

Laminar flow analysis for microchannel networks aiming hydrodynamic filtration of particle sorting

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The accurate analysis of laminar flow is crucial to sort in microchannel. We performed flow-based sorting of particles by using microfluidic chips based on hydrodynamic filtration (HDF) principle. The HDF is a kind of passive separation realized by hydrodynamic effects combined with the fluid interaction with the microfluidic channel, instead of utilizing external forces. A precise estimation of the fractioned boundary width of the focused stream is necessary to design the optimal channel. In this study we design hydrodynamic filtration (HDF) microchip with the parameters rigorously determined by the complete analysis of laminar flow for flow fraction and complicated networks of main and multi-branched channels for particle sorting. Our results provide useful information of fluid flows in microfluidic devices to accomplish highly efficient particle counting and sorting.