Electronic Supplementary Material (ESI) for Lab on a Chip

SUPPORTING INFORMATION

Glass over-etching to bridge micro- and nanofluidics

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1. Time serial analysis for the glass ridge formation

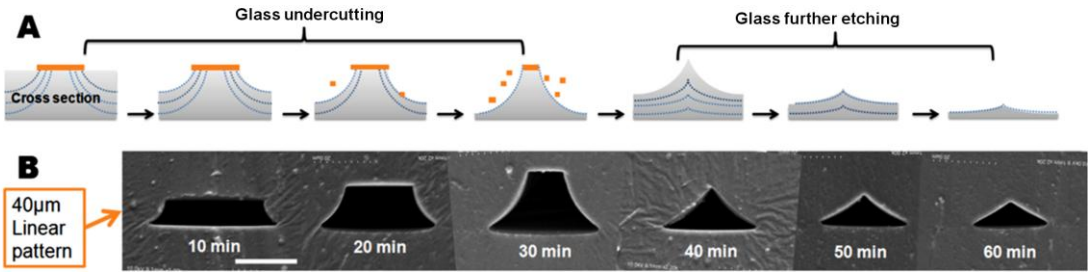

Figure S1. Two stages for glass ridge formation. A. Illustration for the detailed process of glass ridge fabrication. B. Typical time serial SEM images for geometry transformation of PDMS channels corresponding to the glass mold. The SEM image corresponds to geometry of 40 μm pattern that experienced 10, 20, 30, 40, 50 & 60 min of glass etching. The scale bar is 20 μm.

2. Optical characterization of nanochannel

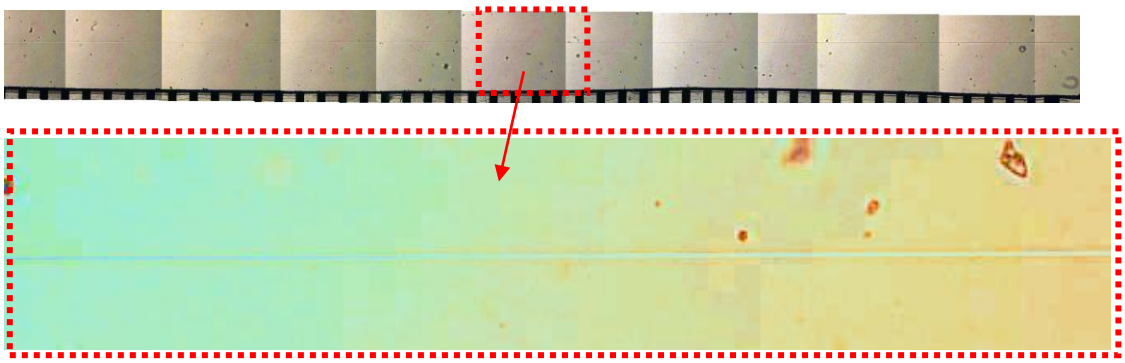

Figure S2. Optical image for a 1cm long nanochannel (30μm, etched for 180min)

3. Consistency of SEM and Laser interferometry

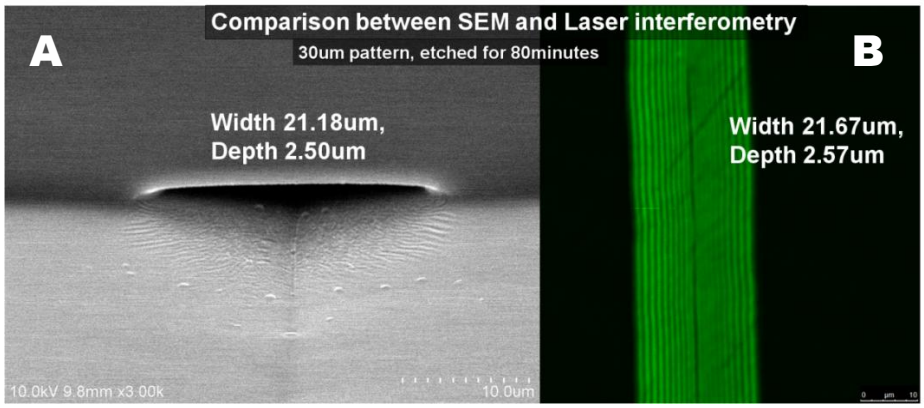

Figure S3. Comparison between SEM and Laser interferometry for their consistency. A: SEM result for the PDMS channel cross section; B: laser interferometry of the same PDMS channel. Experiment condition: 30μm Cr pattern, etched for 80minutes.

4. Geometrical analysis of the PDMS channel

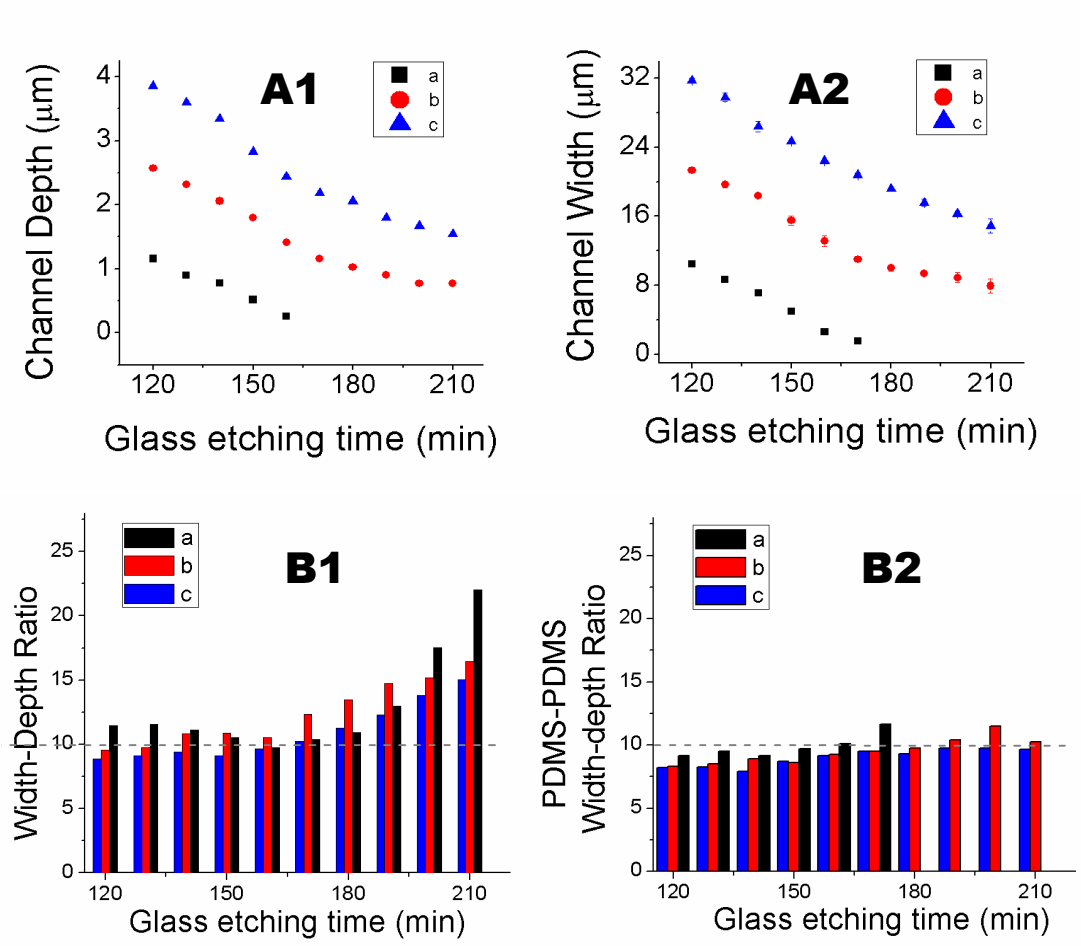

Figure S4. Geometrical analysis of sample a, b &c, and resistance analysis of the PDMS channels. A1&A2. Relationship between depth/width and etching time of PDMS channels. B1. The width-depth ratio of ridges for the glass mold, B2. The width-depth ratio for the PDMS channel fabricated based on the glass mold.

Five channels in an array are linked by two microchannel arms for electrical resistance analysis.

The arm microchannels are fabricated with deep height (100 µm) and large width (500 µm) so that their resistance would not be comparable to the 5 channels in an array. 0.1 M KCl was used as running liquid. A pair of Ag/AgCl microelectrodes linked to Keithley SCS 4200 was applied as detector for channel resistance analysis.

The geometry of the PDMS channel is characterized by laser interferometry. The results are shown in figure S4 A1 & A2. It is different from the glass mold because of the elastomeric origin of the PDMS. Boundary collapsing occurs to the structure, rendering a smaller structure than the glass mold.