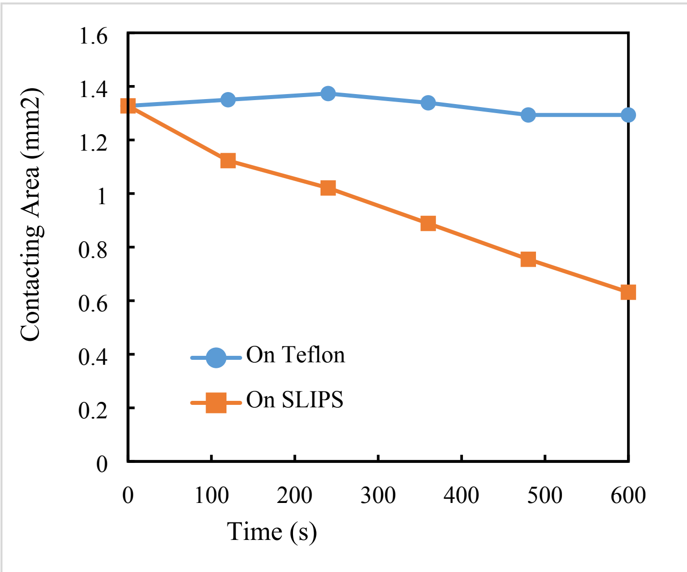
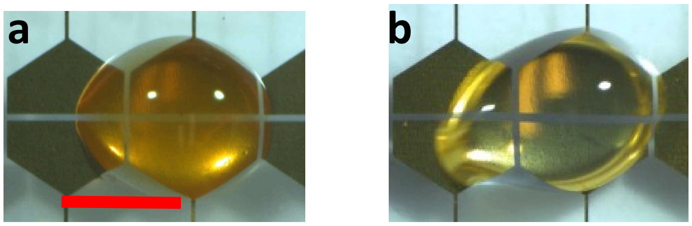
Electronic Supplementary Material (ESI) for Lab on a Chip.



Supplementary Fig. 1 Fabrication of digital microfluidic device with SLIPS and the surface properties. a, Fabrication of conventional EWOD and **b,** anti-biofouling EWOD digital microfluidic devices. The 4.2-µm-thick porous PTFE film is transferred using a thin PDMS slab to avoid any folds and wrinkles. With IPA, the porous PTFE film is released from the PDMS slab and bonded to the SU-8 surface. After IPA volatilizes, Krytox-103 oil is infused to form a SLIPS. The excessive oil is removed by vertically leaning the device for several hours. **c,** Change of the opacity of the PTFE film. The film is attached to the plastic surface on which word, ‘PITT’ is printed. Before infusing Krytox-103 oil (lubricant), the word is shown blurry (top), since the nanoporous film diffusively reflects light. After infusing lubricant, the layer becomes transparent, clearly showing the word.



Supplementary Fig. 2 Contacting area of 50 mg/mL protein droplet on Teflon and SLIPS during evaporation. On Teflon surface, the strong pinning effect keeps the area almost constant. On SLIPS, the area decreases with time due to the extremely low friction.



Supplementary Fig. 3 Different mechanisms responsible for the transporting of dielectric and conductive droplets. a, When the left electrode is energized (300 V), the thin crude oil (dielectric fluid) droplet is stretched around the gap area, meaning that the responsible mechanism is liquid dielectrophoresis. The dielectrophoretic force is maximum at the gap region, where a strong fringe field is generated. **b,** When the left electrode is energized (275 V), the ionic liquid (conductive fluid) droplet spreads over the wide area of the energized left electrode, meaning that the responsible mechanism is EWOD. Scale bar: 1.5 mm.