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

Supplementary Material

Table A. Dimensions of the relevant geometrical parameters for the eight different T-junction microchannels. Given geometrical parameters are described in Fig. 2(b)-(c).

Case	w_m (μm)	w_s (μm)	h (μm)	t (μm)
1	100	50	45	17 on glass slide
2	100	50	45	17
3	100	50	45	10
4	100	50	45	5
5	200	100	45	17 on glass slide
6	200	100	45	17
7	200	100	45	10
8	200	100	45	5

Table B. Mechanical properties of thin membranes. The Young's modulus (E) is measured by an Agilent Nano Indenter G200. The bending stiffness B is calculated according to the equation, $B = EI$ where I is the second moment of area; $I = t^3 w_m/12$ for a thin film of thickness t and width w.

Case	w_m (μm)	t (μm)	E (Pa)	B (Nm^2)
1	100	17 on glass slide	7.17×10^{10}	4.8×10^{-3} ‡
2	100	17	6.00×10^{6}	2.5×10^{-13}
3	100	10	6.98×10^{6}	5.8×10^{-14}
4	100	5	7.17×10^{6}	7.5×10^{-15}
5	200	17 on glass slide	7.17×10^{10}	9.6×10^{-3} ‡
6	200	17	6.0×10^{6}	4.9×10^{-13}
7	200	10	6.98×10^{6}	1.6×10^{-13}
8	200	5	7.17×10^{6}	1.5×10^{-14}

‡ For cases 1 and 5, to calculate the bending stiffness, we assume that the dominant material is the glass slide where the thickness is 2 mm. Therefore, the Young's modulus of the glass slide is used for the two cases.

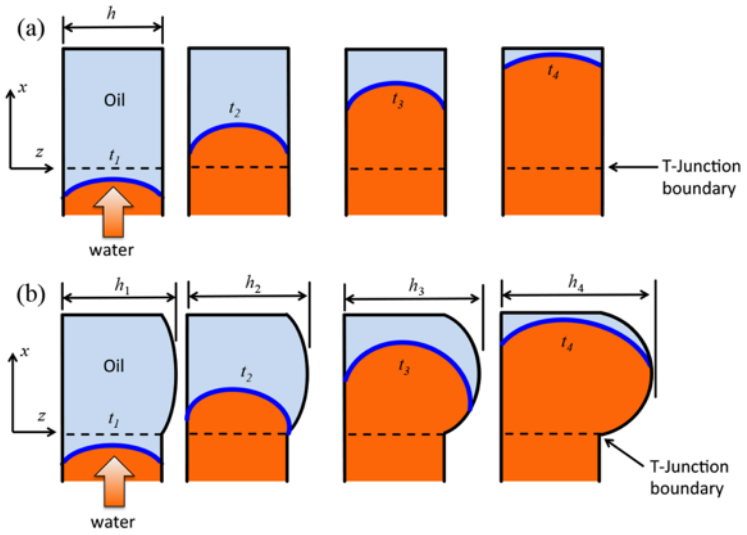

Fig. A. Comparison of schematics of the liquid-liquid interface time evolution in the x-z plane at the T-junction. (a) The conventional rigid T-junction and (b) the soft wall T-junction. The blue solid lines indicate the water-oil interface.