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MicroFluidic Oscillator: A Technical Solutionfor MicroMixture

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Abstract: The diffusion flux given by the Fick's law characterizethe mixing rate. A passive mixingstrategy is proposed to enhance mixing of two fluids through perturbed jet low. A numerical studyof passive mixers has been presented. This paper is focused on the modeling of a micro-injectionsystems composed of passive amplifier without mechanical part. The micro-system modeling isbased on geometrical oscillators form. An asymmetric micro-oscillator design based on amonostable fluidic amplifier is proposed [2,7]. The characteristic size of the channels is generallyabout a few hundred of microns. The numerical results indicate that the mixing performance can beas high as 99 % within a typical mixing chamber of0.20 mm diameter inlet and 2.0 mm distance ofnozzle - spliter. In addition, the results confirm that self-rotation in the circular mixer significantlyenhances the mixing performance. The novel micro mixing method presented in this study providesa simple solution to mixing problems in microsystem.

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