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# Numerical Analysis of Fluid Mixing in Three Split and Recombine Micromixers at Different Inlets Volume Ratio

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**Abstract :** Numerical simulation were carried out to study the mixing of miscible liquid at different inlets volume ratio (1 to 3) within two existing mixers namely Chain, Tear-drop and one new “C-H” mixer. The new passive C-H micromixer is developed based on split and recombine principles, combining the operation concepts of known Chain mixer and H mixer. The mixing performances of the three micromixers were predicted by a preliminary numerical analysis of the flow patterns inside the channel in terms of the segregation or distribution of path lines. Afterward, the efficiency and the pressure drop were investigated numerically, taking into account species transport. All numerical calculations were computed at a wide range of Reynolds number from 1 to 100. Among the presented three micromixers, tear-drop provides fairly good efficiency except in the middle range of Re numbers but has high-pressure drop. In addition, inlets flow ratio has a significant influence on efficiency, especially at the Re number range of 10 to 50, Moreover maximum increase of efficiency is almost 10% when inlets flow ratio is increased by 1. Chain mixer presents relatively low mixing efficiency at low and middle range of Re numbers (5≤Re≤50) but has reasonable pressure drop. Furthermore, Chain mixer shows almost no dependence on inlets flow ratio. Whereas, C-H mixer poses excellent mixing efficiency (more than 93%) for all range of Re numbers and causes the lowest pressure drop, On top of that efficiency has slight dependency on inlets flow ratio. In addition, C-H mixer shows respectively about three and two times lower pressure drop than Tear-drop and Chain mixers.

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