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

Supporting Information

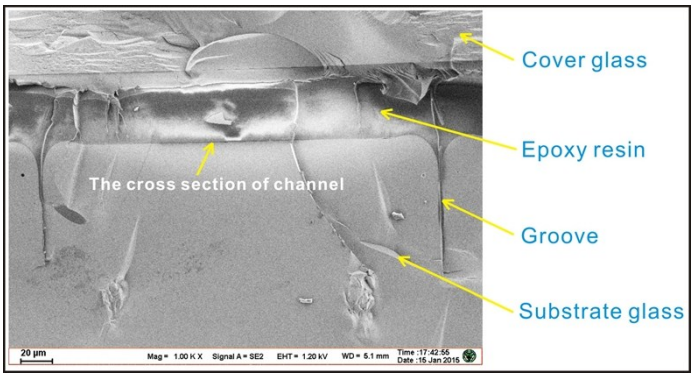


Fig. S1 SEM cross-section picture of the whole three-layer structure of the nanochannel. The cross-section was obtained by breaking off the nanochannel device mechanically.

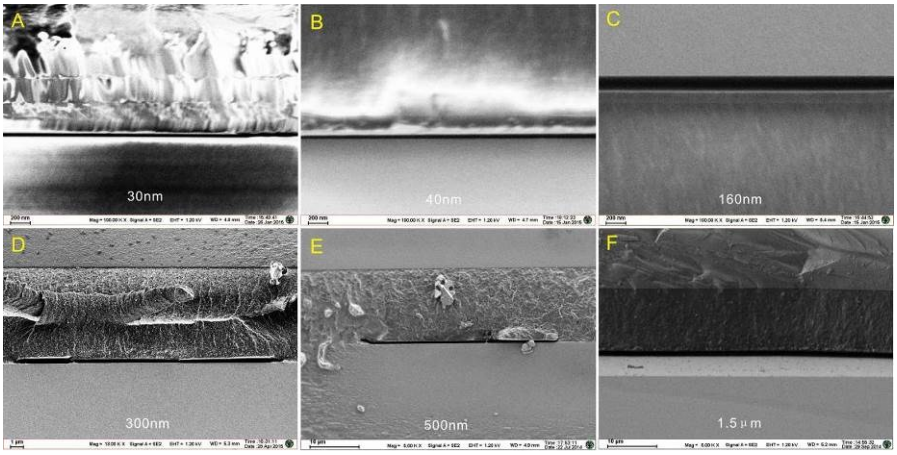


Fig. S2 SEM images of cross-sections of the nanochannels with the depth of 30,40,160, 300,500 nm, and 1.5 μ m.

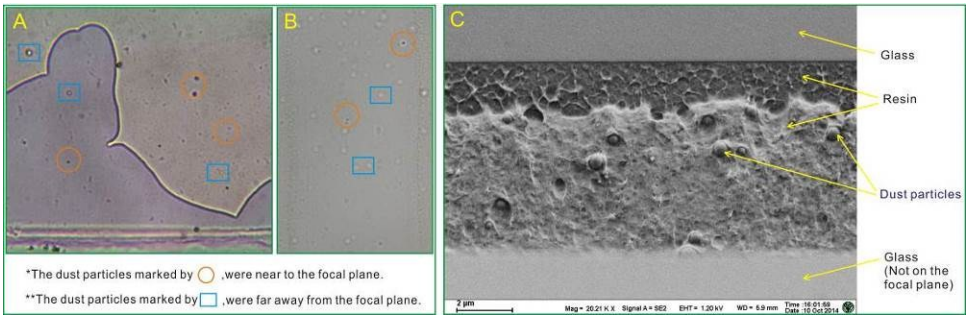


Fig. S3 Images of dust particles. (A) and (B) the dust particles were on the background of nanochannels under optical microscopy; (C) the dust particles were wrapped by the resin in SEM image of the cross-section of resin.

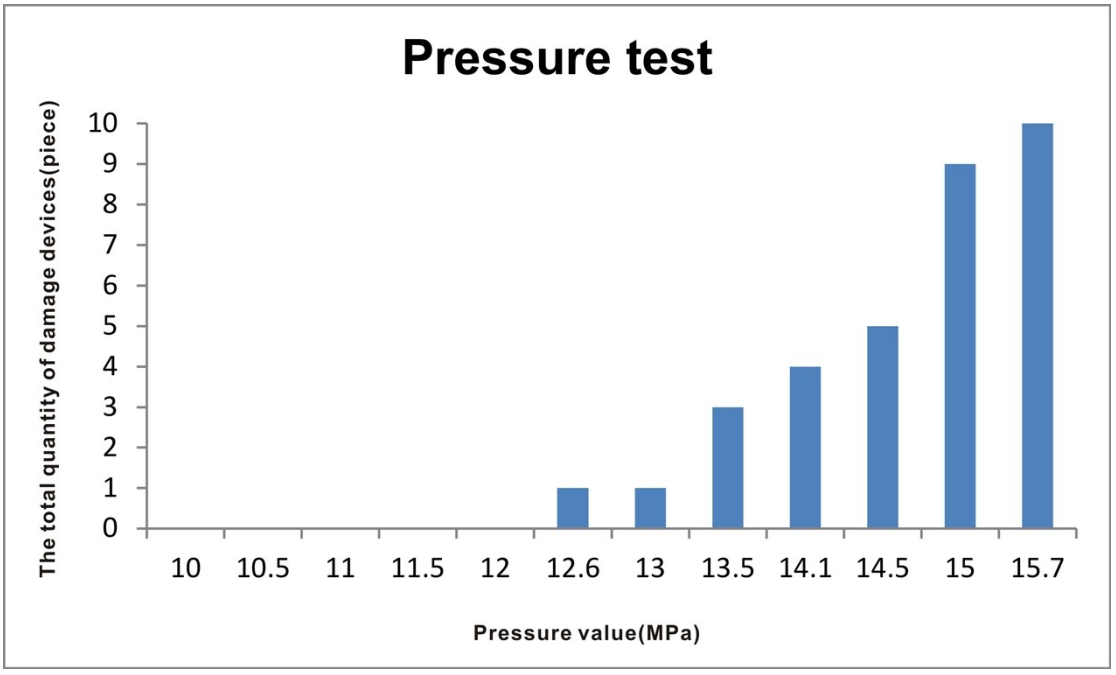


Fig. S4 Pressure test of 10 pieces of nanochannel devices. High-pressure water was pumping into the nanochannels, and measured the corresponding destruction pressure. No nanochannel was damaged under the pressure below 12.5 MPa.

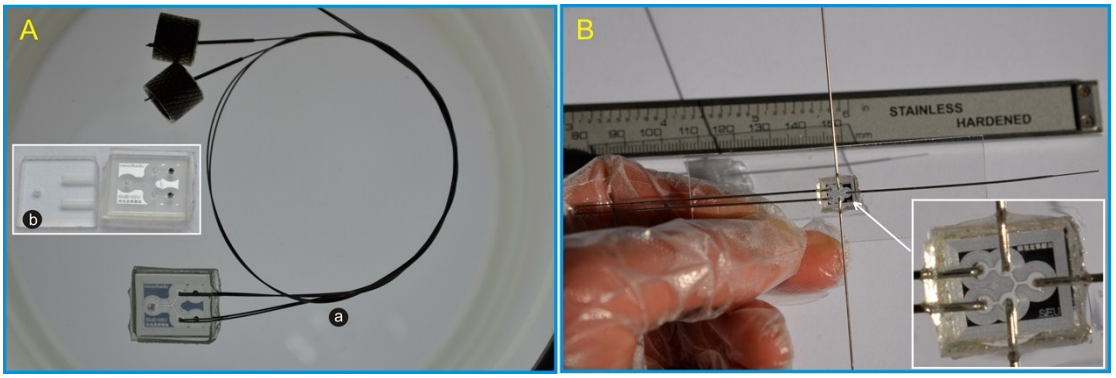
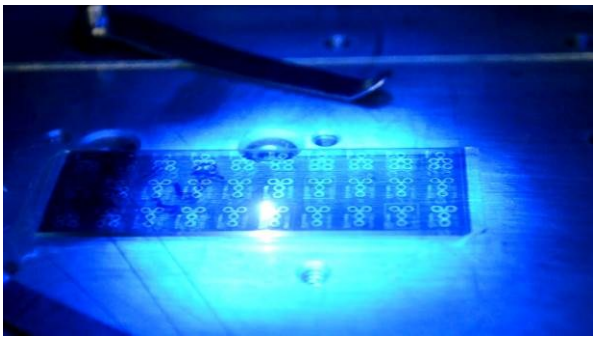
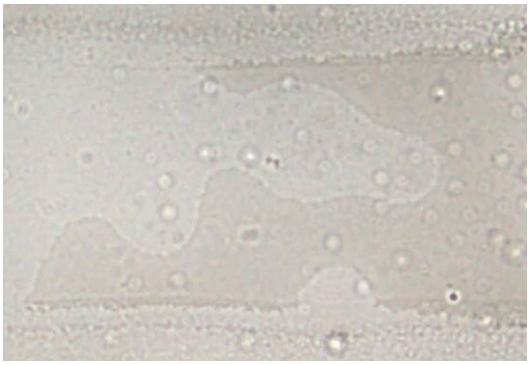


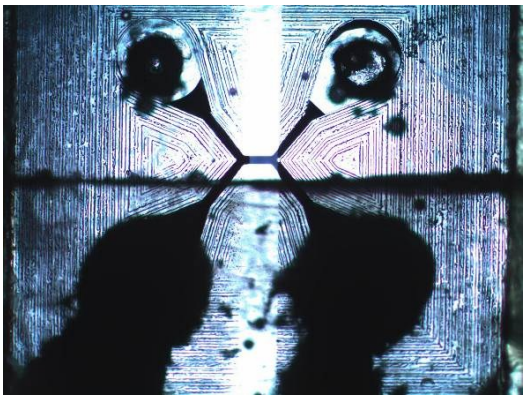
Fig. S5 Nanochannel devices mounted with stainless steel capillaries. (A) mounting method with stainless steel pipes, nanochannel device mounted with the pipes(a) and the device before mounting (b); (B) mounting method with concentric stainless steel pipes in which a smaller inner pipe embedded in a larger pipe.



Video S1. Fabrication of nanochannel device. Part Ⅰ(from 0′ 5″ to 1′ 35″): Manufacturing specific shape of the aluminum sacrificial layer by laser engraving. Part Ⅱ(from 1′ 37″ to 1′ 49″): Animation of the whole fabrication process of the nanochannel device.



Video S2. Experiments based on nanochannel devices. Part Ⅰ(from 0′ 5″ to 6′ 12″): Evaporation process in the nanochannel. Part Ⅱ(from 6′ 14″ to 6′ 39″): The water flow through the nanochannel driven by capillary force. Part Ⅲ(from 6′ 41″ to 7′ 23″): The flow of aqueous solution of fluorescein sodium through the nanochannel between two microchannels.



Video S3. Ecthing Process of Sacrificial Layers. Part Ⅰ(from 0′ 5″ to 5′ 55″) and Part Ⅱ(from 5′ 57″ to 6′ 42″): Electrolysis of aluminum sacrificial layers with the thickness of 20nm. Part Ⅲ(from 6′ 44″ to 10′ 18″):Electrolysis of aluminum sacrificial layer with the thicknesses including both micro- and nano-scales.