

Consideration of obstacles number in designing passive micromixer for laminar mixing flow

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ABSTRACT

Micromixer can be divided into two categories which are active micromixer and passive micromixer. Due to simple fabrication technology and easy implementation in a complex microfluidic system, obstacle based passive micromixer will be the focus in this work. A passive micromixer is depends on low Reynolds number and the channel geometry for mixing effectiveness. In this work, three designs of obstacle based Y-micromixer were designed and evaluated. The micromixers are Y shape with obstacle SAR technique micromixer, Y shape with internal rib micromixer, Y shape with zigzag obstacle micromixer, and Y shape with mirrored zigzag obstacle micromixer. These micromixers has 237 μ m channel length, 30 μ m inlet length, 900 between inlets ports, width and depth are 30 μ m each. The fluids used for mixing were blood which has 3.0×10^{-3} kg/ μ ms of viscosity and glycerin which has high viscosity than blood (1.49×10^{-3} kg/ μ ms). The fluids used to evaluate the differences in term of their visual performance based image's standard deviation by plotting the graph and mixing efficiency by calculation. Based on these evaluations, the Y shape with zigzag obstacle micromixers is the best micromixer design with the highest mixing efficiency of 100% at the outlet of the channel.

Keywords: *passive micromixer, laminar flow, obstacle, low Reynold Number*

Amplified Spontaneous Emission (ASE) analysis of Erbium Doped Fiber Amplifier (EDFA)

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ABSTRACT

The Erbium Doped Fiber Amplifier (EDFA) is an amplifier component that is widely used in optic application nowadays. This study is about EDFA characteristics in terms of Amplified Spontaneous Emission (ASE). Study results are analyzed and conclusion has been done. As a result, study that has been carried out is able to explain EDFA characteristics. Objective of this study is to investigate principles and characteristics of EDFA. EDFA usage can be practiced as well as to strengthen the concepts and knowledges about EDFA. Through this study, measurement and analysis can be done, thus can be related with pump and signal power. Results that have been obtained can be related with model that has been presented. Study is done by experiment set up in lab. During experiment set up, forward pumping configuration is used. Measurement and observation have been done; data were collected, analyzed and came with conclusion. Study shows that results that have been obtained from experiment and measurement are tally with theory. Therefore, results that have been obtained proved the theories that have been found from reference materials such as books and etc. EDFA gives big contribution in optic communication development for present and future. EDFA is the best choice if compared with other amplifiers.

Keywords: *Erbium Doped Fiber Amplifier (EDFA), Amplified Spontaneous Emission (ASE), fiber optic.*