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Sommario/riassunto

Micro-total analysis systems and lab-on-a-chip platforms are widely used for sample preparation and analysis, drug delivery, and biological and chemical syntheses. A micromixer is an important component in these applications. Rapid and efficient mixing is a challenging task in the design and development of micromixers. The flow in micromixers is laminar, and, thus, the mixing is primarily dominated by diffusion. Recently, diverse techniques have been developed to promote mixing by enlarging the interfacial area between the fluids or by increasing the residential time of fluids in the micromixer. Based on their mixing mechanism, micromixers are classified into two types: active and passive. Passive micromixers are easy to fabricate and generally use geometry modification to cause chaotic advection or lamination to promote the mixing of the fluid samples, unlike active micromixers, which use moving parts or some external agitation/energy for the mixing. Many researchers have studied various geometries to design efficient passive micromixers. Recently, numerical optimization techniques based on computational fluid dynamic analysis have been proven to be efficient tools in the design of micromixers. The current Special Issue covers new mechanisms, design, numerical and/or experimental mixing analysis, and design optimization of various passive micromixers.