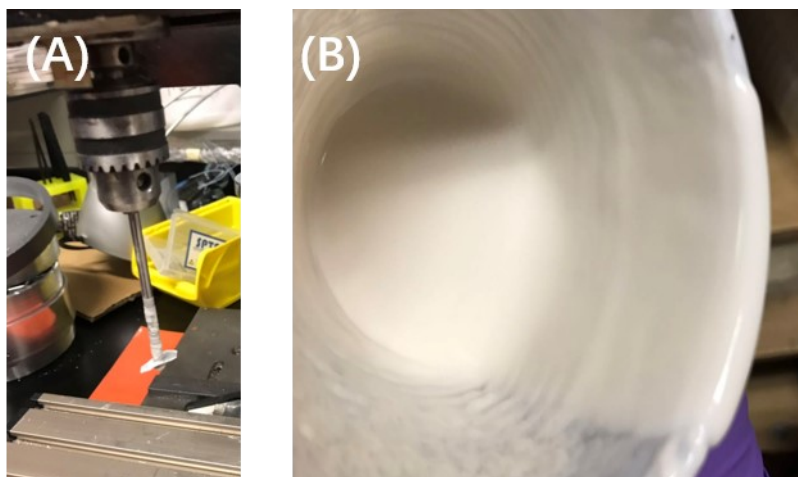


# A Reinforced PDMS Mold for Hot Embossing of Cyclic Olefin Polymer in the Fabrication of Microfluidic Chips

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**Figure S1.** Images of the homemade stirrer (A) and (B) stirred mixture.

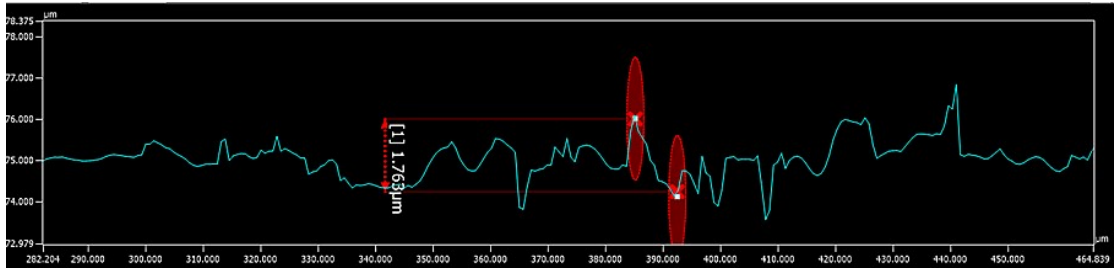
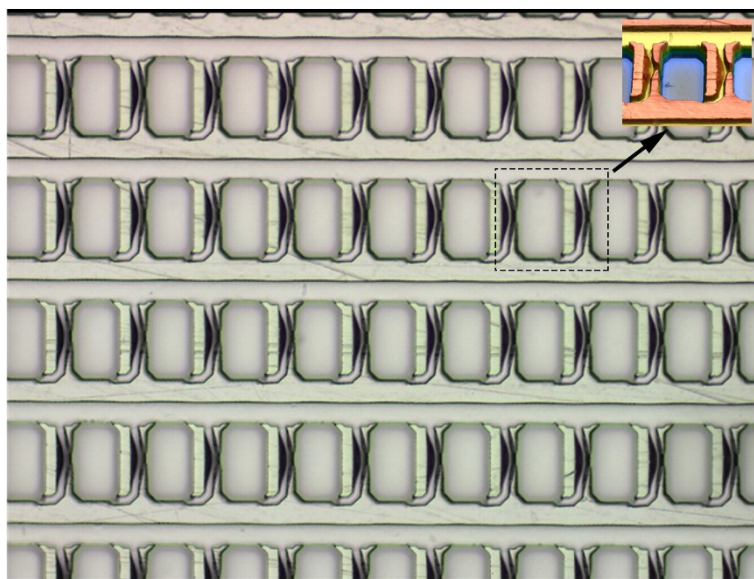
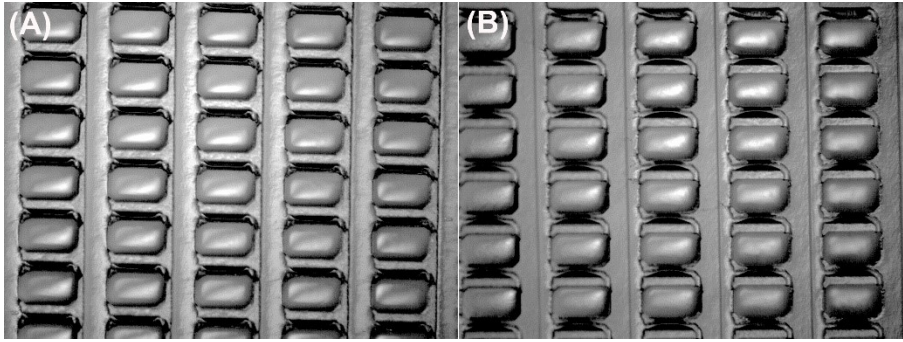


Figure S2. Surficial roughness measurement from Figure 1 D.



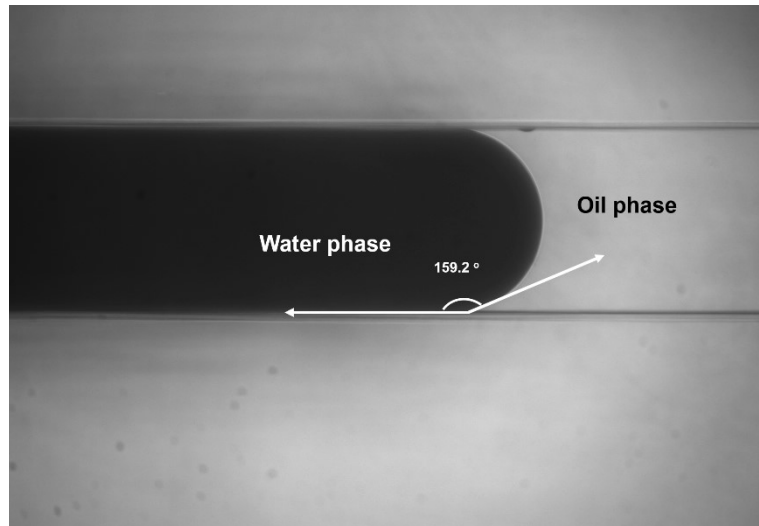
**Figure S3.** Image of a COP sheet following hot embossing with a pure PDMS mold (without investment powder) in an aluminum frame, showing poorly formed (curved and cracked) draining channels (located to the right of each well).



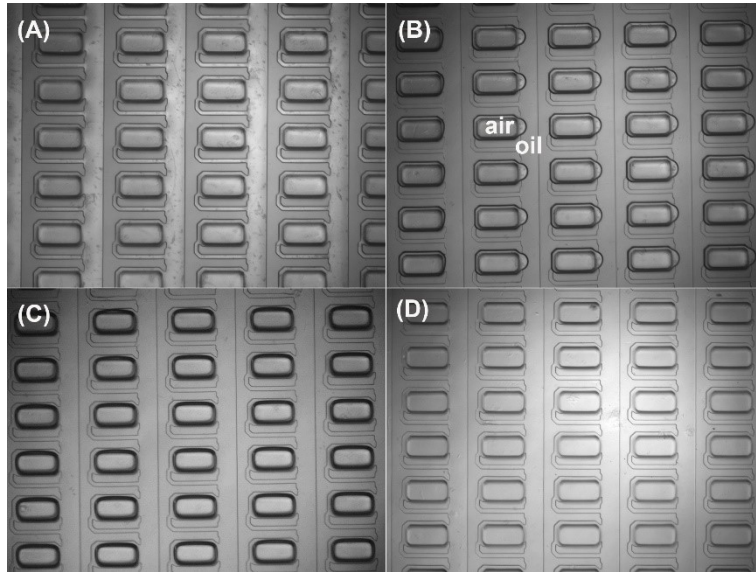
**Figure S4.** The images of the embossed COP sheet using PDMS mold with 20% SiO<sub>2</sub> nanoparticles (A, 50 nm) and 50% ZrO<sub>2</sub> nanoparticles (B, 200 nm).



**Figure S5.** Image of a COP sheet following hot embossing with a PDMS-investment powder mold without an aluminum frame, showing distortion of fine features: drainage channels are at a  $6.5^\circ$  angle from perpendicular to the main channel.

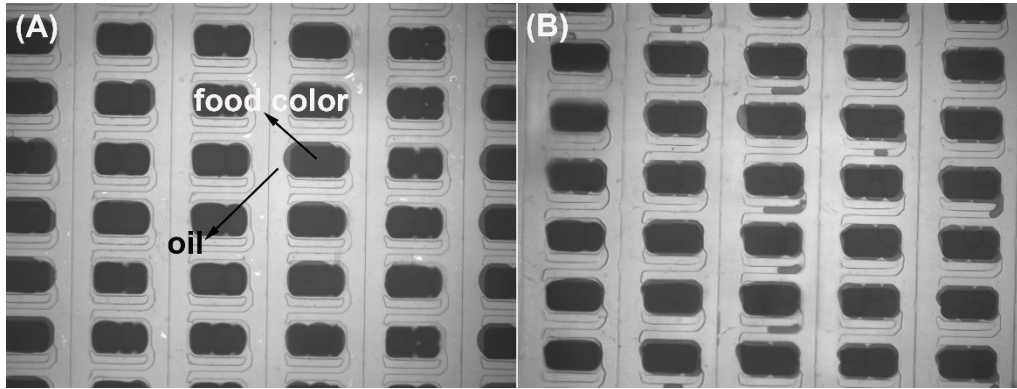


**Figure S6.** Contact angle of oil and water phases in a COP channel.



**Figure S7.** Images of oil prefilling process in COP chip. (A) Empty chip before pipetting oil into the inlet. (B) Pipetted oil mix into the inlet reservoir and kept undisturbed for 5 min, the oil could flow into the main channel and draining channel spontaneously because of the hydrophobic surface. (C) 20 min after oil injection into the inlet. (D) Put the chip into a vacuum desiccator, followed by applying a vacuum pump to degas the chip for 5 min.





**Figure S8.** Images of COP chip (A) before and (B) after heating at 72 °C for 5 h, using water with food color for contrast, showing the stability of the well oil-water interface.