Asia-Pacific Journal of Chemical Engineering - Decision on Manuscript ID APJ-21-0455

Asia-Pacific Journal of Chemical Engineering <onbehalfof@manuscriptcentral.com>

Mon 10/01/2022 10:39

To:Khairul Fikri b Tamrin <tkfikri@unimas.my>

09-Jan-2022

Dear Dr. Tamrin,

I write you in regard to Manuscript ID APJ-21-0455 entitled "Enhanced fluid mixing in reversed multi-staged Tesla micro-mixer" which you submitted to Asia-Pacific Journal of Chemical Engineering.

To ensure the quality of the journal, we have conducted a very rigorous reviewing process. In view of the comments of the referee(s) found at the bottom of this letter, your manuscript has been declined for publication in Asia-Pacific Journal of Chemical Engineering.

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Thank you for considering Asia-Pacific Journal of Chemical Engineering for the publication of your research.

Sincerely,

Dr. Hong Mei Yao
Editor
Asia-Pacific Journal of Chemical Engineering

==========Referee(s)' Comments to Author:==========

Reviewing: 1

This study proposes a 10-stage micro-Tesla valve micromixer and studies experimentally the mixing index at different valve stages for Re = 5–140.The proposed design achieves a mixing index of 74% for Re = 20 at 10th stage valve and for Re > 40, chaotic advection amplified intensively to increase mixing index even at lesser valve stage. The proposed design performance have been compared with previous designs in the literature.

The paper cannot be published as the design is not novel and there are many similar designs[1–3]. The author has not mentioned the novelty of this design. Furthermore, the discussion on the result does not add any new information to the readers.

1. Wang, C.-T.; Chen, Y.-M.; Hong, P.-A.; Wang, Y.-T. Tesla Valves in Micromixers. International Journal of Chemical Reactor Engineering 2014, 12, 397–403, doi:10.1515/IJCRE-2013-0106.

2. Wang, X.; Yang, L.; Sun, F. CFD Analysis and RSM Optimization of Obstacle Layout in Tesla Micromixer. International Journal of Chemical Reactor Engineering 2021, 19, 1045–1055, doi:10.1515/IJCRE-2021-0087.

3. WENG Xiangyu, YAN Shenghu, ZHANG Yue, LIU Jianwu, SHEN Jiefa. Design, simulation and experimental study of a micromixer based on Tesla valve structure[J].Chemical Industry and Engineering Progress, 2021, 40(8): 4173-4178.

Reviewing: 2

This manuscript studied the fluid mixing performance of reversed 10-stage micro-Tesla valves. At higher Reynolds number regime (Reynolds number ≤ 40), a steady incremental mixing was observed as the flow passes by each stage in the reverse micro-Tesla valve. While at higher Reynolds number regime (Reynolds number > 40) remarkably, an enhanced early mixing at stage 1 is noted. The authors also discussed the reasons for these phenomena, which could provide a guide for the future applications. I think this manuscript could be accepted by the Asia-Pacific Journal of Chemical Engineering after major revision. Comments and questions are listed below.

(1) The text in Figure 1 should be adjusted for clarity.

(2) The parentheses of formulas 1, 2 and 3 should be adjusted to one line.

(3) For Table 1, “368 x 368” should be corrected into “368×368”.

(4) The experiments in the manuscript should be repeated for at least three times. And the error bars in Figures 6-10 should be added in the manuscript.

(5) What are the differences between this work with the Reference “Development of a 3D-Tesla Micromixer for Bio-Applications”? Why the mixing index could reach 100% in the 4th stage valve when the Reynolds number was 40, while the mixing index was ~40% in the reference at the same condition?

(6) The Conclusions section should indicate the limitations of this work and the prospects for future work.
