NEW STATIC AND PASSIVE FLUID MICROMIXER

Description:

A micromixer is an apparatus for achieving the mixing of two fluid materials on a micrometer scale. Static micromixers have a clear advantage over dynamic ones, since, by not having moving parts, it is possible to achieve significant reductions in the size of the parts that compose it and, with this, the possibility of integrating them into other systems, such as exchangers. heat and miniature reactors. The present invention refers to a static micromixer that can be manufactured on a micrometer scale with some ease. Given the micrometric size of the device, the necessary volume of fluids to be mixed is very small, as well as their residence time in the device, which translates into a very low response time. Due to their size, they are easy to transport, therefore allowing the process for which it has been designed to be carried out efficiently and quickly in-situ, without the need to transport the fluids involved. Specifically, the patented invention consists of a static micromixer where the main fluid circulates through a series of microchannels and the secondary fluid, whose flow rate can be very different from the main one, is injected into the main fluid, obtaining high mixing efficiency. Through the joint action of two or more static components connected to each other in a reduced space, additional possibilities of optimizing the mixing of fluids are achieved in processes both with and without chemical reaction.

Keywords:

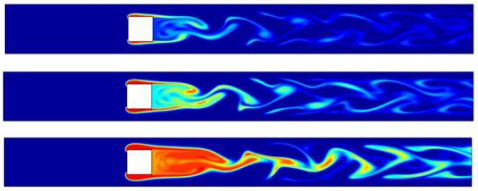
Micromixer, Vortices, Microfluidics, Fluids

Sectors:

Biotechnology, Health, Engineering, Environment and Energy, Chemistry

Areas:

Health Sciences, Industrial, Instrumentation, Biotechnology, Chemistry, Technological Improvements



Advantages:

This new micromixer has the following advantages: - Simplicity in manufacturing: Dynamic mixers have the disadvantage of having moving parts, which makes it considerably difficult to reach micrometric scales in their manufacture. The present invention is about a static mixer where the mixing is carried out without using moving parts, which favors its construction, reliability and durability. - Low cost: Due to the fact that it is a passive mixer, without the need to use additional energy sources to that of the impulsion of the fluids themselves, and due to the geometric simplicity of the micromixer, the resulting system is of low cost. - Adjustable secondary flow: allows to achieve high efficiency with low flow of the second fluid to be mixed, which makes it especially interesting in those processes in which the flow rates of the two fluids are not the same.

Uses and Applications:

The present invention finds application in the field of developing new micrometric-scale tools in engineering, biochemistry, medicine and pharmacology. Some examples of micromixer applications include wastewater treatment and chemical processing. They can also be used in refineries, for example for the desalination of crude oil. In polymer production, static mixers can be used for polymerization reactions or for mixing liquid additives. In biochemistry and biotechnology, micromixers have application for the analysis and synthesis of DNA, for the supply of drugs, to carry out medical analyzes, etc.

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