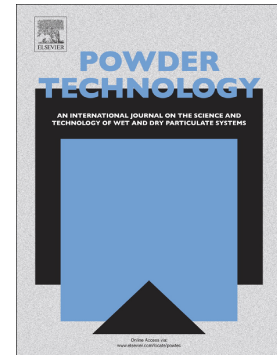


Accepted Manuscript

Numerical study on fine-particle charging and transport behaviour in electrostatic precipitators

Ming Dong, Fei Zhou, Yuxuan Zhang, Yan Shang, Sufen Li



PII: S0032-5910(18)30159-1
DOI: [doi:10.1016/j.powtec.2018.02.038](https://doi.org/10.1016/j.powtec.2018.02.038)
Reference: PTEC 13214
To appear in: *Powder Technology*
Received date: 3 August 2017
Revised date: 24 January 2018
Accepted date: 12 February 2018

Please cite this article as: Ming Dong, Fei Zhou, Yuxuan Zhang, Yan Shang, Sufen Li , Numerical study on fine-particle charging and transport behaviour in electrostatic precipitators. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Ptec(2017), doi:[10.1016/j.powtec.2018.02.038](https://doi.org/10.1016/j.powtec.2018.02.038)

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 proof before it is published in its final 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.

Numerical study on fine-particle charging and transport behaviour in electrostatic precipitators

Ming Dong*, Fei Zhou, Yuxuan Zhang, Yan Shang, Sufen Li

Key Laboratory of Ocean Energy Utilization and Energy Conservation of Ministry of Education, School of Energy and Power Engineering, Dalian University of Technology, Dalian 116024, China;

Corresponding author: Ming Dong, School of Energy and Power Engineering, Dalian University of Technology, No. 2 Linggong Road, Ganjingzi District, Dalian, Liaoning, 116024, People's Republic of China, Tel:+86-0411-84762312, Fax:+86-0411-84708460

E-Mails: dongming@dlut.edu.cn; 18042681196@163.com; 13238040806@163.com; shangyan@dlut.edu.cn; lisuf@dlut.edu.cn;

Abstract

In this work, a numerical study on the charging and transport of fine particles has been carried out based on wire-plate electrostatic precipitators (ESPs) with multiple wire electrodes. The effect of the applied wire voltage, inlet height, and wire spacing on particle charging and transport, and the influence of the precipitator structure on particle trapping are analysed in detail. Results indicate that a voltage increase in the high voltage range improves the particle-trapping efficiency. However, the Brownian diffusion causes the particle fluctuation, but it doesn't change the direction of main movement. Particles injected into the precipitator at the channel centre are influenced most intensively, whereas particles injected at approximately 5 mm from the centre of the precipitator exhibit the poorest particle-trapping ability. An increased wire spacing enhances particle trapping, within a certain range, and a larger particle size causes an even more obvious enhancement. Furthermore, changing the discharge-electrode arrangement shows a much greater effect on the charging and transport behaviour of particles in the model of M3, which has the highest trapping efficiency.

Keywords: Electrostatic precipitators (ESPs); Electrostatic precipitators structure; Particle trapping; Wire spacing.

Download English Version:

<https://daneshyari.com/en/article/6675026>

Download Persian Version:

<https://daneshyari.com/article/6675026>

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