Calculation of theoretically maximal enrichment

The enrichment, η, is defined as $\eta=\varepsilon_1/\varepsilon_0$ where ε_1 is the ratio between the desired cells and the unwanted cells after sorting and ε_0 is the ratio before sorting.

The theoretically maximal enrichment, η_{max}, is defined as the enrichment that could be achieved if the only limitation to the enrichment were the occasional co-encapsulation event of a desired cell together with an unwanted cell in the same droplet as governed by the Poission encapsulation. Baret et al. 2009, showed that η_{max} can be derived as:

$$\eta_{max} = \frac{1}{1-e^{-\lambda\varepsilon_0/(1+\varepsilon_0)}}$$

Where λ is the average number of cells per droplet. With ε_0=0.25 and λ=0.4 the η_{max} could be calculated as:

$$\eta_{max} = \frac{1}{1-e^{-0.4\cdot 0.25/(1+0.25)}} = 13.0$$

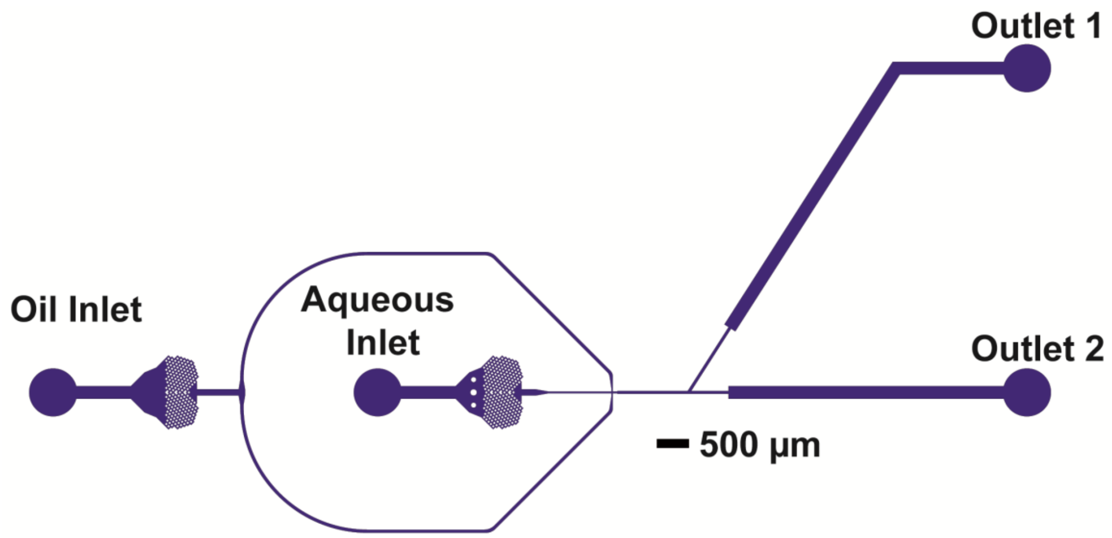

Figure S1: Schematic of the droplet generation circuit as seen from above. The channels are 30 µm deep.

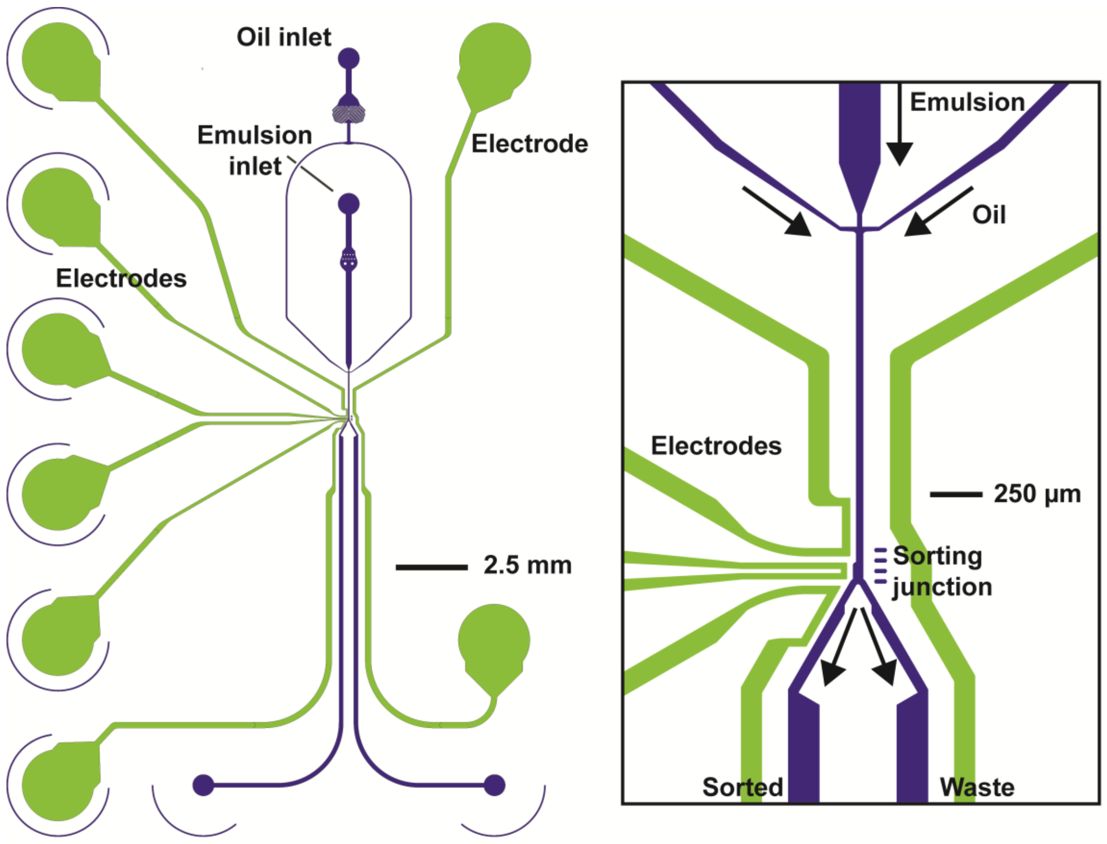

Figure S2: Schematic of the droplet sorter circuit (circuit two) as seen from above. Channles are 30 μm deep. Blue indicates microfluidic channels; green indicates electrode channels, which are filled with liquid solder in chip fabrication process.