

MicroFluidic Oscillator: A Technical Solution for MicroMixture

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Abstract: The diffusion flux given by the Fick's law characterizes the mixing rate. A passive mixing strategy is proposed to enhance mixing of two fluids through perturbed jet flow. A numerical study of passive mixers has been presented. This paper is focused on the modeling of a micro-injection system composed of a passive amplifier without mechanical part. The micro-system modeling is based on geometrical oscillators. An asymmetric micro-oscillator design based on a non-stable fluidic amplifier is proposed [2,7]. The characteristic size of the channels is generally about a few hundred of microns. The numerical results indicate that the mixing performance can be as high as 99 % within a typical mixing chamber of 0.20 mm diameter inlet and 2.0 mm distance of nozzle - splitter. In addition, the results confirm that self-rotation in the circular mixer significantly enhances the mixing performance. The novel micro mixing method presented in this study provides a simple solution to mixing problems in microsystem.

Keywords : Micro oscillator, modeling, Micro mixture, diffusion, Size effect.