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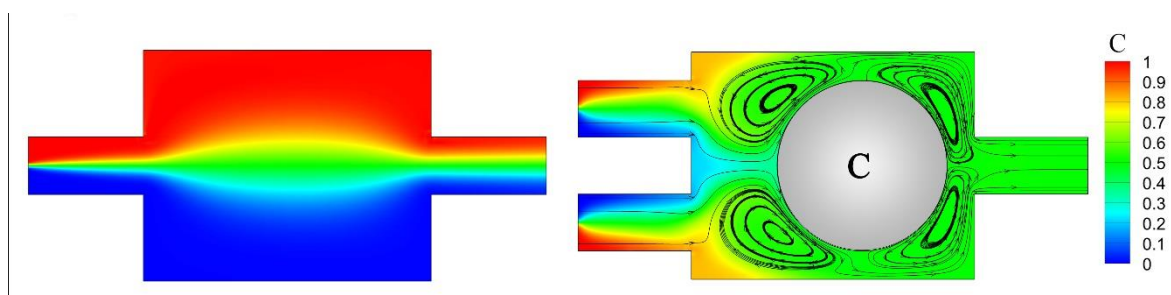
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Graphical abstract



Highlights:

- Investigation of parameters influencing formation of micro-vortices
- study of conducting particle's role in mixing efficiency
- A comprehensive performance study of electrokinetic micro-mixer

Abstract

Mixing different species to produce a homogeneous solution is of great interest, affecting the performance of lab-on-a-Chip (LOC) devices. Because of the laminar characteristic of the flow field in microchannels, the LOC devices usually suffer from poor mixing efficiency. This study numerically investigates the enhancement of mixing efficiency in a microchannel using a conductive micro-particle. For this, the governing equations of the induced-charged electrokinetics based on the thin EDL assumption are solved by the finite volume method to provide a comprehensive parametric

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