

Numerical investigation of mixing in serpentine microchannels

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Abstract

A numerical model is developed in order to study the extent of mixing of fluids in serpentine microchannel, and a parametric study involving geometric and physical parameters like waviness of the micromixer (α), wavelength of the micromixer (γ), Reynolds Number (Re). Two-dimensional numerical model was developed in OpenFOAM, version 2012 and grid sensitivity analysis was performed. Further, simulations were done on the grid independent mesh at various operating conditions and geometric parameters. The work is also validated with the Mondal *et al.* 2019 study. Pressure drop, tracer concentration and velocity contours were studied for Reynolds numbers of 1, 5, 25, 50 and 100.

1 References

- Mondal, B., Mehta, S., Patowari, P., Pati, P.(2019). Numerical study of mixing in wavy micromixers: comparison between raccoon and serpentine mixer. *Chemical Engineering and Processing - Process Intensification*, 136:44-61.