

The Characteristic of Fluid and Laminar Flow Mixing in a Piezoelectric Diffuser/Nozzle-based Micropump for Microfluidic Applications

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Diffuser/nozzle-based micropump employs two diffuser/nozzle elements to rectify the flow instead of conventional check valves. Because of the principle of micropump, it makes bi-directionally oscillating flow and this bi-directional flow causes the circular flow in micropump chamber. We numerically simulate the flow in a diffuser/nozzle-based micropump to observe the flow pattern in micropump chamber. Furthermore, we test that laminar flow mixing occurs in micropump chamber because the circular flow that is observed by simulation can enhance mixing of different fluids. From the results of this study, it can be thought that diffuser/nozzle-based micropump has ability to mix two or more laminar flows. If pumping and mixing could be achieved at the same time, it would be expected to reduce the number of components in microfluidic system.