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

Modulation of aspect ratio for complete separation in an inertial microfluidic channel

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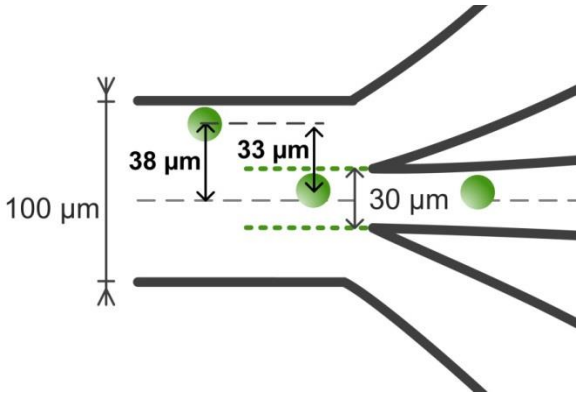

ESI Fig. 1 In separation of 20 µm particles, as long as they migrate into the region bounded by the green dashed line, they will flow into the central outlet branch. Thus, thus the migration distance from the full equilibration position near sidewall (38 µm from channel centerline) is 33 µm.

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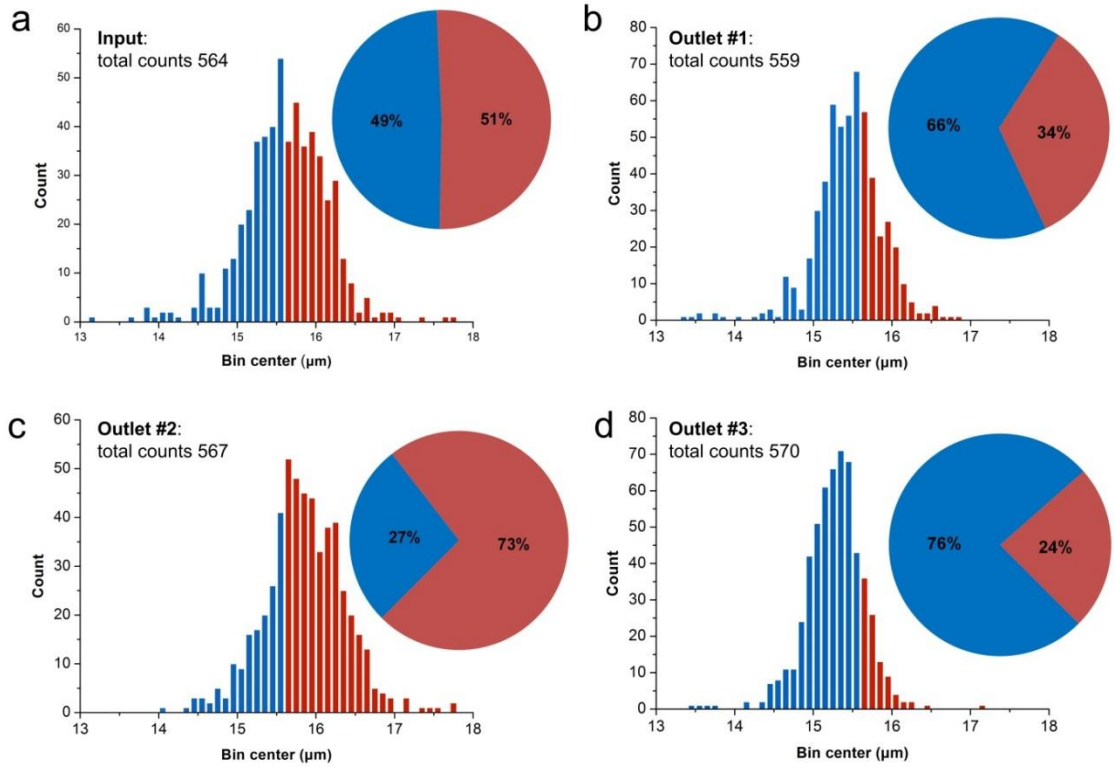

ESI Fig. 2 Sensitivity testing using 15.5 μm diameter particles. (a) Size distribution of the particle suspension at the input, illustrating the mean diameter of 15.5 μm with a standard deviation of 1.5 μm. (b-d) Size distributions of particles collected at outlets #1, #2 and #3, respectively. Pie chart insets illustrate population fraction of particles with sizes below and above the cutoff size of $a_{cutoff} \sim 15.65$ μm. Bin size is 0.1 μm.

Methods (for size measurements and counting):
We used brightfield images of samples to obtain the size distributions. The 15.5 μm diameter particles (BangsLab, Inc.) were suspended in deionized water to reach the volume fraction of 0.025%. Particle suspension was injected into the device at input $Re = 40$ and sample from each outlet was collected. A sample from the input was also collected. Samples were centrifuged and re-suspended to re-concentrate for counting. A ~20 μL volume of each sample was pipetted onto glass slide and particles were permitted to settle down for 2 min prior to imaging with a 10× objective in bright field. Measurements particle size and counts were done using cell count module in Image Pro Plus (ver. 7). Multiple images from each input were analyzed until the total number of counted particles exceeded 500. Images with less than 25 particles were discarded. We used OriginLab (ver. 8.1) to process the collected data and plot the results. Note that the size distribution obtained using this approach does not accurately reflect the concentration.