

Author's Accepted Manuscript

On the Design of Miniature Parallel-Plate
Differential Mobility Classifiers

Thamir Alsharifi, Da-Ren Chen



PII: S0021-8502(18)30046-6
DOI: <https://doi.org/10.1016/j.jaerosci.2018.04.003>
Reference: AS5271

To appear in: *Journal of Aerosol Science*

Received date: 12 February 2018
Revised date: 26 March 2018
Accepted date: 9 April 2018

Cite this article as: Thamir Alsharifi and Da-Ren Chen, On the Design of Miniature Parallel-Plate Differential Mobility Classifiers, *Journal of Aerosol Science*, <https://doi.org/10.1016/j.jaerosci.2018.04.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

On the Design of Miniature Parallel-Plate Differential Mobility Classifiers

Thamir Alsharifi^{1,2}, Da-Ren Chen^{1*}

¹Particle Laboratory, Department of Mechanical and Nuclear Engineering, Virginia Commonwealth University, 401 West Main Street, Richmond, VA 23284

²Al-Khwarizmi College of Engineering, University of Baghdad, Iraq.

*Corresponding author: Da-Ren Chen, dechen3@vcu.edu

ABSTRACT

The effect of design parameters of particle classification channel on the performance of miniature parallel-plate differential mobility classifier (i.e., mini-plate DMCs) was numerically investigated in this work to establish the general design guideline for compact parallel-plate DMCs. The design parameters under consideration were the aspect ratio and the cross-sectional area of the particle classification channel, the percentage of aerosol inlet and exit slit opening (relative to the full width of the classification channel), and the aerosol injection angle. COMSOL Multiphysics 5.3[®] and MATLAB R2016a[®] were used in this numerical modeling. Prior to the parametric study, our modeling was validated by comparing the numerical result with the experimental data published by Liu and Chen (2016a). Our study shows that the performance of mini-plate DMCs deteriorated as the channel aspect ratio reduced to a value less than eight. The opening percentage of aerosol inlet and exit slits was also an important factor for the mini-plate DMC design. The peak of DMC transfer function decreased as the aerosol opening

Download English Version:

<https://daneshyari.com/en/article/8865248>

Download Persian Version:

<https://daneshyari.com/article/8865248>

[Daneshyari.com](https://daneshyari.com)