

Abstract

# Optimization of Variable Radius Spiral Micromixer <sup>†</sup>

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A novel single-layer passive mixer is designed which takes advantage of gradually increasing the radius of curvature of a spiral micro mixer. The mixing efficiency is further optimized via iterations on key geometric parameters using numerical simulations. Numerical results indicate that the optimized mixer has better mixing efficiency than the conventional constant radius of the curvature spiral channel for a wide range of the Reynolds number. The spiral shape guarantees the best surface area occupation and provides the maximum mixing length with a reduced pressure drop. According to the numerical results, the mixing efficiency can reach up to 99.5% at the outlet and it is improved by 20% compared to constant radius spiral micromixers. The proposed micromixer can be manufactured using a wide range of processes since its geometry is embedded on a single layer.

**Conflicts of Interest:** The authors declare no conflict of interest.



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