

Design of High Performance Micromixer for Lab-on-chip (LOC) Applications

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Abstract

This paper presents the design and simulation of micromixer for lab-on-chip (LOC) applications. There are two types of micromixers: one is an active micromixer and another one is a passive micromixer. This paper investigates microfluidic flow characterization and mixing rate of two fluids in a micro-channel. Understanding the microfluidic flow at the micro channel is a develop methods of mixing fluids for LOC applications. These type of micromixers are mostly used in medical diagnosis and it have been made possible through research in this field. Compare to conventional diagnosis method laboratories, these micro level mixers are biocompatible devices, minimally invasive, better performance, fast and well mixing in short time duration due to miniaturization along with cost reduction.

Prior to fabrication of high performance micromixer LOC applications, the design should be simulated using suitable simulation physics module tool.

COMSOL® is very helpful to creating or importing the geometry of the module and performing various studies to obtain velocity and concentration profiles to decide the range of measurement, time taken for the mixing rate and reaction time.

The CFD Module of COMSOL® will be used to solve and analyse the mixing of two different viscosity and density liquids using the y channel micromixer.